Lower Colorado River Multi-Species Conservation Program

Post Development Bat Monitoring

2008 Results
Goals

- Distribution & habitat use
- Changes in bat activity as habitats mature
- Management guidelines
- Adaptive management
MONITORING AREAS

Beal Riparian and Marsh Restoration Area

Ahakhav Preserve

Palo Verde Ecological Reserve

Cibola Valley Conservation Area

Cibola National Wildlife Refuge Unit #1

Imperial Ponds Conservation Area

Pratt Restoration Area
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Acoustic Monitoring

Echolocation calls recorded onto CFCs

9 or more units deployed simultaneously – insures variation in conditions affecting activity consistent among sampling sites

Anabat SD1 Bat Detector

Because individual bats cannot be identified index of bat activity used to determine use
Study Design

• 5 Habitat Types in 7 Habitat Restoration Areas
Study Design

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- CVCA/CNWR#1 and Imperial Ponds/Pratt combined to provide adequate sample
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• CVCA/CNWR#1 and Imperial Ponds/Pratt combined to provide adequate sample
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• 3 bat detectors are deployed in each habitat type so that at least 9 detectors are being deployed on any given night
Study Design

• 5 Habitat Types in 7 Habitat Restoration Areas
• CVCA/CNWR#1 and Imperial Ponds/Pratt combined to provide adequate sample
• At least 3 of the 5 habitat types are monitored per study area
• 3 bat detectors are deployed in each habitat type so that at least 9 detectors are being deployed on any given night
• Surveys conducted for 2 days every quarter at each study area - all 4 seasons are sampled each year
Habitat Types:
“Intermediate” cottonwood-willow plantings - average DBH > than 8 cm

- ‘Ahakhav
- CVCA
- Cibola NWR
- Imperial
- Pratt
Habitat Types:
“Sapling” cottonwood-willow plantings - average DBH < than 8 cm

- Beal
- ‘Ahakhav
- PVER
- CVCA
Habitat Types:
Mesquite plantings - average canopy height ≥3 m

- Beal
- ‘Ahakhav
- Cibola NWR
Habitat Types:
Monotypic *Tamarix* spp. stands

- Beal
- PVER
- Imperial
- Pratt
Habitat Types:
Agricultural Fields

- PVER
- CVCA
- Cibola NWR
- Imperial
- Pratt
Bat Minutes & the Index of Relative Bat Activity

# of bat calls converted to bat minutes.

The highest rating a bat species can have is 60 in an hour indicating that the species (but not necessarily the same individual) is recorded continuously during the hour.

A call minute indicates that a given species is present if it is recorded within that minute.

Index of Relative Bat Activity eliminates bias of overestimating bat relative abundance if multiple files of the same individual recorded in a short time period – or underestimating bat abundance when multiple individuals are recorded within a single file.
Western Red Bat

# Bat Minutes

Beal Riparian and Marsh Restoration Area
Palo Verde Ecological Reserve
Cibola Valley Conservation Area
Cibola National Wildlife Refuge Unit #1
Pratt Restoration Area
Imperial Ponds Conservation Area

Western Red Bat

- BEAL
- CRIT
- PVER
- CVCA/CNWR#1
- INWR/PRATT

Legend:
- YCW
- MCW
- MESQ
- SC
- AG
- POND
MONITORING AREAS

Beal Riparian and Marsh Restoration Area
Palo Verde Ecological Reserve
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Western Yellow Bat

# Bat Minutes

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<th>YCW</th>
<th>MCW</th>
<th>MESQ</th>
<th>SC</th>
<th>AG</th>
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<th>RIVER</th>
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Pale Townsend's Big-Eared Bat

# Bat Minutes

- BEAL
- CRIT
- PVER
- CVCA/CNWR#1
- INWR/PRATT

Legend:
- YCW
- MCW
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MONITORING AREAS

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California Leaf-nosed Bat

# Bat Minutes

Beal | CRIT | PVER | CVCA/CNWR#1 | INWR/PRAIT

YCW | MCW | MESQ | SC | AG | POND | RIVER
Beal Permanent Anabat Station

- 12-volt battery recharged by solar panel
- 1-GB flash card lasts over a month before downloading
Benefits of a Permanent Station

- Variation at multiple scales:
  Nightly, seasonally (migration), and annually
- Rare species - higher likelihood of detection

Total # Bat Minutes - April-September, 2008
Western Yellow Bat

![Western Yellow Bat](image)

**Bat Minutes**

- April
- May
- June
- July
- Aug
- Sept
Pale Townsend’s Big-eared Bat
California Leaf-nosed Bat
Bat Capture Surveys

Complements Acoustic Surveys

Provides Data on Sex, Age & Reproductive Condition
Acoustic voucher calls
Observational habitat use
• 5 sites surveyed
• 22 nights
• 8 species captured
• 2 MSCP covered species
Mist-nets and harp traps placed in corridors or flyways in a habitat creation site – usually near water
Data Collected

- Sex
- Age
- Reproductive Status
- Forearm Length
- Tragus Length
- Weight
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<th>‘Ahakhav N=5</th>
<th>Unit 1 N=5</th>
<th>Pratt N=5</th>
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### Bat Capture Surveys

#### Results from all sites for 2008

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2009 Directions

Increased netting to 5 months – May – Sept
Add 2\textsuperscript{nd} Triple High Net
Dropping Beal, adding CVCA
Detector placement to avoid insect noise

Sonobat technology may improve call I.D.

Add permanent bat station at CRIT