Le Conte’s Thrashers
Guiding conservation in the Carrizo Plains

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Point Blue conservation Science
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Overview

• About Point Blue
• About LCTH – why it matters?
• Project History – understanding LCTH needs
  • What we did and how we did it
• Results
• Conservation management implications
• Next steps
Point Blue Conservation Science

Reducing the impacts of habitat loss, climate change, and other environmental threats while promoting nature-based solutions for wildlife and people.

- Founded in 1965 as Point Reyes Bird Observatory
- 150 seasonal and full time staff
- Advancing conservation through science, partnerships, outreach
- Work throughout the US, Latin America, Antarctica
- Promote climate-smart conservation

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About the LeConte’s Thrasher
Distribution: *Toxostoma lecontei*

Uncommon resident of the southwestern deserts

2-3 subspecies

- *T.l. lecontei*
- *T.l. arenicola*
- *T.l. macmillanorum*

From The Birds of North America Online
State of the Birds Report

• Le Conte’s Thrasher is an indicator species of aridlands in the western US
• It is the fastest declining species among 17 aridland obligate indicators

Why:
• Habitat loss & fragmentation
• Energy development
• Long-term habitat degradation (e.g. non-native plants)
• Climate change

See Our Approach for description of bird population indicators.
Projections into the future (http://data.prbo.org/apps/svj/)

- The Carrizo Plain may be a climate refuge
- LCTH is projected to persist in the Carrizo Plain
Conservation Challenges in CA

Identified as a Bird Species of Special Concern (CDFW):

• Habitat loss and degradation

• Low population density (i.e. high sensitivity to disturbance)

• Habitat needs poorly understood (little research done)
Distribution: *Toxostoma lecontei*

- *T.l. macmillanorum*

The Monument is one of the largest intact parcels of habitat in the current range.
Le Conte’s Habitat Needs
what we know

Prefers desert flats with saltbush (Atriplex spp) or cholla cactus (Opuntia spp.)

Low topo relief, open habitat and mid-height shrubs for nesting

Feeds on arthropods on open ground, under leaf litter and shrubs
Project history and overview
Project History

• Funded in 2010 via NLCS grant.
  • First monitoring design, habitat model
• Monitoring methods refined in 2011
• Final area search plots established in 2012
• Surveys continued in 2013
• Small grant to improve models in 2014
• Monitoring for 2015 funded by MidAmerican Solar and the Bureau of Land Management
On-line app
http://data.prbo.org/apps/cplcth/
Project’s current objectives

- Understand LCTH habitat needs and guide management
- Understand LCTH density distribution in the landscape
- Identify priority areas for conservation of LCTH populations in the Central Valley
- Provide density targets in the Carrizo Plain
Study Area – Survey Plots
Plot Selection

Plots established based on the habitat model, vegetation maps, and historic sightings

Plots are $250\text{m}^2$ – approx. size of a LCTH territory

117 plots established

Each plot sampled 1 to 3 times per year
Vegetation Relevés

- Focused on dominant plant types thought to be important for thrashers
  - Saltbush types
  - Other shrubs
- Height and cover
- Ground cover (grass, open ground)
- Slope and aspect
Leo’s disclaimer

Never been to the Carrizo Plain
Never seen a LCTH
But there is a reason….

…how do you say “go to hell!” in Venezuela?
Imperfect-detection model
Why and how

• Rare/difficult to find species = surveys with low counts (many 0’s too). What is the true density?

• Repeated counts example

Visit 1: 0 birds  
Visit 2: 2 birds  
Visit 3: 0 birds  

At least 2 birds, but surely more
Imperfect-detection model
Why and how

• Probability of detecting each bird each visit $<< 1$
• Estimates must correct for imperfect detection
• Imperfect detection models use repeated count data, site-specific covariates

![Graph showing frequency of detection counts, with a histogram and a smoothed curve indicating corrected values.](chart.png)
From density estimates to landscape model

• Landscape-level factors affect distribution and abundance in the landscape
• Use geospatial covariates (e.g. veg cover layers) + density estimates across landscape
• Machine-learning models as landscape models (trade bias over variance to predict exceptionally accurately)
Vegetation Type – Old Data Layer

- Relatively low resolution
- Broad vegetation classes
New Vegetation Layer

• NEW! California Native Plant Society layer
• High resolution
• Precise vegetation classes
• Ground cover, shrub cover
Covariate:
Proportion Ephedra californica

- Important veg class
- From CNPS layer!
Covariate: Proportion Atriplex polycarpa

- Important veg class
- From CNPS layer!
Covariate: Percent Shrub Cover

- Important veg class
- From CNPS layer!
Covariate: Aspect

- Additional covariate
- Others: slope, distance to wash
Project results
Data summary

- 152 plots over 4 years
- 67 detections in 41 plots
- Complex, subtle differences between sites with and without LCTH
Density model results

- % bare ground
- % saltbush cover
- % shrub cover

Predicted abundance

Predicted prob. detection

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Landscape model results

- Mean Aspect (25.2%)
  - Predicted abundance

- Mean prop. - E. californica (15.8%)
  - Predicted abundance

- Mean prop. - A. polycarpa (15.5%)
  - Predicted abundance

- Total dist. to washes (13.9%)
  - Predicted abundance

- Mean shrub cover - Landscape (5.5%)
  - Predicted abundance
Results – landscape model

Where?

Model predicts density in all locations

Set threshold for 0 abundance (< 2 pairs/km²), conservative
Results – landscape model

How many LCTH?

High LCTH density locations are independent of threshold

How many LCTH? Threshold dependent (BIG caveat)
Management recommendations

• Target priority areas for conservation based on high density models (improvement over occupancy models)

• Manage for LCTH-friendly habitat (features identified in this project):
  • % ground cover (~80%?)
  • % shrub cover in general (~10-20%)
  • % saltbush cover (part of the shrub cover)
Management recommendations

• Manage areas with 0.5-1 bird/hectare to target >1 bird/hectare
• Validate the model: survey predicted new high-density areas
• Use model results to conserve areas outside the CPNM
• Improve area search survey to estimate trends and set management targets based on trends
Next steps
Improving model

- Survey (again) fully randomized wrt relevant density, detection covariates
- Survey fully randomized wrt relevant landscape-level covariates
- Evaluate models at different plot sizes
THANK YOU!
Color Palette Reference Guide

Please use this page as a visual reference only for choosing colors from your custom color palette. This page is not editable.

Bright Blue, Green, and Dark Blue are the primary colors and take priority over the secondary palette.

Lichen, Poppy, Light Grey, and Dark Grey are used minimally and when you need more colors than the Blues and Green.