National Park Service
U.S. Department of the Interior

Natural Resource Program Center

Inventory of Fish Species in Lewis and Clark National Historical Park, Oregon (2007)

Natural Resource Technical Report NPS/NCCN/NRTR—2008/142

ON THE COVER
Ness Creek, rivermile 0.4
Photograph courtesy of NPS files

Inventory of Fish Species in Lewis and Clark National Historical Park, Oregon (2007)

Natural Resource Technical Report NPS/NCCN/NRTR—2008/142

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U.S. Department of the Interior
National Park Service
Natural Resource Program Center
Fort Collins, Colorado

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NPS D-82, December 2008

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Acknowledgments

We thank Scott Stonum, Chief of Natural Resources of LEWI, for his support of this project, assistance in the field, and information used in the Introduction and Study Area sections of this report. We thank Nancy Eid (LEWI) who provided information about samples sites. We also thank Katherine Maslenikov (University of Washington Fish Collection) who aided in the fish identification to confirm the species list. Additionally, we thank Mary Hanson (ODFW), Keith Braun (Tillamook District, ODFW), and Leslie Schaeffer (NMFS) who helped obtain the proper permits This project was funded by the Inventory and Monitoring Program of the North Coast and Cascades Network.

Introduction

Fort Clatsop National Memorial was established in 1958 to commemorate the culmination and the 1805 to 1806 winter encampment of the Lewis and Clark Expedition on the Oregon coast. In 2004, Congress authorized the expansion of the Fort Clatsop National Memorial from 51 ha (125 acres) to 1295 ha (3,200 acres) and renamed the National Park Service unit to Lewis and Clark National Historical Park (LEWI). LEWI now encircles the ecologically significant Columbia River estuary.

LEWI is part of the North Coast and Cascades Network that comprises seven national park units in the Pacific Northwest including Mount Rainier, Olympic, and North Cascades National Parks. The network also includes Ebey's Landing National Historical Reserve, Fort Vancouver National Historical Park, and San Juan Island National Historical Park. Park managers at LEWI recognize the importance and contribution of aquatic and fish resources to both the ecosystem processes and the natural heritage of the park.

As part of the Inventory and Monitoring Program for the North Coast and Cascades Network, fisheries biologists from Olympic National Park (OLYM) conducted a cursory inventory of fish species that inhabit Ness Creek, West Fork Ness Creek, Trail Creek and the Skipanon River in portions of lands recently added to LEWI (Figures 1 and 2). The total funds available for this inventory were limited to $5,000. Prior to these surveys, the only published information of fish species in LEWI was from a fish inventory conducted in Alder Creek and Hansen Creek in 2002. Brenkman (2002) reported a total of nine fish species from five families in Alder Creek and five fish species from four families were observed in Hansen Creek. That fish inventory was designed to provide baseline information on fish species that inhabit those creeks.

The fish inventory in Alder and Hansen Creeks represented a thorough, yet incomplete representation of species compositions in each creek and established a baseline inventory for LEWI. In addition to fish surveys, an overview of water resources was conducted by National Park Service Water Resources Division in 1992 and 1993. Water quality sampling occurred in ponds and streams throughout Fort Clatsop National Memorial from 1994 to 1997 (Larson and Ek 1998). Those surveys provided a baseline inventory of water quality variables and documented diverse and variable water quality characteristics in the park.

The goal of this project was to establish a baseline inventory of fish species that inhabit sampled portions of each creek and the Skipanon River. Specifically, the objectives were to: 1) determine the presence of fish species in each creek and river; and 2) establish a small collection of voucher specimens as a reference for LEWI. Information derived from fish inventories on newly acquired lands may provide a better understanding of the existing conditions of resources in the park and will permit park managers to make more informed resource management decisions.

Figure 1. Location of Lewis and Clark National Historical Park, Oregon.

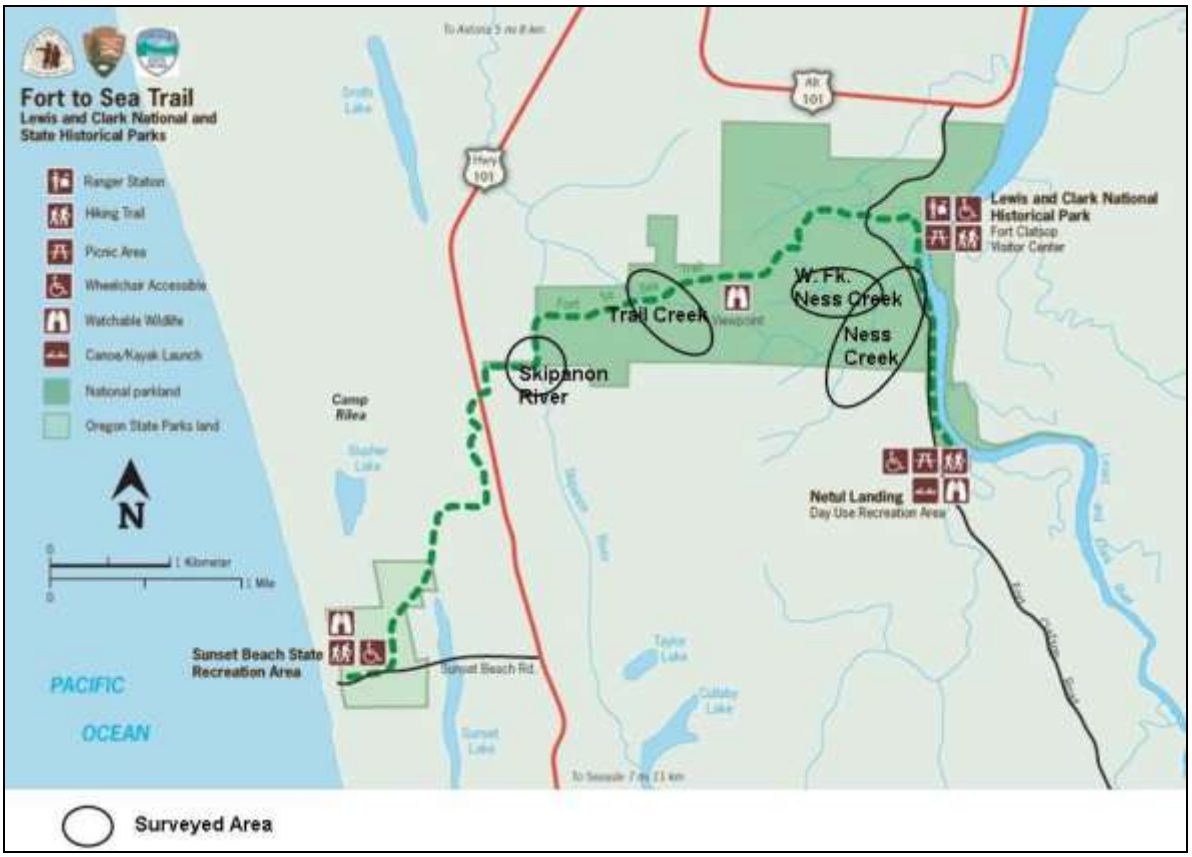

Figure 2. Location and general survey area in Ness Creek, West Fork Ness Creek, Trail Creek and Skipanon River in relation to Lewis and Clark National Historical Park, Oregon.

Study Area

LEWI preserves a variety of ecosystems including coastal dunes, estuarine mudflats, tidal marshes, shrub wetlands, temperate rainforests and swamps. The waterways in LEWI include the tidally-influenced Lewis and Clark River, two unnamed brackish sloughs, four ephemeral streams, two ephemeral springs, and wetland habitats (Larson and Ek 1998). Portions of LEWI are located on each side of the Lewis and Clark River, one mile upstream from the confluence with the Columbia River. The Lewis and Clark River drains into the Columbia River, and contains some the last freshwater refugia for juvenile salmonids emigrating down the Columbia Basin to the ocean. Aquatic habitats have been influenced by logging activities, residential development, installation of dikes, and the presence of barriers such as tide gates and culverts

This cursory fish inventory focused on Ness Creek, West Fork Ness Creek, Trail Creek and the Skipanon River. Newly acquired waterways within LEWI include the Skipanon River and one of its tributaries. The river is tidally influenced within the park and is surrounded by agricultural and residential properties. The unnamed (hereafter referred to as Trail Creek) tributary drains the central portion of forest lands previously owned and operated by Weyerhaeuser.

LEWI has a maritime climate and is warm and dry in summer and fall and mild and wet in winter and spring. Mean annual precipitation is 188 cm in the coastal lowlands. The coastal geology contains Quaternary marine and non-marine terrace deposits and alluvium in the lowlands, with Miocene basalts and marine sandstone, siltstone, and shale in the uplands. Elevations in the park range from sea level to 91 m.

The following fish species are known to occur in the Lewis and Clark River: coho salmon (*Oncorhynchus kisutch*), chinook salmon (*O. tshawytscha),* chum salmon (*O. keta*), steelhead trout *(O. mykiss*), cutthroat trout *(O. clarki*), American shad (*Alosa sapidissima),* white sturgeon (*Acipenser transmontanus*), chiselmouth (*Acrocheilus alutaceus*), peamouth (*Mylocheilus caurinus*), and lamprey species (*Lampetra spp.)* (Oregon Department of Fish and Wildlife, Joe Sheahan, pers. comm, February 19, 2002). Eulachon *(Thaleichthys pacificus)* also have been reported in the Fort Clatsop area (FOCL 1995).

The following fish species occur in Alder Creek: Pacific staghorn sculpin (*Leptocottus armatus),* prickly sculpin (*Cottus asper),* reticulate sculpin (*Cottus perplexus*), threespine stickleback (*Gasterosteus aculeatus*), banded killifish *(Fundulus diaphanus),* cutthroat trout, and coho salmon. Additionally, peamouth (*Mylocheilus caurinus)* and chum salmon fry were observed at the junction of Alder Creek and the Lewis and Clark River. Fish species known to inhabit Hansen Creek include: prickly sculpin (*Cottus asper),* threespine stickleback, coho salmon, and lamprey spp. Bullfrog (*Rana catesbeiana),* Pacific treefrog *(Hyla regilla),* and crayfish spp. (*Pacifasticus spp*.) also were observed in Hansen Creek (Brenkman 2002).

Ness Creek (N46° 07.73', W123° 52.69') (Appendix B9) is the provisional name of a small creek that flows into the Lewis and Clark River at ~rkm 3.8. Ness Creek crosses Fort Clatsop road through a culvert and tidegate. West Fork Ness Creek (N46° 07.64', W123° 53.00') is the provisional name of a small creek that drains into Ness Creek near rkm 0.8. Trail Creek (N46° 07.00', W123° 54.06') (Appendix B10) is the provisional name of a small creek that drains into

the Skipanon River near rkm 5.2. The Skipanon River (N46° 07.00', W123° 55.07') (Appendix B8) is a river that originates at Cullaby Lake and enters the Skipanon waterway which eventually reaches the Columbia River near rkm 8.0.

Methods

To determine presence or non-detection of fish species in Ness, West Fork Ness and Trail Creeks, single-pass electrofishing without block-nets was employed from April 26 to 28, 2005. A two-person crew, equipped with a Smith-Root Model 12A backpack electrofisher and dip-nets proceeded upstream capturing and identifying fish. Water conductivity level was measured prior to each survey event and electrofishing equipment was adjusted accordingly to minimize injury to captured fish. In the Skipanon River, only the margin of the west bank was sampled to a point where water depth reduced the effectiveness of backpack electrofishing. We also deployed a baited minnow trap for 36 hours at creek km 0.3 in Ness Creek near the pool upstream of the culvert and tidegate at Fort Clatsop Loop Road from April 26 to 28, 2005.

Captured fish were enumerated by species and the range of total lengths for each species was measured to the nearest mm. Fish were released near their point of capture unless vouchers were collected. Ness Creek was sampled on April 26 (creek km 0.0-1.2) and April 28 (creek km 1.2-2.0). West Fork Ness Creek was sampled on April 26 (creek km 0.0-0.2). The Skipanon River (rkm 5.8-6.0) was sampled on April 27. Trail Creek (creek km 1.1-2.6) was sampled on April 27. Creek kilometers were determined using mapping software.

To confirm species identification, a total of five fish from Ness Creek, one fish from West Fork Ness Creek, and three fish from Trail Creek were vouchered in 95% ethanol. Species identification was verified by Katherine Maslenikov (Manager of Fish Collection at University of Washington). Specimens are currently housed at OLYM, but we intend to return specimens to LEWI to be used as a reference for fish species in the area.

To create a genetic sample archive, fin tissue was collected from a three cutthroat trout and two coho salmon from Ness Creek and one cutthroat trout from Trail Creek. To obtain genetic samples, fin tissue (<0.75 cm^2) was collected from the anal fin and preserved in 95% non-denatured ethanol. Analysis of these samples has not been conducted to date. Tissue samples are currently housed at OLYM, and will be returned with the other fish specimens.

All fish sampling was conducted in accordance with a permit issued by Oregon Department of Fish and Wildlife (Permit No. OR2005-2650) and the 4(d) Scientific Research limit under the Endangered Species Act as implemented by the National Marine Fisheries Service (NMFS), Protected Resources Division (Appendix A).

Results

Ness Creek

A total of seven fish species from three different families (Cottidae, Gasterosteidae, and Salmonidae) were observed in Ness Creek (Table 1). The following fish species were captured in Ness Creek: Pacific staghorn sculpin (*Leptocottus armatus*; n=1 fish at 50 mm), riffle sculpin (*Cottus gulosus*; n=1 fish at 103 mm), reticulate sculpin (*Cottus perplexus*; n=2 fish; range=52 to 74 mm; mean=63 mm), threespine stickleback (*Gasterosteus aculeatus*; n=155 fish; range=29 to 62 mm; mean=40 mm*;* Appendix B5), cutthroat trout (*Oncorhynchus* clarki; n=14 fish; range=43 to 180 mm; mean=136 mm; Appendix B3), coho salmon (*Oncorhynchus kisutch*; n=17 fish; range=66 to 131 mm; mean=119 mm) and rainbow trout (*Oncorhynchus mykiss*; n=1 fish at 44 mm). We also captured unidentified salmonids (n=8 fish) and unidentified sculpins (n=104 fish; Appendix B4). Additionally, we captured one rough-skinned newt (*Taricha granulosa)* in Ness Creek. No fish or amphibians were captured by the baited minnow trap that was deployed in Ness Creek.

Table 1. Summary of fish and amphibians captured in Ness Creek (creek km 0.0 to 2.0) based on electrofishing surveys conducted on April 26 and April 28, 2005. See Appendix E for original data form.

Species observed in Ness Creek	No. of Each Species	Mean Total Length	Range in Total Length	Comments
Threespine stickleback	155	40 mm	29 to 62 mm	
Pacific staghorn sculpin	1	50 mm	50 mm	Voucher LEWI-05-1
Cutthroat trout	14	136 mm	43 to180 mm	Fin Clips LEWI-05-01, LEWI-05-03, LEWI-05-04
Coho salmon	17	119 mm	66 to 131 mm	Fin Clips LEW-05-02, LEWI-05-05
Unidentified salmonid	8	NA	NA	
Unidentified sculpin	104	NA	NA	
Rainbow trout	1	44	44	Voucher LEWI-05-3
Riffle sculpin	1	103	103	Voucher LEWI-05-4
Reticulate sculpin	2	63	52 to 74 mm	Vouchers LEWI-05-2, LEWI-05-9
Roughskin newt	3	NA	NA	

West Fork Ness Creek

A total of four fish species from three different families (Cottidae, Gasterosteidae, and Salmonidae) were observed in West Fork Ness Creek including coastrange sculpin (*Cottus aleuticus;* n=1 fish at 80 mm), threespine stickleback (*Gasterosteus aculeatus;* n=17 fish), cutthroat trout (*Oncorhynchus clarki;* n=1 fish at 127 mm), and coho salmon (*Oncorhynchus kisutch;* n=5 fish) (Table 2). We also captured an unidentified sculpin (n=1 fish).

Table 2. Summary of fish and amphibians captured in West Fork Ness Creek (creek km 0.0-0.2) based on electrofishing surveys conducted on April 26, 2005. See Appendix F for original data form.

Species observed in West Fork Ness Creek	No. of Each Species	Mean Total Length	Range in Total Length	Comments
Threespine stickleback	17	NA	NA	
Cutthroat trout	1	127 mm	127 mm	
Coastrange sculpin	1	80 mm	80 mm	Voucher LEWI-05-5
Unidentified sculpin	1	NA	NA	
Coho salmon	5	NA	NA	

Trail Creek

A total of five fish species from four different families (Cottidae, Gasterosteidae, Salmonidae and Petromyzontidae) were observed in Trail Creek (Table 3). The following fish species were observed in Trail Creek: threespine stickleback (*Gasterosteus aculeatus*; n=3 fish), cutthroat trout (*Oncorhynchus clarki*; n=3 fish; range=136-147 mm; mean=141 mm; Appendix B1), western brook lamprey (*Lampetra richardsoni*, n=7 fish; Appendix B2), riffle sculpin (*Cottus gulosus* n=1 fish at 105 mm), and Chinook salmon (*Onchorhynchus tshawytcha*, n=1 fish at 40 mm). We also captured an unidentified salmonid (n=1 fish) and unidentified sculpins (n=66 fish). Additionally, we captured three rough-skinned newts (*Taricha granulosa)* in Trail Creek.

Table 3. Summary of fish and amphibians captured in Trail Creek (creek km 1.1-2.6) based on electrofishing surveys conducted on April 27, 2005.

Species observed in Trail Creek	No. of Each Species	Mean Total Length	Range in Total Length	Comments
Threespine stickleback	3	NA	NA	
Cutthroat trout	3	141 mm	136 to147 mm	Fin Clip LEWI-05-06
Western brook lamprey	7	NA	NA	Voucher LEWI-05-7
Chinook salmon	1	40 mm	40 mm	Voucher LEWI-05-8
Riffle sculpin	1	105 mm	105 mm	Voucher LEWI-05-6
Unidentified sculpin	66	NA	NA	
Unidentified salmonid	1	NA	NA	
Roughskin Newt	3	NA	NA	

Skipanon River

A total of two fish species from two different families (Cottidae, Gasterosteidae) were observed in the Skipanon River (Table 4). The following fish species were observed in the Skipanon River: threespine stickleback (*Gasterosteus aculeatus*; n=2 fish; range 38-46 mm; mean=42 mm) and an unknown sculpin species (n=1 fish; 64 mm). Additionally, we captured one rough-skinned newt (*Taricha granulosa)* in the Skipanon River. No voucher specimens were collected in the Skipanon River.

Table 4. Summary of fish and amphibians captured in the Skipanon River (rkm 5.8-6.0) based on electrofishing surveys conducted on April 27, 2005.

Species observed in Skipanon River	No. of Each Species	Mean Total Length	Range in Total Length	Comments
Threespine stickleback	2	42 mm	38 to 46 mm	
Unidentified sculpin	1	64 mm	64 mm	
Roughskin newt	1	NA	NA	

Discussion

A total of 10 fish species from four families were observed during surveys in Ness, West Fork Ness, and Trail Creeks and the Skipanon River in LEWI. This fish inventory represents a thorough, yet incomplete representation of species compositions and builds from previous surveys that were summarized in Brenkman (2002). In this inventory, it is likely that we did not capture the entire fish species assemblage in those systems based on the limited sampling effort (spatially and temporally), the extent of seasonal movements of fish, and the presumed high occurrence of non-native fish species in the lower Columbia Basin. This inventory, however, does establish a baseline for LEWI for systems that previously were unsurveyed. The following fish species were observed in 2005 that were not observed in 2002 surveys: riffle sculpin (*Cottus gulosus*), western brook lamprey (*Lampetra richardsoni*) and federally threatened Lower Columbia River Chinook salmon (*Oncorhynchus tshawytcha*).

We observed adult western brook lamprey that appeared to exhibit spawning behavior in Trail Creek (Appendix B7), and the late April observation corresponds with known spawn timing of Pacific lamprey (April through July), river lamprey (April to June), and western brook lamprey (April through July) (Wydoski and Whitney 2003). Three species of lamprey, including western brook lamprey, are currently undergoing status review to determine whether a threatened listing under ESA is warranted (USFWS 2004).

Resident, fluvial, adfluvial and anadromous life history forms of coastal cutthroat trout are known to exist in the Tillamook District (ODFW 2004). For nearby rivers within the Tillamook District, there is a currently proposed rule change to allow anglers to retain two coastal cutthroat trout per day during the general trout season. The current regulation restricts anglers to catch and release fishing only for cutthroat trout (ODFW 2004).

The following evolutionary significant units listed under the Endangered Species Act may or are known to inhabit LEWI:
Chinook salmon (*Oncorhynchus tschawytcha*), Lower Columbia River ESU
Chum salmon (*Oncorhynchus keta*), Columbia River ESU
Steelhead (*Oncorhynchus mykiss*), Lower Columbia River ESU

The following species are listed under the Oregon Endangered Species Act and may or are known to inhabit LEWI:
Critical Status:
Coho salmon (*Oncorhynchus kisutch*)
Chum salmon (*Oncorhynchus keta*)
Coastal Steelhead (*Oncorhynchus mykiss*) Lower Columbia River
Coastal Cutthroat trout (*Oncorhynchus clarki clarki*)

Vulnerable status:
Pacific lamprey (*Lampetra tridentata*)

To more effectively sample portions of the Skipanon River, future surveys should consider the use of a boat electrofisher, seining, gill netting, or trapping methods. Additionally, a sample

schedule that varies temporally and spatially will be more likely to capture the entire fish assemblage in Ness Creek, West Fork Ness Creek, Skipanon River and Trail Creek.

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Appendix A. Permits obtained from Oregon Department of Fish and Wildlife and National Marine Fisheries Service to sample fish in LEWI.

Oregon
Theodore R. Kulongoski, Governor

Department of Fish and Wildlife
Fish Division
3604 Cherry Avenue NE
Salem, OR 97303
(503) 947-6200
FAX (503) 947-6202
TTY (503) 947-6339
www.dfw.state.or.us

SCIENTIFIC TAKING PERMIT - FISH

PERMITTEE: **Steve Corbett**
ORGANIZATION: **National Park Service**

PERMIT NUMBER: **OR2005-2650M1**
PROJECT TITLE: **Determine presence or non-detection of fish species of fish species that inhabit selected systems within Lewis and Clark National Historic Park**

ADDRESS: **600 East Park Avenue**
Port Angeles, WA 98362

DATES: **3/21/2005 through 12/31/2005**

PHONE: **360-565-3086**
E-MAIL: **Steve_Corbett@nps.gov**

FEDERAL AUTHORIZATION: **NMFS 4d authorization letter dated 2/8/2005**

NAME OF PROJECT LEADER: **Phil Kennedy** NAME OF COLLECTOR: **Phil Kennedy**

SIGNATURE:_____ SIGNATURE: _____

TYPE OF PERMIT: **Individual** RENEWABLE: **YES** MAY COPY? **YES**

LOCATION WHERE COLLECTION ACTIVITY IS AUTHORIZED:
Lower Columbia-Youngs: Skipanon River, Unnamed Creek (T8N, R10W, S34)

CONDITIONS AND AUTHORIZATION OF THIS PERMIT:

1. General conditions of Oregon revised statutes and Oregon administrative rules apply to this permit that cannot be used in lieu of any permit required by federal law or regulation. Permission to sample in areas where federally protected fish may occur is contingent upon the permittee obtaining necessary authorization from the appropriate federal agency and acting in accordance with the conditions established by the federal government.
2. This permit is not transferable from one company or person to another and must be carried on person while collecting.
3. Access to private property is contingent on the permission of the landowner. This permit does not authorize trespassing.
4. Is not valid in any refuge, park, city, wildlife area or other area closed to collection without written approval of manager or administrator.
5. Local officials of the Department of Fish and Wildlife and Oregon State Police must be notified prior to each sampling effort.
6. An annual activity/collection report associated with this permit must be submitted to ODFW by 31 December, 2005, using the on line application process available at http://fishresearch.nwr.noaa.gov/. Renewal of this permit is subject to receipt by ODFW of the annual activity/collection report either prior to or in conjunction with the renewal application.
7. No protected species may be taken unless specifically listed below and any other necessary federal authorizations have been granted. See ODFW Sport Fishing Regulations for listing of species, or contact ODFW directly.

Appendix A. Permits obtained from Oregon Department of Fish and Wildlife and National Marine Fisheries Service to sample fish in LEWI (continued).

8. All numbers of fish authorized in this permit are annual totals.
9. Persons named above as "Collectors" must sign their own copy of the permit and carry the signed copy while engaged in the activities authorized in this permit.
10. Persons not named above may assist in collecting only while accompanied by project leader(s) or authorized collector(s) listed above.
11. Additional conditions and authorization:

a) **May capture, examine and release (take) up to a total of 15 juvenile Chinook salmon (Lower Columbia River Chinook Salmon ESU), 15 juvenile chum salmon (Lower Columbia River Chum Salmon ESU), 15 juvenile hatchery and 10 unmarked coho salmon (Lower Columbia Coho Salmon ESU), 15 adult largemouth bass, 15 juvenile steelhead, 15 adult cutthroat trout, and unlimited numbers of other species. After examination and recovery, all fish should be immediately released, unharmed, at the capture site and recorded in the take.**

b) **Fish may be taken by backpack electrofishing. Electrofishing protocols should follow the guidelines established by the National Marine Fisheries Service (NMFS) in June 2000. If sampling equipment (nets & boots primarily) is not from a local source it must be disinfected with an iodine solution before use and after project completion.**

c) **Activities must be coordinated with local ODFW Fish Biologist, Keith Braun or Chris Knutsen, *prior to any sampling*. Please provide the results of your data collection to the ODFW fish biologists at the conclusion of project sampling.**

d) **Indirect mortality may not exceed 5% of the total take for any species at any site. In the event that mortality for any species exceeds this rate, the permittee should contact the Endangered Species Act Coordinator, ODFW, (503/947-6253) prior to any further activity.**

e) **This permit only grants authority to conduct this activity under state law. Obtaining appropriate federal clearance under the Endangered Species Act is the permittee's responsibility. Terms and conditions in Attachment 1 must be adhered to for species covered under NMFS 4(d) authorization. If a condition on this permit conflicts with a condition on the federal permit or authorization, then the permittee must comply with the more restrictive condition.**

f) **Unless otherwise stated in this permit, all authorized take is only for the species, purposes and by the protocols described in the permit application. If you approach or meet your permitted take in a location and still have sampling to do, please contact the ODFW ESA Coordinator as soon as possible.**

ISSUED BY:

Mary L. Hanson
Endangered Species Act Coordinator

DATE: July 26, 2005

Distribution: Keith Braun, Chris Knutsen – ODFW; Leslie Schaeffer - NOAA Fisheries

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Appendix A. Permits obtained from Oregon Department of Fish and Wildlife and National Marine Fisheries Service to sample fish in LEWI (continued).

Attachment 1

Terms and Conditions for 4(d) Authorized Take

1. Each Researcher must ensure that the listed species are taken only at the levels, by the means areas, and for the purposes set forth in the Programs and in conditions in NMFS' determination

2. Each Researcher must not intentionally kill or cause to be killed any listed species—unless the l under the 4(d) rules specifically allows intentional lethal take.

3. Each Researcher must handle each listed fish with extreme care and keep them in cold water to maximum extent possible during sampling and processing procedures. When fish are transferr healthy environment must be provided—e.g., the holding units must contain adequate amounts circulated water. When gear is used that captures a mix of species, listed fish must be processe minimize handling stress.

4. Each Researcher must stop handling listed juvenile fish if the water temperature exceeds 70 de Fahrenheit at the capture site. Under these conditions, listed fish may only be identified and co

5. If the Researcher must anesthetize listed fish to keep from injuring or killing them while they are the fish must be allowed to recover before being released. Fish that are only counted must rem and not be anesthetized.

6. Each Researcher must use a sterilized needle for each individual injection when passive integra transponder tags (PIT-tags) are inserted into listed fish.

7. If the Researcher incidentally captures any listed adult fish while sampling for juveniles, the adu be released without further handling and such take must be reported.

8. Each Researcher must exercise due caution during spawning ground surveys to avoid disturbin salmonids when they are spawning. Researchers must also avoid walking in salmon streams w possible—especially where listed salmonids are likely to spawn. Visual observation must be us intrusive sampling methods, especially when just determining anadromous fish presence.

9. Any Researcher using backpack electrofishing equipment must comply with NMFS' Backpack E Guidelines (June 2000) available online at http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/final4d/electro2000.pdf. No boat electrofish approved under the 4(d) rules.

10. If any Researcher violates the stated terms and conditions they will be subject to any and all pe provided by the ESA. NMFS may revoke this approval if the Projects it authorizes are not cond accordance with the approval, both 4(d) rules, and the requirements of the ESA or if NMFS dete the findings made under section 4(d) of the ESA are no longer valid.

11. NMFS Northwest Region may amend the provisions of this approval after giving the Researche notice of the amendment.

12. Each Researcher must possess a copy of NMFS' determination letter, the enclosed terms and and their project description (copy of submitted application) when engaging in their project activ

13. The Researcher may not transfer or assign this approval to any other person as defined in Sect the ESA. This approval ceases to be in effect if transferred or assigned to any other person wit authorization from NMFS.

14. Each Researcher must obtain all other Federal, state, and local permits/authorizations necessa conducting the approved projects.

OR2005-2650M1 Page 3

Appendix A. Permits obtained from Oregon Department of Fish and Wildlife and National Marine Fisheries Service to sample fish in LEWI (continued).

15. Each Researcher must allow any NMFS employee or representative to accompany field personnel while they conduct the activities authorized. The Researchers must also allow such NMFS representatives to inspect any records or facilities relevant to the activities covered by the approval.

16. Each Researcher must obtain approval from NMFS before changing sampling locations or research protocols.

17. Each Researcher must notify NMFS as soon as possible but no later than two days after any authorized level of take is exceeded or if such an event is likely. Researchers must submit a written report detailing why the authorized take level was exceeded or is likely to be exceeded.

18. On or before January 31th of 2006, ODFW must submit to NMFS an annual report of projects conducted under their Program. The report must be submitted on line using the NMFS' fishresearch website. In addition, ODFW must provide a description of the populations sampled and an estimate of the proportion of each population taken as a result of their Program including efforts being made to prevent the over utilization of small populations. Approval for subsequent years' research activities will be contingent upon NMFS' acceptance of this report. Falsifying annual reports or records related to the research is a violation of this approval.

19. Each Researcher is responsible for any biological samples collected from listed species as long as they are used for research purposes. The Researcher may not transfer biological samples to anyone not listed in their application without prior written approval from NMFS.

Project-Specific Terms and Conditions

1. Listed species under the jurisdiction of the U.S. Fish & Wildlife Service (USFWS)
   Researchers are required to contact the USFWS regarding listed bull trout and other species under their jurisdiction that may be taken during this research.

2. Surrogate Hatchery Fish: Hatchery fish shall be used as test animals whenever possible as surrogates for listed fish. In particular, projects associated with documenting the effects of hydropower facilities on fish survival and/or passage shall explore using hatchery fish as test animals and the project leaders must notify NMFS of their plans.

Appendix B. Photo documentation of electrofishing captures and study sites for the LEWI fish inventory.

Figure B1. Digital photograph of cutthroat trout captured by electrofishing in Trail Creek on April 27, 2005.

Figure B2. Digital photograph Western brook lamprey captured by electrofishing in Trail Creek on April 27, 2005.

Figure B3. Digital photograph of cutthroat trout captured by electrofishing in Ness Creek on April 26, 2005.

Figure B4. Digital photograph of unidentified sculpin captured by electrofishing in Ness Creek on April 26, 2005.

Figure B5. Digital photograph of threespine stickleback captured by electrofishing in Ness Creek on April 26, 2005.

Figure B6. Digital photograph of unidentified salmonid captured by electrofishing in Ness Creek on April 26, 2005.

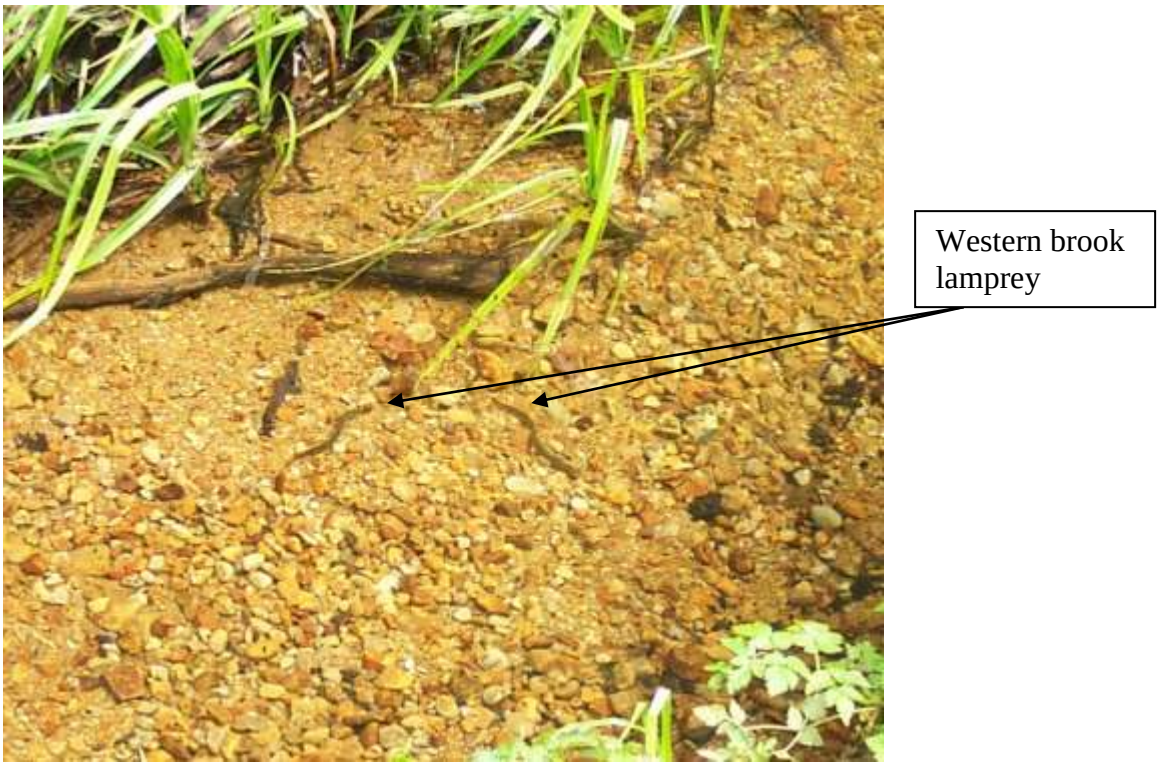

Figure B7. Digital photograph of western brook lamprey that exhibited spawning behavior and constructed redd in Trail Creek on April 27, 2005.

Figure B8. Photo of Skipanon River at Rkm 6.0.

Figure B9. Photo of Ness Creek at creek km 0.4.

Figure B10. Photo of Trail Creek at creek km 0.9.

Appendix C. Voucher specimens collected to verify species identification.*

Species	Common name	Drainage	Voucher #
Leptocottus armatus	Pacific staghorn sculpin	Ness Creek	LEWI-05-FV-1
Cottus perplexus	Reticulate sculpin	Ness Creek	LEWI-05-FV-2
Oncorhynchus mykiss	Rainbow trout	Ness Creek	LEWI-05-FV-3
Cottus gulosus	Riffle sculpin	Ness Creek	LEWI-05-FV-4
Cottus aleuticus	Coastrange sculpin	West Fork Ness Creek	LEWI-05-FV-5
Cottus gulosus	Riffle sculpin	Trail Creek	LEWI-05-FV-6
Lampetra richardsoni	Western brook lamprey	Trail Creek	LEWI-05-FV-7
Oncorhynchus tshawytcha	Chinook salmon	Trail Creek	LEWI-05-FV-8
Cottus perplexus	Reticulate sculpin	Ness Creek	LEWI-05-FV-9

* Voucher specimens were identified by Katherine Maslenikov at University of Washington Fish Collection.

Appendix D. Tissue samples collected for genetic analysis.

Species (Based on Field ID)	Drainage	Sample #
Cutthroat trout	Ness Creek	LEWI-05-01
Coho salmon	Ness Creek	LEWI-05-02
Cutthroat trout	Ness Creek	LEWI-05-03
Cutthroat trout	Ness Creek	LEWI-05-04
Coho salmon	Ness Creek	LEWI-05-05
Cutthroat trout	Trail Creek	LEWI-05-06

Appendix E. Original data from electrofishing surveys conducted in Ness Creek.

Survey Area Creek km _0.0_ to _2.0_ Page _1_ of _2_

Olympic National Park Electrofishing Survey Form

River /Creek:___Ness Creek_____ Date: _4/26/05_and 4/28/05
Time of Survey: 4/26/05 Begin _0930__End _ 1530_ 4/28/05 Begin _0800__End _ 0945_
Observer/s & Agency: _____S. Corbett, P, Kennedy, S. Stonum (NPS)___
Survey Method: Backpack Electrofisher Water Visibility: Fair
Flow: LOW Water Temp (C°) = __10.5__at _0930__ Weather: Overcast

Shocker Settings and Information

Shocker Setting: _____I-5_____
Voltage Range: _____200-400_____
Time Counter Beginning: __0_____
Time Counter Ending: _____572_____
Conductivity (µs/cm): ___165 ____

Comment

Baited minnow trap deployed between 4/26/05 1600 and 4/28/05 1000 – No fish captured

Summary

Species	Mean TL (mm)	Length Range	Species Count
GAAC	40	29-62	155
LEAR	50	50	1
ONCL	136	43-180	14
ONKI	119	66-131	17
ONXX	NA	NA	8
COXX	NA	NA	104
TAGR	NA	NA	3
COGU	103	103	1
COPE	52-74	63	2
ONMY	44	44	1

Species	Total Length (mm)	Comments	Species	Total Length (mm)	Comments
GAAC	62		COPE	52	Voucher #05-2
GAAC	64	Photo #56	ONCL	163	Photo #52; fin clip #05-01
GAAC	29		ONKI	131	Unmarked; Photos #50 and #51
GAAC	37		ONCL	115	
GAAC	39		ONCL	111	
GAAC	34		COXX	120	
GAAC	52		GAAC		n=58
GAAC	41		ONCL	131	
GAAC	44		ONXX	43	
COXX	63		ONMY	44	Voucher #05-3
COXX	73		GAAC		n=23
COXX		n=58	ONCL	180	Photo #48 Fin clip #05-04
ONXX	46		ONCL	110	
ONXX	43		ONCL	155	Photos #41 and #42
LEAR	50	Photo #53; voucher #05-1	ONXX		n=5
COXX	162		TAGR	n=2	
COXX	140				

Species Codes

ONKI	Coho Salmon	ONKE	Chum Salmon	COAS	Prickly Sculpin	LEAR	Pac. Staghorn Sculpin
ONTS	Chinook Salmon	ONCL	Cutthroat Trout	COGU	Riffle Sculpin	LARI	West Brook Lamprey
ONMY	Rainbow/Stealhead	ONXX	Unidentified salmonid	COAL	Coast-range Sculpin	LATR	Pacific Lamprey
ONNE	Sockeye/Kokanee	COXX	Unidentified Sculpin	COPE	Reticulate Sculpin	LAXX	Unidentified Lamprey
ONGO	Pink Salmon	GAAC	ThreespineStickleback	CORH	Torrent Sculpin	TAGR	Roughskin Newt

Appendix E. Original data from electrofishing surveys conducted in Ness Creek (continued).

Olympic National Park Electrofishing Survey Form

River /Creek:___Ness Creek_____ **Date: _4/26/05_and 4/28/05**

Time of Survey: 4/26/05 Begin _0930__End _ 1530_ 4/28/05 Begin _0800__End _ 0945_

Observer/s & Agency: _____S. Corbett, P, Kennedy, S. Stonum (NPS)___

Survey Method: Backpack Electrofisher

Flow: LOW Water Temp (C^o) = __10.5__at _0930__

Water Visibility: Fair

Weather: Overcast

Shocker Settings and Information

Shocker Setting: _____I-5_____

Voltage Range: _____200-400_____

Time Counter Beginning: __0_____

Time Counter Ending: _____572_____

Conductivity (µs/cm): ___165 ____

Summary

Species	TL (mm)	Length Range	Species Count
	See Page 1		

Species	Total Length (mm)	Comments	Species	Total Length (mm)	Comments
GAAC		n=13	ONKI	66	
ONKI		n=2	COXX		n=23
GAAC		n=13	ONKI		n=4
GAAC		n=14	TAGR		n=1
COXX		n=1			
GAAC		n=6			
ONKI		n=7	ONCL	130	
ONCL	129		COXX		n=15
GAAC		n=10	COPE	74	Voucher #05-9
ONKI		n=1			
COGU	103	Photo #37; voucher #05-4			
COXX		n=2			
GAAC		n=9			
ONCL		n=5			
ONKI	119	Unmarked; fin clip #05-05; photo #36			

Species Codes

ONKI	Coho Salmon	ONXX	Unidentified salmonid	COAS	Prickly Sculpin	LARI	West Brook Lamprey
ONTS	Chinook Salmon	SACO	Bull Trout	COCO	Short-head Sculpin	LAXX	Unidentified Lamprey
ONMY	Rainbow/Stealhead	SAFO	Brook Trout	COAL	Coast-range Sculpin	CACA	Longnose Sucker
ONNE	Sockeye/Kokanee	SAMA	Dolly Varden	COPE	Reticulate Sculpin	RHCA	Longnose Dace
ONGO	Pink Salmon	SAXX	Bull Trout/Dolly V.	CORH	Torrent Sculpin	RHOS	Speckled Dace
PRWI	Mountain Whitefish	PTOR	Northern Pikeminnow	RIBA	Redside Shiner	NOHU	Olympic Mudminnow
ONCL	Cutthroat Trout	COXX	Unidentified Sculpin	LAAY	River Lamprey	XXXX	Unidentified sp.
ONKE	Chum Salmon	COGU	Riffle Sculpin	LATR	Pacific Lamprey	TAGR	Roughskin Newt

Appendix F. Original data from electrofishing surveys conducted in West Fork Ness Creek.

Survey Area Creek km _0.0 to _0.2_ Page _1_ of _1_

Olympic National Park Electrofishing Survey Form

River /Creek:___W. Fk. Ness Creek_____ **Date: _4_/_26_/_05_**

Time of Survey: Begin _1450__ End _ 1530__

Observer/s & Agency: _____S. Corbett, P, Kennedy (NPS)___

Survey Method: Backpack Electrofisher

Flow: LOW Water Temp (C^o) = ___12__at _1450__

Water Visibility: Very Good

Weather: Overcast

Shocker Settings and Information

Shocker Setting: _____I-5_____

Voltage Range: _____300-400_____

Time Counter Beginning: __NA_____

Time Counter Ending: _____NA_____

Conductivity (µs/cm): ___NA ____

Summary

Species	Mean TL (mm)	Length Range	Species Count
GAAC	NA	NA	17
ONCL	127	127	1
COAL	80	80	1
COXX	NA	NA	1
ONKI	NA	NA	5

Species	Total Length (mm)	Comments	Species	Total Length (mm)	Comments
ONKI	Fry	n=2			
GAAC		n=5			
ONCL	127				
COAL	80	Voucher #05-5			
GAAC		n=4			
ONKI	Fry	n=1			
COXX		n=1			
GAAC		n=8			
ONKI	Fry	n=2			

Species Codes

ONKI	Coho Salmon	ONXX	Unidentified salmonid	COAS	Prickly Sculpin	LARI	West Brook Lamprey
ONTS	Chinook Salmon	SACO	Bull Trout	COCO	Short-head Sculpin	LAXX	Unidentified Lamprey
ONMY	Rainbow/Stealhead	SAFO	Brook Trout	COAL	Coast-range Sculpin	CACA	Longnose Sucker
ONNE	Sockeye/Kokanee	SAMA	Dolly Varden	COPE	Reticulate Sculpin	RHCA	Longnose Dace
ONGO	Pink Salmon	SAXX	Bull Trout/Dolly V.	CORH	Torrent Sculpin	RHOS	Speckled Dace
PRWI	Mountain Whitefish	PTOR	Northern Pikeminnow	RIBA	Redside Shiner	NOHU	Olympic Mudminnow
ONCL	Cutthroat Trout	COXX	Unidentified Sculpin	LAAY	River Lamprey	XXXX	Unidentified sp.
ONKE	Chum Salmon	COGU	Riffle Sculpin	LATR	Pacific Lamprey	TAGR	Roughskin Newt

Appendix G. Original data from electrofishing surveys conducted in the Skipanon River.

Survey Area Rkm _5.8_ to _6.0_ Page _1_ of _1_

Olympic National Park Electrofishing Survey Form

River /Creek:___Skipanon River _____ **Date: _4_/_27_/_05_**

Time of Survey: Begin _0910__ End _ 1000__

Observer/s & Agency: _____S. Corbett, P, Kennedy, S. Stonum (NPS)___

Survey Method: Backpack Electrofisher

Flow: LOW Water Temp (C^o) = ___14__at _0910__

Water Visibility: Fair

Weather: Overcast

Shocker Settings and Information

Shocker Setting: _____I-5_____

Voltage Range: _____300-600_____

Time Counter Beginning: __572_____

Time Counter Ending: _____725_____

Conductivity (µs/cm): ___120 _____

Summary

Species	Mean TL (mm)	Length Range	Species Count
COXX	64	64	1
GAAC	42	38-46	2
TAGR	NA	NA	1

Species	Total Length (mm)	Comments	Species	Total Length (mm)	Comments
COXX	64	Photo # 28			
GAAC	46				
GAAC	38				
TAGR	NA	n=1			
		Backpack electro-fishing ineffective method due to size/depth; Recommend seining, boat electrofish,, or hoop net.			

Species Codes

ONKI	Coho Salmon	ONXX	Unidentified salmonid	COAS	Prickly Sculpin	LARI	West Brook Lamprey
ONTS	Chinook Salmon	SACO	Bull Trout	COCO	Short-head Sculpin	LAXX	Unidentified Lamprey
ONMY	Rainbow/Stealhead	SAFO	Brook Trout	COAL	Coast-range Sculpin	CACA	Longnose Sucker
ONNE	Sockeye/Kokanee	SAMA	Dolly Varden	COPE	Reticulate Sculpin	RHCA	Longnose Dace
ONGO	Pink Salmon	SAXX	Bull Trout/Dolly V.	CORH	Torrent Sculpin	RHOS	Speckled Dace
PRWI	Mountain Whitefish	PTOR	Northern Pikeminnow	RIBA	Redside Shiner	NOHU	Olympic Mudminnow
ONCL	Cutthroat Trout	COXX	Unidentified Sculpin	LAAY	River Lamprey	XXXX	Unidentified sp.
ONKE	Chum Salmon	COGU	Riffle Sculpin	LATR	Pacific Lamprey	TAGR	Roughskin Newt

Appendix H. Original data from electrofishing surveys conducted in Trail Creek

Survey Area Creek km _1.1_ to _2.6_ Page _1_ of _1_

Olympic National Park Electrofishing Survey Form

River /Creek:___Trail Creek_____ **Date: _4_/_27_/_05_**

Time of Survey: Begin _1100__ End _ 1500__

Observer/s & Agency: _____S. Corbett, P, Kennedy, S. Stonum (NPS)___

Survey Method: Backpack Electrofisher

Flow: LOW Water Temp (C^{o}) = ___10__at _1030__

Water Visibility: Very Good Weather: Overcast

Shocker Settings and Information

Shocker Setting: _____I-5_____

Voltage Range: _____300-400_____

Time Counter Beginning: __725_____

Time Counter Ending: _____1456_____

Conductivity (µs/cm): ___134 ____

Summary

Species	TL (mm)	Length Range	Species Count
GAAC	NA	NA	3
ONCL	141	136-147	3
LARI	NA	NA	7
ONXX	NA	NA	1
COXX	NA	NA	66
TAGR	NA	NA	3
COGU	105	105	1
ONTS	40	40	1

Species	Total Length (mm)	Comments	Species	Total Length (mm)	Comments
	Fork #1			Fork #2	
COGU	105	Voucher # 05-6	ONCL	147	Photo #16; fin clip #05-06
COXX	82		COXX		n=6
COXX		n=2	LARI	120	Photos #14 and #15; voucher # 05-7
COXX	47		COXX		n=28
COXX		n=8	ONTS	40	Photos #12 and #13 voucher #05-8
GAAC		n=3	ONCL	136	Photo #8
TAGR		n=3	ONCL	140	Photo #7
			COXX		n=12
			LARI		n=5; observed spawning pairs and several redds
			COXX		n=8
			ONXX	Fry	Observed
			LARI		Observed

Species Codes

ONKI	Coho Salmon	ONXX	Unidentified salmonid	COAS	Prickly Sculpin	LARI	West Brook Lamprey
ONTS	Chinook Salmon	SACO	Bull Trout	COCO	Short-head Sculpin	LATR	Pacific Lsmprey
ONMY	Rainbow/Stealhead	SAFO	Brook Trout	COAL	Coast-range Sculpin	LAXX	Unidentified Lamprey
ONNE	Sockeye/Kokanee	SAMA	Dolly Varden	COPE	Reticulate Sculpin	ONCL	Cutthroat Trout
ONGO	Pink Salmon	SAXX	Bull Trout/Dolly V.	CORH	Torrent Sculpin	COXX	Unidentified Sculpin
PRWI	Mountain Whitefish	PTOR	Northern Pikeminnow	COGU	Riffle Sculpin	TAGR	Roughskin Newt

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

NPS D-82, December 2008

National Park Service
U.S. Department of the Interior

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