



Washington State Ferries  
**Sustainability Action Plan**  
2019–2021

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# Executive summary



In 2017, Washington State Ferries (WSF) took an unprecedented step forward on strategies improve sustainable practices and environmental stewardship. To date, WSF has made considerable headway on an electric hybrid ferry program as well as operational efficiencies that have reduced current consumption of diesel fuel by over 450,000 gallons in one year. Additional initiatives have had a positive impact within almost every department.

Under the leadership of Governor Jay Inslee, Washington State Department of Transportation's (WSDOT) emphasis on sustainable transportation has increased in recent years. With the signing of Executive Order 18-01,<sup>1</sup> Governor Inslee challenged WSF to begin the transition to a zero-carbon-emission ferry fleet.

In January 2019, WSF completed its 2040 Long Range Plan, which includes "sustainability and resilience" as one of the four key themes. The plan outlines recommendations to invest in infrastructure and operations to maintain reliable service in a changing climate and reduce the ferry system's environmental impact.

This 2019-2021 Sustainability Action Plan

## Our system

Washington State Ferries (WSF), a division of the Washington State Department of Transportation (WSDOT), operates the largest ferry system in the United States. The system carried 24.7 million riders in 2018 through the operation of 10 routes and 20 terminals.



<sup>1</sup> Executive Order 18-01 "State Efficiency and Environmental Performance," [https://www.governor.wa.gov/sites/default/files/exe\\_order/18-01%20SEEP%20Executive%20Order%20%28tmp%29.pdf](https://www.governor.wa.gov/sites/default/files/exe_order/18-01%20SEEP%20Executive%20Order%20%28tmp%29.pdf)

discusses implementation of the near-term recommendations from the 2040 Long Range Plan and other goals and actions to continue WSF's commitment to sustainability.

This Plan organizes WSF's current sustainability efforts within a context-based framework. The Plan presents six focus areas derived from industry best practice and prioritized based on legislative mandates, executive orders, agency goals, and community concerns. These focus areas include:

- Greenhouse gas (GHG) emissions
- Air quality
- Biodiversity
- Water
- Waste
- Community impacts and engagement

Within each focus area, the Plan sets Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) goals with associated actions to achieve those goals within the 2019-2021 biennium.

Similar to the 2040 Long Range Plan, WSF considers this Sustainability Action Plan to be a "living document" that will guide our sustainability efforts over the course of the next biennium. This plan allows WSF to take the first steps to achieving the sustainability vision set out in the Long Range Plan and, in doing so, make strides to become the most sustainable ferry operator in the world.

### *Defining sustainability*

Defined simply, sustainability is considering the short- and long-term effects on the "three E's" of economy, environment, and equity in all of our decisions and actions. For WSF, as a division of WSDOT, sustainability is an integral part of our mission, vision, and goals, and defines one of our agency's six values, calling on each of us to "be resource stewards by supporting economic, environmental, and community need." In this Sustainability Action Plan, sustainability strategies primarily focus on environmental stewardship and proactive approaches to address climate change.

# Contextualizing sustainability



“Context-based Sustainability” is setting science-based goals so that WSF can play our part in maintaining and enhancing key environmental and social systems.<sup>2</sup> This approach includes aiming for targets that have meaning in the real world, and developing metrics that allow us to measure and manage our efforts, and tell our story.<sup>3</sup>



The first step on the “road to context” is the acknowledgement that we operate within global, regional, and local social, economic, and environmental systems.<sup>4</sup> As evidenced in our agency’s mission, vision, goals, and values, WSF has already taken this difficult first step. The second step is trying to identify and prioritize focus areas that are relevant to the social, economic, and environmental systems in which we operate. The focus areas for our sustainability context were drawn from The Embedding Project, a collaborative research project committed to creating public value through social science.<sup>5</sup> These focus areas are those most commonly used in business today to contextualize a sustainability

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<sup>2</sup> Context-based Sustainability, Center for Sustainable Organizations, <https://www.sustainableorganizations.org/context-based-sustainability-cbs/>

<sup>3</sup> “Why Companies Need Context-Based Sustainability Metrics,” Robert Kroop, <https://www.greenbiz.com/blog/2014/06/26/context-based-sustainability-metrics>

<sup>4</sup> The Road to Context: Tools for Corporate Strategy-Making and Goal Setting, The Embedding Project, <https://embeddingproject.org/resources/the-road-to-context>

<sup>5</sup> About the Embedding Project, The Embedding Project, <https://www.embeddingproject.org/about>

journey.<sup>6</sup> Our focus areas are relevant to WSF as a state agency operating within Puget Sound and include GHG Emissions, Air Quality, Biodiversity, Water, Waste, and Community Impacts. Our focus areas are prioritized based on legislative mandates, executive orders, agency goals, and community concerns with the higher priority focus areas coming first.

The third step in our journey is to set our goals for each of these focus areas by identifying the performance gap between where we are and where we need to be. The goals for each topic area must be Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) and should be developed through the perspective of “backcasting,”<sup>7</sup> which is “a way of planning in which a successful outcome is imagined in the future.”<sup>8</sup>

For many of our focus areas, our journey is just beginning and it is necessary to develop baseline current states as our initial goal. For other focus areas, we understand our baseline and have a vision for the sustainable future or have science-based guidance from other sources, which allows us to identify our performance gaps. With these gaps in mind, we can develop and prioritize actions based on impact, feasibility, cost, and ease of implementation.

The final leg of our journey is to transparently track our performance in relation to our goals. We have developed an internal dashboard that currently tracks our actions. As we continue our journey, we will make this tool more transparent and user friendly. We will develop different formats for different audiences with a target to have our sustainability journey tracked on our external website. In doing so, we will be able to better measure our progress and tell our story at a local, regional, and global level.

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<sup>6</sup> “The Road to Context: Contextualizing Your Strategy and Goals,” The Embedding Project, [https://www.embeddingproject.org/system/attachments/documents/000/000/078/original/EP\\_The\\_Road\\_to\\_Context\\_Guidebook.pdf?1527885106](https://www.embeddingproject.org/system/attachments/documents/000/000/078/original/EP_The_Road_to_Context_Guidebook.pdf?1527885106)

<sup>7</sup> “Essence of Backcasting,” Karl H. Dreborg, [https://www.unifg.it/sites/default/files/allegatiparagrafo/07-07-2014/essence-of-backcasting\\_1996\\_futures.pdf](https://www.unifg.it/sites/default/files/allegatiparagrafo/07-07-2014/essence-of-backcasting_1996_futures.pdf)

<sup>8</sup> Backcasting, The Natural Step Canada, <http://www.naturalstep.ca/backcasting>

# Greenhouse gas emissions



Currently, state law requires state agencies to reduce greenhouse gas (GHG) emissions by 15 percent below 2005 levels by 2020, 36 percent below 2005 levels by 2035, and 57.5 percent below 2005 levels by 2050.<sup>9</sup> With the signing of Executive Order 18-01,<sup>10</sup> Governor Inslee challenged WSF to reduce GHG emissions even further by beginning a transition to a zero-carbon-emission ferry fleet. Governor Inslee specifically cited “accelerated adoption of both ferry electrification and operational improvements” to achieve this ambitious goal.

Although there are several GHGs of concern, including methane, nitrous oxide (N<sub>2</sub>O), and fluorinated gases, carbon dioxide (CO<sub>2</sub>) is the most prevalent GHG emitted into the atmosphere, accounting for 81 percent of all GHG emissions.<sup>11</sup> The primary effect of GHG is trapping heat within the planet and increasing global temperatures, leading to climate change. This has enormous effects on human health, ecosystem vitality, and our economy. Just as importantly, CO<sub>2</sub> is also a primary driver of ocean acidification, which occurs as

## *Reducing speeds to save fuel*

Washington State Ferries is the largest consumer of diesel fuel in Washington state at over 18 million gallons each year. Starting in April 2018, WSF has been operating on new speed guidelines intended to reduce fuel consumption at minimal to no investment. These speed reductions have saved approximately 450,000 gallons of fuel in the first year compared to the previous year with little impact on schedules and on-time performance. This savings equates to almost \$900,000 and 4,365 metric tons of CO<sub>2</sub> emissions saved.

<sup>9</sup> Greenhouse Gas Emission Limits for State Agencies, RCW 70.235.050, <http://apps.leg.wa.gov/rcw/default.aspx?cite=70.235.050>

<sup>10</sup> Executive Order 18-01 “State Efficiency and Environmental Performance,” [https://www.governor.wa.gov/sites/default/files/exe\\_order/18-01%20SEEP%20Executive%20Order%20%28tmp%29.pdf](https://www.governor.wa.gov/sites/default/files/exe_order/18-01%20SEEP%20Executive%20Order%20%28tmp%29.pdf)

<sup>11</sup> Overview of Greenhouse Gases, Environmental Protection Agency (EPA), [https://19january2017snapshot.epa.gov/ghgemissions/overview-greenhouse-gases\\_.html](https://19january2017snapshot.epa.gov/ghgemissions/overview-greenhouse-gases_.html)

CO<sub>2</sub> is absorbed by oceans and is transformed into carbonic acid.<sup>12</sup> Increased acidity has dramatic effects on calcifying species, such as oysters, clams, crabs, urchins, corals, planktons, and pteropods.<sup>13</sup> The demise of pteropods is particularly troubling in that they form the base of the food chain for salmon.<sup>14</sup> For Puget Sound, ocean acidification could lead to the demise of the shellfish and seafood industries, which contribute almost \$2 billion in revenue and account for over 45,000 jobs.<sup>15</sup> Shellfish and seafood are also critical food, economic, and cultural resources for Puget Sound tribes, which have reserved treaty rights throughout Puget Sound.

In 2016, the Washington Department of Ecology (DOE) and the Climate Impacts Group (CIG) at the University of Washington evaluated current climate science and emission reduction agreements.<sup>16</sup> Focusing particularly on the global climate change science assessment issued by the Intergovernmental Panel on Climate Change (IPCC),<sup>17</sup> the 2015 Paris Agreement,<sup>18</sup> national and state reduction targets, and the Under2 MOU,<sup>19</sup> DOE and CIG recommended stronger GHG emission reduction targets than are currently set in state law. Their recommendation is based on the need to limit global warming to less than 2 degrees centigrade by 2050. This 2 degree increase is a critical point at which the effects of climate change upon humanity and the economy may be devastating. DOE recommends the following: by 2020, reduce overall GHG emissions in the state to 1990 levels; by 2035, reduce overall GHG emissions in the state to 40 percent below 1990 levels; and, by 2050, reduce overall GHG emissions in the state to 80 percent below 1990 levels. With current long range planning, WSF is on pace to exceed our state-mandated goals in 2035 and 2050, and have an opportunity to achieve the more stringent goals recommended by DOE and CIG. For agency consistency, however, our goal will remain what is mandated of state agencies. WSF should attempt to meet the more stringent recommendations if possible.

## Goal

- 1) WSF will reduce GHG emissions to 15 percent below 2005 levels by 2020, to 36 percent below 2005 levels by 2035, and to 57.5 percent below 2005 levels by 2050.

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<sup>12</sup> Ocean Acidification: The Other Carbon Dioxide Problem, National Oceanic and Atmospheric Administration (NOAA), <https://www.pmel.noaa.gov/co2/story/Ocean+Acidification>

<sup>13</sup> Acidification in Puget Sound, DOE, <https://ecology.wa.gov/Water-Shorelines/Puget-Sound/Issues-problems/Acidification>

<sup>14</sup> Ocean Acidification: A Wake-up Call in Our Waters, NOAA, <http://www.noaa.gov/ocean-acidification-high-co2-world-dangerous-waters-ahead>

<sup>15</sup> Ocean Acidification in Washington State: From Knowledge to Action, DOE, <https://fortress.wa.gov/ecy/publications/publications/1201017.pdf>

<sup>16</sup> Washington Greenhouse Gas Emission Reduction Limits, DOE, <https://fortress.wa.gov/ecy/publications/documents/1601010.pdf>

<sup>17</sup> Climate Change 2014 Synthesis Report, IPCC, <https://www.ipcc.ch/report/ar5/syr/>

<sup>18</sup> The Paris Agreement, UN, <https://unfccc.int/process/the-paris-agreement/what-is-the-paris-agreement>

<sup>19</sup> The Under2 MOU, Under2 Coalition, <https://www.under2coalition.org/under2-mou>

## Actions

- 1) WSF will work on hybridization and associated infrastructure improvements for the Jumbo Mark II class vessels.
- 2) WSF will electrify the fleet and all terminals, except Shaw and Lopez islands and Sidney, BC.
- 3) An Operational Efficiency Work Group was formed in November 2017 and continues to meet regularly to initiate operational measures to reduce GHG emissions.
- 4) WSF initiated a Fleet Advisory on optimal speeds and make-up speeds for each vessel class in April 2018 and continues tracking and refining the initiative.
- 5) WSF will issue Fleet Advisory and Safety Management System (SMS) changes to roll out two engine operations for Jumbo Mark II vessels. Training on two engine operations was conducted in Spring 2018.
- 6) WSF will initiate a data collection effort to identify issues with improper trim on vessels and address issues through revised loading procedures and other improvements.
- 7) WSF will initiate a pilot project to substitute smaller vessels on lesser-used runs on the Seattle/Bainbridge route to improve fuel efficiency and efficiency of service while maintaining current level of service.
- 8) WSF will use a 10 percent blend of biodiesel (B10) fleetwide. This is an increase in use of biofuels from the current 5 percent blend (B5) fleetwide.
- 9) WSF will complete an energy services performance contract to perform a deep energy retrofit at 18 facilities, including solar installation at the Bainbridge Island Terminal.
- 10) WSF will pursue renewable energy credits with electricity providers for 19 facilities. Port Townsend is the only facility without a renewable energy credit option.

# Air quality



## Pollutant air emissions

According to the Puget Sound Clean Air Agency (PSCAA), roughly 23 percent of the diesel exhaust in Puget Sound comes from the maritime sector.<sup>20</sup> Sulfur Oxide (SOx) and Nitrogen Oxide (NOx) emissions lead to increases in nitrogen and sulfur compounds in the atmosphere that are transformed to sulfuric and nitric acid, which contribute to the acidification of aquatic and terrestrial environments, including the deterioration of buildings and other structures in the built environment.<sup>21</sup> NOx also contributes to ground-level ozone formation, which leads to smog and has adverse effects on human health.<sup>22</sup>

Northwest Ports Clean Air Strategy is a cooperative effort between the Ports of Seattle, Tacoma, and Vancouver, and the Northwest Seaport Alliance to address diesel Particulate Matter (PM) and GHG.<sup>23</sup> Their goal for diesel PM is a reduction of 80 percent relative to 2005 by 2020, with PM measured per metric ton of cargo. As part of their Clean Air Action Plan,<sup>24</sup> the San Pedro Bay Ports (Ports of Long Beach and Los Angeles) have set their goal for diesel PM at a 77 percent reduction relative to 2005 by 2023. In addition, the San Pedro Bay Ports have set a 59 percent reduction goal for NOx and 93 percent reduction goal for SOx relative to 2005 by 2023. Although these targets provide comparative data for goal setting, port emission inventories tend not to be directly comparable to vessel operators, who have higher baselines given the amount of diesel burned.

As a partner in the Puget Sound Maritime Air Forum, WSF has provided data in support of

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<sup>20</sup> Reducing Pollution from Maritime Engines, PSCAA, <https://www.pscleanair.org/249/Maritime>

<sup>21</sup> Environment at a Glance 2013: OECD Indicators, Organisation for Economic Cooperation and Development [https://www.oecd-ilibrary.org/environment/environment-at-a-glance-2013/sulphur-oxides-so-and-nitrogen-oxides-no-emissions\\_9789264185715-7-en;jsessionid=adUmDiH528ri22jjj-57VoAN.ip-10-240-5-160](https://www.oecd-ilibrary.org/environment/environment-at-a-glance-2013/sulphur-oxides-so-and-nitrogen-oxides-no-emissions_9789264185715-7-en;jsessionid=adUmDiH528ri22jjj-57VoAN.ip-10-240-5-160)

<sup>22</sup> Nitrogen Oxides (NOx), Why and How They Are Controlled, United States Environmental Protection Agency, <https://www3.epa.gov/ttnecatc1/dir1/fnoxdoc.pdf>

<sup>23</sup> Northwest Ports Clean Air Strategy: 2016 Implementation Report, [https://www.nwseaportalliance.com/sites/default/files/nwpcas\\_implementation\\_report\\_2016\\_updated\\_final-2017-11-28.pdf](https://www.nwseaportalliance.com/sites/default/files/nwpcas_implementation_report_2016_updated_final-2017-11-28.pdf)

<sup>24</sup> San Pedro Bay Ports Clean Air Action Plan (CAAP), <http://www.cleanairactionplan.org/>

the 2005,<sup>25</sup> 2011,<sup>26</sup> and 2016 Puget Sound Maritime Air Emissions Inventory.<sup>27</sup> Currently, WSF is working to drill down on this data to create a vessel-specific baseline inventory of NOx, SOx, and PM, which is the first necessary step to setting reduction goals.

## Goals

- 1) WSF will create and maintain an annual inventory of NOx, SOx, and PM by 2021.
- 2) WSF will set reduction goals for NOx, SOx, and PM based on inventory and industry benchmarks by 2021.

## Actions

- 1) As part of Green Marine's self-reporting, WSF will complete an inventory of NOx, SOx, and PM beginning with the calendar year 2019.
- 2) As part of Green Marine's self-reporting and third-party certification process, WSF will maintain an emissions inventory in subsequent years.
- 3) WSF will develop reduction goals by 2021.

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<sup>25</sup> 2005 Puget Sound Maritime Air Emissions Inventory, [https://pugetsoundmaritimeairforum.files.wordpress.com/2016/06/2007pugetsound\\_maritimeairemissionsinventory.pdf](https://pugetsoundmaritimeairforum.files.wordpress.com/2016/06/2007pugetsound_maritimeairemissionsinventory.pdf)

<sup>26</sup> 2011 Puget Sound Maritime Air Emissions Inventory, [https://pugetsoundmaritimeairforum.files.wordpress.com/2016/06/2011pseireportupdate\\_20130523.pdf](https://pugetsoundmaritimeairforum.files.wordpress.com/2016/06/2011pseireportupdate_20130523.pdf)

<sup>27</sup> 1026 Puget Sound Maritime Air Emissions Inventory, <https://pugetsoundmaritimeairforum.files.wordpress.com/2018/10/final-2016-psei-report-19-oct-2018-scg.pdf>

# Biodiversity



## Southern Resident Killer Whale recovery

Southern Resident Killer Whales (SRKW) are a distinct population segment of killer whales that are listed as endangered under the Endangered Species Act in the United States<sup>28</sup> and under the Species at Risk Act in Canada.<sup>29</sup> In March 2018, Governor Inslee signed Executive Order 18-02 “Southern Resident Killer



Whale Recovery and Task Force.”<sup>30</sup> EO 18-02 created a task force to focus on solutions to the three primary threats to SRKWs: prey availability; toxic contaminants; and, disturbance from vessel noise and traffic. The executive order specifically directed WSF to “develop strategies for quieting state ferries in areas most important to Southern Residents.” In June 2018, the death of a member of the L Pod of SRKW (L92 “Crewser”) brought the total number of SRKWs in the wild down to 75, which is the lowest population level since 1984.<sup>31</sup> A recent peer-reviewed article in *Scientific Reports* authored by Lacy et al. suggests that a decrease in ambient sound levels in the Salish Sea by 50 percent and an increase in prey availability by 15 percent would allow the population of SRKWs to attain a recovery target of 2.3 percent annual population growth.<sup>32</sup>

Starting in 2017, WSF has slowed its vessels during their crossing of Haro Strait in critical SRKW habitat to reduce vessel-generated underwater noise.

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<sup>28</sup> Listing of Southern Resident Killer Whale Under the ESA, NOAA, <https://www.fisheries.noaa.gov/action/listing-southern-resident-killer-whale-under-esa>

<sup>29</sup> Killer Whale (Northeast Pacific Southern Resident Population), DFO, <http://www.dfo-mpo.gc.ca/species-especes/profiles-profil/killerWhalesouth-PAC-NE-epaulardsud-eng.html>

<sup>30</sup> Executive Order 18-02 “Southern Resident Killer Whale Recovery and Task Force,” [https://www.governor.wa.gov/sites/default/files/exe\\_order/eo\\_18-02\\_1.pdf](https://www.governor.wa.gov/sites/default/files/exe_order/eo_18-02_1.pdf)

<sup>31</sup> “Death Brings Endangered West Coast Orca Population to Lowest in Decades,” Center for Biological Diversity, [https://www.biologicaldiversity.org/news/press\\_releases/2018/southern-resident-killer-whale-06-18-2018.php](https://www.biologicaldiversity.org/news/press_releases/2018/southern-resident-killer-whale-06-18-2018.php)

<sup>32</sup> “Evaluating Anthropogenic Threats to Endangered Killer Whales to Inform Effective Recovery Plans,” Lacy et al., <http://www.nature.com/articles/s41598-017-14471-0>

## Goals

- 1) WSF will complete a baseline noise inventory of its fleet to identify sources and solutions for noise levels and frequencies of concern by 2021.
- 2) WSF will set a strategy and timeline by 2021 to reduce underwater-radiated noise from fleet vessels within the frequencies of concern as identified in the baseline inventory.

## Actions

- 1) WSF and WSDOT's Air, Noise, and Energy Group will conduct a baseline noise inventory of the ferry fleet.
- 2) WSF and WSDOT's Air, Noise, and Energy Group will develop operational and engineered solutions to address any noise of concern documented in the baseline noise inventory.

## Nearshore and estuarine habitat

In their "2016 State of Our Watersheds" document, the Northwest Indian Fisheries Commission (NWIFC) identified the loss or degradation of estuarine and nearshore habitat as the principal threat to salmon recovery in Puget Sound.<sup>33</sup> One specific example of such degradation is the armoring of shoreline, which removes critical sources of sand and gravel that replenish beaches



and provide spawning habitat for forage fish. Forage fish are an important food source for endangered salmon. Improving this food source would not only benefit salmon, but would also help in the recovery of the SRKWs, as salmon are a critical part of their diet. "Of the

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<sup>33</sup> 2016 State of Our Watersheds: A Report by the Treaty Tribes in Western Washington, NWIFC, [https://geo.nwifc.org/SOW/SOW2016\\_Report/SOW2016.pdf](https://geo.nwifc.org/SOW/SOW2016_Report/SOW2016.pdf)

Puget Sound's 2,500 miles of shoreline, more than one quarter are currently armored."<sup>34</sup> WSF manages nearshore habitat at all of its 20 facilities across Puget Sound and estuarine habitat at a significant subset of these locations. Currently, WSF does not maintain a habitat inventory of its facilities. Such an inventory will be used to prioritize opportunities for restoration or enhancement projects.

## Goals

- 1) WSF will create and maintain a habitat inventory of its 20 facilities in Puget Sound by 2021.
- 2) WSF will use the habitat inventory to propose and prioritize a list of projects by 2021 that enhance or restore habitat functionality.

## Actions

- 1) WSF will conduct habitat inventories of existing WSF facilities and manage the data in a GIS environment.
- 2) WSF will work with the habitat inventory data and current project lists to prioritize opportunities to improve habitat.

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<sup>34</sup> "First Salish Sea-wide Shoreline Armoring Study Shows Cumulative Effects on Ecosystem," UW News, <https://www.washington.edu/news/2016/04/18/first-salish-sea-wide-shoreline-armoring-study-shows-cumulative-effects-on-ecosystem/>

# Water

## Stormwater

Urban stormwater runoff contains a mix of heavy metals, pathogens, excess nutrients, and other toxins, which affect aquatic life and human health. For example, Coho salmon in urban watersheds experience a 60 percent to 100 percent die off prior to spawning.<sup>35</sup> This condition, known as “urban spawner mortality syndrome,” appears attributable to toxins within urban stormwater runoff.<sup>36</sup> Although not identifying a single toxin as the cause, recent research confirms that the toxins of most concern originate from motor vehicles, and areas with more traffic density result in a greater association with the mortality syndrome.<sup>37</sup> During terminal construction, WSF uses a variety of best management practices, such as drain socks, to keep potential stormwater pollutants from entering Puget Sound. WSF has conducted stormwater testing efforts at highly traveled terminals, such as Bainbridge Island, as well as the Eagle Harbor Maintenance Facility. WSF has made stormwater improvements as part of terminal construction projects, such as the recent work at the Seattle and Mukilteo terminals. Currently, WSF maintains a basic inventory of the stormwater systems at its facilities, but has no systemwide baseline for stormwater quality.

### Goals

- 1) WSF will create and maintain a complete inventory of its stormwater systems by 2021.
- 2) WSF will develop and implement a stormwater testing program by 2021 to identify issues and propose potential solutions.

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<sup>35</sup> “Recurrent Die-Offs of Adult Coho Salmon Returning to Spawn in Puget Lowland Urban Streams,” Scholz et al.,

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0028013>

<sup>36</sup> “Interspecies Variation in the Susceptibility of Adult Pacific Salmon to Toxic Urban Stormwater Runoff,” McIntyre et al.,

<https://www.sciencedirect.com/science/article/pii/S026974911734527X?via%3Dihub>

<sup>37</sup> “Narrowing Down Pre-Spawning Mortality Factors for Coho Salmon,” Northwest Treaty Tribes, <https://nwtreatytribes.org/narrowing-pre-spawning-mortality-factors-coho-salmon/>

## Actions

- 1) WSF and WSDOT's Stormwater Program will inventory all existing stormwater facilities, and WSF will manage the data in a GIS environment.
- 2) WSF will plan and implement a stormwater testing program, beginning with the analysis and evaluation of pervious pavement at the Vashon terminal.

## Impervious surfaces

From 1996 to 2006, the amount of impervious surfaces in the Puget Sound drainage basin increased from 3.7 percent of the total basin to 4.1 percent of the total basin.<sup>38</sup> Studies have shown that a 10 percent coverage of impervious surfaces within a watershed often leads to measurable and irreversible loss of ecosystem function.<sup>39</sup> Some watersheds within Puget Sound,



notably the lower Snohomish watershed, already exceed this 10 percent coverage threshold.<sup>40</sup> Currently, WSF does not maintain an inventory of all surfacing at its facilities. WSF has installed pervious pavement at several locations, but the effectiveness of these surface treatments has not been studied.

## Goals

- 1) WSF will create and maintain an inventory of the surfacing at its 20 facilities in Puget Sound by 2021.
- 2) WSF will use this inventory to propose and prioritize a list of projects, and/or integrate pervious solutions into existing projects by 2021.
- 3) WSF will complete a study of the effectiveness of pervious pavement at the Vashon Terminal by 2021.

## Actions

- 1) WSF will conduct a surfacing inventory of existing WSF facilities and manage the

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<sup>38</sup> Impervious Surfaces and Stormwater Runoff, Encyclopedia of Puget Sound, <https://www.eopugetsound.org/articles/stormwater-facts>

<sup>39</sup> "Consequences of Urbanization on Aquatic Systems—Measured Effects, Degradation Thresholds, and Corrective Strategies," Derek B. Booth and Lorin E. Reinelt, Proceedings Watershed '93: A National Conference on Watershed Management, pp.545-550, 1993.

<sup>40</sup> 2016 State of Our Watersheds: A Report by the Treaty Tribes in Western Washington, NWIFC, p.8, [https://geo.nwifc.org/SOW/SOW2016\\_Report/SOW2016.pdf](https://geo.nwifc.org/SOW/SOW2016_Report/SOW2016.pdf)

data in a GIS environment.

- 2) WSF will work with the surfacing inventory data and current project lists to prioritize opportunities to pursue pervious solutions.
- 3) WSF will pursue analysis and evaluation of pervious pavement at the Vashon Terminal.

## Creosote removal

Creosote is a wood preservative made up of as many as 10,000 different chemicals, all of which break down slowly in the environment and are acutely toxic and/or carcinogenic to fish, birds, amphibians, and mammals. Compounds in creosote can accumulate in the tissues of mollusks and other invertebrates, and have also been shown to negatively affect the development of salmon and Pacific herring, which are an important forage fish in Puget Sound.<sup>41</sup>



Currently, WSF removes creosote from its facilities and replaces it with more environmentally-friendly materials, such as steel and concrete. To date, WSF has removed over 16 tons of creosote from the marine environment. WSF ensures the removed creosote is properly disposed of at an appropriate disposal facility and not reused in marine or terrestrial applications. During the in-water work season in 2019-2020, WSF will be removing all of the remaining creosote-treated wood from the trestle at Colman Dock in Seattle. This will amount to over 1,100 creosote-treated pilings removed along with associated trestle decking.

WSF does not currently maintain an inventory of the remaining creosote at its facilities or a plan for the removal and replacement of the remaining creosote.

### Goals

- 1) WSF will create and maintain an inventory of the remaining creosote at its 20 facilities in Puget Sound by 2021.

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<sup>41</sup> "Brief Science of Creosote," Washington Department of Natural Resources, [https://www.dnr.wa.gov/publications/aqr\\_cleanup\\_creosote\\_brief.pdf](https://www.dnr.wa.gov/publications/aqr_cleanup_creosote_brief.pdf)

- 2) WSF will use this inventory to develop a plan by 2021 for the removal of all of the creosote at its facilities.

## Actions

- 1) WSF will conduct a creosote inventory of existing WSF facilities and manage the data in a GIS environment.
- 2) WSF will work with the creosote inventory data and current project lists to prioritize opportunities to pursue creosote removal.

## Water use

Historically, water supplies in Puget Sound have relied on snowmelt and abundant rainfall. With the average annual temperature in Washington having risen by 1.5 degrees Fahrenheit in the twentieth century and an expectation of a 0.5 degree Fahrenheit rise per decade in the first half of the twenty-first century, both snowfed water and groundwater are likely to be significantly reduced.<sup>42</sup> One of the important components to ensure water security in our future is to practice water conservation. Currently, state law requires new state facilities to meet LEED Silver requirements, which include high efficiency water fixtures.<sup>43</sup>

## Goals

- 1) WSF will install high efficiency water fixtures at its existing facilities as part of a deep energy retrofit and new construction by 2021.
- 2) WSF will research high efficiency water fixtures for its fleet by 2021.

## Actions

- 1) WSF will install high efficiency water fixtures at all facilities.
- 2) WSF will investigate the potential for installation of high efficiency water fixtures on vessels.

## Prevention of spills and leakages

Preventing spills and leakages is much more cost effective than the response, clean up, and mitigation that may be required after a spill has occurred.<sup>44</sup> Even small spills of oil or other substances threaten aquatic life and water quality. Large spills may result in widespread environmental and economic impacts throughout Puget Sound.

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<sup>42</sup> "Water Smart, Not Water Short: 5 Ways to Secure Water for Washington's Future," DOE, <https://fortress.wa.gov/ecy/publications/documents/0911008.pdf>

<sup>43</sup> Standards for Major Facility Projects, Revised Code of Washington (RCW) 39.35D.30, <https://app.leg.wa.gov/rcw/default.aspx?cite=39.35D.030>

<sup>44</sup> "The Cost of a Spill," DOE, <https://ecology.wa.gov/Spills-Cleanup/Spills/Oil-spill-prevention>

## Goals

- 1) WSF will target a goal of zero for spills and leakages of oil and fuel, and continue to develop policies and procedures to attain that goal.

## Actions

- 1) WSF will continuously improve existing policies and procedures to eliminate spills
- 2) WSF will continue to track spill trends and focus improvements on repetitive root causes.

# Waste



## Waste management

In 2015, the Washington Department of Ecology (DOE) set forth a vision for waste management in Washington State with the publication of “The State Solid and Hazardous Waste Plan: Moving Washington Beyond Waste and Toxics.”<sup>45</sup> This plan shifted the state towards the use of a “sustainable materials management” approach, which focuses on the full life cycle of materials from production through



use to eventual disposal with an emphasis on reducing environmental impacts throughout this cycle. This focus on sustainability is intended to reduce pollution, conserve resources, protect human health, and protect our environment. In January 2018, Washington State Governor Jay Inslee signed Executive Order 18-01.<sup>46</sup> EO 18-01 requires state agency directors to ensure compliance with state rules and guidance in regards to environmentally-preferred purchasing.

According to data collected by DOE, in 2015, just under 50 percent of solid waste in Washington was diverted from landfills through recycling or recovery.<sup>47</sup> The Port of Seattle’s Marine Division has targeted a goal of 60 percent waste diversion by 2020.<sup>48</sup> WSF has begun a pilot composting program on the Seattle-Bainbridge route and is refining this effort to inform potential systemwide expansion of such a program. Currently, WSF does not maintain an inventory of its waste generation or diversion. WSF does not have a policy for environmentally-preferred purchasing.

<sup>45</sup> “The State Solid and Hazardous Waste Plan: Moving Washington Beyond Waste and Toxics,” DOE, <https://fortress.wa.gov/ecy/publications/documents/1504019.pdf>

<sup>46</sup> Executive Order 18-01 “State Efficiency and Environmental Performance,” [https://www.governor.wa.gov/sites/default/files/exe\\_order/18-01%20SEEP%20Executive%20Order%20%28tmp%29.pdf](https://www.governor.wa.gov/sites/default/files/exe_order/18-01%20SEEP%20Executive%20Order%20%28tmp%29.pdf)

<sup>47</sup> “Material Recovery and Disposal Data in Washington,” DOE, <https://ecology.wa.gov/Asset-Collections/Doc-Assets/Solid-waste/Solid-waste-recycling-data/MaterialRecoveryandDisposal-2015>

<sup>48</sup> Maritime Recycling Program, Port of Seattle, <https://www.portseattle.org/programs/maritime-recycling-program>

## Goals

- 1) WSF will complete a baseline waste inventory to understand the percent of waste that is currently diverted in its operations by 2021.
- 2) WSF will use the baseline inventory to set incremental diversion goals by 2021 that target a zero waste strategy.
- 3) WSF will develop a policy for environmentally-preferred purchasing that sets goals based on a sustainable materials management approach by 2020.

## Actions

- 1) WSF will complete a baseline waste inventory to document current waste diversion metrics at its facilities and on ferries.
- 2) WSF will develop diversion goals and implement strategies to achieve, measure, and track those goals.
- 3) WSF will form a work group to develop and implement an environmentally-preferred purchasing policy, and continue to refine existing related policy and procedure.

# Community impacts and engagement

Community and stakeholder engagement is a crucial part of developing and maturing a sustainability journey. In addition, engaging technical advisors also greatly aids in the success of those efforts. Development of the 2040 Long Range Plan included an extensive community engagement effort that will continue through the implementation the plan. WSF engages Ferry Advisory Committees, community members, customers, taxpayers, tribes, elected officials and others in decisions that affect ferry service, the communities we serve and our environment. We will continue to ask for input, share information and aim for informed consent through implementation of this Sustainability Action Plan.

WSF will also engage technical advisors for our sustainability initiatives through several organizations and peer groups in which we participate. WSF is part of Gov. Inslee’s Maritime Innovation Advisory Council, which is developing the Maritime Blue Strategy that envisions that “Washington State will be home to the nation’s most sustainable and competitive maritime industry by 2050.”<sup>49</sup> WSF is also a member of Green Marine,<sup>50</sup> a voluntary environmental certification program for the North American maritime industry, and a member of the Vancouver Fraser Port Authority’s Enhancing Cetacean Habitat and Observation (ECHO) Program,<sup>51</sup> an initiative to better understand and mitigate the potential threats to endangered whales from shipping activities.

In addition to these organizations, WSF has developed ongoing peer group exchanges with:

- BC Ferries
- Vancouver Fraser Port Authority
- Port of Seattle
- Port of Tacoma
- Port of Everett
- Port of Bellingham
- Port of Olympia
- Northwest Seaport Alliance



<sup>49</sup> Washington Maritime Blue, <https://www.maritimefederation.com/about-wa-maritime-blue.html>

<sup>50</sup> Green Marine, <https://green-marine.org/>

<sup>51</sup> Vancouver Fraser Port Authority, ECHO Program, <https://www.portvancouver.com/environment/water-land-wildlife/echo-program/>

## Community relations

Washington State Law directs WSF to work with Ferry Advisory Committees (FACs) that represent the communities we serve.<sup>52</sup> The purpose of this interaction is to help these communities and WSF work together on developing schedules, resolving problems, and understanding issues of community concern. For all major projects and initiatives, WSF engages communities, customers, elected officials, tribal governments and other stakeholders to ensure a robust and inclusive decision-making and planning process.



For example, WSF hosted over 54 public meetings, advisory group meetings and open houses in 2018, in addition to numerous community and outreach events on vessels and in communities. WSF strives to address community concerns and work in collaboration with ferry-served communities to achieve shared goals.

### Goal

- 1) By 2020, WSF will identify new, or prioritize existing, focus areas, goals, and actions for engaging communities and customers on sustainability initiatives based on community engagement for the 2040 Long Range Plan.

### Actions

- 1) WSF will identify potential new focus areas, goals, and actions for this sustainability plan.
- 2) WSF will continue community engagement efforts with a goal of continuing meaningful dialogue related to WSF's sustainability efforts.

## Noise and light pollution

Noise and light pollution are considered nuisances that can affect the quality of life for surrounding communities. In human populations, excessive light and noise has been linked to health impacts, such as hearing impairment, high blood pressure, and sleep

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<sup>52</sup> State Ferries—Local Expressions—Ferry Advisory Committees, RCW 47.60.310, <http://apps.leg.wa.gov/RCW/default.aspx?cite=47.60.310>

deprivation.<sup>53</sup> Similar negative effects from both light and noise can occur in wildlife populations, particularly in marine environments. Researchers have identified the dramatic effects of light pollution on the behavior and metabolism of many aquatic species, particularly salmon, and have recognized it as one of the fastest growing and most pervasive forms of pollution in Puget Sound.<sup>54</sup> Similarly, researchers are beginning to understand the impacts that noise, particularly from pile driving and vessel operation, have on marine life and what can be done to manage and mitigate this increasing threat.<sup>55</sup>

## Goals

- 1) WSF will install high efficiency LED light fixtures that minimize light spillage at its existing facilities as part of a deep energy retrofit by 2021.
- 2) WSF will consult with local ferry-served communities to identify any specific concerns related to noise and light from WSF facilities by 2021.

## Actions

- 1) WSF will install LED light fixtures with low spillage at all facilities.
- 2) WSF will undertake community engagement efforts related to potential concerns related to noise and light at WSF facilities.

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<sup>53</sup> Light and Noise Nuisances, EPA, <https://www.epa.gov/community-port-collaboration-and-capacity-building/ports-primer-53-potential-community-interests#nuisances>

<sup>54</sup> "Light Pollution and Salmon – A Growing Concern," 2016 State of Our Watersheds Report -- Green-Duwamish River, White-Puyallup River, and Lake Washington Basins, Muckleshoot Indian Tribe, [http://geo.nwifc.org/sow/SOW2016\\_Report/Muckleshoot.pdf#page=16](http://geo.nwifc.org/sow/SOW2016_Report/Muckleshoot.pdf#page=16)

<sup>55</sup> "The Grand Challenges in Researching Marine Noise Pollution from Vessels: A Horizon Scan for 2017," McWhinnie et al., <https://core.ac.uk/download/pdf/82857563.pdf>

# Conclusion

Washington State Ferries created this Sustainability Action Plan to fulfill our agency's commitment to sustainability, achieve the ambitious goals set out in Governor Inslee's Executive Orders 18-01 and 18-02, and implement our commitment to sustainable practices and environmental stewardship outlined in our 2040 Long Range Plan. This Plan sets a course for WSF's sustainability journey for the next biennium. Future updates to the Sustainability Action Plan will address the remaining two sustainability recommendations from the 2040 Long Range Plan ("promote mode shift" and "reduce vehicle emissions") and other initiatives beyond 2021.



**WSDOT**



**Washington State Ferries**