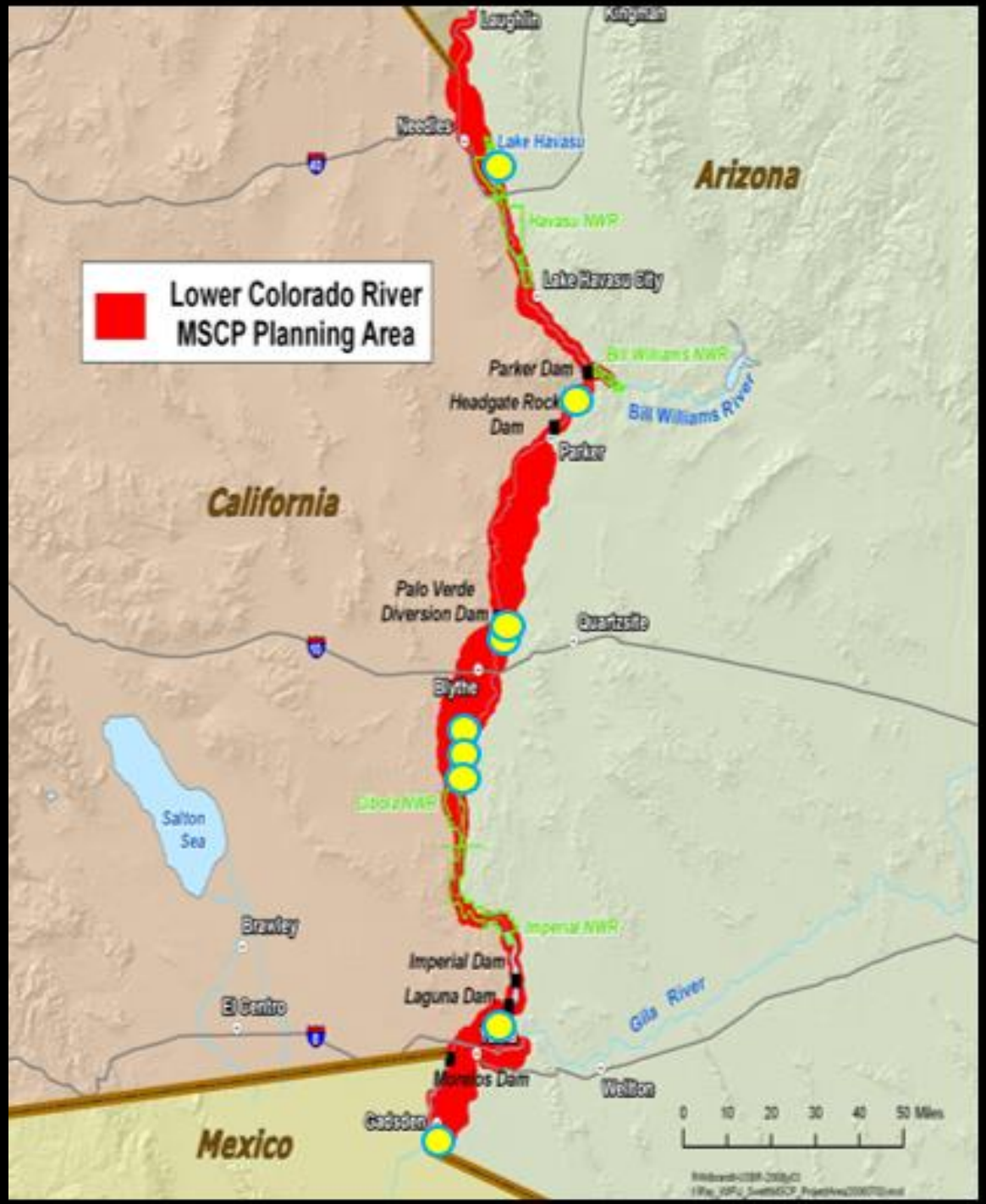
Lower Colorado River Multi-Species Conservation Program

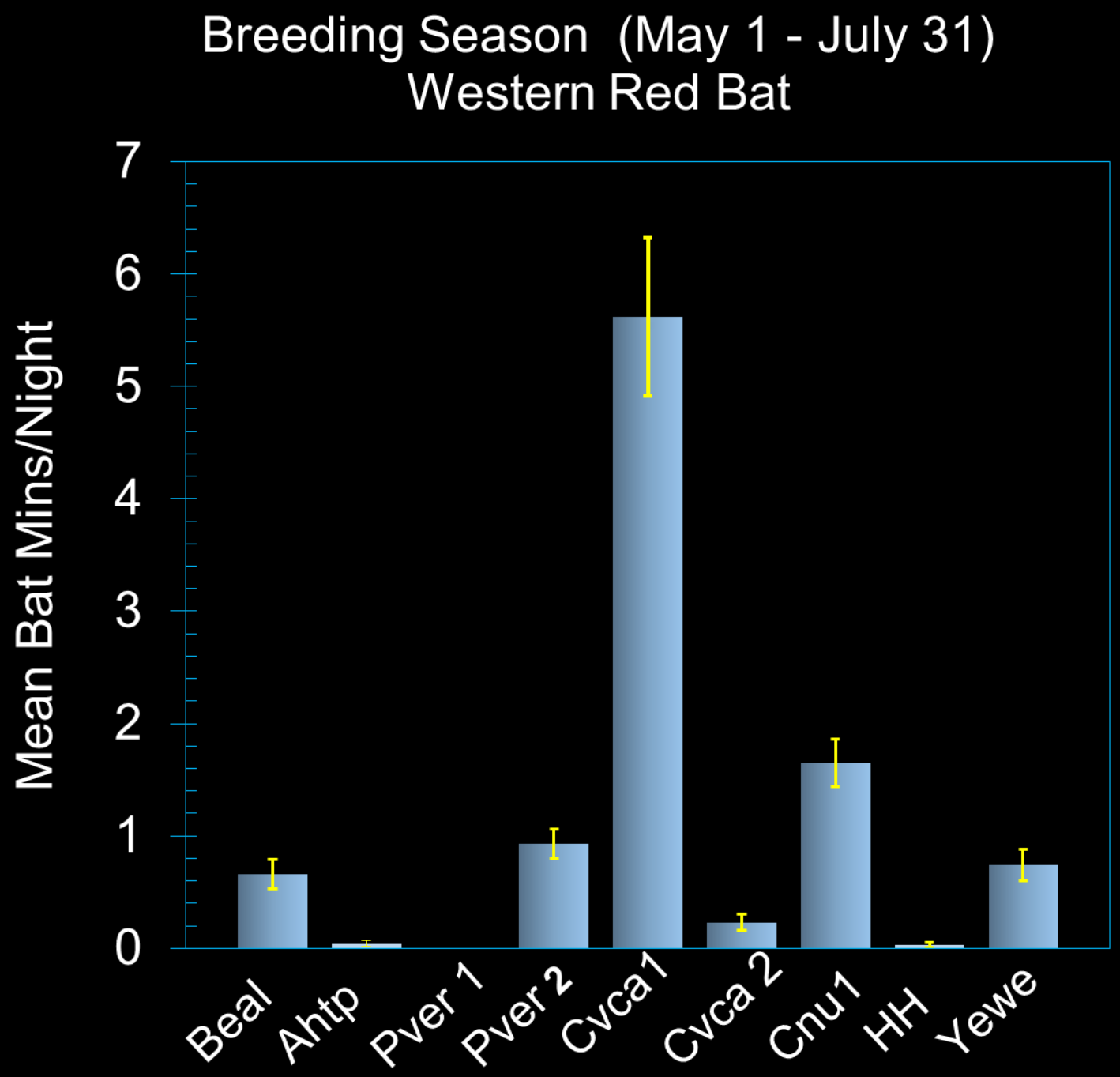
Balancing Resource Use and Conservation

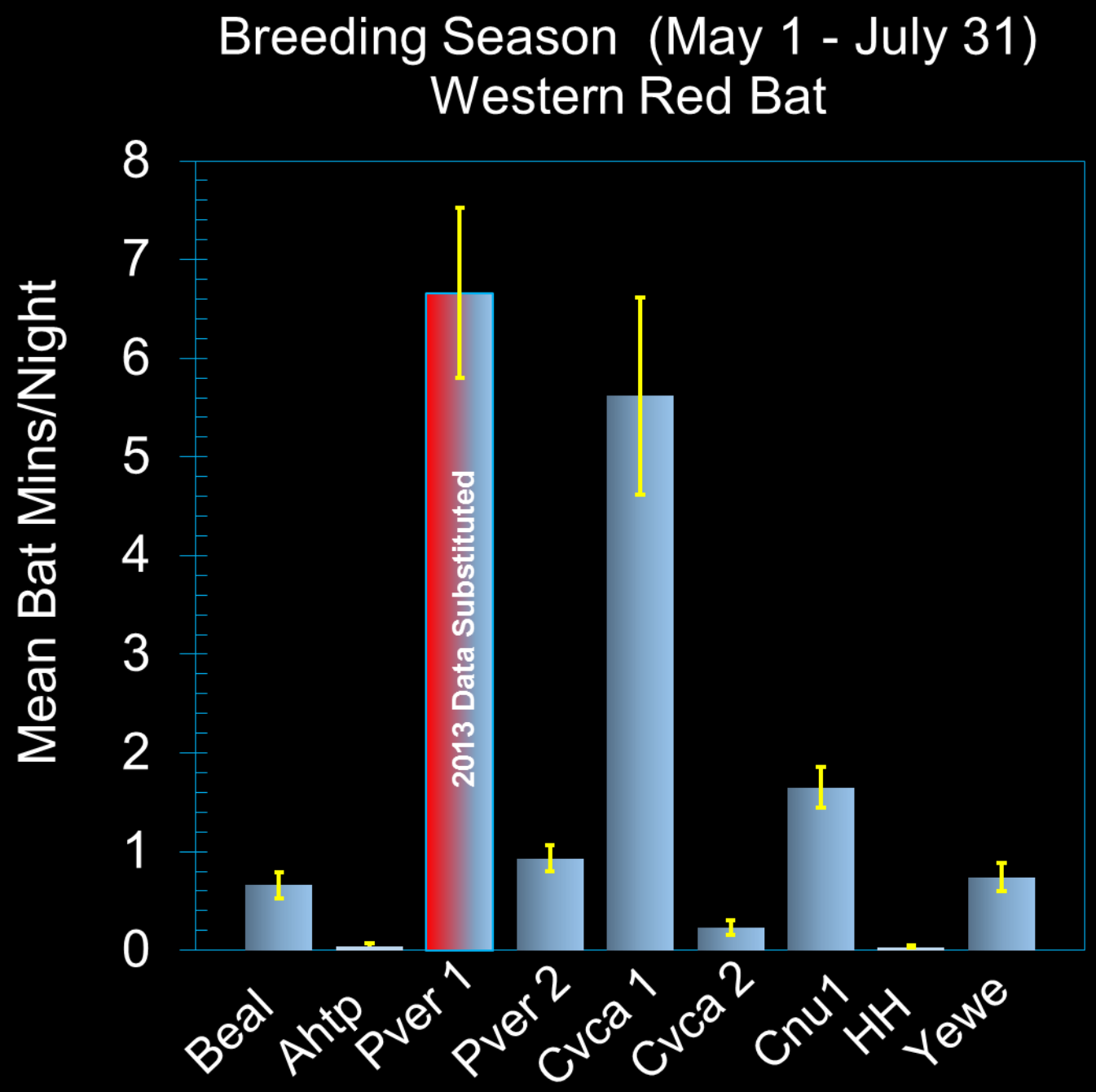
Post Development Acoustic Bat Monitoring - 2014

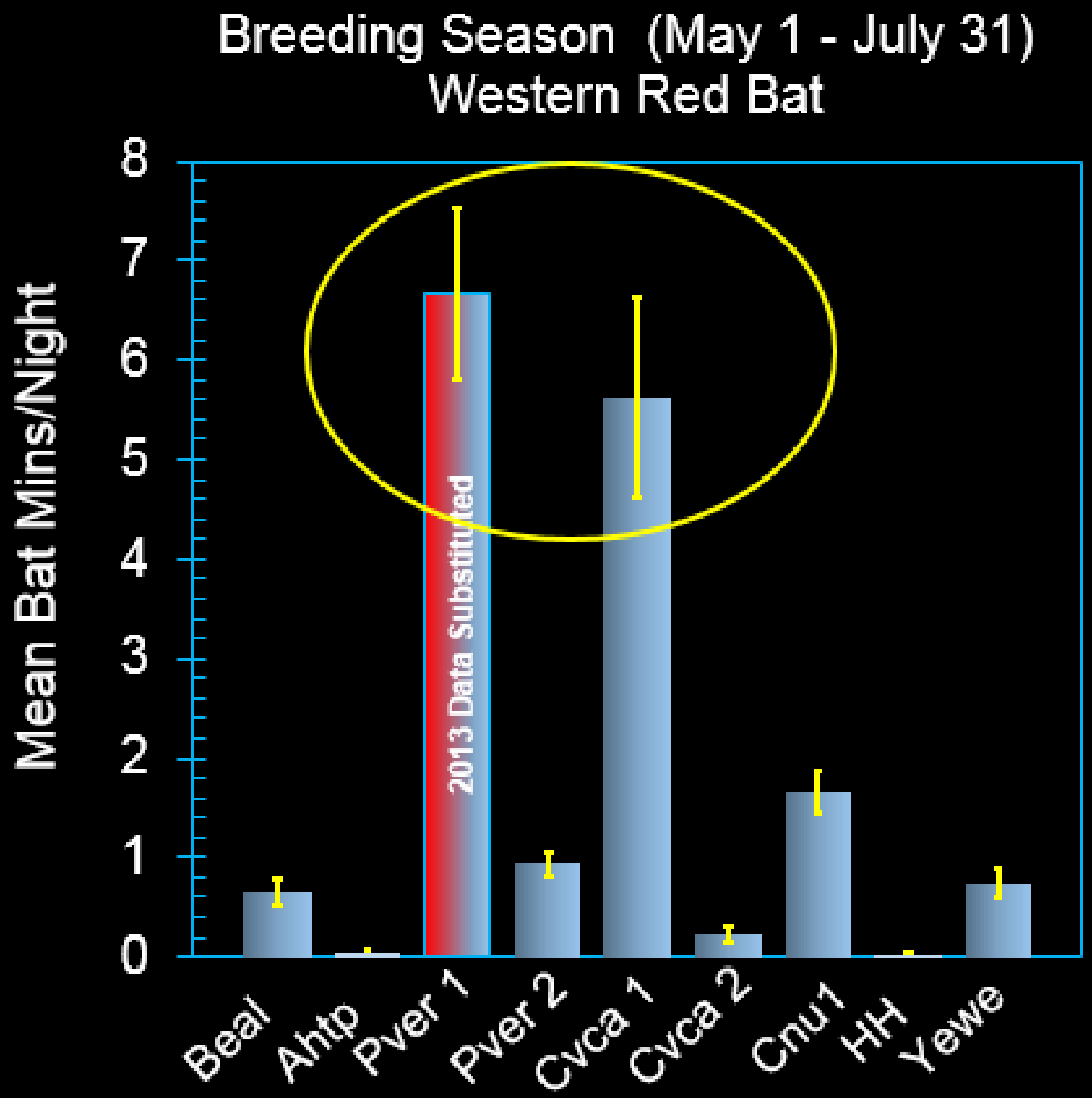
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

Goal of this presentation:
Big Picture
distilled from Anabat detectors operating year-round dusk - dawn at 9 HCA's


Lower Colorado River
MSCP Planning Area
Arizona
California
Mexico
Lake Havasu
Havasu NWR
Lake Havasu City
Bill Williams NWR
Parker Dam
Headgate Rock Dam
Bill Williams River
Parker
Palo Verde Diversion Dam
Quartzsite
Blythe
Salton Sea
Brawley
Imperial NWR
Imperial Dam
Laguna Dam
El Centro
Gila River
Morelos Dam
Welton
Cadeton
0 10 20 30 40 50 Miles


Breeding Season (May 1 - July 31)
Western Red Bat
Mean Bat Mins/Night
7
6
5
4
3
2
1
0
Beal
Ahtp
Pver 1
Pver 2
Cvca1
Cvca 2
Cnu1
HH
Yewe


Breeding Season (May 1 - July 31)
Western Red Bat
Mean Bat Mins/Night
8
7
6
5
4
3
2
1
0
2013 Data Substituted
Beal
Ahtp
Pver 1
Pver 2
Cvca 1
Cvca 2
Cnu1
HH
Yewe


Breeding Season (May 1 - July 31)
Western Red Bat
Mean Bat Mins/Night
0
1
2
3
4
5
6
7
8
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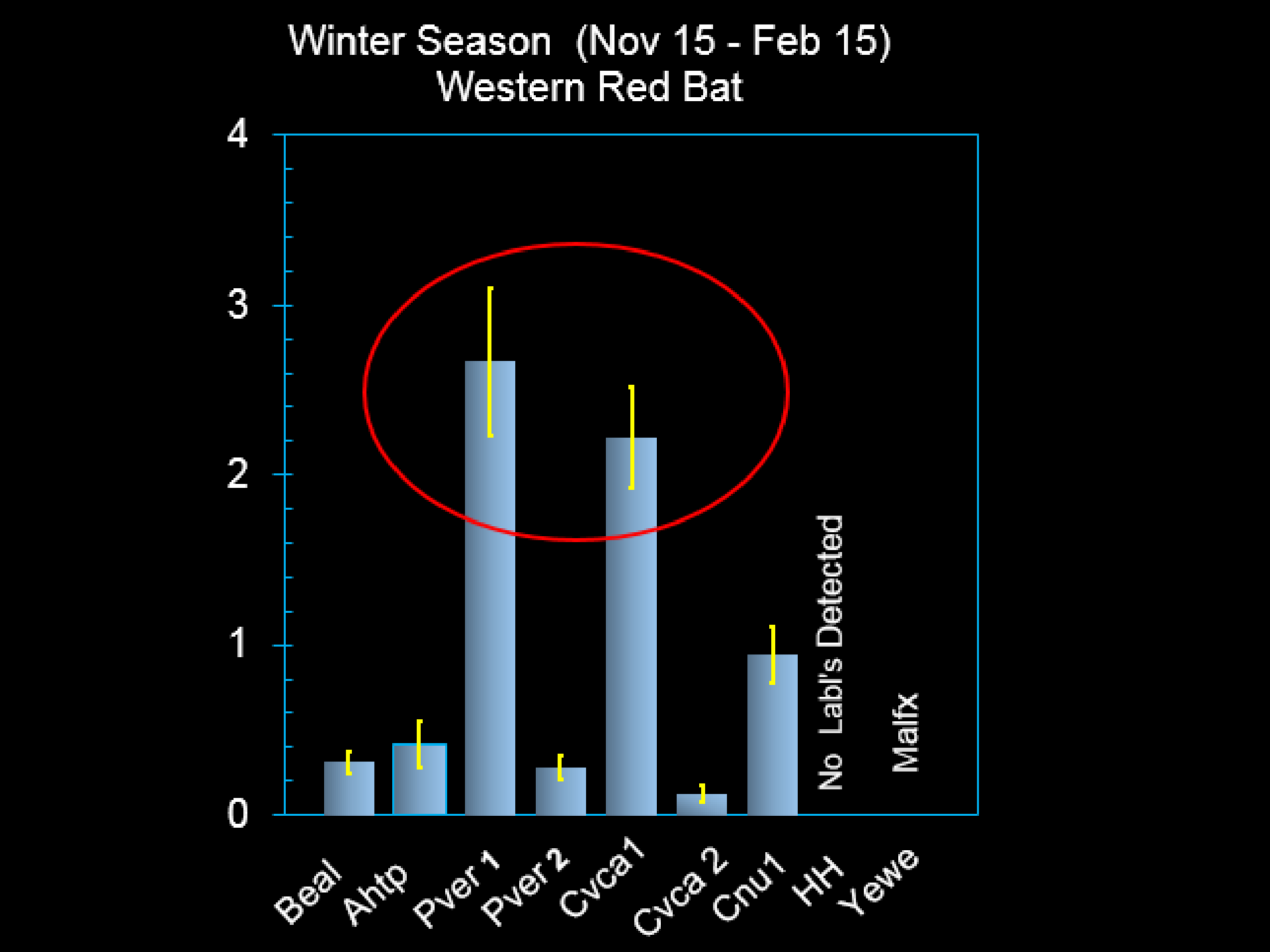
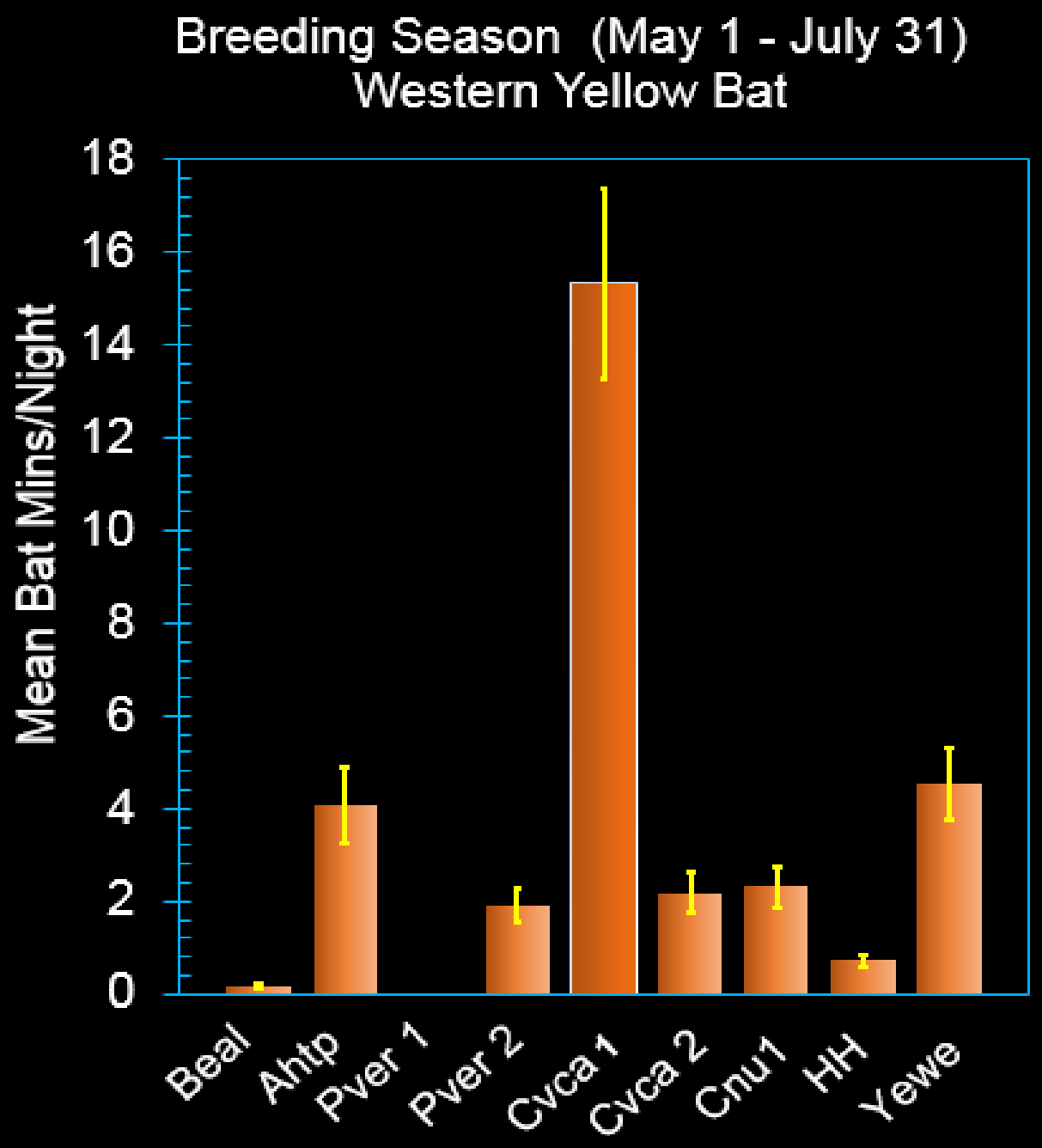
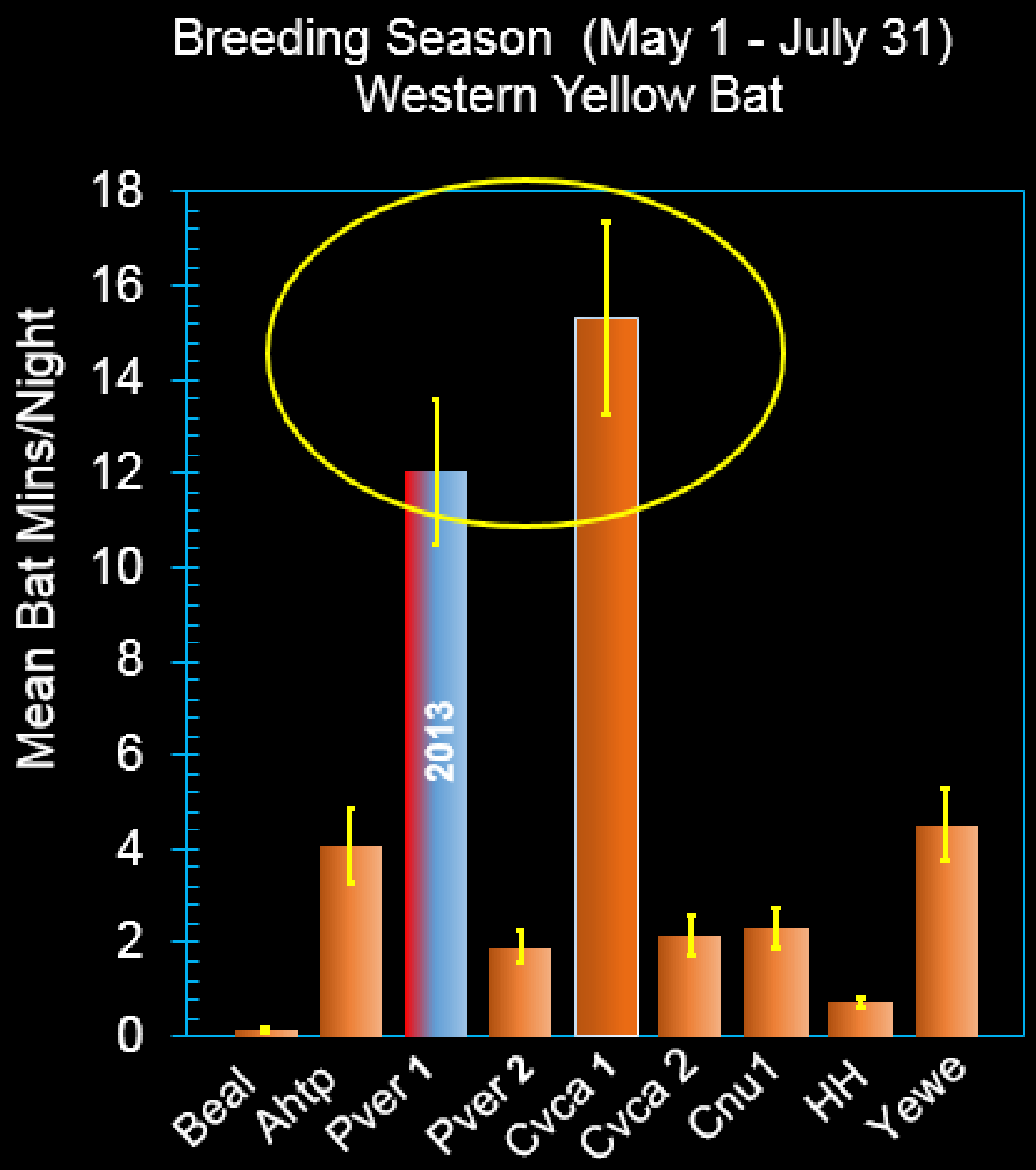

Winter Season (Nov 15 - Feb 15)
Western Red Bat
4
3
2
1
0
Beal
Ahtp
Pver 1
Pver 2
Cvca1
Cvca 2
Cnu1
HH
Yewe
No Labl's Detected
Malfx


Breeding Season (May 1 - July 31)
Western Yellow Bat
Mean Bat Mins/Night
18
16
14
12
10
8
6
4
2
0
Beal
Ahtp
Pver 1
Pver 2
Cvca 1
Cvca 2
Cnu1
HH
Yewe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2013
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Pver 2
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Cvca 2
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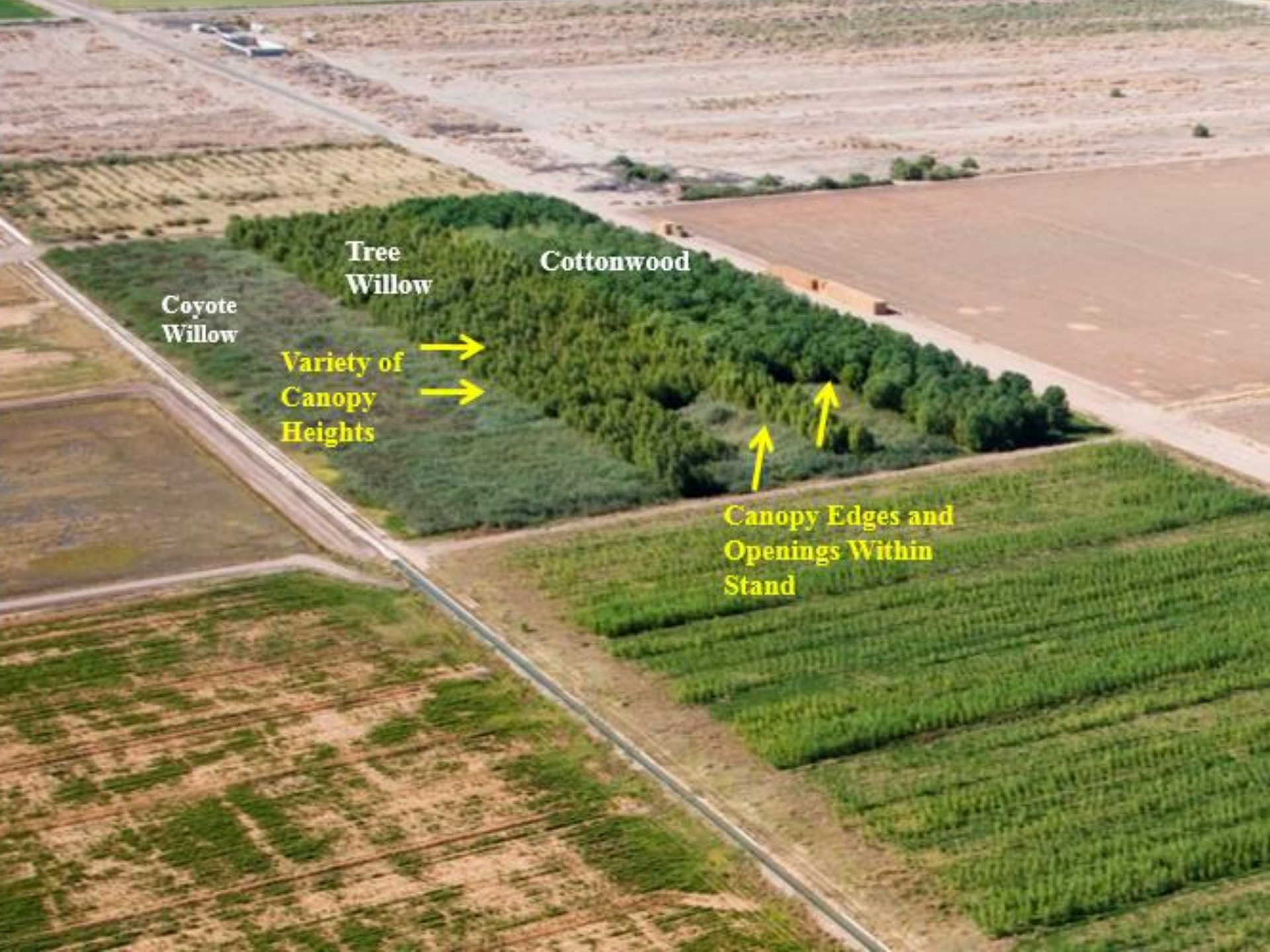
Mean Bat Minutes/Night for Yellow Bat in winter ranges from 0.00 to 0.06 throughout the HCA's – so HCA's provide a very small amount of wintering habitat.

PVER OVERVIEW

Pver 1 Bat Station in Complex Habitat

CVCA Overview

CVCA 1 Bat Station within Complex Habitat


Tree
Willow
Cottonwood
Coyote
Willow
Variety of
Canopy
Heights
Canopy Edges and
Openings Within
Stand

Characteristics of Sites with Tree Roosting Bats

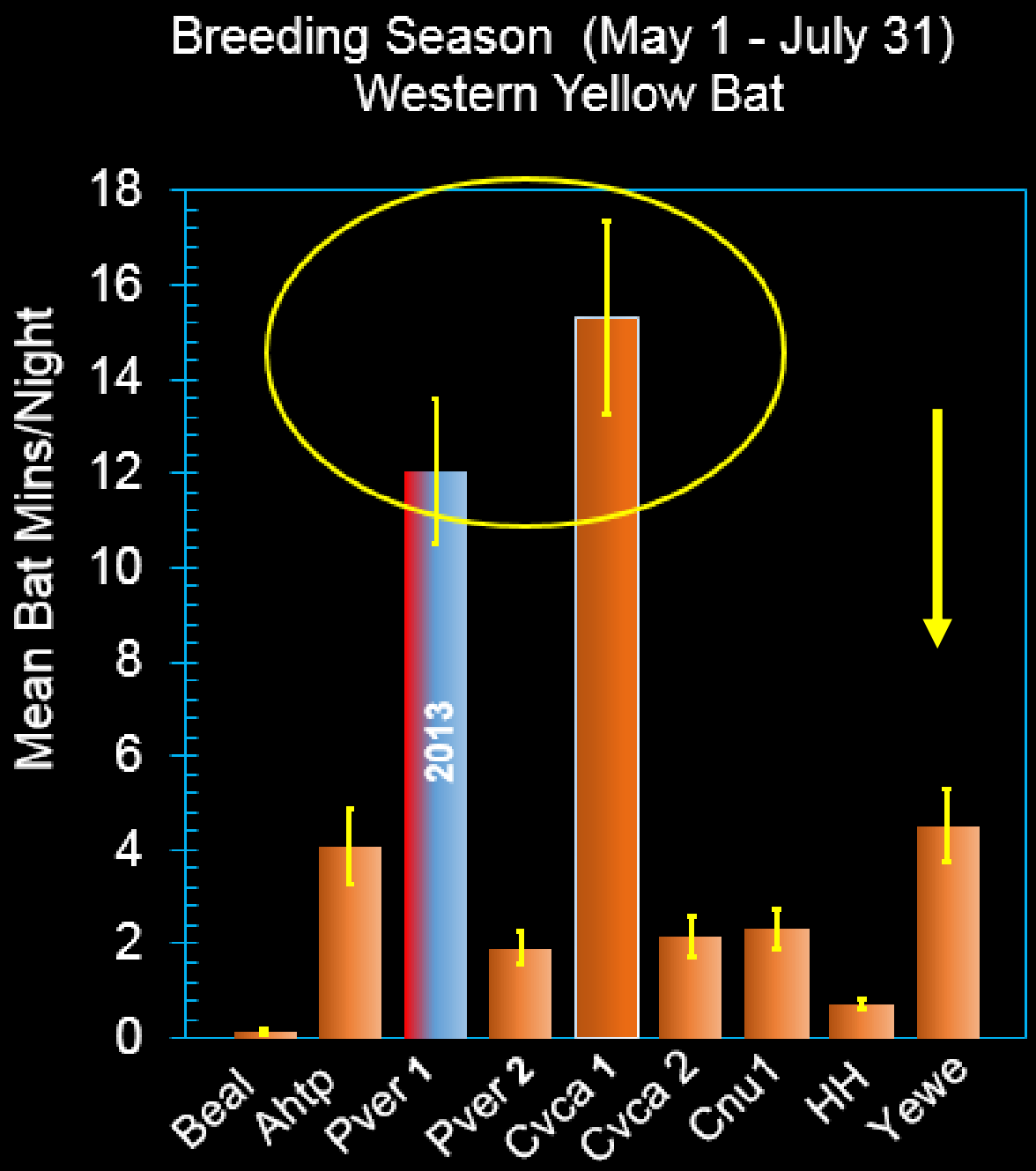
- Complex canopy with different age classes And species
- Understory dense, complex
- Openings along stand edges or interior

Contrast with Smaller HCA's, Less Habitat Complexity, Younger Stands

PVER 2
© 2015 Google
Imagery Date: 5/10/2014 lat 33.713003° lon -114.501348° elev

PVER 2
Monitoring
Station

One of the outliers is YEWE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HH
Yewe

Data Source: LCR MSCP Final Implementation Report, FY2015 Work Plan & FY 2013 Accomplishment Report. 2014.

HCA	Acres	Began Planting	Completed Planting & Future Planting	Monitoring Station Installed
BEAL	107	2003	2005 Ph 1 - 2	April 2008
AHTP	154	2001		April 2012
PVER	1,023	2006 2009 2011	2008 Ph 1 - 3 2010-2011 Ph 4-6 2013 – Ph 6-8	April 2012 (PVER 1) July 2013 (PVER 2)
CVCA	507 done 575 future	2006 2007 2015	2008 Ph 1-2 2011- Ph 3-6, 12 2019 - Ph 7 - 11	April 2011 (CVCA 1) July 2013 (CVCA 2)
CNU1	905 total 403 done 547 future	2005 2013	2007 Area 1-155ac 2009 Area 5-154 ac 2013 Area 2-94 ac 2016 Area 2-244 ac 2018 Area 3-107 ac 2017 Area 4-158 ac	July 2013

HCA	Acres	Began Planting	Completed Planting & Future Planting	Monitoring Station Installed
HUNTER'S	44	2012	2012	April 2013
YEWE	392	2010	2010	Sept 2013

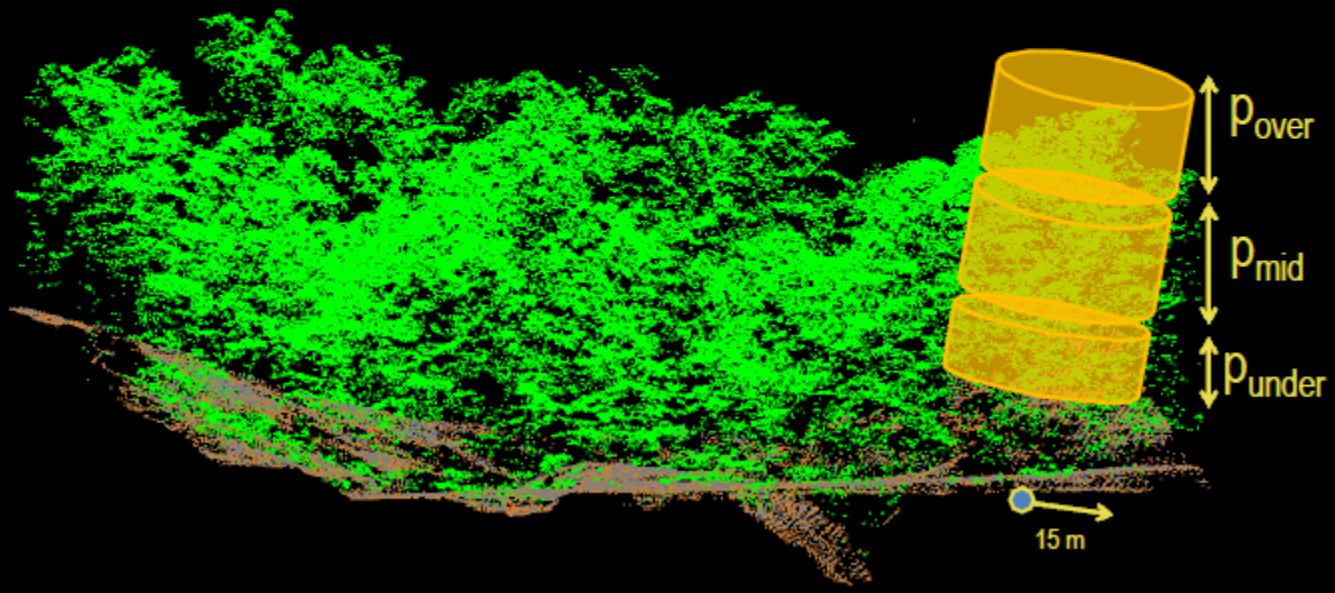
Relating acoustic bat data to Reclamation's management goals for bats

- Thresholds of bat minutes
- Visualizing complex bat habitats

Methods

LiDAR Variables

- Laser returns across over-, mid-, & understory strata[1]
- 15 m radii around survey points[1]



[1]Lesak et al. 2011. Remote Sensing of Environment 115: 2823-2835

Davies and Asner 2014. Advances in animal ecology from 3D-LiDAR ecosystem mapping

- Linked LiDAR – derived data to acoustic bat sampling. Even with 736 nights – results were complex.

- Muller et al 2013. From ground to above canopy: bat activity in mature forests driven by vegetation density and height. Forest Ecol. Manag.

- Found canopy height positively associated with increases in bat activity and occurrence

- Jung al 2012. Moving in 3 dimensions: effects of structural complexity in occurrence and activity of insectivorous bats in managed forest stands. J. Appl. Ecology.

- Found positive relationship

Questions, thoughts?