Analysis of Osprey *(Pandion haliaetus)* Egg Tissue Collected from Portland Harbor and Surrounding Areas: Progress Report

Prepared by:

The Portland Harbor Natural Resource Trustee Council

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INTRODUCTION

This progress report provides an update of the investigation of contaminants in eggs from osprey (*Pandion haliaetus*) collected within the Portland Harbor Superfund Study Area (Study Area), Multnomah Channel, and an upstream reference area. This analysis is part of the remedial investigation and feasibility study (RI/FS) and Natural Resource Damage Assessment (NRDA) process for the Portland Harbor Superfund Site in Portland, Oregon.

The osprey eggs were collected as part of a joint effort with the Portland Harbor Natural Resource Trustees and were collected by the U.S. Geological Survey (USGS) and U.S. Fish and Wildlife Service (USFWS) coincident with a separate USGS study of osprey on the lower Columbia River. Osprey egg contents were analyzed for organochlorine pesticides, polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), dioxins, furans, and mercury. Eggshells were also collected to evaluate the degree of thinning compared to reference values.

Project Objectives

The objectives of the project were to collect osprey eggs from the Study Area and vicinity and analyze for chemicals of concern in order to:

- facilitate the development of baseline chemical concentrations as part of a long-term, post-remediation monitoring program,
- evaluate if incorporation of these tissue data would improve the accuracy of risk estimates for fish-eating birds presented in the final risk assessment, and
- determine if egg contaminants exceed injury thresholds and evaluate extent of contamination in ospreys outside the Study Area (NRDA only).

Methods and Collection Location

The field collection of eggs is described in the *Field Sampling Plan for the Collection of Osprey Eggs from the Portland Harbor Superfund Site* (Buck and Henny 2008). A detailed description of methods for chemical analysis is provided in the Quality Assurance Project Plan (QAPP) for the study (Buck 2008). The collection location, constituents analyzed per egg, and egg conversion factor used to correct eggs for moisture loss for reporting concentrations on the basis of fresh weight (Stickel et al. 1973) are listed in Table 1.

Table 1. Osprey egg samples collected from Portland Harbor and surrounding areas.

Egg Sample Number	RM	GPS Coordinates NAD83 Dec. Degrees North	GPS Coordinates NAD83 Dec. Degrees West	Egg Conversion Factor[1]	Analysis[2]
Portland Harbor					
W3B	3.4	45.6181418	122.7964497	0.86	OC pests; PCBs; PBDEs, DioFurFullPCBs, THg
W6	5.8	45.5885787	122.7667377	0.89	OC pests; PCBs; PBDEs, DioFurFullPCBs, THg
W7A	7.2	45.5739458	122.7457653	0.86	OC pests; PCBs; PBDEs, DioFurFullPCBs, THg
W9B	8.5	45.5646316	122.7129607	0.86	OC pests; PCBs; PBDEs, DioFurFullPCBs, THg
W11	10.7	45.541439	122.690914	0.82	OC pests; PCBs; PBDEs, DioFurFullPCBs, THg
Multnomah Channel					
MC-1B	NA	45.8457931	122.7974236	0.90	OC pests; PCBs; PBDEs, THg
MC-2B	NA	45.8347953	122.8124416	0.89	OC pests; PCBs; PBDEs, DioFurFullPCBs, THg
MC-9	NA	45.7540894	122.8254419	0.86	OC pests; PCBs; PBDEs, THg
MC-10B	NA	45.7402561	122.8395151	0.81	OC pests; PCBs; PBDEs, DioFurFullPCBs, THg
MC-20	NA	45.6360044	122.8208784	0.90	OC pests; PCBs; PBDEs, DioFurFullPCBs, THg
Upstream Reference Area					
W23	69.2	45.1136963	123.0135010	0.81	OC pests; PCBs; PBDEs, THg
W28	73	45.0830931	123.0722048	0.84	OC pests; PCBs; PBDEs, THg
W30B	74.6	45.0584356	123.0581361	0.78	OC pests; PCBs; PBDEs, DioFurFullPCBs;THg
W30C	75.3	45.0481222	123.0526841	0.85	OC pests; PCBs; PBDEs, THg
W32	77.3	45.0209344	123.0698927	0.84	OC pests; PCBs; PBDEs, DioFurFullPCBs;THg

[1] Egg conversion factor was calculated as egg volume divided by egg mass and is used to convert egg contaminant concentrations from wet weight to fresh weight to account for moisture loss during incubation (Stickel et al. 1973).

[2] OC pests = organochlorine pesticide scan; PCBs = selected congener-specific polychlorinated biphenyls by GC/ECD; PBDEs = polybrominated diphenyl ethers; DioFurFullPCBs = dioxins, furans, and 209 polychlorinated biphenyls including planar PCBs; THg = total mercury.

Investigation Status

Three laboratories were used to analyze contaminants in eggs as described in the QAPP. These laboratories included Axys Analytical Services, Ltd., in British Columbia, the Great Lakes Institute for Environmental Research (GLIER) at the University of Windsor, Ontario, and the National Wildlife Research Centre at Carleton University, Ontario. All results have been received from the analytical laboratories. The trustees have contracted with EcoChem, Inc., to validate the results. Validation has been completed for the results on eggs received from Axys, but the validation of results from GLIER and Carleton is ongoing and expected to be completed within the month. In addition, eggshell measurements have not yet been completed by USGS.

Schedule

Complete validation of the remaining egg results is expected by November 2009. Eggshell measurement results are expected to be completed by January 2010. A data report will be produced by February 2010, and will include all validated analytical results. Additional funding will be pursued for completion of a final report during 2010.

REFERENCES

Buck, J.A. 2008. Quality Assurance Project Plan (QAPP) for the Analysis of Osprey (*Pandion haliaetus*) Egg Tissue Collected from Portland Harbor and Surrounding Areas. Prepared in cooperation with the U.S. Environmental Protection Agency, Portland, Oregon, and the Portland Harbor Natural Resource Trustee Council by the U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office, Portland, Oregon.

Buck, J.A. and C.J. Henny. 2008. Field sampling plan for the collection of osprey eggs from the Portland Harbor Superfund Site. Prepared for the U.S. Environmental Protection Agency, Portland, Oregon, by the U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office, Portland, Oregon.

Stickel, L.F., S.M. Wiemeyer, and L.J. Blus. 1973. Pesticide residues in eggs of wild birds: Adjustment for loss of moisture and lipid. Bulletin of Environmental Contamination and Toxicology 9(4):193-196.