Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Vegetation Classification Mapping Along the LCR

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Outline

- Review previous mapping efforts.
- Current mapping effort – 2013.
- Draft maps of priority areas.
- Future mapping efforts.

Review of Previous Mapping Efforts on the LCR

- Anderson and Ohmart – 1976 &1984
- Younker and Andersen – 1986
- Salas et al. – 1996
- CH2MHill – 1999
- BioWest – 2004
- USBR – 2013

Anderson and Ohmart – 1976 &1984

Objective 1: Develop a classification system defining broad community and structural types for use in quickly identifying habitats in the field; delineate habitat along the LCR.

Objective 2: Determine the species richness and abundances of wildlife associated with each vegetation type.

- Emphasis - similarities rather than differences between vegetation communities…
  - Community types – based on dominant plant species
  - Structural types – based on vertical configuration of vegetation
- Their intention was for the classification system to be used only at the scale it was meant for.
- Minimum mapping unit (MMU) ⟶ 25 acres.
- Anything less than 25 acres, they felt would give inaccurate assessments of wildlife use patterns.
- Used aerial photographs to delineate habitat types and then ground truthed to make final maps.

Younker and Andersen – 1986

Objective: Update the 1984 A&O map.

- Added a new community type – Creosote (CR).
- MMU ⟶ 25 acres (a few exceptions…1- small isolated patches of vegetation; 2- a pure vegetation type could be delineated within a mixed stand).
- Used aerial photographs (1:6,000) and Mylar overlays to delineate type boundaries.
- Community types were primarily identified using color and growth form.
- Stereoscopic photos were used to ID structure.
- Ground truthing.

Salas et al. - 1996

Objective: Use the A&O classification system to map vegetation along the LCR. A “start from scratch” project, not an update to previous maps.

- Used same community types as Younker & Andersen plus:
  - Added - sandbars, river channels and backwaters.
- MMU – 25 acres (with the following exceptions).
  - Marshes -1 acre mmu.
  - Strip vegetation was delineated separately regardless of size.
- Aerial photos (1:6,000); Mylar overlays.
- Determined community types by using - size, color, shape, shadows, topographic location, field observations.
- Ground Truthing.

CH2MHill – 1999

Objective 1: Develop a GIS database of the A&O classified study area that would be sufficiently accurate to estimate the current and historical distribution of SWFL.

Objective 2: Re-register the 1996 Salas et al. map.

- Used same community types as Younker & Andersen, plus…
  - Added - Open Water (OW) and Structured Open Water (SOW).
- Changed the MMU's – based on an error.
  - Typo in the Salas et al. report which listed the mmu as 5 acres and 1 acre instead of 25 acres and 1 acre, but the correct mmu's were clearly stated later in the report.
  - This detail was missed by CH2MHill; they subsequently determined that all mmu's should be the same and proceeded to change it to 1 acre for all types (deviating from the intended use of the system).
- Aerial photos (1997) viewed under stereoscope; and DOQs used for on-screen digitizing to delineate polygons.
- Ground truthing.

BioWest – 2004

Objective: Update 1999 vegetation classification map; classify previously unmapped areas; delineate backwaters.

- Used same community types as the previous map, plus:
  - Added 4 types - No Classification (NC); Backwaters (BW); Agriculture (AG); Undeveloped Bare Ground (UD).
- Continued using the 1 acre mmu for all types.
- Used high quality digital aerial imagery – orthorectified.
  - 1 foot resolution
- Used 3 techniques
  - Computer based, unsupervised classifications using Ecognition.
  - Mylar mapping
  - On-screen digitizing
- Ground truthing

USBR - Current

Objective: Identify survey areas for system-wide covered species surveys.

- Used same community types as in 2004, plus:
    - Added - Bare Ground (BG)
- Minimum mapping unit -
    - Returned to a scale that better “fit” with the original intention of the A&O classification system, but also takes into account the objective of this mapping effort.
        - 10 acre mmu for cottonwood/willow
        - 10 acre mmu mesquite habitat
        - 1 acre mmu for marsh / backwater
        - 25 acre mmu for everything else
- 2010 NAIP Imagery – 1 meter resolution

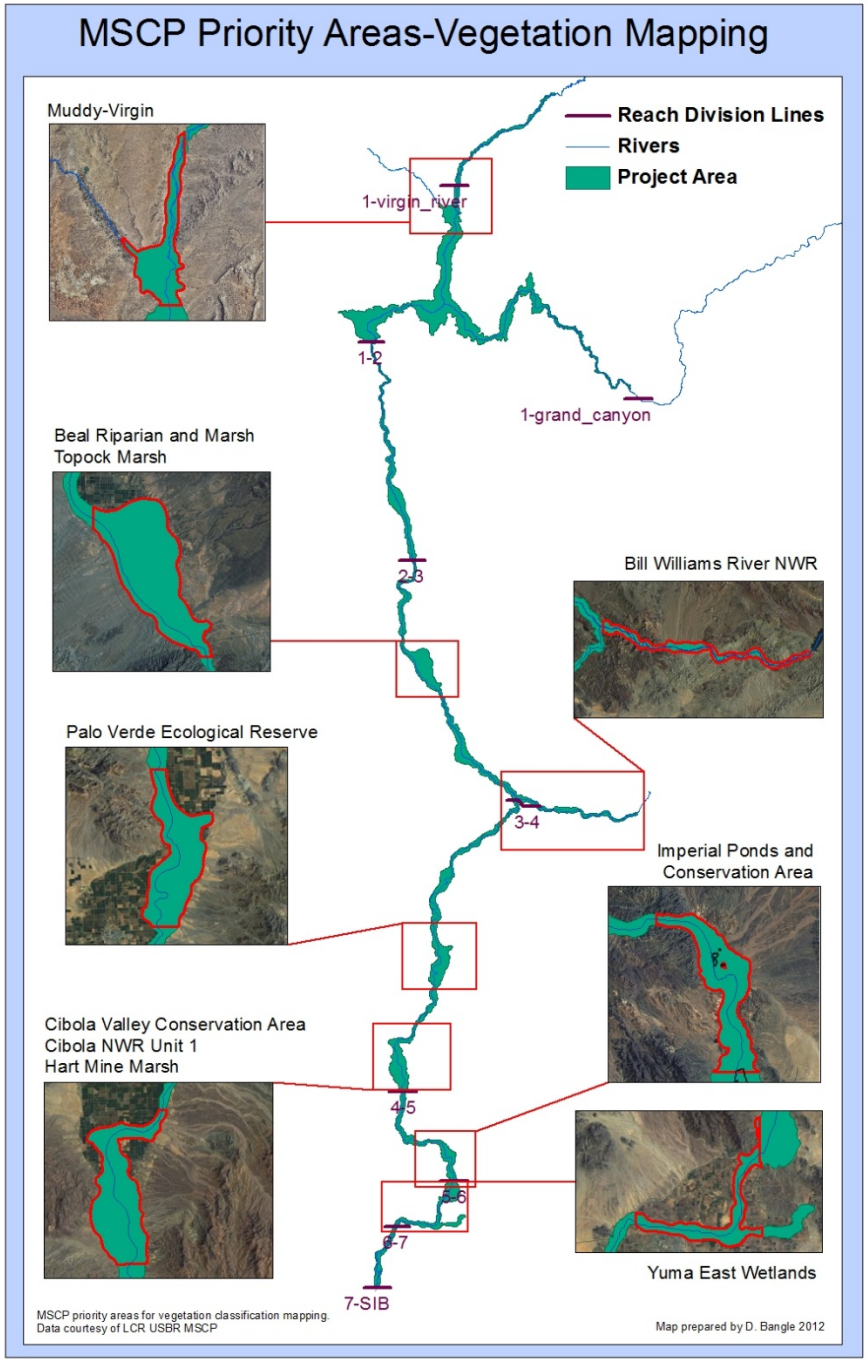
USBR (cont.)

- Combination of Ecognition classifications and on-screen digitizing.
- Ground truthing protocols.
- Deviations from NAIP
- Video flight recordings to help classify Virgin River and BWR because of flooding events occurring after 2010 imagery was acquired.
- Limitations
  - Limited budget.
  - Imagery – 2010 NAIP; 3 spectral bands.
  - Structural types difficult to assign with available imagery.
  - Difficulty differentiating between mesquite species.

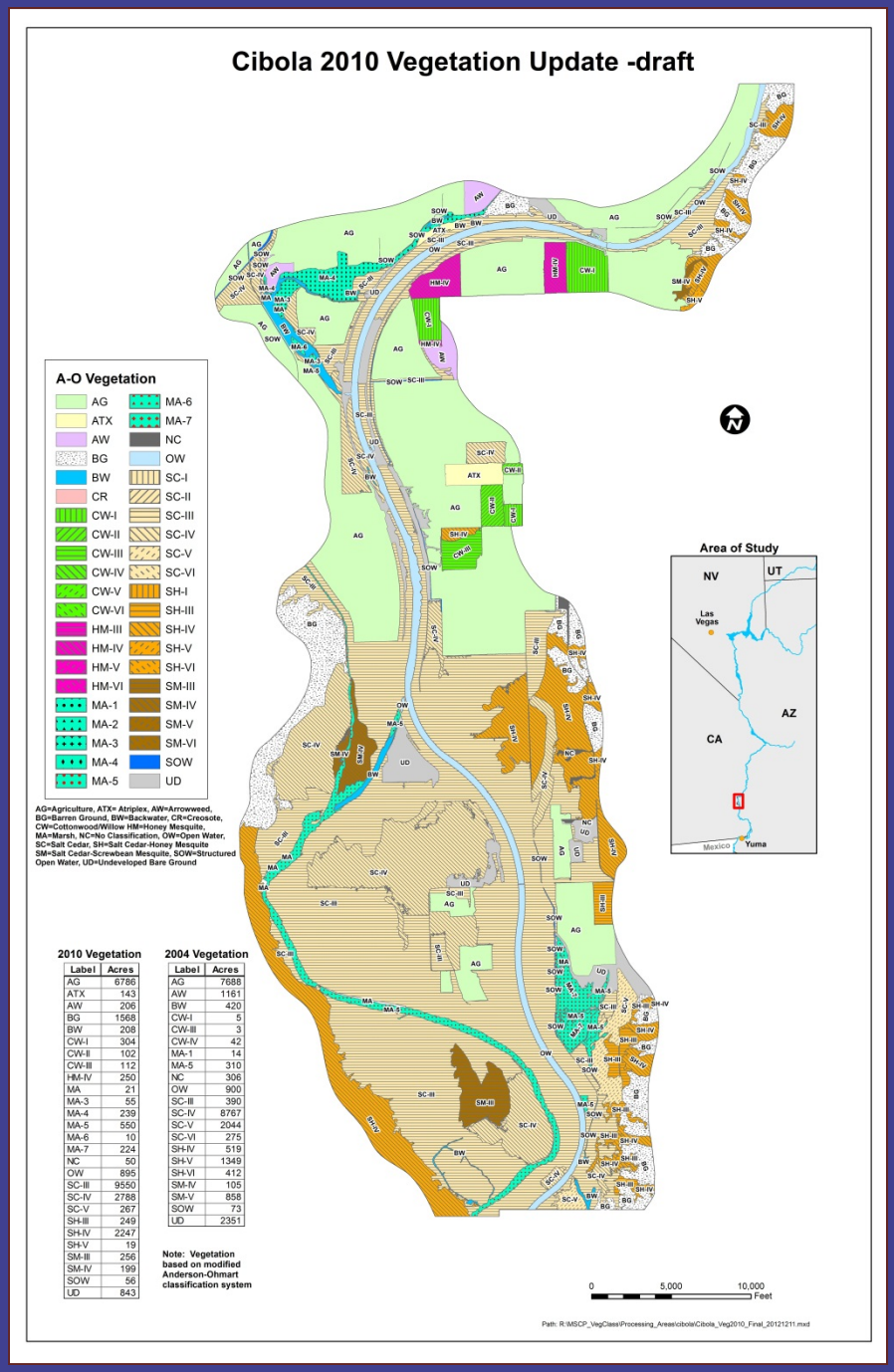
Status of the Project

Draft Maps for Priority Areas

- Muddy – Virgin Area
- Beal Riparian
- Bill Williams River
- PVER
- CVCA
- Cibola
- Imperial
- Yuma East Wetlands



Cibola Area Map



2010 Vegetation

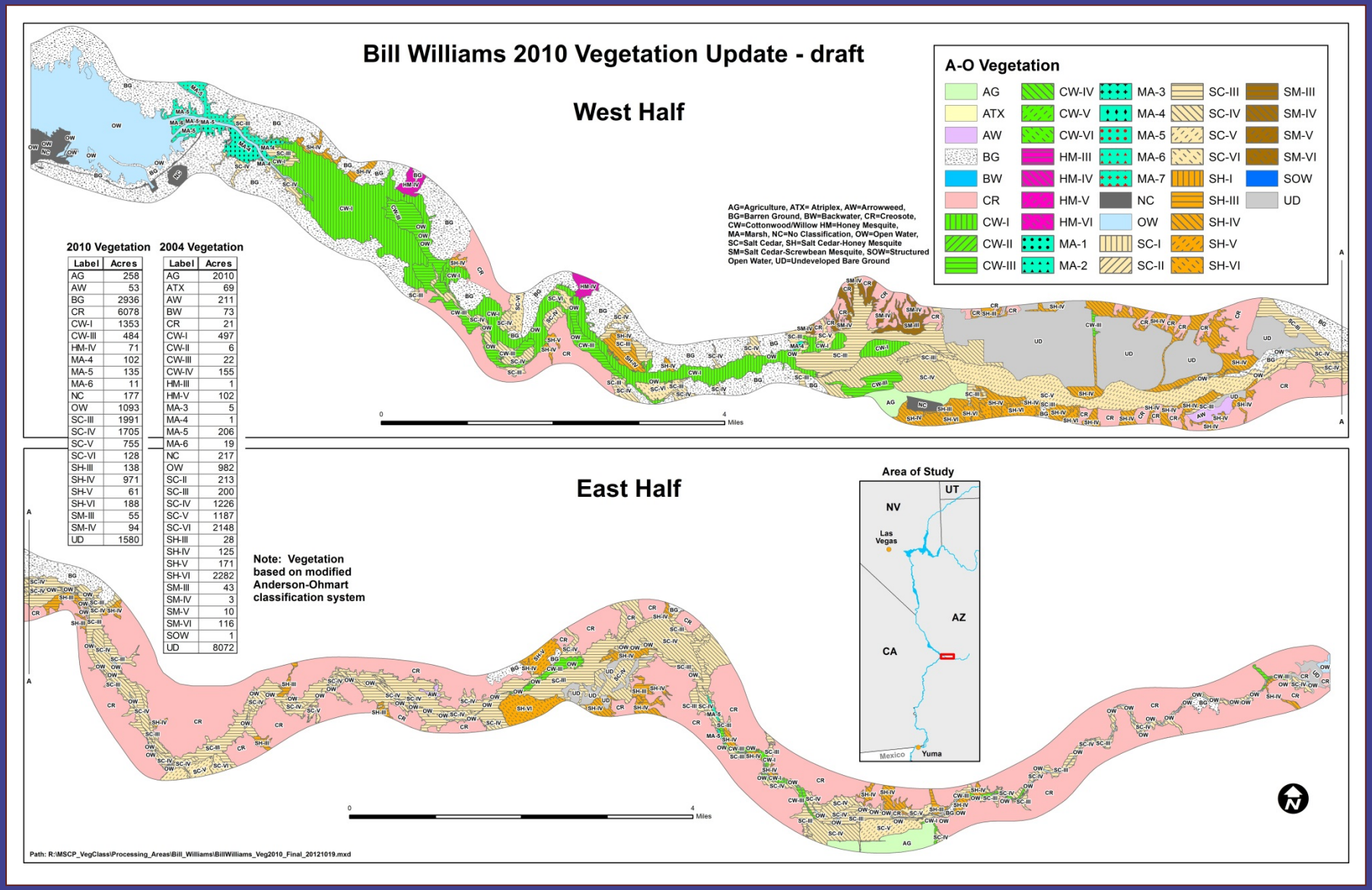
Label	Acres
AG	6786
ATX	143
AW	206
BG	1568
BW	208
CW-I	304
CW-II	102
CW-III	112
HM-IV	250
MA	21
MA-3	55
MA-4	239
MA-5	550
MA-6	10
MA-7	224
NC	50
OW	895
SC-III	9550
SC-IV	2786
SC-V	267
SH-III	249
SH-IV	2247
SH-V	19
SM-III	256
SM-IV	199
SOW	56
UD	843

2004 Vegetation

Label	Acres
AG	7688
AW	1161
BW	420
CW-I	5
CW-III	3
CW-IV	42
MA-1	14
MA-5	310
NC	306
OW	900
SC-III	390
SC-IV	8767
SC-V	2044
SC-VI	275
SH-IV	519
SH-V	1349
SH-VI	412
SM-IV	105
SM-V	858
SOW	73
UD	2351

Note: Vegetation based on modified Anderson-Ohmart classification system

Bill Williams River Map



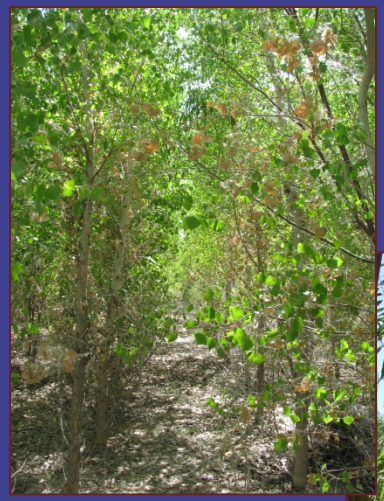
2010 Vegetation

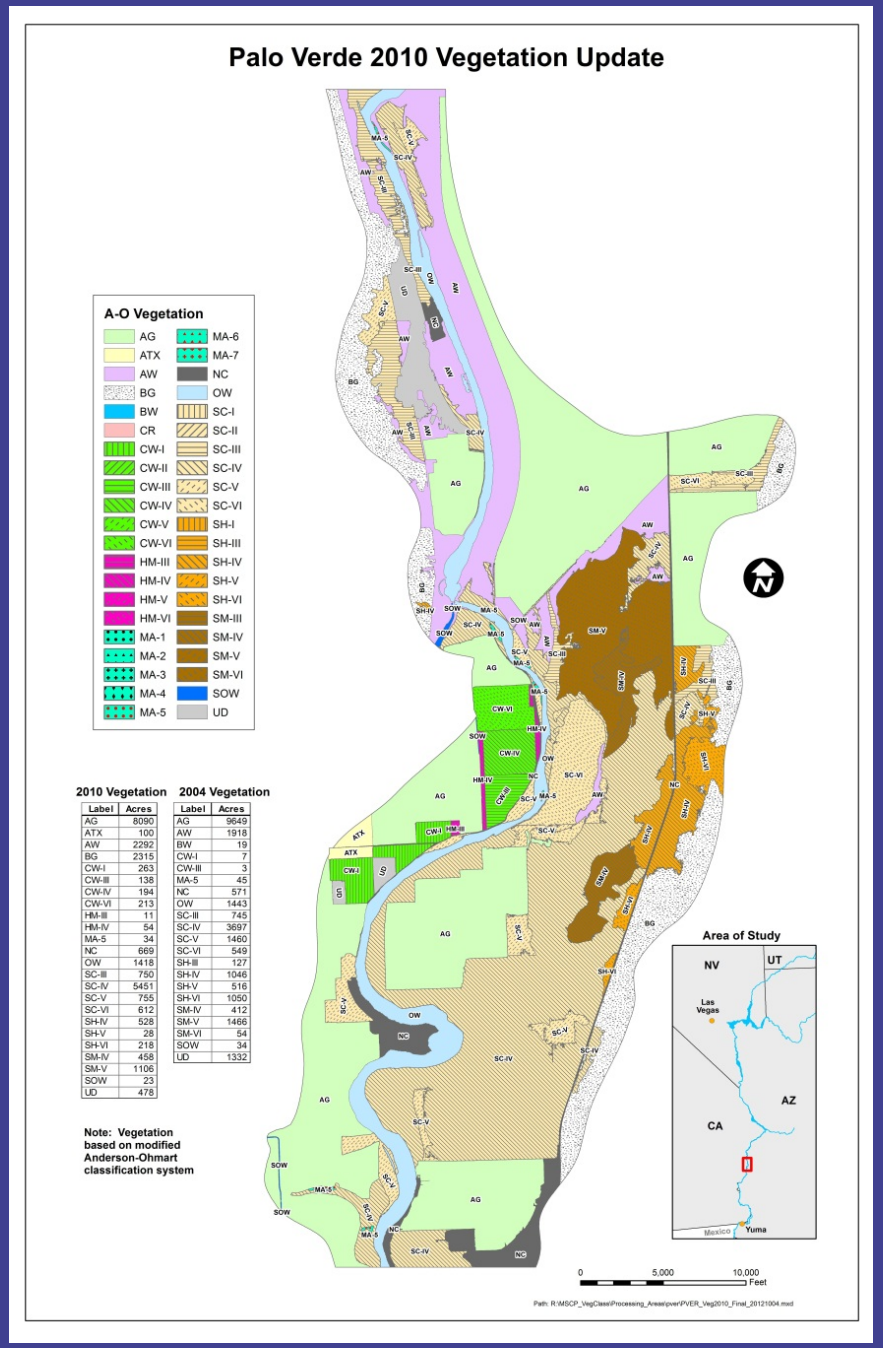
Label	Acres
AG	258
AW	53
BG	2936
CR	6078
CW-I	1353
CW-III	484
HM-IV	71
MA-4	102
MA-5	135
MA-6	11
NC	177
OW	1093
SC-III	1991
SC-IV	1705
SC-V	755
SC-VI	128
SH-III	138
SH-IV	971
SH-V	61
SH-VI	188
SM-III	55
SM-IV	94
UD	1580

2004 Vegetation

Label	Acres
AG	2010
ATX	69
AW	211
BW	73
CR	21
CW-I	497
CW-II	6
CW-III	22
CW-IV	155
HM-III	1
HM-V	102
MA-3	5
MA-4	1
MA-5	206
MA-6	19
NC	217
OW	982
SC-II	213
SC-III	200
SC-IV	1226
SC-V	1187
SC-VI	2148
SH-III	28
SH-IV	125
SH-V	171
SH-VI	2282
SM-III	43
SM-IV	3
SM-V	10
SM-VI	116
SOW	1
UD	8072

Palo Verde Area Map





2010 Vegetation

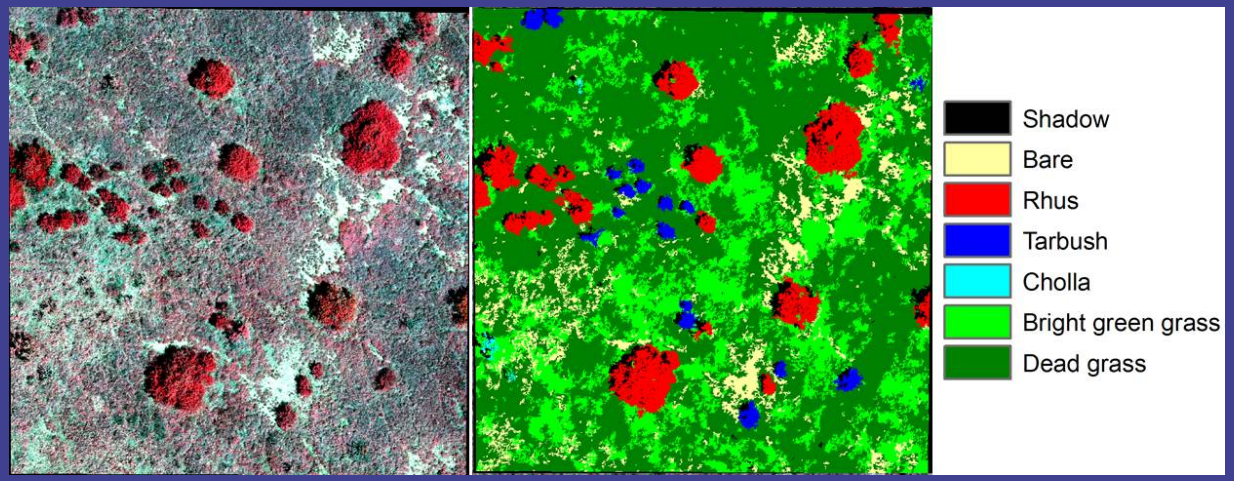
Label	Acres
AG	8090
ATX	100
AW	2292
BG	2315
CW-I	263
CW-III	138
CW-IV	194
CW-VI	213
HM-III	11
HM-IV	54
MA-5	34
NC	669
OW	1418
SC-III	750
SC-IV	5451
SC-V	755
SC-VI	612
SH-IV	528
SH-V	28
SH-VI	218
SM-IV	458
SM-V	1106
SOW	23
UD	478

2004 Vegetation

Label	Acres
AG	9649
AW	1918
BW	19
CW-I	7
CW-III	3
MA-5	45
NC	571
OW	1443
SC-III	745
SC-IV	3697
SC-V	1460
SC-VI	549
SH-III	127
SH-IV	1046
SH-V	516
SH-VI	1050
SM-IV	412
SM-V	1466
SM-VI	54
SOW	34
UD	1332

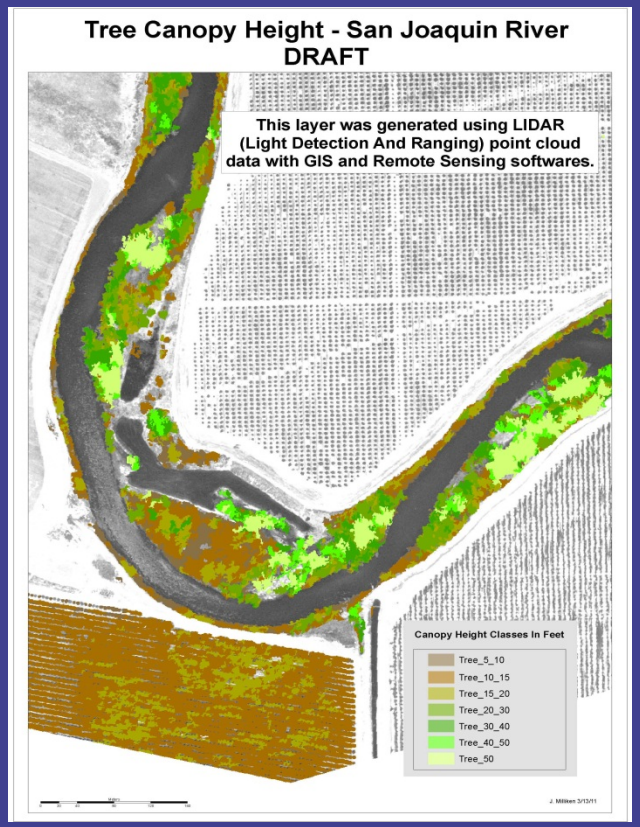
Note: Vegetation based on modified Anderson-Ohmart classification system

In future mapping efforts, we hope to include…



Multispectral Quickbird satellite – earthmetric.com

- High quality - Multispectral imagery
- LiDAR
  - Point cloud data
  - Waveform data



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