Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Final Implementation Report, Fiscal Year 2014 Work Plan and Budget, Fiscal Year 2012 Accomplishment Report

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

June 2013

Lower Colorado River Multi-Species Conservation Program Steering Committee Members

Federal Participant Group

Bureau of Reclamation
U.S. Fish and Wildlife Service
National Park Service
Bureau of Land Management
Bureau of Indian Affairs
Western Area Power Administration

Arizona Participant Group

Arizona Department of Water Resources
Arizona Electric Power Cooperative, Inc.
Arizona Game and Fish Department
Arizona Power Authority
Central Arizona Water Conservation District
Cibola Valley Irrigation and Drainage District
City of Bullhead City
City of Lake Havasu City
City of Mesa
City of Somerton
City of Yuma
Electrical District No. 3, Pinal County, Arizona
Golden Shores Water Conservation District
Mohave County Water Authority
Mohave Valley Irrigation and Drainage District
Mohave Water Conservation District
North Gila Valley Irrigation and Drainage District
Town of Fredonia
Town of Thatcher
Town of Wickenburg
Salt River Project Agricultural Improvement and Power District
Unit "B" Irrigation and Drainage District
Wellton-Mohawk Irrigation and Drainage District
Yuma County Water Users' Association
Yuma Irrigation District
Yuma Mesa Irrigation and Drainage District

Other Interested Parties Participant Group

QuadState Local Governments Authority
Desert Wildlife Unlimited

California Participant Group

California Department of Fish and Wildlife
City of Needles
Coachella Valley Water District
Colorado River Board of California
Bard Water District
Imperial Irrigation District
Los Angeles Department of Water and Power
Palo Verde Irrigation District
San Diego County Water Authority
Southern California Edison Company
Southern California Public Power Authority
The Metropolitan Water District of Southern California

Nevada Participant Group

Colorado River Commission of Nevada
Nevada Department of Wildlife
Southern Nevada Water Authority
Colorado River Commission Power Users
Basic Water Company

Native American Participant Group

Hualapai Tribe
Colorado River Indian Tribes
Chemehuevi Indian Tribe

Conservation Participant Group

Ducks Unlimited
Lower Colorado River RC&D Area, Inc.
The Nature Conservancy

Lower Colorado River Multi-Species Conservation Program

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Lower Colorado River
Multi-Species Conservation Program
Bureau of Reclamation
Lower Colorado Region
Boulder City, Nevada
http://www.lcrmscp.gov

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Acronyms

ACEC	Area of Critical Environmental Concern
AGFD	Arizona Game and Fish Department
AMP	Adaptive Management Program
ASU	Arizona State University
BEVI	Arizona Bell's Vireo
BHCO	Brown-headed Cowbird
BLM	Bureau of Land Management
BLRA	California Black Rail
BO	Biological and Conference Opinion
BONY	Bonytail
CAP	Central Arizona Project
CAWCD	Central Arizona Water Conservation District
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CLRA	Yuma Clapper Rail
CNWR	Cibola National Wildlife Refuge
CRIT	Colorado River Indian Tribes
CRITER	Colorado River Terrestrial and Riparian Ecosystem
CVCA	Cibola Valley Conservation Area
ELOW	Elf Owl
ESA	Endangered Species Act
FLSU	Flannelmouth Sucker
FMA	Funding and Management Agreement
FY	Fiscal Year
GBBO	Great Basin Bird Observatory
GIFL	Gilded Flicker
GIS	Geographic Information System
GIWO	Gila Woodpecker
GPS	Global Positioning System
HCP	Habitat Conservation Plan
HUCH	Humpback Chub
IA	Implementation Agreement
ISC	Interim Surplus Criteria
ISG	Interim Surplus Guidelines
LCR	Lower Colorado River
LCR MSCP	LCR Multi-Species Conservation Program
LEBI	Western Least Bittern
LMBV	Largemouth Bass Virus
MAPS	Monitoring Avian Productivity and Survivorship
MCWA	Mohave County Water Authority
Metropolitan	The Metropolitan Water District of Southern California
MSHCP	Clark County Multi-Species Habitat Conservation Program
NAU	Northern Arizona University
NDOW	Nevada Division of Wildlife
NEPA	National Environmental Policy Act
NFH	National Fish Hatchery
NFWG	Native Fish Work Group
NPS	National Park Service

NWR	National Wildlife Refuge
PIT	Passive Integrated Transponder
PVER	Palo Verde Ecological Reserve
RASU	Razorback Sucker
Reclamation	Bureau of Reclamation
RFP	Request for Projects
SDCWA	San Diego County Water Authority
SNARRC	Southwestern Native Aquatic Resources & Recovery Center
SFH	State Fish Hatchery
SIA	Secretarial Implementation Agreement
SNWA	Southern Nevada Water Authority
SUTA	Summer Tanager
SWA	State Wildlife Area
SWFL	Southwestern Willow Flycatcher
TL	Total Length
U of A	University of Arizona
UCD	University of California, Davis
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VEFL	Vermilion Flycatcher
WMA	Wildlife Management Area
YAO	Reclamation, Yuma Area Office
YBCU	Yellow-billed Cuckoo
YWAR	Yellow Warbler

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Program Overview

The Lower Colorado River Multi-Species Conservation Program (LCR MSCP) is a partnership of Federal and non-Federal stakeholders, created to respond to the need to balance the use of Lower Colorado River (LCR) water resources and the conservation of native species and their habitats in compliance with the Endangered Species Act (ESA). This is a long-term (50-year) plan to conserve at least 26 species along the LCR from Lake Mead to the Southerly International Boundary with Mexico through implementation of a Habitat Conservation Plan (HCP).

This long-term program will accommodate current water diversions and power production, and optimize opportunities for future water and power development, to the extent consistent with the law. The comprehensive program addresses future Federal agency consultation needs under Section 7 of the ESA, and non-Federal agency needs for endangered species incidental take authorization under Section 10 of the ESA. The program also allows California agencies to meet their obligations under California state law for the California Endangered Species Act (CESA).

Twenty-six Federal or state-listed candidate and sensitive species and their associated habitats, ranging from aquatic and wetland habitats to riparian and upland areas, are covered in the LCR MSCP. Of the 26 covered species, six are currently listed under the Federal ESA. The program addresses the biological needs of mammals, birds, fish, amphibians, and reptiles, as well as invertebrates and plants.

Implementing the LCR MSCP will create at least 8,132 acres of new habitat (5,940 acres of cottonwood-willow, 1,320 acres of honey mesquite, 512 acres of marsh, and 360 acres of backwater) and produce 660,000 subadult razorback suckers (RASU) and 620,000 bonytails (BONY) to augment the existing populations of these fish in the LCR. The LCR MSCP may also participate in the recovery programs for these fish by funding other appropriate activities in lieu of stocking. In addition, the program has a substantial research and monitoring component. The program also establishes a $25 million fund to support projects implemented by land use managers to protect and maintain existing habitat for covered species.

The program's estimated cost in 2003 dollars is $626 million, and will be annually adjusted for inflation. The Bureau of Reclamation (Reclamation) will pay 50 percent of the LCR MSCP cost. The states of California, Nevada, and Arizona will pay the remaining 50 percent, with California paying one-half of the state total, and Nevada and Arizona each paying one-quarter of the state total.

Program Implementation

On April 2, 2005, and April 4, 2005, the Secretary of the Interior, representatives from Arizona, California, and Nevada, and water and power organizations in these states signed the program documents required to implement the LCR MSCP. Program documents for the LCR MSCP include an Environmental Impact Statement/Environmental Impact Report, a Biological Assessment, a Biological and Conference Opinion (2005 BO), an HCP, a Record of Decision, a Funding and Management Agreement (FMA), an Implementation Agreement (IA), and a Section 10 Permit. These documents can be found on the LCR MSCP website.

Implementation of the LCR MSCP also provides compliance for two other actions:

1. In December of 2001, the U.S. Fish and Wildlife Service (USFWS) issued to Reclamation the *Biological Opinion for Interim Surplus Criteria, Secretarial Implementation Agreements, and Conservation Measures on the Lower Colorado River, Lake Mead to the Southerly International Boundary, Arizona, California and Nevada* (2001 BO). Although this is a separate compliance action, the requirements listed in the 2001 BO were integrated into the LCR MSCP and are being implemented by Reclamation in conjunction with the LCR MSCP. Section 8.6 of the FMA states that implementation of the 2001 Biological Opinion conservation and mitigation measures shall be credited against the requirements of the LCR MSCP in accordance with the HCP.

2. On April 4, 2005, Reclamation entered into a Memorandum of Agreement with the California Partners to implement the LCR MSCP in a coordinated manner to help meet the requirements of the CESA permit issued by the California Department of Fish and Wildlife (CDFW). The requirements of that CESA permit are generally consistent with the LCR MSCP HCP. A copy of the Memorandum of Agreement and the CESA Permit are available from the California Partners upon request.

As agreed to in the FMA, Reclamation is the entity responsible for implementing the LCR MSCP over the 50-year term of the program. The FMA also calls for the establishment of a Steering Committee, currently consisting of 57 entities, to provide input and oversight functions in support of LCR MSCP implementation. The Steering Committee includes non-Federal and Federal entities that are receiving ESA coverage through the LCR MSCP, or stakeholders interested in the environment of the LCR. A complete list of Steering Committee membership can be viewed on the LCR MSCP website. During FY12, Chris Harris, Colorado River Board of California, served as Chair of the Steering Committee, and Perri Benemelis, Arizona Department of Water Resources, served as Vice Chair.

Section 7.4.1 of the FMA requires Reclamation to submit an Implementation Report, Work Plan and Budget (Annual Report) to the Steering Committee each year, consistent with the program documents. The current Annual Report contains a description of conservation activities accomplished during FY12, a summary of work underway during FY13, and proposed work to be performed during FY14. It also documents research and monitoring activities undertaken in support of the LCR MSCP. Incidental Take for covered actions implemented during FY12 is also documented. This Annual Report fully meets the reporting requirements outlined in Section 7.4.1 of the FMA.

LCR MSCP Program Funding

As outlined in the FMA, the total program cost in 2003 dollars is $626,180,000 split in a 50-50 cost share between the Federal and non-Federal entities. Table 7-1 of the HCP outlines the annual minimum funding level before inflation. Each year, the annual program cost is adjusted for inflation based on a formula outlined in Section 8.1.1 of the FMA. Table 1-1 provides Annual Contribution Before Inflation, Composite Inflation Index, and Indexed Annual Program (Federal and Non-Federal) contributions. Indexed Annual Program costs are calculated using the Composite Inflation Index from two years prior as outlined in the FMA. A summary of required contributions received to date is provided in Appendix D-1.

Table 1-1. Federal/Non-Federal Funding Requirements for LCR MSCP

Fiscal Year	Annual Contribution Before Inflation	Composite Inflation Index	Composite Calculation Year	Indexed Annual Program	Indexed Annual Federal	Indexed Annual Non-Federal
2006	$11,214,000	1.083	2004	$12,144,762	$6,072,381	$6,072,381
2007	$11,214,000	1.122	2005	$12,582,108	$6,291,054	$6,291,054
2008	$11,214,000	1.187	2006	$13,311,018	$6,655,509	$6,655,509
2009	$11,214,000	1.210	2007	$13,568,940	$6,784,470	$6,784,470
2010	$11,214,000	1.294	2008	$14,510,916	$7,255,458	$7,255,458
2011	$27,540,000	1.191	2009	$32,800,140	$16,400,070	$16,400,070
2012	$27,540,000	1.210	2010	$33,323,400	$16,661,700	$16,661,700
2013	$27,540,000	1.251	2011	$34,452,540	$17,226,270	$17,226,270
2014	$27,540,000	1.276	2012	$35,141,040	$17,570,520	$17,570,520

Section 8.1.2 of the FMA states that funds provided by either a Federal Party or a State Permittee that are in excess of the funding obligation for a specific year shall

be treated as a credit against future funding obligations. Any shortage of funds provided by either a Federal Party or a State Permittee will be treated as a deficit to future funding obligations. Appendix D-2 provides a summary of funding credits earned and funding credits used.

FY14 Contributions and Adjustments

As outlined in Table 1-1, the annual funding commitment for FY14 is $27,540,000, based on the 2003 estimate, and $35,141,040 after the Composite Inflation Index of 1.276 is applied. In accordance with Section 8.3 of the FMA, the non-Federal share of the cost by state and the Federal share of the cost for FY14 are shown in Table 1-2. Section 8.3 of the FMA allows for adjusted non-Federal funding during the first 10 years of the program. The FY14 adjusted funding amounts for the three states are also shown in Table 1-2 (amounts based on direction from the Central Arizona Water Conservation District (CAWCD), (see Appendix A).

Table 1-2. FY14 Contribution Schedule

Funding Entity	FY14 Contributions	FY14 Adjusted Contributions
Federal:	$17,570,520.00	$17,570,520.00
Non-Federal:	$17,570,520.00	$17,570,520.00
California	*$8,785,260.00*	*$9,663,786.00*
Arizona	*$4,392,630.00*	*$2,635.578.00*
Nevada	*$4,392,630.00*	*$5,271,156.00*
Total:	**$35,141,040.00**	**$35,141,040.00**

2001 Biological Opinion Account

A total of $6 million, plus interest, was available to Reclamation through the 2001 BO Funding Agreement. This funding is part of LCR MSCP contributions from the San Diego County Water Authority (SDCWA) and The Metropolitan Water District of Southern California (Metropolitan) and was used to meet the financial commitments for these entities. The mitigation requirements outlined in the 2001 BO needed to be implemented on the front end of the LCR MSCP; therefore, funding in excess of the entities' LCR MSCP annual required contribution was requested by Reclamation and resulted in funding credits in the early years of the program. In FY08, requirements under the 2001 BO specifically related to the Secretarial Implementation Agreement (SIA) were completed and all remaining funds were withdrawn. In FY09, SDCWA started using their funding credits to meet their LCR MSCP annual contribution. The SDCWA will continue to use their funding credits to meet their annual obligations until their funding credits are exhausted. Metropolitan will use their credits over a three-year period (FY11 – FY13).

Habitat Maintenance Fund

As outlined in Section 8.4.2 of the FMA, a $25 million (2003 dollars) habitat maintenance fund is being developed during the first 10 years of LCR MSCP implementation to restore covered species habitats that have been degraded; a share of each state's contribution will be set aside in an interest-bearing account referred to as the Existing Habitat Maintenance Fund accounts. While each state is maintaining its own account, interest earned on these accounts will be added to the accounts for the benefit of implementing the LCR MSCP. Table 1-3 provides total funds contributed through FY12 with interest, FY13 contributions, and FY14 projected contributions. Minimum required funding in FY13 for the Habitat Maintenance Fund was $5,629,500. Reclamation had proposed providing additional funds in FY13, but due to budget constraints, only the required amount will be deposited. A FY13 revised contribution schedule from CAWCD is included in Appendix A. For FY14, Reclamation is proposing that $6,928,680 be contributed to the fund. This consists of $5,742,000 of required funding and $1,186,680 of additional funding. A detailed accounting of the Habitat Maintenance Fund is in Appendix D-3. No funds have been withdrawn from any of the accounts to date.

Table 1-3. Existing Habitat Maintenance Fund

Funding Partner	FY12 Contribution	Cumulative through FY12*	FY13 Contribution**	F14 Projected Contribution
California:	$2,722,500	$8,144,856.21	$2,814,750	$3,464,340
Arizona:	$1,361,250	$3,458,912.45	$1,407,375	$1,732,170
Nevada:	$1,361,250	$3,880,536.87	$1,407,375	$1,732,170
Total:	**$5,445,000**	**$15,484,305.53**	**$5,629,500**	**$6,928,680**

*Includes interest earned.

**Revised.

Remedial Measures Fund

The HCP requires the set aside of contingency funds to pay for implementing remedial measures in the event that changed circumstances affect program conservation measures (HCP, Section 5.12.13). The amount of funding is set forth in Table 7-1 of the HCP, totaling $13,270,000 (2003 dollars) to be paid from year 6 through year 25 of the program. On April 25, 2012, the Steering Committee passed Program Decision Document 12-001, which approved establishment of state interest-bearing Remedial Measures Funds. Reclamation will enter into agreements with each of the states for management of those funds. Table 1-4 provides total funds contributed through FY12 with interest, FY13 contributions, and FY14 projected contributions. No funds have been withdrawn from any of the accounts to date.

Table 1-4. Remedial Measures Fund

Funding Partner	FY12 Contribution	Cumulative through FY12	FY13 Contribution*	F14 Projected Contribution
California:	$0	$0	$499,149.00	$169.708.00
Arizona:	$0	$0	$249,574.50	$84,854.00
Nevada:	$0	$0	$249,574.50	$84,854.00
Total:	**$0**	**$0**	**$998,298.00**	**$339,416.00**

*Includes FY11 & FY12 Contributions.

Land and Water Fund

A Land and Water Fund has been established by Reclamation to set aside funds for acquisition of land and water resources to implement conservation measures described in the HCP. Through guidelines developed under Conservation Area Site Selection (E16), Reclamation works with interested parties to secure land and water resources. Once potential sites have been evaluated, including determining financial value through the Federal appraisal process using the Department of Interior designated appraisal services office, land and water resources nominated by Reclamation for acquisition must be approved by the Steering Committee through a Land and Water Resolution. The entire site-selection process may extend over multiple years; therefore, this fund has been established to ensure funding will be available to complete these acquisitions. The Land and Water Fund will be limited to the amount of funding identified in Table 7-1 in the HCP, indexed for inflation. Once land and water resources have been approved for acquisition, funds will be withdrawn from the Land and Water Fund and a work task developed. If funds set aside in the Land and Water Fund are no longer required for land or water acquisition, they may be used to implement other actions necessary for conservation measures accomplishment. Table 1-5 lists the funds set aside in the Land and Water Account through FY12. No funding is expected to be contributed in FY13 or FY14.

Table 1-5. Land and Water Fund

Funding Partner	FY12 Contribution	Cumulative through FY12	FY13 Contribution	F14 Projected Contribution
Reclamation	$4,600,000	$13,500,000	$0	$0

In-Kind Contributions

Section 8.7.4 of the FMA provides that in-kind goods or services shall be credited based on approval by the Program Manager and the Steering Committee. In April 2007, the Steering Committee passed Program Decision Document 08-001, *In-Kind Credit for Goods and Services*, which provides specific guidelines for the

calculation of in-kind credit for goods and services. No in-kind contributions were provided in FY12.

CESA Permit

As discussed in the Program Implementation section of this Annual Report, the California Partners are responsible for meeting the terms of the CESA permit. While Reclamation and non-Federal entities located in Nevada and Arizona have no legal requirement to comply with a CESA permit with respect to the LCR MSCP, Reclamation is working with the California Partners in meeting their requirements.

An aspect of the Memorandum of Agreement between Reclamation and the California Partners regarding LCR MSCP conservation actions for the CESA permit discusses Reclamation's commitment to implement the conservation plan in a manner that facilitates CESA compliance requirements. In exchange, the California Partners have made land and water available at no cost in the Palo Verde Irrigation District for program purposes. Given this exchange and the overall commonality between the CESA permit and the HCP, these California-specific actions are not expected to result in additional program costs.

Proposed FY14 Program and FY12 Accomplishment

The minimum funding required in the LCR MSCP program documents for FY14 is $35,141,010. Reclamation is proposing an annual program budget totaling $35,142,064 as shown in Table 1-6. Table 1-7 shows the following by work task: FY12 estimates and actual accomplishment, cumulative program expenditures (FY04-FY12), FY13 approved program, FY14 proposed program, and out-year funding for FY15 and FY16. Out-year funding estimates are not adjusted for future inflation. In Table 1-7, current year accomplishment is shown as obligations (money that is set aside during the year for program expenses). Cumulative accomplishment is shown as expenditures (actual funding expended).

Table 1-6. FY14 Proposed Program Funding

Program Area	FY14 Funding
Program Administration	$1,298,968
Fish Augmentation	$1,675,000
Species Research	$4,939,000
System Monitoring	$3,265,000
Conservation Area Development and Management	$13,821,000
Post-Development Monitoring	$1,425,000
Adaptive Management Program	$1,350,000
Funding Account-Existing Habitat Maintenance	$6,928,680
Funding Account-Remedial Measures	$339,416
Public Outreach	$100,000
Total	**$35,142,064**

Reclamation will ensure the minimum program accomplishment occurs that meets the Indexed Annual Contribution outlined in Table 1-1 of $35,141,010. By receiving Steering Committee and USFWS input on the broad range of work, Reclamation can accomplish additional work should funds become available, or can accomplish a change in work priorities as future circumstances arise. In accordance with the FMA, a description of the work is being presented to the Steering Committee to ensure that no disputes exist, and the description will subsequently be presented to the USFWS to ensure that work is consistent with the HCP.

Reclamation's goal is to fully implement the LCR MSCP in a biologically effective, cost-efficient, and transparent manner. During FY14, should Reclamation determine that a specific work task cannot be undertaken, funds identified for that specific work task will be redirected and used for the following purposes: 1) funding another work task approved through this document, 2) increasing the funding for a work task that is expected to require funding in FY15 or FY16, 3) providing more than the minimum funding required to the Habitat Maintenance Fund or Remedial Measures Fund, or 4) beginning activities associated with any changed circumstances as defined in Section 5.12.3 of the HCP, should any occur.

In FY12, Reclamation estimated work tasks totaling $33,494,780. Actual LCR MSCP accomplishments for FY12 were $31,357,384.98. Actual accomplishment was less than the minimum accomplishment due to continued negotiations on the Yuma East Wetlands Land Use Agreement and the acquisition of Planet Ranch. In accordance with the FMA, Reclamation incurred a funding debit of $3,105,120.42 for FY12 (Appendix D-2). Cumulative program accomplishment through FY12 is $132,648,293.91 (Appendix D-4).

Table 1-7. Annual Funding Matrix

Work Task	Name	FY12 Approved Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Projected Estimate[1]	FY16 Projected Estimate[1]
A	**Program Administration**							
A1	Program Admin.	$1,231,780.00	$917,627.80	$7,935,399.08	$1,273,518.00	$1,298,968.00	$1,298,968.00	$1,298,968.00
Closed[2]	Work Tasks Pre-FY12			$130,535.22				
		$1,231,780.00	**$917,627.80**	**$8,065,934.30**	**$1,273,518.00**	**$1,298,968.00**	**$1,298,968.00**	**$1,298,968.00**
B	**Fish Augmentation**							
B1	Lake Mohave Razorback Sucker Larvae Collections	$200,000.00	$203,360.50	$1,619,981.56	$200,000.00	$200,000.00	$200,000.00	$200,000.00
B2	Willow Beach National Fish Hatchery	$250,000.00	$298,730.97	$2,201,971.21	$609,000.00	$300,000.00	$300,000.00	$300,000.00
B3	Achii Hanyo Rearing Station	$150,000.00	$145,868.05	$682,715.68	$150,000.00	$150,000.00	$150,000.00	$150,000.00
B4	Southwestern Native Aquatic Resources & Recovery Center at Dexter	$200,000.00	$148,422.27	$1,133,641.32	$250,000.00	$250,000.00	$250,000.00	$250,000.00
B5	Bubbling Ponds Fish Hatchery	$250,000.00	$306,855.83	$1,960,624.83	$300,000.00	$300,000.00	$300,000.00	$300,000.00
B6	Lake Mead Fish Hatchery	$50,000.00	$66,798.28	$313,750.42	$100,000.00	$125,000.00	$125,000.00	$125,000.00
B7	Lake-Side Rearing Ponds	$175,000.00	$173,805.16	$1,462,379.26	$200,000.00	$200,000.00	$200,000.00	$200,000.00
B8	Fish Tagging Equipment	$90,000.00	$65,514.81	$590,004.96	$100,000.00	$100,000.00	$100,000.00	$100,000.00

Work Task	Name	FY12 Approved Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Projected Estimate[1]	FY16 Projected Estimate[1]
B11	Overton Wildlife Management Area	$75,000.00	$36,397.60	$314,245.05	$50,000.00	$50,000.00	$50,000.00	$50,000.00
Closed[2]	Work Tasks Pre-FY12		$0.00	$558,428.94	$0.00	$0.00	$0.00	$0.00
		$1,440,000.00	**$1,445,753.47**	**$10,837,743.23**	**$1,959,000.00**	**$1,675,000.00**	**$1,675,000.00**	**$1,675,000.00**
C	**Species Research**							
C2	Sticky Buckwheat and Threecorner Milkvetch Conservation	$11,000.00	$10,731.82	$52,025.15	$11,000.00	$11,000.00	$11,000.00	$11,000.00
C3	Multi-Species Conservation Program Covered Species Profile Development	$15,000.00	$13,408.44	$249,443.12	$30,000.00	$15,000.00	$15,000.00	$15,000.00
C4	Relict Leopard Frog	$11,000.00	$10,162.78	$84,563.54	$11,000.00	$11,000.00	$11,000.00	$0.00
C5	Effects of Abiotic Factors on Insect Populations in Riparian Restoration Sites	$90,000.00	$86,835.87	$501,917.22	$95,000.00	$0.00	$0.00	$0.00
C6	Insectivore Prey Base Abundance and Diversity in Conservation Areas	$0.00	$0.00	$101,441.68	$150,000.00	$265,000.00	$265,000.00	$265,000.00
C10	Razorback Sucker Rearing Studies	$125,000.00	$126,121.64	$765,880.49	$125,000.00	$125,000.00	$125,000.00	$0.00
C11	Bonytail Rearing Studies	$150,000.00	$140,147.91	$787,571.10	$150,000.00	$150,000.00	$150,000.00	$0.00

Work Task	Name	FY12 Approved Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Projected Estimate[1]	FY16 Projected Estimate[1]
C13	Lake Mead Razorback Sucker Study	$125,000.00	$134,764.80	$1,522,137.15	$135,000.00	$135,000.00	$135,000.00	$0.00
C14	Humpback Chub Program Support	$11,000.00	$71,167.73	$214,744.93	$57,000.00	$57,000.00	$57,000.00	$57,000.00
C24	Avian Species Habitat Requirements	$200,000.00	$243,998.17	$851,071.96	$200,000.00	$300,000.00	$300,000.00	$300,000.00
C25	Imperial Ponds Native Fish Research	$250,000.00	$246,544.45	$1,065,280.10	$250,000.00	$250,000.00	$250,000.00	$250,000.00
C27	Small Mammal Population Studies	$50,000.00	$56,612.17	$337,641.01	$50,000.00	$50,000.00	$50,000.00	$50,000.00
C30	Development and Evaluation of Measures to Reduce Transport of Quagga Mussel During Fish Transfer and Stocking Activities	$150,000.00	$65,684.91	$306,464.71	$160,000.00	$0.00	$0.00	$0.00
C31	Razorback Sucker Genetic Diversity Assessment	$125,000.00	$124,776.15	$379,246.55	$130,000.00	$130,000.00	$130,000.00	$0.00
C32	Determination of Salinity, Temperature, and Oxygen Limits for Bonytail and Razorback Sucker	$125,000.00	$115,711.54	$381,393.84	$115,000.00	$115,000.00	$115,000.00	$115,000.00
C33	Comparative Survival of 500-mm Razorback Sucker Released in Reach 3	$100,000.00	$97,020.68	$405,396.25	$100,000.00	$0.00	$0.00	$0.00

Work Task	Name	FY12 Approved Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Projected Estimate[1]	FY16 Projected Estimate[1]
C35	Western Red Bat and Western Yellow Bat Roosting Characteristics Study	$175,000.00	$289,115.34	$209,889.72	$150,000.00	$25,000.00	$0.00	$0.00
C36	Elf Owl Detectability Study	$20,000.00	$13,383.19	$251,868.95	$0.00	$0.00	$0.00	$0.00
C37	Hydrology Studies for Avian Riparian Obligate Species	$10,000.00	$26,351.59	$291,163.14	$0.00	$0.00	$0.00	$0.00
C39	Post-Stocking Distribution and Survival of Bonytail in Reach 3	$250,000.00	$252,447.59	$643,728.59	$250,000.00	$250,000.00	$250,000.00	$0.00
C40	Genetic and Demographic Studies to Guide Conversation Mgmt. of RASU and BONY in Off-Channel Habitats	$180,000.00	$180,401.56	$270,718.43	$180,000.00	$180,000.00	$180,000.00	$180,000.00
C41	Role of Artificial Habitat in Survival of RASU and BONY	$25,000.00	$31,584.07	$68,619.88	$65,000.00	$65,000.00	$0.00	$0.00
C42	Experiments and Demonstration of Soil Amendments for Use in Restoration Sites	$200,000.00	$118,748.43	$253,475.76	$200,000.00	$200,000.00	$200,000.00	$0.00
C43	Population Demographics and Habitat Use of the California Leaf-Nosed Bat	$40,000.00	$15,413.97	$12,958.68	$60,000.00	$50,000.00	$0.00	$0.00

Work Task	Name	FY12 Approved Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Projected Estimate[1]	FY16 Projected Estimate[1]
C44	Management of Fish Food Resources in Off-Channel Native Fish Habitats	$100,000.00	$94,204.34	$127,746.60	$100,000.00	$0.00	$0.00	$0.00
C45	Ecology and Habitat Use of Stocked RASU in Reach 3	$200,000.00	$193,102.42	$313,781.22	$200,000.00	$200,000.00	$200,000.00	$0.00
C46	Physiological Response in BONY and RASU to Transport Stress	$120,000.00	$117,603.73	$168,804.14	$70,000.00	$0.00	$0.00	$0.00
C47	Genetic Monitoring and Management of Recruitment in Bonytail Rearing Ponds	$250,000.00	$237,437.06	$51,837.75	$250,000.00	$250,000.00	$0.00	$0.00
C48	Genetic Characterization of RASU Broodstock at SNARRC	$60,000.00	$50,590.60	$98,254.83	$0.00	$0.00	$0.00	$0.00
C49	Investigations of RASU and BONY Movements and Habitat Use Downstream of Parker Dam	$150,000.00	$59,867.17	$59,867.17	$150,000.00	$150,000.00	$0.00	$0.00
C51	Vermilion Flycatcher Detectability and Distribution Study	$20,000.00	$26,532.93	$26,532.93	$150,000.00	$150,000.00	$150,000.00	$0.00
C52	Gilded Flicker Research	$20,000.00	$22,422.40	$22,422.40	$150,000.00	$300,000.00	$300,000.00	$0.00

Work Task	Name	FY12 Approved Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Projected Estimate[1]	FY16 Projected Estimate[1]
C53	Sonic Telemetry of Juvenile Flannelmouth Suckers in Reach 3	$120,000.00	$105,869.79	$54,806.89	$120,000.00	$120,000.00	$120,000.00	$0.00
C54	Techniques to Establish Native Grasses and Forbs	$0.00	$0.00	$0.00	$200,000.00	$200,000.00	$200,000.00	$200,000.00
C55	Techniques to Increase Leaf Litter Decomposition Rates	$0.00	$0.00	$0.00	$125,000.00	$75,000.00	$75,000.00	$75,000.00
C56	Characterization of Lake Mohave Backwaters to Evaluate Factors Influencing Spawning Success	$0.00	$0.00	$0.00	$265,000.00	$100,000.00	$100,000.00	$0.00
C57	Sonic Telemetry of Lake Mead Juvenile Razorback Suckers	$0.00	$0.00	$0.00	$250,000.00	$250,000.00	$250,000.00	$0.00
C58	Investigating Shoreline Habitat Cover for BONY	$0.00	$0.00	$0.00	$75,000.00	$60,000.00	$60,000.00	$0.00
C59	Selenium Monitoring in Created Backwater and Marsh Habitat	$0.00	$0.00	$0.00	$250,000.00	$250,000.00	$250,000.00	$0.00
C60	Habitat Manipulation	$0.00	$0.00	$0.00	$100,000.00	$100,000.00	$100,000.00	$100,000.00

Work Task	Name	FY12 Approved Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Projected Estimate[1]	FY16 Projected Estimate[1]
C61	Evaluation of Alternative Stocking Methods for Fish Augmentation	$0.00	$0.00	$0.00	$0.00	$150,000.00	$150,000.00	$150,000.00
C62	Lowland Leopard Frog and Colorado River Toad Habitat and Ecology Study	$0.00	$0.00	$4,021,407.67	$0.00	$200,000.00	$200,000.00	$200,000.00
Closed[2]	Work Tasks Pre-FY12		$1,704.01	$4,122,849.35				
		$3,478,000.00	**$3,380,469.25**	**$15,055,545.23**	**$5,129,000.00**	**$4,939,000.00**	**$4,399,000.00**	**$1,968,000.00**
D	**System Monitoring**							
D1	Marsh Bird Surveys	$35,000.00	$21,802.58	$200,203.81	$25,000.00	$25,000.00	$25,000.00	$25,000.00
D2	Southwestern Willow Flycatcher Habitat Monitoring	$675,000.00	$708,540.74	$5,477,322.94	$600,000.00	$675,000.00	$675,000.00	$675,000.00
D3	Southwestern Willow Flycatcher Habitat Monitoring	$90,000.00	$111,833.44	$647,595.21	$90,000.00	$0.00	$0.00	$0.00
D5	Monitoring Avian Productivity and Survivorship	$250,000.00	$253,792.34	$2,036,148.17	$250,000.00	$250,000.00	$250,000.00	$250,000.00
D6	System Monitoring for Riparian Obligate Avian Species	$280,000.00	$465,205.66	$1,338,781.77	$400,000.00	$400,000.00	$400,000.00	$400,000.00
D7	Yellow-Billed Cuckoo Presence/Absence Surveys	$550,000.00	$563,565.52	$3,478,668.94	$550,000.00	$650,000.00	$650,000.00	$650,000.00

Work Task	Name	FY12 Approved Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Projected Estimate[1]	FY16 Projected Estimate[1]
D8	Razorback Sucker and Bonytail Stock Assessment	$575,000.00	$624,518.66	$3,433,712.00	$675,000.00	$675,000.00	$675,000.00	$675,000.00
D9	System Monitoring and Research of Covered Bat Species	$150,000.00	$188,280.52	$836,042.21	$150,000.00	$375,000.00	$375,000.00	$375,000.00
D10	System Monitoring of Rodent Populations	$40,000.00	$20,104.65	$105,594.36	$40,000.00	$40,000.00	$40,000.00	$40,000.00
D12	Lowland Leopard Frog and Colorado River Toad Surveys	$150,000.00	$238,443.61	$188,324.93	$125,000.00	$25,000.00	$25,000.00	$25,000.00
D13	Elf Owl System-Wide Surveys	$0.00	$0.00	$0.00	$60,000.00	$150,000.00	$150,000.00	$150,000.00
Closed[2]	Work Tasks Pre-FY12			$530,188.50				
		$2,795,000.00	**$3,196,087.72**	**$18,272,582.84**	**$2,965,000.00**	**$3,265,000.00**	**$3,265,000.00**	**$3,265,000.00**
E	**Conservation Area Development and Management**							
E1	Beal Lake Conservation Area	$950,000.00	$916,195.79	$4,080,857.71	$300,000.00	$300,000.00	$300,000.00	$300,000.00
E4	Palo Verde Ecological Reserve	$1,950,000.00	$1,154,766.77	$7,160,327.80	$990,000.00	$725,000.00	$675,000.00	$650,000.00
E5	Cibola Valley Conservation Area	$650,000.00	$361,277.27	$10,082,755.73	$650,000.00	$550,000.00	$700,000.00	$800,000.00
E9	Hart Mine Marsh	$300,000.00	$414,640.69	$5,691,016.62	$750,000.00	$250,000.00	$200,000.00	$200,000.00

Work Task	Name	FY12 Approved Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Projected Estimate[1]	FY16 Projected Estimate[1]
E14	Imperial Ponds Conservation Area	$525,000.00	$771,006.55	$8,396,907.73	$395,000.00	$600,000.00	$500,000.00	$400,000.00
E15	Backwater Site Selection	$20,000.00	$28,211.19	$1,310,691.05	$550,000.00	$0.00	$0.00	$0.00
E16	Conservation Area Site Selection	$375,000.00	$209,391.63	$1,446,492.30	$375,000.00	$600,000.00	$600,000.00	$400,000.00
E17	Topock Marsh Pumping	$2,550,000.00	$2,209,091.02	$1,101,023.34	$70,000.00	$1,000.00	$1,000.00	$1,000.00
E18	Law Enforcement and Fire Suppression	$325,000.00	$326,234.76	$897,622.68	$325,000.00	$250,000.00	$250,000.00	$250,000.00
E21	Planet Ranch, Bill Williams River	$1,500,000.00	$44,803.79	$207,759.86	$40,000.00	$40,000.00	$40,000.00	$40,000.00
E24	Cibola NWR Unit #1	$1,000,000.00	$862,441.09	$3,015,089.43	$1,100,000.00	$500,000.00	$900,000.00	$900,000.00
E25	Big Bend Conservation Area	$30,000.00	$16,826.97	$1,100,514.66	$30,000.00	$30,000.00	$30,000.00	$30,000.00
E27	Laguna Division Conservation Area	$6,290,000.00	$6,562,631.03	$8,146,215.66	$5,000,000.00	$8,600,000.00	$4,000,000.00	$1,500,000.00
E28	Yuma East Wetlands	$400,000.00	$75,792.42	$592,203.75	$450,000.00	$450,000.00	$450,000.00	$450,000.00
E30	Flat-tailed Horned Lizard	$50,000.00	$166,849.05	$255,733.98	$0.00	$0.00	$0.00	$0.00
E31	Hunters Hole	$30,000.00	$88,198.74	$56,805.78	$150,000.00	$75,000.00	$65,000.00	$60,000.00
E32	Bureau Bay	$0.00	$0.00	$0.00	$200,000.00	$0.00	$0.00	$0.00
E33	Pretty Water Conservation Area	$0.00	$0.00	$0.00	$200,000.00	$600,000.00	$700,000.00	$700,000.00
E34	Groundwater and Soil Salinity Monitoring Network	$0.00	$0.00	$0.00	$250,000.00	$250,000.00	$300,000.00	$300,000.00

Work Task	Name	FY12 Approved Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Projected Estimate[1]	FY16 Projected Estimate[1]
Closed[2]	Work Tasks Pre-FY12		$16.19	$2,657.014.40				
		$16,945,000.00	**$14,208,374.95**	**$56,199,032.48**	**$11,825,000.00**	**$13,821,000.00**	**$9,711,000.00**	**$6,981,000.00**
F	**Post-Development Monitoring**							
F1	Habitat Monitoring of Conservation Areas	$425,000.00	$754,927.68	$2,570,356.04	$650,000.00	$650,000.00	$650,000.00	$650,000.00
F2	Avian Use of Conservation Areas	$210,000.00	$375,849.49	$926,845.22	$220,000.00	$220,000.00	$220,000.00	$220,000.00
F3	Small Mammal Colonization of Conservation Areas	$55,000.00	$21,525.04	$276,597.02	$55,000.00	$60,000.00	$60,000.00	$60,000.00
F4	Covered Bat Species Monitoring at Conservation Areas	$100,000.00	$109,437.27	$597,883.24	$125,000.00	$135,000.00	$135,000.00	$135,000.00
F5	Post-Development Monitoring of Fish at Conservation Areas	$175,000.00	$172,897.42	$835,057.02	$250,000.00	$250,000.00	$250,000.00	$250,000.00
F6	MacNeill's Sootywing Monitoring at Conservation Areas	$70,000.00	$79,854.92	$226,897.61	$80,000.00	$80,000.00	$80,000.00	$80,000.00
F7	Marsh Birds Monitoring at Conservation Areas	$30,000.00	$14,271.51	$15,674.57	$30,000.00	$30,000.00	$30,000.00	$30,000.00
		$1,065,000.00	**$1,528,763.33**	**$5,449,310.72**	**$1,410,000.00**	**$1,425,000.00**	**$1,425,000.00**	**$1,425,000.00**

Work Task	Name	FY12 Approved Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Projected Estimate[1]	FY16 Projected Estimate[1]
G	**Adaptive Management Program**							
G1	Data Management	$700,000.00	$728,250.63	$2,358,562.19	$950,000.00	$800,000.00	$800,000.00	$800,000.00
G3	Adaptive Mgmt. Research Projects	$200,000.00	$282,786.62	$1,904,781.92	$300,000.00	$300,000.00	$300,000.00	$300,000.00
G4	Science/Adaptive Mgmt. Strategy	$125,000.00	$127,754.31	$483,096.45	$250,000.00	$250,000.00	$250,000.00	$250,000.00
		$1,025,000.00	**$1,138,791.56**	**$4,746,440.56**	**$1,500,000.00**	**$1,350,000.00**	**$1,350,000.00**	**$1,350,000.00**
H	**Funding Accounts**							
H1	Existing Habitat Maintenance	$5,445,000.00	$5,445,000.00	$13,752,500.00	$7,460,400.00[3]	$6,928,680.00[4]	$4,555,320.00	$0.00
H2	Remedial Measures Fund	$0.00	$0.00	$0.00	$998,298.00	$339,416.00	$339,416.00	$339,416.00
		$5,445,000.00	**$5,445,000.00**	**$13,752,500.00**	**$8,458,698.00**	**$7,268,096.00**	**$4,894,736.00**	**$339,416.00**
I	**Public Outreach**							
I1	Public Outreach	$70,000.00	$96,516.90	$208,144.87	$100,000.00	$100,000.00	$100,000.00	$100,000.00
Closed	Work Tasks Pre-FY12			$61,059.68				
		$70,000.00	**$96,516.90**	**$269,204.55**	**$100,000.00**	**$100,000.00**	**$100,000.00**	**$100,000.00**
	Program Total:	**$33,494,780.00**	**$31,357,384.98**	**$132,648,293.91**	**$34,620,216.00**	**$35,142,064.00**	**$28,118,704.00**	**$18,402,384.00**

[1]FY15 and FY16 numbers are not adjusted for inflation.

[2]Closed work tasks are shown in Appendix D-4.

[3]Actual FY13 is $5,629,500.

[4]H1 Cumulative Habitat Maintenance amount does not include interest.

Compliance Reporting

LCR MSCP

As required in the FMA, the following information is included in the Annual Report:

1. *A running tabulation of habitat created or restored by the LCR MSCP.*

   To meet species habitat creation requirements, the HCP provides goals for habitat creation based on land cover types. These land cover types are described using the Anderson and Ohmart vegetation classification system. In total, the LCR MSCP is directed to design and create 8,132 acres of cottonwood-willow, mesquite, marsh, and backwater land cover types. This is the minimum amount of land cover type to be created to meet species habitat requirements. Table 1-8 shows how much land cover by type has been created at each conservation area. In FY12, 279 acres of land cover were established. Total land cover established through FY12 is 2,447 acres.

   The HCP specifies that created land cover types will be designed in an integrated mosaic and managed for more than one covered species, including habitat elements for each species. The HCP contains habitat creation conservation measures for 20 of the 26 species. Table 1-9 shows how much habitat has been created for each of those species by conservation area.

2. *A running tabulation and description of all Conservation Measures that have been completed from the commencement of the LCR MSCP to the date of the report.*

   Table 1-10 provides a summary of fish repatriation. Table 1-11 provides a matrix showing those work tasks that work toward the completion of the Conservation Measures. Appendix E lists technical reports that were published in FY12.

   The Conservation Measure FTHL1 was completed in FY12. The creditable acres established exceed species habitat creation conservation measures requirements for WRBA2, SUTA1, and MNSW2.

3. *A description of any take known to have occurred during the previous budget period.*

   In accordance with FMA section 7.4.1(F), any incidental take known to have occurred during LCR MSCP Implementation in FY12 is reported in Appendix B. The USFWS Section 10 Permit and the 2005 BO authorize incidental take resulting from conduct of Federal Covered Actions and

non-Federal Covered Activities, and Reclamation's implementation of the HCP, as long as Conservation Measures and Avoidance and Minimization Measures are in place. Due to the wide range and scope of the program, surrogate measures were used in the program compliance documents to quantify impacts. These same surrogates are used to determine types and levels of any incidental take known to have occurred in FY12. As described in the 2005 BO, the surrogate measures for incidental take are:

Flow-Related

Total loss of suitable habitat for covered species that utilize cottonwood-willow, marsh, and backwaters resulting from the changes in points of diversions, extension of the interim surplus guidelines (ISG), and implementation of the shortage criteria.

As total habitat loss is calculated for all of these actions, take is being documented as the amount and type of covered actions and activities being implemented.

Non-Flow-Related

Acreage or miles of habitats affected by non-flow-related actions.

Other Non-Flow-Related (Continuing Actions)

Acreage or miles of facilities affected by maintenance actions.

Creation of Restoration Sites

Affected habitat acreage for the covered species, with the understanding that during creation of higher value habitat there may be harassment of individuals.

Appendix B summarizes the surrogate measures for incidental take for Federal Flow-Related Actions, Federal Non-Flow-Related Actions, and Non-Federal Activities. Non-Federal Flow-Related Activities are included as part of the Federal Flow-Related Actions.

4. *Any recommendation made by the USFWS or any state wildlife agency regarding the LCR MSCP.*

The September 12, 2012 consistency letter from the USFWS for the *Final Implementation Report, Fiscal Year 2013 Work Plan and Budget, Fiscal Year 2011 Accomplishment Report,* the May 29, 2012 letter from the USFWS acknowledging completion of FTHL1, the July 2, 2012 letter from the USFWS confirming final completion of AMM2, and the August 14, 2012 letter from the USFWS amending the Interim Surplus/Secretarial Implementation Agreement Biological Opinion, are included in Appendix C.

5. *Approval or rejection of any minor modification described in Section 14.1 of the Implementation Agreement.*

   No minor modifications to the LCR MSCP were made in FY12.

Table 1-8. Conservation Area Land Cover Type

Land Cover Type	Management Unit	Established Acres FY12	Established Acres Total*
Cottonwood-willow	E1 Beal Lake (AZ)	0	107
	E4 PVER (CA)	226	945
	E5 CVCA (AZ)	0	265
	E24 CWR Unit 1 (AZ)	0	270
	E31 Hunters Hole (AZ)	44	44
TOTAL		**270**	**1,631**
Mesquite	E4 PVER (CA)	0	40
	E5 CVCA (AZ)	0	405
TOTAL		**0**	**445**
Marsh	E1 Beal Lake (AZ)	9	9
	E9 Hart Mine Marsh (AZ)	0	255
	E14 Imperial Ponds (AZ)	0	12
TOTAL		**9**	**276**
Backwater	E14 Imperial Ponds (AZ)	0	80
	E25 Big Bend (NV)	0	15
TOTAL		**0**	**95**
TOTAL		**279**	**2,447**

*Does not include upland buffer.

Table 1-9. Conservation Area by Species Habitat Creation Conservation Measures

Species Habitat Creation Conservation Measures (Required Acres)	Management Unit	Creditable Acres FY12	Creditable Acres Total
CLRA1 (512 acres)	E9 Hart Mine Marsh	142	255
	E14 Imperial Ponds	0	12
Total		**142**	**267**
WIFL1(4,050 acres)	E1 Beal Lake	0	0
	E4 PVER	0	0
	E5 CVCA	0	0
	E24 Cibola Unit 1	0	0
Total		**0**[1]	**0**
BONY2 (360 acres)	E14 Imperial Ponds	0[2]	0
	E25 Big Bend	0	15
Total		**0**	**15**
RASU2 (360 acres)	E14 Imperial Ponds	0[2]	0
	E25 Big Bend	15	15
Total		**15**	**15**
WRBA2 (765 acres)	E1 Beal Lake	0	107
	E4 PVER	216	499
	E5 CVCA	0	265
	E24 Cibola Unit 1	116	270
Total		**332**	**1141**[6]
WYBA3 (765 acres)	E1 Beal Lake	0	0
	E4 PVER	0	0
	E5 CVCA	0	0
	E24 Cibola Unit 1	0	0
Total		**0**[3]	**0**
CRCR2 (125 acres)	E9 Hart Mine Marsh	0	0
Total		**0**[4]	**0**
YHCR2 (76 acres)		0	0
Total		**0**	**0**
LEBI1 (512 acres)	E9 Hart Mine Marsh	142	255
	E14 Imperial Ponds	0	12
Total		**142**	**267**
BLRA1 (130 acres)	E9 Hart Mine Marsh	0[5]	0
	E14 Imperial	0	12
Total		**0**	**12**

Species Habitat Creation Conservation Measures (Required Acres)	Management Unit	Creditable Acres FY12	Creditable Acres Total
YBCU1(4,050 acres)	E1 Beal Lake	0	107
	E4 PVER	216	499
	E5 CVCA	0	265
	E24 Cibola Unit 1	116	270
Total		**332**	**1,141**
ELOW1(1,784 acres)	E1 Beal Lake	0	107
	E4 PVER	216	499
	E5 CVCA	405	661
	E24 Cibola Unit 1	116	270
Total		**737**	**1,537**
GIFL1 (4,050 acres)	E1 Beal Lake	0	107
	E4 PVER	216	499
	E5 CVCA	0	265
	E24 Cibola Unit 1	116	270
Total		**332**	**1,141**
GIWO1(1,702 acres)	E1 Beal Lake	0	107
	E4 PVER	436	935
	E5 CVCA	0	265
	E24 Cibola Unit 1	0	270
Total		**436**	**1,577**
VEFL1 (5,208 acres)	E1 Beal Lake	0	107
	E4 PVER	436	935
	E5 CVCA	405	670
	E24 Cibola Unit 1	0	270
Total		**841**	**1,982**
BEVI1 (2,983 acres)	E4 PVER	260	476
	E5 CVCA	405	405
	E24 Cibola	0	116
Total		**665**	**997**
YWAR1(4,050 acres)	E1 Beal Lake	0	107
	E4 PVER	436	935
	E5 CVCA	0	265
	E24 Cibola Unit 1	0	270
Total		**436**	**1,577**
SUTA1 (602 acres)	E1 Beal Lake	0	107
	E4 PVER	216	499
	E5 CVCA	0	265
	E24 Cibola Unit 1	116	270
Total		**332**	**1,141**[6]

Species Habitat Creation Conservation Measures (Required Acres)	Management Unit	Creditable Acres FY12	Creditable Acres Total
FLSU1 (85 acres)	E25 Big Bend	0	15
Total		**0**	**15**
MNSW2 (222 acres)	E4 PVER	40	40
	E5 PVER	405	405
Total		**445**	**445**[6]

[1]WIFL 1—Although the conservation areas provide the appropriate structure type (CW I-IV) as defined in WIFL 1, Reclamation is in the process of gathering the appropriate hydrologic data to determine saturated soils, moist soils, or slow moving water at each of those conservation areas. Once this has been determined the conservation areas will be evaluated.

[2]BONY 2 and RASU 2—At this time Imperial Ponds is not suitable for establishment and maintenance of healthy fish. Reclamation is beginning a five-year management strategy to determine the criteria and management actions required to maintain healthy fish at Imperial Ponds.

[3]WYBA 3—Reclamation is in the process of determining the foraging and roosting habitat for the Western Yellow bat. Once this has been determined, each conservation area that provides foraging or roosting habitat will be evaluated.

[4]CRCR2—Reclamation is in the process of evaluating data collected to determine marsh and cottonwood-willow habitat uses by the Colorado River cotton rat. The preliminary data suggest the Colorado River cotton rat uses both cottonwood-willow and fringe marsh habitats.

[5]BLRA 1—Reclamation is in the process of determining the land and water interface and the method for delineating BLRA marsh habitat at <1 inch. Once this has been determined, Hart Mine Marsh and Big Bend will be evaluated.

[6]Total for creditable acres established exceeds species habitat creation conservation measures requirement. For many species creditable acres established beyond conservation measure requirements is due to habitat creation efforts for other species.

Table 1-10a. Summary of Fish Augmentation Conservation Measure RASU5

REACH	RASU FY12	TOTAL RASU
2	12,793	67,779
Total	12,793	67,779

Table 1-10b. Summary of Fish Augmentation Conservation Measure RASU3

REACH	RASU FY12	TOTAL RASU
3	7,683	54,142
4/5	6,629	64,182
Total	14,312	118,324

Table 1-10c. Summary of Fish Augmentation Conservation Measure BONY3

REACH	BONY FY12	BONY PROGRAM
2	0	6,998*
3	4,000	30,304
4/5	3,821	18,591
Total	7,821	55,893

*Additional stocking in Reach 2 will be initiated after completion of USFWS stocking.

Table 1-11. Status of Conservation Measures

Species/Habitat/Action	Code	Description	FY12 Approved	FY13 Approved	FY14 Proposed
Yuma Clapper Rail	CLRA1	Create habitat, 512 acres	C3 E9 E14 E16 E21 E26 E27 E28 F2 F7 G1 G4	C3 E9 E14 E16 E21 E26 E27 E28 E34 F2 F7 G1 G4	C3 E9 E14 E16 E21 E26 E27 E28 E34 F2 F7 G1 G4
	CLRA2	Maintain existing important habitat	C3 G1 G4 H1	C3 G1 G4 H1	C3 G1 G4 H1
	MRM1	Define habitat characteristics	C3 C24 D1 E21 F2 F7 G1 G4	C3 C24 D1 E21 F2 F7 G1 G4	C3 C24 D1 E21 F2 F7 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 C24 D1 F1 F2 F7 G1 G4	C3 C24 C59 D1 F1 F2 F7 G1 G4	C3 C24 C59 D1 F1 F2 F7 G1 G4
	MRM5	Monitor selenium levels in backwater		C59	C59
	CMM1	Reduce risk of loss to wildfire	E18 G1 G4	E18 G1 G4	E18 G1 G4
	CMM2	Replace created habitat affected by wildfire	F2 G1 G4	F2 G1 G4	F2 G1 G4
Southwestern Willow Flycatcher	WIFL1	Create habitat, 4,050 acres	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 G1 G4	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E34 G1 G4	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E34 G1 G4
	WIFL2	Maintain existing important habitat	C3 D2 D3 D4 E21 F1 G1 G4 H1	C3 D2 D3 D4 E21 F1 G1 G4 H1	C3 D2 D3 D4 E21 F1 G1 G4 H1
	MRM1	Define habitat characteristics	C3 C5 C24 C37 C42 D2 D3 D4 D5 D6 E21 F2 G1 G4	C3 C5 C24 C37 C42 D2 D3 D4 D5 D6 E21 F2 G1 G4	C3 C5 C24 C37 C42 D2 D3 D4 D5 D6 E21 F2 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C24 D2 D3 D4 D5 D6 F1 F2 G1 G4	C24 C55 C60 D2 D3 D4 D5 D6 F1 F2 G1 G4	C24 C55 C60 D2 D3 D4 D5 D6 F1 F2 G1 G4
	MRM4	Brown-headed cowbird evaluation	D2 G1 G4	D2 G1 G4	D2 G1 G4
	CMM1	Reduce risk of loss to wildfire	E18 G1 G4	E18 G1 G4 C55	E18 G1 G4 C55
	CMM2	Replace created habitat affected by wildfire	F2 G1 G4	F2 G1 G4	F2 G1 G4
Desert Tortoise	**DETO1**	**Acquire, protect 230 acres — Completed**	**E29**	**E29**	

Species/Habitat/Action	Code	Description	FY12 Approved	FY13 Approved	FY14 Proposed
	DETO2	Avoid impacts on individuals and burrows	C3 G1 G4	C3 G1 G4	C3 G1 G4
Bonytail	BONY1	Coordinate conservation efforts with USFWS and recovery programs	A1	A1	A1
	BONY2	Create 360 acres of bonytail habitat	C3 C25 C30 C32 C40 E2 E14 E15 E16 E25 E26 G1 G4	C3 C25 C30 C32 C40 E2 E14 E15 E16 E25 E26 E32 E34 G1 G4	C3 C25 C30 C32 C40 E2 E14 E15 E16 E25 E26 E32 E34 G1 G4
	BONY3	Rear/stock 620,000: 5,000 sub-adult/year for 40 years Lake Mohave 4,000 sub-adult/year for 50 years Lake Havasu 4,000 experimental augmentation at Parker-Imperial for 10 consecutive years 4,500 sub-adults/year Parker-Imperial for 40 years	C11 C30 C32 C39 C41 C46 C47 C49 G1 G4	C11 C30 C32 C39 C41 C46 C47 C49 C56 G1 G4	C11 C30 C32 C39 C41 C46 C47 C49 C56 C61 G1 G4
	BONY4	Develop (if necessary) additional rearing capacity	B2 B3 B4 B7 B8 C11 C30 C46 C47 C49 G1 G4	B2 B3 B4 B7 B8 C11 C30 C46 C47 C49 G1 G4	B2 B3 B4 B7 B8 C11 C30 C46 C47 C49 G1 G4
	BONY5	Monitor and research, adaptive management populations and backwater habitat	B7 B8 C11 C23 C30 C32 C34 C39 C40 C41 C44 C46 C47 C49 D8 F5 G1 G4	B7 B8 C11 C23 C30 C32 C34 C39 C40 C41 C44 C46 C47 C49 C56 C58 C59 D8 F5 G1 G4	B7 B8 C11 C23 C30 C32 C39 C40 C41 C44 C46 C47 C49 C56 C58 C59 C61 D8 F5 G1 G4
	MRM5	Monitor selenium levels in backwater	G1 G4	G1 G4 C59	G1 G4 C59
Humpback Chub	HUCH1	$500,000 to existing programs	C14 G1	C14 G1	C14 G1
Razorback Sucker	RASU1	Coordinate conservation efforts with USFWS and recovery programs	A1	A1	A1
	RASU2	Create 360 acres of razorback sucker habitat	C3 C25 C30 C31 C32 C40 E2 E14 E15 E16 E25 E26 G1 G4	C3 C25 C30 C31 C32 C40 E2 E14 E15 E16 E25 E26 E32 E34 G1 G4	C3 C25 C30 C31 C32 C40 E2 E14 E15 E16 E25 E26 E32 E34 G1 G4

Species/Habitat/Action	Code	Description	FY12 Approved	FY13 Approved	FY14 Proposed
	RASU3	Rear/stock 660,000: 12,000 sub-adult/year for 10 years (Parker, Mohave — see plan) 6,750 sub-adult/year for 40 years Lake Havasu 6,750 sub-adult/year for 40 years Parker Dam	B1 B2 B3 B4 B5 B6 B7 B8 B11 C10 C26 C30 C31 C32 C33 C41 C46 C48 C49 G1 G4	B1 B2 B3 B4 B5 B6 B7 B8 B11 C10 C26 C30 C31 C32 C33 C41 C46 C48 C49 C 56G1 G4	B1 B2 B3 B4 B5 B6 B7 B8 B11 C10 C26 C30 C31 C32 C33 C41 C46 C48 C49 C 56 C61 G1 G4
	RASU4	Develop (if necessary) additional rearing capacity	B2 B3 B4 B5 B6 B7 B8 B11 C10 C26 C30 C46 C48 C49 G1 G4	B2 B3 B4 B5 B6 B7 B8 B11 C10 C26 C30 C46 C48 C49 G1 G4	B2 B3 B4 B5 B6 B7 B8 B11 C10 C26 C30 C46 C48 C49 G1 G4
	RASU5	Support ongoing Lake Mohave conservation efforts	B1 B2 B7 B8 C12 C30 C31 C32 C41 G1 G4	B1 B2 B7 B8 C12 C30 C31 C32 C41 G1 G4	B1 B2 B7 B8 C30 C31 C32 C41 C61 G1 G4
	RASU6	Monitor and research, adaptive management populations and backwater habitat	B2 B7 B8 B11 C8 C10 C23 C30 C31 C32 C33 C34 C40 C41 C44 C45 C46 C49 C50 D8 F5 G1 G4	B2 B7 B8 B11 C8 C10 C23 C30 C31 C32 C33 C34 C40 C41 C44 C45 C46 C49 C50 C56 C57 C59 D8 F5 G1 G4	B2 B7 B8 B11 C8 C10 C23 C30 C31 C32 C33 C40 C41 C44 C45 C46 C49 C56 C57 C59 C61 D8 F5 G1 G4
	RASU7	Funding for ongoing Reclamation/SNWA Lake Mead Studies	B6 B11 C13 G1 G4	B6 B11 C13 G1 G4	B6 B11 C13 G1 G4
	RASU8	Continue conservation efforts identified in ISC/SIA BO	B1 B6 B11 C26 C30 G1 G4	B1 B6 B11 C26 C30 G1 G4	B1 B6 B11 C26 C30 G1 G4
	MRM5	Monitor selenium levels in backwater	G1 G4	G1 G4 C59	G1 G4 C59
Western Red Bat	WRBA1	Status/habitat surveys	C3 D9 F4 G1 G4	C3 D9 F4 G1 G4	C3 D9 F4 G1 G4
	WRBA2	**Create 765 acres — Creditable acres established exceed requirement**	**C3 D9 E1 E3 E4 E5 E8 E16 E21 E24 G1 G4**	**C3 D9 E1 E3 E4 E5 E8 E16 E21 E24 E33 E34 G1 G4**	**C3 D9 E1 E3 E4 E5 E8 E16 E21 E24 E33 E34 G1 G4**
	MRM1	Define habitat characteristics	C3 C5 C35 D9 E21 F4 G1 G4	C3 C5 C35 D9 E21 F4 G1 G4	C3 C5 C35 D9 E21 F4 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 F1 F4 G1 G4	C3 F1 F4 G1 G4	C3 F1 F4 G1 G4

Species/Habitat/Action	Code	Description	FY12 Approved	FY13 Approved	FY14 Proposed
	CMM1	Reduce risk of loss of habitat to wildfire	E18 G1 G4	E18 G1 G4	E18 G1 G4
	CMM2	Replace created habitat affected by wildfire			
Western Yellow Bat	WYBA1	Conduct surveys for species distribution	C3 D9 G1 G4	C3 D9 G1 G4	C3 D9 G1 G4
	WYBA2	Avoid removal of roost trees (palms)	E16 F4 G1 G4	E16 F4 G1 G4	E16 F4 G1 G4
	WYBA3	Create 765 acres	C3 D9 E1 E3 E4 E5 E8 E21 E24 F4 G1 G4	C3 D9 E1 E3 E4 E5 E8 E21 E24 E33 E34 F4 G1 G4	C3 D9 E1 E3 E4 E5 E8 E21 E24 E33 E34 F4 G1 G4
	MRM1	Define habitat characteristics	C3 C5 C35 D9 E21 F4 G1 G4	C3 C5 C35 D9 E21 F4 G1 G4	C3 C5 C35 D9 E21 F4 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 F1 F4 G1 G4	C3 F1 F4 G1 G4	C3 F1 F4 G1 G4
	CMM1	Reduce risk of loss of habitat to wildfire	E18 G1 G4	E18 G1 G4	E18 G1 G4
	CMM2	Replace created habitat affected by wildfire			
Desert Pocket Mouse	DPMO1	Locate occupied habitat, restore disturbed habitat	C3 F3 G1 G4	C3 F3 G1 G4	C3 F3 G1 G4
Colorado River Cotton Rat	CRCR1	Status/habitat surveys — define habitat first 5 years	C3 C27 F3 G1 G4	C3 C27 F3 G1 G4	C3 C27 F3 G1 G4
	CRCR2	Create 125 acres	C3 E9 E16 E21 G1 G4	C3 C54 E9 E16 E21 E34 G1 G4	C3 C54 E9 E16 E21 E34 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 F1 F3 G1 G4	C3 C54 C60 F1 F3 G1 G4	C3 C54 C60 F1 F3 G1 G4
	CMM1	Reduce risk of loss of habitat to wildfire	E18 G1 G4	E18 G1 G4 C54	E18 G1 G4 C54
	CMM2	Replace created habitat affected by wildfire			
Yuma Hispid Cotton Rat	YHCR1	Status/habitat surveys — define habitat first 5 years	C3 C27 G1 G4	C3 C27 G1 G4	C3 C27 G1 G4

Species/Habitat/Action	Code	Description	FY12 Approved	FY13 Approved	FY14 Proposed
	YHCR2	Create 76 acres	C3 E16 E27 E28 G1 G4	C3 C54 E16 E27 E28 E34 G1 G4	C3 C54 E16 E27 E28 E34 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 F1 F3 G1 G4	C3 C54 C60 F1 F3 G1 G4	C3 C54 C60 F1 F3 G1 G4
	CMM1	Reduce risk of loss of habitat to wildfire	E18 G1 G4	E18 G1 G4 C54	E18 G1 G4 C54
	CMM2	Replace created habitat affected by wildfire			
Western Least Bittern	LEBI1	Create 512 acres	C3 E9 E14 E16 E21 E26 E27 E28 F7 G1 G4	C3 E9 E14 E16 E21 E26 E27 E28 E34 F7 G1 G4	C3 E9 E14 E16 E21 E26 E27 E28 E34 F7 G1 G4
	MRM1	Define habitat characteristics	C3 C24 D1 E21 F2 F7 G1 G4	C3 C24 D1 E21 F2 F7 G1 G4	C3 C24 D1 E21 F2 F7 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 C24 D1 F1 F2 F7 G1 G4	C3 C24 D1 F1 F2 F7 G1 G4	C3 C24 D1 F1 F2 F7 G1 G4
	MRM5	Monitor selenium levels			
	CMM1	Reduce risk of loss of habitat affected by wildfire	E18 G1 G4	E18 G1 G4	E18 G1 G4
	CMM2	Replace created habitat affected by wildfire	F2 G1 G4	F2 G1 G4	F2 G1 G4
California Black Rail	BLRA1	Create 130 acres	C3 E14 E16 E26 E27 E28 F7 G1 G4	C3 E14 E16 E26 E27 E28 E34 F7 G1 G4	C3 E14 E16 E26 E27 E28 E34 F7 G1 G4
	BLRA2	Maintain existing occupied habitat	C3 G1 G4 H1	C3 G1 G4 H1	C3 G1 G4 H1
	MRM1	Define habitat characteristics	C3 C24 D1 F2 G1 G4	C3 C24 D1 F2 G1 G4	C3 C24 D1 F2 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 C24 D1 F1 F2 G1 G4	C3 C24 C59 D1 F1 F2 G1 G4	C3 C24 C59 D1 F1 F2 G1 G4
	MRM5	Monitor selenium levels		C59	C59
	CMM1	Reduce risk of loss of habitat affected by wildfire	E18 G1 G4	E18 G1 G4	E18 G1 G4

Species/Habitat/Action	Code	Description	FY12 Approved	FY13 Approved	FY14 Proposed
	CMM2	Replace created habitat affected by wildfire	F2 G1 G4	F2 G1 G4	F2 G1 G4
Yellow-billed Cuckoo	YBCU1	Create 4,050 acres	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 G1 G4	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E34 G1 G4	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E34 G1 G4
	YBCU2	Maintain existing habitat	C3 D7 E21 G1 G4 H1	C3 D7 E21 G1 G4 H1	C3 D7 E21 G1 G4 H1
	MRM1	Define habitat characteristics	C3 C5 C24 C37 C42 D5 D6 D7 E21 F2 G1 G4	C3 C5 C24 C37 C42 D5 D6 D7 E21 F2 G1 G4	C3 C5 C24 C37 C42 D5 D6 D7 E21 F2 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 C24 D5 D6 D7 F1 F2 G1 G4	C3 C24 C55 C60 D5 D6 D7 F1 F2 G1 G4	C3 C24 C55 C60 D5 D6 D7 F1 F2 G1 G4
	CMM1	Reduce risk of loss of habitat affected by wildfire	E18 G1 G4	E18 G1 G4 C55	E18 G1 G4 C55
	CMM2	Replace created habitat affected by wildfire	F2 G1 G4	F2 G1 G4	F2 G1 G4
Elf Owl	ELOW1	Create 1,784 acres reaches 3-5	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 G1 G4	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E33 E34 G1 G4	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E33 E34 G1 G4
	ELOW2	Install elf owl boxes before Gila woodpeckers established	C3 G1 G4	C3 G1 G4	C3 G1 G4
	MRM1	Define habitat characteristics	C3 C24 C36 C37 C42 D5 D6 E21 F2 G1 G4	C3 C24 C36 C37 C42 D5 D6 E21 F2 G1 G4	C3 C24 C36 C37 C42 D5 D6 E21 F2 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 C24 D5 D6 F1 F2	C3 C24 C55 D5 D6 F1 F2	C3 C24 C55 D5 D6 F1 F2
	MRM3	Research nest competition European starlings	C3 G1 G4	C3 G1 G4	C3 G1 G4
	CMM1	Reduce risk of loss of habitat affected by wildfire	E18 G1 G4	E18 G1 G4 C55	E18 G1 G4 C55
	CMM2	Replace created habitat affected by wildfire	F2 G1 G4	F2 G1 G4	F2 G1 G4

Species/Habitat/Action	Code	Description	FY12 Approved	FY13 Approved	FY14 Proposed
Gilded Flicker	GIFL1	Create 4,050 acres reaches 3-7	C3 C52 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 G1 G4	C3 C52 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E34 G1 G4	C3 C52 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E34 G1 G4
	GIFL2	Install artificial snags until vegetation has matured			
	MRM1	Define habitat characteristics	C3 C5 C24 C37 C42 C52 D5 D6 E21 F2 G1 G4	C3 C5 C24 C37 C42 C52 D5 D6 E21 F2 G1 G4	C3 C5 C24 C37 C42 C52 D5 D6 E21 F2 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 C24 D5 D6 F1 F2 G1 G4	C3 C24 C55 D5 D6 F1 F2 G1 G4	C3 C24 C55 D5 D6 F1 F2 G1 G4
	MRM3	Research nest competition European starlings	C3 G1 G4	C3 G1 G4	C3 G1 G4
	CMM1	Reduce risk of loss of habitat affected by wildfire	E18 G1 G4	E18 G1 G4 C55	E18 G1 G4 C55
	CMM2	Replace created habitat affected by wildfire	F2 G1 G4	F2 G1 G4	F2 G1 G4
Gila Woodpecker	GIWO1	Create 1,702 acres reaches 3-6	C3 E3 E4 E5 E8 E16 E21 E24 E27 E28 G1 G4	C3 E3 E4 E5 E8 E16 E21 E24 E27 E28 E34 G1 G4	C3 E3 E4 E5 E8 E16 E21 E24 E27 E28 E34 G1 G4
	GIWO2	Install artificial snags			
	MRM1	Define habitat characteristics	C3 C5 C24 C37 C42 D5 D6 E21 F2 G1 G4	C3 C5 C24 C37 C42 D5 D6 E21 F2 G1 G4	C3 C5 C24 C37 C42 D5 D6 E21 F2 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 C24 D5 D6 F1 F2 G1 G4	C3 C24 C55 D5 D6 F1 F2 G1 G4	C3 C24 C55 D5 D6 F1 F2 G1 G4
	MRM3	Research nest competition European starlings	C3 G1 G4	C3 G1 G4	C3 G1 G4
	CMM1	Reduce risk of loss of habitat affected by wildfire	E18 G1 G4	E18 G1 G4 C55	E18 G1 G4 C55
	CMM2	Replace created habitat affected by wildfire	F2 G1 G4	F2 G1 G4	F2 G1 G4

Species/Habitat/Action	Code	Description	FY12 Approved	FY13 Approved	FY14 Proposed
Vermilion Flycatcher	VEFL1	Create 5,208 acres	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 G1 G4	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E33 E34 G1 G4	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E33 E34 G1 G4
	MRM1	Define habitat characteristics	C3 C5 C24 C37 C42 C51 D5 D6 E21 F2 G1 G4	C3 C5 C24 C37 C42 C51 D5 D6 E21 F2 G1 G4	C3 C5 C24 C37 C42 C51 D5 D6 E21 F2 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 C24 C51 D5 D6 F1 F2 G1 G4	C3 C24 C51 C55 C60 D5 D6 F1 F2 G1 G4	C3 C24 C51 C55 C60 D5 D6 F1 F2 G1 G4
	MRM4	Brown-headed cowbird evaluation			
	CMM1	Reduce risk of loss of habitat affected by wildfire	E18 G1 G4	E18 G1 G4 C55	E18 G1 G4 C55
	CMM2	Replace created habitat affected by wildfire	F2 G1 G4	F2 G1 G4	F2 G1 G4
Arizona Bell's Vireo	BEVI1	Create 2,983 acres	C3 C5 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 G1 G4	C3 C5 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E33 E34 G1 G4	C3 C5 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E33 E34 G1 G4
	MRM1	Define habitat characteristics	C3 C37 C42 D5 D6 E21 F2 G1 G4	C3 C37 C42 D5 D6 E21 F2 G1 G4	C3 C37 C42 D5 D6 E21 F2 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 C24 D5 D6 F1 F2 G1 G4	C3 C24 C55 D5 D6 F1 F2 G1 G4	C3 C24 C55 D5 D6 F1 F2 G1 G4
	MRM4	Brown-headed cowbird evaluation			
Sonoran Yellow Warbler	YWAR1	Create 4,050 acres	C3 E1 E3 E4 E5 E8 E16 E21 E27 E28 G1 G4	C3 E1 E3 E4 E5 E8 E16 E21 E27 E28 E34 G1 G4	C3 E1 E3 E4 E5 E8 E16 E21 E27 E28 E34 G1 G4
	MRM1	Define habitat characteristics	C3 C5 C24 C37 C42 D5 D6 E21 F2 G1 G4	C3 C5 C24 C37 C42 D5 D6 E21 F2 G1 G4	C3 C5 C24 C37 C42 D5 D6 E21 F2 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 C24 D5 D6 F1 F2 G1 G4	C3 C24 C55 C60 D5 D6 F1 F2 G1 G4	C3 C24 C55 C60 D5 D6 F1 F2 G1 G4
	MRM4	Brown-headed cowbird evaluation			

Species/Habitat/Action	Code	Description	FY12 Approved	FY13 Approved	FY14 Proposed
	CMM1	Reduce risk of loss of habitat affected by wildfire	E18 G1 G4	E18 G1 G4 C55	E18 G1 G4 C55
	CMM2	Replace created habitat affected by wildfire	F2 G1 G4	F2 G1 G4	F2 G1 G4
Summer Tanager	**SUTA1**	**Create 602 acres — Creditable acres established exceed requirement**	**C3 E1 E3 E4 E5 E8 E16 E21 E27 E28 G1 G4**	**C3 E1 E3 E4 E5 E8 E16 E21 E27 E28 E34 G1 G4**	**C3 E1 E3 E4 E5 E8 E16 E21 E27 E28 E34 G1 G4**
	MRM1	Define habitat characteristics	C3 C5 C24 C37 C42 D5 D6 E21 F2 G1 G4	C3 C5 C24 C37 C42 D5 D6 E21 F2 G1 G4	C3 C5 C24 C37 C42 D5 D6 E21 F2 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 C24 D5 D6 F1 F2 G1 G4	C3 C24 C 55D5 D6 F1 F2 G1 G4	C3 C24 C 55D5 D6 F1 F2 G1 G4
	MRM4	Brown-headed cowbird evaluation			
	CMM1	Reduce risk of loss of habitat affected by wildfire	E28 G1 G4	E28 G1 G4 C55	E28 G1 G4 C55
	CMM2	Replace created habitat affected by wildfire	F2 G1 G4	F2 G1 G4	F2 G1 G4
Flat-tailed Horned Lizard	**FTHL1**	**Acquire and protect 230 acres — Completed**	**C3 G1 G4**	**C3 G1 G4**	**C3 G1 G4**
	FTHL2	Implement conservation measures to avoid take	C3 E30 G1 G4	C3 E30 G1 G4	C3 E30 G1 G4
Relict Leopard Frog	RLFR1	10,000/year for 10 years to conservation program	C4 G1	C4 G1	C4 G1
Flannelmouth Sucker	FLSU1	85 acres Reach 3	C3 C53 E15 E16 E25 G1 G4	C3 C53 E15 E16 E25 E32 E34 G1 G4	C3 C53 E15 E16 E25 E32 E34 G1 G4
	FLSU2	80,000/year for 5 years	C15 G1 G4	C15 G1 G4	C15 G1 G4
	FLSU3	Develop management needs/strategies	C15 C 53 G1 G4	C15 C 53 G1 G4	C15 C 53 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 G1 G4	C3 G1 G4 C59	C3 G1 G4 C59
	MRM5	Monitor selenium levels in backwaters	G1 G4	G1 G4 C59	G1 G4 C59

Species/Habitat/Action	Code	Description	FY12 Approved	FY13 Approved	FY14 Proposed
MacNeill's Sootywing Skipper	MNSW1	Status surveys/habitat — define habitat first 5 years	C3 F6 G1 G4	C3 F6 G1 G4	C3 F6 G1 G4
	MNSW2	**Create 222 acres — Creditable acres established exceed requirement**	C3 E1 E3 E4 E5 E16 E21 G1 G4	C3 E1 E3 E4 E5 E16 E21 E34 G1 G4	C3 E1 E3 E4 E5 E16 E21 E34 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 F1 F6 G1 G4	C3 F1 F6 G1 G4	C3 F1 F6 G1 G4
	CMM1	Reduce risk of loss of habitat affected by wildfire	E18 G1 G4	E18 G1 G4	E18 G1 G4
	CMM2	Replace created habitat affected by wildfire			
Sticky Buckwheat	STBU1	10,000/year until 2030 to conservation program	C2 G1	C2 G1	C2 G1
Threecorner Milkvetch	THMI1	10,000/year until 2030 to conservation program	C2 G1	C2 G1	C2 G1
California Leaf-nosed Bat	CLNB1	Distribution surveys	C3 D9 G1 G4 C34	C3 D9 G1 G4 C34	C3 D9 G1 G4 C34
	CLNB2	Create habitat near roost sites (priority when creating cottonwood-willow, mesquite habitat for other species)	C3 E1 E3 E4 E5 E8 E16 E21 E24 G1 G4 C34	C3 E1 E3 E4 E5 E8 E16 E21 E24 E34 G1 G4 C34	C3 E1 E3 E4 E5 E8 E16 E21 E24 E34 G1 G4 C34
	MRM1	Define habitat characteristics	C3 C5 D9 E21 F4 G1 G4	C3 C5 D9 E21 F4 G1 G4	C3 C5 D9 E21 F4 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 F4 G1 G4	C3 F4 G1 G4	C3 F4 G1 G4
	CMM1	Reduce risk of loss of habitat affected by wildfire	E18 G1 G4	E18 G1 G4	E18 G1 G4
	CMM2	Replace created habit affected by wildfire			
Pale Townsend's Big-eared Bat	PTBB1	Distribution surveys	C3 D9 G1 G4	C3 D9 G1 G4	C3 D9 G1 G4
	PTBB2	Create habitat near roost sites	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 G1 G4	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E34 G1 G4	C3 E1 E3 E4 E5 E8 E16 E21 E24 E27 E28 E34 G1 G4

Species/Habitat/Action	Code	Description	FY12 Approved	FY13 Approved	FY14 Proposed
	MRM1	Determine habitat characteristics	C3 C5 D9 E21 F4 G1 G4	C3 C5 D9 E21 F4 G1 G4	C3 C5 D9 E21 F4 G1 G4
	MRM2	Monitor and adaptively manage created habitat	C3 F4 G1 G4	C3 F4 G1 G4	C3 F4 G1 G4
	CMM1	Reduce risk of loss of habitat affected by wildfire	E18 G1 G4	E18 G1 G4	E18 G1 G4
	CMM2	Replace created habitat affected by wildfire			
Colorado River Toad	CRTO1	Distribution surveys, habitat affinity, limiting factors	C3 D12 G1 G4	C3 D12 G1 G4	C3 C62 D12 G1 G4
	CRTO2	Protect existing occupied habitat	C3 G1 G4 H1	C3 G1 G4 H1	C3 C62 G1 G4 H1
	CRTO3	Research to establish in unoccupied habitat	C3 G1 G4	C3 G1 G4	C3 C62 G1 G4
Lowland Leopard Frog	LLFR1	Distribution surveys, habitat affinity, limiting factors	C3D12 G1 G4	C3D12 G1 G4	C3 C62 D12 G1 G4
	LLFR2	Protect existing occupied habitat	C3 G1 G4 H1	C3 G1 G4 H1	C3 C62 G1 G4 H1
	LLFR3	Research to establish in unoccupied habitat	C3 G1 G4	C3 G1 G4	C3 C62 G1 G4
Other					
Topock Marsh Pumping	**AMM2**	**Avoid flow-related impacts on covered species — Completed**	E17	E17	E17
Law Enforcement and Fire Suppression	CMM1	Reduce effects of fire and vandalism on created habitats	E18	E18	E18

2001 Biological Opinion

In addition to fulfilling the requirements in the LCR MSCP HCP, the work plans also satisfied conservation measures required in the 2001 BO. The requirements listed in the 2001 BO were integrated into the LCR MSCP and are being implemented by Reclamation in conjunction with the LCR MSCP. Requirements under the 2001 BO specifically related to the SIA were completed in FY08. Monitoring under Conservation Measure 4, Tier 1a will continue until 5 years after implementation of all water transfers covered under the 2001 BO.

Requirements under the 2001 BO specifically related to the SIA include:

Conservation Measure 4, Tier 1

Identify and monitor 372 acres of currently occupied southwestern willow flycatcher habitat that may be affected by water transfers and changes in points of delivery between Parker and Imperial dams. Soil moisture will be monitored and if levels decrease as a result of water transfer actions, management actions will be taken to maintain monitored habitat. The monitoring program will be reviewed every 5 years to determine the appropriate level of effort to monitor effects of water transfer actions. Monitoring will continue for up to 5 years after implementation of all water transfer actions unless it becomes part of a broader effort associated with recovery actions.

Status In FY05, monitoring of 372 acres of occupied southwestern willow flycatcher habitat was initiated. This acreage is split into 11 different sites between Palo Verde Diversion Dam and Imperial Dam. Annual monitoring of soil moisture conditions at these sites is being performed to determine whether a change in soil moisture conditions has occurred due to water transfer actions. No change in soil moisture conditions attributable to water transfer actions was observed through 2011; therefore, no management actions have been required. Monitoring was expected to continue under Work Task D3 for up to 5 years after implementation of all water transfer actions. A review of the current monitoring program, including methodology and results from the first 5 years, was completed and a decision was made to discontinue this monitoring. A concurrence letter was received from USFWS on August 14, 2012.

Conservation Measure 4, Tier 2

Establish baseline soil moisture conditions within 1 year of acceptance of the BO. Depending on the status of southwestern willow flycatcher population trends along the LCR, replace additional flycatcher habitat if management actions to prevent adverse changes to Tier 1 monitored habitat are no longer viable or will not be successful in maintaining baseline conditions.

Status A review of the current monitoring program, including methodology and results from the first 5 years, was completed and a decision was made to discontinue this monitoring. Therefore, no replacement habitat is required. A concurrence letter was received from USFWS on August 14, 2012.

Requirements under the 2001 BO specifically related to the ISC include:

1. *Reclamation will continue to provide funding and support for the ongoing Lake Mead Razorback Sucker Study. The initial continuation will be conducted for 5 years, followed by a review and determination of the scope of studies for the following 10 years of the duration of the ISC.*

   The ongoing 5 years of study have been completed through C13. A 10-year summary report for the Lake Mead Razorback Sucker Study has been compiled and is currently being used by the newly formed Lake Mead Razorback Sucker Work Group to determine actions to be implemented during the final 10-year duration of the ISC.

2. *Reclamation will provide rising spring water surface elevations of 5-10 feet on Lake Mead, to the extent practicable and that hydrologic conditions allow.*

   During the period of the ISC compliance actions to date, there has been no practicable opportunity to provide rising spring water surface elevations.

3. *Reclamation will continue existing operations on Lake Mohave that benefit native fish during the 15-year ISC period and will explore additional ways to provide benefits to native fish.*

   To date, existing operations on Lake Mohave that benefit native fish have been continued.

4. *Reclamation will monitor water levels of Lake Mead from February through April of each year during the 15 years that the ISC are in place. Should water levels reach 1,160 feet because of the implementation of the ISC, Reclamation will implement a program to collect and rear larval razorback suckers in Lake Mead during the spawning season following this determination.*

   The level of Lake Mead reached the 1,160 feet msl elevation during FY05. Reclamation, the Southern Nevada Water Authority (SNWA), and NDOW are cooperatively rearing razorback sucker larvae captured from Lake Mead for future repatriation into Lake Mead. Both the Lake Mead SFH and Overton Wildlife Management Area are used for rearing (B6 and B11).

California Endangered Species Act (CESA) Permit

In conjunction with Federal ESA coverage, California State law requires CESA permitting for the California activities. The California Partners applied for and received a CESA Incidental Take Permit pursuant to CDFG Code sections 2081(a) and 2081(b). The California Partners negotiated the terms of the CESA permit with CDFW to be compatible with the LCR MSCP. This CESA permit provides compliance only for California Partners.

The LCR MSCP conservation activities fulfill the requirements of the CESA permit. However, certain CESA permit requirements are more specific in relationship to location or timing. All other CESA permit requirements are otherwise the same as those for the LCR MSCP. By meeting LCR MSCP program requirements in FY12, CESA program requirements were also met for FY12. Listed below are the CESA requirements that are more detailed than the LCR MSCP HCP:

1. Requirements for various types of coordination with CDFW during the identification, development, and construction and maintenance for habitat created or restored within the State of California under the LCR MSCP.

2. Various reporting requirements to be made to CDFW including annual status reports and notifications.

3. Riparian, Marsh, and Backwater Replacement Plans are to be submitted to CDFW for approval for riparian and marsh habitat creation and restoration within the State of California under the LCR MSCP.

4. Monitoring, Research, and Adaptive Management Plans for the replacement habitat created or restored under the LCR MSCP within the State of California are to be submitted to CDFW for approval.

5. Locations of all habitat replaced or restored in the State of California under the LCR MSCP must be approved by the CDFW.

6. A minimum of 2,614 acres of the LCR MSCP riparian replacement habitat is to be located in California, including 1,566 acres of cottonwood-willow and 1,048 acres of honey mesquite.

7. A minimum of 240 acres of LCR MSCP marsh habitat is to be created or restored within the State of California, including 170 acres for Yuma clapper rail (CLRA) and 70 acres for California black rail (BLRA). The acreage shall also support at least 58 acres of Colorado River cotton rat habitat.

8. A minimum of 194 acres of LCR MSCP backwater habitat is to be created or restored within the State of California.

9. Habitat created within California will be protected in perpetuity.

10. An endowment fee of $295.00 per acre (in 2005 dollars) will be provided to CDFW for each acre of habitat that is transferred to the Department in Fee Title at the time of transfer.

11. A total of 270,000 razorback suckers and 200,000 bonytails of at least 12 inches in length will be stocked into reaches 3-5.

Through FY12, 118,324 RASU and 48,895 BONY have been stocked into reaches 3, 4, and 5. Since the start of the LCR MSCP, 167,219 native fish have been stocked into the lower river in California.

In FY12, 226 acres of cottonwood-willow land cover were established at the Palo Verde Ecological Reserve (PVER). Total land cover, not including upland, established to date is 945 acres of cottonwood-willow and 40 acres of mesquite.

Through FY12, 759 acres of cottonwood-willow and honey mesquite land cover meet the structural type required for Riparian Replacement Habitat. Reclamation is in the process of gathering the appropriate hydrologic data to determine saturated soils, moist soils, or slow-moving water. Once this has been determined, Riparian Replacement Habitat at PVER will be evaluated.

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OVERVIEW OF WORK TASKS

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Fish Augmentation, Monitoring, and Research

As described in the HCP, the LCR MSCP will implement 17 conservation measures for four native fish species: eight conservation measures for razorback sucker (RASU), five for bonytail (BONY), three for flannelmouth sucker (FLSU), and one for humpback chub (HUCH). These conservation measures are addressed through the numerous work plans presented in this report. A brief summary of the work completed, ongoing activities, and proposed future work is provided here.

Fish Augmentation (Section B)

The target goal of the augmentation program is to provide a total of 660,000 RASU and 620,000 BONY for reintroduction into the Colorado River over a 50-year period. A Fish Augmentation Plan for the LCR MSCP has been developed and approved, and is available on the LCR MSCP website. Between 2005 and the end of calendar year 2012, the program has stocked 241,996 native fish (Tables 1-10 a-c). This rate of stocking continues to meet or exceed the annual program goals which were prescribed in the LCR MSCP Fish Augmentation Plan.

To obtain sufficient numbers of young fish for grow-out and eventual stocking, the LCR MSCP must maintain adult broodstock for each species. The adult RASU population in Lake Mohave is the most genetically diverse among RASU populations and is the primary broodstock for this species. The LCR MSCP currently captures offspring from this stock directly from the lake and rears them at Willow Beach NFH. The fish are then stocked into the Lower Colorado River. A second broodstock of RASU, developed by the USFWS from Lake Mohave offspring, is maintained at the Southwestern Native Aquatic Resources & Recovery Center (SNARRC, formerly the Dexter National Fish Hatchery & Technology Center). Additional fish rearing capacity is located at the Bubbling Ponds State Fish Hatchery in Arizona. In 2007, the exotic quagga mussel was found in Lake Mead. To insure that quagga mussels do not gain access to Bubbling Ponds SFH, RASU larvae are being provided to Bubbling Ponds SFH from the SNARRC broodstock.

SNARRC maintains the only BONY broodstock in the world (the parents of these fish also came from Lake Mohave). A genetic management plan for this stock has been developed by the USFWS and is in effect. The LCR MSCP is providing funding to SNARRC to support maintenance of this broodstock, hatch out BONY, and deliver the young to grow-out facilities.

The LCR MSCP provides support to the following existing facilities that are currently rearing RASU or BONY:

1. Willow Beach NFH (USFWS)
2. Achii Hanyo Rearing Station (USFWS)

3. SNARRC (USFWS)
4. Bubbling Ponds SFH (AGFD)
5. Lake Mead SFH (NDOW)
6. Overton WMA (NDOW)

FY12 Accomplishments

Over the past several years research and monitoring of fish survival has shown some reaches to have such poor survival that continued stocking is essentially ineffective in accomplishing program goals (i.e., conservation of native fish). Originally, fish production levels were to be ramped up to provide extra fish for species research in the years FY11-FY15, but prerequisite research needs have pushed these target dates into Phase 3 (FY19-FY30). This postponement is required to research how increasing stocking size, training for predator avoidance, improving fish condition prior to release, and evaluating alternate stocking practices may improve survival.

In September 2010, largemouth bass virus (LMBV) was confirmed at SNARRC. LMBV was isolated in one lot of bonytail, the 2008 year class, and in the refuge population of Gila topminnow. Since that time, continued disease testing has not found any presence of LMBV. In 2011, state resource agencies, particularly CDFW, requested that fish from SNARRC not be stocked into the LCR. Through an accelerated series of disease testing and discussions between the USFWS and the states of California, Nevada, and Arizona, a one-time dispensation was granted that allowed stockings of specific RASU and BONY lots in 2011. In 2012, the name of Dexter National Fish Hatchery was changed to Southwestern Native Aquatic Resources & Recovery Center (SNARRC). In October 2012, the Fish Health Unit concluded SARRC's annual fish health inspection using enhanced testing protocols. No pathogens of concern were detected and the facility's disease classification was upgraded from *suspect* LMBV to Class A (pathogen free) disease classification. Prior to the annual inspection, fish lots had been tested in November 2010 and April 2011 and no pathogens of concern were detected at those times.

Fish Augmentation work tasks are presented in Section B. Key accomplishments for FY12 include:

- Successful capture of 25,003 wild RASU larvae from Lake Mohave (B1).
- One new well was drilled at Willow Beach NFH, and an existing well was rehabilitated, increasing available water substantially.
- Tagging and stocking of 605 BONY and 3,998 RASU from Achii Hanyo Rearing Station (B3).
- Tagging and stocking of 7,206 BONY from SNARRC and started developing a second BONY broodstock at SNARRC (B4).
- Tagging and stocking 13,710 RASU from Bubbling Ponds SFH (B5).
- Collection of 400 Lake Mead RASU larvae for rearing at the Lake Mead SFH (B6) and stocking 600 juvenile RASU from the Lake Mead SFH to Overton WMA (B11).
- Tagging and stocking 544 large RASU from lake-side ponds (B7).
- Stocking 1,278 RASU into lake-side ponds (B7).

FY13 Activities

Fish augmentation actions currently underway in FY13 are similar to those conducted in FY12, with similar results expected. Lake-side rearing ponds have undergone routine maintenance for vegetation and debris removal.

Proposed FY14 Activities

Similar to FY13, routine fish augmentation program plans for FY14 look to repeat the successful activities conducted over the first seven years of the program and described in work tasks B1 through B11.

Stocking targets for FY14 are as follows:

- RASU larvae will continue to be collected from Lake Mohave with a target of 25,000 larvae.
- Reach 2 will receive a total of 6,000 RASU. These will be wild-caught larvae collected at Lake Mohave and reared at either Willow Beach NFH, Achii Hanyo Fish Rearing Facility (satellite of Willow Beach NFH), or in lake-side ponds. No BONY will go into Reach 2.
- Reach 3 will receive 8,000 RASU from Bubbling Ponds SFH or SNARRC, and 4,000 BONY from SNARRC.
- Reach 4 will receive 4,000 RASU from Bubbling Ponds SFH and 4,000 BONY from Achii Hanyo Fish Rearing Facility.
- No fish are targeted for Reach 5 at this time.

Species Research (Section C)

Research is being conducted on covered fish species and their habitats to guide selection and application of conservation techniques, to document successful implementation of conservation measures, and to develop alternatives to conservation actions that prove ineffective. This strategy will allow researchers to quantify existing knowledge, identify data gaps, and design and implement species research to fill these data gaps.

A five-year monitoring and research plan was completed in 2008. This plan identified and prioritized research needs relative to specific program elements, to include: fish augmentation and distribution research, general species research, and created habitat research.

FY12 Accomplishments

Fish research work tasks presented in Section C detail accomplishments for FY12. Some of the more significant findings from FY12 are:

Fish Augmentation and Distribution Research

- A study determining that it is not possible to raise RASU to 500 mm in 4 years or less at Willow Beach NFH was conducted (C10).
- Predator detection and avoidance training is ongoing (C10).

- Five different KCl-based quagga mussel control agents were evaluated along with a biological control agent, Zequanox. While some KCL-based formulations showed some promise, none was markedly successful at eliminating quagga veligers and being non-lethal to fish. The Zequanox trial did not work due to problems with the experimental system. No further trials are expected on this work task (C30).
- Ten larval RASU were collected from the inflow area of Lake Mead as well as 26 adult and sub-adult RASU (C13).

General Species Research

- A dual release of BONY was conducted in an effort to understand BONY physical habitat preferences in Lake Havasu and the Bill Williams River National Wildlife Refuge; BONY appear to favor habitat found in the refuge relative to habitat found in the lake (C39).
- The lower limits for dissolved oxygen were determined for BONY fingerlings at both 20°C and 30°C (C32).

Created Habitat Research

- BONY and RASU were removed from ponds 2, 4, and 6, and placed in Pond 1 pending water quality monitoring of the other ponds at the Imperial Ponds Conservation Area (C25).

FY13 Activities

Research remained focused on propagation and culturing, broodstock maintenance, post-stocking survival, habitat use and needs, genetics, and developing new/improved monitoring tools.

Proposed FY14 Activities

In order to attempt to increase survival of augmented BONY and RASU throughout the planning area, several variations to stocking practices will be evaluated. These alternate stocking practices will be conducted under the umbrella work task C61. These are meant to evaluate how well several current and past projects may lead to increased survival. Examples of past projects that might lead to greater survival include conditioning fish prior to release (C26), and predator identification and avoidance training (C10 and C11). Other alternative stocking practices that are likely to be evaluated will include nighttime stocking, stocking in different locations, and tempering fish prior to release.

System Monitoring (Section D)

System monitoring is conducted on existing populations of covered fish species to determine population status, distribution, density, migration, productivity, and other ecologically important parameters. The system monitoring for RASU and BONY is covered in D8. Monitoring data for FLSU are included in the research actions covered in C15. Reclamation annually presents this information by project reach in a status report to the LCR MSCP Steering Committee.

FY12 Accomplishments

Multi-agency, lake-wide fish surveys were conducted on lakes Mead, Mohave, and Havasu, and on river reaches between these reservoirs. Surveys were completed using nets and electro-fishing boats. In addition, helicopter surveys were completed from Lake Mead downstream to Palo Verde Diversion Dam.

Research studies conducted in each reach added additional fishery information. The RASU population in Reach 1 is estimated to be 596 adults, and larvae and juvenile fish were observed, along with active spawning in four separate areas. However, BONY are absent from this reach. Reach 2 had a population of roughly 2,577 repatriated RASU. Repatriated BONY were present in low numbers. Reach 3 also had a strong RASU population, with an estimate of 2,270, which was an increase over the estimate from 2011 of 1,400.

Fish surveys in Reach 4/5 were limited; however, a permit from the Colorado River Indian Tribes (CRIT) was obtained by the USFWS. Field sampling of fish within Reach 4 was limited due to a delay associated with the start of Work Task C49. All fisheries surveys in Reach 5 were restricted to Imperial Ponds. These ponds are discussed under C25.

FY13 Activities

Monitoring data will be collected for reaches 1 through 5. Information will be gleaned from ongoing fish research activities as well as through fish monitoring fieldwork. Fieldwork will include collecting larvae, trammel netting, electro-fishing, remote sensing of PIT-tagged fish, and active and passive tracking of sonic-tagged fish. In particular, the work associated with Work Task C49 will begin with monitoring on the CRIT.

Proposed FY14 Activities

Monitoring will continue in all reaches as previously outlined, and LCR MSCP staff will continue to participate in multi-agency field surveys.

Conservation Area Development (Section E)

Habitat creation for native fish is limited to backwater development. Implementation strategies range from making minor modifications in existing backwaters to major modifications such as the complete excavation of undeveloped land. Beal Lake Conservation Area (E1), Imperial Ponds Conservation Area (E14), and Big Bend Conservation Area (E25) are existing work tasks with native fish habitat creation features. Future backwater development for native fish will be guided by the outcome of Backwater Site Selection (E15) and Conservation Area Site Selection (E16). This work is central to facilitating development of the remaining backwaters necessary under the LCR MSCP.

FY12 Accomplishments

No new backwaters were created this fiscal year. A potential backwater at Bureau Bay, near the city of Needles, California was identified and evaluated; however, the backwater was not selected for implementation at this time and Work Task E32 Bureau Bay has been closed. Potential backwaters at the Parker Dam Camp and adjacent to Park Moabi were identified for evaluation starting in FY13.

FY13 Activities

Subsurface investigations, soil boring, and groundwater well installation was conducted at Parker Dam Camp. The quality and quantity of available render the site unsuitable as a native fish backwater; however, the area may be evaluated as a riparian restoration site in the future. The evaluation of a backwater upstream of the existing Park Moabi channel is being investigated and discussions with the California State lands office (property owner) and San Bernardino County (lease) are ongoing. The project has been titled the Mohave Valley Backwater and will be the focus of our backwater creation efforts in FY13. Subsurface investigations at PVER-South are scheduled for the summer and will determine the groundwater aquifer's characteristics.

Proposed FY14 Activities

Development and construction of the Mohave Valley Backwater, 52 acres of open water and emergent marsh, is tentatively scheduled pending successful negotiations with property owners and leasees. The backwater is located in Reach 3 and therefore would be open to the main channel of the river. Although the focus is on creation of a backwater for native fish, integration of all four land cover types (open water, marsh, honey mesquite, and cottonwood-willow) is being proposed.

Post-Development Monitoring (Section F)

Post-development monitoring will be conducted at each conservation area following completion of habitat creation activities. This monitoring will evaluate both the maturation of the site as it develops into covered species habitat and the use of the habitat by the covered species. Post-Development Monitoring of Fish Restoration Sites (F5) provides funding to support post-development monitoring of Beal Lake and Imperial Ponds. Monitoring of the connected backwater at Big Bend Conservation Area began under C15, and will be continued under F5.

FY12 Accomplishments

Relative abundance and biomass estimates were determined for all species within Beal Lake. Results of this survey indicate that the backwater contains nearly 4,000 individual fish and at least 6 different species. Common carp and largemouth bass comprise almost 90% of the total fish. Water quality was constantly monitored throughout the backwater; low levels of DO and high temperatures were observed locally but not lake-wide. Zooplankton and phytoplankton sampling was increased in FY12, and results continue to show relatively low levels of plankton biomass.

Native fish continue to be contacted at BBCA; routine monitoring documented multiple captures of RASU and FLSU. Water quality parameters continue to remained with in thresholds for all native fish. Zooplankton and phytoplankton abundance were much lower than at other sites, but not surprising for a backwater with this hydrological connection.

FY13 Activities

Monitoring activities for Beal Lake will be reduced until long-term management guidelines are established. Water quality and plankton monitoring will continue, along with periodic remote sensing to track the small population of RASU. Monitoring activities at Beal Lake will be replaced by specific research activities to address native fish life history questions, as well as general site management questions.

BBCA will be monitored at a level similar to FY12. Additional effort will be expended to deploy remote PIT scanners during routine monitoring events and quarterly water quality monitoring.

Proposed FY14 Activities

The activities from FY13 will continue into this year. Recommendations for management guidelines at Beal Lake will dictate future monitoring and research objectives for the site.

Adaptive Management Program (Section G)

The LCR MSCP Adaptive Management Program (AMP) will address uncertainties encountered during implementation of the conservation measures outlined in the HCP. The program has three central components: 1) gauging the effectiveness of existing conservation measures, 2) proposing alternative or modified conservation measures as needed, and 3) addressing changed and unforeseen circumstances.

The current needs of the AMP are in the form of data collection and organization so that the information can be readily accessed for use in the decision-making process. For native fishes, all stocking and tagging data developed by the LCR MSCP are maintained in an electronic database. Data Management (G1) is an integral component of any conservation program, including the LCR MSCP.

Another aspect of the AMP that is needed is a toolbox of evaluation techniques that can gauge the effectiveness of conservation measures as they are completed. Adaptive Management Research Projects (G3) will allow for the development of these tools. Funds allocated from G3 are used to initiate reconnaissance level investigations. If more research is needed, the work is written up as a separate research study and submitted for funding under Section C above.

Fishery program activities under the LCR MSCP are coordinated with other recovery actions (Upper Colorado River Endangered Fish Recovery Program, San Juan River Basin Recovery Implementation Program, and Glen Canyon Dam Adaptive Management Program) through participation annually in meetings and presentations to research and

management groups. These groups include local chapters of the American Fisheries Society, the Colorado River Aquatic Biologists, the Lake Mead Work Group, the Lake Mohave Native Fish Work Group, and the Lower Colorado River Native Fish Work Group.

FY12 Accomplishments

In FY12, the native fish database continued to be maintained. The digitization of the Minckley Library was completed in March FY12. The library is available as a searchable database.

FY13 Activities

In FY13, the LCR MSCP database structure development will continue with other fish project data modules being constructed. Standardization of data across fish projects has begun. Data dictionaries will be developed for fish projects on a priority basis.

Proposed FY14 Activities

In FY14, the LCR MSCP database structure development will continue with other fish project data modules being constructed on a priority basis. Standardization of data across fish projects will continue. Data dictionaries will continue to be developed for fish projects on a priority basis. The development and testing of mobile data collection activities will begin.

Monitoring and Research for Terrestrial, Riparian, and Marsh Habitats and Associated Covered Species

The LCR MSCP utilizes a habitat-based approach to the conservation of covered species. In order to fully comply with the HCP, monitoring and research programs will be conducted throughout the LCR MSCP implementation period. Monitoring and research activities use standardized and scientifically accepted protocols for evaluating covered species and their habitats, guide selection and application of conservation techniques, document successful implementation of conservation measures, and develop alternatives to ineffective conservation actions. The HCP lists five general elements of the monitoring and research program:

1. Species Research (Section C)
2. System Monitoring (Section D)
3. Restoration Research (Incorporated into Section E)
4. Post-Development Monitoring (Section F)
5. Adaptive Management (Section G)

Although the HCP separates the monitoring and research program into five elements, connectivity and overlap exist throughout the monitoring and research program. Work tasks may have multiple goals or study results may directly lead to additional work tasks in other elements. This connectivity is spelled out in each work task under Connections with Other Work Tasks. A brief summary of the work planned for each target area is provided here.

Species Research (Section C)

Species research work tasks are designed to provide the necessary information required to create and manage habitats and populations for covered species. Work tasks identified in this section focus on life history and habitat requirements for covered species, and addressing information gaps in establishing and managing created habitats for these species. Information gained will be used to design and evaluate protocols for system-wide surveys in Section D, and to help design and manage habitat created in Section E.

FY12 Accomplishments

Species research work tasks focus on key priorities set in the Five-Year Monitoring and Research Priorities document. An updated Five-Year Monitoring and Research report (years 2013-2017) was completed in FY12. An updated Species Accounts report will be completed in FY13.

Two of the work tasks (C2 and C4) are specific to stand-alone conservation measures in which money is transferred to another entity to support ongoing programs for sticky buckwheat, threecorner milkvetch, and the relict leopard frog.

In FY12, two new work tasks focused on two covered bird species that have been extremely difficult to locate during the system-wide bird monitoring conducted under C24 and D6. These work tasks (C51 and C52) focus on the distribution and habitat requirements of the vermilion flycatcher and the gilded flicker. Species-specific survey protocols are being developed, and habitat requirements will be determined for incorporation into habitat creation areas. Work tasks that were completed in FY12 included Work Task C36: Elf Owl Detectability Study and Work Task C37: Hydrology Studies for Avian Riparian Obligate Species.

FY13 Activities

Several new FY13 work tasks focused on vegetation, habitat manipulation, and insect populations. Techniques to Establish Native Grasses and Forbs (C54) will develop techniques to establish native grasses and herbaceous perennial forbs. Techniques to Increase Leaf Litter Decomposition Rates (C55) will evaluate methods to reduce litter biomass at habitat creation sites, which contributes to fuel load build up. Habitat Manipulation (C60) will develop cost-effective management techniques for maintaining multi-successional riparian habitats. One work task, Insect Population Biology in Riparian Restoration Sites (C6), will be resurrected to determine presence of insect and arachnid species at LCR MSCP habitat creation sites and the Bill Williams River NWR, and estimate abundances by species in order to determine prey base at the sites.

Proposed FY14 Activities

One additional work task has been proposed for FY14. This work task focuses on habitat characterization for the lowland leopard frog and Colorado River toad (C62).

System Monitoring (Section D)

System monitoring is being conducted to evaluate the ongoing status of covered species and their habitats in the LCR MSCP planning area. System monitoring programs that were established prior to LCR MSCP implementation were continued. Two system monitoring work tasks, Southwestern Willow Flycatcher Presence/Absence Surveys (D2) and Southwestern Willow Flycatcher Habitat Monitoring (D3), continue existing monitoring for the SWFL and its habitat. In FY12, Reclamation received a concurrence letter from the USFWS to discontinue the Southwestern Willow Flycatcher Habitat Monitoring (D3); therefore, work task D3 will be discontinued in FY13.

Multi-species survey protocols have been developed to monitor additional avian species covered under the LCR MSCP. Monitoring Avian Productivity and Survivorship (D5) collects intensive site-specific data on avian species utilizing two restoration sites. Data from this protocol also goes into a national database to track trends of bird species throughout the United States. System Monitoring for Riparian Obligate Avian Species

(D6) uses a multi-species protocol and sample plan developed by the U.S. Geological Survey (USGS) to document long-term population trends and habitat use of riparian bird species throughout the LCR MSCP area.

System monitoring for YBCU was initiated in FY06 and surveys continue under D7 utilizing a species-specific protocol to provide data on this late successional riparian obligate species. Data from these studies will be used to help design and manage created habitats in Section E. Presence/absence surveys continued in FY12 and YBCU have been found nesting at four LCR MSCP conservation areas, including CVCA, PVER, Cibola NWR Unit #1, and Beal Lake Conservation Area.

System Monitoring and Research of Covered Bat Species (D9) continues using protocols developed in FY06. Acoustic surveys and capture techniques will provide information on bat distribution and habitat use. Data from these studies, along with Post-Development Monitoring of Covered Bat Species (F4), will be used to help design and manage created habitats.

System monitoring is also continuing for the lowland leopard frog and Colorado River toad. These surveys will determine the extant populations of the lowland leopard frog and Colorado River toad along the LCR, and help in understanding their habitat requirements.

FY13 Activities

A new work task, Elf Owl System-wide Surveys (D13), began in FY13. A protocol was developed under the Elf Owl Detectability Study (C36) and will be implemented to determine presence/absence of owls along the LCR and population and distribution trends.

Proposed FY14 Activities

System-wide and post development monitoring activities will be continued in FY 14.

Post-Development Monitoring (Section F)

Extensive monitoring of created habitats is necessary to evaluate implementation and effectiveness of designed habitat creation projects. To accomplish this task, pre-development monitoring is conducted to document baseline conditions prior to habitat creation. After habitat creation has been initiated, post-development monitoring for biotic and abiotic habitat characteristics is conducted to document successful implementation and to record successional change within the restored areas.

FY12 Activities

In FY12, post-development monitoring for habitat characteristics and LCR MSCP covered species use was conducted at several riparian restoration demonstration sites and habitat creation sites (Table 1-12). Each habitat creation project will be designed to provide habitat requirements for targeted covered species. To evaluate effectiveness in providing these habitat requirements, pre- and post-development monitoring will be

conducted for targeted covered species, including avian species (F2), small mammals (F3), bats (F4), insects (F6), and marsh birds (F7).

Table 1-12. LCR MSCP Covered Species Post-Development Monitoring in FY12

Conservation Area	Vegetation	Avian	YBCU	SWFL	Small Mammals	Bats	Marsh Birds
Beal Lake	X	X	X	X	X	X	X
Big Bend					X		X
PVER	X	X	X	X	X	X	
CVCA	X	X	X	X	X	X	
Cibola NWR Unit #1	X	X	X	X	X	X	
Hart Mine Marsh							X
Imperial NWR		X			X	X	X
Yuma East Wetlands	X	X	X	X	X	X	X
Hunter's Hole	X				X		

In FY12, post-development monitoring also occurred at Hunters Hole and at Yuma East Wetlands. Surveys were conducted to monitor bats, small mammals, vegetation, avian use, SWFL, YBCU, and marsh birds at Yuma East Wetlands in anticipation of this site becoming part of the LCR MSCP. Preliminary monitoring occurred at Hunters Hole for vegetation and small mammals, as it was only the first growing season for this site.

Adaptive Management Program (Section G)

The AMP will address uncertainties encountered during program implementation by gauging the effectiveness of existing conservation measures, proposing alternative or modified conservation measures as needed, and addressing changed or unforeseen circumstances. The *Final Science Strategy* details the AMP process for the research and monitoring programs at the project and programmatic levels. A five-year planning cycle has been identified to allow for the receipt of new information, the analysis of that information, and the incorporation of the new information into the design or direction of future work tasks. The five-year planning cycle will allow for a review of past activities and the setting of priorities for the next five-year cycle. The *Final Five-Year Monitoring and Research Priorities for the Lower Colorado River Multi-Species Conservation Program: 2013-2017* was completed in FY12.

Data Management (G1) is an integral component of any conservation program, including the LCR MSCP. Funds are allocated to design a data management system capable of tracking all information needed in the decision making process.

Funding has been allocated under Adaptive Management Research Projects (G3) to begin research studies identified as priorities when applicable.

FY12 Accomplishments

In FY12, the test database was constructed to include all LCR MSCP data locations and species tables, and database modules were created for the general bird and vegetation monitoring projects. Under G3, data analysis was completed for the Tamarisk Beetle Study. Also in FY12, vegetation typing of new aerial photos was cost-shared with Reclamation's Lower Colorado River Accounting Systems group under G3. This product will provide Reclamation with additional tools for determining vegetation changes over time at the landscape scale. This project is expected to be completed in FY13.

FY13 Activities

In FY13, the LCR MSCP database structure development has continued with the southwestern willow flycatcher, yellow-billed cuckoo, and bats modules being constructed. Data dictionaries will be developed for each of these projects on a priority basis. Under G3, peer review of the bat monitoring projects will begin in FY13.

Proposed FY14 Activities

In FY14, the LCR MSCP database structure development will continue with other data modules being constructed on a priority basis. Database modules are expected to be designed for all wildlife species in future years. Funding has been allocated under G3 to begin research studies identified as priorities when applicable will continue.

Conservation Area Development and Management

A major component of the LCR MSCP is the creation and management of habitat. Section E addresses the identification, selection, development, and management of created habitat and any restoration research being conducted. In general, habitat creation projects target land-cover types with the intent that the vegetation is managed for or developed into a species-specific habitat for covered species.

Cottonwood-willow, honey mesquite, marsh, and backwater are the predominant land cover types to be created under the LCR MSCP. For terrestrial and marsh land cover types, trees, shrubs, and groundcover are typically planted or seeded to create the desired land cover type. For backwater land cover types, which include open water and associated emergent marsh, the habitat is defined by evaluation of the physical, chemical, and biological conditions suitable for the establishment and maintenance of healthy populations of fish and other species associated with backwaters. Maturation and management of the land cover types ultimately create the habitat.

As described in the conservation measures, habitat creation goals for the LCR MSCP include establishing:

1. 5,940 acres of cottonwood-willow
2. 1,320 acres of honey mesquite
3. 512 acres of marsh
4. 360 acres of backwater
   8,132 total acres

To the extent practicable based on site conditions, cottonwood-willow, honey mesquite, marsh, and backwaters will each be restored in proximity to other land cover types to create integrated mosaics of habitat that approximate the relationships among aquatic and terrestrial communities historically present along the LCR floodplain. The selection process is described in the *Draft Guidelines for the Screening and Evaluation of Potential Conservation Areas*, which is available on the LCR MSCP website. These conservation areas are discrete areas of conserved habitats managed as a single unit under the LCR MSCP. Conservation areas include LCR MSCP created habitats as well as buffer areas and other lands that may be included in the conservation area design. Conservation areas developed primarily for riparian and marsh species followed a different selection and evaluation process from those established primarily for native fish. Costs associated with development and implementation of the guidelines were captured in Backwater Site Selection (E15) and Conservation Area Site Selection (E16). Starting in FY13, the effort to select riparian, marsh, and backwater conservation areas will be captured under E16 to reflect the intended integration of all land cover types whenever feasible.

Conservation areas developed primarily for riparian and honey mesquite land cover types such as PVER (E4), CVCA (E5), and Cibola NWR Unit #1 (E24) involve the conversion

of existing land cover types (such as active agricultural, fallow agricultural, and undeveloped land) to native riparian species. Restoration research priorities are being developed in accordance with the Final Science Strategy. The requirements are expected to include methods to cost-effectively establish and manage planned land cover types while excluding growth of nonnative plant species. Terrestrial restoration research projects include Beal Lake Riparian Restoration (E1), ‘Ahakhav Tribal Preserve (E3), Cottonwood Genetics Study (E6), Mass Transplanting Demonstration (E7), Seed Feasibility Study (E8), and Groundwater and Soil Salinity Monitoring Network (E34).

The current strategy for conservation areas that are being developed primarily as disconnected backwaters for native fish include: 1) delivery of 100% non-native fish free replacement water, and 2) the ability to completely drain and renovate the ponds with the use of piscicides. Backwaters created in Reach 3 will continue to be connected to the main stem river in to address the life history requirements of the flannelmouth sucker. Restoration research priorities for backwater development are expected to include researching the screening of water to exclude nonnative fish, maintaining water quality in isolated backwaters, and controlling nonnative fish species.

Creating and maintaining the appropriate habitats as dictated by the conservation measures presents several challenges. Present flow regimes on the LCR have been altered considerably from dynamic pre-development flows. Introduced and invasive species exist throughout the program area. Approaches to habitat creation must not only acknowledge the differences from historical conditions, but must also be able to work effectively within the context of current conditions. In addition, existing knowledge and practices must be incorporated to take advantage of appropriate available technologies. An example of this as applied to riparian habitat creation is the use of agricultural technology and infrastructure to deliver water and simulate flooding events for riparian habitat creation projects.

To meet these challenges and the goals of the LCR MSCP, three components of habitat creation have been developed: 1) site identification and selection, 2) research and demonstration, and 3) development and management. The following sections describe the distinctions between the components of habitat creation and how they are interconnected within the context of an adaptive management approach.

Site Identification and Selection

A logical process for identifying and selecting locations for habitat creation projects contributes to the overall success of the LCR MSCP. In general, ideal sites are those that have the greatest potential for successfully achieving the desired habitat in the most cost-effective manner. Although this objective appears obvious, it is obscured by a number of variables that can affect both cost-effective development and habitat success. These variables can be 1) logistical: site accessibility, available infrastructure, availability of sufficient resources (water), 2) physical: depth to groundwater, soil texture and chemistry, water quality, eutrophic stage, and 3) political: potential impacts to other species or habitats, permitting requirements, and landowner/partner support. This represents only a portion of the

known variables that must be considered when identifying and selecting sites, as unforeseen factors can contribute to greater costs and may limit success in habitat creation. As the program proceeds, this newly acquired knowledge will be incorporated into the site-selection processes. Appropriate adaptations are being made through the AMP to properly address and apply newly acquired information, allowing for more accurate assessment of development costs and success potential for future habitat creation projects.

FY12 Accomplishments

Conservation Areas

LCR MSCP staff continued to attend and contribute at numerous meetings held with other resources agencies and tribal entities. We also conduct quarterly meetings with the USFWS representatives from all four federal refuges on the Lower Colorado River, both complex managers, and staff from both the Ecological Services and the Arizona Fisheries Research Office of the USFWS.

The Pretty Water Conservation Area, formerly known as the Shark's Tooth Conservation Area, was reviewed and found acceptable to both the USFWS and the LCR MSCP. When completed, the Conservation Area is expected to establish over 500 acres of honey mesquite within the State of California, located on Cibola National Wildlife Refuge.

A site visit hosted by the Bard Water District was held on the Yuma Island Area. A potential project titled, Haughtelin Lake Wildlife Area, was discussed and concepts for potential habitat creation identified. The project as envisioned would follow the old river channel with the Yuma Island and create a mix of cottonwood, willow, marsh, and honey mesquite. The review is in the preliminary stage and further discussions are necessary to define land ownership and water before any project can move forward.

Backwater Site Selection

Restoring Parker Dam Camp Conservation Area, located in Reach 4 within the State of California, as a backwater with adjacent cottonwood-willow and honey mesquite was discussed with officials from Parker Dam. The camp was established as a Government Camp in 1934, but is no longer in use. The camp is located on Reclamation withdrawn lands and within the security zone of the dam, and is fenced and closed to the public. Internally, Reclamation was able to agree that restoration of the camp was a compatible use and an agreement has been drafted to secure the project area for the LCR MSCP. Additional data collection, specifically determining the quantity and quality of water in the aquifer below the site, is necessary to revise the conceptual design.

A 146-acre parcel just north of Park Moabi within Reach 3 along the Colorado River in California has been identified as a potential connected backwater to be restored under the program. Initial discussions with California State Lands Office (owner), San Bernardino County (lease), and Reclamation have indicated a willingness to partner in the creation and management of the backwater.

FY13 Activities

Starting in FY13, all activities previously tracked under Work Task E16 and E15 have been combined and are now captured under Work Task E16. It is expected that staff from the LCR MSCP will continue to attend and contribute at numerous meetings held with other resources agencies and tribal entities. Quarterly meetings are being conducted with the USFWS representatives from all four federal refuges on the Lower Colorado River, both complex managers, and staff from both the Ecological Services and the Arizona Fisheries Research Office of the USFWS.

Conservation Areas

Signing of a land use agreement, compliance, and permitting have begun for the Pretty Water Conservation Area, which was identified under site selection in FY12, and are being tracked under site-specific Work Task E33.

Drilling of exploratory wells at Parker Dam Camp is expected to be completed. The quantity and quality of 100% non-native, fish-free water available will determine the size and scope of backwater creation. A conceptual restoration design based on site conditions and water availability will be prepared.

Discussions are expected to continue with multiple parties on a potential Conservation Area within the Yuma Island area titled, Haughtelin Lake Wildlife Area. The first issue to be addressed is land ownership and resolving claims from both the California and Arizona state lands offices.

Opportunities for restoration on tributaries to the lower Colorado River are also being discussed. The Nature Conservancy has recently finished a review of restoration opportunities on the lower Gila River and Reclamation is also evaluating a potential riparian restoration project on the lower Virgin River.

Drafting of a site-specific Restoration Development and Monitoring Plan for the Mohave Valley Backwater is anticipated. The project is targeting all four land cover types (backwater, marsh, honey mesquite, and cottonwood-willow) and is projecting 52 of backwater dedicated to native fish within the state of California.

Figure 1 depicts the geographical distribution of nine established conservation areas, as well as two potential conservation areas (Planet Ranch and Yuma East Wetlands) that are being evaluated for inclusion into the program.

Figure 1.

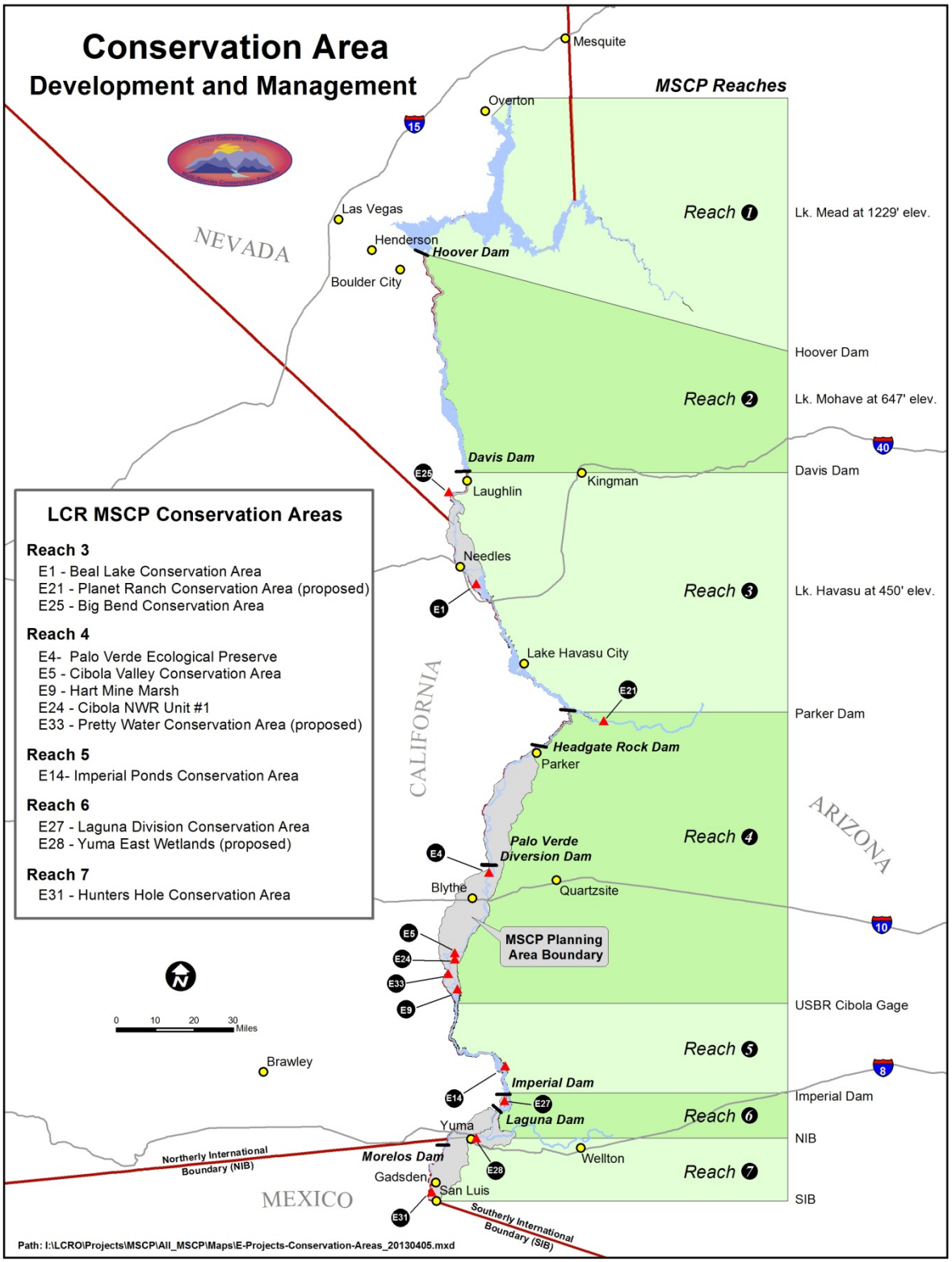
Conservation Area
Development and Management
MSCP Reaches
Mesquite
Overton
Las Vegas
Henderson
Hoover Dam
Boulder City
NEVADA
Reach 1
Lk. Mead at 1229' elev.
Hoover Dam
Reach 2
Lk. Mohave at 647' elev.
Davis Dam
Kingman
Laughlin
Davis Dam
Needles
Reach 3
Lk. Havasu at 450' elev.
Lake Havasu City
CALIFORNIA
Parker Dam
Headgate Rock Dam
Parker
ARIZONA
Reach 4
Palo Verde Diversion Dam
Blythe
Quartzsite
MSCP Planning Area Boundary
USBR Cibola Gage
Reach 5
Brawley
Imperial Dam
Imperial Dam
Reach 6
Laguna Dam
Yuma
NIB
Wellton
Morelos Dam
Gadsden
San Luis
Reach 7
SIB
MEXICO
Northerly International Boundary (NIB)
Southerly International Boundary (SIB)
LCR MSCP Conservation Areas
Reach 3
E1 - Beal Lake Conservation Area
E21 - Planet Ranch Conservation Area (proposed)
E25 - Big Bend Conservation Area
Reach 4
E4- Palo Verde Ecological Preserve
E5 - Cibola Valley Conservation Area
E9 - Hart Mine Marsh
E24 - Cibola NWR Unit #1
E33 - Pretty Water Conservation Area (proposed)
Reach 5
E14- Imperial Ponds Conservation Area
Reach 6
E27 - Laguna Division Conservation Area
E28 - Yuma East Wetlands (proposed)
Reach 7
E31 - Hunters Hole Conservation Area
0 10 20 30 Miles
Path: I:\LCRO\Projects\MSCP\All_MSCP\Maps\E-Projects-Conservation-Areas_20130405.mxd

Figure 2.

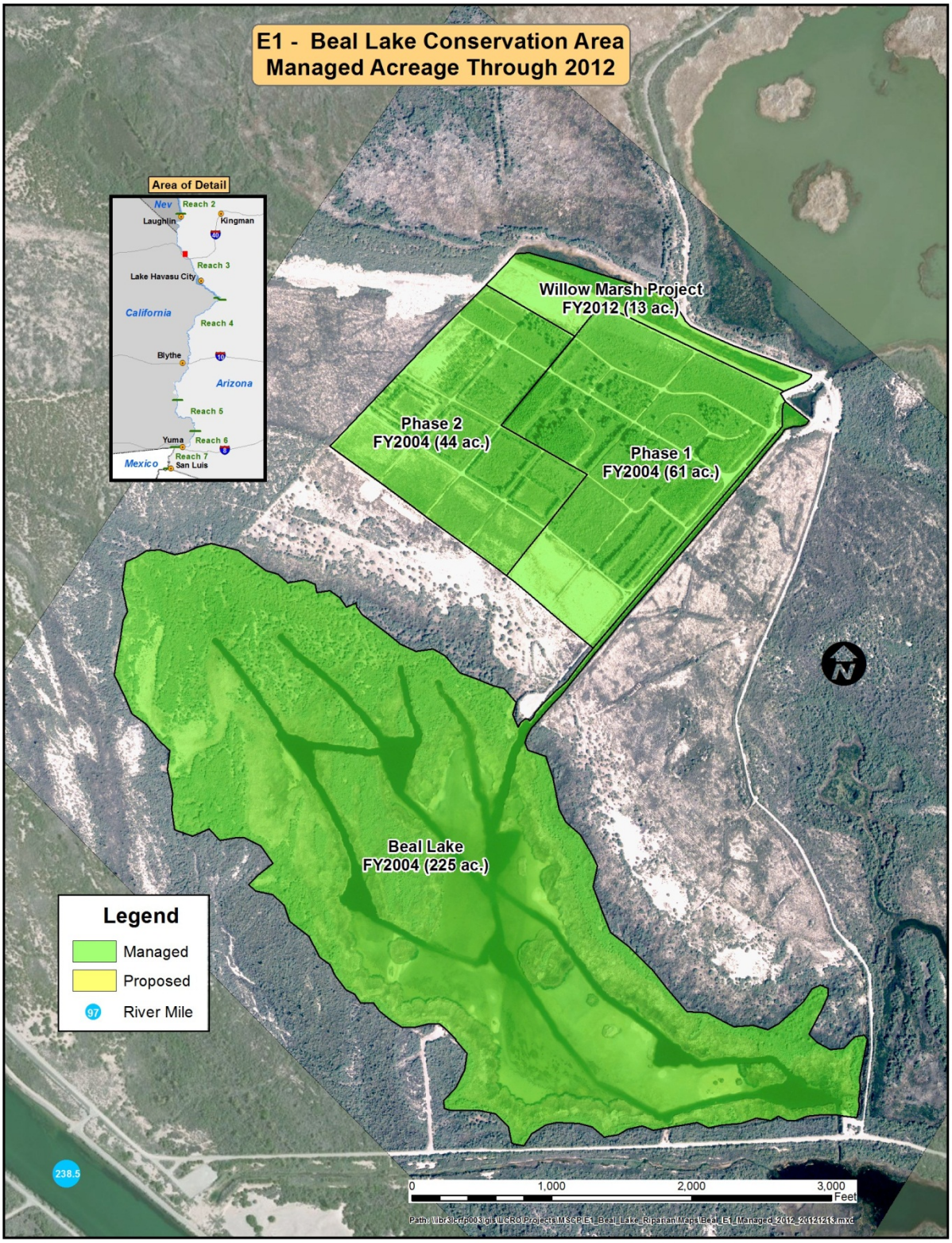
E1 - Beal Lake Conservation Area
Managed Acreage Through 2012
Area of Detail
Nev
Reach 2
Laughlin
Kingman
Reach 3
Lake Havasu City
California
Reach 4
Blythe
Arizona
Reach 5
Yuma
Reach 6
Reach 7
Mexico
San Luis
Willow Marsh Project
FY2012 (13 ac.)
Phase 2
FY2004 (44 ac.)
Phase 1
FY2004 (61 ac.)
Beal Lake
FY2004 (225 ac.)
Legend
Managed
Proposed
River Mile
238.5
0
1,000
2,000
3,000
Feet

Figure 3.

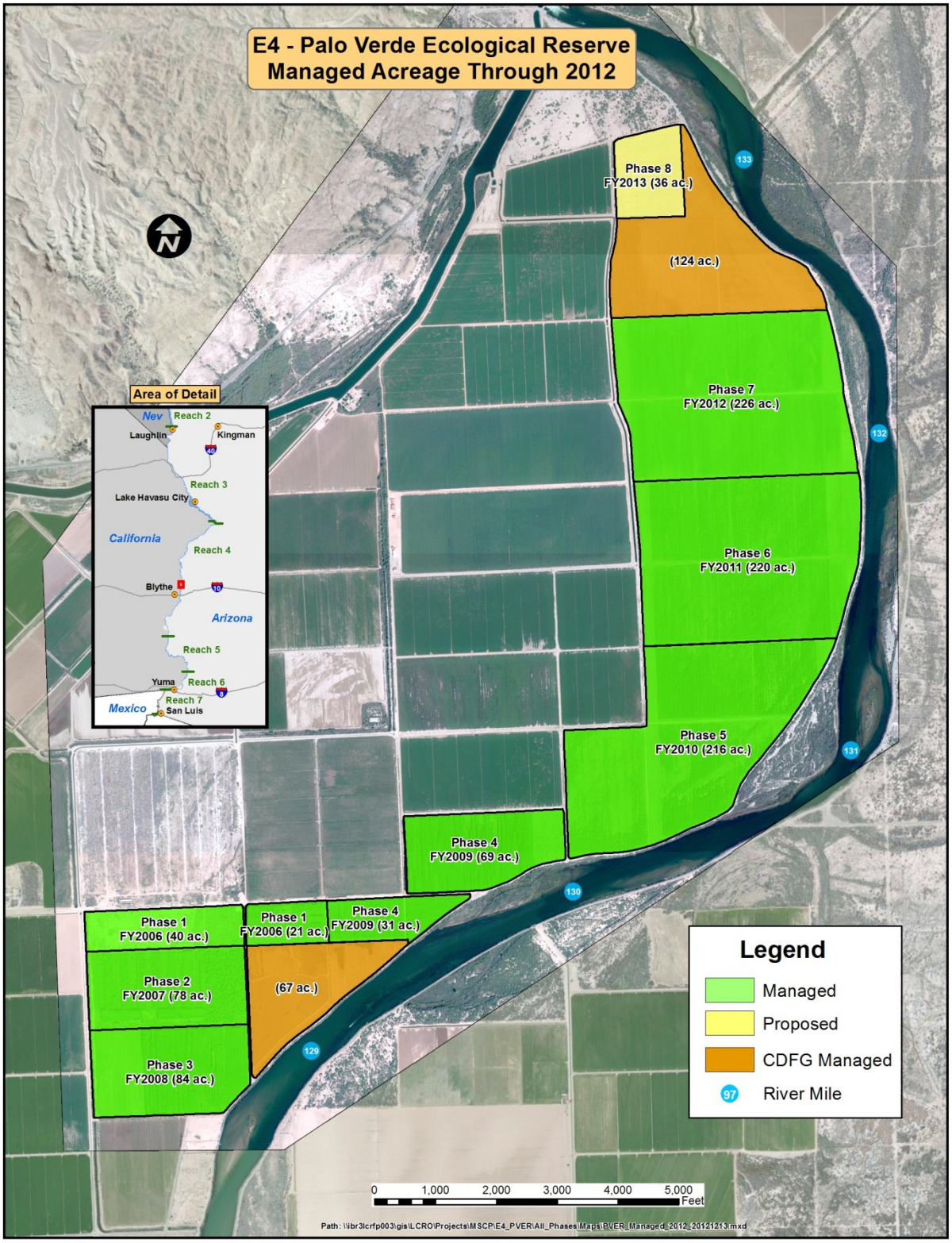
E4 - Palo Verde Ecological Reserve
Managed Acreage Through 2012
Phase 8
FY2013 (36 ac.)
(124 ac.)
Phase 7
FY2012 (226 ac.)
Phase 6
FY2011 (220 ac.)
Phase 5
FY2010 (216 ac.)
Phase 4
FY2009 (69 ac.)
Phase 1
FY2006 (40 ac.)
Phase 1
FY2006 (21 ac.)
Phase 4
FY2009 (31 ac.)
Phase 2
FY2007 (78 ac.)
(67 ac.)
Phase 3
FY2008 (84 ac.)
133
132
131
130
129
Area of Detail
Nev
Reach 2
Laughlin
Kingman
Reach 3
Lake Havasu City
California
Reach 4
Blythe
Arizona
Reach 5
Yuma
Reach 6
Reach 7
San Luis
Mexico
Legend
Managed
Proposed
CDFG Managed
River Mile
0
1,000
2,000
3,000
4,000
5,000
Feet
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Figure 4.

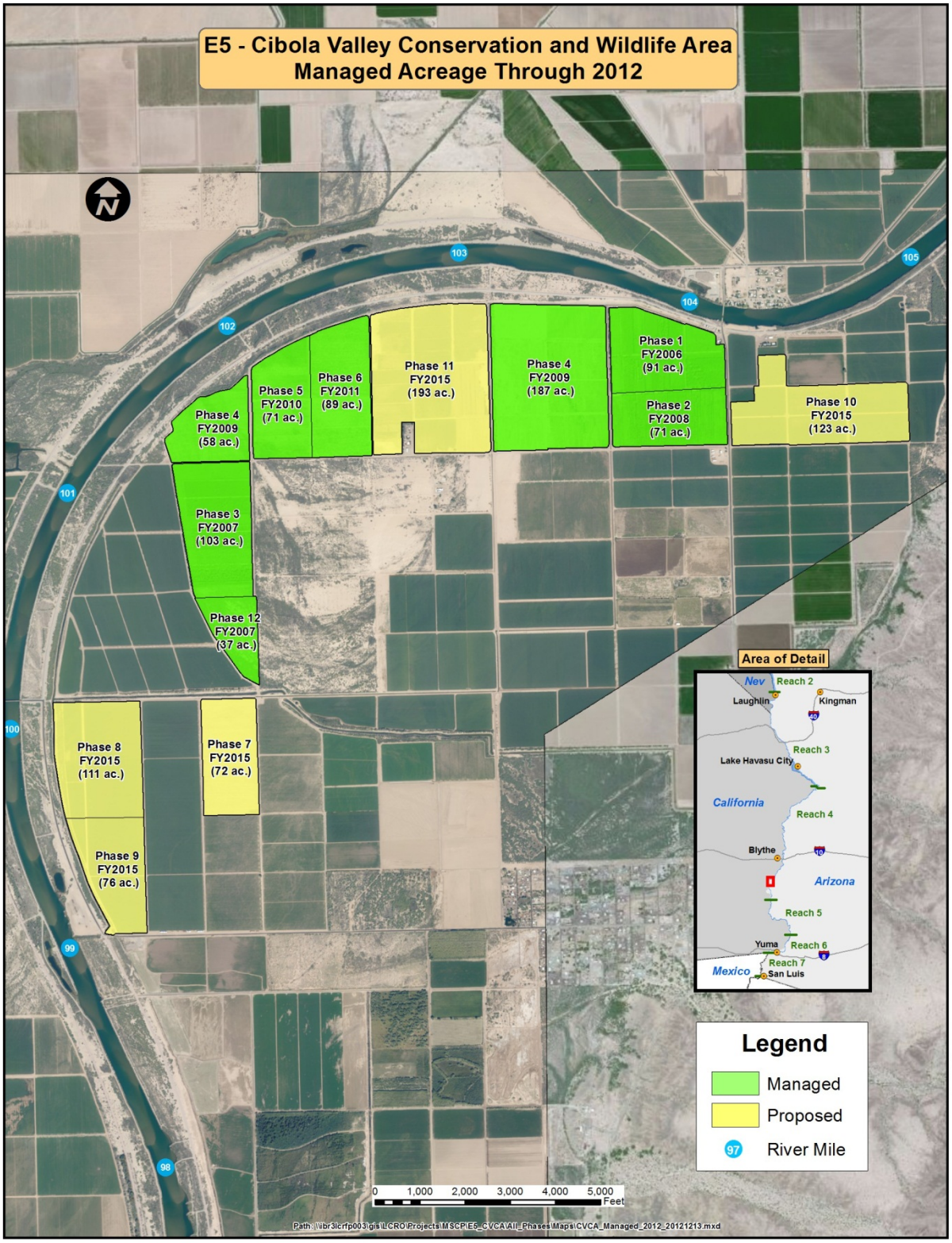
E5 - Cibola Valley Conservation and Wildlife Area
Managed Acreage Through 2012
Phase 1 FY2006 (91 ac.)
Phase 2 FY2008 (71 ac.)
Phase 3 FY2007 (103 ac.)
Phase 4 FY2009 (58 ac.)
Phase 4 FY2009 (187 ac.)
Phase 5 FY2010 (71 ac.)
Phase 6 FY2011 (89 ac.)
Phase 7 FY2015 (72 ac.)
Phase 8 FY2015 (111 ac.)
Phase 9 FY2015 (76 ac.)
Phase 10 FY2015 (123 ac.)
Phase 11 FY2015 (193 ac.)
Phase 12 FY2007 (37 ac.)
Area of Detail
Nev
Reach 2
Laughlin
Kingman
Reach 3
Lake Havasu City
California
Reach 4
Blythe
Arizona
Reach 5
Yuma
Reach 6
Reach 7
Mexico
San Luis
Legend
Managed
Proposed
River Mile
0 1,000 2,000 3,000 4,000 5,000 Feet

Figure 5.

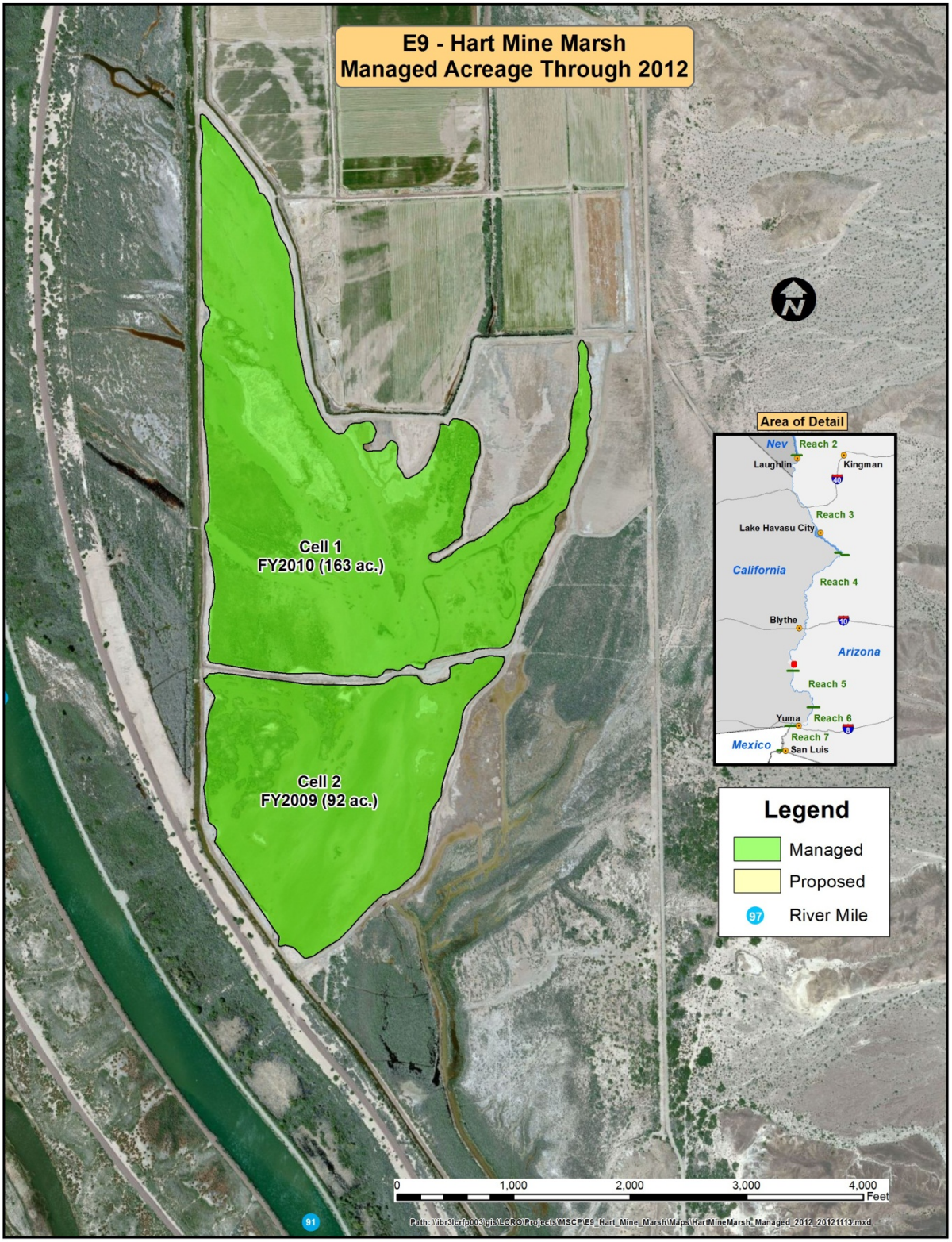
E9 - Hart Mine Marsh
Managed Acreage Through 2012
Cell 1
FY2010 (163 ac.)
Cell 2
FY2009 (92 ac.)
Area of Detail
Nev
Reach 2
Laughlin
Kingman
Reach 3
Lake Havasu City
California
Reach 4
Blythe
Arizona
Reach 5
Yuma
Reach 6
Reach 7
Mexico
San Luis
Legend
Managed
Proposed
River Mile
0
1,000
2,000
3,000
4,000
Feet

Figure 6.

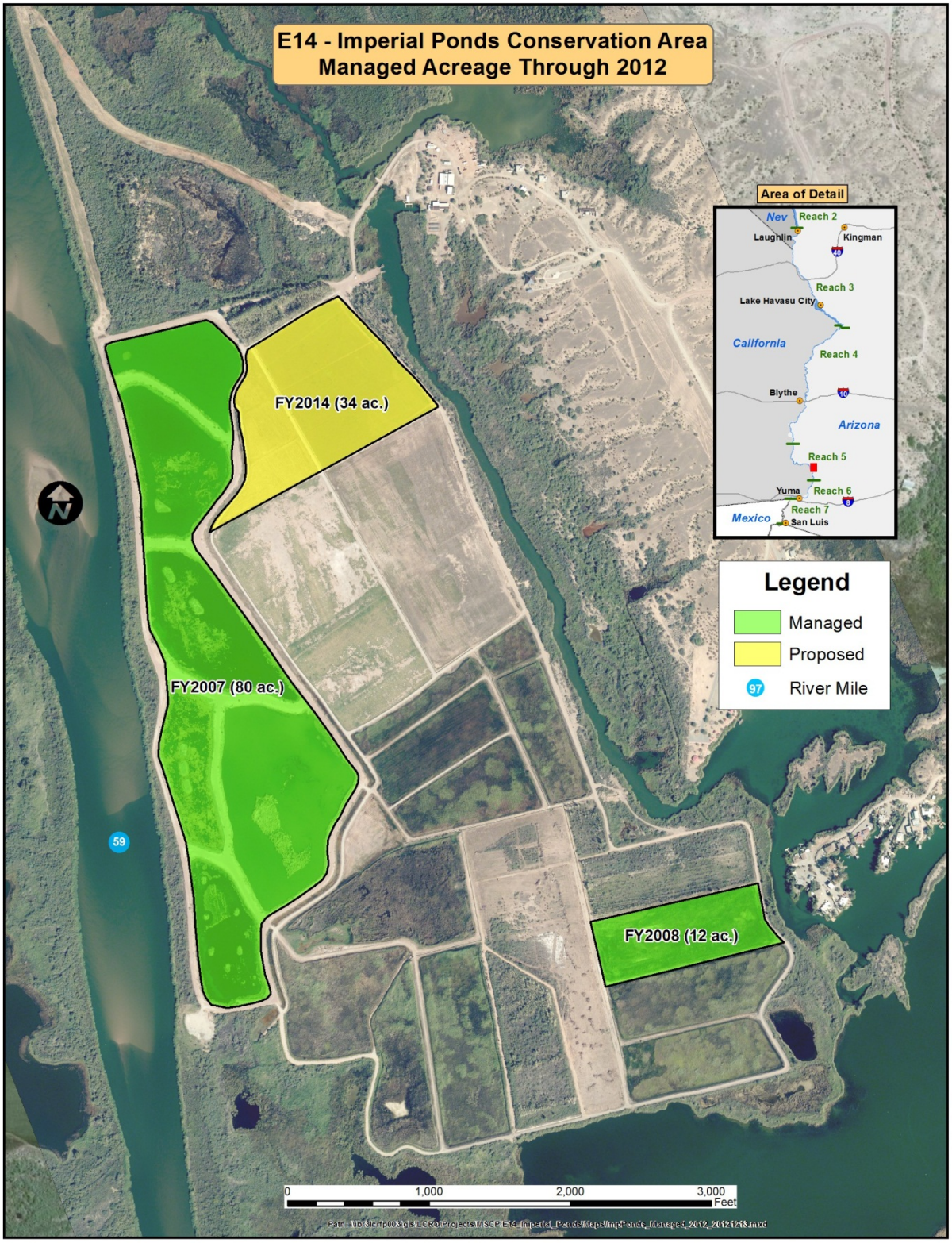
E14 - Imperial Ponds Conservation Area
Managed Acreage Through 2012
Area of Detail
Nev
Reach 2
Laughlin
Kingman
40
Reach 3
Lake Havasu City
California
Reach 4
Blythe
10
Arizona
Reach 5
Yuma
Reach 6
8
Reach 7
Mexico
San Luis
Legend
Managed
Proposed
97
River Mile
FY2014 (34 ac.)
FY2007 (80 ac.)
FY2008 (12 ac.)
N
59
0
1,000
2,000
3,000
Feet

Figure 7.

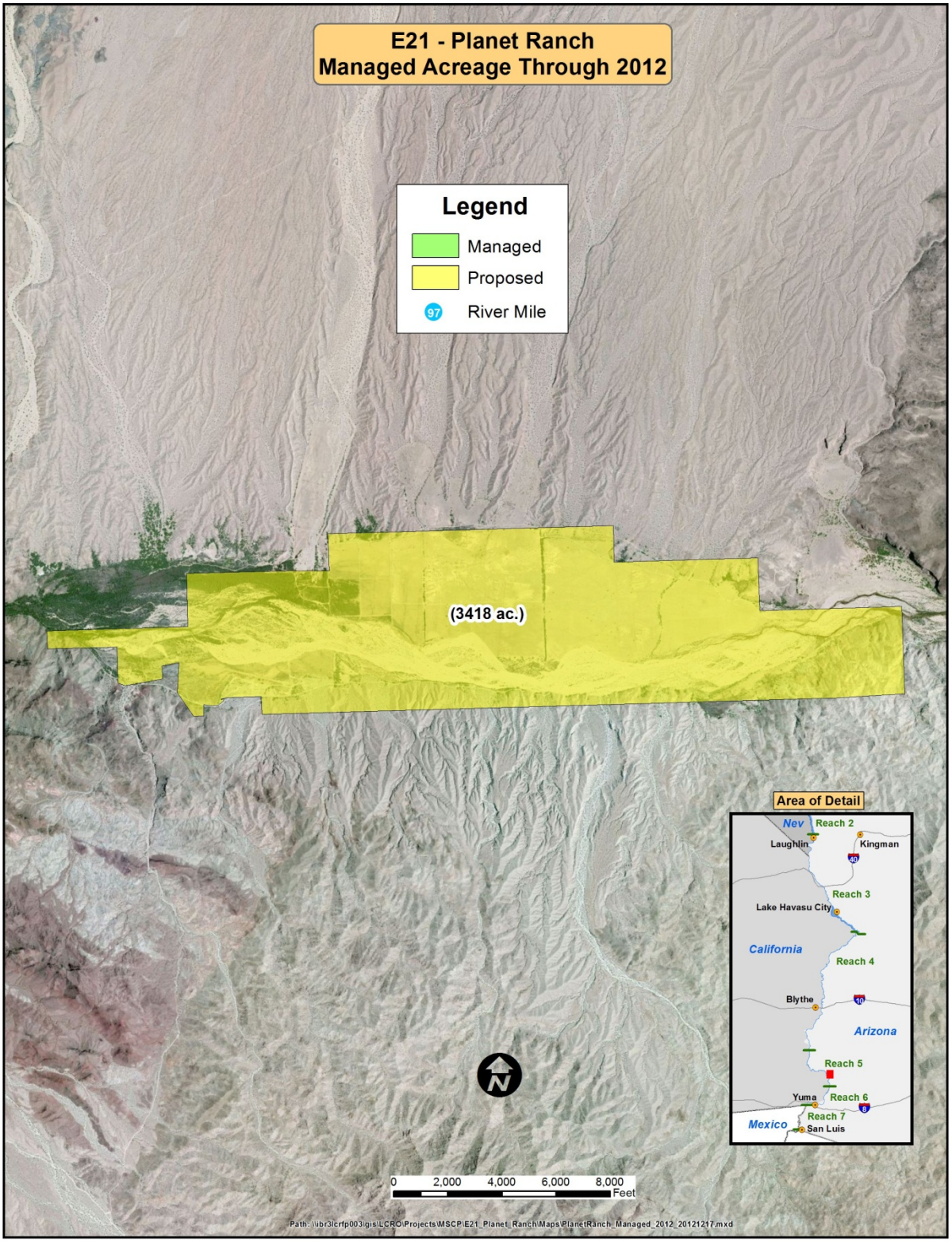
E21 - Planet Ranch
Managed Acreage Through 2012
Legend
Managed
Proposed
97
River Mile
(3418 ac.)
Area of Detail
Nev
Reach 2
Laughlin
Kingman
Reach 3
Lake Havasu City
California
Reach 4
Blythe
Arizona
Reach 5
Yuma
Reach 6
Reach 7
Mexico
San Luis
0
2,000
4,000
6,000
8,000
Feet
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Figure 8.

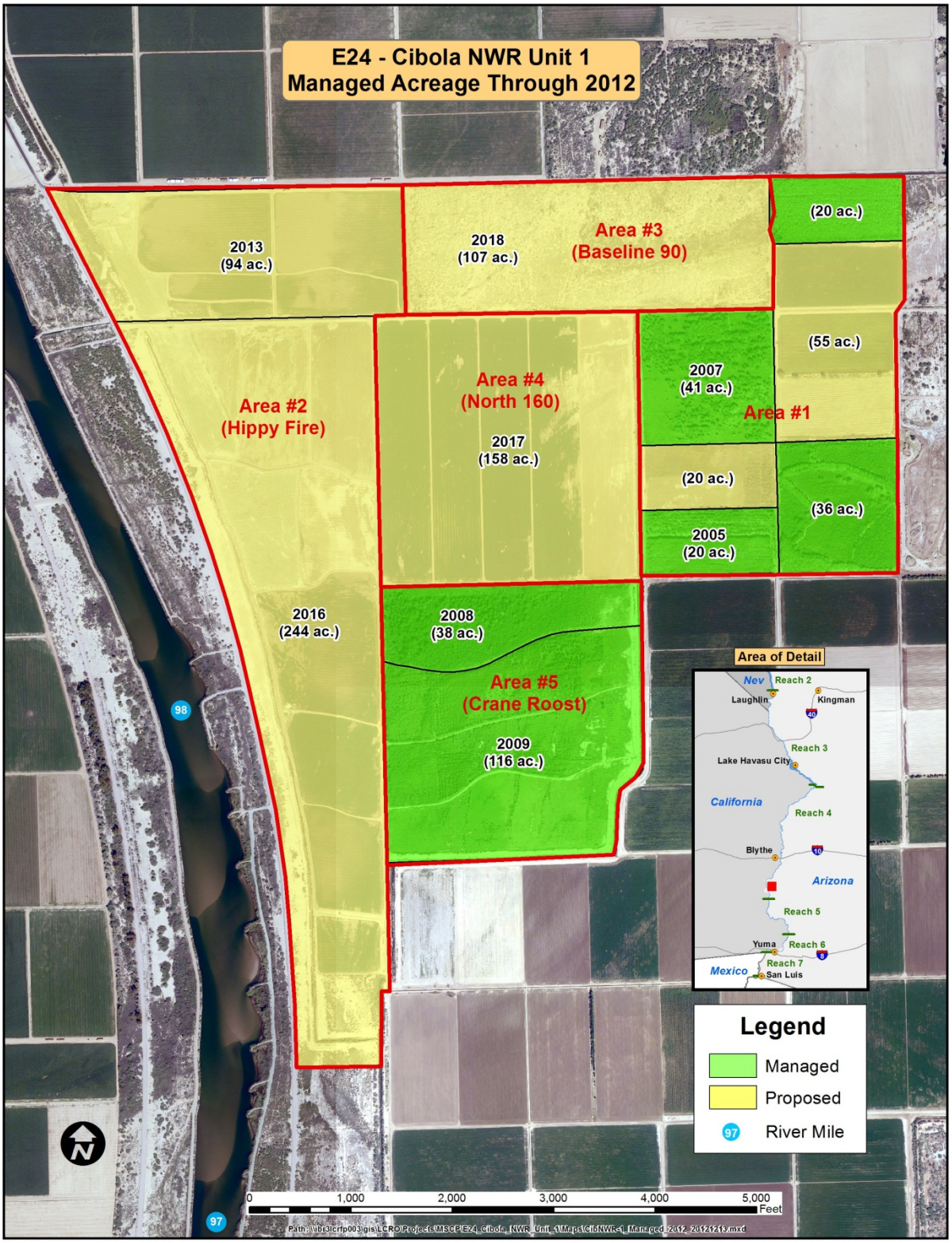

E24 - Cibola NWR Unit 1
Managed Acreage Through 2012
2013
(94 ac.)
2018
(107 ac.)
Area #3
(Baseline 90)
(20 ac.)
(55 ac.)
2007
(41 ac.)
Area #1
Area #2
(Hippy Fire)
Area #4
(North 160)
2017
(158 ac.)
(20 ac.)
(36 ac.)
2005
(20 ac.)
2016
(244 ac.)
2008
(38 ac.)
Area #5
(Crane Roost)
2009
(116 ac.)
98
97
Area of Detail
Nev
Reach 2
Laughlin
Kingman
40
Reach 3
Lake Havasu City
California
Reach 4
Blythe
10
Arizona
Reach 5
Yuma
Reach 6
8
Reach 7
Mexico
San Luis
Legend
Managed
Proposed
97
River Mile
0
1,000
2,000
3,000
4,000
5,000
Feet

Figure 9.

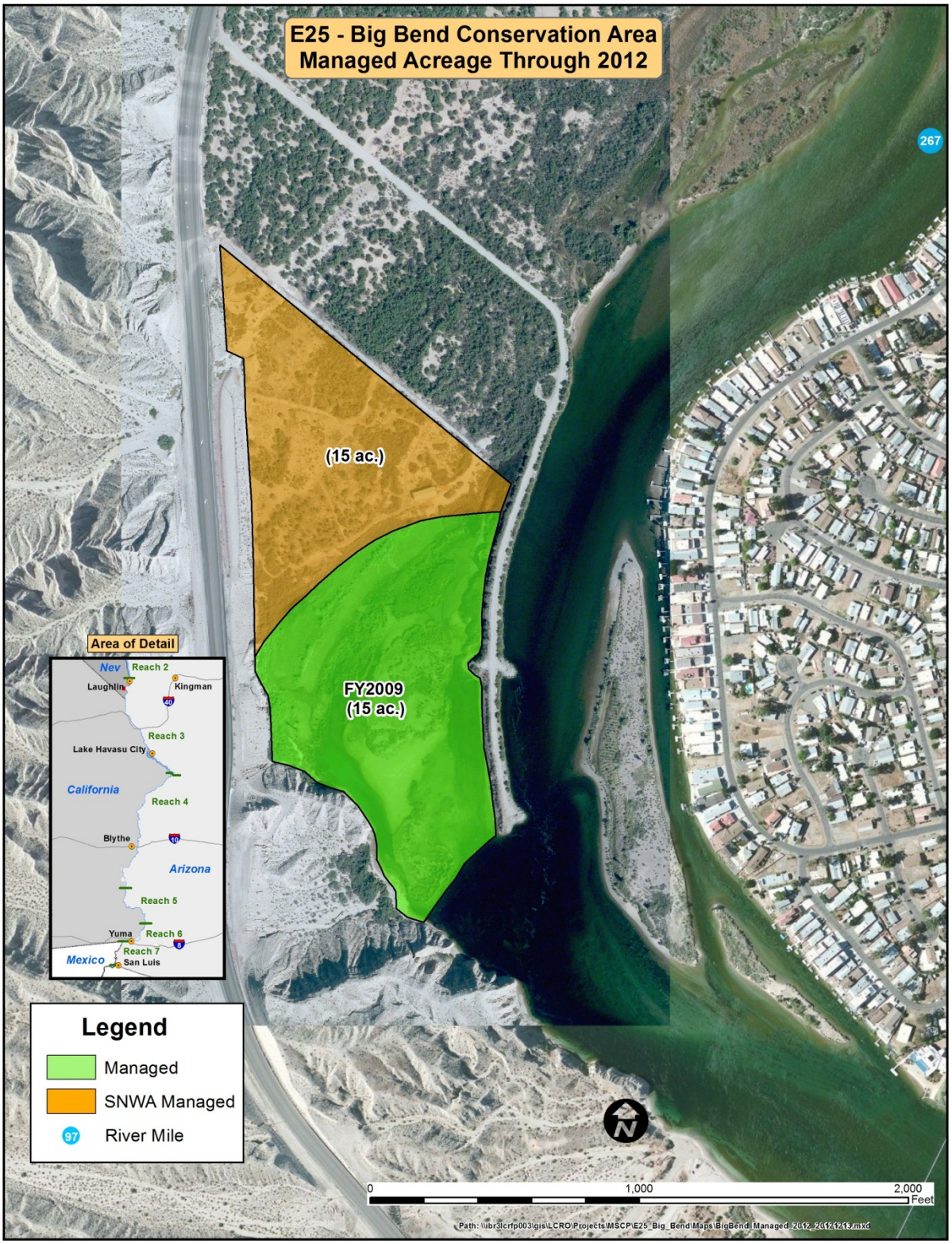

E25 - Big Bend Conservation Area
Managed Acreage Through 2012
267
(15 ac.)
FY2009
(15 ac.)
Area of Detail
Nev
Reach 2
Laughlin
Kingman
40
Reach 3
Lake Havasu City
California
Reach 4
Blythe
10
Arizona
Reach 5
Yuma
Reach 6
8
Reach 7
Mexico
San Luis
Legend
Managed
SNWA Managed
97
River Mile
0
1,000
2,000
Feet
Path: \\br3lcrfp003\gis\LCRO\Projects\MSCP\E25_Big_Bend\Maps\BigBend_Managed_2012_20121213.mxd

Figure 10.

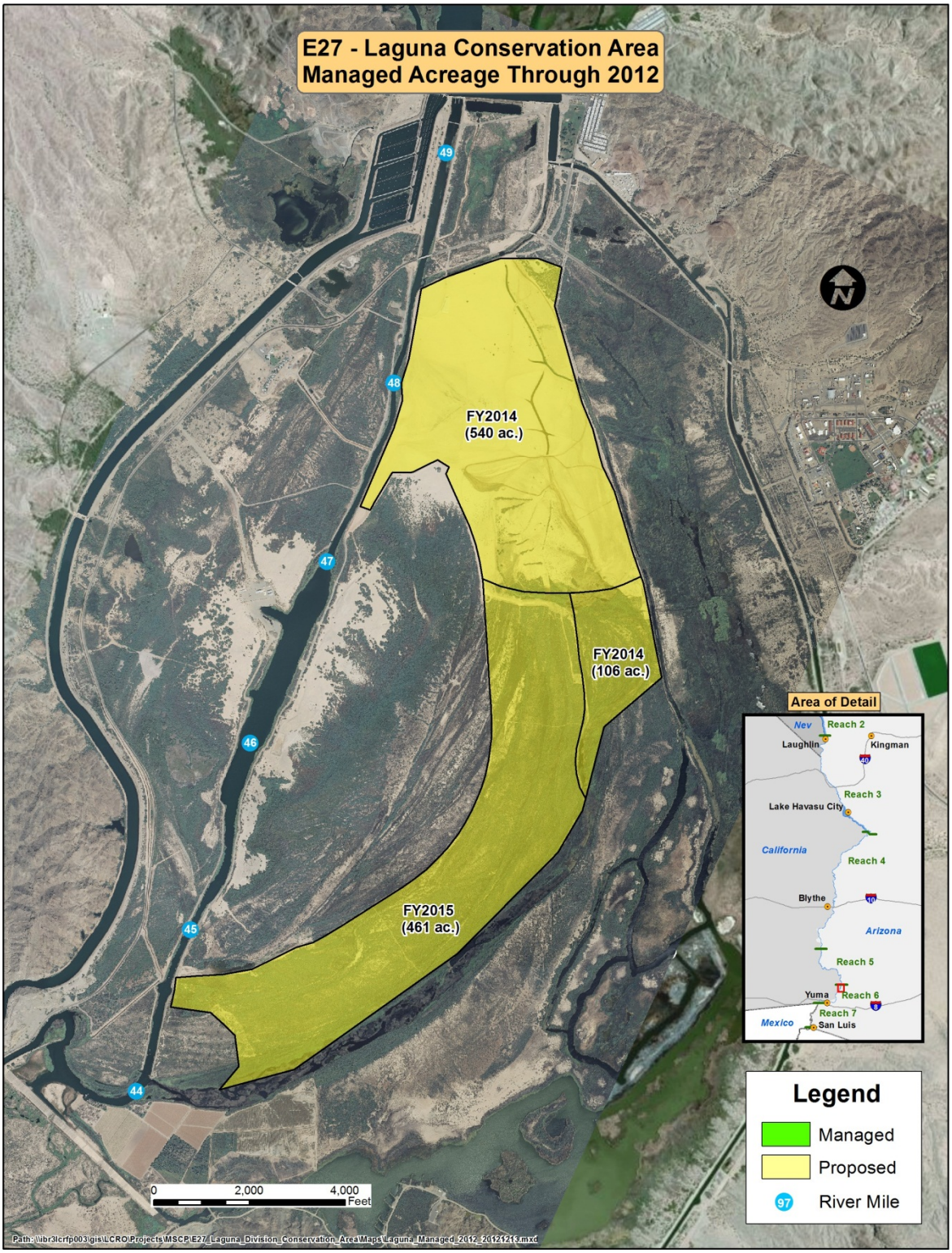

E27 - Laguna Conservation Area
Managed Acreage Through 2012
49
48
47
46
45
44
FY2014
(540 ac.)
FY2014
(106 ac.)
FY2015
(461 ac.)
Area of Detail
Nev
Reach 2
Laughlin
Kingman
Reach 3
Lake Havasu City
California
Reach 4
Blythe
Arizona
Reach 5
Yuma
Reach 6
Reach 7
Mexico
San Luis
Legend
Managed
Proposed
River Mile
0
2,000
4,000
Feet
Path: \\br3lcrfp003\gis\LCRO\Projects\MSCP\E27_Laguna_Division_Conservation_Area\Maps\Laguna_Managed_2012_20121213.mxd

Figure 11.

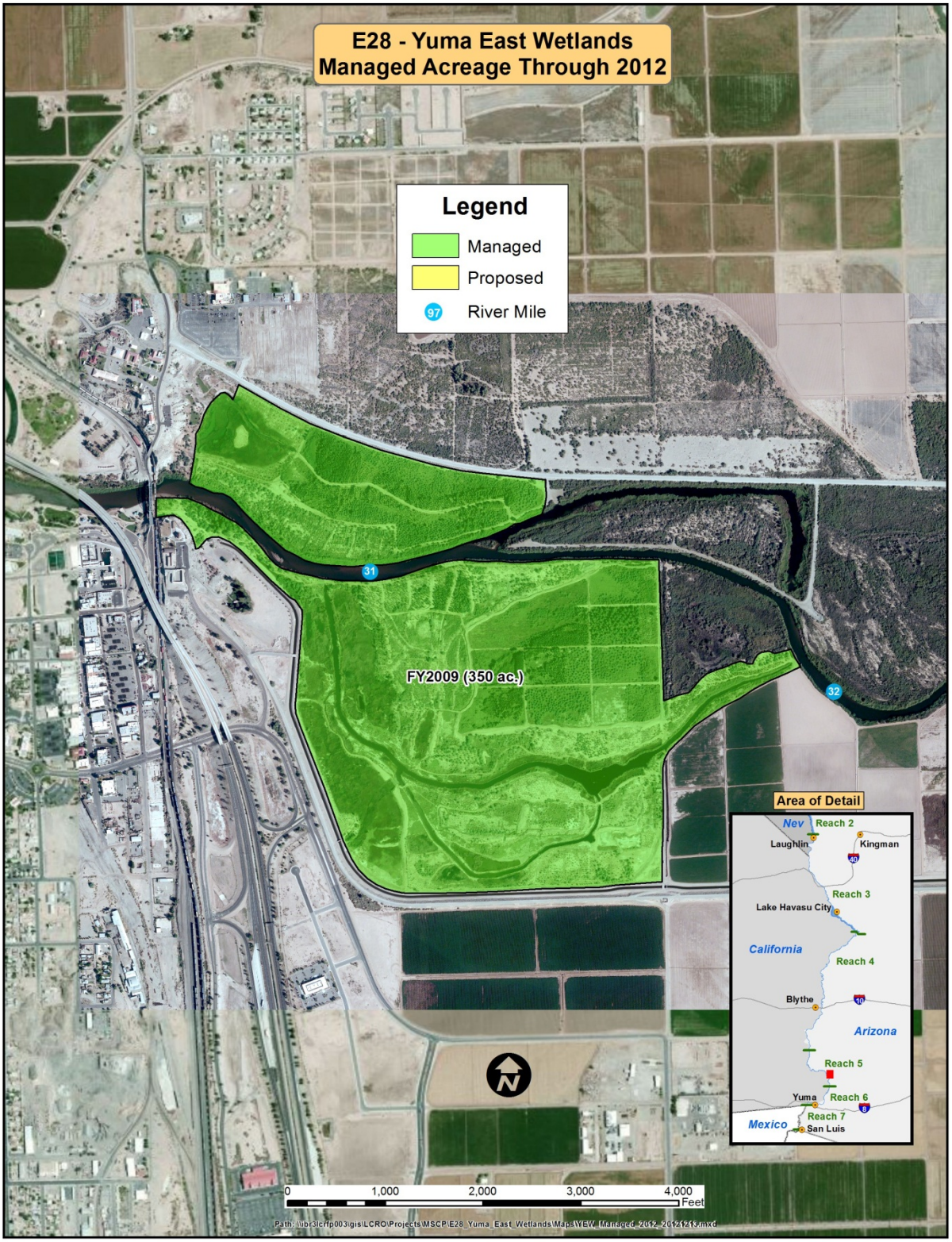

E28 - Yuma East Wetlands
Managed Acreage Through 2012
Legend
Managed
Proposed
97 River Mile
31
32
FY2009 (350 ac.)
Area of Detail
Nev
Reach 2
Laughlin
Kingman
Reach 3
Lake Havasu City
California
Reach 4
Blythe
Arizona
Reach 5
Yuma
Reach 6
Reach 7
Mexico
San Luis
0
1,000
2,000
3,000
4,000
Feet

Figure 12.

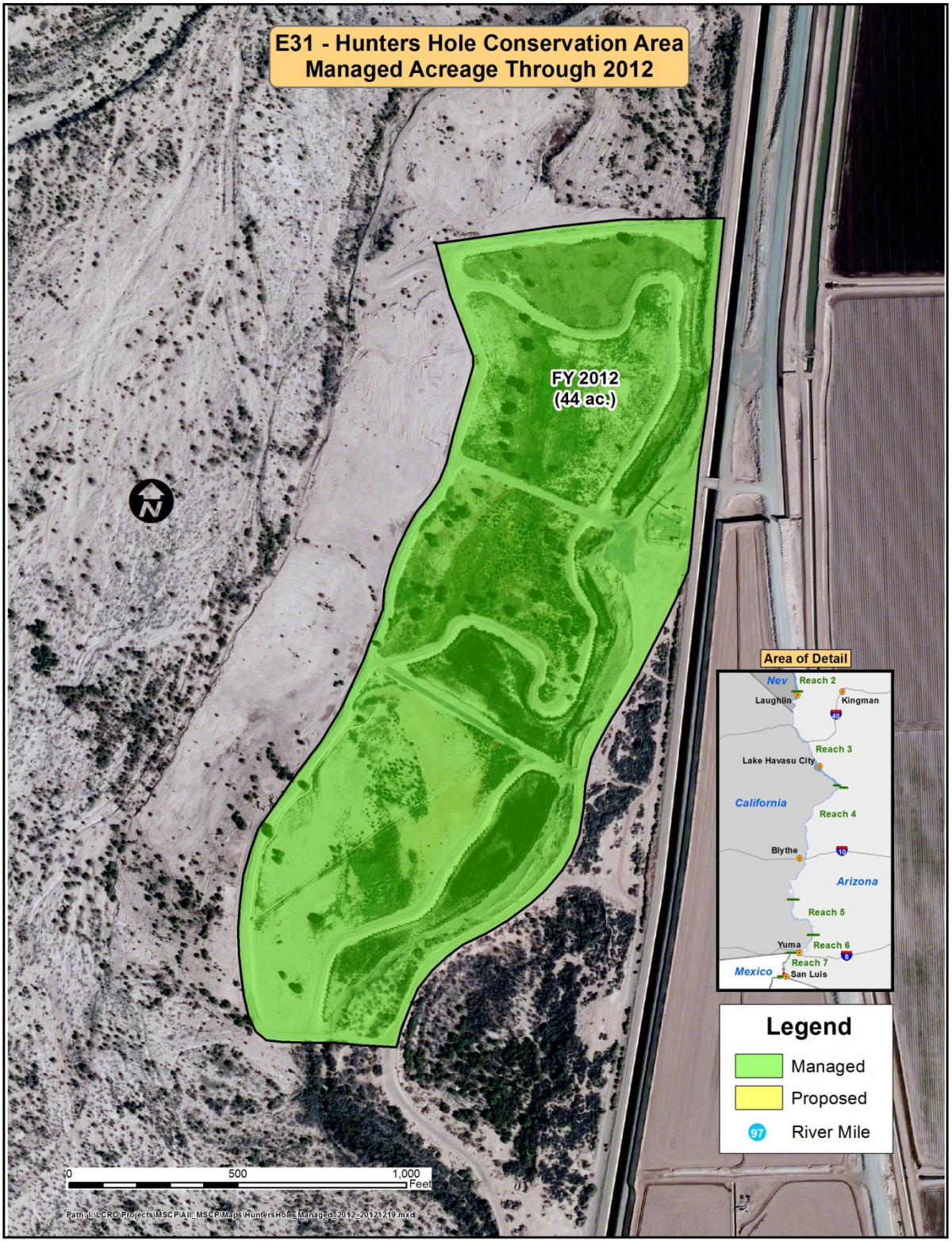
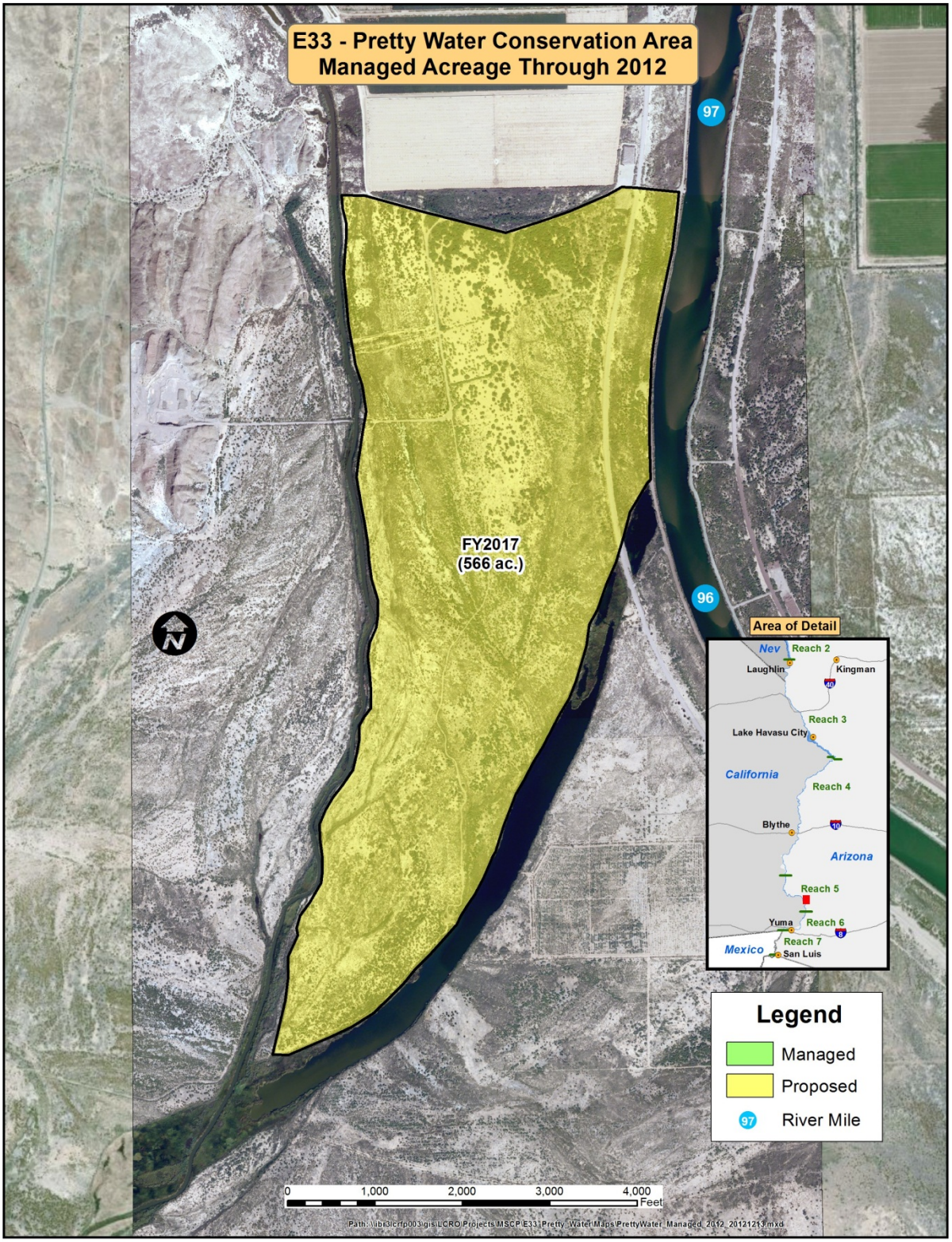

E31 - Hunters Hole Conservation Area
Managed Acreage Through 2012
FY 2012
(44 ac.)
N
Area of Detail
Nev
Reach 2
Laughlin
Kingman
40
Reach 3
Lake Havasu City
California
Reach 4
Blythe
10
Arizona
Reach 5
Yuma
Reach 6
8
Reach 7
Mexico
San Luis
Legend
Managed
Proposed
97
River Mile
0
500
1,000
Feet

Figure 13.


E33 - Pretty Water Conservation Area
Managed Acreage Through 2012
97
96
FY2017
(566 ac.)
Area of Detail
Nev
Reach 2
Laughlin
Kingman
Reach 3
Lake Havasu City
California
Reach 4
Blythe
Arizona
Reach 5
Yuma
Reach 6
Reach 7
Mexico
San Luis
Legend
Managed
Proposed
River Mile
0
1,000
2,000
3,000
4,000
Feet

FY14 Proposed Activities

Conservation Areas

Coordination with resource agencies and attendance at planning meetings is expected to be similar to efforts in FY13. Activities in FY14 will focus on the identification and evaluation of potential conservation areas, primarily in California. Permitting, compliance, and potentially development of the Mohave Valley Backwater in Reach 3 will continue. The 52 acre backwater project is located in California near the town of Needles. Drafting of a site specific Development and Monitoring Plan for PVER-South is also anticipated.

Research/Demonstration

Restoration research and demonstration projects are vital in supplying new information to make habitat creation projects more effective in terms of meeting species-specific habitat requirements, and more efficient in terms of overall costs to meet those requirements. In general, restoration research projects are those that have specific research questions and are supported by a robust, replicated study design where some level of analysis can be conducted and inferences can be made. These projects may include, but are not limited to, research directed at habitat development to meet species needs, improving vegetation growth and survival, testing alternate propagation and habitat establishment techniques, determining habitat creation potential at identified sites based on current ecological functions, and evaluating technologies to assist in meeting specific habitat requirements.

Work tasks can address specific research questions, or use demonstration projects to assess a particular technique to determine whether the technique might be feasible and effective for use in a habitat creation project. Demonstration projects are designed to evaluate techniques, effectiveness, and cost efficiency. These activities may mature into a land cover type that meets the specific performance criteria for created habitat for the covered species. Until that time, these projects will be referred to as research or demonstration projects. Both of these types of investigations increase knowledge of habitat creation and will be used to inform and guide future selection and implementation of habitat creation projects.

FY12 Accomplishments

Research from previous studies funded by G3 has suggested that riparian obligate trees will utilize groundwater over applied surface water when they have reached sufficient maturity. In FY12, an extensive review of the literature available on salinity and sodicity was conducted to summarize what was already know about managing saline soil and groundwater conditions and is available on the LCR MSCP website. A soil and groundwater monitoring network was established at three conservation areas: Beal, PVER, and Cibola Unit #1, and will be expanded in FY14. Accomplishments and expenditures are now tracked under Work Task E34.

FY13 Activities

A summary of data collected under the Soil and Groundwater Salinity Monitoring Network (E34) has been completed and was presented at the Colorado River Terrestrial and Riparian (CRTR) meeting in Laughlin. The data included evaluation of a mass balance to evaluate salt accretion/loss in soils and groundwater. The decision was made to continue monitoring and expand the network to other conservation areas. However, to allow time for procurement and review the final report, limited activity (and expenditures) will occur in FY13.

FY14 Proposed Activities

The established Soil and Groundwater Soil Salinity Monitoring Network (E34) will be expanded to include additional conservation areas. Data collected is expected to track and support the long-term health and survival of established land cover types.

Development/Management

Habitat development and management are strongly connected. As described previously, in many cases created habitat is achieved through the process of development, establishment, and modification of the site and growth (maturation) of the land cover type. Subsequent management of that land cover type either maintains the specific requirements necessary for that created habitat, or moves that land cover type towards achievement of those specific habitat requirements.

Habitats, both aquatic and terrestrial, are dynamic. They are better described as a continuum rather than a stage of development or succession. By using knowledge gained from research, demonstrations, and experience, sites with the greatest potential for success can be identified, and the most effective designs and approaches can be employed to create the targeted cover type.

In the context of current conditions, to achieve the desired habitat under the LCR MSCP calls for establishing and managing for a snapshot in time and ecological succession. This may require actively creating disturbance to reset or maintain the land cover type in the proper seral stage (in the case of some riparian habitat). For a backwater, it may involve removing organic matter from the bottom of the backwater to reduce biological oxygen demand and maintain acceptable levels of water quality. In any case, habitat creation does not necessarily end with the establishment of the proper vegetation type or isolation of a backwater.

Over the course of identifying and selecting sites, conducting research studies and demonstration projects, and developing and managing created land cover types, information is gathered that may help in better understanding these processes. This feedback, in turn, may serve to modify site selection or establishment approaches for future projects. The information can also reveal program needs not previously anticipated. For example, during collections for the Mass Transplanting Demonstration (E7), it became apparent that establishment of native plant nurseries would be needed to

supply an adequate source of cuttings for future large-scale propagation and establishment of riparian vegetation. A centralized location with an easily accessible supply of riparian species would also reduce time and costs associated with collection. These nurseries were incorporated into the phased developments plans for E4 and E5. Each site, whether identified as marsh, backwater, honey mesquite, or cottonwood-willow cover type, will have its own set of site-specific challenges to overcome.

The HCP includes tentative schedules for development of all four land cover types, with a final end date for habitat creation of 2036. However, the funding described in the HCP reflects an end date of 2026 for habitat creation, assuming efficient habitat creation techniques are identified during the first few years of implementation. To balance available resources and ensure progress is being made to complete the habitat requirements under the program, habitat creation is expected to be complete in 2026 in conformance with the funding schedule. Since funding estimates are based on 5-year periods, habitat creation includes both long-term planning and selection of projections to implement within the next five years. This allows time for planning, site evaluation, coordination with partners, design, permitting, and sequencing into the program.

For 2013-2018, restoration is expected to occur at 1) the Laguna Division Conservation Area, 2) Pretty Water Conservation Area, 3) Cibola NWR Unit #1, 4) Cibola Valley Conservation Area, 5) Mohave Valley Backwater, and 6) PVER-South. However, the program is flexible enough to take advantage of other restoration opportunities and uses the work plan (Annual Report) to refine short-term restoration projections. The primary focus from FY13 through FY15 is on development of the Laguna Division Conservation Area, which reflects the bulk of funding and available plant material.

FY12 Accomplishments

Planting of the Phase 7 cottonwood-willow land cover type was completed at the Palo Verde Ecological Reserve, which established an additional 226 acres of cottonwood-willow cover types on the property owned by the California Department of Fish and Wildlife. Hunters Hole Conservation Area was planted in the spring of 2012 and established another 44 acres of cottonwood-willow. The creation of willow marsh on Beal Lake Conservation Area also added an additional nine acres of marsh to the program. The total number of acres developed in FY12 was 279 acres.

Table 1-13. Managed Acres by Conservation Area Through FY12

Conservation Area	Established Land Cover Types	Managed Acreage	Available Lands
E1: Beal Lake Riparian Restoration (AZ)	116	116	116
E4: Palo Verde Ecological Reserve (CA)	985	985	1,021
E5: Cibola Valley Conservation Area (AZ)[1]	670	779	1,282
E9: Hart Mine Marsh (AZ)	255	255	255
E14: Imperial Ponds Conservation Area (AZ)[2]	92	126	126
E25: Big Bend (NV)	15	15	15
E24: Cibola NWR (AZ)	270	950	950
E27: Laguna Division Conservation Area (AZ & CA)	0	0	1,107
E31: Hunters Hole (AZ)	44	44	44
Total	**2,447**	**3,270**	**4,916**

[1]Includes 72 acres of wheat in Phase 7 to stabilize the ground prior to restoration.

[2]Includes 34 acres of cover crop which will ultimately be converted to cottonwood-willow.

The total number of acres being managed by land cover type and by reach and state on established conservation areas is shown in Table 1-14. The LCR MSCP through 2012 has 4,916 acres of land available to the program, of which 3,270 acres are being actively managed. Not all acreage can or will be converted into either of the four land cover types due to resource limitations or the habitat creation needs of the program.

Table 1-14. Land Cover Type by Reach and State Through FY12

	Cottonwood-Willow	Honey Mesquite	Marsh	Backwaters		TOTAL
ARIZONA						
Reaches 1-2	0	0	0	0		0
Reach 3	107	0	9	0		107
Reach 4	535	405	255	0		1,195
Reach 5	0	0	12	80		92
Reach 6	0	0	0	0		0
Reach 7	44	0	0	0		0
Total	**686**	**405**	**276**	**80**		**1,447**
CALIFORNIA						
Reaches 1-2	0	0	0	0		0
Reach 3	0	0	0	0		0
Reach 4	945	40	0	0		985
Reach 5	0	0	0	0		0
Reach 6	0	0	0	0		0
Reach 7	n/a	n/a	n/a	n/a		n/a
Total	**945**	**40**	**0**	**0**		**985**
NEVADA						
Reaches 1-2	0	0	0	0		0
Reach 3	0	0	0	15		15
Reach 4-7	n/a	n/a	n/a	n/a		n/a
Total	**0**	**0**	**0**	**15**		**15**
TOTAL	**1,631**	**445**	**276**	**95**		**2,447**

Of the 3,270 acres being actively managed by the program, the four land cover types have been established on approximately 2,447 acres. Acreages at conservation areas still in the planning phase or for which there were no signed land use agreements by FY12, such as Planet Ranch, Laguna Division Conservation Area, Yuma East Wetlands, and Pretty Water Conservation Area, are not included in the tables at this time.

FY13 Activities

Phase 8, 36 acres of honey mesquite land cover type, was planted in March 2013 at the Palo Verde Ecological Reserve, on the property owned by the California Department of Fish and Wildlife. Planting of the 94 acres within the upper Hippy Fire Area at Cibola

NWR Unit #1 was also completed in March 2013. Planting of marsh within Reach 1 of the Laguna Division Conservation Area is also scheduled to begin in late 2013.

FY14 Proposed Activities

The primary focus of planting in FY14 will be at the Laguna Division Conservation Area. Marsh within Reach 1 is expected to be completed along with establishing cottonwood-willow and upland. Marsh planting in Reach 2 is expected to begin in late FY14. The entire conservation area is expected to be planted by spring of 2015.

Development and/or planting the Pretty Water Conservation Area (E33 honey mesquite) will also begin. Due to the size and complexity of these projects, their development is expected to transition over multiple fiscal years.

WORK TASKS SECTION A

PROGRAM ADMINISTRATION

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Work Task A1: Program Administration

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$1,231,780	$917,627.80	$7,935,399.08	$1,273,518	$1,298,968	$1,298,968	$1,298,968

Contact: John Swett, (702) 293-8555, jswett@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Program administration.

Conservation Measures: N/A

Location: N/A

Purpose: Program administration.

Connections with Other Work Tasks (past and future): N/A

Project Description: This project provides senior staff and administration support to manage implementation of the LCR MSCP. The Program Manager directs functions and activities associated with implementation of the HCP to ensure the completion of activities in accordance with the program documents.

Previous Activities: The LCR MSCP Office was established in the Lower Colorado Region of the Bureau of Reclamation in 2005. The Steering Committee was established in accordance with the Funding and Management Agreement (FMA), and the Bylaws for the Steering Committee were approved.

FY12 Accomplishments: Program Administration for FY12 continued the management of the LCR MSCP. Ongoing administrative activities include financial, human resources, and support for the program. Coordination with the Steering Committee continued with Steering Committee meetings held in October 2011 and April 2012. Technical Work Group meetings were held one month prior to these dates to review upcoming actions of the steering committee. The *Final Implementation Report, Fiscal Year 2013 Work Plan and Budget, Fiscal Year 2011 Accomplishment Report* was prepared. The Steering Committee approved the establishment of a Remedial Measures Fund and a Land and Water Fund and the Habitat Maintenance Fund Process. A tour of the Laguna Division Conservation Area was conducted for the Steering Committee in March 2012.

FY13 Activities: Program Administration for FY13 will continue the management of the LCR MSCP. Ongoing administrative activities include financial, human resources, and

support for the program. Coordination with the Steering Committee will continue with Steering Committee meetings held on October 2012 and April 2013. Technical Work Group meetings were held one month prior to these dates to review upcoming actions of the Steering Committee. The Steering Committee approved the Five-Year Research and Monitoring Report (2013-2017). The *Final Implementation Report, Fiscal Year 2014 Work Plan and Budget, Fiscal Year 2012 Accomplishment Report* will be prepared. Financial tracking for the program will continue and the annual financial work group meeting was held in February 2013. A tour of fish activities on Lake Mead will be conducted for the Steering Committee.

Proposed FY14 Activities: Program Administration for FY14 will continue the management of the LCR MSCP. Ongoing administrative activities include financial, human resources, and support for the program. Coordination with the Steering Committee will continue with biannual Steering Committee meetings, specific work group meetings, and email announcements. The *Final Implementation Report, Fiscal Year 2015 Work Plan and Budget, Fiscal Year 2013 Accomplishment Report* will be prepared. Financial tracking for the program will continue and the annual financial work group meeting will be held. Securing additional land and water for the program will be pursued.

Pertinent Reports: The *Final Implementation Report, Fiscal Year 2013 Work Plan and Budget, Fiscal Year 2011 Accomplishments* is posted on the LCR MSCP website. The *Final Implementation Report, Fiscal Year 2014 Work Plan and Budget, Fiscal Year 2012 Accomplishment Report* is posted to the website.

WORK TASKS SECTION B

FISH AUGMENTATION

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Work Task B1: Lake Mohave Razorback Sucker Larvae Collections

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$200,000	$203,360.50	$1,619,981.56	$200,000	$200,000	$200,000	$200,000

Contact: Patricia Delrose, (702) 293-8202, pdelrose@usbr.gov

Start Date: FY04

Expected Duration: FY55

Long-term Goal: Fish augmentation.

Conservation Measures: RASU3, RASU5, and RASU8.

Location: Reach 2, Lake Mohave, Arizona/Nevada.

Purpose: Develop the RASU broodstock in Lake Mohave, maintain the broodstock, and harvest offspring for rearing as needed to accomplish the LCR MSCP Fish Augmentation Program.

Connections with Other Work Tasks (past and future): Work tasks B2, B4, B5, B6, and B7 are related to this work task, as the RASU to be reared under these work tasks originate from Lake Mohave.

Project Description: The RASU broodstock in Lake Mohave provide a level of genetic diversity found nowhere else in the world. This project captures wild-born RASU larvae from Lake Mohave, and delivers them to Willow Beach NFH for initial rearing. Work includes helicopter surveys every two weeks to locate spawning groups, night-time larvae collection, and maintenance of the boat fleet and field station at Cottonwood Cove. These larvae are captured one at a time, making this a labor-intensive program. Hence, most expenditures are for salary, travel, and fuel.

Work normally commences in January and extends into April. Equipment is delivered to and staged at Cottonwood Cove, where a field station is established. The lake's shoreline is surveyed by helicopter, and locations of spawning aggregations of RASU are recorded. Crews of two to four staff meet at the field stations at sunset, gather batteries, lights, dip nets, and buckets, and set out by boat to the spawning areas. Razorback sucker larvae attracted to submerged lights suspended from the boat are captured by net and are counted. Crews return to the field station, label buckets of larvae, record their capture success and location, place batteries back on chargers, clean and stow other gear, and place air stones in buckets to maintain adequate oxygen levels. The next morning the larvae are transferred to Willow Beach NFH by either boat or vehicle, where they are logged in as to date received, number collected, and location. This work is repeated 4 to 6 nights per week through mid- to late April.

Previous Activities: This work is part of a program started by the Native Fish Work Group (NFWG) in 1989 to rebuild the adult stock of RASU in Lake Mohave so that these fish could be used as brood fish for RASU recovery. A portion of the larvae collected are used to sustain broodstock and the remaining larvae are reared for release into reaches 3-5 to accomplish augmentation goals of the program.

FY12 Accomplishments: Twenty-five thousand and three (25,003) wild larvae were collected from four areas. The contribution of larvae from each zone of Lake Mohave by month of capture is presented in the following table.

Larval RASU Collected from Lake Mohave, 2012

	January	February	March	April	May	Total
Nine Mile	0	2,630	4,169	0	0	6,799
Tequila	250	2,850	4,962	677	0	8,739
Yuma	500	2,750	3,487	225	0	6,962
AOP	0	0	638	1,865	0	2503
Total	**750**	**8,230**	**13,256**	**2,766**	**0**	**25,003**

FY13 Activities: A target of 25,000 larvae was established at the Lake Mohave Native Fish Work Group meeting. These larvae will be delivered to Willow Beach NFH for rearing.

Proposed FY14 Activities: RASU larvae collections will continue. The target level for FY14 is 25,000 to 30,000 larvae.

Pertinent Reports: A status report titled, *Five-Year Summary of Razorback Sucker (Xyrauchen texanus) Larval Collections on Lake Mohave: 2005-2009*, is posted on the LCR MSCP website. A summary report for 2010-2014 will be posted on the website.

Work Task B2: Willow Beach National Fish Hatchery

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$250,000	$298,730.97	$2,201,971.21	$609,000	$315,000	$315,000	$320,000

Contact: Ty Wolters, (702) 293-8463, twolters@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Fish augmentation.

Conservation Measures: RASU3, RASU4, RASU5, BONY3, and BONY4.

Location: Reach 2, Willow Beach, Arizona.

Purpose: Annually contribute RASU and BONY to the LCR MSCP Fish Augmentation Program.

Connections with Other Work Tasks (past and future): Willow Beach NFH receives larval RASU from B1, and BONY from B4. Fish from Willow Beach are reared at Achii Hanyo (B3). Some fishery research actions described in Section C are ongoing at this facility, including Razorback Sucker Rearing Studies (C10), and Development and Evaluation of Measures to Reduce Transport of Quagga Mussel During Fish Transfer and Stocking Activities (C30).

Project Description: Willow Beach NFH is managed by the USFWS. The hatchery receives funding from the LCR MSCP for rearing of RASU and BONY for the Fish Augmentation Program. There are three primary tasks at the hatchery:

1. **Receive fish to be reared.** Willow Beach NFH annually receives wild RASU larvae collected from Lake Mohave, and fingerling BONY (25-75 mm TL) from SNARRC (B4).

2. **Provide fish to other hatcheries.** Initially, Willow Beach NFH was to provide fingerling RASU to Bubbling Ponds SFH to be further reared and ultimately stocked into reaches 3-5, provide fingerling RASU from wild-caught larvae to SNARRC for further rearing and eventual repatriation to Lake Mohave, and provide juvenile BONY to Achii Hanyo Rearing Station for further rearing and ultimately for stocking into reaches 3-5. Due to the current infestation of quagga mussels, Willow Beach NFH is only delivering fish to Achii Hanyo and Lake Mead SFH.

3. **Annually rear RASU for release to Lower Colorado River.** Willow Beach NFH will rear 8,000 subadult RASU to 300 mm TL for stocking into reaches 2-5, and rear up to 1,000 RASU greater than 400 mm for repatriation to Lake Mohave.

Previous Activities: This coldwater hatchery began operation in 1962 to produce rainbow trout for recreational fishing. Between 1994 and 1997, the USFWS and Reclamation cooperatively added solar heating systems to the hatchery, converting 50 percent of its rearing capacity to warmwater fish production. Each year since 1996, the hatchery has received wild RASU larvae, reared juvenile RASU, and repatriated fish back to Lake Mohave.

During January 2007, the exotic quagga mussel was discovered in Lake Mead, and was subsequently found at Willow Beach NFH. Larval RASU that were to be transferred to Bubbling Ponds SFH were not collected (B1) and no RASU were delivered to waters outside the lower Colorado River corridor. Quagga mussels have not severely impacted the maintenance or operation of the facility; however, they continue to have an impact on delivery of fish. Fish transport protocols are being tested (see C30).

FY12 Accomplishments: During 2012, 25,003 RASU larvae were received from Lake Mohave, 901 RASU juveniles were stocked to lake-side rearing ponds (B7), and 7,770 RASU were repatriated into Lake Mohave (Reach 2). A total of 5,300 FY10 RASU were transferred to Achii Hanyo Rearing Station (B3) for further grow out. The majority of funds were for salary and consumable materials (fish feed, medicines, chemicals, etc.) but a portion of the funds were used to acquire motors, feeders, aluminum tubing, PVC pipe, tools, a trailer, and probes for monitoring ammonia, nitrate, and dissolved oxygen. A second well was drilled on station that will be able to supply 250 gpm at 19°C. Rehabilitation of one functioning well on station improved capacity from 120 gpm to 250 gpm. These two wells will be able to supply the hatchery with 500 gpm of pathogen-free water. Investigations into methods for removing quagga mussel from transport tanks at Willow Beach NFH (C30) were completed this year.

FY13 Activities: Willow Beach NFH will receive RASU larvae from Lake Mohave, and continue to rear and distribute RASU and BONY currently on station. This includes 1,899 RASU of the 2008 year class, 4,486 RASU of the 2009 year class, 13,022 RASU of the 2010 year class, 15,170 of the 2011 year class, and 16,295 RASU of the 2012 year class. BONY have not been reared at the hatchery since 2010. BONY from SNARRC (B4) are delivered directly to Achii Hanyo Rearing Station (B3). Additional funding of $358,000 is to install a third well and pump, and a second pump with associated electrical parts will be installed on an existing well. Well water would supply Willow Beach NFH with pathogen-free water, thereby helping eliminate quagga mussel from this facility.

Proposed FY14 Activities: The hatchery will continue to receive RASU larvae from Lake Mohave and to rear and distribute RASU and BONY for the LCR MSCP Fish Augmentation Program. Budget increases in FY14 are due to anticipated cost increases associated with raising fish to target size.

Pertinent Reports: Annual administrative reports are available upon request.

Work Task B3: Achii Hanyo Rearing Station

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$150,000	$145,868.05	$682,715.68	$150,000	$165,000	$170,000	$170,000

Contact: Ty Wolters, (702) 293-8463, twolters@usbr.gov

Start Date: FY04

Expected Duration: FY55

Long-term Goal: Maintain and operate fish-rearing facility as an integral part of the LCR MSCP Fish Augmentation Program.

Conservation Measures: RASU3, RASU4, BONY3, and BONY4.

Location: Reach 4, Colorado River Indian Tribes Reservation, Parker, Arizona.

Purpose: Support operation and maintenance of fish rearing facilities to annually contribute RASU and BONY to the LCR MSCP Fish Augmentation Program for stocking into reaches 3-5 of the LCR.

Connections with Other Work Tasks (past and future): This work task was previously included in the FY04 work tasks as Achii Hanyo National Fish Hatchery (A1). This work is related to B2 and B4, as fish from both Willow Beach NFH and SNARRC may be transferred to Achii Hanyo Rearing Station. Additionally, fish research for RASU and BONY may be accomplished at this facility.

Project Description: This project supports both the development and maintenance of Achii Hanyo Rearing Station as a grow-out site for RASU and BONY and the rearing of BONY for release into reaches 3-5 of the LCR. The Achii Hanyo station is primarily used as a facility for BONY from SNARRC, although RASU are occasionally brought on station in response to stocking needs and space limitations at other facilities. Funds allocated are used for staff salary, facility operation and maintenance, fish feed and chemicals, and fish distribution.

This facility is located on the Colorado River Indian Tribes Reservation (CRIT), near Parker, Arizona. There are nine earthen ponds that receive Colorado River water from an irrigation canal. A metal building was constructed to house four flow-through raceways and three circular tanks; in addition, 12 circular tanks are housed under an outside canopy, and there is one large, outside research tank.

Fish rearing is seasonal, producing one crop per year. BONY are brought in from Willow Beach NFH and/or SNARRC in the winter. Fish are fed through the spring and summer.

In the fall, the ponds are drained, and fish are harvested, tagged, and released. Fish under target size (less than 300 mm TL) are returned to a pond for continued rearing. New fish are then brought onto the station and the process is repeated. The annual production goal is 4,000 BONY for stocking into the LCR.

Previous Activities: The USFWS and Reclamation have cooperatively worked to upgrade this facility since FY04. Work completed includes the purchase and assembly of a metal building (tank house) and fiberglass fish tanks. An office, feed storage room, restrooms, and electrical upgrades have been completed. A backup generator and upgraded aeration systems for fish tanks in the tank house were completed.

FY12 Accomplishments: At the start of the year, 8,590 BONY were on station. This number included 835 FY09 fish, 1,255 FY10 fish, and 6,500 FY11 fish. At the start of the year, 5,960 RASU were on station. This number included 260 FY07 fish and 5,700 FY10 fish. At the end of the year, 605 BONY and 3,988 RASU were harvested, tagged, and stocked into the LCR. A total of 3,988 RASU were stocked into Reach 2, and 605 BONY were stocked into Reach 4. All fish on station in FY12 were part of research assessing RASU growth to 500 mm TL (C10) and polyculture of RASU and BONY (C11). Production goals will remain at 4,000 BONY greater than 300 mm TL. All fish were stocked from station this year in an effort to improve fish production. Any BONY less than 300mm were stocked in Reach 4. Polyculture of RASU and BONY will no longer be conducted.

FY13 Activities: BONY will be brought on station from SNARRC to meet production goals. Delivery of approximately 15,000 BONY from SNARRC is expected in late winter. Earth work will be performed in several ponds this winter in an attempt to facilitate harvest next winter. Earth work will be performed on three ponds to repair leaks and widen one levee. During February, disking and grading will be accomplished on as many ponds as weather conditions permit.

Proposed FY14 Activities: BONY left on station from FY13 will be reared to target size, and fingerling BONY will be delivered from either SNARRC or Willow Beach NFH. Budget increases in FY14 are due to anticipated cost increases associated with raising fish to target size.

Pertinent Reports: Annual administrative reports are available upon request.

Work Task B4: Southwestern Native Aquatic Resources & Recovery Center at Dexter*

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$200,000	$148,422.27	$1,133,641.32	$250,000	$250,000	$250,000	$250,000

*Name of facility changed

Contact: Ty Wolters, (702) 293-8463, twolters@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Maintain fish-rearing capability to provide RASU and BONY for the LCR MSCP Fish Augmentation Program.

Conservation Measures: RASU3, RASU4, BONY3, BONY4, and HUCH1.

Location: Off-river, Dexter, New Mexico.

Purpose: Support operation and maintenance at the facility, support maintenance of BONY broodstock, and annually provide RASU and BONY to the LCR MSCP Fish Augmentation Program.

Connections with Other Work Tasks (past and future): This work is related to work tasks B2, B3, and B5, as fish from SNARRC will be delivered to Willow Beach NFH, Achii Hanyo Rearing Station, and Bubbling Ponds State Fish Hatchery. In addition, fish-rearing research activities outlined in C10, C11, C14, and C30 may be conducted at SNARRC.

Project Description: SNARRC is managed and operated by the USFWS. The facility maintains the only broodstock for BONY in the world, and maintains a backup broodstock of RASU. Funds provided will be used to maintain extant broodstock, produce fingerling BONY annually for distribution to other hatcheries, and annually rear BONY to 300 mm TL for distribution within reaches 2 through 5.

Previous Activities: Reclamation and the USFWS have past and ongoing interagency agreements to support rearing and research for RASU and BONY at SNARRC. Since the inception of the LCR MSCP through 2011, a total of 3,224 RASU have been stocked into Reach 2, a total of 794 RASU have been stocked into Reach 3, a total of 1,357 BONY have been stocked into Reach 2, a total of 12,671 BONY have been stocked into Reach 3, and a total of 535 BONY have been stocked into Reach 4.

FY12 Accomplishments: In October 2012 the Fish Health Unit concluded SNARRC's annual fish health inspection using enhanced testing protocols. No pathogens of concern were detected and the facilities disease classification was upgraded from suspect LMBV to Class A (pathogen free) disease classification. Prior to the annual inspection, fish lots had been tested in November 2010 and April 2011 and no pathogens of concern were detected at those times.

BONY. SNARRC staff maintained 2,000 adult BONY broodstock. The stock comprises six year classes of Lake Mohave origin fish. Approximately 40,000 BONY were maintained on station for future stocking into the Lower Colorado River: 13,000 from the 2009 year class, 15,000 from the 2011 year class, and 12,000 from the 2012 year class. Staff from the USFWS hormonally induced and hand-stripped eggs and sperm from 44 adult BONY, producing 313,060 eggs. No BONY were transferred to Willow Beach NFH, or Achii Hanyo Rearing Station, during 2012. Following the reissuing of their Class A rating in October 2012, USFWS staff harvested, PIT-tagged, hauled, and stocked a total of 4,000 subadult BONY (300+ mm TL) into Lake Havasu (Reach 3), and a total of 3,216 subadult BONY (300+ mm TL) into Reach 4. SNARRC staff began developing a second BONY broodstock this year.

RASU. SNARRC staff maintained a refuge stock of 1,250 adult RASU. The broodstock comprises nine year classes of Lake Mohave origin fish. USFWS staff hormonally induced and hand-stripped eggs and sperm from 36 adult RASU, producing 331,992 eggs. A total of 55,000 RASU larvae were transferred to Bubbling Ponds SFH for grow out and future stocking in the Lower Colorado River. Approximately 29,000 RASU were maintained on station for future stocking into the lower Colorado River: 1,000 from the 2008-2009 year class, 20,000 from the 2011 year class, and 8,000 from the 2012 year class. No RASU were transferred to SNARRC from Willow Beach NFH due to ongoing quagga mussel issues. A total of 602 RASU from SNARRC were stocked into the Lower Colorado River at River Island State Park (Reach 4) in 2012.

FY13 Activities: Budget was increased due to contract price increases. The BONY broodstock will be maintained, and the hatchery will produce between 150,000 and 300,000 fingerling BONY for distribution depending upon various agency requests (including Willow Beach NFH, Achii Hanyo Rearing Station, Bubbling Ponds SFH, and Lake Mead SFH); up to 1,000 RASU will be reared to 500 mm TL for stocking into the LCR. A total of 4,000 BONY will be reared to 300 mm TL for distribution within Reach 3.

SNARRC will continue to provide up to 50,000 RASU larvae to Bubbling Ponds SFH from hand-spawned broodstock held on station.

Proposed FY14 Activities: The BONY broodstock will be maintained. Up to 75,000 fingerling BONY will be produced for distribution to Willow Beach NFH and Achii Hanyo Rearing Station, and 4,000 BONY will be reared to 300 mm TL for distribution within reaches 3-5.

Pertinent Reports: Annual administrative reports are available upon request.

Work Task B5: Bubbling Ponds Fish Hatchery

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$250,000	$306,855.83	$1,960,624.83	$300,000	$315,000	$320,000	$320,000

Contact: Ty Wolters, (702) 293-8463, twolters@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Maintain fish-rearing capability and provide RASU for the LCR MSCP Fish Augmentation Program.

Conservation Measures: RASU3 and RASU4.

Location: Off-river, Cornville, Arizona.

Purpose: Operate and maintain the fish-rearing facility and annually contribute RASU to the LCR MSCP Fish Augmentation Program.

Connections with Other Work Tasks (past and future): Activities at Bubbling Ponds SFH are related to B4, as Bubbling Ponds SFH receives RASU from SNARRC. Some of the fish-rearing research activities outlined in C10 are conducted at Bubbling Ponds SFH.

Project Description: Bubbling Ponds SFH is managed and operated by AGFD. This is a warm water rearing facility supplied by a continuous, year-round, 10 cfs spring flow of 68°F water. The facility has 10 acres of production ponds, a work shop, a storage shed, a small laboratory, and sufficient fish distribution equipment to meet the delivery requirements for the LCR MSCP. Program funds provide for salary, fish feed and supplies, facility operation and maintenance, and delivery of fish. Production goals are 12,000 RASU of 300 mm minimum TL for release to reaches 3-5 of the Lower Colorado River.

Previous Activities: Prior to the LCR MSCP, 70,000 RASU were successfully reared at this facility and delivered to the Lower Colorado River as required by two biological opinions (1997 and 2001). Both commitments have now been met. Between the start of the LCR MSCP and the end of 2011, Bubbling Ponds SFH has reared and stocked 86,791 RASU.

FY12 Accomplishments: A total of 50,000 fry were received for rearing from SNARRC in April. This year a total of 13,710 RASU were harvested, PIT/wire-tagged, and stocked: 7,683 were stocked into Lake Havasu (Reach 3), and 6,027 were stocked below Parker Dam (Reach 4). During 2012 funds were expended for salaries and associated costs for

fish-rearing activities. Funds were also used to purchase feed, chemicals, and gravel to resurface all hatchery roads. A portion of the pipeline was replaced that conveys spring water from the spring to the hatchery. Several trees encroaching on a water supply ditch were removed. A new 12-inch corrugated polyethylene pipe was brought to the lower ponds supplying fresh water for fish reared there. An electrical supply line was buried, thereby removing a hazardous situation. These improvements accounted for the $50,000 increase in FY12.

FY13 Activities: Bubbling Ponds SFH began 2013 with approximately 56,000 RASU on station. This total includes 16,000 year class 2009 fish, 10,000 year class 2010 fish, and 30,000 year class 2012 fish. These fish are from SNARRC and were delivered either prior to the outbreak of LMBV at SNARRC or after SNARRC received a LMBV-free rating. They are expected to reach target size in 2013 and 2014. Plans are underway to replace existing deteriorated water supply pipes throughout the hatchery. This will require diversion of the incoming water supply.

Proposed FY14 Activities: RASU larvae will be received from SNARRC, RASU from the 2013 and 2014 year classes will continue to be reared, 12,000 RASU (300 mm TL) will be sorted, tagged, and delivered to the lower Colorado River, and annual progress reports will be produced. Construction of production design features will continue. As features are completed, normal fish culture activities will be dovetailed into the new systems. Budget increases in FY14 are due to anticipated cost increases associated with raising fish to target size.

Pertinent Reports: Annual administrative reports are available upon request.

Work Task B6: Lake Mead Fish Hatchery

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$50,000	$66,798.28	$313,750.42	$100,000	$125,000	$125,000	$125,000

Contact: Jim Stolberg, (702) 293-8206, jstolberg@usbr.gov

Start Date: FY05

Expected Duration: FY16

Long-term Goal: Operate and maintain the fish-rearing facility to provide RASU for the LCR MSCP Fish Augmentation Program.

Conservation Measures: RASU3, RASU4, RASU7, and RASU8.

Location: Reach 1, Lake Mead, Boulder City, Nevada.

Purpose: Support Lake Mead RASU studies and contribute RASU to the LCR MSCP Fish Augmentation Program.

Connections with Other Work Tasks (past and future): Activities at Lake Mead SFH contribute to other LCR MSCP work tasks, including B11 and C13.

Project Description: Lake Mead SFH is managed and operated by the Nevada Department of Wildlife (NDOW). Renovation of Lake Mead SFH allowed for the development and inclusion of dedicated facilities for rearing RASU and other native fish. Reclamation and NDOW are cooperatively rearing RASU captured from Lake Mead and Lake Mohave for future needs. Funds from this work task provide for the staff, equipment, feed, and chemicals necessary to rear these fish. Additional hatchery rearing space was made available in FY12 in continued support of the LCR MSCP Fish Augmentation Program. This additional rearing capacity is being developed for future years when the number of RASU annually stocked into reaches 3-5 is expected to increase. This additional space is also currently supporting FLSU rearing for research projects occurring in reach 3.

Previous Activities: In 2005, Reclamation assisted with the installation of a single 500-gallon fiberglass tank for the purpose of rearing RASU collected from Lake Mead. Installation took place in the new native fish room and included plumbing for air and water delivery lines, standpipe and standpipe screen construction, and placement of a central drain line. The native fish room was completed in 2006 with the addition of twenty-five 10-gallon aquaria, four 240-gallon fiberglass troughs, and six 700-gallon fiberglass tanks. Since 2007, larval RASU have been brought into the facility and reared in these tanks.

FY12 Accomplishments: Fewer RASU larvae were collected from Lake Mead in FY12 in response to the increased survival of previous RASU year classes and the planned renovation of the Overton WMA grow-out ponds. During the course of the FY12 spawning season, approximately 400 larval RASU were collected from Lake Mead and taken to Lake Mead SFH for grow-out. To make room for these incoming larvae, Reclamation transported 379 Lake Mohave RASU to Davis Cove backwater for additional grow-out, and NDOW transported and stocked 600 juvenile Lake Mead RASU into Center Pond at the Overton WMA. An additional 2,500 subadult Lake Mohave RASU were also brought on station in early FY12 to begin development of the additional rearing capacity that the LCR MSCP will need by 2018. These fish are currently being reared at lower densities with the goal of producing up to 500 RASU with a minimum total length of 500 mm, and up to 2,000 RASU with a minimum total length of 300 mm. These fish will be stocked into Lake Mohave as they reach target sizes, and additional fish brought to the hatchery in subsequent years are anticipated to be used for Reach 3-5 stockings. Currently, over 4,500 RASU from multiple year classes remain on station. These fish will be stocked or made available for research purposes as needs are identified.

FY13 Activities: NDOW will continue to operate Lake Mead SFH for RASU and FLSU production. Operations will include capture and rearing of wild-caught RASU larvae from Lake Mead, capture and rearing of juvenile FLSU from Lake Mead and Reach 3, and grow-out of subadult native fish from the 2009-2012 year classes. It is anticipated that NDOW will continue their evaluation of constructing ponds that may be used as future rearing sites through their Safe Harbor Agreement Program.

Proposed FY14 Activities: Continued rearing of Lake Mead RASU captured during previous years will occur and hatchery stock will be augmented with 2014 year-class RASU larvae. Adult and subadult Lake Mead RASU will be delivered to the Overton WMA and to additional off-channel grow-out sites as necessary. Rearing of Lake Mohave RASU and FLSU from Lake Mead and below Davis Dam that are already on station will also continue. It is anticipated that the Lake Mead SFH will contribute up to 2,000 Lake Mohave RASU and 2,000 BONY towards annual fish augmentation goals beginning in FY17. The additional funding requested in FY14 will support rearing this increased number of native fish for future augmentation needs.

Pertinent Reports: The *2010 Nevada Department of Wildlife Lake Mead Razorback Sucker Augmentation Project Activities Report* will be posted to the LCR MSCP website. The 2011 Activities Report is in review and will be posted to the website upon completion. The 2012 *Lake Mead Razorback Sucker Augmentation, Lake Mead Fish Hatchery* report has been received and will be posted to the website upon completion of review.

Work Task B7: Lake-Side Rearing Ponds

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$175,000	$173,805.16	$1,462,379.26	$200,000	$200,000	$200,000	$200,000

Contact: Eric Loomis, (702) 293-8519, eloomis@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Maintain fish-rearing capability, provide RASU and BONY for the LCR MSCP Fish Augmentation Program, and accomplish species research.

Conservation Measures: RASU3, RASU4, RASU5, RASU6, BONY3, BONY4, and BONY5.

Location: Reach 2, Lake Mohave, Arizona/Nevada.

Purpose: Operate and maintain fish grow-out areas along the Lake Mohave shoreline to contribute to RASU brood stock development.

Connections with Other Work Tasks (past and future): Activities are related to B2, B4, and B5, as fish for grow-out ponds may come from Willow Beach NFH, SNARRC, and/or Bubbling Ponds SFH. In addition, some of the fish-rearing research activities outlined in C10, C11, C34, C40, and C44 may be conducted at these ponds.

Project Description: Lake Mohave is operated by Reclamation as a re-regulation reservoir. It fluctuates annually within a 15-foot vertical range, filling by mid-May and lowering to an annual minimum in October. Wave actions redistribute sediment deposits from desert washes and shape these deposits into sandbars or natural berms. In some areas these sandbars isolate the lower portions of the desert washes from the lake proper, and when the lake is at full pool, lake-side ponds form at many of these washes. Reclamation and its partners in the Lake Mohave Native Fish Work Group have been using these lake-side ponds since 1993 as rearing and grow-out areas for RASU and BONY. The ponds are stocked with juvenile fish as the reservoir fills in the spring (typically stocked in March). Reclamation staff monitor the fish and manage the ponds throughout the growing season. This work includes periodic fertilization with alfalfa pellets and ammonium nitrates to sustain algae blooms and plankton production, removal of weeds and debris, installing and maintaining floating windmills or solar well pumps to mix the water and provide sufficient oxygen levels, and routine monitoring of physical, chemical, and biological parameters. The ponds are normally harvested in the fall as the lake elevation declines. The fish from these ponds are then released back into Lake

Mohave. Reclamation anticipates the need for these ponds to support RASU and BONY conservation through the life of the program (FY55).

Previous Activities: These ponds have been in use since 1993 and more than 31,000 RASU have been reared and repatriated to Lake Mohave. In an effort to expedite development of RASU brood stock, the target size for repatriation was increased to 500 mm TL during 2007. Since this new target size went into effect, the ponds have been managed to rear larger size fish for the program. Typically, RASU in excess of 300 mm TL are stocked into the ponds and then harvested in the fall. Any in situ production from volunteer spawning is usually transferred to Yuma Cove pond or Davis Cove pond. These two ponds contain water throughout the year and support multiple year classes of fish, and are operated separately from the other ephemeral ponds. They also serve as reservoirs for fish that have not yet met a minimum stocking size of 300 mm TL. In 2011, with cooperation from the National Park Service, the berm at the Yuma Cove backwater was successfully rebuilt on time and within the budget estimates.

FY12 Accomplishments: Seven backwaters were stocked at the beginning of the year with juvenile RASU that were originally collected from Lake Mohave as larvae and then reared at Willow Beach National Fish Hatchery. AJ and Dandy backwaters were stocked in January as part of the C40 work task. The remaining backwaters were stocked in March: this included Yuma, North Chemehuevi, Nevada Larvae, and Willow. The last backwater stocked was Davis as part of the C41 work task in April of 2012. The backwaters received 200, 200, 200, 201, 50, 50, and 377 razorbacks, respectively, for a total of 1,278 fish. Mean TL for all backwater pond fish at harvest was 439.2 mm with a range of 334 mm to 560 mm. Year class for all fish stocked in 2012 was 2008. North Nine Mile backwater did not receive any fish in 2012. All fish were PIT-tagged at the time of initial stocking into the backwaters. Fish were re-scanned at the time of harvest and a new tag was inserted if the original PIT tag was not detected. The total number of fish harvested from the 2012 stocking into Yuma was 134; this total likely included holdover fish from previous stockings. These potential holdover fish stocked prior to 2012 were included in the total harvest and released into Lake Mohave. Zero fish were harvested from the 2012 stocking at Davis. The following table lists numbers of fish for the 2012 harvest. A total of 259 in situ-produced fish captured from Arizona Juvenile, Yuma, and Dandy spawning were PIT-tagged or fin-clipped and transferred to Reach 3.

2012 adult razorback suckers repatriated to Lake Mohave from lake-side rearing ponds

Pond/Backwater	# Stocked	Mean Length at Stocking	# Harvested	Mean Length at Harvest	% Harvested from 2012 Stocking
Yuma	200	358	134*	484*	67.0*
Willow	50	370	47	435	94.0
Dandy	200	418	77	439	38.5
Arizona Juvenile	200	421	99	444	49.5
Nevada Larvae	50	371	9	403	18.0
N. Chemehuevi	201	361	178	430	88.6
Davis	377	249	0	0	0.0
Total	1,278	364.0	544*	439*	42.5*

*Indicates the total number and overall mean lengths of fish at harvest for ponds that contained fish prior to 2012.

FY13 Activities: Lake-side ponds are again being used for RASU brood stock maintenance and development. Nevada Larvae has not been successful the past few years due to poor water quality and will not be used in the foreseeable future. Research investigations have been ongoing to look at ways to better manage natural food resources in these ponds (C44). In situ voluntarily spawned fish in Arizona Juvenile, Yuma, and Dandy ponds continue to be harvested and released to downstream locations in Reach 3 below Davis Dam.

Proposed FY14 Activities: Lake-side ponds along the shoreline of Lake Mohave will be operated and maintained for native fish. The ponds will be harvested in the fall as the lake elevation declines, and fish reared in these ponds will be released back into Lake Mohave for development and maintenance of RASU brood stock. Voluntarily spawned fish from backwaters will continue to be transported downstream of Davis Dam.

Out-of-production backwaters, including North Nine Mile, Nevada Larvae, and Nevada Egg, will be stocked with BONY to quantify genetic and demographic parameters. This work is related to investigations into reproductive success of RASU in Arizona Juvenile and Dandy ponds (C40).

Pertinent Reports: N/A

Work Task B8: Fish Tagging Equipment

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$90,000	$65,514.81	$590,004.96	$100,000	$100,000	$100,000	$100,000

Contact: Jon Nelson, (702) 293-8046, jnelson@usbr.gov

Start Date: FY04

Expected Duration: FY55

Long-term Goal: Acquire and maintain supply of fish-tagging materials and equipment for marking fish to be released for research and for augmentation stockings.

Conservation Measures: RASU3, RASU4, RASU5, RASU6, BONY3, BONY4, and BONY5.

Location: N/A

Purpose: Fish released into the LCR by the LCR MSCP will be marked for identification purposes to assess survival and distribution.

Connections with Other Work Tasks (past and future): Activities are related to all work tasks that result in fish stocking for augmentation, fish research, and fish monitoring.

Project Description: The LCR MSCP will rear and stock more than 1.2 million native fish into the LCR. Fish will be marked to assess distribution and survival and for effective research and decision making. Funds provide for both tagging materials and detection equipment needed during monitoring and research. Reclamation anticipates the need for fish tags and tagging equipment throughout the life of the program.

Previous Activities: Fish released into the LCR have been tagged with 400-kHz PIT tags (Lake Mead and Lake Mohave, reaches 1 and 2), 125-kHz PIT tags (Davis Dam to Parker Dam, Reach 3), and wire tags (Davis Dam to Imperial Dam, reaches 3, 4, and 5). Recaptured fish below Parker Dam have been retagged with 125-kHz PIT tags. In addition, both radio tags and sonic tags have been implanted in fish used for research on lakes Mead, Mohave, and Havasu. Fin clipping and spaghetti tags (or Floy tags) have been used for short-term survival studies in some rearing and grow-out ponds.

A decision was made in 2006 to begin using new 134.2-kHz frequency PIT tags. These new tags have a greater detection range than the previously used tags (12 inches versus 2 inches away from fish) and will allow for testing and deployment of remote listening stations within spawning areas. Purchase of the new PIT tags, tag readers, and antennae

began in 2006. A total of 72,651 RASU and 17,454 BONY were PIT-tagged and/or wire-tagged and released into the LCR between 2006 and 2008. More recent stockings have included 24,299 RASU and 6,579 BONY in 2009, 22,476 RASU and 4,993 BONY in 2010, and 25,598 RASU and 7,122 BONY in 2011.

FY12 Accomplishments: PIT tags, tagging equipment, and tag readers were purchased as needed to mark fish for monitoring and research. A total of 27,105 RASU and 7,821 BONY were tagged and released into the LCR during 2012.

FY13 Activities: PIT tags, tagging equipment, and tag readers will be purchased as needed to mark fish for monitoring and research.

Proposed FY14 Activities: PIT tags, tagging equipment, and tag readers will continue to be purchased as needed to mark fish for monitoring and research.

Pertinent Reports: N/A

Work Task B11: Overton Wildlife Management Area

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$75,000	$36,397.60	$314,245.05	$50,000	$50,000	$50,000	$50,000

Contact: Jim Stolberg, (702) 293-8206, jstolberg@usbr.gov

Start Date: FY06

Expected Duration: FY16

Long-term Goal: Develop and maintain off-site rearing capability to augment production at state and Federal hatcheries.

Conservation Measures: RASU3, RASU4, RASU6, RASU7, and RASU8.

Location: Reach 1, Overton, Nevada.

Purpose: Provide additional rearing capacity for RASU, and complete RASU conservation measures identified in the 2001 SIA BO.

Connections with Other Work Tasks (past and future): This work task was initiated in April 2006 following approval from the Steering Committee and concurrence by the USFWS. This work is closely related to the Lake Mead Fish Hatchery (B6) and the Lake Mead Razorback Sucker Study (C13). Ponds at the Overton Wildlife Management Area (WMA) also receive additional fish from Willow Beach NFH (B2) for grow-out and future repatriation.

Project Description: Overton WMA is located in Clark County, Nevada, at the upper end of Lake Mead at the confluence of the Muddy and Virgin rivers, 65 miles northeast of Las Vegas. The wildlife area is managed solely for fish and wildlife and their habitats and has limited public access. The Overton WMA covers more than 17,000 acres, and includes three primary waterfowl management ponds, all of which are available for native fish culture.

The LCR MSCP activities for this site include receiving Lake Mead and Lake Mohave RASU for grow-out to target size (300+ mm) for future program needs. Overton WMA may also provide opportunities to conduct species research under the LCR MSCP AMP.

Previous Activities: Designs for site modifications, including repair and improvement to water delivery infrastructure to facilitate managing Honeybee and Center ponds for native fish culture, were completed in 2006. Improvements to the water delivery infrastructure for Honeybee and Center ponds were completed in 2007 and followed with stockings of native fish in both ponds. To curtail aquatic vegetation and maintain ponds

with sufficient open water areas, a 14-foot aluminum boat with chemical spray unit was purchased in 2008. Due to low native fish survival and invasion of nonnative fish species, stockings in Honeybee Pond ceased in 2008. Plans to remove nonnative fish species and investigate potential means of renovating Honeybee Pond were scheduled for future years. Between 2009 and 2010, a total of 3,535 RASU were stocked into Center Pond. During this time stocked fish and pond water quality were monitored periodically. Pond improvements also continued in 2010 with the addition of a new boat ramp in the northeast corner of Center Pond. An additional 1,080 RASU were stocked into Center Pond during 2011.

FY12 Accomplishments: A total of 600 juvenile RASU reared at Lake Mead SFH were stocked into Center Pond during December 2012. Associated field work was performed and included periodic monitoring of pond water quality as well as two sampling events to assess RASU pond stock. The November sampling event yielded 110 RASU averaging 476 mm (266-575 mm) in total length (TL). The sampling event conducted in April had similar success with the capture of 161 RASU averaging 391 mm TL (230-589 mm). The lower average TL observed during the second sampling event was likely due to the younger year class stocked in December. The pond's water delivery infrastructure was also inspected and minor repairs were completed as necessary. Repair and improvement to the boat launch at Center Pond and a single treatment to curtail shoreline aquatic vegetation were completed early in the year. NDOW also held internal meetings to evaluate additional onsite ponds for RASU rearing and grow-out. No new rearing ponds were identified, but the state did develop a renovation plan for Honeybee Pond, which had previously been used for RASU grow-out. The plan includes draining the pond, deepening silted-in areas, removing dense shoreline vegetation, and replacing the current outlet structure. The new outlet structure and valves were purchased in FY12; however, renovation was delayed until FY13, which resulted in reduced expenditures in FY12.

FY13 Activities: No stockings of Overton WMA ponds are scheduled for FY13. Any RASU being moved off station from the Lake Mead Hatchery will be transferred to Mulberry Pond at Floyd Lamb City Park. RASU currently held in Center Pond will be monitored at least twice during the year, and water quality information will be collected quarterly using standardized methods consistent with water quality data collection from previous project segments. Routine maintenance will be performed as necessary on the existing water delivery infrastructure. Renovation of Honeybee Pond will follow the closure of the fall/winter waterfowl season and is scheduled for March 2013.

Proposed FY14 Activities: Following the renovation of Honeybee Pond, RASU from Lake Mead Hatchery will be stocked for grow-out and future program needs. Fish populations and water quality of Overton WMA ponds will continue to be monitored through sampling efforts.

Pertinent Reports: The final draft of the 2012 *Razorback Sucker Augmentation, Overton Wildlife Management Area* report is complete. It will be posted to the LCR MSCP website following editorial review.

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WORK TASKS SECTION C

SPECIES RESEARCH

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Work Task C2: Sticky Buckwheat and Threecorner Milkvetch Conservation

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$11,000.00	$10,731.82	$52,025.15	$11,000.00	$11,000.00	$11,000.00	$11,000.00

Contact: Dianne Bangle, (702) 293-8220, dbangle@usbr.gov

Start Date: FY06

Expected Duration: FY30

Long-term Goal: Support existing conservation programs for covered plant species.

Conservation Measures: STBU1 and THMI1.

Location: Reach 1, Nevada.

Purpose: Provide funding to support existing conservation programs for sticky buckwheat and threecorner milkvetch.

Connections with Other Work Tasks (past and future): These are stand-alone conservation measures described in the HCP.

Project Description: Sticky buckwheat and threecorner milkvetch are covered species within the LCR MSCP. Funding in the amount of $10,000 per year will be provided to an ongoing conservation program or other entity approved by the USFWS to implement conservation activities for these two plant species. Funding may be advanced for up to five years, depending on availability, to keep administrative costs at a minimum.

Previous Activities: In FY10, $10,000 was provided to the NPS. Monitoring of select populations implemented in 2008 continued through 2009. Data were summarized and a report written summarizing results of two years monitoring sticky buckwheat and threecorner milkvetch. In 2010, presence/absence surveys of sticky buckwheat and threecorner milkvetch were conducted at select sites. In 2011, surveys were conducted at known locations for these two rare plants within NPS boundary.

FY12 Accomplishments: In FY12, $10,000 was provided to the NPS. Tasks included surveys, and invasive species removal. A final report covering 2012 activities will be posted to the website. Surveys were conducted at Sandy Cove and Ebony Cove for threecorner milkvetch. There were no threecorner milkvetch observed emerging at Sandy Cove or Ebony Cove. The area between Submarine Point (just south of Lime Cove) and Kline Hole was informally surveyed for sticky buckwheat. There were approximately

7,000 plants recorded. In addition, approximately 1.5 acres of Sahara mustard plants were removed from the dunes at Sandy Cove and surrounding beaches.

FY13 Activities: Funds in the amount of $10,000 will be transferred to NPS to implement conservation activities for these two plant species. Surveys are set to take place in the spring of 2013. An annual report will be provided to Reclamation summarizing achievements towards conservation goals for threecorner milkvetch and sticky buckwheat.

Proposed FY14 Activities: Funds in the amount of $10,000 will be transferred to an ongoing conservation program to implement conservation activities for these two plant species. An annual report will be provided to Reclamation summarizing achievements towards conservation goals for threecorner milkvetch and sticky buckwheat.

Pertinent Reports: Annual reports summarizing survey and monitoring efforts in FY12 for sticky buckwheat and threecorner milkvetch will be posted on the LCR MSCP website.

Work Task C3: Multi-Species Conservation Program Covered Species Profile Development

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$15,000	$13,408.44	$249,443.12	$30,000	$15,000	$15,000	$15,000

Contact: Sonja Kokos, (702) 293-8033, skokos@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Species research.

Conservation Measures: MRM1, MRM2, MRM3, CLRA1, CLRA2, WIFL1, WIFL2, DETO1, DETO2, BONY2, RASU2, WRBA1, WRBA2, WYBA1, WYBA3, DPMO1, CRCR1, CRCR2, YHCR1, YHCR2, LEBI1, BLRA1, BLRA2, YBCU1, YBCU2, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, FTHL1, FTHL2, FLSU1, MNSW1, MNSW2, CLNB1, CLNB2, PTBB1, PTBB2, CRTO1, CRTO2, CRTO3, LLFR1, LLFR2, and LLFR3.

Location: System-wide, Arizona, California, Nevada.

Purpose: Assess existing knowledge for each LCR MSCP covered species to determine research needs and habitat requirements for current and future habitat creation projects.

Connections with Other Work Tasks (past and future): Information collected during this literature review is currently being used to develop future work tasks, design monitoring programs, design habitat creation projects, and implement the adaptive management process. Information from this work task will be utilized under E16.

Project Description: To successfully create habitat for LCR MSCP covered species, species accounts have been developed. Extensive literature searches were conducted to accumulate existing knowledge on each covered species. Species accounts were written for both covered and evaluation species, including known habitat requirements and management concerns. Data gaps were identified to direct covered species research priorities.

These species accounts were based on extensive literature searches for each species and include the most recent scientific information. These accounts include current knowledge about each species' legal status, life history, distribution, habitat requirements, behavior, and LCR MSCP conservation measures as it relates to the creation and management of the species' habitats.

Reclamation will use these species accounts to identify information needed for the creation and management of covered species habitats, enabling the successful completion of conservation measures. The LCR MSCP research and monitoring data needs have been identified for each covered and evaluation species, where appropriate. These needs have been prioritized in a five-year plan and will be completed according to importance, urgency, and cost. Other potential research and monitoring opportunities, either identified through this process or by other scientists or conservation programs, that are outside of the scope and purpose of the LCR MSCP have also been listed.

Previous Activities: Species accounts for the 25 covered species and 5 evaluation species listed in the HCP that utilize terrestrial, marsh, and riparian habitats were completed in 2008.

FY12 Accomplishments: New information was incorporated and updated internally into the species accounts. Literature searches, literature acquisition, and data compilation were conducted to update species accounts as needed.

FY13 Activities: Information is being gathered from recent literature and will be incorporated into the species accounts on a five-year cycle. An updated species accounts report will be completed this fiscal year.

Proposed FY14 Activities: Information will be gathered from recent literature and will be incorporated into the species accounts on a five-year cycle.

Pertinent Reports: *Species Accounts for the Lower Colorado River Multi-Species Conservation Program Covered Species* is posted on the LCR MSCP website.

Work Task C4: Relict Leopard Frog

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$11,000	$10,162.78	$84,563.54	$11,000	$11,000	$11,000	$0

Contact: Allen Calvert, (702) 293-8311, acalvert@usbr.gov

Start Date: FY06

Expected Duration: FY15

Long-term Goal: Support existing relict leopard frog conservation programs.

Conservation Measures: RLFR1.

Location: Reach 1, Nevada and Arizona.

Purpose: Provide funding to support existing relict leopard frog conservation programs.

Connections with Other Work Tasks (past and future): This is a stand-alone conservation measure as described in the LCR MSCP.

Project Description: The LCR MSCP will assist and contribute to existing relict leopard frog research and conservation efforts initiated by the Relict Leopard Frog Conservation Team. Ten thousand dollars per year, for a period of 10 years, will be contributed to the Relict Leopard Frog Conservation Team to implement planned, but unfunded, conservation measures.

Previous Activities: Funds in the amount of $10,000 annually were transferred to the NPS through an inter-agency agreement.

FY12 Accomplishments: Funds in the amount of $10,000 were transferred to the NPS through the second year of a new five-year agreement. Relict leopard frog conservation activities supported by these funds were completed at 15 sites within southern Nevada and northwestern Arizona and included:

1. 728 tadpoles and 979 juvenile frogs were released at six experimental sites and one natural site. Eight frogs were sent to the Las Vegas Springs Preserve for a relict leopard frog display.
2. Diurnal and nocturnal surveys were conducted year-round at natural and experimental sites; egg masses were seen at 13 of 18 sites and adult or juvenile frogs were seen at all sites.

3. Lime Spring, Bearpaw Poppy Spring, and Horse Spring were added as translocation sites, and tadpoles and frogs were released in the spring and early summer.

FY13 Activities: Funds in the amount of $10,000 will be transferred to the NPS through the third year of a five-year agreement. A report will be provided to Reclamation summarizing calendar year 2012 monitoring of experimental and natural populations of relict leopard frogs, and frog rearing and relocation activities.

Proposed FY14 Activities: Funds in the amount of $10,000 will be transferred to the NPS through the fourth year of a five-year agreement. A report will be provided to Reclamation summarizing calendar year 2013 monitoring of experimental and natural populations of relict leopard frogs, and frog rearing and relocation activities.

Pertinent Reports: *Relict Leopard Frog Monitoring and Management, 2012 Activity Report* will be posted on the LCR MSCP website.

Work Task C5: Effects of Abiotic Factors on Insect Populations in Riparian Restoration Sites

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$90,000	$86,835.87	$501,917.22	$95,000	$0	$0	$0

Contact: Bill Wiesenborn, (702) 293-8699, wwiesenborn@usbr.gov

Start Date: FY06

Expected Duration: FY13

Long-term Goal: Species Research.

Conservation Measures: WIFL1, WIFL2, YBCU1, YBCU2, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, WRBA2, WYBA3, CLNB2, PTBB2.

Location: Beal Lake Conservation Area (Havasu NWR), Palo Verde Ecological Reserve, Cibola Valley Conservation Area.

Purpose: The purpose of this work task is to determine the effect of two abiotic factors, water and nutrient contents, on abundances of insects and insectivorous birds and bats covered by the LCR MSCP. Establishing vegetation at restoration sites will not by itself provide habitat for birds and other wildlife. Proper amounts of plant water and other nutrients in plants and insects are needed to support wildlife.

Connections with Other Work Tasks (past and future): Work task C5 developed from the Southwestern Willow Flycatcher Prey Base Study (C20). Information obtained in these studies will be used in the design and implementation of future habitat creation projects detailed in Section E.

Project Description: Eight species of birds and four species of bats included in the LCR MSCP eat insects. Creating and maintaining habitat for these species requires providing an adequate supply of insects for food. This is especially difficult at the LCR MSCP habitat creation sites being developed, because riparian vegetation is being planted in non-riparian farmland.

Plant-feeding insects respond to water and nutrient concentrations of their plant hosts. Plants with higher water concentrations produce more insects. This increase in phytophagous insects also increases densities of predaceous insects and spiders. Plant nitrogen concentrations similarly affect insect populations. Nutrient concentrations in spiders and insects also may affect foraging by insectivorous birds. Nutrients that vary

among spiders and insects include nitrogen, sulfur, and phosphorous. This project will examine the following at LCR MSCP restoration sites:

1. the influence of increased plant-nitrogen content on spider and insect densities
2. variation in nitrogen, sulfur, and phosphorus among spiders and insects
3. the influence of plant water-content on spider and insect densities

Previous Activities: Effects of plant water and nitrogen contents on arthropod abundance and mass was examined at the Palo Verde Ecological Reserve. Fertilizing trees with nitrogen had a small but significant effect on insect abundance and mass. Nitrogen concentrations were measured in collected arthropods. Overall, arthropod herbivores and predators contained similar nitrogen concentrations. A follow-up study was performed in 2010 examining the occurrence of resilin in insects. Resilin was abundant in grasshoppers, dragonflies, and true bugs, and rare in flies and beetles.

Amounts of sulfur in spiders and insects collected at the Beal Riparian Restoration Site were examined during 2011. Insectivorous birds require these compounds for growth and reproduction. Concentrations of sulfur were measured in 4 families of spiders and 22 families of insects. Spiders contained higher sulfur-concentrations than insects, and concentrations of sulfur were lower in beetles than in other insects.

FY12 Accomplishments: The element phosphorus in arthropods at the Beal Riparian Restoration Site was examined during 2012. Phosphorus is found in DNA and RNA, in AMP, ADP, and ATP, and in phospholipids. Phosphorus concentrations were higher in spiders than in insects, in insect predators than in herbivores, and in strong-flying insects compared with weak-flying or non-flying insects.

FY13 Activities: The effects of irrigation frequency on densities of arthropods on different plant species at Beal Riparian Restoration Site will be examined during 2013. Three adjacent plots at Beal will be irrigated on different schedules during 2013. All three plots contain planted coyote willow, Goodding's willow, and cottonwood. Arrowweed may also be examined. Numbers and biomasses of arthropods will be measured on each species at each plot monthly during April to September. The effects of irrigation frequency on spider and insect abundance on each plant species will be determined. Plant water contents also will be measured.

Proposed FY14 Activities: Closed in FY13.

Pertinent Reports: Annual reports for C5 are available on the LCR MSCP website.

Work Task C6: Insectivore Prey Base Abundance and Diversity in Conservation Areas

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$101,441.68	$150,000	$265,000	$265,000	$265,000

Contact: Barbara Raulston, (702) 293-8396, braulston@usbr.gov

Re-Start Date: FY13

Expected Duration: FY16

Long-term Goal: Species Research.

Conservation Measures: WIFL1, WIFL2, YBCU1, YBCU2, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, WRBA2, WYBA3, CLNB2, PTBB2.

Location: Topock Marsh (Reach 3), Beal Lake Conservation Area (Reach 3), and Cibola Valley Conservation Area (Reach 4).

Purpose: The purpose of this study is to determine presence of insect and arachnid species at LCR MSCP conservation areas and the Bill Williams River NWR, and estimate abundances by species. Few restoration programs address arthropods as part of habitat development and restoration projects. Wildlife species key in on riparian habitat because of the microclimate conditions, canopy cover, and prey abundance that riparian habitats provide. Additionally, healthy riparian habitats are linked to the vital roles arthropods play as pollinators, decomposers, herbivores, seed dispersers, and food sources.

Several LCR MSCP covered species are insectivores and may be selecting breeding habitat based on prey availability. According to the LCR MSCP HCP, created habitat will be specifically managed to ensure production of LCR MSCP covered species insect prey base.

The LCR MSCP now has several habitat creation sites that are of the correct structure for several covered species. Most of these habitat creation sites include using mass planting techniques to establish target tree densities similar to known densities of covered species habitat. This technique has been effective and successful for the development of habitat for the LCR MSCP, but it circumvents the typical and gradual stages of plant succession (i.e. changes in species composition over time) that take place as habitats develop slowly over time. These gradual processes allow for a simultaneous succession of arthropod species. The LCR MSCP needs data to show which arthropod species are currently present or absent at LCR MSCP sites.

LCR MSCP habitat creation sites, in time, are expected to support an abundance and diversity of insects associated with more natural habitats, thus contributing to the availability of prey for LCR MSCP covered insectivorous species (LCR MSCP HCP).

Connections with Other Work Tasks (past and future): This is a re-initiation of Work Task C6 that was in place during FY06-07. This work task initially developed from the Southwestern Willow Flycatcher Prey Base Study (C20). Work Task C6 parallels Effects of Abiotic Factors on Insect Populations in Riparian Restoration Sites (C5).

Project Description: The presence/absence and abundance of arthropods at LCR MSCP sites will be further studied in order to fill in gaps in our knowledge of arthropod species, thereby contributing to the routine evaluation of habitat health and habitat use by LCR MSCP covered species. Surveys will be conducted at existing vegetation monitoring plot locations. Insect species richness and estimates of abundance will be determined at LCR MSCP vegetation monitoring plots. In order to develop a more complete picture of the diversity of insects and arachnids that are using LCR MSCP habitat plus a natural area in the same region, all crawling, leaf dwelling, and flying insects and arachnids found during the surveys will be identified to species or logged with a unique identifier if ID is not possible.

Previous Activities: We identified insects collected from tamarisk (*Tamarix ramosissima*) flowers during FY06 at Topock Marsh, Arizona, where earlier work identified insects eaten by southwestern willow flycatchers. We also estimated specificities of insects to tamarisk flowers by determining proportions of pollen carried comprised of tamarisk pollen. All insects collected were specific to tamarisk flowers, with pollen loads comprising greater than 86% tamarisk pollen on leaf-cutting bees and *M. tepida*, and greater than 95% on other insects.

FY12 Activities: N/A

FY13 Activities: This study will ascertain arthropod species richness associated with vegetation monitoring plots at four LCR MSCP habitat creation sites. The study will also estimate abundances of arthropod species found at LCR MSCP habitat creation sites. A study design will be completed and implementation will begin.

Arthropod species richness and estimates of abundance will be evaluated at a subset of LCR MSCP vegetation monitoring plots utilizing several collection methods, which may include sweeps, traps, and stem counts. Arthropods will be collected, counted and, at a minimum, identified to family, if not genus, level.

Proposed FY14 Activities: The study will continue to collect information on insect species richness and estimates of abundance at LCR MSCP vegetation monitoring plots utilizing several collection methods such as sweeps, traps, and stem counts. The level of effort will be increased, which will lead to an increase in costs in FY14.

Pertinent Reports: The study plan is available upon request.

Work Task C10: Razorback Sucker Rearing Studies

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$125,000	$126,121.64	$765,880.49	$125,000	$125,000	$125,000	$0

Contact: Andrea Finnegan, (702) 293-8203, afinnegan@usbr.gov

Start Date: FY06

Expected Duration: FY15

Long-term Goal: Provide RASU of sufficient quantity and quality for the Fish Augmentation Program, and ensure that these fish are reared in a cost-effective manner.

Conservation Measures: RASU3, RASU4, and RASU6.

Location: Various locations including hatcheries, rearing ponds, universities, and private research facilities.

Purpose: Evaluate factors affecting rearing of subadult RASU to maximize quantity and quality of RASU produced for the LCR MSCP.

Connections with Other Work Tasks (past and future): This work task is a companion study to Bonytail Rearing Studies (C11) and may share some of the same locations, source data, and testing staff during implementation. Also, investigations carried out may be conducted at hatcheries identified in Section B.

Project Description: This work task provides funding for investigating rearing and culture practices of RASU. The goal is to investigate ways to accelerate growth and improve post-stocking survival of RASU through manipulation of physical, chemical, and biological attributes of the rearing environment.

Objectives:

- Evaluate factors affecting growth in aquaculture
- Evaluate polyculture techniques to maximize rearing capabilities
- Identify requirements to rear RASU to 500mm using existing facilities at WBNFH
- Evaluate predator recognition and avoidance training

Previous Activities: Literature reviews, site visits to RASU aquaculture facilities, communication with fisheries professionals, and workshop led to the development of hypotheses for single-variable experimental designs.

Factors that affect RASU growth in captivity have been evaluated and methods to improve growth rates at Bubbling Ponds SFH have been identified. Results showed that growth rates of RASU are 6-9 mm/ month; this is consistent between ponds and all tested densities are temperature independent. Growth may be enhanced by separating fast-growing and slow-growing fish after the first year, substantially reducing fish density, and modifying the water delivery system to eliminate *Ichthyophthirius multifiliis* (Ich) from the hatchery source water.

Polyculture of RASU and BONY was evaluated at Achii Hanyo Rearing Station. The study concluded that polyculture of BONY and RASU is not detrimental to either species provided densities do not exceed carrying capacity. This is no longer being practiced at Achii Hanyo due to difficulties with maintaining pond densities amidst voluntarily spawned BONY.

FY12 Accomplishments: RASU growth studies at Willow Beach NFH concluded that current production rates prohibited achieving fish growth of 500 mm TL within four years. In order to achieve the desired 500 mm TL, annual production would have to be reduced to 1,600 razorback suckers instead of the current production of 7,000 razorback suckers to 300 mm TL and 1,000 to 400 mm TL.

Infrastructure improvements were made to the research building at Bubbling Ponds SFH in preparation for initiating RASU and BONY Predator Recognition experiments in FY13. This included installation and repairs to tanks and water supply. RASU have been obtained from SNARRC, and predators (largemouth bass and flathead catfish) have been captured and quarantined.

FY13 Activities: Predator recognition research will continue. RASU will be exposed to the conspecific alarm substance and a predator with a temporarily incapacitated jaw muscle concurrently. Survival trials of conditioned and unconditioned fish when exposed to actively feeding predators will be evaluated over 24 hours.

RASU and BONY predator recognition experiments will be initiated in FY13. RASU will concurrently be exposed to its conspecific alarm substance and a predator with a temporarily incapacitated jaw muscle. Survival trails of conditioned and unconditioned RASU when exposed to actively feeding predators will be evaluated over 24 hour intervals.

Pond restoration is expected to begin late in FY13. Three ponds will be restructured into six identically sized mesocosms to evaluate survival of BONY and RASU at various levels of predator avoidance training.

Proposed FY14 Activities: Pond reconstruction and installation of remote PIT scanning antennae is going to be completed. Predator recognition studies to investigate whether a subset of conditioned fish increases survival of unconditioned fish will continue. Investigations of long-term survival of trained RASU will also continue. How time between conditioning and stocking influence survival in the presence of actively feeding predators will be evaluated.

Pertinent Reports: Scopes of work and project reports are available upon request. *Effects of Disease Treatments on Growth of Razorback Sucker*; *Effects of Capture By Trammel Nets On Native Arizona Fishes;* and *Factors Affecting Growth of Razorback Sucker in Captivity: Literature Review and Knowledge Assessment* are available on the LCR MSCP website.

Work Task C11: Bonytail Rearing Studies

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$150,000	$140,147.91	$787,571.10	$150,000	$150,000	$150,000	$0

Contact: Andrea Finnegan, (702) 293-8203, afinnegan@lc.usbr.gov

Start Date: FY06

Expected Duration: FY15

Long-term Goal: Provide BONY of sufficient quantity and quality for the Fish Augmentation Program, and ensure that these fish are reared in a cost-effective manner.

Conservation Measures: BONY3, BONY4, and BONY5.

Location: Various locations including hatcheries, rearing ponds, universities, and private research facilities.

Purpose: Evaluate factors affecting growth of subadult BONY to maximize total length at release and reduce rearing time in hatchery.

Connections with Other Work Tasks (past and future): This work task is a companion study to Razorback Sucker Rearing Studies (C10) and may share some of the same locations, source data, and testing staff during implementation. Also, investigations carried out may be conducted at hatcheries identified in Section B.

Project Description: This work task provides funding for investigations into rearing and culture of BONY. The species is a rare fish for which only limited life-history data exist, and data that exist are mostly for adults, not young life stages such as those being reared in hatcheries. The goal is to investigate ways to accelerate growth and post-stocking survival of BONY through manipulation of physical, chemical, and biological attributes of the rearing environment.

Objectives:

- Review current practices and prioritize research actions
- Evaluate species specific diet for BONY
- Investigate BONY stressors during the handling process
- Evaluate predator recognition and avoidance training

Previous Activities: Investigations and evaluations of current culture practices for BONY were performed through literature reviews, survey questionnaires, site visits to culture facilities, and interviews with fish culturists. A workshop was held in August

2007 for fish culturists to review survey findings and prioritize research actions. Research hypotheses were formulated for study designs and investigations are currently being carried out or are complete.

Five fish feeds were evaluated, four experimental feeds and the currently used feed, to determine whether alternative protein sources and/or lipid levels could improve growth of BONY. All five diets evaluated performed equally well. It was recommended that BONY remain on the current diet until further research dictates otherwise.

Arizona State University conducted a comprehensive review of available published and gray literature, compiling it into an annotated bibliography.

Investigations into handling stressors in BONY at Achii Hanyo Rearing Facility were completed. Results showed that fish tagged at 16°C had significantly lower plasma cortisol levels than those tagged at 12°C and 20°C.

A site visit to Achii Hanyo Rearing Facility during the annual harvest was conducted. Observations were made on the culturing, handling, tagging, and transporting procedures at Achii Hanyo Rearing Facility. Recommendation include assessing tolerances of BONY to hatchery and stocking stressors by evaluating the stress responses at the biochemical, organismal, population, community, and ecological levels to alleviate observed handling stressors.

FY12 Accomplishments: A predator recognition study using classical conditioning techniques while introducing predator-naive BONY to a predator with temporarily incapacitated jaw muscles in the presence of the conspecific alarm substance is in progress. Installation of tanks, drain and inflow plumbing, large holding tanks with a recirculating system, air supply, and a distilled water system are complete. BONY have been obtained from SNARRC and predators (largemouth bass and flathead catfish) have been captured and quarantined. Botulinum toxin concentrations necessary to adequately paralyze the jaw muscles of predator fish have been determined.

FY13 Activities: Predator recognition research will continue. BONY will be exposed to the conspecific alarm substance and a predator with a temporarily incapacitated jaw muscle concurrently. Survival trials of conditioned and unconditioned fish when exposed to actively feeding predators will be evaluated over a 24 hour time intervals.

Experiments to investigate long-term survival of conditioned BONY will begin. The first question to be evaluated is whether the frequency of predator avoidance conditioning influences survival of RASU in the presence of actively feeding predators.

Proposed FY14 Activities: Pond reconstruction and instillation of remote PIT scanning antennae is to be completed in FY14. Predator recognition studies to investigate whether a subset of conditioned fish may be able to increase survival of unconditioned fish will continue. Investigation of long-term survival of trained BONY will also continue. How the time between conditioning and stocking influences survival in the presence of actively feeding predators will be evaluated.

Pertinent Reports: Scopes of work and project reports are available upon request. *BONY Rearing Studies: Literature Review; Passive Integrated Transponders in Gila elegans; Location, Retention, Stress, and Mortality;* and *Stress Inducing Factors of BONY Hatchery and Stocking Practices*, are available on the LCR MSCP website.

Work Task C13: Lake Mead Razorback Sucker Study

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$125,000	$134,764.80	$1,522,137.15	$135,000	$135,000	$135,000	$0

Contact: Jim Stolberg, (702) 293-8206, jstolberg@usbr.gov

Start Date: FY05

Expected Duration: FY15

Long-term Goal: Determine conditions that allow for natural recruitment of RASU.

Conservation Measures: RASU7.

Location: Reach 1, Lake Mead, Nevada/Arizona.

Purpose: Assess RASU population and recruitment in Lake Mead.

Connections with Other Work Tasks (past and future): This work task was previously included in the Draft FY05 Work Tasks as Lake Mead Razorback Study (D7). The long-term monitoring portion of this research has now been moved to D8, and larvae collected through that effort are being reared at Lake Mead Hatchery (B6) and Overton WMA (B11).

Project Description: The LCR MSCP will continue to fund and support the ongoing studies of RASU in Lake Mead. The focus areas of these studies are to:

1. Locate populations of RASU in Lake Mead.
2. Document use and availability of spawning areas at various water elevations.
3. Monitor potential nursery areas.
4. Continue aging of captured RASU.
5. Confirm recruitment events that may be tied to physical conditions in the lake.

Previous Activities: In 1995 the Southern Nevada Water Authority, Nevada Department of Wildlife, and Reclamation began a monitoring program for RASU in Lake Mead. Between 1995 and 2004, some 200 adult and 30 juvenile RASU were captured. Aging data showed that a low level of recruitment had occurred in at least 22 of the past 30 years. This remarkable recruitment has happened in the face of extensive non-native fish populations and declining lake elevations. A summary report of the first 10 years of the study was completed and posted to the LCR MSCP website. The general sites identified in that report are now part of the long-term monitoring for RASU in Lake Mead (D8). Research under this work task has now been focused on an additional area of Lake Mead, the Colorado River inflow (CRI). Through FY11, 72 RASU larvae, 12 FLSU larvae, 12

wild adult RASU, and 164 FLSU have been captured from the CRI. All captured adult and subadult native fish were marked with passive integrated transponder tags for individual identification before being released back into Lake Mead, and all captured RASU have been aged between 6 and 11 years old.

FY12 Accomplishments: The third year of research in the CRI area of Lake Mead was completed in FY12. Using sonic-tagged RASU to locate potential spawning sites, larval sampling was conducted on 39 nights and resulted in the capture of 10 larval RASU. Trammel netting was used to capture adults where concentrations of RASU were suspected, and fin ray specimens were obtained from adult RASU for aging purposes. From 181 net-nights, 26 wild RASU, 1 razorback-flannelmouth sucker hybrid, and 201 FLSU were captured. Of these fish, 13 RASU and 36 FLSU were recaptured fish. Fourteen of the wild RASU were males expressing milt, and the remaining 12 were females showing signs of spawning. Ages from the 14 new wild razorback suckers ranged from 6 to 10 years.

FY13 Activities: All research actions including larval sampling, trammel netting, monitoring of sonic-tagged fish, evaluating growth rates of recaptured fish, and fin-ray sectioning for aging of adult and subadult RASU are expected to continue. Data obtained through these actions will help further identify the size, age structure, habitat use, spawning areas, and recruitment patterns of the RASU aggregate located in the CRI.

Proposed FY14 Activities: Investigations will continue in the Colorado River inflow area of Lake Mead.

Pertinent Reports: The *Razorback Sucker Investigations at the Colorado River Inflow Area Lake Mead, Nevada and Arizona 2012 Final Annual Report* is available upon request and will be posted to the LCR MSCP website.

Work Task C14: Humpback Chub Program Support

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$11,000	$71,167.73	$214,744.93	$57,000	$57,000	$57,000	$57,000

Contact: Ty Wolters, (702) 293-8463, twolters@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Support HUCH conservation.

Conservation Measures: HUCH1.

Location: Grand Canyon, Arizona; Willow Beach, Arizona; Dexter, New Mexico.

Purpose: Provide support to the Glen Canyon Dam AMP for conservation of HUCH.

Connections with Other Work Tasks (past and future): This work is connected to B2 and B4, as money will be transferred to USFWS through an agreement for activities at Willow Beach NFH and SNARRC.

Project Description: The LCR MSCP will provide a total of $500,000 over the life of the program (50 years) to the Glen Canyon Dam AMP, or other entities approved by USFWS, to support implementation of planned, but unfunded HUCH conservation measures.

Previous Activities: In support of the Glen Canyon Dam AMP, funds were provided to USFWS at Willow Beach NFH in FY06 for the care of HUCH from the Little Colorado River being held on station. In an effort to reduce administrative costs and optimize planning, the USFWS requested funding of $10,000 per year for three years (FY06-08). During calendar year 2008, the LCR MSCP agreed to provide additional funds for the development of a refugia broodstock for HUCH. The agreement for broodstock development was in place for FY09-FY11. The increased funding for broodstock development in addition to the previous support means that approximately half of the original $500,000 commitment to this work task has been spent. The remaining funds in this work task will likely be allocated when the Glen Canyon Dam AMP, in agreement with the USFWS develop constructive uses of the funds.

Young-of-year fish were transferred from the Little Colorado River to Arizona Game and Fish's Bubbling Ponds Hatchery. The fish were treated for parasites and held in quarantine for 30 days, then transferred to SNARRC. Through the end of 2011, 857 HUCH have been brought on station for establishing the (500-1000) refuge population at

SNARRC. SNARRC staff completed the draft USFWS Genetic Management Plan for Captive and Translocated Endangered Humpback Chub in the Lower Colorado River Basin.

FY12 Accomplishments: The original three-year agreement was extended one year to complete a refuge population/captive broodstock of Grand Canyon HUCH at the SNARRC. SNARRC received 180 young of the year HUCH collected from the Little Colorado River, Grand Canyon. Following a quarantine period, 175 fish were added to the captive broodstock. In 2012, SNARRC successfully maintained 1,032 HUCH: 277 from the 2008 year class, 205 from the 2009 year class, 175 from the 2010 year class, 200 from the 2011 year class, and 175 from the 2012 year class.

FY13 Activities: Options for allocation of the remaining funds are being considered. Maintenance of the refuge population/captive broodstock for HUCH at SNARRC will continue. SNARRC staff will also evaluate and refine fish culture, marking, and transport methodologies for wild-caught HUCH.

Proposed FY14 Activities: Support will continue for HUCH conservation in coordination with the USFWS and the Glen Canyon AMP. Remaining funds will be spent according to research needs as agreed to among all cooperating agencies.

Pertinent Reports: Progress reports are available upon request.

Work Task C24: Avian Species Habitat Requirements

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$200,000	$243,998.17	$851,071.96	$200,000	$300,000	$300,000	$300,000

Contact: Beth Sabin, (702) 293-8435, lsabin@usbr.gov

Start Date: FY08

Expected Duration: FY17

Long-term Goal: Develop habitat suitability index models for covered avian species.

Conservation Measures: MRM (CLRA, LEBI, BLRA, SWFL, YBCU, ELOW, GIFL, GIWO, VEFL, BEVI, YWAR, SUTA).

Location: LCR MSCP project area; Imperial Ponds Conservation Area, Arizona.

Purpose: Determine habitat requirements for covered marsh and riparian bird species, including Yuma clapper rail (CLRA), least bittern (LEBI), California black rail (BLRA), southwestern willow flycatcher (SWFL), yellow-billed cuckoo (YBCU), elf owl (ELOW), gilded flicker (GIFL), Gila woodpecker (GIWO), vermilion flycatcher (VEFL), Arizona Bell's vireo (BEVI), Sonoran yellow warbler (YWAR), and summer tanager (SUTA).

Connections with Other Work Tasks (past and future): Information gained from this work task will be used to design, create, and maintain marsh and cottonwood-willow habitat described in Section E that targets covered bird species. Information will also be used to maintain existing habitat as described in H1. Data collected in work tasks D2, D3, D5, D6, D7, and F2 will be used to help define habitat requirements.

Project Description: The HCP requires the creation of a minimum of 512 acres of marsh habitat for three covered marsh bird species. All 512 marsh acres should provide habitat for CLRA and LEBI, while 130 acres will provide habitat for BLRA. Studies will be conducted to determine habitat requirements for marsh bird species. Created habitats in turn will be designed in a mosaic to provide the characteristics required by each species. In addition, potential limiting factors such as water fluctuation, percent cover by plant species, minimum patch size, and selenium bio-accumulation may be determined.

The HCP also requires the creation of a minimum of 5,940 acres of cottonwood-willow habitat and 1,320 acres of honey mesquite habitat for nine covered riparian obligate bird species. Habitat requirements for these covered species are not fully understood. Studies will be conducted to determine habitat requirements for riparian obligate species. Results

from these studies may be utilized in created habitats. Habitat models will be created for the Sonoran yellow warbler, Arizona Bell's vireo, summer tanager, Gila woodpecker, vermilion flycatcher, gilded flicker and elf owl. Habitat associations for the southwestern willow flycatcher (D2) and the western yellow-billed cuckoo (D7) are covered under other work tasks.

Previous Activities:

Restoration of managed marsh units to benefit black rail and other marsh birds. Vegetation surveys were conducted in 2009 and water depth data were downloaded from all monitoring wells. Bi-weekly marsh bird surveys were conducted at Imperial NWR in fields 16 and 18 throughout the breeding season in 2009. The locations of all black rails, clapper rail, and least bitterns were mapped in both fields. Black rails were first detected in fields 16 and 18 in April and July of 2009. Yuma clapper rails were consistently detected in Field 16 throughout the summer, with a high of 21 birds. In Field 18 clapper rails were also detected in 2009. In 2011, a final report was prepared giving recommendations on creation and management of marshes for both clapper and black rails.

Yellow-billed cuckoo habitat modeling. Two preliminary multivariate models of yellow-billed cuckoo breeding habitat were developed in 2009. This GIS-based model for quantifying occupied yellow-billed cuckoo breeding habitat may help in determining essential factors for landscape level habitat development.

In 2010, a draft report summarizing the results of the GIS habitat model has been submitted for review. The GIS models examined the effects of landscape-scale habitat variables on cuckoo distribution and identified features that constituted high quality cuckoo habitat within the LCR MSCP planning boundaries. Existing data on cuckoo distribution and abundance within the planning area and in both the Verde River and San Pedro River watersheds were used to develop and test the model. A probability map depicting the likelihood of cuckoo habitat was created and tested with a set of known cuckoo locations from 2007.

Habitat associations for riparian obligate species. Location of each territory and general bird surveys were conducted under D6, but all habitat research and data collection for each territory was conducted under this work task.

Territories per covered species were paired with non-use sites from the same region and habitat type. From 2008-2010, habitat data was gathered for the Arizona Bell's vireo, Sonoran yellow warbler, summer tanager, vermilion flycatcher and the Gila woodpecker. Habitat assessments were not conducted for the gilded flicker due to lack of gilded flickers detected in the bird surveys. A preliminary habitat suitability model was created for these species from the three years of data (2008-2010).

In 2011, system-wide surveys (D6), post-development monitoring on habitat conservation areas (F2), and habitat modeling were continued under a new contract. More detailed habitat models that will address microclimate for the Sonoran yellow warbler,

Gila woodpecker, Arizona Bell's vireo, and the summer tanager will be created during a five-year period from 2011 to 2015. In 2011, the first year of data for these models was collected.

FY12 Accomplishments:

Yellow-billed cuckoo habitat modeling. Landscape-scale habitat variables on cuckoo distribution and the identity of features that constitute high quality cuckoo habitat within the Bill Williams River NWR and the Grand Canyon/upper Lake Mead areas were used to develop a habitat model. The model predicted that a core area of dense cottonwood/willow within a 120-m radius (4.5 ha) of a location increased the chances of cuckoo occurrence, and the likelihood of cuckoo occurrence continued to increase if the core area was surrounded by a large, native forest (480 m radius/72 ha) that contained lots of structural diversity. The odds of cuckoo occurrence decreased rapidly when too much tamarisk surrounded the site.

Habitat associations for riparian obligate species. In 2012, the second year of data was collected for habitat models for the Sonoran yellow warbler, Arizona Bell's vireo, summer tanager and Gila woodpecker. Ten use sites for each species were randomly chosen from all available territories and paired with a non-use site randomly chosen in the same habitat stratum and region. Vegetation plots were randomly placed within use sites (established territories) with one vegetation plot per two acres. There was a maximum of five vegetation plots within each territory (established territories). One vegetation plot was measured per non-use site regardless of the territory size of its paired use site. The random points translated to the center of each vegetation plot. Vegetation plots consisted of nested plots that measured habitat characteristics of overstory trees, the shrub and intermediate layer, canopy closure and gaps, total vegetation volume and the herbaceous layer. The data collection protocol followed the standard LCR MSCP vegetation monitoring methodology.

Temperature and humidity were also assessed at the vegetation plots. Six vegetation plots per species were randomly selected from all the use site plots and six plots were randomly selected from the non-use site plots. Data loggers were established at the center point of the vegetation plot and set to record temperature and relative humidity measurements every 15 minutes. Data were downloaded from the data loggers every three months.

FY13 Activities:

Habitat associations for riparian obligate species. Habitat assessments for the new detailed models (2011-2015) will continue to be conducted in 2013. Ten use sites (established territories) and ten non-use sites will be evaluated per species for the Sonoran yellow warbler, Gila woodpecker, Arizona Bell's vireo and the summer tanager. The parameters measured and field protocol will be the same as in 2011 and 2012.

Data will be downloaded from the data loggers that were established in August and September of 2012 every three months. The vegetation and microclimate data will be analyzed and included in the 2013 report.

Elf owl habitat modeling. A habitat modeling study for the elf owl will be initiated. The objective of the study is to quantify habitat preferences of elf owls in riparian habitat. The study will focus on habitat requirements within the area near the nest cavity and within the home range. The study will also gather additional information on the detectability of elf owls in dense riparian habitat.

A thorough literature review of elf owl habitat studies and preferences will be initiated. The only currently known population of elf owls within the LCR MSCP program area is located at the Bill Williams River NWR on the edge of mosquito flats. Additional populations of elf owls in riparian habitats similar to type of habitat in the LCR MSCP program area will be located. A study plan and scope of work will be drafted for the study.

Proposed FY14 Activities:

Habitat associations for riparian obligate species. Habitat assessments for the new detailed models (2011-2015) continue to be conducted in 2014. In 2014, ten use sites (established territories) and ten non-use sites will be evaluated per species for the Sonoran yellow warbler, Gila woodpecker, Arizona Bell's vireo and the summer tanager. The parameters measured and field protocol will be the same in previous years.

Data will be downloaded from the data loggers every three months. The 2014 vegetation data and 2013 microclimate data will be analyzed and included in the 2014 report. Work will begin on the habitat models.

Elf owl habitat modeling. The habitat modeling study will be implemented in 2014, and will include vegetation parameters from 10 use and 10 non-use sites to create habitat models. The data and results obtained from work task C36, Elf Owl Detectability Study, will be used to guide the data collection and the design of this modeling effort. The implementation of the elf owl habitat modeling will increase costs in FY 14.

Pertinent Reports: The following reports are on the LCR MSCP website. *Lower Colorado River Riparian Bird Surveys 2012*; *Restoration of Managed Marsh Units to Benefit California Black Rails and Other Marsh Birds: An Adaptive Management Approach, Final Report 2011*; and *Development of a GIS-based Model of Yellow-Billed Cuckoo Breeding Habitat Within the LCR MSCP Area, San Pedro River and Verde River, AZ 2012.*

Work Task C25: Imperial Ponds Native Fish Research

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$250,000	$246,544.45	$1,065,280.10	$250,000	$250,000	$250,000	$250,000

Contact: Andrea Finnegan, (702) 293-8203, afinnegan@usbr.gov

Start Date: FY08

Expected Duration: FY18

Long-term Goal: Species research, backwater restoration.

Conservation Measures: RASU2, BONY2.

Location: Reach 5, Imperial National Wildlife Refuge, Arizona.

Purpose: Evaluate six ponds created as backwater habitats at Imperial NWR to assess the efficacy of the ponds for native fish species, specifically BONY and RASU.

Connections with Other Work Tasks (past and future): BONY and RASU to be stocked into the ponds are provided through: Lake Mohave Razorback Sucker Larvae Collection (B1), Willow Beach National Fish Hatchery (B2), Achii Hanyo Rearing Station (B3), Dexter National Fish Hatchery (B4), and Bubbling Ponds Fish Hatchery (B5). Ponds were developed under Imperial Ponds Conservation Area (E14), and additional monitoring support will be provided through Post-Development Monitoring of Fish Restoration Sites (F5). Data are maintained in part under Data Management (G1).

Project Description: This activity will monitor and evaluate the development of native fish refugia in six constructed ponds on Imperial NWR. Pond construction incorporated design features such as riprap, spawning gravels, hummocks, and increased depth, all thought to provide suitable habitat for life cycle completion by BONY and RASU. The experimental design of this research program will evaluate the role and importance of each of these features toward developing self-sustaining native fish populations.

Previous Activities: Several fish monitoring techniques have been assessed for native fish monitoring at Imperial Ponds. Imaging sonar provided inconsistent data and was discarded as a viable monitoring technique. Swimming transects was marginally successful when water clarity was greater than 3 meters. Hoop netting in autumn was effective in capturing young-of-year BONY, but adult BONY were rare. Adult RASU were effectively captured by using entanglement nets during autumn sampling. Remote PIT-tag scanning units were developed and tested. These units can provide PIT tagging data for BONY and RASU year-round without causing distress to the fish.

Habitat use was evaluated for RASU in pond 2, 4, and 6. Habitat use for RASU shifted across seasons, but habitat preference in any given season was different for RASU populations in each pond.

BONY and RASU were implanted with acoustic transmitters to asses distribution. BONY were distributed in deep waters along the north, south, and northeast corner during daylight, and in open water across the length of the pond avoiding shallow areas during nighttime. RASU utilized deep waters west of the hummock during the day, night time monitoring results found RASU concentrated on the boat ramp and on or around the spawning beds. Spatial overlap was minimal between the two species.

FY12 Accomplishments: Remote PIT scanners were used to monitor population size and habitat association of BONY and RASU in Pond 1. Adult BONY population estimates ranged from 53 (March 2012) to 11 (August 2012). Adult RASU population estimates ranged from 131 (January 2012) to 103 (August 2012).

BONY survival was estimated at 53.5% and adult RASU survival was estimated at 92% over the 11-month study period. During annual autumn sampling, 28 BONY and 30 RASU were captured. Mean daily growth was 0.34 mm/day for BONY and 0.07 mm/day for RASU. No specific health issues were identified for either native species. No larval BONY or RASU were encountered, but juvenile RASU were captured and the population of new recruits was estimated at 130 fish.

BONY and RASU habitat associations were evaluated from targeted remote PIT scanning data. There were consistently more contacts for both species at night than during daytime. During summer deep open water areas were preferred by both species and little activity was detected. BONY contacts were few and habitat associations generally equivocal. RASU were associated with gravel beds during the nominal spawning season that peaked in late winter/spring.

Water quality was measured monthly or bi-monthly (temp > 27°C). Most parameters remained within established acceptable limits in all ponds (pH < 9.0, DO > 4 mg/l, and temperature < 33.3° C).

Development of a five-year research plan for Imperial Ponds was postponed pending results of a water management study in ponds 2 through 6. Results may influence future water needs and pond management.

FY13 Activities: Survivorship and recruitment of BONY and RASU will be evaluated in pond 1. Water quality and chemistry will continue to be monitored in all ponds. A five-year research plan will be drafted to include water management and fisheries research and management.

Proposed FY14 Activities: Research will continue based on the priorities developed under the five-year plan with an emphasis on factors influencing post-stocking mortality.

Pertinent Reports: The scopes of work are available upon request. Annual reports are posted to the LCR MSCP website.

Work Task C27: Small Mammal Population Studies

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$50,000	$56,612.17	$337,641.01	$50,000	$50,000	$50,000	$25,000

Contact: Allen Calvert, (702) 293-8311, acalvert@usbr.gov

Start Date: FY08

Expected Duration: FY16

Long-term Goal: Determine distribution, genetics, habitat requirements, and establish monitoring protocol of covered small mammal species.

Conservation Measures: CRCR1, YHCR1.

Location: Reaches 3 through 7 from Davis Dam to the Southerly International Boundary with Mexico.

Purpose: To implement distribution, habitat, and genetics studies for system monitoring of LCR MSCP covered small mammal species. These studies are being conducted to determine geographic range limits of the Yuma hispid cotton rat and the Colorado River cotton rat, and to determine habitat requirements for these species. Data will be used through the adaptive management process to coordinate surveys of habitat creation sites and design habitat for covered mammal species.

Connections with Other Work Tasks (past and future): Data collected as part of Small Mammal Colonization (F3) will also be analyzed as part of the effort to determine species distribution of the two cotton rat species found along the LCR. Previous presence/absence surveys on small mammal populations were conducted under D10. This research will aide in developing a long term population monitoring protocol for small mammals and develop a habitat model for the two cotton rat species that can be used in restoration efforts (Section E) and adaptive management (Section G).

Project Description: Studies will be designed to determine the habitat usage, population status, genetic differentiation, and distributional range of two covered small mammal species: the Colorado River cotton rat and Yuma hispid cotton rat. Small mammals will be trapped in various habitat types along the LCR to collect genetic samples. Samples will be sent to a genetics laboratory for DNA analysis. Genetic differentiation data for animals captured along the LCR will also be compared with data from animals of different subspecies located within Arizona, east of the LCR MSCP planning area, to obtain genetic markers. These data will be used to compare and contrast specific subspecies and determine the distributional range of each species of cotton rat within the LCR watershed. Habitat use and population demographic analyses are currently being

estimated with mark-recapture analyses. A habitat model and population demography study will be implemented to determine habitat usage and establish a protocol for population monitoring at conservation areas.

Previous Activities: *Sigmodon* have been captured at seven localities along the LCR, including sites near Yuma, Arizona, Imperial NWR, Cibola NWR, PVER, and Pintail Slough on Havasu NWR. A study was initiated at the end of FY07 to determine genetic differentiation between covered small mammal species, distributional range for each species, and habitat usage along the LCR. In FY08, additional efforts were made to identify cotton rat populations, including sampling known populations along the LCR. Distribution and population genetic analyses have been conducted for these covered species. Population monitoring and habitat model development research began in FY10.

FY12 Accomplishments: Data collection for the habitat modeling portion of the study was completed.

FY13 Activities: The habitat modeling and the initial mark-recapture data sets for the Colorado River cotton rat will be analyzed and a report will be produced. The mark-recapture portion of the study will continue, focusing on more detailed population and demography data. Testing of the habitat model will begin and a draft protocol for long term monitoring of *Sigmodon* will be produced. Yuma hispid cotton rats will continue to be surveyed to discover a stable population where a habitat and demography study can be conducted.

Proposed FY14 Activities: Continue population/demography monitoring design and research. This study was expanded because long term datasets are necessary for this species due to the drastic population cycles, which may have short-term local effects on the population.

Pertinent Reports: The final report, *Colorado River and Yuma Hispid Cotton Rat Distribution and Habitat*, is available on the LCR MSCP website. The habitat modeling and population monitoring study design is available upon request.

Work Task C30: Development and Evaluation of Measures to Reduce Transport of Quagga Mussel During Fish Transfer and Stocking Activities

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$150,000	$65,684.91	$306,464.71	$160,000	$0	$0	$0

Contact: Ty Wolters, (702) 293-8463, twolters@usbr.gov

Start Date: FY09

Expected Duration: FY13

Long-term Goal: Maintain effectiveness of the fish augmentation program.

Conservation Measures: BONY2, BONY3, BONY4, BONY5, RASU2, RASU3, RASU4, RASU5, RASU6, and RASU8.

Location: Various state and federal hatcheries and laboratories in Boulder City, Nevada; Willow Beach, Arizona; Cornville, Arizona.

Purpose: To develop and test measures to assure non-transmittal of quagga mussel larvae and adult quagga mussels during the fish transport and stocking activities of the LCR MSCP Fish Augmentation Program.

Connections with Other Work Tasks (past and future): This work is related to all fish facilities in B2, B3, B4, B5, B6, B7, and B11 as RASU and/or BONY are moved between these sites and the lower Colorado River. Work began as a literature investigation under G3.

Project Description: This study will develop and test means to assure that quagga mussel larvae and adult mussels are not being transported throughout the Colorado River system as a result of the Fish Augmentation Program. The original Fish Augmentation Plan called for capture of wild RASU larvae from Lake Mohave, which are provided to Willow Beach NFH (B2), SNARRC (B4), and Bubbling Ponds SFH (B5). In addition, RASU larvae and juveniles are transported from Willow Beach NFH to Lake Mead SFH (B6) and to lake-side rearing ponds (B7). BONY are transferred from SNARRC to Willow Beach NFH and to Achii Hanyo Rearing Station (B3), and directly to the river system. This is an acceptable pathway because quagga mussels are already present at the Willow Beach and Achii Hanyo facilities; therefore, no quagga-free facility is exposed to quagga infestation as the result of this strategy. Transfers of fish from quagga-infested facilities to non-infested facilities have been halted until such time that assurances can be

made that quagga mussels are not being carried along with these fish. This study will attempt to develop measures to allow such certification.

Previous Activities: During January 2007, the exotic quagga mussel was discovered in Lake Mead, and subsequently found in both Lake Mead SFH (B6) and Willow Beach NFH (B2). Larval RASU that were to be transferred to Bubbling Ponds SFH (B5) were not collected (B1) and no RASU of any size or year class were delivered to waters outside the Lower Colorado River corridor. Quagga mussels have not severely impacted the maintenance or operations at Willow Beach NFH. However, quagga mussels continue to have an impact on delivery of fish.

Preventing further movement or transfer of quagga mussels is a priority for state and federal agencies. Fish transport protocols for the lower Colorado River corridor have been developed and are under review by cooperating resource agencies. Studies conducted by the USFWS determined that concentrations of potassium chloride (KCl) and formalin, which had been recommended for killing quagga mussel larvae in transport water, were not effective in killing quagga larvae under the water conditions at Willow Beach NFH and the levels of KCl/formalin tested may be toxic to native fish species.

In FY10 three chemicals were chosen for testing by USFWS at Willow Beach NFH to evaluate their effectiveness at killing quagga mussel life stages. Quagga mussel veligers exhibited resistance to most of the concentrations of all three chemicals tested in the 6-7 hour time frame allotted which simulates the average transportation time for stocking fish into the lower Colorado River. Mortality in 100% of veligers was observed only in the two highest concentrations of peracetic acid; however, BONY exposed to one half concentrations died in less than 30 minutes.

In FY11 research refocused based on the ability of quagga mussel veligers to withstand relatively high concentrations of chemicals for the duration of a simulated 8-hour transportation time. Research looked into development of a pretreatment to relax the veligers and prevent them from closing their shells, subsequently allowing a molluscicide to be applied in lower doses that will not be toxic to fish. Formalin was chosen as the molluscicide to be tested in combination with each of six chemicals. All six chemicals were found either to be highly toxic to fish at concentrations required to kill 100% veligers, or treatment duration required was too long.

FY12 Accomplishments: Five chemical compounds and a biological control agent were selected for research. All five chemicals were potassium-based compounds (potassium monobasic, potassium pyrophosphate, langbeinite, potash, and a potassium chloride/magnesium chloride mix), which were tested with the addition of formalin in most of the trials.

The treatment observed to be the most effective at killing 100% of veligers within the 8-hour time frame was a 4-hour treatment of 1000 mg/L potassium pyrophosphate followed by a 2-hour treatment of 25 mg/L formalin. In acute toxicity tests exposing juvenile bonytail to the potassium pyrophosphate treatment, no mortalities were observed. Further

testing is required before considering the efficacy of this treatment in controlling quagga mussel veligers.

The trials with the biological control agent *Pseudomonas fluorescens* (*Pf*-CL145A SDP Zequanox) were not successful because the product settled on the bottom of the test wells and was not taken up by the filter feeding veligers.

FY13 Activities: Closed in FY12.

Proposed FY14 Activities: Closed in FY12.

Pertinent Reports: The scope of work is available upon request. Annual reports from each year will be posted to the LCR MSCP website.

Work Task C31: Razorback Sucker Genetic Diversity Assessment

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$125,000	$124,776.15	$379,246.55	$130,000	$130,000	$130,000	$0

Contact: Jeff Lantow, (702) 293-8557, jlantow@usbr.gov

Start Date: FY09

Expected Duration: FY15

Long-term Goal: Maintain genetic quality of RASU utilized in the LCR MSCP.

Conservation Measures: RASU2, RASU3, RASU5, RASU6.

Location: Wayne State University, Detroit, Michigan.

Purpose: To maintain a sound genetic management program for RASU within the LCR MSCP.

Connections with Other Work Tasks (past and future): This work is related to larval RASU collections (B1) and to management of fish habitat restoration sites (for example, E14, E25, F5, and C40). Larval and adult tissue samples are collected at no additional cost from each reach of the program wherever RASU are captured. This includes work accomplished under work task D8, C13, C33, C45, and C49.

Project Description: This work task provides the funding to analyze the genetic structure of RASU communities in reservoirs, river reaches, and off-channel habitats within the LCR and characterize the various RASU stocks relative to the founder population from Lake Mohave. Our fish augmentation program continues to produce large numbers of fish annually and these large pulses of fish have the potential to change the genetic diversity of a population in a short period of time, especially when populations are small. It is important to monitor the genetic structure of the various RASU communities over many years in order to detect changes in the genetic diversity as these populations mature.

Larval fish and adult fin clips will be collected and preserved from each stock during numerous annual surveys and the continuing Lake Mohave larvae collections. These samples will be delivered to WSU's genetics research laboratory for analyses. Results will be used to determine the genetic health of these communities, to assess effectiveness of the Fish Augmentation Program, to continue monitoring of the Lake Mohave repatriation effort, provide guidance on management of RASU in Lake Mead, as well as populations developing in newly constructed floodplain habitats within the LCR MSCP area.

Previous Activities: Samples of larvae and adult fin clips were obtained on an annual basis from multiple time periods and from various spawning areas, reservoirs, river reaches, and off-channel habitats within the LCR MSCP area. DNA was extracted and samples were characterized for mtDNA and microsatellite variation. Analyses of microsatellite data collected over the past 15 years are consistent with those from mtDNA, indicating that the razorback sucker conservation strategy employed in Lake Mohave is maintaining genetic diversity in the nuclear genome as well. Interpretation of the data in the context of effective number of breeders and census size identifies the importance of increasing census population size in Lake Mohave.

FY12 Accomplishments: In Lake Mohave there was a decline in mtDNA variation in 2012 compared to 2011. However, overall patterns of variation were generally consistent with those found in previous years, indicating that levels of genetic variation continue to be maintained by the current management program. As long as adult population size remains low, however, there are concerns over the impact of random effects on this population.

Fine-scale variation in larval production in Lake Mohave was also evaluated. Analysis of microsatellite variation failed to identify significant differences among regions or samples, indicating that samples of larvae collected from a single location during the same week are not genetically different. This indicates that the collection of one sample per week at an individual location is adequate to represent the genetic variation of the adult population.

Analyses of the Lake Mead population indicates that levels of genetic variation remain low. However, as in Lake Mohave, these levels were comparable to previous estimates.

FY13 Activities: Reclamation will continue to assess razorback sucker genetics for the LCR through analyses of RASU fin clips and larvae collected from spawning areas, reservoirs, river reaches, and off-channel habitats within the LCR MSCP area.

Proposed FY14 Activities: Collection of larval RASU, fin clips, and muscle plugs will continue from spawning areas within the LCR MSCP area. DNA will be extracted and samples characterized for mtDNA and microsatellite variation. Due to the small population size, future work will evaluate potential problems related to the effective number of breeders.

Pertinent Reports: *Razorback Sucker Genetic Diversity Assessment: Final Project Report 2011*, and *Razorback Sucker Genetic Diversity Assessment: Interim Report 2012* are completed and will be posted to the LCR MSCP website.

Work Task C32: Determination of Salinity, Temperature, and Oxygen Limits for Bonytail and Razorback Sucker

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$125,000	$115,711.54	$381,393.84	$115,000	$115,000	$115,000	$115,000

Contact: Jim Stolberg, (702) 293-8206, jstolberg@usbr.gov

Start Date: FY09

Expected Duration: FY17

Long-term Goal: To develop and maintain high quality backwater habitats for native fishes.

Conservation Measures: RASU2, RASU3, RASU5, RASU6, BONY2, BONY3, BONY5.

Location: LCR MSCP Native Fish Laboratory, Boulder City, Nevada.

Purpose: To determine RASU and BONY early life stage thresholds of survival for salinity, dissolved oxygen, temperature, and pH.

Connections with Other Work Tasks (past and future): This work began under Adaptive Management Research Projects (G3). This work is related to management of fish habitat restoration sites.

Project Description: This study will determine through laboratory testing the upper and lower limits of water quality parameters needed to sustain various life stages of BONY and RASU in backwater habitats developed by the LCR MSCP.

Previous Activities: Salinity concentrations evaluated during FY07 and FY08 indicated that upper salinity tolerances ranged from 11,000 to 12,000 µS/cm for RASU eggs, and from 23,000 to 27,750 µS/cm for RASU larvae. Observations during larval trials also showed that long-term survival may be possible at salinities as high 23,000 µS/cm when larval RASU are properly acclimated.

During FY09, research focused on determining dissolved oxygen limits for early life stage RASU. Results from egg trials indicated that the lower dissolved oxygen limit for this life stage is in the 2.5 to 3 mg/L range. The limit observed for RASU larvae was slightly lower, with increased mortality occurring at dissolved oxygen concentrations near 2 mg/L. Larvae exposed to concentrations of 3mg/L or greater showed low levels of mortality and displayed no behavioral abnormalities.

Research during the FY10 study year was focused on determining the threshold levels of pH for early life stage RASU. Results from egg trials indicated that the threshold levels for successful embryo development are between pH 9 and 10. The pH threshold observed for RASU larvae was slightly higher, with long-term exposure (20 days) to pH 10 resulting in 98% survival.

Research during FY11 focused on determining the threshold levels of pH for fingerling BONY and RASU survival. Trials for BONY and RASU were run separately, and both were exposed to pH ranging from 7 to 11 at 20°C and 30°C. Results from BONY trials indicated that the upper lethal limit is near pH 10 at both 20°C and 30°C. Low levels of mortality were observed at both temperatures during the first 72 hours, but mortality increased to 93% after 20 days of exposure at 20°C and to 83% after 15 days of exposure at 30°C. Survival increased in lower pH trials and it should be noted that BONY exposed to pH 9 at 20°C displayed zero mortality over 20 days and only 8% mortality after a 15-day exposure at 30°C.

Results from RASU trials also indicated that the upper lethal limit is near pH 10 at both 20°C and 30°C. For the pH 10 trial run at 20°C, zero mortality was observed during the first 72 hours. However, mortality for this treatment increased to 87% after 15 days of exposure. Survival at 30°C was lower, with 38% mortality observed in the first 72 hours and 97% mortality observed over 15 days. Similar to the results from the BONY trials, survival increased for RASU exposed to pH 9.5 and below.

FY12 Accomplishments: Research during this study year focused on determining the lower lethal dissolved oxygen limits for fingerling BONY. Trials were run at both 20°C and 30°C, and fish were exposed to dissolved oxygen concentrations of 2-6 mg/L in triplicate. Survival was evaluated at 72 hours (acute toxicity) and after 15 or 20 days of exposure (chronic toxicity).

Results from the 20°C trials indicated that the lower lethal dissolved oxygen limit is below 2 mg/L at this temperature. Only 17% mortality was recorded for BONY exposed to the 2 mg/L treatment for 15 days, and all mortality for this treatment occurred within the first 24 hours of exposure. Mortality for the remaining treatments was greatly reduced, with only 1% mortality for all fish exposed to oxygen concentrations of 3-6 mg/L.

Results from the 30°C trials indicated that the lower lethal limit is near 2 mg/L at this temperature. Sixty-seven percent mortality was observed for this treatment at 72 hours, and 100 percent mortality was observed at 18 days. Mortality decreased incrementally as dissolved oxygen concentrations increased for the remaining treatments at 30°C. Twenty-day mortality was observed at 57 percent, 37 percent, 5 percent, and 5 percent for 3, 4, 5, and 6 mg/L treatments, respectively.

FY13 Activities: Research during this study year will be focused on determining dissolved oxygen limits for BONY eggs and larvae. It is anticipated that multiple trials will be run to evaluate the combined effects of increased temperature and decreased dissolved oxygen on BONY survival. The current study design includes dissolved oxygen

levels from 2 mg/L to saturation (at 1 mg/L increments) with temperatures ranging from 20°C to 30°C.

Proposed FY14 Activities: Research actions will continue based on findings from previous study years, observations and measurements made during monitoring, and the review of available literature.

Pertinent Reports: The 2011 report, *Effects of Temperature and Elevated pH on Mortality of Juvenile Bonytail and Razorback Sucker,* and the 2012 report, *Dissolved Oxygen Tolerances of Juvenile Bonytail* will be posted to the website.

Work Task C33: Comparative Survival of 500-mm Razorback Sucker Released in Reach 3

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$100,000	$97,020.68	$405,396.25	$100,000	$0	$0	$0

Contact: Jeff Lantow, (702) 293-8557, jlantow@usbr.gov

Start Date: FY09

Expected Duration: FY13

Long-term Goal: To maintain the effectiveness of the Fish Augmentation Program.

Conservation Measures: RASU3, RASU6

Location: Mainstem river within Reach 3 and various off-channel fish grow-out ponds.

Purpose: To determine the relative survival of 500-mm TL RASU versus 300-mm TL RASU released into Reach 3.

Connections with Other Work Tasks (past and future): This work is related to current fish rearing (B2, B5), fish research (C12, C13), post-development monitoring (F5), and any future work tasks for rearing RASU, as data collected from this study will help evaluate the effect that size of released fish has on survival, and ultimately, on conservation of the species.

Project Description: This study will evaluate the relative survival of 500-mm TL RASU versus 300-mm TL RASU released into the Lower Colorado River within Reach 3. Ongoing studies at Lake Mohave (C12) suggest that RASU being raised for brood stock development in that reservoir (Reach 2) should be held in captivity and reared to a total length of 500 mm prior to repatriation in an attempt to increase survival. It has been suggested that the LCR MSCP should increase its target size for RASU being reared under the Fish Augmentation Program from 300 mm to 500 mm TL.

A cause for the adult mortality of stocked RASU in Lake Mohave is predation by large striped bass, combined with a lack of turbidity. RASU in Lake Mead (Reach 1) have shown consistent, albeit low-level recruitment for the past 20-plus years. Research (C13) suggests that turbidity is the key component allowing such survival and recruitment. Both predator loads and the amount of turbidity within Reach 3 differ from what is available in Reach 2. Before this management strategy is agreed to and applied to Reach 3, it is prudent to make paired releases of both 300-mm TL RASU and 500-mm TL RASU and compare the relative survival of the two size classes.

This work will be conducted over a 5-year period. The first several years focused on growing and tagging sufficient numbers and sizes of RASU and releasing them into the

river system. The LCR MSCP is currently stocking RASU of 300 mm or greater total length into Reach 3. Under the Fish Augmentation Program, 300-mm TL RASU are credited to the program when stocked into off-channel habitats as well as into the mainstem river. Funds from this study have been used to support harvest, tagging, and distribution of large RASU (500 mm or greater TL) harvested from these off-channel habitats.

Previous Activities: More than 38,000 RASU (>300 mm TL) have been PIT tagged and released into Reach 3 and its associated floodplain since October 2006, and all are research subjects for this study. More than 28,000 RASU have either been stocked directly into the main channel or redistributed into the main channel following grow out at off-channel habitats, of which 3,555 were greater than 400 mm TL. The remaining fish are still growing in various off-channel habitats that are currently being managed by the LCR MSCP and/or USFWS.

Monitoring the growth of RASU in various off-channel habitats has continued. An interagency agreement was initiated between Reclamation and the USFWS to cover costs at off-channel habitats that the USFWS currently manages. These off-channel habitats are the source of larger RASU that will be used to complete this work task.

Numerous additional spawning groups of RASU were located throughout Reach 3. It is expected that surviving fish are best censused while spawning; therefore, identifying spawning sites increases chances for recontacting these fish during future surveys related to this work task.

Analysis of data through 2011 showed relative capture probabilities for four size classes (< 300 mm, 300-349 mm, 350-399 mm, and ≥400 mm) of 1.35, 1.29, 2.84, and 3.07 percent, respectively. These capture probabilities were significant for all size classes. This illustrates a positive correlation between size at release and capture probability, which is a clear indication of survival.

FY12 Accomplishments: Remote PIT scanning data were incorporated into the censusing and data analysis for this project. The combination of remote PIT scanning and regular sampling methodologies totaled 1,006 fish contacts in 2012; this is more than a three-fold increase from previous years. The relative capture rates for RASU were directly related to the size of fish at release. Fish released in the higher size classes, greater than 500 mm, were contacted at a rate of 3.2 to 10.3 times greater than fish released in any other individual size class of fish less than 449 mm. Individuals were also significantly more likely to be contacted if released in the spring months than the autumn. Data collected for this project was also used to generate a population estimate of 2,770 individuals.

FY13 Activities: The combination of remote PIT scanning and traditional sampling methodologies will continue for FY13. The high contact rates of remote PIT scanning over data from multiple seasons will allow us to make inter-year comparisons and provide opportunities for more complete data analysis. It is expected that the results of these additional analyses will form a foundation upon which to base recommendations to adjust the Reach 3 stocking program to enhance the post-release survival of repatriated

fish. As this is the final year of the project, monitoring with remote PIT scanners will be incorporated into the standard monitoring program. Other factors affecting survival will continue to be analyzed as data sets become more robust.

Proposed FY14 Activities: Closed in FY13.

Pertinent Reports: A report titled, *Comparative Survival of Repatriated Razorback Sucker in Lower Colorado River Reach 3,* has been completed and will be posted to the LCR MSCP website.

Work Task C35: Western Red Bat and Western Yellow Bat Roosting Characteristics Study

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$175,000	$289,115.34	$209,889.72	$150,000	$25,000	$0	$0

Contact: Allen Calvert, (702) 293-8311, acalvert@usbr.gov

Start Date: FY10

Expected Duration: FY14

Long-term Goal: To determine roosting characteristics for the western red bat and western yellow bat.

Conservation Measures: MRM1 (WRBA, WYBA).

Location: Within the LCR MSCP project boundary, Bill Williams River NWR, and other riparian areas where western red bats and/or western yellow bats are known to occur.

Purpose: To better define roosting characteristics for the two species using radio telemetry.

Connections with Other Work Tasks (past and future): Work tasks D9 and F4 determine the distribution of each species and determine areas in which to capture the target species.

Project Description: Radio transmitters will be attached to both western red bats and western yellow bats. These bats will then be tracked to their roosting sites (in trees) during the day to pinpoint their roosting locations. Vegetation measurements will be collected at both known roost sites as well as random non-use sites to determine whether these bat species have specific roosting characteristics. These data will be used to design habitat creation projects for these species.

Previous Activities: In FY11, preliminary mist-netting was conducted to determine likely areas where red and yellow bats could be captured both on the LCR and elsewhere. Equipment was purchased for the project.

FY12 Accomplishments: A total of eight red bats were radio-tracked at PVER and CVCA. Roosts were found for 4 of these bats, all in cottonwoods. One red bat was radio-tracked at one of the Three Links Ranch control site and a single roost was located, also in a cottonwood. A total of nine yellow bats were radio-tracked at three habitat creation

sites (Ahakhav, PVER, and CVCA). Roosts in palm trees were found for four yellow bats. None of these bats were found roosting within habitat creation areas. No yellow bats were radio-tracked at control sites. Preliminary data suggests that red bat roosting preference is based on canopy structure and patch scale habitat characteristics while yellow bats appear to be associated with specific roost tree characteristics, specifically, palm trees with a large dead palm frond skirt. Funds were pre-obligated for work expected in FY13, thus the FY13 obligations should decrease.

FY13 Activities: A third year was added to the study in order to acquire a statistically sufficient sample size. Red and yellow bats will be radio-tracked at the same sites as in FY12 in the winter and summer seasons. Roost data will be collected and the data will be analyzed for the final report.

Proposed FY14 Activities: The final report will be submitted and reviewed. Information on red and yellow bat roosting requirements and management recommendations for habitat creation areas will be included in the report.

Pertinent Reports: The study plan and FY11and FY12 annual reports are available upon request.

Work Task C36: Elf Owl Detectability Study

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$20,000	$13,383.19	$251,868.95	$0	$0	$0	$0

Contact: Beth Sabin, (702) 293-8435, lsabin@usbr.gov

Start Date: FY09

Expected Duration: FY12

Long-term Goal: To develop a long-term elf owl monitoring field protocol for the LCR MSCP.

Conservation Measures: MRM1 (ELOW).

Location: Bill Williams River.

Purpose: To conduct a detectability study on a known population of elf owls that breed in riparian habitat.

Connections with Other Work Tasks (past and future): This study will be used to modify the survey protocol used for system-wide (D13) and post-development (F2) presence/absence elf owl surveys.

Project Description: Data to support the current tape-playback presence/absence elf owl survey protocol are lacking. A detectability study will be conducted on a known population of elf owls that breed in riparian habitat along the Bill Williams River.

The objectives of this study are to: 1) systematically test how varying the parameters of call-broadcast surveys (distance to owl, time of night, decibel level of call playback, habituation, duration of call playback) affects the response type and response time of elf owls in known locations, 2) recommend survey protocols that optimize detectability, and recommend the number of seasonal surveys and amount of long-term survey effort required for effective population monitoring, and 3) quantify the likelihood of detection if the recommended methods are implemented. Data from this study may be used to modify the existing elf owl presence/absence survey protocol.

Previous Activities: The study design for the elf owl detectability study was completed in FY10. Field work was conducted at the Bill Williams River NWR from 1 March to 2 June in 2010 and 2011. Passive listening and call-playback surveys were conducted along survey routes in the interior and along the edges of the riparian habitat to inventory elf owls and determine their nesting sites and/or activity centers. Seven territories were

detected in 2010 and eight territories were detected in 2011. Five of the territories were in the same location in 2010 and 2011.

Capturing and radio tagging of the elf owls occurred in 2010 and 2011 opportunistically. Capturing the elf owls was around 50% successful. For the detectability trials radio telemetry was not a requirement.

Detectability experiments were conducted on seven pairs in 2010 and five pairs in 2011 from 9 April to 21 June. Parameters tested were distance and time. Three different call-playback distances were tested (100 m, 250 m, and 450 m) and three different times of night (Dusk: 30 minutes after sunset until 12 a.m., Midnight: 12 a.m. to 3 a.m., and Predawn: 3 a.m. until 30 minutes before sunrise) were tested. In 2011, tests were conducted within open upland habitat and dense riparian habitat. Responsiveness of elf owls was highest at dusk (78%) at the 100 m distance (77%) and in low and intermediate illumination (63% and 65%, respectively). The majority of elf owls (85%) responded within two minutes of the start of the call-broadcast. Elf owls exhibited some movement in response to call-broadcast; however, movement patterns differed greatly between the individual owls.

In 2011, digital recordings of elf owl vocalizations were obtained. A peeper cam was used to locate and visually examine the contents of three different elf owl nest cavities and to photograph owls in the nest cavities. On the same date, breeding stage was different among the three territories, ranging from presence of eggs to presence of feathered nestlings.

A draft final report incorporating both years of data was prepared (2010 and 2011). A draft recommended call-broadcast survey protocol was prepared giving recommended distance between points, call-broadcast listening time at each point, illumination levels, time of night surveys shall be conducted, decibel level of call-broadcast, time of year surveys shall take place, and number of surveys in a season. A likelihood of detection of 95% was calculated for the recommended survey protocol.

FY12 Activities: The study report and the recommended elf owl survey protocol were reviewed and finalized. All deliverables such as tabular and spatial data, metadata, photographs, and digital recordings were received. The final project report and protocol was peer reviewed. The elf owl monitoring protocol for system-wide monitoring within the LCR MSCP planning area has been finalized and is ready to use for surveys.

FY13 Activities: Closed in FY12. The data and survey protocol created through this project will be used in FY 14 for the Elf Owl Habitat Modeling project that is part of the C24 work task.

Pertinent Reports: The report, *Elf Owl Detectability Study Report 2010 and 2011,* is posted on the LCR MSCP website. The study plan is available upon request.

Work Task C37: Hydrology Studies for Avian Riparian Obligate Species

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$10,000	$26,351.59	$291,163.14	$0	$0	$0	$0

Contact: Chris Dodge (702) 293-8115; CDodge@usbr.gov

Start Date: FY10

Expected Duration: FY12

Long-term Goal: Species Research.

Conservation Measures: MRM1 (WIFL, YBCU, ELOW, GIFL, GIWO, VEFL, BEVI, YWAR, SUTA).

Location: Southwestern willow flycatcher and yellow-billed cuckoo breeding sites and LCR MSCP habitat creation sites.

Purpose: To measure hydrologic conditions such as soil moisture, depth to ground water, and amount of standing water needed underneath habitat for the willow flycatcher and yellow-billed cuckoos in order to duplicate conditions at habitat creation sites.

Connections with Other Work Tasks (past and future): Breeding habitat for willow flycatchers is being determined through studies completed under D2 and breeding habitat for yellow-billed cuckoos is being determined through studies completed under D7. Habitat parameters for other obligate riparian species, such as summer tanagers, yellow warblers, and Bell's vireos that may benefit from these types of studies are being addressed under Work Task D6. This study was initiated under G3 in 2009.

Project Description: Based on information gathered during surveys for southwestern willow flycatchers on the LCR since 1997, it has been noted that within the dense, moist riparian habitats where flycatchers are found, several other LCR MSCP covered species are also commonly encountered. These species include yellow-billed cuckoos, summer tanagers, vermilion flycatchers, yellow warblers, gilded flicker, and Gila woodpecker. Some soil moisture and/or standing water may be an important feature of optimal riparian habitat, but the exact role this water has in habitat use is not known. It may increase vegetation health, which may be related to insect abundance, or it may increase humidity and lower temperatures. It is also not known how long moisture needs to be present or how large an area needs to be kept in this state during the breeding season.

Although much has been determined regarding site conditions needed for breeding southwestern willow flycatchers (flycatchers) and yellow-billed cuckoos (cuckoos), quantification of how much moist soil or standing water within breeding locations, and how to maintain needed hydrological conditions is still undetermined. This study will review hydrological studies that have been completed already within other river systems that have nesting flycatchers and cuckoos. Monitoring will also begin on hydrologic conditions such as ground water, soil moisture and standing water under known breeding flycatcher and cuckoos sites along the Virgin and lower Colorado River systems in order to quantify them.

Previous Activities: In February and March of 2010, sites were selected and random plots were placed in known willow flycatcher and yellow-billed cuckoo habitats at Bill Williams River National Wildlife Refuge, Topock Marsh, Mormon Mesa, and at the Cibola Valley Conservation Area restoration site. Piezometers were placed at each site and transects were established to measure each point for various hydrologic characteristics. The following characteristics were measured at each site: depth to water table, soil texture, soil organic layer, soil moisture and temperature, standing water, and indices for evapotranspiration were created.

A second year of data collection was completed starting in April and ending in September 2011. The data were used to compare vegetation and hydrologic characteristics within both SWFL and YBCU habitat separately, and to compare SWFL habitat to YBCU habitat.

FY12 Accomplishments: The final report stated that at both SWFL and YBCU sites, correlations identified a negative relationship between percent sand (soil texture) and percent soil moisture. At SWFL sites correlations identified a positive relationship between distance to flowing water and tree height and between stream discharge and tree height. At the SWFL sites the average percent soil moisture was more than twice as high as YBCU sites and SWFL sites had shallower depths to ground water than YBCU sites. SWFL sites had a higher number of sites with standing water present (29) than YBCUs (4). YBCUs utilized sites much farther from the nearest flowing water (up to 2100 m) than SWFLs (up to 542 m). The logistic regression indicated that depth to ground water was a statistically significant variable influencing predicting SWFL versus YBCU habitat, along with soil texture and distance to flowing water.

FY13 Activities: Closed in FY12.

Pertinent Reports: The final report, *Soil Hydrology Conditions in Occupied Southwestern Willow Flycatcher and Yellow-Billed Cuckoo Habitat*, will be posted on the LCR MSCP website.

Work Task C39: Post-Stocking Distribution and Survival of Bonytail in Reach 3

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$250,000	$252,447.59	$643,728.59	$250,000	$250,000	$250,000	$0

Contact: Jeff Lantow, (702) 293-8557, jlantow@usbr.gov

Start Date: FY10

Expected Duration: FY15

Long-term Goal: Assess the effectiveness of the fish augmentation program.

Conservation Measures: BONY3, BONY5.

Location: Reach 3 to include main stem and backwater habitats.

Purpose: To determine the distribution and post-stocking survival of BONY within Reach 3.

Connections with Other Work Tasks (past and future): This work is related to work tasks B2, B3, and B4, all of which provide BONY for augmentation stocking. Study results will add to the database used to complete D8.

Project Description: This study will follow stocked fish after they are released into Reach 3 of the Colorado River to design and test ways to improve post-stocking survival. Techniques for monitoring will include marking, tagging, netting, electro-fishing, and visual observations. A final report will make recommendations for future BONY augmentation stockings.

Previous Activities: The first round of acoustic telemetry implemented under the reported work task was completed. Fish were monitored for a three month post-stocking period using active and passive tracking techniques to determine survival and dispersal. All acoustic tagged bonytail were contacted and by the end of the 90-day study period fish had dispersed as much as 30-km upstream from the stocking area (Bill Williams National Wildlife Refuge). Post-stocking survival over the course of the three-month study was high (95%); only one transmitter was recovered by divers from the bottom of the reservoir. All other fish were assumed to be living at the end of the study.

Concurrent to the work in Lake Havasu, a captive fish experiment was implemented at SNARRCTC to assess surgical techniques and to monitor fish health and tag retention over a three month period. At the conclusion of the study, all fish remained healthy and no transmitters were shed. No adverse effects of tag implantation were apparent when necropsies were performed on five fish.

A second acoustic telemetry study was completed and a third telemetry study was initiated during FY11, both of which used 6 month transmitters. Acoustic tagged bonytail were monitored through June 2011 using active and passive tracking techniques to determine survival and dispersal. All individuals were contacted and by the end of the first month fish had dispersed as much as 30-km upstream from their point of release. The maximum distance fish dispersed away from the stocking site became smaller as the study progressed, and by the end of six months most contacts were recorded within or near the Bill Williams River NWR. Three-month post-stocking survival was lower than the previous study (45% vs. 95%, respectively), and by the end of the six month study period 35% of acoustic tagged fish were alive. A majority of all fish contacts (~99%) for the first two telemetry studies occurred within or near the Bill Williams River NWR.

FY12 Accomplishments: To test whether dispersal and survival was related to stocking location or habitat availability, a dual stocking was implemented at BWRNWR and Cattail Cove State Park. Acoustic-tagged bonytail (10 implanted with six-month battery life transmitters, and 5 with 45-day battery life depth-sensing transmitters) were released at each location. Preliminary active-tracking data indicate depth-tagged bonytail were contacted on average at 80% of the depth of the reservoir water column. Fish location relative to the shoreline indicated bonytail were contacted further from shore during crepuscular and nighttime hours than during the day. Turbidity readings for depth-tagged fish stocked at Cattail Cove were approximately one-third of those associated with fish stocked in BWRNWR. Continuous inhabitance of bonytail stocked at BWRNWR indicated those fish nearly exclusively utilized habitat found within the refuge. Continuous inhabitance of bonytail stocked at Cattail Cove was higher in Lake Havasu than BWRNWR, however, 20% of those individuals showed preferences for habitats found in BWRNWR as opposed to those found Lake Havasu. Data acquisition continued through June 2012, and results and analysis will be presented in the 2012 Annual Report.

FY13 Activities: Another iteration of split stockings was initiated in October 2012; fish were distributed between BWRNWR and a river location near Blankenship Bend, upstream of Lake Havasu. Monitoring of these fish will continue through January 2013, and the results will be presented in the 2012 Annual Report.

Additional iterations of releases will be scheduled if time permits. These releases will focus on daily movements and micro habitat selection for individual fish across different habitats.

Based on current results, bonytail will continue to be released at the BWRNWR, and experimental stockings will take place elsewhere in Reach 3 to determine if other suitable stocking locations can be identified.

Proposed FY14 Activities: It is expected that this work will continue to focus on daily movements and micro habitat selection for individual fish across different habitats.

Pertinent Reports: A report titled, *Distribution and Post-Stocking Survival of Bonytail in Lake Havasu: 2010 Annual Report*, is posted on the LCR MSCP website and the 2011 annual report is completed and waiting to be posted.

Work Task C40: Genetic and Demographic Studies to Guide Conservation Management of RASU and BONY in Off-Channel Habitats

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$180,000	$180,401.56	$270,718.43	$180,000	$180,000	$180,000	$180,000

Contact: Jeff Lantow (702) 293-8557, jlantow@usbr.gov

Start Date: FY10

Expected Duration: FY18

Long-term Goal: Effective fishery management of backwater habitats developed by the LCR MSCP.

Conservation Measures: RASU2, RASU6, BONY2, BONY5

Location: Reaches 2, 3, 4, and 5 backwater habitats.

Purpose: Quantify genetic and demographic parameters that are necessary for informed, long-term management of RASU and BONY in off-channel habitats.

Connections with Other Work Tasks (past and future): This work is related to Imperial Ponds Native Fish Research (C25), RASU Genetic Diversity Assessment (C31), Characterization of Lake Mohave Backwaters to Evaluate Factors Influencing Spawning Success (C56), and Lake-Side Rearing Ponds (B7).

Project Description: When observed on Lake Mohave and elsewhere, RASU and BONY demonstrate a group spawning behavior whereby a female will spawn with multiple partners many times over a period of a few weeks. These observations led biologists to believe that all possible genetic crosses were being made during the spawn. However, analyses of adult RASU placed into the Yuma Cove backwater in 1991 and 1992, along with analyses of the larval RASU produced each year, showed that not all of the adults contributed genetic material to the next generation. It is possible that individual adults do not spawn every year or that even if they do, they don't always contribute genetic material to the next generation. This information needs to be verified in order to model population structure within these isolated habitats over subsequent generations, and to predict at what frequency genetic material needs to be exchanged between habitats to maintain robustness of the overall RASU and BONY populations within the LCR MSCP program area.

This study will collect demographic and genetic information that will lead to recommendations to optimize long-term management of off-channel habitats for these two critically endangered fishes. Genetic data will be captured from larval, juvenile, and adult RASU and BONY from at least two replicate groups from off-channel habitats.

Characterization of microsatellite and mitochondrial DNA variation will be used to assign the parentage of individual larvae to specific adults. These data can then be compared and contrasted to determine the actual number of individuals that participate in annual spawning activities, and census the populations, and to quantify patterns of survivorship.

There are three phases to the study: field observations, laboratory analyses of genetic materials, and modeling of population dynamics. The study will require multiple years of data collection and analyses, and final recommendations are anticipated by 2018. Numbers of samples will be lower during the first two years of the study, but estimated costs are initially high to cover purchase of specialized, analytical equipment.

This project requires stable populations for both RASU and BONY to allow for multiple years of censusing. These stable populations are currently available for RASU, and BONY will be incorporated into the study as habitats and populations of BONY become available.

Previous Activities: Tissues from reared RASU and BONY were collected under C31. RASU larvae and juveniles from lake-side ponds (B7) were also collected. Adults, larvae and juveniles have been genotyped and preliminary statistical analyses completed. Samples collected during FY10 were analyzed, identifying considerable variability in individual reproductive success within and especially among different lake-side ponds.

FY12 Accomplishments: RASU genetic samples were collected from AJ and Dandy backwaters as well as Imperial NWR pond 1. AJ backwater has reliably produced offspring that remained viable into the autumn, with little change in the proportion of individuals contributing to larval production across years. The proportion of individuals contributing to larval production at Dandy backwater and Imperial NWR Pond 1 was more variable, possibly resulting from processes influencing productivity.

A small proportion of individuals seem to be contributing a relatively large number of larvae in any given year. This variation in reproductive success is concerning, but variation across years may ameliorate this effect.

FY13 Activities: Sample collections and analysis similar to previous years will continue; Yuma cove backwater will be included in the analysis during FY13. This will provide replication that will allow us to assess stability of life history parameters across time.

Proposed FY14 Activities: Sample collections and analysis similar to previous years will continue. Ponds and funding will be dedicated to bonytail reproduction, this portion of the project will be new in FY14, this will allow for analysis of the variation in reproductive success for this species.

Pertinent Reports: The report, *Genetic and Demographic Studies to Guide Conservation Management of Bonytail and Razorback Sucker in Off-channel Habitats*, *November 2012* is posted to the website. The report, *2012 Interim Report: Genetic and Demographic Studies to Guide Conservation Management of Bonytail and Razorback Sucker in Off-channel Habitats* is in review.

Work Task C41: Role of Artificial Habitat in Survival of RASU and BONY

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$25,000	$31,584.07	$68,619.88	$65,000	$65,000	$0	$0

Contact: Jeff Anderson (702) 293-8216, jranderson@usbr.gov

Start Date: FY10

Expected Duration: FY14

Long-term Goal: Assess effectiveness of the fish augmentation program.

Conservation Measures: BONY3, BONY5, RASU3, RASU5, RASU6

Location: Reach 2, Davis Cove.

Purpose: To assess use and role of artificial reefs and structures by native fishes released by the LCR MSCP.

Connections with Other Work Tasks (past and future): This work is related to all work tasks in Section B that provide RASU and BONY for augmentation stocking, specifically B7, C23, and F5. Study results will add to the database used to complete D8.

Project Description: Approximately 800 acres of artificial fish habitat have been constructed and deployed in Lake Havasu over the past 15 years. Similar structures have recently been placed into coves in Lake Mohave. RASU have been periodically observed by SCUBA divers in and around these structures, along with numerous species of exotic fishes. This study will determine which if any of these structures may be preferred by native species.

This study was originally to be completed in Beal Lake. It was moved to Davis Cove due to low post-stocking survival in Beal Lake. Davis Cove, a rearing pond along Lake Mohave, provides the best opportunity to monitor and assess a native fish population's response to the deployment of artificial habitat. Davis Cove is a 2.7-acre backwater pond that has supported a native fish community since 2005. It is dominated by rock and sand shorelines with little emergent vegetation, and it is devoid of large submerged habitats. This study will place a variety of constructed habitat types into Davis Cove and attempt to determine which types of structures are preferred by native species. The information may be used to guide current habitat projects in Reaches 2 and 3, as well as facilitate the design and development of LCR MSCP backwater habitats. It will also be used to determine future stocking locations in Reaches 2 and 3. For example, if certain types of structures are known to be used as cover by native fishes, fish could be released in the vicinity of these structures.

Previous Activities: PIT-tag antennae have been purchased and are being incorporated into artificial habitats. Beal Lake was stocked with 610 PIT-tagged RASU in February 2010 and the population was tracked throughout the year using remote PIT-tag antenna. The population dropped to approximately 130 individuals by the end of the year with more than 50% of the loss occurring during the first three months post-stocking. The reason for the demise of the stocked fish is unknown, but some possibilities are predation by migratory birds, mortalities associated with stocking and handling, or water quality deficiencies.

In 2011 the site location was moved from Beal Lake to Davis Cove due to poor fish survival. Davis Cove was stocked with 376 PIT-tagged RASU (<300 mm). Two different habitat types (brush bundles, pipe structures) were constructed within a PVC frame and equipped with PIT-tag antennae. Three habitats at a time were deployed at different locations throughout Davis Cove. Each habitat was paired with a single antenna, which was placed without a habitat, approximately 10 to 15 feet away. Scanning occurred in five-day intervals (Monday through Friday) for a total of 12 intervals. Brush bundles were deployed May 9- July 1 (5 intervals), and pipe structures were deployed from July 18 to October 10 (7 intervals). Water quality profiles were taken in conjunction with PIT scanner deployment. Data analysis did not show a statistically significant difference in habitat use versus non-habitat use. Upon retrieval of the habitats, it was found that young of the year and juvenile bonytail were utilizing the inside of the PVC frames, which had pulled apart in some places.

FY12 Accomplishments: In 2012, habitat deployments in Davis Cove were reduced to a single location; two different habitat types and a control were deployed. A total of eleven scanning intervals were completed, but periodic equipment failure with the brush habitat and antenna resulted in a reduction of paired observations used in the analysis. The Wilcoxon Signed-Rank Test was used to test for differences between the two habitat types as well as each habitat type and the antenna (control). There were no statistically significant differences between the habitat types or the habitats and the control.

Short-term sonic telemetry tags were also used to track habitat use by individual razorbacks in an attempt to corroborate the scanning results. Fish were tracked at multiple times throughout the day and night over the course of one month. Detections of sonic-tagged fish were never made within the proximity of any of the deployed habitats. Razorback population estimates were monitored throughout the course of the study and the population remained stable for the duration of the scanning period.

FY13 Activities: If the razorback population persist, PIT-scanning efforts will be similar to those in FY12, and additional effort will be directed toward bonytail habitat use. Habitat scanning will be initiated earlier in the field season to allow for additional scanning and an increase in paired scanning events. Sonic tagged bonytail will be monitored with respect to their use of artificial habitats. Small-scale habitats will be integrated into fish traps to evaluate habitat preferences for the multiple size classes of non-PIT-tagged BONY in Davis Cove, this will include young of year. Water quality and population estimates will continue to be recorded with each remote sensing equipment deployment.

Proposed FY14 Activities: Activities similar to 2012 and 2013 will continue, with a continued emphasis on habitat use by bonytail since razorbacks do not appear to use artificial habitat.

Pertinent Reports: A report titled, *Role of Artificial Habitat in the Survival of Razorback and Bonytail: 2012*, is in draft and will be posted to the LCR MSCP website upon completion.

Work Task C42: Experiments and Demonstration of Soil Amendments for Use in Restoration Sites

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$200,000	$118,748.43	$253,475.76	$200,000	$200,000	$200,000	$0

Contact: Barbara Raulston, (702) 293-8396, braulston@usbr.gov

Start Date: FY10

Expected Duration: FY15

Long-term Goal: To determine and demonstrate the feasibility of soil amendments to improve restored habitat and management options for irrigation of habitat restoration sites.

Conservation Measures: MRM1 (WIFL, YBCU, ELOW, SUTA, GIWO, GIFL, VEFL, YWAR, BEVI)

Location: Reclamation's Denver TSC laboratory for controlled experiments and possible sites for large demonstrations including the Beal Restoration Site on Havasu NWR.

Purpose: The purpose of this study is to explore the use of soil amendments, alternative site preparation, and irrigation methods to 1) maintain moist soils and/or standing water within habitats created for the southwestern willow flycatcher and 2) improve germination of willow seed. Habitat conditions for other covered species will also be improved by maintenance of moist soil conditions. Improving low quality soils will also improve water conservation and lower irrigation costs. This work will parallel species habitat and hydrology studies. This information will be used by project managers during site preparation and by land managers to create and maintain habitat with enough standing water and/or moist soils to replicate the structural characteristics of vegetation and microclimate found at occupied flycatcher habitat.

Connections with Other Work Tasks (past and future): Initial literature search and laboratory studies were conducted under G3. A seed feasibility study was conducted under E24 and outcomes from that research will be used in conjunction with the soil amendment to determine if the amendment will bolster willow production from seed..

Project Description: After a review of soil amendments and their associated costs, availability, and water retention capabilities, a product called Lassenite Pozzolan was identified as the most feasible and appropriate product for improving water retention and irrigation practices of sandy soils. Although the material has been tested for use on golf courses in desert environments, there are several differences in the use proposed by

Reclamation that require further examination. Depending on results from these controlled experiments, application demonstrations will be conducted on site at the Beal Restoration Site, where sandy soil conditions exist. Other demonstration areas may be identified in the future.

One application is planting willow seeds with the Lassenite to determine whether better results from direct seeding can be accomplished. Seeding will be combined with different concentrations of Lassenite to determine the most efficient and cost-effective means of optimizing seed germination and production in sandy locations.

Previous Activities: In 2007, under Work Task G3, a preliminary literature and product search was conducted to gather information on soil amendments for use in habitat restoration projects. In 2008-2009, additional information was gathered on Lassenite Pozzolan and a complete study proposal was written. In FY10, laboratory work was completed to test the feasibility of this product for restoration purposes including movement of product through soil profile, application rates and soil moisture retention, and facilitation of water movement.

FY12 Activities: A field study was formulated to further test the soil amendment under field conditions at Beal Lake Riparian Restoration at Havasu NWR. The purpose of the field study is to determine if the addition of Lassenite Pozzolan to sandy soils has a positive effect on germination, survival, and growth of dense willow habitat from seed. The Field study describes how smaller plots will be treated with higher percentages of Lassenite to determine if the product increases soil moisture retention between irrigations. Both dense willows and moist soils are required by nesting southwestern willow flycatchers.

Two fields in the Beal Riparian Area that have not produced the desired habitat quality in previous efforts will be used for the study. Seed was collected and stored following procedures outlined in previous reports (E8). Cottonwood poles were planted to the water table around the perimeter of each field to decrease the establishment of windborne seed.

FY13 Activities: The fields will undergo soil testing for salinity, weed seed-bed reduction, and irrigation to remove salts, if needed. Final site preparation will include clearing of existing vegetation, tilling, leveling and furrowing the fields. An irrigation ditch will be placed along one side of each field and additional rock will be placed around the irrigation valve to direct water for furrow irrigation. Instrumentation will be installed for continuous soil moisture and irrigation monitoring. Seeds collected in 2012 will be planted in April.

Proposed FY14 Activities: The site will be monitored for vegetation growth and survival, soil moisture, and soil salinity throughout FY14. The data will be analyzed and an annual report will be written.

Pertinent Reports: The report, *Laboratory Testing of Lassenite Pozzolan for Use as a Soil Amendment at Habitat Restoration Sites,* is posted on the LCR MSCP website.

Work Task C43: Population Demographics and Habitat Use of California Leaf-Nosed Bat, a Genetic Evaluation

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$40,000	$15,413.97	$12,958.68	$60,000	$50,000	$0	$0

Contact: Allen Calvert, (702) 293-8311, acalvert@usbr.gov

Start Date: FY11

Expected Duration: FY14

Long-term Goal: Determine the population demographics and habitat use of an LCR MSCP evaluation species, the California leaf-nosed bat.

Conservation Measures: CLNB1, CLNB2.

Location: Reaches 3-5.

Purpose: Determine the population genetic history of California leaf-nosed bats along the LCR including geographic structuring, evolutionary history, and other population demographic parameters using modern molecular techniques and determine the distribution of genetic variation in California leaf-nosed bat roost sites and identify where individuals from different roosts are foraging.

Connections with Other Work Tasks (past and future): Data on roost site location and samples collected from restoration sites will come from surveys conducted under D9 and F4.

Project Description: This work task is being initiated to evaluate to status of California leaf-nosed bats along the LCR within the framework of the LCR MSCP using a modern molecular approach. This will allow a better understanding of how far individuals are willing to travel to forage (currently assumed to be only 5 miles) and what constitutes appropriate habitat.

Genetic samples from each of the known roost sites near the LCR and from individuals captured during system monitoring will be collected and DNA sequencing and microsatellite analyses will be performed. This will document the genetic structuring of roost sites and allow various population demographic parameters to be estimated. These parameters include population size, previous population expansion or contraction, and dispersal between roosts. Individuals collected during conservation area monitoring will be assigned to their most likely roost site based on their unique genetic signature. Distance from roosts to restoration sites and other pertinent habitat information will be determined using GIS.

Previous Activities: Preliminary activities of gathering genetic samples and mitochondrial sequencing for initial samples prior to FY12 were conducted under G3.

FY12 Accomplishments: Genetic samples were processed, data on mitochondrial sequencing was collected, and these data were analyzed. Additional samples were collected at new localities in southern Nevada.

FY13 Activities: Genetic samples will continue to be gathered, especially for locations away from the LCR to determine the uniqueness of haplotypes on the LCR and potentially the historic and current population of California leaf-nosed bats throughout its range. Analyses will include the use of phylogenetic networks, and analysis of molecular variance or other similar methods to describe and statistically test the population structuring of California leaf-nosed bat populations along the LCR and other locations in Arizona and Nevada. Funding was increased in FY13 to collect and process the additional samples that are necessary to complete the project. Previously, samples were collected while work was being conducted for other work tasks (F4 and D9).

Proposed FY14 Activities: Additional samples will be collected and analyzed on the LCR as well as other locations until the appropriate sample size is achieved. Samples are needed from populations away from the LCR in order to determine the importance of the LCR populations compared to the overall population. This will help determine the conservation significance of populations on the LCR. Once all data is collected, a full analysis will be made to determine population structure and size (past and present) which will help determine the species conservation status both on the LCR as well as throughout its range.

Pertinent Reports: *Genetic Characterization of Macrotus californicus Populations along the Lower Colorado River—2010 Annual Report* is available on the LCR MSCP website. The research design is available upon request.

Work Task C44: Management of Fish Food Resources in Off-Channel Native Fish Habitats

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$100,000	$94,204.34	$127,746.60	$100,000	$0	$0	$0

Contact: Jim Stolberg, (702) 293-8206, jstolberg@usbr.gov

Start Date: FY11

Expected Duration: FY13

Long-term Goal: To maintain effectiveness of restored fish habitats.

Conservation Measures: BONY5, RASU6.

Location: Various off-channel fish grow-out ponds and native fish refugia.

Purpose: To determine best management practices for maintaining ample food resources for native fishes in off-channel ponds within the Colorado River floodplain.

Connections with Other Work Tasks (past and future): This work is related to B7, B11, C25, C34, F5, and G3.

Project Description: This three-year study will evaluate means to enhance food resources in the various flood-plain ponds being used within the LCR to hold or rear RASU and/or BONY. Off-channel habitats, including both man-made and natural flood-plain ponds are being used to support communities of RASU and BONY. In some ponds the fish are fed prepared feeds, in some cases the ponds are only fertilized with the assumption that this act boosts development of zooplankton for food, and in some cases neither feed nor fertilizer are added to the ponds and the fish must subsist on whatever food is naturally available. To successfully manage these habitats, the amounts of zooplankton in these ponds must be optimized. This study evaluates ways to manipulate zooplankton communities to benefit native fishes and works toward developing recommendations for adding feed and/or fertilization to maintain food levels needed by native fish to attain targeted growth rates.

Previous Activities: Information characterizing the zooplankton communities of 33 separate native fish ponds was collected quarterly during FY09 and FY10. This information was gathered through C34, and will be used as a baseline for comparison. At the start of FY11 an extensive literature search was performed to gather information on potential methods for boosting plankton production within fish rearing ponds. Information gathered from this search indicated that a mix of organic and inorganic

fertilizers was likely the best method for promoting the desired plankton bloom. Fertilizer quantities and types were selected based on recommendations from the reviewed literature and on the total surface area of the four individual ponds selected. Ponds were fertilized by two different methods, with two of the study ponds receiving inorganic ammonia phosphate and organic alfalfa pellet, and two of the ponds receiving ammonia phosphate and rice bran. A single pond received no fertilizer inputs and acted as a control. Plankton sampling was conducted prior to pond fertilization and then once a month from March through October.

FY12 Accomplishments: Investigation into the effects of pond fertilization on zooplankton and phytoplankton communities in native fish rearing ponds continued in FY12 with the fertilization of four lake-side backwater ponds on Lake Mohave. Fertilizer quantities were increased from the previous study year to determine if an equivalent increase in plankton abundance would result. Plankton sampling for the four fertilized ponds and a single control pond that received no fertilizer was conducted prior to fertilization and then monthly from March through October. An additional 15 off-channel native fish ponds were also sampled on a quarterly basis, and the cost of sample analyses was covered under this work task. The sampling of these additional sites was done to evaluate their extant plankton populations and develop a data set for comparative purposes. Data sets for all ponds were summarized and interpreted.

FY13 Activities: Investigation into the effects of pond fertilization on zooplankton communities in native fish rearing ponds will continue. For the third study year, additional means of fertilization may be explored in addition to the methods previously used. Phytoplankton and zooplankton samples will continue to be collected and analyzed on a monthly or quarterly basis depending on the individual site. A three-year project report will be completed.

Proposed FY14 Activities: Closed in FY13.

Pertinent Reports: Data sets for FY11 and FY12 have been summarized and are available in tabular and graphical formats.

Work Task C45: Ecology and Habitat Use of Stocked RASU in Reach 3

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$200,000	$193,102.42	$313,781.22	$200,000	$200,000	$200,000	$0

Contact: Jeff Lantow, (702) 293-8557, jlantow@usbr.gov

Start Date: FY11

Expected Duration: FY15

Long-term Goal: To assess survival and habitat use of stocked RASU.

Conservation Measures: RASU6.

Location: Reach 3 from Davis to Parker dams.

Purpose: To assess ecology and distribution of habitats available to stocked RASU in Reach 3, and to evaluate the overall effectiveness of the Fish Augmentation Program.

Connections with Other Work Tasks (past and future): Work is related to C33, D8, and G3.

Project Description: There have been more than 38,000 RASU reared and released into Reach 3 through the Fish Augmentation Program and roughly 30,000 more RASU stocked prior to the LCR MSCP. We regularly contact several hundred of these fish each year through annual surveys and associated work task. The contacted fish appear to be in excellent health with little to no signs of parasites or disease, and they demonstrate growth rates comparable to other populations of repatriated RASU. In winter and spring, fish are located at known spawning areas near Needles, California, and Laughlin, Nevada. During summer and fall, stocked fish are found throughout the main channels, and in numerous off-channel lakes and ponds within Topock Gorge. This five-year study will assess the availability of physical, chemical, and biological fish habitats within Reach 3 to help identify habitat limitations to survival and to allow assessment of possible habitat saturation.

Previous Activities: A of group of backwaters (Park Moabi, Pulpit Rock, Sand Dunes, Blankenship, Castle Rock, Clear Bay, and two small unnamed backwaters) was used to study razorback sucker habitat use in Reach 3. Razorback sucker use of these backwaters was quantified through catch per unit effort data (CPUE) of fish captured with trammel nets and electrofishing. Water quality measurements for select backwaters were collected monthly. Methods were developed to describe the zooplankton, macroinvertebrate, and plant communities within these backwaters. Geo-referenced depth data were collected for use in developing bathymetric maps of these backwaters.

FY12 Accomplishments: Razorback CPUE was calculated for select backwaters within Topock Gorge. Catch rates ranged from 0 to 81 fish/1000 m^2; Park Moabi, Trampas Cove, and Blankenship Bend had the highest relative catch rates. Catch rates from 2012 were calculated for all species and compared to data collected prior to 2005, results were similar with the exception of increases in in redear, bluegill, yellow bullhead, and smallmouth bass to a lesser degree. Liminological data continued to be collected and will be compared once several years of data have been obtained.

FY13 Activities: Fish sampling and remote PIT scanning will continue in the select group of backwaters to monitor razorback CPUE. Water quality and zooplankton data will be collected on a monthly basis. Macroinvertebrate, plant community, phytoplankton, and water chemistry (nutrients) will be collected on a quarterly basis.

Proposed FY14 Activities: FY13 activities will continue, including analyzing habitat and environmental data from previous years; additional sampling will be added if needed.

Pertinent Reports: A report summarizing results through 2012 titled, *Ecology and Habitat use of Stocked Razorback Suckers in the Colorado River between Davis and Parker Dams (Reach 3 of the LCR-MSCP)*, is completed and will be posted to the LCR MSCP website.

Work Task C46: Physiological Response in BONY and RASU to Transport Stress

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$120,000	$117,603.73	$168,804.14	$70,000	$0	$0	$0

Contact: Andrea Finnegan, (702) 293-8203, afinnegan@usbr.gov

Start Date: FY11

Expected Duration: FY13

Long-term Goal: To maintain an effective fish augmentation program.

Conservation Measures: BONY3, BONY4, BONY5, RASU3, RASU4, and RASU6.

Location: SNARRC and Achii Hanyo Rearing Facility.

Purpose: Characterize the physiological stress response of BONY and RASU during pond harvest, tagging, and before, during, and after transport, and discern levels of recovery and post hauling mortality to develop an effective transport protocol.

Connections with Other Work Tasks (past and future): This work is related to Achii Hanyo Rearing Station (B3), SNARRC (B4), Razorback Sucker Rearing Studies (C10), and Bonytail Rearing Studies (C11).

Project Description: This three-year study will characterize the physiological stress response of BONY and RASU before, during, and after a 12-hour transport. Results will be used to develop and test revised hauling procedures to minimize such stress.

Previous Activities: Blood sample collection of BONY was completed during pond harvest, tagging, and before, during, and after transport. The detection of largemouth bass virus (LMBV) at SNARRC prohibited the transport of fish to Achii Hanyo Rearing Facility. The first group of BONY were transported for 12 hours simulating a stocking run before returning to Dexter. Afer testing negative twice for LMBV the second group of BONY were able to be tranported to Achii Hanyo, exposing BONY to water quality conditions more representative of the Colorado River.

FY12 Accomplishments: Blood sampling was completed to discern levels of plasma cortisol, glucose, chloride, and osmolality in RASU before, during, and after a 12-hour transport from SNARRC to Achii Hanyo Rearing Facility.

FY13 Activities: Assays and analysis of plasma cortisol, glucose, lactate, chloride, and osmolality levels in BONY and RASU will be completed. Data are to be compiled into a final report including recommendations to improve handling and hauling protocols for BONY and RASU.

Proposed FY14 Activities: Closed in FY13.

Pertinent Reports: Annual progress reports are available upon request.

Work Task C47: Genetic Monitoring and Management of Recruitment in Bonytail Rearing Ponds

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$250,000	$237,437.06	$51,837.75	$250,000	$250,000	$0	$0

Contact: Andrea Finnegan, (702) 293-8203, afinnegan@usbr.gov

Start Date: FY12

Expected Duration: FY14

Long-term Goal: To maintain an effective fish augmentation program.

Conservation Measures: BONY3, BONY4, and BONY5.

Location: Off-site rearing stations (SNARRC and Achii Hanyo Rearing Station).

Purpose: To assess effects of volunteer spawning by BONY in holding ponds on the genetic integrity and goals of the captive management plan for this species.

Connections with Other Work Tasks (past and future): This work is related to Willow Beach National Fish Hatchery (B2), Achii Hanyo Rearing Facility (B3), Dexter National Fish Hatchery (B4), and Bonytail Rearing Studies (C11).

Project Description: This three-year study will characterize the genetic diversity of inadvertently spawned BONY in ponds at Achii Hanyo Rearing Facility, SNARRC, and Uvalde NFH, and compare these fish to the founder population of BONY broodstock at Dexter. This project will determine average diversity of pond recruitment at SNARRC. The study will also assess utility of using a biological control (piscivorous fish) to reduce or eliminate inadvertent spawns in grow-out ponds at SNARRC.

Previous Activities: BONY tissue samples have been collected from Uvalde NFH, Achii Hanyo Rearing Station, and SNARRC.

FY12 Accomplishments: Two-thirds of the BONY tissues samples have been genotyped using a suite of 20 microsatellite markers. Piscivorous fish have been obtained and quarantined.

FY13 Activities: Biological controls will be investigated to reduce or eliminate inadvertent spawns, which may lead to overcrowding, and high densities resulting in oxygen depletion, and increased susceptibility to disease. Ponds will be prepared for stocking in April 2013.Treatments include BONY with no piscivorous fish, one half

pound piscivorous fish for every 50 pounds of BONY, and one pound piscivorous fish for every 50 pounds of BONY.

Tissue samples are to be taken and analyzed from 1,000 bonytail derived from inadvertent spawns. All fish are to be inventoried from the study ponds, total parent versus recruitment biomass recorded and compared to determine effects and efficiency of piscivore use.

Proposed FY14 Activities: The initial treatment protocols looking at a biological control will be adjusted for effectiveness based on previous year's results and repeated in FY14.

Pertinent Reports: Scopes of work are available upon request.

Work Task C48: Genetic Characterization of RASU Brood Stock at SNARRC

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$60,000	$50,590.60	$98,254.83	$0	$0	$0	$0

Contact: Jim Stolberg, (702) 293-8206, jstolberg@usbr.gov

Start Date: FY11

Expected Duration: FY12

Long-term Goal: To maintain an effective fish augmentation program.

Conservation Measures: RASU3, RASU4.

Location: Southwestern Native Aquatic Resources & Recovery Center (formerly Dexter National Fish Hatchery & Technology Center).

Purpose: To genetically assess RASU captive brood stock.

Connections with Other Work Tasks (past and future): B2, B4, B5, B10, C10, and C31.

Project Description: This two-year study will compare the genetic diversity of captive RASU brood stock and the source stock in Lake Mohave. The Southwestern Native Aquatic Resources & Recovery Center (SW Native AR & RC) maintains three different stocks of RASU that originated from Lake Mohave. Concern has been expressed that captive fish stocks have lowered genetic diversity and thus less utility for conservation activities. To address this concern, razorback sucker broodstocks will be tested to ensure that they are genetically diverse and representative of wild or repatriate populations. Levels of inbreeding, allelic diversity, and statistical measures used to identify genetic divergence will be calculated.

Previous Activities: This effort builds upon research from B4, B10, C11, and C31. In FY11 the genetic status of RASU broodstocks held at the SW Native AR & RC was documented by determining their mitochondrial diversity and comparing it to the diversity found in the Lake Mohave RASU population. In addition, the genetic status of captive stocks at the SW Native AR & RC and the Ouray and Grand Valley hatchery complex were characterized using microsatellites. Analyses demonstrated that overall the RASU broodstocks were high in genetic diversity and did not show signs of inbreeding. However, diversity was found to be lower in Ouray and Grand Valley stocks. The genetic analyses performed to date indicate that these two hatchery stocks are still providing genetically appropriate production fish for conservation activities.

FY12 Accomplishments: During FY12, the genetic diversity and pairwise relatedness of individual RASU from the Ouray National Fish Hatchery Grand Valley Unit was determined and compared to those estimates for wild Lake Mohave individuals and the broodstocks held at the SNARRC. The purpose of this comparison was to determine if the Grand Valley hatchery broodstocks are proportionally more related than other stocks and if randomly selecting Grand Valley individuals for spawning without tracking family lots can be accomplished while not altering genetic diversity through inbreeding. Tissue samples were taken from a total of 96 RASU at the Grand Valley hatchery for the purpose of genomic DNA extraction. In summary, the samples from the Grand Valley unit had fewer alleles (lower allelic richness) than the other stocks. Recommendations resulting from DNA analyses include continued tracking of family lots and unique matings, or performing a rapid response study to genetically screen individuals prior to spawning for the purpose of determining relatedness and inbreeding levels. All information obtained during this two-year study is being used to update the 2003 *Genetics Management and Captive Propagation Plan*.

FY13 Activities: Closed in FY12.

Proposed FY14 Activities: Closed in FY12.

Pertinent Reports: The 2011 *Razorback Sucker Broodstock Evaluation and Genetic Monitoring* annual report and the 2012 *Razorback Sucker Broodstock Evaluation and Genetic Monitoring* annual report have been completed and will be posted to the LCR MSCP website.

Work Task C49: Investigations of RASU and BONY Movements and Habitat Use Downstream of Parker Dam

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$150,000	$59,867.17	$59,867.17	$150,000	$150,000	$0	$0

Contact: Jeff Lantow, (702) 293-8557, jlantow@usbr.gov

Start Date: FY12

Expected Duration: FY14

Long-term Goal: To maintain an effective fish augmentation program.

Conservation Measures: BONY3, BONY 4, BONY5, RASU3, RASU4, and RASU6.

Location: Reach 4, Colorado River, between Parker and Palo Verde dams.

Purpose: Assess distribution and habitat use of stocked RASU.

Connections with Other Work Tasks (past and future): This work is related to C8 and D8.

Project Description: This three-year study will evaluate post-stocking survival, movement, and habitat use of RASU and BONY released between Parker Dam and Palo Verde Diversion Dam. Both species have been stocked into the river below Parker Dam, and both species show low levels of survival. Most of this reach occurs on Colorado River Indian Tribes land and has not previously been examined by LCR MSCP staff.

Previous Activities: This effort is building upon research conducted under C8. RASU and BONY have been stocked below Parker Dam since 2005. This work task was postponed until FY12. No work was performed in FY11.

FY12 Activities: An agreement was finalized with USFWS to perform this work. This work was partially funded in FY12 in order to finalize a study plan, literature review, and a signed MOU with the CRIT; fieldwork is scheduled to begin in FY13.

FY13 Activities: Up to 6,000 RASU and 4,000 BONY will be stocked within the study reach, which includes CRIT lands. The tracking of sonic tagged fish will be used to monitor post-stocking dispersal patterns and possibly identify the locations used by any RASU currently inhabiting the study area. Other monitoring activities will include trammel netting, electrofishing, remote PIT scanning, and routine water quality monitoring.

Proposed FY14 Activities: Monitoring activities will be similar to those from FY13, with added emphasis on areas used by sonic tagged razorback and bonytail.

Pertinent Reports: A study plan and a literature review have been completed and are available upon request.

Work Task C51: Vermilion Flycatcher Detectability and Distribution Study

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$20,000	$26,532.93	$26,532.93	$150,000	$150,000	$150,000	$0

Contact: Barbara Raulston, 702-293-8396, braulston@usbr.gov

Start Date: FY12

Expected Duration: FY15

Long-term Goal: Determine current distribution and abundance of VEFL on LCR and identify habitat characteristics for the species in MSCP habitat creation areas.

Conservation Measures: VEFL1, MRM1, MRM2, MRM4, CMM1, CMM2 (Vermilion Flycatcher)

Location: Various sites from Lake Mead to Yuma, yet to be determined.

Purpose: To determine best field method for determining current population abundance and location of VEFL within the LCR MSCP boundary.

Connections with Other Work Tasks (past and future): Information obtained through this work task will be used in conjunction with data collected during post-development monitoring of habitat conservation areas (F2) and system-wide surveys conducted under D6. Information obtained through this work task will also be used in association with C24 to help define habitat requirements for riparian obligate bird species.

Project Description: The VEFL is highly visible when present due to its bright coloration, active behavior, and distinct vocalizations. However, general bird surveys conducted under D6 in habitats previously occupied by VEFL (Bill Williams River NWR) have not detected them in numbers expected. Surveys for cuckoos (D7) and willow flycatchers (D2) are also lacking in incidental reports of this species. VEFL may begin courtship as early as February, much earlier than many other species on the LCR, thus a presence/absence survey protocol is needed specifically for this species and should begin in February. A literature review will be conducted and a preliminary, system-wide search for the species will be used to develop a site list and survey protocol.

Previous Activities: New start in 2012.

FY12 Activities: A review of the literature of the past 3 decades on VEFL on the LCR was conducted. Results of the literature review showed that VEFL were not at all common on the LCR during the 1980s; however, in the 1990s, 10 nests were documented

during April and May of 1993. According to reports and field notes, there were at least 30 pairs of VEFL breeding on the Bill Williams River NWR and at least 74 nesting attempts in 1994. Various survey efforts for other species within the past decade also report few, if any, incidental observations of VEFL on the Bill Williams River or main stem of the LCR. According to observations of VEFL along established transects beginning in 1998, numbers detected were still high. Since then, there has been a steady decline, with no more than 5 individuals detected during each breeding season between 2006 and 2012.

In 2012, areas on the LCR where VEFL were documented previously were visited as well as the locations of LCR Christmas Bird Counts, and other sightings. A total of 40 sites from Yuma to Needles were visited between 2 February and 19 April, 2012. VEFLs were documented through casual observations (not structured surveys) at 9 locations between Yuma, AZ and Lake Havasu City, AZ and nesting was documented at five locations.

The Blythe Golf Course was occupied by at least one pair and an immature male and a female of unknown age were present the Parker Dam Residences. A small breeding population has been present at the Colorado River Indian Tribe's 'Ahakhav Preserve south of Parker, AZ for at least 10 years, and nesting occurs at the restored cottonwood, willow, and mesquite habitat adjacent. VEFL are also present at the 'Ahakhav Preserve during the winter, although it is unknown if they are the same individuals that breed there.

FY13 Activities: Current and future habitat being created and managed at PVER, CVCA, Cibola Unit 1, Beal Lake Conservation Area and Laguna Division Conservation Area is very consistent with habitat being used by VEFL currently or in the recent past on the Bill Williams River NWR: cottonwood, willow and mesquite stands adjacent to irrigated agricultural fields. Over time, openings within these created habitats will develop. To determine baseline distribution and population abundance, a study design and field protocol will be tested in FY13. Surveys will take place at random locations within the LCR MSCP area that have a potential to support vermilion flycatchers (stratified sampling). The presence of brown-headed cowbirds will also be noted during surveys. Stratified, random surveys will also be conducted within suitable habitat at the restoration sites listed above to determine if and when VEFL colonize these areas.

Proposed FY14 Activities: To determine baseline distribution and population abundance, the 2013 study design and field protocol will continue to be tested and implemented in FY14. Surveys will take place at random locations within the LCR MSCP area that have a potential to support vermilion flycatchers (stratified sampling). The presence of brown-headed cowbirds will also be noted during surveys. Stratified, random surveys will also be conducted within suitable habitat at the restoration sites listed above to determine if and when VEFL colonize these areas.

Pertinent Reports: Annual reports will be available on the LCR MSCP website.

Work Task C52: Gilded Flicker Research

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$20,000	$22,422.40	$22,422.40	$150,000	$300,000	$300,000	$0

Contact: Beth Sabin, (702) 293-8435, lsabin@usbr.gov

Start Date: FY12

Expected Duration: FY15

Long-term Goal: Determine current distribution and abundance of gilded flicker on the LCR by conducting species specific, non-random surveys.
Conservation Measures: GIFL1, MRM1.

Location: Habitat within and adjacent to the LCR MSCP project area.

Purpose: To determine best field methods for surveying and determine the current population abundance and location of gilded flicker within the LCR MSCP boundary.

Connections with Other Work Tasks (past and future): Information obtained through this work task will be used in conjunction with data collected during post-development monitoring of habitat conservation areas (F2) and system-wide surveys conducted under D6. Information obtained through this work task will also be used in association with C24 to help define requirements for riparian obligate bird species.

Project Description: General bird surveys conducted under D6 in habitats recently occupied by gilded flickers have not detected them in numbers expected. Additional, research and monitoring is needed to understand the habitat use and population distribution of this species in areas within and adjacent to the LCR MSCP planning area. This research and monitoring may include preliminary literature searches and exploratory surveys, a study to determine year round habitat use and breeding chronology, a study to determine the extent that hybridization occurs between red-shafted and gilded flickers and a design of a species-specific survey protocol.

Previous Activities: This was a new start in FY12.

FY12 Accomplishments: Literature searches were conducted on gilded and northern flickers to add to literature Reclamation had already compiled in 2005. The information was added to the existing annotated bibliography and species profile. All information obtained was cataloged in Reclamation's internal library.

Historical and recent reports and accounts were examined for gilded flicker detections within the LCR MSCP planning area and along the Bill Williams River. Gilded flickers

have been detected more in the riparian habitat of the LCR during the months of the year when they are typically not breeding.

Preliminary surveys to locate breeding gilded flickers were conducted from February 1 to April 31. Areas surveyed were: 1) those areas determined suitable during habitat reconnaissance surveys, 2) areas of known cottonwood and willow habitat determined by Reclamations 2004 vegetation classification and aerial photographs, and 3) saguaro habitat outside the LCR MSCP planning area.

From June 1 to September 31, some of the areas of riparian habitat were surveyed again to see if any gilded flickers were moving in to those areas as individuals or family groups after breeding. Seven of the locations where gilded flickers were detected in the spring were revisited in June, July, and September to see if pairs and/or family groups were staying near their breeding locations after the breeding season.

There was one family group detected in mesquite habitat within the LCR MSCP planning area north of Mineral Wash Road in August. They were observed feeding on the mistletoe that was in the mesquite trees. There was one pair of gilded flickers detected at McIntyre Park in Blythe, California from May through June. The nest cavity was never found so breeding could not be confirmed; however, these birds were probable breeders. There was an incidental sighting of a gilded flicker at the Yuma East Wetlands restoration site. Gilded flickers were readily detected in the saguaro habitat adjacent to the LCR MSCP planning area by Quartzite, Arizona and Kofa NWR and areas north and south of the Bill Williams. Surveying them proved more difficult than thought due to the large home ranges, infrequent vocalizations and the fact that they are indistinguishable by sound from northern flickers.

FY13 Activities: After reviewing the results of the exploratory surveys and literature searches, Reclamation decided to focus its efforts within the next few years on a habitat use, local movement and natural history study. The objectives of this study will be to determine year round habitat use, seasonal movements, breeding chronology and other natural history characteristics (roosting habitat, cavity construction, vocalizations) of the gilded flicker.

In the spring of 2013, the pilot year of the project will begin. Little research has been done on the gilded flicker so the pilot year will be used to test various methods needed to conduct the study. These methods include capturing birds, finding nest cavities, attaching radio transmitters to birds, radio-tracking birds over a time period of six months to a year and recapturing birds in the winter. Staff will closely watch for any negative affects the radio transmitters are having on the health of the bird and determine life of batteries in transmitters. A study plan for the full-scale FY14-15 study will be written.

Proposed FY14 Activities: The second year of the habitat use, local movement and natural history study will take place. This year will be the first year of full implementation of the study with a number of birds being captured, fitted with transmitters and tracked.

Pertinent Reports: The 2012 gilded flicker exploratory survey report will be on the LCR MSCP website. The study plan for the pilot year is available upon request.

Work Task C53: Sonic Telemetry of Juvenile Flannelmouth Suckers in Reach 3

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$120,000	$105,869.79	$54,806.89	$120,000	$120,000	$120,000	$0

Contact: Jeff Lantow, (702) 293-8557, jlantow@usbr.gov

Start Date: FY12

Expected Duration: FY15

Long-term Goal: Support flannelmouth sucker (FLSU) conservation.

Conservation Measures: FLSU1 and FLSU3.

Location: Reach 3, Arizona/Nevada/California.

Purpose: Determine habitat use and preference for juvenile FLSU in Reach 3. Provide resource managers with recommendations to enhance juvenile flannelmouth sucker habitats as a requirement for LCR MSCP habitat creation goals.

Connections with Other Work Tasks (past and future): Work conducted under this task is related to C15 and C45.

Project Description: Flannelmouth sucker were reintroduced into the Colorado River below Davis Dam by AGFD in 1976 by transfer of fish captured at the confluence of the Colorado and Paria rivers at Lee's Ferry, Arizona. This stock has persisted for three decades and now represents the only known population of this native species in the Colorado River downstream of Davis Dam.

The LCR MSCP completed five years of research on this population. The study contacted all life stages of flannelmouth sucker and telemetry of adults gave us great insight as to movements and habitat use of adult flannelmouth suckers. However, only 9 juvenile flannelmouth suckers greater than 100 mm and less than 350 mm total length were contacted during this study. Previous studies by U.S. Geological Survey in the 20 river miles above Lake Havasu had similar difficulty contacting juveniles, but found that while flannelmouth sucker contacts were rare, the majority (85%) of flannelmouth captured consisted of these smaller size classes. This study will define the habitats used by these younger fish and provide managers a complete life history of FLSU within Reach 3.

Previous Activities: This study will build upon the previous work accomplished through work task C15. Juvenile RASU and FLSU tagging studies were accomplished under D8 in preparation for this project. Larval FLSU were captured near Laughlin, Nevada, and are currently being reared as a potential source of juvenile fish.

FY12 Accomplishments: This study was initiated and attempts were made to secure juvenile wild flannelmouth sucker to implant with sonic tags. Following several weeks of effort, zero juvenile fish were captured and the hatchery-reared fish were not yet to size. All effort and funding related to this project was suspended until FY13, which is reflected in the obligation being higher than the expenditures.

FY13 Activities: Hatchery reared flannelmouth or surrogates from another section of the Colorado River will be used to initiate the telemetry work. Up to 30 hatchery-reared suckers of varying sizes will be selected and tagged with appropriate-sized transmitters. Additional tags will be available for any wild captured flannelmouth suckers encountered while in the field. Tagged fish will be released near Laughlin and tracking will commence immediately following their release. Habitat data will be collected throughout the tracking process to determine habitat preferences.

Proposed FY14 Activities: Activities will be similar to those from FY12; specifics may vary depending on FY13 results.

Pertinent Reports: A study plan was developed in FY11 and is available upon request.

Work Task C54: Techniques to Establish Native Grasses and Forbs

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$200,000	$200,000	$200,000	$200,000

Contact: Dianne Bangle, (702) 293-8220, dbangle@usbr.gov

Start Date: FY13

Expected Duration: FY16

Long-term Goal: Develop techniques to establish native grasses and herbaceous perennial forbs while suppressing establishment of invasive species.

Conservation Measures: MRM2, CRCR2, YHCR2, CMM1.

Location: Cibola NWR Unit #1.

Purpose: The purpose of this study is to develop successful planting techniques and research alternative methods of native grasses and forbs establishment while suppressing weed species establishment. Typically, grass and forb species can be difficult to establish when competition from weed species is high. Additionally, invasive plant species can modify riparian plant communities, degrade wildlife habitat, and increase risk of fire.

Connections with Other Work Tasks (past and future): Post-development habitat monitoring will be conducted at habitat creation sites detailed in work tasks F1-F4.

Project Description: This study addresses several conservation measures that include creation of species habitat, maintenance of existing species habitat, monitoring, and research. The HCP requires the creation of over 8,100 acres of various land cover types to provide habitat for targeted LCR MSCP covered species. The habitat requirements of covered and associated species can be established at each habitat creation site through the design and maintenance of habitat mosaics, especially through manipulation of plant species composition, stand seral stages, tree densities, and water regimes.

Currently groundcover being utilized includes non-natives such as alfalfa. Native herbaceous grass and forb species can be difficult to establish especially in areas with an abundance of weed species. This study will attempt to determine effective planting techniques that may increase the survival of native plantings while testing different methods of weed suppression and control. Once natives are established, they typically become effective competitors and may be able to keep weed presence down to a

minimum. In this way, native grasses can be used in place of the non-native groundcovers, which may provide better habitat for covered species such as cotton rats.

As the LCR MSCP moves forward, it is anticipated that conservation areas planted previously will be managed to improve habitat quality by increasing diversity at all trophic levels. A collection of native herbaceous and shrub seeds is a useful tool to have on hand when there are opportunities for seeding. Seeds of many native species are difficult to obtain from vendors on short notice. They become available based on how abundant each species was at the time of collection, and if there is a market for particular species. Some species are simply not collected because vendors are not aware of a need for them. This work task will also provide funds for seed purchase and/or collection and storage each year for research and adaptive management purposes. This funding will also be used to determine the best and most cost effective seeding techniques, storage and handling of native seed.

Previous Activities: N/A

FY12 Accomplishments: FY12 accomplishments were funded under F1. Seed bank samples were collected in February and May 2012 in both control and experimental fields. The experimental field was plowed and watered several times to encourage weed seed germination. Seed bank samples were grown and identified to species.

FY13 Activities: A draft research protocol and an initial species list for planting will be developed. Grass plugs will be grown. Herbaceous seeds will be either bought or collected in the field at the appropriate time of year.

Additional soil samples will be collected in early 2013 and immediately before the field are prepped for planting.

Proposed FY14 Activities: Planting and seed collecting activities will continue. Additional plant species will be tested as necessary.

Pertinent Reports: An annual progress report titled *Seed Bank Study at Cibola National Wildlife Refuge* describes the results of the first two rounds of greenhouse grow out.

Work Task C55: Techniques to Increase Leaf Litter Decomposition Rates

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$125,000	$75,000	$75,000	$75,000

Contact: Dianne Bangle, (702) 293-8220, dbangle@usbr.gov

Start Date: FY13

Expected Duration: FY17

Long-term Goal: Develop techniques to reduce litter biomass.

Conservation Measures: MRM2, CMM1 (WIFL, YBCU, ELOW, GIFL, GIWO, VEFL, BEVI, YWAR, SUTA).

Location: Palo Verde Ecological Reserve.

Purpose: To evaluate if a reduction in accumulated leaf litter and fuel load is needed, and to develop tools to reduce the accumulated litter. In many of the LCR MSCP habitat creation sites there is a buildup of dead vegetation and leaf litter that contributes to fuel loads at LCR MSCP habitat creation sites, which could eventually become a fire hazard.

Connections with Other Work Tasks (past and future): Post-development habitat monitoring will be conducted at habitat creation sites detailed in work tasks F1-F5; fire management plan under E18; create and manage a mosaic of native land cover types under E4.

Project Description: Leaf litter decomposition is a fundamental source of energy and nutrients in forested ecosystems and is historically investigated for its role in nutrient cycling. The process begins as leaf litter accumulates; organisms colonize the litter and begin the decomposition process resulting in humus formation. Nutrient cycling and litter decomposition are understudied in restored habitat especially restored riparian systems that do not undergo the same floodplain processes as natural riparian communities. At some MSCP habitat creation areas, litter has accumulated in the absence of natural flooding regimes and may pose a fire risk. The MSCP is interested in evaluating the litter and soil communities (e.g. microfauna and macrofauna, and microbiota) at select habitat creation sites to determine which litter/soil species are present and their abundances. An examination of the soil biota is needed in conjunction with litter biota as these communities are interrelated. In addition to potential fuel reductions, benefits from breaking down the leaf litter include, an increase in soil nutrients, organic matter, and microorganisms essential for a healthy forest floor environment.

The purpose of this study is to evaluate soil and litter species richness and composition from mixed and single species leaf litter at LCR MSCP conservation areas. With these results, an analysis of conditions at the sites will be prepared that will identify if the litter and soil communities support the appropriate species and abundances to effectively decompose the leaf litter.

Tools will be investigated to increase litter/soil biota and thus reduce litter biomass, if necessary. One method that will be tested is by adding biological compost tea (BCT) to the litter to improve the biotic communities, thus increasing litter decomposition. This task would include determining the proper BCT recipe, testing at least two application methods (including incorporating the BCT into the litter layer), and monitoring plots before and after BCT treatment.

Previous Activities: N/A

FY12 Accomplishments: New start in FY13.

FY13 Activities: A literature search will be conducted to gather information on existing studies related to litter, nutrient and soil quality. A project outline and research proposal will be developed for including preparing a study design to determine soil and litter species richness and composition from mixed and single species leaf litter at MSCP conservation areas. Once complete, the fieldwork will begin.

Proposed FY14 Activities: Fieldwork will continue to be collected on litter species richness and composition from various conservation areas. Data will be analyzed to evaluate soil and litter communities at the associated conservation areas. A report will be written to recommend what tools (including BTC), if any, will be tested.

Pertinent Reports: N/A

Work Task C56: Characterization of Lake Mohave Backwaters to Evaluate Factors Influencing Spawning Success

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$265,000	$100,000	$100,000	$0

Contact: Andrea Finnegan, (702) 293-8203, afinnegan@usbr.gov

Start Date: FY13

Expected Duration: FY15

Long-term Goal: To help inform future design and management of created backwater habitats.

Conservation Measures: RASU3, RASU6, BONY3, BONY5.

Location: Lake Mohave, Reach 2.

Purpose: Characterize Lake Mohave backwater rearing ponds, to include but not limited to Arizona Juvenile (AJ), Dandy, and Yuma where stocked juvenile RASU have been observed to spawn at different rates in order to determine which factors are most influential in promoting spawning and subsequent survival of RASU larvae.

Connections with Other Work Tasks (past and future): Genetic and Demographic Studies to Guide Conservation Management of RASU and BONY in Off-Channel Habitats (C40).

Project Description: Disconnected backwater ponds on Lake Mohave are used for rearing RASU in support of the fish augmentation program. Sub-adult fish are currently PIT tagged at 300 mm TL, fin clipped for genetics, and stocked into these ponds during winter or spring. The ponds are harvested in the fall, as the backwaters are drawn down with the seasonally declining water level of Lake Mohave.

Over the past two years, genetic analyses of larvae that were spawned from stocked RASU in AJ and Dandy showed differences in reproductive success. In AJ, a minimum 52% of the stocked fish contributed to the larvae sampled, while in Dandy a minimum of 33% contributed in 2010. In 2011, only larvae were captured from AJ, a minimum of 68% of the adults contributed to the larvae sampled.

This project will provide a detailed characterization of selected Lake Mohave backwaters to determine which factors are most influential towards successful RASU spawning and

subsequent larval survival. The research will begin with a narrow focus on AJ and Dandy, two ponds with different spawning success, at Lake Mohave but may be expanded to include other backwaters or other known RASU spawning areas.

Previous Activities: N/A

FY12 Accomplishments: This is a new start in FY13.

FY13 Activities: Complete larval sampling at AJ, Dandy, and Yuma backwaters on Lake Mohave AZ/NV on a bi-weekly basis to obtain accurate catch per unit effort data. Develop a study plan to examine the physical habitat, physicochemical parameters, and predation dynamics of backwater habitats.

Proposed FY14 Activities: Examine the physical habitat, physicochemical parameters, and predation dynamics on AJ, Dandy, and Yuma backwaters.

Pertinent Reports: N/A

Work Task C57: Sonic Telemetry of Lake Mead Juvenile Razorback Suckers

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$250,000	$250,000	$250,000	$0

Contact: Jim Stolberg, (702) 293-8206, jstolberg@usbr.gov

Start Date: FY13

Expected Duration: FY15

Long-term Goal: Support razorback sucker (RASU) conservation.

Conservation Measures: RASU 6.

Location: Reach 1, Lake Mead, Arizona/Nevada.

Purpose: Investigate habitat use of immature RASU and determine conditions that allow for natural recruitment of Lake Mead RASU.

Connections with Other Work Tasks (past and future): This work task is related to the Lake Mead Razorback Sucker Study (C13) and Razorback Sucker and Bonytail Stock Assessment (D8).

Project Description: From 1996 to 2011, 95 sonic-tagged adult RASU have aided researchers in locating spawning populations of RASU in Lake Mead and understanding the habitat use and spawning preferences of the adult population. Trammel-netting efforts during this time also provided valuable information on Lake Mead RASU demographics and included the capture of over 100 juvenile/sub-adult RASU. To date only limited effort has been expended trying to capture this young life stage, which is an important element in understanding why RASU recruitment is occurring in Lake Mead. This project will investigate habitat use of immature RASU through sonic telemetry.

Previous Activities: This study builds upon work conducted on the Lake Mead adult RASU population (C13 and D8).

FY12 Accomplishments: New start in FY13.

FY13 Activities: This project will investigate the habitat use of juvenile RASU by implanting hatchery reared, and potentially wild-caught fish with sonic tags and monitoring their movements. A variety of sampling techniques including trammel nets, minnow traps, hoop nets, Fyke nets, and seines will also be used in conjunction with

tracking efforts to sample specifically for juvenile RASU throughout appropriate portions of the year. Tissue samples will be taken from any RASU captured during the course of this effort for genetic analyses, and the age of all captured RASU will be determined through appropriate nonlethal techniques. In addition to these activities, the physicochemical environment including water quality parameters, substrate types, and vegetation of any potential recruiting habitat or areas where juvenile fish are tracked or contacted will also be identified. Information gathered from this study will provide resource managers with recommendations for enhancing juvenile RASU habitat.

Proposed FY14 Activities: Investigation and identification of juvenile RASU habitat will continue. Additional hatchery reared juvenile RASU will be sonic tagged for the purposes of tracking, and follow up sampling will be conducted with the goal of capturing wild juveniles for inclusion in the tracking portion of this work. All other project elements will also continue.

Pertinent Reports: N/A

Work Task C58: Investigating Shoreline Habitat Cover for BONY

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$75,000	$60,000	$60,000	$0

Contact: Andrea Finnegan, (702) 293-8203, afinnegan@usbr.gov

Start Date: FY13

Expected Duration: FY15

Long-term Goal: To provide qualitative measurements when constructing riprap shoreline habitat for BONY.

Conservation Measures: BONY 5

Location: Reach 3 and 4, Achii Hanyo Native Fish Facility, Parker Dam Pond, and Cibola High Levee Pond.

Purpose: To determine size and depth preference of cavity cover in riprap shoreline habitat for BONY.

Connections with Other Work Tasks (past and future): BONY used in this study would be provided through), Achii Hanyo Rearing Station (B3) and SNARRC (B4), and Role of Artificial Habitat in Survival of RASU and BONY (C41), the scope of work will be developed under BONY Rearing Studies (C11).

Project Description: Bonytail have been documented using open water and shoreline cover in Lake Mohave backwater ponds and at Cibola High Levee. Currently the Role of Artificial Habitat in Survival of RASU and BONY (C41) is being investigated for open water. This work task is designed to investigate shoreline habitat, specifically cavities within rip-rap shorelines, for BONY at multiple life stages. Substrate measurements will be taken from the rip-rap shoreline at Cibola High Levee Pond to provide length, width, and depth measurements of the cavities. Cavities of multiple size and depth will be created and BONY preference will be tested at Achii Hanyo Rearing Facility. Investigation of preferred water depth of these cavities is to be completed at Parker Dam Pond. Results may facilitate the design and development of rip-rap shorelines for LCR MSCP backwater habitats.

Previous Activities: This is a new start for FY13.

FY12 Accomplishments: This is a new start for FY13.

FY13 Activities: Complete evaluation of rip-rap shoreline substrate data collected from Cibloa High Levee Pond. Design and test cavity structures to determine cavity opening size preference for multiple life stages of bonytail. Cavity structures investigations will continue for depth preference in multiple life stages of BONY.

Proposed FY14 Activities: Continue rip-rap cavity investigations building on information from previous years. Prepare final report.

Pertinent Reports: N/A

Work Task C59: Selenium Monitoring in Created Backwater and Marsh Habitat

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$250,000	$250,000	$250,000	$0

Contact: Jim Stolberg, (702) 293-8206, jstolberg@usbr.gov

Start Date: FY13

Expected Duration: FY15

Long-term Goal: To develop a long-term selenium monitoring plan for the LCR MSCP.

Conservation Measures: MRM2 MRM5 (BONY, RASU, CLRA, BLRA).

Location: Created backwater and marsh land cover types within the LCR MSCP planning area.

Purpose: Monitor selenium levels in created backwater and marsh land cover types and provide information necessary to adaptively manage these sites.

Connections with Other Work Tasks (past and future): Monitoring for selenium will be conducted for habitat created through Section E work tasks (E1, E9, E14, E15, E16, E25, E27, and E28), and will be incorporated into post-development monitoring tasks listed in Section F (F1, F3, F5, and F7).

Project Description: As described in the conservation measures, the LCR MSCP is developing 512 acres of marsh and 360 acres of backwaters as part of its habitat creation goals. These created habitats will be monitored over the term of the LCR MSCP to ensure that they maintain their function for all associated covered species. This study will evaluate selenium levels within these created habitats and be used to develop a long-term selenium monitoring plan as required by the Habitat Conservation Plan.

Previous Activities: N/A

FY12 Accomplishments: New start in FY13.

FY13 Activities: Sampling will be conducted at three LCR MSCP Conservation Areas containing backwater and/or marsh habitat with the goal of determining baseline selenium concentrations at each site. Conservation Areas designated for the first year of this study include the Big Bend Conservation Area (BBCA), Hart Mine Marsh (HMM), and the Imperial Ponds Conservation Area. Additional sites may be included in future

years for pre and/or post development sampling and monitoring as sites and funding become available. Specific work to be performed in FY13 includes conducting individual site evaluations to determine sampling locations, collecting water and sediment samples from each site, analyzing collected samples, comparing extant selenium levels to known thresholds for aquatic species, and providing an annual report detailing methods, results, and recommendations. Results from the first study year will be used to inform work conducted in subsequent years.

Proposed FY14 Activities: Sampling efforts will continue at designated project sites for the purpose of developing a larger data set on which management decisions can be based.

Pertinent Reports: Future annual reports will be posted to the LCR MSCP website upon completion of review.

Work Task C60: Habitat Manipulation

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$100,000	$100,000	$100,000	$100,000

Contact: Sonja Kokos, (702) 293-8033, skokos@usbr.gov

Start Date: FY13

Expected Duration: FY17

Long-term Goal: Develop cost-effective management techniques and determine timing and extent of management actions necessary for maintaining structural diversity in riparian habitats.

Conservation Measures: MRM2 (WIFL, YBCU, VEFL, YWAR, CRCR, YHCR).

Location: All current and future riparian LCR MSCP Conservation Areas.

Purpose: Identify riparian habitat areas in need of structural diversity enhancement and develop protocols to manage portions of LCR MSCP habitat creation sites. The intent is to use the results of this research to appropriately manage these successional stages of riparian habitat that are required by several covered riparian avian species, and thereby meet established management guidelines.

Connections with Other Work Tasks (past and future): Post-development habitat monitoring data obtained in F2 and F3 will be used.

Project Description: The LCR MSCP riparian habitat creation sites are planted in phases and use a mass-planting technique in order to reduce invasive species competition with native species and provide dense habitat for covered avian species. Over time, the vegetation can sometimes mature at the same successional stage, especially in areas with consistent growing conditions and with low riparian tree species diversity.

In natural systems where periodic flooding is a component of the system, portions of the habitat can be periodically disturbed and "reset" to earlier successional stages and increased structural diversity. Several covered avian species require as habitat early to mid-successional stages of native riparian trees. Over time, some of the LCR MSCP riparian habitat creation sites may grow beyond suitable habitat for some covered species unless management actions are taken.

Without the disturbance events that were once more common in the historic river hydrograph, direct manipulation of portions of these conservation areas may be required. This research project will provide information to perform assessments and provide

protocols to guide the deliberate manipulations of these habitats to enhance structural diversity and produce the appropriate serial stages for covered species.

The objectives of this study are to:

1. Provide a protocol for assessing areas for structural diversity and target areas that may require enhancement to meet management objectives. This will typically result in identifying areas have at least eight years of growth and that comprise more monotypic stands of riparian trees; however, the protocols that are developed may indicate longer or shorter durations based on measures of structural diversity.

2. Provide a protocol to guide cost-effective and appropriate manipulations of identified riparian habitats in order to reset portions of these areas to the earlier successional stages. Protocols that may be established could include, but are not limited to: locations within stands for thinning, numbers or percent of trees per stand to be removed, height at which trees should be cut to encourage stump sprouting, and potential for in-planting in thinned areas to encourage species diversity as well as longer-term structural diversity.

3. Determine the timing and extent of manipulation necessary for maintaining multi-successional riparian habitat at the appropriate scale. Based on the collected data from this research, potential areas and extent of manipulation for future areas may be predicted so that proper timing and budgeting for management can be more controlled and proactive. Funds for actual management action for conservation areas will be provided through each specific conservation area's work plan.

Previous Activities: N/A

FY12 Accomplishments: New start in FY13.

FY13 Activities: A literature review will be completed and preliminary protocol development will begin. Current relevant literature on riparian stand thinning/manipulations will be reviewed to determine the best approaches for achieving the desired habitat structure and determine the measured parameters needed to indicate success. Information from the literature regarding best approaches for assessing habitat diversity in different structure types may also be employed to identify study sites with low structural diversity, and or those with later successional stages of growth.

A plan and protocol to test methods will be drafted following the literature search. Since the Conservation Areas are relatively young and undergoing rapid changes, manipulation of the habitat may be premature at this time. However, development of appropriate tools that are ready for implementation in anticipation that these tools will be needed in the future for maintaining structural diversity at the sites is recommended.

Proposed FY14 Activities: Potential management tools will be identified for further evaluation. Further research will be conducted on the feasibility of implementing habitat management strategies when conditions within created habitat warrant their use.

Pertinent Reports: N/A

Work Task C61: Evaluation of Alternative Stocking Methods for Fish Augmentation

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$0	$150,000	$150,000	$150,000

Contact: Jim Stolberg, (702) 293-8206, jstolberg@usbr.gov

Start Date: FY14

Expected Duration: FY18

Long-term Goal: To improve survival of fish stocked under the Fish Augmentation Program.

Conservation Measures: RASU3, RASU5, RASU6, BONY3, BONY5

Location: The Lower Colorado River within the LCR MSCP planning area, including reservoirs and connected channels from Lake Mead downstream to Imperial Dam.

Purpose: To evaluate the effects alternative stocking methods have on survival of RASU and BONY stocked within the LCR MSCP planning area.

Connections with Other Work Tasks (past and future): Related work tasks include B2, B3, B4, B5, B6, C10, C11, C31, C33, C39, C46, D8, and G3.

Project Description: The LCR MSCP Fish Augmentation Program is to provide a total of 660,000 RASU and 620,000 BONY for reintroduction into the Colorado River over a 50 year period. The LCR MSCP is committed to extensive monitoring of these stocked fish, and in accordance with the HCP several monitoring and research elements have been included as part of the Fish Augmentation Program.

This project addresses two of these research elements, including 1) understanding and minimizing adverse effects of stocking, and 2) understanding post-stocking distribution and survival. This work task will evaluate alternative stocking methods for RASU and BONY within the Fish Augmentation Program boundaries. Alternative methods to be evaluated may include stocking during different seasons, stocking at night, stocking cohorts of various quantities, and stocking at specific locations. These alternative methods will generally be evaluated through multiple iterations of paired stockings with one group representing the more traditional stocking and one representing the alternative method being investigated.

In addition to these alternative stocking methods, fish reared by alternative means may also be evaluated through these efforts. These stockings would be done in paired groups and may include fish that have been either flow conditioned or trained to recognize predators. Information regarding post-stocking distribution and survival will be obtained through ongoing research and monitoring work tasks. As information on these stockings becomes available, specific combinations of these alternative stocking methods may also be evaluated.

Previous Activities: N/A

FY12 Accomplishments: N/A

FY13 Activities: This is a new start in FY14.

Proposed FY14 Activities: During FY14 a portion of the RASU stockings taking place in Lake Mohave will be carried out through day and night paired stockings. RASU will be transported by boat or by truck, and stockings at each location will be separated by a minimum of 12 hours with night stockings occurring at least 2 hours after sunset. Stocking cohorts will be a minimum of 500 fish each for the purpose of increasing post-stocking detectability. Monitoring efforts conducted during FY14 and in future years will be used to determine the effectiveness or benefit of night stockings as compared to traditional day stocking events. Additional alternatives to traditional stockings will also be evaluated during the year, and potential opportunities to implement these alternatives will be evaluated as fish become available.

Pertinent Reports: N/A

Work Task C62: Lowland Leopard Frog and Colorado River Toad Habitat and Ecology Study

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$0	$200,000	$200,000	$200,000

Contact: Allen Calvert, (702) 293-8311, acalvert@usbr.gov

Start Date: FY14

Expected Duration: FY20

Long-term Goal: To gather statistically robust data on the ecology and habitat of the lowland leopard frog and Colorado River toad to implement a pilot introduction into unoccupied habitat.

Conservation Measures: LLFR1, LLFR2, LLFR3, CRTO1, CRTO2, and CRTO3

Location: LCR MSCP program area and the Bill Williams River and its tributaries.

Purpose: To determine habitat characteristics and other ecological factors that limit each species distribution which can then be used to determine the feasibility of establishing lowland leopard frog and Colorado River toad in unoccupied habitat, along with implementing a pilot introduction into unoccupied habitat.

Connections with Other Work Tasks (past and future): Preliminary data collected under D12 will be expanded upon in this study.

Project Description: Surveys for these species in the past have located very few populations. Additional habitat surveys need to be collected on multiple populations in order to get a robust sample size for a detailed habitat analysis. This analysis will in turn be used to determine if it is feasible to establish either species in unoccupied habitat.

Researchers will go to known occupied areas for each species and collect detailed habitat information, especially in confirmed breeding areas and where egg masses are found. Vegetation and other habitat variables will be collected on each species' ecological needs such as presence of non-native predators, minimum and maximum water depth and temperature, substrate type (e.g., gravel, sand), water temperature, pH, turbidity, stream discharge, vegetation composition, etc. Due to the Bill Williams River being the only known occupied area (within the program area) for either species, other similar river systems may be surveyed so that the sample size is statistically robust. It is estimated that this will be a three year project.

Previous Activities: N/A

FY12 Accomplishments: This is a new start in FY14.

FY13 Activities: This is a new start in FY14

Proposed FY14 Activities: The study design will be completed. Sites will be selected and presence/absence surveys will begin in February for lowland leopard frogs and at the start of summer monsoons for the Colorado River toad. Habitat analyses will take place as each species is detected to quantify habitat requirements. Surveys will continue through August or until the end of the monsoon season each of the three years of the project.

Pertinent Reports: N/A

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WORK TASKS SECTION D

SYSTEM MONITORING

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Work Task D1: Marsh Bird Surveys

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$35,000	$21,802.58	$200,203.81	$25,000	$25,000	$25,000	$25,000

Contact: Joe Kahl, (702) 293-8568, jkahl@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: System monitoring for marsh birds.

Conservation Measures: MRM1 AND MRM2 (CLRA, BLRA).

Location: Havasu National Wildlife Refuge, Arizona and California.

Purpose: Monitor Yuma clapper rail (CLRA), California black rail (BLRA), and western least bittern (LEBI) along a designated reach of the LCR as part of the inter-agency system monitoring program.

Connections with Other Work Tasks (past and future): Data obtained from F7 may also be used in the marsh bird system monitoring program described in D1. The protocol developed for D1 will also be used for F7.

Project Description: Yuma clapper rail and other marsh bird surveys have been conducted annually since the 1980s by multiple agencies. The LCR MSCP surveys are conducted in the Topock Gorge, Havasu National Wildlife Refuge.

Prior to implementation of the LCR MSCP, a study was conducted to determine whether CLRA surveys could be expanded to a multi-species protocol without compromising CLRA detection rates. Information obtained from this study has produced a multi-species protocol for marsh birds, including the LCR MSCP covered species (CLRA, BLRA, and LEBI). Marsh bird surveys will continue at designated survey points to track detections of covered species utilizing the multi-species protocol.

Previous Activities: Reclamation has monitored CLRA within Topock Gorge since 1996.

FY12 Accomplishments: Marsh bird surveys were conducted between the I-40 Bridge, near Needles, California, and Lake Havasu during March, April, and May 2012. All three covered species were encountered. In April, 54 CLRA were detected, which was the highest count in FY12. There were 23 CLRA detections in March and 53 in May. Detections of LEBI were highest in May with 27; only 1 was detected in March and 18 in

April. Three BLRA were detected in March. This was the only month that BLRA were detected. Data were compiled and entered into the National Marsh Bird database.

FY13 Activities: Marsh bird surveys will be conducted in Topock Gorge and the upper reaches of Lake Havasu using the multi-species marsh bird survey protocol. Data will be submitted to the USFWS. Information obtained through this work task may be used in planning future marsh bird habitat creation activities. Also, Reclamation will retrieve paper copies currently stored by the USFWS and enter historical CLRA survey data into the database.

Proposed FY14 Activities: Marsh bird surveys will be conducted in Topock Gorge and the upper reaches of Lake Havasu and other sites using the multi-species marsh bird survey protocol. Data will be submitted to the USFWS. Information obtained through this work task may be used in planning future marsh bird habitat creation activities.

Pertinent Reports: *Marsh Bird Surveys–2011* and *Marsh Bird Surveys–2012* will be posted to the LCR MSCP website.

Work Task D2: Southwestern Willow Flycatcher Presence/Absence Surveys

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$675,000	$708,540.74	$5,477,322.94	$600,000	$675,000	$675,000	$675,000

Contact: Chris Dodge (702) 293-8115; cdodge@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: System monitoring for southwestern willow flycatcher

Conservation Measures: MRM1, MRM2, MRM4 (WIFL)

Location: Reaches 1-7 along the LCR, the Virgin River between the Virgin River Gorge and Lake Mead, NPS lands in the Grand Canyon below Separation Canyon, and Pahranagat NWR. Life history study sites are located at 1) Pahranagat NWR in east-central Nevada, 2) along the Virgin River at Mesquite, Nevada, 3) along the Virgin River, near Mormon Mesa, Nevada, and 4) Topock Marsh, Havasu NWR, Arizona.

Connections with Other Work Tasks (past and future): Information gathered under this work task, and D3 provide data on SWFL population numbers and demographics along the LCR.

Project Description: Presence/absence surveys are conducted along the LCR from the Southerly International Boundary with Mexico (SIB) to Separation Canyon in the Grand Canyon (excluding Hualapai tribal lands), including the lower Virgin River, lower Bill Williams River, and lower Gila River. Life history and cowbird control studies are conducted at four known breeding areas.

Previous Activities: Presence/absence surveys and life history studies for SWFL have been conducted along the LCR since 1996.

FY12 Accomplishments: Presence/absence surveys were conducted at 59 sites along the LCR and its tributaries in 2012. Life history studies were conducted at the following sites: Pahranagat NWR, Nevada; Mesquite, Nevada; Mormon Mesa, Nevada; Muddy River, Nevada; Topock Marsh, Arizona; and Bill Williams NWR, Arizona. Sites have not been surveyed in the Grand Canyon since 2009 due to low water and inaccessibility. Surveys in the Grand Canyon will be discontinued until water levels rise to a point where access is once again possible.

Activities included banding, nest monitoring, extensive vegetation analysis, and microclimate analysis. Brown-headed cowbird trapping studies were discontinued after 2007, but information from life history studies were utilized to determine effectiveness of post-trapping.

Willow flycatchers were detected on at least one occasion at 38 sites. Resident or breeding SWFLs were detected at 11 sites within the following five study areas: Pahranagat NWR, Mesquite, Mormon Mesa, Muddy River, Topock Marsh, and Bill Williams River NWR. No flycatcher detections were recorded at any sites south of Bill Williams River NWR after June 20, 2012, and no breeding was confirmed south of Bill Williams River NWR.

Water levels at Topock Marsh have been lower since 2010 and the numbers of flycatchers breeding in the area have declined over the previous two years. Water levels at the marsh increased from the levels in 2010 and 2011 but lower than those recorded from 2006 to 2009 when more SWFL were breeding in the area. In 2012, only one resident bird was detected, but this bird spent most of the breeding season at the Beal Restoration Site. It was first detected near Topock Marsh in habitat occupied in previous years and then moved to Beal where it was detected singing into late July. The bird was identified as a bird originally banded as a fledgling at Bill Williams River/Planet Ranch Road in 2010. This is the first bird to be present at a restoration site for a long enough period to be classified as a resident and territorial bird. The bird was a male and did not find a female to pair with and, therefore, did not attempt to breed.

A total of 21 adult flycatchers were captured in 2012; 13 were new captures, and 8 were banded in previous years and were recaptured. An additional 38 adults banded in previous years were resighted. A total of 26 nestlings from 12 nests were banded. A total of 51 territories were recorded with 36 territories consisting of paired flycatchers, 1 pair that did not demonstrate breeding activity, and 14 consisting of unpaired individuals. Of the 95 resident adult flycatchers identified to individuals in 2011, 52 (55%) were located in 2012; 6 (12%) were detected at a different study area from where they were last detected in 2011. Of the 36 banded juveniles from 2011, 9 (25%) were identified in 2012. Twenty-one individuals originally banded as nestlings in previous years were identified for the first time in 2012.

Nest success was calculated for 38 SWFL nests. Sixteen (42%) nests were successful and fledged young, 22 (58%) failed. Depredation was the major cause of nest failure, accounting for 43% of all failed nests and 59% of nests that failed after flycatcher eggs were laid. Brown-headed cowbird brood parasitism was observed in 5 of 34 (15%) nests with eggs and known contents.

Defoliation of salt cedar by salt cedar beetles occurred at the Mormon Mesa site much earlier than in 2011. Extensive defoliation was noted along the entire Virgin and Muddy Rivers by late May. A similar number of pairs attempted to breed at the site in 2012 as compared to 2011, but the fecundity rate and nest abandonment rate was much higher in 2012 at Mormon Mesa after defoliation. All breeding occurred in the remaining native

habitat, and the defoliated salt cedar seemed unsuitable for breeding. This site will continue to be monitored to determine if this population will decline in numbers.

FY13 Activities: A new five-year contract will be awarded to conduct SWFL surveys and demography studies along the LCR in January of 2013. Presence/absence SWFL surveys will be conducted at approximately 40-60 sites, in 15 study areas, along the Virgin River, and the LCR. Areas in the southern portion of the LCR will not be surveyed in 2013 to allow for the development of a database for all SWFL data, which will be incorporated into the LCR MSCP database. Grand Canyon below Separation Canyon will not be surveyed in 2013.

Life history studies are being conducted at Mesquite, Mormon Mesa, and Topock Marsh. Pahranagat NWR surveys will be discontinued. Activities include banding, nest monitoring, and microclimate analysis. The brown-headed cowbird trapping study was completed in 2007, but post-trapping data will continue to be collected.

Proposed FY14 Activities: Presence/absence SWFL surveys will be conducted at approximately 40-60 sites, in 15 study areas, along the Virgin River and the LCR. Sites below Parker Dam will again be surveyed with half of those sites being surveyed in 2014 and the other half in 2015. After 2015, these sites will be surveyed once every three years.

Pertinent Reports: *Southwestern Willow Flycatcher Surveys, Demography, and Ecology along the LCR and Tributaries, 2012* and *Southwestern Willow Flycatcher Surveys, Demography and Ecology along the Lower Colorado River and Tributaries, 2008-2012. Summary Report* are both posted on the LCR MSCP website.

Work Task D3: Southwestern Willow Flycatcher Habitat Monitoring

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$90,000	$111,833.44	$647,595.21	$90,000	$0	$0	$0

Contact: Chris Dodge, (702) 293-8115, cdodge@usbr.gov

Start Date: FY05

Expected Duration: FY12

Long-term Goal: Monitor the effects of reduced flows and the associated reduction in groundwater table, specifically associated with the SIA, on southwestern willow flycatcher breeding habitat between Parker and Imperial dams.

Conservation Measures: MRM1, MRM2 (WIFL).

Location: Reaches 4 and 5, California and Arizona.

Purpose: Monitor SWFL habitat conditions until 5 years after implementation of all water transfers covered under the SIA.

Connections with Other Work Tasks (past and future): This work task, in conjunction with surveys conducted under D2, will provide information necessary for the Existing Habitat Maintenance (H1). Data collected may also be used in future habitat creation projects listed under Section E.

Project Description: In 2001, Reclamation received a BO on the SIA for the change in point of diversion of up to 400,000 acre-feet of water between Imperial and Parker dams. This work is being implemented through the LCR MSCP. Reduced river flows, created by the change in the point of diversion, may affect SWFL breeding habitat located between these two dams.

In 2005, Reclamation began monitoring 372 acres of SWFL breeding habitat to document changes in habitat conditions specifically attributable to covered SIA activities, and will continue to do so until 5 years after implementation of all water transfers covered under the SIA.

In FY12, Reclamation received a letter from the USFWS stating that its obligation under the SIA BO has been fulfilled and habitat below Parker Dam no longer needs to be monitored. This work task was closed FY12.

Previous Activities: In 2004, Reclamation identified 372 acres of SWFL habitat between Parker and Imperial dams to monitor for the SIA BO requirements. In each identified site, three to five temperature/humidity data loggers and one groundwater observation well were installed. Soil moisture measurements were collected at each data logger location during each flycatcher survey period. Vegetation data were also collected after the surveys were completed.

The previously identified 372 acres of SWFL occupied habitat at 11 sites, along with two control sites, were monitored between Parker and Imperial dams by collecting and analyzing microclimate data, groundwater monitoring, and vegetation monitoring, using similar protocols to those in place for the life history studies. Daily, weekly, and seasonal cycles in groundwater levels were apparent. Water levels drop during afternoon hours when evapotranspiration is high and on weekends when water releases from Parker Dam decline. Seasonal cycle in groundwater levels mirrors the seasonal fluctuations in river flow. Analysis of groundwater data indicates a strong correlation between piezometer water levels and releases from Parker Dam. Data did not show strong correlations between piezometer water level and soil moisture within the habitat monitory sites.

Each site was monitored for temperature, relative humidity, soil moisture, vegetation, and groundwater. In 2011, data were compiled since 2005 and compared across this period. Results were similar to those found in 2010. Comparisons of microclimate characteristics among years in 2005-2011 at the habitat monitoring sites indicated hotter and more humid conditions in 2006, cooler conditions in 2009, less humid conditions in 2010, and declining further in 2011. These inter-annual changes were similar between test and control sites, suggesting that these changes were regional, rather than being influenced by local conditions. The inter-annual changes in soil moisture in were not similar between test and control sites, with soil moisture declining more sharply at the control sites from 2005 to 2008 and then rising sharply after 2009. This suggests that local conditions, in addition to regional climate, may have influenced soil moisture. Mean daily temperature range and mean maximum diurnal temperature were higher at test sites but lower at control sites in 2008 versus 2007. These metrics decreased sharply in 2009 and then increased in 2010-2011 at both test and control sites, presumably in response to climate conditions during portions of each summer. Thus, there have not been any consistent patterns in the changes in microclimate characteristics at test versus control sites that could be attributed to changes in river flows.

FY12 Accomplishments: The 372 acres of SWFL breeding habitat between Parker and Imperial dams was monitored by collecting and analyzing microclimate data, groundwater monitoring, and vegetation monitoring utilizing similar protocols as those in place for the life history studies.

After discussions with the USFWS a report was written to demonstrate that further monitoring efforts of the 372 acres for vegetation, microclimate and hydrology are not needed. After consulting with the USFWS it was determined that the 372 acres no longer need to be monitored. These sites are not suitable for SWFL breeding and would not be impacted by reductions in flow due to further diversions as soil moisture at the sites is not currently affected by water levels in the river.

FY13 Activities: Closed in FY12.

Proposed FY14 Activities: Closed in FY12.

Pertinent Reports: *Southwestern Willow Flycatcher Surveys, Demography, and Ecology along the LCR and Tributaries, 2012* will be posted on the LCR MSCP website.

Work Task D5: Monitoring Avian Productivity and Survivorship

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$250,000	$253,792.34	$2,036,148.17	$250,000	$250,000	$250,000	$250,000

Contact: Joe Kahl, (702) 293-8568, jkahl@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: System monitoring for avian covered species by conducting intensive monitoring of habitat creation sites and sites that typify current conditions along the LCR.

Conservation Measures: MRM1, MRM2 (WIFL, YBCU, ELOW, GIFL, GIWO, VEFL, BEVI, YWAR, SUTA).

Location: Cibola NWR Unit #1, Cibola Valley Conservation Area and Beal Lake Conservation Area.

Purpose: To collect intensive, site-specific data on avian species demographics, physical condition, species composition and diversity, and site persistence at existing and created habitat sites.

Connections with Other Work Tasks (past and future): Data from this work task are used in conjunction with data collected from the system-wide bird monitoring program (D6) to monitor overall bird use of the LCR. Data collected at MAPS (Monitoring Avian Production and Survivorship) stations located at habitat creation sites may also be used for post-development monitoring.

Project Description: This project intensively monitors habitat creation sites and sites that represent habitat typically found along the LCR for avian use. Banding collects more detailed information about avian species use patterns and demographics. This site-specific data can be used to characterize habitats and, along with less intensive, widespread monitoring methods, is used to monitor habitat use, population trends, and demographics of avian species along the LCR.

The MAPS program monitors avian populations, using a standardized protocol, throughout the United States, Canada, and Mexico. Long-term population trend data are collected by conducting intensive banding throughout the breeding season. Data collected are analyzed by the Institute for Bird Populations (IBP), and long-term population trends are determined on a regional and continental level. Population trends can be more readily

determined by using a national database as larger databases have increased statistical power that cannot be economically duplicated at a site-specific level.

In 2002, prior to LCR MSCP implementation, Reclamation established a MAPS station (CIBO) at the Cibola Nature Trail Demonstration site on Cibola NWR. In 2005, an additional MAPS station (HAVA) was established on Havasu NWR, at the New South Dike, in mixed cottonwood-saltcedar habitats. These sites provide data from different reaches of the LCR and from different habitat types to allow comparisons between habitat creation sites and other areas more typically found along the LCR. The IBP recommends conducting MAPS stations a minimum of 5 years to acquire site-specific data. After 5 years, each site will be evaluated and a decision will be made to continue, discontinue, or move the MAPS station to a new location.

Previous Activities: Winter banding was conducted from 2002 through 2005 at the Pratt restoration site (PRAT) near Yuma, AZ, at the Cibola Nature Trail site from 2002 to 2011, and at the Havasu NWR site (HAVA) from 2005 to 2009. Fall migration banding was conducted at PRAT and CIBO from 2002 to 2005. Summer MAPS banding has been conducted at the CIBO site since 2002 and at the HAVA site from 2005 to 2008. A MAPS station (HERO) was run for 5 years on Colorado River Indian Tribe lands, near Headgate Rock Dam (2000-2004), in mixed native and nonnative habitat. A site at the delta of the Colorado River (CRLM) at Lake Mead National Recreation Area was established in 2002 but abandoned the next year because of loss of habitat due to dropping water levels. Color banding target species such as Bell's vireo, yellow warbler and summer tanager was initiated in August 2008 at the banding sites to monitor site persistence during the breeding and winter banding seasons.

In late September 2008, a fire occurred at the Havasu NWR site (HAVA) and burned a significant portion of it. This site (HAVA) was last used for winter banding in 2008-2009 and was abandoned as a MAPS site. A new MAPS site (BERS) was selected at the Beal Lake Conservation Area also on Havasu NWR and started operating in 2009. In 2011, a MAPS site at the Cibola Valley Conservation Area (CVCA), Phases 1 & 2, was added.

Data on fall migration and winter use were also being recorded using an adapted MAPS protocol similar to protocols from migration banding projects throughout the West and the MOSI protocol that is used in Mesoamerica. Data from these surveys will help define habitat use by birds during the non-breeding season. Winter banding was discontinued in 2011.

FY12 Accomplishments: During the summer, banding was conducted at 3 conservation areas using the MAPS protocol. Banding was conducted for 5 hours a day, beginning 1 half-hour before sunrise. Banding was conducted once every 10-day period, at each site, for a total of 10 days of banding. During the breeding season, there were a total of 252 captures at the Cibola site, 194 total captures at the Beal site and 214 captures at the Cibola Valley site.

Three LCR MSCP listed species were captured and color banded. They were yellow warbler (three at CIBO, three at CVCA and two at the BERS), summer tanager (one at BERS), and Bell's vireo (three at BERS). One Bell's vireo was target netted and color banded at the Beal site during the MAPS season. One yellow warbler was recaptured at CVCA which was color banded earlier this year at CIBO. Two yellow warblers, two Bell's vireos, and one summer tanager were recaptured at BERS. Re-sightings of a Bell's vireo and a summer tanager were made at the Beal site during the MAPS season. Through re-sightings and recaptures at the Beal site, it was determined that the first pair of summer tanagers color banded in 2009 still were present in 2012. A single southwestern willow flycatcher was observed on a territory at the Beal site from June 15 to July 17; it did not nest. Two migrant willow flycatchers were banded at CIBO on June 5. A total of four migrant willow flycatchers were banded at CVCA on May 6 (2), and 14, and June 23. Migrant willow flycatchers were banded at BERS on May 17 and 24. A yellow-billed cuckoo was heard at the Cibola site on July 17; several were heard at the Cibola Valley site from July 11 thru July 26. At the Beal site, yellow-billed cuckoos were heard on July 12 and 27.

FY13 Activities: The MAPS banding stations will continue at all three sites during the 2013 breeding season. Color banding of LCR MSCP covered species will continue to be implemented to increase the effective recapture rate. A visual identification of a color-banded bird qualifies as a recapture for statistical purposes. Restoration sites such as PVER will be reviewed as potential banding stations.

Proposed FY14 Activities: Breeding season monitoring will continue in 2014. Information obtained will be used for the system monitoring program and to inform habitat creation projects listed in Section E.

Pertinent Reports: The 2011 MAPS Summary Banding Report and 2012 MAPS Summary Banding Report will be posted to the website.

Work Task D6: System Monitoring for Riparian Obligate Avian Species

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$280,000	$465,205.66	$1,338,781.77	$400,000	$400,000	$400,000	$400,000

Contact: Beth Sabin, (702) 293-8435, lsabin@usbr.gov

Start Date: FY06

Expected Duration: FY55

Long-term Goal: System monitoring for avian covered species

Conservation Measures: MRM1, MRM2 (ELOW, GIFL, GIWO, VEFL, BEVI, YWAR, SUTA)

Location: System-wide

Purpose: Monitor riparian obligate avian species covered under the LCR MSCP to document long-term population trend and habitat use.

Connections with Other Work Tasks (past and future): Information obtained through this work task will be used to conduct system monitoring for avian covered species. Data collected during post-development monitoring of habitat conservation areas (F2) may also be used in this work task. Information obtained through this work task will also be used in association with C24 to help define habitat requirements for riparian obligate bird species. Information obtained through this work task will be used in work tasks D2, D7 and D13 that monitor single avian species (SWFL, YBCU and ELOW).

Project Description: The LCR MSCP includes nine neo-tropical migratory bird species. It is inefficient to monitor every covered species individually throughout the entire LCR MSCP planning area. Many bird populations can be monitored effectively using multi-species survey protocols. The six LCR MSCP covered species are gilded flicker, Gila woodpecker, summer tanager, vermilion flycatcher, Sonoran yellow warbler, and Arizona Bell's vireo. Avian system monitoring protocols have been developed that can incorporate data into a coordinated bird monitoring network. Data from the LCR can be incorporated into a larger, regional database, which makes the data more powerful during analysis. Population trends can be derived over time, thus enabling Reclamation to monitor existing avian populations. The avian multi-species protocol described below is designed to monitor six LCR MSCP covered species as well as non-covered neo-tropical migratory bird species.

Single-species surveys for the elf owl are necessary due to the nocturnal nature of this species and its rarity along the LCR. Beginning in FY2013 elf owl system wide monitoring will be under a separate work task.

Previous Activities:

Multi-Species Bird Surveys. In 2005-06, existing vegetation, characterized using the Anderson and Ohmart classification system, was stratified and random point-count transects were established and conducted. After reviewing data collected during the 2005-06 breeding seasons, the monitoring plan shifted to a double sampling technique in 2007. System-wide avian monitoring was conducted during the 2007-2011 breeding seasons utilizing a double sampling rapid/intensive area search protocol. This protocol was utilized to provide density estimates of the six focal species and other common species in the LCR MSCP planning area.

In 2010, a final project report was written for system wide monitoring from 2008-2010 during the study plan and field protocol development stage. In 2011, monitoring continued according to the final sampling plan and field protocol developed in 2010.

A three year study was initiated to test the assumption of unbiased estimation during intensive area search surveys in 2011. The three goals of the study were: 1) evaluate the assumption that unbiased estimates are being obtained during intensive area search surveys; 2) estimated the average error rate being made during intensive area search surveys and determine if differences in error rate exist between species or habitats; 3) suggest improvements to intensive area search survey methods to achieve higher accuracy, if any are needed.

Elf Owl Surveys. Twenty-one survey sites and 45 single call stations in suitable habitat in the LCR MSCP planning area were selected to be surveyed for elf owls in 2008-2010. Suitable habitat was defined as historical locations, incidental sightings, and HMIII, CWI, and CWII habitat. Surveys were conducted from 27 March to 1 May of each year, and used a tape-playback presence-absence survey protocol. One elf owl was detected near Blankenship Bend.

FY12 Accomplishments:

Multi-Species Bird Surveys. Funds were pre-obligated for work expected in FY13; thus, FY13 obligations should decrease. System wide surveys were conducted according to the final sampling plan and following the same sampling field protocol used in 2007-2011. In 2012, 80 plots were randomly selected, using the 2010 GIS plots layer. Each rapid area search plot was surveyed twice in 2011; one plot was surveyed between early-April and mid-May and the other plot was surveyed between mid-May and Mid-June. A random subsample of eight plots was surveyed intensively to determine actual numbers of breeding birds present in each plot. Each intensive area search plot was surveyed eight times between 1 April and 16 June 2011. Data from intensive surveys and rapid surveys were combined to provide detection ratios and density estimates for the six focal species and other common species in the LCR MSCP planning area for FY12. In 2012, the

season started one to two weeks earlier than the previous years but ended at the same time. This change was made to more accurately estimate the population of early-nesting species. Changes were made to improve crew training and add additional management oversight.

During system-wide rapid surveys in FY12, 161 species were recorded. Of these, 88 species were territorial breeders, 11 were non-territorial breeders and 126 were migrants or non-breeders. During system-wide intensive surveys, 141 species were recorded. Of these, 31 species were territorial breeders, 6 non-territorial species, and 44 were migrants or non-breeders. The population estimates for the number of territories of focal species in the LCR MSCP planning area from 2012 were: 1) Arizona Bell's vireo (1069), 2) Sonoran yellow warbler (717), 3) Gila woodpecker (402), 4) summer tanager (199), and 5) Vermilion flycatcher (0). There was one breeding gilded flicker detected near Alamo Lake, in the Bill Williams River. The bird's territory was mostly outside the plot in upland habitat. The bird was not nesting within the plot but it was foraging within the plot.

In FY12, a more extensive data management protocol was implemented to improve the management and quality of the data. Data forms in Microsoft Access were created for data input for the project and tested during the field season. All FY12 data was entered into these forms. These data forms improved the quality of the data and allow the data to be directly uploaded to the MSCP data base. Queries were created within the data forms to automate data analysis and transfer files to the DS program.

The second year of a study to test the assumption of unbiased estimation during intensive area search surveys was completed. Eight plots were surveyed to contribute to a 3 year total sample size of 24 plots. The two years of data collected so far shows that estimation rates during intensive studies for the majority of riparian obligate birds are between 70 to 100%. The Gila woodpecker, Sonoran yellow warbler and Arizona Bell's vireo show rates that are between 83% and 98%.

Elf Owl Surveys. No system-wide surveys for elf owls were conducted in 2012 while protocols were developed under C36.

FY13 Activities:

Multi-Species Bird Surveys. Area searches will be conducted during the breeding season following the double sampling intensive/rapid area search protocol used in previous years. A new set of 80 rapid area search plots will be randomly chosen from the 2010 plots layer using a stratified random sampling design. Two rapid surveys will be conducted per plot during the breeding season. Eight of these plots will be surveyed intensively with each plot being surveyed eight times during the breeding season.

The third year of the study to test the assumption of unbiased estimation during intensive area search surveys will be implemented and recommendations to improve survey methods will be made.

Bird surveys will be initiated in SWFL breeding habitat at sites such as Mormon Mesa, Overton WMA Topock Marsh and the Bill Williams in order to determine potential effects of beetles on breeding populations of LCR MSCP species before the beetles arrive in the lower river valley. The surveys would be conducted using the same methodology used for system-wide riparian surveys. In order to minimize excess disturbance of any breeding taking place at the sites we would limit surveys to rapid surveys within SWFL habitat so that only 2 surveys would be conducted. The rapid survey data from the SWFL sites could then be compared to the data collected as part of the system-wide effort to calculate a density estimate of the riparian bird species present at SWFL breeding sites. Sixty plots will be surveyed using rapid area searches; 30 plots will be selected from SWFL sites on the Virgin River and 30 plots will be selected from SWFL sites in Topock Marsh and the Bill Williams NWR.

Proposed FY14 Activities: System-wide area search surveys for riparian obligate species including the six focal species will continue in FY14. Area searches will be conducted during the breeding season of FY14 following the double sampling intensive/rapid area search protocol used in previous years. A new set of 80 rapid area search plots will be randomly chosen from the 2010 plots layer using a stratified random sampling design. Two rapid surveys will be conducted per plot during the breeding season. Eight of these plots will be surveyed intensively with each plot being surveyed eight times during the breeding season. Bird surveys in the SWFL habitat will continue.

Pertinent Reports: *Report on the Lower Colorado River Riparian Bird Surveys 2011,* and *A Sampling Plan for Riparian Birds of the Lower Colorado River—Final Report* are posted on the LCR MSCP website.

Work Task D7: Yellow-Billed Cuckoo Presence/Absence Surveys

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$550,000	$563,565.52	$3,478,668.94	$550,000	$650,000	$650,000	$650,000

Contact: Barbara Raulston, (702) 293-8396, braulston@usbr.gov

Start Date: FY06

Expected Duration: FY55

Long-term Goal: Acquire yellow-billed cuckoo data as part of the system monitoring program.

Conservation Measures: MRM1, MRM2 (YBCU).

Location: General presence/absence surveys are conducted in approximately 55 sites of suitable habitat within the LCR MSCP project boundary.

Purpose: Conduct surveys to determine existing yellow-billed cuckoo (YBCU) populations along the LCR from the Grand Canyon to the Southerly International Boundary with Mexico and monitor long-term trends.

Connections with Other Work Tasks (past and future): Work Task C37 measured the hydrologic conditions preferred by southwestern willow flycatcher and yellow-billed cuckoo. Data collected in this work task will be utilized in the YBCU modeling being conducted under C24.

Project Description: Yellow-billed cuckoo utilize cottonwood-willow habitat and may act as an umbrella species for other covered avian species that use these mature habitats. Existing YBCU populations and habitat are being determined along the LCR as systematic surveys are conducted over the project area. This work task assesses existing YBCU populations and evaluates required habitat characteristics. Data collected on vegetation characteristics of occupied sites are used to design habitat creation sites for YBCU and recommend future demographic studies necessary to understand more about the YBCU populations along the LCR.

Previous Activities: The YBCU life history and monitoring studies began in FY06. Prior to the creation of riparian habitat under the LCR MSCP, the only large breeding population of cuckoos was on the BWRNWR, with few scattered pairs elsewhere on the LCR. Within the past five years, in addition to the BWRNWR, multiple pairs of cuckoos have been confirmed breeding at PVER, CVCA, and ‘Ahakhav Tribal Preserve, with

occasional pairs at HNWR, INWR and CNWR, in addition to detections at other sites on the LCR. Nesting has also been confirmed as late as September at some sites.

FY12 Accomplishments: In FY12, monitoring and research activities continued. Surveys were conducted system-wide and at all restoration sites. Activities included presence/absence surveys, vegetation monitoring, microclimate data collection, telemetry, nest searching, and monitoring and prey studies.

Call-playback surveys were conducted for yellow-billed cuckoos at sites within the LCR MSCP area in potentially suitable habitat. Surveys were conducted at 49 sites along the Muddy, Virgin, Bill Williams, Gila, and lower Colorado rivers, including LCR MSCP restoration sites that contained appropriate habitat. Cuckoos were detected 282 times during the breeding season, representing an 80 potential breeding pairs. Thirty confirmed breeding territories were located at the following sites: Bill Williams River NWR (1), Palo Verde Ecological Reserve (24), Cibola Valley Conservation Area (3), and the Cibola Crane Roost site at Cibola National Wildlife Refuge Unit #1(2). Twenty-eight nests were found and monitored.

Thirty-seven adults were captured, with 33 newly color-banded and 4 recaptured from previous years. Twenty-three young from 11 nests were also color-banded. Five new dispersal events were recorded, supporting continued evidence of high male site fidelity. Four adults all returned to their previous breeding sites (one at CVCA and three at PVER. A returning banded nestling also returned to her natal area (PVER). One female fitted with a geo-locator in 2011 (in order to monitor movement year-round) returned to the area where she was captured and was recaptured. Data are still being analyzed on her activities over the year. Twenty-eight adult cuckoos were radio-tracked, with 27 of these tracked for at least 2 days. Tracked birds had home ranges estimates of 28.4 acres. Micro-climate monitoring indicated nest locations were more humid and had significantly cooler diurnal temperatures compared to available habitat, supporting results from previous years.

The current survey protocol was evaluated and suggests that changes to the timing of surveys during the peak period of reproduction would improve detection of cuckoos: there will now be three surveys in July, rather than two, with one survey in June and one in August. The wide-ranging behavior and lack of strict territory boundaries of cuckoos precludes the confirmation of nesting with surveys alone. Instead, criteria defining “possible”, “probable”, and “confirmed” nesting have been developed based on survey results combined with observed behaviors of cuckoos.

FY13 Activities: Activities in FY13 will involve the solicitation of a new contract to continue work similar to previous years, as 2012 was the final year for the project under the existing contract.

Proposed FY14 Activities: Work will continue as in previous years and include presence/absence surveys, nest monitoring, banding and habitat surveys.

Pertinent Reports: *Yellow-billed Cuckoo Distribution, Abundance, and Habitat Use on the Lower Colorado River and Tributaries, 2011 Annual Report* has been posted to the website and the 2012 report will be posted when final.

Work Task D8: Razorback Sucker and Bonytail Stock Assessment

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$575,000	$624,518.66	$3,433,712.00	$675,000	$675,000	$675,000	$675,000

Contact: Ty Wolters, (702) 293-8463, twolters@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Conduct long-term system monitoring of RASU and BONY

Conservation Measures: RASU6 and BONY5

Location: Lower Colorado River within the LCR MSCP planning area, including reservoirs and connected channels, from Lake Mead downstream to Imperial Dam.

Purpose: Supplement and maintain sufficient knowledge and understanding of RASU and BONY populations within the LCR MSCP planning area to have an effective AMP.

Connections with Other Work Tasks (past and future): Monitoring data for RASU and BONY have been or will be gleaned from work accomplished under C8, C12, C13, C15, F5, and G3.

Project Description: This project collects and organizes RASU and BONY population and distribution data to maintain up-to-date, system-wide, stock assessments for these species. Data acquisition work is accomplished by one of two strategies: 1) gleaning information from ongoing fish monitoring and fish research activities, and 2) direct data collection through field surveys within the LCR MSCP planning area not covered by other work tasks.

Work routinely includes trammel netting and electro-fishing, but visual surveys using Reclamation's helicopter are periodically conducted, as well as surveys using specialized equipment and techniques (e.g., aerial and underwater photography and video recordings). Costs described under this work task are for salary, travel, and materials necessary for Reclamation staff to accomplish this work. Project costs include all costs associated with conducting field surveys, gleaning or capturing data from ongoing research actions and monitoring programs (both internal and external to the LCR MSCP), transfer of these data into record archives, and organizing these data into a cohesive report.

Previous Activities: Reclamation has cooperatively conducted fish surveys with Nevada and Arizona on Lake Mead each fall since 1999, and has provided funding and support to the Lake Mead Razorback Study (C13) since 1995. Interagency cooperative native fish roundups have been occurring since 1987 on Lake Mohave and since 1999 on Lake Havasu (including the river reach below Davis Dam). Fish monitoring in Reach 2 was previously conducted under Demographics and Post-Stocking Survival of Repatriated Razorback Suckers in Lake Mohave (C12), which ended in 2011. Fish monitoring on Reaches 4 and 5 was previously conducted as part of the Razorback Sucker Survival Study (C8), which ended in 2008.

FY12 Accomplishments: Accomplishments for this work task have been summarized by river reach.

Reach 1 (Lake Mead). Reclamation, in cooperation with the AGFD, NDOW, and NPS, conducted annual fall surveys of Lake Mead. Participating agencies were responsible for sampling Boulder Basin, Virgin Basin, Gregg Basin, and the Overton Arm. Techniques employed in this lake wide effort included gill netting and electro-fishing and resulted in the capture of over 1,500 fish including 13 different species. Two species of native fish were captured during this effort including 3 RASU and 4 FLSU. Of the three RASU contacted, two were new captures and one was a recapture.

Collection of wild-born RASU larvae took place at all major spawning sites (Las Vegas Bay, Echo Bay, and the Muddy River/Virgin River inflow) over the course of the spawning season. This effort yielded 274 larvae from Las Vegas Bay, 439 larvae from Echo Bay, and 4 larvae from the Muddy River/Virgin River inflow area for a lake wide total of 717 larvae. Approximately 400 larvae were subsequently delivered to the Lake Mead State Fish Hatchery (B6) for rearing. An additional 75 were retained for genetic analyses with the remaining being returned to the lake.

Monitoring of the Lake Mead RASU population also continued. Tracking of sonic-tagged fish continued to gather information on habitat use and movement patterns of RASU, and data obtained from monitoring sonic-tagged fish provided valuable information including the general location of RASU populations, the location of spawning sites, and the movement patterns of RASU within and between spawning areas. Trammel netting surveys conducted during the spawning season resulted in the capture of 53 total RASU, with 18 coming from Echo Bay, 2 from Las Vegas Bay, and 33 from the Muddy River/Virgin River inflow area. Of the 53 RASU captured, 20 were recaptured fish. The remaining 33 captured RASU were new wild fish captured in the Muddy River/Virgin River inflow area. Aging information was obtained from 35 RASU during the 2012 study year bringing the total number of RASU aged as part of the long-term monitoring program to 395. The evaluation of fin-ray sections removed from captured fish continues to suggest ongoing and recent recruitment in Lake Mead.

A pilot sonic telemetry study to monitor the movement and habitat preference of juvenile RASU was also initiated in FY12 as part of this work task, which was responsible for the increase in funding. A total of 4 juvenile fish were implanted with sonic tags and tracked

through the study year. When fish were located, information regarding water quality, substrate composition, and vegetation was collected. This study will continue under a separate work task in FY13 (Work Task C57) with the goal of identifying what conditions may be allowing for natural recruitment of RASU in Lake Mead.

Reach 2 (Lake Mohave). Reclamation successfully repatriated 12,793 RASU into Lake Mohave in calendar year 2012. This is an increase from the number of RASU stocked in 2011 (7,687) and above the targeted 6,000.

Following the completion of Work Task C12, monitoring of Reach 2 is now accomplished through a contract which resulted in an increase in funding during FY12. Lake-wide surveys for native fish were conducted using both trammel netting (44 net nights, 47 RASU contacted) and electro-fishing (274 seconds, 12 RASU contacted) techniques. Remote sensing was expanded in 2011 to include the lotic portion of Lake Mohave upstream of Willow Beach. New advances in remote PIT tag antennae design allowed for sampling in the high flow conditions of that reach, thereby contacting a significant number of RASU that had been previously undetected through other sampling methodology.

In 2012, a total of 46,855 remote sensing contacts were recorded lake-wide (9,241 for 2011) with 19,813 (3,134 in 2011) representing 1934 (730 in 2011) RASU coming from the reach above Willow Beach with an effort of 4397 hours of scan time (1,987 hours in 2011) and 27,042(6,107 in 2011) contacts representing 854 RASU(321 in 2011) with an effort of 3996 hours of scan time (1,275.5 hours in 2011) throughout the rest of Lake Mohave for a total of 2,748 individual RASU contacted with 8,393 hours of scan time compared with 1,044 individual RASU in 3,262.5 hours in 2011. 40 RASU were contacted in both the lentic and lotic sections of the lake compared with 7 for 2011.

Netting and electro-fishing contact data were analyzed under Demographics and Post-Stocking Survival of Repatriated Razorback Suckers in Lake Mohave (C12) resulting in the current population estimate of 2,577 adult RASU, compared with the population estimate for 2011 of 2,979 adult RASU and 1,463 adult RASU for 2010.

Annual RASU (May and November) roundups were conducted. Bimonthly helicopter surveys were conducted to verify presence of RASU on known spawning beds and to search for new spawning congregations during the spawning season. A total of 25,003 RASU larvae were collected and delivered to Willow Beach National Fish Hatchery (B2) for rearing.

Reach 3 (Lake Havasu). A total of 7,683 RASU and 4,000 BONY were released into Reach3 during calendar year 2012, all fish were released with a PIT tag.

Capture/contact data was acquired through work task C33, C39, C45, C53, F5, ongoing multi-agency native fish roundups, and from other annual surveys conducted by LCR MSCP partners. A fall netting survey was conducted through Topock Gorge to look for young native fishes, a total of 111 RASU and 13 BONY were collected. A total of 42

RASU and 0 BONY were contacted during the annual Lake Havasu roundup. Captures of BONY from annual surveys is down this year, compared to the unusually high numbers of FY11. Large numbers of RASU continue to be contacted in the riverine portions near Needles and select backwaters throughout Topock Gorge. Gizzard shad continue to become more abundant and are present in all portions of Reach 3. The remainder of the non-native fish community did not show any significant changes.

The combination of remote PIT scanning and regular sampling methodologies totaled 1,006 razorback contacts in 2012, this is over a 3 fold increase from previous years. This is due to the increase in remote PIT tag scanning associated with work task C33. This increase in contacts resulted in a population estimate of 2,770 individuals, this is nearly double the 2011estimate of 1,400 RASU. The RASU population estimate continues to be refined as survey methods and the analysis are improved. In general, this population has maintained an upward trend and has more than doubled since the beginning of the MSCP.

Reach 4 and 5 (Parker Dam to Imperial Dam). Under the Fish Augmentation Program, 6,629 RASU and 3,821 BONY were stocked into Reach 4. All 6,629 RASU were stocked into the LCR between Parker Dam and Headgate Rock Dam. A total of 3,216 BONY were stocked between Parker Dam and Headgate Rock Dam, and 605 BONY were stocked at Deer Island and Moovalya Marsh on the Colorado River Indian Tribe (CRIT).

An agreement was finalized with the USFWS under Investigations of RASU and BONY Movements and Habitat Use Downstream of Parker Dam (C49), which includes an MOU with the CRIT for stocking and monitoring of native fish on CRIT lands. Field work associated with this work task is scheduled to begin in FY13. Preliminary monitoring continues to contact BONY shortly following their release, as well as a small population of RASU which are assumed to be spawning downstream of Parker Dam.

In Reach 4 a total of six RASU were contacted in Palo Verde Oxbow Lake from previous year's stockings. The numbers contacted are too low to generate a population estimate for this reach. In Reach 5 remote PIT scanners were used to monitor population size and habitat association of BONY and RASU at Imperial Wildlife Refuge. Adult BONY population estimates ranged from 53 (March 2012) to 11 (August 2012). Adult RASU population estimates ranged from 131 (January 2012) to 103 (August 2012). No larval BONY or RASU were encountered, but juvenile RASU were captured and the population of new recruits was estimated at 130 fish.

FY13 Activities: Monitoring data will be collected for Reaches 1 through 5. Information will be gleaned from ongoing fish research activities as well as through fish monitoring field work. Field work will include trammel netting, electro-fishing, remote sensing of PIT-tagged fish, and active and passive tracking of sonic-tagged fish.

Proposed FY14 Activities: Monitoring will continue in all reaches as previously outlined, and LCR MSCP staff will continue to participate in multi-agency field surveys.

Pertinent Reports: The *Razorback Sucker Studies on Lake Mead, Nevada and Arizona 2011-2012 Final Annual Report,* the *2012 Lake Mohave Razorback Sucker Monitoring Annual Report*, and the *Movements of Sonic Tagged Razorback Suckers Between Davis and Parker Dams (Lake Havasu) Final Report* will be posted to the LCR MSCP website following review.

Work Task D9: System Monitoring and Research of Covered Bat Species

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$150,000	$188,280.52	$836,042.21	$150,000	$375,000	$375,000	$375,000

Contact: Allen Calvert, (702) 293-8311, acalvert@usbr.gov

Start Date: FY04

Expected Duration: FY55

Long-term Goal: System monitoring and species research will be conducted for LCR MSCP bat species to determine distribution and to evaluate habitat implementation success.

Conservation Measures: MRM1 (WRBA, WYBA, CLNB, PTBB) WRBA1, and WYBA1.

Location: System-wide along the Lower Colorado River below Hoover Dam.

Purpose: To conduct system monitoring and research for the distribution of covered bat species utilizing roost surveys, acoustic survey techniques, and capture techniques.

Connections with Other Work Tasks (past and future): System monitoring data will be used in conjunction with post-development monitoring (F4) to determine habitat needs and characteristics of covered bat species. Data collected will be used in future habitat creation projects listed in Section E.

Project Description: Several survey techniques will be utilized to detect covered species or provide equivalent data using indicator species. Acoustic surveys, conducted with Anabat or Sonobat technology, will be used to identify foraging behavior in native riparian stands for covered bat species. Roost surveys will be conducted to track bat populations and to survey species that are not readily detected by acoustic technology, such as Townsend's big-eared bat and California leaf-nosed bat. Individual bats will be captured using techniques such as mist netting to obtain reference calls for bat identification and to verify reproductive status.

Previous Activities: A Lower Colorado River Bat Monitoring Protocol was produced to assist in the development of a system-wide distribution and demography monitoring plan for covered bat species. A system-wide acoustic monitoring program was implemented through the Arizona Game and Fish Department (AGFD) that coordinated the collection and analysis of acoustic bat data for system-wide monitoring of the LCR. Four permanent

acoustic detector stations were placed along the river and are providing data that may be useful for analyzing migration movements along the river as well as correlating bat activity with environmental variables.

FY12 Accomplishments: The four permanent Anabat monitoring stations continued to operate to provide year-round data. The Bill Williams River NWR station had the most overall calls from LCR MSCP species, though the Mittry Lake station had more western red bat calls and the Picacho State Park station had the most California leaf-nosed bats. The Cibola NWR and Picacho State Park stations did not detect the Townsend's big-eared bat. The total number of LCR MSCP species calls only made up 0.18% of all species calls combined. Outflight counts were conducted at various mines along the LCR including surveys of mines within the vicinity of Planet Ranch in the winter and early summer. These counts will be used to determine trends in California leaf-nosed bat and Townsends big-eared bat populations. The increase in funding was due to additional surveys conducted in the vicinity of Planet Ranch.

FY13 Activities: The four permanent Anabat monitoring stations will continue to operate. Data will be collected and analyzed. Acoustic monitoring will continue as the main survey method for system-wide (non-restoration are) monitoring of the four covered species (especially western red and western yellow bats) into future years. Outflight counts will be conducted at various mines along the LCR including surveys of mines within the vicinity of Planet Ranch in the winter and early summer. These counts will be used to determine trends in California leaf-nosed bat and Townsends big-eared bat populations. Archived California leaf-nosed bat banding data will be compiled and entered into a single database. Archived acoustic data will be organized, analyzed, and compiled so that it may be entered into a single database.

Proposed FY14 Activities: The four permanent Anabat monitoring stations will continue to operate. A fifth permanent Anabat monitoring station will be installed in Reach 3 to reduce the data gap for stations operating in areas other than habitat creation areas. Data will be collected and analyzed. Outflight counts will be conducted at various mines along the LCR including surveys of mines within the vicinity of Planet Ranch in the winter and early summer. These counts will be used to determine trends in California leaf-nosed bat and Townsends big-eared bat populations, as acoustic methods are not as successful In documenting presence due to their low decibel echolocation calls. Outflight counts will continue as the primary survey method for monitoring California leaf-nosed bat and Townsend's big-eared bat populations into future years. Banding and acoustic data will continue to be added to a single database. All historic banding and acoustic data will be archived into the database by FY16.

A study will be initiated to investigate if either mine roosting species (California leaf-nosed and Townsend's big-eared bats) forage at greater distances than what previous research suggests and to identify any additional roosts for either species within foraging distance of the program area. Bats will be radio-tracked starting in during the winter and summer (post-maternity) seasons at roost sites and foraging areas. Average and maximum foraging distances will be determined. If new roosts are discovered, they will

be monitored. Radio-tracking will continue through September during each of the three years of the study.

Pertinent Reports: *Monitoring of Covered and Evaluation Bat Species for the Lower Colorado River Multi-Species Conservation Program, Annual Report, 2011* is posted to the LCR MSCP website.

Work Task D10: System Monitoring of Rodent Populations

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$40,000	$20,104.65	$105,594.36	$40,000	$40,000	$40,000	$40,000

Contact: Allen Calvert, (702) 293-8311, acalvert@usbr.gov

Start Date: FY11

Expected Duration: FY55

Long-term Goal: System monitoring to document presence of possible source populations of LCR MSCP covered rodents along the LCR.

Conservation Measures: AMM1, AMM6, MRM2, DPMO1, CRCR1, CRCR2, YHCR1, and YHCR2.

Location: System-wide along the lower Colorado River, including the Bill Williams River.

Purpose: Implement presence/absence sampling for system monitoring of LCR MSCP covered and evaluation rodent species. This survey is being conducted to determine the extent of the geographic range limits of the covered and evaluation rodent species: Yuma hispid cotton rat, the Colorado River cotton rat, and the desert pocket mouse. Another goal of this survey is to document all possible source populations of immigrants to restoration sites, to the extent practicable. Surveys under this work task are only at non MSCP habitat creation areas. Surveys at MSCP habitat creation areas are conducted under work task F3.

Connections with Other Work Tasks (past and future): System monitoring will be used in conjunction with post-development monitoring (F3) and small mammal research (C27) to determine habitat needs and likely source populations for covered rodent species. Data will be used in future habitat creation project design under Section E.

Project Description: This survey is designed to detect the presence the Colorado River cotton rat and the Yuma hispid cotton rat in an attempt to document populations on or near the LCR. Furthermore, Reclamation will conduct surveys to locate desert pocket mouse habitat that could be affected by LCR MSCP habitat creation-related activities to determine whether the habitat is occupied by this species.

Ecological niche models (ENM) for each of the species will be developed using historic collection data and museum locality information. Ground, boat, and aerial surveys for potential habitat followed by presence/absence trapping will be concentrated in the core predicted areas from the ENM. Surveys will also be conducted in the extreme edges of

each species' range in an attempt to document the outer limits of their respective distributions within the LCR MSCP planning area. Particular attention will be given to the area surrounding the proposed barrier between the two cotton rat species, the Trigo and Chocolate Mountains, to determine if the species are in fact geographically isolated by this barrier. Potential site surveys will be based on the ENM, habitat availability in the area, and expert knowledge. Because cotton rat populations are known to experience extreme cycles, multiple sampling occasions across different years and seasons will be conducted before determining that a species is absent from a particular site. Potential genetic analyses, including karyotyping (genetic analysis) and DNA sequencing, are being investigated to better understand direction and extent of dispersal of *Sigmodon* to the LCR and to clarify the distribution of DPMO.

Previous Activities: Surveys have been conducted in potential Colorado River and Yuma hispid cotton rat habitat within the LCR MSCP program area to determine each species range and collect genetic samples.

FY12 Accomplishments: Surveys were conducted within previously known locations to determine the stability of those populations. Areas surveyed included potential habitat near Yuma, Cibola, Blythe, Needles, and Laughlin. CRCR was found for the first time at the Big Bend Conservation Area along the transition area between marsh, grassland, and shrub habitat. This was the first record in Nevada in over 50 years. CRCR have continued to have been found at Pintail Slough at Havasu NWR, and the PVER accretion bench as well as within most habitat creation areas. Surveys were conducted for the Yuma Hispid Cotton Rat near Yuma East Wetlands. A new location for YHCR was found along the Gila River just east of highway 95.

FY13 Activities: System-wide rodent surveys for covered species will continue. Emphasis will be on aerial and ground surveys for YHCR habitat from the Trigo and Chocolate mountains south to the Mexican border. Other surveys may include the Bill Williams, Gila River, Laughlin area, and northern Lake Mead.

Proposed FY14 Activities: Surveying areas throughout the LCR system to determine the extent of each species' range will continue and potential source populations for colonization of habitat creation areas will be evaluated. Focus this year will be on improving the knowledge of the range and distribution of the Yuma hispid cotton rat. Only a few isolated small populations have been found compared to the Colorado River cotton rat further north. A long-term monitoring plan that is being designed under work task C27 will be finalized and will be implemented in this work task.

Pertinent Reports: Annual reports will be posted on the LCR MSCP website.

Work Task D12: Lowland Leopard Frog and Colorado River Toad Surveys

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$150,000	$238,443.61	$188,324.93	$125,000	$25,000	$25,000	$25,000

Contact: Allen Calvert, (702) 293-8311, acalvert@usbr.gov

Start Date: FY10

Expected Duration: FY17

Long-term Goal: Determine the extant populations of the lowland leopard frog and Colorado River toad along the LCR, and understand their habitat requirements.

Conservation Measures: LLFR1, CRTO1.

Location: Within reaches 3-7 of the LCR MSCP boundary and the Bill Williams River.

Purpose: To better define distribution, habitat requirements, and factors limiting the distribution of the lowland leopard frog and Colorado River toad using a system-wide monitoring approach.

Connections with Other Work Tasks (past and future): Populations that were found during the previous 3 years will be monitored as part of a more detailed habitat analysis (work task C62) that will help determine the feasibility of establishing populations of either species in unoccupied habitat.

Project Description: A system-wide survey for these two species will be conducted along the LCR and the Bill Williams River. It is unknown if any extant populations exist for either species along the LCR. The lowland leopard frog has been observed on the Bill Williams River and surveys will help determine the stability of this population. If it is decided to attempt to establish this species by reintroduction along the mainstem LCR, the Bill Williams River population would be the most likely source. Habitat characteristics will also be gathered in conjunction with surveys where presence of either species is confirmed.

Previous Activities: In FY11, 139 locations were surveyed with only six Colorado River toads being found within Planet Ranch. No lowland leopard frogs were found in the first year, and neither species was detected along the mainstem LCR.

FY12 Accomplishments: Funds were pre-obligated for work expected in FY13; thus, FY13 obligations should decrease. The second year of the project was completed with

184 locations visited. Topock Gorge and the Bill Williams River were the main focus for this year's surveys, though locations were visited throughout reaches 3-7. A robust population of lowland leopard frogs was discovered along the Bill Williams River, just east of Planet Ranch. Frogs were found through all survey periods and breeding was confirmed. Colorado River toads were also found just east of Planet Ranch, mainly in the sandy uplands adjacent to the Bill Williams River. A preliminary habitat analysis was conducted at 21 leopard frog locations and 13 toad locations. Additional non-use habitat data was collected to compare with occupied habitat. Leopard frog habitat was found to contain shallow slow moving water with some emergent vegetation and little to no non-native predators. Colorado River toad habitat was mainly upland sandy desert habitat with a low density of shrubs such as creosote. Some toads were found near water in areas similar to leopard frog habitat. Also, Mexican garter snakes (a candidate for federal listing) were found in the same area of the Bill Williams River. They preferentially prey on amphibians, including the lowland leopard frog. Neither species of amphibian were detected on the mainstem LCR for the second year in a row.

FY13 Activities: The third year of the project will begin and an annual report will be completed based on data collected during the first two years. An additional field crew may be added this year to increase the chance of finding either species. A new technique known as eDNA will be tested. It consists of taking water samples and analyzing them for the presence of DNA of target species within the water column.

Proposed FY14 Activities: A final report for the first 3 years of the project will be completed. The eDNA technique may be utilized to continue monitoring the mainstem LCR and lower Bill Williams River for presence of either species.

Pertinent Reports: Annual reports for FY11 and FY12 will be posted on the website.

Work Task D13: Elf Owl System-Wide Surveys

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$60,000	$150,000	$150,000	$150,000

Contact: Beth Sabin, (702) 293-8435, lsabin@usbr.gov

Start Date: FY13

Expected Duration: FY55

Long-term Goal: To detect trends in population estimates and distribution of elf owls within the LCR MSCP project area and adjacent upland area and on LCR MSCP Habitat Conservation Areas until FY55 (end of LCR MSCP program).

Conservation Measures: ELOW1, ELOW2, MRM1, MRM2, AMM1, AMM3.

Location: Habitat within and adjacent to the LCR MSCP Project area and LCR MSCP Habitat Conservation Areas.

Purpose: The purpose of the project is to provide information on trends in elf owl population and distribution within the LCR MSCP project area and adjacent areas and on LCR MSCP habitat conservation areas. This data can be used for a variety of purposes: 1) to determine location of new habitat conservation areas; 2) to assess effectiveness of habitat conservation areas in providing habitat for the elf owl; 3) to determine if there is an increase in the elf owl population within the project area as the LCR MSCP program progresses in time; 4) to identify populations of elf owls that can be used for the habitat modeling study (2014-2016) and 5) to contribute information to status assessments for the species across its range.

Connections with Other Work Tasks (past and future): Baseline exploratory surveys for elf owls were implemented in 2008-2010 under D6. A field protocol based on quantitative data has been developed under C36.Information obtained through this work task will be used in conjunction with data collected during post-development monitoring of habitat conservation areas (F2).

Project Description: Single-species surveys for the elf owl are necessary due to the nocturnal nature of this species and its rarity along the LCR. Species-specific surveys for elf owls will be implemented in FY14 following the standardized monitoring plan and field protocol that will be finalized in FY13. The monitoring plan developed in FY13 under this work task and the field protocol were finalized under C36: Elf Owl Detectability Study in FY12 will determine how often surveys need to be conducted.

Previous Activities: New start in FY13.

FY12 Accomplishments: New start in FY13.

FY13 Activities: A long-term monitoring plan for system wide surveys will be developed. Sites will be selected using stratified random sampling. Habitat will be stratified using the most recent aerial imagery and habitat classifications. All equipment needed to implement the surveys will be purchased. Due to delays in finalizing the survey protocol, system-wide surveys will begin in FY14.

Proposed FY14 Activities: System-wide surveys will be implemented for the elf owl according to the monitoring plan finalized under this work task and the field protocol finalized under C36: Elf Owl Detectability Study. Implementation of system-wide surveys will increase costs in FY 14.

Pertinent Reports: N/A

WORK TASKS SECTION E

CONSERVATION AREA DEVELOPMENT AND MANAGEMENT

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Work Task E1: Beal Lake Conservation Area

FY12 Estimate*	FY12 Actual Obligations*	Cumulative Expenditures Through FY12*	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$950,000	$916,195.79	$4,080,857.71	$300,000	$300,000	$300,000	$300,000

*Includes E2

Contact: Jed Blake, (702) 293-8165,jblake@usbr.gov

Start Date: FY04

Expected Duration: FY55

Long-term Goal: Habitat creation.

Conservation Measures: WIFL1, WRBA2, WYBA3, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, FUTA1, MNSW2, CLNB2, PTBB2, MNSW2, BONY2 and RASU2.

Location: Reach 3, Havasu NWR, Arizona, 0.5 miles east of river miles 238 and 239.

Purpose: Create and manage a mosaic of native land cover types for LCR MSCP covered species.

Connections with Other Work Tasks (past and future): With the concurrence of the Steering Committee work tasks E1 and E2 have been combined into the Beal Lake Conservation Area. Vegetation and species monitoring are being addressed under F1-F4. Monitoring of native fish is being addressed under F5. Portions of restoration research at Beal Lake have been funded under G3.

Project Description: Beal Lake was 225 acres of shallow, low-quality aquatic habitat that was dredged in 2001 to create a functioning backwater dedicated to native fish. The Beal Lake restoration project is a continuation of the commitment to construct habitat for protected native fish under the 1997 Biological Opinion. Continued maintenance and management obligations of Beal Lake, as well as research and development of the backwater as native fish habitat, were assumed under the LCR MSCP in 2005.

The development of the Beal Lake Riparian Area was initiated to research effective ways of using dredge material. The plan called for blending sediment dredged from Beal Lake with adjacent soils and replanting the mixed substrate with native vegetation. The project area, which is divided into fields that can be independently irrigated and managed, was designed to provide a location for testing various riparian restoration methods and techniques for site preparation, planting, irrigation, monitoring, and management.

Previous Activities: Post-development habitat and avian monitoring has been conducted since FY04. Monitoring of post-development microclimate, small mammals, and bats has been conducted since FY06. At the end of the 2011 monitoring season, the Beal Lake Conservation Area had nesting pairs of Sonoran yellow warbler, Arizona Bell's vireo, summer tanager, and yellow-billed cuckoo. The riparian restoration site currently provides approximately 107 acres of cottonwood, willow, and mesquite habitats, as well as contributes valuable information about restoration techniques and management practices.

FY12 Accomplishments:

Maintenance/Restoration/Management.

Riparian Fields. Clearing, grubbing, and contouring of the 14 acre willow-marsh site was finished in January 2012. In addition to the earthwork, two culverts were installed to allow for water management within the marsh area. The acreage was planted in March 2012 with bulrush and salt grass in the marsh cell and Goodding's and coyote willow in the riparian field. Cattails and cottonwoods have both voluntarily established on site.

Two distinct actions utilizing Lassenite Pozzolan are being conducted within the riparian fields at the Beal Lake Conservation Area. The first effort cleared two fields, which were cleared during the willow-marsh construction effort. The fields were used to demonstrate the feasibility of using the soil amendment. One field was left as a control while the other was treated with Lassenite Pozzolan per the company's instructions. The demonstration was conducted to determine if the product could significantly increase irrigation efficiency, as well as increase the retention of moisture within the soil. Based on the results of the field scale trial, no significant difference was found between the field treated with Lassenite Pozzolan and the control. The second action is a research project described in C42. In FY12 the final Lassenite Pozzolan study plan and experimental design was completed for the study. Willow seeds were collected from trees along the LCR and stored for use. All permits were obtained. Fields J and E were cleared of all existing vegetation. Deep pot cottonwood trees were planted around the perimeter of experimental fields to provide a wind break.

Irrigation, maintenance, and on-site management were conducted on the riparian fields from mid-March through mid-September. A combination of Nitrogen, Phosphorus and Manganese fertilizers were applied via the fertigation system.

Beal Lake. A second gaging station was installed to monitor the water surface elevation of Beal Lake at the west end of the Beal ditch. Data from previous years had misrepresented true lake elevations due to blockages in the ditch, which delivers surface water to the lake. The data collected from this station allowed comparison of elevations of Beal Lake to those recorded at the embayment on the west side of the rock structure to determine if the inlet ditch was functioning, as well as monitor the true water surface elevation of the lake.

Monitoring.

Riparian Fields. Post-development vegetation monitoring was conducted in 17 fields. Thirty-five intensive plots were evaluated for density, vegetation structure and community composition.

A study of phosphorous content in insects was completed at the site. Results indicate that certain arthropods contain more phosphorus than others and may provide better nutrition for insectivorous bird.

Small mammal monitoring was conducted in a portion of the Conservation Area in the fall (November) and spring (March); two CRCR were detected. One sub adult female was captured in the fall and one adult male was captured in the spring.

Exploratory bat capture surveys determined that it was feasible to make the riparian fields of the Beal Lake Conservation Area a long-term capture site. Surveys were conducted once per month in May, July, and September. The California leaf-nosed bat was the only LCR MSCP covered species captured. In conjunction with the bat capture surveys, the long-term acoustic bat station continuously collects acoustic bat data. A 40-foot tall pole was installed on the bat station to increase the height of the microphone to reduce insect noise.

General avian surveys were conducted using intensive and rapid area search surveys. Four area search plots were established. Bell's vireo (13 territories), yellow warbler (9 territories) and summer tanager (1 territory) were confirmed breeding. Single species surveys were conducted for the southwestern willow flycatcher and western yellow-billed cuckoo during their respective breeding seasons. Yellow-billed cuckoos were detected on two of the five visits. One bird was detected on June 24 and two birds were detected on July 5. Yellow-billed cuckoos were not confirmed nesting at the site. The riparian fields were surveyed five separate times for willow flycatchers. One territorial southwestern willow flycatcher was detected at Beal Lake that had in previous years held a territory in the Pipes #3 site, which is located north of Beal Lake adjacent to Topock Marsh. Three willow flycatchers for which residency could not be determined were detected April 23 and May 16.

Avian mist netting following the Monitoring Avian Productivity and Survivorship protocol (D5) was conducted from 29 April to 9 August. Sonoran yellow warblers, Arizona Bell's vireos, and summer tanagers were color banded to better monitor their breeding activities at the site.

Beal Lake. RASU stocking was discontinued at Beal Lake due to poor survival, and fisheries surveys were reduced to a relative abundance and biomass estimate for all species with in the backwater. Results of this survey indicate that the backwater contains nearly 4,000 individual fish and at least 6 different species. Common carp and largemouth bass comprise almost 90% of the total fish numbers (69% and 20% respectively), with carp comprising 88% of the total fish biomass. This level of non-

natives is likely leading to a competition of resources and at least contributing to the poor survival of native fish. Water quality was constantly monitored throughout the backwater; low levels of DO and high temperatures were observed locally but not lake wide. Zooplankton and phytoplankton sampling was increased in FY12, and results continue to be analyzed.

Nine marsh bird stations were surveyed at Beal Lake. During the three visits to each of the stations, 3 Yuma clapper rails and 26 least bitterns were detected. No black rails were detected in 2012.

FY13 Activities:

Maintenance/Restoration/Management.

Riparian Fields. No construction activities are planned within the riparian fields of the Beal Lake Conservation Area during FY13. However, the perimeter of one field will be planted with salt grass to reduce salt cedar from establishing along the edges. Two fields will be used in a soil amendment study investigating if Lassenite Pozzolan on germination, survival, and growth of willow habitat planted from seed. This research is funded and documented under work task C42.

Irrigation and maintenance will continue, however, a reduced irrigation schedule will be implemented for FY13. The water level of the marsh cell constructed in FY12 will passively rise and fall with Topock Marsh via the culvert that provides a surface water connection between the two.

Beal Lake. No construction or major restoration activities are planned for Beal Lake during FY13.

The gauging stations continue to be maintained and calibrated by Reclamation's Hydrographic Office in Blythe, California.

Monitoring.

Riparian Fields. Post-development vegetation monitoring will be conducted in 17 fields. Thirty-five intensive plots will be evaluated for density, vegetation structure and community composition. Small mammal monitoring will be conducted annually. The second year of exploratory bat capture surveys will be conducted. An already established long term bat monitoring station will be used to collect acoustic data. General avian surveys utilizing intensive and rapid area search surveys will be conducted from mid-April to mid-June. Single species surveys for the southwestern willow flycatcher and yellow-billed cuckoo will be conducted during their respective breeding seasons. Irrigation, soil moisture and vegetation data will begin to be collected on the experimental fields in the Lassenite Pozzolan study. Marsh bird surveys will be initiated in the newly constructed wetlands.

Beal Lake. Monitoring activities for Beal Lake will continue while long-term management guidelines are established. Water quality and plankton monitoring will continue, along with periodic remote sensing to track the existing small population of RASU. Specific research activities will be identified to address native fish life history questions, as well as site-specific management questions. Marsh bird surveys will be conducted at the nine established survey points.

Proposed FY14 Activities:

Maintenance/Restoration/Management.

Riparian Fields. Management through irrigation and fertilization will continue. Irrigation for the 107 acres is provided using a diesel driven pump, which delivers water to each individual field through an alfalfa valve. The system requires on-site personnel to fuel, start, and maintain the pump as well as manually open and close the alfalfa valves. No new activities are anticipated within the riparian fields of the Beal Lake Conservation Area during FY14.

Beal Lake. No construction or major restoration activities are planned for Beal Lake during FY14. The water level of Beal Lake is maintained through surface water deliveries from Topock Marsh as well as some upwelling of groundwater. Surface water enters the lake from Topock Marsh through 8 wedge-wire screens and seepage through the semi-permeable rock structure. Maintenance and manual cleaning of the screens is conducted on a regular basis throughout the year.

Monitoring.

Riparian Fields. Vegetation monitoring will continue at previously established plot locations. Small mammal monitoring will be conducted annually. An already established long term bat monitoring station will be used to collect acoustic data. General avian surveys utilizing intensive and rapid area search surveys will be conducted from mid-April to mid-June. Single species surveys for the southwestern willow flycatcher and yellow-billed cuckoo will be conducted during their respective breeding seasons. Irrigation, soil moisture and vegetation data will continue to be collected on the experimental fields in the Lassenite Pozzolan study. Surveys for marsh birds will be conducted within the constructed wetlands.

Beal Lake. Recommendations for management guidelines at Beal Lake will dictate future monitoring and research objectives for the site. Marsh bird surveys will be conducted at the nine established survey points.

Pertinent Reports: *Beal Lake Restoration Site Amendment Study: Irrigation Monitoring and Instrumentation Report 2012* will be posted to the website. The *2012 Beal Lake Conservation Area Annual Report*, which summarizes any planting conducted, site management, results of monitoring, and any recommendations for future adaptive management will be posted after integration of data collected throughout the calendar year.

Work Task E4: Palo Verde Ecological Reserve

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$1,950,000.00	$1,154,766.77	$7,160,327.80	$990,000	$725,000	$675,000	$650,000

Contact: Gail Iglitz, (702) 293-8138, giglitz@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Habitat creation.

Conservation Measures: WIFL1, WRBA2, WYBA3, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, MNSW2, CLMB2, PTBB2.
Location: Reach 4, CDFW, river miles 129-133, California.

Purpose: Create and manage a mosaic of native land cover types for LCR MSCP covered species.

Connections with Other Work Tasks (past and future): Vegetation is being addressed under F1-F4, Wildlife under D2, D6, D7, D9, D10, and insect populations are being evaluated under C5 and C6.

Project Description: The Palo Verde Ecological Reserve (PVER) encompasses more than 1,300 acres. This property (formerly known as the Travis Ranch) has been made available to the LCR MSCP for habitat restoration activities by CDFW. Development of the project is intended to satisfy both the LCR MSCP and a portion of the California Endangered Species Act (CESA) Incidental Take Permit No. 2081-2005-008-06.

The eastern boundary of the property (more than 4 miles) is adjacent to the Colorado River; the western boundary is adjacent to active agricultural fields. The PVER has an extensive infrastructure consisting of miles of lined irrigation ditches, roads, and a pump. Each year a portion of the active crop acreage is taken out of production to develop the next phase of native habitat. The intent is to create as much riparian habitat as practical. Generally, all phases at PVER are targeted for SWFL, YBCU, and other covered species. Palo Verde Irrigation District provides water to PVER. The costs associated with irrigation, electricity, and water is proportional to the amount of acreage that has been converted to habitat.

It is our intent to create a mosaic of habitats that contain areas of riparian species (including mesquite), and ground covers or open areas. Ground cover is an effective method of controlling non-native species and provides another layer of vegetation for habitat. Ground covers are planted with transplants or by seed; costs vary with the

methods of planting used. Mesquite trees are generally planted by a tree planter or auger. Typically, mesquite costs are based on a 1-gallon planted tree.

Agricultural areas have irrigation systems in place that are conducive for water management of riparian species. Checks, which are small borders placed within a given field, allow for flooding of only a portion of a field. This provides additional flexibility to create and maintain standing water or saturated soil areas for covered species.

Previous Activities: Through FY11, over 750 acres of cottonwood-willow and mesquite land cover types have been established in phases 1-6 and are being managed for the LCR MSCP covered species.

FY12 Accomplishments:

Maintenance/Restoration/Management. At PVER, 226 acres of cottonwood-willow were planted in Phase 7. Prior to planting, an initial application of fertilizer consisting of NO3-N (nitrogen), and PO3-P (phosphorus) was applied.

In March 2012, trees and shrubs were planted in Phase 7, checks 2-13 and 16-28, utilizing mass transplanting. Checks 1, 14, 15, 29 were hand planted with mesquite. Over 417,000 trees and shrubs were planted within a 10-day period. The checks were planted according to the design *(Palo Verde Ecological Reserve: Restoration Development Plan Phase 7, 2011)*. The 2012 planting contained the following averaged percentages of plants and trees: 31.9% cottonwood, 3.5% *Baccharis*, 41.6% Goodding's willow, 21.8% coyote willow, and 0.9% mesquite. The average number was 1,922 plants per acre.

The Palo Verde Ecological Reserve Development & Monitoring Plan: Phase 8 document was reviewed and approved by CDFW.

Two electric 30 cubic feet per second pumps and material (pipe, steel, etc.) were purchased in 2012 and are scheduled to be installed at heading JO2 in 2013. The new irrigation pumps will replace an aging single pump and platform and provide redundancy in the case of pump failure.

Monitoring. Vegetation monitoring plots were surveyed at full intensity at the following sites: PVER1 (8 plots), PVER2 (18 plots), PVER3 (22 plots), and PVER4 (20 plots). The remaining sites were monitored at a reduced effort including, PVER5 (28 plots), and PVER6 (40 plots).

MacNeill's sootywing were surveyed between April and August by walking one random transect in phases 4 and 5 each month. In April, 9 sootywing were observed, 0 in May, 1 in June, 3 in July, and 0 in August. No sootywing were detected in Phase 5.

Cotton rats were captured in Phase 4 and Phase 5 in FY12. The bench along the river below PVER also continues to support a population of Colorado River cotton rats.

Bats were mist-netted at PVER once per month from May to September. Ten yellow bats, 6 red bats and 1 California leaf-nosed bat were captured, making 2012 the third consecutive year yellow and red bats have been captured there. Pregnant, juvenile, and reproductive male yellow bats were captured as well as reproductive male red bats and pregnant female red bats, indicating PVER is being used as a maternity site for both species.

Surveys for SWFL were conducted five times in phases 2 and 3. No breeding or resident SWFL were detected, but migrants were detected in May and June.

General avian surveys of habitat creation sites with more than two years growth were conducted using an intensive area search method. Five Sonoran yellow warbler pairs were confirmed breeding in PVER 4 and 5, and Arizona Bell's vireos were detected, but not confirmed breeding. PVER had a total of 322 confirmed breeding pairs comprised of 22 territorial species (MSCP and non-MSCP species combined).

Five surveys for yellow-billed cuckoos were conducted in each of PVER phases 1-5 between 17 June and 24 August 2012. Cuckoos nested in all five areas, with results as follows: PVER 1 (1 nest), PVER 2 (3 nests), PVER3 (2 nests), PVER 4 (10 nests), and PVER 5 (6 nests). These 22 nests produced 20 fledglings. Capture and banding results will be detailed in the 2012 YBCU report once it is final.

FY13 Activities:

Maintenance/Restoration/Management. The development of Phase 8 (36 acres) is the focus in FY13. The ground will be prepared for Phase 8 planting, which includes disking, laser leveling, and plowing as needed for mass transplanting the trees and shrubs. Mass transplanting and hand planting techniques will be utilized to plant approximately 36 acres of upland species (approximately 150,000 of alkali sacaton and 7,700 honey mesquites). Spacing will be 2-foot in-line with 40 inches between rows for alkali sacaton and 15 feet on center for mesquite.

The two (30 cfs) electric fixed irrigation pumps, delivery pipes, electrical upgrade, and pump stand will be installed in 2013. Irrigation will continue on the same schedule until data become available that indicate adjustments are needed.

Since development will now be complete, the management plan for the entire Conservation Area will be drafted in 2013 and is expected to be finalized in 2015.

Monitoring. Vegetation monitoring for FY13 was conducted between October and December 2012. The same plots were monitored in 2012 as in 2011. The only change to note was that PVER5 was surveyed at full intensity instead of reduced effort. Two new sites were added to monitoring at PVER in FY13, PVER1 (nursery) and PVER7.

A second Anabat station will be set up in early 2013 in either Phase 5 or 6 to evaluate whether multiple stations are needed to assess covered species occupancy across a large (greater than 800 acre) conservation area. SWFL surveys will be conducted in PVER 2,

3, 4, and 5 and yellow-billed cuckoos will be surveyed in all appropriate habitat. All other monitoring conducted in FY12 will be continued in FY13.

Proposed FY14 Activities:

Maintenance/Restoration/Management. With the final planting of Phase 8 in 2013, the entire Conservation Area is now fully developed and is transitioning from the development stage and into the maintenance and monitoring stage. Water for irrigation of the trees and to simulate historical river flooding is provided by Palo Verde Irrigation District. A local farmer is utilized to divert and irrigate the various phases based on site conditions and species planted. The farmer provides local knowledge of weather and farming practices, which are applied to the maintenance of the Conservation Area. The farmer and his employees are an on-site presence and provide early recognition of issues or concerns. The farmer is also responsible for assessing the water needs of the trees, and in coordination with the district and the LCR MSCP, orders and delivers the water. Maintenance activities include grading access roads, maintaining field borders, irrigation canals, invasive plant control including hand removal and application of herbicides, and physically opening and closing irrigation gates for over 1,000 acres of established land cover types. Annual costs associated with operating within the district, such as water tax, water tolls, electrical power utility bills, and assessments for district operation are included in the annual maintenance costs.

Monitoring. Species, vegetation, microclimate, and abiotic monitoring conducted in FY13 will be continued in FY14.

Pertinent Reports: *The Palo Verde Ecological Reserve Restoration Development and Monitoring Plan: Phase 8,* which described the restoration activities planned for FY13, is posted on the LCR MSCP website. The *2012 Palo Verde Ecological Reserve Annual Report*, which summarizes any planting conducted, site management, results of monitoring, and any recommendations for future adaptive management will be posted after integration of data collected throughout the calendar year.

Work Task E5: Cibola Valley Conservation Area

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$650,000	$361,277.27	$10,082,755.73	$650,000	$550,000	$700,000	$800,000

Contact: Bill Singleton, (702) 293-8159, wsingleton@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Habitat creation.

Conservation Measures: WIFL1, WRBA2, WYBA3, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, MNSW2, CLMB2, PTBB2.

Location: Reach 4, AGFD, river miles 99-104, Arizona.

Purpose: Create and manage a mosaic of native land cover types for LCR MSCP covered species.

Connections with Other Work Tasks (past and future): Vegetation and species monitoring are being addressed under F1-F4, and F6.

Project Description: In 2007, Reclamation secured 1,309 acres of land serviced by the Cibola Valley Irrigation and Drainage District and established the Cibola Valley Conservation Area (CVCA). The Arizona Game and Fish Department (AGFD) acquired the CVCA in September 2007 through a multi-organizational agreement involving the AGFD, Reclamation, the Mohave County Water Authority, The Conservation Fund, and the Hopi Tribe. Through these agreements, AGFD acquired CVCA fee title and water entitlements and agreed to manage the site.

Cibola Valley Conservation Area is located in southwestern La Paz County, Arizona, about 15 miles south of Blythe, California. The valley encompasses the land inside an engineered bend of the lower Colorado River and a remnant oxbow on the west side of the river (Palo Verde Oxbow). Six phases have been restored with native vegetation and the remainder is farmed for cotton and alfalfa. The area is bordered to the south by Cibola NWR and on the east by unimproved land under the jurisdiction of the Bureau of Land Management. The river forms the north and west boundaries, except for the Palo Verde Oxbow, from river miles 98.8 to 104.9.

Agricultural areas have irrigation systems in place that are conducive for water management of riparian species. Checks, which are small borders placed within a given

field, allow for flooding of only a portion of a field. This provides additional flexibility to create and maintain saturated soil areas for covered species.

Previous Activities: Through FY11, over 650 acres of cottonwood-willow, honey mesquite, and buffer-stabilized ground have been established in phases 1-6 and are being managed for LCR MSCP covered species. Phase 4 actually consists of two locations; one site (58 acres) is located north of Phase 3. The other site consisting of 187 acres is located west of Phases 1 and 2. Approximately 80 acres of this site was planted with a mix of native seeds and irrigated in an effort to eliminate blowing dust and stabilize the ground. This seed mixture consisted of quailbush, needle grama, curly mesquite grass, desert bluebells, and desert Indian wheat. A sprinkler system was rented for four months to provide irrigation water for initial plant germination.

FY12 Accomplishments:

Maintenance/Restoration/Management. No restoration activities were scheduled for FY12. Maintenance and irrigation activities were performed throughout the site.

All fields continued to be flood irrigated. Field crews continued to control small patches of morning-glory, volunteer cotton, and saltcedar as necessary, with hand tools, throughout all the phases. This method of using crews proved to be an effective method of controlling invasive plants as they germinate. The crews remove invasive plants from the fields in the late spring or early summer.

Vegetation growing near concrete-lined canals was mechanically cleared several times to keep the tree roots from damaging or blocking the irrigation canals. Limited chemical spraying is also used to control plants and invasives from growing along the concrete lined canals.

Pole cutting in the nursery was undertaken during the winter months by the LCR MSCP and the Quechan Tribe. Collection of poles from a LCR MSCP Conservation Area by other entities involved in restoration of the lower Colorado River requires submitting a written request and receiving approval from the LCR MSCP.

The Cibola Valley Irrigation District hosts monthly meetings with its water users. The LCR MSCP is represented at each meeting. All topics are discussed ranging from irrigation issues, to maintenance, to upcoming events and activities.

Monitoring. Vegetation monitoring plots were surveyed at full intensity at the following sites: CVCA1 (19 plots), CVCA2 (19 plots), and CVCA3 (13 plots). The remaining sites were monitored at a reduced effort including, CVCA4E (6 plots), CVCA4W (11 plots), CVCA5 (13 plots), and CVCA6 (15 plots).

Three yellow-billed cuckoo nests were found at CVCA between July and August 2012. Of these, one nest fledged three young. All three fledglings from CVCA were banded with USFWS numbered bands and color bands.

Resident or breeding southwestern willow flycatchers were not found at CVCA during 2012. Eight migrating flycatchers were detected on 23 May, 19 on June 6, and one on June 13.

General bird surveys were conducted at CVCA from 15 April to 15 June 2011. Covered species detected were four pairs of yellow warblers and two pairs of summer tanagers.

CVCA was mist-netted for bats once per month during the summer season from May-September during 2012. Seven western yellow bats and four western red bats were captured in mist nets.

Colorado River cotton rats were located at CVCA phases 1 and 2 during 2012.

MacNeill's sootywings continued to be nearly absent at CVCA during 2012. Restoration plots containing the butterfly's host plant, *Atriplex lentiformis*, were sampled monthly during April to August. On each date, a random transect across the entire plot was walked, and checks within phases were sampled separately for a total of 45 transects. A total of six sootywings were counted during 2012.

FY13 Activities:

Maintenance/Restoration/Management. Maintenance of Phases 1-7 is continuing. No additional restoration planting is scheduled until at least FY16. The intent of this planting delay is to determine if additional irritation water might become available. However, normal irrigation and maintenance activities will continue.

Monitoring. Vegetation monitoring during FY13 will be the same as during 2012. All other monitoring will continue as in FY12.

Proposed FY14 Activities:

Maintenance/Restoration/Management. Maintenance and management of land cover types established in phases 1-7 will continue. Restoration of additional Phases is not scheduled until at least FY16. Water for irrigation of the trees and to simulate historical river flooding is provided by Cibola Valley Irrigation District. A local farmer is utilized to divert and irrigate the various Phases based on site conditions and species planted. The farmer provides local knowledge of weather and farming practices, which are applied to the maintenance of the Conservation Area. The farmer and his employees are an on-site presence and provide early recognition of issues or concerns. The farmer is also responsible for assessing the water needs of the trees, and in coordination with the district and the LCR MSCP, orders and delivers the water.

Maintenance activities include grading access roads, maintaining field borders, irrigation canals, invasive plant control including hand removal and application of herbicides, and physically opening and closing irrigation gates of established land cover types. Annual costs associated with operating within the district; such as water tax, water tolls, electrical

power utility bills, and assessments for district operation are included in the annual maintenance costs.

Monitoring. Species, vegetation, microclimate, and abiotic monitoring conducted in FY13 will be continued in FY14.

Pertinent Reports: The *2012 Cibola Valley Conservation Area Annual Report*, which summarizes any planting conducted, site management, results of monitoring, and any recommendations for future adaptive management will be posted after integration of data collected throughout the calendar year.

Work Task E9: Hart Mine Marsh

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$300,000	$414,640.69	$5,691,016.62	$750,000	$250,000	$200,000	$200,000

Contact: Gregg Garnett, (702) 293-8644, ggarnett@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Habitat creation.

Conservation Measures: CLRA1, LEBI1, and CRCR2.

Location: Reach 4, Cibola NWR, River Mile 92, Arizona.

Purpose: Create and manage marsh habitat for Yuma clapper rail, least bittern, and Colorado River cotton rat.

Connections with Other Work Tasks (past and future): Vegetation and species monitoring are being addressed under F1-F4.

Project Description: Hart Mine Marsh was a decadent marsh located on Cibola NWR that was restored and expanded to create functional habitat for covered species. This was accomplished by the installation of control structures to manage water levels, providing sources of higher quality surface water flows, making physical changes to the site's topography, and by planting and supporting native wetland and marsh vegetation. The basic approach was to remove a substantial amount of existing saltcedar from the site, deepen areas of existing open water and contour areas adjacent to those deeper areas, and manage water at the higher elevations to promote and sustain marsh cover type vegetation and wetland functions. The creation of habitat included both the establishment of native plants and management of water levels to meet performance standards for integrating emergent vegetation and open water at varying depths into a mosaic of marsh habitats.

Previous Activities: In FY08, NEPA compliance activities, cultural surveys, topographic surveys, and pre-development surveys for marsh birds and riparian obligate birds were conducted. Engineering designs were finalized, and all regulatory permitting required for construction was completed including NEPA, ESA, sections 401 and 404 of the CWA, and Section 106 of the NHPA. In FY09, the first phase of construction was completed and resulted in 92 acres of marsh. In FY10, phase 2 of construction created an additional 163 acres of marsh.

FY12 Accomplishments:

Maintenance/Restoration/Management. The majority of the activities that occurred in FY12 were for management, maintenance, and monitoring of the established marsh. Water management, including water delivery to maintain static water levels during marsh bird nesting season, were performed. Invasive and nonnative vegetation control continued. Monitoring of abiotic and biotic parameters was also conducted.

Minor construction activities occurred in FY12. These included: improving access to one of the large islands in cell 1 to permit more efficient vegetation management and, the expansion of one of the parking areas in the north east corner of cell 1. Vegetation maintenance included controlling weedy species on the islands in HMM. Up to this point, little attention was paid to the islands, mainly due to accessibility issues. Controlling invasive and nonnative species on these islands was considered extremely important to reduce nonnative seed sources throughout the marsh and to keep nonnative invaders from completely colonizing the islands within the marsh. This increase in effort was one of the reasons for increased costs for FY12, but is expected to result in long-term cost saving for site management.

Planning and procurement of materials for future infrastructure repairs and upgrades also took place in FY12. To account for the time requirements of the procurement process and to avoid potential schedule problems during the short time window when installation of the new unit 2 water supply lines would occur, the decision was made to purchase the majority of the materials and supplies needed for the infrastructure repair in FY12 for installation in winter of FY13. Although necessary to insure minimal system down-time, these purchases were the primary cause of a substantial increase in cost for the FY12 budget. Pre-purchasing of materials is expected to reduce expenditures in FY13.

Monitoring. Marshbird surveys were conducted 4 times between March and May. Two Yuma clapper rails were detected during the April 18 survey. At least one least bittern was detected during all four surveys, with a maximum of 11 detected during the April 18 survey.

FY13 Activities: The third and final phase includes major infrastructure repair and is planned for FY13. To avoid system failures during critical times for covered species breeding seasons and to maintain adequate water levels to keep vegetation at HMM alive, these steps to upgrade the infrastructure components are being made to protect the investments made by the LCR MSCP. This will involve the replacement of the leaking water delivery lines from the Unit 2 pumps and the installation of a dedicated water line for HMM. The water delivery infrastructure for the Unit 2 management area on Cibola NWR (that also supplies HMM) needs to be replaced to handle the water demands of HMM and the water volume generated by the newly installed 40 cfs pump.

Regular management and monitoring activities will continue in FY13. Water management, including the maintenance of water levels and water delivery activities on the site will continue. Invasive and nonnative vegetation control will continue. Monitoring of marsh vegetation and marshbirds will be conducted.

Proposed FY14 Activities: No major construction or repairs are planned for FY14. Activities are expected to be limited to marsh management, maintenance of access roads, invasive plant control, and monitoring. To maintain relatively static water levels for marsh birds during the nesting season and to mitigate salinity in the marsh, a combination of drainage water from the Arnett Ditch and pumped Colorado River water is used. Annual maintenance costs include electrical utility bills associated with pumping, labor to turn on the pumps and adjust water control structures, invasive and nonnative vegetation control, water quality sampling, and road grading. Monitoring of marsh vegetation and marshbirds will also continue.

Pertinent Reports: The *2012 Hart Mine Marsh Conservation Area Annual Report*, which summarizes any planting conducted, site management, results of monitoring, and any recommendations for future adaptive management will be posted after integration of data collected throughout the calendar year.

Work Task E14: Imperial Ponds Conservation Area

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$525,000	$771,006.55	$8,396,907.73	$395,000	$600,000	$500,000	$400,000

Contact: Gregg Garnett, (702) 293-8347 ggarnett@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Habitat creation.

Conservation Measures: CLRA1, BONY2, RASU2, LEBI1, and BLRA1.

Location: Reach 5, Imperial NWR, River Mile 59, Arizona.

Purpose: Create and manage a mosaic of native land cover types for LCR MSCP covered species.

Connections with Other Work Tasks (past and future): Work task vegetation and species monitoring is being conducted under F1, F2, F3, F4, F5, and D9.

Project Description: The Imperial Ponds Conservation Area is an integrated mosaic of native land cover types, including disconnected backwaters, cottonwood/willow, and marsh. It is situated within the Intensive Management Area of the Imperial National Wildlife Refuge, an area of focused management for sensitive wildlife species including native fish, marsh birds, neo-tropical migratory birds, and migratory waterfowl.

Previous Activities:

Ponds. Between FY05 and FY07, extensive site development was undertaken to excavate six isolated, independently managed backwater ponds, to create habitat primarily for razorback sucker and bonytail. Since that time, the ponds have been stocked and managed primarily for razorback sucker and bonytail, and secondarily for the benefit of marsh species. Six ponds have been constructed to provide approximately 80 surface acres of backwater habitat for endangered razorback sucker and bonytail, as well as provide marsh habitat for western least bittern and Yuma clapper rail. The ponds provide a diversity of depths and habitat features, including rip-rap for fish cover and hummocks on which to place native wetlands plants.

Colorado River water was supplied to the ponds by a pump that uses fish screening technology (wedge-wire screen). The screen was constructed to prevent the eggs and larvae of nonnative, predatory fish from entering into the ponds. The ponds are not

interlinked; each pond is independently managed. In FY09, through work task (G3) an evaluation of the wedge wire screen system on the 6,000 gallon per minute pump, supplying the ponds, was conducted. As mentioned in G3, the preliminary results found that eggs and larvae of the smallest size class of nonnative fishes (those with eggs less than 1 mm in diameter) were entrained through the screen in nearly all the samples taken, which raised concern over continued use of the screened pump to supply the ponds without additional filtering. Additionally, pH levels in two of the ponds during mid-summer exceeded 9.0; these levels were quickly resolved by pumping from the well (which has a consistently lower pH than the Colorado River). Since the summer of 2009, water supply to the ponds has been exclusively via the 750-1,200 gallon per minute well pump, to reduce the risk of introducing non-native fish larvae into the ponds, as well as to manage pH. When water is released from a pond, it enters a drainage ditch where native wetland and riparian vegetation has been planted.

Riparian. Using material excavated from the ponds, an existing 4 acre cottonwood nursery on the refuge will be expanded by 34 acres to develop cottonwood-willow land cover for the yellow-billed cuckoo. The pond material was spread over approximately 100 acres; the acreage not used for cottonwood-willow will be managed by the refuge for migratory waterfowl. Both the yellow-billed cuckoo and willow flycatchers have been sighted in the existing nursery. Field leveling and irrigation system installation for the area were completed in FY08. However, restoration and planting with native cottonwood and willow is not anticipated until FY15 due to the large planting effort at the Laguna Division Conservation Area.

Marsh. A 12-acre marsh unit was created at Field 18 in the southeast corner of Imperial NWR. This field was cleared in the winter of 2007-2008, and was converted into a bulrush-dominated marsh. Because the field is adjacent to several marsh units currently occupied by California black rail, the objective was to increase habitat acreage for this species and other species of concern.

FY12 Accomplishments:

Maintenance/Restoration/Management. Funding for onsite maintenance, utility payments, and water management for the site continued through FY12. E14 was also used to support the dewatering, evaluations, maintenance of each pond. Vegetation management is an ongoing action, which keeps the pond shorelines clear of excessive growth *Phragmites*.

Ponds. No Colorado River surface water was supplied to ponds 2-6. Water Surface Elevation (WSE) and water quality monitoring were conducted monthly on all ponds during this time, to answer questions regarding the similarity or contrast of the natural WSE and water quality parameters between the ponds, the LCR, and the south channel. Collected information will be used to develop and study methods to reduce or simplify water delivery to the ponds and enhance water quality. Overview of results from WSE and water quality monitoring are included below in the monitoring section.

Riparian. Major infrastructure failures occurred in FY12 on the irrigation supply canal at INWR. Temporary repairs were made to insure continued water delivery to both MSCP conservation areas and to refuge managed fields, however, these failures indicated defects in the water conveyance system. In particular these included improper soil compaction and construction of the irrigation canal. Efforts are underway to replace the existing irrigation supply canal to combat future emergency repairs and insure reliable water delivery for the future. Part of this effort included the obligation funds for contracted services to design and install the new canal system. This obligation explains the overage in budget for this conservation area in FY12.

No additional restoration or monitoring was performed on the 34 acres of the future cottonwood-willow field areas. Discussions about crop rotation continued and eliminated the use of alfalfa, due to its management intensity (need for cutting/bailing). A cover crop was established; however there are no immediate plans to establish cottonwood willow riparian cover type in this area until FY15 to allow planting efforts to be focused at the Laguna Division Conservation Area. When the irrigation canal is replaced, management of this area will be greatly facilitated and cultural practices such as winter flooding to push down salts can be employed which should increase survivorship.

Marsh. The 12-acre marsh created in Field 18 in the southeast corner of Imperial NWR will continue to be managed for marsh covered species.

Monitoring.

Ponds. Preliminary data suggests that WSE in ponds are positively correlated to surface elevations in the adjacent Colorado River; this also suggests that there is some sub-surface connection between the ponds and the Colorado River. The WSE in ponds 2-6 did not meet the WSEs prescribed for management of the ponds without the addition of surface water. In general, average values for water quality in ponds 2-6 were within acceptable thresholds throughout most of the year and in some cases, better than the values for Pond 1 (except for pH) which was managed with the addition of surface water. Another year of baseline data will be collected before management actions are discussed or implemented.

Riparian. Surveys for willow flycatchers were conducted five times in the area immediately to the north of Pond 1 from May to July. Five birds were detected on 18 May and one bird was detected on 2 June. These birds were all considered migrants, and no signs of breeding SWFL were found. No small mammal or bat surveys were conducted in 2012. Yellow-billed cuckoo surveys were conducted at the area and 3 birds were detected on 2 July, 2 birds were detected on 16 July, and 1 bird was detected on 24 July. No nests were located.

Marsh. Marsh bird surveys were conducted at the Imperial Ponds and at Field 18 over three survey periods from March to late April. Black rails were detected in all 3 survey periods with a maximum of 3 birds detected in the last period in late April. In the second survey period in early April 1 clapper rail was detected.

FY13 Activities:

Maintenance/Restoration/Management. Onsite maintenance, utility payments, and water management for the site will continue. Canal replacement will occur in FY14 to minimize impact on irrigated fields.

Ponds. Monitoring of ponds WSE and water quality will be conducted monthly to answer questions regarding the similarity or contrast of the natural WSE and water quality parameters between the ponds, the LCR, and the south channel. Methods to reduce or simplify water delivery to the ponds and enhance water quality will be implemented and monitored based on the results for the two-years of baseline data. These implementations are expected to be limited in FY13, however an adaptive management plan will be developed to aid and guide future management of the Imperial Ponds.

Riparian. Planning and design of the new canal system to replace the failing system at INWR will continue. Additional funds may be obligated in FY13 for the canal replacement, but installation is not expected to commence until late fall of 2013 (FY14) when water demands are low and temporary water outages will have lower impacts on refuge operations, vegetation, and wildlife.

Marsh. The 12-acre marsh created in Field 18 in the southeast corner of Imperial NWR will continue to be managed for marsh covered species.

Monitoring. Monitoring will continue in FY13, similar to previous efforts for fish, marsh birds, SWFL, and YBCU.

Proposed FY14 Activities:

Maintenance/Restoration/Management. Onsite maintenance, utility payments, and water management for the site will continue. Modifications to water delivery system for the ponds will begin FY14, but are expected to be completed in FY15.

Ponds. Monitoring of ponds WSE and water quality will be conducted monthly to answer questions regarding the similarity or contrast of the natural WSE and water quality parameters between the ponds, the LCR, and the south channel. Methods to reduce or simplify water delivery to the ponds and enhance water quality will be implemented and monitored.

Riparian. A blend of cottonwood, willow, and other native plants are expected to be pre-purchased for planting in FY15 on the 34 acres.

Marsh. The 12-acre marsh created in Field 18 in the southeast corner of Imperial NWR will continue to be managed for marsh covered species.

Monitoring. Monitoring will continue in FY14, similar to previous efforts for fish, marsh birds, SWFL, and YBCU.

Pertinent Reports The *2012 Imperial Ponds Conservation Area Annual Report*, which summarizes any planting conducted, site management, results of monitoring, and any recommendations for future adaptive management will be posted after integration of data collected throughout the calendar year.

Work Task E15: Backwater Site Selection

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$20,000	$28,211.19	$1,310,691.05	$550,000	$0	$0	$0

Contact: Terry Murphy, (702) 293-8140, tmurphy@usbr.gov

Start Date: FY06

Expected Duration: Closed in FY13

Long-term Goal: Habitat creation.

Conservation Measures: BONY2, RASU2, and FLSU1.

Location: Reaches 3-6; California, and Nevada, River Mile 22-276, Arizona, California, and Nevada.

Purpose: The backwater site selection process is used to evaluate and prioritize potential sites for backwater habitat creation for razorback sucker, bonytail, and flannelmouth sucker.

Connections with Other Work Tasks (past and future): E16 was used with this work task to identify projects other than existing backwaters for habitat creation. Starting in FY14, E15 and E16 have been combined into one Work Task E16.

Project Description: Backwater site selection consists of a five-step process to evaluate existing backwaters along the Colorado River within the LCR MSCP planning area, from reaches 3 to 6. This ultimately results in the conceptual-level planning efforts for a select number of sites, which would become available for the Program Manager to select for inclusion into the program. New backwaters, which may be constructed separate from the existing river channel (and its associated backwaters), are excluded from this effort, and would follow the general site-selection process (E16). Backwaters may be disconnected or connected with the main channel of the Lower Colorado River. Backwaters that are disconnected from the LCR channel are of considerably higher value to bonytail and razorback sucker than connected backwaters in the LCR, and are the preferred type of backwater to achieve LCR MSCP conservation goals for these species.

Previous Activities: The inventory of existing backwaters within Reaches 3-6 has been completed. Three backwaters are currently being managed under the LCR MSCP: 1) Beal Lake, 2) Big Bend Conservation Area, and 3) Imperial Ponds. Beal Lake was created under the 1997 Biological Opinion and does not count towards the 360 acres required under the LCR MSCP. Big Bend represents 15 acres of connected backwater within Reach 3 and Imperial Ponds represents 80 of disconnected backwater within Reach 5.

Discussions were held with representatives from the USFWS, CDFW, AGFD, NDOW, and Reclamation to clarify the goals of the backwater creation conservation measures and allow the program to continue to select and implement additional backwaters. As discussed with our Steering Committee, the focus of the new backwaters is on development in California.

The key discussion items and decisions addressed both the type of backwater to be created (disconnected and connected) and the location of these backwaters (Reach and State). First, although disconnected backwaters are the preference for the program a mix of connected and disconnected is expected to provide benefit to native fishes and therefore is acceptable. Second, backwaters within Reach 3 should be open to river to allow flannelmouth suckers access to the slackwater. Based on these clarifications, a five-year backwater strategy is no longer necessary.

Since the program is no longer inventorying the river to identify backwaters for restoration as originally envisioned the Work Task will be closed and backwaters will be identified using Work Task E16. This will also allow backwaters to be developed as a mosaic of multiple land cover types, which is the intent of the program and was also confirmed by the USFWS.

FY12 Accomplishments: With all parties in agreement, evaluation of backwaters in Reach 3 within California, which should be open to the river, have begun. An opportunity to partner with the City of Needles to maintain an open backwater at Bureau Bay arose and was evaluated. After discussion with our Yuma Area Office to clarify the frequency of maintenance required to keep the small backwater connected to the mainstem it was determined that the project was not feasible. In consultation with the City of Needles, Work Task E32: Bureau Bay will be closed at this time. If site conditions change, such as the need to re-open the dredge yard, the project may be reviewed again.

Excavation of a new backwater adjacent to Park Moabi was reviewed and initial discussions with the land owner (California State Lands Department), the leasee (San Bernardino County), and the California Department of Fish and Wildlife were initiated.

Another potential backwater project within Reach 4, located on an area referred to as PVER-South, are being evaluated with CDFW and would consist of both connected and disconnected backwaters.

FY13 Activities:

Reach 3. A 146-acre parcel adjacent to Park Moabi along the Colorado River in California, between river mile 237 and 236, is being investigated as the location for a potential connected backwater project. The property is owned by the California State Lands Commission and leased to San Bernardino County, who manages the parcel as part of the Park Moabi Regional Park. Discussions between the California State Lands Commission, San Bernardino County, and the LCR MSCP are underway.

A design concept and a report for the backwater was developed. The report reviews the location, offers expertise on the proposed channel's point of approach, evaluates potential sediment dynamics, and suggests ways of introducing habitat complexity without increasing maintenance. The design concept and report were submitted in October 2012. Should the project move forward based on the current design concept, approximately 50 acres of connected backwater habitat will be created.

Reach 4. Parker Dam Camp is being evaluated as a potential Conservation Area with an emphasis on creating backwater acreage. Originally developed as employee housing for the dam workers, the construction of Parker Dam Government Camp began in 1934 with the construction of Parker Dam. Once established, the property consisted of numerous residences and other buildings. Many decades after the completion of the Dam, in the 1990s, the Bureau of Reclamation determined that the facility was no longer required for project activities, and began the process of disposing of the houses and other buildings off site.

Asphalt roads, concrete sidewalks, and sparse landscaping are all that remain of the government town. Still owned and managed by Reclamation, the property is being purposed as the site for a new conservation area, and will consist of a series of native fish ponds between four and six acres each, along with riparian and upland land cover types. While the conservation area design is still being developed, 36 acres is the goal for disconnected backwater habitat credit. Drilling of investigatory wells at the project is scheduled for FY13.

In order to determine the quantity and quality of groundwater beneath PVER-South, which would provide water to any disconnected backwaters, drilling of investigatory wells are scheduled for FY13.

Proposed FY14 Activities: This Work Task is closed and activities will be tracked under E16: Conservation Area Site Selection.

Pertinent Reports: N/A

Work Task E16: Conservation Area Site Selection

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$375,000	$209,391.63	$1,446,492.30	$375,000	$600,000	$600,000	$400,000

Contact: Terry Murphy, (702) 293-8140, tmurphy@usbr.gov

Start Date: FY05

Expected Duration: FY25

Long-term Goal: Habitat creation.

Conservation Measures: CLRA1, WIFL1, BONY2, RASU2, WRBA2, WYBA2 CRCR2, YHCR2, LEBI1, BLRA1, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, FLSU1, MNSW2, CLMB2, PTBB2

Location: Reaches 1-7, Arizona, California, and Nevada

Purpose: Request, identify, prioritize, visit, and recommend potential conservation areas to the Steering Committee for development under the habitat creation requirements of the LCR MSCP.

Connections with Other Work Tasks (past and future): The process developed under this work task will guide the selection of future conservation area sites to be developed under Section E work tasks. Starting in FY14, Work Task E15: Backwater Site Selection will be closed and activities and expenditures will be included under E16.

Project Description: Reclamation will work with landowners to secure an interest in land and water resources sufficient to create and maintain LCR MSCP habitats. It is anticipated that willing landowners will enter into some form of long-term commitment that secures resources for the 50-year term of the LCR MSCP.

When developing a financial value for subject lands and water, Reclamation must administer a Federal appraisal using the Department of Interior's designated appraisal services office. The cost of appraisal services is typically captured in the E16 budget.

As new sites are evaluated and prioritized, each new site will be presented to the Steering Committee either through the site selection process or, if acquisition is required, through a Land and Water Resolution or Program Decision Document. This approval allows Reclamation to move forward with the new site and prepare specific restoration development and monitoring plans guiding implementation of the conservation area.

Previous Activities: Guidelines have been developed to describe the process for working with interested parties to identify sites for screening and evaluation as potential conservation areas for creating and maintaining habitat over the term of the LCR MSCP.

Starting in FY14, Backwater Site Selection previously tracked under Work Task E15 will be tracked under E16. This change reflects the change in process to select backwaters and allows integration of multiple land cover types on a Conservation Area whose primary purpose is the creation of a backwater.

FY12 Accomplishments: We continued to attend and contribute at numerous meetings held with other resource agencies and tribal entities. We also conducted quarterly meetings with the USFWS representatives from all four federal refuges on the lower Colorado River both complex managers, and staff from both the Ecological Services Office and the Arizona Fisheries Research Office of the USFWS.

Pretty Water Conservation Area, previously identified as the Shark's Tooth Conservation Area and approved by the CDFW, was approved by the Steering Committee for development. A draft land use agreement was prepared and is expected to be signed early in FY13. After signing, initial project activities such as permitting will comment and tracked under Work Task E33: Pretty Water Conservation Area. Once complete, the Conservation Area is intended to establish over 500 acres of honey mesquite within the state of California.

Discussions with CDFW, USFWS, and Reclamation have centered on the development of PVER-South, of which the majority of lands are owned by CDFW. As discussed, the restoration would include both connected and disconnected backwater as well as cottonwood-willow and honey mesquite. Because development of marsh and backwater projects require the collection of significantly more site-specific data than projects targeting honey mesquite, their development plans will take longer to be drafted.

Restoration concepts for the Bard Water District-Haughtelin Lake Wildlife Area were developed. However, multiple issues such as land ownership, water rights, and long-term management need to be addressed.

FY13 Activities: Coordination with resource agencies and attendance at planning meetings is expected to be expanded with the inclusion of Work Task E15.

Discussion with Bard Water District on the Haughtelin Lake Wildlife Area is expected to continue. Additional opportunities for restoration on tributaries to the lower Colorado River are also being discussed. Specifically, the Nature Conservancy has prepared a review of restoration options for the lower Gila River. We are also actively involved in potential restoration opportunities on the Virgin River on lands owned by the NDOW and managed as the Overton Wildlife Management Area.

Proposed FY14 Activities: Coordination with resource agencies and attendance at planning meetings is expected to be similar to those in FY13. FY14 activities will be

expanded to address all Conservation Area selection and continue to focus on the identification and evaluation of potential conservation areas, primarily in California.

Development and construction of the Mohave Valley backwater, 52 acres of open water and emergent marsh, is tentatively scheduled pending successful negotiations with property owners and leasee's. The backwater is located in Reach 3 and therefore would be open to the main channel of the river. Although the focus is on creation of a backwater for native fish, integration of all four land cover types (open water, marsh, honey mesquite, and cottonwood-willow) is being proposed.

Pertinent Reports: N/A

Work Task E17: Topock Marsh Pumping

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$2,550,000	$2,209,091.02	$1,101,023.34	$70,000	$1,000	$1,000	$1,000

Contact: Ashlee Rudolph, (702) 293-8178, arudolph@usbr.gov

Start Date: FY06

Expected Duration: FY25

Long-term Goal: Avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh.

Conservation Measures: AMM2

Location: Reach 3, Havasu NWR, river miles 235-244, Arizona

Purpose: To avoid flow-related covered impacts on covered species habitats at Topock Marsh by constructing a reliable and manageable water control structure that diverts water both gravitationally and through pumping.

Connections with Other Work Tasks (past and future): None

Project Description: Topock Marsh has been identified as an important area for LCR MSCP covered species such as Yuma clapper rail and the southwestern willow flycatcher. At times, flow-related activities could lower river elevations to levels that will disrupt existing gravitational diversions of water from the river to the marsh. Construction of a new control structure that diverts water through both gravitational and pumped means ensures the delivery of water to the marsh even when river elevations are low.

Previous Activities: In early 2010, the LCR MSCP committed $1 million toward the construction of the Firebreak Canal, which improved the delivery of water to Topock Marsh by greatly reducing transmission losses that occurred when using the old, unlined inlet canal. In return for the LCR MSCP's contribution, the USFWS rendered correspondence stating that the LCR MSCP had met its construction obligations under AMM2.

At the LCR MSCP Steering Committee Meeting on April 28, 2010 the decision was made to provide the USFWS with all the Operation and Maintenance funds, required under the second part of AMM2, in a lump sum of $2.55 million during Fiscal Year 2012. It was agreed that upon USFWS's receipt of the funds a second letter would be

rendered to the LCR MSCP affirming that all Operation and Maintenance commitments under AMM2 had been fulfilled.

FY12 Accomplishments: In January 2012 USFWS rendered a second letter to the LCR MSCP affirming that all commitments under AMM2 would be fulfilled with the commitment of an additional $2.5 million for Operation and Maintenance. In March 2012 the funds were made available from the LCR MSCP to the USFWS via an Interagency Agreement. The final USFWS service letter, releasing the LCR MSCP from any further commitments under the AMM2 conservation measure, was presented to the Steering Committee during the October 2012 meeting. Since no construction actions have occurred, the current balance available to the USFWS for construction activities and for utility expenses after construction is $2,550,000. It is anticipated that these funds will be fully expended by FY25.

FY13 Activities: Although the Avoidance Measure has been completed, the work task will remain open and be used to track USFWS expenditures until all funds have been expended. Construction on the pump station has not yet begun pending a design review initiated by the USFWS. The design review is anticipated to be complete by January 2013. USFWS is likely to begin construction in fall 2013. No further actions, beyond tracking USFWS expenditures, are required by the LCR MSCP.

Proposed FY14 Activities: Tracking the progress and expenditures of the USFWS.

Pertinent Reports: N/A

Work Task E18: Law Enforcement and Fire Suppression

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$325,000	$326,234.76	$897,622.68	$325,000	$250,000	$250,000	$250,000

Contact: Jed Blake, (702) 293-8165, jblake@usbr.gov

Start Date: FY06

Expected Duration: FY55

Long-term Goal: Created habitat protection.

Conservation Measures: CMM1.

Location: Reaches 1-7.

Purpose: Provide law enforcement and fire suppression in support of habitat created under the LCR MSCP.

Connections with Other Work Tasks (past and future): Law enforcement and fire suppression are anticipated to be integral management components for all habitats created through Section E work tasks.

Project Description: This project funds law enforcement and fire protection for created habitat. It is assumed that BLM, USFWS, AGFD, CDFW, NDOW, BIA, CAL-Fire and other agencies will conduct law enforcement and fire fighting activities on the river. Law enforcement and fire suppression strategies have been developed at the programmatic level and for each individual Conservation Area. As new Conservation Areas are incorporated into the program, site specific fire and law plans will be drafted.

Previous Activities: The BLM Colorado River District office based in Lake Havasu, Arizona provides fire management support services to the LCR MSCP. BLM is responsible for fire related activities and is the lead wildland fire agency for Conservation Areas on both state and Reclamation lands. Conservation Areas located on federal refuges are managed for wildland fire and law enforcement by the USFWS.

The BLM also conducts patrols on the site, outreach to land owners, risk assessment, site mapping and identification of critical infrastructure. The inspections are intended to proactively identify and address potential wildland fire management issues. Recommendations are discussed with the land owner and the LCR MSCP project manager. These recommendations help identify high risk areas, areas in need of fuels reduction, damage to infrastructure and management of visitor use areas.

FY12 Accomplishments: A majority of activities in FY12 were devoted to allowing fire and law agencies to become familiar with the conservation areas located in Yuma to the international border. Imperial Ponds, Laguna Division, Yuma East Wetlands and Hunters Hole were all visited; site visits documented and fire management services required were discussed. The program is actively working with Border Patrol and other law local law enforcement agencies to ensure the safety of staff working at Hunter's Hole. Funds from E18 were used to assist in the rehabilitation of the groundwater well at E31 Hunters Hole to increase capacity and allow for remote operation. This, in conjunction with automation of the irrigation valves, will allow rapid flooding of the cells without staff being present in case of a law or fire incident. It was anticipated that the LCR MSCP would approach the Bureau of Land Management, United States Border Patrol, City of Yuma, Quechan Indian Tribe, and the Arizona Game and Fish Department for law and fire management at Yuma East Wetlands; however, the land use agreement has not been signed yet so this activity will be delayed until FY13.

The BLM successfully conducted fire management support services at the Palo Verde Ecological Reserve (PVER) and for the Cibola Valley Conservation and Wildlife Area (CVCWA). Activities on the conservation areas included: attendance at irrigation district meetings, proactive patrols on the conservation areas, site visits with LCR MSCP staff, signage placement, budget meeting attendance, communicating with local irrigators, working with the local state game wardens and habitat managers.

In the August 2012 a driving tour with BLM law enforcement and fire personnel was conducted in the greater Yuma Area. Fire history on the new sites was discussed; site accessibility and potential fuels reduction activities were identified. Additionally, fire and law agencies located in the adjacent communities were identified and slated to be contacted as the conservation areas are developed.

A revision to the LCR MSCP conservation area specific plans was conducted in FY12. The revisions included updated maps, points of contacts for supporting agencies, correct telephone numbers included, and reproduction.

There were no fires on LCR MSCP conservation areas during FY12.

FY13 Activities: A pre-fire meeting in the Yuma area will be conducted with fire and law staff from the BLM, USFWS and local state agencies. Unlike conservation areas located in the Blythe area where jurisdiction is much clearer; the Yuma area has much more overlap between federal, state, tribal and city jurisdictions.

To help make the conservation areas known to fire and law staff, additional site visits and coordination meetings will be held. The LCR MSCP will be asking for the BLM's assistance in helping to outreach to the multiple fire agencies located in the area. A key reason the LCR MSCP is asking for the BLM's help is that the BLM maintains "mutual aide agreements" with every fire agency on the lower Colorado River. These agreements allow for partner agencies to respond to fire on conservation areas for up to 24 hours. When responding to a fire on conservation areas, the local fire agency will have been

informed of the habitat value, access routes, land ownership and limited use of suppression tactics on the site due to threatened and endangered animals.

Several fire plans will be drafted by the BLM and incorporated into the BLM's state fire plan. As conservation areas are developed the state fire plan will be revised to reflect the new site footprint in the following year's adoption of the plan. Some areas with past revegetation efforts such as Hunters Hole will be a revision to the state plan whereas new projects such as Laguna Division Conservation Area will be drafting of a new plan.

LCR MSCP staff is looking at new fuels reduction methods and techniques that can be implemented in the following years with the land owners consent. Proactive measures can be implemented through state conservation crews, internal staff or by commercial vendor.

Proposed FY14 Activities: Working with local fire and law agencies proactively in support of the conservation areas will continue in FY14. Map creation, site visits, coordination meetings, attendance at agency staff meetings, etc. is envisioned. One facet of the law and fire program for the LCR MSCP is that support agencies do not have the resources to seek out the Program for information. Rather the LCR MSCP must outreach to these agencies and make the conservation areas intention known.

The BLM will formally adopt the new Laguna Division fire plan and the revised fire plan for Hunters Hole. It is envisioned that the new conservation areas (i.e. Parker Dam Camp) will soon be established and will have the need for law and fire management. As new conservation areas are developed the BLM may be asked to be the lead law and fire agency or the LCR MSCP will work with the appropriate state, city or tribal agencies leveraging the existing mutual aide agreements in place.

Fuel load reduction may occur on or adjacent to conservation areas. Chemical treatments, manual, mechanical and chipping of invasive species are all generally accepted fuels reduction techniques. The BLM, USFWS, and supporting fire management offices will help advise the LCR MSCP on implementation of new fire breaks, vehicle turn-arounds, and associated fire management actions.

Pertinent Reports: N/A

Work Task E21: Planet Ranch, Bill Williams River

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$1,500,000	$44,803.79	$207,759.86	$40,000	$40,000	$40,000	$40,000

Contact: Gregg Garnett, (702) 293-8347, ggarnett@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Habitat creation.

Conservation Measures: CLRA1, WIFL1, WIFL2, WRBA2, WYBA3, CRCR2, LEB1, YBCU1, YBCU2, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, MNSW2, CLNB2, PTBB2.

Location: Reach 3, Bill Williams River, 11 miles east of River Mile 190, Arizona.

Purpose: Create and manage a mosaic of native land cover types for LCR MSCP covered species.

Connections with Other Work Tasks (past and future): This work task was previously included in the Draft FY05 Work Tasks as Planet Ranch, Bill Williams River (E4). Costs associated with a federal land and water appraisal conducted in FY08 were captured under work task Conservation Area Site Selection (E16). E21 was closed at the end of FY05, but was reopened in FY09 to track expenditures during negotiations.

Project Description: Planet Ranch (owned by Freeport-McMoRan), encompasses approximately 8,400 acres, of which approximately 2,400 acres had previously been farmed for alfalfa. In 2008, the LCR MSCP Steering Committee approved a land and water resolution, which authorizes Reclamation to enter into negotiations to secure approximately 3,418 acres of land and 4,668 acre-feet of water per year. The sum of $8,300,000 to secure this land and water was determined through the federal appraisal process. Negotiations are also underway to allow the Bureau of Land Management to secure the remaining acreage, which has no water entitlement from the Bill Williams River. Once finalized, the terms and conditions to secure the land and water resources will be brought back to the Steering Committee.

An estimated 550 acres of primarily cottonwood-willow land cover type is anticipated to be developed on Planet Ranch. In addition, another 396 acres of cottonwood-willow land cover type on the Bill Williams River National Wildlife Refuge is afforded protection by securing the Planet Ranch property. However, since groundwater is pumped for

irrigation, the opportunity exists to incorporate disconnected backwaters into the restoration.

Previous Activities: Reclamation evaluated Planet Ranch and developed a conceptual design, assuming the entire ranch and water entitlement were secured for the program. This information is posted on the LCR MSCP website as *Planet Ranch: Potential Restoration Site, Preliminary Site Analysis and Conceptual Design*.

Regulatory compliance activities required under the National Environmental Policy Act, the Endangered Species Act, and the National Historic Preservation Act are complete, but may be updated at the time of property purchase. Native American consultation and a Class I Cultural Survey as prescribed in section 106 of the National Historic Preservation Act was completed in FY11.

FY12 Accomplishments: Negotiations to secure the land and water resources for the project continued; specifically, final details of the lease, donation, and water agreements are still being negotiated. Once finalized, the terms and conditions to secure the land and water resources will be brought back to the Steering Committee. Expenditures were far below the projected budget in FY12 due to delays in acquisition.

Proposed FY13 Activities: Negotiations to secure the land and water resources for the project will continue with Freeport McMoRan. Once an agreement has been reached, a land and water resolution will be presented to the Steering Committee. The budget continues at $40,000 to allow for continued involvement and negotiations.

Proposed FY14 Activities: Negotiations to secure the land and water resources for the project will continue with Freeport McMoRan. Once an agreement has been reached, a land and water resolution will be presented to the Steering Committee. The budget continues at $40,000 to allow for continued involvement and negotiations.

Pertinent Reports: N/A

Work Task E24: Cibola NWR Unit #1

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$1,000,000	$862,441.09	$3,015,089.43	$1,100,000	$500,000	$900,000	$900,000

Contact: Darrin Miller, (702) 293-8166, dmiller@usbr.gov

Start Date: FY07

Expected Duration: FY55

Long-term Goal: Habitat creation.

Conservation Measures: WIFL1, WRBA2, WYBA3, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, CLNB2, PTBB2.

Location: Reach 4, Cibola National Wildlife Refuge, one-half mile east of River Mile 97, Arizona.

Purpose: Create and manage a mosaic of native land cover types for LCR MSCP covered species.

Connections with Other Work Tasks (past and future): This work task incorporates Cottonwood Genetics Study (E6), Mass Transplanting Demonstration (E7), and upon completion, the Seed Feasibility Study (E8) with additional adjacent acreage on Unit #1 of Cibola NWR. After completion of the research projects in FY07, operation and maintenance of these work tasks will be tracked under E24.

Project Description: Reclamation currently has a number of established projects at Unit #1, which includes restoration research and demonstration projects that began as a pre-cursor to the LCR MSCP. In 1999, the USFWS and Reclamation planted the Cibola Nature Trail and established 34 acres of cottonwood-willow and mesquite land cover type within Unit #1. In 2002, the USFWS and Reclamation planted another approximately 18 acres of cottonwood-willow in Unit #1 north of the Nature Trail. Four additional fields of approximately 20 acres each in Unit #1 are occupied by three projects that have been fully or partially funded by the LCR MSCP. These include Cottonwood Genetics Study (E6), Mass Transplanting Demonstration (E7), and Seed Feasibility Study (E8). To the east of these projects are an additional two agricultural fields. A 50-year land use agreement with the USFWS to develop and maintain land covers on Unit #1 has been signed.

Work Task E24 incorporates the aforementioned existing projects and agricultural land as well as substantial additional adjacent acreage into a single conservation area. The land included in Unit #1 (E24) encompasses approximately 950 acres and ranges in cover and

use from agricultural fields, to partially improved land, to undeveloped land. The acreage in Unit #1 is targeted primarily for cottonwood-willow cover type development for SWFL, but will also likely include a mosaic of native habitats including riparian, wetland, and riparian-upland interface areas.

The acreage in Unit #1 has been categorized into five areas. Area #1 (193 acres) includes active agricultural fields, existing (converted agriculture) cottonwood-willow cover type, and ongoing LCR MSCP research and demonstration projects. Area #2 (Hippy Fire) includes 338 acres that have been cleared as a result of the Hippy Fire. Cibola NWR has performed substantial capital improvements to this area over the past few years including clearing, laser-leveling, field construction, and irrigation and drainage infrastructure installation. The area is currently planted in a cover crop and is being conditioned to improve soil salinity. Areas #3 (Baseline 90) and #4 (North 160) are 107 and 158 acres of undeveloped land and fallowed agricultural land, respectively. The areas will require clearing, leveling, installation of irrigation infrastructure, and soil conditioning before development for native riparian species. Area #5 (Crane Roost, 154 acres) has been cleared and leveled and is currently irrigable. A portion of this area has been planted with cottonwood, willow, and mesquite species. The area will require upgrades to the irrigation system and needs further soil conditioning to continue development.

Previous Activities: A land use agreement and exhibit specific to this conservation area have been signed. Several research and development projects are underway or completed and are currently being managed as land cover types for various LCR MSCP covered species. Through FY11, 270 acres of native trees have been established within the 950 acre site.

FY12 Accomplishments:

Maintenance/Restoration/Management. Ongoing infrastructure improvements including drain construction and repair occurred during this fiscal year. Site maintenance including irrigation, invasive and nonnative weeding, and other associated farm services were conducted.

The northern portion of Area #2 (Hippy Fire) is scheduled to be planted in FY13. To facilitate the planting, over 147,000 trees were purchased in FY12 and will be planted on 94 acres in the spring. The trees include a mix of cottonwood, coyote willow, Goodding's willow, and honey mesquite.

Monitoring. Vegetation monitoring plots were surveyed at full intensity at the following sites: Nature Trail (24 plots), Mass Planting (6), Crane Roost (27), and Cibola Cottonwood North (6). Seed bank samples were collected in February and May at Cibola Unit 1 Area 1 field 8 and delivered to UNLV for growout and identification (Work Task 54).

Small mammal trapping was conducted at the Nature Trail, Cottonwood Genetics fields, and the Crane's Roost southernmost field. Cotton rats were documented at Nature Trail and the Cottonwood Genetics fields. The long term bat station ran most of the year and

all LCR MSCP species were detected, but activity was low. One red bat and one yellow bat were captured at the Nature Trail; this was the first capture of the red bat at Cibola NWR. California leaf-nosed bats were also captured.

General avian species were surveyed to determine breeding status at the Nature Trail, Crane Roost, and the LCR MSCP research and demonstration fields using area search and spot mapping techniques. The Sonoran yellow warbler and Arizona bell's vireo were the only LCR MSCP covered avian species found breeding within the conservation area.

Bird banding was again conducted at the Nature Trail, following the MAPS protocol. Ten surveys were conducted between May and August. The yellow warbler was the only LCR MSCP species captured.

No breeding southwestern willow flycatchers were detected at the Cibola Nature Trail, and all birds were detected before June 16th when birds are considered to be residents. Four migratory birds were detected and the site was surveyed five separate times.

Yellow-billed cuckoos were detected at the Nature Trail, Mass Planting and Cranes Roost fields, with most detections at the Cranes Roost. Two nests were found at the Crane Roost.

Proposed FY13 Activities:

Maintenance/Restoration/Management. Planting of the northern portion of area #2 (Hippy Fire) is scheduled for the spring of 2013. The area has been in a cover crop since 2008, beginning with a salt-tolerant grass and converted to alfalfa in 2010. Overall, site maintenance will continue including regular watering and field maintenance of all the established fields within the Conservation Area's portion of Unit #1. Pre- and post-development monitoring will continue at Cibola NWR Unit #1 Conservation Area.

Monitoring. FY13 plots were surveyed at full intensity at the following sites: Nature Trail (24 plots), Mass Planting (6), Crane Roost (27), and Cibola Cottonwood North (6).

Additional seed bank samples will be collected in early 2013 and before fields are prepped for experimental planting.

Wildlife monitoring will continue at the FY12 levels, and include general bird surveys, SWFL Surveys, YBCU surveys, small mammal surveys, and bat surveys.

Proposed FY14 Activities: No additional restoration or tree planting is scheduled for FY14. Restoration will continue in FY16 after large scale planting at the Laguna Division Conservation Area is complete. Site maintenance will increase slightly as new acres of riparian cover-type are established (FY13), but these activities are expected to include the same services needed across the rest of the established portions of the Conservation Area. Water for irrigation of the trees and to simulate historical river flooding is provided by Cibola NWR. A local farmer is utilized to divert and irrigate established land cover types based on site conditions and species planted. The farmer provides local knowledge of

weather and farming practices, which are applied to the maintenance of the Conservation Area. The farmer and his employees are an on-site presence and provide early recognition of issues or concerns. The farmer is also responsible for assessing the water needs of the trees, and in coordination with the Refuge and the LCR MSCP, delivers the water. Maintenance activities include grading access roads, maintaining field borders, irrigation canals, invasive plant control including hand removal and application of herbicides, and physically opening and closing irrigation gates of established land cover types. Annual costs associated with operating irrigation pumps are shared with the Refuge and are included in the annual maintenance costs. Vegetation monitoring will continue at above listed sites. Experimental plantings may take place at Area 1 field 8 (Work Task C54). Wildlife Monitoring will continue for the same species as FY13.

Pertinent Reports: The *2012 Cibola NWR Unit #1 Conservation Area Annual Report*, which summarizes any planting conducted, site management, results of monitoring, and any recommendations for future adaptive management will be posted after integration of data collected throughout the calendar year.

Work Task E25: Big Bend Conservation Area

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$30,000	$16,826.97	$1,100,514.66	$30,000	$30,000	$30,000	$30,000

Contact: Jed Blake, (702) 293-8165, jblake@usbr.gov

Start Date: FY09

Expected Duration: FY55

Long-term Goal: Habitat protection

Conservation Measures: BONY2, RASU2, and FLSU1.

Location: Reach 3, NV, River Mile 266.5.

Purpose: Protection of an existing backwater from development, which would result in 15 acres of backwater credit.

Connections with Other Work Tasks (past and future): Marsh bird surveys are conducted under D1 while fish surveys have been conducted under multiple Work Tasks in section C and F5.

Project Description: The Boy Scout Camp purchased by the Southern Nevada Water Authority (SNWA) combined with the adjacent backwater managed by the State of Nevada has collectively been identified as the Big Bend Conservation Area (BBCA). The conservation area includes approximately 15 acres of backwater within the Nevada portion of the Colorado River that will be protected, and approximately 15 acres of upland area adjacent to the backwater. The dry upland area is planned to be enhanced for education and outreach purposes by SNWA at minimal cost to the program and is being completed in concert with protection of the backwater. The properties are adjacent to and buffered by Big Bend State Park.

Past native fish monitoring efforts have indicated the presence of native fishes in and adjacent to the existing backwater. Successfully securing the site will result in 15 acres of backwater habitat credit that benefits flannelmouth sucker, razorback sucker, and bonytail in Reach 3 of the LCR MSCP planning area. Reach 3 maintains the only self-sustaining population of flannelmouth sucker and has very few undeveloped backwaters, which make protection of the existing backwater a priority for the LCR MSCP. The Colorado River and Reach 3 in particular are experiencing extensive urban development. The BBCA, formerly known as the Boy Scout Camp, maintains access to the river via the adjacent backwater and would make the area a likely candidate for development. Securing the property for the LCR MSCP ensures the commitment of adjacent land

owners, and controls future development in the surrounding areas. Long-term security of the property provides protection to the backwater and allow for future restoration activities as warranted.

Previous Activities: The land use agreement documents the roles and responsibility of each party pertaining to continual management of the BBCA. In FY09, SNWA assumed the responsibility of restoring the upland portion of BBCA at minimal cost to the program. Reclamation reviewed and concurred with the site improvement plans to ensure compatibility with LCR MSCP. Saltcedar was removed from the upland site and roughly 800 mesquite trees were planted. The LCR MSCP provided the mesquite trees, development of the existing groundwater well, and procurement of a portion of the irrigation system in support of SNWA's upland restoration action.

In FY10, SNWA was reimbursed for approximately one half of the funding used to secure the Boy Scout Camp property through an in-kind contribution. SNWA continued their effort to establish native plants on the upland property and ensure compatibility with the goals of backwater protection with the support of the LCR MSCP. Also in FY10, NDOW received approval from the Nevada Wildlife Commission to install two buoys, which have been placed at the entrance of the backwater.

FY12 Accomplishments:

Maintenance/Restoration/Management. Selective clearing of non-native vegetation, to reduce the risk of fire, was conducted using youth conservation crews funded with non-cost share dollars. Once cleared, non-native material was chipped and spread onto the trail system. Mulch allowed for dust control and road stabilization for work trucks entering the site.

The irrigation well onsite failed in August 2012 and required repair. Both the SNWA and Reclamation contributed to the rehabilitation of the irrigation system. A temporary irrigation system repair was completed and it is forecasted to be used for the next two years. The LCR MSCP will continue to support SNWA's effort to establish native plants on the upland property and ensure compatibility with the goals of backwater protection.

Monitoring. Marsh bird surveys were conducted during March, April and May utilizing the National Marsh Bird Monitoring Protocol. Four survey points were established within the boundaries of the conservation area. No LCR MSCP species were detected.

Small mammal trapping was conducted in the spring and fall of 2012. Two cotton rats were captured in spring of 2012 and three cotton rats were captured in the fall of 2012.

All fisheries surveys for 2012 were conducted during February through May as part of the ongoing flannelmouth sucker activities associated with work task C15. Two LCR MSCP covered species were contacted. Two razorback suckers (351 and 470 mm TL) were contacted during March and May sampling (one during each period), and a single sub-adult flannelmouth sucker (365 mm TL) was captured during the April survey.

FY13 Activities:

Maintenance/Restoration/Management. The project will continue to host youth conservation crews funded with non-cost share dollars. The site provides a good venue for youth to conduct habitat maintenance and is consistent with the goals and objectives of the conservation area. LCR MSCP staff will be available for coordination meetings, site visits, meetings with adjacent land owners and similar meetings when required.

During heavy rain storms, debris and moving water enter the parking lot causing erosion damage. Improvements to the parking lot and drainage area of the site will be conducted in the spring. Cooperatively, Reclamation and SNWA have cleaned up a four-car garage used for dry storage and also serves as a meeting area. Paint, weatherization and removal of debris will be conducted.

Monitoring. Marsh bird surveys will be conducted during March, April and May using the National Marsh Bird Monitoring Protocol at the four established survey points. Small mammal trapping was conducted in January 2013 with two Colorado River cotton rats captured. Trapping will also take place during the fall of 2013.

Fisheries surveys will be conducted. Electro-fishing, larval light trapping, and trammel nets will be accomplished monthly from February through May at locations, which are dictated by water level, or at locations, which have historically produced native fish. Water quality profiles will be performed during each monitoring event and quarterly outside of the monitoring period.

Proposed FY14 Activities:

Maintenance/Restoration/Management. The project may continue to host youth conservation crews funded with non-cost share dollars. The site provides a good venue for youth to conduct habitat maintenance and is consistent with the goals and objectives of the conservation area. The LCR MSCP will continue to support SNWA's effort to establish native plants on the upland property and ensure compatibility with the goals of backwater protection.

Monitoring. Marsh bird surveys will be conducted during March, April and May using the National Marsh Bird Monitoring Protocol at the four established survey points.

Fisheries surveys will be conducted. Electro-fishing, larval light trapping, and trammel nets will be accomplished monthly from February through May at locations, which are dictated by water level, or at locations, which have historically produced native fish. Water quality profiles will be performed during each monitoring event and quarterly outside of the monitoring period.

Pertinent Reports: The *2012 Big Bend Conservation Area Annual Report*, which summarizes any planting conducted, site management, results of monitoring, and any recommendations for future adaptive management will be posted after integration of data collected throughout the calendar year.

Work Task E27: Laguna Division Conservation Area

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$6,290,000	$6,562,631.03	$8,146,215.66	$5,000,000	8,600,000	$4,000,000	$1,500,000

Contact: Nick Schultz, (702) 293-8089, nschultz@usbr.gov

Start Date: FY10

Expected Duration: FY55

Long-term Goal: Habitat creation.

Conservation Measures: CLRA1, WIFL1, YHCR2, LEBI1, BLRA1, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, PTBB2

Location: Reach 6, Federal Lands, River Mile 43-49, California and Arizona.

Purpose: Create and manage a mosaic of native land cover types for LCR MSCP covered species.

Connections with Other Work Tasks (past and future): This was a new start for the LCR MSCP in FY10.

Project Description: The Laguna Division, river miles 43-49, has been identified as having potential for large-scale riparian and marsh restoration and enhancement (approximately 1,200 acres). In 2007, the Laguna Division Planning Group was formed to identify potential restoration projects within the division. The intent was to identify potential restoration projects and combine resources to ensure any actions taken in the area would not affect other potential restoration projects or ongoing river operations.

The Laguna Division Planning Group consists of representatives from the following organizations:

- Arizona Game and Fish Department
- Arizona Department of Water Resources
- California Department of Fish and Wildlife
- Pacific Institute
- U.S. Fish and Wildlife Service
- Bureau of Land Management
- Bureau of Reclamation

The Laguna Division Conservation Area (LDCA) is a relatively wide, undeveloped area with a series of low linear depressions, which are remnants of former river meanders. The intent of this project is to create marsh and riparian land cover types by shaping and contouring multiple meandering channels. These land cover types will be maintained with a maximum base flow of 100 cubic feet per second (cfs) from the Gila Gravity Canal sluicing gates. Open water areas have been created in the form of linear excavations aligned with historic river meanders east of lands identified as future stockpiling areas for dredged silt removed from the river (Laguna settling basin). To minimize earthwork, cuts and fills follow the existing topography where feasible. Adjacent terraces are graded to allow flooding and promote the establishment of native riparian species. Water control structures have been designed to manage water levels. Upland vegetation will receive water through flooding.

To support the concept described above, inlet modifications to the point of diversion at the Gila Gravity Canal sluicing gates will be made to allow for up to 100 cfs capacity. The diversion pipe system has been engineered to allow for maximum management flexibility including diverting the entire flow to Mittry Lake Wildlife Area, LDCA, or the historic river channel. The Water Accounting Agreement will be used to support LDCA.

In coordination with the Laguna Planning team, several conceptual designs were created with the intent of determining the technical feasibility of implementing a large scale restoration project. In addition, a team was established to determine the availability of water to create and support the new habitat. The combination of technical feasibility, water availability, and cost effectiveness was used to determine the project's implementation.

A final design was presented and approved as a new start project by the LCR MSCP Steering Committee in October 2009 with the passing of resolution 10-002. The final Environmental Assessment was prepared for LDCA in February 2011. A Finding of No Significant Impact (FONSI) was signed by Reclamation, which allowed earthwork to commence.

Previous Activities: Procurement and delivery of approximately 4,000 feet of 48-inch HDPE pipe was completed in early 2011. Fusion and installation of the pipeline began in summer of. Clearing of Reach 1 began in fall 2011.

A pre-development monitoring plan was developed based on vegetation type, presence/absence of standing water or moist soils, and the presence/absence of LCR MSCP species in adjacent areas. The land adjacent to LDCA has been surveyed for many years by AGFD for marshbirds including Yuma clapper rail, California black rail and least bittern, which are LCR MSCP covered species. All three of these species are present within the wetland/marsh area during the breeding season. Surveying of marshbirds continued until work began at the site.

FY12 Activities:

Construction, Maintenance/Restoration/Management. Continued analysis and design refinements occurred between the Laguna Planning team, local stakeholders, state and federal agencies, and Reclamation. Clearing of Reach 1 (over 500 acres) was completed.

The newly created topography of Reach 1 was verified by utilizing Light Detection and Ranging (LIDAR). This is an optical remote sensing technology, flown in late summer, which was used to create contour mapping. This mapping was used to verify the original design drawings.

Six ground water monitoring wells have been installed in Reach 1 and will be instrumented with data loggers to collect ground water elevations and salinity throughout the lifetime of the project. Modeling to forecast groundwater and surface water interaction once diversions begin and 100 cfs is delivered to the site have been completed.

A water control structure, which allows the delivery of water into Mittry Lake from Reach 1, was constructed. This was the first of four water control structures to be built. Pipeline installation was completed in April 2012 with the exception of the diversion structure, which is scheduled for FY13.

The irrigation water inlet structure was relocated from the Gila Canal storage basin to one of the Gila sluiceway gates. Several months of meetings were scheduled with representatives from multiple offices within Reclamation to design and approve constructible drawings.

Monitoring. No monitoring was completed in FY12 due to construction.

FY13 Activities:

Construction, Maintenance/Restoration/Management. As construction progresses, further analysis and design refinement will occur between local stakeholders, state and federal agencies, and Reclamation.

Clearing activities began in Reach 2 in summer 2012 and are expected to be substantially completed in 2013 (over 500 acres). Over 800,000 marsh plants were ordered for approximately 150 acres in Reach 1 and are scheduled to be planted late in FY13. Cottonwood, willow, and other riparian species will be ordered in 2013 for planting of Reach 1 the following year. Invasive weed control within the project footprint will continue and extend through 2018.

Construction of remaining water control structures will continue through May 2013. Test flooding of Reach 1 is anticipated to occur in summer 2013, to verify groundwater elevations in preparation for marsh planting in late August 2013. Between test-flooding cycles, the Reach 1 area will be re-contoured, if necessary, to correct discrepancies

between the design elevations and site conditions caused by wind, rain, and erosion. During test-flooding, the site will be evaluated for habitat viability, and planting plan changes will be made as necessary to ensure the highest rate of survivability.

Monitoring. There will be no monitoring of species during construction. Once vegetation has been established monitoring will commence.

Proposed FY14 Activities:

Construction, Maintenance/Restoration/Management. Clearing and contouring of Reach 2 is expected to be completed. The final and southern most water control structure is scheduled to be constructed. Due to the scale and complexity of the LDCA site, planting is expected to take up to 8 weeks for each sequence. Riparian and mesquite planting of Reach 1 will commence in February 2014. Marsh planting of Reach 2 will commence in August 2014. Final riparian and mesquite plantings are scheduled for spring 2015.

Control of invasive and non-native species is necessary and is expected to continue through 2018. Site maintenance, irrigation, and hand planting are expected to continue throughout clearing and construction, and for the first 3-5 years of plant establishment. Internal roads within the LDCA will be restricted to pedestrians and horses only; vehicles are prohibited. The LDCA project managers will work with the Bureau of Land Management to control access and provide law enforcement support.

Monitoring. There will be no monitoring of species during construction. Once vegetation has been established monitoring will commence.

Pertinent Reports: N/A

Work Task E28: Yuma East Wetlands

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$400,000	$75,792.42	$592,203.75	$450,000	$450,000	$450,000	$450,000

Contact: Jed Blake, (702) 293-8165, jblake@usbr.gov

Start Date: FY10

Expected Duration: FY55

Long-term Goal: Habitat creation.

Conservation Measures: CLRA1, WIFL1, CRCR2, YHCR2, LEBI1, BLRA1, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, PTBB2.

Location: Reach 6, Arizona, River Mile 31.

Purpose: To maintain newly created land cover types that benefit LCR MSCP covered species.

Connections with Other Work Tasks (past and future): Vegetation and species monitoring are being addressed under F1-F4.

Project Description: In 2000, the City of Yuma and the Quechan Tribe collaborated to analyze the potential of restoring the local wetlands along the Colorado River by removing over grown non-native species. Approximately 350 acres have been restored to create a mosaic of marsh, mesquite, and cottonwood-willow. YEW has adopted wildlife monitoring standards consistent with the LCR MSCP and has observed numerous LCR MSCP covered species on-site. LCR MSCP covered species and land cover type data sharing between the Yuma Crossing National Heritage Area (YCNHA) and Reclamation biologists is ongoing.

The project is located in Yuma, Arizona, on City of Yuma, Quechan Tribal, and Arizona Game and Fish Commission lands. In partnership with the Yuma Crossing National Heritage Area (YCNHA), the lead agency establishing the wetlands, the LCR MSCP will maintain existing habitat and support adaptive management activities to improve site conditions, which will benefit the LCR MSCP covered species.

Previous Activities: The LCR MSCP has drafted a long term land use agreement amongst the land owners and interested parties. The YCNHA is the lead agency working with land owners to complete the drafting and signing of a land use agreement by all

entities involved. Funding in the amount of $350,000 was provided by the LCR MSCP for maintenance of created habitats in FY10 and FY11.

FY12 Accomplishments:

Maintenance/Restoration/Management. Habitat maintenance funding was withheld in FY12 until the land use agreement is signed. All parties agreed to continue negotiations to allow additional time to present the drafted land use agreements to the Quechan Tribe and the City of Yuma.

As negotiations continued in FY12, LCR MSCP staff was made available to discuss upcoming maintenance activities and provide technical expertise for site infrastructure. Pumps, roads, fueling areas, site maintenance yard and the irrigation system continued to be maintained.

Management activities included LCR MSCP coordination meetings among biologists, stakeholder meetings on upcoming habitat maintenance activities, attendance of budget meetings, review of progress and financial reports, and updating the site safety plan.

Maintenance activities conducted by the landowners consisted of invasive weed control, herbicide control, replanting native species, irrigating and irrigation system maintenance, fueling, signage placement, and access road maintenance.

The site hosted a youth conservation crew in April funded by non-cost share dollars. The crew assisted with habitat maintenance activities. Clearing invasive species, planting native grasses, trail maintenance and general site clean-up were all conducted.

During summer 2012, the Yuma area received a heavy rain storm resulting in flooding at the Yuma East Wetlands. After flood waters receded equipment was brought in to re-contour roads, establish new drainage areas and reinforce berms separating the marshes and flooded fields.

Monitoring. At the Yuma East Wetlands surveys were conducted for general birds, small mammals, bats, vegetation, and marsh birds. The portions of the site, which have riparian cover types, were divided into three sections and each was surveyed eight times for birds as intensive surveys following the LCR MSCP double sampling protocol. No MSCP species were detected and a total of 26 breeding pairs comprised of 7 different species were detected. Southwestern willow flycatcher surveys were conducted and no resident or breeding individuals were detected. Yellow-billed cuckoo surveys were conducted and 2 birds were detected on 29 June and one bird was detected on 9 July. No evidence of breeding was found. The LCR MSCP vegetation monitoring protocol was implemented at YEW for the first time. Across the site 40 rapid plots and 14 intensive plots were surveyed. Small mammal trapping was conducted several times through 2012. Monthly bat surveys were conducted at YEW from May to September and western yellow bats were detected on 3 separate surveys and a western red bat was detected on 1 survey.

FY13 Activities:

Maintenance/Restoration/Management. Early in FY13, the Quechan Tribe, Arizona Game and Fish Department, City of Yuma, Yuma Crossing National Heritage Area, and Reclamation agreed in principle to the terms and conditions in the multi-party land use agreement. The land use agreement is scheduled for signatory in 2013 after review by the Steering Committee.

Habitat maintenance activities may restart in FY13 and mainly consist of removal of non-native species, application of herbicide, replanting of native species as required, maintenance and repair of irrigation systems, sign placement, fuel delivery, access road maintenance, fertilizer ordering and application, vehicle maintenance, safety meetings, and ensuring the site meets Arizona occupational safety and health work standards.

Management activities in FY13 will consist of administration of the federal agreement, implementing the LCR MSCP vegetation and wildlife monitoring protocols for the habitat, standard operating procedures for the irrigation system, 2013 Safety Plan update, water accounting data submitted to Reclamation, coordination meetings with stakeholders, and ensuring the site is managed for LCR MSCP covered species.

Monitoring. The same monitoring activities that took place in 2012 will again take place in 2013 with some minor modifications. Small mammal surveys were conducted in November 2012 and the first YHCR (two individuals) were captured in native vegetation at the site. Bird surveys will again be conducted but, in order to adequately survey the site for birds, the site will be divided into four survey areas instead of three. This is because as the vegetation matures, it is anticipated that a greater number of birds will be present at the site necessitating smaller survey areas. The number of vegetation survey points will be increased to 60 to increase the sample size at YEW.

Proposed FY14 Activities: Habitat maintenance will continue in FY14, assuming the land use agreement has been signed. Maintenance will primarily consist of removal of non-native species, application of herbicide, replanting of native species as required, maintenance and repair of irrigation systems, sign placement, fuel delivery, access road maintenance, fertilizer ordering and application, vehicle maintenance, safety meetings, and ensuring the site meets Arizona occupational safety and health work standards.

Management activities in FY14 will consist of: administration of the federal agreement, implementing the LCR MSCP vegetation and wildlife monitoring protocols for the habitat, standard operating procedures for the irrigation system, 2014 Safety Plan update, water accounting data submitted to Reclamation; and coordination meetings with stakeholders. Monitoring activities will continue in FY14 as conducted in FY13.

Pertinent Reports: N/A

Work Task E30: Flat-tailed Horned Lizard

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$50,000	$166,849.05	$255,733.98	$0	$0	$0	$0

Contact: Jed Blake, (702) 293-8165, jblake@usbr.gov

Start Date: FY11

Expected Duration: Completed in FY12

Long-term Goal: Acquisition and protection of unprotected occupied habitat.

Conservation Measures: FTHL1.

Location: The Yuha Desert Area of Critical Environmental Concern (ACEC) is located in southwestern Imperial County California.

Purpose: Acquire 230 acres of unprotected occupied flat-tailed horned lizard habitat for permanent protection of the species' habitat.

Connections with Other Work Tasks (past and future): Prior to Steering Committee approval all activities associated with this conservation measure were charges to Conservation Area Site Selection (E16).

Project Description: The HCP requires the LCR MSCP to acquire and protect 230 acres of existing unprotected occupied flat-tailed horned lizard habitat.

The Coachella Valley Mountains Conservancy proposed the acquisition of 230 acres of flat-tailed horned lizard habitat within the Dos Palmas Conservation Area, which is managed by the Bureau of Land Management (BLM). In 2007, the BLM's California Desert District Office was contacted to determine the transfer of ownership process. Discussions indicate that private parcels acquired by the program will be transferred to the BLM after purchase at no additional cost to the program.

After consulting with the local BLM office and reviewing suitable habitat within Dos Palmas Conservation Area, there is not enough private acreage available. Suitable habitat that is in private ownership consists of small parcels and is adjacent to unsuitable habitat for flat-tail horned lizards. It is anticipated that additional costs for multiple federal appraisals, title searches, and available willing sellers will disqualify the site for the LCR MSCP.

At the October 27, 2010 Steering Committee Meeting, Program Decision Document 10-001(r) was presented for approval. This Decision Document outlined the reasoning for

not working in the Dos Palmas Conservation Area at this time and proposed three alternative areas: Yuha Desert ACEC, East Mesa ACEC, and West Mesa ACEC are all suitable alternatives.

Previous Activities: In November 2010 in consultation with staff from the BLM's El Centro Field Office, the LCR MSCP targeted acquisition to the Yuha Desert ACEC. The Yuha Desert ACEC is one of three management areas for the flat-tailed horned lizard managed by the BLM. The BLM requested the LCR MSCP focus acquisition in the Yuha based on its smaller total acreage and contiguous flat-tail habitat remaining undisturbed.

A total of 13 land owners were contacted in the Yuha Desert ACEC. To reduce the numbers of potential properties to be surveyed and federally appraised a minimum acreage of 69 was chosen. Two willing land owners signed and returned the right-of-entry permit allowing the LCR MSCP to access their land. Access is required for administering a hazardous materials inspection, a species survey by walking transects, and a federal appraisal conducted. One parcel totals 160 acres and the second totals 80 acres.

A preliminary title review conducted by the BLM shows no issues with legal ownership and the lands are minimally disturbed, free of any hazardous materials. Both parcels had species surveys conducted in May and June 2011. The parcels were divided into 24 (4-ha) plots and each plot was surveyed once. Two flat-tailed horned lizards (male) were detected in the 160-acre parcel and one flat-tailed horned lizard (female) was detected in the 80-acre parcel. Two desert horned lizards were detected on the 160 acre parcel and eight desert horned lizards were detected on the 80 acre parcel. Horned lizard scat was present in 22 of the 24 plots.

The BLM El Centro Field Office agreed to accept the two parcels and manage the lands for permanent species protection when the LCR MSCP acquisitions are completed.

FY12 Accomplishments: Acquisition of two parcels, 160-acre parcel and 80-acre parcel was completed. The FY12 budget reflects final acquisition costs and the delay in acquisition from FY11 and therefore was higher than the approved estimate. Reclamation received confirmation from the BLM that both grant deeds have been recorded and we have received concurrence from the USFWS that the conservation measure has been fully satisfied.

Proposed FY13 Activities: The conservation measure was completed and closed in FY12.

Pertinent Reports: N/A

Work Task E31: Hunters Hole

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$30,000	$88,198.74	$56,805.78	$150,000	$75,000	$65,000	$60,000

Contact: Jed Blake, (702) 293-8165, jblake@usbr.gov

Start Date: FY11

Expected Duration: FY55

Long-term Goal: Habitat creation and maintenance.

Conservation Measures: WIFL1, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, PTBB2.

Location: Reach 7, Arizona, River Mile 2.5.

Purpose: To create and maintain land cover types and support site improvements that benefit LCR MSCP covered species.

Connections with Other Work Tasks (past and future): Vegetation and species monitoring are being addressed under F1-F7.

Project Description: In 2010, the Yuma Crossing National Heritage Area (YCNHA), in cooperation with the Reclamation, has developed a restoration plan for Hunters Hole located within the State of Arizona and within Reach 7 of the LCR MSCP planning area. The focus of the restoration has changed due to dropping groundwater levels. The open water was eliminated and replaced with wet, dense, cottonwood-willow and honey mesquite. The result is anticipated to achieve 36 acres of cottonwood-willow land cover type, reduce future pumping costs, use less water, and maximize the credit for the LCR MSCP. A supplemental Environmental Assessment has been completed based on the revised restoration plan.

The YCNHA has secured funding from the Arizona Water Protection Fund to design, permit, clear, and restore the Hunters Hole area. At the October 27, 2010 LCR MSCP Steering Committee Meeting, Resolution 11-001 was approved. Once the Conservation Area is established, the LCR MSCP has agreed to provide long-term funding for the operation and maintenance of created land cover types.

Previous Activities: In 2008 YCNHA approached Reclamation with a request to complete the project, which would be located on federal lands. In response, the Yuma Area Office completed National Environmental Protection Act compliance after discussions with other federal agencies. The Environmental Assessment was completed

in April 2009, and the Finding of No Significant Impact (FONSI) document was signed in June 2009.

YCNHA invited a number of stakeholders to participate in the project planning effort. These stakeholders include BLM, U.S. Border Patrol, USFWS, U.S. and Mexican Sections of the International Boundary and Water Commission, AGFD, the City of San Luis, the City of Somerton, the City of Yuma, Yuma County Sheriff's Office, Environmental Defense, National Wildlife Federation, ProNatura Noroeste, and private landowners in the area. ProNatura Noroeste has developed a complimentary restoration plan on the Mexico side heralding the project as a bi-national border restoration effort.

FY12 Accomplishments:

Maintenance/Restoration/Management. Earthwork and irrigation infrastructure was fully installed in February. The site was planted using a variety of native species planting techniques during March. The site was planted similar to the original design that incorporated marsh and riparian land cover types. Bulrush and willows were planted in the marsh cells and willows, mesquite, cottonwoods and native grasses planted in the flood managed fields.

Non-native species control, irrigation and maintenance of irrigation infrastructure were the bulk of the effort spent in the remainder of 2012 after planting.

A new ground water pump was ordered for the project in 2012. These pumps are a special order from the manufacture and built to the sites requirements. Replacement is slated for the upcoming year.

Monitoring. The only monitoring activity, which took place in 2012, was the monitoring of vegetation at the site. No other monitoring was needed since planting took place in the spring and other types of wildlife monitoring does not take place until after at least one year of growth has occurred. Ten random points were established throughout the site and vegetation was measured at each point in October.

FY13 Activities:

Maintenance/Restoration/Management. Invasive species control and irrigation will continue throughout 2013 as the site becomes established. During planning meetings it was envisioned that labor required for the site would be reduced in future years.

A standard operating procedure for the irrigation system will be refined and implemented on the property. A draft schedule was developed in FY12; this schedule will be tailored for the site and incorporated into the operating plan after a year of irrigating.

The new groundwater pump will be installed in 2013 as well as additional upgrades to the irrigation system. Due to the travel time associated with reaching the site, Hunters Hole will utilize an automated irrigation system in future years. Multiple upgrades are required to have remote irrigation capabilities, however travel time and security risks warrant the

use of a remote operated system. Upgrades would include: automated valves, upgraded electrical panel, telemetry unit and associated hardware required to be incorporated into Reclamation's remote monitoring network.

Road maintenance is ongoing and conducted as required. The roads besides being used for LCR MSCP purposes are also used by the United States Border Patrol for patrolling the surrounding area.

Monitoring. In 2013 vegetation monitoring will be conducted at the same sites that were monitored in 2012. System-wide bird surveys will be conducted. Two rapid surveys will be conducted and will then be incorporated into the rest of the general bird surveys at restoration sites for purposes of analysis.

Proposed FY14 Activities: The site will be maintained and operated by the LCR MSCP, to meet covered species habitat requirements and support adaptive management activities to improve site conditions. Maintenance, monitoring and project coordination will be conducted. Groundwater well upgrades, which includes automation of the water control valves are scheduled to be completed in 2014. The automation is expected to reduce future operational costs.

Road maintenance is ongoing and conducted as required. The roads besides being used for LCR MSCP purposes are also used by the United States Border Patrol for patrolling the surrounding area.

In FY14, monitoring will include vegetation, general bird surveys, small mammal trapping, bat monitoring, southwestern willow flycatcher and yellow-billed cuckoo surveys.

Pertinent Reports: The *2012 Hunters Hole Conservation Area Annual Report*, which summarizes any planting conducted, site management, results of monitoring, and any recommendations for future adaptive management will be posted after integration of data collected throughout the calendar year.

Work Task E32: Bureau Bay

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$200,000	$0	$0	$0

Contact: Ashlee Rudolph, (702) 293-8178, arudolph@usbr.gov

Start Date: FY13

Expected Duration: Closed in FY13

Long-term Goal: Habitat protection

Conservation Measures: BONY2, RASU2, and FLSU1.

Location: Reach 3, CA, River Mile 244.

Purpose: Excavation and maintenance of an existing connected 6 acre backwater.

Connections with Other Work Tasks (past and future): The backwater was identified under Work Task E15: Backwater Site Selection. Marsh bird surveys are conducted under D1 while fish surveys have been conducted under multiple Work Tasks in section C and F5.

Project Description: Bureau Bay is a backwater directly connected to the lower Colorado River on the California side within Reach 3. Formerly the launch site for Reclamation's dredge equipment, the backwater and majority of the adjacent lands are currently leased to the City of Needles, California. Reclamation maintains a small acreage to the west, a private landowner has title to lands to the south, and the Colorado River is to the east. The City of Needles has leased the property from the Federal Government since 1973 as a community recreational facility known as Jack Smith Park. The City's lease was renewed in 2007 for a 25-year term.

Little maintenance has been performed on the backwater in the past few decades and subsequently the mouth of the backwater is filling with sediment. If no action is taken Bureau Bay will eventually be disconnected from the main stem of the river and 6 acres of connected backwater habitat will be lost. LCR MSCP monitoring efforts have contacted native fishes in and adjacent to Bureau Bay. Additionally, Reach 3 maintains the only self-sustaining population of flannelmouth sucker and has very few undeveloped backwaters, which make protection and maintenance of existing backwaters a priority for the LCR MSCP. Discussions with the USFWS and the CDFW indicate that maintaining a connection to the main stem of the Colorado River to allow passage of native fishes is consistent with habitat creation requirements of both the LCR MSCP HCP and the CESA 2081 permit.

Previous Activities: This is a new start in FY13.

FY12 Accomplishments: Bureau Bay was investigated as a potential project to help the LCR MSCP work toward its connected backwater acreage goal within Reach 3. The objective of the project was to maintain Bureau Bay's connection to the river during periods of low flow so it would remain accessible to native fish. The project was evaluated by developing three potential cost scenarios: excavate a small channel (14 feet wide, 6 feet deep, 600 feet long); excavate a large channel (80 feet wide, 10 feet deep, 600 feet long); excavate a large channel and construct a culvert system at the inlet of the backwater to prevent the channel from filling back in and reduce maintenance costs. Expenditures in FY12 were charged to E15: Backwater Site Selection, which typical for projects being evaluated for inclusion into the program.

All scenarios were evaluated over a 50-year period. Multiple Reclamation Offices were contacted to provide construction cost estimates, and the City of Needles provided the information necessary to accurately estimate costs associated with the disposal of excavated material. Based on the long-term per acre costs associated with Bureau Bay, Reclamation decided not to move forward with the project at this time. If site conditions change, such as Reclamation's Yuma Area Office re-opens the dredge yard, the project would be revisited. Re-opening the dredge yard could provide a potential cost sharing partner and make the project more cost effective. The City of Needles was notified of Reclamation's decision during a meeting in August 2012. The meeting was followed by official correspondence.

FY13 Activities: This work task was closed in FY13.

Pertinent Reports: N/A

Work Task E33: Pretty Water Conservation Area

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$200,000	$600,000	$700,000	$700,000

Contact: Gregg Garnett, (702) 293-8347, ggarnett@usbr.gov

Start Date: FY13

Expected Duration: FY55

Long-term Goal: Habitat creation.

Conservation Measures: VEFL1, WRBA 2, WYBA3, ELOW1, BEVI 1.

Location: Reach 4, Cibola National Wildlife Refuge, River Miles 95-97, California.

Purpose: Create and manage a mosaic of native land cover types for LCR MSCP covered species.

Connections with Other Work Tasks (past and future): This work task was identified under Work Task E16: Conservation Area Site Selection and was previously identified as the Shark's Tooth Conservation Area.

Project Description: The Pretty Water Conservation Area (previously referred to as the Shark's Tooth Conservation Area) consists of approximately 566 acres on Cibola National Wildlife Refuge, located in California between river miles 95 and 97. On July 17, 2006, lightning ignited a fire on Cibola NWR and burned approximately 4, 600 acres of salt cedar intermixed with mesquite in both California and Arizona. This Conservation Area seeks to restore a burned section primarily with honey mesquite with a small cottonwood-willow component as described in the Sharks Tooth Conservation Area, *Restoration, Development, and Monitoring Plan*. Development of the project is intended to satisfy both the LCR MSCP and a portion of the California Endangered Species Act (CESA) Incidental Take Permit No. 2081-2005-008-06. The intent is to create the large honey mesquite bosque, which will be managed for LCR MSCP covered species.

Previous Activities: This is a new start in FY13.

FY12 Accomplishments: During FY12, the restoration and development plan was finalized and submitted to CDFW for approval. The plan was approved and the land use agreement exhibit was drafted and transmitted to USFWS for signatures. Compliance activities (NEPA, Section 106 NHPA, and ESA) were also initiated in FY12. These expenditures were captured in E16: Conservation Area Site Selection, which is typical for projects being evaluated for inclusion into the LCR MSCP.

FY13 Activities: Approval by USFWS and finalization and of the land use agreement exhibit is anticipated in early FY13. Final NEPA, cultural (section 106 of the NHPA), and ESA compliance will be completed by May 2013. A wetland delineation will be also be completed in February 2013 to determine if ACOE compliance (Section 404 of the CWA) will be necessary before construction can commence. Minor earthwork for access and monitoring may occur on site in FY13 based on available resources and status of compliance activities; however no major restoration activities are anticipated for FY13. Wildlife pre-development monitoring (baseline data collection) of the site will be initiated in spring of FY13.

Proposed FY14 Activities: Mobilization, clearing, and restoration are expected to begin in FY14. Due to the size of the project, restoration will occur in phases (approximately 100-150 acres per year) over several years. No wildlife monitoring will occur due to planned construction activities.

Pertinent Reports: N/A

Work Task E34: Groundwater and Soil Salinity Monitoring Network

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$250,000	$250,000	$300,000	$300,000

Contact: Ashlee Rudolph, (702) 293-8178; arudolph@usbr.gov

Start Date: FY13

Expected Duration: FY55

Long-term Goal: Restoration research to guide management actions.

Conservation Measures: CLRA1, WIFL1, BONY2, RASU2, WRBA2, WYBA3 CRCR2, YHCR2, LEBI1, BLRA1, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, FLSU1, MNSW2, CLMB2, PTBB2.

Location: Conservation Areas.

Purpose: Monitor soil and groundwater salinity to inform management actions that will allow for the long-term health and survival of established land cover types on LCR MSCP Conservation Areas.

Connections with Other Work Tasks (past and future): This work task was initiated with funds from G3, E24, and E4.

Project Description: Monitoring soil and groundwater conditions provides information about why some restoration sites establish and develop more successfully than others. The network will be expanded, and soil and groundwater monitoring will be standardized across all applicable LCR MSCP Conservation Areas. The process of determining which phases will be monitored and to what level will occur over a period of years. The information gathered through this effort will inform decisions about managing saline conditions of soils and groundwater, and will ensure the long term viability of LCR MSCP conservation areas.

Previous Activities: Research from previous studies funded by G3 has suggested that riparian obligate trees will utilize groundwater over applied surface water when they have reached sufficient maturity.

An extensive review of the literature available on salinity and sodicity was conducted to summarize what was already know about managing saline soil and groundwater conditions and is available on our website.

A soil and groundwater monitoring network was established at three LCR MSCP Conservation Areas: Beal, PVER, and Cibola Unit #1.

Using the data collected from the three conservation areas over 2.5 years, a mass balance model to evaluate salt accretion/loss in soils and groundwater was developed.

FY12 Accomplishments: This is a new start in FY13.

FY13 Activities: Soil and groundwater data will continue to be monitored at the three conservation areas within the established network. Expenditures will be less than approved to allow time to prepare, contract, and implement the strategy for expanding the soil and groundwater salinity monitoring network into other established Conservation Areas. Also during that time, data from the preceding three years will be sequenced into the LCR MSCP database.

Proposed FY14 Activities: The new soil and groundwater monitoring effort will go into effect and additional LCR MSCP conservation areas will be added to the network, which is reflected in the increased budget.

Pertinent Reports*: Cibola NWR Unit 1 Conservation Area 2010 Annual Report*; *Review of Salinity and Sodicity; Monitoring, and Remediation for Riparian Restoration Areas*; and *Groundwater and Soil Salinity Monitoring Network in Support of Long-Term Irrigation* and *Salt Management of MSCP Restoration Areas: Well Installation and Preliminary Monitoring Data Report,* will be posted to the website.

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WORK TASKS SECTION F

POST-DEVELOPMENT MONITORING

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Work Task F1: Habitat Monitoring of Conservation Areas

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$425,000	$754,927.68	$2,570,356.04	$650,000	$650,000	$650,000	$650,000

Contact: Dianne Bangle, (702) 293-8220, dbangle@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Pre- and Post-development monitoring.

Conservation Measures: MRM2 (CLRA, WIFL, WRBA, WYBA, CRCR, YHCR, LEBI, BLRA, YBCU, ELOW, GIFL, GIWO, VEFL, BEVI, YWAR, SUTA, MNSW).

Location: Beal Lake, Havasu NWR, Arizona; Bill Williams River NWR, Arizona; PVER, California; CVCA, Arizona; Cibola Unit 1, Cibola NWR, Cibola, Arizona; Hart Mine Marsh, Cibola NWR, Cibola, Arizona, Imperial Ponds, Imperial NWR, Arizona; LDCA, Yuma, Arizona.

Purpose: Post-development monitoring is necessary to assess the effectiveness of each habitat creation and restoration sites plus management activities. Specifically, monitoring will include biotic components and abiotic components. Habitat monitoring data will guide management decisions throughout the life of the LCR MSCP.

Connections with Other Work Tasks (past and future): Post-development habitat monitoring will be conducted at habitat creation sites detailed in Section E.

Project Description: Post-development monitoring will assess change in habitat characteristics (such as vegetation growth and density, microclimate, and soil moisture and nutrients) over time and will attempt to determine the causes of said change. Monitoring data will be used to document progress towards achieving the biological goals and minimum habitat requirements for covered species, and document the number of acreage by land cover type (riparian, mesquite, marsh) each year.

Previous Activities: Five habitat creation sites were monitored in FY09 using pilot year monitoring protocols. In FY10 and FY11, the new double sampling protocol was used to monitor habitats and included density, species richness, vegetation structure, ground cover, canopy closure, distance to nearest standing water, and distance to nearest open space. Temperature and relative humidity were also collected.

FY12 Accomplishments: Habitat monitoring continued in FY12 at Beal Lake Conservation Area, Cibola National Wildlife Refuge Unit #1, Cibola Valley

Conservation Area, Palo Verde Ecological Reserve, and Bill Williams River NWR using 2010 monitoring protocols. Data were collected at 362 intensive plots in 2012; data included density, species richness, vegetation structure, ground cover, canopy closure, distance to nearest standing water, and distance to nearest open space within 30 meters of plot center. Temperature and relative humidity data were collected at 90 locations across the four habitat creation sites.

A soil moisture pilot study was initiated to determine the appropriate instrumentation for data collection. Instrumentation was installed at PVER in June FY12 and vegetation density surveys and soil sampling were conducted at each sensor location. Since June, the distribution of continuous monitoring instrumentation has recorded data on irrigation and soil moisture gradients from the irrigation gates to the end of each irrigation check, the effects of soil texture on moisture and overall irrigation distribution.

Vegetation mapping of the LCR MSCP project area began in FY12 Under G3. The purpose of the project was to update the 2004 vegetation classification maps in order to identify survey areas for several MSCP covered bird species and to identify potential areas for the habitat maintenance fund.

Funds were pre-obligated in FY12 for work expected in FY13, thus FY13 obligations should decrease.

FY13 Activities: Post-development monitoring continued at the four Conservation Areas plus Bill Williams River. Monitoring includes vegetation, microclimate, and soil moisture. A total of 405 plots were monitored. Immature sites (year 1 and 2 after planting) and mesquite sites were monitored at a reduced effort per vegetation protocols; including, CVCA 5, CVCA6, PVER6, PVER 7, and CVCA4E. Temperature and relative humidity data will be collected at 90 locations at four habitat creation sites in FY13.

The soil moisture pilot study was extended through FY13 to collect sufficient data across an entire bird breeding season. Instrumentation will remain in place, data will be collected and analyzed, and a report will be written with recommendations for an effective, efficient, and comprehensive soil moisture monitoring protocol and instrumentation at conservation areas.

Vegetation mapping that began in FY12 under G3 will continue under this work task. Draft maps of LCR MSCP priority areas were completed in November 2012. Draft maps of non-priority areas will be completed in FY13. Ground truthing and final maps will also be completed in 2013.

Proposed FY14 Activities: Habitat monitoring including, vegetation, microclimate, and soil moisture monitoring will continue in FY14 at habitat creation sites and the Bill Williams River. Soil moisture monitoring (currently only at PVER2) will be implemented at additional habitat creation sites after results are analyzed and recommendations made from the soil moisture pilot study. Marsh monitoring will take place in FY14 at Hart Mine Marsh and Imperial NWR Field18.

Pertinent Reports: Results from 2010 vegetation monitoring can be found in the report, *2010 Vegetation Monitoring results – MSCP Habitat Creation Sites.* The 2011 vegetation monitoring report (FY12 field season) is in prep.

Work Task F2: Avian Use of Conservation Areas

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$210,000	$375,849.49	$926,845.22	$220,000	$220,000	$220,000	$220,000

Contact: Beth Sabin, (702) 293-8435, lsabin@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Conduct pre- and post-development monitoring for avian species.

Conservation Measures: MRM1, MRM2 (ELOW, GIFL, GIWO, VEFL, BEVI, YWAR, SUTA).

Location: Beal Lake, Havasu NWR, Arizona; Palo Verde, California; Cibola Valley, Arizona; Cibola Unit 1, Cibola NWR, Cibola, Arizona; Laguna Division, Arizona; Yuma East Wetlands, Arizona; Parker Dam, California and Pretty Water, California.

Purpose: Monitor avifauna use of habitat conservation areas to provide data for the adaptive management process and develop management guidelines for created habitat conservation areas. Collect pre-development data on areas that will be converted to more favorable habitat to compare bird use between existing low quality habitat to created high quality habitat.

Connections with Other Work Tasks (past and future): Post-development and pre-development avian monitoring will be conducted at habitat conservation areas listed in section E. In addition, information obtained from this work task may be used to provide data to avian system monitoring by using the same protocols established in the system monitoring program (D6).

Project Description: Creation of riparian habitat will benefit LCR MSCP covered avian neo-tropical migratory species. Conservation areas will be monitored for bird activity, using the same sampling plan and field protocol as in system wide surveys; the double sampling area search method using intensive and rapid area search surveys. Data gathered will be used to guide the design of future riparian habitat conservation areas to provide covered species habitat.

Previous Activities: Pre- and post-development monitoring for avian covered species has been conducted at habitat conservation areas since 2005. Post-development monitoring for avian covered species has occurred at Cibola Unit 1, Palo Verde, Beal Lake, and Cibola Valley. Avian pre-development monitoring has been conducted at Cibola Valley, Hart Mine Marsh, Cibola Unit 1, Imperial Ponds, Palo Verde and Laguna

Division. Avian use has been summarized and evaluated for each conservation area and compared between conservation areas.

The same sampling plan and field protocol, the rapid and intensive area search surveys that was developed for system wide monitoring in 2007 has been used in most of the pre and post development monitoring that has occurred.

FY12 Accomplishments: Avian post-development monitoring was conducted at existing habitat conservation areas in 2012. The following habitat conservation and demonstration areas were surveyed: 1) Beal Lake, 2) Cibola Unit 1, 3) Cibola Valley, 4) Palo Verde and 5) Yuma East Wetlands. The same sampling plan and field protocol as in system wide surveys; the double sampling area search method using intensive and rapid area search surveys was used.

Each conservation area or phase surveyed was divided into area search plots approximately 9 to 15 ha in size. The plots were stratified by conservation area and habitat type (tall woody and low woody). Seventy-four area search plots were created which encompassed all existing habitat at all habitat conservation areas except a portion of Beal Lake. Rapid area search surveys were conducted on 71 plots and intensive area search surveys were conducted on a random subsample of four of those plots. The three plots at Yuma East Wetlands were only surveyed intensively.

There were 94 pairs of breeding birds comprising 16 species detected at Beal Lake. This included seven pairs of Sonoran yellow warblers, 10 pairs of Arizona Bell's vireos, and one summer tanager pair. There were 234 pairs of breeding birds comprising 23 species detected at Cibola Unit 1. This included four pairs of Sonoran yellow warblers and one Arizona Bell's vireo pairs. There were 256 pairs of breeding birds comprising 23 species detected at Cibola Valley. This included 4 pairs of Sonoran yellow warblers and 2 pairs of summer tanagers. There were 334 pairs of breeding birds comprising 22 species detected at Palo Verde. This included five pairs of Sonoran yellow warblers.

Funds were pre-obligated in FY12 for work expected in FY13; thus, FY13 obligations should decrease.

FY13 Activities: Avian post-development monitoring will be conducted at conservation and demonstration areas, including Beal Lake, Cibola Unit 1, Cibola Valley, Palo Verde and Yuma East Wetlands. Avian pre-development monitoring will be conducted at Sharks tooth and Parker Dam. Surveys will be conducted using the same sampling plan and field protocol that is being used in system wide surveys.

Proposed FY14 Activities: Avian post-development monitoring will be conducted at conservation and demonstration areas, including Beal Lake, Cibola Unit 1, Cibola Valley, Palo Verde, and Yuma East Wetlands and additional pre-development areas where needed. Surveys will be conducted using the same sampling plan and field protocol used in previous years.

Pertinent Reports: The following reports are posted on the LCR MSCP website: *Summary Report on the Lower Colorado River Riparian Bird Surveys, 2008-2010; Report on the Lower Colorado River Riparian Bird Surveys 2011;* and *A Sampling Plan for Riparian Birds of the Lower Colorado River—Final Report.*

Work Task F3: Small Mammal Colonization of Conservation Areas

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$55,000	$21,525.04	$276,597.02	$55,000	$60,000	$60,000	$60,000

Contact: Allen Calvert, (702) 293-8311, acalvert@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: Conduct pre- and post-development monitoring for small mammal species.

Conservation Measures: YHCR1, CRCR1, DPMO1, MRM2 (DPMO, CRCR, YHCR).

Location: Beal Lake, Havasu NWR; PVER, California; CVCA, Cibola Nature Trail, Laguna Division Conservation Area.

Purpose: Monitor small mammal populations within habitat creation sites. Data will be used in the adaptive management process to guide the design of future habitat creation projects targeting covered small mammal species.

Connections with Other Work Tasks (past and future): Post-development small mammal monitoring will be conducted at habitat creation sites listed in Section E. In addition, information obtained from this work task, in conjunction with C27 and D10, will be used to define habitat requirements for future habitat creation projects. Data from C27 and D10 will aide in design of population monitoring protocol.

Project Description: Presence/absence surveys will be conducted in restoration demonstration and habitat creation sites to determine small mammal occurrence. These efforts will be focused on detecting the presence of Yuma hispid cotton rats and Colorado River cotton rats at these sites. Once presence is established at a restoration site, population monitoring will be conducted with a protocol developed under C27 and data collected under D10.

Previous Activities: In previous years, small mammal surveys have been conducted at the Cibola NWR Unit #1 and at the Pratt Agricultural site. Several animals from the genus *Sigmodon* have been captured at each site. At the Pratt Agricultural site, Yuma hispid cotton rats were captured in dense *Baccharis* spp., and at the Cibola NWR Unit #1, Colorado River cotton rats were captured in dense Johnsongrass. No cotton rat species has been captured at Pratt Agricultural since 2005. Presence/absence live trapping surveys were conducted at several habitat creation sites during FY06, but only one

Colorado River cotton rat was captured at the Beal Lake Riparian Restoration site. In 2007, cotton rats were found at the Cibola NWR Unit #1, Imperial NWR, and at a reference site between Laguna Dam and Mittry Lake north of Yuma, Arizona. In 2008, one cotton rat was captured during pre-development monitoring in adjacent habitat at the Imperial National Wildlife Refuge site. A new cotton rat population was found very close to the Palo Verde Ecological Reserve during a different study. In 2009, 2010, and 2011 surveys detected cotton rats at the Cibola NWR Unit #1 and the bench population near PVER.

FY12 Accomplishments: Surveys were conducted at Beal, PVER, CVCA, Cibola NWR Unit #1, and Big Bend Conservation Area. Cotton rats were captured within all five areas. Cotton rats at Big Bend were the first captures in Nevada in over 50 years. They were found within a transition area between the marsh, grassland, and shrub habitats. Cotton rats were found at Beal within a small grassy patch within a mesquite and arrowweed dominated cell. Cotton rats were found in Phases 4 and 5 of PVER, phases 2, 3 and 4 of CVCA, and within the Nature Trail and Cottonwood genetics fields in Cibola NWR Unit #1.

FY13 Activities: Presence/absence live trapping surveys will continue as part of the post-development monitoring efforts at habitat creation sites. Yuma East Wetland and Hunter's Hole will be added to the monitoring schedule.

Proposed FY14 Activities: Post-development monitoring activities will continue for small mammals at habitat creation sites and adjacent areas. A long term monitoring plan will be finalized.

Pertinent Reports: Annual reports will be posted on the LCR MSCP website.

Work Task F4: Covered Bat Species Monitoring of Conservation Areas

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$100,000	$109,437.27	$597,883.24	$125,000	$135,000	$135,000	$135,000

Contact: Allen Calvert, (702) 293-8311, acalvert@usbr.gov

Start Date: FY07

Expected Duration: FY55

Long-term Goal: Pre- and post-development monitoring of covered bat species.

Conservation Measures: MRM1, MRM2 (WRBA, WYBA, CLNB, PTBB), WRBA1, WYBA1.

Location: Beal Lake, Havasu NWR; PVER, California; CVCA, Cibola NWR Unit 1, Cibola, Arizona; Imperial Ponds, Imperial NWR, Arizona; Laguna Conservation Area, Arizona, Yuma East Wetlands, and Hunters Hole.

Purpose: The principal goal of this monitoring is to assess seasonal use of the restoration sites by the two covered bat species (western red bat and western yellow bat), and the two evaluation species (Townsend's big-eared bat and California leaf-nosed bat). Monitor bat use of habitat creation sites to provide data for the adaptive management process and develop management guidelines for created habitat sites. Pre- and post-development monitoring for the presence/absence of covered bat species will be conducted following a study design developed in 2008. Information obtained through this work task, in conjunction with D9, will help determine the distribution of these species.

Connections with Other Work Tasks (past and future): Post-development bat monitoring will be conducted at habitat creation sites listed in Section E. In addition, information obtained from this work task may be used to provide data to D9.

Project Description: Post-development monitoring includes both acoustic and capture methods. Acoustic monitoring will be conducted at habitat creation and demonstration sites, including CVCA, PVER, Cibola NWR Unit #1, Beal Lake, and Imperial Ponds. These surveys will utilize either active or passive Anabat systems to record bat echolocation calls for presence/absence surveys. A capture program will also be used in the above-mentioned sites to acquire reference acoustic calls and determine age, sex, and reproductive status of covered bat species. These surveys will provide data on foraging habitat and use by covered species. Bat surveys will be conducted before and after habitat

creation utilizing Anabat, Sonobat, infrared cameras, stationary detection equipment, and mist netting, where appropriate.

Previous Activities: Sites were monitored from FY07 to FY10 using acoustic and/or capture techniques.

FY12 Accomplishments: Acoustic monitoring consisted of long term bat detector stations that record the echolocation calls of bats every night. Stations collected data at Beal, ‘Ahakhav, PVER, CVCA, and Cibola NWR Unit #1. All four species were detected at all five sites, with high occupancy for red and yellow bats at CVCA and PVER. Interference due to high insect noise occurred at most sites during the summer season. A new higher pole was installed and tested at CVCA to attempt to put the detector microphone high enough to avoid most insect noise. The new pole consists of a 40-foot tall pole that tilts down to the ground using a hand winch. The microphone was first tested at 25 feet above the ground and successfully decreased insect noise. The ‘Ahakhav and Cibola NWR stations were raised temporarily using an extendable painters pole until new tilt over poles could be installed.

Capture surveys were conducted at four LCR MSCP habitat creation areas (Beal, PVER, CVCA, and Cibola NWR), and at the ‘Ahakhav Tribal Preserve and the Yuma East Wetlands, ‘Ahakhav because of the long term data site at this older restoration site, and Yuma East to get baseline surveys for this potential MSCP site. A total of 795 bats of 14 species were captured across the six sites. Western red bats, western yellow bats, and California leaf-nosed bats were captured at ‘Ahakhav, PVER, and Cibola NWR. This was the first time a red bat had been captured at Cibola NWR. Red and yellow bats were captured at CVCA. Red and yellow bats were captured at Yuma East Wetlands. A California leaf-nosed bat and a hoary bat were captured at Beal for the first time. Some of the red and yellow bats captured under this work task were radio-tracked for the roosting characteristics study under C35.

FY13 Activities: The current five stations will continue and additional stations will be added at Hunter’s Hole, PVER (a second station), and possibly Yuma East Wetlands, if it becomes a part of the program. Data will be analyzed and occupancy rates will be created. Capture surveys will continue at all sites surveyed in FY12. The second PVER station will be compared to the first station to determine if a second station is necessary at larger HCA’s for accurate occupancy rates.

Proposed FY14 Activities: All long term stations will continue to run and one new station will be added at the Laguna Division Conservation Area, and a new station may be added at Imperial NWR if the new habitat is planted. Capture surveys will continue and red and yellow bats may be PIT tagged to determine site fidelity. Data will continue to be analyzed and be used to guide adaptive management for covered bat species.

Pertinent Reports: FY12 Annual reports for acoustic and capture surveys will be posted on the LCR MSCP website.

Work Task F5: Post-Development Monitoring of Fish at Conservation Areas

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$175,000	$172,897.42	$835,057.02	$250,000	$250,000	$250,000	$250,000

Contact: Jeff Lantow, (702) 293-8557, jlantow@usbr.gov

Start Date: FY07

Expected Duration: FY55

Long-term Goal: Post-development monitoring.

Conservation Measures: RASU6 and BONY5.

Location: Reaches 3-6 backwater habitats.

Purpose: Monitor fish use of habitat creation sites to provide data for the adaptive management process and develop management guidelines for created backwater habitats.

Connections with Other Work Tasks (past and future): All backwaters created in Section E. Work Task C23, C31, C33, C34, C40, and C41.

Project Description: This work will monitor the fish and fish habitat at conservation areas. It is anticipated that these sites will play various roles for conservation of target fish species throughout the term of the LCR MSCP. Some habitats will be able to develop self-sustaining populations, others may become overpopulated requiring harvest or thinning, and some will require continuous population augmentation. Most isolated fish habitats will require some stock rotation to maintain genetic diversity through time. Basic surveys of the fish population and the physical and chemical habitat developed or restored will be required. Fish monitoring will include trapping (hoop, fyke, and minnow traps), trammel netting, electro-fishing, larvae light trapping, and ocular surveys (including scuba and snorkeling where necessary and practical). Water quality assessment will require annual measurements of temperature, oxygen, pH, and conductivity (salinity), as well as periodic monitoring of chemical makeup, including electro-ions and selenium.

Previous Activities: Since 2006, Beal Lake has been renovated and stocked with more than 6,000 RASU and 2,000 large BONY (an additional 27,000 YOY BONY have also been released); a limited portion of each of these stockings were marked with PIT tags. Non-natives were identified shortly after the renovation efforts. Annual surveys have contacted subsets of each of these stockings, but long term survival has been low. Closer order monitoring via remote sensing was initiated in FY09 and continued through FY11. Populations of stocked RASU declined rapidly within the first several months post-release and eventually leveled off near 100 individuals. Water quality has been monitored

constantly with multi-parameter water quality loggers and all parameters have remained within the known ranges of acceptability for native fish. Zooplankton collections were initiated as part of Work Task C44 and results show lower than average mean zooplankton biomass. Annual netting and electro-fishing surveys have been coordinated with the USFWS and have resulted in the capture of numerous RASU, as well as large numbers of non-natives. The majority of RASU contacted during survey events have been relocated to the Colorado River near Needles, California.

Routine monitoring of Big Bend Conservation Area is accomplished through monthly monitoring from February through May. This monitoring includes electro-fishing, trammel netting, and larval light trapping in areas dictated by water level and based on historical contacts of native fish. Water quality profiles were conducted during each monitoring trip and at least quarterly the remainder of the year. FY11 monitoring resulted in the capture of 3 RASU and 1 FLSU adult/subadults, and more than 30 FLSU larvae. Water quality was exceptional, as was expected for a habitat with a direct connection to the river. Research and monitoring of Imperial Ponds is being accomplished under C25.

FY12 Accomplishments: Stockings were discontinued at Beal Lake due to poor survival, and fisheries surveys were reduced to a relative abundance and biomass estimate for all species with in the backwater. Results of this survey indicate that the backwater contains nearly 4,000 individual fish and at least 6 different species. Common carp and largemouth bass comprise almost 90% of the total fish (69% and 20% respectively), with carp occupying 88% of the total fish biomass. This level of non-natives is likely leading to a competition of resources and at least contributing to the poor survival of native fish. Water quality was constantly monitored throughout the backwater; low levels of DO and high temperatures were observed locally but not lake wide. Zooplankton and phytoplankton sampling was increased in FY12, and results continue to show relatively low levels of plankton biomass.

Routine monitoring at Big Bend Conservation Area continued in FY12; native fish contacts included seven RASU and four larval FLSU. All of the razorbacks originated from a stocking event, which occurred months earlier approximately ½ mile upstream. Fish surveys at this location are highly influenced by river operations from Davis Dam. Water quality parameters remained with in thresholds for all native fish. Zooplankton and phytoplankton abundance were much lower than at other sites, but not surprising for a system, which is routinely flushed by river water.

FY13 Activities: Monitoring activities for Beal Lake will be reduced until long-term management guidelines are established. Water quality and plankton monitoring will continue, along with periodic remote sensing to track the existing small population of RASU. Monitoring activities at Beal Lake will be replaced by specific research activities to address native fish life history questions, as well as general site management questions.

Big Bend Conservation Area will be monitored at a level similar to FY12. Additional effort will be expended to deploy remote PIT scanners during routine monitoring events and quarterly water quality monitoring.

Proposed FY14 Activities: The activities from FY13 will continue into this year. Recommendations for management guidelines at Beal Lake will dictate future monitoring and research objectives for the site. Big Bend Conservation Area activities will be similar to the previous year, and the remote PIT scanning surveys will be evaluated and incorporated into the routine monitoring if they are productive.

Pertinent Reports: A report titled, *Beal Lake Species Abundance and Biomass*, is completed and will be posted to the LCR MSCP website.

Work Task F6: MacNeill's Sootywing Monitoring of Conservation Areas

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$70,000	$79,854.92	$226,897.61	$80,000	$80,000	$80,000	$80,000

Contact: Dianne Bangle, (702) 293-8220, dbangle@usbr.gov

Start Date: FY09

Expected Duration: FY55

Long-term Goal: Post-development monitoring for MacNeill's sootywing.

Conservation Measures: MNSW2

Location: Habitat-creation sites: Palo Verde Ecological Restoration Site, Cibola Valley Wildlife Conservation Area, Laguna Division Conservation Area, Hart Mine Marsh

Purpose: The purpose of this work task is to monitor vegetation, plant-quality, and populations of MacNeill's sootywing in habitat created for the species.

Connections with Other Work Tasks (past and future): Habitat requirements were determined in Work Task C7, Survey and Habitat Characterization for MacNeill's sootywing.

Project Description: Results from Work Task C7 determined that sootywings require host plants quailbush that are larger than 1.6 m in height, greater than 64% in plant water content, and greater than 3.2% in leaf nitrogen content. Sootywings also require plants other than quailbush for nectar (e.g., *Heliotropium curassavicum* [Boraginaceae] and *Sesuvium verrucosum* [Aizoaceae]). These attributes will need to be monitored in created habitat. Monitoring host-plant water content is especially critical, as it will be driven by the timing and amounts of irrigation. Leaf nitrogen-content does not need to be monitored, because quailbush fixes atmospheric nitrogen, and leaf nitrogen-content increases with leaf water-content. Utilization of new habitat by sootywings also will need to be surveyed. Additional requirements of the species will need to be considered if created habitat fails to become colonized.

Previous Activities: Habitat created for MacNeill's sootywing at CVCA and PVER was surveyed for adult sootywings during April-September 2009-2010. In 2009, four plots were surveyed at CVCA, and one plot was surveyed at PVER. Five plots were surveyed at CVCA, and three plots were surveyed at PVER, during 2010. Sootywings were most abundant during both years at CVCA Phase 4, with > 200 adults counted during

September along a dirt road bisecting the plot. Sootywings also were abundant at a detached CVCA Phase 4 plot. Sootywings were rare (< 5 adults per date) or absent at the other CVCA plots and at all of the PVER plots. The large population of sootywings at CVCA Phase 4-west during 2009-2010 disappeared during 2011. The most-successful sootywing plot at PVER is Phase 4. Sootywing populations were low (< 5 adults per date) but increasing late in the season. Sootywing populations at the other CVCA and PVER plots were low or absent.

FY12 Activities: Monitoring method changed during FY12. One random-transect was walked in each check monthly from April through August. Plots monitored were CVCA Phases 2 and 3, CVCA Phase 4 West (2 checks) and East (3 checks), CVCA Phase 5 (2 checks), PVER Phase 4, and PVER Phase 5 (2 checks). Sootywings were generally absent throughout the season. A total of 7 sootywings were counted at CVCA, and a total of 13 sootywings were counted at PVER (all in Phase 4, mostly in April).

FY13 Activities: Quailbush plots will be sampled for sootywings using the same random-transect method as in FY12. Nine restoration plots, totaling 280 acres, will be monitored for sootywings during April to September:

Activities during this fiscal year also will begin monitoring of sootywing abundances and habitat characteristics at conservation areas. Habitat characteristics include: 1) host-plant water content, 2) availabilities of nectar sources, and 3) plot size and isolation in relation to sootywing dispersal. Other factors such as predation or parasitization may need to be examined if created habitat fails to become sufficiently colonized.

Proposed FY14 Activities: The plots mentioned above will continue to be monitored. Additional plots will be monitored as they are planted. This may include Hart Mine Marsh and possibly Laguna Division Conservation Area. Activities during this fiscal year also will continue examining causes of different sootywing abundances among conservation areas.

Pertinent Reports: 2012 Annual Reports for MSCP Work Task F6: Monitoring MacNeill's Sootywing in Habitat Creation Sites.

Work Task F7: Marsh Birds Monitoring of Conservation Areas

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$30,000	$14,271.51	$15,674.57	$30,000	$30,000	$30,000	$30,000

Contact: Joe Kahl, (702) 293-8568, jkahl@usbr.gov

Start Date: FY11

Expected Duration: FY55

Long-term Goal: The purpose of this work is to determine whether marsh land cover types created under the LCR MSCP are used by California black rails, Yuma clapper rails, and western least bitterns.

Conservation Measures: MRM1 AND MRM2 (CLRA, BLRA, LEBI), LEBI1, BLRA1, CLRA1.

Location: Presence/absence surveys will be conducted at newly developed marsh habitat sites including Hart Mine Marsh, Cibola NWR, Cibola, Arizona, Imperial NWR, Arizona, and Big Bend Conservation Area, Nevada.

Purpose: Monitor the use of created marsh habitat by covered marsh bird species.

Connections with Other Work Tasks (past and future): System-wide marsh bird surveys have been conducted by Reclamation on existing marsh habitat since 1996 under D1.

Project Description: Surveys for Yuma clapper rail in existing habitat have been conducted in Topock Gorge by Reclamation since 1996 (D1). Since 2006, Reclamation has participated in the National Marsh Bird Monitoring Program, which involves surveying for several species, including the LCR MSCP covered marsh species, simultaneously using taped recordings of the species calls. Surveys of marsh habitat created under the LCR MSCP utilize this same protocol. Marsh bird survey data on the LCR is utilized by the USFWS for baseline population estimates and habitat suitability analysis.

Previous Activities: Hart Mine Marsh, Big Bend, and portions of Imperial NWR have been surveyed for marsh birds prior to development. Marsh bird surveys were conducted at Big Bend Conservation Area, Beal Lake Conservation Area, Hart Mine Marsh on Cibola NWR, and Field 16 on Imperial NWR in 2011.

FY12 Accomplishments: Marsh bird surveys were conducted in cooperation with the USFWS at Hart Mine Marsh (Cibola NWR), Field 16 and the Imperial Ponds (Imperial NWR) during March, April, and May 2012. At Hart Mine Marsh, 2 CLRA and 11 LEBI were detected during the April survey. There were no BLRA detections. In Field 16, 1 CLRA and 1 LEBI were detected during the April survey. A total of 9 BLRA detections occurred over the survey period. At Beal Lake, 1 CLRA was detected in April and 2 in May. LEBI numbers ranged from 2 in March, 9 in April and 14 in May. There were no BLRA detections. At the Big Bend Conservation Area no covered LCR MSCP marsh birds were detected in FY12.

FY13 Activities: Marsh bird surveys will be conducted in cooperation with USFWS on conservation areas once the marsh vegetation has developed in sufficient acreage, vegetation type, and suitability. These sites will include Beal Lake and Willow Marsh (Havasu NWR) Hart Mine Marsh (Cibola NWR), Field 16 and the Imperial Ponds (Imperial NWR) and Big Bend Conservation Area. Data will be inputted into the database and analyzed, comparing pre and post development.

Proposed FY14 Activities: Marsh bird surveys will be conducted on conservation areas which have a marsh habitat component in sufficient acreage, vegetation type, and suitability. These sites will include Beal Lake and Willow Marsh (Havasu NWR) Hart Mine Marsh (Cibola NWR), Field 16 and the Imperial Ponds (Imperial NWR) and Big Bend Conservation Area. Data will be inputted into the database and analyzed, comparing pre and post development.

Pertinent Reports: Results of surveys will be reported in the annual reports for each associated restoration site as well as one report for all conservation areas.

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WORK TASKS SECTION G

ADAPTIVE MANAGEMENT PROGRAM

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Work Task G1: Data Management

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$700,000	$728,250.63	$2,358,562.19	$950,000	$800,000	$800,000	$800,000

Contact: Sonja Kokos, (702) 293-8033, skokos@usbr.gov

Start Date: FY07

Expected Duration: FY55

Long-term Goal: Data management will be an ongoing task for species research, system monitoring, habitat creation, post-development monitoring, and habitat maintenance programs.

Conservation Measures: All.

Location: System-wide.

Purpose: Develop and maintain an accessible, multi-disciplinary, spatially referenced, relational database to consolidate, organize, document, store, and distribute scientific information related to the LCR MSCP.

Connections with Other Work Tasks (past and future): Database management is integral in the successful completion of work tasks undertaken for Fish Augmentation (Section B), Species Research (Section C), System Monitoring (Section D), Habitat Creation (Section E), Post-Development Monitoring (Section F), Adaptive Management (Section G), and Habitat Maintenance (Section H).

Project Description: This project provides data management and GIS staff support to manage all aspects of the Program related to the database, data collection, applications development, and software management. To fully implement the LCR MSCP, a database management system is being developed to manage data collected through the species research, system monitoring, habitat creation, post-development monitoring, adaptive management, and habitat maintenance programs. Database design, initial implementation, and maintenance are funded through this work task.

Previous Activities: Hardware was purchased to increase data storage for the implementation of the centralized database. The intranet/document/calendar management system was maintained and modified, for future needs of the LCR MSCP. Implementation of remote data collection from field data loggers began at Beal Lake. The automatic collection of remote data into a centralized database allows for the secure transmission of data with integrated quality control to support mission critical projects. The native fish database was maintained.

Database design and implementation of a centralized Database Management System (DBMS) was completed. The planning, acquisition, and data modules for the LCR MSCP centralized database have been completed. All data modules will be phased in according to priority for the implementation of the HCP. Data modules consist of an application for input of data (data entry) within a centralized database, to include quality assurance and quality control. On an annual phased approach all project and species projects will be incorporated into the database.

FY12 Accomplishments: The Minckley Library project was completed in March of FY12. The library is now available as searchable database housing over 11,000 total documents. Documents include a variety of literature types and were digitized and organized using bibliographic software. Error checking was performed to ensure consistency and accuracy when accessing the database, and individual electronic copies of all documents have been received and serve as a backup to the database.

The new LCR MSCP website was completed. The native fish database continued to be maintained. The intranet/document/calendar management system (SharePoint 2010) was upgraded. The LCR MSCP data management requirements document was developed to provide standards for metadata to contractors.

Reclamation staff toured three large natural resource program's sites and met with data management stewards from each program to identify the various program's data standards, processes and lessons learned to improve LCR MSCP data management.

It was determined in FY12 that the entire planning area needed to be delineated in terms of standardizing locations where data collection would be conducted using past and present site naming conventions. This delineation was completed in June of 2012, and will be updated as needed throughout the Program term. Developed and deployed data structures and MS Access forms for Bird Monitoring for 2012 collection protocols. The data structures and MS Access forms for the 2011 and 2012 Vegetation Monitoring data collection protocols were revised.

Revised master LCR MSCP SQL Database to reflect current schema environment and built collection data import process. Developed and maintained Developer program and project documentation. Developed and deployed FTP protocols for LCR MSCP form deployment and contractor data retrieval. Assisted Contractors and Project Managers in the development of quality assurance queries and reporting.

Mobile data loggers and software for collection of data in the field was acquired. These units are expected to standardize all data collection across LCR MSCP projects and programs. Development of mobile forms/data dictionaries using Pathfinder Office to collect data while in the field began. The development of remote sensing data collection from field data loggers will continue.

FY13 Activities: The native fish database continued to be maintained. Update and maintenance of the LCR MSCP website will continue. The planning, acquisition, and data modules for the LCR MSCP centralized database development will continue.

Database implementation will continue for all projects. Continue to support current MS Access forms, queries and reports as needed.

Develop, test, and implement mobile forms for use in the field. These forms will initially be used with the vegetation monitoring project. The next program expected to use these is the yellow-billed cuckoo and southwestern willow flycatcher projects. The development and support of remote data collection from data loggers will continue. The LCR MSCP Data Management Plan will be drafted. Support mobile data logger's import and quality assurance process.

In FY13, development of quality assurance for the SQL database with full audit trail capabilities will begin. Investigate and support quality assurance process analysis tools.

Proposed FY14 Activities: The FY14 budget estimate has been lowered to reflect actual costs. The native fish database will continue to be maintained. The planning, acquisition, and data modules for the LCR MSCP centralized database development will continue. Update and maintenance of the LCR MSCP website will continue. The development of remote data collection from field data loggers will continue. The development of the LCR MSCP Data Management Plan will be finalized and implemented.

Pertinent Reports: N/A

Work Task G3: Adaptive Management Research Projects

FY12 Estimates	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$200,000	$282,786.62	$1,904,781.92	$300,000	$300,000	$300,000	$300,000

Contact: Sonja Kokos, (702) 293-8033, skokos@usbr.gov

Start Date: FY06

Expected Duration: FY55

Long-term Goal: Effective conservation of native species and their habitats.

Conservation Measures: MRM1, MRM2, MRM4, WIFL1, MRM5, BONY5, RASU6, CRCR1, YHCR1, MRM3, FLSU3, LLFR1, LLFR3.

Location: System-wide.

Purpose: Develop tools to effectively evaluate conservation actions.

Connections with Other Work Tasks (past and future): Research projects initiated under this work task may be continued as Species Research (Section C). Information obtained may be used for Fish Augmentation (Section B), System Monitoring (Section D), Habitat Creation (Section E), Post-Development Monitoring (Section F), or Habitat Maintenance (Section H).

Project Description: The Adaptive Management Program is an assurance that the conservation actions presented in the HCP are effectively accomplished. This work task develops and evaluates tools by which the conservation actions can be measured, and provides data to improve the efficacy of techniques to successfully create habitat.

This work task enables Reclamation to initiate priority research projects in a timely manner. For example, opportunistic research proposals (e.g. time-sensitive such as spawning or breeding season dependent) can be considered and initiated during the funding year and then be elevated to full research or monitoring status (Section C, D, or F) the following year. Also, experimental techniques can be evaluated through research to assess their utility, and if found to be useful, they would be incorporated into monitoring activities.

Previous Activities: All previous activities were moved to other work tasks after initial year of funding.

FY12 Accomplishments: Four Lake Mead subadult RASU were sonic tagged in FY12 for the purpose of identifying and describing the habitat type(s) frequently used by this

RASU life stage. Fish were tracked and located weekly during the spawning season (February – May) and monthly during the less intensive monitoring season (June – December). Sub-adult RASU generally showed seasonal preferences, occupying shallow habitat characterized by inundated vegetation during the early spring and late fall and moving into deeper habitat with higher turbidity during the summer. Water quality parameters and substrate composition were also recorded at five points within the immediate area each time a sonic tagged fish was located so that the habitat being used could be better defined. No other sub-adult RASU were contacted during associated sampling efforts. This work will continue under D8.

Vegetation typing of new aerial photos has been cost-shared with other Reclamation offices to reduce costs. This product will provide Reclamation with additional tools for determining vegetation structure changes over time. Vegetation mapping of the MSCP project area began in FY12. The purpose of the project was to update the 2004 vegetation classification maps in order to identify survey areas for several MSCP covered bird species and to identify potential areas for the habitat maintenance fund. The Anderson and Ohmart Classification system was modified slightly for this mapping effort. Additionally, the minimum mapping units were modified to more closely fit with the original intention of the Anderson and Ohmart classification methodology. The minimum mapping units are, 1 acre for marsh habitat, 10 acres for cottonwood/willow and mesquite habitat, and 25 acres for all remaining habitat types. The project is expected to be completed in FY13 under F1.

It was identified in FY12 that high insect noise at the bat stations was interfering with the acoustic bat monitoring data. It was recommended that the bat acoustic equipment be raised above the canopy using taller poles. Since canopy height varies and increases after the sites are planted, having bat poles that can be adjusted on an as needed basis for appropriate data collection and maintenance was recommended. A test pole was designed, built and installed at CVCA in July 2012. The design of the pole worked to the specifications for minimizing insect noise, data acquisition and maintenance, so nineteen poles were ordered.

FY13 Activities: Research questions identified during fish augmentation, species research, system-wide monitoring, habitat creation, and post-development monitoring will be evaluated for development into adaptive management research projects under this work task. The bat poles will be installed at each of the conservation areas in FY13, and later as sites are developed.

Proposed FY14 Activities: Research questions identified during fish augmentation, species research, system-wide monitoring, habitat creation, and post-development monitoring will be evaluated for development into adaptive management research projects under this work task.

Pertinent Reports: *Razorback Sucker Studies on Lake Mead, Nevada and Arizona 2011–2012 Annual Report* is posted to the website.

Work Task G4: Science/Adaptive Management Strategy

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$125,000	$127,754.31	$483,096.45	$250,000	$250,000	$250,000	$250,000

Contact: Sonja Kokos, (702) 293-8033, skokos@usbr.gov

Start Date: FY06

Expected Duration: FY55

Long-term Goal: Ensure successful and efficient implementation of the LCR MSCP conservation measures.

Conservation Measures: All conservation measures dealing with habitat creation, species research, system monitoring, and fish augmentation.

Location: LCR MSCP planning area.

Purpose: Define the process for implementing the LCR MSCP using the best available science and adaptive management processes.

Connections with Other Work Tasks (past and future): All science-based work tasks.

Project Description: The HCP conservation measures were designed to meet the biological needs for 26 covered species and to benefit five evaluation species. A science strategy, developed in FY06, defines processes for ensuring LCR MSCP implementation using the best available science. This strategy describes a two-tier planning process to ensure effective implementation of research and monitoring actions: first, a five-year planning cycle, and second, annual work plans covering a three-year cycle.

Every five years, a plan will be developed that describes the current knowledge for covered species, establishes the monitoring and research priorities for that five-year period, and describes potential challenges that may inhibit successful implementation of the conservation measures. During each five-year cycle, the accumulated data from ongoing research and monitoring will be reviewed, along with existing species accounts. Highest priority for the next five-year period will go to completion of any ongoing research and monitoring activities. Second priority will be given to new research and monitoring needs identified by ongoing work, and third priority will be given to refining and updating life history data sets. Additional work may be generated from evaluation of research through G3.

LCR MSCP staff will participate in interagency meetings and workshops held to discuss natural resource conservation along the LCR. These meetings bring together scientists,

managers, and resource users interested in the Lower Colorado River ecosystem. Additional special topic workshops will be held for covered species or their habitats as needed to revisit the status of one or more of these species within the LCR MSCP program area.

An annual work plan report, which summarizes prior year accomplishments, describes current year ongoing activities, and outlines the proposed activities for the coming fiscal year will be developed and presented to the Steering Committee each year. Recently completed, ongoing, and proposed research and monitoring activities will be reviewed as they relate to the current 5-year monitoring and research priority plan.

Previous Activities: The Science Strategy was developed in FY06-07. Colorado River Terrestrial and Riparian (CRTR) and Colorado River Aquatic Biologists (CRAB) meetings were attended. The first *Five-Year Monitoring and Research Priorities* report was drafted in FY07. A draft procedure, *Habitat Creation Conservation Measure Accomplishment Tracking Process,* was developed for tracking conservation measure accomplishment pertaining to the habitat creation conservation measures in FY10-11.

FY12 Accomplishments: The *Final Habitat Creation Conservation Measure Accomplishment Tracking Process* was finalized and approved by the Steering Committee on October 26, 2011. Research activities were reviewed in accordance with the priorities established in the current five-year plan, and the *LCR MSCP Five-Year Monitoring and Research Priorities: 2013-2017* was drafted and presented to the Steering Committee Technical Work Group in September. The Big Bend Conservation Area and Hart Mine Marsh management plans have been drafted.

FY13 Activities: Research activities continue to be reviewed in accordance with the priorities established in the current five-year plan. The *LCR MSCP Five-Year Monitoring and Research Priorities: 2013-2017* was finalized and approved by the Steering Committee on October 24, 2012. Finalization of Big Bend Conservation Area and Hart Mine Marsh Management Plans are expected in FY13. Coordination with land owners and agency partners for development of Managements Plans will continue. There is an increasing demand to gather, evaluate, and provide a synthesis of information on topics such as species status or other natural resources topics, all to be done in compliance with applicable, established scientific protocols and formats. The MSCP expects these demands to increase in the future and thus, will be using independent scientific and technical services to assist in meeting this and the associated workload.

Proposed FY14 Activities: Research activities will continue to be reviewed and evaluated in accordance with the priorities established in the current five-year plan. Other site Management plans for existing conservation areas may be initiated. Technical review of research and monitoring activities will continue.

Pertinent Reports: The *Final Science Strategy,* the *LCR MSCP Five-Year Monitoring and Research Priorities—2008-2012,* the *LCR MSCP Five-Year Monitoring and Research Priorities—2013-2017,* and the *Final Habitat Creation Conservation Measure Accomplishment Tracking Process* are posted on the LCR MSCP website.

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WORK TASKS SECTION H

EXISTING HABITAT MAINTENANCE

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Work Task H1: Existing Habitat Maintenance

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$5,445,000	$5,445,000.00	$13,752,500.00	$7,460,400	$6,928,680	$4,555,320	$0

Contact: Sonja Kokos, (702) 293-8033, skokos@usbr.gov

Start Date: FY06

Expected Duration: FY55

Long-term Goal: Maintenance of existing habitat.

Conservation Measures: CLRA2, WIFL2, BLRA2, and YBCU2.

Location: Lower Colorado River (reaches 1-7).

Purpose: Maintain existing habitat areas, excluding newly created habitat within conservation areas, by implementing actions that will prevent the further degradation or loss of habitat for LCR MSCP covered species.

Connections with Other Work Tasks (past and future): N/A

Project Description: A $25 million fund is being established over a 10-year period to restore habitats suitable for LCR MSCP covered species in the planning areas that have become degraded since the LCR MSCP was initiated. Funding during the initial five years of the program was established at $500,000 per year. Funding in years 6-10 of the program was established at $5,000,000 per year. Both values are indexed to 2003 dollars and adjusted annually for inflation. The degraded habitat condition targeted by this fund is that which occurs because of past LCR operations and maintenance actions that continue into the future. The habitat maintenance fund will be administered by the Program Manager. The process for determining degradation in habitat value as well as how funds are requested, disbursed, and tracked will be defined and refined with the assistance of the Steering Committee.

Previous Activities: Annual contributions were made through FY11.

FY12 Accomplishments: A total of $5,445,000 was deposited into interest-bearing accounts among the Arizona, California, and Nevada partners. The total dollar value of the fund at the end of FY12, with interest, was $15,484,305.53. A process for requesting, reviewing, selecting, disbursing, and tracking of dollars from the Habitat Maintenance Fund was drafted in consultation with the USFWS and approved by the Steering Committee in April 2012.

FY13 Activities: Required funding for the Habitat Maintenance Fund is $5,629,500. It was anticipated that an additional $1,830,900 of future Habitat Maintenance Funding would be contributed and deposited into the three non-Federal interest-bearing accounts. However, due to federal budget constraints, only the required funding will be deposited.

Proposed FY14 Activities: A total of $6,928,680 will be deposited into interest-bearing accounts among Arizona, California, and Nevada partners. This consists of $5,742,000 of required funding and $1,186,680 of additional funding.

Pertinent Reports: N/A

Work Task H2: Remedial Measures Fund

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$0	$0	$0	$998,298	$339,416	$339,416	$339,416

Contact: John Swett, (702) 293-8555, jswett@usbr.gov

Start Date: FY13

Expected Duration: FY55

Long-term Goal: Remedial measures for changed circumstances.

Conservation Measures: CLRA1, WIFL1, BONY2, BONY3, RASU2, RASU3, WRBA2, WYBA3, CRCR2, YHCR2, LEBI1, BLRA1, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, FLSU1, MNSW2.

Location: Lower Colorado River (reaches 1-7).

Purpose: Implement remedial measures to respond to changed circumstances, as necessary.

Connections with Other Work Tasks (past and future): Any B and E Section work tasks that may be affected by changed circumstances.

Project Description: To address the potential for changed circumstances, a contingency fund will be established to implement remedial measures identified in the HCP. A process for setting aside contingency funds will be formalized and funds will be allocated through 2030. Total funding allocated to remedial measures is $13,270,000 in 2003 dollars indexed to inflation. The first five year funding period has been set at $1,330,000 in 2003 dollars indexed to inflation.

In the event that changed circumstances occur, the Program Manager will implement remedial measures identified in the HCP. Remedial measures will be implemented within the available LCR MSCP budget, including contingency funds allocated through this work task. The Program Manager will administer the remedial measures fund. In order to effectively manage this contingency fund, a formalized process must be established and approved by the Steering Committee. If additional funding becomes available, these funds could be added to meet future obligations.

Previous Activities: N/A

FY12 Accomplishments: This is a new start in FY13.

FY13 Activities: A remedial measures fund process was established and approved by the Steering Committee. A total of $998,298 will be deposited into the three non-Federal interest-bearing accounts. This amount includes FY11, FY12, and FY13 funding.

Proposed FY14 Activities: A total of $339,416 is expected to be deposited into the three non-Federal interest-bearing accounts.

Pertinent Reports: N/A

WORK TASKS SECTION I

PUBLIC OUTREACH

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Work Task I1: Public Outreach

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
$70,000	$96,516.90	$208,144.87	$100,000	$100,000	$100,000	$100,000

Contact: Nathan Lenon, (702) 293-8015, nlenon@usbr.gov

Start Date: FY05

Expected Duration: FY55

Long-term Goal: To increase education and support for the LCR MSCP.

Conservation Measures: N/A

Location: N/A

Purpose: To communicate, coordinate, and educate LCR MSCP Steering Committee members, internal and external stakeholders, and the general public about LCR MSCP implementation activities.

Connections with Other Work Tasks (past and future): All LCR MSCP work tasks.

Project Description: This work task provides a budget to implement an outreach program for the LCR MSCP. Activities are widely varied, and include creating educational materials, participation at conferences and other public events, interaction with some school events, and coordination with youth conservation corps groups. Outreach may be specific to a project, but more typically addresses the overall focus of the LCR MSCP and general conservation issues.

Previous Activities: The program has sponsored two regional science meetings for several years now, CRTR and CRAB (Colorado River Aquatic Biologists), which provide centralized forums for scientists and resource managers to discuss current research and monitoring projects taking place on the lower Colorado River. Both of these annual meetings have web space within the LCR MSCP website.

A wide range of printed materials, videos, and reports have been created to explain various program features, in both summary (fact sheet) format as well as more lengthy reports. Several banner displays have been created; these materials have been used extensively to promote the program at conferences, conservation area dedications, and other events.

The program has been able to leverage non-program funding through DOI's "Youth Initiative" for several years, to hire local youth conservation corps to work 80 hour "shifts" on LCR MSCP projects. These projects have included pole planting of cottonwood/willow, vegetation/wildlife monitoring, native fish harvesting, and general hatchery maintenance at program partnering facilities. The projects provide the corps members valuable job experience and firsthand knowledge of local conservation issues; the program receives the physical labor from these young people at no cost.

FY12 Accomplishments: We created a new four-panel banner display emphasizing the content published in the highlights report. A portable TV/DVD player was also purchased to provide the ability to display multimedia (photos, videos) at conferences.

During FY12, we developed a template and draft outreach plan for Cibola Unit 1 and Hart Mine Marsh Conservation Areas. This plan will provide guidelines and procedures for conducting field trips at these specific conservation areas, and will be useful for drafting similar outreach plans at other conservation areas.

We conducted one field trip to Cibola Unit 1 with Appleby Elementary School in Blythe, CA with approximately 80 second grade students, showcasing small mammals and how biologists monitor them. Several other school presentations were made to schools from the Las Vegas area, Dolan Springs (AZ), and Bullhead City (AZ), including elementary, middle, and high school students.

We demonstrated live native fish and bat monitoring technology at the second annual Las Vegas Science Expo. Finally, we provided native fish education during two family-based public fishing clinics in Boulder City, NV.

Funding was secured through DOI's "youth initiative" to hire three youth conservation corps, at three sites, as well as two student summer hires. These projects involved site maintenance, nonnative vegetation management, native plantings, pond harvests, and vegetation microclimate monitoring. Each trip utilized between 8 to 10 or more youth over 80 hour periods to perform conservation work in support of existing program facilities.

FY13 Activities: We continue to pursue opportunities for outside funding through DOI's youth initiative, which allow us to hire youth conservation corps groups to assist with vegetation maintenance and fish pond harvests.

We sponsored the Southwest Partners in Amphibian and Reptile Conservation's annual conference in Las Vegas and hosted an exhibit booth at the Colorado River Water Users Association annual meeting in Las Vegas. We are participating in the National Park Service's "Grad 2016" program, which provides environmental education to ninth graders at schools surrounding the Lake Mead National Recreation Area. We continue to organize the CRAB and CRTR meetings each January.

We plan to participate in several activities with Appleby Elementary School in Blythe as well as the new Arizona State University campus in Lake Havasu City, AZ. Students from the new ASU campus have participated in bat surveys this year.
We plan to continue developing outreach plans for additional conservation areas, with additional focus on interpretive signage.

Proposed FY14 Activities: Emphasis for outreach will continue to focus on program stakeholder education, with interaction in local communities. The LCR MSCP will continue to sponsor 1-3 events per year, such as the Colorado River Water Users Association and the Yuma Birding and Nature Festival, or other activities, which present opportunities to expand stakeholder knowledge of the program. Programs outreaching to local community schools and colleges will continue.

Pertinent Reports: The FY12 Annual Report is posted to the website.

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APPENDICES

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Appendix A. Letter from Central Arizona Water Conservation District

CAP
CENTRAL ARIZONA PROJECT

June 3, 2013

Joseph A. Vanderhorst
Deputy General Counsel
Metropolitan Water District of Southern California
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Christopher S. Harris
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Colorado River Board of California
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Jason L. Thiriot
Natural Resource Analyst
Colorado River Commission of Nevada
555 E. Washington Ave., Suite 3100
Las Vegas, NV 89101

Gentlemen:

The Multi-Species Conservation Program (MSCP) Non-Federal share for the Federal Fiscal Year 2014, both annually and quarterly, are shown by state below. The inflation index used is 1.276.

Remedial Measures funding represents the amount for FY14 of the plan. Existing Habitat Maintenance represents $5,742,000 for FY14 (year 9) and an accelerated amount of $1,186,680 which will reduce the final contribution to be made in FY15.

FY 2014 Non-Federal Share (2003 $)	$13,770,000
FY 2014 Inflation Index	1.276
FY 2014 Non-Federal Share (Escalated $)	$17,570,520

FY 2013 Non-Fed	Existing Habitat Maintenance	Remedial Measures	Other Work Tasks	Total Non-Fed Payment Due
Arizona (25%- EHM&RM) (15%-Total Payment)	$1,732,170.00	$ 84,854.00	$ 818,554.00	$ 2,635,578.00
Nevada (25%-EHM&RM) (30%-Total Payment)	1,732,170.00	84,854.00	3,454,132.00	5,271,156.00
California (50%-EHM&RM) (55%-Total Payment)	3,464,340.00	169,708.00	6,029,738.00	9,663,786.00
Totals	$6,928,680.00	$339,416.00	$10,302,424.00	$17,570,520.00

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FY 2014 Quarterly Payments		Existing Habitat Maintenance	Remedial Measures	Other Work Tasks	Total Non-Fed Payment Due
Arizona	Q1	$ 433,042.50	$ 21,213.50	$ 204,638.50	$ 658,894.50
	Q2	433,042.50	21,213.50	204,638.50	658,894.50
	Q3	433,042.50	21,213.50	204,638.50	658,894.50
	Q4	433,042.50	21,213.50	204,638.50	658,894.50
	FY Totals	$1,732,170.00	$ 84,854.00	$ 818,554.00	$2,635,578.00
Nevada	Q1	$ 433,042.50	$ 21,213.50	$ 863,533.00	$1,317,789.00
	Q2	433,042.50	21,213.50	863,533.00	1,317,789.00
	Q3	433,042.50	21,213.50	863,533.00	1,317,789.00
	Q4	433,042.50	21,213.50	863,533.00	1,317,789.00
	FY Totals	$1,732,170.00	$ 84,854.00	$3,454,132.00	$5,271,156.00
California	Q1	$ 866,085.00	$ 42,427.00	$1,507,434.50	$2,415,946.50
	Q2	866,085.00	42,427.00	1,507,434.50	2,415,946.50
	Q3	866,085.00	42,427.00	1,507,434.50	2,415,946.50
	Q4	866,085.00	42,427.00	1,507,434.50	2,415,946.50
	FY Totals	$3,464,340.00	$169,708.00	$6,029,738.00	$9,663,786.00

If you have any questions, please call or e-mail either Dana Sedig, 623-869-2148 (dsedig@cap-az.com) or myself, 623-869-2167 (tcooke@cap-az.com).

Sincerely,

Theodore Cooke
Central Arizona Project
Assistant General Manager
Finance and Information Technologies

Attachments

Cc John Swett, MSCP Program Manager, Bureau of Reclamation
Laura Vecerina, MSCP Program Deputy Manager, Bureau of Reclamation
Linda Carbone, MSCP Management & Program Analyst
Douglas Dunlap, Manager-Finance and Accounting, CAP
Dana Sedig, Supervisor-Financial Operations, CAP
Jack Ozomaro, Financial Analyst-Financial Operations, CAP

Section 8.1.1 - Fiscal Year 2014 Inflation Calculation for Lower Colorado River Multi-Species Conservation Program (Actual Indices through September 2012)

Item		Description / Formula		Values		Result
FY	=	Federal Fiscal Year Being Adjusted for Inflation		2014		2014
FY-2	=	Federal Fiscal Year for 2 years prior to Federal Fiscal Year Being Adjusted for Inflation		2012		2012
PPI Inflation Index for FY	=	Producer Price Index for Materials and Components for Const Sept FY-2 / Producer Price Index for Materials and Components for Const Sept 2002	=	219.2/ 152.1	=	1.441
GDPIP Inflation Index for FY	=	Gross Domestic Product Implicit Price Deflator September 30, FY-2 / Gross Domestic Product Implicit Price Deflator September 30, 2002		115.810 / 104.243	=	1.111
Inflation Index for FY	=	(PPI Inflation Index for FY + GDPIP inflation Index for FY)/2		(1.441+1.111)/2	=	1.276
Non-Federal Funding Obligation for FY	=	(5 - year Amount from Table 7-1 of HCP 2003 dollars adjusted to yearly amount)/2	=	$137,700 / 5 = $27,540 $27,540 / 2	=	$13,770
Federal Funding Obligation for FY	=	(5 - year Amount from Table 7-1 of HCP 2003 dollars adjusted to yearly amount)/2	=	$137,700 / 5 / 2	=	$13,770
Non-Federal Indexed Funding Obligation for FY	=	(Non-Federal Funding Obligation for FY) X (Inflation Index for FY)		$13,770 X 1.276	=	$17,570.520
Federal Indexed Funding Obligation for FY	=	(Federal Funding Obligation for FY) X (Inflation Index for FY)		$13,770 X 1.276	=	$17,570.520

All $ are in thousands

Individual State's share in $			
California Share - 50%		50%	$8,785,260.00
Arizona Share - 25%		25%	$4,392,630.00
Nevada Share - 25%		25%	$4,392,630.00
Total Non-Federal Share			$17,570,520.00

Adjusted Split in Individual State Shares		
California - 55%	55%	$ 9,663,786.00
Arizona - 15%	15%	2,635,578.00
Nevada - 30%	30%	5,271,156.00
Total Non-Federal Share	100%	$ 17,570,520.00

2/28/2013

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Producer Price Index-Commodities

```
Series Id:  WPUSOP2200
Not Seasonally Adjusted
Group:      Stage of processing
Item:       Materials and components for construction
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Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2003	151.4	152.1	152.3	152.9	152.9	153.0	153.6	153.7	155.0	155.2	155.6	155.6	153.6
2004	156.2	159.0	161.9	164.7	166.9	166.9	167.5	169.8	170.9	170.8	170.7	171.3	166.4
2005	173.1	174.7	175.1	175.4	175.0	175.5	175.7	175.4	177.0	179.2	180.8	181.7	176.6
2006	184.2	185.0	185.5	186.7	188.2	189.2	190.2	190.7	191.0	190.4	189.6	189.6	188.4
2007	190.3	190.6	191.2	192.1	192.8	193.1	193.5	193.5	193.2	193.2	193.2	193.4	192.5
2008	194.4	195.7	197.3	200.2	203.3	206.5	209.8	212.9	214.0	212.2	210.2	207.9	205.4
2009	207.0	204.8	204.2	203.2	202.8	202.0	201.9	201.5	202.0	201.9	201.7	202.0	202.9
2010	202.3	203.5	204.6	206.1	207.4	206.6	206.3	206.2	205.9	205.9	206.3	207.0	205.7
2011	208.3	209.5	210.9	212.1	212.8	213.7	214.7	214.6	214.5	214.4	214.2	214.2	212.8
2012	215.3	216.8	217.4	218.3	219.1	219.1	218.5	218.7	219.2	219.1	219.5	219.9	218.4
2013	221.2(P)	221.9(P)	223.0(P)	223.1(P)									

P : Preliminary. All indexes are subject to revision four months after original publication.

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Bureau of Economic Analysis

Table 1.1.9. Implicit Price Deflators for Gross Domestic Product

[Index numbers, 2005=100] Seasonally adjusted

Last Revised on: May 30, 2013 - Next Release Date June 26, 2013

Line		2011 I	2011 II	2011 III	2011 IV	2012 I	2012 II	2012 III	2012 IV
1	**Gross domestic product**	**112.372**	**113.109**	**113.950**	**113.987**	**114.599**	**115.035**	**115.810**	**116.089**
2	**Personal consumption expenditures**	**112.636**	**113.630**	**114.290**	**114.590**	**115.297**	**115.493**	**115.949**	**116.409**
3	Goods	107.263	108.817	109.630	109.567	110.254	109.741	110.258	110.548
4	Durable goods	90.759	91.109	90.963	90.382	90.158	89.889	89.360	88.901
5	Nondurable goods	116.971	119.239	120.627	120.880	122.138	121.473	122.661	123.440
6	Services	115.500	116.190	116.769	117.268	117.986	118.573	118.995	119.550
7	**Gross private domestic investment**	**105.674**	**106.295**	**106.797**	**106.630**	**107.234**	**107.545**	**107.845**	**108.270**
8	Fixed investment	105.857	106.492	106.969	107.326	107.636	107.951	108.299	108.713
9	Nonresidential	106.471	107.153	107.660	108.062	108.532	108.847	109.073	109.397
10	Structures	124.054	126.022	127.749	129.150	130.014	131.044	131.386	131.827
11	Equipment and software	100.131	100.424	100.554	100.648	100.992	101.085	101.273	101.558
12	Residential	102.861	103.296	103.643	103.804	103.431	103.746	104.585	105.355
13	Change in private inventories	---	---	---	---	---	---	---	---
14	**Net exports of goods and services**	---	---	---	---	---	---	---	---
15	Exports	116.104	118.475	118.988	117.838	118.651	118.801	118.791	119.235
16	Goods	116.357	119.027	119.393	117.924	118.622	118.515	118.553	118.896
17	Services	115.388	117.051	117.904	117.514	118.604	119.379	119.249	119.939
18	Imports	119.419	123.053	122.458	122.452	124.145	122.931	120.896	122.454
19	Goods	119.697	123.766	123.133	123.316	125.249	123.730	121.333	123.062
20	Services	117.440	118.912	118.531	117.613	118.117	118.399	118.134	118.855
21	**Government consumption expenditures and gross investment**	**119.968**	**121.172**	**121.902**	**121.908**	**122.983**	**123.161**	**123.579**	**124.067**
22	Federal	115.696	116.716	117.368	117.114	118.042	118.406	118.683	119.145
23	National defense	116.437	117.372	118.043	117.776	119.004	119.264	119.537	120.110
24	Nondefense	114.216	115.399	116.013	115.785	116.117	116.685	116.970	117.215
25	State and local	122.572	123.900	124.682	124.870	126.046	126.093	126.609	127.114
	Addendum:								
26	Gross national product	112.362	113.106	113.940	113.985	114.600	115.035	115.807	116.090

MSCP
Habitat Maintenance Account

Per Table 7-1 of the HCP		
	Years 1-5	Years 6-10
Existing Habitat Maintenance Cost	2,500,000	22,500,000
Total Cost	56,070,000	137,700,000
Percent of Existing Habitat Cost to Total Cost	4.458712323880860%	16.339869281045800%

	FY 2006 - YR 1	FY 2007 - YR 2	FY 2008 - YR 3	FY 2008 - YR 4	FY 2008 - YR 5
Total Annual Funding Commitment	$ 12,144,762.00	$ 12,582,108.00	$ 13,311,018.00	$ 13,568,940.00	$ 14,510,916.00
X Existing Habitat Percentage Above	4.458712323880860%	4.458712323880860%	4.458712323880860%	4.458712323880860%	4.458712323880860%
Existing Habitat Maintenace Cost	$ 541,500.00	$ 561,000.00	$ 593,500.00	$ 605,000.00	$ 647,000.00
Arizona - 25%	$ 135,375.00	$ 140,250.00	$ 148,375.00	$ 151,250.00	$ 161,750.00
Nevada - 25%	135,375.00	140,250.00	148,375.00	151,250.00	161,750.00
California - 50%	270,750.00	280,500.00	296,750.00	302,500.00	323,500.00
Total Existing Habitat Maintenance Cost	**$ 541,500.00**	**$ 561,000.00**	**$ 593,500.00**	**$ 605,000.00**	**$ 647,000.00**

	FY 2011 - YR 6	FY 2012 - YR 7	FY 2013 - YR 8	FY 2014 - YR 9	FY 2015 - YR 10
Total Annual Funding Commitment	$ 32,800,140.00	$ 33,323,400.00	$ 34,452,540.00	$ 35,141,040.00	
X Existing Habitat Percentage Above	16.339869281045800%	16.339869281045800%	16.339869281045800%	16.339869281045800%	16.339869281045800%
Existing Habitat Maintenace Cost	$ 5,359,500.00	$ 5,445,000.00	$ 5,629,500.00	$ 5,742,000.00	$ -
Arizona - 25%	$ 1,339,875.00	$ 1,361,250.00	$ 1,407,375.00	$ 1,435,500.00	$ -
Nevada - 25%	1,339,875.00	1,361,250.00	1,407,375.00	1,435,500.00	-
California - 50%	2,679,750.00	2,722,500.00	2,814,750.00	2,871,000.00	-
Total Existing Habitat Maintenance Cost	**$ 5,359,500.00**	**$ 5,445,000.00**	**$ 5,629,500.00**	**$ 5,742,000.00**	**$ -**

Accelerated Payment	$ 1,186,680.00
Arizona - 25%	296,670.00
Nevada - 25%	296,670.00
California - 50%	593,340.00
Total Existing Habitat Maintenance Accelerated Payment	$ 1,186,680.00

TOTAL PAYMENT	
Existing Habitat Maintenace Cost-2014	$ 5,742,000.00
Accelerated Payment	1,186,680.00
TOTAL PAYMENT	$ 6,928,680.00
Arizona - 25%	$ 1,732,170.00
Nevada - 25%	1,732,170.00
California - 50%	3,464,340.00
TOTAL PAYMENT	$ 6,928,680.00

(Established FY 2012-Cumulative Funding for years 6-8 in FY13)

Per Table 7-1 of the HCP		
	Years 1-5	Years 6-10
Remedial Measures Cost (2003 dollars)	-	1,330,000
Amount per Year (2003 dollars)		266,000

	FY 2011 - YR 6	FY 2012 - YR 7	FY 2013 - YR 8	FY 2014 - YR 9	FY 2015 - YR 10	Total
Cumulative Funding for (FY11 - FY13) 2003 dollars	$ -	$ -	$ 798,000.00	$ 266,000.00		
X Inflation Factors	1.191	1.210	1.251	1.276		
Remedial Measures Cost (inflated)	$ -	$ -	$ 998,298.00	$ 339,416.00		$ 998,298.00
Arizona - 25%	$ -	$ -	$ 249,574.50	$ 84,854.00		$ 249,574.50
Nevada - 25%	-	-	249,574.50	84,854.00		249,574.50
California - 50%	-	-	499,149.00	169,708.00		499,149.00
Total Remedial Measures Cost	$ -	$ -	$ 998,298.00	$ 339,416.00	$ -	$ 998,298.00

CAP
CENTRAL ARIZONA PROJECT

REVISED March 7, 2013

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Gentlemen:

The Multi-Species Conservation Program (MSCP) Non-Federal share for the Federal Fiscal Year 2013, both annually and quarterly, are shown by state below. The inflation index used is 1.251.

Remedial measures funding represents the cumulative amount for years 6-8 of the plan ($798,000 in 2003 dollars) inflated by the FY2013 index. Existing Habitat Maintenance represents $5,629,500 for FY13 (year 8).

FY 2013 Non-Federal Share (2003 $)	$13,770,000
FY 2013 Inflation Index	1.251
FY 2013 Non-Federal Share (Escalated $)	$17,226,270

FY 2013 Non-Fed	Existing Habitat Maintenance	Remedial Measures	Other Work Tasks	Total Non-Fed Payment Due
Arizona (25%- EHM&RM) (15%-Total Payment)	$1,407,375.00	$249,574.50	$ 926,991.00	$ 2,583,940.50
Nevada (25%-EHM&RM) (30%-Total Payment)	1,407,375.00	249,574.50	3,510,931.50	5,167,881.00
California (50%-EHM&RM) (55%-Total Payment)	2,814,750.00	499,149.00	6,160,549.50	9,474,448.50
Totals	$5,629,500.00	$998,298.00	$10,598,472.00	$17,226,270.00

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FY 2013 Quarterly Payments		Existing Habitat Maintenance	Remedial Measures	Other Work Tasks	Total Non-Fed Payment Due
Arizona	Q1	$ 466,275.00	$ 62,393.62	$ 117,316.50	$ 645,985.12
	Q2	466,275.00	62,393.62	117,316.50	645,985.12
	Q3	466,275.00	62,393.63	117,316.50	645,985.13
	Q4	8,550.00	62,393.63	575,041.50	645,985.13
	FY Totals	$1,407,375.00	$249,574.50	$ 926,991.00	$2,583,940.50
Nevada	Q1	$ 466,275.00	$ 62,393.62	$ 763,301.63	$1,291,970.25
	Q2	466,275.00	62,393.62	763,301.63	1,291,970.25
	Q3	466,275.00	62,393.63	763,301.62	1,291,970.25
	Q4	8,550.00	62,393.63	1,221,026.62	1,291,970.25
	FY Total	$1,407,375.00	$249,574.50	$3,510,931.50	$5,167,881.00
California	Q1	$ 932,550.00	$124,787.25	$1,311,274.87	$2,368,612.12
	Q2	932,550.00	124,787.25	1,311,274.87	2,368,612.12
	Q3	932,550.00	124,787.25	1,311,274.88	2,368,612.13
	Q4	17,100.00	124,787.25	2,226,724.88	2,368,612.13
	FY Total	$2,814,750.00	$499,149.00	$6,160,549.50	$9,474,448.50

If you have any questions, please call or e-mail either Dana Sedig, 623-869-2148 (dsedig@cap-az.com) or myself, 623-869-2167 (tcooke@cap-az.com).

Sincerely,

T Cooke

Theodore Cooke
Central Arizona Project
Assistant General Manager
Finance and Information Technologies

Attachments
Cc John Swett, MSCP Program Manager, Bureau of Reclamation
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Appendix B. Description of Take

B-1. Federal Flow-Related Covered Actions and Accomplishments, Calendar Year 2012

Federal Covered Actions ***Biological Assessment*** **Chapter 2**	**Nondiscretionary Actions**	**Discretionary Actions**	**Nondiscretionary Actions Related to Non-Federal Actions**[1]	**2012 Accomplishments**[2, 3]
2.2 BUREAU OF RECLAMATION				
2.2.1 Ongoing Flow-Related Actions				
2.2.1.1 Flood Control (page 2-3; Table 2-1, page 2-5)	• Prescribed flood control releases per Field Working Agreement and Water Control Manual for Lake Mead/Hoover Dam	• Timing of required releases may be varied within the month • Anticipatory flood control releases • Available flood control space in Lake Mead can be reduced to 1.5 million acre-feet (maf) August 1 to January 1 if prescribed space is available in upstream reservoirs • Management of target elevations for Lake Mohave (Davis Dam) and Lake Havasu (Parker Dam)	• None	No flood control releases were made from Lake Mead. The hourly elevation of Lake Mead provided for flood control space which was well above that space required. In 2012, the Lake Mead elevation varied between 1,114.98 and 1,134.52 feet above mean sea level. Elevations at Lake Mohave and Lake Havasu were managed to target elevations.
2.2.1.2 State Apportionment and Water Contracts (page 2-5; Table 2-2, page 2-6)	• Delivery of water to water users in the United States pursuant to applicable Federal law, including the Boulder Canyon Project Act (BCPA) and the Supreme Court Consolidated Decree of 2006 in Arizona v. California, 547 U.S. 150 (Decree) • Delivery of a state's unused entitlement to a junior entitlement holder within that state on an annual basis	• Determinations and delivery of post-2016 unused apportionment water from one state to another within the Lower Basin on an annual basis	• Delivery of water to water users in the United States pursuant to applicable Federal law, including the BCPA and the Decree	Water deliveries were made to water users in Arizona, California, and Nevada to satisfy the basic entitlements for delivery of Colorado River water. Unused entitlement water within a state's apportionment was delivered to junior priority holders in that state.

2.2.1.3 Annual Operations Normal, Surplus, Shortage, and Unused Apportionment (page 2-6; Table 2-3, page 2-9)	• Issuance of an annual operating plan • Delivery of water to water users in the United States pursuant to applicable Federal law, including the BCPA and the Decree. • Delivery of water to Mexico pursuant to the 1944 Water Treaty • Determination of shortage conditions based on the Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (Interim Guidelines) • Determination of surplus conditions based on the Interim Guidelines	• Revision of annual operations through the Annual Operating Plan (AOP), pursuant to the Long-Range Operation of Colorado River Reservoirs (LROC) within the year to reflect current hydrologic conditions • Determinations and delivery of post-2016 unused apportionment water from one state to another within the Lower Basin on an annual basis • Execution of agreements and the delivery of surplus water pursuant to the Reclamation Reform Act (RRA) and the Reclamation States Emergency Drought Relief Act • Periodic review of the LROC	• Delivery of water to water users in the United States pursuant to applicable Federal law, including the BCPA and the Decree	The Annual Operating Plan for 2012, which governed releases, was issued. Annual operations were revised through the AOP pursuant to the LROC and the Interim Guidelines to reflect current hydrologic conditions. An Intentionally Created Surplus (ICS) Surplus condition was declared for 2012. ICS was created in 2012. Water was delivered to water users in the United States pursuant to applicable Federal law, including the BCPA and the Decree. Water was delivered to Mexico pursuant to the 1944 Water Treaty. No review of the LROC was conducted in 2012. In 2012, Nevada and Arizona did not use their entire apportionments.
2.2.1.4 Daily Hoover Dam Operations(Table 2-4, page 2-10)	• Water releases are made to satisfy beneficial use requirements of entitlement holders in the United States, deliver 1944 Water Treaty water to Mexico, and generate hydropower with these water releases	• Monthly energy targets are set prior to each month, based on the best information available with respect to downstream water demands and lake elevation targets at Lakes Mohave and Havasu; energy targets may be revised during the month to meet changing water demands and other constraints (e.g., to benefit native fish in Lake Mohave)	• Water releases are made to satisfy beneficial use requirements of entitlement holders in the United States and to generate hydropower with these water releases	Water releases from Hoover Dam were made to satisfy beneficial use requirements of entitlement holders in the United States, to deliver 1944 Water Treaty water, and to generate hydropower with these water releases.Energy targets were set monthly based on the best information available with respect to downstream water demands and lake elevation targets at Lakes Mohave and Havasu. Energy targets were revised during the month (if needed) to meet changing water demands and other constraints.

2.2.1.4 Daily Davis Dam Operations (Table 2-5, page 2-11)	• Water releases are made to satisfy beneficial use requirements of entitlement holders in the United States, deliver 1944 Water Treaty water to Mexico, and generate hydropower with these water releases	• Timing of releases, to a limited degree, may be varied by a few days, based on available downstream storage, Lake Mohave and Lake Havasu operational constraints, downstream water requirements, and hydropower needs	• Water releases are made to satisfy beneficial use requirements of entitlement holders in the United States and generate hydropower with these water releases	Water releases from Davis Dam were made to satisfy beneficial use requirements of entitlement holders in the United States, to deliver 1944 Water Treaty water to Mexico, and to generate hydropower with these water releases. The timing of releases was varied based on available downstream storage, operational constraints for Lakes Mohave and Havasu, downstream water requirements, and hydropower needs.
2.2.1.4 Daily Parker Dam Operations (Table 2-6, page 2-11)	• Water releases are made to satisfy beneficial use requirements of entitlement holders in the United States, deliver 1944 Water Treaty water to Mexico, and generate hydropower with these water releases	• Timing of releases, to a limited degree, may be varied by the hour based on hydropower needs, water requirements, or other operations constraints immediately downstream of the dam	• Water releases are made to satisfy beneficial use requirements of entitlement holders in the United States and generate hydropower with these water releases	Water releases from Parker Dam were made to satisfy beneficial use requirements of entitlement holders in the United States, to deliver 1944 Water Treaty water to Mexico, and to generate hydropower with these water releases. The timing of releases was varied based on available downstream water requirements, hydropower needs, and other operational constraints immediately downstream of Parker Dam.
2.2.1.4 Daily Senator Wash, Imperial Dam, Laguna Dam, and Warren H. Brock Reservoir Operations (Table 2-7, page 2-11)	• Water releases are made to satisfy beneficial use requirements of entitlement holders in the United States, deliver 1944 Water Treaty water to Mexico, and generate hydropower with water releases for Senator Wash	• Senator Wash, Imperial Dam, and Laguna Dam operations to prevent over deliveries, to release water to entitlement holders, for sluicing operations, to deliver a portion of the 1944 Water Treaty deliveries to Mexico, and for flood control purposes	• Water releases are made to satisfy beneficial use requirements of entitlement holders in the United States	Water releases from Senator Wash, Imperial and Laguna Dams, and Brock Reservoir were made to satisfy beneficial use requirements of entitlement holders in the United States, to deliver 1944 Water Treaty water to Mexico. Water releases from Senator Wash and Imperial and Laguna Dams were made to prevent water passing to Mexico in excess of treaty requirements, to release water to entitlement holders, for sluicing operations, to deliver a portion of the 1944 Water Treaty water deliveries to Mexico.
2.2.1.5 Electric Power Generation (page 2-11) **43 CFR PART 431 (page 2-14)**	• Operational requirements to satisfy 43 CFR Part 431 requirements	---	---	Hydroelectric power generated: • Hoover Dam: 3,705,574,280 kWh • Davis Dam: 1,130,209,000 kWh • Parker Dam: 458,594,527 kWh Operations met the requirements to satisfy 43 CFR Part 431.
2.2.1.6 Lower Colorado Water Supply Project - California (page 2-15; Table 2-8, page 2-16)	• Delivery of water under executed Lower Colorado Water Supply Project (LCWSP) contracts	• Reclamation's execution and administration of individual LCWSP contracts	• Participate in the development of and consult in the execution of individual contracts under the LCWSP.	In 2012, 4,616 acre-feet was pumped by the LCWSP wellfield. Imperial Irrigation District (IID) reduced its consumptive use of Colorado River water by this amount and the water was made available for use by the LCWSP contractors, including Metropolitan Water District (MWD) through exchange.

2.2.1.7 1944 Water Treaty Deliveries(page 2-17; Table 2-9, page 2-20)	• Delivery of Mexico allotment (1.5 maf) pursuant to the 1944 Water Treaty and related Minutes • Delivery of Mexico allotment (up to 1.7 maf) when surplus water is determined by the United States Section of the International Boundary Water Commission (IBWC) to be available beyond the needs of U.S. users • Delivery of Mexico allotment pursuant to the 1944 Water Treaty and related Minutes under extraordinary drought conditions • Compliance with the salinity requirements of Minute No. 242 of the 1944 Water Treaty • Delivery of emergency water to Tijuana pursuant to Minute No. 314 of the 1944 Water Treaty and contract	• Routing of water through the Yuma Division for delivery to Northerly International Boundary (NIB) • Determination of quantity of water delivered at Southerly International Boundary (SIB) up to 140,000 acre-feet per year. • Drainage pumping and delivery of drainage return flows at NIB and SIB • Operation of variable-speed pumps and diversion canal at SIB to reduce salinity • Execution of contracts to deliver a portion of Mexico's allotment to Tijuana pursuant to Minute No. 314 of the 1944 Water Treaty • Routing of water through the Yuma Division during flood control conditions	• Delivery of emergency water to Tijuana pursuant to Minute No. 314 of the 1944 Water Treaty and contract • Retention of a portion of MWD's entitlement in Lake Mead to accommodate delivery of water pursuant to Minute No. 314 of the 1944 Water Treaty	Water delivery met the Mexico allotment (1.5 maf) pursuant to the 1944 Water Treaty and related Minutes.Reclamation complied with the salinity requirements of Minute No. 242 of the 1944 Water Treaty.Delivery of emergency water to Tijuana pursuant to Minute No. 314 of the 1944 Water Treaty totaled 95 acre-feet. Pursuant to criteria outlined in Minute No. 318, water deliveries to Mexico included a downward adjustment of 132,977 acre-feet. This water was stored in Lake Mead for future delivery to Mexico. Delivery of water at SIB totaled 124,764 acre-feet. Delivery at NIB totaled 1,328,400 acre-feet. A total of 94,830 acre-feet of water passed to Mexico in excess of treaty requirements. In 2012, 126,221 acre-feet of water were bypassed pursuant to Minute No. 242 of the IBWC. Drainage pumping and delivery of drainage return flows were made at NIB and SIB.
2.2.1.8 Decree Accounting (page 2-21; Table 2-10, page 2-22)	• Annual preparation of official records of the diversion, return flow, and consumptive use of Colorado River water pursuant to Article V of the Decree	• None	• Report data for Decree Accounting records	The Colorado River Accounting and Water Use Report; Arizona, California, Nevada for Calendar Year 2012, will be published May 15, 2013, and provisional diversions are summarized below. The final report will be available at http://www.usbr.gov/lc/region/g4000/wtracct.html Diversions from Mainstream Summary: <u>Arizona:</u> Diversions = 3,657,009 acre-feet Measured Returns = 712,878 acre-feet Unmeasured Returns = 154,464 acre-feet Consumptive Use = 2,789,667 acre-feet

				California: Diversions = 5,027,076 acre-feet Measured Returns = 655,016 acre-feet Unmeasured Returns = 82,198 acre-feet Consumptive Use = 4,416,718 acre-feet Nevada: Diversions = 439,357 acre-feet Measured Returns = 200,654 acre-feet Unmeasured Returns = 1,542 acre-feet Consumptive Use = 237,161 acre-feet
2.2.2 Future Flow-Related Covered Actions				
2.2.2.1 Specific Surplus and Shortage Guidelines (page 2-22; Table 2-11, page 2-24)	• Delivery of surplus water pursuant to Article II(B)(2) of the Decree • Delivery of water pursuant to the Article II(B)(3) of the Decree (shortage) • Determination of shortage conditions based on criteria developed in the Interim Guidelines • Determination of surplus conditions based on criteria listed in the Interim Guidelines	• Adoption of specific post-2026 surplus guidelines • Adoption of specific post-2026 shortage guidelines	• Consult with States on development of specific post-2026 surplus guidelines or specific post-2026 shortage guidelines • Delivery of water to water users in the United States pursuant to applicable Federal law, including the BCPA and the Decree	No surplus water was delivered pursuant to Article II(B)(2) of the Decree. 1,000 acre-feet of ICS was delivered to SNWA pursuant to the criteria listed in the Interim Guidelines. There were no reductions in deliveries pursuant to Article II(B)(3) of the Decree.
2.2.2.2 Flood Release Contracts (page 2-24; Table 2-12, page 2-25)	• Delivery of water under executed flood release contracts	• Execution of contracts for water released during flood control operations	• Participate in the development of and consult in the execution of flood release contracts	No water deliveries were made under flood release contracts.
2.2.2.3 Changes in the Storage and Delivery of State Entitlement Waters through Various Administrative Actions (page 2-25; Table 2-13, page 2-26)	---	---	---	No administrative actions were taken to reduce the water deliveries as listed in Table 2-13 of the Biological Assessment.
Flow Changes Below Hoover Dam to Davis Dam (Table 2-14, after page 2-26)	---	---	---	Deliveries to IID were reduced by 448 acre-feet for repayment of IOPP overruns. 179,677 acre-feet of ICS was created by MWD. Mexico adjusted its delivery schedule downward by 132,977 acre-feet. These amounts would have been released from Lake Mead for downstream use but were left in Lake Mead decreasing the volume of water passing through Hoover Dam by 313,102 acre-feet.

				However, during 2012, IID incurred an overrun in the amount of 134,076 acre-feet; Beattie Farms Southwest incurred an overrun in the amount of 235 acre-feet. This resulted in a net storage of 178,791 acre-feet in Lake Mead (i.e. the net change in flow below Hoover Dam was -178,791 acre-feet). [All values in terms of consumptive use.]
Flow Changes Below Davis Dam to Parker Dam (Table 2-15, after page 2-26)	---	---	---	Deliveries to IID were reduced by 448 acre-feet for repayment of IOPP overruns. 179,677 acre-feet of ICS was created by MWD. Mexico adjusted its delivery schedule downward by 132,977 acre-feet. These amounts would have been released from Lake Mead for downstream use but were left in Lake Mead decreasing the volume of water passing through Davis Dam by 313,102 acre-feet. However, during 2012, IID incurred an overrun in the amount of 134,076 acre-feet; Beattie Farms Southwest incurred an overrun in the amount of 235 acre-feet. This resulted in a net storage of 178,791 acre-feet in Lake Mead (i.e. the net change in flow below Davis Dam was -178,791 acre-feet). [All values in terms of consumptive use.]
Flow Changes Below Parker Dam to Imperial Dam(Table 2-16, after page 2-26)	---	---	---	IID conserved the following amounts, which were diverted by MWD at Lake Havasu: 93,677 acre-feet under the amended 1988 IID/MWD Conservation Agreement; 106,722 acre-feet under the IID/San Diego County Water Authority (SDCWA) transfer agreement; and 67,700 acre-feet from AAC lining conservation. Coachella Valley Water District (CVWD) conserved 28,439 acre-feet from lining of the Coachella Canal, which was diverted by MWD at Lake Havasu. A total of 296,538 acre-feet of Colorado River water was diverted by MWD which would otherwise have passed Parker Dam for delivery to IID and CVWD. Mexico's downward delivery adjustment of 132,977 acre-feet reduced flows below Parker Dam. These activities resulted in a total of 429,515 acre-feet of reduced flows past Parker Dam. IID incurred an overrun in the amount of 134,076 acre-feet; Beattie Farms Southwest incurred an overrun in the amount of 235 acre-feet, and excess water to Mexico in the amount of 94,830 acre-feet all resulted in a total of 229,141 acre-feet of increased flows past Parker Dam. The net change in flow below Parker Dam in 2012 is a reduction of 200,374 acre-feet. [All values in terms of consumptive use.]
Water Conservation Field Services Program (page 2-27; Table 2-17, page 2-28)	• Develop water conservation program pursuant to RRA section 210(a)	• Implementation of the Field Services Program	• Consult in the development of conservation plans pursuant to RRA section 210(a)	All water conservation plans for the Lower Colorado Region are complete.

Unlawful Use (page 2-28; Table 2-18, page 2-30)	• BCPA requires all Colorado River water users to have a contract with the Secretary of the Interior	• Implementation of appropriate policy or rule to address unlawful use of Colorado River water • Execution of water delivery contracts with entities or individuals identified as unlawful users	• Consult with states in the development of policies or rules to address unlawful use of Colorado River water • Consult with the states on the execution of water delivery contracts with entities or individuals identified as unlawful users	A proposed policy is currently under development.
Unallocated Colorado River Water in Arizona, Exclusive of CAP (page 2-30; Table 2-19, page 2-31) Note: changed title from "Unallocated or Noncontract Water in Arizona, Exclusive of CAP"	• Delivery of water pursuant to executed contracts for unallocated water in Arizona (non-CAP)	• Execution of water delivery contracts for unallocated water in Arizona (non-CAP)	• Review of water delivery contracts and consultation with Arizona on contract recommendations	Unallocated non-CAP Arizona water was delivered to Central Arizona Water Conservation District (CAWCD) as allowed under CAWCD's contract with the United States. This water is unallocated because it is not yet placed under permanent contract. Arizona Department of Water Resources will recommend to the Secretary of the Interior the entities with which the Secretary should contract for the unallocated Arizona water upon completion of the well inventory. The well inventory is being performed for Reclamation by USGS to identify wells that draw water directly from the lower Colorado River or pump water that would be replaced by water drawn from the lower Colorado River.
Central Arizona Project Contract Actions (page 2-31; Table 2-20, page 2-31)	• Delivery of water pursuant to executed contracts	• Completion of allocation and execution of contracts for delivery of CAP water subject to Congressional direction	• Review of contracts and consultation on proposed allocation	Water was delivered to the CAP for use by CAP subcontractors and Indian tribes in satisfaction of water delivery contracts. On April 18, 2012, a CAP water lease among the United States, the San Carlos Apache Tribe, and the Pascua Yaqui Tribe was entered into for the delivery of 1,000 acre-feet of the San Carlos Apache Tribe's CAP water to the Pascua Yaqui Tribe during calendar year 2012. On June 28, 2012, an Amendment No. 1 to a CAP water lease among the United States, the San Carlos Apache Tribe, and the Town of Gilbert, Arizona (Gilbert) was entered into which increased the maximum annual quantity being leased from the San Carlos Apache Tribe's CAP water to Gilbert in 2011 from 20,000 acre-feet to 25,925 acre-feet, and to continue the lease arrangements for another year with 20,000 acre-feet being leased during the period January 1, 2012, through December 31, 2012. On August 24, 2012, an Amendment No. 2 to a CAP water lease among the United States, the Fort McDowell Yavapai Nation, and Gilbert was entered into which continued lease arrangements of 13,683 acre-feet annually from the Fort McDowell Yavapai Nation's CAP water to Gilbert through December 31, 2013.

				On November 16, 2012, an Amendment No. 2 to a CAP water lease among the United States, the San Carlos Apache Tribe, and Gilbert was entered into which extends the arrangement to lease 20,000 acre-feet of the Tribe's CAP water to Gilbert for an additional year from January 1 through December 31, 2013. On December 19, 2012, a CAP water lease among the United States, the San Carlos Apache Tribe, and the Pascua Yaqui Tribe was entered into for the delivery of 1,000 acre-feet of the San Carlos Apache Tribe's CAP water to the Pascua Yaqui Tribe during calendar year 2013.
Changes in Delivery Related to Water Transfers (page 2-32; Table 2-21, page 2-32	•Delivery of water pursuant to contracts that recognize temporary or permanent transfers of water entitlements	•Approval of new contracts or contract changes to recognize temporary or permanent transfers of water entitlements	•Review of contracts and consultation on new or amended contracts that recognize transfers of water entitlements	The following conservation and transfers were made pursuant to the Colorado River Water Delivery Agreement (CRWDA). They represent changes in delivery amounts and points of diversion required to implement the Quantification Settlement Agreement. IID conserved 106,722 acre-feet of water for transfer to SDCWA via exchange with MWD. IID conserved 104,140 acre-feet under the amended 1988 IID/MWD Conservation Agreement, of which 93,821 acre-feet were diverted by MWD and 10,319 acre-feet were diverted by CVWD. IID conserved 67,700 acre-feet from All American Canal lining, of this amount 56,200 acre-feet were transferred to SDCWA and 11,500 acre-feet were transferred to MWD. IID conserved and CVWD diverted 21,000 acre-feet to meet the Intra-priority 3 Transfer. In addition, CVWD conserved 30,850 acre-feet by the Coachella Canal Lining project and exchanged 26,350 acre-feet with SDCWA and made 4,500 acre-feet of water available to MWD. On November 15, 2012, a partial assignment and transfer from Arizona Recreational Facilities, LLC (ARF) to EPCOR Water Arizona Inc. (EPCOR) was approved which transferred 14 acre-feet per year of ARF's Arizona fourth priority Colorado River water entitlement to EPCOR. ARF's annual entitlement was reduced by 14 acre-feet from 2,700 acre-feet to 2,686 acre-feet and EPCOR's annual entitlement was increased by 14 acre-feet from 1,420 acre-feet to 1,434 acre-feet.
Changes in Delivery Related to Off-Stream Storage (page 2-32; Table 2-22, page 2-33)	• Delivery of water under executed off-stream storage agreements, pursuant to 43 CFR Part 414	• Execution of Storage and Interstate Release Agreements (SIRA), pursuant to 43 CFR Part 414	• Delivery of water under executed off-stream storage agreements, pursuant to 43 CFR Part 414	MWD diverted 62,839 acre-feet of Nevada unused apportionment pursuant to a SIRA executed under 43 CFR Part 414.

Changes in Amount of Delivery(page 2-33; Table 2-23, page 2-34)	• Delivery of water pursuant to executed contracts or amendments to recognize changes in amounts of delivery or changes in points of diversion	• Execution of contract amendments or amendments to recognize changes in amounts of delivery or changes in points of diversion	• Review of contracts and consultation on new or amended contracts	On November 15, 2012, a partial assignment and transfer from ARF to EPCOR was approved which transferred 14 acre-feet per year of ARF's Arizona fourth priority Colorado River water entitlement to EPCOR. ARF's annual entitlement was reduced by 14 acre-feet from 2,700 acre-feet to 2,686 acre-feet and EPCOR's annual entitlement was increased by 14 acre-feet from 1,420 acre-feet to 1,434 acre-feet.
Changes in Type of Water Use (page 2-34; Table 2-24, page 2-34)	• Delivery of water pursuant to executed contracts or contract amendments that recognize changed water use types	• Execution of contracts or contract amendments that recognize changed water use types	• Review of contracts and consultation with Reclamation on new or amended contracts	No changes.
Inclusions and Exclusions to Service Areas (page 2-34; Table 2-25, page 2-35)	• Delivery of water pursuant to executed contract amendments or new contracts that includes or excludes lands in service areas	• Execution of contract amendments or new contracts that includes or excludes lands in service areas	• Review of contracts and consultation on new or amended contracts	Inclusion and exclusion of 90 acres of land within the Central Arizona Irrigation and Drainage District for lands owned by Superstition Ring LLC signed on November 16, 2012.
Contract Terminations (page 2-35; Table 2-26, page 2-36)	• None	• Termination of water contract due to abandonment • Execution of contract amendments when entitlement holder has relinquished water	• Consultation on the disposition of any water allocated for use but not consumptively used within a state	No water contracts were terminated.
2.3 WESTERN AREA POWER ADMINISTRATION	---	---	---	See section 2.2.1.5 accomplishments in this table.
2.4 NATIONAL PARK SERVICE	---	---	• Water entitlement holder	See section 2.2.1.8 accomplishments in this table.
2.5 BUREAU OF INDIAN AFFAIRS				
2.5.2.2 Ongoing Water Conservation Practices (page 2-77)	---	• Conduct conservation measures for efficient water use	---	Existing practices were continued.
2.5.2.6 Flow-Related Actions (page 2-82)	---	---	• Water entitlement holder	See section 2.2.1.8 accomplishments in this table.
2.5.3.2 Future Water Conservation Practices (page 2-77)	---	• Institute new conservation measures for efficient water use	---	No implementation in 2012.
2.5.3.5 Headgate Rock Dam Operation and Maintenance (page 2-88)	---	• Water releases and generate hydropower with these water releases	---	Existing practices were continued.
2.6 FISH AND WILDLIFE SERVICE	---	---	• Water entitlement holder	See section 2.2.1.8 accomplishments in this table.

2.7 BUREAU OF LAND MANAGEMENT	---	---	• Water entitlement holder	See section 2.2.1.8 accomplishments in this table.

NOTES:
1. See *LCR MSCP Habitat Conservation Plan*, section 2.1.1, Relationship of Non-Federal Covered Activities to Federal Nondiscretionary Actions. This can be accessed at http://www.lcrmscp.gov/publications/VolumeII.pdf.
2. Reporting for the Non-Federal Flow-Related Covered Activities (Appendix B, Table B-3) is included in the Federal Flow-Related Covered Actions and Accomplishments.
3. Flow-Related Federal Covered Actions and Flow-Related Non-Federal Covered Activities are reported for Calendar Year 2012.

B-2. Federal Non-Flow-Related Covered Actions and Incidental Take Summary, Fiscal Year 2012

Federal Covered Actions *Biological Assessment* Chapter 2	Covered Actions Summary			Covered Actions Implemented						Notes
	Nondiscretionary Actions	Discretionary Actions	Nondiscretionary Actions Related to Non-Federal Actions	Reach	Location	River Miles	Habitat Type Impacted	Number of Acres Impacted	Complied with Avoidance and Minimization Measures	
2.2 BUREAU OF RECLAMATION										
2.2.3 Ongoing Non-Flow-Related (Facilities and Channel Activities) (page 2-36; Table 2-27, page 2-37)	• Operate, maintain, and control river in Arizona, California, and Nevada • Construct, maintain, and improve drainage works for water projects • Maintain floodway to accommodate flood flows for 100-year event or 40,000 cfs, whichever is greater • Measure diversions and return flows to and from the mainstem of the Colorado River	---	• Administration of contracts for water district operation and maintenance of Federally owned facilities							See line items in this table.
2.2.3.1 Channel Maintenance (page 2-38)	---	---	---							
Wash Fans (page 2-40; Table 2-30, page 2-42)	---	• Wash fan removal	---							No Implementation in FY12
Protected Bankline Maintenance and Care of Unprotected Banklines (page 2-43)	---	• Protected bankline location and maintenance	---	6	Yuma Division	30.4	Salt Cedar Arrowweed	0.5	1,3, and 4	500 feet of bankline repairs (AZ side)

Levee Maintenance (page 2-44)	---	• Levee location and maintenance	---							No Implementation in FY12
Desilting Basins (page 2-46; Table 2-32, page 2-46)	---	• Sediment dredging upstream of principal canal diversions and disposal sites • Maintenance of settling basins to remove sediment and maintain flows; four principal basins	---							No Implementation in FY12
Jetties and Training Structures (page 2-47; Tables 2-33 – 2-34, page 2-48)	---	• Jetty and training structure location and maintenance	---							No Implementation in FY12
Stockpiles (page 2-49; Table 2-37, page 2-49)	---	• Location of three future stock piles	---							No Implementation in FY12
Riprap Placement and Haul Roads (page 2-50)	---	• Haul roads and riprap storage location and maintenance	---	7 6 6 6 4 4 4 3	Limitrophe Yuma Laguna Gila Area Cibola Palo Verde Parker Mohave Valley	0 to 24 24 to 50 24 to 50 24 to 50 87 to 193 87 to 193 87 to 193 193 to 276	None None None None None None None None	0 0 0 0 0 0 0 0	1, 3, and 6 1, 3, and 6 1, 3, and 6 1, 3, and 6 1,3, and 6 1, 3, and 6 1, 3, and 6 1, 3, and 6	Limitrophe Division Miles 113.7 Yuma Division Miles 167.5 Laguna Divison Miles 1.0 Gila River Area Miles 17.4 Cibola Divison Miles 66.4 Palo Verde Divison Miles 0 Parker Divison Miles 67.8 Mohave Valley Divison Miles 49.4

2.2.3.2 Major Federal Facilities and Miscellaneous Operation, Maintenance, and Replacement (page 2-50; Table 2-36, after page 2-50)	---	• Maintenance of Yuma area drainage wells and conveyance facilities including maintenance and access roads • Maintenance of open channel drains and outfall channels • Maintenance and replacement of gauging stations, survey line markers, and boat ramps	---	7 7	DPOCs II and Bypass canals Yuma Mesa Conduit	22-36 27.0	None None	0 0	1, 3, and 6 1, 3, and 6	DPOC II - Replaced outlet structure and gate Yuma Mesa Conduit upgrading
Maintenance Activities at the SIB (page 2-52)	---									No implementation in FY12
2.2.3.3 Backwater Maintenance (page 2-53; Table 2-37, page 2-54)	---	• Backwater maintenance	---							
Mohave Division (page 2-55; Table 2-38, page 2-56)	---	• Backwater maintenance	---							No implementation in FY12
Parker Division (page 2-57; Table 2-39, page 2-57)	---	• Backwater maintenance	---							No implementation in FY12
Palo Verde Division (page 2-58; Table 2-40, page 2-58)	---	• Backwater maintenance	---	4 4 4	A-7 A-10 LCR	120.5 to 118.4 115.2 to 113.8 120	Saltcedar/ Arrowweed	0.5 0.5 0.5	1,3, and 6 1,3, and 6 1,3, and 6	Improvement inlet and outlet Improvement inlet and outlet Blythe Marina-Culvert replacement and training structure
Cibola Division (page 2-58; Table 2-41, page 2-59)	---	• Backwater maintenance	---							No implementation in FY12

Imperial Division (page 2-59; Table 2-42, page 2-59)	---	• Backwater maintenance	---							No implementation in FY12
Laguna Division (page 2-60; Table 2-43, page 2-60)	---	• Backwater maintenance	---							No implementation in FY12
Yuma Division (page 2-60; Table 2-44, page 2-61)	---	• Backwater maintenance	---							No implementation in FY12
Limitrophe Division Mitigation Obligations (page 2-61; Table 2-45, page 2-62)	---	---	---							No implementation in FY12
2.2.3.4 Limitrophe Division Maintenance (page 2-62)	---	---	---							No implementation in FY12
2.2.4 Future Non-Flow-Related Actions (page 2-63)	---	---	---							
2.2.4.1 Topock Marsh (page 2-63)	---	---	---							No implementation in FY12
2.2.4.2 Laguna Reservoir (page 2-63)	---	---	---	6	Laguna Dam	49.0	Cattails	7	1,3, and 6	Laguna Reservoir Restoration Project (on-going)
2.2.4.3 Bankline Maintenance - Unprotected Banklines (page 2-65; Table 2-46, page 2-66)	---	---	---							No implementation in FY12
2.2.4.4 Proposed Jetties (page 2-67; Table 2-48, page 2-67)	---	---	---							No implementation in FY12
2.3 WESTERN AREA POWER ADMINISTRATION										
2.4 NATIONAL PARK SERVICE										

2.4.2 Riparian Habitat Restoration (page 2-70)		• Riparian habitat restoration on Lake Mead and Lake Mohave			Lake Mead Lake Mohave		Fountain grass Tamarisk Cali. fan palm Sarah mustard	8,704 acres 258 acres 5 acres 1.5 acres 287 acres		Habitat restoration through removal of exotic plants (gross infested acres).
2.4.3 Fishery Management (page 2-71)		• Habitat modifications on Lake Mead and Lake Mohave, including development and enhancement of grow-out ponds, construction of docks, and creation of angler enhancement structures			Lake Mohave			.5 acres		Creation of fish habitat at Bass, Box, Princess Cove in partnership with NDOW.
2.4.4 Boating Access (page 2-72)		• Maintenance and enhancement of boating access on Lake Mead and Lake Mohave								No implementation in FY12
2.5 BUREAU OF INDIAN AFFAIRS										
2.5.2.1 Ongoing Irrigation System Operation and Maintenance (page 2-74)		• Irrigation system operation and maintenance for existing Irrigation Projects		3 3 4 6 7	Fort Mohave Chemehuevi CRIT Fort Yuma Cocopah	-- -- -- -- --	None None None None None	0 0 0 0 0	1 and 3 1 and 3 1 and 3 1 and 3 1 and 3	Continued existing practices. Continued existing practices. Continued existing practices. Continued existing practices. Continued existing practices.

2.5.2.2 Ongoing Water Conservation Practices (page 2-77)		• Operation and maintenance of existing equipment								Continued existing practices
2.5.2.4 Ongoing Wildland Fire Management (page 2-88)		•Implementation of fuels management projects								No implementation in FY12
2.5.2.5 Ongoing Woodland and Shoreline Maintenance (page 2-82)		• Maintenance on Chemehuevi Woodlands Project								Continued existing practices
2.5.3.1 Future Canal Lining (page 2-84)		• Repair, reline, and line irrigation canals								No implementation in FY12
2.5.3.2 Future Water Conservation Practices (page 2-85)		• Installation, operation, and maintenance of new equipment								No implementation in FY12
2.5.3.3 Future Farmland Development (page 2-85)		• Develop additional agricultural acreage, including construction of irrigation systems								No Implementation in FY12
2.5.3.6 Future Wildland Fire Management (page 2-88)		• Implementation of new fuels management projects								No implementation in FY12
2.6 FISH AND WILDLIFE SERVICE										No Non-Flow-Related Actions are covered by the LCR MSCP.
2.7 BUREAU OF LAND MANAGEMENT										No Non-Flow-Related Actions are covered by the LCR MSCP.

B-3. LCR MSCP Non-Federal Covered Activities and Incidental Take Summary, Fiscal Year 2012

Non-Federal Covered Activities *Habitat Conservation Plan* Chapter 2	Covered Activities Summary	Covered Activities Implemented						Notes
		Reach	Location	River Miles	Habitat Type Impacted	Number of Acres Impacted	Complied with Avoidance and Minimization Measures	
2.2 ARIZONA								
2.2.1 Ongoing Flow-Related Covered Activities[1] (page 2-4)	• Diversion of up to 2.8 maf of Arizona's full annual entitlement, plus surplus, plus Arizona's share of any unused apportionment, plus the volume of return flow, as applicable • Generation and transmission of hydroelectric power • Power contracting							Non-Federal Flow-Related Covered Activities are included in the Federal Flow-Related Covered Actions and Accomplishments (see Appendix B, Table B-1).
2.2.2 Future Flow-Related Covered Activities[1] (page 2-6)	Future Arizona water contract holder activities may include: • Diversions, discharges, and return flows through existing facilities • Changes to points of diversion • New points of diversion • Interstate water banking • Water marketing • Water transfers • Any other actions as made possible from any future agreements and/or measures taken by the Arizona Department of Water Resources or contract holder(s) Future Arizona hydroelectric power contract holder activities may include: • Execution, administration, and operation of extended, renewed, new, or additional contracts for hydroelectric power from hydroelectric facilities at Hoover Dam, Davis Dam, Parker Dam, Headgate Rock Dam, Siphon Drop Power Plant, and Pilot Knob Power Plant							Non-Federal Flow-Related Covered Activities are included in the Federal Flow-Related Covered Actions and Accomplishments (see Appendix B, Table B-1).

2.2.3 Ongoing Non-Flow-Related Covered Activities (page 2-7)	Operation, maintenance, and replacement of: • The facilities and equipment through which water is diverted and conveyed • The facilities through which return flows are returned to the river • Drainage wells in the Yuma area • The facilities and equipment through which electric power is generated and transmitted • The appurtenant works that support these facilities, including access and service roads, electric power and communication transmission lines and substations, docks, boat ramps, and bankline protection	6	Yuma Valley	---	---	---	1 and 3	195 miles of canal maintenance and 60 miles of open drain maintenance.
2.2.3.1 Arizona Game and Fish Department Programs and Activities								
Vegetation and Habitat Management Programs (page 2-8)	• Aquatic, wetland, and riparian habitat maintenance and restoration activities							No implementation in FY12.
Fish Surveys (page 2-8)	• Surveys for nonnative fish species							**Kingman Region:** Lake Mead: 3 days/2 nights gillnets, 4 nights electrofishing Lake Mohave: 3 days/2 nights gillnets, 2 nights electrofishing Topock Marsh: 3 days/2 nights gillnets **Yuma Region:** 12 nights electrofishing, 11 days electrofishing flathead surveys, 3 nights trammel netting
Fish Stocking (page 2-9)	• Stocking of trout							No fish stocking activity.
Maintenance of Aids to Navigation and Boating Access (page 2-9)	• Place and maintain aids to navigation							Maintained 132 buoys, one boat dock, and one boat ramp.
Law Enforcement Patrol Activities (page 2-9)	• Administer law enforcement and boating safety program using watercraft patrols							4,525 hours of watercraft law enforcement. Includes all of AGFD regions III and IV watercraft law enforcement patrols.

2.3 CALIFORNIA								
2.3.1 Ongoing Flow-Related Covered Activities[1] (page 2-11)	• Diversion of up to 4.4 maf of California's full annual entitlement (consistent with the Quantification Settlement Agreement), plus California's share of any unused apportionment and designated surpluses, plus volume of return flows, as applicable • Generation and transmission of hydroelectric power • Power contracting							Non-Federal Flow-Related Covered Activities are included in the Federal Flow-Related Covered Actions and Accomplishments (see Appendix B, Table B-1).
2.3.2 Future Flow-Related Covered Activities[1] (page 2-13)	Future California water contract holder activities may include: • Diversions, discharges, and return flows through existing facilities • Changes to points of diversion • New points of diversion • Interstate water banking • Water marketing • Water transfers • Any other actions as made possible from any future agreements and/or measures taken by the Colorado River Board of California or contract holder(s) Future California hydroelectric power contract holder activities may include: • Execution, administration, and operation of extended, renewed, new, or additional contracts for hydroelectric power from hydroelectric facilities at Hoover Dam, Davis Dam, Parker Dam, Headgate Rock Dam, Siphon Drop Power Plant, and Pilot Knob Power Plant							Non-Federal Flow-Related Covered Activities are included in the Federal Flow-Related Covered Actions and Accomplishments (see Appendix B, Table B-1).
2.3.3 Ongoing Non-Flow-Related Activities	Operation, maintenance, and replacement of: • The facilities and equipment through which water is diverted and conveyed • The facilities through which return flows are returned to the river	4 6	Palo Verde Irrigation District Bard Water District	---	---	---	1 and 3 1 and 3	FY10 14.32 acres FY11 12.16 acres FY10 9.57 acres FY11 1.99 acres

	• The facilities and equipment through which electric power is generated and transmitted • The appurtenant works that support these facilities, including access and service roads, electric power and communication transmission lines and substations, docks, boat ramps, and bankline protection							
2.4 NEVADA								
2.4.1 Ongoing Flow-Related Covered Activities[1] (page 2-15)	• Diversion of up to 0.3 maf of Nevada's full annual entitlement, plus surplus flows, plus Nevada's share of any unused apportionment, plus volume of return flows, as applicable • Generation and transmission of hydroelectric power • Power contracting							Non-Federal Flow-Related Covered Activities are included in the Federal Flow-Related Covered Actions and Accomplishments (see Appendix B, Table B-1).
2.4.2 Future Flow-Related Covered Activities[1] (page 2-17)	Future Nevada water contract holder activities may include: • Diversions, discharges, and return flows through existing facilities • Changes to points of diversion • New points of diversion • Interstate water banking • Water marketing • Water transfers • Any other actions as made possible from any future agreements and/or measures taken by the Colorado River Commission of Nevada or contract holder(s) Future Nevada hydroelectric power contract holder activities may include: • Execution, administration, and operation of extended, renewed, new, or additional contracts for hydroelectric power from hydroelectric facilities at Hoover Dam, Davis Dam, Parker Dam, and Headgate Rock Dam							Non-Federal Flow-Related Covered Activities are included in the Federal Flow-Related Covered Actions and Accomplishments (see Appendix B, Table B-1).

2.4.3 Ongoing Non-Flow-Related Activities (page 2-18)	Operation, maintenance, and replacement of: • The facilities and equipment through which water is diverted and conveyed • The facilities through which return flows are returned to the river • The facilities and equipment through which electric power is generated and transmitted • The appurtenant works that support these facilities, including access and service roads, electric power and communication transmission lines and substations, docks, boat ramps, and bankline protection							No implementation in FY12.
2.4.3.1 Nevada Department of Wildlife Programs and Activities (page 2-18)	Implementation of select Federally funded:							
	• Aquatic, wetland, and riparian habitat maintenance and restoration activities	---	---	---	---	---	---	A total of 44 habitat modules were placed on approximately 2.0 acres at Carp, Box, and Arrowhead coves on Lake Mohave. Cooperative project with NPS and AGFD.
	• Aquatic, wetland, and riparian revegetation enhancement activities	---	---	---	---	---	---	No implementation in FY12.
	• Place and maintain aids to navigation and boating access	3	Clark County, downstream of Davis Dam	257.5 - 275.0	None	0	1 and 3	Performed routine maintenance and inspection of aids to navigation.
	• Administer law enforcement and boating safety program using watercraft patrols	1 and 2	---	Lake Mead - 275.0	None	0	1 and 3	Conducted routine law enforcement patrols on Lake Mead, Lake Mohave, mainstem of LCR below Davis Dam, and limited patrol activities in Laughlin Lagoon.

[1] See *LCR MSCP Habitat Conservation Plan*, section 2.1.1, Relationship of Non-Federal Covered Activities to Federal Nondiscretionary Actions. This can be accessed at http://www.lcrmscp.gov/publications/VolumeII.pdf.

Appendix C. Recommendations from Resource Agencies

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:
AESO/SE
22410-2004-F-0161

September 12, 2012

Memorandum

To: Program Manager, Lower Colorado River Multi-Species Conservation Program, Bureau of Reclamation, Boulder City, Nevada (LC-8000)

From: Field Supervisor

Subject: Acceptance of Lower Colorado River Multi-Species Conservation Program Fiscal Year 2011 Accomplishment Report and Consistency Review of Fiscal Year 2013 Work Plan and Budget

This responds to your memorandum of August 16, 2012, requesting review by the Fish and Wildlife Service (FWS) of the combined document containing the Fiscal Year 2011 Accomplishment Report and the Fiscal Year 2013 Work Plan and Budget for the Lower Colorado River Multi-Species Conservation Program (LCR MSCP). This combined document encompasses the reporting requirements of the LCR MSCP section 10(a)(1)(A) permit dated April 4, 2005, (TE-086834-0) and the biological and conference opinion dated March 4, 2005, and requirements of the Funding and Management Agreement sections 7.4.2. and 7.4.3.

The Fiscal Year 2011 Accomplishment Report details the activities undertaken by the Bureau of Reclamation (Reclamation) to implement the LCR MSCP in accordance with the section 10 permit and biological opinion. The report also lists the Federal actions and non-Federal activities included in the LCR MSCP as covered actions that were implemented during Fiscal Year 2011 covered by the LCR MSCP (October 1, 2010-September 31, 2011), including the measurement of incidental take that occurred during this period. While this listing is comprehensive, we would like to suggest an additional summary table for the changes in point of diversion covered under the 1.574 mafy total included in the section 10 permit. We suggest this only to document over time how much of the total has been transferred. It may be valuable also to summarize (perhaps every five years) the amount of other work (such as new bankline stabilization) that has specific amounts included in the program to assess implementation progress. We are open to discussions on these matters.

We have reviewed the information provided and conclude that the document meets the requirements for the annual report for the LCR MSCP under the section 10(a)(1)(A) permit and the incidental take section of the biological and conference opinion. All covered actions and activities and implementation of the Conservation Plan are suitably described and documented.

The Fiscal Year 2013 Work Plan and Budget contains the work tasks and estimated costs for LCR MSCP implementation during Fiscal Year 2013 beginning on October 1, 2012. We have reviewed the Work Plan and determined that its implementation is directly applicable to meet the conservation requirements and is consistent with the LCR MSCP section 10(a)(1)(A) permit and biological opinion.

We appreciate the positive working relationship between the FWS and Reclamation on the implementation of the LCR MSCP. The opportunity to review and contribute to the development of the Accomplishment Report and Work Plan is greatly appreciated. Thank you for your significant efforts to conserve listed and special-status species through the LCR MSCP. If there are any questions or concerns about this response, please contact Lesley Fitzpatrick at (x236) or me (x244) at (602) 242-0210.

Steven L. Spangle

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES: Marty Tuegel)

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United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:
AESO/SE
22410-2004-F-0161

May 29, 2012

Memorandum

To: Program Manager, Lower Colorado River Multi-Species Conservation Plan, Bureau of Reclamation, Boulder City, Nevada (LC-8451)

From: Field Supervisor

Subject: Completion of Conservation Measure FTHL1under the LCR MSCP for the Flat-tailed Horned Lizard, Imperial County, California

This memorandum responds to your April 27, 2012, request for Fish and Wildlife Service (FWS) concurrence with the completion of the requirement under FTHL1 to acquire, protect, and transfer 230 acres of unprotected, occupied flat-tailed horned lizard habitat to offset effects of the proposed actions covered under the LCR MSCP.

The material provided with your request documents that the Bureau of Reclamation (Reclamation) has purchased 240 acres of private land within the Bureau of Land Management's (BLM's) Yuha Basin Area of Critical Environmental Concern (Yuha ACEC) in Imperial County, California and title to these properties was transferred to the BLM. The BLM manages the public lands within the Yuha ACEC to protect resource values and habitat for native plant and animal species such as the flat-tailed horned lizard. The 240 acres is adjacent to the west Mesa portion of the Yuha Basin Flat-tailed Horned Lizard Management Area and extends protection for the species in the overall vicinity through incorporation into the Yuha ACEC.

The FWS concurs with Reclamation that the acquisition of this 240 acres and its transfer to BLM for long-term management for flat-tailed horned lizards meets the requirements of FTHL1 in the LCR MSCP. Reclamation should document the completion of this conservation action in the appropriate annual report for LCR MSCP covered activities.

We congratulate Reclamation and the other LCR MSCP partners on this accomplishment. The LCR MSCP has accomplished significant conservation benefits in the seven years since it was signed in 2005. We look forward to our continuing involvement with this important program.

If there are other questions, or we may assist in any way, please contact Ms. Lesley Fitzpatrick of my staff at (602) 242-0210 (x236) or me (x244).

MA Martinez

for Steven L. Spangle

cc: Chief, Nongame Branch, Arizona Game and Fish Department, Phoenix, AZ

W:\Lesley Fitzpatrick\04-261 FTHL1 completion.docx:cgg

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:
AESO/SE
22410-2004-F-0161

July 2, 2012

Memorandum

To: Project Manager, Lower Colorado River Multi-Species Conservation Program, Bureau of Reclamation, Boulder City, Nevada

From: Field Supervisor

Subject: Amendment to Project for Protection of Water Levels at Topock Marsh, Havasu National Wildlife Refuge, Mohave County, Arizona: Final Confirmation of Completion of Avoidance and Minimization Measure 2

The Fish and Wildlife Service (FWS) Regional Office's National Wildlife Refuge Division and Arizona Ecological Services Office (AESO) worked with the Bureau of Reclamation's (Reclamation's) Lower Colorado River Multi-Species Conservation Program (LCR MSCP) to implement *Avoidance and Minimization Measure 2* (AMM2), a conservation responsibility for Topock Marsh to ensure that future water deliveries to the marsh are not compromised by the LCR MSCP's covered actions. Reclamation, through the LCR MSCP, has contributed, and the FWS has accepted, a total of 3.5 million dollars to fund the new Firebreak Canal and the new pump station (or another non-gravity means of supplying water) for the canal. In addition, Reclamation will hold any funds remaining of the 3.5 million dollars that remains after completion of the pump station for Havasu National Wildlife Refuge to pay utilities costs associated with operating the station until such funds are exhausted. Reclamation has provided us with the signed Interagency Agreements documenting these actions.

AESO has coordinated with Havasu National Wildlife Refuge and our Regional Office on this response. The FWS provided provisional concurrence in our memorandum to Reclamation dated January 4, 2012. With this memorandum, the FWS confirms that Reclamation and the LCR MSCP have completed all requirements contained in AMM2 of the conservation plan and no additional funding will be required under this task.

We appreciate the cooperative working relationship between us, Ms. Ashlee Rudolph and Mr. Terry Murphy of the LCR MSCP, Mr. Andrew Hautzinger of the Regional Office, and Ms. Linda Miller of the Refuge to address this comprehensive plan.

If you have any questions concerning this confirmation, please contact Lesley Fitzpatrick at 602-242-0210 (x236) or me (x244).

Steven L. Spangle

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM
(NWRS: Tom Harvey, Andrew Hautzinger)
Complex Manager, Havasu-Bill Williams River National Wildlife Refuge Complex, Parker, AZ
Refuge Manager, Havasu National Wildlife Refuge, Needles, CA

W:\Lesley Fitzpatrick\04-261 Topock Marsh AMM2 2012 final concur.docx:cgg

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:
AESO/SE
22410-2000-F-0273
22410-2004-F-0161

8/17/12

8/20/12 A 8000

August 14, 2012

Memorandum

To: Project Manager, Lower Colorado River Multi-Species Conservation Program, Bureau of Reclamation, Boulder City, Nevada (LC-8000)

From: Field Supervisor

Subject: Amendment to Interim Surplus Criteria/Secretarial Implementation Agreement for California Water Plan Components Biological Opinion: Cessation of Habitat Monitoring Below Parker Dam, Colorado River, Arizona and California

The Arizona Ecological Services Office (AESO) received your request for our consideration to amend the requirements of our January 12, 2001, final biological opinion (FBO) for the subject project. The project included the Bureau of Reclamation's (Reclamation's) delivery of 400,000 acre-feet (af) of California's Colorado River water to a different point of delivery as part of the California Colorado River Water Use Plan (the 4.4 Plan). This 400,000 af would, under the 4.4 Plan, be diverted from the river above Parker Dam instead of below Parker Dam, thus reducing the amount of water flowing below Parker Dam downstream to Imperial Dam.

The proposed action contained four conservation measures to be completed by Reclamation intended to offset adverse effects of the implementation of the 4.4 Plan changes in points of delivery. Of relevance to your request, Conservation Measure 4 stated (in part):

"A two-tiered conservation plan has been developed to minimize potential effects to willow flycatcher habitat that could result because of reduced flows on the Colorado River between Parker and Imperial dams as water transfers and associated changes in point of delivery are implemented.

Tier 1a: The primary strategy of this tier is to use management actions to prevent changes in the existing micro-habitat and prey base of occupied willow flycatcher habitat. Reclamation will identify and monitor 372 acres of currently occupied habitat (monitored habitat) that may be affected by water transfers and changes in point of delivery of up to 400,000 af of Colorado River water between Parker and Imperial dams (water transfer actions). Soil moisture will be monitored and if levels decrease as a result of implementation of water transfer actions under consultation, management actions will be taken to maintain the monitored habitat. Initially, monitoring efforts will be at a level of effort similar to Reclamation's monitoring program under

the existing interim biological opinion for river operations and maintenance. The monitoring program will be reviewed every five years to determine whether this level of effort is appropriate to monitor effects of water transfer actions or can be reduced for the remainder of the period that water transfer actions are occurring. Monitoring will continue for up to five years after implementation of all water transfer actions unless it becomes part of a broader effort associated with recovery actions."

Reclamation initiated funding for habitat monitoring in 2004. In 2005, implementation of habitat monitoring on the 372 acres of occupied southwestern willow flycatcher habitat was transferred to the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) and has been completed each year to date and reported in the annual report.

Completion of Conservation Measures 1 through 3 and Tier 1b of Conservation Measure 4 was documented by Reclamation in a memorandum to AESO dated January 8, 2009. In that memorandum, the continuation of the habitat monitoring on 372 acres of occupied southwestern willow flycatcher habitat required under Tier 1a of measure 4 was confirmed. The AESO confirmed completion of measures 1 through 3 and Tier 1b, and the continuation of monitoring under Tier 1a via a memorandum dated May 26, 2009.

Your request to us dated July 20, 2012 concerns the required continuation of habitat monitoring under Tier 1a. To this point, only 210,000 af of the 400,000 af has been subject to a change in point of delivery to above Parker Dam, so the project envisioned in the FBO has not been completed. However, with your request you provided significant new information on the status of the southwestern willow flycatcher and what was considered "occupied" habitat in 2001 and results of six years of habitat monitoring that are relevant to the continuation of this Conservation Measure. Further, as stated in the text of the Conservation Measure, it is appropriate for us to evaluate the efficacy of this monitoring after five years. We have reviewed the background material in the FBO on the potential effects to, and the status of, the southwestern willow flycatcher with the new information provided, and reached the following conclusions.

Southwestern willow flycatcher status

At the time of the FBO, surveys were still trying to determine the breeding status of southwestern willow flycatchers in the reach of the Colorado River below Parker Dam. The sub-species was listed in 1995 and more information was needed to fully understand its behavior and nesting requirements. Annual surveys on the Colorado River were initiated in 1996 using the best available information and survey protocols available. Following these surveys, flycatcher territories were primarily detected at Lake Havasu and Bill Williams NWRs and Lake Mead NRA, but other lone territories were detected sporadically south of Hoover Dam to the Southerly International Boundary. Migrant flycatchers were regularly detected south of Parker Dam moving north along the LCR during spring. As surveys were completed and more information became available, new protocols were developed that incorporated definitions and criteria that more clearly defined when a detected southwestern willow flycatcher has established a territory. The latest such protocol was developed in 2010. As a result of implementing updated survey protocols and with additional information, these lone territories (primarily south of the Bill Williams River) have yet to be detected again.

Based on this new information, our previous conclusions on the recent presence of breeding southwestern willow flycatchers below Parker Dam are now questionable. Based on the implementation of new survey protocols and interpretation of older data, there is uncertainty whether the recent detections of flycatcher territories below Parker Dam were established flycatcher territories or rather late season migrants. Although no territories have been documented since 2010, these surveys have continued to affirm the importance of this segment of the LCR as a flycatcher migration corridor. The LCR below Parker Dam also continues to be an important area for flycatcher recovery, with a goal of establishing 150 territories. When breeding southwestern willow flycatchers are documented outside of managed LCR MSCP conservation areas below Parker Dam, we will review this conclusion.

Habitat suitability for southwestern willow flycatchers

Effects of the changes in point of delivery for water transfer actions were hypothesized to occur due to the reduction in river stage levels from the decrease in flows below Parker Dam that could affect existing groundwater levels that supported soil moisture conditions in the occupied nesting habitat. Declines in groundwater levels could, therefore, reduce the amount of moisture in the upper soil levels in those areas containing southwestern willow flycatcher habitat and degrade habitat quality. Southwestern willow flycatchers are known to select breeding areas that have higher soil moisture at the surface that acts to mitigate high temperatures and produce insects for the prey base. The monitoring program focused on temperature and humidity data loggers, soil moisture measurements, and a piezometer to measure groundwater levels at each monitoring and control site.

Information presented in your report on the results of the habitat monitoring from 2005-2011 indicates that soil moisture at the sites is more related to local and regional climatic conditions than strongly correlated with river stage and groundwater levels, due to the currently degraded baseline where the floodplains are largely disconnected from the river. Soil moisture levels did not show measurable changes as the 210,000 af of water was removed from the river above Parker Dam. Nor were changes in vegetation community at the sites documented that could be tied to the reduced river stage, although many of these sites have been degraded by other un-related events, particularly the ongoing drought and wildfires.

Based on this new information, we conclude that the monitoring program has not documented that soil moisture, temperature and humidity, and vegetation conditions in the monitored habitat are conclusively affected by the change in river stage or groundwater levels resulting from the change in point of delivery for 210,000 af. Given the results of the monitoring, it is unlikely that any such change would be documented for the remaining 190,000 af. Continuation of the habitat monitoring program is unlikely to provide information to activate the requirement that management actions to maintain soil moisture would be implemented or, if those actions failed, to implement the additional habitat creation included under Tier 2 of Conservation Measure 4.

Conclusion

The new information on southwestern willow flycatcher breeding status below Parker Dam and the monitoring information on effects of reduced river stage on soil moisture in flycatcher

habitats along the river indicate that the potential for adverse effects from the implementation of the 4.4 Plan changes in point of delivery is less likely to occur than assumed in 2001. However, that does not mean there is no effect from the changes, only that our new understanding alters the evaluation parameters.

We do not believe it is currently necessary to continue to monitor the 372 acres for changes in soil moisture or other parameters related to the change in point of delivery for the 400,000 af of water under the 4.4 Plan. Confounding variables that have more significant effects to those parameters reduce the effectiveness of the monitoring to detect changes. Our re-assessment of how these acres are used by nesting or migrating southwestern willow flycatchers is also a factor in our decision; however, we believe these areas continue to provide benefits to migrating flycatchers for food and shelter and are also important to improve to reach recovery goals.

We have also considered the completion of Tier 1b of Conservation Measure 4 to restore and maintain 372 acres of suitable southwestern willow flycatcher nesting habitat along the Colorado River below Parker Dam as confirmed in 2009. With this habitat in place, there has been no net loss of suitable flycatcher nesting habitat due to the 4.4 Plan. Further, the implementation of the LCR MSCP requirement to create an additional 3,678 acres of southwestern willow flycatcher nesting habitat (a total of 4,050 acres) to address additional losses of existing habitat, provides a net increase in managed habitat for the species along the lower Colorado River corridor that overrides the loss of the 372 acres.

We appreciate the extensive efforts of the LCR MSCP to document effects of water transfer actions to riparian habitats along the lower Colorado River. Implementation of the LCR MSCP conservation program has, and will continue to, increase the amount and quality of riparian habitats along the river to the benefit of the southwestern willow flycatcher and other riparian obligate species. We understand that surveys for southwestern willow flycatcher will continue along the lower Colorado River, and those surveys will assist in documenting any flycatcher use of the area below Parker Dam.

Monitoring of the 372 acres of monitored habitat may cease upon receipt of this concurrence or in 2013 as appropriate to your implementation of this action. If there are any questions concerning this concurrence, please contact Lesley Fitzpatrick (602-242-0210 x236), Greg Beatty (x247), or me (x244).

Steven L. Spangle

cc: Wildlife Biologist, Fish and Wildlife Service, Phoenix, AZ (Attn: Greg Beatty)

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Appendix D. Financial Statement

D-1. Required Contributions

	FY06	FY07	FY08	FY09	FY10	Subtotal
Reclamation						
Cash	6,072,381.00	6,291,054.00	6,655,509.00	6,784,470.00	7,255,458.00	33,058,872.00
Total	**6,072,381.00**	**6,291,054.00**	**6,655,509.00**	**6,784,470.00**	**7,255,458.00**	**33,058,872.00**
Arizona						
Cash	471,863.10	488,855.40	517,175.90	866,420.50	926,568.70	3,270,883.60
Habitat Maintenance	135,375.00	140,250.00	148,375.00	151,250.00	161,750.00	737,000.00
Total	**607,238.10**	**629,105.40**	**665,550.90**	**1,017,670.50**	**1,088,318.70**	**4,007,883.60**
Nevada						
Cash	1,838,148.82	1,904,342.55	2,014,665.43	1,884,091.00	1,578,887.40	9,220,135.20
Habitat Maintenance	135,375.00	140,250.00	148,375.00	151,250.00	161,750.00	737,000.00
In-Kind Credit	0	0	0	0	436,000.00	436,000.00
Total	**1,973,523.82**	**2,044,592.55**	**2,163,040.43**	**2,035,341.00**	**2,176,637.40**	**10,393,135.20**
California						
Cash	**3,220,869.08**	**3,336,856.05**	**3,530,167.67**	**3,266,131.22**	**3,492,870.91**	**16,846,894.93**
MWD	1,887,361.54	1,955,327.46	2,068,604.00	1,939,074.72	2,073,688.19	9,924,055.91
IID	500,971.43	519,011.96	549,079.48	559,718.78	598,575.29	2,727,356.94
CVWD	273,257.15	283,097.43	299,497.92	305,301.15	326,495.61	1,487,649.26
LADWP	154,845.72	160,421.88	169,715.48	173,003.99	185,014.18	843,001.25
SDCWA	145,737.14	150,985.30	159,732.19	0	0	456,454.63
PVID	122,067.53	126,463.31	133,789.60	136,382.00	145,849.84	664,552.28
SCPPA	63,760.00	66,056.07	69,882.84	71,236.94	76,182.31	347,118.16
SCE	54,651.43	56,619.49	59,899.60	61,060.23	65,299.11	297,529.86
Bard	6,072.38	6,291.05	6,655.52	6,784.47	7,255.46	33,058.88
CRBC	6,072.38	6,291.05	6,655.52	6,784.47	7,255.46	33,058.88
Needles	6,072.38	6,291.05	6,655.52	6,784.47	7,255.46	33,058.88
Funding Credit						
SDCWA	**0**	**0**	**0**	**162,827.28**	**174,130.99**	**336,958.27**
MWD	**0**	**0**	**0**	**0**	**0**	**0**
Habitat Maintenance	**270,750.00**	**280,500.00**	**296,750.00**	**302,500.00**	**323,500.00**	**1,474,000.00**
Total	**3,491,619.10**	**3,617,356.05**	**3,826,917.67**	**3,731,458.50**	**3,990,501.90**	**18,657,853.20**
TOTAL	**12,144,762.00**	**12,582,108.00**	**13,311,018.00**	**13,568,940.00**	**14,510,916.00**	**66,117,744.00**

	FY11	FY12	Total
Reclamation			
Cash	16,400.070.00	16,661,700.00	66,120,642.00
Total	16,400.070.00	16,661,700.00	66,120,642.00
Arizona			
Cash	1,120,135.50	1,138,005.00	5,529,024.10
Habitat Maintenance	1,339,875.00	1,361,250.00	3,438,125.00
Total	**2,460,010.50**	**2,499,255.00**	**8,967,149.10**
Nevada			
Cash	3,144,146.00	3,637,260.00	16,001,541.20
Habitat Maintenance	1,339,875.00	1,361,250.00	3,438,125.00
In-Kind Credit	436,000.00	0	872,000.00
Total	**4,920,021.00**	**4,998,510.00**	**20,311,666.20**
California			
Cash	**5,333,036.34**	**5,418,114.16**	**27,598,045.43**
MWD	2,320,583.58	2,357,603.81	14,602,243.30
IID	1,353,005.78	1,374,590.25	5,454,952.97
CVWD	738,003.15	749,776.50	2,975,428.91
LADWP	418,201.78	424,873.35	1,686,076.38
SDCWA	0	0	456,454.63
PVID	134,240.47	136,382.00	935,174.75
SCPPA	172,200.74	174,947.85	694,266.75
SCE	147,600.63	149,955.30	595,085.79
Bard	16,400.07	16,661.70	66,120.65
CRBC	16,400.07	16,661.70	66,120.65
Needles	16,400.07	16,661.70	66,120.65
Funding Credit			
SDCWA	**393,601.68**	**399,880.80**	**1,130,440.75**
MWD	**613,650.48**	**623,440.04**	**1,237,090.52**
Habitat Maintenance	**2,679,750.00**	**2,722,500.00**	**12,278,500.00**
Total	**9,020,038.50**	**9,163,935.00**	**36,841,826.70**
TOTAL	**32,800,140.00**	**33,323,400.00**	**132,241,284.00**

D-2. Funding Credits

San Diego County Water Authority:

Credits Earned

FY	Credits Earned	Composite i	2003 Dollars	Total 2003 Dollars
2005	145,737.14	1.019	143,019.76	143,019.76
2006	500,000	1.083	461,680.51	604,700.27
2007	250,000	1.122	222,816.39	827,516.66
2008	3,298,069.94	1.187	2,778,491.95	3,606,008.61

Credits Used

FY	Total 2003 Credits Available	2003 Credits Used	Composite i	Current Year Credits
2009	3,606,008.61	134,568.00	1.210	162,827.28
2010	3,471,440.61	134,568.00	1.294	174,130.99
2011	3,336,872.61	330,480.00	1.191	393,601.68
2012	3,006,392.61	330,480.00	1.210	339,880.80
2013	2,675,912.61	330,480.00	1.251	413,430.48
2014	2,345,432.61			

The Metropolitan Water District:

Credits Earned

FY	Credits Earned	Composite i	2003 Dollars	Total 2003 Dollars
2008	1,834,768.57	1.187	1,545,719.10	1,545,719.10

Credits Used

FY	Total 2003 Credits Available	2003 Credits Used	Composite i	Current Year Credits
2011	1,545,719.10	515,239.70	1.191	613,650.48
2012	1,030,479.40	515,239.70	1.210	623,440.04
2013	515,239.70	515,239.70	1.251	644,564.86
2014	0			

Bureau of Reclamation:

Credits/Debits

FY	Credits/Debits Earned*	Composite i	2003 Dollars	Total 2003 Dollars
2004	1,559,739.07	1.000	1,559,739.07	1,559,739.07
2005	4,112,477.11	1.019	4,035,796.97	5,595,536.04
2006	-2,871,624.04	1.083	-2,651,545.74	2,943,990.30
2007	2,314,455.02	1.122	2,062,794.14	5,006,784.44
2008	-495,025.15	1.187	-417,038.88	4,589,745.56
2009	1,833,416.80	1.210	1,515,220.50	6,104,966.06
2010	4,335,477.54	1.294	3,350,446.32	9,455,412.38
2011	796,149.37	1.191	668,471.34	10,123,883.72
2012	-3,105,120.42	1.210	-2,566,215.22	7,557,668.50

*Revised based on expenditures

D-3. Funding Accounts

Habitat Maintenance Fund:

Contributions

FY	Required 2003 Dollars	Additional 2003 Dollars	Composite i	Total Current Year Dollars	Cumulative*
2006	$500,000		1.083	$541,500	$541,500
2007	$500,000		1.122	$561,000	$1,102,500
2008	$500,000		1.187	$593,500	$1,696,000
2009	$500,000		1.210	$605,000	$2,301,000
2010	$500,000		1.294	$647,000	$2,948,000
2011	$4,500,000		1.191	$5,359,500	$8,307,500
2012	$4,500,000		1.210	$5,445,000	$13,752,500
2013	$4,500,000		1.251	$5,629,500	$19,382,000
2014	$4,500,000	$930,000	1.276	$6,928,680	$26,310,680
2015	$3,570,000				
2016	0				

*Does not include interest earned.

Remedial Measures Fund:

Contributions

FY	Required 2003 Dollars	Additional 2003 Dollars	Composite i	Total Current Year Dollars	Cumulative**
2011	$266,000			0	0
2012	$266,000			0	0
2013*	$266,000		1.251	$998,298	$998,298
2014	$266,000		1.276	$339,416	$1,337,714

*Includes FY11 and FY12 contributions

**Does not include interest earned.

Land and Water Fund:

FY	Current Year Contributions	Cumulative Contributions
2011	$8,900,000	$8,900,000
2012	$4,600,000	$13,500,000
2013	0	$13,500,000
2014	0	$13,500,000

D4. Cumulative Program Accomplishment

Work Task	2004 Obligations	2004 Expenditures	2005 Obligations	2005 Expenditures	Subtotal Expenditures
A1	$0.00	$0.00	$421,740.74	$403,953.57	$403,953.57
G2	$0.00	$0.00	$0.00	$0.00	$0.00
Total A	**$0.00**	**$0.00**	**$421,740.74**	**$403,953.57**	**$403,953.57**
B1	$55,223.00	$55,223.00	$115,645.72	$115,645.72	$170,868.72
B2	$0.00	$0.00	$155,810.60	$145,568.04	$145,568.04
B3	$200,000.00	$0.00	$0.00	$14,527.30	$14,527.30
B4	$0.00	$0.00	$100,000.00	$9,857.95	$9,857.95
B5	$0.00	$0.00	$108.50	$40,720.81	$40,720.81
B6	$0.00	$0.00	$25,878.76	$25,878.76	$25,878.76
B7	$0.00	$0.00	$186,003.61	$186,003.61	$186,003.61
B8	$54,762.00	$54,762.00	$70,030.00	$70,030.00	$124,792.00
B9	$0.00	$0.00	$3,073.11	$3,073.11	$3,073.11
B10	$0.00	$0.00	$0.00	$0.00	$0.00
B11	$0.00	$0.00	$0.00	$0.00	$0.00
Total B	**$309,985.00**	**$109,985.00**	**$656,550.30**	**$611,305.30**	**$721,290.30**
C1	$0.00	$0.00	$45,276.00	$45,276.00	$45,276.00
C2	$0.00	$0.00	$0.00	$0.00	$0.00
C3	$0.00	$0.00	$0.00	$0.00	$0.00
C4	$0.00	$0.00	$0.00	$0.00	$0.00
C5	$0.00	$0.00	$0.00	$0.00	$0.00
C6	$0.00	$0.00	$0.00	$0.00	$0.00
C7	$0.00	$0.00	$0.00	$0.00	$0.00

Work Task	2004 Obligations	2004 Expenditures	2005 Obligations	2005 Expenditures	Subtotal Expenditures
C8	$0.00	$0.00	$177,053.00	$136,060.00	$136,060.00
C9	$0.00	$0.00	$43,816.00	$43,816.00	$43,816.00
C10	$0.00	$0.00	$0.00	$0.00	$0.00
C11	$0.00	$0.00	$0.00	$0.00	$0.00
C12	$0.00	$0.00	$0.00	$0.00	$0.00
C13	$0.00	$0.00	$99,996.80	$99,996.80	$99,996.80
C14	$0.00	$0.00	$0.00	$0.00	$0.00
C15	$0.00	$0.00	$22,255.00	$22,255.00	$22,255.00
C16	$0.00	$0.00	$0.00	$0.00	$0.00
C17	$0.00	$0.00	$45,000.00	$9,750.00	$9,750.00
C18	$0.00	$0.00	$41,981.82	$41,981.82	$41,981.82
C19	$0.00	$0.00	$0.00	$0.00	$0.00
C20	$64,011.00	$0.00	$53,779.96	$53,779.96	$53,779.96
C21	$0.00	$0.00	$95,534.00	$70,000.00	$70,000.00
C22	$0.00	$0.00	$48,096.00	$0.00	$0.00
C23	$0.00	$0.00	$0.00	$0.00	$0.00
C24	$0.00	$0.00	$0.00	$0.00	$0.00
C25	$0.00	$0.00	$0.00	$0.00	$0.00
C26	$0.00	$0.00	$0.00	$0.00	$0.00
C27	$0.00	$0.00	$0.00	$0.00	$0.00
C28	$0.00	$0.00	$0.00	$0.00	$0.00
C29	$0.00	$0.00	$0.00	$0.00	$0.00
C30	$0.00	$0.00	$0.00	$0.00	$0.00
C31	$0.00	$0.00	$0.00	$0.00	$0.00

Work Task	2004 Obligations	2004 Expenditures	2005 Obligations	2005 Expenditures	Subtotal Expenditures
C32	$0.00	$0.00	$0.00	$0.00	$0.00
C33	$0.00	$0.00	$0.00	$0.00	$0.00
C34	$0.00	$0.00	$0.00	$0.00	$0.00
C35	$0.00	$0.00	$0.00	$0.00	$0.00
C36	$0.00	$0.00	$0.00	$0.00	$0.00
C37	$0.00	$0.00	$0.00	$0.00	$0.00
C38	$0.00	$0.00	$0.00	$0.00	$0.00
C39	$0.00	$0.00	$0.00	$0.00	$0.00
C40	$0.00	$0.00	$0.00	$0.00	$0.00
C41	$0.00	$0.00	$0.00	$0.00	$0.00
C42	$0.00	$0.00	$0.00	$0.00	$0.00
C43	$0.00	$0.00	$0.00	$0.00	$0.00
C44	$0.00	$0.00	$0.00	$0.00	$0.00
C45	$0.00	$0.00	$0.00	$0.00	$0.00
C46	$0.00	$0.00	$0.00	$0.00	$0.00
C47	$0.00	$0.00	$0.00	$0.00	$0.00
C48	$0.00	$0.00	$0.00	$0.00	$0.00
C49	$0.00	$0.00	$0.00	$0.00	$0.00
C50	$0.00	$0.00	$0.00	$0.00	$0.00
Total C	**$64,011.00**	**$0.00**	**$672,788.58**	**$522,915.58**	**$522,915.58**
D1	$0.00	$0.00	$29,367.09	$29,367.09	$29,367.09
D2	$0.00	$0.00	$750,000.00	$370,174.62	$370,174.62
D3	$0.00	$0.00	$0.00	$0.00	$0.00
D4	$0.00	$0.00	$60,520.00	$60,520.00	$60,520.00

Work Task	2004 Obligations	2004 Expenditures	2005 Obligations	2005 Expenditures	Subtotal Expenditures
D5	$0.00	$0.00	$247,118.33	$247,118.33	$247,118.33
D6	$0.00	$0.00	$0.00	$0.00	$0.00
D7	$0.00	$0.00	$0.00	$0.00	$0.00
D8	$0.00	$0.00	$134,246.08	$134,246.08	$134,246.08
D9	$55,000.00	$0.00	$0.00	$0.00	$0.00
D10	$0.00	$0.00	$0.00	$0.00	$0.00
D11	$400,000.00	$168,133.36	$341,866.45	$100,963.76	$269,097.12
D12	$0.00	$0.00	$0.00	$0.00	$0.00
Total D	**$455,000.00**	**$168,133.36**	**$1,563,117.95**	**$942,389.88**	**$1,110,523.24**
E1	$1,077,729.33	$835,629.33	$348,991.39	$388,028.39	$1,223,657.72
E2	$0.00	$0.00	$147,333.85	$147,333.85	$147,333.85
E3	$1,037,791.00	$400,290.00	$31,268.45	$83,721.77	$484,011.77
E4	$0.00	$0.00	$17,278.54	$17,278.54	$17,278.54
E5	$0.00	$0.00	$80,058.95	$100,548.43	$100,548.43
E6	$110,004.00	$0.00	$109,927.52	$79,586.39	$79,586.39
E7	$0.00	$0.00	$370,437.68	$312,199.68	$312,199.68
E8	$0.00	$0.00	$1,035.50	$1,035.50	$1,035.50
E9	$0.00	$0.00	$53,320.19	$53,320.19	$53,320.19
E10	$0.00	$0.00	$0.00	$0.00	$0.00
E11	$0.00	$0.00	$0.00	$0.00	$0.00
E12	$6,673.38	$6,673.38	$70,893.38	$25,754.05	$32,427.43
E13	$0.00	$0.00	$48,482.00	$25,912.33	$25,912.33
E14	$0.00	$0.00	$84,309.07	$84,309.07	$84,309.07
E15	$0.00	$0.00	$0.00	$0.00	$0.00

Work Task	2004 Obligations	2004 Expenditures	2005 Obligations	2005 Expenditures	Subtotal Expenditures
E16	$0.00	$0.00	$134,814.86	$5,392.59	$5,392.59
E17	$0.00	$0.00	$0.00	$0.00	$0.00
E18	$0.00	$0.00	$0.00	$0.00	$0.00
E19	$0.00	$0.00	$0.00	$0.00	$0.00
E20	$95,000.00	$35,000.00	$0.00	$0.00	$35,000.00
E21	$0.00	$0.00	$19,729.97	$19,739.97	$19,739.97
E22	$5,088.00	$4,028.00	$0.00	$0.00	$4,028.00
E23	$0.00	$0.00	$0.00	$0.00	$0.00
E24	$0.00	$0.00	$0.00	$0.00	$0.00
E25	$0.00	$0.00	$0.00	$0.00	$0.00
E25 In-Kind	$0.00	$0.00	$0.00	$0.00	$0.00
E26	$0.00	$0.00	$0.00	$0.00	$0.00
E27	$0.00	$0.00	$0.00	$0.00	$0.00
E28	$0.00	$0.00	$0.00	$0.00	$0.00
E29	$0.00	$0.00	$0.00	$0.00	$0.00
E30	$0.00	$0.00	$0.00	$0.00	$0.00
E31	$0.00	$0.00	$0.00	$0.00	$0.00
Total E	**$2,332,285.71**	**$1,281,620.71**	**$1,517,881.35**	**$1,344,160.75**	**$2,625,781.46**
F1	$0.00	$0.00	$199,492.67	$199,492.67	$199,492.67
F2	$0.00	$0.00	$65,235.81	$65,235.81	$65,235.81
F3	$0.00	$0.00	$23,023.55	$23,023.55	$23,023.55
F4	$0.00	$0.00	$0.00	$0.00	$0.00
F5	$0.00	$0.00	$0.00	$0.00	$0.00
F6	$0.00	$0.00	$0.00	$0.00	$0.00

Work Task	2004 Obligations	2004 Expenditures	2005 Obligations	2005 Expenditures	Subtotal Expenditures
F7	$0.00	$0.00	$0.00	$0.00	$0.00
Total F	**$0.00**	**$0.00**	**$287,752.03**	**$287,752.03**	**$287,752.03**
G1	$235,000.00	$0.00	$0.00	$0.00	$0.00
G3	$0.00	$0.00	$0.00	$0.00	$0.00
G4	$0.00	$0.00	$0.00	$0.00	$0.00
Total G	**$235,000.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
H1	$0.00	$0.00	$0.00	$0.00	$0.00
H2	$0.00	$0.00	$0.00	$0.00	$0.00
Total H	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
I1	$0.00	$0.00	$0.00	$0.00	$0.00
G5	$0.00	$0.00	$0.00	$0.00	$0.00
Total I	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
GRAND Totals	**$3,396,281.71**	**$1,559,739.07**	**$5,119,830.95**	**$4,112,477.11**	**$5,672,216.18**

Work Task	2006 Obligations	2006 Expenditures	2007 Obligations	2007 Expenditures	2008 Obligations	2008 Expenditures	2009 Obligations	2009 Expenditures	2010 Obligations	2010 Expenditures	Subtotal Expenditures
A1	$1,120,653.36	$1,138,440.53	$1,052,867.52	$1,037,492.71	$965,660.35	$965,660.35	$1,052,853.25	$1,052,853.25	$1,296,959.74	$1,255,046.41	$5,449,493.25
G2	$57,262.87	$57,262.87	$73,272.35	$73,272.35	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$130,535.22
Total A	**$1,177,916.23**	**$1,195,703.40**	**$1,126,139.87**	**$1,110,765.06**	**$965,660.35**	**$965,660.35**	**$1,052,853.25**	**$1,052,853.25**	**$1,296,959.74**	**$1,255,046.41**	**$5,580,028.47**
B1	$222,390.86	$216,316.31	$227,440.83	$246,686.92	$149,085.82	$144,764.64	$206,001.63	$223,658.88	$234,965.09	$234,965.09	$1,066,391.84
B2	$206,485.90	$206,485.90	$233,348.47	$149,191.21	$334,013.77	$330,768.94	$503,628.30	$417,210.83	$352,255.56	$555,904.57	$1,659,561.45
B3	$13,190.17	$13,190.17	$41,588.73	$41,588.73	$102,288.46	$77,288.46	$169,669.00	$179,239.39	$95,522.93	$106,304.52	$417,611.27
B4	$127,627.57	$54,248.17	$117,698.86	$174,269.47	$140,519.61	$86,110.71	$229,364.46	$212,292.78	$269,833.73	$318,418.43	$845,339.56
B5	$176,017.60	$121,570.05	$301,359.83	$95,138.87	$303,301.12	$186,455.13	$259,449.57	$231,055.42	$351,957.84	$481,429.95	$1,115,649.42
B6	$101,713.03	$36,713.03	$20,654.33	$50,255.33	$48,190.46	$10,897.25	$31,769.89	$59,462.10	$41,521.10	$77,031.09	$234,358.80
B7	$205,640.44	$167,528.16	$136,000.40	$171,075.40	$173,950.09	$173,950.09	$185,238.41	$185,238.41	$165,056.32	$165,056.32	$862,848.38
B8	$50,869.73	$50,869.73	$46,711.07	$46,711.07	$66,890.83	$66,890.83	$73,421.00	$26,111.00	$78,710.75	$126,020.75	$316,603.38
B9	$570.14	$570.14	-$36.00	-$36.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$534.14
B10	$57,122.00	$0.00	$260,000.00	$147,305.11	$74,191.86	$126,084.93	$89,956.67	$122,880.49	$70,053.15	$140,878.20	$537,148.73
B11	$39,704.30	$39,704.30	$67,010.31	$2,010.31	$16,879.79	$28,895.98	$119,439.72	$47,327.37	$53,930.37	$132,727.00	$250,664.96
Total B	**$1,201,331.74**	**$907,195.96**	**$1,451,776.83**	**$1,124,196.42**	**$1,409,311.81**	**$1,232,106.96**	**$1,867,938.65**	**$1,704,476.67**	**$1,713,806.84**	**$2,338,735.92**	**$7,306,711.93**
C1	$73,525.15	$72,382.15	$0.00	$29,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$101,382.15
C2	$10,000.00	$0.00	$10,000.00	$0.00	$10,000.00	$20,000.00	$10,000.00	$20,000.00	$10,000.00	$10,000.00	$50,000.00
C3	$161,445.47	$161,445.47	$34,848.11	$34,848.11	$4,637.56	$4,637.56	$11,547.48	$11,547.48	$13,285.36	$13,285.36	$225,763.98
C4	$14,128.53	$4,128.53	$11,780.56	$1,780.56	$12,667.29	$22,667.29	$15,557.23	$25,557.23	$11,532.14	$10,648.80	$64,782.41
C5	$8,583.92	$8,583.92	$47,425.58	$47,425.58	$82,971.14	$82,971.14	$83,428.78	$83,428.78	$97,189.14	$97,189.14	$319,598.56
C6	$76,875.35	$76,875.35	$26,676.33	$26,676.33	-$2,110.00	-$2,110.00	$0.00	$0.00	$0.00	$0.00	$101,441.68
C7	$189,789.41	$68,121.58	$80,818.40	$102,387.02	$88,573.21	$148,829.53	$129,403.53	$110,818.42	$58,380.22	$116,808.22	$546,964.77
C8	$187,973.54	$108,932.54	$180,751.80	$157,708.80	$190,297.91	$142,918.10	$23,606.34	$39,115.60	-$4,417.26	-$4,417.26	$444,257.78

Work Task	2006 Obligations	2006 Expenditures	2007 Obligations	2007 Expenditures	2008 Obligations	2008 Expenditures	2009 Obligations	2009 Expenditures	2010 Obligations	2010 Expenditures	Subtotal Expenditures
C9	$30,253.86	$5,828.86	$38,785.76	$63,210.76	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$69,039.62
C10	$63,519.00	$47,365.78	$106,382.73	$116,382.73	$159,000.24	$156,041.84	$132,905.58	$51,983.16	$127,882.41	$204,288.36	$576,061.87
C11	$95,301.06	$44,091.06	$142,660.83	$147,083.82	$128,801.82	$121,895.64	$135,376.13	$98,043.33	$160,883.55	$137,378.89	$548,492.74
C12	$173,576.33	$122,584.33	$184,685.94	$155,160.86	$174,728.02	$155,237.02	$184,842.91	$209,012.49	$216,432.73	$171,572.67	$813,567.37
C13	$265,621.17	$160,471.22	$302,066.02	$325,075.86	$147,816.23	$170,683.76	$149,876.40	$209,148.98	$341,670.90	$266,310.38	$1,131,690.20
C14	$38,229.17	$8,229.17	$67.52	$67.52	$0.00	$0.00	$65,136.31	$13,360.30	$67,997.50	$63,679.95	$85,336.94
C15	$98,025.48	$98,025.48	$92,892.96	$92,892.96	$81,892.97	$81,892.97	$80,882.78	$80,882.78	$96,551.48	$96,551.48	$450,245.67
C16	$0.00	$0.00	$55,332.60	$18,882.60	$0.00	$36,450.00	$0.00	$0.00	$0.00	$0.00	$55,332.60
C17	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C18	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C19	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C20	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C21	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C22	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C23	$0.00	$0.00	$138,945.21	$138,945.21	$148,207.26	$143,751.26	$70,985.95	$74,129.95	$0.00	$0.00	$356,826.42
C24	$0.00	$0.00	$0.00	$0.00	$86,935.13	$86,935.13	$377,198.25	$281,820.73	$165,079.12	$250,183.33	$618,939.19
C25	$0.00	$0.00	$0.00	$0.00	$210,841.42	$129,741.75	$228,412.27	$216,650.06	$213,756.65	$245,692.99	$592,084.80
C26	$0.00	$0.00	$0.00	$0.00	$621.85	$621.85	$74,709.00	-$291.00	$82,395.92	$49,780.55	$50,111.40
C27	$0.00	$0.00	$0.00	$0.00	$93,190.68	$39,734.64	$110,074.68	$147,061.35	$57,914.14	$71,248.65	$258,044.64
C28	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$130,739.27	$68,885.22	$26,392.77	$52,670.45	$121,555.67
C29	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$80,464.99	$80,464.99	$126,061.29	$26,061.29	$106,526.28
C30	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$94,554.39	$59,880.30	$77,335.50	$93,241.41	$153,121.71
C31	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$103,693.22	$66,655.68	$100,903.63	$73,863.03	$140,518.71

Work Task	2006 Obligations	2006 Expenditures	2007 Obligations	2007 Expenditures	2008 Obligations	2008 Expenditures	2009 Obligations	2009 Expenditures	2010 Obligations	2010 Expenditures	Subtotal Expenditures
C32	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$87,893.04	$87,893.04	$85,228.77	$85,228.77	$173,121.81
C33	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$205,229.84	$5,229.84	$70,817.31	$75,956.21	$81,186.05
C34	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$42,196.13	$42,196.13	$69,518.18	$69,518.18	$111,714.31
C35	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$33,949.46	$10,688.46	$10,688.46
C36	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$21,836.95	$93,004.96	$93,004.96
C37	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$266,477.27	$113,822.56	$113,822.56
C38	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$6,250.70	$6,250.70	$6,250.70
C39	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$251,804.17	$170,403.17	$170,403.17
C40	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$71,936.76	$2,106.76	$2,106.76
C41	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$5,885.67	$5,885.67	$5,885.67
C42	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$49,236.73	$49,236.73	$49,236.73
C43	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C44	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C45	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C46	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C47	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C48	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C49	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
C50	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total C	**$1,486,847.44**	**$987,065.44**	**$1,454,120.35**	**$1,457,528.72**	**$1,619,072.73**	**$1,542,899.48**	**$2,628,714.50**	**$2,083,474.84**	**$2,980,169.16**	**$2,728,139.86**	**$8,799,108.34**
D1	$44,997.82	$44,997.82	$18,766.77	$18,766.77	$20,146.27	$20,146.27	$27,400.01	$27,400.01	$18,997.38	$18,997.38	$130,308.25
D2	$848,505.45	$708,099.72	$915,330.65	$711,050.40	$621,896.84	$907,303.29	$1,274,835.64	$556,069.59	$152,316.08	$719,637.66	$3,602,160.66
D3	$74,346.50	$25,199.42	$72,362.72	$78,829.48	$81,286.79	$69,400.31	$222,500.41	$140,793.91	$104,750.84	$113,389.00	$427,612.12

Work Task	2006 Obligations	2006 Expenditures	2007 Obligations	2007 Expenditures	2008 Obligations	2008 Expenditures	2009 Obligations	2009 Expenditures	2010 Obligations	2010 Expenditures	Subtotal Expenditures
D4	$66,045.80	$3,058.80	$71,104.98	$111,368.21	$75,233.41	$61,170.52	$780.62	$24,973.85	$0.00	$0.00	$200,571.38
D5	$245,205.41	$245,205.41	$238,487.89	$238,487.89	$254,903.38	$254,903.38	$282,279.28	$282,279.28	$224,813.84	$224,813.84	$1,245,689.80
D6	$158,961.43	$58,961.43	$177,773.39	$192,511.07	$124,050.07	$166,931.67	$300,988.48	$148,813.20	$226,354.82	$194,266.82	$761,484.19
D7	$454,775.02	$166,600.05	$450,164.71	$463,095.44	$526,687.60	$710,350.15	$526,939.86	$447,287.78	$548,459.47	$521,922.72	$2,309,256.14
D8	$310,623.73	$302,623.73	$332,620.94	$340,620.94	$339,719.60	$339,719.60	$469,412.71	$469,412.71	$676,835.76	$636,835.76	$2,089,212.74
D9	$99,886.92	$33,254.92	$89,831.54	$79,684.54	$101,177.29	$40,618.43	$139,417.88	$153,474.97	$162,881.50	$169,968.27	$477,001.13
D10	$18,977.01	$18,977.01	$27,483.85	$12,118.85	$5,369.81	$20,734.81	$0.00	$0.00	$0.00	$0.00	$51,830.67
D11	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
D12	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$12,886.12	$7,730.12	$7,730.12
Total D	**$2,322,325.09**	**$1,606,978.31**	**$2,393,927.44**	**$2,246,533.59**	**$2,150,471.06**	**$2,591,278.43**	**$3,244,554.89**	**$2,250,505.30**	**$2,128,295.81**	**$2,607,561.57**	**$11,302,857.20**
E1	$273,378.20	$240,612.20	$230,237.45	$181,081.26	$120,026.35	$115,480.80	$195,931.36	$197,716.08	$204,821.21	$213,790.05	$948,680.39
E2	$270,978.22	$238,212.22	$0.00	$0.00	$26,446.69	$95,003.21	$86,242.83	$68,373.83	$91,981.79	$106,416.04	$508,005.30
E3	$53,581.02	$53,581.02	$94,430.60	$94,430.60	$65,565.30	$65,565.30	$97,370.14	$96,480.04	$17,434.18	$15,805.84	$325,862.80
E4	$590,485.99	$275,398.70	$782,488.02	$706,458.13	$828,982.19	$662,454.83	$1,349,593.46	$952,890.91	$1,553,565.67	$1,355,331.31	$3,952,533.88
E5	$1,292,930.68	$843,994.77	$3,322,086.06	$997,606.83	$3,611,928.60	$3,207,890.57	$789,905.06	$3,373,478.92	$770,765.54	$559,001.12	$8,981,972.21
E6	$23,437.93	$23,437.93	$16,036.43	$16,036.43	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$39,474.36
E7	$12,309.09	$12,309.09	$5,515.55	$5,515.55	$4,410.55	$597.23	$0.00	$0.00	$0.00	$0.00	$18,421.87
E8	$488,610.09	$185,255.91	$71,382.17	$317,523.58	$163,444.58	$169,788.34	$132,389.11	$104,938.56	$0.00	$59,498.19	$837,004.58
E9	$117,538.92	$77,538.92	$85,084.59	$115,256.59	$182,393.19	$184,705.20	$2,285,834.49	$1,776,712.34	$2,129,989.54	$2,072,293.39	$4,226,506.44
E10	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E11	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E12	$32,151.02	$32,151.02	$11,633.08	$11,633.08	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$43,784.10
E13	$82,438.05	$82,438.05	$18,876.44	$18,876.44	$110.00	$110.00	$0.00	$0.00	$0.00	$0.00	$101,424.49

Work Task	2006 Obligations	2006 Expenditures	2007 Obligations	2007 Expenditures	2008 Obligations	2008 Expenditures	2009 Obligations	2009 Expenditures	2010 Obligations	2010 Expenditures	Subtotal Expenditures
E14	$2,114,868.58	$1,630,141.53	$3,188,676.30	$3,664,056.46	$965,430.09	$970,775.11	$540,515.32	$442,013.60	$655,197.95	$464,914.90	$7,171,901.60
E15	$265,497.38	$220,949.66	$421,634.95	$383,320.87	$433,665.01	$338,520.03	$161,470.80	$201,103.14	$4,331.69	$121,330.87	$1,265,224.57
E16	$158,330.58	$200,443.47	$103,685.80	$103,685.80	$234,994.34	$234,994.34	$203,840.83	$203,145.39	$294,547.68	$251,048.46	$993,317.46
E17	$1,287.40	$1,287.40	$4,757.28	$4,757.28	$10,480.66	$10,480.66	$7,711.94	$7,711.94	$1,013,487.38	$13,487.38	$37,724.66
E18	$0.00	$0.00	$2,376.11	$2,376.11	$25,218.68	$25,218.68	$205,056.92	$190,497.11	$197,050.80	$154,637.24	$372,729.14
E19	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E20	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E21	$0.00	$0.00	$0.00	$0.00	-$802.38	-$802.38	$83,869.06	$83,869.06	$26,129.72	$26,129.72	$109,196.40
E22	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E23	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E24	$0.00	$0.00	$55,957.46	$51,332.46	$1,075,422.08	$389,885.00	$689,711.29	$988,219.33	$523,414.75	$590,792.33	$2,020,229.12
E25	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$137,722.25	$117,119.60	$63,672.19	$84,274.84	$201,394.44
E25 In-Kind	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$436,000.00	$436,000.00	$436,000.00
E26	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$147.62	$147.62	$0.00	$0.00	$147.62
E27	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$12,635.95	$12,635.95	$688,738.54	$283,233.36	$295,869.31
E28	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$257,890.16	$156,905.74	$156,905.74
E29	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$173,512.57	$173,512.57	$173,512.57
E30	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E31	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total E	**$5,777,823.15**	**$4,117,751.89**	**$8,414,858.29**	**$6,673,947.47**	**$7,747,715.93**	**$6,470,666.92**	**$6,979,948.43**	**$8,817,053.42**	**$9,102,531.36**	**$7,138,403.35**	**$33,217,823.05**
F1	$138,265.04	$138,265.04	$286,184.13	$255,369.52	$305,647.09	$221,016.81	$360,842.17	$344,424.98	$394,781.36	$379,228.21	$1,338,304.56
F2	$28,524.45	$28,524.45	$143,492.76	$143,492.76	$157,021.22	$78,686.22	$143,556.56	$182,724.56	$114,944.30	$125,520.30	$558,948.29

Work Task	2006 Obligations	2006 Expenditures	2007 Obligations	2007 Expenditures	2008 Obligations	2008 Expenditures	2009 Obligations	2009 Expenditures	2010 Obligations	2010 Expenditures	Subtotal Expenditures
F3	$10,384.22	$10,384.22	$30,038.11	$30,038.11	$33,109.48	$33,109.48	$55,782.13	$55,782.13	$48,782.43	$48,782.43	$178,096.37
F4	$0.00	$0.00	$69,897.69	$69,897.69	$93,145.13	$93,145.13	$92,697.58	$92,697.58	$115,018.90	$115,018.90	$370,759.30
F5	$0.00	$0.00	$41,573.87	$41,573.87	$137,912.88	$129,939.88	$175,494.19	$167,068.67	$156,279.56	$169,647.12	$508,229.54
F6	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$17,076.49	$17,076.49	$41,207.42	$41,207.42	$58,283.91
F7	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total F	**$177,173.71**	**$177,173.71**	**$571,186.56**	**$540,371.95**	**$726,835.80**	**$555,897.52**	**$845,449.12**	**$859,774.41**	**$871,013.97**	**$879,404.38**	**$3,012,621.97**
G1	$97,959.45	$97,959.45	$144,443.78	$94,607.72	$145,357.59	$174,902.91	$337,661.19	$318,351.29	$484,297.71	$438,276.83	$1,124,098.20
G3	$283,189.83	$206,117.04	$342,265.08	$230,401.38	$414,505.30	$273,816.05	$388,826.06	$441,109.20	$241,728.79	$326,952.38	$1,478,396.05
G4	$82,039.77	$80,869.98	$60,549.49	$61,719.28	$8,485.07	$8,485.07	$33,419.32	$33,419.32	$33,414.42	$33,414.42	$217,908.07
Total G	**$463,189.05**	**$384,946.47**	**$547,258.35**	**$386,728.38**	**$568,347.96**	**$457,204.03**	**$759,906.57**	**$792,879.81**	**$759,440.92**	**$798,643.63**	**$2,820,402.32**
H1	$541,500.00	$541,500.00	$561,000.00	$561,000.00	$593,500.00	$593,500.00	$605,000.00	$605,000.00	$647,000.00	$647,000.00	$2,948,000.00
H2	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total H	**$541,500.00**	**$541,500.00**	**$561,000.00**	**$561,000.00**	**$593,500.00**	**$593,500.00**	**$605,000.00**	**$605,000.00**	**$647,000.00**	**$647,000.00**	**$2,948,000.00**
I1	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$16,429.75	$16,429.75	$18,946.39	$18,946.39	$35,376.14
G5	$8,789.12	$8,789.12	$35,511.43	$35,511.43	$16,759.13	$16,759.13	$0.00	$0.00	$0.00	$0.00	$61,059.68
Total I	**$8,789.12**	**$8,789.12**	**$35,511.43**	**$35,511.43**	**$16,759.13**	**$16,759.13**	**$16,429.75**	**$16,429.75**	**$18,946.39**	**$18,946.39**	**$96,435.82**
GRAND Totals	**$13,156,895.53**	**$9,927,104.30**	**$16,555,779.12**	**$14,136,583.02**	**$15,797,674.77**	**$14,425,972.82**	**$18,000,795.16**	**$18,182,447.45**	**$19,518,164.19**	**$18,411,881.51**	**$75,083,989.10**

Work Task	2011 Obligations	2011 Expenditures	2012 Obligations	2012 Expenditures	Expenditures Grand Total
A1	$1,138,509.80	$1,164,324.46	$917,627.80	$917,627.80	$7,935,399.08
G2	$0.00	$0.00	$0.00	$0.00	$130,535.22
Total A	$1,138,509.80	$1,164,324.46	$917,627.80	$917,627.80	$8,065,934.30
B1	$206,468.97	$196,380.27	$203,360.50	$186,340.73	$1,619,981.56
B2	$230,585.84	$215,918.30	$298,730.97	$180,923.42	$2,201,971.21
B3	$136,901.52	$141,549.52	$145,868.05	$109,027.59	$682,715.68
B4	$150,310.56	$111,787.33	$148,422.27	$166,656.48	$1,133,641.32
B5	$270,542.88	$516,841.63	$306,855.83	$287,412.97	$1,960,624.83
B6	$17,692.75	$23,230.91	$66,798.28	$30,281.95	$313,750.42
B7	$246,148.11	$242,893.11	$173,805.16	$170,634.16	$1,462,379.26
B8	$83,094.77	$63,127.77	$65,514.81	$85,481.81	$590,004.96
B9	$0.00	$0.00	$0.00	$0.00	$3,607.25
B10	$3,498.01	$17,672.96	$0.00	$0.00	$554,821.69
B11	$25,979.31	$72,240.61	$36,397.60	-$8,660.52	$314,245.05
Total B	$1,371,222.72	$1,601,642.41	$1,445,753.47	$1,208,098.59	$10,837,743.23
C1	$0.00	$0.00	$0.00	$0.00	$146,658.15
C2	$11,293.33	$1,293.33	$10,731.82	$731.82	$52,025.15
C3	$10,270.70	$10,270.70	$13,408.44	$13,408.44	$249,443.12
C4	$11,705.91	$8,879.67	$10,162.78	$10,901.46	$84,563.54
C5	$95,482.79	$95,482.79	$86,835.87	$86,835.87	$501,917.22
C6	$0.00	$0.00	$0.00	$0.00	$101,441.68
C7	-$2,315.00	-$2,315.00	$0.00	$0.00	$544,649.77
C8	$0.00	$0.00	$0.00	$0.00	$580,317.78
C9	$0.00	$0.00	$0.00	$0.00	$112,855.62

Work Task	2011 Obligations	2011 Expenditures	2012 Obligations	2012 Expenditures	Expenditures Grand Total
C10	$132,922.93	$117,400.67	$126,121.64	$72,417.95	$765,880.49
C11	$57,589.11	$165,093.69	$140,147.91	$73,984.67	$787,571.10
C12	$196,158.23	$230,969.52	$54.45	-$8,270.02	$1,036,266.87
C13	$80,324.83	$155,096.91	$134,764.80	$135,353.24	$1,522,137.15
C14	$71,883.70	$117,164.58	$71,167.73	$12,243.41	$214,744.93
C15	$23,239.78	$23,239.78	$0.00	$0.00	$495,740.45
C16	$0.00	$0.00	$0.00	$0.00	$55,332.60
C17	$0.00	$0.00	$0.00	$0.00	$9,750.00
C18	$0.00	$0.00	$0.00	$0.00	$41,981.82
C19	$0.00	$0.00	$0.00	$0.00	$0.00
C20	$0.00	$0.00	$0.00	$0.00	$53,779.96
C21	$0.00	$0.00	$0.00	$0.00	$70,000.00
C22	$0.00	$0.00	$0.00	$0.00	$0.00
C23	$0.00	$0.00	$0.00	$0.00	$356,826.42
C24	$183,056.69	$24,155.95	$243,998.17	$207,976.82	$851,071.96
C25	$252,351.95	$243,390.68	$246,544.45	$229,804.62	$1,065,280.10
C26	$4,795.46	$112,410.83	$1,165.90	-$33,711.16	$128,811.07
C27	$42,984.20	$42,984.20	$56,612.17	$36,612.17	$337,641.01
C28	-$4,261.38	$31,314.99	$483.66	$212.08	$153,082.74
C29	$0.00	$100,000.00	$0.00	$0.00	$206,526.28
C30	$91,603.18	$84,466.75	$65,684.91	$68,876.25	$306,464.71
C31	$111,372.84	$175,450.98	$124,776.15	$63,276.86	$379,246.55
C32	$92,560.49	$92,560.49	$115,711.54	$115,711.54	$381,393.84
C33	$50,844.82	$245,705.92	$97,020.68	$78,504.28	$405,396.25

Work Task	2011 Obligations	2011 Expenditures	2012 Obligations	2012 Expenditures	Expenditures Grand Total
C34	$12,304.81	$12,304.81	$0.00	$0.00	$124,019.12
C35	$146,076.28	$11,161.28	$289,115.34	$188,039.98	$209,889.72
C36	$50,440.81	$138,207.29	$13,383.19	$20,656.70	$251,868.95
C37	$53,704.86	$150,988.99	$26,351.59	$26,351.59	$291,163.14
C38	$0.00	$0.00	$0.00	$0.00	$6,250.70
C39	$174,690.00	$201,453.00	$252,447.59	$271,872.42	$643,728.59
C40	$125,751.99	$125,107.76	$180,401.56	$143,503.91	$270,718.43
C41	$31,150.14	$31,150.14	$31,584.07	$31,584.07	$68,619.88
C42	$103,142.42	$32,289.92	$118,748.43	$171,949.11	$253,475.76
C43	$1,099.56	$1,099.56	$15,413.97	$11,859.12	$12,958.68
C44	$33,542.26	$33,542.26	$94,204.34	$94,204.34	$127,746.60
C45	$175,342.41	$125,969.16	$193,102.42	$187,812.06	$313,781.22
C46	$103,992.63	$56,680.51	$117,603.73	$112,123.63	$168,804.14
C47	$1,147.88	$1,147.88	$237,437.06	$50,689.87	$51,837.75
C48	$50,572.34	$50,502.41	$50,590.60	$47,752.42	$98,254.83
C49	$0.00	$0.00	$59,867.17	$59,867.17	$59,867.17
C50	$0.00	$0.00	$0.00	$0.00	$0.00
C51	$0.00	$0.00	$26,532.93	$26,532.93	$26,532.93
C52	$0.00	$0.00	$22,422.40	$22,422.40	$22,422.40
C53	$0.00	$0.00	$105,869.79	$54,806.89	$54,806.89
Total C	$2,576,822.95	$3,046,622.40	$3,380,469.25	$2,686,898.91	$15,055,545.23
D1	$18,725.89	$18,725.89	$21,802.58	$21,802.58	$200,203.81
D2	$655,142.92	$850,868.92	$708,540.74	$654,118.74	$5,477,322.94
D3	$120,009.76	$96,376.11	$111,833.44	$123,606.98	$647,595.21

Work Task	2011 Obligations	2011 Expenditures	2012 Obligations	2012 Expenditures	Expenditures Grand Total
D4	$0.00	$0.00	$0.00	$0.00	$261,091.38
D5	$289,547.70	$289,547.70	$253,792.34	$253,792.34	$2,036,148.17
D6	$237,749.92	$295,090.92	$465,205.66	$282,206.66	$1,338,781.77
D7	$543,056.20	$600,256.19	$563,565.52	$569,156.61	$3,478,668.94
D8	$614,086.24	$592,711.03	$624,518.66	$617,542.15	$3,433,712.00
D9	$147,131.56	$217,528.56	$188,280.52	$141,512.52	$836,042.21
D10	$33,659.04	$33,659.04	$20,104.65	$20,104.65	$105,594.36
D11	$0.00	$0.00	$0.00	$0.00	$269,097.12
D12	$117,017.13	$45,155.76	$238,443.61	$135,439.05	$188,324.93
Total D	$2,776,126.36	$3,039,920.12	$3,196,087.72	$2,819,282.28	$18,272,582.84
E1	$267,986.63	$222,156.86	$916,620.08	$890,963.41	$3,285,458.38
E2	$132,989.92	$140,484.47	-$424.29	-$424.29	$795,399.33
E3	$0.00	$61,353.62	$0.00	$0.00	$871,228.19
E4	$1,483,727.80	$1,502,175.84	$1,154,766.77	$1,688,339.54	$7,160,327.80
E5	$451,820.04	$734,522.58	$361,277.27	$265,712.51	$10,082,755.73
E6	$0.00	$0.00	$0.00	$0.00	$119,060.75
E7	$0.00	$0.00	$0.00	$0.00	$330,621.55
E8	$0.00	$22,143.98	$0.00	$0.00	$860,184.06
E9	$738,284.20	$961,222.68	$414,640.69	$449,967.31	$5,691,016.62
E10	$0.00	$0.00	$0.00	$0.00	$0.00
E11	$0.00	$0.00	$0.00	$0.00	$0.00
E12	$0.00	$0.00	$0.00	$0.00	$76,211.53
E13	$0.00	$0.00	$0.00	$0.00	$127,336.82
E14	$508,610.43	$683,705.92	$771,006.55	$456,991.14	$8,396,907.73

Work Task	2011 Obligations	2011 Expenditures	2012 Obligations	2012 Expenditures	Expenditures Grand Total
E15	$17,255.29	$17,255.29	$28,211.19	$28,211.19	$1,310,691.05
E16	$259,346.35	$186,157.60	$209,391.63	$261,624.65	$1,446,492.30
E17	$41,359.94	$730,765.63	$2,209,091.02	$332,533.05	$1,101,023.34
E18	$205,944.26	$205,088.24	$326,234.76	$319,805.30	$897,622.68
E19	$0.00	$0.00	$0.00	$0.00	$0.00
E20	$0.00	$0.00	$0.00	$0.00	$35,000.00
E21	$34,019.70	$34,019.70	$44,803.79	$44,803.79	$207,759.86
E22	$0.00	$0.00	$0.00	$0.00	$4,028.00
E23	$0.00	$0.00	$0.00	$0.00	$0.00
E24	$639,675.70	$716,795.58	$862,441.09	$278,064.73	$3,015,089.43
E25	$10,293.25	$10,293.25	$16,826.97	$16,826.97	$228,514.66
E25 In-Kind	$436,000.00	$436,000.00	$0.00	$0.00	$872,000.00
E26	$0.00	$0.00	$0.00	$0.00	$147.62
E27	$3,060,556.46	$810,593.24	$6,562,631.03	$7,039,753.11	$8,146,215.66
E28	$258,521.17	$330,289.20	$75,792.42	$105,008.81	$592,203.75
E29	$59,667.12	$59,667.12	$16.19	$16.19	$233,195.88
E30	$88,884.93	$88,884.93	$166,849.05	$166,849.05	$255,733.98
E31	$21,979.16	$16,115.11	$88,198.74	$40,690.67	$56,805.78
Total E	$8,716,922.35	$7,969,690.84	$14,208,374.95	$12,385,737.13	$56,199,032.48
F1	$480,326.82	$497,781.32	$754,927.68	$534,777.49	$2,570,356.04
F2	$185,177.77	$158,354.77	$375,849.49	$144,306.35	$926,845.22
F3	$53,952.06	$53,952.06	$21,525.04	$21,525.04	$276,597.02
F4	$119,649.91	$118,393.86	$109,437.27	$108,730.08	$597,883.24

Work Task	2011 Obligations	2011 Expenditures	2012 Obligations	2012 Expenditures	Expenditures Grand Total
F5	$153,930.06	$153,930.06	$172,897.42	$172,897.42	$835,057.02
F6	$88,758.78	$88,758.78	$79,854.92	$79,854.92	$226,897.61
F7	$1,403.06	$1,403.06	$14,271.51	$14,271.51	$15,674.57
Total F	$1,083,198.46	$1,072,573.91	$1,528,763.33	$1,076,362.81	$5,449,310.72
G1	$678,848.47	$625,217.16	$728,250.63	$609,246.83	$2,358,562.19
G3	$54,339.42	$171,292.05	$282,786.62	$255,093.82	$1,904,781.92
G4	$137,434.07	$137,434.07	$127,754.31	$127,754.31	$483,096.45
Total G	$870,621.96	$933,943.28	$1,138,791.56	$992,094.96	$4,746,440.56
H1	$5,359,500.00	$5,359,500.00	$5,445,000.00	$5,445,000.00	$13,752,500.00
H2	$0.00	$0.00	$0.00	$0.00	$0.00
Total H	$5,359,500.00	$5,359,500.00	$5,445,000.00	$5,445,000.00	$13,752,500.00
I1	$76,251.83	$76,251.83	$96,516.90	$96,516.90	$208,144.87
G5	$0.00	$0.00	$0.00	$0.00	$61,059.68
Total I	$76,251.83	$76,251.83	$96,516.90	$96,516.90	$269,204.55
GRAND Totals	**$23,969,176.43**	**$24,264,469.25**	**$31,357,384.98**	**$27,627,619.38**	**$132,648,293.91**

Appendix E. Reports Published in FY12

Except where otherwise noted for journal articles, these reports are available on the LCR MSCP website at:
http://www.lcrmscp.gov/steer_committee/technical_reports.html

Work Task	Report Title
B1:	Five Year Summary of Razorback Sucker (*Xyrauchen texanus*) Larval Collections on Lake Mohave: 2005-2009
C2:	*Eriogonum viscidulum* (Sticky Buckwheat) and *Astragalus geyeri* var. *triquetrus* (Threecorner Milkvetch) Monitoring—2009 Update
C2:	Monitoring *Eriogonum viscidulum* (Sticky Buckwheat) and *Astragalus geyeri* var. *triquetrus* (Threecorner Milkvetch) within Lake Mead National Recreation Area—2008 Update
C5:	Effects of Abiotic Factors on Insect Populations in Riparian Restoration Sites 2009 Annual Report
C7:	Survey and Habitat Characterization for MacNeill's Sootywing, 2009 Annual Report
C13:	Razorback Sucker Studies on Lake Mead, Nevada and Arizona 2009-2010 Final Report
C13:	Razorback Sucker Studies on Lake Mead, Nevada and Arizona 2008-2009 Final Report
C15:	Flannelmouth Sucker Habitat Use, Preference, and Recruitment Downstream of Davis Dam—2009 Annual Report
C15:	Investigations of Flannelmouth Sucker Habitat Use, Preference, and Recruitment Downstream of Davis Dam, 2006-2010
C29:	Razorback Sucker Aging and Stocking Population Assessment, 2008-2009 Annual Report
C30:	Development of an Efficient Method for Removal of Quagga Mussel Veligers from Transport Tanks at Willow Beach National Fish Hatchery – Interim Report

C30:	Development of an Efficient Method for Removal of Quagga Mussel Veligers from Transport Tanks at Willow Beach National Fish Hatchery October 2010
C30:	Efficacy of Potassium Chloride and Formalin for Removing Quagga Mussel Veligers from Transport Tanks at Willow Beach National Fishery Hatchery November 2009
C32:	Salinity Tolerances for Egg and Larval Stages of Razorback Sucker 2007-2008
C39:	Distribution and Post-stocking Survival of Bonytail in Lake Havasu 2010 Annual Report
C42:	Laboratory Testing of Lassenite Pozzolan for Use as a Soil Amendment in Habitat Restoration
D1:	Marsh Bird Surveys 2009
D2:	Southwestern Willow Flycatcher Surveys, Demography, and Ecology along the Lower Colorado River and Tributaries, 2011. Annual Report
D5:	Bird Banding Summary Report for the 2008 and 2009 Seasons
D6:	Summary Report on the Lower Colorado River Riparian Bird Surveys, 2008-2010
D7:	Yellow-billed Cuckoo Distribution, Abundance and Habitat Use on the Lower Colorado River and Tributaries, 2011 Annual Report
D8:	Movements of Sonic Tagged Razorback Suckers between Davis and Parker Dams (Lake Havasu) 2007–2010
E1:	Beal Riparian and Marsh Restoration, 2008 Annual Report
E4:	Palo Verde Ecological Reserve Restoration Development and Monitoring Plan: Phase 7
E9:	Hart Mine Marsh: Annual Report 2010
E14:	Imperial Ponds Conservation Area 2008 Annual Report
E14:	Evaluation of a Secondary Filtration Technology for Nonnative Fish Exclusion at the Imperial Ponds, Imperial National Wildlife Refuge, Arizona

E24:	Feasibility Study Using Native Seeds in Restoration, California-Arizona-Nevada Final Annual Report
E25:	Big Bend Conservation Area 2009 Annual Report
E33:	Shark's Tooth Conservation Area Restoration Development and Monitoring Plan
F4:	Post-Development Bat Monitoring 2009 Acoustic Surveys
F6:	Monitoring MacNeill's Sootywing in Habitat Creation Sites 2010 Annual Report
F6:	Monitoring MacNeill's Sootywing in Habitat Creation Sites 2009 Annual Report
G1:	Colorado River Fishes Database Management, 2011 Final Report
G4:	Final Habitat Creation Conservation Measure Accomplishment Tracking Process