

Documenting Snowy Plover survival in Oregon

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Background

The Snowy Plover, a ground nesting shorebird, is listed as Threatened along the Oregon coast by USFWS and ODFW. Land management agencies in Oregon collaborate to recover plover populations, and although monitoring has been intensive, the effect of management on population growth is unknown.

Management included:

- Habitat restoration – removal of invasive vegetation and addition of oyster shell to improve crypsis.
- Protective nest exclosures – wire cages to protect eggs from predation. Exclosures improve nest success, but they may cause increased adult mortality.
- Lethal predator management – conducted at some sites in 2002 & 2003, expanded to all sites by 2004. Focus crows, ravens and fox.



Aims

- Document survival rates across the life cycle for the Oregon population
- Explore the effect of environmental and management variables on success at each life stage

Methods

I used nest monitoring and mark-resight data from 1990-2014 (25 years) to document apparent survival and detection probability at each life stage in Program MARK (White and Burnham 1999). I incorporated covariates appropriate to each life stage to identify effects from management.

Results

Nest survival

Daily survival rate was 0.97 ± 0.01 ; nests had a 0.38 likelihood hatching at least one egg. Survival varied by:

- Season – nests at peak of season most likely to hatch
- Site
- Habitat restoration
- Clutch size
- Nest exclosures OR predator management; no additional benefit from both.



Chick survival

The probability that a chick would survive the 28-day fledging period averaged 0.53 ± 0.04 across all sites. Survival varied by:

- Site
- Chick age
- Predator management
- No effect from hatch date within seasons

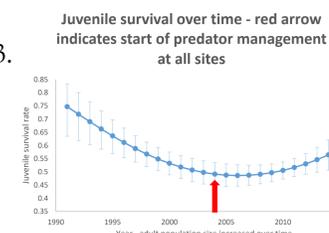


Juvenile survival

Average survival from fledging to the following spring was 0.47 ± 0.03 .

Survival varied by:

- Age; juveniles had lower survival than adults
- Apparent survival decreased as adult population increased
- Predator management offset the effects of adult population size.
- No effect of sex, site, season, or parent age



Adult survival

Average adult survival was 0.71 ± 0.01 annually. Survival varied by:

- An interaction between exclosures and predator management. With predator management, exclosure use resulted in lower adult survival. In the absence of predator management, birds nesting in exclosures had slightly higher survival.
- No effect of sex on survival



Conservation Implications

- Habitat restoration and use of nest exclosures improve nest success.
- Predator management improves survival at all stages.
- Increasing adult populations lead to lower juvenile survival or increased emigration outside Oregon. However, predator management offsets this negative effect.
- Adult survival is maximized with predator management and without exclosure use.
- Because population growth is likely most sensitive to adult survival, increased productivity seen with exclosures may not offset decreased adult survival.



Next steps

I am developing an **integrated population model** that incorporates count, mark-resight, and fecundity data. This model will allow me to explore the effects of management on overall population growth. I expect this novel method will allow me to **quantify dispersal**, providing more accurate estimates of survival and population growth, and clarify the Oregon's population in relation to neighboring recovery units in California and Washington.

Thank you to our partners

