2020 Annual Summary of Fish, Shellfish, and Marine Invertebrate Take for Science, Education, and Rescue/Salvage

Oregon Department of Fish and Wildlife

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Introduction

The Oregon Department of Fish and Wildlife (ODFW) has been issuing permits and authorizations for the take of fish, shellfish, and marine invertebrates through a permitting program since as early as 1993. The ODFW mission is to protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations. The Fish Division permitting program carries out the agency's mission to conserve indigenous species and to provide guidance to researchers and resource managers to help study, manage, and protect fish and habitat resources.

Permitting is important for several reasons in addition to being mandated by Oregon Revised Statutes (ORS) and Oregon Administrative Rules (OAR). Permits are a way for ODFW to track take activities happening statewide, which provides ODFW the opportunity to manage resources including protections of listed or sensitive species or areas where sampling (or multiple sampling events) could have negative impacts. Permitting also allows ODFW to coordinate efforts so that researchers are not interfering or overlapping sampling areas and ensures that researchers, educators, and restoration practitioners maintain compliance with laws and have protection from litigation. Approved permits and authorizations can include terms and conditions such as sampling protocols, anesthetic guidelines, and temperature restrictions which also promotes responsible and ethical treatment of animals.

The permitting program authorizes the scientific, educational, and rescue/salvage take of all fish, shellfish, and marine invertebrates in Oregon. This responsibility arises from the authority assigned to ODFW and the Oregon Fish and Wildlife Commission in law (ORS 492.012, 497.075, 497.298, 498.002, 506.036, and 506.109; OAR 635-007-0900 to 635-007-0930, 635-100-0005, 635-100-0040, and 635-100-0125). A primary consideration in reviewing and authorizing permits is to assure the ethical and conservative use of these species, consistent with needs identified by the state list of Threatened and Endangered Species (ORS 496.176 and 496.182), the Sensitive Species List (OAR 635-100-0040), conservation and recovery plans, and the Oregon Conservation Strategy (ODFW 2016). The federal Endangered Species Act (Code of Federal Regulations 16 sections 1531 – 1544) provides additional focus, and the program

closely coordinates with the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA) and the U.S. Fish and Wildlife Service (USFWS).

Take of fish from the waters of the state is prohibited unless there is a permit or other authorization from ODFW in place to allow it (ORS 498.002, ORS 497.075). A Scientific Take Permit (STP) can be issued to any agency, corporation, association, entity, or student desiring to engage in taking of fish for scientific or educational purposes (OAR 635-007-0900). A Rescue/Salvage Authorization (RSA) is issued if the purpose of the take is to remove fish from an area to avoid or minimize impacts to the fish due to in-water work activities. STPs and RSAs are not needed for ODFW employees or enrolled tribal members working within the boundaries of reservation lands. The definition of "take" means to "fish for, hunt, pursue, catch, capture or kill, or attempt to fish for, hunt, pursue, catch, capture or kill" (ORS 506.006 (12), OAR 635-006-0001 (43)). The permitting program issues permits and authorizations to take fish if the purpose of the take is for science, education, or rescue/salvage.

The purpose of this report is to summarize and document information collected by ODFW Scientific Take Permits and Rescue/Salvage Authorizations. While the program has been in place since at least 1993, the program annual reports started in 2019. The intention of this report is to provide information on the types of activities the permitting program authorizes including a summary of the species handled across the state with examples showing the different types of data collected through this permitting program.

Types of permits and authorizations

There are two types of take permits/authorizations that the permitting program issues: Scientific Take Permits (STP) and Rescue/Salvage Authorizations (RSA). A STP issued by the Fish Division of ODFW is required for any person desiring to take marine fish, shellfish or invertebrates, freshwater fish, mussels, clams, shrimp, or crayfish from waters of this state for scientific or educational purposes (OAR 635-007-0900). An RSA is required if the take is for rescue/salvage purposes related to in-water work activities.

Prior to 2019, any rescue/salvage project was permitted with a STP. In 2019, some changes were made to the permitting program and RSAs began to be issued to authorize the take of fish and shellfish for construction and in-water work projects where the purpose of the take was to aid in the survival of the animal that would likely be harmed or die otherwise. This change better aligned ODFW Fish Division with how ODFW Wildlife Division authorized similar activities, alleviated the need to charge a fee because this change meant not issuing a permit defined in rule, and allowed for a more streamlined and simpler application, review, and reporting process.

When the purpose of a project is for scientific take or education and includes transport of live eggs, fish or marine invertebrates related to those activities, the transport of these organisms can be authorized under the STP to alleviate the need for an ODFW Fish Transport Permit and the need to get two separate permits from ODFW.

One benefit of the way ODFW implements the permitting program is the close partnership with NOAA Protected Resources Division. ODFW administers the 4(d) research permit program in close collaboration with NOAA to obtain annual, easy to modify research permits for ESA fish that are jointly issued with NOAA. As part of this process, ODFW permitting staff coordinate with researchers in Oregon to submit applications that are reviewed by ODFW and NOAA via joint process. NOAA makes a Section 7 determination (NMFS ECO Consultation Number: WCRO-2019-03648, 3/26/2020) for the annual 4(d) permit program which analyzes effects to all NOAA species. Much of the joint permit review process with NOAA for the 4(d) program as well as other jointly issued permits like Willamette Biological Opinion and CRS Biological Opinion also ensures that the agencies coordinate with proposed research projects to make sure there is not duplicate sampling or take occurring in Oregon.

Payments Overview

The 2009 Legislature voted to charge a fee to receive a Fish or Wildlife Scientific Take Permit effective January 1, 2010 (OAR 635-006-1025). The intention of the permit fees (TABLE 1) is to offset the costs of administrative and permitting tasks.

TABLE 1. List of fees for Scientific Take Permits by year. ODFW stopped charging for K-12 educational institutes in 2016. There is no fee for Rescue/Salvage Authorizations.

Time Period (Years)	K-12	Other Entity
2010-2015	$ 17.00	$ 102.00
2016-2017	-	$ 108.00
2018-2019	-	$ 114.50
2020-2023	-	$ 121.50

Process

The ODFW permitting program uses a web-based program to administer STPs and RSAs. The Authorizations and Permits for Protected Species (APPS: https://apps.nmfs.noaa.gov) website is written and maintained by a private consultant (Helen Kupeli at HMKConsulting) via contract from NOAA. ODFW permits were incorporated into the APPS system in 2002, prior to which ODFW permits were managed using paper applications. The database is housed on a server at the NOAA's Northwest Fisheries Science Center in Seattle, WA and there are several programs at NOAA that use APPS including the Protected Resources Programs on both the east and west

coasts. Oregon is currently the only state to include state level take permitting within the APPS program.

Because Oregon uses the APPS program, ODFW works jointly with permitting partners at NOAA to allow some combined ODFW/NOAA permits and authorizations. Applicants can apply for NOAA Section 10 permits, NOAA 4(d) research permits, Determination of Take authorizations under both the Willamette and Columbia River System Biological Opinions, Oregon Scientific Take permits, and Oregon Rescue/Salvage authorizations all with the same application process using APPS.

Once an application is submitted, it is reviewed for completeness making sure all the fields are filled in and comprehensible, that the take requested matches what is described in the methods, and that all the information needed to understand the project purpose and impacts of take are included. If ESA-listed fish are included, the corresponding federal authorization is reviewed to make sure the state permit is not authorizing anything that would affect ESA-listed species that is not already included in the federal authorization. The timeline from receiving an application to issuance is generally 4-6 weeks or less. Applicants can apply for ODFW permits at any time during the year; permits are issued for the calendar year, expiring December 31.

Part of the purpose of the ODFW permitting program is to help inform relevant entities of all the work happening across the landscape so that managers can understand total impacts to the resource due to research, education, and construction-related activities. For each permit or authorization issued, several interested individuals are cc'd on the issued permit email, depending on the scope of the project. The ODFW District and Assistant District Fish Biologists, and the Marine Program Shellfish and Finfish Biologists receive notifications for each of the locations included in the permit and will submit comments prior to permits being issued. Review comments are also sought out from programs or specialists in the agency if applicable, such as Willamette Biological Opinion staff, the Statewide Lamprey Coordinator, the Invasive Species Coordinator, Columbia River Program staff, Marine Reserve Staff, or the Statewide Geneticist. ODFW notifies Oregon Parks and Recreation Department when projects include work on marine shorelines/parks, and Oregon State Police and NOAA's Office of Law Enforcement for projects occurring in the Pacific Ocean.

At any time during the year, requests can be submitted to modify ODFW permits and authorizations. Modifications can be made to any part of the permit, and there is no fee to process and issue them. Administrative or editorial changes are made directly, but changes to methods or take are sent to the ODFW Fish Districts for review.

An annual report is required of any issued permit or authorization (OAR 635-007-0920). An annual report that accounts for the take of all the species that were interacted with and responses to a couple of brief questions summarizing the implementation of the project is due

at the end of each year and no later than January 31. This report is submitted using the APPS program. All the information contained in the following sections of this summary report was compiled by querying the APPS permitting database of submitted annual reports associated with scientific take permits and rescue/salvage authorizations.

What is not included in this report is the take of any non-ESA listed fish by ODFW employees, or ESA-listed fish from ODFW employees that was authorized outside of the 4(d) program. Examples of activities implemented by ODFW employees that are not included here would be fish handled as part of an HGMP, take of USFWS listed species under USFWS/ODFW Section 6 agreement, emergency rescue/salvage take reported under Limit 3 to NOAA, ODFW project take covered by a NOAA Section 7 or 10, volunteer/STEP program, or other management activity that are authorized by ODFW outside of the STP program.

There are limitations of the reported take in the dataset. The records are not QA/QC'd for accuracy, the data is based on what is reported by different individuals (that are not always the project biologists), and the formatting and types of data collected are based on the way the APPS system was programmed. The information reported through APPS is available for anyone to search and can be a useful tool to find species reported by locations, take methods, and a variety of search fields. An example of a limitation for *Oncorhynchus mykiss* specifically is that in areas where both rainbow trout and steelhead occur, and there is no way in the field to differentiate between the two, they are often all reported as steelhead. Therefore, the tallies for steelhead may be inflated because they include rainbow trout.

Take is reported in APPS by 4th field HUC which doesn't align exactly with ODFW Fish District boundaries. Throughout this report, where HUCs overlap multiple districts, the HUCs were included in summaries by the district that encompassed the majority of HUC area as follows: Lower Willamette HUC assigned to NWWD coast district (not included in NWWD Cascade district), Middle Willamette HUC assigned to Mid-Willamette district (not included in NWWD Cascade district), Hells Canyon HUC assigned to Wallowa district (not included in LaGrande district), and Upper Willamette HUC assigned to mid-Willamette district (not included in Upper Willamette district).

Take as reflected in this report is an underestimate of the total research, monitoring, education, and rescue/salvage take that occurred in Oregon for various reasons. First, ODFW staff do not need a STP for non-ESA fish take, therefore any activities conducted by ODFW staff or by other entities with ODFW staff present are not reported through the permitting program. Second, for any border waters with Washington or Idaho, if researchers are not working on a specific state's shoreline and only working in open waters, a permit from either state is valid. If a project was permitted by Washington or Idaho, that take is not reported to Oregon under this program. In addition to being an underestimate of total numbers, take is sometimes reported

by the permit holders or primary contacts which are not always the biologists that collect the data. There are no confirmations on identification of species or locations. When unusual numbers, locations, or species are reported, it is sometimes questioned during the report review process, however, reports are not always confirmed.

Take Summaries

Prior to 2002, permits were managed with paper applications which have been archived at ODFW but have not been converted electronically. The permitting program started using the APPS system in 2002, therefore permit information can only be electronically summarized back to 2002. Since 2002, the ODFW permitting program has issued over 5,500 permits and authorizations using APPS (TABLE 2). Close to 300 permits are issued annually, with most of the applications submitted for 'Management/Applied Research' or 'Monitoring' project types.

TABLE 2. Number of permits issued by year (2002-2020), authorization type, and project type. OR-RSA = Oregon Rescue/Salvage Authorization, OR-STP = Oregon Scientific Take Permit.

Year	# Permits Issued	Authorization Type			Project Type					
		NOAA 4(d)	OR-RSA**	OR-STP	Academic Research	Mmt - Applied Research	Education - School/ College	Monitoring	Public Display or Interpretive Program	Rescue/ Salvage
2002	294	196		191	54	196	31	135	9	2
2003	328	215		238	62	192	42	145	11	24
2004	304	184		242	54	167	41	131	10	33
2005	295	158		254	58	147	45	114	9	33
2006	295	158		254	51	141	42	120	11	46
2007	315	145		269	55	143	35	133	8	51
2008	328	80		290	53	156	49	130	11	53
2009	324	117		265	62	158	42	123	16	45
2010	312	101		261	64	143	43	117	12	58
2011	275	93		227	50	134	39	112	10	44
2012	284	82		239	53	136	39	104	10	53
2013	272	85		223	50	130	36	105	9	49
2014	275	78		229	46	130	30	103	7	52
2015	277	76		234	44	123	34	102	8	68
2016	279	79		236	53	125	32	105	14	59
2017	281	76		239	54	120	35	99	10	68
2018	265	73		226	49	119	32	84	10	68
2019	286	74	65	187	44	117	37	101	13	86
2020	264	75	77	157	50	203	33	92	17	79
*Total**	*5,553*	*2,145*	*142*	*4,461*	*1,006*	*2,780*	*717*	*2,155*	*205*	*971*

*Totals do not match because permits can include multiple authorizations and project types

**ORSA authorizations were created in 2019, although the rescue/salvage project type was always available.

Take data is authorized and reported spatially by the 4th field Hydrologic Unit Code (HUC) subbasin level. Of the 91 4th-field HUC's available to work in Oregon, permits have been issued in all but three of them (TABLE 3, Appendix FIGURE A1). Two of the three HUC's that have never appeared in the ODFW STP database are in the Southeast district (East Little Owyhee, Thousand Virgin) and the third is in the Klamath district (Butte). The HUC with the most permitted activity is Siletz-Yaquina, which is likely because it has both marine and freshwater projects. The freshwater only HUC with the most permitted activity is the Upper Willamette.

TABLE 3. Total number of permits by 4th field HUC for 2020, 2002-2020 combined, and annual average for 2002-2020 combined.

4th Field HUC	**2020**	**Total (2002-2020)**	**Average (2002-2020)**
Alsea	27	430	23
Alvord Lake	0	25	2
Applegate	4	122	6
Brownlee Reservoir	3	15	1
Bully	0	5	1
Burnt River	0	9	1
Chetco	4	126	7
Clackamas	18	341	18
Coast Fork Willamette	9	160	8
Coos	29	580	31
Coquille	14	273	14
Crooked-Rattlesnake	0	4	1
Donner und Blitzen	2	32	2
Goose Lake	2	44	2
Guano	0	11	1
Harney-Malheur Lakes	2	30	2
Hells Canyon	5	83	4
Illinois	5	125	7
Imnaha River	3	71	4
Jordan	0	2	1
Lake Abert	1	30	2
Little Deschutes	1	35	2
Lost River	3	44	2
Lower Columbia	17	290	15
Lower Columbia-Clatskanie	13	204	11
Lower Columbia-Sandy	18	271	14
Lower Crooked	4	76	4
Lower Deschutes	5	138	7
Lower Grande Ronde	3	61	3
Lower John Day	7	138	7

4th Field HUC	2020	Total (2002-2020)	Average (2002-2020)
Lower Klamath River	1	4	1
Lower Malheur	1	35	2
Lower Owyhee	0	13	1
Lower Rogue	10	188	10
Lower Snake-Asotin	1	14	2
Lower Willamette	24	441	23
McKenzie	17	327	17
Middle Columbia-Hood	12	261	14
Middle Columbia-Lake Wallula	6	124	7
Middle Fork John Day	8	145	8
Middle Fork Willamette	14	243	13
Middle Owyhee	0	13	2
Middle Rogue	8	155	8
Middle Snake-Payette	0	3	2
Middle Snake-Succor	0	4	1
Middle Willamette	20	384	20
Molalla-Pudding	11	154	8
Marine	47	980	52
Necanicum	9	137	7
Nehalem	8	216	11
North Fork John Day	9	149	8
North Santiam	14	215	11
North Umpqua	11	213	11
Powder River	0	23	2
Siletz-Yaquina	40	674	35
Siltcoos	7	136	7
Silver	1	24	2
Silvies	2	29	2
Siuslaw	20	309	16
Sixes	5	160	8
Smith River	1	18	2
South Fork Crooked	1	15	1
South Fork Owyhee	0	3	1
South Santiam	15	218	11
South Umpqua	14	240	13
Sprague	4	86	5
Summer Lake	0	22	2
Trout	2	35	2
Tualatin	19	303	16
Umatilla	8	89	5
Umpqua	22	378	20

4th Field HUC	2020	Total (2002-2020)	Average (2002-2020)
Upper Crooked	3	44	2
Upper Deschutes	8	128	7
Upper Grande Ronde River	6	118	6
Upper John Day	10	167	9
Upper Klamath Lake	7	149	8
Upper Klamath River	7	102	5
Upper Malheur	2	51	3
Upper Quinn	0	10	1
Upper Rogue	8	161	8
Upper Willamette	32	546	29
Walla Walla	2	60	3
Wallowa River	4	79	4
Warner Lakes	3	38	2
Williamson	3	69	4
Willow E	0	5	1
Willow N	0	11	1
Wilson-Trask-Nestucca	25	356	19
Yamhill	13	196	10

Information reported annually includes the actual take numbers of any species handled as part of the project. The actual take reported from the 264 issued permits in 2020 included 11,015,744 individual animals, with work occurring in every ODFW Fish District (TABLE 4, Appendix FIGURE A2, or accompanying Excel spreadsheet).

Over 9 million of those animals were marine invertebrates and over 1.8 million were freshwater fish. Of the 170 identifiable species taken in 2020, there were 30 marine fish species, 56 marine invertebrate species, 76 freshwater fish species, and nine freshwater shellfish species reported. The complete list of species handled in 2020 is shown in Appendix TABLE A1. Since many anadromous species can be captured in either marine or freshwater projects and many projects sample in both locations, one clarification is that salmon, Eulachon, sturgeon, and Starry Flounder in TABLE 4 are summarized under the freshwater fish category in this report.

The freshwater fish take reported in 2020 (Appendix TABLE A1, accompanying Excel spreadsheet) comprises 522,326 native game fish of which white sturgeon were taken the least (N=7) and Coho Salmon were taken the most (N=206,427). Freshwater fish take included 458,848 non-native game fish composed of 75% American Shad, 20% Yellow Perch, 2% Brown and Brook Trout, and less than 1% each of Channel Catfish, bullhead, Smallmouth and Largemouth Bass, Walleye, and other centrarchids.

Marine invertebrate take (TABLE 4) made up 83% of the total take reported in Oregon during 2020. Most of the invertebrate take (N=9,186,469) was from one marine project targeting invertebrates for academic research that were collected via plankton net. Almost half (N=4,979) of the marine fish take (N=10,715) reported in TABLE 4 was from one beach seine project that was looking at the use of estuarine habitats by juvenile salmon.

TABLE 4. Number of freshwater fish, freshwater shellfish, marine fish, and marine invertebrates taken within ODFW Fish Districts in 2020. Additional detailed data by district/HUC/species/take type is available via accompanying Excel spreadsheet distributed with this report.

ODFW Fish District	**Freshwater**		**Marine**		**Total**
	Fish	**Shellfish**	**Fish**	**Invertebrate**	
Coos-Coquille	42,618	594	3,399	87,702	134,313
Deschutes	167,579	44	-	-	167,623
John Day	18,065	111	-	-	18,176
Klamath	820,641	-	-	-	820,641
La Grande*	1,129	-	-	-	1,129
Mid-Willamette*	12,698	452	-	-	13,150
Mid-Coast	148,195	5,148	2,074	61,115	216,532
Mid-Columbia	170,723	590	-	-	171,313
North Coast	22,872	126	1,975	1,383	26,356
NWWD - Cascade Unit*	98,793	2,394	-	-	101,187
NWWD - Coast Range*	7,656	7,228	-	-	14,884
South Coast	3,453	-	-	-	3,453
Southeast	14,188	-	-	-	14,188
Umatilla	207,032	3	-	-	207,035
Umpqua	33,966	9	-		33,975
Upper Rogue	4,347	8	-	-	4,355
Upper Willamette*	4,399	-	-	-	4,399
Wallowa*	23,136	-	-	-	23,136
Marine (Shoreline/Offshore)	363	-	3,267	9,036,269	9,039,899
Total	*1,801,853*	*16,707*	*10,715*	*9,186,469*	*11,015,744*

*Note: where a HUC overlaps two districts, it was assigned to the district that had the higher amount of area included.

Non-native, non-game fish have been introduced throughout Oregon and are common in many basins. In 2020, a total of nine non-native, non-game species were reported as taken in 10 of 18 ODFW Fish Districts (TABLE 5); they were not reported in the Deschutes, John Day, LaGrande, Mid-Coast, South Coast, Umpqua, Upper Rogue, and Upper Willamette districts, as well as the marine shoreline/offshore areas. The highest quantity of a single non-native, non-game fish was the Fathead Minnow (n=133,744) which were caught in projects from the Klamath and NWWD – Coast Range districts. The coast unit of the North Willamette Watershed District reports included seven of the nine non-native, non-game species reported. Eight of the nine species captured in 2020 were also reported in 2019 and while not an unknown species found in Oregon, Tench was the additional species reported in 2020. As of 1/10/23, in the USGS

Nonindigenous Aquatic Species Database (https://nas.er.usgs.gov/queries/default.aspx), Banded Killifish have not been reported east of the John Day Dam, but were reported to ODFW as observed at McNary Dam in 2020. Mosquitofish in Coos-Coquille HUC have never been reported previously on the USGS website. The ODFW permitting program advises permittees to report invasive species to the ODFW Invasive Species Coordinator so the program is aware of sightings, however we do not directly report observations to the NAS database since we cannot QA/QC the identification.

TABLE 5. Number of non-native, non-game fish reported in 2020 within ODFW Fish Districts.

Species/Disposition	Coos-Coquille	Klamath	Mid-Willamette*	Mid-Columbia	North Coast	NWWD - Cascade Unit*	NWWD - Coast Range*	Southeast	Umatilla	Wallowa*	Total
Carp, Common											
Capture/Handle/Release				1		3	19		16	43	82
Intentional Mortality							7	2,288			2,295
Goby, Amur											
Intentional Mortality							1				1
Goldfish											
Capture/Handle/Release	16	96									112
Intentional Mortality			4				57				61
Rescue/Salvage		1,957									1,957
Kilifish, Banded											
Capture/Handle/Release				1	10				15		26
Intentional Mortality						2					2
Minnow, Fathead											
Capture/Handle/Release		70,111					64				70,175
Intentional Mortality		23									23
Rescue/Salvage		63,546									63,546
Mosquitofish											
Capture/Handle/Release	4		81			17	2				104
Intentional Mortality							298				298
Rescue/Salvage			1				28				29
Shiner, Golden											
Capture/Handle/Release							2				2
Tench											
Capture/Handle/Release									1		1
Weatherfish, Oriental											
Intentional Mortality						1	15				16
Total	*20*	*135,733*	*86*	*2*	*10*	*23*	*493*	*2,288*	*32*	*43*	*138,730*

*Note: where a HUC overlaps two districts, it was assigned to the district that had the higher amount of area included.

APPS records the type of take (or handling, i.e., observe/harass, capture/handle/release, transport) that occurs by permittee when encountering the animal. A permit and subsequent reporting are not required if the only take action is 'observe/harass'. There are many projects throughout the state that conduct snorkel surveys or spawning grounds surveys where the only take action is observe/harass. Permittees are encouraged to include observations when they are part of a larger project with multiple collection methods and types of take, but they are not required to do so. Because some permittees report this action and others do not, observe/harass is not directly comparable with other take actions reported. Most of the take reported for freshwater fish species is capture/handle/release which is generally the take action used for the incidental capture of non-target species (TABLE 6). Note that when a project has multiple take actions, often the most intrusive method is reported instead of using multiple lines to report every possible take action. For instance, if a project is tagging only a portion of the fish they capture, then usually all take is reported on one line as capture/mark, tag, sample tissue/release instead of having a separate line for the ones that didn't get tagged. Therefore, numbers handled by take action cannot be tallied precisely in these summaries.

Rescue/salvage projects contributed to 35% of the total freshwater fish take reported in APPS during 2020. Most of the intentional mortality take of freshwater shellfish was from a study looking at the distribution, abundance, and habitat association of Asian Clams (N=5,076).

TABLE 6. Number of organisms taken by type of handling (called 'take action' in APPS).

Take Action	**Freshwater Fish**	**Freshwater Shellfish**	**Marine Fish**	**Marine Invertebrate**	**Total**
Capture/Handle/Release Animal	809,765	659	10,184	9,314	829,922
Capture/Mark, Tag, Sample Tissue/Release Live Animal	97,793	4,645	-	-	102,438
Collect, Sample, and Transport Live Animal	171,496	6	174	9,150,034	9,321,710
Intentional (Directed) Mortality	8,345	5,217	357	26,721	40,640
Observe/Harass	75,997	389	-	400	76,786
Observe/Sample Tissue Dead Animal	68	-	-	-	68
Rescue/Salvage	638,389	5,791	-	-	644,180
Total	*1,801,853*	*16,607*	*10,715*	*9,186,469*	*11,015,744*

There were 529,404 individual salmonids handled or observed in 2020 (TABLE 7), which was 29% of the total freshwater fish handled. Take included both juveniles and adults of most of the salmonid species that occur in Oregon. There was no take of juvenile chum salmon, pink salmon and some introduced trout species in lakes. In TABLE 7, 'juvenile' includes fry, jack,

smolt, larvae, sub adult, sub-yearling and yearling life stages, 'adult' includes adult, carcass and kelt life stages and 'all/unknown' includes unknown life stages. There was no 'egg' life stage take reported for salmonids in 2020.

TABLE 7. Number of salmonid species taken by species and life stage in 2020.

Species	**Life Stage**			**Carcasses**	**Total**
	Adult	**Juvenile**	**All/Unknown**		
Kokanee	14,838	5,479	-		20,317
Salmon, Chinook	5,231	130,716	-	68	136,015
Salmon, Chum	-	501	-		501
Salmon, Coho	11,905	194,522	-		206,427
Salmon, Sockeye	65	33,290	-		33,355
Steelhead*	3,492	85,728	3	156	89,379
Trout, Brook	28	2,273	1,801		4,102
Trout, Brown	331	2,563	118		3,012
Trout, Bull	405	795	18		1,218
Trout, Cutthroat	3,077	5,563	-		8,640
Trout, Rainbow/Redband*	2,310	19,622	2,769		24,701
Whitefish, Mountain	242	39	1,456		1,737
Total	*41,924*	*481,091*	*6,165*	*224*	*529,404*

*Note: *Oncorhynchus mykiss* are split into trout and steelhead in this table.

In 2020, there were 39,072 individual lamprey reported as captured using a variety of methods (TABLE 8). One of the limitations of APPS is that methods are standardized using drop down boxes. Experimental or novel collection methods are characterized simply as 'other'. When summarizing the data, the 'other' collection method can be a variety of techniques. While ongoing efforts by ODFW and USFWS are made to hold trainings to educate researchers on lamprey identification, the majority of lamprey taken under ODFW permit program are still reported as either unknown species, Pacific lamprey, or Western Brook Lamprey. No take was reported during 2020 for any of the other lamprey species present in Oregon: Goose Lake, Miller Lake, Pacific Brook, Pit-Klamath or Western River Lamprey. Most of the rarer species are likely not reported here because there are very few projects working in those HUCS and the projects are not using methods to target capture of lamprey. For species with wider distribution such as Pacific Brook and Western River Lamprey, take is likely not reported to species because researchers are not always able to identify the larval/juveniles sampled and therefore they are reported as unknowns.

TABLE 8. Number of lamprey taken by species, life stage, and capture method, 2020.

Species by Life Stage	Method										Total
	Electrofishing	Fish Passage Facility	Hand and/or Dip Net	Net, Plankton	Screw Trap	Seine	Substrate (Core/Dredge/pump)	Trap (Fyke/Hoop/Pot/Minnow)	Visual Observations	Trawl	
Lamprey (unknown)											
Adult	9					4			20	2	35
All/Unknown	1					4		361			366
Juvenile	1,041	8,403	22,586		323	127	1		125		32,596
Lamprey, Klamath Lake											
Adult	100										100
Juvenile	100										100
Lamprey, Klamath River											
Adult	103										103
Juvenile	103										103
Lamprey, Pacific											
Adult		3	36		68			476			583
Juvenile	763	3,089		10	352			435			4,649
Lamprey, Western Brook											
Adult	55				6			2			63
Juvenile	324				41	7					372
Lamprey, Western River											
Juvenile										2	2
Total	*2,589*	*11,495*	*22,622*	*10*	*790*	*142*	*1*	*1,274*	*145*	*4*	*39,072*

There were 5,776 freshwater mussels taken in 2020 (TABLE 9) by five different projects. During 2020, 736 mussels were rescue/salvaged, 389 were observed during projects but not handled, and 4,651 mussels were captured/released/transported and/or tagged or marked (details in accompanying Excel spreadsheet). Freshwater mussels were reported from only 12 of the 91 4th-field HUC's available to work in Oregon and most of them (N=4,500) were from one project in the mainstem and tributaries of the Willamette River downstream of Willamette Falls.

TABLE 9. Number of total freshwater mussels reported as taken by HUC and species in 2020. Includes take actions: Capture/Handle/Release, Tagging, Live Transport, Observe/Harass and Rescue/Salvage.

4th Field HUC	Floater spp.	Western Pearlshell	Western Ridged	Total
Coquille		153		153
Lower Columbia-Sandy	23			23
Lower Crooked	3		14	17
Lower John Day			2	2
Lower Willamette		4,500		4,500
North Fork John Day	1		1	2
Siuslaw		538		538
South Fork Crooked	18		3	21
Tualatin		7		7
Upper Deschutes		6		6
Upper John Day	39	64		103
Upper Willamette	1	343	60	404
Total	*85*	*5,611*	*80*	*5,776*

There were many different combinations of procedures used on salmon and steelhead in 2020 (TABLE 10). The totals in the cells with multiple procedures in TABLE 10 do not necessarily indicate that all those methods were used on all fish. Some projects have multiple objectives and will not do every procedure on every fish. Applicants are required to include all the procedures they would like to use for each species, but they are not required to report how many of each species received each procedure. Therefore, TABLE 10 indicates the potential maximum number of fish to which the procedure(s) could have been applied.

The most common procedure is the use of anesthetic, reported on up to 52% of the total salmon/steelhead taken in 2020 (TABLE 10). There is not a way to summarize different anesthetics available for use within APPS, but permitees are asked to provide that information in the text portion of the application. A term and condition is placed on all issued permits that requires projects to follow FDA-approved protocols and use only FDA-approved substances for anesthetizing fish.

Other common procedures used on salmon and steelhead included tagging and marking (TABLE 10). Keeping in mind that not all fish received all procedures; 8% could have received a PIT tag, 10% may have been marked with a maxillary clip, and <1% might have received a floy or radio tag. See accompanying Excel spreadsheet for a complete list of the methods, take actions, and procedures used in 2020 for all species.

TABLE 10. Procedures used on salmon and steelhead in 2020.

Procedures	Chinook Salmon (# of fish)	Chum Salmon (# of fish)	Coho Salmon (# of fish)	Sockeye Salmon (# of fish)	Steelhead Trout (# of fish)
Anesthetize	26,770	501	72,316	32,691	7,313
Anesthetize; Dye Injection (Tattoo, Photonic)			5		311
Anesthetize; Dye Injection (Tattoo, Photonic); Fin Clip - Mark	1,421		6,476		117
Anesthetize; Dye Injection (Tattoo, Photonic); Tag, PIT; Tissue Sample Scale					83
Anesthetize; Dye Injection (Tattoo, Photonic); Tissue Sample Scale					359
Anesthetize; Fin Clip - Mark	991		21,438		837
Anesthetize; Fin Clip - Mark; Tag, Acoustic or Sonic (Internal); Tag, PIT; Tag, Radio (Internal)	1,865				
Anesthetize; Fin Clip - Mark; Tag, PIT; Tissue Sample Fin or Opercle					665
Anesthetize; Fin Clip - Mark; Tissue Sample Fin or Opercle			55		
Anesthetize; Maxillary Clip	27,879				15,805
Anesthetize; Maxillary Clip; Tag, Acoustic or Sonic (Internal); Tag, PIT; Tag, Radio (Internal)					552
Anesthetize; Maxillary Clip; Tag, PIT	627			599	607
Anesthetize; Stomach Pump (Non-Lethal); Tissue Sample Fin or Opercle	43				
Anesthetize; Tag, Acoustic or Sonic (Internal); Tag, PIT	226				
Anesthetize; Tag, Elastomer			256		
Anesthetize; Tag, Floy; Tag, Radio (Internal)	13			18	47
Anesthetize; Tag, Floy; Tissue Sample Scale					380
Anesthetize; Tag, PIT	1,767		1,401		2,039
Anesthetize; Tag, PIT; Tissue Sample Fin or Opercle	2,555				337
Anesthetize; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	166		194		7,294
Anesthetize; Tag, PIT; Tissue Sample Scale					200
Anesthetize; Tissue sample (other internal tissues)	3,784				
Fin Clip - Mark	2		591		865
Fin Clip - Mark; Paint, Stain or Dye Immersion	245		212		5,582
Punch (Opercle, Caudal, etc.)	196				1,318
Punch (Opercle, Caudal, etc.); Tag, Floy			454		
Punch (Opercle, Caudal, etc.); Tissue Sample Scale			1,367		
Stomach Pump (Non-Lethal); Tag, PIT; Tissue Sample Fin or Opercle					572
Tag, Floy; Tissue Sample Fin or Opercle				47	2
Tag, Floy; Tissue Sample Scale			430		
Tag, PIT	3,590		2,484		5,160
Tag, PIT; Tissue Sample Fin or Opercle					2,216
Tag, PIT; Tissue Sample Scale	55				457
Tissue sample (other internal tissues)	62				
Tissue Sample Fin or Opercle	314				3
Tissue Sample Scale			19		48
Total Fish With No Procedure Administered	*63,444*	*0*	*98,729*	*0*	*36,210*
Grand Total of All Salmon/Steelhead Take	*136,015*	*501*	*206,427*	*33,355*	*89,379*

The ODFW Fish Division permit program uses a standard allowable incidental mortality rate of 3% for electrofishing and 1% for all other collection methods unless an exception is authorized during district biologist review during permitting for special circumstances. Exceptions are typically authorized for activities like trawling or special dam passage studies and for any project that will have intentional directed mortality. Total incidental mortality rate by collection method for organisms handled during 2020, which excludes intentional/directed mortality (lethal sampling) as well as dead fish observations (carcass sampling) and the visual observation take method is summarized in TABLE 11. The overall mortality for 2020 was 1.1% for freshwater projects combined and 0.05% for all marine projects combined. Marine plankton sampling was the method statewide that had the largest amount of take (n= 9M) but had a very low mortality rate of <1%.

During 2020, overall statewide take showed that the reported electrofishing mortality was well under the 3% standard allowable rate at 1.6% (TABLE 11) which implies the projects authorized for take are doing a good job of using handling techniques to minimize mortality even with a high-risk activity like electrofishing. In contrast, mortality rates for gill/trammel net were well over the 1% standard at 16%, which can be common for this sampling type. Substrate sampling at 11% mort rate was caused by high mortality rates associated with core sampling (TABLE 11). Marine hook and line sampling was over the allowable 1% mort rate at 26.2% as was trap netting at 2.9% and trawling at 94.6%. Some of the fish captured by hook and line were further transported and held in captivity and mortality was due to a power outage at facility not due to capture method from wild.

Rescue salvage projects during 2020 used two primary methods of sampling and reported low incidental mortality rates of 0.5% for seining and 0.6% for electrofishing. Both incidental mortality rates are lower than the STP rates of 0.6% for seining and 2.8% for electrofishing, resulting in rescue salvage projects having lower mortality rates than research, monitoring, or educational projects during this year.

There are four species in Oregon that were recently delisted: Oregon Chub, Foskett Speckled Dace, Borax Lake Chub and Modoc Sucker. There was no take reported on STPs for Oregon Chub, Borax Lake Chub or Modoc Sucker during 2020. Foskett Speckled Dace were taken (n=197) via minnow trap on one morphology research project with 102 directed mortalities and 95 fish that were released. Take of ESA listed fish under USFWS authority included Lost River Suckers (n= 15,742) and Shortnose Suckers (n=22,445). Most of that take was the larval life stage for a USFWS project related to a conservation rearing program including 20,617 Shortnose Suckers and 10,000 Lost River Suckers (TABLE 12). Bull Trout are also under USFWS jurisdiction and permittees handled a total of 1,218 Bull Trout during 2020, of which one third of handled fish were adults.

TABLE 11. Incidental mortality from organisms handled during 2020- reported as total number of organisms and percent of total take by method for freshwater and marine locations.

Take Method	Total Take	Total Incidental Mortality	Mortality Rate (%)
Freshwater Location Total	**1,875,821**	**20,993**	**1.1%**
Electrofishing	96,145	1,537	1.6%
Fish Passage Facility	555,729	9,591	1.7%
Hand and/or Dip Net	129,255	1,261	0.0%
Hook and Line	631	2	0.3%
Net, Gill/Trammel	12,511	1,964	15.7%
Net, Plankton	122,503	108	0.1%
Other/Unknown	138	0	0.0%
Screw Trap	169,154	1,867	1.1%
Seine	574,677	2,891	0.5%
Substrate	814	92	11.3%
Trap (Fyke/Hoop/Pot/Minnow)	214,233	1,680	0.8%
Trawl	31	0	0.0%
Marine Location Total	***9,017,906***	***4,118***	***0.0%***
Hand and/or Dip Net	12,888	149	1.2%
Hook and Line	84	22	26.2%
Net, Plankton	9,000,020	0	0.0%
Other/Unknown	0	0	0.0%
Substrate	4	0	0.0%
Trap (Fyke/Hoop/Pot/Minnow)	761	22	2.9%
Trawl	4,149	3,925	94.6%
Total	*10,898,250*	*25,111*	*0.2%*

TABLE 12. Actual take, incidental mortality and incidental mortality rate of USFWS listed fish from 2020 ODFW permit program.

Species/Stock	Life Stage	Reported Actual Take (# Fish)	Reported Incidental Mortalities (# Fish)	Incidental Mortality Rate (%)
Lost River Sucker	Adult	4,694	0	-
	Juvenile	11,048	0	-
	Total	*15,742*	*0*	-
Shortnose Sucker	Adult	1,828	0	-
	Juvenile	20,617	0	-
	Total	*22,445*	*0*	-
Bull Trout	Adult	405	3	0.74%
	All/Both	18	0	-
	Juvenile	795	3	0.38%
	Total	*1,218*	*6*	*0.49%*

Other Highlights

During review of the 2018-2020 ODFW 4(d) programs, NOAA was especially interested in ODFW coordination of responses from researchers on why they needed to sample ESA-listed fish rather than use the new technologies in eDNA sampling to avoid direct handling. NOAA proposed that in the future they may require projects that do not need to handle fish to migrate to use eDNA rather than approve take for ESA fish. ODFW coordinated with permittees and internally with staff to respond on eDNA as a conservation measure to reduce take. As of fall 2019, ODFW had collected about 90% of native fish and 70% of non-native fish tissues to catalog Oregon species eDNA. Since all species were not yet documented as of 2020, eDNA was not yet able to be widely used. Additionally, the cost of eDNA lab processing continues to be prohibitive.

The permitting program collects a variety of information related to the take of animals in Oregon waters. These data can be useful for a range of purposes, especially because it is a large database of take observations statewide that includes 19 years of information. This is the second summary report from the permit program and includes examples of what we can include in tables based on APPS reporting database. Additional or different information for specific districts, species, methods, or other parameters can be provided in future reports based on staff interest or request.

Literature Cited:

National Marine Fisheries Service. 2020. Consultation on the Evaluation and Determination of Research Programs Submitted for Consideration Under the Endangered Species Act Section 4(d) Rule's Scientific Research Limit [50 CFR 223.203(b)(7)] and Scientific Research and Monitoring Exemptions [50 CFR 223.210(c)(1)] NMFS ECO Consultation Number: WCRO-2019-03648. 170 p.

Oregon Department of Fish and Wildlife. 2016. Oregon Conservation Strategy. Salem, Oregon. https://www.oregonconservationstrategy.org/overview/

Appendix

FIGURE A1 – Oregon 4th Field HUCS

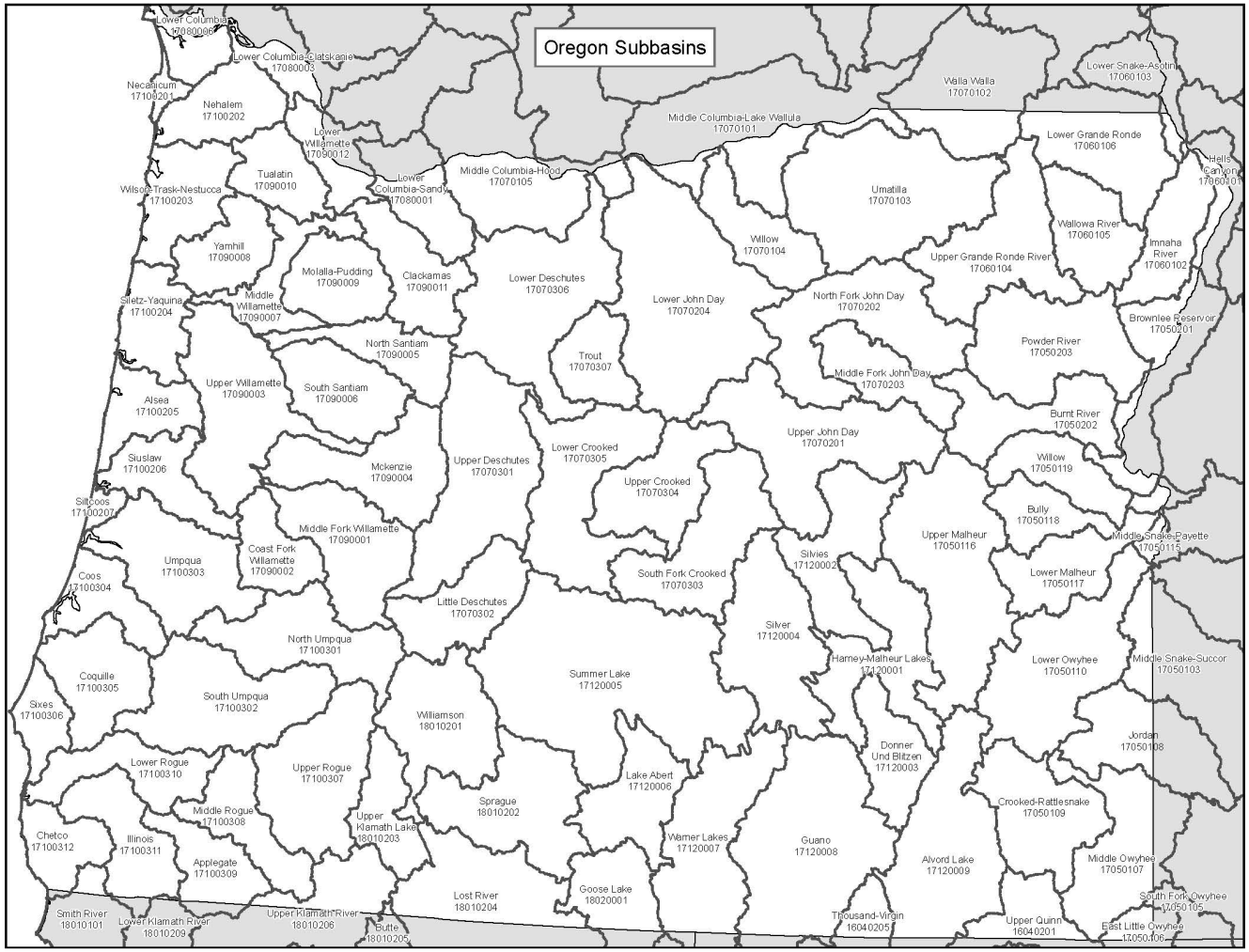

FIGURE A2 – ODFW Fish Districts

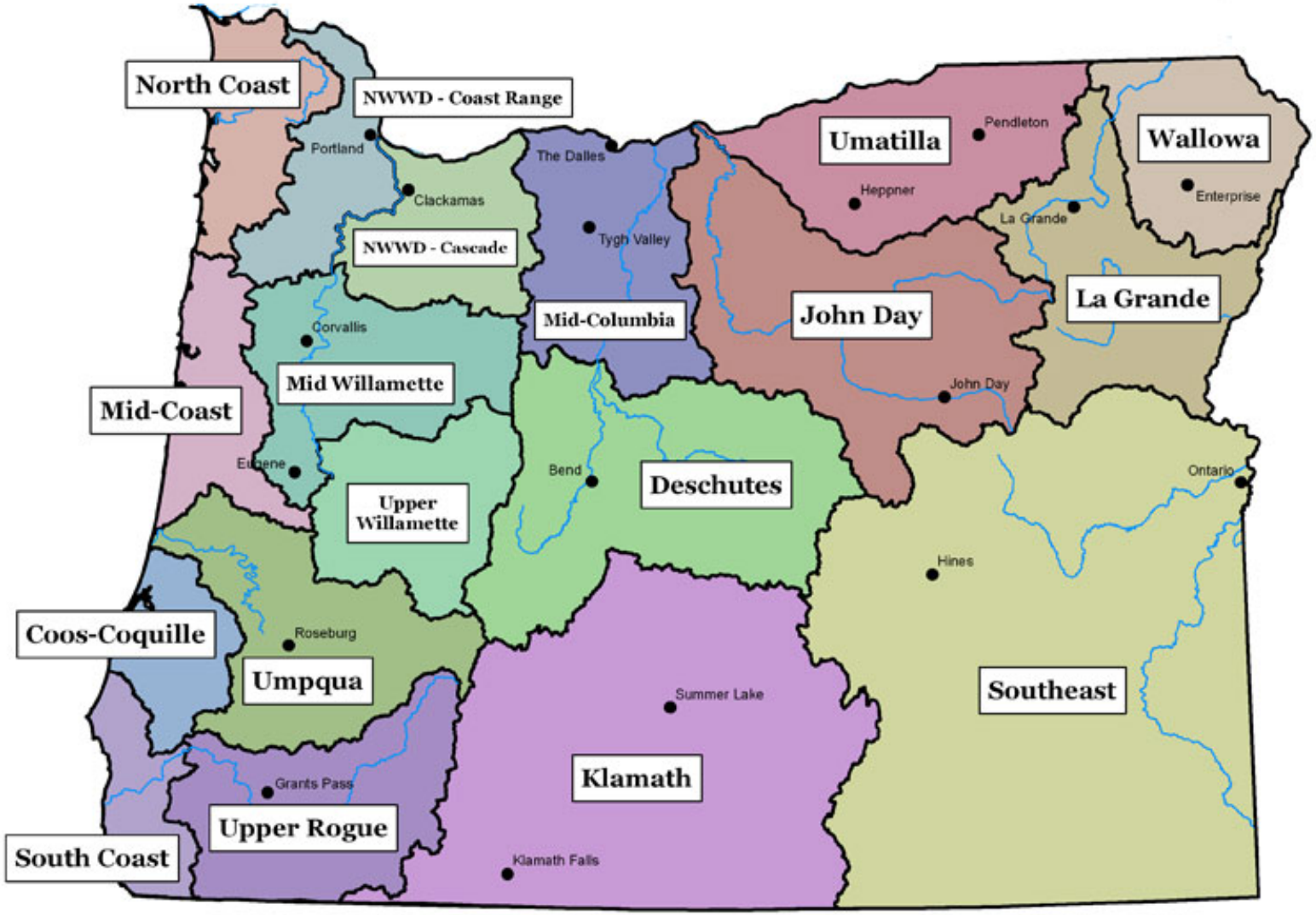

TABLE A1 – Total actual take and incidental mortality by species (# of organisms) and life stage collected in 2020.

Species Common Name	Adult	Juvenile	All/Both	Total Actual Take	Total Incidental Mortality
Freshwater Fish					
Bass, Largemouth	186	241	0	427	6
Bass, Smallmouth	2,329	101	1,138	3,568	49
Bass, unknown	0	12	0	12	0
Bluegill	1,230	396	143	1,769	83
Bullhead (unknown)	4	26	32	62	3
Bullhead, Brown	2,724	30	435	3,189	51
Bullhead, Yellow	29	258	0	287	37
Carp, Common	88	0	2,289	2,377	0
Catfish, Channel	46	0	0	46	0
Catfish, Flathead	6	0	0	6	0
Chub, Blue	17,513	209,286	1,381	228,180	1,132
Chub, Chiselmouth	31	0	1,433	1,464	42
Chub, Tui	10,462	188,837	6,559	205,858	986
Chub, Umpqua	3,551	0	335	3,886	0
Cottids	1,426	523	380	2,329	29
Crappie, Black	1,550	0	5	1,555	34
Crappie, White	673	7	1,671	2,351	1,680
Dace (unknown)	2,394	130	2,891	5,415	6
Dace, Foskett speckled	0	0	197	197	0
Dace, Longnose	937	980	51	1,968	6
Dace, Millicoma	1,325	0	0	1,325	0
Dace, Speckled	2,655	286	2,475	5,416	64
Dace, Umpqua	15	50	3	68	0
Eulachon	29	0	0	29	0
Flounder, Starry	0	28	1	29	0
Goby, Amur	1	0	0	1	0
Goldfish	118	1,952	60	2,130	10
Kilifish, Banded	17	1	10	28	3
Kokanee	14,838	5,479	0	20,317	314
Lamprey (unknown)	35	32,596	366	32,997	539
Lamprey, Klamath Lake	100	100	0	200	12
Lamprey, Klamath River	103	103	0	206	0
Lamprey, Pacific	583	4,649	0	5,232	92
Lamprey, Western Brook	63	372	0	435	1
Lamprey, Western River	0	2	0	2	0
Minnow, Fathead	64	108,897	24,783	133,744	533
Mosquitofish	35	69	327	431	7
Peamouth	74	11	0	85	2
Perch, Sacramento	0	10	0	10	0

Species Common Name	Adult	Juvenile	All/Both	Total Actual Take	Total Incidental Mortality
Perch, Yellow	5,569	84,171	3,975	93,715	476
Pikeminnow, Northern	89	370	226	685	25
Pikeminnow, Umpqua	45	16	0	61	0
Pumpkinseed	73	191	173	437	10
Salmon, Chinook	5,299	130,716	0	136,015	1,141
Salmon, Chum	0	501	0	501	0
Salmon, Coho	11,905	194,522	0	206,427	891
Salmon, Sockeye	65	33,290	0	33,355	484
Sandroller	4	0	0	4	0
Sculpin (unknown)	5,287	12,200	34,179	51,666	792
Sculpin, Coast Range	56	28	404	488	3
Sculpin, Klamath Lake	0	0	988	988	0
Sculpin, Marbled	0	854	3,134	3,988	0
Sculpin, Mottled	1	0	0	1	0
Sculpin, Prickly	17	0	0	17	0
Sculpin, Reticulate	343	0	0	343	0
Sculpin, Riffle	2	0	0	2	0
Shad, American	116	343,949	0	344,065	7,890
Shiner (unknown)	0	0	437	437	11
Shiner, golden	2	0	0	2	0
Shiner, Redside	2,022	1,738	5,398	9,158	78
Steelhead	3,648	85,728	3	89,379	739
Stickleback, Threespine	4,323	8,605	841	13,769	58
Sturgeon, white	0	7	0	7	5
Sucker (unknown)	170	5,886	286	6,342	80
Sucker, Bridgelip	86	210	212	508	4
Sucker, Klamath largescale	656	10,717	0	11,373	22
Sucker, Klamath smallscale	8	0	0	8	1
Sucker, Largescale	423	2,062	40	2,525	4
Sucker, Lost River	4,694	11,048	0	15,742	0
Sucker, Mountain	3	0	0	3	0
Sucker, Shortnose	1,828	20,617	0	22,445	0
Sunfish, Green	70	0	30	100	0
Sunfish, Unknown	14	41	8	63	1
Tench	1	0	0	1	0
Trout, Brook	28	2,273	1,801	4,102	125
Trout, Brown	331	2,563	118	3,012	273
Trout, Bull	405	795	18	1,218	6
Trout, Cutthroat	3,077	5,563	0	8,640	104
Trout, Inland Columbia Redband	196	298	2,274	2,768	16

Species Common Name	Adult	Juvenile	All/Both	Total Actual Take	Total Incidental Mortality
Trout, Rainbow	2,105	12,888	0	14,993	160
Trout, Redband (Native Rainbow)	9	6,436	495	6,940	326
Unknown Fish	1	45,678	425	46,104	257
Walleye	53	0	1	54	1
Warmouth	18	0	0	18	0
Weatherfish, Oriental	16	0	0	16	10
Whitefish, Mountain	242	39	1,456	1,737	306
Freshwater Shellfish					
Clam, Asian	5,089	0	0	5,089	0
Crayfish, Columbia River signal	1	0	0	1	0
Crayfish, other	470	2,239	119	2,828	10
Crayfish, rusty	1	0	0	1	0
Crayfish, Signal	681	2,149	11	2,841	16
Mixed Invertebrate	141	0	0	141	5
Mussel, Unknown Floater	85	0	0	85	0
Mussel, Western Pearlshell	4,958	500	153	5,611	46
Mussel, Western Ridged	80	0	0	80	0
Marine Fish					
Anchovy, Northern	0	41	4	45	0
Cabezon	11	0	0	11	2
Eel, Wolf	0	0	12	12	0
Estuarine Fish - not listed here	1	0	0	1	0
Flatfish - not listed here	0	63	0	63	0
Greenling, Kelp	1	0	0	1	1
Gunnel	0	2	3	5	0
Herring, Pacific	0	0	14	14	0
Irish Lord, Red	1	0	0	1	0
Lingcod	94	2	0	96	10
Marine Fish - not listed here	2	100	2	104	101
Pipefish, Bay	0	0	8	8	0
Rockfish, Black	37	0	0	37	10
Rockfish, Copper	11	0	0	11	5
Rockfish, Other	0	8	0	8	8
Rockfish, quillback	1	0	0	1	1
Rockfish, Vermilion	1	0	0	1	1
Sablefish	0	1,565	0	1,565	1,565
Sanddab	1	9	0	10	9
Sanddab, Speckled	0	0	1	1	0
Sculpin, Pacific Staghorn	731	4,694	67	5,492	27

*There was only one project with 'egg' take in 2020, due to formatting constraints, the 98 Nucella Snail eggs were omitted from this table.