Waste Tire Cleanup Program Evaluation

Solid Waste Management Program

Washington State Department of Ecology

Olympia, Washington

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Photo of Osbourne Tire Reef, Florida coast, by Miguel Garces, 2014

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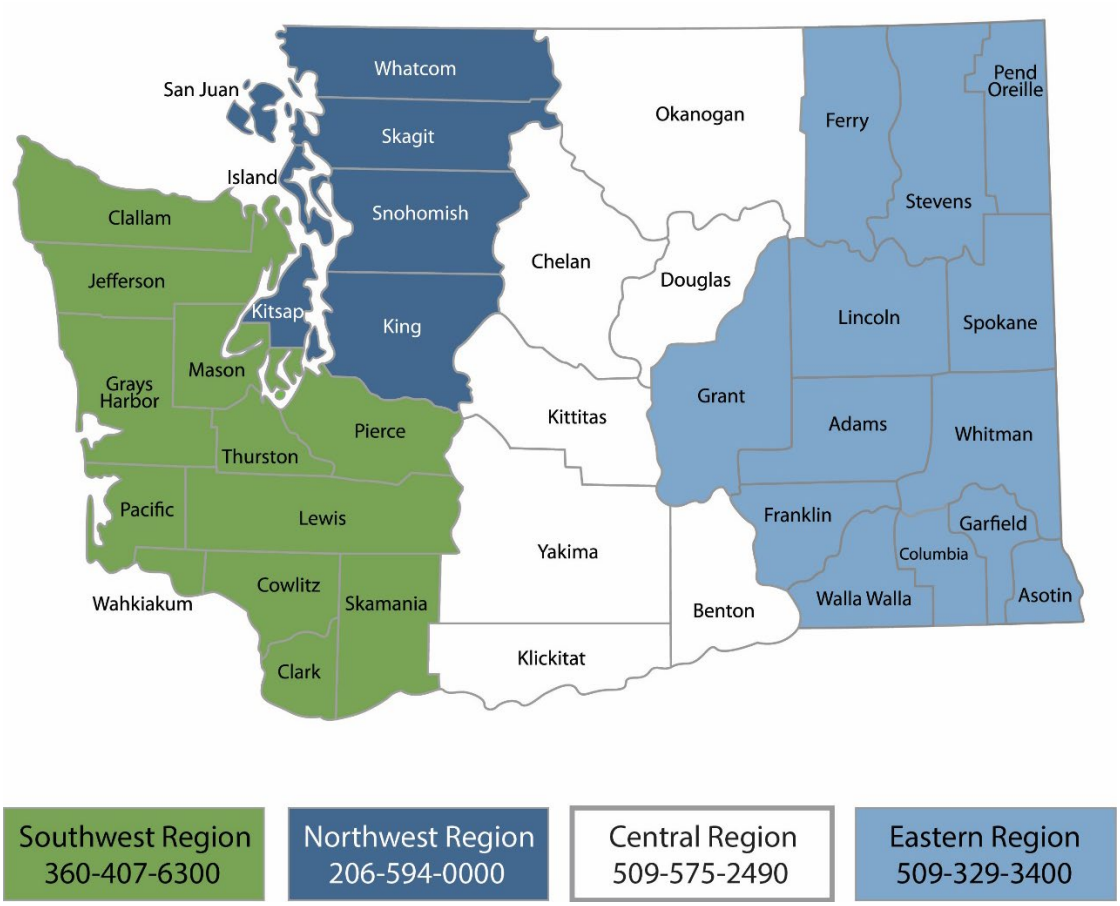
Map of Counties Served



Southwest Region 360-407-6300	Northwest Region 206-594-0000	Central Region 509-575-2490	Eastern Region 509-329-3400

Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
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Acknowledgements

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- Washington State Department of Natural Resources, Aquatic Resources Division
- Local Jurisdictional Health Departments throughout the State
- City of Richland

Abstract

The objectives of this evaluation of the Waste Tire Cleanup Program were established by ESSB 5689 (Supplemental transportation appropriations), during the 2022 Washington State Legislative Session, under Section107, chapter 186, Laws of 2022.

The exact statutory language is as follows:

> The evaluation must include, but is not limited to, the following: An inventory of all major tire piles that exist by county and an identification of whether those tire piles are on public or private lands; an assessment of the ability to recover tire clean-up and disposal costs from the responsible parties for each of those sites; and an inventory of major tire pile that were previously placed in marine waters in an attempt to establish artificial reefs, including a review of the environmental and safety issues associated with those marine tire piles. Based on the information gathered, the final report must include recommendations for the highest and best use of approximately $2,000,000 in time-limited resources for tire piles clean-up activities and recommendations to improve the Department of Ecology's current waste tire clean-up program in the future.

Section 1: Inventory of Major Tire Piles in Marine Waters

Information in Section 1 of this evaluation was largely gathered in cooperation with, and is used with permission of the Washington State Department of Natural Resources (DNR). The information in Section 1 is discussed in greater detail in DNR's draft "Technical Report - Mapping Puget Sound's Artificial Reefs" as prepared by DNR's Aquatic Resources Division.

1.1 Background of Tire Reefs placed in Puget Sound

Many large artificial reefs were constructed in Puget Sound in the 1970s and 1980s. These reefs were built by different government and non-governmental organizations to enhance alternative fishing opportunities in the face of truncated salmon fishing limits for sport enthusiasts.

Starting in 1975, and over a 15-year period, the Washington Department of Fisheries (WDF) (now the Washington Department of Fish and Wildlife) spearheaded the planning for and construction of large artificial reefs adjacent to many of Puget Sound fishing piers to attract reef species for fishing enthusiasts. To create artificial reefs, WDF dropped structural materials onto featureless bottoms with the intent to increase bottom complexity and attract reef dwelling fish (Stone 1974, Hueckel 1982).[2]

During the same period in which these large installments were placed near metropolitan centers, smaller artificial reefs were installed at multiple locations throughout Puget Sound to improve bottom fishing opportunities for boating anglers (Buckley 1982)[3]. These reefs were likely placed there by recreational fishing and diving clubs, as well as DNR, for habitat enhancement (Buckley 1982, G. Hueckel 2022)[4]. This evaluation focuses on major tire piles placed as reefs and not the smaller installations.

A wide range of materials were used to construct these major reefs, but early on they were primarily built out of used automobile tires, scrap concrete, and quarry rock. While quarry rock and scrap concrete have obvious natural reef properties, automobile tires were also preferred because their hollow construction provided ample hiding space. Inclusion as habitat provided an inexpensive solution for their disposal (Sherman and Spieler 2006)[5].

[2] Stone R.B. A brief history of artificial reef activities in the United State. Proceeding of an International Conference on Artificial Reefs**.**
[3] Buckley, R. Marine Habitat Enhancement and Urban Recreational Fishing in Washington. Marine Fisheries Review, Vol. 44.
[4] Buckley, R., G.J. Hueckel. Analysis of Visual Transects For Fish Assessment on Artificial Reefs. Bulletin of Marine Science. Vol. 44 (2). Pp. 893-898.
[5] Sherman, R. L. & Spieler, R. E. Tires: unstable materials for artificial reef construction. Oceanography Paper 58 doi: 10.2495/CENV060211.

1.2 Mapping and Inventory of Puget Sound Tire Reefs

In recent years, DNR's Aquatic Lands Restoration Team (ALRT) received reports of an increasing number of tires washing up at sites nearby to known tire reefs. This development indicates that the bands used to hold tires in groups at the reef sites are breaking apart. With the current understanding regarding negative effects tires have in the marine aquatic environment and to remain consistent with DNR's s own habitat stewardship measures, the removal of tire reef sites on State Owned Aquatic Land (SOAL) in Puget Sound has become a priority for the ALRT.

In the first phase of DNR's Tire Reef Mapping Pilot, from 2019 to 2021, ALRT worked with DNR's Aquatic Assessment and Monitoring Team (AAMT) to initiate a comprehensive survey and mapping effort for 20 major tire reef sites. The ALRT identified these locations as priority sites based on Washington Department of Fish and Wildlife (WDFW) information that suggested they were built of tires, their placement on SOAL, and their proximity to adjacent state, city, or county owned uplands.

The primary objective of this DNR study was first to confirm whether tires are present at each priority site. Additional information collected includes:

- quantity of tires present at their precise locations
- type and condition of tire modules (banding broken or intact)
- banding material present (rope, chain, steel strap, et cetera)
- condition of tire degradation
- extent of burial into natural sediments
- identification of other non-tire materials that comprise the reefs

A comprehensive understanding of the tire reef characteristics in Puget Sound based on the information above will allow DNR's ALRT to select sites as pilot studies for tire removal. Major tire reefs were found at 14 of the 20 surveyed sites by DNR's ALRT and AAMT (see Table 1). DNR estimates there are between 275 to 780 tons of tires covering 42 nautical acres at these 14 sites. All 20 surveyed sites are noted in Figure 1.

Table 1. Major Tire Piles Placed in Puget Sound

Location	Puget Sound Region	Latitude	Longitude	Tonnage Estimate	Acre Reef Footprint
Driftwood County Park	North	48.1630	-122.637	0.4 to 1.7	0.97
Fort Worden Pier	North	48.1354	-122.761	1.5 to 2.5	3.45
Edmonds Fishing Pier	North	47.8122	-122.387	44.6 to 122.1	3.43
Elliot Bay Fishing Pier	Central	47.6257	-122.373	50.7 to 88.5	3.23
Illahee State Park	Central	47.6126	-122.594	24.6 to 40.3	1.34
Des Moines Public Fishing Pier	Central	47.4031	-122.334	98.9 to 221.2	5.67
Saltwater State Park	Central	47.3731	-122.328	13.0 to 45.2	4.43
Old Town Dock	Central	47.2779	-122.465	7.7 to 69.9	1.04
Carr Inlet	South	47.3094	-122.692	0.8 to 4.5	1.91
Solo Point	South	47.1379	-122.636	21.5 to 82.8	6.75
Tolmie State Park	South	47.1249	-122.772	0.1 to 21.9	2.10
Case Inlet	South	47.2603	-122.863	1.4 to 4.8	3.01
Burfoot County Park	South	47.1311	-122.907	8.9 to 61.8	3.21
Frye Cove County Park	South	47.117	-122.961	1.5 to 13.1	1.31

Figure 1. Location of Major Marine Tire Piles in Puget Sound

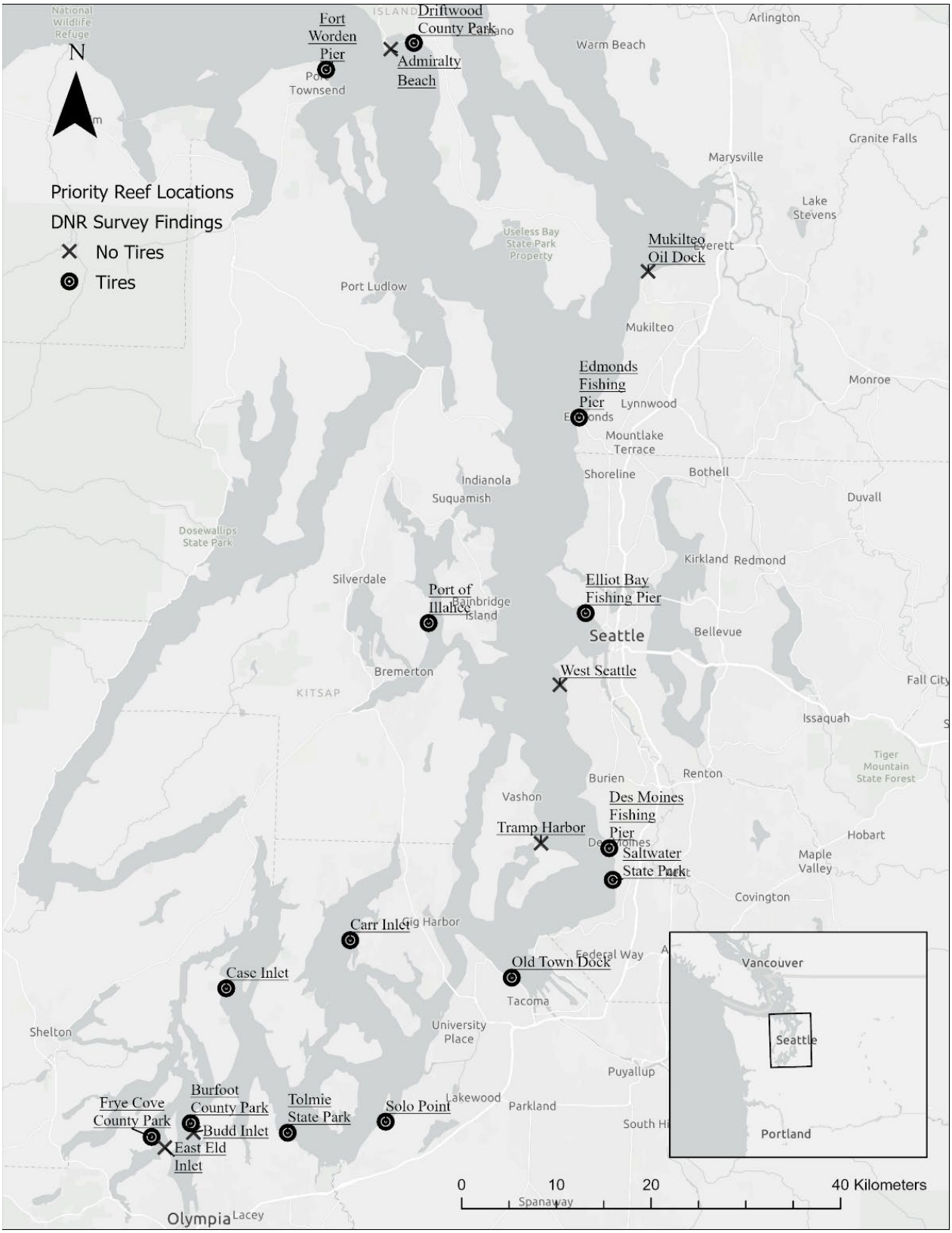


Figure 1 provided by WA DNR Aquatic Resources Division

Section 2: Environmental and Safety Issues Associated with Marine Tire Piles

Information in Section 2 of this evaluation was largely gathered in cooperation with DNR. The information is discussed in greater detail in DNR's draft "Technical Report - Mapping Puget Sound's Artificial Reefs," as prepared by DNR's Aquatic Resources Division.

There are several safety and environmental considerations associated with marine tire piles and their potential removal. This includes, but is not limited to, turbidity and visibility at tire reef cleanup locations, sediment contamination at the sites which may require testing prior to tire removal, and disturbance to the seafloor during tire removal. While there are similarities in attributes at different tire reef sites, many of the reefs surveyed revealed significant variation in the depth they were placed at, number of tires present, area over which the tires have spread, extent of burial, bundle type and size, and other materials present. Due to the unique structure of each tire reef, a variety of environmental and safety challenges exist that affect the procedures and costs of removal. Because reef removal relies on divers, the associated cost is largely dictated by the hours of dive time.

Tire reef removal can occur with different techniques based on the specific attributes of a reef. To determine various potential environmental and safety issues, DNR researched other tire reef removal projects:

Osbourne Tire Reef

Large tire removal projects like those at the Osbourne Tire Reef in Fort Lauderdale, Florida, have employed the services of U.S. Navy diver salvage teams. They utilized the opportunity for removal and disposal of tires as training exercises. In the case of the Osbourne reef, the metal banding holding tire modules together had completely failed. For every tire removed, divers had to collect and string together the tires. To do this, roughly 50 tires at a time were placed together and threaded with a metal cable. The grouped tires were then lifted to the surface with 4,000-pound capacity lift bags. Once the bags surfaced, a crane operator would hook up the metal cable joining the tires and lift the tires onto a floating barge.

Les Davies Pier

A smaller removal project occurred at the Les Davies Pier in Tacoma, Washington. This project shows how tire reefs could be removed in Puget Sound. In 2015, 2,855 tires were removed from an area running along the Les Davies Pier in Tacoma. Tire removal at this site was carried out by the Nisqually Indian Tribe's Marine Services Division, who bundled the tires with synthetic rope and lifted them to the surface with lifting straps by boat mounted crane. In all, 57 individual tire bundles were removed from the site at a total cost of ten dollars per tire.

2.1 Considerations for Removal of Tires from Puget Sound

Differences in the attributes found by DNR at certain reefs will provide challenges of varying degree when tire reefs are eventually removed. For example, sites that have tires at greater depths (i.e., Des Moines, Saltwater, Elliott Bay, Edmonds, and Burfoot County Park) will take more time and require more divers than sites in shallower water. Extra time associated with the removal of tires or tire features that are at greater depths will be crucial when calculating the cost of removal. Similarly, reefs like those in South Sound which have less tires per area will be costlier per tire to remove. In these cases, costs are inflated due to the time needed for divers or boat operators to search and find tires that would otherwise be obvious at sites with higher density tires per acre.

Also, tires buried in sediment will take additional effort to remove. DNR found that at certain locations some tires and tire features are nearly or completely buried in fine sediment. These sites may require additional effort from diving personnel to find and free buried bundles before they are cable joined and lifted to the surface. Another unknown factor will be the total mass of buried tire features once they are freed from the sediment. While DNR does not anticipate there being negative ballast like concrete filling the tires, they will likely be filled with sediment. This additional mass should be included when calculating weight limits and equipment capacities.

Bundle size is an important consideration. DNR has not been able to determine if the polypropylene line still grouping tires into tire features is robust enough to hold the weight of the tires as they are lifted to the surface. With a study line, it will be cost effective to hook removal equipment directly to the polypropylene line connecting the bundles. Based on the specific conditions at a site, bundles may be attached either to a high-capacity float-bag or lifted directly by crane onto a floating barge, as described. For sites with tires that are banded into larger formations and have more tires per group (21 to 24 tires), costs would be lower due to the reduced number of times a diver would need to descend to connect to a lifting-load.

This description assumes the strength of the polypropylene line is robust enough to hold each bundle as it is lifted. Failed banding was found at several sites where individual tires were distributed across the seafloor and the polypropylene line had visibly worn through. This wear may indicate that the banding at these sites is too old or brittle to support the weight of tires. We estimate that these sites will require more dive time per unit area than other sites with more intact bundles. We also suggest additional diver safety considerations in this situation because divers will likely need to descend and manually thread cable or line through individual tires.

Finally, it is important to highlight the presence of other materials that may complicate the removal of tires from these sites. Many of the sites that were surveyed contain non-tire structure that are mixed in with tires and tire bundles. This other material ranges from concrete blocks and pilings to creosote pilings and wooden barge debris. At some of these sites, tires were found underneath or mixed in with this other material. When planning for the removal of tires at these sites, it is important to factor in the removal or movement of these other materials that may impede the tire extraction process.

The removal of tires from sites, especially those sites with the greatest estimated quantity, will be coordinated with Ecology to ensure there is space and a location for the proper disposal of material that is brought to the surface. Because of the marine life growing on the tires, the condition of the tires, and recent links to coho salmon mortality from the tire anti-degradant 6 p-Phenylenediamin-quinone (6PPD-q) in roadway runoff, it is not likely that the tires will be good candidates for a recycling program. Ecology assumes all tires removed from Puget Sound will be disposed in a landfill.

2.2 Reef Removal Indicators

DNR's ALRT will prioritize removal for tires based on the condition of tire module banding. Sites where DNR observed evidence of breaking or already broken bundles include Saltwater State Park, Solo Point, Burfoot County Park, and Frye Cove State Park. Once tire module banding has failed, tires separate from their initial grouping and are more difficult to collect for removal. At some sites, tires from broken modules have washed ashore where they are more likely to break into smaller crumb pieces. Alternatively, some tires and tire pieces that are pushed deeper by subsurface currents, separate at greater depths and may be even costlier to find and remove. To prevent the further spread of tires from these reefs and to minimize environmental marine degradation, sites with the poorest condition of banding may be prioritized for removal.

Disbanding of marine tire reefs causes environmental concerns. Individual tires that have broken from initial banding within Puget Sound reefs are already being dispersed. They are at risk of being dislodged and moved by currents where they are more likely to end up on their sides and become completely buried, making them more difficult to find and remove. Due to their lack of structural complexity, individual tires lying flat on the bottom provide little or no habitat value to fish. Loose tires are also less likely to allow for attached invertebrate growth due to their movement. Moreover, single tires can move into different tidal zones and detrimentally impact other habitats such as eelgrass beds and the species that reside there.

2.3 Next Pilot Steps and Additional Monitoring

DNR's ALRT will review data collected at the 14 confirmed tire reefs and identify one of them as a pilot removal project. This pilot site will be selected to cover a wide range of attributes with the intent to provide accurate information on the actual removal cost for different types of tire reefs. The information from the pilot project will be used to efficiently and cost effectively plan for the removal of tires at the remaining 13 sites. Discussed further in Section 5 of this report, a pilot tire reef removal project is a priority recommendation with a portion of the $2 million in time-sensitive Waste Tire Removal Account (WTRA) appropriation.

DNR's AAMT plans to partner with WDFW to monitor the pilot removal site and two other project sites for before and after comparisons. Some of the data that may be collected in this monitoring effort will be additional sonar surveys, grain size, turbidity, assessments of fish use, and information on subtidal vegetation distribution.

Section 3: Inventory of Major Land Tire Piles by County

3.1 Waste Tire Removal Account

In 2005, the Washington State Legislature passed Substitute House Bill (SHB) 2085, creating the Waste Tire Removal Account (WTRA) to fund cleanup of unauthorized and unlicensed tire piles. Funds for this account come from a $1 fee charged on each new replacement tire sold in Washington. Cleanup work with WTRA funding began in 2007. In 2009 the Legislature removed the sunset date on this fee and allocated an ongoing biennial budget of $1 million to Ecology (Senate Bill 5976). Under current statute (RCW 70A.205.415), the cash balance in excess of one million dollars from the WTRA must be transferred to the Washington State Department of Transportation's (WSDOT's) Motor Vehicle Account on September 1 of odd numbered years for road wear maintenance on state and local public highways.

3.2 Tire Pile Cleanup History, 2007 to Present

In the initial years after creation of the WTRA, multiple cleanup contracts were executed between May 2007 and September 2010. Much of the focus in the initial years was on large, and in many cases well known tire piles with 4,000 or more tons of tires on each unauthorized site. Many of these cleanups were on private property and were limited to a single-occasion tire pile removal. The largest tire pile cleanup was at a Goldendale site that contained more than 30,000 tons of tires.

From 2007 to 2010, a total of 175 tire piles were cleaned up, resulting in removal of over 54,000 tons of waste tires. Five of those 175 cleanup sites yielded approximately 48% of that total weight.

By 2011, most of the very large tire piles known to state and local governments had been removed. Since 2015, between 55% and 60% of Ecology's annual expenditures from the WTRA has paid for amnesty events and periodic pickups coordinated with contracted haulers. The current Waste Tire Cleanup Program is successful.

One large tire pile awaiting cleanup is on Twin Bridges Road in the City of Richland, in Benton County. The City of Richland estimates 7,100 tons of tires at the Twin Bridges Road location. Many of the tires on site are baled, although there are about 100 tons of loose tires. The Richland Public Works Department estimates the cleanup and disposal cost at the Twin Bridges Road location to be between $1.1 million and $1.6 million, including tipping fees (which is the cost, usually by weight, to dispose of material) to landfill the tires. The Twin Bridges Road tire pile cleanup is a priority recommendation with a portion of the $2 million time-sensitive WTRA appropriation and is discussed further in Section 5 of this evaluation.

3.3 Major Land Tire Piles as of March 2023

Ecology has identified 49 major tire piles in 27 counties as of March 2023. This inventory was generated largely from information submitted to Ecology by local governments based on surveys sent to them each spring. In some cases, tire piles were directly reported to Ecology. In addition to the 7,100 tons at the Twin Bridges Road location, there are an estimated 390 to 400 tons of tires at the remaining 48 locations. The weight of tires at each site ranges from approximately 0.5 tons to 86 tons, with most tire piles in the one-to-seven-ton range. See Table 2 for land tire piles by county.

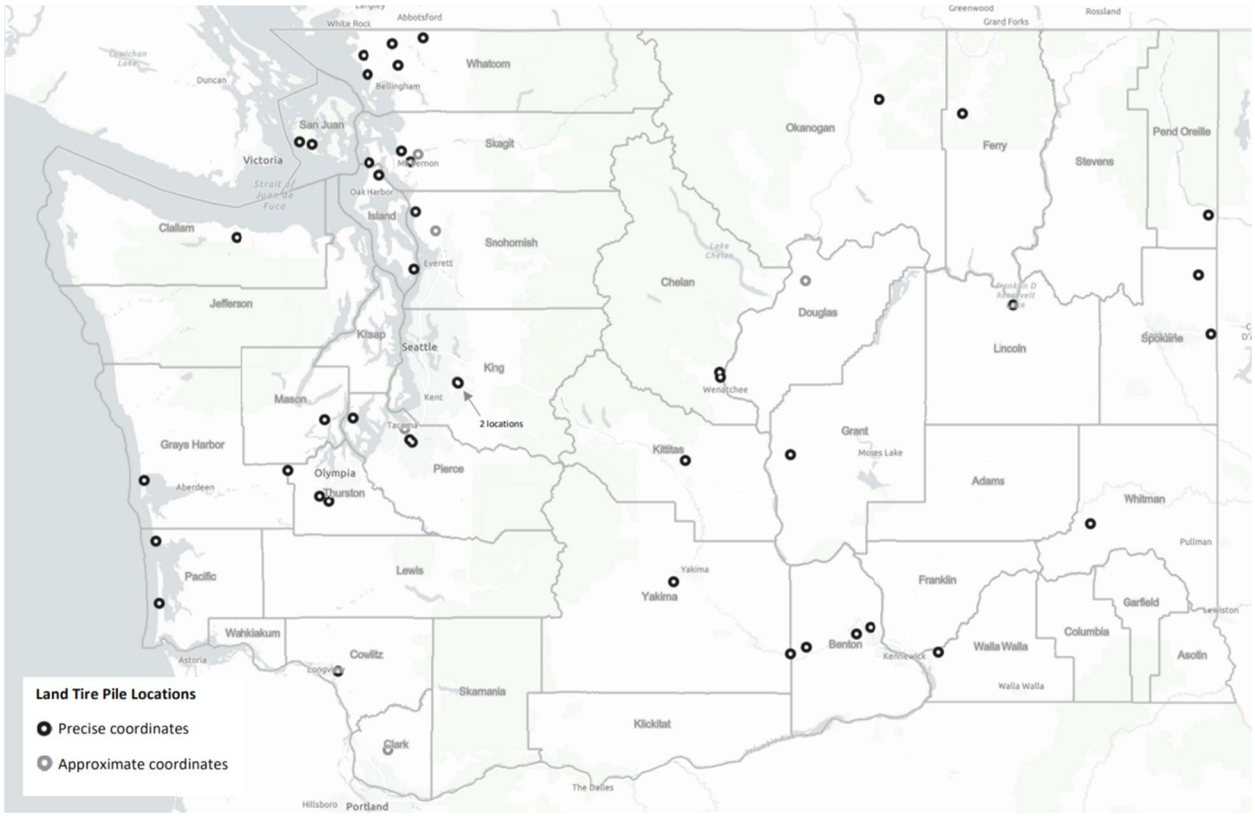
Table 2. Land Tire Piles by County

County	Latitude	Longitude	Land Type	Ton Estimate
Benton	46.313871	-119.438486	Private	0.7
Benton	46.34183	-119.34299	Private	7,100
Benton	46.25108	-119.76914	Private	0.8
Chelan	47.902568	-119.7716	Public	0.5
Chelan	47.49316	-120.34174	Private	0.5
Chelan	47.47369051	-120.336681	Private	0.6
Clallam	48.09149	-123.54158	Private	3.2
Clark	45.78092	-122.5341	Public	7.0
Cowlitz	46.143448	-122.869247	Private	10.0
Ferry	48.63542	-118.73667	Public	23.0
Grant	47.1274	-119.87368	Private	5.7
Grays Harbor	47.05582	-123.19817	Private	6.1
Grays Harbor	47.00987	-124.15099	Private	3.3
Grays Harbor	46.73792237	-124.0745533	Public	85.6
Island	48.36824	-122.59608	Private	20.0
Island	47.9543	-122.36793	Private	0.8
King	47.44946	-122.08174	Private	0.5
King	47.44812	-122.07501	Private	5.5
Kittitas	47.10108872	-120.5684936	Private	10.3
Lincoln	47.79325	-118.39438	Private	2.6
Mason	47.28436	-122.95952	Private	11.4
Okanogan	48.69846	-119.28295	Private	0.6
Pacific	46.45274	-124.05035	Private	0.5
Pend Oreille	48.190361	-117.095337	Private	4.6
Pierce	47.241196	-122.425972	Private	11.6
Pierce	47.18105	-122.37799	Private	0.5
Pierce	47.1936	-122.39246	Private	6.0
Pierce	47.29062	-122.77073	Private	6.2

San Juan	48.50283	-123.03999	Private	0.5
San Juan	48.51239	-123.12302	Private	3.6
Skagit	48.42433	-122.39032	Private	3.5
Skagit	48.4723	-122.44752	Private	5.0
Skagit	48.458891	-122.335788	Public	1.2
Skagit	48.42231	-122.66127	Private	2.8
Snohomish	48.122964	-122.221136	Public	2.7
Snohomish	48.20709062	-122.3554574	Tribal	8.0
Spokane	47.9276 4	-117.16228	Private	2.9
Stevens	47.66617	-117.07934	Private	0.6
Thurston	46.91634	-122.93019	Public	2.3
Thurston	46.93972	-122.99073	Private	17.0
Walla Walla	46.228125	-118.894242	Private	2.1
Whatcom	48.80794	-122.6718	Private	2.8
Whatcom	48.84606	-122.46735	Private	0.5
Whatcom	48.89036	-122.70154	Private	15.5
Whatcom	48.96495	-122.30294	Private	30.0
Whatcom	48.9419	-122.50913	Private	49.0
Whitman	46.813675	-117.883712	Public	11.4
Yakima	46.55094	-120.64895	Private	3.0
Yakima	46.22338	-119.874	Private	1.2

A pinpoint map with distribution of tire piles throughout the state can be found in Figure 2.

Figure 2. Map of Land Tire Piles



Section 4: Assessment of Cost Recovery for Tire Pile Cleanup

Penalties for improper disposal of waste tires can be found in RCW 70A.205.400 and in RCW 70A.205.445.

- Under RCW 70A.205.400, a civil penalty may apply for the improper storage or disposal of waste tires.
- Under RCW 70A.205.450, it is a gross misdemeanor for the improper transport and disposal of waste tires.
- RCW 70A.205.450 also states that the party responsible for the improper transport, storage, or disposal of waste tires is liable for the costs of cleanup.

WAC 173.350.350 (Waste tire storage) provides the storage and disposal requirements for waste tires.

RCW 70A.200.060 provides for penalties and restitution for litter and illegal dumping, which includes tires illegally dumped on private or public property.

Local jurisdictions have the primary responsibility for the enforcement of RCW 70A.205.400 and RCW 70A.205.445 and for enforcing applicable local codes and ordinances. Ecology requests local jurisdictions vet and verify each tire pile before sending the cleanup requests to our contractors for cleanup.

If the landowner is determined responsible for the dumping, it usually goes to enforcement under the local jurisdiction and is rarely sent to Ecology's contractor for cleanup. In most waste tire cleanups referred to Ecology's contractor for cleanup, the original potentially liable party is either unknown or untraceable.

The applicable code, chapter, or ordinance for 27 counties with land tire piles identified in Section 3 of this evaluation are listed in Table 3.

Table 3. Enforcement/Cost Recovery Ordinance by County with Land Tire Piles

County	Enforcement/Cost Recovery Ordinance
Benton	Benton-Franklin Board of Health Rules and Regulations No. 6
Chelan	Chelan Douglas Health District Code 4.38
Clallam	Clallam Code Chapter 41.11
Clark	Clark Code 40.260.200
Cowlitz	Cowlitz Code 15.30.060 and 15.30.230
Ferry	Defers to the requirements in WAC 173.350.350
Grant	Grant Health District Ordinance 2019-3
Grays Harbor	Grays Harbor Municipal Chapter 8.28
Island	Chapter 8.08B - Solid Waste Handling Regulations
King	King Code (K.C.C.) Title 23
Kittitas	Kittitas Code Chapter 8.20
Lincoln	Lincoln Code Chapter 8.25
Mason	Mason Code 6.72.031
Okanogan	Okanogan Code Chapter 8.28
Pacific	Pacific Board of Health Ordinances 2A, 2B, 2C
Pend Oreille	Defers to the requirements in WAC 173.350.350
Pierce	Pierce Code 18J.15.240
San Juan	San Juan Code 8.14.030
Skagit	Skagit Code (SCC) 12.16.440
Snohomish	Snohomish Code 2.15.320, 2.15.160€, 2.15.110
Spokane	Spokane Code Title 8.24 and 8.26
Stevens	Defers to the requirements in WAC 173.350.350
Thurston	Thurston Code 8.34.090
Walla Walla	Walla Walla Code 8.24.010
Whatcom	Whatcom Code 24.06
Whitman	Whitman Code Chapter 8.13
Yakima	Yakima Ordinance Title 13.11

Section 5: Recommendations

Recommendations for the Waste Tire Cleanup Program are twofold.

First, Ecology is instructed by ESSB 5689 (Supplemental transportation appropriations), during the 2022 Washington State Legislative Session, under Section107, chapter 186, Laws of 2022 to recommend the "highest and best use of approximately $2 million in time-limited resources for tire pile cleanup activities" based on information gathered as part of this evaluation.

Second, Ecology is instructed to make recommendations to improve the Waste Tire Cleanup Program in the future.

5.1 Best Use of Time-Limited Resources

As noted in Sections 2.3 and 3.3 of this evaluation, Ecology makes two recommendations for the approximately $2 million in time-limited resources.

$1.5 million to Ecology for cleanup costs at the Twin Bridges Road tire pile

The City of Richland Public Works, Police and Fire departments, City Attorney, and the Benton-Franklin County Health Department have been authorized to initiate legal proceedings against the property owner. The City of Richland is committed to the process and expects it to result in a court-authorized abatement empowering the City of Richland to remediate the property. The city will attempt cost recovery to the maximum extent possible, but that outcome is unknown.

The City of Richland requested Ecology consider investing in the cleanup of the Twin Bridges Road site in October 2022. In March 2023, the City of Richland estimated cleanup costs at this site, including cleanup and disposal, to be between $1.1 and $1.6 million. Because this cleanup cost exceeds the current $1 million allocation to Ecology from the WTRA, Ecology recommends a one-time $1.5 million appropriation for this cleanup as the best use of this time-limited resource.

The City of Richland operates a suitable landfill for disposing of shredded tires and owns a shredding machine capable of shredding tires for disposal. With its proximity to the Twin Bridges Road site, the City of Richland indicated it could be an effective contractor for Ecology to complete this remediation and cleanup. Its landfill is a cost-effective tire disposal site.

$500,000 to DNR for cleanup costs associated with conducting a pilot tire reef cleanup project

DNR indicated in prior discussions with Ecology that it will be ready to begin a pilot tire reef removal project in 2024. The ALRT will use any WTRA appropriations to increase the amount of funding for alternative DNR aquatic land cleanup priorities, including creosote piling removal, derelict structure cleanup, derelict vessels removal, and other marine debris removal projects.

A successful tire reef pilot project, partially funded with a $500,000 appropriation, in addition to the $1 million DNR received in the 2023 Legislative Session, will help ensure DNR is ready and able to efficiently carry out their efforts to remove the 14 large Puget Sound tire reefs discussed in this evaluation beginning in the 2025-2027 biennium.

5.2 Future Improvements to Ecology's Waste Tire Cleanup Program

The Waste Tire Cleanup Program has been largely successful since cleanup work began in 2007. Most known large tire piles existing before 2007 were cleaned up and removed in the program's first four years. Subsequent large piles have also been remediated in a timely fashion and continue to be scheduled for contracted cleanup.

While large-scale modifications to the program are not needed, several changes could improve the program. In the future, Ecology plans to consider a possible budget request and possible agency request legislation, if necessary to meet our program and agency timelines and goals. Ecology's recommendations for future improvement of the Waste Tire Cleanup Program include:

- Increase the ongoing biennial new appropriation to Ecology from the WTRA from $1 million to $1.5 million. Since the original appropriation to Ecology was set at $1 million in 2009, labor, transportation, and disposal costs have increased significantly. Additional funding is needed to operate the program at historical levels and continue to provide for large cleanups, amnesty events, and periodic pickup over the two-year funding period.
- The current $1 fee is applied only to the sale of new tires sold in Washington. Ecology may consider extending the fee to retread tire sales. This extension would increase funding to the WTRA and allow the allocation of $1.5 million to Ecology's waste tire cleanup program without reducing the transfer amount to WSDOT's Motor Vehicle Account. An Ecology bill analysis for Senate Bill 5739 conducted in 2022 estimated that extending a $1 fee to the sale of retread tires would generate approximately $350,000 annually.
- Establish an online reporting portal for illegally dumped and illegally stored waste tires on Ecology's website. Ecology staff could review the reports and respond to them appropriately. This portal could include notifying jurisdictional health departments for potential enforcement actions, scheduling periodic pickups in a timely manner, or assigning litter and illegal dump cleanup teams to quickly respond to small, illegally dumped tire piles on public land.
- Consider waste tire product stewardship or extended producer responsibility (EPR) legislation like those in British Columbia, Saskatchewan, and Manitoba, Canada, and in several European Union countries. Canadian provinces and the European Union have

reached 95% diversion rate for waste tires (Millette et al 2021)[6]. EPR legislation could reduce illegal tire dumping and non-permitted tire storage.

Conclusion

The Waste Tire Cleanup Program has been largely successful since its creation in 2007. In this evaluation, Ecology has demonstrated its success since inception and presents recommendations to improve the program in the future. DNR anticipates cleanup of the tire reef piles will begin in 2024 with a pilot cleanup and will ramp up extensively in the 2025-2027 and 2027-2029 biennia with adequate funding. Ecology will continue to work with our partners to clean up the Twin Bridges Road tire pile and over the next two years, address as many of the 48 additional tire piles inventoried in this evaluation, as possible.

[6] Millette, Giroux and Kelleher**.** Tires: A successful Waste Diversion Story.

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