Double-crested Cormorant declines in San Francisco Bay

Meredith L. Elliott[1], Mark Rauzon[2], Jennifer E. Roth[1], and Kathy Hieb[3]

[1] PRBO Conservation Science/Marine Ecology Division, 3820 Cypress Drive, #11, Petaluma, CA 94954

[2] Laney College, Geography Dept. 900 Fallon St. Oakland. CA 94607

[3] California Department of Fish and Game, Bay-Delta Region, 4001 N. Wilson Way, Stockton, CA 95205

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Issue

In 2009, Double-crested Cormorant colonies in San Francisco Bay have experienced sharp declines in breeding pairs, particularly the colonies on the San Francisco-Oakland Bay Bridge (SFOBB) and the Richmond-San Rafael Bridge (RSRB; Figure 1).

Brandt's Cormorants (*Phalacrocorax penicillatus*) also had reduced breeding numbers and unexplained mortalities in the Bay and the central California coast in 2009.

Other colonies not subjected to disturbance from construction and maintenance activities (e.g., Southeast Farallon Island (SEFI) and South Bay colonies) have also experienced drops in breeding pairs.

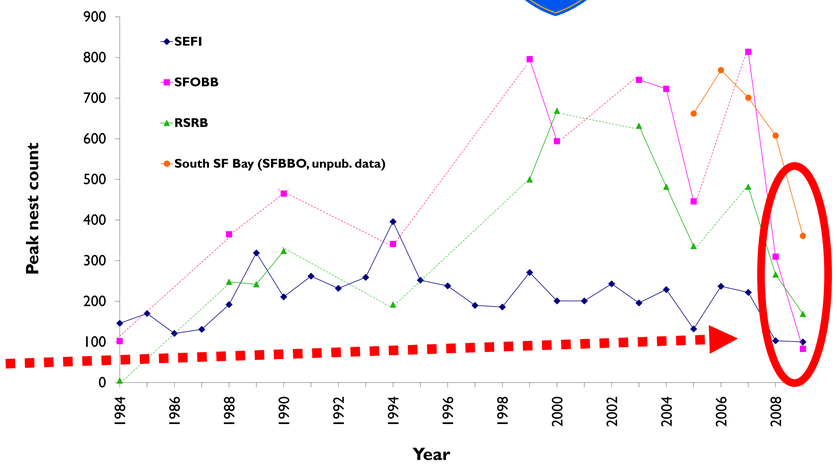

Figure 1. Numbers of Double-crested Cormorant breeding pairs in San Francisco Bay regional metapopulation, 1984-2009.

Reasons for the declines?

Disturbance

- The construction of the new east span of the SFOBB began in 2006 (Figure 2). However, in 2007, during the most active construction phase (pile driving, boat traffic, etc.), the colony was at its highest recorded number (814 pairs). In 2009, there was relatively little construction activity, but the cormorants were nesting in record low numbers.
- Maintenance activities on the RSRB have occurred in the core area of the colony, which affected where the cormorants could nest.
- We might expect cormorants to relocate to other colonies in the region if disturbed, but there is no clear evidence of this. Therefore, disturbance cannot be the sole factor for these declines.

Figure 2. New east span (left) and existing east span (right) of the SFOBB.

Prey

- Northern anchovy (*Engraulis mordax*) catch declined substantially in Bay trawls in 2009 (Figure 3).
- Larger anchovies (100 mm or larger) were particularly absent during the cormorant breeding season in 2009 (Figure 4).
- Both cormorant breeding numbers and anchovy catch have declined in 2008 and 2009.
- Current cormorant diet is unknown, but northern anchovy was a known diet item in the late 1980s. (PRBO, unpublished data). The absence of this high-energy fish could negatively affect cormorant breeding effort and success.

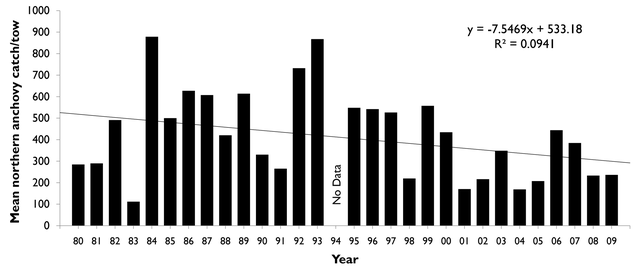

Figure 3. Mean catch of northern anchovy from midwater trawls in San Pablo, Central Bay, and South Bay, March-July, 1980-2009.

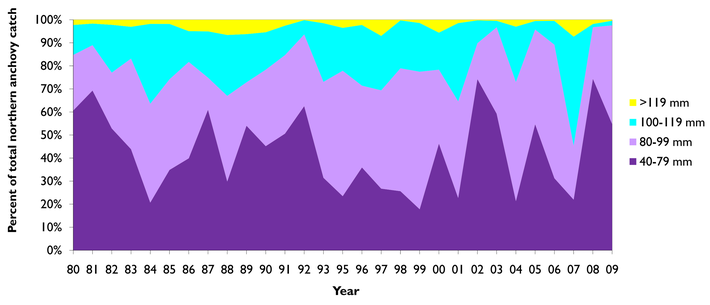

Figure 4. Percentages of northern anchovy size classes from midwater trawls in San Pablo Bay, Central Bay, and South Bay, March-July, 1980-2009.

Contaminants

- The International Bird Rescue Research Center (IBRRC) in Cordelia received several Double-crested Cormorant chicks and eggs to be reared in spring and summer of 2009. Two of the chicks had spine deformities, and two chicks that hatched at the IBRRC facility had bill deformities.
- In addition to deformities, ~45% of the eggs brought to IBRRC were not viable.
- We cannot confirm if contaminants have caused these reproductive failures. However, deformities, embryonic mortality, and increased adult mortality are documented in the Great Lakes region and are known consequences of the accumulation of contaminants (Hatch and Weseloh 1999).
- The *Cosco Busan* Spill of 2007 caused few Double-crested Cormorant mortalities. However, the long-term effects from this spill on the regional population are unknown.

Conclusions

There are several reasons to explain the declines in Double-crested Cormorants in San Francisco Bay in 2009. To better understand what factors are affecting Double-crested Cormorants, we recommend: 1) population and productivity studies on key Double-crested Cormorant colonies in the San Francisco Bay, 2) diet studies to understand what cormorants are currently consuming, and 3) collection and analysis of non-viable eggs for contaminant research.

Acknowledgments

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Literature Cited

Hatch, J. J. and D.V. Weseloh. 1999. Double-crested Cormorant (*Phalacrocorax auritus*). *In* The Birds of North America, No. 441 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.