

California Ridgway's Rail Range-Wide Surveys and Population Estimate

Julian Wood, Leo Salas, Megan Elrod, Nadav Nur South Bay Salt Pond Science Symposium - 11 May 2022

Photo by Megan Elrod

Rallus obsoletus obsoletus

Photo by Julian Wood

Contents

- 1. Conservation goals
- 2. Measuring progress
- 3. Previous population estimates
- 4. Developing a standard protocol
- 5. Population estimate update
- 6. Future steps

Conservation Goals

- Recovery goals (USFWS)
 - 3,180 Central/South SF Bay
 - 2,080 San Pablo Bay
 - 200 Suisun
- Abundant and resilient native tidal marsh
 - high tide refugia (including tzone)
 - high density channel networks
 - larger more compact marshes
- Recovery actions
 - Tidal breach restoration
 - Enhance existing habitat
 - Predator control

U.S. Fish & Wildlife Service

Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California



rmia clapper vail Suaeda californica Ilus longirostris (California sea-blite obsoletus) Cirrium kydrophilum vux hydrophilum (Swisan thistle) Chloropyron molle ssp. molle (soft bird's-beak) Salt marsk karvest mou (Reitkrudontomys raviventris)

Volume I





Measuring Progress

- How do we know if we're making progress?
 - Population size
 - Population trends
- Which strategies work best?
 - Measuring response to conservation and restoration
 - tidal breach restoration
 - transition zone restoration
 - within-marsh high tide refugia
 - predator control





Previous Population Estimates

Surveyed areas only

All areas





Previous Population Estimates

Challenges with multiple protocols

- Difficult to impossible to aggregate data
- Challenging QA/QC
- lengthy data preparation
- Reduced statistical power

Multiple Survey Protocols



Developing a standard protocol

Multi-partner Effort





Developing a standard protocol

- North American Protocol- SF Bay
 - 10 min point count
 - Broadcast BLRA and RIRA
 - 3 visits per season (Jan-Mar)
- Since 2017
- 200+ marshes (San Pablo, SF, Suisun)
- All partner data in the AKN







Site-specific Protocol for Monitoring Marsh Birds Don Edwards San Francisco Bay and San Pablo Bay National Wildlife Refuges

Survey ID Numbers: FF08RSFB00-003 and FF08RSNP00-008



- Update uses similar methods
- 2019-2021 survey data
 - FWS
 - ISP
 - Point Blue
 - CDFW
- 1,314 survey points





Accounting for birds not detected

- Actual number of birds = number detected x 1/probability of detection
- Population estimate model has 2 components:
 - Detection sub-model
 - Abundance sub-model





• Abundance submodel:

Abundance for each surveyed point within a marsh can vary with:

• Year, specific marsh, bay, and marsh cover





• Abundance submodel:

Abundance for each surveyed point within a marsh can vary with:

• Year, specific marsh, bay, hybrid Spartina and marsh cover





Landscape model for un-surveyed areas

- Ensemble of machine-learning models
- Use information on landscape-level predictors of rail abundance at surveyed marshes to infer abundance at un-surveyed marshes.
 - Potential landscape covariates:
 - elevation
 - salinity
 - marsh size
 - location
 - proximity to bay, urban
- Landscape covariate challenges
 - salinity (limited marsh data)
 - elevation (quickly outdated)





Previous covariate relationships



Higher salinity = higher rail density

Greater tidal range = higher rail density





Previous covariate relationships



Larger marshes = higher density

More compact marshes = higher density





Future Steps

- Finalize population estimate
- Revise protocol document
 - updated data entry and management procedures
 - Describe multi-partner effort
- Tools for data visualization and reporting
- Measure response to conservation actions
 - Time course of restoration
 - Marsh mounds (high tide refuge islands)
 - Native plant enhancement
 - Predator control
- Expand analysis to Black Rails





Thank you

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Photo: Rick Lewis