

Eight Years of Bat Capture Surveys at Riparian Restoration Areas



Allen Calvert



Goals of Bat Capture Surveys

- To augment acoustic surveys for the detection of MSCP bat species at conservation areas (some species difficult to detect with acoustic survey methods, i.e. whispering bats)
- To collect demographic information about MSCP bat species (which helps to understand how these bats are utilizing the habitat, i.e. resident vs. migrant)
- To collect additional information about other bat species utilizing conservation areas



Methods

- Each site was surveyed once per month from May-September
- Surveys started a half hour after sunset and continued for 4 hours (weather permitting)
- Three triple high mist-nets (over 8 meters high) were used at all sites
- Net length varied from 6-18 meters



Cibola NWR Unit 1
Conservation Area (CNU1):
Nature Trail and Mass
Planting



'Ahakhav Tribal
Preserve (AKTP)

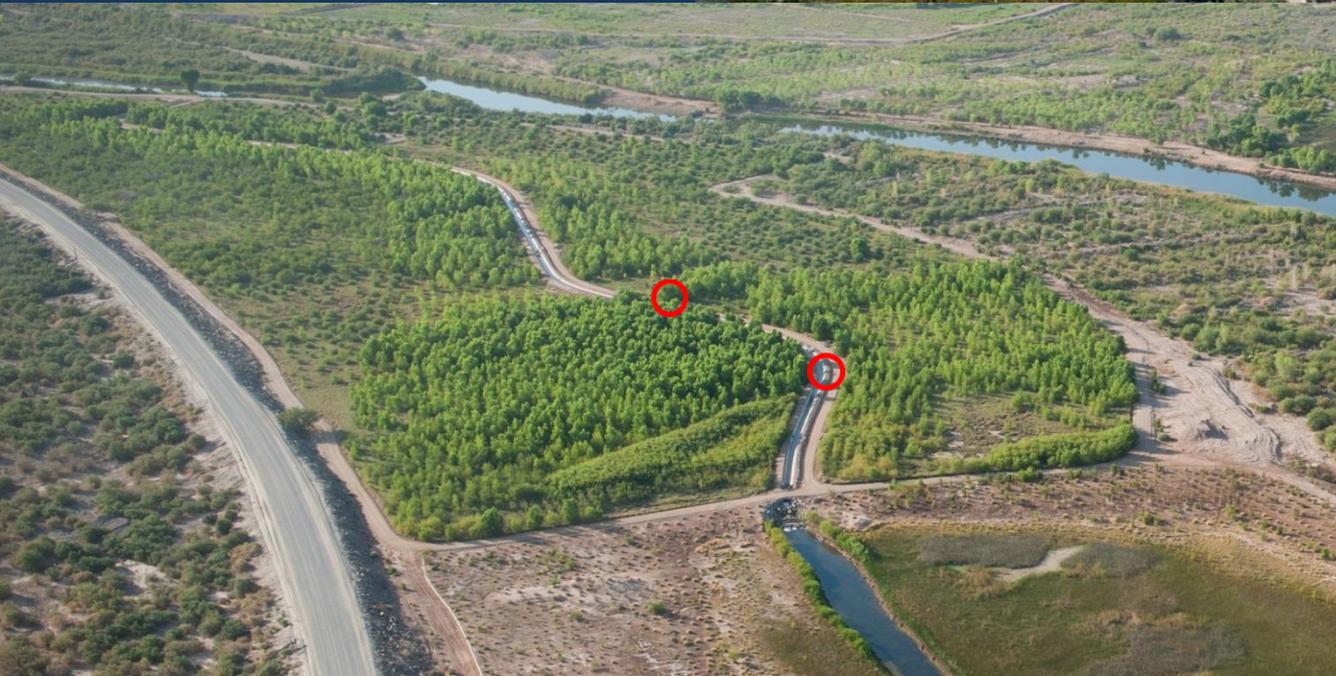


Cibola Valley Conservation Area (CVCA)



Palo Verde Ecological Reserve (PVER)

Beal Lake
Conservation Area
(BEAL)



Yuma East
Wetlands
(YEWE)

Covered and Evaluation Bat Species

Western Red Bat
(*Lasiurus blossevillii*)



Townsend's
Big-Eared Bat
(*Corynorhinus townsendii*)



California Leaf-Nosed Bat
(*Macrotus californicus*)



Western Yellow Bat
(*Lasiurus xanthinus*)



Results

Beal Lake Conservation Area (BLCA)

2014

2007-2008, 2012-2014

- 75 bats of 9 species were captured
 - Two MSCP species captured
 - One lactating female Townsend's big-eared bat was captured in June
- 202 bats of 10 species captured
 - Two MSCP species captured
 - Female Townsend's big-eared bats have been captured in 2013 and 2014.



Results

'Ahakhav Tribal Preserve (AKTP)

2014

2007-2014

- 223 bats of 9 species were captured
 - Two MSCP species captured
 - Seven CA leaf-nosed bats captured during exploratory survey in February (44% of all captures)
- 1,126 bats of 14 species captured
 - All four MSCP species captured (1st red bat on LCR)
 - Western yellow bat and CA leaf-nosed bat captured every year



Results

Palo Verde Ecological Reserve (PVER)

2014

2010-2014

- 159 bats of 12 species were captured
- Three MSCP species captured
- Four of the six CA leaf-nosed bats were captured during exploratory survey in February
- 797 bats of 12 species captured
- Three MSCP species captured every year 2011-2014
- Western mastiff bat captured in two different years



Results

Cibola Valley Conservation Area (CVCA)

2014

2009-2014

- 172 bats of 11 species were captured
- Three MSCP species captured
- One of the eight total red bats were captured during an exploratory survey in February
- 1056 bats of 13 species captured
- Red bats captured every year including two captured during a winter survey in 2010
- Yellow bats captured every year



Results

Cibola NWR Unit 1 Conservation Area (CNU1)

2014

2007-2014

- 68 bats of 10 species were captured
- Two MSCP species captured
- Yellow bats were likely migrants/transients
- 603 bats of 11 species captured
- Three MSCP species captured
- CA leaf-nosed bats captured every year except 2013



Results

Yuma East Wetlands (YEWE)

2014

2012-2014

- 83 bats of 6 species were captured
- Two MSCP species captured
- 83% of captures were big brown bats
- 223 bats of 10 species captured
- Three MSCP species captured
- Yellow bats captured every year



Summary of all sites

2014

2007-2014

- 778 bats of 15 species were captured
 - CVCA is red bat hot spot
 - Yellow bats captured at all sites except Beal
 - CA leaf-nosed bats captured at all sites
 - A single Townsend's captured at Beal
- 4007 bats of 15 species captured
 - Red bats captured every year including two captured during a winter survey in 2010
 - Yellow bats captured every year



So what does it all mean?

- Species diversity measures allow us to compare species richness and abundance between years and between sites
- Understanding species diversity allows us to better understand how the whole bat community is responding to these habitat conservation areas

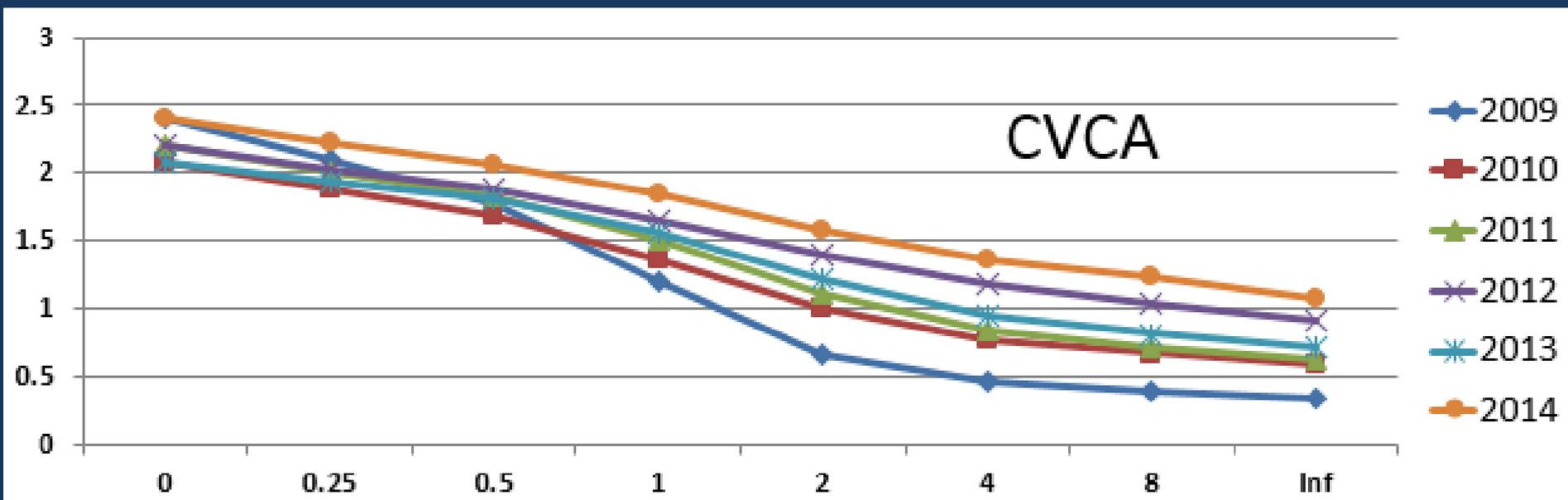
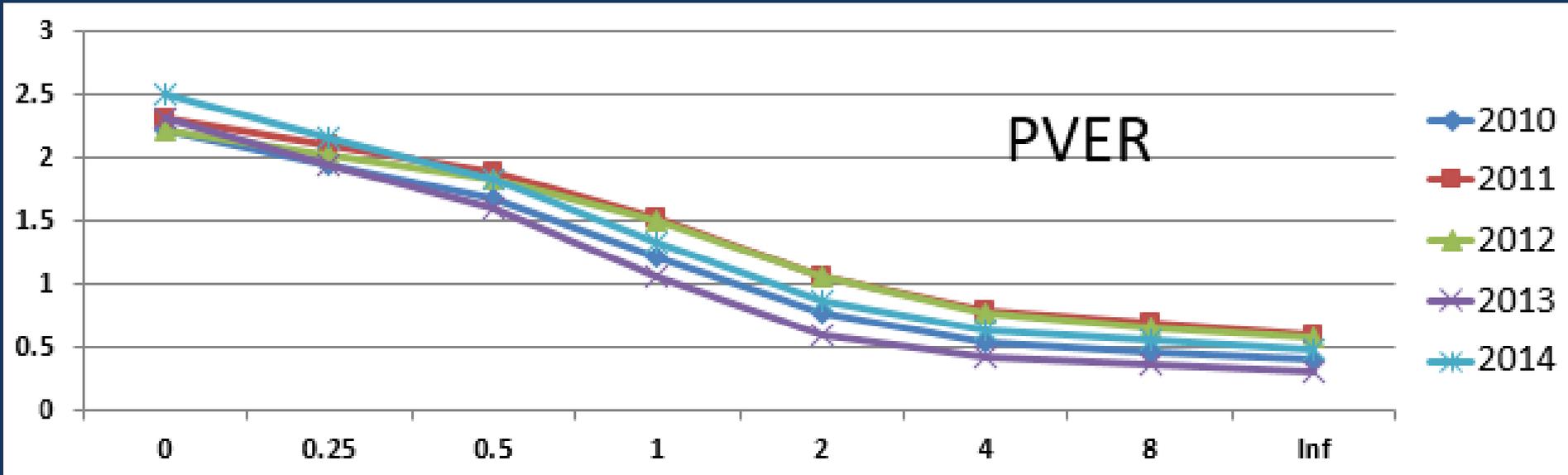


Species Diversity

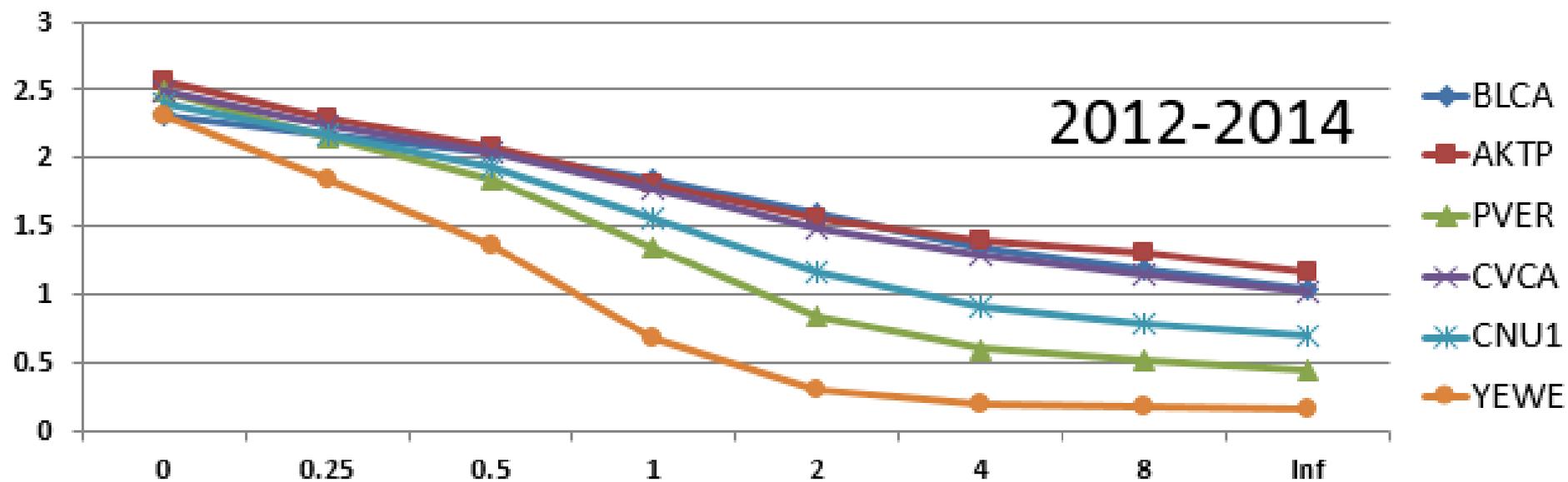
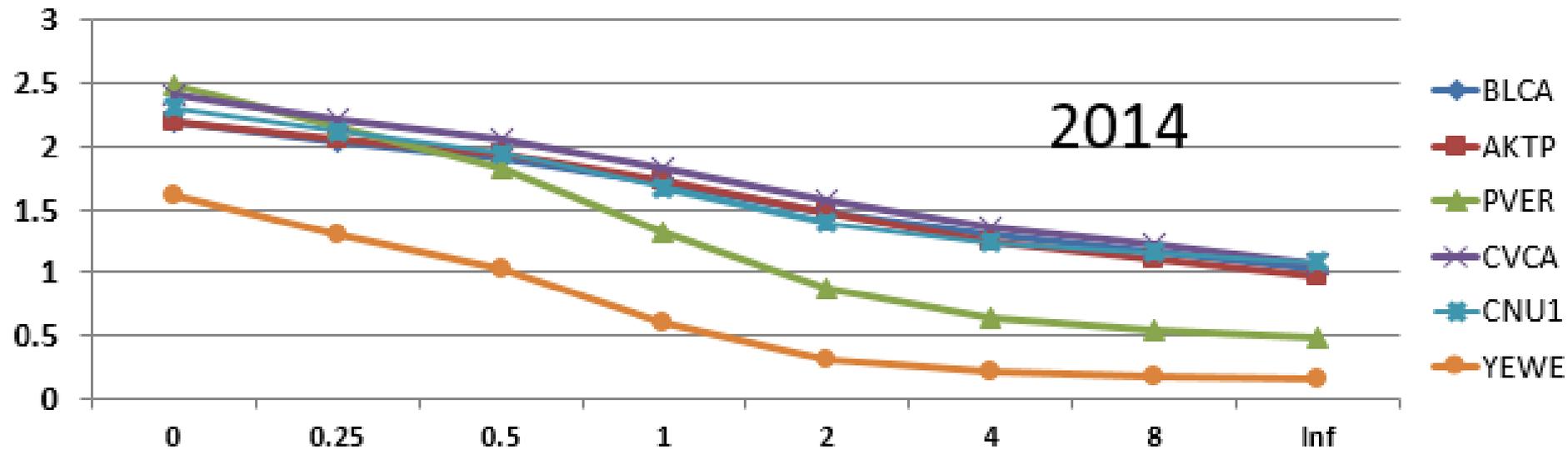
- Because all species diversity indices are biased, Renyi diversity profiles are used to compare sites and years using multiple indices at once
- The more horizontal the profile, the more evenly species are distributed
- Main indices that the Renyi profile uses are: richness, Shannon, Simpson, and dominance
- Program R (using Rcmdr) with the BiodiversityR GUI was used to create Renyi profiles



Renyi Profiles Between Years



Renyi Profiles Between Sites



Species Diversity Discussion

- Species richness can be similar across sites
- Species evenness can be quite different between sites
- Species diversity does not appear to be related to MSCP species presence



Overall Discussion

- While confirming presence of MSCP species is the primary objective, understanding how the entire bat community responds to habitat restoration is also important
- Looking at multiple years of data also portrays a better “picture” of what is going on at a site.



What's next?

- The same six sites will be surveyed in 2015
- California leaf-nosed bat and Townsend's big-eared bat foraging study (Stay for Pat's talk)
- Want to see some bats? You're invited!



Questions?



acalvert@usbr.gov