Oregon Department of Fish and Wildlife Endangered Species Management Plan for Southern Resident Orcas (*Orcinus orca ater*)

Photo credit: NOAA

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Contents

EXECUTIVE SUMMARY

Southern Resident orcas (SRO, *Orcinus orca ater*) are a distinct population of orcas (killer whales) comprised of 73 individuals (as of July 1, 2024). The waters off the Oregon Coast are an important part of the designated critical habitat for SRO. The SRO population has been declining since 1995 and lack of prey, vessel and noise disturbance, and environmental contaminants were identified as the key threats to their survival and recovery.

SRO were listed as endangered under the federal Endangered Species Act in 2005 and under the Oregon Endangered Species Act (OESA) in 2024. The OESA requires state land-owning or managing agencies with a role to play in SRO conservation to define their role and develop an endangered species management plan (ESMP; ORS 496.182; OAR 635-100-0140). The Oregon Fish and Wildlife Commission identified the Oregon Department of Fish and Wildlife (ODFW, Department) as one of these agencies because it manages fisheries in state waters where SRO or their habitat are found. In addition, the Department operates fish hatcheries that produce Chinook salmon (*Oncorhynchus tshawytscha*), the preferred prey for SRO. ODFW defined its role as "contributing to conservation" and developed its ESMP based on the agency's biological assessment for SRO, the federal recovery plan, and consultations with Department staff with expertise in areas related to SRO conservation. The agency's plan was reviewed both internally and by key stakeholders.

ODFW's ESMP includes the following management actions that the agency is either currently taking or planning to implement to contribute to SRO conservation:

Maintain current actions:

- Restore freshwater habitat that is critical to the recovery of wild salmon populations
- Improve passage conditions for juvenile and adult salmonids
- Support fishery management measures that help ensure an adequate prey base for SRO
- Maintain existing hatchery salmon production that helps provide prey
- Work with DEQ and other agencies to reduce contamination of prey
- Recommend measures to protect SRO from development in Oregon's territorial sea
- Continue current outreach and education efforts to increase awareness of SRO

Implement new actions:

- Evaluate potential enhanced hatchery production to increase prey availability
- Implement new outreach and education activities as opportunities arise
- Address potential vessel disturbance of SRO in Oregon waters by educating boaters on the current vessel guidelines for orcas and assessing the need for new regulations
- Partner with researchers to collect additional data on SRO presence off the Oregon Coast

The Department plans to monitor implementation of its ESMP and will review and reassess the plan as needed. ODFW management actions contributing to SRO conservation are consistent with recommendations in the federal recovery plan and other regional recovery efforts.

BACKGROUND

Southern Resident Orca Natural History

Southern Resident orcas (SRO, *Orcinus orca ater*) are a distinct population of orcas (killer whales) native to the eastern North Pacific Ocean with a range that extends from southeastern Alaska to central California. SRO are highly social animals with a well-developed social structure consisting of several female-led matrilines in three pods designated J, K, and L. Vocalizations are critical for communication between individuals, maintaining social bonds, navigation, and foraging (Ford 1989). SRO feed on fish, primarily Pacific salmon (*Oncorhynchus* spp.). Chinook salmon (*O. tshawytscha*) are an important prey species for SRO, accounting for 70–90% of their diet, depending on the time of year (Hanson et al. 2010; Ford et al. 2016; Hanson et al. 2021). Chinook are likely preferred over other salmon species due to their large size and high fat content. SRO consume Chinook salmon from a variety of stocks originating between northern British Columbia and central California but rely heavily on Chinook from the Fraser and Columbia rivers and Puget Sound. Reproduction is delayed in SRO as females usually produce their first calf between 12 and 17 years of age and males reach sexual maturity at 11–15 years of age. The average life expectancy of SRO is 29 years for females and 17 years for males, with maximum life spans of 90 and 70 years, respectively (Olesiuk et al. 1990). The main sources of mortality for SRO are malnutrition, disease, and traumatic injury (Raverty et al. 2020).

Habitat

The waters off the Oregon Coast are part of the designated critical habitat for SRO (Figure 1; NMFS 2021a). The K and L pods spend much of the winter and spring in outer coastal waters, especially along the southern Washington coast and near the mouth of the Columbia River. The latter is considered a foraging hotspot and SRO presence there peaks with the return of spring Chinook salmon to the Columbia. Oregon coastal waters between Cape Meares and the California border serve as an important travel corridor for SRO as they move between foraging areas to the north and south. Recently, SRO appear to be spending less time in the Salish Sea and more time in outer coastal waters, possibly due to lower abundances of Chinook salmon in the inland waters (Shields et al. 2018; Ettinger et al. 2022).

Figure 1. SRO critical habitat designated by NMFS in 2006 (medium blue) and 2021 (dark blue).

Population Status and Trends

The SRO population lost about 30% of its members during the late 1960s and early 1970s due to collections of orcas for aquariums and marine parks. After the removals ended, the population

increased to a peak of 98 orcas in 1995 but has gradually decreased since then (Figure 2; NMFS 2021b). The current population size for SRO (as of July 1, 2024) is 73 orcas (25 in J pod, 15 in K pod, and 33 in L pod; Center for Whale Research 2025). There are also signs of reproductive problems within the SRO population. Compared to other orca populations, mating within pods appears to be more common for SRO, resulting in higher levels of inbreeding (Ford et al. 2018). In addition, several late-term miscarriages have occurred among SRO females and the proportion of reproductive-age females that have not given birth is relatively high (Wasser et al. 2017). Inbreeding depression, along with other reproductive issues, is likely to make recovery of the SRO population more difficult (Kardos et al. 2023). Population viability modeling indicates that if poor reproduction continues, the SRO population may decline to between 39 and 64 individuals by 2045 (NMFS 2021b).

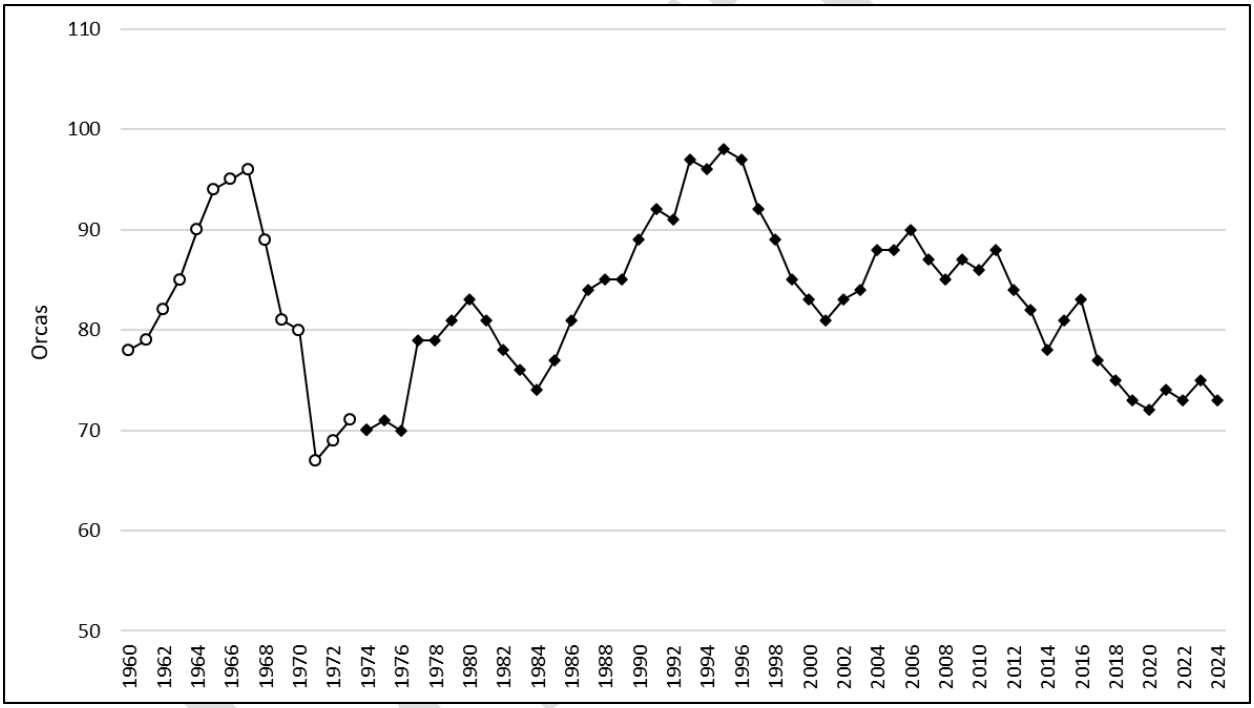

Figure 2. Population size and trend of Southern Resident orcas, 1960–2024.

Population Threats

In the federal recovery plan for SRO (NMFS 2008), the National Marine Fisheries Service (NMFS) identified the following key threats to the survival and recovery of the population:

Prey availability—Decreased abundance of Chinook salmon in the Pacific Northwest over the last 150 years affected a critical part of the prey base for SRO. Several Chinook salmon stocks are listed as threatened or endangered under the U.S. Endangered Species Act (ESA) or eligible for listing under Canada's Species At Risk Act. The effects of climate change are expected to place additional stress on these imperiled populations (Zhang et al. 2019). In addition, Chinook

salmon have decreased in body size over the past few decades (Oke et al. 2020; Ohlberger et al. 2023). While the reasons for this are still being studied, smaller prey results in fewer calories being consumed per unit of foraging effort for SRO. Nutritional stress can lead to increased mortality and poor reproductive success.

Sound and vessel disturbance—Commercial shipping, ferry operations, whale watching, recreational boating, and interest in marine energy development have all expanded within the Pacific Northwest in recent decades. Noise from vessel traffic, dredging and drilling, and construction activities can interfere with the orcas' ability to communicate with each other and forage efficiently (NMFS 2008). Ambient noise may mask or prevent the perception of vocalizations (Giles and Cendak 2010) and interfere with echolocation, making detection of prey more difficult (Holt 2008).

Environmental contaminants—Contaminants known as persistent organic pollutants (POPs) are considered one of the greatest contaminant risks to SRO because they degrade slowly in the environment and concentrate in the orcas' bodies over time (Mongillo et al. 2016). POPs bioaccumulate in top marine predators such as orcas through their consumption of contaminated prey. High levels of POPs have been detected in Chinook salmon from Puget Sound and the lower Columbia River, likely due to large urban and industrial areas near those waterbodies (O'Neill et al. 2006; Johnson et al. 2012). High POP concentrations in marine mammals have been linked to endocrine and immune system disruption, decreased reproduction, and increased calf mortality.

Federal and State Listings

Federal

NMFS listed the SRO population as endangered under the ESA in 2005, and in its latest status review in 2021, the agency determined that the population remains endangered (NMFS 2021b). Key protections afforded by the ESA include: 1) prohibition on "take" (i.e., killing, collection, or harassment of individual animals), 2) requirement for federal agencies (or non-federal entities with a federal nexus) to consult with NMFS on activities which may negatively affect the species or its critical habitat, 3) designation of critical habitat for the species, and 4) development of a federal recovery plan.

Oregon

In February 2024, the Oregon Fish and Wildlife Commission (Commission) voted to amend OAR 635-100-0125 to list SRO as endangered under the Oregon Endangered Species Act (OESA). At the time of listing, the Commission also adopted survival guidelines for the species (OAR 635-

100-0138), as required by statute. These rule changes, which became effective February 21, 2024, affect decisions made on state owned or managed lands, including leased lands or where the state holds a recorded easement, and includes state waters ("state lands"). In June 2024, the Commission determined that three state agencies—Oregon Department of Fish and Wildlife (ODFW, Department), Oregon Department of State Lands (DSL, proprietary component), and Oregon Parks and Recreation Department (OPRD)—own or manage lands where SRO or their habitat are found and that the agencies can play a role in SRO conservation. Each of these agencies must determine the role its land will serve in SRO conservation (ORS 496.182(8)(a)(B); OAR 635-100-0140(6)). This role may include, but is not limited to:

- *Conservation*—Defined in OAR 635-100-0100(2) as the use of methods and procedures necessary to bring a species to the point at which the measures provided under ORS 496.171 to 496.182 are no longer necessary
- *Contributing to conservation*—Agency actions make an important contribution towards conservation of the species but not to the degree under a conservation role
- *Take avoidance*—"Take" defined in OAR 635-100-0100(14) as to kill or obtain possession or control of any species on the state list

In determining this role, the agency needs to consider the survival guidelines adopted by the Commission, information provided by ODFW on the species' conservation needs, the social and economic impacts of implementing conservation measures, and the agency's statutory obligations.

Within 18 months of the listing decision, each agency is required to develop an endangered species management plan (ESMP) for SRO (ORS 496.182(8)(a)(C); OAR 635-100-0140(6)). The ESMP must, at a minimum, address the elements outlined in OAR 635-100-0140(6)(a-g), and the plan will be submitted to the Commission for review and approval. If the Commission determines that, based on the biology of the species, the ESMP does not achieve the role defined by the agency, the Commission may (in consultation with the agency) modify the plan to be consistent with the role (OAR 635-100-0140(6)(h)). The Commission must approve the ESMP as submitted or modified within 24 months of listing.

In March 2025, the Commission also determined that five state non-land-owning or managing agencies—Oregon Department of Environmental Quality (DEQ), Oregon Department of Land Conservation and Development (DLCD), Oregon State Marine Board (OSMB), Oregon State Police (OSP, Fish and Wildlife Division), and DSL (non-proprietary component)—have a role to play in SRO conservation. These agencies are not required to prepare an ESMP but do need to provide the Commission with written documentation of their agency's role and the actions it can take to support SRO conservation. Together with the land-owning agencies, non-land-owning agencies will be an important part of Oregon's conservation efforts for SRO.

ESMP REQUIRED ELEMENTS

This section addresses the plan elements required in OAR 635-100-0140(6)(a-g).

1. ESMP Development

ODFW developed its ESMP based on the Department's biological assessment for SRO (Takata et al. 2025). The biological assessment presented current peer-reviewed information on SRO natural history, habitat, population status, and threats to the population's survival and recovery. It also summarized a wide range of management actions being taken at the federal and state levels to address the key threats facing SRO.

The ESMP was prepared in consultation with Department staff, including the Information and Education and Habitat divisions, and the Marine Resources, Natural Production, Fish Propagation, and Ocean Salmon and Columbia River programs. The plan received extensive internal review, including by Department leadership. ODFW coordinated with the other two state land-owning and managing agencies on ESMP formatting and completion of required elements. The Department also reached out to key stakeholders for high level feedback on the plan prior to submitting it to the Commission.

2. Lands Covered by the ESMP

ODFW manages fisheries in state waters off the Oregon Coast where SRO or their habitat are found. The Commission determined that this, along with the potential impact of some of the agency's actions on SRO, indicated that ODFW is a state land-owning or managing agency with a role to play in SRO conservation (OAR 635-100-0140(2)). Actions on Department lands such as fish hatcheries may also affect SRO since some hatcheries, particularly those located in the Columbia River basin, produce Chinook salmon that are important prey for SRO.

3. Role of ODFW Lands in SRO Conservation

ODFW defines the role its lands play in SRO conservation as "contributing to conservation". In defining this role, the Department considered the survival guidelines for SRO and balanced the following factors: 1) the statutory requirements and policies relating to the agency's programs, 2) the social and economic impacts of SRO conservation on the state, 3) the conservation needs of SRO, 4) the purpose of the Department's lands, and 5) the roles that lands other than state lands may play in SRO conservation (OAR 635-100-0140(3)(a-e)). ODFW selected this role because, under the OESA, a role defined as "conservation" requires actions that have enough impact over time to significantly move a species towards de-listing. Examples of such actions for a listed species could include adding or providing access to large amounts of new habitat or

severely curtailing harvest of the species. ODFW is dedicated to its mission of protecting and enhancing Oregon's fish and wildlife and their habitats for present and future generations; however, the agency must also operate within fiscal constraints. Given ODFW's lack of funding and staff dedicated to SRO issues, the Department does not believe that actions needed for a conservation role can be taken at this time. In addition, SRO are primarily traveling through Oregon coastal waters, making it less likely for the Department's actions to have an impact consistent with a conservation role. Nevertheless, ODFW can maintain and implement several important actions that contribute to the conservation of SRO. These actions are grounded in the conservation needs of SRO, as identified in the Department's biological assessment and the federal recovery plan.

4. ODFW Management Actions Contributing to SRO Conservation

A. Maintain current actions

1) ***Restore salmon habitat***—Protecting and improving freshwater and estuarine habitat is critical to the recovery of wild salmon populations and ensuring abundant prey for SRO in the long term. ODFW staff work with both public and private partners to plan and implement a variety of habitat improvement projects, restore streamflow by applying for in-stream water rights and purchasing leases on existing water rights, and protect critical cold-water areas (ODFW 2025a, 2025b; OWEB 2025a, 2025b).

Large woody debris placement, Nehalem River watershed (ODFW)

2) ***Improve fish passage***—ODFW will continue to address fish passage issues by removing passage barriers, screening water diversions and tide-gates, and working with state, federal, and tribal co-managers to upgrade the fish passage infrastructure and improve passage conditions for migrating juvenile and adult salmonids at hydroelectric dams on the Columbia and Snake rivers.

Culvert replacement, Necanicum River watershed (ODFW)

3) ***Support fishery management that considers the prey needs of SRO***—ODFW supports measures in regional fishery management frameworks, like the 2019–2028 Pacific Salmon Treaty (PST) Agreement (PSC 2025) and Amendment 21 of the Pacific Coast Salmon Fishery Management Plan (NMFS 2025a; PFMC 2025a), that help ensure an adequate prey base for SRO. Actions include harvest reductions for PST Chinook salmon fisheries in both the U.S. and Canada that help protect a variety of stocks important to SRO, and reduced seasons and quotas in Pacific Fishery Management Council (PFMC) salmon fisheries when Chinook salmon pre-fishery abundance in the North of Falcon fishery management area is below a threshold level (currently 623,000 Chinook; PFMC 2022).

4) ***Maintain existing hatchery salmon production***—ODFW releases about 35 million hatchery salmon annually in Oregon, including 20 million Chinook salmon from the Columbia River basin, an important source of prey for SRO (Hanson et al. 2021). Part of the Columbia River Chinook salmon releases (1.5 million spring Chinook and 370,000 fall Chinook) support the Hatchery Prey Increase Program (HPIP) initiated by NMFS in 2020 to help increase the amount of prey available to SRO (NMFS 2025b). ODFW is working to ensure that Oregon's hatcheries are resilient and capable of sustainable production in the face of funding uncertainties, aging infrastructure, and the impacts of climate change (ODFW 2025c).

5) ***Address contamination of SRO prey***—Staff from ODFW's Habitat Division regularly work with their counterparts at DEQ to address the effects of contaminants on the state's fish and wildlife. These efforts include participating in state-wide teams such as the Pesticide Management Team, which helps identify pesticide-related water quality issues and potential solutions (DEQ 2025), and the Oregon Regional 6PPD-q Working Group, tasked with addressing the growing threat from 6PPD-quinone, a tire chemical that is extremely lethal to adult coho salmon and moderately lethal to Chinook salmon.

6) ***Protect SRO from project impacts in the Oregon Territorial Sea***—As one of several state agencies responsible for reviewing proposals and applications for development projects within Oregon's territorial sea, ODFW serves on project-specific Joint Review Panels, and is also a member of the Joint Agency Review Team, which reviews applications for marine renewable energy facilities (DLCD 2025). Detailed information on SRO migratory habitats from recent satellite tagging studies (NMFS 2021a) help ODFW staff understand how project activities might affect SRO so that they can recommend appropriate mitigation measures.

7) ***Continue current outreach and education efforts for SRO***—Engaging Oregonians in SRO conservation can create a sense of stewardship and build public support that may help secure funding for recovery actions. Soon after the state listing, ODFW initiated outreach and education actions to increase awareness of SRO, the threats they face, and the connection between the population and Oregon. The Department has also worked to educate the public on environmentally friendly actions they can take in their daily lives that, when adopted at a larger scale, can help contribute to SRO recovery. ODFW built a new webpage dedicated to information on SRO and began posting SRO-related stories and news to its social media channels. The Department also produced a creative and informative postcard on SRO to distribute at outreach events.

B. Implement new actions

1) ***Potentially increase hatchery Chinook salmon production***—Oregon Columbia River hatcheries currently have an annual production goal for the HPIP of 1.5 million spring Chinook and 370,000 fall Chinook. ODFW plans to follow a two-step process to investigate whether it can increase production of hatchery Chinook salmon for the program:
   a. *Assess feasibility of increased production*—The Department will first evaluate whether it is logistically feasible to increase hatchery production, particularly of spring Chinook, which are a priority stock for SRO due to their high fat content, low interception rate in ocean fisheries, and known history of consumption (Hanson et al. 2021; PFMC 2025b). Because spring Chinook need to be reared for one year prior to release, staff must determine which ODFW hatcheries have sufficient space and water supply to increase production of this stock.

b. *Seek funding for enhanced production*—If it is feasible to increase the production of hatchery spring Chinook at Oregon facilities, ODFW will pursue funding through the PST and the state legislature.

If ODFW finds that increasing hatchery production is feasible and can obtain funding, the enhanced production will be implemented in accordance with the Department's Native Fish Conservation Policy, Fish Hatchery Management Policy, and Fish Health Management Policy (ODFW 2025d), as well as the appropriate Hatchery Genetic Management Plan(s) approved by NMFS (ODFW 2025e). ODFW will evaluate the effectiveness of the enhanced production by monitoring survival and fishery contribution using coded wire tag analysis. The Department does not plan on making changes to fishery seasons or bag limits if hatchery production is increased.

2) ***Implement new outreach and education efforts for SRO***—ODFW will look for opportunities to collaborate with other state agencies and nonprofit organizations to help increase awareness of SRO in Oregon. Examples include partnering with OPRD at Oregon Whale Watch Week activities and presenting information on SRO for webinars.

3) ***Address potential vessel disturbance of SRO***—Since boats in Oregon's marine waters may encounter SRO, ODFW plans to take the following actions to address potential vessel disturbance of SRO:
   a. *Increase awareness of current viewing guidelines*—ODFW will initiate a collaborative effort with OSMB and OSP to increase awareness of orca viewing guidelines off the Oregon Coast. NMFS recommends that vessel operators stay at least 100 yd from "whales", which includes orcas; however, the guideline is voluntary (NMFS 2025c). ODFW will post information on the orca viewing guidelines to its website and social media channels and provide technical support to the other agencies for their outreach and education actions.
   b. *Evaluate the need for stricter vessel regulations*—The Department will encourage OSMB to organize a meeting with OSP and various stakeholders (e.g., whale watching charters and guides, boating and fishing groups, coastal communities, and nonprofit organizations) to gather input that will help determine whether vessel regulations for orcas that are stricter than the current federal guidelines are needed in Oregon state waters. ODFW would present information on SRO biology and migratory habits, the latest research findings on vessel and noise disturbance, and management actions being taken in other states and provinces to address vessel disturbance.

4) ***Partner with researchers to collect data on SRO presence off the Oregon Coast***—Where feasible, ODFW will seek opportunities to partner with researchers to learn more about SRO movements along the Oregon Coast. This information would help state agencies to better manage activities in Oregon's territorial sea. The Department is currently advising Oregon Shores Conservation Coalition and Adventure Scientists on their plans for a research project

that could provide additional spatial and temporal information on SRO presence off the Oregon Coast.

5. Monitoring ESMP Implementation

ODFW intends to monitor implementation of its ESMP and will keep the public informed on the progress of plan implementation through updates on its website.

6. ESMP Review and Reassessment

ODFW will review its ESMP as needed. For example, significant changes to SRO population status or their conservation needs, or the Department's ability to contribute to SRO conservation, could trigger a review and reassessment of the plan. In addition, dramatic changes to ocean conditions and food webs due to climate change could have significant impacts on SRO that warrant re-evaluation of the Department's ESMP. ODFW will meet at least annually with NMFS and Washington State partners to stay informed on SRO issues, and where applicable, coordinate actions. If funding becomes available to increase ODFW's conservation efforts for SRO, the Department plans to examine ways to expand on the management actions outlined in this ESMP.

7. Relation to Other ESMPs, Federal Recovery Plans, and Recovery Efforts

Each of the three state land-owning agencies with a role to play in SRO conservation developed its own agency-specific ESMP for SRO. Because each agency has a distinct statutory responsibility, area of expertise, and connection to SRO conservation, these separate ESMPs can be considered complementary. For example, ODFW has a unique responsibility among state agencies for fisheries management and fish hatchery operation while DSL ensures that proposed projects in Oregon's territorial sea are thoroughly reviewed so that negative impacts are avoided or minimized, and OPRD is heavily involved in outreach and education related to whale watching. These varied efforts can provide a comprehensive approach to addressing the multiple threats facing SRO.

The federal recovery plan for SRO provides federal, state, and local agencies, as well as non-governmental organizations and other entities, with guidance on the actions they can take to address the key threats facing SRO and aid population recovery (NMFS 2008). Several of the actions in ODFW's ESMP focus on prey availability since management of Oregon's salmon resource is one of the Department's major functions. ODFW actions to restore salmon habitat and improve fish passage are consistent with the federal recovery plan's recommendation to rebuild depleted salmon populations in the region by supporting restoration efforts. Similarly, the Department's support for measures in regional salmon fishery management plans that

consider the prey needs of SRO aligns with the recovery plan's guidance on using salmon harvest management to help ensure an adequate prey base for SRO. Some actions in the ESMP address other threats highlighted in the federal recovery plan such as environmental contaminants and noise and vessel disturbance. ODFW's engagement with DEQ on contaminant issues across the state and in working groups addressing specific pollutants like 6PPD-q is consistent with recommendations in the federal recovery plan to "minimize continuing inputs of contaminants into the environment" and "minimize contamination in prey". The Department's plans to initiate cooperative efforts with OSMB and OSP to educate boaters on vessel buffer guidelines for orcas off the Oregon Coast and to evaluate the necessity of stricter regulations helps address the need to "minimize disturbance of Southern Resident killer whales from vessels" as stated in the recovery plan. Lastly, ODFW's outreach and education actions support the recovery plan's recommendation to develop information and education programs that enhance public awareness of the SRO population's status and the threats they face.

Management actions outlined in ODFW's ESMP also support other recovery efforts for SRO. The Department's plan to assess the feasibility of increasing hatchery Chinook salmon production to enhance prey availability for SRO aligns with NMFS's recent decision to continue the HPIP (NMFS 2025d). Another action that supports regional recovery efforts is ODFW's plan to partner with Oregon Shores and Adventure Scientists on SRO research off the Oregon Coast. Updated spatial and temporal data would add to current knowledge on SRO movements in the outer coastal waters and provide useful information to other researchers and management agencies involved in SRO recovery.

ODFW's ESMP is also clearly connected to salmon recovery efforts in the region. Actions to restore habitat and improve fish passage are beneficial for both salmon populations and the orcas that rely on them. Similarly, the Department's participation in working groups to tackle pollutants like 6PPD-q in salmon streams will benefit SRO by helping to improve adult salmon survival and spawning success.

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