



US Army Corps
of Engineers®
Portland District

Double-crested Cormorant Research on East Sand Island

U.S. ARMY CORPS OF ENGINEERS

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The U.S. Army Corps of Engineers is releasing a Draft Environmental Impact Statement addressing the predation of double-crested cormorants on Endangered Species Act-listed salmonids. Learn more about the research discussed below by visiting www.BirdResearchNW.org. For more information about the EIS, please visit the Corps' website at <http://www.nwp.usace.army.mil/Missions/Currentprojects/CormorantEIS.aspx>.



Research in the Columbia River Estuary

Since the late 1990s, the Corps has monitored the diet of double-crested cormorants nesting on East Sand Island in the Columbia River estuary. Monitoring the effects of these avian predators on juvenile salmon is one of the reasonable and prudent alternatives to mitigate the effects of operating Corps hydropower dams. The goal is to assess the impact of this type of predation on the recovery of Columbia River salmonids listed under the Endangered Species Act.

The Corps funds research by the Department of Fisheries and Wildlife Research Unit at Oregon State University. The National Oceanic and Atmospheric Administrations' National Marine Fisheries Service then reviews this. The research methodology is peer-reviewed and the findings published in annual reports and in many peer-reviewed scientific journals.

Diet and consumption studies

Annual studies monitor year-to-year variations in the double-crested cormorant diet. Juvenile salmon represent a variable portion of this diet, ranging between 2 and 28 percent. A change in the availability of other food sources may be one explanation for this variation.

The diet studies provide input to estimate prey consumption. The model estimates the colony's energy demands for the entire season based on individual energy needs, population size and duration in the estuary.

Estimates of the number of juvenile salmon and other food sources that must be consumed to meet the colony's energy demands are made by measuring the proportion of salmon and other prey found in the diet. This information is then included into long-term data sets to show trends in the total consumption of salmonids.



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Passive Integrated Transponder tags

PIT tags inserted into salmon help researchers study fish behavior and survival. Used for decades, the tags provide specific information about each tagged fish, including the species, rearing type (hatchery or wild) and timing of migration. Recovery of these tags from bird colonies helps estimate predation rates and determines which fish species and populations are more susceptible to predation. However, not all PIT tags ingested by birds are found on their nesting colony. An unknown number of tags are damaged during digestion, deposited off-colony or not recovered. Researchers adjust predation rates to represent a minimum predation estimate.



Habitat modification and dissuasion studies

In 2008, the Corps began to investigate specific methods to deter or dissuade double-crested cormorants from nesting in select locations on East Sand Island. Methods included hazing with lights, reducing nesting habitat and using human presence to flush birds off potential nesting sites. In 2011, efforts focused on reducing the amount of habitat available to double-crested cormorants. Nesting habitat was reduced by 15 percent in 2011 and by 62 percent in 2012 by installing barrier fences and hazing birds away from non-colony areas. Researchers learned that even with habitat reduction, the overall population of double-crested cormorants nesting on the island was not reduced significantly.

Monitoring productivity and distribution

Efforts are ongoing to monitor the colony on East Sand Island to determine their nesting success and migration throughout the region. Over the last several years, hundreds of adult and juvenile double-crested cormorants have been banded with VHF radio and satellite bands. Results indicate the birds are producing eggs later into the nesting season than was expected. This may be influenced by the appearance and disturbance associated with bald eagles, a natural predator.

This monitoring also provides information on where birds go during dissuasion efforts and at the end of nesting season. Double-crested cormorants banded from the East Sand Island colony have been



sighted after the nesting season in Western British Columbia, the Northern California coast, the lower Columbia River and the Puget Sound area. During the habitat modification and dissuasion studies described above, monitoring indicated that most of the banded birds stayed near East Sand Island, moving upriver into the estuary. They also were observed nesting on the Astoria-Megler Bridge.