

2019



1 Southern Resident Orca Task Force

2 **DRAFT Year 2 Report**
3 **and Recommendations**

4 OCTOBER 2019

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18 Executive summary

19 The power, beauty, intelligence and grace
20 of the Southern Resident orca touches us
21 all. How thrilling for locals and visitors
22 alike to glimpse a pod of Southern
23 Residents frolicking in the waters of the
24 Salish Sea or the Pacific Ocean. How
25 privileged to experience an orca sighting
26 whether from land, by boat or even as a
27 ferry passenger! Orcas — and especially
28 our Southern Residents — connect us to
29 the beauty and bounty of nature and serve
30 as a reminder of the interconnectedness
31 of all living things.

32 By their words and deeds, our sovereign
33 tribal partners show us an even deeper
34 cultural and spiritual connection with the
35 orca — they consider the orcas their
36 ancestors, protectors of humankind and
37 family members. The Lummi people call
38 the orcas *qwe 'lhol mechen*, which means
39 “our relations under the waves.” To

40 Leonard Forsman, chairman of the
41 Suquamish Tribe, “The Southern Resident killer whales are like us: They depend on these waters for
42 their survival, for their well-being, for food and recreation, for their spirituality as well [1].” For time
43 immemorial, tribes fished the Salish Sea and Northern Pacific for Chinook salmon alongside the
44 Southern Residents. These orcas evolved as a top predator and developed uncommon intelligence,
45 empathy and even emotions. We witnessed the expression of those emotions in summer 2018 when
46 Tahlequah carried her stillborn calf for 17 days following its death [2].

47 Today, the Southern Resident orca population is in decline and threatened with extinction. Although
48 scientists estimate that Southern Residents numbered up to 140 individuals historically, and the
49 population reached a peak of 98 in 1995, only 73 animals remain today [3, 4]. This small population
50 faces multiple threats: lack of Chinook salmon (their primary food source), disturbance from noise
51 and vessel traffic, toxic contaminants, the emerging impacts of climate change and the cumulative
52 effects of continuous population growth across the region.



The task force envisions a thriving and resilient population of Southern Resident orcas, living in healthy waters and inspiring our descendants with their majesty.

53 In response, Gov. Jay Inslee signed [Executive Order 18-02](#) on
54 March 14, 2018, establishing the Southern Resident Orca Task
55 Force, charged with preparing comprehensive recommendations to
56 ensure a healthy and resilient ecosystem that supports a thriving
57 Southern Resident orca population, protected from extinction. The
58 task force comprised scientists, fishermen and representatives of
59 business, agriculture, environmental interests and government. As
60 sovereign nations, several tribes also chose to send representatives
61 to engage with the task force, sharing their perspectives and
62 knowledge about orcas, salmon recovery and treaty rights.

63 From May through November 2018, the task force convened to learn about the threats, identify
64 solutions and formulate consensus recommendations. Working groups consisting of subject matter
65 experts and key stakeholders supported the task force, using the best available science to identify,
66 research and analyze potential actions. In addition, the task force received over 18,000 public
67 comments, which were crucial for informing its decisions and recommendations. The task force
68 submitted a final report with a set of bold recommendations to the governor and Legislature in
69 November 2018. These recommendations resulted in significant new investments, policies and
70 regulatory initiatives to help recover Southern Residents.

71 The task force continued to meet throughout 2019 to assess progress made on implementing Year
72 One recommendations, identify outstanding needs and emerging threats and formulate new
73 recommendations. This report presents the outcome of these deliberations.

74 **With deep appreciation**

75 Over the past two years, members of the task force and working groups have contributed their
76 expertise, passion, deep experience and countless hours to the consensus-driven, science-based
77 process that led to these comprehensive and far-reaching recommendations. Task force members
78 and working group participants, along with tribal co-managers, worked together in good faith and
79 with a shared commitment to enable a thriving and resilient population of Southern Residents and a
80 healthy ecosystem.

81 The task force particularly commends and expresses its deepest appreciation to:

- 82 • Gov. Inslee for initiating this effort, taking immediate executive action to address the needs
83 of the Southern Residents and supporting the task force's recommendations in the
84 Legislature.
- 85 • The Legislature for authorizing significant investment and statutory changes in the 2019
86 session to initiate implementation of the task force's recommendations.

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- Tribal partners and co-managers who have participated in this process, even as they engage government-to-government to resolve the issues facing the orcas and salmon.
 - Our Canadian counterparts for coordinating Southern Resident recovery efforts across boundaries. Representatives from Canada and Washington have participated in each other’s working group, advisory group and task force meetings, sharing lessons learned through their respective processes.
 - The leadership and staff at federal and state government agencies — including the Washington Department of Fish and Wildlife, Office of Financial Management, Department of Ecology, Puget Sound Partnership, Department of Natural Resources, Department of Transportation, Washington State Ferries, Governor’s Salmon Recovery Office, Recreation and Conservation Office and the National Oceanic and Atmospheric Administration — for their unending dedication to the recovery of the Southern Residents and contribution of their time and expertise throughout the process.
 - Members of the public, for showing up to every meeting no matter the location, for demonstrating how much they care and for constantly reminding us to take bold and aggressive action. Their heartfelt testimony and pleas to not let these magnificent creatures go extinct have resonated across borders, gaining global media attention and reminding us that the survival of these orcas is imperative to us all — both within and beyond Washington state.



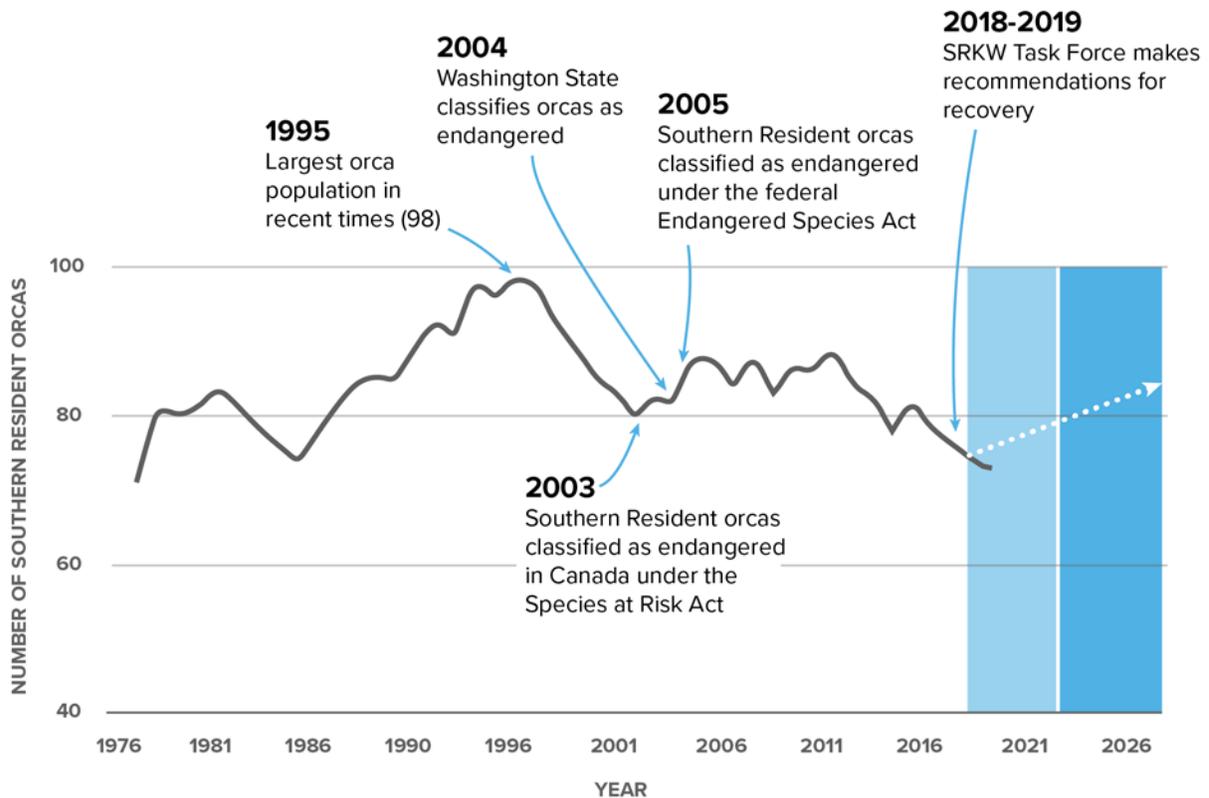
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107 Southern Resident population trends and goals

108 In its 2018 report, the task force set forth the goal of increasing the Southern Resident population to
109 84 whales by 2028, or “10 more whales in 10 years,” aligning with the [National Marine Fisheries
110 Service 2008 Recovery Plan for the Southern Resident Killer Whales](#). In addition, the task force
111 defined near-term criteria for recovery that includes evidence of consistently well-nourished whales,
112 more live births and the survival of several thriving young orcas.

113 Figure 1 depicts the Southern Resident population relative to this goal and provides over 40 years of
 114 historical data. At 73 whales in 2019, the population of Southern Resident orcas has reached its
 115 lowest level in over 30 years. While the task force celebrated the birth of two new orca calves in
 116 2019 (L124 and J56), we also mourned the loss of three adult orcas in the same year (J17, K25 and
 117 L84).

118 **Figure 1. Southern Resident orca population trends and recovery goals [3].**



From 2018-2022

our goal is to witness evidence of consistently well-nourished whales, more live births, and the survival of several thriving young orcas.



By 2028

our goals are to see the primary indicator of body condition of the whales (the ratio of head width to body length in adults) remain high and stable between seasons and across years and to see an increase in the population to 84 whales (10 more whales in 10 years).

119 **Progress made**

120 In its 2018 deliberations, the task force established four goals and submitted 36 recommendations
 121 for new or modified investments, policies and regulatory actions, research and monitoring, funding
 122 and accountability. Thanks to leadership from the governor, Legislature and state agencies, initial
 123 progress has been made on many of these recommendations, even as much remains to be
 124 accomplished. The four goals established in 2018 are:

125 **Goal 1: Increase Chinook abundance.**

126 This goal addresses the urgent need for prey on which the Southern Residents feed — primarily
127 Chinook salmon. Several runs of Chinook salmon identified as important to orcas have declined
128 precipitously in recent years. Sixteen Year One recommendations focus on reversing these trends by
129 restoring and protecting habitat, increasing hatchery production, increasing the survival of Chinook
130 in relation to hydropower, ensuring sustainable fisheries, promoting a healthy food web and forage
131 fish populations and reducing predation. Substantive actions have already been undertaken or are
132 underway on seven of these recommendations, and partial efforts are underway on nine others.

133 Important and notable successes include:

- 134 • **Increased hatchery production to increase food for orcas.** Washington state, tribes and
135 public utility districts received \$13.4 million to increase hatchery production starting in July
136 2019, with 18 million new smolts in 2019. Nearly \$40 million was also provided to make
137 capital improvements to state hatcheries ([Recommendation 6](#)).
- 138 • **Improved habitat protections.** The state passed legislation that addressed habitat
139 protection of shorelines and waterways, specifically increasing WDFW’s civil enforcement
140 authority for hydraulic project approvals and removing key exemptions (Chapter 290 RCW)
141 ([Recommendations 3 and 4](#)).
- 142 • **Increased survival through the hydro system.** Ecology initiated a rulemaking process to
143 update Washington’s total dissolved gas criteria for the lower Snake and lower Columbia
144 rivers, allowing spill up to 125% total dissolved gas ([Recommendation 8](#)).
- 145 • **Decreased predatory fish impacts.** Legislation was passed in 2019 to decrease impacts of
146 predatory fish on salmon, directing WDFW to develop rules to increase bag limits for certain
147 species that overlap with and prey on salmon (Chapter 290 RCW) ([Recommendation 14](#)).
- 148 • **Decreased pinniped predation on the Columbia River.** The federal Endangered Salmon
149 Predation Prevention Act (PL 115-329) was signed into law, giving state and tribal resource
150 managers more flexibility to manage sea lion predation in the Columbia River to minimize
151 impacts to salmon ([Recommendation 13](#)).

152 **Goal 2: Decrease disturbance of and risk to Southern Residents** 153 **from vessels and noise and increase their access to prey.**

154 This goal focuses on mitigating the impact of the ever-increasing number of vessels and their
155 proximity to orcas in the Salish Sea. The task force set forth 12 recommendations to address these
156 threats, with substantive progress made on five and initial or partial efforts underway on four others.
157 Key accomplishments include:

- 158 • **Rapid implementation of legislation passed in 2019:**
 - 159 – Boats must stay farther away and travel slowly near Southern Residents (Chapter 291
 - 160 RCW) (**Recommendations 17, 26, 28**).
 - 161 – Initiation of a licensing system for commercial whale watching operations (Chapter 291
 - 162 RCW) (**Recommendation 18**).
 - 163 – To improve protection from oil spills, Washington will establish new standards for tug
 - 164 escorts for oil barges in Rosario Strait (Chapter 289 RCW) (**Recommendation 24**).
- 165 • **Broadened outreach efforts.** Based on the new laws, the state broadened its outreach
- 166 efforts to educate boaters and promote compliance through Be Whale Wise (Chapter 293
- 167 RCW) (**Recommendation 19**).
- 168 • **Limited use of echo sounders near orcas.** In both Puget Sound and Canadian waters,
- 169 maritime groups established safe, voluntary standards to reduce the potential interference of
- 170 depth finders on Southern Residents' echolocation (**Recommendation 21**).

171 **Goal 3: Reduce the exposure to Southern Residents orcas and their**

172 **prey to contaminants.**

173 This goal addresses the threat posed by pollutants in the marine environment, including persistent,

174 bioaccumulative and toxic chemicals emanating from stormwater runoff, contaminated sediments,

175 permitted discharges from wastewater and other facilities, toxics in consumer products and

176 pharmaceuticals. The task force put forth five recommendations in response to these threats, with

177 progress made on two:

- 178 • **New state authorities created to prioritize chemicals.** Includes new authority to
- 179 prioritize for species, to develop caps and to ban chemicals in products (**Recommendation**
- 180 **30**).
- 181 • **Funding provided for water quality enforcement staff.** Municipal stormwater permits
- 182 now require smaller jurisdictions to implement local source control (**Recommendation 32**).

183 **Goal 4: Ensure that funding, information and accountability**

184 **mechanisms are in place to support effective implementation.**

185 The task force advanced three recommendations to achieve this goal; progress includes funding for:

- 186 • **Fish barrier corrections.** \$275 million for WSDOT to complete fish barrier corrections
- 187 necessary to meet the requirements of the U.S. federal court culvert injunction
- 188 (**Recommendation 1**).
- 189 • **Habitat protection and restoration.** \$10.3 million in the operating budget and \$447.8
- 190 million in the capital budget for salmon habitat restoration programs (**Recommendations 1**
- 191 **and 5**).

- 192 • **Habitat enforcement and technical assistance.** \$4.5 million to increase technical
193 assistance and enforcement of state water quality, water quantity and habitat protection laws
194 (**Recommendation 3**).
- 195 • **Hatchery production.** \$13.5 million in the operating budget to increase hatchery
196 production by 19%, resulting in 24 million additional smolts annually (**Recommendation**
197 **6**).
- 198 • **Assessment of lower Snake River dams.** \$750,000 to implement a stakeholder
199 engagement process to determine the economic, social and environmental impacts of the
200 potential breaching or removal of the Snake River dams (**Recommendation 9**).
- 201 • **Vessel electrification:** \$140 million in the transportation budget to acquire one new hybrid
202 electric ferry and to convert two existing ferries to hybrid electric (**Recommendation 23**).
- 203 • **Contaminant prevention:** \$4.7 million in the operating budget and \$3.7 million in the
204 capital budget to prevent toxics from entering the environment (**Recommendation 30**).
- 205 • **Containment cleanup:** \$4.8 million in the operating budget and \$136.6 million in the
206 capital budget to clean up toxics sites and contaminants (**Recommendation 31**).

207 These actions and investments, along with the enactment of new policies and statutory
208 requirements, represent an encouraging and important first step in Southern Resident recovery.
209 Again, the task force appreciates and thanks the Legislature, the governor and participating agencies
210 for their response and actions taken.

211 Importantly, these efforts provide multiple benefits that, if sustained, will lead to better water
212 quality, an uptick in the indicators for the health of Puget Sound and stronger, more robust salmon
213 runs, among others. Ultimately all Washingtonians, our sovereign tribal partners and communities
214 beyond our borders will benefit from less pollution, better fishing and shellfish harvesting, more
215 access to recreation and the opportunity for future generations to enjoy and appreciate the majesty
216 of the orca and the beauty and abundance of the greater Northwest ecosystem.



217

218 **Southern Resident orcas are still in crisis**

219 Despite this progress, the status of the Southern Resident population remains critical, with a
220 declining population (as noted in Figure 1), a continued lack of prey and ever-increasing adverse
221 impacts from vessels and toxics. Over the past two years, three orca calves have been born, while
222 four adults have died, along with Tahlequah's newborn calf. While the health of many of the
223 individuals across the three pods is stable at the present time, it continues to be problematic.

224 In early summer 2019, locals lamented the absence of Southern Residents, which have historically
225 frequented the Salish Sea in summer months but were remarkably absent from their critical habitat
226 in Puget Sound and the Strait of Georgia for an extended period. While the reason for the absence
227 of Southern Residents in these critical areas is unknown, it is likely that adverse conditions and
228 scarcity of Chinook led to their selection of fishing grounds elsewhere. Several Salish Sea Chinook
229 stocks, such as from the Fraser River, saw extremely low numbers of returning Chinook. The
230 successful recovery of Southern Resident orcas and their prey will continue to hinge on coordinated
231 transboundary monitoring and management actions, especially as species alter their geographical
232 distributions due to climate change [5].

233 Even as the task force and the state have taken initial steps toward recovery, threats to the Southern
234 Resident population continue to increase:

- 235 • NOAA has expanded the Southern Resident orca critical habitat designation to include the
236 outer coasts of Washington to California, an acknowledgment that critical orca habitat exists
237 well beyond the Salish Sea [6].
- 238 • The U.S. Navy has proposed new underwater training and testing operations off the coast of
239 Cape Flattery. These operations include detonating explosives, increasing sonar testing by
240 over 90% and the use of new technologies such as high-energy lasers, kinetic energy
241 weapons and biodegradable polymers. Navy testing already alters the soundscape in areas

242 where orcas are present. These new activities are highly likely to increase noise and related
243 disturbances that adversely affect the Southern Residents, with the potential to cause direct
244 mortality [7, 8].

- 245 • According to Puget Sound Harbor Safety Committee bi-monthly report summaries, the
246 volume of fast ferry and water taxi traffic has risen dramatically in recent years, and the levels
247 rank near the top of all vessel classes in Puget Sound. Based on the PSP’s assessment of
248 automatic identification system information, such vessels travel over 300,000 miles (in more
249 than 10,000 hours) annually in Puget Sound. These vessels typically travel faster than orcas,
250 creating an elevated risk of collisions. The use of these vessels is increasing, creating the need
251 for practices and policies to minimize the potential to harm orcas [9].
- 252 • The U.S. Environmental Protection Agency has proposed a rule to repeal Washington’s
253 consolidated human health water quality standard. This rule, if enacted, would affect how
254 polychlorinated biphenyls, polycyclic aromatic hydrocarbons (more commonly referred to as
255 “PCBs” and “PAHs,” respectively) and dioxins, among other contaminants, are regulated.
256 Along with other environmental rollbacks being enacted at the federal level, these changes
257 undermine state efforts to improve water quality, consequently threatening the health of the
258 Southern Residents.

259 **Long-term threats imperil orca survival and put** 260 **recovery efforts at risk**

261 In 2019, the task force focused on two systemic threats to the Southern Residents, that if left
262 unchecked, will undermine recovery efforts and could lead to extinction: (1) climate change and
263 ocean acidification and (2) rapid population growth and development. The task force established
264 two new goals and formulated seven new recommendations to respond to and mitigate the threats
265 from climate change and population growth. These new goals and recommendations are
266 summarized below, with a full description of the threats and recommendations provided in the body
267 of this report.

268 In addition, the task force examined the impact of excessive nutrient loadings on the health of
269 waters of Puget Sound and inland rivers on (1) the food web, (2) the vitality of the ecosystem and (3)
270 the survival of the orca. The [Contaminants](#) chapter and [Appendix 2](#) discuss nutrient issues and new
271 recommendations to address this challenge.

272 These long-term threats are synergistic — they exacerbate one another and combine to increase the
273 stressors on orcas and their prey — and collectively, they threaten the vitality of Washington’s
274 ecosystems, economy and ultimately human well-being.

275 **Recommendations for successful recovery of** 276 **Southern Residents**

277 **Given the ongoing orca health crisis and the prospects for the future, the task force**
278 **recommends that the Legislature, the Office of the Governor, state agencies, tribes and**
279 **partner federal agencies and local governments deepen efforts to recover Southern Resident**
280 **orcas, increase salmon populations and improve the health of the Washington waters**
281 **Southern Residents depend upon.**

282 While the initial actions undertaken and ongoing over the past year are commendable, even more
283 aggressive, comprehensive and sustained action is required. The task force developed 13 new
284 recommendations to tackle emergent threats and enable sustained and successful long-term
285 recovery, including a recommendation to continue the vital work of the task force to monitor and
286 advocate for the Southern Residents once it disbands.

287 In addition, the task force recommends that the Legislature, governor, agencies and co-managers
288 “double down” on implementing and funding recommendations that address unmet needs and gaps,
289 capitalize on initial progress and ensure that recovery efforts are sustained over time. Actions to
290 address critical gaps and accelerate progress on the ground and new actions to address emerging and
291 longer-term threats are highlighted below, with more detail provided in the body of this report.

292 The following key elements together form the heart of the task force’s Year Two recommendations:
293 address critical gaps and accelerate progress, address the long-term threats of climate change and
294 population growth, provide sustainable funding and continue the mission of Southern Resident orca
295 recovery.

296 **Address critical gaps and accelerate progress**

297 **Prey**

298 *Sustain the priority focus on increasing Chinook abundance through habitat protection and restoration, hatchery*
299 *production and decreased predation.*

- 300 • **Increase funding to fully implement salmon recovery plans.** Focus on implementing
301 habitat restoration and protection projects that local experts have prioritized in each salmon
302 recovery region and that will benefit Chinook and Southern Residents (**urgent action on**
303 **Recommendations 1, 2 and 6, requires legislative funding**).
- 304 • **Provide funding to investigate and address pinniped predation** to (1) determine if
305 pinniped predation is a limiting factor for Chinook in Puget Sound and along Washington’s
306 outer coast and (2) more effectively manage pinniped predation in the Columbia River
307 (**urgent action on Recommendations 12 and 13, requires legislative funding**).

- 308 • **Increase early marine survival research and monitoring in Puget Sound** ([urgent](#)
309 [action on Recommendations 12, 15, 16, requires legislative funding](#)).
- 310 • **Prevent northern pike expansion into the Columbia River and predation on salmon**
311 **(additional component of Recommendation 14, requires legislative funding)**.
- 312 • **Improve water quality** by proceeding with language in new rules on increasing the standard
313 for total dissolved gas allowances in the Columbia and Snake rivers ([urgent action on](#)
314 [Recommendation 8](#)).

315 **Vessels**

316 *Advance and fund solutions to vessel disturbances and noise and respond to emerging threats.*

- 317 • **Increase ongoing funding for enforcement** officers and equipment ([urgent action for](#)
318 [Recommendation 20, requires legislative funding](#)).
- 319 • **Create and charter a transboundary forum** for waterways management and Southern
320 Resident conservation ([additional component of Recommendations 24 and 27](#)).
- 321 • **Apply the State Environmental Policy Act** to changes in vessel use and traffic that may
322 adversely affect Southern Residents ([additional component of Recommendation 27](#)).
- 323 • **Provide resources for expanded boater education** on whale-safe boating, compliance
324 with critical habitat restrictions and regulations ([additional component of](#)
325 [Recommendation 19, requires legislative funding](#)).
- 326 • **Encourage compliance with Canada's feeding sanctuary zones** ([additional](#)
327 [component of Recommendation 22](#)).
- 328 • **Coordinate with NOAA and the Navy to reduce noise and disturbance** affecting
329 Southern Resident orcas from military exercises and Navy aircraft ([urgent action on](#)
330 [Recommendation 25](#)).

331 **Contaminants**

332 *Provide resources for implementation, update standards and prioritize actions based on emerging threats to Southern*
333 *Residents. Take action to address nutrient pollution.*

- 334 • **Maintain Model Toxics Control Act funding** for preventing and cleaning up toxics
335 **(additional component of Recommendation 31)**.
- 336 • **Provide additional funding for staff and to support local source control inspectors**
337 **(Recommendation 30, 31 and 32, requires legislative funding)**. Funding should also be
338 provided for incentives to reduce stormwater threats ([urgent action on Recommendation](#)
339 [31, requires legislative funding](#)).

- 340 • **Increase funding to support infrastructure improvements** (**additional component of**
341 **Recommendation 31, requires legislative funding**).
- 342 • **Prioritize stormwater management and cleanup based on toxic impacts on salmon**
343 **populations** (**urgent action on Recommendation 31**).
- 344 • **Update water quality standards for pollutants most harmful to Southern Residents**
345 **(additional component of Recommendation 32, requires legislative funding)**.
- 346 • **Continue monitoring and research** and dedicate funding to Ecology, PSP and WDFW to
347 enable adaptive management and application of best available science (**additional**
348 **component of Recommendation 33**).
- 349 • **Protect against regulatory rollbacks** at the federal and state level (**NEW**
350 **Recommendation 37**).
- 351 • **Explore setting minimum standards for local stormwater funding** to ensure that all
352 programs have the resources necessary to protect water quality (**NEW Recommendation**
353 **38, requires legislative policy**).
- 354 • **Develop a new National Pollutant Discharge Elimination System framework for**
355 **advanced wastewater treatment** in Puget Sound to reduce nutrients in wastewater
356 discharges (**NEW Recommendation 39, requires legislative funding**).
- 357 • **Better align existing nonpoint programs with nutrient reduction activities** and explore
358 new ways to achieve the necessary non-point-source nutrient reductions (**NEW**
359 **Recommendation 40**).
- 360 • **Collect high-quality nutrient data in watersheds** to fill key knowledge gaps of baseline
361 conditions (**NEW Recommendation 41, requires legislative funding**).

362 **Address the long-term threats of climate change and population** 363 **growth**

364 **Climate change**

- 365 • **Emissions:** Take aggressive, comprehensive and sustained action to reduce human-caused
366 greenhouse gas emissions, with the goal of achieving net zero emissions by 2050 (**NEW**
367 **Recommendation 43, requires legislative policy and funding**).
- 368 • **Ocean acidification:** Increase Washington’s ability to understand, reduce, remediate and
369 adapt to the consequences of ocean acidification (**NEW Recommendation 44, requires**
370 **legislative funding**).
- 371 • **Prey:** Mitigate the impact of a changing climate by accelerating and increasing action to
372 boost the resiliency and vitality of salmon populations and the ecosystems upon which they
373 depend (**NEW Recommendation 45, requires legislative funding**).

- 374 • **Vessels:** Expand the Governor’s Maritime Blue scope of work and provide funding to
 375 implement recommendations from the Southern Resident Orca Task Force and pursue
 376 shipping and other maritime innovations that benefit Southern Residents (**NEW**
 377 **Recommendation 46, requires legislative funding**).
- 378 • **Contaminants:** Identify and mitigate increased threats to Southern Residents from
 379 contaminants due to climate change and ocean acidification. Prioritize actions that
 380 proactively reduce exposure where the impacts are expected to be most severe (**NEW**
 381 **Recommendation 47**).

382 Population growth

- 383 • Adopt and implement policies, incentives and regulations for future growth and
 384 development to prevent any further degradation of critical habitat and sensitive ecosystems;
 385 enable and channel population growth in ways that result in net ecological gain; evaluate and
 386 report outcomes for all jurisdictions at the state, county, tribal and municipal level (**NEW**
 387 **Recommendation 48, requires legislative policy and funding**).
- 388 • Conduct a comprehensive environmental review and take action to minimize potential
 389 whale-strike risk and underwater noise posed by the growing number and distribution of
 390 fast-ferries and water taxis in Southern Resident critical habitat (**NEW Recommendation**
 391 **49**).

392 Provide sustainable funding

393 Accelerating action on the ground, mitigating the threat posed by climate change and managing
 394 population growth to minimize impacts on the orca requires funding at scale, sustained over the
 395 long term. For comparison, the potential cost to implement salmon recovery plans has been
 396 estimated at \$5.5 billion. Even with increased appropriations in the current biennium, OFM
 397 estimates that the funding shortfall for salmon recovery alone ranges from 50–80%.

398 In addition, the majority of Recommendations 1-36 require sustained operating resources for
 399 effective implementation, while several others require significant capital investments. Although new
 400 funds have been appropriated in many instances, in others they have not, and many that have will
 401 require consistent funding over multiple biennia. In addition to these funding needs, resources for
 402 culvert replacement and fish passage improvements are estimated at over \$3.3 billion for the state.
 403 These figures point to the urgent and overarching need for new funding sources — beyond the
 404 General Fund, capital budget, Model Toxics Control Act accounts and other existing funding
 405 mechanisms — to enable healthy, productive regional waters that can support the survival and
 406 recovery of the Southern Resident and Chinook salmon.

407 Recommendation 34 in the 2018 report calls for funding to support effective implementation,
 408 including an action item for “the governor and Legislature to establish a sustainable, durable funding

409 source to implement these recommendations and meet needs as they arise”. **With great urgency,**
410 **the task force calls upon our elected officials, working with representatives from tribal**
411 **governments, to engage stakeholders, experts and the public to preserve existing funding**
412 **sources and identify and secure sufficient new funding sources to meet these needs. This**
413 **funding is vital to bringing to scale the work now underway for Southern Resident and**
414 **Chinook survival and recovery.**

415 Ensuring funding, information and accountability mechanisms are in in place to support effective
416 implementation also includes:

- 417 • Transitioning one-time investments in orcas and salmon from 2019 to ongoing investments.
418 Much of the increases in funding that WDFW received as part of the Southern Resident orca
419 package was one-time funding. To most benefit orcas, this funding should be sustainable
420 **(additional component of Recommendation 34, requires legislative funding).**
- 421 • Funding to PSP, WDFW, GSRO and Ecology to evaluate effectiveness of task force
422 recommendations through monitoring and adaptive management while leveraging current
423 efforts **(urgent action on Recommendation 35, requires legislative funding).**

424 **Continuing the mission of Southern Resident orca recovery**

425 The task force recognizes it is critically important that an oversight committee or similar body
426 continues to monitor progress, advocate for the implementation of the recommendations and adapt
427 to changing conditions by issuing new recommendations as needed. The task force has laid a
428 foundation for Southern Resident recovery; strong, dedicated leadership and governance are
429 necessary to build on this foundation with meaningful, immediate and sustained action. The Task
430 Force recommends the governor creates one or more entities with authority and funding to recover
431 and advocate for the Southern Residents orcas by implementing task force recommendations,
432 creating new recommendations as needed, and reporting to the public, governor, and tribal co-
433 managers on status **(NEW Recommendation 42, requires legislative funding)**. The task force
434 has identified options in the [Funding, monitoring and accountability](#) chapter for the governor to
435 consider.

436 The task force invites and encourages the entire Washington community to join us in these efforts,
437 with the private sector and the public working together to achieve our shared vision of a “thriving
438 and resilient population of Southern Resident orcas, living in healthy waters and inspiring our
439 descendants with their majesty.” Although we sometimes see solutions through a slightly different
440 lens, each and every one of us shares in a common foundation for this collective effort: We all want
441 the orcas to thrive, now and long into the future.

442 Introduction

443 With only 73 Southern Resident orcas remaining today, the population is in decline and facing
444 threats from the lack of Chinook salmon (their primary food source), disturbance from noise and
445 vessel traffic, toxic contaminants, the emerging impacts of climate change and the cumulative effects
446 of continuous population growth across the region. In response to this crisis, Gov. Jay Inslee
447 established the Southern Resident Orca Task Force, and charged it with preparing comprehensive
448 recommendations to ensure a healthy and resilient ecosystem that supports a thriving Southern
449 Resident orca population, protected from extinction.

450 Year One of the Southern Resident Orca Task Force

451 From May through November 2018, the task force convened to learn about the threats to Southern
452 Residents, identify solutions and formulate consensus recommendations:

- 453 • The task force comprised scientists, fishermen and representatives of business, agriculture,
454 environmental interests and government. As sovereign nations, several tribes also chose to
455 send representatives to engage with the task force.
- 456 • Working groups consisting of subject matter experts and key stakeholders supported the task
457 force, using the best available science to identify, research and analyze potential actions.
- 458 • The task force submitted a final report with a set of bold recommendations to the governor
459 and Legislature in November 2018. These recommendations resulted in significant new
460 investments, policies and regulatory initiatives to help recover Southern Residents.

461 Year Two of the Southern Resident Orca Task Force

462 The task force continued to meet throughout 2019 to assess progress made on implementing Year
463 One recommendations, identify outstanding needs and emerging threats and formulate new
464 recommendations. The following report presents the outcome of these deliberations and is
465 organized as follows:

- 466 • Overview of the task force's Year One recommendations.
- 467 • Progress made on Year One recommendations, outstanding needs, lessons learned, emerging
468 issues and new recommendations for each primary threat area (prey, vessels, contaminants).
- 469 • Outstanding funding, monitoring and accountability needs and a proposed path forward
470 after the task force sunsets in November 2019.
- 471 • Overview of the ways that climate change and population growth affect Southern Resident
472 health and recovery, with new recommendations for addressing these overarching threats.

473 Overview of the task force's Year 474 One recommendations

475 The following goals and recommendations were included in the Year One task force report to the
476 governor. Full recommendations are provided in the "Recommendations" chapter of the report,
477 available on the governor's website:

478 [https://www.governor.wa.gov/sites/default/files/OrcaTaskForce_reportandrecommendat
479 ions_11.16.18.pdf](https://www.governor.wa.gov/sites/default/files/OrcaTaskForce_reportandrecommendations_11.16.18.pdf)

480 Goal 1: Increase Chinook abundance

481 Habitat restoration and acquisition: Increase Chinook abundance 482 by restoring and acquiring salmon habitat and food sources

- 483 • **Recommendation 1:** Significantly increase investment in restoration and acquisition of
484 habitat in areas where Chinook stocks most benefit Southern Resident orcas.
- 485 • **Recommendation 2:** Immediately fund acquisition and restoration of nearshore habitat to
486 increase the abundance of forage fish for salmon sustenance.

487 Habitat protection and enforcement: Protect habitat through 488 improved enforcement of existing laws, strengthening laws and 489 ensuring compliance

- 490 • **Recommendation 3:** Apply and enforce laws that protect habitat.
- 491 • **Recommendation 4:** Immediately strengthen protection of Chinook and forage fish habitat
492 through legislation that amends existing statutes, agency rule making and/or agency policy.

493 Habitat protection: Increase incentive programs to encourage 494 salmon habitat conservation

- 495 • **Recommendation 5:** Develop incentives to encourage voluntary actions to protect habitat.

496 Hatcheries: Provide additional Chinook through increased hatchery 497 production

- 498 • **Recommendation 6:** Significantly increase hatchery production and programs to benefit
499 Southern Resident orcas consistent with sustainable fisheries and stock management,

500 available habitat, recovery plans and the Endangered Species Act. Hatchery increases need to
501 be done in concert with significantly increased habitat protection and restoration measures.

502 **Hydropower operations: Improve survival and distribution of** 503 **Chinook populations**

- 504 • **Recommendation 7:** Prepare an implementation strategy to reestablish salmon runs above
505 existing dams, increasing prey availability for Southern Resident orcas.
- 506 • **Recommendation 8:** Increase spill to benefit Chinook for Southern Residents by adjusting
507 total dissolved gas allowances at the Snake and Columbia River dams.
- 508 • **Recommendation 9:** Establish a stakeholder process to discuss potential breaching or
509 removal of the lower Snake River Dams for the benefit of Southern Resident orcas.

510 **Harvest: Increase adult Chinook abundance through reduced catch** 511 **and bycatch**

- 512 • **Recommendation 10:** Support full implementation and funding of the 2019–28 Pacific
513 Salmon Treaty.
- 514 • **Recommendation 11:** Reduce Chinook bycatch in west coast commercial fisheries.

515 **Predation of Chinook: Decrease the number of adult and juvenile** 516 **Chinook lost to predation by species other than Southern** 517 **Residents**

- 518 • **Recommendation 12:** Direct the appropriate agencies to work with tribes and National
519 Oceanic and Atmospheric Administration to determine if pinniped (harbor seal and sea lion)
520 predation is a limiting factor for Chinook in Puget Sound and along Washington’s outer
521 coast and evaluate potential management actions.
- 522 • **Recommendation 13:** Support authorization and other actions to more effectively manage
523 pinniped predation of salmon in the Columbia River.
- 524 • **Recommendation 14:** Reduce populations of nonnative predatory fish species that prey
525 upon or compete with Chinook.

526 **Forage fish: Increase the food available for Chinook**

- 527 • **Recommendation 15:** Monitor forage fish populations to inform decisions on harvest and
528 management actions that provide for sufficient feedstocks to support increased abundance
529 of Chinook.

- 530 • **Recommendation 16:** Support the Puget Sound zooplankton sampling program as a
531 Chinook and forage fish management tool.

532 **Goal 2: Decrease disturbance of and risk to Southern**
533 **Resident orcas from vessels and noise and increase**
534 **their access to prey**

535 **Reduce noise from small vessels operating near Southern Resident**
536 **orcas**

- 537 • **Recommendation 17:** Establish a statewide “go-slow” bubble for small vessels and
538 commercial whale watching vessels within half a nautical mile of Southern Resident orcas.
- 539 • **Recommendation 18:** Establish a limited-entry whale-watching permit system for
540 commercial whale-watching vessels and commercial kayak groups in the inland waters of
541 Washington state to increase acoustic and physical refuge opportunities for the orcas.
- 542 • **Recommendation 19:** Create an annual Orca Protection endorsement for all recreational
543 boaters to ensure all boaters are educated on how to limit boating impacts to orcas.
- 544 • **Recommendation 20:** Increase enforcement capacity and fully enforce regulations on small
545 vessels to provide protection to Southern Residents.

546 **Reduce noise from the use of echo sounders near orcas**

- 547 • **Recommendation 21:** Discourage the use of echo sounders and underwater transducers
548 within one kilometer of orcas.

549 **Reduce noise from ships and ferries near Southern Resident orcas**

- 550 • **Recommendation 22:** Implement shipping noise-reduction initiatives and monitoring
551 programs, coordinating with Canadian and U.S. authorities.
- 552 • **Recommendation 23:** Reduce noise from the Washington state ferries by accelerating the
553 transition to quieter and more fuel-efficient vessels and implementing other strategies to
554 reduce ferry noise when Southern Residents are present.

555 **Increase protection of Southern Residents from the risk of a**
556 **catastrophic oil spill**

- 557 • **Recommendation 24:** Reduce the threat of oil spills in Puget Sound to the survival of
558 Southern Residents.

559

560 **Formalize or extend vessel protections for Southern Resident orcas**

- 561 • **Recommendation 25:** Coordinate with the Navy in 2019 to discuss reduction of noise and
562 disturbance affecting Southern Resident orcas from military exercises and Navy aircraft.
- 563 • **Recommendation 26:** Revise chapter 77.15.740 RCW to increase the buffer to 400 yards
564 behind the orcas.
- 565 • **Recommendation 27:** Determine how permit applications in Washington state that could
566 increase traffic and vessel impacts could be required to explicitly address potential impacts to
567 orcas.
- 568 • **Recommendation 28:** Suspend viewing of Southern Resident orcas.

569 **Goal 3: Reduce the exposure of Southern Resident**
570 **orcas and their prey to contaminants**

571 **Prevent further use and release of toxics that could harm orcas and**
572 **their prey**

- 573 • **Recommendation 29:** Accelerate the implementation of the ban on polychlorinated
574 biphenyls in state-purchased products and make information available online for other
575 purchasers.
- 576 • **Recommendation 30:** Identify, prioritize and take action on chemicals that impact orcas
577 and their prey.

578 **Accelerate removal and clean-up of legacy sources of toxics**
579 **harmful to orcas and their prey**

- 580 • **Recommendation 31:** Reduce stormwater threats and accelerate clean-up of toxics harmful
581 to orcas.

582 **Improve pollution permitting and management to reduce**
583 **contaminant exposure of orcas and their prey**

- 584 • **Recommendation 32:** Improve effectiveness, implementation and enforcement of National
585 Pollutant Discharge Elimination System permits to address direct threats to Southern
586 Resident orcas and their prey.
- 587 • **Recommendation 33:** Increase monitoring of toxic substances in marine waters; create and
588 deploy adaptive management strategies to reduce threats to orcas and their prey.

589 **Goal 4: Ensure funding, information and**
590 **accountability mechanisms are in place to support**
591 **effective implementation**

592 **Provide sustainable funding**

- 593
 - **Recommendation 34:** Provide sustainable funding for implementation of all
- 594 recommendations.

595 **Conduct research, science and monitoring to enable adaptive**
596 **management**

- 597
 - **Recommendation 35:** Conduct research, science and monitoring to inform decision
- 598 making, adaptive management and implementation of actions to recover Southern Residents.

599 **Track progress and address gaps in Year Two**

- 600
 - **Recommendation 36:** Monitor progress of implementation and identify needed
- 601 enhancements.

602 Prey

603 Overview

604 Southern Resident orcas rely on salmon, with Chinook salmon making up about 80% of their diet
605 [10]. Many Chinook populations across the Pacific Northwest have declined to a fraction of their
606 historic abundance and are listed as either threatened or endangered under the Endangered Species
607 Act. In addition, Chinook are returning younger and smaller than they have historically. These
608 significant shifts in abundance and size are making Chinook less available and less nutritious for
609 Southern Resident orcas. To put orcas on the path to recovery, Chinook populations need to be
610 abundant, diverse and accessible, which requires productive and protected habitat and a reliable
611 forage fish food source for Chinook and other salmon.

612 Many factors combine to affect salmon abundance and productivity, including habitat loss and
613 degradation, fish passage, hydro survival, hatcheries, predation and forage fish and food web
614 interactions. As such, the actions the prey working group addressed in the Year One Report
615 encompassed the gamut of challenges facing salmon. Additional details on the task force's
616 recommendations for increasing Chinook abundance are provided in the [2018 Southern Resident
617 Orca Task Force Report and Recommendations](#). The sections below highlight progress made,
618 outline outstanding needs and describe lessons learned for the Year One recommendations.

619 Progress made

620 In 2019, the prey working group and the task force evaluated progress made on the task force's 2018
621 recommendations, highlighting the following accomplishments to date:

- 622 • **Increasing hatchery production to increase food for orcas.** Washington state, tribes and
623 public utility districts received \$13.4 million to increase hatchery production starting in July
624 2019, with 18 million new smolts in 2019. Nearly \$40 million was also provided to make
625 capital improvements to state hatcheries ([Recommendation 6](#)).
- 626 • **Improving habitat protections.** The state passed legislation requested by the governor in
627 2019 that addressed habitat protection of shorelines and waterways, specifically increasing
628 Washington Department of Fish and Wildlife civil enforcement authority for hydraulic
629 project approvals and removing key exemptions (Chapter 290 RCW) ([Recommendations 3
630 and 4](#)).
- 631 • **Increasing survival through the hydro system.** On March 29, 2019, the Washington State
632 Department of Ecology issued a short-term modification for total dissolved gas criteria for
633 areas on the lower Snake and lower Columbia rivers so that the allowable 120% total
634 dissolved gas aligned with Oregon. In May 2019, Ecology initiated a rulemaking process to

635 update Washington’s total dissolved gas criteria for these rivers, allowing spill up to 125%
636 total dissolved gas. If adopted, the rule would allow the U.S. Environmental Protection
637 Agency the regulatory time frame to approve revised total dissolved gas water quality criteria
638 by the 2020 spring spill season (**Recommendation 8**).

639 • **Decreasing predatory fish impacts.** Legislation passed in 2019 to decrease impacts of
640 predatory fish on salmon, directing WDFW to develop rules to increase bag limits for certain
641 species that overlap with and prey on salmon (Chapter 290 RCW) (**Recommendation 14**).

642 • **Decreasing pinniped predation on the Columbia River.** The federal Endangered Salmon
643 Predation Prevention Act (PL 115-329) was signed into law, giving state and tribal resource
644 managers more flexibility to manage sea lion predation in the Columbia River to minimize
645 impacts to salmon. The law allows the National Marine Fisheries Service to approve permits
646 for Washington, Oregon, Idaho and several area tribes that will streamline the removal
647 process of a designated number of sea lions from a portion of the Columbia River and
648 adjacent tributaries each year (**Recommendation 13**).

649 Outstanding needs

650 While noteworthy progress has been made on the recommendations above, the prey working group
651 and task force identified recommendations that have not advanced enough to achieve the goal of
652 increasing Chinook abundance. As a result, the prey working group and task force propose the
653 following urgent actions and/or funding to advance these recommendations:

654 • **Fully fund salmon recovery plans.** Work with legislators, stakeholders and tribes to
655 increase funding to fully implement salmon recovery plans. Focus on implementing habitat
656 restoration and protection projects that local experts have prioritized in each salmon
657 recovery region and that will benefit Chinook and Southern Residents. Ensure funding
658 includes administration and local capacity-building to accelerate projects that are underway
659 or have committed resources. Ensure greater collaboration between hatchery and habitat
660 restoration efforts so that habitat is available to recover wild fish and for newly produced
661 hatchery fish (**urgent action for Recommendations 1, 2 and 6, requires legislative**
662 **funding**).

663 • **Investigate and address pinniped predation.** Provide funding to WDFW to (1) determine
664 if pinniped predation is a limiting factor for Chinook in Puget Sound and along
665 Washington’s outer coast and (2) more effectively manage pinniped predation in the
666 Columbia River (**urgent action for Recommendations 12 and 13, requires legislative**
667 **funding**).

668 • **Increase early marine survival research and monitoring in Puget Sound.** Increase
669 funding to Puget Sound Partnership and WDFW for salmon marine survival research and
670 monitoring projects through the Puget Sound Action Agenda to ensure that results may be
671 integrated in recovery and management plans, as appropriate. Research and monitoring

672 projects could include Puget Sound Atlantis Modeling, zooplankton monitoring, salmon and
673 forage fish sampling and pinniped predation work ([urgent action for Recommendations](#)
674 [12, 15, 16, requires legislative funding](#)).

675 • **Prevent northern pike expansion into the Columbia River.** Increase funding to WDFW
676 for northern pike eradication and containment efforts to prevent predation on salmon in the
677 Columbia River ([additional component of Recommendation 14, requires legislative](#)
678 [funding](#)).

679 • **Improve water quality.** Encourage Ecology to proceed with language in new rules on
680 increasing the standard for total dissolved gas allowances in the Columbia and Snake rivers
681 that will ensure the durability of the new rule ([urgent action for Recommendation 8](#)).

682 **Lessons learned and emerging issues**

683 Since the task force finalized its recommendations in November 2018, additional prey-related
684 considerations emerged and were evaluated by the prey working group and the task force, as
685 outlined below:

686 • **Continue research, seek new technology and adapt actions for salmon and orca**
687 **recovery.** The reduced age and size of Chinook at return increases concern about prey
688 quality and quantity available to Southern Residents. Additional investigation and adaptive
689 management are needed to better understand and address the underlying reasons for these
690 changes in prey. Tracking progress and effectiveness of task force recommendation
691 implementation is critical to maintaining recovery momentum and achieving recovery goals.

692 • **Continue to work within the Pacific Fisheries Management Council and North**
693 **Pacific Management Council to further reduce the bycatch of Chinook.** Task force
694 Recommendation 11 requested that WDFW continue to work with regional councils and
695 stakeholders to further reduce bycatch in West Coast fisheries. In recent years, substantial
696 progress has been made by the Pacific Fisheries Management Council and North Pacific
697 Management Council to reduce the bycatch of Chinook in federal groundfish fisheries in the
698 Bering Sea, Gulf of Alaska and off Washington, Oregon and California coasts. For example,
699 2018 Chinook bycatch levels in the Bering Sea and Gulf of Alaska were 34,288 (NPMC),
700 well below the upper limit of about 109,000. Bycatch in the West Coast groundfish fisheries
701 was 6,500 (PFMC), which is also considerably lower than the limit of 20,000. While changes
702 to timing, gear and harvest areas have contributed to the bycatch reductions to date, WDFW
703 will need to continue to work within the councils to seek further reductions when and where
704 possible as new technology and research become available.

705 **New recommendations**

706 The task force did not submit any new prey recommendations in 2019.

707 Vessels

708 Overview

709 Vessels transiting near Southern Resident orcas can produce underwater noise that masks or impairs
710 orca communication and echolocation (the method orcas use to find their prey). This noise makes it
711 harder for orcas to find food and can reduce the time orcas devote to foraging by almost 20%,
712 limiting their potential prey intake and increasing their energy expenditure [11, 12]. Refer to the [2018](#)
713 [Southern Resident Orca Task Force Report and Recommendations](#) for a detailed synopsis of these
714 threats.

715 Progress made

716 In 2019, the vessels working group and the task force evaluated progress made on Year One
717 recommendations, highlighting the following accomplishments to date:

- 718 • Rapid implementation of legislation passed in 2019:
 - 719 – Boats must stay farther away and travel slowly near Southern Residents (Chapter 291
720 RCW) (**Recommendations 17, 26, 28**).
 - 721 – Initiation of a licensing system for commercial whale watching operations (Chapter 291
722 RCW) (**Recommendation 18**).
 - 723 – To improve protection from oil spills, Washington will establish new standards for tug
724 escorts for oil barges in Rosario Strait (Chapter 289 RCW) (**Recommendation 24**).
- 725 • Based on the new laws, the state broadened its outreach efforts to educate boaters and
726 promote compliance through Be Whale Wise (Chapter 293 RCW) (**Recommendation 19**).
- 727 • New voluntary guidelines limit boaters' use of echo sounders near orcas. In both Puget
728 Sound and Canadian waters, maritime groups established safe, voluntary standards to reduce
729 the potential interference of depth finders on Southern Residents' echolocation
730 (**Recommendation 21**).

731 Outstanding needs

732 The vessels working group and task force identified the following recommendations that need
733 urgent legislative action and/or funding to achieve the goal of decreasing vessel noise and related
734 risks to Southern Residents. The vessels working group and task force propose the following actions
735 to advance these recommendations:

- 736 • Increase funding and make funding ongoing to the Washington Department of Fish and
737 Wildlife for additional officers and equipment for enforcement (**urgent action for**
738 **Recommendation 20, requires legislative funding**).
- 739 • Create and charter a transboundary forum for waterways management and Southern
740 Resident conservation by working with the appropriate federal partners, tribes and agencies
741 to integrate and coordinate state, federal and Canadian actions. Evaluate cumulative impacts
742 of vessel traffic (**additional component of Recommendations 24 and 27**).
- 743 • Help ensure that the State Environmental Policy Act review of marine facilities is routinely
744 applied to standard and atypical changes in use and ownership that may lead to higher vessel
745 traffic or unusual vessel traffic dynamics. Provide tools for local and state governments to
746 identify potential impacts and recommend appropriate mitigation measures (**additional**
747 **component of Recommendation 27**).
- 748 • Provide resources to WDFW to (1) expand boater education and enforcement to central
749 Puget Sound in the fall, (2) seek vessel mitigation opportunities and (3) extend outreach to
750 promote compliance by vessel operators in newly proposed critical habitat on the outer coast
751 of Washington (**additional component of Recommendation 19, requires legislative funding**).
- 752 • Encourage compliance by the United States shipping sector and recreational vessels with
753 Canada's interim and potential future (feeding) sanctuary zones such as Swiftsure Bank and
754 Pender Island (**additional component of Recommendation 22**).
- 755 • The Governor's Office and state agencies should coordinate with the National Oceanic and
756 Atmospheric Administration and the U.S. Navy to reduce noise and disturbance affecting
757 Southern Resident orcas from military exercises and Navy aircraft. In particular, the final
758 decisions on training and testing activities conducted in the Northwest training and testing
759 study area between November 2020 and November 2027 should eliminate impacts from
760 new or additional exercises involving mid-frequency sonar, explosives and other activities
761 with the potential to adversely affect Southern Resident orca recovery or incorporate
762 enhanced mitigation measures to reduce impacts (**urgent action on Recommendation 25**).

763 **Lessons learned and emerging issues**

764 Since the task force finalized its recommendations in November 2018, a new vessels-related
765 consideration related to Navy operations emerged and was evaluated by the vessels working group
766 and the task force. The Navy has proposed that several new training and testing operations occur in
767 the Cape Flattery offshore area of Washington's northern coast. In 2019, the draft supplemental
768 environmental impact statement for these activities revealed several significant concerns. Gov.
769 Inslee, Seattle Mayor Jenny Durkan, WDFW, the Puget Sound Partnership and many other
770 organizations submitted formal comments to the Navy to express concerns and recommend
771 measures to mitigate potential impacts related to sound, emerging technologies and spatial and
772 temporal overlaps between Navy activities and orca populations. Specific concerns include:

- 773 • The Navy’s testing is already altering the soundscape in areas where orcas are present. The
774 draft supplemental environmental impact statement does not appear to take into account
775 research by NOAA describing the overlap between the Navy’s current and planned activities
776 revealed by NOAA’s offshore hydrophone network [7].
- 777 • Underwater explosive detonations are projected to continue. Detonations can cause
778 ruptured or hemorrhaged organs in marine mammals that can be fatal [8].
- 779 • New sonar testing is proposed both pier-side and at sea. Surface ship sonar maintenance is
780 proposed to increase by over 90%. Sonar can cause temporary hearing loss, behavioral
781 reactions, masking of sounds and stress in orcas [8].
- 782 • The Navy’s new activities will incorporate new technologies with unknown effects, such as
783 high-energy lasers, kinetic energy weapons and biodegradable polymers. They will also
784 increase the use of unmanned systems, which raises concerns about underwater noise, sonar
785 use, radio transmissions and use of lasers. Current and proposed Navy activities overlap with
786 a proposed expansion of the area designated as Southern Resident orca critical habitat.
787 Although the Navy proposes to use surface-level lookout systems for whales, these lookouts
788 are inadequate because historically one-quarter of Navy tests have occurred at night [7].
- 789 • The proposed Navy activities do not account for the Southern Residents’ seasonal
790 behaviors. By assessing their seasonal movements, the Navy can reduce negative impacts to
791 Southern Resident orcas and other species [7].
- 792 • While the federal regulatory process for the draft supplemental environmental impact
793 statement is underway, the Navy has been proactive in its participation on the vessels
794 working group. The Navy is exploring the opportunity to follow the precedent set by
795 Washington State Ferries to be an early adopter of the Whale Report Alert System from
796 Canada, as mariners and experienced observers in Puget Sound try to extend the tool’s
797 effective range southward [7]. WRAS would provide the Navy with an additional source of
798 nearly real-time information on the location of Southern Residents before conducting
799 operations that might affect the whales.

800 **New recommendations**

801 The task force did not submit any new vessels recommendations in 2019.

802 Contaminants

803 Overview

804 Southern Residents and their prey are exposed to pollutants in the marine environment, particularly
805 in the Salish Sea, many of which are poorly metabolized, persist in the environment and
806 bioaccumulate and bio-magnify in the food web. These toxics can reduce salmon survival by making
807 them more susceptible to disease, which in turn means less food available for the orcas. Toxic
808 contaminants can also reduce immunity and cause reproductive disruption in orcas. Refer to the
809 [2018 Southern Resident Orca Task Force Report and Recommendations](#) for a detailed synopsis of
810 these threats.

811 Progress made

812 In 2019, the contaminants working group and the task force evaluated progress made on the
813 recommendations above, highlighting the following accomplishments to date:

- 814 • New state authorities have been created to prioritize chemicals — including new authority to
815 prioritize for species, to develop caps and to ban chemicals in products (**Recommendation**
816 **30**).
- 817 • Funding was provided for water quality enforcement staff. Municipal stormwater permits
818 now require smaller jurisdictions to implement local source control (**Recommendation 32**).

819 Outstanding needs

820 The contaminants working group and task force identified the following recommendations that have
821 not advanced enough and need urgent legislative action and/or funding to achieve the goal of
822 reducing exposure to contaminants. The contaminants working group and task force propose the
823 following actions to advance these recommendations:

- 824 • Toxics control funding provided through the state's Model Toxics Control Act should be
825 maintained for preventing and cleaning up toxics (**additional component of**
826 **Recommendation 31**).
- 827 • Additional funding should be provided for Washington State Department of Ecology staff
828 to support contaminants recommendations and funding to support local source control
829 inspectors (**Recommendation 30, 31 and 32, requires legislative funding**). Funding
830 should also be provided for incentives to reduce stormwater threats (**urgent action on**
831 **Recommendation 31, requires legislative funding**).

- 832 • Increase funding to specific accounts that support infrastructure improvements, including
833 the Clean Water Pollution State Revolving Fund, Stormwater Financial Assistance Program,
834 Public Works Trust Fund and increase caps on utility fees to help fund improved wastewater
835 treatment, stormwater and other contaminant sources (**additional component of**
836 **Recommendation 31, requires legislative funding**).
- 837 • Prioritize stormwater management and cleanup based on evidence of toxic impacts limiting
838 salmon population productivity (**urgent action on Recommendation 31**).
- 839 • Ecology should update aquatic life water quality standards focused on pollutants most
840 harmful to Southern Resident orcas and their prey (**additional component of**
841 **Recommendation 32, requires legislative funding**).
- 842 • Weave monitoring into each recommendation and dedicate funding to Ecology, the Puget
843 Sound Partnership and the Washington Department of Fish and Wildlife to provide data on
844 effectiveness (**additional component of Recommendation 33**).

845 **Lessons learned and emerging issues**

846 Since the task force finalized its recommendations in November 2018, new contaminants-related
847 considerations emerged and were evaluated by the contaminants working group and the task force,
848 as outlined below:

- 849 • **The Washington State Department of Transportation should work with Ecology to**
850 **explore opportunities to increase the pace of stormwater retrofits and ways to provide**
851 **increased stormwater treatment on state highways (Recommendation 31).** Roadways
852 accumulate toxics; when not adequately managed, the runoff that contains those toxics can
853 be lethal to salmonids. As methods are available to reduce the impact of road runoff, the
854 contaminants working group recognized the importance of accelerating work on public
855 highways to address them as a source of toxic contaminants. Finding ways to do more, faster
856 is an important long-term need for recovering Southern Resident orcas and their prey.
- 857 • **Support the Attorney General’s Office efforts to pursue the polychlorinated biphenyl**
858 **(more commonly referred to as “PCB”) case against Monsanto (Recommendation**
859 **31).** Shifting the cost burden to producers of toxic contaminants is critical to supporting
860 their long-term reduction. It is important to find ways to ensure that the costs of remediating
861 contaminants are borne by those responsible for introducing them in the first place.
- 862 • **Fund local governments to conduct facilities planning through 2070 that looks at**
863 **population growth through a wastewater, centralized and onsite sewage and**
864 **stormwater lens to ensure increased contaminant loads do not impact salmon and**
865 **orcas (Recommendation 32).** Planning our infrastructure systems over a timeline that sets
866 us up for long-term success is crucial. The Puget Sound region’s population is expected to
867 roughly double by 2070. We should ensure that our planning recognizes the long-term

868 challenges of population growth and climate change in a way that clearly recognizes the scale
869 of each of these challenges.

870 **Human sources of nutrients**

871 In addition to the emerging contaminants-related considerations described above, Ecology’s 2019
872 Salish Sea Modeling Report¹ evaluated the impact of human sources of nutrients on Puget Sound
873 water quality. The report found that the excess of nutrients from human sources is causing or
874 contributing to low dissolved oxygen in many sensitive inlets and bays within Puget Sound, resulting
875 in oxygen levels that fall below the concentrations needed for marine life to thrive. Human sources
876 of nutrients in diffuse or direct discharges may include municipal wastewater, agriculture, forestry
877 and other land use activities.

878 In addition to lowering dissolved oxygen, excess nutrients can impair the foundations of the marine
879 food web by degrading the habitat and water quality conditions conducive to healthy and robust
880 populations of marine species. Refer to Recommendations 39, 40 and 41 below, developed by
881 Ecology and informed through discussions with regional stakeholders and tribes at the Puget Sound
882 Nutrient Reduction Forum to address these threats. Refer to [Appendix 2](#) for further information on
883 the impacts of human sources of nutrients on marine water quality.

884 **New recommendations**

885 Since issuing its recommendations in 2018, the contaminants working group and task force have
886 developed the new recommendations below to address additional contaminants and nutrients related
887 threats and achieve Goal 3:

888 **Goal 3: Reduce the exposure of Southern Resident orcas and their prey to**
889 **contaminants and human sources of nutrients.**

890 **Recommendation 37:** Protect against regulatory rollbacks at the federal and state level.

891 *Implementation details*

892 Given the current federal regulatory environment, ensure that state authority, rules and
893 regulatory protections are sufficient to prevent moving backwards.

894

¹ The Salish Sea Model is a three-dimensional scientific and engineering simulation of hydrodynamic and water quality processes in Puget Sound, the Strait of Juan de Fuca, and the Strait of Georgia, as well as inputs from 64 rivers and streams and 99 facilities/point sources (mostly municipal wastewater treatment plants) in the U.S. and Canada. The model includes simulated water quality features including a total of 19 state variables, two species of algae, dissolved and particulate carbon, and nutrients [69].”

895 **Recommendation 38:** Explore setting minimum standards for local stormwater funding to ensure
896 that all programs have the resources necessary to protect water quality.

897 *Implementation details*

898 **Requires legislative policy.** Local government spending on stormwater programs varies
899 from jurisdiction to jurisdiction, leaving some programs without adequate funding. The state
900 should explore legislation to set minimum standards for local stormwater funding, ensuring
901 that all programs have the resources necessary to protect water quality.

902
903 **Recommendation 39:** Develop a National Pollutant Discharge Elimination System permit
904 framework for advanced wastewater treatment in Puget Sound to reduce nutrients in wastewater
905 discharges to Puget Sound by 2022.

906 *Implementation details*

907 **Requires legislative funding.** Discharges of excess nutrients to Puget Sound from
908 wastewater treatment plants represent more than 50% of the human sources of nutrients
909 into Puget Sound and contribute significantly to low dissolved oxygen levels. As such,
910 Ecology must require wastewater treatment plants to control nutrients consistent with the
911 Clean Water Act and Washington's Water Pollution Control Act.² Ecology should explore
912 ways to use its National Pollutant Discharge Elimination System³ regulatory authority to
913 address point sources of nutrients. Significant nutrient reductions can be achieved by
914 implementing advanced wastewater technology.

915 Ecology proposes developing a Puget Sound Nutrients General Permit to control nutrient
916 discharges from domestic wastewater treatment plants (sewage treatment plants). Ecology
917 issued a public notice for a preliminary determination to develop a Puget Sound Nutrients
918 General Permit on August 21, 2019. The purpose of this comment period is to obtain
919 feedback about whether a general permit is the right NPDES permit framework for this
920 purpose. The alternative to a general permit is to include nutrient control requirements in
921 each of wastewater treatment plant's individual permits, one by one, as they are reissued over
922 the next five to 10 years.

923
924 **Recommendation 40:** Better align existing nonpoint programs with nutrient reduction activities
925 and explore new ways to achieve the necessary non-point-source nutrient reductions.

926 *Implementation Details*

927 Ecology should establish minimum requirements for non-point-source best management
928 practices to ensure they meet water quality standards and expand existing state and local

² More information is available at <https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-quality-permits/Water-Quality-general-permits>.

³ Created in 1972 by the Clean Water Act, the NPDES permit program regulates point sources that discharge pollutants to U.S. waters. The permit provides two levels of control: technology-based limits and water quality-based limits [72].

929 non-point-source programs to include nutrient reduction best management practices to
930 begin correcting known land use problems in watersheds. Existing non-point-source
931 programs can be expanded to address known problems from nutrient runoff from
932 agricultural, suburban/urban and rural land use activities. Many of these non-point-source
933 implementation actions have multiple benefits for water quality improvement, including
934 nutrient reduction.

935 Ecology is developing minimum performance requirements for agricultural nutrient
936 reduction best management practices that will meet water quality standards. Continuing that
937 process and beginning to explore other ways to achieve meaningful non-point nutrient
938 reductions will occur over the next few years as Ecology continues working with
939 stakeholders using state-of-the-art modeling to develop an integrated Puget Sound nutrient
940 management plan for point source and non-point-source nutrient reductions.

941

942 **Recommendation 41:** Collect high-quality nutrient data in watersheds to fill key knowledge gaps of
943 baseline conditions.

944

Implementation Details

945 **Requires legislative funding.** Ecology should augment key watershed monitoring stations
946 with continuous nutrient monitoring technology to improve our understanding of watershed
947 nutrient loads and establish baseline conditions to measure future change.

948 Making science-based nutrient management decisions depends on having the right tools and
949 high-quality data. The Salish Sea Model is our best tool for understanding the marine waters
950 of Puget Sound and evaluating the best suite of nutrient load reductions necessary to achieve
951 water quality standards. Explore potential tools to quantify human sources in watersheds and
952 evaluate nutrient management actions to meet total watershed nutrient reduction goals.

953 We can improve our understanding of the timing and magnitude of nutrient discharges from
954 watersheds with modest enhancements to existing long-term watershed monitoring
955 networks. Monitoring is critical to establish a strong scientific basis to characterize both
956 baseline conditions and to measure progress as nutrient reduction actions are implemented.
957 Nutrient management decisions in watersheds depend on quality science and data to
958 understand complex interactions between human sources and freshwater and marine water
959 quality.

960 Funding, monitoring and 961 accountability

962 Overview

963 In 2018, the task force recognized that its recommendations would not be successful without
964 adequate funding, information and accountability mechanisms in place. Likewise, in 2019 the task
965 force recognized the critical importance of an oversight committee or similar body to continue to
966 monitor progress, advocate for the ongoing implementation of task force recommendations and
967 adapt to changing conditions by issuing new recommendations as needed.

968 Progress made

969 The enacted 2019–21 biennial budgets (operating, capital and transportation) provided \$1.1 billion
970 to support the recovery of Southern Resident orca populations and implement the
971 recommendations of the Governor’s Southern Resident Orca Task Force. Key recommendations
972 receiving funding included:

- 973 • **Washington State Department of Transportation fish passage:** \$275 million for
974 WSDOT to complete fish barrier corrections necessary to meet the requirements of the U.S.
975 federal court culvert injunction. This funding is a \$176 million, or 177%, increase from the
976 previous biennium (**Recommendation 1**).
- 977 • **Habitat protection and restoration:** \$10.3 million in the operating budget and \$447.8
978 million in the capital budget for salmon habitat restoration programs. This funding
979 represents a 22.1% increase in capital funding from the previous biennium
980 (**Recommendations 1 and 5**).
- 981 • **Habitat enforcement and technical assistance:** \$4.5 million to increase technical
982 assistance and enforcement of state water quality, water quantity and habitat protection laws.
983 This funding will result in four additional Washington Department of Fish and Wildlife
984 enforcement officers to enforce hydraulic project approval permits. The Washington State
985 Department of Ecology will hire three additional non-point-source water quality specialists,
986 three additional water quality inspectors focusing on point-source pollution and five
987 additional water masters in Puget Sound to enforce instream flow rules (**Recommendation**
988 **3**).
- 989 • **Hatcheries:** \$13.5 million in the operating budget to increase hatchery production by 19%,
990 resulting in 24 million additional smolts annually. The capital budget provided \$40 million
991 for capital improvements to state hatcheries, a 20% increase (**Recommendation 6**).

- 992 • **Lower Snake River dams:** \$750,000 to implement a stakeholder engagement process to
993 determine the economic, social and environmental impacts of the potential breaching or
994 removal of the Snake River dams (**Recommendation 9**).
- 995 • **Vessels:** \$140 million in the transportation budget to acquire one new hybrid electric ferry
996 and to convert two existing ferries to hybrid electric (**Recommendation 23**).
- 997 • **Contaminant prevention:** \$4.7 million in the operating budget and \$3.7 million in the
998 capital budget to prevent toxics from entering the environment (**Recommendation 30**).
- 999 • **Containment cleanup:** \$4.8 million in the operating budget and \$136.6 million in the
1000 capital budget to clean up toxics sites and contaminants. This funding represents a 27.3%
1001 increase in capital funding from the previous biennium (**Recommendation 31**).

1002 Outstanding needs

1003 Although significant additional investments occurred in the 2019–21 biennium, considerable
1004 outstanding costs for implementing projects and programs for salmon and orca recovery remain:

- 1005 • A recent estimate of the costs and potential funding gaps to implement regional salmon
1006 recovery plans is currently unavailable. The latest, most comprehensive estimate of the
1007 statewide cost of implementing the habitat-related elements of regional salmon recovery
1008 plans was completed in 2011:
 - 1009 – That report estimated the cost to implement regional salmon recovery plans for all
1010 species for the period of 2010–19 to be \$5.5 billion, with \$4.7 billion in capital costs and
1011 nearly \$800 million in non-capital costs [13].
 - 1012 – This funding translates to \$550 million in annual costs. The report found that if current
1013 state, federal and local sources were maintained for the coming 10 years, they would
1014 support approximately 25% of the actions recommended in regional recovery plans
1015 statewide.
 - 1016 – This estimate does not include the costs of non-habitat-related actions (hydro power,
1017 hatcheries, harvest, predation and invasive species) needed to recover salmon.
 - 1018 – This estimate is likely to be somewhat higher than what would be needed solely for orca
1019 recovery since it includes costs for salmon species that are not a primary food source for
1020 Southern Residents.
- 1021 • Assuming that state funding of \$225 million annually in the 2019–21 biennium capital
1022 budget continues, current funding sources would be providing approximately 50% of the
1023 annual need for salmon habitat restoration.
 - 1024 – This estimate is not adjusted for inflation and does not reflect projects which have been
1025 funded or new projects that may have been developed since 2011.

- 1026 – The Puget Sound Partnership’s 2018–22 Action Agenda for Puget Sound Recovery,
1027 completed in December 2018, estimates a total cost of implementation of a little more
1028 than \$1.3 billion.
- 1029 – To date, secured funding of \$254 million amounts to only 19% of projected costs [14].
- 1030 • Focusing only on Chinook recovery in Puget Sound yields a similar result:
- 1031 – The 2018–22 Action Agenda estimates a cost of \$729 million to implement the Chinook
1032 Salmon Priority focus area over those four years.
- 1033 – The \$135 million in secured funding to date represents only 18.5% of the funding
1034 necessary to implement the near-term actions related to Chinook recovery [15].
- 1035 – These estimates for overall Puget Sound recovery as well as Chinook recovery do not
1036 reflect the actual increase in funding in the 2019–21 biennial budget, so this estimate is
1037 likely overestimating the funding gap.
- 1038 • Although some overlap with fish passage barrier projects in the Regional Salmon Recovery
1039 plans exists, a significant funding gap for the correction of state and local fish passage
1040 barriers remains.
- 1041 – Under a federal injunction, the WSDOT has 992 remaining fish passage barriers to
1042 correct in Puget Sound and along the Washington coast north of the Willapa and
1043 Columbia River drainages.
- 1044 – Four hundred and fifteen of these barriers with significant habitat blockages need to be
1045 corrected by 2030 to meet the injunctions requirements.
- 1046 – WSDOT’s current estimate to comply with the injunction by 2030 is an additional \$3.1
1047 billion [16].
- 1048 • In addition to state fish passage barriers, local governments also have barriers blocking fish
1049 passage.
- 1050 – Approximately 3,200 county culverts are within the injunction case area with an
1051 estimated cost of \$7.7 billion to correct [17, 18].
- 1052 – The Association of Washington Cities has estimated a potential cost of \$4.2 billion to
1053 correct its 1,233 known city barriers [19].
- 1054 – So far, no long-term funding source has been identified to fix the fish blockages in local
1055 government jurisdictions.
- 1056 • Ensuring that funding, information and accountability mechanisms are in place to support
1057 effective implementation also includes:
- 1058 – Transitioning one-time investments in orcas and salmon from 2019 into ongoing
1059 investments. Much of the increases in funding that WDFW received as part of the
1060 Southern Resident orca package was one-time funding. To most benefit orcas, this
1061 funding should be sustainable (**additional component of Recommendation 34,**
1062 **requires legislative funding**).

- 1063 – Providing funding to PSP, WDFW, the Governor’s Salmon Recovery Office and
 1064 Ecology to evaluate effectiveness of task force recommendations through monitoring
 1065 and adaptive management while leveraging existing efforts ([urgent action on](#)
 1066 [Recommendation 35, requires legislative funding](#)).

1067 **New recommendations**

1068 The task force will sunset after submitting the Year Two report on November 8, 2019. The task
 1069 force submits the following new recommendation for the strong governance necessary to continue
 1070 meaningful and sustained action.

1071 **Goal 4: Ensure funding, information and accountability mechanisms are in**
 1072 **place to support effective implementation.**

1073 **Recommendation 42:** Create one or more entities with authority and funding to recover and
 1074 advocate for Southern Resident orcas by implementing task force recommendations, creating new
 1075 recommendations as needed and reporting to the public, governor and tribal co-managers on status.
 1076 Any oversight group must incorporate the following elements:

- 1077 • Is co-managed by the Governor’s Office and tribes.
- 1078 • Coordinates with federal agencies in both the United States and Canada to stay connected to
 1079 ongoing policies around species recovery.
- 1080 • Aligns with governor’s priority on diversity, equity and inclusion and environmental justice.
- 1081 • Maintains some element of the working group structure and provides ongoing support and
 1082 facilitation of working groups by state agencies.
- 1083 • Continued engagement from non-profits, businesses and other stakeholders to monitor
 1084 implementation of existing recommendations, consider new recommendations and
 1085 recommend course corrections for continued recovery.
- 1086 • Maintains and enhances public visibility and interest in this crisis and facilitates a robust
 1087 public engagement process.
- 1088 • Builds on ongoing monitoring and reporting to maintain accountability to the public.
- 1089 • Maximizes institutional durability, at least until the population reaches 84 whales by 2028.⁴

1090

⁴ In its 2018 report, the task force set forth the goal of increasing the Southern Resident population to 84 whales by 2028, or “10 more whales in 10 years,” aligning with the National Marine Fisheries Service 2008 Recovery Plan for the Southern Resident Killer Whales.

1091 *Implementation Details*

1092 **Requires legislative funding.** The task force has identified three options for moving this
1093 recommendation forward. The options are listed below and described in more detail in
1094 [Appendix 3](#). The options are not listed in priority order.

1095 **Option 1: Expand existing agency capacity.**

1096 – Expand the capacity and function of the Governor’s Salmon Recovery Office to include
1097 orca recovery (e.g., Governor’s Salmon and Orca Recovery Office). This option
1098 leverages existing agency infrastructure and is modeled after the Salmon Recovery
1099 Funding Board with policy coordination and administration functions within the
1100 proposed Governor’s Salmon and Orca Recovery Office and a policy board comprising
1101 governor-appointed members and agency heads.

1102 **Option 2: Create a new executive level team in Governor’s Office.**

1103 – Create an executive-level salmon and orca leadership team in the Governor’s Office.
1104 This option includes explicit tribal co-manager engagement by the Governor’s Office.
1105 This option houses the main functions of the policy leadership team within the
1106 Governor’s Office and maintains an executive-level focus on recovery.

1107 **Option 3: Create a new orca recovery office.**

1108 – Create an orca recovery office led by technical experts. This option creates a new office
1109 that is staffed to implement actions. This office can be located within the Governor’s
1110 Office or within an existing agency. The key element of this option is that it is not a
1111 stakeholder-led process.

1112 In addition to building the bodies described in the three options, the task force recommends
1113 leveraging PSP’s recovery system where appropriate. It is well-positioned to contribute to
1114 vessels recommendations, coordinate with Canadian representatives and actions, support
1115 scientific monitoring, advise on communications and track progress. Likewise, Salmon
1116 Recovery Councils on the Columbia River and Washington Coast could be useful partners.
1117 Refer to [Appendix 3](#) for additional detail on the options above.

1118 Climate change and ocean 1119 acidification

1120 Overview

1121 Introduction

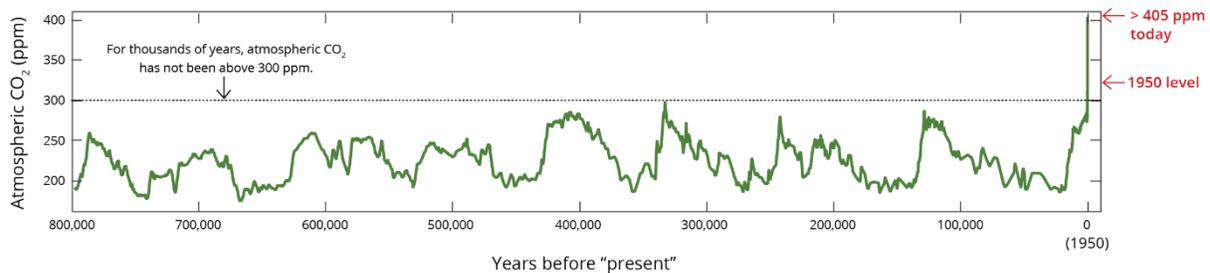
1122 Changes in the climate and increasing ocean acidification are imperiling Southern Resident orcas and
1123 Chinook salmon — the primary prey species on which they subsist — pushing them to the brink of
1124 extinction. Species like the orcas and Puget Sound Chinook are highly endangered, making them
1125 especially sensitive to changes in their environment. Climate change and ocean acidification
1126 compound the stressors already limiting their survival and undermine ongoing recovery efforts. The
1127 extinction of the Southern Resident orcas would be an unacceptable and foreboding loss. As a top
1128 predator, they serve as an indicator of the overall health of our ecosystem; if the orcas are unable to
1129 survive, it portends trouble for all inhabitants of this region, including humans.

1130 Swift, bold and effective actions are urgently needed to sustain the Southern Resident orca
1131 population and restore the ecosystem upon which they — and we — depend. **This task force calls**
1132 **for immediate and aggressive action in Washington state and beyond to reduce human-**
1133 **caused greenhouse gas emissions, consistent with the best available science, and to increase**
1134 **the resilience of our ecosystem to climate-induced changes.** Findings and recommendations
1135 related to addressing the impacts of climate change and ocean acidification on Southern Residents
1136 are presented below, along with cross-cutting recommendations that address root causes and
1137 increase resiliency.

1138 Human-caused emissions

1139 As shown in Figure 2, the level of carbon dioxide in the atmosphere remained below 300 parts per
1140 million for thousands of years prior to 1950 [20]. Human activities related to transportation,
1141 electricity, industry and consumption have increased accumulation of CO₂ in the atmosphere to 405
1142 ppm, causing global temperatures to rise by about 1°C above pre-industrial levels [20]. About 25%
1143 of these CO₂ emissions are absorbed by the ocean, resulting in ocean acidification, or the decrease
1144 of oceanic pH [20]. Human activity also releases other potent greenhouse gases, which are rapidly
1145 accumulating in the atmosphere and are major drivers of climate change. For example, methane gas
1146 is emitted as a byproduct of coal and natural gas production, distribution and use, as well as from
1147 the agriculture and waste management sectors. Methane is 34 times more potent than CO₂ over a
1148 100-year period and 86 times more potent over a 20-year period, magnifying its short-term impact
1149 on climate change relative to CO₂ emissions [21].

1150 **Figure 2. Atmospheric carbon dioxide parts per million over the past 800,000 years [20].**



1151 Although the effects of climate change are already observable due to the current 1.0°C increase in
 1152 global temperatures, human activities continue to add approximately 0.2°C to global average
 1153 temperatures each decade [20]. Scientists project catastrophic and irreversible changes to life on
 1154 Earth when global warming surpasses 1.5°C, with even greater consequences after 2.0°C. For
 1155 example, 1.5°C of warming is projected to cause marine fisheries to decline by 4.5 million metric
 1156 tons, while 2.0°C of warming is projected to cause a 6.0 million metric ton decline (1.3 times worse)
 1157 [20]. Without significant reductions in emissions of CO₂ and other greenhouse gases, global average
 1158 warming will likely reach 1.5°C between 2030 and 2052 [20].

1159 To limit warming to 1.5°C, we must reduce global CO₂ emissions by 45% from 2010 levels by 2030
 1160 and reach net zero emissions by about 2050 [20]. To limit warming to 2.0°C, we must reduce global
 1161 CO₂ emissions by 25% from 2010 levels by 2030 and reach net zero emissions by about 2070 [20].

If current trends continue, the University of Washington Climate Impacts group projects that 1.5°C of warming could be reached as soon as 2030 and will result in [20]...

- 67% more days above 90°F.
- 38% decrease in snowpack.
- 16% increase in winter streamflow.
- 23% decrease in summer streamflow.

These changes will lead to further deterioration in conditions for the Southern Residents and their prey, underscoring the urgency of action to limit emissions and stabilize global temperatures.

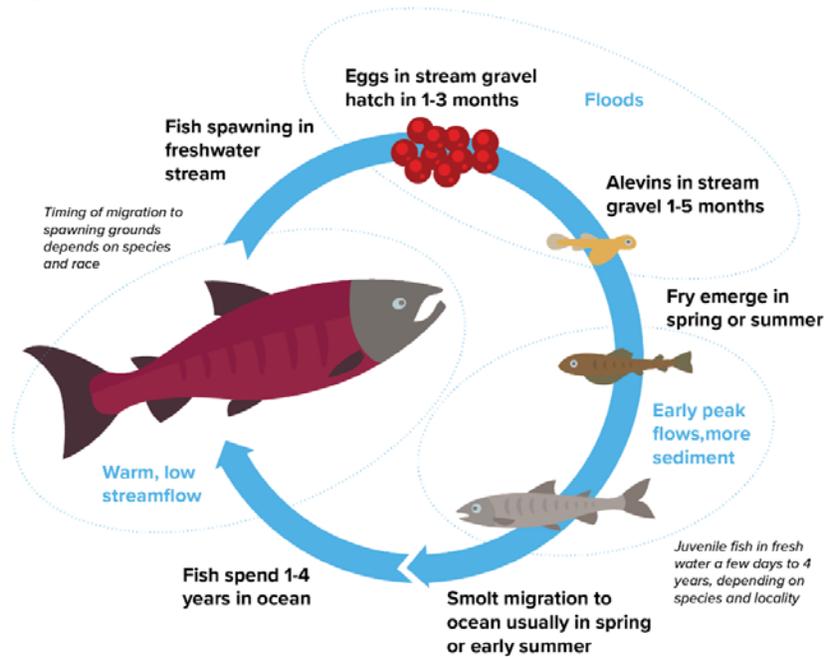
1162

1163 **Climate change effects on Southern Residents**

1164 Climate change is already exacerbating existing stresses on Southern Residents and the ecosystems
 1165 upon which they depend, including salmon and forage fish. As temperatures continue to rise,

1166 Southern Residents will be affected primarily through their food web and higher temperatures will
1167 impact salmon habitats and populations at each life stage (Figure 3).

1168 **Figure 3. Effects of climate change on salmon throughout their lifecycle (modified from The**
1169 **Wilderness Society, 1993)**



1170 The Cascade Mountains have seen a 25% decrease in snowpack levels since 1950 due to increasing
1171 global temperatures, which cause this snow to melt earlier [22]. At the same time, heavier winter
1172 rainstorms caused by a warming climate lead to flooding and other high-flow events. These
1173 conditions cause more water to enter streams during the winter (nearly a 20% increase since 1950)
1174 [22], which can scour riverbeds and destroy or smother salmon redds (nests), increasing egg and fry
1175 mortality. Flooding can also increase the amount of sediment entering streams, burying spawning
1176 gravels.

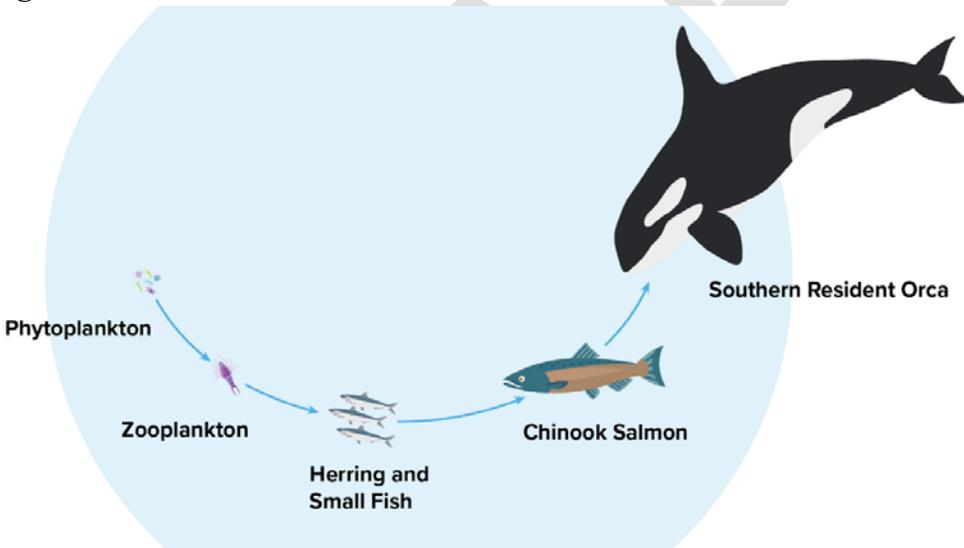
1177 Lower snowpack and changing precipitation patterns caused by the warming climate are also
1178 damaging salmon populations by lowering summer streamflows. Although winter streamflows
1179 continue to increase, summer streamflows have decreased up to 15% since 1950 [22]. Lower
1180 streamflows in the summer increase water temperature, which decreases suitable salmon habitat,
1181 shifts salmon activities upstream and impedes migration. Increasing water temperatures act as a
1182 pollutant, placing further metabolic demands on salmon, which depletes their energy reserves,
1183 reduces growth, increases disease susceptibility, impedes migration and increases vulnerability to
1184 predators. The end result is fewer salmon in our streams, rivers and oceans — and, consequently,
1185 less food for the Southern Residents.

1186 Most Puget Sound glaciers are in decline, with measured volume decreases ranging from 56% loss in
1187 the North Cascades from 1900–2009 to 34% in the Olympic Range from 1980–2009 [23]. Glacial

1188 melt caused by warming temperatures affects the streams, aquifers and river systems on which
1189 juvenile salmon and their prey depend, therefore impacting Southern Residents at the top of the
1190 food chain. These declines will continue, increasing summer meltwater from some glaciers in the
1191 near term but dramatically reducing meltwater in the second half of the 21st century. Other impacts
1192 that affect salmon, forage fish and the viability of the food web include increased localized flooding,
1193 erosion and sedimentation [23].

1194 In the marine environment, warming ocean temperatures can affect the base of the orca food web,
1195 changing the phytoplankton and zooplankton composition to lower-calorie species (Figure 4) [24,
1196 25]. Warming ocean temperatures also decrease oxygen levels and promote the abundance of
1197 harmful algal blooms (toxic to fish) and plankton grazers such as jellyfish, which are a caloric dead-
1198 end in the food web due to their few predators [26, 27]. These issues can ripple out into the food
1199 web and affect the growth and survival of juvenile salmon and forage fish. Forage fish support both
1200 salmon and higher order predators such as piscivorous fish, marine mammals and seabirds. When
1201 forage fish abundance is limited, these predators can increase predation on juvenile salmon.

Figure 4. Southern Resident orca food web



1202 Warmer ocean temperatures can also bring more predators into the region, favoring warm-adapted
1203 nonnative fishes, like Pacific hake and mackerel, that outcompete or prey on salmon [28]. They also
1204 reduce kelp abundance, resulting in a loss of critical fish habitat [29, 30]. Higher ocean temperatures
1205 also promote new pathogen and disease vectors that could be harmful for orcas, while accelerating
1206 the rate at which excess human nutrients change the base of the marine food web.

1207 Further, as sea levels rise, long-buried, legacy shoreline waste sites are likely to become inundated,
1208 resulting in a new source of toxics entering the marine environment and inland waters. Combined
1209 sewer overflows and overflows from sewage treatment facilities occur more frequently with flooding
1210 and high-flow events, increasing the quantity of toxic substances that enter water bodies. The region

1211 is already experiencing an increase in combined sewer overflow events that cause untreated sewage
1212 to enter marine and inland waters. As orcas starve from insufficient prey, they metabolize more of
1213 the toxics stored in their bodies, increasing their potential to experience neurological problems and
1214 disease.

1215 Similarly, sea level rise caused by climate change will permanently inundate and destroy coastal
1216 habitat, which is important for juvenile salmon and their prey. It will also reduce habitat and
1217 spawning grounds available to forage fish, which spawn in the intertidal and shallow subtidal zones.
1218 For example, surf smelt and sand lance depend on high, extensive beaches for spawning. With sea
1219 level rise, beaches will naturally tend to migrate inland. Bulkheads and other structures may impede
1220 this movement and complicate both natural and human efforts at resiliency and adaptation [31].

1221 Collectively, these impacts compound existing stressors on Chinook, further reducing their
1222 abundance and leaving Southern Residents hungry. Many of these changes have already been
1223 observed in the Pacific Northwest. For example, during the drought of 2015, average air
1224 temperatures were approximately 2.7°C warmer than pre-industrial averages and Washington state
1225 snowpack was 70% below normal [20]. These conditions led to low summer streamflow and warm
1226 waters, resulting in lethal strandings, fishery closures and die-offs of salmon and steelhead across the
1227 Pacific Northwest, including over 250,000 Columbia River sockeye salmon [20]. In 2015–16, the
1228 region also experienced a marine heat wave (the “blob”) with ocean temperatures up to 7°C warmer
1229 than average, triggering the largest and most persistent harmful algal bloom ever recorded on the
1230 West Coast and contributing to weak salmon returns.

The summer of 2015 drought and the “blob”

In the summer of 2015, the region experienced an extreme drought and heat wave, and the emergence of “the blob” — a large mass of water off the coast with temperatures 5.4 °F above normal. It didn’t rain. The Hoh Rain Forest received 0.17 inches in June — the lowest rainfall on record. Water temperatures spiked inland. The state experienced some of its most intense wildland fires on record. Human bucket brigades helped deepen channels in the Dungeness River with volunteers hand-carrying fish over obstacles to try to mitigate the impact of these events.

These conditions reduced survival among young salmon, caused humpback whales to become entangled in fishing gear as they hunted closer to shore, stranded thousands of young sea lions on beaches as their mothers foraged far out to sea, and caused an algae bloom that shut down crabbing and clamming activities. The Washington Department of Fish and Wildlife lost about 1.5 million juvenile fish in overheated rivers and streams. State and federal agencies declared several fisheries to be disasters and many fisheries closed. While the origins of these warmer waters are not fully understood, their presence is unprecedented and portends risks in the years ahead from a warming planet.

1231 Ocean acidification effects on Southern Residents

1232 While the changes described above are due primarily to CO₂ accumulation in the atmosphere, ocean
 1233 acidification results from CO₂ emissions being absorbed by the ocean. CO₂ reacts with marine
 1234 waters to form carbonic acid, which increases hydron ion (H⁺) concentrations and results in lower
 1235 oceanic pH.

1236 Ocean acidification is progressing 10 to 100 times faster than it did in the previous 50 million years,
 1237 outpacing inhabitants' ability to adapt and evolve to the changes [32]. Pacific Northwest waters are
 1238 particularly vulnerable to ocean acidification due to several contributing factors:

- 1239 • Atmospheric CO₂ in the Puget Sound area is increasing faster than the global average [33].
- 1240 • Puget Sound is colder with more freshwater (salt-free) than the global average, allowing CO₂
 1241 to dissolve more effectively [32].
- 1242 • Natural upwelling mixes deep waters with the already-acidified surface water layer [34].
 1243 These deep waters carry increasing amounts of legacy human-generated CO₂ from 30 to 50
 1244 years ago when the water was last in contact with the atmosphere [34]. As a result,
 1245 conditions will continue to acidify from upwelled waters for several decades due to the
 1246 existing carbon load [34].
- 1247 • Ocean waters receive freshwater discharge from surrounding rivers and streams. Freshwater
 1248 is typically more acidic than the ocean and carries dissolved nutrients like nitrogen,
 1249 phosphorous and organic carbon. These nutrients enter the marine environment and
 1250 contribute significantly to ocean
 1251 acidification in certain areas of
 1252 Puget Sound by adding CO₂ to
 1253 the water as a product of
 1254 microbial decomposition [34].
 1255 Scientific studies suggest that
 1256 nutrients can also stimulate
 1257 harmful algal blooms, which may
 1258 produce more toxins under
 1259 acidified conditions [34]. Human
 1260 sources of nutrients, such as
 1261 sewage treatment plants, septic
 1262 systems and runoff from land
 1263 practices (e.g., fertilizers and
 1264 livestock) are significant
 1265 contributors to acidification in
 1266 many parts of Puget Sound.

Ocean acidification and climate change

“While ocean acidification and climate change share a common cause (increases in CO₂ in the atmosphere), climate change encompasses the effects associated with changes in the Earth’s heat budget (due to the greenhouse effect of CO₂ and, to a lesser extent, other climate-reactive gases), which cause global warming and changes in weather patterns. Ocean acidification specifically refers to the lowering of ocean pH resulting from its absorption of human-released CO₂ from the atmosphere. Ocean acidification does not include the warming of the ocean.”

— Christopher L. Sabine, Supervisory Oceanographer,
 NOAA Pacific Marine Environmental Laboratory, USA

1267 Ocean acidification is already affecting shellfish in Puget Sound — particularly juvenile forms such
1268 as oyster larvae — and threatening to undermine the livelihoods of rural communities that grow
1269 oysters and harvest crabs commercially [31]. The phenomena primarily impacts Southern Residents
1270 and salmon through their highly interconnected food web (Figure 4, above), the same system on
1271 which shellfish depend for their survival. Pteropods and copepods (such as the phytoplankton and
1272 zooplankton) that support the base of the orca food web grow more slowly in acidified waters [34].

1273 Recent studies on juvenile coho salmon exposed to low-pH water showed disruption of olfactory-
1274 driven behaviors and related neural signaling pathways. Although the salmon’s ability to smell
1275 remained intact, their response to alarm odors was indifference, rather than typical fear and
1276 avoidance. Olfaction plays a central role in salmon survival, navigation and reproduction. These
1277 neural signaling pathways are highly conserved across many species, indicating that other salmon
1278 species could be at risk as well [35]. Although few studies exist on the direct effects of ocean
1279 acidification on Pacific salmon species, studies of projected future ocean acidification scenarios on
1280 tropical reef fish showed reduced growth, behavioral changes and decreased survival [36, 37].

1281 Ocean acidification also increases the bioavailability of metals including iron and copper in orcas,
1282 which has the potential to adversely affect the food web and orcas over time. Further, ocean
1283 acidification extends the spatial spread of underwater noise (for frequencies up to 10kHz), making it
1284 more difficult for orcas to communicate [30, 38]. Ocean acidification will continue to “amplify”
1285 underwater noise by reducing the natural absorption of sound at lower frequencies, allowing sounds
1286 to propagate further and making it harder for orcas to locate their prey [30, 38].

1287 Existing stressors on endangered Southern Residents and Chinook have already increased their
1288 likelihood of extinction. Without intervention, the compounding effects of changing ocean
1289 conditions due to climate change will continue to exacerbate these stressors, pushing Chinook
1290 salmon and orcas even closer to the tipping point.

1291 **New recommendations**

1292 The task force urges aggressive and sustained action in Washington state and beyond to (1) reduce
1293 human-caused emissions, consistent with the best available science, limiting planetary warming to
1294 1.5-2.0 °C, (2) limit the causes and consequences of ocean acidification and (3) act aggressively to
1295 increase the resiliency of the habitat and ecosystems that orcas and salmon depend upon for their
1296 survival.

1297 As an overarching guiding principle and approach to doing business, state agencies responsible for
1298 implementing task force recommendations should adopt a “climate lens” to ensure that actions and
1299 investments are made based on the best available science, focusing on increasing resiliency and
1300 adapting to impending changes. Most recent climate projections and modeling should be
1301 incorporated into assessments and decision-making.

1302 Five recommendations to achieve these outcomes are presented below. Recommendations 43 and
 1303 44 address the imperatives of reducing emissions and mitigating ocean acidification.
 1304 Recommendations 45, 46 and 47 focus on increasing resilience and are directly related to existing
 1305 recommendations and ongoing actions to recover the Southern Residents. All five recommendations
 1306 are high priority with short-, near- and longer-term actions identified to benefit orcas now and over
 1307 time. Progress must be made on each one to enable the survival of the Southern Residents.

1308 **Goal 5: Reduce the threat from climate change, including ocean**
 1309 **acidification, to Southern Residents, the region’s biodiversity, and**
 1310 **ultimately, the well-being of Washington’s people and economy.**

1311 **Greenhouse gas emissions**

1312 **Recommendation 43:** Take aggressive, comprehensive and sustained action to reduce human-
 1313 caused greenhouse gas emissions, with the goal of achieving net zero emissions by 2050.

- 1314 • At the individual, organizational and community levels and across the public, private and
 1315 not-for-profit sectors, take immediate action to reduce greenhouse gas emissions.
- 1316 • Build on existing policies and initiatives and advance policies at the state and local
 1317 government levels to increase investments, regulatory frameworks and incentives that lead to
 1318 a systematic and sustained reduction in emissions over the next 30 years.
- 1319 • Monitor emissions reductions over time; take additional actions consistent with the goal of
 1320 limiting planetary warming to 1.5-2°C.
- 1321 • At the state level, provide leadership to reduce emissions in government operations and
 1322 engage collectively with other states, the private sector and civil society to advance national
 1323 and international solutions to reduce emissions.
- 1324 • Inform and engage the public, stakeholders and decision makers on the connection between
 1325 orcas, salmon, climate change and human well-being.
- 1326 • Address equity issues associated with reducing human-caused emissions and transforming to
 1327 a net zero carbon economy — by engaging and meeting the needs of disproportionately
 1328 affected communities and workers, businesses and economic sectors that are adversely
 1329 affected by the transition to low- or zero-carbon energy sources.

1330 **Implementation Details**

1331 **Requires legislative policy and funding.** With a focus on a vision of a thriving Southern Resident
 1332 population, the task force supports immediate, aggressive and sustained action to reduce greenhouse
 1333 gas emissions locally, regionally and globally. Actions can occur at all levels and be undertaken by
 1334 individuals, organizations and governments across the public and private sectors and civil society.

1335 While it is beyond the task force’s expertise to define specific policies and actions to reduce
1336 emissions, the science is clear that planetary warming must be stabilized at 1.5-2°C above
1337 preindustrial levels to limit the consequences of climate change [20, 39]. Most of the greenhouse gas
1338 emissions in Washington state are from transportation, electricity generation and residential,
1339 industrial, commercial and agricultural activities (Figure 5).

1340 A sampling of actions that can be taken within Washington to reduce emissions are summarized in
1341 Table 1 below. Although it does not endorse any specific activities or policies, the task force urges
1342 all members of the Washington community to examine their own contribution to the problem and
1343 both directly take, and advocate for, forceful action and policies to reduce emissions.

1344 **The Legislature — together with other local and regional governments and agencies —**
1345 **must continue to advance and adopt policies, investments, incentives and regulatory**
1346 **frameworks that can catalyze dramatic reduction in emissions generated in Washington**
1347 **over the next 30 years.** In addition to individual actions, a policy framework and investment is
1348 needed to restructure the economy, ensure equity, address dislocations to workers and businesses
1349 and accelerate the transition to a low carbon future. In 2018, the Washington State Legislature
1350 passed significant policies, such as SB 5116, the 100% Clean Electricity Bill, that will lead to clean
1351 energy investments and emission reductions over time. More action, however, is needed to establish
1352 policies and frameworks to: (1) reduce emissions in the transportation, building, commercial and
1353 industrial sectors, (2) encourage sequestration and emission reduction in the agriculture and forestry
1354 sectors and (3) incentivize innovations that will achieve deep de-carbonization over the longer term.

1357 **Table 1. Methods for reducing carbon footprint [41, 42, 43]**

Activity	Ways to reduce emissions
Transportation	<ul style="list-style-type: none"> • Walk, bike, bus, or use rail instead of driving • Use electric vehicles • Telecommute/teleconference • Carpool • Switch to low carbon fuels (e.g. biodiesel)
Building heating and cooling	<ul style="list-style-type: none"> • Maximize use of efficient carbon-free energy (e.g., heat pumps) • Source clean, carbon-free electricity (e.g., wind, solar)
Food	<ul style="list-style-type: none"> • Reduce food waste • Reduce consumption of carbon-intensive food sources (e.g., meat)
Consumption and waste	<ul style="list-style-type: none"> • Reduce overall consumption • Maximize reuse and recycling
Industrial	<ul style="list-style-type: none"> • Electrify energy sources • Maximize efficiency • Source lower carbon inputs
Agriculture and forestry	<ul style="list-style-type: none"> • Practice no-till agriculture and regenerative farming techniques • Improve soil health for carbon sequestration • Improve forest health to increase carbon sequestration and reduce emissions from wildland fires

1358 Table 2 presents an overview of alternative policy options, categorized into four broad types and
 1359 linked to the major sources of emissions depicted in Figure 5. While broad consensus exists in
 1360 Washington on the need for action to reduce emissions, each of the policy options has advantages
 1361 and disadvantages in terms of efficacy, cost, equity and who is most impacted. They are supported,
 1362 or opposed, to varying degrees by different constituencies, sectors and organizations. Experts have
 1363 concluded that no single “silver bullet” policy will be the solution, but rather, a suite of
 1364 complementary policies is necessary [44]. In this context, possible state actions include developing a
 1365 comprehensive plan to achieve reductions across all major sectors of economy, prioritizing near-
 1366 term actions that address the largest source of emissions (i.e., transportation) and having the
 1367 Legislature create legal accountability to achieve the associated targets.

1368 **Table 2. Carbon Emission Reduction Policy Options [44]**

Policy Type	Examples	Emissions & Sectors targeted
Performance standards – minimum requirements for energy efficiency, renewable energy uptake, or product performance	<ul style="list-style-type: none"> • Vehicle fuel economy standards • Low carbon fuel standard • Building codes for energy efficiency, fuel source, other carbon requirements • Renewable portfolio standards • Power plant emission limits 	<ul style="list-style-type: none"> • Transportation • Transportation • Residential & commercial • Electricity • Electricity
Economic signals – pricing designed to accelerate the adoption of low-carbon technologies and incorporate externalities into product costs	<ul style="list-style-type: none"> • Carbon fees or taxes • Cap & Trade • Subsidies, e.g. For clean energy production or efficiency upgrades 	<ul style="list-style-type: none"> • All • All • Electricity, transportation, residential and commercial; Marine
Support for R&D – funding and incentives to accelerate innovation and create an enabling environment for innovation to thrive	<ul style="list-style-type: none"> • Funding for basic research • Shared technical expertise • Adopting intellectual property protections • Promoting STEM • Attracting STEM talent 	Multiple – depending on the focus of efforts
Enabling Policies – those that enhance the functionality of the other policies	<ul style="list-style-type: none"> • Direct government expenditures • Information transparency • Reduction of barriers to better choices, e.g. energy use labels, good urban design providing transit options enabling a response to price signals such as a carbon tax 	Multiple – depending on the focus of efforts

1369 **To benefit Southern Residents, actions that both reduce emissions and improve resiliency**
 1370 **warrant priority consideration.** Actions include investments in forest health, riparian and habitat
 1371 restoration and agricultural practices that both sequester carbon and reduce runoff. In addition,
 1372 many regulations and policies that serve to reduce emissions will also improve the health and well-
 1373 being of the Salish Sea and its inhabitants including the orca, and vice versa. Education about the co-
 1374 benefits of strong climate action may help build support for the policies and actions needed to
 1375 address the problem at scale.

1376 Within state and local government, actions that provide leadership in reducing emissions and have a
 1377 nexus with the Southern Resident include Executive Order 18-01, which directs the WA State
 1378 Ferries to move to a zero-emission fleet. The task force endorses full and accelerated
 1379 implementation of this Executive Order, while also addressing the associated noise issues that affect
 1380 the orca. Other actions the state could take directly to reduce emissions include electrifying its
 1381 vehicle fleets and providing support for local governments and school districts to electrify their
 1382 fleets. Such leadership will help accelerate the transformation of the transportation sector from gas
 1383 and diesel to electric-powered vehicles.

1384 In addition to state and local action, Washington state should continue to work collectively with
 1385 other states, the private sector and civil society to advance national and international solutions to
 1386 reduce emissions to scientifically determined safe levels. State-level action is not enough.
 1387 Washington state officials and leading Washington-based businesses and organizations must join
 1388 together to advocate for and advance policies at the regional, national and international levels.

1389 The successor to the task force should maintain a focus on the impact of climate change and ocean
 1390 acidification on orcas and support the leadership of the governor, Legislature and state agencies to
 1391 advance policies and solutions that reduce emissions. Support could include providing science-based
 1392 information on the link between climate change and orca health, advocating for policy action to
 1393 reduce emissions and educating the public about the imperative of reducing emissions to the
 1394 survival of the orca.

SUMMARY

Lead State Agencies: Ecology, Department of Commerce, Office of Financial Management, Department of Enterprise Services

Legislative Action Required, if any: policies to reduce emissions; funding

1395 Ocean acidification

1396 **Recommendation 44:** Increase Washington’s ability to understand, reduce, remediate and adapt to
 1397 the consequences of ocean acidification.

- 1398 • Reduce local land-based contributions to ocean acidification. Reducing inputs of nutrients
 1399 and organic carbon from local sources will decrease acidity in affected marine waters,
 1400 decreasing the effects of ocean acidification on marine species in the area.
- 1401 • Reduce Washington’s carbon dioxide emissions quickly and aggressively. Reducing carbon
 1402 dioxide emissions will decrease future acidification and help protect marine species (see
 1403 Recommendation YR2-H).
- 1404 • Implement measures to adapt to and remediate the impact of ocean acidification.

- 1405 • Continue to invest in Washington’s ability to monitor ocean acidification and its effects. This
1406 investment will enable effective responses to ocean acidification.
- 1407 • Inform, educate and engage stakeholders, decision makers and the public in addressing
1408 ocean acidification. Engage and dialogue is essential to building support for investment in,
1409 and implementation of, effective actions.
- 1410 • Maintain a sustainable and coordinated focus on ocean acidification.

1411 **Implementation Details**

1412 **Requires legislative funding.** Washington was an early leader addressing ocean acidification and,
1413 in 2012, became the first state to develop a comprehensive plan for tackling ocean acidification
1414 through the Marine Resources Advisory Council. Since its inception, MRAC has provided a
1415 sustainable and coordinated focus on implementing the actions in the state’s plan and updated it in
1416 2017. The task force supports continued implementation of actions in the state’s Ocean
1417 Acidification Action Plan and MRAC’s recommended priorities, including:

- 1418 • **Reducing local carbon dioxide emissions more aggressively.** Current projections
1419 indicate sharp declines in pH in Puget Sound over the next 30 years if we do not reverse
1420 course. Our local emissions contribute to local acidification and, therefore, must be part of
1421 the solutions advanced.
- 1422 • **Accelerating actions that reduce human sources of nutrients.** Local human sources of
1423 nutrients are contributing significantly to ocean acidification causing low oxygen and
1424 threatening marine life, particularly in parts of Puget Sound. Nutrients come from many
1425 sources, including wastewater treatment facilities, so reducing these discharges into Puget
1426 Sound is a priority. Management and policy actions that reduce nutrients from wastewater
1427 treatment plants, septic systems and other land-based sources will improve marine water
1428 quality for marine species. Department of Ecology’s Puget Sound Nutrient Reduction
1429 Project is evaluating and advancing such actions, including developing a general permit for
1430 wastewater treatment plants.
- 1431 • **Improving resiliency of the ecosystem.** Protect and enhance kelp and eelgrass, which may
1432 reduce acidification locally and provide areas of refuge for marine species.
- 1433 • **Continue investing in science and collaboration** that underpin our actions and provide a
1434 sustainable and coordinated focus for our state to address and lead on this issue.
- 1435 • **Update communications material and conduct strategic outreach** to increase
1436 understanding and connect with key audiences.

1437 Beyond these actions at the state and local levels, Washington should continue leading,
1438 collaborating, advocating for and advancing policies at the regional, national and international levels
1439 in partnership with leading state-based businesses and organizations, elected officials and others.

SUMMARY

This recommendation and the actions identified are closely linked to existing recommendations:

Recommendation 2: Immediately fund acquisition and restoration of nearshore habitat to increase the abundance of forage fish for salmon sustenance.

Recommendation 34: Conduct research, science and monitoring to inform decision making, adaptive management and implementation of actions to recover Southern Residents.

Lead State Agencies: Ecology, Puget Sound Partnership, WDFW

Legislative Action Required, if any: policies to reduce emissions; funding

1440 Prey

1441 **Recommendation 45:** Mitigate the impact of a changing climate by accelerating and increasing
1442 action to increase the resiliency and vitality of salmon populations and the ecosystems on which they
1443 depend.

- 1444 • Fully implement and fund salmon recovery plans to improve climate resiliency against sea
1445 level rise, changes in precipitation, increased stream temperatures and ocean acidification.
1446 Where needed, adaptively manage and incorporate climate adaptation and resilience
1447 strategies in regional and watershed-scale recovery plans.
- 1448 • Increase fish access to cold water habitats and refugia. Selectively remove, design and retrofit
1449 infrastructure (e.g., dams, culverts, dikes, rail lines, hatcheries, fish passage) to ensure climate
1450 resiliency for the future changes in flows and water temperatures.
- 1451 • Significantly increase the scale and scope of investment in habitat protection and restoration
1452 investments that focus on habitat diversity and complexity and increase the diversity and
1453 resiliency of wild and hatchery salmon stocks.
- 1454 • Ensure diverse wild and hatchery salmon populations to create more climate-resilient fish.
1455 Adaptively manage habitat restoration and hatcheries to account for and mitigate against
1456 climate change impacts such as water flow, water temperature and sea level rise. Changes
1457 may affect the location, type or operation of hatchery facilities.

1458 Implementation details

1459 Funding and investments

1460 **Requires legislative funding.** Fully fund salmon recovery plans as written to ensure
1461 implementation. Increase funding as needed and look for opportunities to frontload investments to

1462 address the urgency of climate change, which exacerbates existing threats to salmon. Identify new
1463 funding sources in addition to WDFW funding. Prioritize restoration investments in nearshore
1464 marine areas and estuaries, floodplains and riparian areas, culverts and infrastructure and areas that
1465 increase access to cold water refugia.

1466 Assess which watersheds and estuaries will be most resistant to sea level rise and other impacts of
1467 climate change over time, such that they will support Chinook populations going forward. Prioritize
1468 investment in restoration and acquisition in these watersheds.

1469 **Cold water habitat and refugia**

1470 Enhance existing efforts to increase access to cold water habitat and refugia. Identify opportunities
1471 to reintroduce species to habitats with cooler waters. Ensure that any losses in hydropower are
1472 replaced with other carbon-free sources and consider other potential conservation impacts.

1473 **Increasing stock diversity and resiliency**

1474 To buffer against climate change and increase stock resiliency, increase diversity and complexity of
1475 habitats throughout geographic range and restore associated life histories. While increasing stock
1476 diversity, identify resilient salmon species with sufficient populations throughout the state that have
1477 sufficient abundance and habitat diversity/complexity to adapt to climate change (also referred to as
1478 anchor populations or strongholds) — for example, unlisted species along the coast.

1479 **Hatcheries**

1480 Account for the impacts of sea level rise, increasing water temperatures and changes in streamflows
1481 when assessing upgrades and modifications to hatchery facilities. Consider facility water temperature
1482 and availability, river access and disease management. Hatchery managers should assess stock
1483 selection, growth rates, diversity and release timing as tools for reducing climate impacts to salmon.
1484 Ensure that these changes do not further exacerbate climate impacts on wild fish.

1485 In addition to the recommendations above, Year One Recommendations 1-9 address (1) preserving,
1486 restoring and protecting habitat, (2) expanding hatchery production, (3) re-establishing salmon runs
1487 above existing dams, (4) increasing spill over dams and (5) establishing a stakeholder process to
1488 examine the future of the Lower Snake River dams. These recommendations further the resiliency
1489 and productivity of the ecosystem and salmon populations, while providing a buffer against future
1490 adverse impacts of increased air and water temperatures, changing stream flows and sea level rise.
1491 See below for a summary of these recommendations.

SUMMARY

This recommendation and the actions identified are closely linked to existing recommendations:

Recommendation 1: Significantly increase investment in restoration and acquisition of habitat to in areas where Chinook stocks most benefit Southern Resident orcas.

Recommendation 2: Immediately fund acquisition and restoration of near shore habitat to increase the abundance of forage fish and salmon sustenance.

Recommendation 6: Significantly increase hatchery production and programs...consistent with sustainable fisheries and stock management, available habitat, recovery plans and the Endangered Species Act.

Recommendation 7: Prepare an implementation strategy to reestablish salmon runs above existing dams, increasing prey availability for Southern Resident orcas.

Recommendation 8: Increase spill to benefit Chinook for Southern Residents by adjusting total dissolved gas allowances at the Snake and Columbia River dams.

Recommendation 9: Establish a stakeholder process to discuss potential breaching or removal of the lower Snake River Dams for the benefit of the Southern Resident orcas.

Lead State Agencies: WDFW, Puget Sound Partnership, Recreation and Conservation Office

Legislative Action Required, if any: Funding

1492 Vessels

1493 **Recommendation 46:** Expand the Governor's Maritime Blue scope of work and provide funding
1494 to implement recommendations from the Southern Resident Orca Task Force and pursue shipping
1495 and other maritime innovations that benefit Southern Residents.

- 1496 • Incentivize low-carbon or zero-emission, low-impact vessels in state waters. Target vessels
1497 with the greatest cumulative emissions impacts, based on vessel type and operational profile.
- 1498 • Expand the scope of the Washington Maritime Blue initiative and the state's strategy for the
1499 "blue economy" to encompass relevant goals and recommendations from the task force.
1500 Provide additional resources as needed.

1501 **Implementation details**

1502 **Requires legislative funding.** Vessels are a significant source of carbon dioxide emissions
1503 contributing directly to climate change and must be reduced over time to meet international and
1504 science-based goals to stabilize temperatures. The task force recommends a targeted approach to
1505 emissions reduction focused on reducing emissions from the vessels spending the most amount of
1506 time and making the highest number of trips in local waters. As it applies to whale-watching vessels,
1507 one option to implement this recommendation could be to prioritize licensing for zero-emission or
1508 low-carbon vessels.

1509 Although reducing emissions is a top priority, underwater noise is another serious concern. Ocean
1510 acidification extends the spatial spread of underwater noise (for frequencies up to 10kHz), making it
1511 more difficult for orcas to communicate. The task force recognizes that while some emerging vessel
1512 propeller technologies may reduce emissions, they can also increase underwater sounds at
1513 frequencies that interfere with orca communication and echolocation. Addressing this trade-off will
1514 require research, innovation and investment to develop and deploy technologies that reduce both
1515 noise and carbon emissions.

1516 To catalyze this research and innovation, the task force recommends supporting Washington
1517 Maritime Blue, a strategic alliance for maritime innovation and sustainability. The governor's
1518 Maritime Blue is an independent, nonprofit partnership between industry, the public sector, research
1519 and training institutions and community organizations tasked with implementing Washington State's
1520 Strategy for the Blue Economy. The effort covers a number of potential strategies for innovation
1521 and sustainability in shipping that could benefit orcas (like sensor technologies, noise- and
1522 emissions-reduction efforts, propeller design and retrofits, etc.); however, in order to advance
1523 opportunities that provide mutual benefits for Washington's shipping industries and orcas, a clear
1524 governance mechanism within Maritime Blue is needed to incorporate priorities for orcas and
1525 sustain the effort over time.

1526 To implement this recommendation, Maritime Blue should modify its governance structure (for
1527 example, by creating a dedicated board member seat or subgroup) to address Southern Resident orca
1528 issues and coordinate closely with the successor to this task force. Actions could include identifying
1529 and addressing shipping and other maritime impacts on orca prey, vessel noise and contaminants.

SUMMARY

This recommendation and the actions identified therein are closely linked to existing recommendations:

Recommendation 1: Significantly increase investment in restoration and acquisition of habitat to in areas where Chinook stocks most benefit Southern Resident orcas.

Recommendation 23: Immediately fund acquisition and restoration of near shore habitat to increase the abundance of forage fish and salmon sustenance.

Recommendation 27: Significantly increase hatchery production and programs...consistent with sustainable fisheries and stock management, available habitat, recovery plans and the Endangered Species Act.

Lead State Agencies: WDFW, WA State Ferries, Governor's Office of Regulatory Innovation and Assistance

Legislative Action Required, if any: Funding, policies to incentivize low emission vessels

1530 Contaminants

1531 **Recommendation 47:** Identify and mitigate increased threats to Southern Residents from
1532 contaminants due to climate change and ocean acidification. Prioritize actions that proactively
1533 reduce exposure where the increased impacts are expected to be most severe.

- 1534 • Identify vulnerabilities of existing storm and wastewater infrastructure (stormwater
1535 management systems, CSO, WWTP, port and rail facilities) to sea level rise, flooding and
1536 other high-flow events. Retrofit or otherwise mitigate facilities at high risk.
- 1537 • Identify and prioritize the timely clean-up and remediation of legacy toxics and waste sites
1538 that are likely to be exposed by sea level rise, flooding and high-flow events caused by
1539 climate change.
- 1540 • Include the impacts of a changing climate and ocean acidification as criteria when developing
1541 a prioritized list of chemicals of concern for orcas.
- 1542 • Address new contaminants entering marine and inland waters associated with the increase in
1543 wildland fires associated with climate change. These contaminants include PAHs (polycyclic
1544 aromatic hydrocarbons) from smoke, flame retardants and increased runoff from erosion.
- 1545 • Ensure that the National Pollutant Discharge Elimination System permit processes are
1546 adaptable and responsive to climate-related impacts.

- 1547 • Support the Department of Ecology’s ongoing nutrients work and initiatives, recognizing the
1548 co-benefits of addressing nutrients to improve climate resiliency and mitigation efforts in
1549 Puget Sound and the Columbia Basin.
- 1550 • Treat increased stream temperature resulting from climate change as a pollutant that creates
1551 potentially lethal conditions for juvenile salmon and returning adults. Mitigate by expanding
1552 riparian vegetation and through other means to moderate temperatures.

1553 **Implementation details**

1554 With runoff anticipated to increase as climate change drives increased precipitation, flooding and sea
1555 level rise, additional work is needed to address increasing levels of contaminants in the state’s waters.
1556 Nutrient loadings will increase with these events and exposure to other toxics could increase as well.
1557 Increased bioavailability of toxics will accumulate up the food chain, ultimately threatening Chinook.
1558 In addition, the increased quantity and intensity of flows due to climate change are highly
1559 problematic, impacting the hydrology of basins and water systems and destroying forage fish and
1560 Chinook habitat.

1561 In the near term, efforts to address this threat should focus on identifying stormwater and
1562 wastewater infrastructure and other facilities — including legacy waste sites — most at risk and
1563 taking action to mitigate those risks. Actions include prioritizing and adapting stormwater retrofits to
1564 account for the impacts of climate change, accelerated clean-up of toxics and waste sites, modifying
1565 or moving treatment facilities to withstand sea-level rise and increased flooding and increasing
1566 protection for low-lying infrastructure facilities (without hardening adjacent shorelines). Over time,
1567 responsible agencies and entities will need to monitor how increased intensity and duration of
1568 rainfall events, sea level rise and flooding, as well as warmer temperatures and ocean acidification,
1569 affect toxics mobility and contaminants in the ecosystem, proactively and adaptively managing to
1570 address expected future conditions.

1571 To address PAHs and other contaminants associated with increased wildland fire, smoke and
1572 suppression, support the efforts of DNR, USFW and other agencies to identify and implement
1573 effective management and mitigation strategies. Accelerate investments and activities to improve
1574 forest health and reduce wildland fire risks currently being undertaken by DNR and USFW to
1575 ultimately reduce the intensity and extend of large catastrophic fires and associated smoke as well as
1576 the consequent need for flame retardants.

1577 With disease susceptibility in salmonids, and other critical species likely to increase with warmer
1578 temperatures, targeted toxics reduction strategies should remain a focus for SRKW recovery.
1579 Additionally, the state should work to better understand emerging toxics threats to determine how
1580 effects might be amplified and synergized with changes in climate, water temperature and chemistry.

1581 Regarding including climate change considerations into the NPDES permit process, increase the
1582 resiliency of WWTP, CSO and stormwater facilities to maintain treatability in the event of sea level
1583 rise, extreme flooding and high-flow events.

1584 Regarding nutrient management, Ecology recommends (1) developing a NPDES permit framework
1585 for wastewater treatment in Puget Sound, (2) developing a watershed nutrient management model
1586 and decision support tool and (3) collecting high-quality nutrient data in watersheds to fill key
1587 knowledge gaps related to baseline conditions. These actions will address current threats from
1588 nutrient loadings to the health of the Puget sound ecosystem, salmon and orcas, as well as the
1589 increase that will result from climate-driven impacts.

SUMMARY

This recommendation and the actions identified are closely linked to existing recommendations:

Recommendation 30: Identify, prioritize and take action on chemicals that impact orcas and their prey.

Recommendation 31: Reduce stormwater threats and accelerate clean-up of toxics harmful to orcas.

Recommendation 32: Improve effectiveness, implementation and enforcement of NPDES permits to address direct threats to Southern Residents and their prey.

Recommendation 33: Increase monitoring of toxic substances in marine waters; create and deploy adaptive management strategies to reduce threats to orcas and their prey.

Lead State Agencies: Ecology, WDFW

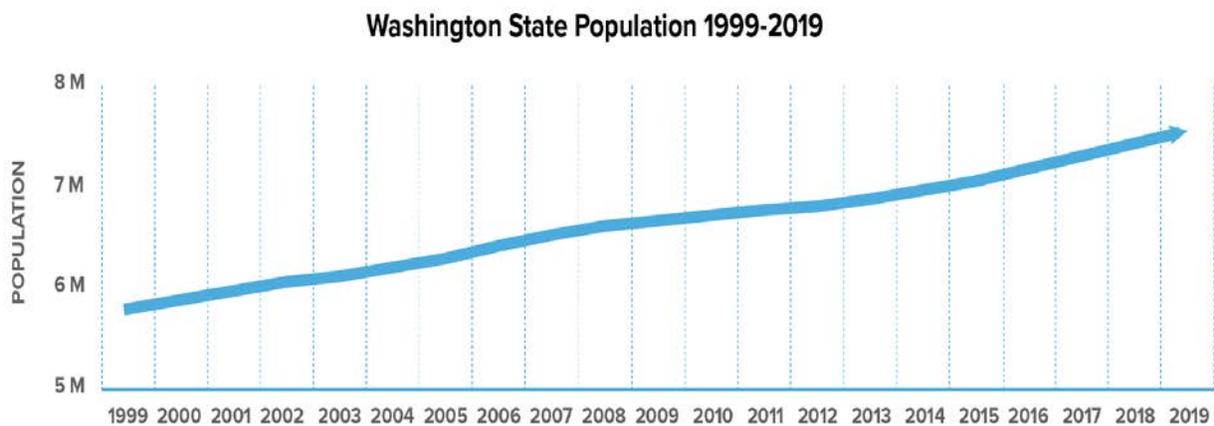
Legislative Action Required, if any: Funding

1590 Population growth and 1591 development

1592 Overview

1593 As shown in Figure 6, Washington’s population has increased over 30% in the past 20 years —
1594 increasing by an average of 87,900 people each year — primarily due to net migration into the state
1595 (people moving in versus moving out) [45]. While this growth is indicative of strong economic
1596 opportunities in the state, uncoordinated and unplanned growth can pose a threat to the
1597 environment.

1598 **Figure 6. Washington population growth over the past 20 years [46]**



1599 Adopted by the Legislature in 1990, the Growth Management Act recognizes this tradeoff and
1600 provides a series of statutes requiring cities and counties to develop comprehensive plans for
1601 managing their population growth [47]. Among other goals, these plans are designed to prevent net
1602 loss of ecological functions by reducing sprawl and protecting natural resources. Similarly, the
1603 Shoreline Management Act requires counties and cities with shorelines to develop and implement
1604 shoreline master programs to prevent uncoordinated development of shorelines and includes the
1605 “no net loss” of ecological function standard.

1606 Despite the components of the GMA and SMA intended to protect natural resources and sensitive
1607 ecosystems, important wildlife habitat lands are being converted for development faster than they
1608 are being restored. At the current rate of population growth and development, a “business as usual”
1609 approach to zoning, transportation, wastewater regulations and infrastructure will result in continued
1610 loss of critical habitat, further imperiling salmon and orcas.

1611 New recommendations

1612 The task force urges transformational change to Washington’s growth management regulations and
 1613 practices, shifting away from the “no net loss” standard — which has not successfully prevented the
 1614 loss of critical habitat and sensitive ecosystems — toward a “net ecological gain” standard. This lens
 1615 should be adopted at the statewide and local levels to (1) prevent environmental harm associated
 1616 with growth and (2) use ongoing development and retrofitting opportunities to improve ecological
 1617 conditions.

1618 **Goal 6: Reduce the threat from population growth and development on the**
 1619 **critical habitat and sensitive ecosystems that Southern Residents and the**
 1620 **food web they rely upon.**

1621 **Recommendation 48:** Adopt and implement policies, incentives and regulations for future growth
 1622 and development to prevent any further degradation of critical habitat and sensitive ecosystems;
 1623 enable and channel population growth in ways that result in net ecological gain; evaluate and report
 1624 outcomes for all jurisdictions at the state, county, tribal and municipal level.

- 1625 • Net ecological gain in this context refers to taking actions through development and land
 1626 management that result in improvement to the quality and quantity of the functions of the
 1627 natural environment. Key elements include:
 - 1628 – Following the mitigation sequence of first avoiding impacts, then minimizing impacts
 1629 and finally—offsetting impacts that cannot be avoided.
 - 1630 – The environmental baseline from which we are measuring improvements must be
 1631 established and defined.
 - 1632 – Operate at a local site-specific scale and a larger watershed scale.
- 1633 • Revise statutes to shift from a “no net loss” standard to a “net ecological gain” standard to
 1634 better protect salmon and orcas. Provide adequate funding and support to state natural
 1635 resource agencies to improve enforcement of the statutes that protect habitat, while funding
 1636 restoration efforts. Examples of statutes include:
 - 1637 – RCW 36.70A - Growth Management Act
 - 1638 – RCW 90.58 - Shoreline Management Act
 - 1639 – RCW 77.55 - Construction Projects in State Waters
 - 1640 – RCW 80.50 - Energy Facilities – Site Locations
 - 1641 – RCW 76.06 - Forest Practices
- 1642 • Disincentivize growth in sensitive riparian and forest areas by requiring mitigation ratios
 1643 greater than 1:1 while incentivizing infill and development in brown fields that would not
 1644 impact critical habitats.

- 1645 • Implement regulations that preclude new development if existing stormwater and
1646 wastewater infrastructure are within a percentage of their thresholds.
- 1647 • Consider equity across rural and urban areas, incentivizing growth in areas that need it to
1648 support their economies while ensuring that economic development does not come at the
1649 cost of the environment.
- 1650 • Increase affordable housing and reducing urban sprawl by growing “up instead of out.”
- 1651 • Promote “live where you work” to reduce commutes while improving public transportation
1652 infrastructure.

1653 *Implementation details:*

1654 **Requires legislative policy and funding.** In order to prevent further loss of critical habitat
1655 and restore what has already been lost, the task force urges Washington state and local
1656 jurisdictions to shift their growth standards from “no net loss” to “net ecological gain.” The
1657 GMA should be more responsive to the needs of the ecosystem, treating habitat as critical public
1658 infrastructure and emphasizing protection over mitigation. To support this goal, loopholes at the
1659 local level that have historically allowed net ecological loss to continue must be closed. This
1660 recommendation and the actions identified are closely linked to existing recommendations:

- 1661 • Strengthen agency rules, regulations and policies. Enforce habitat protection laws and
1662 increase incentives for landowners (**Recommendations 3, 4 and 5**).
- 1663 • Invest in and fully implement salmon recovery plans (**Recommendations 1, 2 and 6**).
- 1664 • Focus “Be Whale Wise” outreach in the Seattle area on new residents (**Recommendation**
1665 **19**).
- 1666 • Expand the governor’s Maritime Blue scope of work to implement recommendations from
1667 the task force and pursue shipping and other maritime innovations that benefit Southern
1668 Residents (**Recommendation 22**).
- 1669 • Determine how permit applications in Washington state that could increase traffic and vessel
1670 impacts could be required to explicitly address potential impacts on orcas
1671 (**Recommendation 27**).
- 1672 • Fund local governments to conduct facilities planning through 2070 that looks at population
1673 growth through a wastewater, centralized and onsite sewage and stormwater lens to ensure
1674 increased contaminant loads do not impact salmon and orcas (**Recommendation 32**).

1676 **Recommendation 49:** Conduct a comprehensive environmental review and take action to minimize
1677 potential whale-strike risk and underwater noise posed by the growing number and distribution of
1678 fast-ferries and water taxis in Southern Resident critical habitat.

- 1679 • Federal and state agencies with the appropriate jurisdiction should coordinate and conduct
1680 the comprehensive environmental review.
- 1681 • Washington State Ferries should work with operators of fast ferries and water taxis to
1682 determine and implement effective actions.
- 1683 • Engage Washington Maritime Blue in technology and innovation solutions.

1684 *Implementation details:*

1685 Since issuing its recommendations in 2018, the vessels working group and task force became
1686 aware of the development of several new fast ferry and water taxi operations in Puget Sound.
1687 Kitsap Transit and King County currently operate fast ferries, with other communities planning
1688 similar operations to the south and north. These ferries make multiple roundtrips in the morning
1689 and afternoon, traveling at relatively high speeds in an area frequented by Southern Residents
1690 (especially in the fall). Collectively, these vessels travel over 300,000 miles and spend more than
1691 10,000 hours in transit annually in Puget Sound.

1692 The vessels working group expressed concerns about the elevated risk of collisions with
1693 Southern Residents as some of these vessels can travel faster than the top speed of orcas. The
1694 emergence of similar fast ferry networks elsewhere in the world (e.g., the Canary Islands and
1695 Korea) have led to more ship strikes with whales and dolphins. The International Whaling
1696 Commission has recommended several precautionary measures to mitigate related risks [48].

1697 The task force urgently recommends working with the fast ferry and water taxi sector on
1698 potential bridge lookout policies and technological mitigations due to (1) the small size of the
1699 Southern Resident population, (2) evidence of collisions leading to the injury or death of
1700 Southern Residents and (3) the comparatively high vulnerability of calves and other young
1701 whales to this potential threat.

1702 **Appendix 1. Year One Southern**
1703 **Resident Orca Task Force Report**

1704 The November 16, 2018 [Southern Resident Orca Task Force Report and Recommendations](#) are
1705 available on the governor's website and will be included in the Year Two report as an appendix in
1706 the final report.

DRAFT

1707 **Appendix 2. Impacts of human**
1708 **sources of nutrients on marine**
1709 **water quality**

1710 The following memo was prepared by the Washington State Department of Ecology, Water Quality
1711 Program on September 18, 2019:

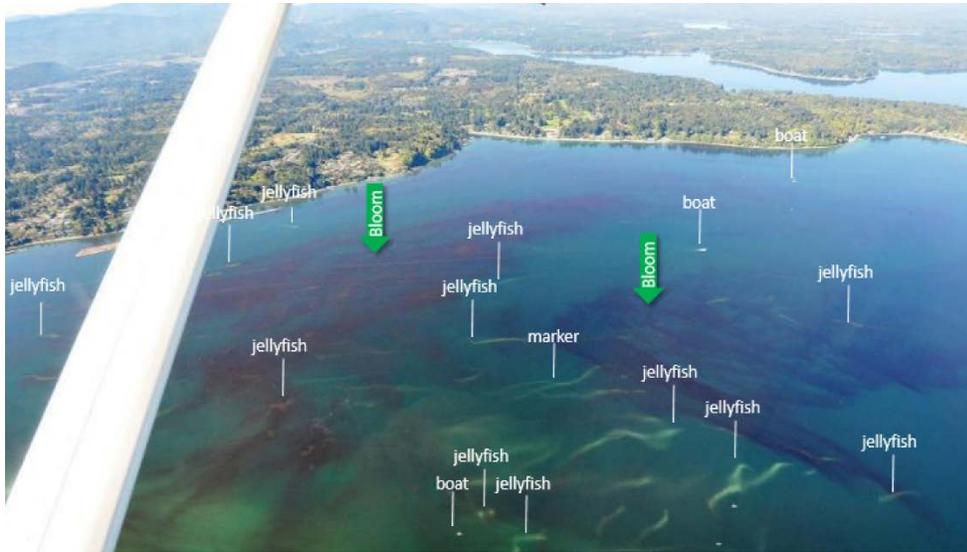
1712 **Introduction**

1713 Productivity in Puget Sound is affected by many factors including: the upwelled waters of the Pacific
1714 Ocean importing nitrogen and low dissolved oxygen, water temperature, biogeochemical activity in
1715 marine sediments and the water column, atmospheric deposition of nitrogen, circulation and
1716 exchange of waters between the ocean and watersheds, and nutrient flux from watersheds to marine
1717 waters. Healthy nearshore eelgrass and kelp habitats, robust fish communities and diverse
1718 macroinvertebrate communities depend on a natural cycle of productivity to create sustainable
1719 populations of forage fish, salmonids and orcas.

1720 Climate change is creating warmer temperatures and reduced circulation in Puget Sound degrading
1721 water quality and producing conditions that create stress on Puget Sound marine ecology. Deep
1722 ocean water entering the Salish Sea is expected to continue to decline in dissolved oxygen levels and
1723 increase in the concentration of nitrogen [49, 50]. Excess nutrients from human activities exacerbate
1724 the stress on Puget Sound water quality.

1725 When a waterbody has excess nutrients, such as nitrogen and carbon, it can cause excessive plant
1726 and algae growth, which ultimately depletes the DO levels in the water. Many parts of Puget Sound
1727 have DO levels that fall below the concentrations needed for marine life to thrive and fail to meet
1728 our state's water quality standards.

1729 **Figure 2: Two indicators of eutrophication (dinoflagellate and jellyfish blooms) at Butler**
1730 **Cover near Budd Inlet. Aerial image taken September 26, 2016.**



1731

1732 **Human sources of nutrients**

1733 The Salish Sea Model characterizes human-source inputs as: municipal and industrial wastewater
1734 facilities that discharge directly to Puget Sound, and watershed inflows that include both point and
1735 nonpoint source nutrient loads. Human sources in watersheds include municipal wastewater,
1736 agriculture, forestry and other land use activities that potentially discharge nutrients in diffuse or
1737 direct discharges.

1738 The 2019 Salish Sea modeling report [51] evaluated the impact of human-sources on Puget Sound
1739 water quality and found that the sum of human sources in Puget Sound are causing violations of
1740 state water quality criteria for DO because of excess nutrients from human-sources. Ecology is
1741 obligated under the federal Clean Water Act and the State Water Pollution Control Act to take
1742 action in order to reduce nutrient loading from human sources that cause or contribute to DO water
1743 quality impairments.

1744 **Imbalance of nutrients effects on Southern Residents**

1745 In addition to the effect of lowering dissolved oxygen, excess nutrients is also connected to other
1746 negative responses in the chemical and biological elements of the marine environment, including:

- 1747 • Production of carbon dioxide from remineralization of organic carbon, which lowers the
1748 pH, contributing to acidification of the water column [52, 53, 54]. As water becomes acidic,
1749 less calcium carbonate is available for marine organisms to form shells [55].

- 1750 • Changes to the benthic (bottom-dwelling) macroinvertebrate community structure and
1751 species diversity, habitat compression and shifts to microbial-dominated energy flow,
1752 resulting in changes to the food chain [56].
- 1753 • Changes to micronutrient availability that can lead to increased incidence and duration of
1754 harmful algal blooms [57].
- 1755 • Increased growth and abundance of opportunistic and ephemeral macroalgae, in particular,
1756 species of *Ulva* [58].
- 1757 • Deleterious effects to eelgrass meadows [59, 60]. Declines in eelgrass shoot density with
1758 increasing macroalgal abundance have been demonstrated [61, 62].

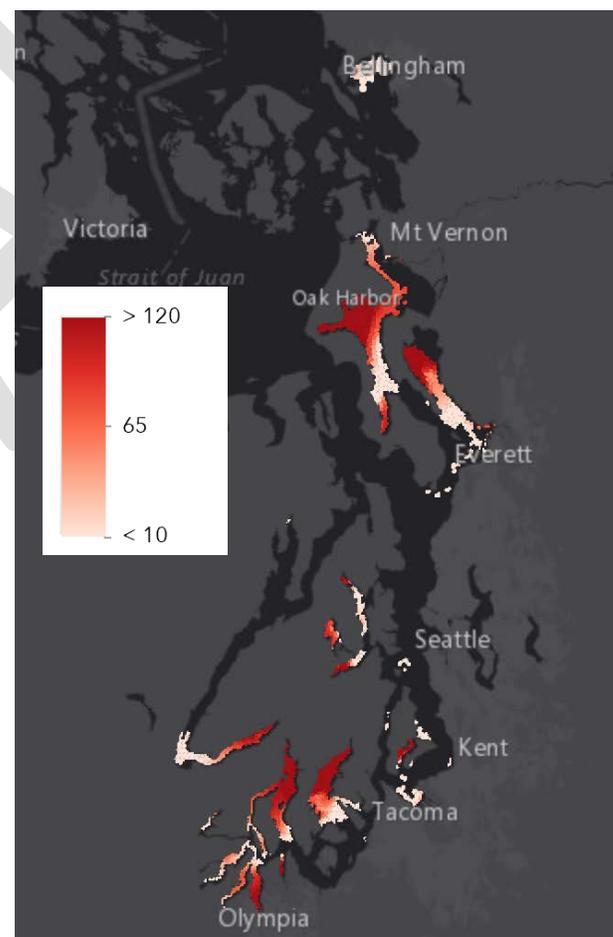
1759 These ecological effects can reduce the foundations
1760 of the marine food web by reducing the habitat and
1761 water quality conditions conducive to healthy and
1762 robust populations of marine species. Reducing
1763 human nutrient inputs to Puget Sound will improve
1764 water quality, support diverse nearshore habitats and
1765 create a healthy, nutritious marine food web to
1766 support forage fish, salmon and orcas. We have the
1767 science that confirms human impacts on DO and
1768 emerging science points to these other indicators
1769 manifesting in Puget Sound.

1770 Ecology's Actions to Reduce 1771 Human-sources of Nutrients to 1772 Puget Sound

1773 Beginning in 2018, the Department of Ecology
1774 initiated the Puget Sound Nutrient Source Reduction
1775 Project to use state of the art science and tools to
1776 inform policy and regulatory discussions about
1777 nutrient management in Puget Sound. We are in a
1778 multi-year process meant to inform future decision-
1779 making at the local and state levels. Recent Salish Sea
1780 modeling results [51] established that human sources
1781 of nutrients are causing or contributing to low
1782 dissolved oxygen in many sensitive inlets and bays
1783 within Puget Sound.

1784 Ecology has been working with federal, state and local partners to develop the tools and data to
1785 understand how human sources of nutrients (i.e. wastewater, agriculture, stormwater and others)

Figure 3: Duration of days not in compliance with DO criteria caused by human-sources of nutrients.



1786 affects water quality in Puget Sound. We have looked at other U.S. coastal estuaries experiencing
1787 similar excess nutrient problems and identified clear lessons from those states, including:

- 1788 • Engagement and collaboration between stakeholders and regulatory authorities is key to
1789 implementing actions to better manage or reduce nutrient discharges to waterbodies.
- 1790 • General permits are an efficient and effective way to manage changes at wastewater
1791 treatment plants that contribute to excess nutrients.
- 1792 • Nutrient reduction solutions touch on a wide-range of point and nonpoint source human
1793 land-use activities.

1794 There has been more than a decade of implementing activities to reduce nutrients in watersheds
1795 draining to these other U.S. coastal estuaries. They have had the most success with nutrient
1796 reductions from advanced wastewater treatment to reduce nitrogen loads, while also reducing
1797 nonpoint sources in watersheds. Marine water quality has improved in Long Island Sound [63] and
1798 Chesapeake Bay [64, 65], and aquatic species that depend on healthy nearshore eelgrass habitats are
1799 on the rebound [66] because of those actions. We need to take similar actions to protect and restore
1800 Puget Sound water quality and populations of iconic species like Chinook salmon and the Southern
1801 Resident orcas.

1802 Ecology is continuing to use the Salish Sea Model to understand the significance of watersheds,
1803 potential improvement from advanced wastewater treatment technology, and the combined effect of
1804 various nonpoint source reduction strategies to improve Puget Sound DO. Recommended
1805 improvements to watershed water quality data collection will further increase our understanding of
1806 watershed nutrient loads to Puget Sound and help inform potential next steps for further reductions
1807 of human sources of nutrients in watersheds in order to protect Puget Sound.

1808 Over the next several years, Ecology will develop a Puget Sound Nutrient Management Plan that
1809 will include the regulatory approaches for point and nonpoint sources of nutrient loading to Puget
1810 Sound. In addition to human-source nutrient reductions, the natural function for nitrogen to
1811 attenuate in watersheds needs to be restored and protected [67]. Ecology is confident that
1812 technology exists to reduce nitrogen from Puget Sound WWTPs and advanced treatment can
1813 significantly improve marine water quality. But, the science is also clear that watershed reductions
1814 (including point and nonpoint sources) are necessary.

1815 **Reducing human nutrients in Puget Sound builds resiliency to** 1816 **Climate Change**

1817 Khangaonkar et al (2019) used the Salish Sea Model to evaluate the impacts of climate change over
1818 the next 100 years and estimated that water temperatures will increase, DO and pH will decrease,
1819 with the area of annually recurring hypoxia could increase 16% relative to Y2000. They also suggest
1820 a species shift from diatoms toward dinoflagellates which would further decrease the quality of the

1821 marine food web. The predicted response to climate change may be less severe than predicted
1822 change to the ocean boundary, and we can create more resiliency to climate change impacts by
1823 reducing our burden of nutrients on Puget Sound [68].

1824 As we continue to grow in population, our wastewater infrastructure and land-use activities must
1825 adapt to accommodate that growth while further reducing our impact on water quality and
1826 ecological resources. Strategically reducing human sources of nutrients now allows more growth
1827 without commensurate environmental degradation and is cheaper and more efficient in the long run.
1828 As a region, we need to start now on improvements that will take a decade or more to build and
1829 implement.

1830 As we reduce human sources of nutrients, we will improve the overall water quality of the Puget
1831 Sound affording increased resiliency to the marine environment that will hedge against increased
1832 ocean temperatures and climate change.

1833 Recommendations

1834 Given our region's growing population and our current science on excess nutrients in Puget Sound,
1835 Ecology believes now is the time to start the process. Infrastructure investments take time and
1836 money, and collaboration with communities to plan for these investments.

1837 Through discussions the Marine Water Quality Implementation Strategy working group and the
1838 Puget Sound Nutrient Reduction Forum advisory group led by Ecology, three specific
1839 recommendations have been identified by Ecology to support this.

1840 Begin addressing human sources of nutrients

1841 **Recommendation #1: Develop a NPDES permit framework for wastewater**
1842 **treatment in Puget Sound to reduce nutrients in wastewater discharges to**
1843 **Puget Sound by 2022.**

1844 **Ecology should explore ways to use its National Pollutant Discharge Elimination System**
1845 **(NPDES) regulatory authority to address point sources of nutrients. Significant nutrient**
1846 **reductions can be achieved with implementing advanced wastewater technology.**

1847 Implementation Details

1848 Ecology is proposing to develop a Puget Sound Nutrients General Permit to control nutrient
1849 discharges from domestic wastewater treatment plants (or sewage treatment plants). The
1850 Department issued a public notice for a Preliminary Determination to develop a Puget Sound
1851 Nutrients General Permit on August 21, 2019. The purpose of this comment period is to obtain

1852 feedback about whether or not a general permit is the right NPDES permit framework for this
1853 purpose.

1854 The alternative to a general permit is to include nutrient control requirements in each of the
1855 WWTP's individual permits, one by one, as they are reissued over the next five to 10 years.
1856 Discharges of excess nutrients to Puget Sound from WWTPs represent more than 50% of the
1857 human sources of nutrients into Puget Sound and significantly contribute to low oxygen levels.
1858 Given this, Ecology must require WWTPs to control nutrients consistent with the Clean Water Act
1859 and Washington's Water Pollution Control Act.

1860 More information is available: [https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-quality-](https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-quality-permits/Water-Quality-general-permits)
1861 [permits/Water-Quality-general-permits](https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-quality-permits/Water-Quality-general-permits).

1862 **Recommendation #2: Better align existing nonpoint programs with nutrient**
1863 **reduction activities and explore new ways to achieve the necessary nonpoint**
1864 **source nutrient reductions.**

- 1865
- Establish minimum requirements for nonpoint BMPs to ensure they meet water quality
1866 standards.
 - Expand existing state and local nonpoint programs to include nutrient reduction best
1867 management practices (BMPs) to begin correcting known land use problems in watersheds.
1868

1869 **Implementation Details**

1870 There are existing nonpoint programs that can be expanded to address known problems from
1871 nutrient runoff from agricultural, suburban/urban, and rural land use activities. Many of these
1872 nonpoint implementation actions have multiple benefits for water quality improvement including
1873 nutrient reduction.

1874 Ecology is developing minimum performance requirements for agricultural nutrient reduction BMPs
1875 that will meet water quality standards. Continuing that process and beginning to explore other ways
1876 to achieve meaningful nonpoint nutrient reductions will occur over the next few years as Ecology
1877 continues working with stakeholders using state-of-the-art modeling to develop an integrated Puget
1878 Sound nutrient management plan for point source and non-point source nutrient reductions.

1879 **Modernize watershed data collection for nutrients**

1880 **Recommendation #3: Collect high-quality, nutrient data in watersheds to fill**
1881 **key knowledge gaps of baseline conditions.**

- 1882
- Augment key watershed monitoring stations with continuous nutrient monitoring
1883 technology to improve our understanding of watershed nutrient loads and establish baseline
1884 conditions to measure future change.
 - Explore potential tools to quantify human sources in watersheds and evaluate nutrient
1885 management actions to meet total watershed nutrient reduction goals.
1886

1887 **Implementation Details**

1888 Making science-based nutrient management decisions depends on having the right tools and high-
1889 quality data. The Salish Sea Model⁵ is our best tool for understanding the marine waters of Puget
1890 Sound, and evaluating the best suite of nutrient load reductions necessary to achieve water quality
1891 standards.

1892 We can improve our understanding of the timing, and magnitude of nutrient discharges from
1893 watersheds with modest enhancements to existing long-term watershed monitoring networks.
1894 Monitoring is critical to establish a strong scientific basis to characterize both baseline conditions
1895 and to measure progress as nutrient reduction actions are implemented on the landscape. Nutrient
1896 management decisions in watersheds depend on quality science and data to understand complex
1897 interactions between human sources and freshwater and marine water quality.

⁵ <https://ecology.wa.gov/Research-Data/Data-resources/Models-spreadsheets/Modeling-the-environment/Salish-Sea-modeling>

Appendix 3. Life After the Task Force Discussion Guide

Overview

The task force will sunset after submitting the Year Two report on November 8, 2019. After this point, it is critically important that an oversight committee or similar body continues to monitor progress, advocate for the ongoing implementation of the recommendations, and adapt to changing conditions by issuing new recommendations as needed. The task force has laid a foundation for the Southern Residents' recovery; strong governance will be necessary to build on this foundation with immediate, sustained and meaningful action.

By selecting one of the following options, the state can better ensure that between now and 2022, we witness evidence of consistently well-nourished whales, more live births and the survival of several thriving young orcas. With adequate consistency and attention, by 2028, we could see the primary indicator of body condition of the whales (the ratio of head width to body length in adults) remain high and stable between seasons and across years and finally see their population increase to 84 whales — an increase of 10 whales in 10 years.

Recommendation: Create one or more entities with authority and funding to recover and advocate for the SRKW by implementing task force recommendations, creating new recommendations as needed, and reporting to the public, governor, and tribal co-managers on status.

Any oversight group must incorporate the following elements:

- Is co-managed by the Governor's Office and tribes and housed in the Governor's Office.
- Aligns with governor's priority on diversity, equity and inclusion, and environmental justice.
- Maintains some element of the working group structure; provides ongoing support and facilitation of working groups by state agencies.
- Takes direction from a strong yet nimble leadership team with representation from nonprofits, businesses and other stakeholders.
- Stays connected to ongoing policies at federal agencies regarding species recovery.
- Maintains and enhances public visibility and interest in this crisis and facilitates a robust public engagement process.
- Builds on ongoing monitoring and reporting to maintain accountability to the public.
- Maximizes institutional durability, at least until the population reaches 84 whales by 2028.

1930 The Life After the Task Force sub-committee discussed three general options for moving this
1931 recommendation forward. These options are summarized here and explained in more detail below;
1932 options are not listed in priority order.

1933 **Option 1. Expand Existing Agency Capacity.**

1934 **Expand the capacity and function of the Governor’s Salmon Recovery Office to include orca**
1935 **recovery (e.g., Governor’s Salmon and Orca Recovery Office).** This option utilizes existing
1936 agency infrastructure and is modeled after the existing Salmon Recovery Funding Board model with
1937 policy coordination and administration functions within the GSORO, and a policy board comprising
1938 governor appointed members and agency heads.

1939 **Option 2. Create a New Executive Level Team in Governor’s Office.**

1940 **Create an executive-level salmon and orca leadership team in the Governor’s Office.** This
1941 option includes explicit tribal co-manager engagement by the Governor’s Office. This option houses
1942 the main functions of the policy leadership team within the Governor’s Office and maintains an
1943 executive-level focus on recovery.

1944 **Option 3. Create a New Orca Recovery Office.**

1945 **Create an Orca Recovery Office led by biologists and technical experts.** This option creates a
1946 new office that is staffed to implement actions. This office can be located within the Governor’s
1947 Office or within an existing agency. The key element of this option is that it is not a stakeholder-led
1948 process.

1949 In addition to building the bodies described in the three options, the task force recommends
1950 leveraging The Puget Sound Partnership’s recovery system where appropriate. It is well-positioned
1951 to contribute to vessels recommendations, coordinate with Canadian representatives and actions,
1952 support scientific monitoring, advise on communications and track progress. Likewise, Salmon
1953 Recovery Councils on the Columbia River and Washington Coast could be useful partners.

1954 The task force’s three proposed options for oversight of the Southern Residents’ recovery are
1955 introduced in the table below. The following sections describe these options in greater detail.

1956

1957

		Gov. Salmon and Orca Recovery Office	Gov. Salmon and Orca Leadership Team	Orca Recovery Office
STRUCTURE	Leadership & Representation	<ul style="list-style-type: none"> • Governor’s appointed executive-level board, or council to oversee orca recovery • GSRO provides policy support in coordination with the Governor’s Office • Executive-level membership TBD; some appointed by the Governor; some ex-officio state agency representatives, and tribal representatives • Staffed by designated agency representatives 	<ul style="list-style-type: none"> • Co-Managers: Governor’s Office Leadership as Chief Executive in co-manager role with tribes • Salmon and Orca Leadership Team: Monitors implementation of existing recommendations, considers new working group recommendations and recommends course corrections. Appointed by the Governor 	<ul style="list-style-type: none"> • Executive team chaired or co-chaired by a wildlife biologist • Team size should be lean and nimble • 1 or 2 leads for each threat (prey abundance, contaminants, vessel impacts, climate change and population growth, new/emerging). • Tribal representatives as tribes see fit.
	Reporting Structure	<ul style="list-style-type: none"> • GSRO statutory authority expanded to include orca recovery (Governor’s Salmon and Orca Recovery Office) 	<ul style="list-style-type: none"> • Salmon and Orca Leadership Team 2x/yr public meetings • Reports to the public, Governor and tribes as co-managers with biennial comprehensive reviews & brief annual updates 	<ul style="list-style-type: none"> • Report to the Governor or RCO, perhaps analogous to the Salmon Recovery Office. • Provide executive support as well as continuity between administrations (however best to accomplish that)
	Key Goals & Actions	<ul style="list-style-type: none"> • Maintain momentum and focus on orca recovery • Coordinate policy and budget initiatives • Coordinate the actions, science and progress through individual agencies 	<ul style="list-style-type: none"> • Maintain executive-level attention on recovery • Track progress on Orca Recovery Task Force actions, recommend new actions, identify course corrections and maintain broad coalition 	<ul style="list-style-type: none"> • Achieve recovery goals • Prioritize & implement recommendations • Amend and develop new task force recommendations • Measure and track progress • Transparency/accountability • Identify roles and schedules for each recommendation
STAKEHOLDERS	Partners & Stakeholders	<ul style="list-style-type: none"> • Tribal treaty rights: tribes will engage on multiple fronts as appropriate, including appointments to the board or council 	<ul style="list-style-type: none"> • Accountable/approver as co-managers • Develops Salmon and Orca Leadership Team recommendations with stakeholders/agencies/others • Working group members 	<ul style="list-style-type: none"> • Co-managers. Seats on council and working groups. Others per input from tribes.
	Partner Agencies	<ul style="list-style-type: none"> • Hybrid executive-level and GSRO structure offers a statewide and transboundary perspective 	<ul style="list-style-type: none"> • Develops Salmon and Orca Leadership Team recommendations with tribes/stakeholders/others • Facilitates working groups • Transboundary consult 	<ul style="list-style-type: none"> • Collaborators and implementers

		Gov. Salmon and Orca Recovery Office	Gov. Salmon and Orca Leadership Team	Orca Recovery Office
IMPLEMENTATION	PUBLIC	<ul style="list-style-type: none"> Engaged via multiple pathways 	<ul style="list-style-type: none"> Consulted: public engagement brought these issues to the forefront and remains critical 	<ul style="list-style-type: none"> Provide feedback/accountability
	Effort / Funding	<ul style="list-style-type: none"> GSRO Staffing (1 FTE) Operational costs for the executive team/board coordination Agency staff support for PSP, WDFW, ECY (3 FTE) 	<ul style="list-style-type: none"> Results WA-style meetings with the Governor, tribes Salmon and Orca Leadership Team twice-annual, all-day public meetings Quarterly or twice-annual meetings x 4 working groups Website communication tools More detailed biennial report Agency staff support (PSP, DFW, ECY, GSRO) and facilitation contracts 	<ul style="list-style-type: none"> 5 to 7 FTEs on Office (Exec director, leads, public engagement) Quarterly reports Technology: Dashboard Communication and public engagement through dashboard, quarterly reports and quarterly public meetings Stipend for working group travel
	Timeline	<ul style="list-style-type: none"> Could be implemented relatively quickly. 	<ul style="list-style-type: none"> By Jan 2020: transition to interim structure Winter/Spring 2020: form new Leadership Team & secure legislative funding 	<ul style="list-style-type: none"> Executive order to start ASAP, should be in place by end of legislative session or sooner.
Puget Sound Partnership Recovery System <ul style="list-style-type: none"> Science, monitoring and adaptive management Tracking/updating recommendations Vessels Communications Coordination with Canada, Columbia, and the Coast 			Columbia River and Coast Salmon Recovery Councils <ul style="list-style-type: none"> Science, monitoring and adaptive management Tracking/updating recommendations 	

1959 **Governor’s Salmon and Orca Recovery Office**

1960 **Structure**

1961 **Leadership:**

- 1962 • Establish executive-level board, or council to oversee orca recovery.
- 1963 • GSRO provides policy support in coordination with the Governor’s Office.

1964 **Members/Representation:**

- 1965 • Executive-level membership to be determined – some appointed by the Governor, some ex-officio state agency representatives.
- 1966 • Staffed by designated agency representatives.

1968 **Reporting Structure:**

- 1969 • Expand GSRO statutory authority to include orca recovery.

1970 **Key Goals & Actions:**

- 1971 • Maintain momentum and focus on orca recovery.
- 1972 • Coordinate policy and budget initiatives specific to orca recovery.
- 1973 • Coordinate the actions, science and progress through individual agencies.

1974 **Structure and Roles:**



1975

1976 **Working Groups**

1977 **Structure:**

- 1978 • Use existing working groups on as-needed basis to address specific topics as they arise.
- 1979 • Do not have standing meetings but may hold periodic check ins to keep the teams intact.
- 1980 • Each working group would continue to be led by staff from Ecology, Fish and Wildlife, and Puget Sound Partnership. These three staff leads would be ex-officio members of the Governor’s Salmon and Orca Recovery Office.
- 1981
- 1982
- 1983 • One new staff to coordinate with the working groups and organize the logistics and reporting of the board or council, these staff would report to the Executive Coordinator.
- 1984

1985

1986 **Stakeholders & Partners**

Role of Tribes	Role of Partner Agencies (State, Federal, International)	Role of the Public
<ul style="list-style-type: none"> • Tribal treaty rights – tribes will engage on multiple fronts as appropriate, including appointments to the board or council. 	<ul style="list-style-type: none"> • Hybrid executive-level and GSRO structure offers a statewide and transboundary perspective. 	<ul style="list-style-type: none"> • The public will remain engaged through multiple pathways; public engagement brought these issues to the forefront and remains critical.

1987

1988 **Level of Effort/Funding**

- 1989 • GSRO Staffing (1 FTE).
- 1990 • Operational costs for the executive level policy board (Approximate = \$200,000/biennium).
- 1991 • Agency staff support for PSP, WDFW, ECY (3 FTE or in-kind).
- 1992 • Plus additional contracted consulting services if required as start up.

1993 **Timeline**

- 1994 • Could be implemented relatively quickly.

1995 **Benefits & Barriers**

1996 **Benefits:**

1997 The Governor’s Salmon and Orca Recovery Office would provide statewide consistency,
1998 coordination and accountability for salmon and orca recovery:

- 1999 • Governor’s Office or RCO can coordinate executive engagement with additional resources.
- 2000 • GSRO can work with RCO to manage associated grants and contracts.
- 2001 • GSRO could leverage its existing role in coordinating among the tribes, state and federal agencies, regional salmon recovery organizations, local partners and jurisdictions, and federal and state legislative activities.

2004 **Barriers:**

- 2005 • Would require additional funding.
- 2006 • May require statutory changes.

2007 Governor's Salmon and Orca Leadership Team

2008 Structure

2009 Leadership:

- 2010 • Co-Managers: Governor's Office Leadership as Chief Executive in co-manager role with
2011 tribes **accountable**⁶ for orca and salmon recovery, drawing from recommendations from
2012 the Salmon and Orca Leadership Team. Note: this option also depends on the Governor's
2013 Office and tribes agreeing to how the co-management roles will cover salmon and orcas.
- 2014 • Salmon and Orca Leadership Team (similar concept to current task force): **Responsible**⁷ for
2015 monitoring implementation of existing recommendations, considering new
2016 recommendations coming from working groups and recommending course corrections for
2017 continued recovery. Representative composition with the same sectors as current Orca
2018 Recovery Task Force (tribes, elected officials, state agencies, fishing interests, NGOs,
2019 business, federal agencies, Canada, etc.). Appointed by the governor, balancing the need to
2020 be small and nimble yet representative.

2021 Reporting Structure:

- 2022 • Salmon and Orca Leadership Team holds twice-yearly public meetings to monitor progress
2023 on implementing recommendations, consider new information sourced from expanded
2024 working groups, take public input and identify necessary course corrections. This group
2025 must answer to the public and to the governor and tribes as co-managers, possibly through a
2026 Results Washington dashboard/accountability structure, subcabinet, or initiatives similar to
2027 Washington Maritime Blue 2050 or U.S.-Canada Maritime Commerce Resilience. Biennial
2028 comprehensive reviews due beginning November 2021, with brief annual updates.

2029 Key Goals & Actions:

- 2030 • Maintain executive-level attention on salmon and orca recovery.
- 2031 • Track progress on Orca Recovery Task Force actions, recommend new actions based on
2032 information from working groups, identify course corrections and maintain the broad
2033 coalition of voices working together toward recovery.

⁶ From **RACI** framework – Responsible, Accountable, Consulted, Informed.

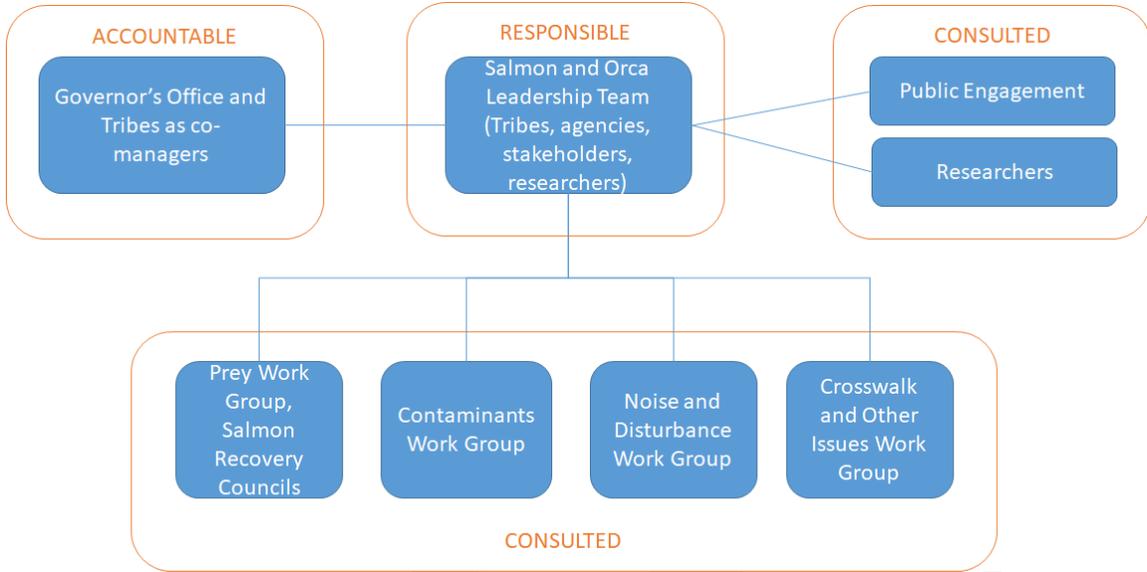
Accountable (or Approver or final approving authority) refers to the one ultimately answerable for the correct and thorough completion of the deliverable or task, the one who ensures the prerequisites of the task are met and who delegates the work to those responsible. In other words, an accountable must sign off (approve) work that responsible provides. There must be only one accountable specified for each task or deliverable.

Consulted refers to those whose opinions are sought, typically *subject matter experts*; and with whom there is two-way communication.

⁷ **Responsible** refers to those who do the work to complete the task. There is at least one role with a participation type of responsible, although others can be delegated to assist in the work required.

2034 **Structure and Roles:**

2035



2036

2037 **Working Groups**

2038 **Structure:**

- 2039 • Existing Prey and Contaminants working groups continue to source information to the
- 2040 Leadership Team, plus reframe the vessels working group to be Noise and Disturbance (not
- 2041 limited to just vessels). Use existing structures to the maximum extent with plenty of
- 2042 expertise; these groups are skilled and should not be recreated.
- 2043 • Add a new working group that addresses crosswalk and “none-of-the-above” issues, climate
- 2044 change, population growth, synergy across working group silos and gaps in that structure.
- 2045 • Agency-led technical expertise and facilitation are critical. Detailed quarterly updates on
- 2046 progress. Produce annual course-correction recommendations that are written and reviewed
- 2047 by the working groups and provided to the Leadership Team and the public.

2048

2049 **Stakeholders & Partners**

Role of Tribes	Role of Partner Agencies (State, Federal, International)	Role of the Public
<ul style="list-style-type: none"> Accountable/approver in co-manager role. Responsible for developing Salmon and Orca Leadership Team recommendations with stakeholders, agencies and others. Consulted as working group members, clarifying new work needed. 	<ul style="list-style-type: none"> Responsible for developing Salmon and Orca Leadership Team recommendations with tribes, stakeholders and others. Responsible for facilitating working groups. Consult role with transboundary organizations. 	<ul style="list-style-type: none"> Consulted⁸: Public engagement brought these issues to the forefront and remains critical; public pressure reminds elected officials and pushes government structures forward.

2050 **Funding**

- 2051 • Results WA-style meetings with the governor, tribes
- 2052 • Salmon and Orca Leadership Team – Facilitate twice-annual, all-day public meetings.
- 2053 Meeting packets with outputs from working groups. Manage public comment process and
- 2054 compile results.
- 2055 • Facilitate quarterly or twice-annual meetings for four working groups (the three existing, plus
- 2056 a new one). Half day.
- 2057 • Manage website communication tools
- 2058 • Produce more detailed biennial report beginning November 2021, continuing until the
- 2059 population reaches 84 whales by 2028.

2060 **Timeline**

- 2061 • November 2019 – January 2020 – transition plan from Orca Recovery Task Force into an
- 2062 interim structure.
- 2063 • Winter/spring 2020 – form new oversight and accountability Leadership Team. Secure
- 2064 funding through the Legislature.

2065 **Benefits & Barriers**

2066 **Benefits:**

- 2067 • Oversight and accountability – Executive-level attention and engagement are crucial to
- 2068 address this crisis, implement the remaining recommendations, develop new
- 2069 recommendations, monitor progress and adjust tactics. Without executive-level leadership,

⁸ **Consulted** refers to those whose opinions are sought, typically *subject matter experts*; and with whom there is two-way communication.

2070 resident orcas and Chinook salmon are doomed to extinction. Salmon and orcas have been
 2071 listed for 20 and 15 years, respectively, but we did not galvanize this much action without the
 2072 leaders in our region setting the table and the public applying pressure.

2073 • Power – It took the breadth of the current task force table to compel actions. Tribes, fishing
 2074 interests and non-governmental organizations make sure government processes do not
 2075 revert to business as usual, and agencies bring expertise and structure from existing
 2076 programs.

2077 • Structure – Hybrid executive and working group structure offers a statewide and
 2078 transboundary perspective and reflects the importance of salmon runs throughout the state
 2079 and transboundary issues with Canada.

2080 • Efficiency – Agency-led working group processes continue through existing and refined
 2081 structures.

2082 **Barriers:**

2083 • Identifying and maintaining durable funding and attention

2084 **Establish an Orca Recovery Office that would report**
 2085 **to the Governor or RCO, analogous to the Salmon**
 2086 **Recovery Office**

2087 **Structure**

2088 **Leadership:**

2089 • Executive team chaired or co-chaired by a wildlife biologist with experience in recovering
 2090 marine mammal populations. Leadership should not be a stakeholder group.

2091 **Members:**

2092 • Team size should be lean and nimble to facilitate effective, responsive analysis and decision-
 2093 making.

2094 • One or two leads for each threat (prey abundance, contaminants, vessel impacts, climate
 2095 change and population growth, new/emerging). Could be working group leads.

2096 • Tribal representatives as tribes see fit.

2097 • Stakeholder interests represented in working groups, not at the leadership level.

2098 **Reporting Structure:**

2099 • Report to the governor or RCO; perhaps analogous to the Salmon Recovery Office.

2100 • Goal of structure is to provide executive support as well as continuity between
 2101 administrations.

2102 **Key Goals & Actions:**

- 2103 • Drive and synchronize state actions toward achieving SRKW population recovery goals.
- 2104 • Prioritize existing recommendations and work with Executive and Legislature to implement.
- 2105 • Evaluate, update and add new recommendations in response to population status.
- 2106 • Identify roles and schedules for implementation of each recommendation, especially where
- 2107 authorities or actions overlap. Recommendations treated like projects to be acted on (or not)
- 2108 with roles, schedules, accountabilities and outcomes clearly defined.
- 2109 • Measure and track progress towards goals, provide transparency and accountability and a
- 2110 mechanism for public engagement.

2111 **Working Groups**

2112 **Structure**

- 2113 • Led (or co-led) by members of the Office.
- 2114 • Lead is responsible for the work products and driving the process to answer key scientific
- 2115 questions.
- 2116 • Working groups should be representative and diverse (tribal/public/private).
- 2117 • Current members should be included for continuity and efficiency. Other members may be
- 2118 added.

2119 **Stakeholders & Partners**

Role of Tribes	Role of Partner Agencies (State, Federal, International)	Role of the Public
<ul style="list-style-type: none"> • Co-managers. Seats on council and working groups. Others roles depending on tribal input. 	<ul style="list-style-type: none"> • Serve as collaborators and implementers. 	<ul style="list-style-type: none"> • Provide feedback.

2120 **Level of Effort/Funding**

- 2121 • Office would be 5 to 7 FTEs (Exec director, leads for each area, public
- 2122 engagement/communications and support).
- 2123 • Quarterly reports on progress towards goals.
- 2124 • Technology: Dashboard to show status of recommendations and progress towards goals,
- 2125 provide transparency and accountability.
- 2126 • Communication and public engagement through dashboard, quarterly reports and quarterly
- 2127 public meetings.
- 2128 • Stipend for working group member travel.

2129 **Timeline**

- 2130
- Executive order to start ASAP, should be in place by end of legislative session or sooner.

2131 **Benefits & Barriers**

2132 **Benefits:**

- 2133
- Focus on orcas is championed and maintained. (Orca recovery includes, but is not the same thing as, salmon recovery.)
- 2134
- 2135
- Tribal representation as recommended by tribes.
- 2136
- Gold star and accountable guidance for decision-makers.
- 2137
- Task force work recommendations are implemented and evolve.
- 2138
- Continued engagement by diverse stakeholders with deep knowledge and experience.
- 2139
- Informed think tank to brainstorm, create and evaluate solutions.
- 2140
- Goal is not to duplicate efforts within agencies, but to synchronize towards orca recovery –
- 2141
- identify gaps and priorities.
- 2142
- Serve as the gold standard for non-biased information about the orcas.

2143 **Barriers:**

- 2144
- Funding
- 2145
- Time to implement

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