Avian Predation Program 2012/2013 Summary and Update

Program Overview:

Concern over predation impacts of double-crested cormorants (DCCO) on juvenile salmonids in Oregon's coastal estuaries has been voiced by various members of the public and sportsman's groups since the late 1980s. Recent concerns are related to the development of a management plan for double-crested cormorants in the Columbia River estuary. The Avian Predation Program is striving to address these concerns through various research and management activities. The following document reviews work done in 2012 and planned for 2013.

ODFW Actions:

1. Depredation Permit Application
2. Diet Studies
3. Hazing Projects
4. Estuary Surveys
5. Aerial Photo Counting
6. Band Resighting
7. UAV Project
8. Public Resource Depredation Order
9. Pacific Flyway Council Products

1. Depredation Permit:

In May 2012, the department submitted an application for a Depredation Permit to the USFWS for lethal take of DCCO in three coastal estuaries and was denied. This permit is required to kill migratory birds for localized depredation control purposes. We are currently working with the USFWS to address the following application requirements:

- **Must show predation in open water is on wild protected fish (federally or state listed threatened, endangered, or of special concern)**
  - USFWS Director's Order 27 allows kill permits at fish facilities to protect threatened fish, specifically excludes open waters

- PRDO (Public Resource Depredation Order) is an exception to the above, see section 8 below

- **2 - 3 years diet data needed in each estuary**
- **Must demonstrate ineffectiveness of non-lethal methods**
- **Must demonstrate that lethal take will resolve the issue**

2. Diet Studies:

In 2012, ODFW was successful in receiving a Scientific Collecting Permit from the USFWS to lethally take (using shotguns) up to 50 cormorants in Tillamook Bay for dissection. Analysis of cormorant stomach contents will provide diet composition information and allow for calculation of salmonid consumption rate. In 2013, the Tillamook study will be repeated and and a permit was obtained for additional diet studies in the Umpqua and Rogue estuaries. Up to 50 cormorants can be lethally collected in each estuary. Data collected from these studies will provide support for future depredation permit applications:

- **45 double-crested cormorants lethally collected in Tillamook Bay in 2012**
- **Diet composition: 56% salmonids in April, 9% salmonids in May**
- **In both April and May, at least 70% of cormorants were observed in the upper bay closer to the river mouths**

3. Hazing Projects:

The Avian Predation Coordinator works with local volunteer groups to conduct non-lethal harassment operations to disrupt foraging attempts by cormorants on juvenile salmonids. Volunteers are provided with some ODFW funds to offset expenses, but often conduct additional fundraising. The Lower Columbia River project will be a pilot project in 2013 and is being conducted by the Clatsop Fisheries Project with no additional funds from ODFW.

- Lower Columbia River (new in 2013)
- Nehalem Bay (annually since 2010)
- Tillamook Bay (annually since 2006)
- Nestucca Bay (annually since 2011)
- Alsea River (new in 2012, continuing in 2013)
- Coquille River (new in 2012, continuing in 2013)

4. **Estuary Surveys:**

Regular surveys of mid and north coast estuaries were conducted in 2012 with the goal of estimating the numbers of double-crested cormorants foraging in these estuaries. Breeding colonies are generally located outside of estuaries so some portion of breeding birds may forage offshore, while foraging habits of non-breeding birds are unknown. Estuary surveys will provide a more accurate estimate of the numbers of birds foraging in salmon outmigration areas and provide support for lethal management requests (depredation permits). This will also aid us in improving and prioritizing hazing projects. In 2013, the survey area will be expanded to include large south coast estuaries.

Estuary	Estuary Area (acres)	DCCO Median	DCCO Range	Month of High Count
Nehalem	2,749	21	0 - 70	October
Tillamook	9,216	123	0 - 404	June
Netarts	2,743	2	0 – 228	October
Nestucca	1,176	11	2 – 83	April
Siletz	1,461	6	1 – 69	May
Yaquina	4,349	100	0 – 299	October
Alsea	2,516	17	0 - 226	April
Coquille	1,058	82	0-319	April

5. **Aerial Photo Counting:**

The most recent count of breeding double-crested cormorants on the Oregon coast was conducted in 2009. In order to determine current breeding colony sizes, ODFW obtained aerial photos taken in 2012 of all known cormorant colonies (photos provided by the United States Fish and Wildlife Service from annual surveys) and received training in aerial photo counting methods. ODFW will estimate breeding population size for 2012 which will be included in our requests for lethal management. ODFW will continue to conduct aerial photo counting based on the timeline set by the Double-crested Cormorant Monitoring Strategy recently adopted by the Pacific Flyway Coucil.

- **The number of breeding pairs on the Oregon coast (excluding the Columbia River estuary) decreased by more than 50% from 2,348 breeding pairs in 2009 to 1,140 breeding pairs in 2012.**

6. **Band Resighting:**

Adult and juvenile double-crested cormorants have been banded at East Sand Island in the Columbia River estuary over the last several years. After the 2012 season, close to 800 birds have received colored leg bands. Resights of these bands can give us information on the

dispersal of East Sand Island cormorants. Opportunities to resight are few and far between as we must be close to birds when they are standing out of the water. In 2012 we were able to obtain one complete band resight and one partial resight on the Oregon coast. The first was in July at a night roost site on the Tillamook River. This bird was banded in that same year as a juvenile at East Sand Island. The second was in January 2013 on Tahkenitch Lake in Douglas County. We were not able to read the code on this band, but the red color identified it as a juvenile banded at East Sand Island in 2012. We will continue to search for bands opportunistically during surveys, and more regularly at known roosting locations.

7. UAV Project:

The Avian Predation Program partnered with Embry-Riddle Aeronautical University in 2012 to develop an Unmanned Aerial Vehicle (also known as a drone) capable of flying to cormorant breeding colonies located on offshore rocks to take aerial photographs. This would provide a method of collecting aerial photographs at a lower cost than traditional piloted flights. The prototype would use a remote-controlled airplane platform outfitted with a camera and autopilot system, but modifications could be made for other applications such as hazing of foraging cormorants. In order to fly a UAV in National Airspace, public agencies must obtain a Certificate of Authorization (COA) from the Federal Aviation Administration. Although the technology to use UAVs for wildlife studies is adequately developed, the federal application process requires technical expertise beyond the abilities of ODFW at this time. As the commercial UAV industry grows, more options for ODFW to utilize this technology may become available.

8. Public Resource Depredation Order (PRDO):

In 2003, the USFWS issued a Public Resource Depredation Order that allowed for the control of double-crested cormorants without a permit in 24 states (mainly Great Lakes and southeastern states) when causing negative impacts to public resources. The USFWS is currently preparing a Supplemental EIS to potentially revise regulations governing the management of cormorants in the U.S. since the current PRDO is scheduled to expire on June 30, 2014.

- In April 2012, ODFW submitted recommendations as part of the public comment period. Requests included:
    - Develop a federal harvest framework (regulated hunting/take)
    - Include Oregon in the revised PRDO

- Liberalize standards for the issuance of Depredation Permits
- Overview - Maximize ODFWs ability to manage cormorant conflicts by improving the accessibility of lethal management tools. This will allow ODFW the flexibility to manage cormorants in an effective and cost efficient manner.

9. Pacific Flyway Products:

The Pacific Flyway Council is an administrative body that forges cooperation among public wildlife agencies of the 12 western states. Oregon is the Chair of the Double-crested Cormorant Subcommittee, which has produced the following:

- **Avian Predation on Fish Resources Policy Statement (July 2010)**
- **A Framework for the Management of Cormorant Depredation on Fish Resources (July 2012):** The purpose of this plan is to facilitate management of cormorants in the Pacific Flyway by providing states with a framework to follow when addressing fish depredation issues. The plan provides a synopsis of cormorant biology, status, resources conflicts, management options, regulatory requirements, and recommended management strategies.
- **Monitoring Strategy for the Western Population of Cormorants (March 2013):** The goal of the monitoring strategy is to establish a coordinated, long-term monitoring effort to estimate the breeding population size, trend, and distribution of the Western Population of cormorants. This information is fundamental for developing effective management recommendations, and for guiding and assessing management actions (e.g., depredation permits) pertaining to cormorant depredation on fish resources.
- **Prescribed Take Level Model Analysis (March 2013):** The committee explored the use of the Prescribed Take Level Model to assess how different levels of take may affect cormorant populations (e.g., decrease, stable, increase). The committee demonstrated that the current level of take through depredation permits has a minimal effect on the population growth of the Western Population of cormorants. This model can be used to help guide and assess management actions pertaining to depredation issues and the issuance of depredation permits.

Summary of Preliminary Juvenile Salmonid Consumption Estimates by Double-crested Cormorants in Tillamook Bay during April and May, 2012

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April 24, 2013

This document summarizes preliminary bioenergetic-based estimates of consumption of juvenile salmonids by double-crested cormorants in Tillamook Bay, Oregon, produced in collaboration with Lindsay Adrean, Oregon Department of Fish and Wildlife. Using Tillamook Bay cormorant foregut samples that Lindsay collected during April and May, 2012, salmonids were estimated to be ~35% of the cormorant diet during this period. Salmonids were identified to species in collaboration with David Kuligowski of NOAA Fisheries, who provided genetic identification of salmonid soft tissue taken from cormorant foregut samples. Lindsay also conducted point count surveys during April and May across Tillamook Bay to quantify how many cormorants were present and potentially consuming salmonids. Energy demands of adult cormorants were scaled from measures of energy expenditure of cormorants rearing chicks in the Columbia River estuary to account for the pre-breeding or incubating status of Tillamook Bay birds. Energy content of cormorant prey in Tillamook Bay were assumed to be equivalent to previously characterized values for the Columbia River estuary, or drawn from the literature when Columbia River values were not available. Monte Carlo calculation techniques were used, with 1000 calculations performed to estimate confidence intervals after Lyons (2010).

The estimates provided here are best described as preliminary for at least two reasons: (1) revisions may occur if more comprehensive data on prey energy content becomes available, and (2) the abundance of cormorants present in Tillamook Bay is challenging to quantify with even the best of surveys. In comparison, estimates of prey consumption by double-crested cormorants in the Columbia River estuary are more robust due to laboratory analysis of prey energy content and more reliable measurements of cormorant abundance made possible by the overwhelming majority of cormorants congregating at a single breeding colony where aerial photographs made accurate counts possible. Regardless of these limitations, the information presented here represents the best available estimates of salmonid consumption by Tillamook Bay cormorants.

We estimate that cormorants consumed between 3 and 13 thousand coho salmon smolts in Tillamook Bay during April and May, 2012 (best estimate is 8,000 coho smolts, 95% CI: 3,000 – 13,000). We estimate consumption of steelhead and cutthroat trout together was between 7 and 30 thousand smolts (best estimate is 19,000, 95% CI: 7,000 – 30,000). Consumption of chum salmon fry was estimated to be between 4 and 40 thousand fry (best estimate is 22,000, 95% CI: 4,000 – 40,000). In total, we estimate that cormorants consumed tens of thousands of juvenile salmonids in Tillamook Bay during April and May, 2012 (best estimate is 50,000 juveniles, 95% CI: 18,000 – 82,000).

To put these estimates in context, comparisons to juvenile salmonid consumption by double-crested cormorants nesting on East Sand Island in the Columbia River estuary are helpful:

	Tillamook Bay	East Sand Island
Estimate Period	April 1 – May 31, 2012	March 27 – May 21, 2012
% Salmonids in Diet	35%	34%
Maximum number of cormorants	215	24,572
Coho Salmon smolts consumed per individual cormorant	37	132
Steelhead/Cutthroat Trout smolts consumed per individual cormorant	85	41
Chum Salmon fry consumed per individual cormorant	97	Below detection levels
Chinook Salmon smolts consumed per individual cormorant	Below detection levels	117

There is considerable uncertainty associated with the point estimates presented in this table so only cautious interpretation should be applied. Nonetheless, in a general sense, per capita consumption of juvenile salmonids by cormorants is relatively similar between the two coastal estuaries. Consumption of individual salmonid species varies more dramatically, presumably reflecting differences in relative availability of the different salmonid types.

Literature Cited:

Lyons, D.E. 2010. Bioenergetics-based predator-prey relationships between piscivorous birds and juvenile salmonids in the Columbia River estuary. Unpubl. Ph.D. dissertation, Oregon State University, Corvallis, Oregon. Available on-line at www.birdresearchnw.org.