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Scoping Memorandum concerning the Pacific Gateway Terminal

Cumulative Effects of Coal Shipping

Prepared By:
Terry J. Wechsler, Esq.,
Coal Costs Us! Project Whatcom

December 2012

Table 1 Proposed Coal Terminals on the Columbia River (2012 Commercial Vessel Port Calls Approx. 1340)[1]				
Terminal Name	Millenium Bulk Logistics	Port Westward Morrow Pacific Project	Port Westward Project	Subtotals
Proponent	Millenium Bulk Terminals, LLC (Subsidiary of Ambre Energy & Arch Coal)	Coyote Island Terminals, LLC (Subsidiary of Ambre Energy)	Kinder Morgan Energy Partners	
Location	Longview, WA, On Columbia R.	Boardman, OR, Columbia R., barges to Port of St. Helens	Port of St. Helens, OR, Port Westward Indus.Pk.	
Coal Pile	Not discussed in JARPA	3 storage barns	Unknown	
Coal Vol.	44 mmta	8 mmta	30 mmta	82 mmta[2]
Other Vol.	n.a.	n.a.	n.a.	
Mining Co.	Arch	Unknown	Unknown	
Rail/Day (going/coming)	14.5 Not discussed in JARPA[2]	2.6	9.9	27 min.[3] Going/coming
Rail Expansion Plans	Unknown	Unknown	$50 mil. for sidings	
Pier	2202', Columbia R. (Existing pier 670')			
Vessels/ Year (one way)	850 Panamax[4] Bulkers[5] Not discussed in JARPA	672 barge transits, 156 Panamax Bulkers	590 (est.) Panamax Bulkers[3]	1596[3] One way
Permits Required	USACE, WA ECOL, Cowlitz Cty.	USACE, OR Dep't St. Lands		
POCs	Mike Wojtowicz, Cowlitz Cty Dep't Bldg & Planning, Kelso, (360) 577-3052 x 6671, wojtowiczm@co.cowlitz.wa.us	Steve Gagnon, Project Mgr, USACE (503) 808-4379, steven.k.gagnon@ usace.army.mil		
Examples: at-grade crossings	422/423 intersection, base of Lewis&Clark Br., Longview, at-grade. St. Johns Hosp. cut off	Ranier	Ranier	
Status	RFP closes 1/15/13	Dep't St. Lands cmts close 1/3; Cmts closed for EA; pending decision re EIS in 6 mos.-1yr.	"Due diligence" stage; no problems i.d.'d	
Website	www.co.cowlitz.wa.us/ buildplan/WhatsNew/ MBTL.htm	www.nwp.usace.army.mil/ Missions/Currentprojects/ CoyoteIslandTerminal.aspx		
Proponent Website	millenniumbulk.com/	morrowpacific.com/	portwestwardproject.com	

Prepared by Protect Whatcom. Revised 12/26/12.

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[1] Marine Safety: Coast Guard Sector Columbia River, Ore. Dist. 13, Astoria, 503-861-6211; Columbia River Bar Pilots, 503.325.2643, http://www.columbiariverbarpilots.com/columbiariverbarpilots_marinetraffic.html. On December 25, 2012, of 18 vessels listed at http://crbp.web.kleinsystems.ca/webx/, 2 had drafts of 30 and 35.5'; all others were 25' or less. Merchant Exchange; OR Board Maritime Pilots.

[2] According to Pacific Northwest Waterways Ass'n, "In 2010, 42 million tons of cargo moved on the Lower Columbia River…." http://morrowpacific.com/wp-content/uploads/2012/06/PNWA_Letter_6012012.pdf. Inexplicably, the association claims in that comment on the Port of Morrow proposal, traffic would not increase significantly on the river, and the government would set an inappropriate precedent if it conducted a programmatic EIS.

[3] Rate applied: .33 trains/1 mmta ***if*** all trains are 1.6 miles long.

[4] Maximum allowable draft for Panamax bulkers, due to constraints in the Panama Canal, is 39.5'. Maximum depth dredged in the Columbia River is 43'.

[5] Extrapolating from numbers provided for the Port of Morrow Project, which is 19.5 bulkers/1 mmmta coal volume.

Table 2 All Proposed Coal Terminals, Oregon and Washington				
Termanal Name	Gateway Pacific	Port of Coos Bay "Project Mainstay"	Columbia River Subtotals (See Table 1)	Totals
Proponent	Pacific Int'l Term. (Subsidiary, SSA Marine; Goldman Sachs 49% owner)	Port in Partnership with Mitsui Group and Metro Ports (Subsidiary, Nautilus Int'l Holding Corp.)		
Location	Cherry Pt., WA	Coos Bay, OR		
Coal Pile	80 ac. X 60' H, Uncovered			
Coal Vol.	48 mmta	11 mmta	82 mmta	141 mmta
Other Vol.	6 mmta other[6]			
Mining Co.	Peabody			
Rail/Day (going/coming)	16 BNSF	3.6 Coos Bay Rail Link + Main Line	27	47 min.[7] Going and coming
Rail Expansion Plans				
Pier	2980', Salish Sea			
Vessels/ Year (one way)	318 Panamax, 169 Cape Class Bulkers	100	1596	2183 One way
Permits Required	USACE, ECOL, Cty.			
POCs	Randel Perry, USACE, 360-734-3119 Tyler Schroeder, WCPDS, 360-676-6907	David Koch, Port CEO, dkoch@portofcoosbay.com Elise Hamner, Port Rep., (541) 267-7678		
Examples: at-grade crossings	Mt. Vernon,			
Status	Comments for DEIS closes 1/21/13			
Website	www.co.whatcom.wa.us/ pds/plan/current/gpt-ssa/			
Proponent Website	gatewaypacificterminal.com/	www.portofcoosbay.com/index.html		

Prepared by Protect Whatcom. Revised 12/26/12.

[6] Stage 2, after 10 years, if market conditions warrant, at second terminal. Initially, calcined coke, a by product of BP Cherry Point operations., and Canadian potash. Other commodities later could include wheat, wood chips, and sulfur.

[7] If any trains are less than 1.6 miles long, this number will be higher.

Fig. 1. Proposed West Coast Coal Terminals

Fig. 2. Most Likely Rail Route to West Coast for Proposed Terminals

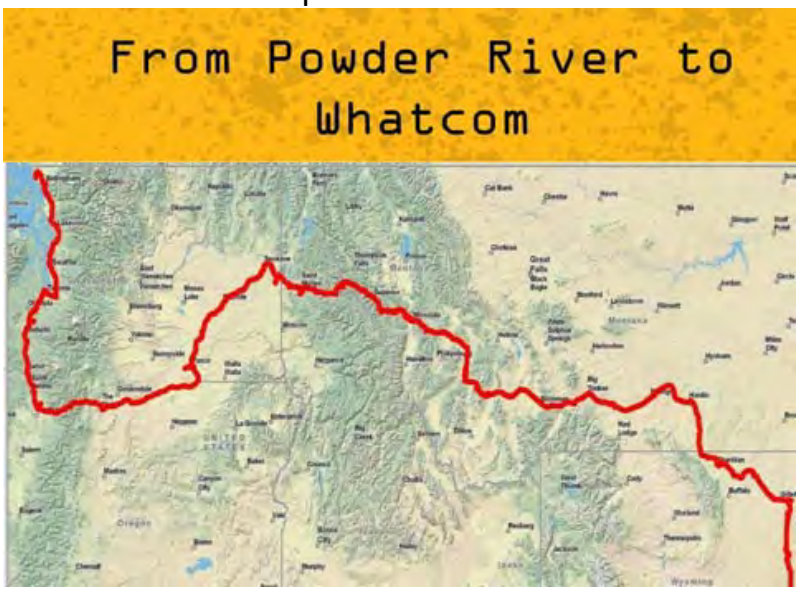
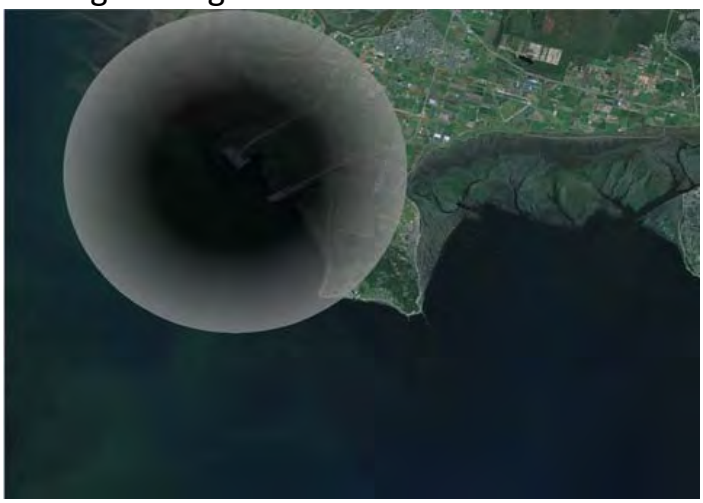


Fig. 3. Westshore Terminals Coal Storage.
(Maximum Capacity: 25 mmta)

GPT describes an 80-acre coal storage pile 60' high, similar to the Westshore footprint.

Fig. 4. Fugitive Coal Dust at Terminals



Westshore Terminals emits roughly 715 metric tons of coal dust a year.
Source: Douglas L. Cope and Kamal K. Bhattacharyya,
A Study of Fugitive Coal Dust Emissions in Canada, Ch. 8,
prepared for The Canadian Council of Ministers of the Environment, November 2001.
Some of that dust lands on Point Roberts, three miles away.

Fig. 5. Fugitive Coal Dust Lost During Loading

Fig. 6. Panamax-class Bulkers

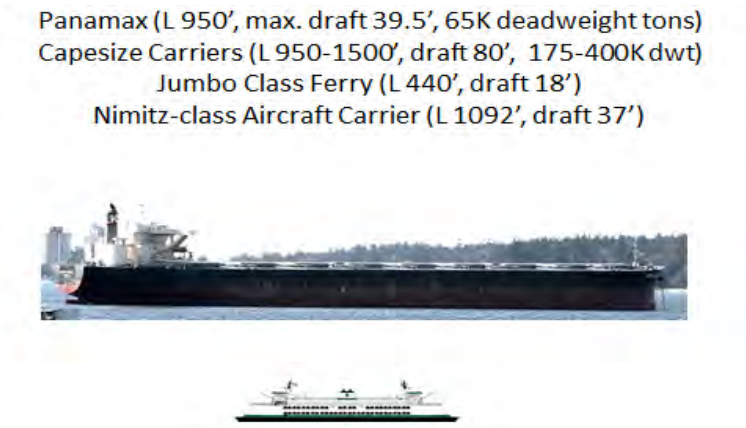


Fig. 7. Potential for Bulker Accidents

Accident at Westshore Terminal Trestle, December 2012. This ship had a pilot on board. Bulkers can travel 7.5 miles when they lose their engines, with no current or wind influences, 2-3 miles after they drop anchor if the chain does not break, which they often do over 12.5 knots. The rescue tug for the Salish Sea is at Neah Bay. There is no rescue tug on the Columbia. Bulkers carry approximately 470,000 gallons of bunker fuel.

Fig. 8. Examples of

Scoping Memorandum concerning the Pacific Gateway Terminal

The Fate of Coal Dust in the Marine Environment

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Prepared For: International Journal of Coal Geology 68 (2006)

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Coal dust dispersal around a marine coal terminal (1977–1999), British Columbia: The fate of coal dust in the marine environment

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Abstract

A 1999 assessment of sediments, adjacent to the Roberts Bank coal terminal in Delta, British Columbia, Canada, shows that the concentration of coal particles (reported as non-hydrolysable solids or NHS) has increased substantially since a prior study in 1977. NHS concentrations have doubled from a mean concentration of 1.80% in 1977 to 3.60% in 1999. Overall the dispersal distance of coal has not increased over the 22-year period but rather the abundance of coal in the surface sediment within the dispersal area has increased. Since 1977 the main deposition of coal has occurred in the vicinity of the coal-loading terminals, where concentrations of 10.5% and 11.9% NHS (non-hydrolysable solids = coal) occur.

The settling properties of fresh and oxidized coal particles (<53 μm up to >2.36 mm) were examined in order to better understand the dispersal of coal in marine waters. No change in settling velocity of coal particles occurred with increasing oxidation. However, the proportion of buoyant coal particles decreases with oxidation in all size fractions, reflecting the decrease of coal hydrophobicity with oxidation.

The distribution of coal around the terminals agrees with measured particle settling velocity and current velocity, with coal concentration decreasing rapidly away from the terminal. Coarser sediment fractions contain the highest coal (NHS) concentrations and carbon/nitrogen ration when compared to finer fractions. Coal particles with >2.36 mm diameter (settling velocities ≤10.54 cm/s) settle out close to the terminal (depending on currents), whilst small (<53 μm) and weakly oxidized coal particles travel further and take longer to settle out (settling velocities ≥0.16 cm/s). This results in a wider dispersal of coal particles, and a corresponding decrease in the coal concentration.

Coal distribution would likely affect those benthic flora and fauna, most susceptible to coal dust coverage and possible anoxic conditions that might arise during coal oxidation within very close proximity (0–100 m) to the coal-loading terminal.
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Keywords: Coal contamination; Coal environment; Coal settling velocity

1. Introduction

The Roberts Bank coal terminal has been in business for over thirty years and is presently operated by Westshore Terminals Ltd (Fig. 1). Located on Roberts Bank in the municipality of Delta, British Columbia, Canada, it is the first stage in a proposed development of a major bulk-loading port and industrial park, as the major terminals in Burrard Inlet (Vancouver, B.C.) exceed their exporting and development capacities.

However, Roberts Bank is not naturally a deep-sea port and is located in one of the most ecologically

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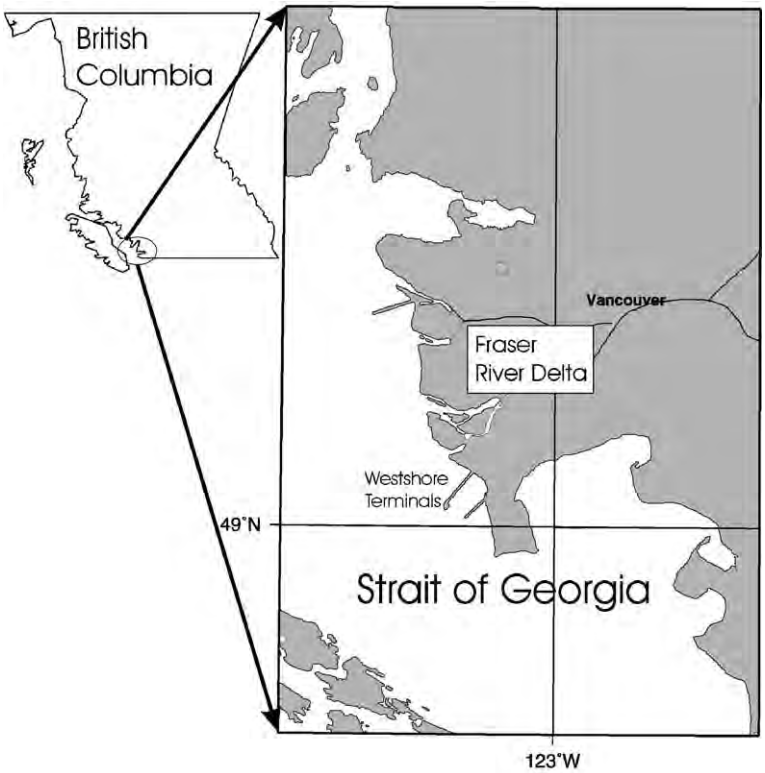

Fig. 1. Location of Westshore Terminals and Fraser River Estuary, British Columbia, Canada.

important estuaries on the west coast of North America. The construction of the coal terminal has had numerous effects on the local ecology, and the release of coal dust has had a detrimental impact on the region.

This paper investigates the coal content of the sediments in the vicinity of the coal loading facility, and reveals significant changes in sediment coal content and distribution in the 23 years since the previous study. An assessment of the settling properties and velocities of the coal particles in the water column were conducted to predict coal particle dispersal around the terminal, and these results are compared with the observed distribution of coal in the sediments adjacent to the coal loading facility. Some of the effects of this coal accumulation on the local ecology are also discussed.

2. History and previous studies

In April 1970, shipments of coal mined in the interior of British Columbia and Alberta began from the Roberts Bank coal terminal located south of the Main Arm of the Fraser River, just south of Vancouver (Fig. 1). The present facility consists of a 96-hectare man-made island situated at the end of a 4.8-km long causeway, serviced by a 20-m deep dredged waterlot and a large ship turning basin located between the terminal and the Tsawwassen Ferry terminal (Fig. 2).

Westshore Terminals handle approximately 30% of the shipping volumes of the British Columbia Lower Mainland. Approximately 90% of this volume is coal that is transported to the facility in unit trains, where the coal is unloaded and stored in large unprotected stockpiles. The coal is subsequently loaded aboard ships ranging in size form 45 000 deadweight tonnes (DWT) to 250 000 DWT for export from two major coal-loading terminals, referred to as pods #1 and 2 (Fig. 2). Coal shipments have increased from 10.6 million metric tonnes in 1980 to a maximum of 23.5 million in 1997. Estimates forecast a continued increase of 4% per annum until 2010 (Fraser River Estuary Management Program (FREMP), 1990a,b). Annual shipments are projected to reach 30 million metric tonnes of coal only with modification of Pod #3, as this terminal is presently being used as a bulk cargo terminal (Deltaport).

In 1975, Westshore Terminals Ltd. applied for a permit under the British Columbia Pollution Control Act, 1967 (Emissions), to discharge “unknown and immeasurable” quantities of coal dust to the air (Pearce and McBride, 1977) as they had previously operated

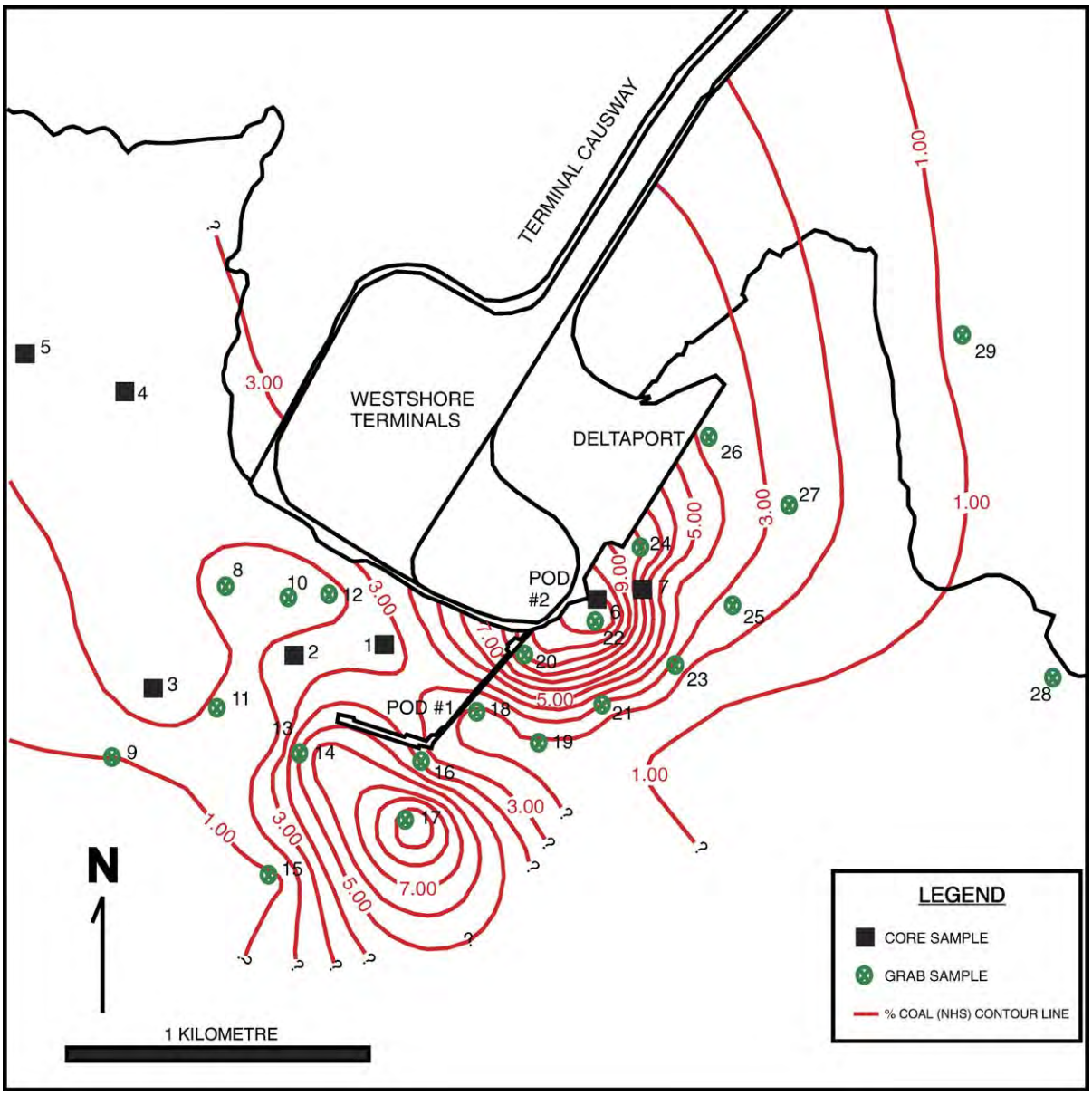

Fig. 2. Sample location and coal dust distribution in surface sediment as measured in weight percent NHS.

without a Pollution Control Branch permit. Local residents as far away as Pt. Roberts, have often complained of the coal dust escaping the terminal (Department of Fisheries and Environment Canada, 1978) from the incoming loaded rail cars, conveyor belts, and returning empty trains during the loading processes. Emissions from open stockpiles also contribute to the coal dust (especially during high wind periods), though it occurs to a lesser degree due to the use of resin binders such as polyvinyl acetate (Pearce and McBride, 1977).

Coal accumulation in bottom sediments, documented by Butler (1972) and Butler and Longbottom (1970) stimulated the Habitat Protection staff of the Fisheries and Marine Service to undertake a limited program in 1975 to study the further accumulation of coal in marine sediments around the terminal, and the possible effect of this coal accumulation on the local ecology. Pearce and McBride conducted the last of these studies in 1977 (Darrel Dejerdin, Vancouver Port Authority, Environmental Services, pers. Comm., 1999) and concluded that the coal content of the

sediments adjacent to the Roberts Bank (reported as non-hydrolysable solids) increased only slightly in the five years since Butler's investigation.

3. Study area

Historically, man's encroachment upon, and development of the ecologically important Fraser Estuary/Delta has generally been both ad hoc and unrestricted. This uncoordinated approach to resource use, without regard to, or knowledge of effects on the environment has led to very significant changes in the environment. Since the 1800's, roughly 70% of the estuary's original wetlands have been lost to dyking, dredging, draining, and filling (FREMP, 1997). However, the total area of freshwater and brackish marshes on the outer estuary may have increased in the last century due to the accretion of mudflats on Sturgeon and Roberts Banks (FREMP, 1996).

3.1. Physical environment

Annual deposits on Roberts Bank of approximately 17 million tonnes of sediment are supplied by the Fraser River (FREMP, 1996), the largest river on the west coast of North America (Fig. 1). This sedimentation plays a vital role in the creation of much of the aquatic habitat on Roberts Bank, and is in a dynamic state due to interacting and variable river flows and tides. Constant dredging is necessary to maintain depths of navigable shipping lanes in the vicinity of Westshore Terminals, and recent applications (Westshore Terminals Administrative Department, 1998) have been submitted to dredge approximately 4000 m^3 in the immediate vicinity of Pod #2, (Fig. 2; Dariah Hasselman, FREMP, Project Review Coordinator, pers. comm.).

Roberts Bank comprises approximately 8000 of the total 14,000 hectares of tidal flat associated with the Fraser River Delta. The dominant platform of Roberts Bank is over 6-km wide and slopes gently from the dyked delta lowlands out to a distinct break in slope, approximately 9 m below the lowest normal tide level (Fig. 2). In the vicinity of the Westshore Terminals causeway, the intertidal area exposed between high and low water is approximately 3000-m wide. Tidal channels, current, and wave ripples interrupt the otherwise featureless bank (Luternauer and Murray, 1973; Luternauer, 1974.

3.2. Estuarine ecology

The Fraser River estuary is notable for its biological productivity. This is especially evident between the Roberts Bank Coal Loading Port and the Tsawwassen Ferry Terminal, home to tidal flats, wetlands and eelgrass beds. These habitats form the basis for populations of varied estuarine life forms (in addition to the large numbers of migratory salmon and waterfowl) including the benthos, plankton and fish (Federal Environmental Assessment Review Office, 1979; Fraser River Estuary Management Program, 1989, 1991a, 1991b, 1993, 1994).

The benthos, composed of organisms dwelling on the sea bottom and in sediments are the most greatly affected due to the disturbance of the bottom caused by deposition of coal particles. Anoxic conditions, evident from the presence of hydrogen sulphide, in the sediments receiving very high levels of organic input (including coal), caused by the consumption of oxygen during the degradation (oxidation) of organic matter, would likely have the most detrimental impact on the benthic florae and faunae.

The ecological contribution of bottom microinvertebrates is very significant, as larvae from clams, mussels, barnacles, and crabs drift out to sea and constitute a substantial proportion of the seasonal food for juvenile salmonids and herring. Damage to the benthos therefore has serious implications for both the mature invertebrate populations as well as those creatures that predate upon the benthic larvae.

The Fraser River and its estuary support one of the largest commercial, recreational, and aboriginal salmon fisheries in British Columbia, which includes salmon, surf smelt, eulachon, cutthroat trout, steelhead trout, white sturgeon, mountain whitefish, and Dolly Varden. The annual commercial fishery of Fraser River salmon between 1989 and 1992 was valued of over $115 million (Canadian dollars), with a post-processing wholesale value of over $230 million (Environment Canada and Fisheries and Oceans Canada, 1995). Additionally, sport fishing throughout British Columbia earns about $180 million/year in direct revenues, with Fraser River Chinook and Coho comprising a large percentage of this catch (Environment Canada and Fisheries and Oceans Canada, 1995). Furthermore, seven native bands (Musqueam, Tsawwassen, Semiahmoo, Coquitlam, Katzie, Matsqui, and Langley) participate in the aboriginal food fishery in the Fraser River Estuary.

On Roberts Bank, the Dungeness crab is the only species that is exploited commercially and recreationally, representing approximately 10% of the total catch in British Columbia (Environment Canada and Fisheries and Oceans Canada, 1995). The reported darker coal-coloration of some crabs taken from Roberts Bank is a concern of local fishermen who find the darker crabs more difficult to market.

4. Material and methods

4.1. Sediment and sample collection

A benthic sample of the sediments was collected from each of 29 subtidal sampling stations (Fig. 2). The station locations were established using a differential GPS device and cross-referenced with the Canadian Hydrographic Chart #3492 (Fig. 2) and were chosen at roughly 200 m intervals radiating from the two main coal-loading terminals (pods #1 and 2). Stations 28 and 29 were situated closer to the Tsawwassen ferry terminal to act as 'controls'.

A gravity impact corer was used to collect the first seven samples at high tide on October 22, 1999 and a Shipek© model sediment sampler was used to collect the last 22 samples on November 26, 1999.

Upon retrieval, the uppermost 2–3 cm (approximately 200 g) of the samples were removed and placed in sealed plastic bags while the remainder of the samples were placed in larger bags, or retained in the core tubes. The samples were transported immediately to the laboratory and placed in a freezer to prevent decomposition.

Two coal samples (samples 30 and 31) from the Balmer seam (R_0 ~1.4%) of the Early Cretaceous Mist Mountain Formation (Kootney Group) were used in both the sediment coal content and coal settling property analyses, as these metallurgical coal samples are representative of the majority of coal exported from the Westshore Terminals facility.

4.2. Analytical techniques

4.2.1. Sediment coal content analysis

Determination of the coal content in the 29 sediment samples (each measured in duplicate) was performed using a modified hydrochloric acid hydrolysis method, mimicking the analytical procedure of Pearce and McBride (1977). During this process hydrolysable protein and acid-soluble carbonates are removed by hydrochloric acid hydrolysis with the remaining non-hydrolysable organic matter being removed by hydrogen peroxide oxidation.

Coal is essentially unaffected by the peroxide oxidation and hydrolysis, and its concentration is determined by subsequent gravimetric analysis and ashing. Coal content is reported here as percent total non-hydrolysable solids (NHS), while the organic content is reported as the percent total hydrolysable solids (HS).

The percent NHS is not a measure of the actual coal content of the marine sediments, mainly due to the presence of hydrolysis-resistant organic material such as wood, charcoal, and bark. Post-hydrolysis combustion of such materials would provide an overestimate of the actual coal content by resulting in an elevated NHS value. Despite this source of error, investigations have shown that NHS values do provide an indication of the coal content in marine sediments (Pearce and McBride, 1977).

Two coal samples from the Balmer seam were also analyzed to allow an estimate of coal lost during the digestion process as well as determining the ash content.

4.2.2. Sediment particle size analysis

Sediment particle size analyses were performed on the seven core samples using the wet sieve method described by Morgans (1956) to minimize the loss of particles and reduction in their grain size. The sediments were sieved into five different size fractions and then dried at 50 °C for 3 h prior to being weighed. Cumulative weight percents were plotted against grain size values to obtain an estimate of the grain size distribution in the vicinity of Westshore Terminals, as well as the degree of sediment sorting. Individual sieve fractions were examined with a microscope to determine an estimate of the fractions in which most of the coal grains occur.

4.2.3. Sediment organic/inorganic carbon and nitrogen analysis

Upon completion of the sediment particle analysis, samples were ground to less than 53 μm using a mortar mill. The organic carbon content for the various sediment size fractions was determined from the difference between total carbon content and inorganic carbon (IOC) content, with IOC content being determined by coulometric analysis.

Sediment total organic carbon (TOC) and nitrogen content for the sediment size fractions were determined using an instantaneous oxidation of the sample by 'flash combustion' and subsequent chromatographic analysis.

4.2.4. Coal settling properties analysis

A series of settling velocity experiments were performed to determine the settling characteristics of coal under various conditions in an attempt to explain the distribution of coal in the sediments surrounding Westshore Terminals. The effects of moisture and various degrees of oxidation on the hydrophobicity of the coal particles were investigated to determine the conditions under which various size fractions would float or sink, as well as to determine their settling velocities.

Coal samples from the Mist Mountain Formation were crushed using a mortar and pestle, dry sieved to the desired size fractions, and placed in sealed plastic containers. Five, 1-g samples of the smallest coal size fraction (<53 μm) were gently placed on the surface of 200 ml of seawater in open jars, and left exposed to the atmosphere for a month without agitation.

The remaining samples of the larger size fractions were divided into four subsamples. One group remained in the sealed plastic containers; the second group was placed on open aluminum foil trays at approximately 25 °C; the third group was placed in open beakers an oven at 50 °C; and the fourth group was placed in open beakers in the oven at 100 °C.

Settling velocities were determined in a 1000-ml test tube filled with 25 °C seawater by dropping individual coal particles from 8 cm above the water surface (to partially overcome surface tension), and the settling time was recorded for individual particles to settle 30 cm in the test tube. Ten trials were run for each size fraction, and an average of the trials was calculated. The number of buoyant coal particles was also recorded, as well as whether agitation was necessary to initiate particle settling. Agitation of the samples involved gently pushing the samples below the water surface with a glass rod; their displacement being factored into the settling times.

The settling velocities of the thirteen different coal size fractions of the first group of 'fresh' (least oxidized) coal samples were measured immediately, while the other three groups were allowed to oxidize for a week at temperatures of 25, 50, and 100 °C. The '100 °C' group of coal particles was returned to the oven for further oxidation and their settling properties were measured on a weekly basis for the following two weeks. Oxidation was confirmed by measuring the loss of caking ability of the coal. Because of the fine particle size, petrographic observations of the samples by light microscopy was not possible.

The densities of the coal samples (larger than 2.36 mm) were measured for the fresh, saturated, and oxidized (25, 50, and 100 °C) groups by weighing the samples in air and in toluene. Specific gravities were determined from the particles' displacement in toluene.

5. Results

5.1. Sediment coal content

The coal and organic content of the sediments, expressed as the percentage of non-hydrolyzable solids and hydrolysable solids respectively, are shown in Table 1.

Based on the sediment NHS content, the subtidal coal distribution in the area around the coal terminal is shown in Fig. 2. The area of greatest accumulation (>11%) is located directly southeast of the Pod #2 coal-loading terminal. This region of high concentration is limited to within a hundred metre radius of the loading facility, and the coal concentration diminishes rapidly to less than 1% within 700 to a 1000 m. A second region of elevated coal dust concentration (>10%) is found approximately 200 m directly south of the Pod #1 coal-loading terminal. Samples were not taken closer to Pod #1 (between stations 14 and 16) because a large coal transport ship was moored at the terminal on both sample collection dates. This region around Pod #1 is

Table 1
Sample location with average total organic carbon content and average coal content (NHS)

Sample station	Average OM content (%)	Average coal content (%)	Sample station	Average OM content (%)	Average coal content (%)
1	17.98	2.74	16	18.62	3.02
2	12.71	2.66	17	31.47	10.47
3	14.46	2.97	18	18.92	1.20
4	14.47	2.52	19	15.45	1.61
5	15.61	2.31	20	14.02	9.90
6	15.17	10.85	21	19.60	2.14
7	22.92	4.22	22	16.12	11.90
8	23.95	1.74	23	16.48	1.95
9	18.28	0.91	24	23.10	7.80
10	17.01	1.62	25	18.26	2.48
11	15.79	1.52	26	24.26	3.29
12	20.74	1.82	27	31.70	2.58
13	14.86	1.04	28 (control)	14.02	0.77
14	14.02	6.72	29 (control)	13.71	0.65
15	13.06	0.92	30 (coal)	0.12	94.89
			31 (coal)	0.77	93.41

also characterized by a high NHS concentration gradient, dropping to levels less than 1% within 500 to 1000 m. An area of moderate accumulation (1–3%) completely surrounds the coal terminal and extends outward for at least 1000 m to the north (limit of sampling), west, and east, and 800 m towards the south. Contouring of Fig. 2 south of stations 15 and 16 is based on limited data. Subtidal control samples collected at stations 28 and 29 (near the Tsawwassen ferry terminal and causeway) contained low (<0.8%) NHS concentrations.

The coal content in the sediments decreased significantly with distance from the terminal (Fig. 3).

Concentrations of hydrolysable matter, assumed to represent organic matter (OM) content, consistently exceeded the non-hydrolysable (coal) content in the sediments in each of the twenty-nine stations sampled. OM was found to compose at least 12% (by weight) of the surface sediment content on Roberts Bank, with a maximum of 31 OM at station 17 (Table 1).

The two Mist Mountain coal samples have an average of 0.44% HS. However, this apparent hydrolysable solid content most likely represents the irremovable coal residue in the test tubes upon completion of the digestion process. The coal samples were analyzed to contain an average of 94.15% NHS, with the decreased mass likely representing the ash content of the coal.

5.2. Sediment particle size

Results from the physical analysis of the sediment samples from the core samples are presented in Figs. 4–6. Subtidal grain sizes range between silt and clay to medium grained sand (<53 to >355 μm). The sediments to the north and northwest of the terminal are primarily silt and fine sand (<53 to 250 μm), while the area to the south and east is dominated by fine to medium sand (125 to 500 μm). The nearshore area adjacent to the coal terminal in the lee of the Pod #1 terminal (Core #1) is dominated by fine sediments in the silt and clay range (<63 μm).

Quartz grains dominate the sand, though a high abundance of lithic grains, shell fragments and mica also occur. Large coal fragments (up to 2 cm in diameter) occur in several of the core and grab samples, and are especially abundant in sample locations 6, 17, 20, and 22. The sediments have a moderate to poor degree of sorting and the larger grains are predominantly subangular with a moderate degree of sphericity. Both the degree of angularity and the composition of these sediments are indicative of poor to moderate chemical and physical maturity.

5.3. Sediment organic/inorganic carbon and nitrogen content

Results from the analysis of the total organic carbon (TOC) indicate that the TOC is highest in the coarser sediment size fractions (>250 μm), with a maximum of 16.8% in Core #6 (Fig. 4). TOC values in the smaller size fractions are generally less than 2%, and the lowest values occur in the 150-μm size fraction.

The inorganic carbon (IOC) values are generally less than 0.7%, with a maximum value of 1.2% occurring in the coarsest fraction (355 to 500 μm) in cores 1 and 7.

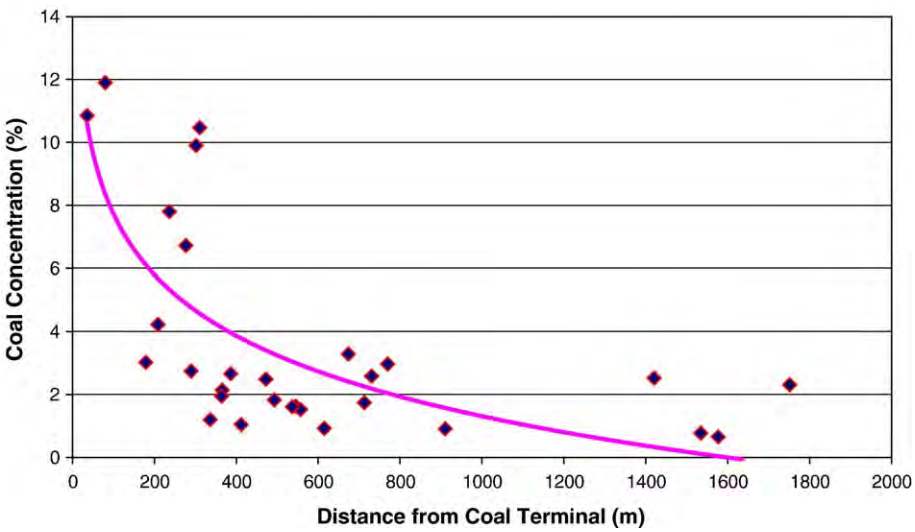

Fig. 3. Coal concentration (wt.%) with distance from the coal terminal.

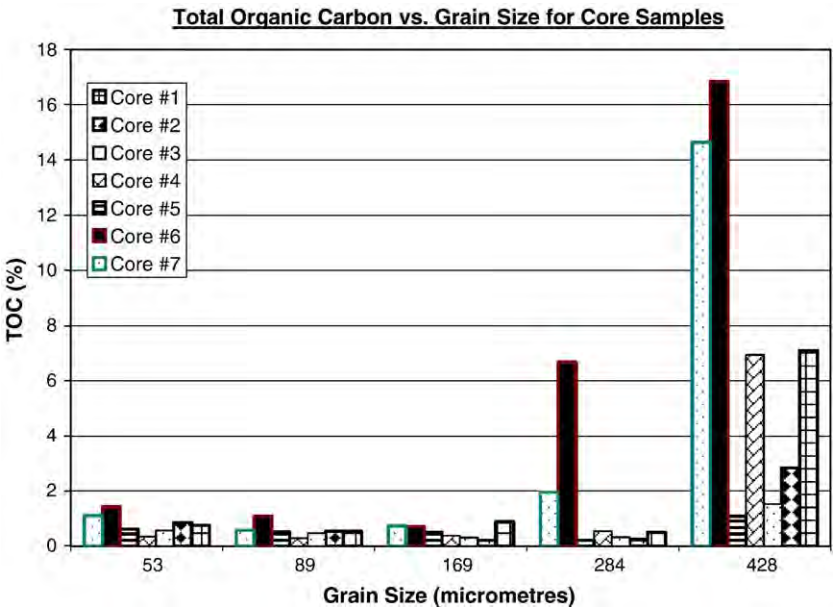

Fig. 4. Total organic carbon content vs. particle size distribution of samples for cores collected across study area (core locations are shown in Fig. 2).

Minimum values of IOC content are found to coincide with a grain size of approximately 200 μm, albeit a poor correlation.

Trends in the sediment nitrogen concentrations are found to generally conform to those of the TOC concentrations, although the nitrogen concentrations are considerably less (Fig. 5). Maximum nitrogen concentrations reached 0.34% in the largest size fraction (355 to 500 μm), while the nitrogen content in the majority of the other size fractions rarely exceed 0.10%. Minimum concentrations of approximately 0.03% nitrogen occur near the 200 μm size fraction.

A ratio between the carbon and nitrogen was plotted against the various core sample grain size fractions to determine whether or not the carbon being measured was from a terrestrial or marine source. Terrestrial carbon sources are known to generally have a higher C/N ratio than their marine counterparts (Mayer, 1994).

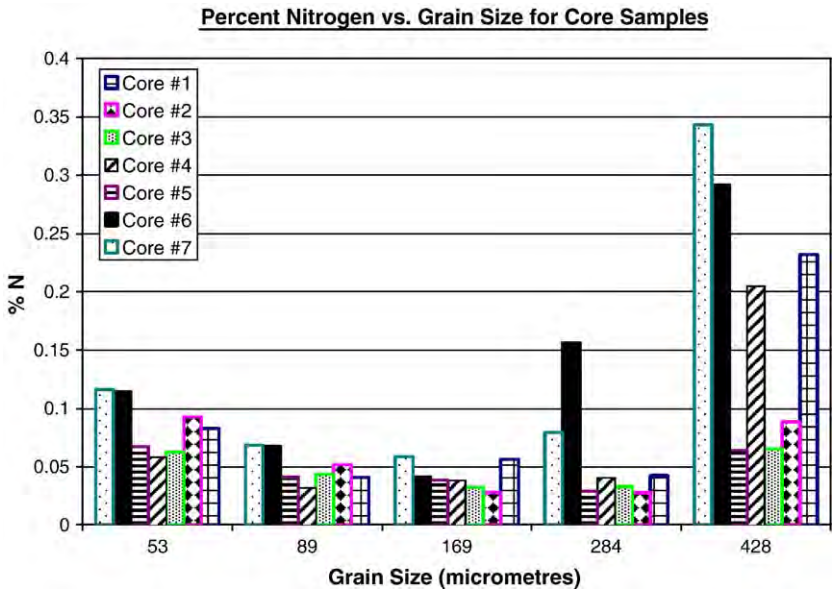

Fig. 5. Particle size distribution of samples vs. the total nitrogen content for cores collected across study area (core locations are shown in Fig. 2).

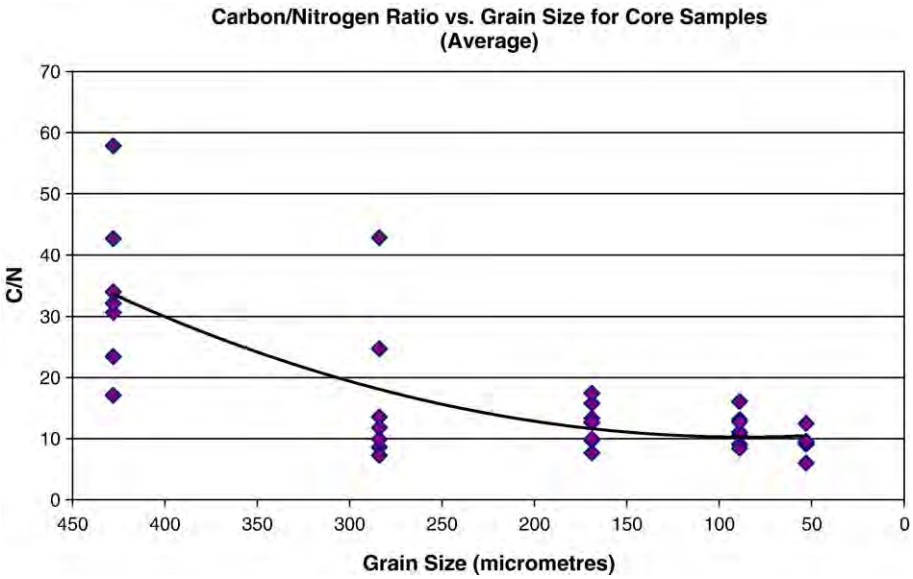

Fig. 6. Carbon to nitrogen ratio vs. grain size.

The highest C/N values occurred in the larger size fractions, and the C/N ratios generally decrease with decreasing particle size (Fig. 6). Cores 6 and 7 have the greatest C/N ratios, with a maximum value of approximately 68 for the 355 to 500 μm size fraction of Core 6. These elevated C/N values generally coincide with the maximum TOC and nitrogen values in the larger size fractions (Figs. 4 and 5), while the lowest C/N values have an approximate correlation with the minimum TOC and nitrogen values of cores 3 and 5 in the smaller size fractions. Cores 1, 2, and 4 lacked correlation between the TOC, nitrogen, and C/N values, although the same general trend can be observed.

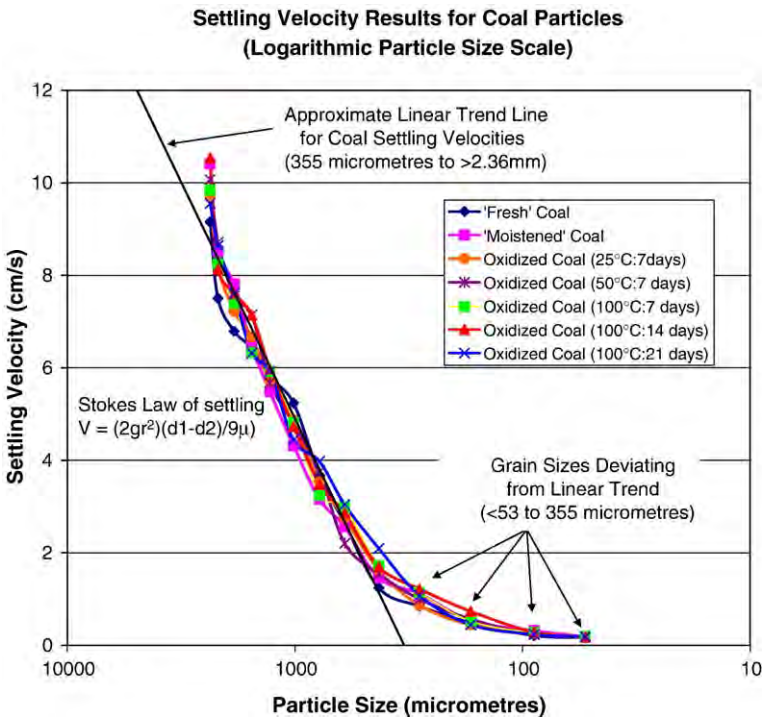

Fig. 7. Variation in coal particle settling velocity with particle size and degree of oxidation. For most particle sizes settling rates follow Stoke's Law.

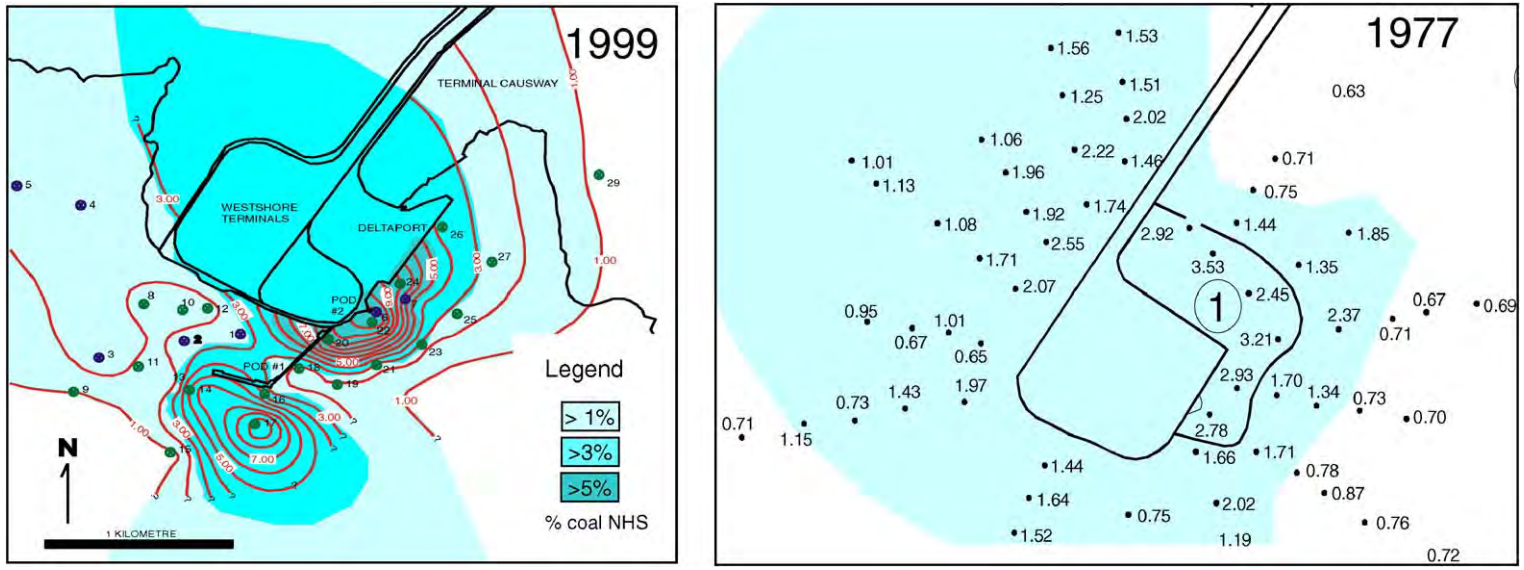

Fig. 8. Comparison of coal distribution (NHS) in 1977 and 1999 in the vicinity of the Terminal. Scale on each map is approximately the same. The aerial extent of the coal has changed little between 1977 and 1999 however the abundance of coal is markedly higher in surface sediments in 1999. The scale for both maps is the same.

5.4. Coal settling properties

The settling velocity results are presented in Figs. 7 and 8. The vast majority (>99%) of the five smallest samples (<53 μm) placed in open jars of quiescent seawater remained on the surface after a month; agglomerating into balls up to 1 cm in diameter. This agglomeration is likely the result of a weak electrostatic attraction between the fine coal particles as they also aggregate in a dry container, disintegrating only when shaken vigorously. The rest of the coal dust remained on the surface as a thin film, attesting to the hydrophobicity of the coal. The resistance to settling of the coal particles could also be due to surface tension, although one would expect this effect to be overcome when the particles were temporarily immersed in the water during vigorous shaking of the jars. Larger particles that did not settle, aggregated at the surface, even when initially separated by up to 5 cm. This attraction might be due to electrostatic forces and mutual repulsion from the water (hydrophobicity). The particles remained bound even after agitation and would settle at a greater velocity due to their combined radii.

The settling velocities of the different coal size fractions did not change significantly with oxidation, as illustrated by the similar trends in settling velocities in Fig. 7. Nonetheless, the settling velocities for the larger grain sizes (1.7 to >2.36 mm) increased slightly when the samples were moistened and exposed to various degrees of oxidation. The settling velocity for coal grains larger than 2.36 mm increased from a minimum of 9.15 cm/s ('fresh' coal) to 10.54 cm/s (100 °C: 14 days). However, exposure of the coal to 25, 50, and 100 °C oxidation conditions over the course of the experiment did not result in a consistent increase in settling velocity for the remaining grain size fractions.

As predicted by Stokes Law, the settling velocities decreased exponentially with decreasing particle size (diameter) for the majority of the grain sizes. The approximate linear trend line illustrated in Fig. 7 when the particle sizes are plotted on a logarithmic scale demonstrates this relationship. The smaller grain sizes (<53 to 355 μm) deviated from this trend, with a reduced rate of settling velocity increase with increasing particle size.

Although the settling velocities of the coal did not change significantly with oxidation, there was a consistent decrease in the size fraction where agitation was necessary. The least oxidized coal samples (based on time of exposure and confirmed by loss of caking ability) were found to have a greater proportion of particles that would float than those oxidized more thoroughly. Agitation was generally necessary for grain sizes smaller than 500 μm.

The specific gravities of the coal particles did not change dramatically under the various exposure conditions averaging 1.39±0.05 for all of the subgroups. However, the specific gravity did vary by as much as 0.10 within each group, attesting to the heterogeneity of the small coal samples.

6. Discussion and conclusion

An assessment of the benthic sediments adjacent to the Westshore Terminals coal terminal on Roberts Bank has shown that the concentrations of coal in the sediments (reported as NHS) has increased substantially since it was last investigated in 1977, having doubled from a concentration of 1.8% in 1975 to a mean concentration of 3.60% in 1999. NHS concentrations range from 0.65% in the 'background' samples 1.5 km away up to 11.90% in the immediate vicinity of the coal loading terminals. Since 1977 the main deposition of coal appears to have occurred in the vicinity of Pods #1 and 2 coal loading terminals, although limited samples were taken on the north side of the coal terminal causeway (Fig. 8). Coal concentrations in the sediments generally decrease rapidly with increasing distance from the terminal. Overall, the dispersal distance of coal has not increased over the 22-year period but rather the abundance of coal in the surface sediment within the dispersal area has increased.

The settling velocities of coal particles ranging from <53 to >2.36 mm did not change significantly with increased saturation and oxidation, although the saturated samples and those that were oxidized did settle faster in the largest size fraction (>2.36 mm). However, the proportion of buoyant coal particles decreased with increasing exposure to oxygen and temperature of heating throughout the range of coal size fractions examined, supposedly reflecting the decrease of coal hydrophobicity with increased oxidation.

Settling velocities for the coal particles in sea water analyzed in this experiment range from 0.16 to 10.54 cm/s for the <53 μm and >2.36 mm size fractions, respectively. These size fractions represent the majority of coal that could escape in the local winds (via deflation and saltation) during the loading processes and from the stockpiles themselves. Local winds average between 10–15 km/h throughout the year and attain speeds in excess of 60 km/h, especially during the winter months (Environment Canada, 1963–1990).

The regions around the coal terminal with the highest coal concentrations average depths between 5–20 m (Fig. 2). According to this experiment, the largest size

fraction (>2.36 mm) would take between 47 s and 3 min to settle 5 and 20 m, respectively. Assuming that the smallest fraction (<53 μm) would settle, it would take coal particles of this size fraction between 52 min and 21 h to settle the same depths. However, both of these calculations assume that the water column lacks any vertical or horizontal currents. Such conditions are rare at Roberts Bank, and would only occur at slack tide on an extremely calm day. The action of any currents in the water column would have drastic repercussions on the settling velocities of the coal particles, especially for the smaller size fractions. ` On Roberts Bank, normal maximum tidal currents alone can reach 0.051–0.76 m/s near Pod #1 (Canadian Hydrographic Service). In such currents the coal particles larger than 2.36 mm could travel laterally up to approximately 60 m to settle 5 m through the water column, and travel 230 m to settle 20 m. In the same currents, the smallest size fraction could travel between 4 and 96 km laterally to settle to the same depths (although it is highly unlikely that maximum tidal currents could be sustained for the 21 h necessary for 96 km of dispersal). Upwelling currents and turbulence would also contribute to the residence time of the coal particles in the water column. Furthermore, these calculations assume that the particles would settle in the first place, though the waves and currents would undoubtedly agitate the coal particles to a degree and initiate settling.

The hydrophobicity of the coal particles would result in particles staying afloat longer than assumed in the above calculations. During the sampling a thin layer of small coal particles floating on calm water approximately 200 m east of Pod #2 was observed. This film of fine coal particles was observed when there was no coal loading activities in progress, and no ship was docked.

The distribution of coal around Westshore Terminals is in agreement with the data from the analysis of the coal settling properties. The sediments that contain the highest coal concentrations are in the coarser size fractions in close proximity to the coal loading facility. The experiments studying the settling velocities of the coal particles indicate that the larger coal particles (with settling velocities of up to 10.54 cm/s) settle out within the first few hundred metres of the terminal (depending on the currents). The degree of coal oxidation would dictate which coal size fraction would readily settle, with the increasingly oxidized particles tending to settle due to their decreased hydrophobicity. The smaller particles (as well as those oxidized to a lesser degree) would float longer and take longer to settle (with minimum velocities of 0.16 cm/s) through the water column, resulting in an increased dispersal of the coal, and coincident decrease in the sediment coal content. These low concentrations would be difficult to detect using the hydrolysis method of this study.

Benthic flora and fauna, which are most susceptible to coal dust coverage and possible anoxic conditions that might arise due to the oxidation of the coal, would likely only be affected on sediments within very close proximity (0–300 m) to the coal loading terminals at pods #1 and 2. Creatures dwelling further away would unlikely experience coal concentrations sufficient to blanket the bottom (thereby decreasing insulation) and give rise to anoxic conditions in the upper sediments. Furthermore, in all of the sediments sampled in this study, the hydrolysable organic matter content of the sediments ranged between one-and-a-half to 20 times the coal content (NHS) of the sediments. If anoxic conditions were to arise, they would likely be the result of the natural organic detritus rather than the coal content. Inspection of the sediments around Westshore Terminals failed to reveal any evidence of anoxic conditions in the upper sediments. If anoxic conditions did prevail, the sediments (at a variable depth below the sediment–water interface, depending on the degree of oxidation) would be expected to have a dark (black) coloration and pungent aroma. Such characteristics would reflect a reducing environment in which bacterial degradation of the organic matter (as well as the activities of detritivores) was inhibited by a lack of oxygen.

The benthic creatures dwelling in the sediments adjacent to the coal terminal would more likely be adversely affected by the alteration of their habitat through changes in the physical nature of the substrate such as size, weight, particle shape, porosity, permeability, and stability of the sediments (Pearce and McBride, 1977) due to the dredging operations in the area.

Though this report does not directly address the amount of suspended solid levels (i.e. coal) in the waters around Westshore Terminals, Shelton (1971) documented the effects of dumping annually 6.2 million metric tonnes of fine coal, fly ash and other colliery wastes off the north coast of England. Investigations demonstrated that the growth of periphytic (attached) algae was inhibited by the reduction of light penetration from increased levels of suspended solid load, adversely affecting the fauna associated with the attached algae. While the volume of coal dust settling on Roberts Bank is undoubtedly much less than that documented by Shelton (1971), the study does indicate the effects of suspended coal levels may have on marine flora and fauna.

Acknowledgements

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Scoping Memorandum concerning the Pacific Gateway Terminal

Impact on "Sea Butterfly"

Individual Comment By: Peter Knutson
Salmon Fisherman

December 13, 2012

Testimony Given for:
Gateway Pacific Terminal,
Seattle Public Comments
Taken at: Seattle Convention Center
800 Convention Place
Seattle, Washington
Reported by: Thad Byrd, CCR
Reported on: December 13, 2012

Obtained at:
http://www.eisgatewaypacificwa.gov/sites/default/files/content/files/SeattleTranscripts.pdf

Pete Knutson, Coal Hearing 12/13/12

For the last 40 years I've been a salmon fisherman in southeast Alaska and Puget Sound. Our boats at Fishermen's Terminal support processing workers, welders, technicians, shipwrights and craftspeople in many fields. Our family's fish feed the people of King County at many farmers' markets.

Anyone who claims that this massive coal project is about jobs had better learn how to subtract. There are 15,000 family wage incomes generated from the Seattle-based fishing industry, according to a Port of Seattle economic study. And we're just one coastal region on a Pacific Rim that runs from California to Korea. All of these marine livelihoods will be jeopardized in this century as the oceans rapidly acidify due to the burning of fossil fuels.

Coal trains through downtown Seattle, rail interference with the Ballard Locks, coal dust in our communities: these impacts will certainly degrade the quality of our local economy and our health.

But the deadliest catch of all is ocean acidification. About 30% of the carbon dioxide generated from fossil fuel burning is absorbed by the earth's oceans, which then become more acidic. We are already seeing impacts to shellfish in Puget Sound, impacts now recognized in the scientific literature, impacts now being studied by NOAA.

North Pacific salmon eat huge quantities of a microscopic floating mollusc called a pteropod, also known as a "sea butterfly". It has a shell which is vulnerable to ocean acidification. If we lose the pteropod, we endanger the salmon which feeds orca, bear, cedar, human and the whole living web of the north pacific rim.

As we plan for future generations, let's bear in mind that a job is not necessarily a livelihood. There's a qualitative difference between a job based on a one-time exploitation of fossil fuel and a livelihood based on the sustainable harvest of a renewable resource.

If we look at the consequences of this coal proposal from the broadest possible perspective the only moral option is to reject it.

Scoping Memorandum concerning the Pacific Gateway Terminal

Ocean Acidification

Prepared by San Olsen,
President, Friends of the San Juans

December 27, 2012

Letter to the editor, San Juan Journal, Dec 27, 2012

We have many problems demanding our attention, but ocean acidification is one which could forever change our islands.

Since the dawn of the industrial age, ever-increasing amounts of carbon dioxide have been released into the atmosphere, not only warming the planet but increasing ocean CO2 content by 30%. For years scientists have been reporting that CO2 absorption is causing seawater to be more acidic; this change is already destroying coral reefs and threatens the entire marine food chain.

According to the Journal *Nature Geoscience*, Pteropods, small snail-like sea creatures important to many fish including pink salmon, are experiencing thinning and dissolution of their shells resulting in increasing mortality. This is occurring at current pH levels, which is a level initially not expected to be reached until 2038. Any marine organism dependent on calcium carbonate for a shell or body parts is now at risk from acidification. Fish eggs and a host of organisms at the very base of the ocean's food web are likewise threatened.

In past epochs, mass extinctions occurred when the oceans became similarly acidic. However, because the chemical changes occurred over many centuries, the ancestors of today's sea creatures were able to adapt. The present rapid chemical changes may not allow marine organisms to develop survival strategies.

If we value the present oceanic biodiversity and food species, it would seem illogical to promote the use of a fuel associated with physical and economic damages linked to atmospheric and oceanic changes.

We have until January 21st to express our concerns about the transportation and burning of coal overseas. Lowering our planetary CO2 and other green house gas emissions could help save the biology, culture, and economy of our islands. See the Lopez or Orcas NO COALition, or the FRIENDS, web-sites for scoping comment assistance.

San Olson, Lopez Island

Scoping Comment concerning the Pacific Gateway Terminal

Consequences of Pollution from Asia

Prepared By: San Olson
President, Friends of the San Juan

January 16, 2013

I live on a west facing waterfront parcel on Lopez Island. Along the shoreline I have many madrone trees (*Arbutus menziesii)*, some of which are having normal limb dieback and others with obvious disease. This past week I had a certified arborist examine these trees because of the disease progression. He mentioned that madrone trees all over the Puget Sound region are having difficulties. He said that madrone trees are "canaries in the coal mine" in that they are more sensitive to pollution than other trees in a mixed forest environment.

I can understand given air quality in the more industrial areas down sound that pollution certainly could be playing a stressor role in the morbidity and mortality of these trees. However there is little industry to the west of the San Juan Islands, except in Asia where industry and power generation is creating massive pollution. This pollution is being carried by prevailing wind patterns across the Pacific Ocean and may be causing our air quality to be less than healthy.

After a little research on coal combustion products and constituents I learned that Sulfur compounds, soot, and other byproducts of Asian coal burning have been detected on mountaintops in the western US. Research has also linked ozone in the air above the US to pollution from Asian countries that are burning fossil fuels. Mercury, a neurotoxin, which is particularly dangerous for children, is especially likely to travel across the ocean. As much as 18% of the mercury in the Willamette River comes from overseas sources, mostly China. On Mt. Bachelor, in central Oregon, 14% of the mercury present was human-created from Asia. I can only conclude that atmospheric effluents from Asia are reaching the Northwest in measurable amounts.

Even in 'pristine' Alaska, chemical contaminants are among many factors suspected to be affecting the survival of stellar sealions, northern fur seals, and harbor seals. Because there are no major sources of industrial pollution (other than infrequent oil spills and localized sources) Asia and other Pacific Rim polluters are thought to the major culprits contaminating Alaskan oceanic ecosystems. This is additional evidence that industrial pollutants are transported far from their origins in Asia.

More worrisome are the large amounts of CO2 being released into the atmosphere. If the proposed coal export terminals come online, at full capacity they could export 100 million tons of coal to be burned in Asia. This thermal coal from the Powder River Basin would add 183 million tons of CO2 into the atmosphere each year. I my view should this happen, it will accelerate and lock in climate change for many decades beyond the lifetimes of Asian coal power plants.

Climatologists are hoping to keep atmospheric CO2 to under 350 parts per million (ppm); presently we have 390 ppm in the atmosphere and it is increasing 2 ppm each year. We may be approaching the "tipping point" where our efforts to reduce CO2 loading will not reverse the climatological changes that will alter life as we know it on our planet. Continuing to add ever more CO2 from coal and other fossil fuels will ensure that we will go beyond the tipping point into irreversible massive climate change within the life time of our grandchildren.

That is what the mining, shipping and burning coal, via the proposed Northwest export terminals, will create if they acquire the requisite permits from our local, state and federal

agencies. I realize the coal companies and shippers wish to limit EIS scoping to the relatively small foot print of a given export facility. But, I submit that ignoring the climate changing capacity of those millions of tons of CO2, and other greenhouse gases, is not only scientifically dishonest, it is immoral.

Please study the effects of pollution on the air quality and human health in the Northwest from the combustion byproducts of coal shipped from the US and burned in Asia.

Please study the climate changing consequences of burning exported US coal in Asia, on global warming, sea level rise, and ocean acidification and any other scientifically recognized problems associated with the combustion products of Powder River Basin coal.

Your decisions may well affect more than Whatcom or San Juan Counties, the State of Washington, or the United States of America. Please keep the long-term health of our planetary chemistry and biosphere in mind when you are weighing these complex legal and policy decisions.

Scoping Memorandum concerning the Pacific Gateway Terminal

Anchoring

Prepared by San Olsen,
President, Friends of the San Juans

December 31, 2012

I previously asked for a through, comprehensive, vessel traffic study that would consider the cumulative impact of increased shipping traffic from the proposed GP Terminal moving through the confined waters surrounding the San Juan Islands. The GPT bulk carriers would be a significant addition to the large number of container, bulker, barge and tanker vessels from US and Canadian ports and terminals already plying these hazardous waters. In that request, I asked that the study include evaluations of the capability of the Vessel Traffic Service (VTS) to handle the current and projected work load, the availability of qualified pilots, the availability of "vessels of opportunity," the capability of existing spill response resources (both US and Canadian) and the adequacy of navigational aids to handle this increased traffic.

After reading other comments, I request that the vessel traffic study also include the probability and consequences of an accumulation of ships associated with the existing terminals, and the GP Terminal, due to delays in product delivery (such as our frequent mudslides closing the rail lines or derailment), mechanical or accidental delays within the terminal complex (such as occurred at Deltaport recently), as well weather delays of inbound or outbound ships waiting for more favorable conditions or queuing to load.

Please study what bathymetric, geographic, and climatic characteristics would be required to determine where safe anchorages could be located for these deep draft vessels during a disruption of product shipment or shipping schedules due to reasonably foreseeable causes.

As a former navigator of a deep draft US naval vessel, I have multiple concerns about the problems inherent in finding and keeping a safe anchorage under difficult weather conditions, particularly when multiple large vessels are present. It would appear that there are a limited number of suitable anchorages in proximity to the existing oil export terminals and the proposed coal terminal for large vessels. For instance, the one designated General Anchorage, 110.230, just west of Neptune Beach, (Chart # 18421) is 1650 yards in diameter and would safely accommodate two vessels of around 1000 feet in length, assuming anchorage diameters of 600 to 800 ft. (using scopes of 3 times water depth) and at least a 550 yard separation. In any high wind situation, probably only one large vessel should occupy this anchorage.

There is no room in the San Juan Islands archipelago to anchor coal ships. Any anchoring in the small offshore areas around the islands would be destructive of seafloor plants and animals through large diameter scouring by anchor chains.

Bellingham Bay is already occasionally used by tankers waiting to dock at their respective refineries. Repeated anchoring in that embayment will likely release significant amounts of contaminated sediment to the water column. Those sediments contain numerous chemicals acquired over many decades of industrial activity on the Bellingham waterfront plus agricultural and residential input from streams and shorelines. What would be the biological and economic consequences of the use of Bellingham Bay as a temporary but repetitive standby anchorage?

West Samish Bay might be an alternative anchorage, but comparable disruption of contaminated sediments and devastation of seafloor biological communities would result from even occasional use by ships with hefty anchors and heavy anchor chains. What would be the economic and biological consequences should Samish, or similar bays, be utilized as temporary backup anchorages?

I would also point out that in almost all instances any ships anchored in the above mentioned bays and off Cherry Point are on lee shores in any of our typical SE and SW strong wind directions. In heavy weather, multiple large ships in constrained anchorages increase the opportunity for collision, allision, or grounding. Numerous ships seeking sea room may find the narrow sinuous channels leading to the Strait of Juan de Fuca quite challenging. The Strait of Georgia might be an alternative for underway storm evasion, but again the challenge of safe vessel separation and control would present a real test for the VTS and ship captains.

Please include in the vessel traffic study, emergency contingencies when ships are waiting for cargo, loading, or waiting for departure at terminals within the Salish Sea. The study should include, scenarios created by storm driven weather, onboard fire, or other foreseeable crises, and an evaluation of the availability and capability of responding personnel and equipment in such emergencies.

Also, please include a comprehensive evaluation, as part of the vessel traffic study, all potential costs and consequences of anchoring in dangerous weather, accumulation of multiple ships at anchor, engineering casualties, and environmental damage at anchorages. Any or all of these situations could arise because of the cumulative growth in ship traffic when GPT vessels are added to existing traffic in and around the San Juan Islands and mainland terminals.

If there is no feasible mitigation for these problems, please consider the no-build option for the Gateway Pacific Terminal.

Scoping Memorandum concerning the Pacific Gateway Terminal

Coal Train Derailments

Prepared By: Friends of the San Juans

January, 2013

Obtained at:

obtained from http://www.coaltrainfacts.org/key-facts#trains

Coal Train Derailments

- St. Charles, VA – December 2012
- Grantville, KS – November 2012
- Painstville, KY – November 2012
- Ashby, NE – October 2012
- Oktaha, OK – September 2012
- Ellicott City, MD – August 2012
- Grants, NM – August 2012
- Raleigh, WV – August 2012
- Saline County, KS – July 2012
- Havelock, NC – July 2012
- Jefferson County, KS – July 2012
- Princeton, IN – July 2012
- Pendleton, TX – July 2012
- Northbrook/Glenview, IL – July 2012
- Mesa, WA – July 2012
- Portageville, MO – June 2012
- Junction City, KS – June 2012
- Collins, MS – May 2012
- Salmon Arm, BC – April 2012
- Houston, BC – February 2012
- Hinton, Alberta – January 2012
- Vanderhoof, BC – January 2012
- Montrose, IA – December 2011
- Vanderhoof, BC – December 2011
- Galland, BC – December 2011
- Topeka, KS – November 2011
- Peetz, NE – October 2011
- Charleston, WV – October 2011
- Emmett, KS – September 2011
- Denison, IA – July 2011
- Omaha, NE – July 2011
- Bloomington, IN – July 2011
- Ashdown, AK – July 2011
- Pueblo, CO – November 2010
- Surveyor, WV – April 2011
- Kearney, NE – September 2010
- Quantico, VA – August 2010
- Drummond, MT – August 2010
- Ferry Farm, VA – July 2010

And, a 2006 spill that resulted in 2 loaded cars being submerged in the Clark Ford River:

Trout Creek, MT – November 2006, 2-4 cars spilled and submerged into Clark Fork River – resulting in EPA Superfund action.

Scoping Memorandum concerning the Pacific Gateway Terminal

Treaty Rights at Risk

Prepared By: A Report from the
Treaty Indian Tribes in Western Washington

July 14, 2011

A REPORT FROM THE
TREATY INDIAN TRIBES IN WESTERN WASHINGTON

Treaty Rights At Risk

Ongoing Habitat Loss, the Decline of the Salmon Resource, and Recommendations for Change

July 14, 2011

Executive Summary

This paper examines how the rights of western Washington treaty tribes to harvest treaty fish and shellfish, and the federal government's salmon and orca protection efforts, are at grave risk. This is being caused by a lack of coordinated federal leadership, a failure to exercise authorities and the disparate application of salmon conservation measures. The U.S. government must step up and provide the leadership needed to resolve these issues if salmon are to be successfully recovered and protected.

Stopping habitat degradation is the cornerstone of salmon recovery, but habitat is still declining.

According to the Puget Sound Chinook Salmon Recovery Plan developed by the state and tribal salmon co-managers and adopted by the National Marine Fisheries Service (NMFS), protecting existing habitat is *the most important action needed in the short term.* Despite this commitment, NMFS' 2010 assessment of the Puget Sound Chinook Salmon Recovery Plan declared that habitat is still declining and protection efforts need improvement.

Tribal harvest is accountable and tribes are doing their share to promote recovery.

In 1974, the federal court decision in *United States v. Washington* – known as the Boldt decision – affirmed the tribes' treaty right to half of the harvestable salmon, and established the tribes as co-managers of Washington fisheries. Initially, this recognition of the tribes' rights led to a significant increase in treaty harvest because the tribes finally were able to catch their share. However, harvest has been and continues to be constrained dramatically by degraded habitat. As a direct result, treaty harvest has been diminished to levels not seen since before the Boldt decision.

Tribal co-management of harvest is governed by the tribes' commitment to support salmon rebuilding efforts. NMFS' own analysis of recovery plan implementation indicates that harvest is doing its share to support salmon recovery. NMFS also concedes that salmon populations in many watersheds cannot recover even if harvest were completely eliminated. Yet, while harvest is accountable for recovery, habitat degradation continues steadily, destroying the salmon resource and along with it, the cultures and communities of the treaty Indian tribes in western Washington.

NMFS is applying disparate conservation standards to harvest actions versus habitat actions, thereby threatening treaty rights and impeding salmon recovery.

NMFS holds the tribes to a different standard than all others by applying more stringent standards to tribal salmon harvest than to actions that degrade salmon habitat. In reviewing harvest decisions, NMFS expects tribal harvest plans to

contribute to salmon recovery over time. In contrast, when reviewing actions affecting Puget Sound habitat, NMFS seeks merely to maintain existing habitat productivity and quantity – regardless of whether it is adequate to support recovery.

NMFS' Biological Opinion and Reasonable and Prudent Alternative (RPA) for the Federal Emergency Management Agency (FEMA) National Flood Insurance Program is a key example of this disparate treatment. This flood insurance program sets the minimum requirements for floodplain management throughout most of Puget Sound. However, NMFS does not require an increase in habitat productivity and quantity, even in watersheds where NMFS concedes that habitat conditions are the key obstacle to salmon recovery. Another example of disparate treatment is NMFS' approach to southern resident killer whales (orca). NMFS claims orca are not recovering because there are too few large chinook salmon for them to eat. But instead of addressing all activities that affect chinook abundance, NMFS looks only to harvest reductions to address the problem.

This overemphasis on harvest restricts the tribes' treaty rights, while ignoring the science that indicates that habitat loss and degradation account for an even greater take of salmon and orca. These discriminatory actions contravene the federal government's trust responsibility to the western Washington treaty Indian tribes and undermine accomplishment of federal fish and wildlife management objectives.

The federal government is not fully implementing its obligation to protect treaty rights.

Salmon recovery is based on the crucial premise that we can protect what habitat remains while we restore previously degraded habitat conditions. Unfortunately, significant investments in recovery may not be realized because the rate of habitat loss continues to outpace restoration. The resulting net decline in habitat demonstrates the federal government's failure to protect the tribes' treaty-reserved rights.

The federal government has existing tools that it could employ to better protect habitat and support salmon recovery, but in many cases those tools are either misapplied or not being implemented adequately. For example, the U.S. Army Corps of Engineers' § 404 permitting authorizes the very same structures that salmon recovery actions seek to remove. Also, the federal government has approved and continues to fund state programs under the guise of coastal zone management that actually impede salmon recovery. For instance, the state's Shoreline Management Act also permits shoreline development for single-family residences, including bulkheads and docks that degrade habitat.

Instream flows also are under assault and need protection from excessive withdrawals. The tribes have pursued a number of approaches to define and

establish the instream flows necessary to protect and restore salmon resources. Unfortunately, each of these efforts has been undermined by flawed state policies that failed to institute a comprehensive effort to establish instream flows. Therefore, federal intervention is needed to adjudicate instream flows that are protective of fish habitat, and consistent with treaty-reserved rights.

Finally, federal agencies such as NMFS have failed to use their authority to prosecute those who degrade salmon habitat. In July 2000, NMFS formally published its policy governing enforcement of the Endangered Species Act (ESA) prohibition against take, and included a series of habitat impacts that would receive "heightened scrutiny." Although shoreline armoring and riparian vegetation removal were on NMFS' priority list, there appears to be only one instance of NMFS exercising its enforcement authority over these activities during the past decade.

Salmon recovery crosses many jurisdictions, and leadership is needed to implement recovery consistently across those jurisdictional lines.

The government's piecemeal approach to recovery has resulted in a lack of agency consistency and ultimately the implementation of federal programs that serve neither to recover salmon nor protect treaty rights. For example, many federally funded environmental and conservation grant programs are not required to protect salmon. Instead, in many cases those programs rely on a planning process that ultimately lets the landowner decide what is best for salmon, even if those choices are contrary to federally approved total maximum daily loads (TMDLs) or federally-approved salmon recovery plans.

Moreover, despite ESA listing, and declining harvest and habitat, basic federal obligations remain unfulfilled. For example, the National Oceanic and Atmospheric Administration (NOAA) and U.S. Environmental Protection Agency (EPA) have failed to use their authority under the Coastal Zone Management Act (CZMA) to protect salmon and treaty rights**.** The CZMA obligates EPA and NOAA to assure that state nonpoint source coastal protection plans are consistent with applicable federal law, including the Clean Water Act, ESA, and federally secured treaty rights. These plans were supposed to be developed by 1995, but 17 years later, the federal agencies have failed to obtain the state of Washington's compliance.

Given the critical importance of protecting habitat, it is essential that leadership is exercised to ensure that these basic federal obligations are met, including protection of treaty rights.

The federal government can remedy this erosion of treaty-reserved rights by taking action:

I. Stop the disparate treatment of Indian tribes when applying salmon conservation measures.

- Apply at least as stringent a conservation standard to actions affecting salmon habitat as is applied to salmon harvest.
- Assure that all federal actions affecting habitat contribute to recovery of salmon and orca.
- Develop a comprehensive and timely plan for addressing orca prey consumption needs that does not result in disparate treatment of treaty fishing and addresses all identified factors for decline.

II. Protect and restore western Washington treaty rights by better protecting habitat.

- Require federal funding that supports state programs and pass-through grants to be conditioned so that all funded efforts are designed to achieve consistency with state water quality standards and salmon recovery plan habitat objectives.
- Direct federal agencies to increase enforcement of federal obligations to protect habitat including the ESA and Clean Water Act.
- Direct NMFS and EPA to assure that state Shoreline Master Program updates are consistent with all federal obligations involving treaty rights.
- Direct the Department of Justice to initiate limited water rights adjudications to identify treaty-reserved rights for instream flows in selected watersheds.

III. Establish federal oversight and coordination to align environmental and conservation programs to achieve salmon recovery and protect treaty-reserved rights.

- Oversee and align funding programs to ensure achievement of recovery objectives.
- Unify federal agencies and resolve inter-agency conflicts to support salmon recovery.
- Hold federal agencies accountable for acts or omissions that lead to disparate treatment of tribes and failure to protect treaty-reserved rights.
- Harmonize federal actions to ensure consistency and compliance with federal obligations and treaty rights.

Introduction

> *"Through the treaties we reserved that which is most important to us as a people: The right to harvest salmon in our traditional fishing areas. But today the salmon is disappearing because the federal government is failing to protect salmon habitat. Without the salmon there is no treaty right. We kept our word when we ceded all of western Washington to the United States, and we expect the United States to keep its word."* – BILLY FRANK JR., CHAIRMAN OF THE NORTHWEST INDIAN FISHERIES COMMISSION

As sovereign nations, 20 treaty Indian tribes in western Washington signed treaties with the United States, ceding most of the land that is now western Washington, but reserving our rights to harvest salmon and other natural resources. For those rights to have meaning there must be salmon available for us to harvest.

Today our fishing rights have been rendered almost meaningless because the federal and state governments are allowing salmon habitat to be damaged and destroyed faster than it can be restored. Salmon populations have declined sharply because of the loss of spawning and rearing habitat. Tribal harvest levels have been reduced to levels not seen since before the 1974 *U.S. v. Washington* ruling that reaffirmed our treaty-reserved rights and status as co-managers with the right to half of the harvestable salmon returning to Washington waters.

As the salmon disappear, our tribal cultures, communities and economies are threatened as never before. Some tribes have lost even their most basic ceremonial and subsistence fisheries – the cornerstone of tribal life.

The Northwest tribes are heartened by millions of dollars and years of focused cooperative work that have been spent on salmon recovery in the region during the past two decades. We have been at the center of most of these efforts. While we have made progress in some areas, the overall quality and quantity of salmon habitat continues to decline. Four species of salmon in western Washington are listed as "threatened" under the Endangered Species Act, some for more than a decade.

Our considerable investment in habitat restoration has not been able to turn the powerful tide of loss and degradation. We are steadily losing habitat throughout the region, and that trend shows no sign of improvement.

The reason is not a lack of effort or a lack of desire to recover salmon. The reason is a lack of federal and state government leadership, policy, commitment and coordination toward a set of salmon recovery goals and objectives.

We know that we cannot stop the massive population growth anticipated in this region over the coming decades, but we can ensure that the associated development is designed and implemented in ways that will better protect salmon and its habitat.

Habitat loss and degradation are the biggest contributors to the decline of the salmon resource, yet the federal government's primary response is to restrict harvest. Tribes are required to prove that our fishing and hatchery plans will lead to increased salmon populations and will not harm ongoing wild salmon recovery efforts. But we have observed that those who damage and destroy salmon habitat aren't held to the same standard.

Instead, the U.S. government continues to approve federal actions and federally funded state actions that either do not contribute to, or actually impede recovery of salmon habitat. The result is the continued slow degradation of habitat that already has suffered from years of pollution, poor land use practices, and other factors. This situation sets the bar higher and higher for tribes to continue our way of life, while setting it lower and lower for those who would destroy the salmon's home. This uncoordinated approach solidifies habitat losses and ultimately fails to protect our huge investment of funding, time, and effort.

The federal government's over-reliance on restricting harvest as the primary means to protect salmon is unfair, ineffective, and contrary to established principles of Indian law. In the end, this policy undermines the recovery of salmon and other listed species in western Washington. Like harvest and hatchery operations, habitat quality and quantity must be calibrated across the spectrum of agencies and jurisdictions involved in salmon recovery.

Salmon recovery begins and ends with habitat. No amount of fishery restrictions can restore the resource unless salmon have good spawning and rearing habitat.

An example is the Nisqually River, with its headwaters in a national park and its mouth in a national wildlife refuge. It is one watershed in Puget Sound where we have made significant habitat gains in recent years. More than 85 percent of lower river estuary habitat has been reclaimed through cooperative federal, tribal, and state work to remove dikes; nearly 75 percent of mainstem river habitat is in permanent stewardship.

Despite this massive cooperative effort, research shows that young ESA-listed salmon and steelhead from the Nisqually River are dying before they can reach Seattle, just 30 miles away. The main cause is believed to be a lack of good nearshore habitat caused by ongoing development practices.

If salmon are to survive, we must begin to achieve real gains in habitat protection and restoration. The path we are on leads to the extinction of the salmon resource and our treaty-reserved rights.

The federal courts have recognized four basic values associated with the treaty-reserved rights of the tribes: (1) conservation value of the resource, (2) ceremonial, religious, and spiritual values, (3) subsistence, and (4) commercial value. The treaty right to fish is a property right of the tribes and is protected under the Fifth Amendment of the U.S. Constitution, our treaties and the U.S. Supreme Court affirmation of this right.

In failing to protect salmon habitat, the federal government is failing in its trust responsibility to honor its treaties with the tribes. We are left with few choices other than the courts to protect our treaty-reserved rights and the salmon that are so essential to our culture.

We are at a legal and biological crossroads in our efforts to recover the salmon and preserve our tribal cultures, subsistence, spirituality, and economies. Not since the darkest days of the fishing rights struggle before Judge Boldt's decision in *U.S. v. Washington* have we feared so deeply for the future of our treaty rights.

This document discusses specific federal government actions that are impeding salmon habitat recovery and restoration, including:

- The application of disparate standards to harvest and habitat.
- Failure to protect treaty rights and financial investments by fully implementing existing federal authority.
- A general lack of alignment by the federal government of its actions with salmon recovery efforts.

This document also recommends specific solutions that will help the federal government meet its trust responsibilities to the treaty Indian tribes in western Washington as we rebuild the salmon resource. Broadly, those actions encompass:

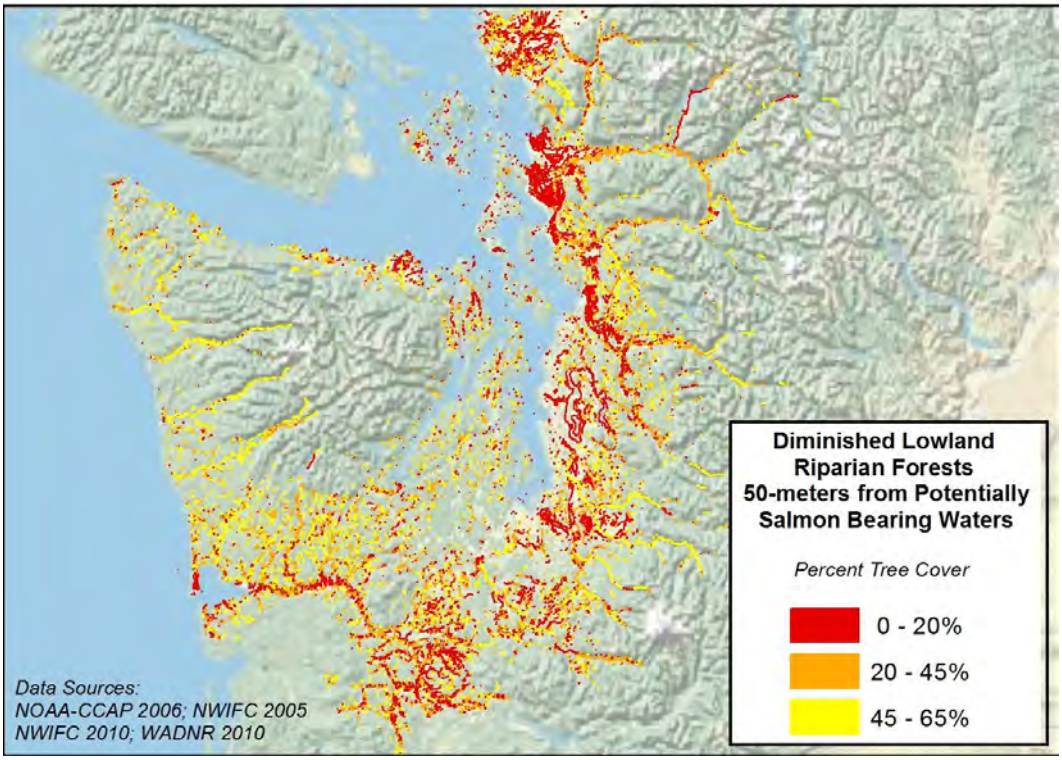
- An urgent call for the federal government to hold the degradation of habitat to the same standards applied to tribal harvest.
- A demand that federal government begin to protect treaty-reserved rights by better protecting habitat.
- Urging federal leadership to provide leadership and oversight to ensure alignment and harmonization of federal programs with salmon recovery efforts.

These actions are critical to reverse the trend toward extinction, and ultimately to recover salmon and restore treaty-reserved harvest rights.

Salmon Habitat Still Declining Despite Recovery Efforts

"We have worked for decades to restore habitat in the Elwha River system, and we are still not fishing on the salmon stocks we have been working to protect. We had to push for an act of Congress to remove two fish-blocking dams on the river, but the way it's going now, we still may never be able to fish for chinook again."
– RUSS HEPFER, LOWER ELWHA KLALLAM VICE CHAIRMAN

Diminished riparian forests in the lowlands of Western Washington continue to impair habitats critical to the recovery of the region's anadromous salmon.



Wild salmon are naturally productive and have just a few basic needs for their survival: access to and from the sea, good spawning and rearing habitat, and the opportunity to reproduce.

Salmon harvest already has been eliminated to the point that further cuts can no longer contribute significantly to the recovery of wild salmon stocks. Yet habitat loss and degradation continue steadily destroying the salmon resource and along with it, the cultures and communities of the treaty Indian tribes in western Washington.

Protecting existing salmon habitat from further decline is the key to recovering endangered salmon populations. According to the 2007 Puget Sound Chinook

Salmon Recovery Plan adopted by NOAA Fisheries and developed by the state and tribal salmon co-managers, and numerous watershed entities:

> Protecting existing habitat and the ecological processes that create it is *the most important action needed in the short term* to increase the certainty of achieving plan outcomes. Protection must occur in both urban and rural areas if we are to ensure the long-term persistence of salmon in Puget Sound.[1]

In the final supplement to the recovery plan, NMFS concurs with the imperative of immediate habitat protection, stating that "protecting functioning habitat is one of the top priorities and first steps for achieving a viable ESU (evolutionarily significant unit)."[2]

However, despite ESA listing of Puget Sound chinook in 1999 and the subsequent call for enhanced protections of remaining habitat, NMFS' 2010 assessment of the Puget Sound Chinook Salmon Recovery Plan declared:

- Habitat is still declining; and
- Habitat protection needs improvement.[3]

The status and trend data summarized in the NMFS report revealed extensive habitat losses across key indicators such as intertidal wetlands and forest cover. The report identified declining trends in habitat by comparing both historical data and trends since the ESA listing of Puget Sound chinook salmon.[4] For example:

- After ESA listing, from 2001 to 2006, about 10,700 acres of forest and 4,300 acres of agricultural land were converted to impervious surfaces.[5]
- Washington has lost an estimated 70 percent of its estuarine wetlands, and 90 percent of its old-growth forest. Together, these native habitat types have been considered among the most diverse and productive in the state.[6]

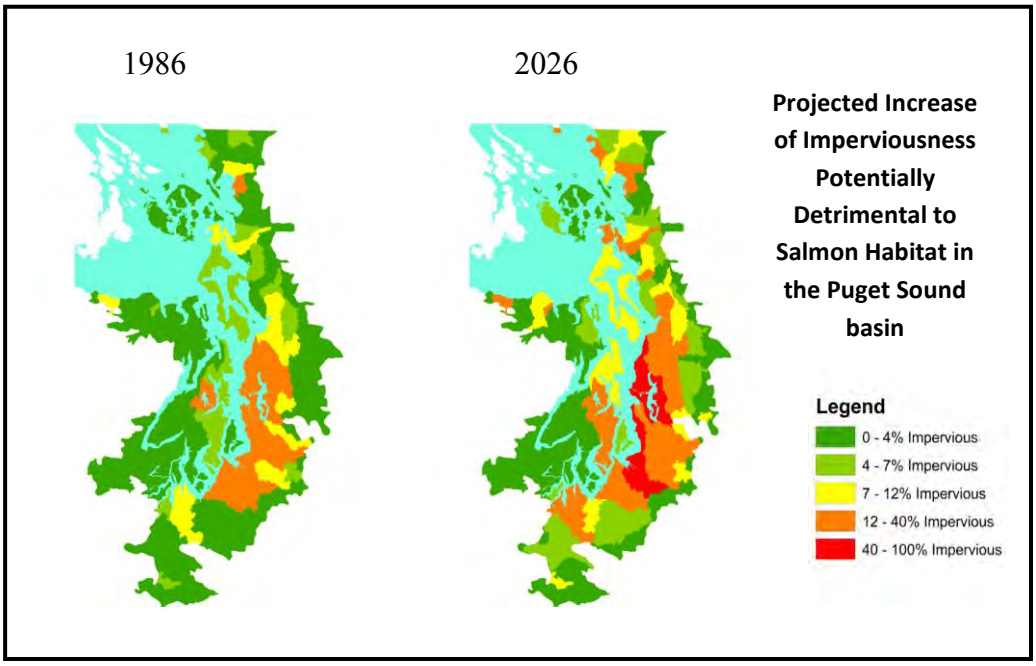
Other studies and analyses echo the NMFS report findings. Key indicators of a declining trend in salmon habitat include:

- Since the ESA listing of Puget Sound fall chinook in 1999, loss of shoreline habitat and function through shoreline armoring continues at a rate of 1.5 miles per year.[7]
- 83 percent of waters sampled to compile the state's 305(b) and 303(d) Clean Water Act lists violate state water quality standards and are polluted.[8]
- About half of critical low gradient riparian forest habitat has insufficient forest cover to support salmon.[9]

- A Puget Sound Nearshore Ecosystem Restoration Project study revealed dramatic losses of habitat in all but one place in the sound during the last 150 years.[10]

- Hood Canal is highly impaired by a lack of dissolved oxygen, and the resultant hypoxia causes fish kills.[11]

- Eelgrass beds, essential to the intricate food web for salmon, are in overall decline.[12]



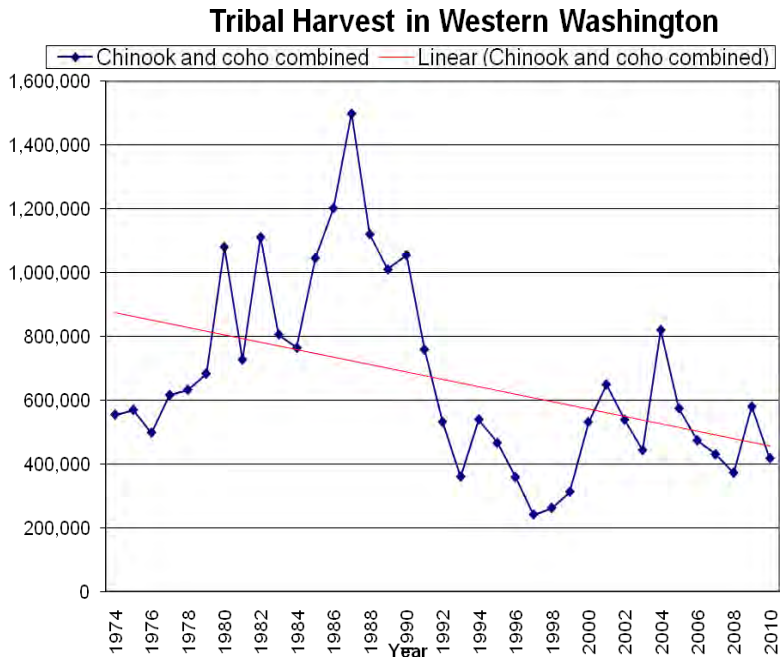
In a recent geographic information system (GIS) analysis of Puget Sound land cover data and population growth rates,[13] existing and projected trends demonstrate dramatic increases in the conversion of vegetated areas to concrete. These increases in impervious surfaces impact salmon habitat by removing essential vegetation and biota, increasing runoff, conveying pollutants, and altering hydrology. Without appropriate planning, placement, and mitigation, these actions will continue to imperil salmon.

Trends at the watershed scale in western Washington also provide a bleak outlook:

- Within the Stillaguamish watershed, during the time period of 1996 through 2006, there was a decrease of 41 percent in forest cover within the Urban Growth Area and a 22 percent decrease of forest cover inside rural residential areas. Now, only 23 percent of the 1,777 acres of riparian area within the floodplain have any forest cover.[14]
- In the Hoh watershed, approximately 31 percent of private forestlands were harvested between 1998-2010 (post ESA listing).[15]
- In the Snohomish watershed, dikes, levees, and flow devices have resulted in the loss of 55 percent of critical mainstem salmon habitat.[16]
- In the Port Gamble S'Klallam Tribe's usual and accustomed grounds, places such as Port Gamble Bay have had 74 percent of the shoreline armored or modified.[17]
- In the Skokomish basin, the watershed has experienced a 51 percent increase in impervious surfaces, with a third of that paving occurring just one mile from Hood Canal.[18]
- In the Muckleshoot Indian Tribe's area of concern, NOAA models predict that more than half of the stream miles of known coho salmon habitat will experience pre-spawn mortality rates greater than the average, and that 141 of those miles will experience mortality rates greater than 35 percent, when under normal conditions these rates are generally less than 1 percent.[19]

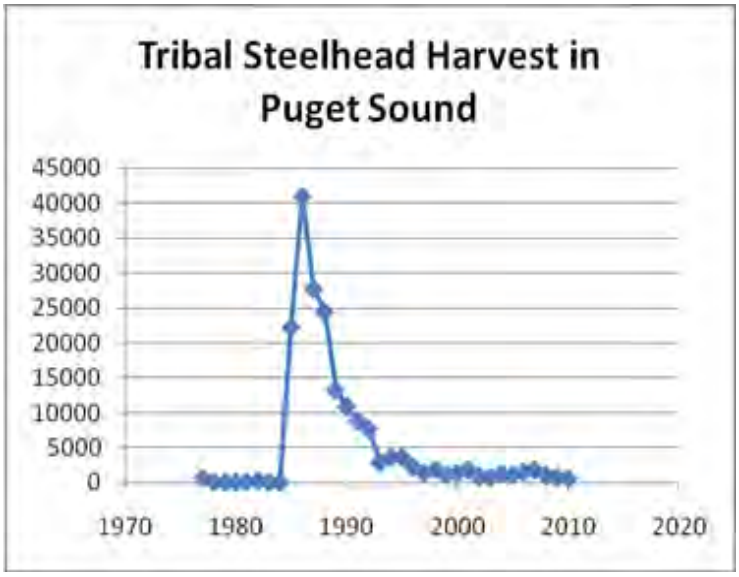
Loss of Harvest and Catch Opportunity

"We volunteered not to fish for chinook and to focus on the recovery of our salmon. But even with the nets out of the river, our fish numbers are not increasing. We work hard to restore habitat and recover Stillaguamish chinook, but in the meantime, our culture faces extinction. We are a living culture and we must have salmon to harvest." –SHAWN YANITY, STILLAGUAMISH CHAIRMAN



Western Washington tribes pursued recognition of their treaty-reserved salmon fishing rights in *U.S. v. Washington* 384 F. Supp. 312 (1974) because their fisheries were being pre-empted by the state of Washington. The state was allowing its ocean and Puget Sound fisheries to overharvest returning adult chinook and coho salmon, but was denying the tribes' their treaty rights to fish in their traditional waters. Tribes were left with little or no fishing opportunity.

U.S. v. Washington – known as the Boldt decision – affirmed the tribes' treaty fishing rights and established the tribes as co-managers of the resource with the right to half of the harvestable salmon returning to Washington waters. [20]

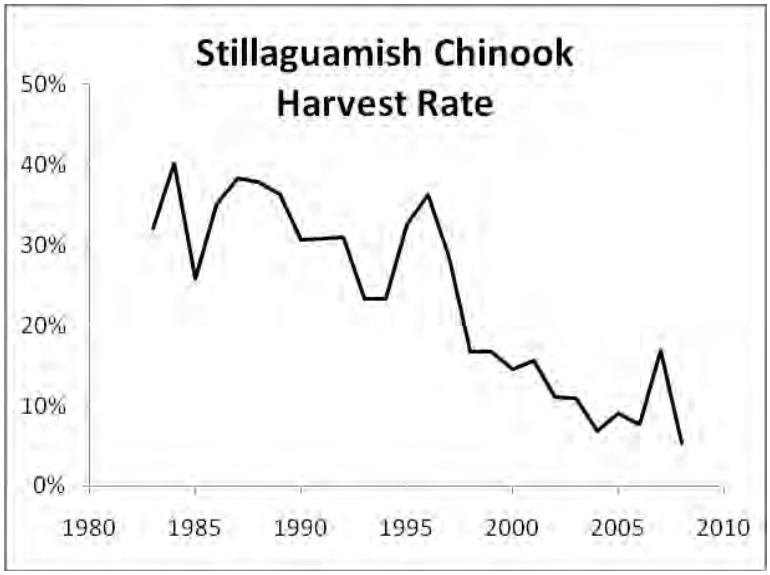


The years following the 1974 ruling witnessed the growth of harvest opportunity and catch, as tribal fisheries accessed 50 percent of the harvestable run. A

joint management framework developed by the state of Washington and the treaty tribes led to better balancing of harvest opportunity across all salmon fisheries.

Despite highly conservative fisheries and the prudent use of hatcheries, ongoing salmon habitat loss and degradation have led to pre-*U.S. v. Washington* tribal harvest levels. This habitat loss has continued even after the establishment of Puget Sound coho as a species of concern (1995), and the listing of Puget Sound chinook (1999) and steelhead (2007) as threatened under the Endangered Species Act.

For more than two decades, harvest rates in all fisheries have been sharply reduced to compensate for the precipitous decline of salmon abundance in Washington state waters, but today harvest cuts can no longer compensate for losses in salmon spawning and rearing habitat.[21]



Analysis of total U.S. harvest rates and run sizes for North Fork Stillaguamish River chinook illustrates this point. Washington harvest rates have been sharply and steadily reduced in reaction to declining returns. While this harvest action maintained spawning at targeted levels, it did not result in more fish returning to spawn, clearly indicating that factors other than harvest are responsible for the stock's decline.[22]

As a result, the Stillaguamish Tribe's treaty-protected river fishery was effectively eliminated and with it, an essential element of tribal culture and source of traditional food. Although the action was not matched by other managers, the tribe gave up even its most basic treaty-reserved ceremonial and subsistence harvest for more than 25 years in an effort to ensure the conservation of this run. In recent years, the Stillaguamish people had to purchase fish from outside their river system to conduct the traditional first salmon ceremony that welcomes and honors the salmon that are the foundation of their culture.

Request for Federal Action

I. Stop the disparate treatment of Indian tribes when applying salmon conservation measures.

The Problem

Currently, NMFS holds the tribes to a different standard than all others by applying more stringent standards to tribal salmon harvest than to actions that degrade salmon habitat. NMFS requires salmon harvest to be managed to contribute to salmon recovery, but fails to apply a corresponding obligation to activities affecting salmon habitat. Similarly, NMFS claims that southern resident killer whales (orca) are not recovering because there are too few large chinook salmon for them to eat. But instead of addressing all activities that affect chinook abundance, NMFS looks only to harvest reductions to address the problem. The federal government continues to focus on restricting the tribes' treaty rights even though the science indicates that salmon will not recover or survive unless the government reduces the even greater take of salmon and orca caused by habitat loss and degradation. The federal government's disparate treatment contravenes its trust responsibility to the western Washington treaty Indian tribes and undermines accomplishment of federal fish and wildlife management objectives.

The Remedy

To eliminate these discriminatory practices, NMFS must hold habitat actions to no less a standard than harvest. Specifically**,** NMFS should be directed to:

- Apply at least as stringent a conservation standard to actions affecting salmon habitat as is applied to salmon harvest.[23]

- Ensure that all federal actions affecting habitat contribute to recovery of salmon and orca.

- Develop a comprehensive and timely plan for addressing orca prey consumption needs that does not result in disparate treatment of treaty fishing.

- In areas where NMFS has declined to designate critical habitat, adopt commensurate harvest management policies.

How the federal government is failing in its trust responsibility:

NMFS applies disparate standards under the ESA, by treating harvest management requirements differently than habitat management requirements.

The Endangered Species Act (ESA) created a responsibility for federal actions affecting listed species to provide an adequate potential for recovery, not just maintain the degraded status quo. For example, as a consequence of the Ninth Circuit's decision in *NWF v. NMFS*,[24] the federal operating agencies and NMFS now recognize that the dams comprising the Federal Columbia River Power System are obligated to contribute to the recovery of salmon. In response to the decision, NMFS and the federal action agencies (in consultation with state and tribal co-managers) assessed the proposed operation of the dams and determined that it would jeopardize ESA-listed salmon. They also determined what improvements were necessary to assure salmon survival and "provide an adequate potential for recovery." Generally, any level of population growth greater than 1 to 1 replacement meets NMFS' interpretation of providing an adequate potential for recovery with respect to the Columbia River dams.[25] While there are differences of opinion among states, tribes, and federal agencies as to whether this interpretation adequately addresses recovery, no one questions that there is a recovery obligation on the Columbia River.

The western Washington treaty tribes' harvest plans are designed to contribute to recovery. NMFS has developed an elaborate procedure for determining whether the impacts of tribal harvest will interfere with recovery of Puget Sound chinook. This includes modeling the likely effects of harvest on 22 individual populations that make up the Puget Sound chinook evolutionarily significant unit (ESU). This analysis looks at the current productivity of existing habitat and assesses the likelihood of a given population falling below a certain critical level or rising above a rebuilding level. Using this approach, harvest is managed to assure both survival *and* eventual recovery.[26]

In analyzing the tribes' harvest plan, NMFS also has stated that poor habitat productivity, not harvest, is the factor preventing chinook rebuilding in river systems such as the Nooksack, Puyallup, Sammamish, Skokomish, Dungeness, and Stillaguamish.[27] NMFS' own federal assessment of recovery plan implementation states that harvest has been managed consistently with this obligation to support recovery, while habitat continues to be the limiting factor to recovery.[28]

In stark contrast to the standards applied to the harvest of listed salmon, NMFS' review of the Federal Emergency Management Agency (FEMA) floodplain insurance program does not address Puget Sound salmon recovery. Instead NMFS applies a no net loss standard that attempts, at best, to maintain existing degraded

habitat conditions. In September 2008, NMFS determined that the continued implementation of the National Flood Insurance Program in Puget Sound (and the land use practices that go along with it) jeopardizes the continued existence of chinook, steelhead, summer chum, and orca. FEMA's flood insurance program subsidizes the alteration and destruction of salmon habitat by providing inexpensive insurance coverage for property and structures that are built in the floodplain.[29] As required by the ESA when it finds jeopardy, NMFS designed a "reasonable and prudent alternative" (RPA) as part of its biological opinion (BiOp), to allow the flood insurance program to go forward. NMFS' RPA is intended explicitly to result in no net loss of floodplain habitat and no adverse impact to "protected areas" (riparian areas, floodways, and channel migration zones).[30] In other words, NMFS' RPA is intended to maintain current degraded habitat conditions.

In crafting its RPA, NMFS did not identify management practices intended to address the gap between current productivity of salmon habitat, and what is needed to provide an "adequate potential for recovery," as it did in the Columbia basin. In contrast, NMFS' analysis of the tribes' Chinook Harvest Plan includes harvest rate ceilings which insure that populations will achieve escapement levels consistent with rebuilding abundance, as needed to foster recovery.[31] Essentially, NMFS fails to apply the same escapement and rebuilding levels required of tribes to its habitat protection decision in the FEMA BiOp.

The problem gets worse. Whereas the RPA calls for no adverse impacts in floodways, channel migration zones, and riparian areas, FEMA's response promises more habitat degradation and allows for local governments to permit development in these areas, with mitigation. NMFS is supporting this response.[32] However, the initial failure of mitigation to alleviate the impacts of development in these areas is one of the reasons why treaty rights aren't being met and salmon became subject to the ESA.[33] Moreover, this is bad flood policy because this development impairs watershed flood capacity and exacerbates flood damages.

Along with allowing more habitat degradation, FEMA and NMFS are delegating to local governments the responsibility for deciding what riparian/floodplain salmon habitat still retains value and what habitat can be written off as undeserving of protection.[34] The federal agencies provide no watershed and salmon population context for how these decisions ought to be made. Nor do NMFS and FEMA explain how writing off salmon habitat is consistent with their obligations to support salmon (and orca) recovery and comply with treaty rights. Moreover, local governments have neither the expertise nor the interest in meeting these obligations.

Despite NMFS' findings regarding the crucial need for increased habitat quantity and productivity to reverse declining population trends, the FEMA BiOp and RPA lack specific provisions for improving habitat to assure the survival and eventual

recovery of these populations. By failing to hold FEMA's flood insurance program to the same standard that it holds harvest, NMFS both applies disparate treatment of treaty harvest and fails to apply conservation measures necessary to assure the survival and recovery of salmon (and the orca that depend on them). If Columbia River dams and Puget Sound treaty fisheries had been managed this way, ESA compliance could have been achieved by simply freezing salmon mortality levels to those occurring at the time salmon were listed. Obviously, this has not occurred.[35] To the contrary, exercise of treaty rights has been restricted and millions of dollars have been spent changing both the configuration and the operation of the dams, as needed to assure an adequate potential for recovery.

In "protecting" orca, NMFS focuses on chinook harvest while ignoring other more damaging impacts.

Southern resident killer whales (orca) were listed as "endangered" under the ESA in November 2005. Prior to December 2010, NMFS indicated that harvest did not significantly affect the availability of prey for orca. Since then, NMFS has gathered additional information regarding orca prey requirements, and concluded that further reduction of chinook harvest may be necessary for orca recovery.

The treaty tribes and states of Alaska and Washington have significant concerns regarding the quality of the new data and the assumptions underlying NMFS' analysis. However, should the data withstand rigorous scientific review, they underscore the need to protect and increase overall chinook abundance, not simply reallocate harvest from humans to orcas. Unfortunately, NMFS's current focus on the reallocation of harvest does not address important factors causing orcas' decline, including toxic contaminants, vessel disturbance, noise, and the continued loss and fragmentation of salmon spawning and rearing habitat.

NMFS, in cooperation with the Canadian Department of Fisheries and Oceans, is convening an expert panel and a series of workshops to evaluate the effects of salmon fisheries on orca. The workshops are being focused narrowly on just one factor that affects chinook abundance – harvest. They will not address key factors such as habitat, even though habitat decline is the critical factor limiting chinook abundance.[36] NMFS has declared that it will start identifying alternative harvest regimes in response to the workshop before the process is even complete. Essentially, NMFS is proposing to preempt their scientific process by acting on conclusions yet to be established. By any standard, this is not an objective approach.

If prey availability (i.e. chinook abundance) is an important problem affecting orca, then the federal government needs to address all the key factors. Other actions and policies affecting chinook abundance include land management, such as FEMA's National Flood Insurance Program, pesticide management, evaluation of Puget Sound hatchery programs, and NMFS' recently issued "Population Recovery Approach."

For example, NMFS is consulting with the EPA about the impacts of a number of pesticides on ESA-listed salmon. Despite the evidence that orca are harmed by the toxic chemicals in the fish they eat[37], NMFS has yet to assess the impacts on orca from ingesting chinook exposed to pesticides and other toxic compounds. Given NMFS' findings that several of these chemicals pose jeopardy to Puget Sound chinook,[38] it would logically follow that NMFS should promptly assess the effects of these pesticides on orca, prior to altering harvest regimes and impacting treaty rights. However, NMFS continues to focus on harvest and ignore the impacts of pesticides on chinook, orca, and the tribes' treaty rights, even though action on toxic chemicals would provide benefits for chinook and orca, as well as improve the overall health of Puget Sound and all the people that reside within the region.

In the case of FEMA's flood insurance program, NMFS found that the program jeopardizes both chinook and orca. Since that 2008 finding was made, NMFS has modified its views regarding orca consumption of chinook. As a result, the impacts stemming from the flood insurance program pose even greater jeopardy to orca. Despite this, NMFS maintains its position that the flood insurance program is obligated only to preserve existing habitat conditions. Worse yet, as discussed above, FEMA's plan allows continued degradation of salmon habitat even though NMFS insists that more chinook are necessary for orca to survive and recover.

Again, the federal government imposes one standard on the treaty tribes and a less stringent standard on activities that jeopardize salmon. As a consequence, treaty rights are impaired and the species these rights depend upon will not recover. The federal government needs to address *all* the sources of the problem in a manner that is consistent with the salmon conservation necessity principles established in treaty case law.[39]

Request for Federal Action

II. Protect and restore western Washington treaty rights by better protecting habitat.

The Problem

Although the federal government makes significant investments in restoring degraded habitat, it does not fully exercise its authority to protect the essential habitat that remains. Without these protections, overall habitat will continue to decline. This progressive habitat degradation will make recovery impossible and threatens the ability of tribes to protect, restore and exercise their treaty-reserved rights to fish.

The lack of habitat protection does not stem from an absence of authority – it is caused by the federal agencies' inability to align environmental and conservation programs with recovery efforts, and to effectively implement and enforce existing laws. For example, federal funding from a number of agencies continues to support state environmental and conservation programs that are inconsistent with salmon recovery and do not achieve compliance with state water quality standards. Moreover, federal agencies have not enforced key environmental statutes such as the ESA, which could serve to protect salmon habitat.

The Remedy

Protecting salmon habitat is an essential element of the fiduciary duty to ensure that the tribes can exercise treaty-reserved rights. In implementing this duty, the federal government must employ *all* authorities and tools to leverage better habitat protection. Specifically, we ask the Administration to:

- Require federal funding supporting state programs and pass-through grants to be conditioned so that all funded efforts achieve consistency with state water quality standards and salmon recovery plan habitat objectives. Examples include:
    - Clean Water Act funds, National Estuary Program funds and Coastal Zone Management Act funds should implement actions designed to achieve state water quality standards, total maximum daily loads (TMDLs), and salmon recovery plan habitat objectives.
    - USDA funds, including Farm Service Agency (FSA) and National Resource Conservation Services (NRCS) programs should implement riparian buffers comparable to those that NMFS has called for in its RPA for FEMA's National Flood Insurance

Program, and implement all other practices consistent with TMDLs, water quality standards, and salmon recovery objectives.

- Direct federal agencies to increase enforcement of their obligations to protect habitat, including the Endangered Species Act and Clean Water Act.
- Direct NOAA and EPA to ensure that state shoreline master program updates are consistent with all federal obligations, including treaty rights.
- Direct the Department of Justice to initiate limited water rights adjudication to identify treaty-reserved rights for instream flows in selected watersheds.

How the federal government is failing in its trust responsibility:

Habitat continues to decline despite investments in habitat enhancement.

Salmon recovery is based on the crucial premise that we can protect what habitat remains while we restore degraded habitat conditions. In the effort to restore salmon, many millions have been spent to protect and restore salmon habitat:

- The Salmon Funding Recovery Board has administered approximately **$788 million** in federal, state, and local funds since 1999.[40]
- The USDA's Farm Service Agency Conservation Reserve and Enhancement Program – developed to rebuild salmon habitat on agricultural lands – has allocated approximately **$71 million** since 1998 (80 percent is federal).[41]
- Since 1987, the Department of Ecology has administered approximately **$60 million** in federal clean water funds to protect beneficial uses – namely salmon.[42]

Unfortunately, these and other significant investments in recovery may not be realized because the rate of habitat loss continues to outpace restoration.[43] This decline can be attributed to the fact that current habitat protection is contingent upon the same programs that existed prior to the ESA listing of Puget Sound salmon. Moreover, since ESA listing, these programs have yet to be recalibrated to protect salmon habitat. The result, as the NMFS report explains, is that the current habitat protection system is based on the very same programs that failed to prevent ESA listing.[44] Nonetheless, many of these outmoded tools continue to be funded by federal dollars and authorized by federal agencies without conditions to require recalibration and alignment with recovery objectives.

The federal government approves funding for state programs that should protect salmon habitat, but do not.

The federal government financially supports the development and implementation of Washington's Shoreline Management Act (SMA), because it is the cornerstone of the state's Coastal Zone Management Program (CZMP).[45] As a result, extensive coastal zone management funds have been given to local governments to develop local plans for their shorelines, and to the state government to subsequently approve them. Since these programs relate to the shorelines, they also govern a large portion of critical salmon habitat.

The SMA was adopted prior to the ESA listing of salmon and has never been calibrated to protect the species, habitat, or the financial investments to rebuild habitat. In fact, in some instances, the SMA has been used to undermine it. For example, Washington state's highest court struck down the City of Bainbridge Island's moratorium on shoreline development, passed in part to prevent potential impacts to endangered salmon.[46] The court rejected the city's protective efforts because its moratorium prohibited what the SMA permits – shoreline development for single family residences, including bulkheads, and docks.[47]

Essentially, although the SMA is funded under the guise of coastal protection, it does not serve to protect coastal species such as ESA-listed chinook salmon and its habitat. In fact, as determined by the programmatic biological assessment for the Shoreline Master Program Guidelines:

> Many project types specifically regulated by *and allowed* under the guidelines are likely to adversely affect proposed critical habitat for Puget Sound chinook salmon.[48]

Another problem with the federally funded SMA program is that it employs a standard that is neither quantifiable nor specific enough to provide concrete performance standards to protect salmon habitat. For example, development of new SMA rules, which amended the state's CZMP, prompted NMFS to declare that the rules were so broad that they could not assess the effects of the rules on salmon.[49] Moreover, even the implementing state agency agreed that the SMA contains an incalculable performance standard, which the state then defers to local governments to quantify. [50]

The nationwide permit system is streamlining habitat modification and inhibiting treaty rights.

The U.S. Army Corps of Engineers is responsible for permitting actions that discharge dredge and fill material into waters of the state. These actions commonly include shoreline armoring, stream modifications, and the attending maintenance of those structures. The Corps' nationwide permit process provides a streamlined system for this work. In the Seattle District, approximately 1,000 permits are obtained each year.[51] The resulting cumulative armoring of waterways is a key cause for Puget Sound decline and habitat loss, in part because it affects nearshore fish abundance, distribution, and behavior patterns.[52] Ironically, the Corps' streamlined system helps build the very structures in which we are investing federal funds to remove as part of habitat improvement projects.

State policies are not protecting instream flows necessary for salmon, and federal protection is needed.

For more than four decades, the western Washington treaty Indian tribes have pursued a number of administrative, cooperative, voluntary, and inter-governmental approaches to define and establish the instream flows necessary to protect and restore salmon resources. Unfortunately, each of these efforts has failed to institute a comprehensive effort to establish instream flows to protect and restore fish habitat consistent with the treaty-reserved rights of the tribes.

Tribes are left with few options, because of a combination of the state-based priority date for instream flows (which is junior to most appropriations); municipal water purveyors' ability to dewater streams; the state's broad use of a vague "public interest" exception to override habitat protection; and the unwillingness of the state to enforce its own laws or control the cumulative impacts from permit-exempt wells. Based on the policies of state law, it will be impossible to truly restore or, at best, protect instream flows. The federal government needs to aggressively secure the protection of tribal rights to instream flows and resources through initiation of litigation or limited adjudications.

Enforcement is necessary to implement salmon recovery, yet federal agencies fail to take action.

On July 10, 2000, NMFS published its take guidance for Puget Sound. It listed a range of activities most likely to cause harm to endangered salmon habitat, which therefore violate the ESA. Implementing this guidance is critical to supporting salmon recovery. There appears to be only one instance of NMFS exercising its enforcement authority over these activities during the past decade. [53] Aside from this anomaly, we know of no further instances of NMFS exercising its enforcement authority to protect habitat.

The first item on NMFS' list of harmful activities is constructing or maintaining barriers to fish passage, e.g., fish-blocking culverts.[54] The Washington Department of Fish and Wildlife recently disclosed that 30 percent of randomly sampled culverts, despite receiving a state permit in the last 10 years, still resulted in blocked fish passage.[55] A state report also noted that increased regulatory presence and subsequent enforcement were necessary to ensure that landowners complied with the ESA. However, NMFS has not instituted ESA enforcement to help remedy this.

Another example of an action known to harm salmon is shoreline armoring. Washington's Shoreline Management Act provides an exemption from state regulation for shoreline homeowners who armor their shoreline.[56] Between 2004 and 2008 alone, the Washington Department of Fish and Wildlife granted 456 permits for new bulkheads in Puget Sound. This doesn't include replacement of old bulkheads.[57] However, NMFS has not used its authority to address any of these harmful habitat modifications.

Request for Federal Action

III. Establish federal oversight and coordination to align environmental and conservation programs to achieve salmon recovery and protect treaty-reserved rights.

The Problem

The federal government has a fiduciary responsibility to exercise its authority so that the tribes receive the benefit of the rights they reserved in their treaties. In western Washington, the government's fiduciary responsibility includes the protection and restoration of salmon and the habitat needed to ensure their survival and recovery. However, the process of salmon recovery crosses many jurisdictions, and there is a lack of leadership to ensure that programs are implemented consistently across those jurisdictional lines. This piecemeal approach to recovery has resulted in a lack of agency consistency and the implementation of federal programs that serve neither to recover salmon nor protect treaty rights. For example, NMFS threatens significant changes in approaches to salmon harvest because of orca concerns. However, EPA and NOAA remain complacent about the state of Washington's 17 years of non-compliance with the Coastal Zone Management Act – a key salmon and orca recovery component. In the meantime, federally funded salmon restoration actions are undermined by state and federal permitting processes that degrade salmon habitat.

The Remedy

The tribes seek stronger federal leadership to oversee the salmon recovery process and ensure successful implementation of recovery actions across jurisdictional lines. This leadership must serve to:

- Align funding programs to ensure achievement of recovery objectives.
- Unify federal agencies and resolve inter-agency conflicts to support salmon recovery.
- Hold federal agencies accountable for acts or omissions that lead to disparate treatment of treaty tribes or failing to protect treaty-reserved rights.
- Harmonize federal actions to ensure consistency and compliance with federal obligations and treaty rights.

How the federal government is failing in its trust responsibility:

Federal funding lacks alignment with salmon recovery efforts.

Many state and federal grant programs, while intending to make improvements, lack mechanisms to ensure that projects are consistent with recovery and protect treaty-reserved rights. For example, water temperature is a limiting factor for salmon survival, and many western Washington watersheds are temperature-impaired. To address this type of water pollution, the state, with significant federal funding, follows the federal Clean Water Act process and develops temperature total maximum daily loads, or TMDLs. Temperature TMDLs develop site-specific prescriptions to reduce stream temperatures, which ultimately are approved by EPA.

However, there are no assurances or accountability mechanisms that ensure that these pollution control prescriptions get implemented through relevant federal programs. For example, despite the fact that grants are the only tool used to implement TMDLs, neither the state nor EPA require that grant recipients actually follow the specific requirements of the TMDL. Instead, in an effort to provide assurances of implementation efficacy, the state requires riparian buffers be a mere 35 feet wide, which under most circumstances does not satisfy the requirements of their own TMDLs,[58] let alone the needs of salmon.[59]

Other state and federal conservation programs, such as the Natural Resources Conservation Service and Washington State Conservation Commission grants, also do not require their grant programs to implement these Clean Water Act prescriptions. Instead those programs rely on a planning process that ultimately lets the landowner decide what is best for salmon and water quality, even if those choices are contrary to federally approved TMDLs or salmon recovery plans.

Federal funding is not conditioned to ensure protection of treaty rights.

The tribes have called for state and federal action to better prevent pervasive pollution problems impacting treaty-reserved rights,[60] with little response or change. However, when non-Indian commercial shellfish interests recently cried for relief from fecal pollution problems, the EPA promptly provided $1 million to a local county for a pollution identification and correction program.

Unfortunately, the granting of funds did not include conditions that required the program to be consistent with water quality standards. After funds were turned over to the county, a governor-led inquiry into the process revealed that even the most basic of pollution controls, such as keeping cows out of streams, were not implemented.[61] Despite the EPA funding, a recent downgrading of 4,000 acres of shellfish beds occurred in this area, impairing treaty-reserved rights and prompting the governor to declare the overall effort a "failure."[62]

Federal approval of coastal protection plans has been unlawfully delayed for 17 years.

The Coastal Zone Act Reauthorization Amendments (CZARA), a component of the Coastal Zone Management Act, requires coastal states to develop and implement nonpoint pollution control programs that "restore and protect coastal waters."[63] To receive approval, a state program must meet both statutory and administrative criteria. If a state fails to submit an approvable program, up to 30 percent of coastal management assistance and 30 percent of the Clean Water Act nonpoint source pollution funding is to be withheld.

These programs were supposed to be developed by 1995, but 17 years later, the federal agencies have failed to approve the state's program. Final approval was withheld because of numerous deficiencies in the state's program, including a lack of communication between the involved agencies.[64]

With ESA listing of salmon and orca, the need for coastal protection is now more pressing than ever. Nonetheless, NOAA and EPA continue their complacency with the state's noncompliance, and have failed to rescind funding in accordance with the law. In Oregon, this institutional lethargy resulted in a recent lawsuit filed against NOAA and EPA to compel final agency action under the Administrative Procedure Act. The subsequent settlement ought to result in enforcement of TMDLs along the Oregon coast. Given the critical importance of protecting habitat, it is essential that leadership is exercised to ensure that basic federal obligations in Washington are met, and in a way that better protects salmon and treaty rights.

Leadership and oversight are needed to align salmon protection programs.

The tribes have worked hard to foster salmon recovery while other federally supported programs undermine this progress. Examples include:

- The federal government significantly invests in habitat enhancement, while federally supported programs such as the state Shoreline Management Act and Corps of Engineers permitting processes continue to degrade habitat.

- NMFS requires tribal harvest to foster salmon and orca recovery, while FEMA is allowed to administer its flood insurance program in a manner that results in continued degradation of salmon habitat and fewer orca.

- The federal government prepares to alter treaty harvest requirements because of orca prey needs, but continues a 17-year streak of not

pressuring the state to finalize its coastal nonpoint pollution plan – a key salmon and orca recovery component.

- Funding secured for conservation and environmental protections are handed out without basic conditions and assurances to require that those actions be consistent with recovery efforts.

Leadership and oversight of salmon recovery is critical to ensure that the myriad federal programs relied upon to implement salmon recovery are in fact working together to accomplish this fundamental goal. Federal leadership must be provided to synchronize actions and ensure protection of the tribes' treaty-reserved rights.

Afterword

This paper is an immediate request for action. Faced with waning salmon populations and declining habitat, the tribes fear for the loss of their cultures and treaty rights. For the tribes, fish and fishing are as essential to life as water and air.

Our requests are simple: Stop the disparate treatment of tribes. Start protecting our treaty rights. Provide leadership to ensure that this is done.

We ask you to act now, before it is too late for the salmon and the treaty Indian tribes in western Washington.

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[1] Puget Sound Chinook Salmon Recovery Plan at p. 354

[2] NFMS Northwest Region, Final Supplement to the Shared Strategy's Puget Sound Salmon Recovery Plan, November 17, 2006.

[3] NMFS, Puget Sound Chinook Salmon Recovery Plan – 2011 Implementation Status Assessment Final Report, 2011, at p. 6.

[4] Id at 20.

[5] Id at 15

[6] NMFS, Puget Sound Chinook Salmon Recovery Plan – 2011 Implementation Status Assessment Final Report, 2011, at 6.

[7] Carman, Taylor, and Skowlund, 2010, Regulating Shoreline Armoring in Puget Sound, in Shipman, Dethier, Gelfenbaum, Fresh and Dinicola eds, 2010 Puget Sound Shorelines and the impacts of Armoring – proceedings of a state of the science workshop, May 2009: U.S. Geological Survey Scientific Investigations Report 2010-5254. P. 49-54.

[8] SSHIAP analysis of Washington's 2008 Water Quality Assessment Data.

[9] SSHIAP analysis of data sources: *NOAA-CCAP 2006; NWIFC 2005; NWIFC 2010; WADNR 2010* . Conservatively, riparian forest cover with less than 65% cover has been determined to be insufficient for anadromous salmon and corroborated. However, NOAA has indicated in guidance that 80% cover was properly functioning, and <70% as not functioning. See National Oceanic and Atmospheric Administration, Coastal Salmon Conservation: Working Guidance for Comprehensive Salmon Restoration Initiatives on the Pacific Coast. Washington, D.C., (1996).

[10] Puget Sound Partnership, State of the Sound Report, Ecosystem Status and Trends at pp 80-82 (2009).

[11] Further information about Hood canal D.O. is available at http://www.hoodcanal.washington.edu/

[12] Further information is available in the annual monitoring report: http://www.dnr.wa.gov/ResearchScience/Topics/AquaticHabitats/Pages/aqr_nrsh_eelgrass_monitoring.aspx

[13] The following datasets were used to generate the Impervious Surface analysis and forecast for the Puget Sound region: Washington State Department of Natural Resources (DNR) Watershed Administrative Unit (WAU); NOAA CCAP. Coastal Change Analysis Project: Washington State Impervious Surface Polygons 1986 and 2006. NOAA Coastal Services Center. Charleston, S.C.; WA OFM. 2007. Projections of the Total Resident Population for the Growth Management Act (2000 to 2030, Low to High) Washington State Office of Financial Management. Olympia, WA; WA OFM. 2010. April 1 Population Determinations Official Change from April 1, 2000 to April 1, 2010. Washington State Office of Financial Management. Olympia, WA. WA OFM. 2011. WA OFM web site search to determine 1986 population by county. Using ArcGIS Desktop 9.3.1 Zonal Mean

function, the mean impervious surface value was calculated for each WAU draining to Puget Sound for both the 1986 and 2006 years. The 1986 and 2006 population totals were calculated for the counties containing the WAUs. The 2026 low, medium and high population estimates were also totaled for the same counties. Change values were calculated for population (2006-1986 & 2026 forecast - 2006) and impervious surface (2006-1986). A ratio analysis was performed comparing the change in population to the change in impervious surface to forecast the 2026 impervious surface change. The regional percentage increase in impervious surface was calculated for each WAU to generate the final thematic map using OFM's "High" 2026 county population estimate. The impervious surface categories are based upon the analysis by Tyson Waldo in the 2010/2011 Tulalip State of the Watershed report.

[14] SSHIAP, State of Our Watersheds Report - Principle Findings, 2011, p. 1.

[15] Id at p. 1

[16] Haas, A and Collins B., A Historical Analysis of Habitat Alterations in the Snohomish River Valley, Washington since the Mid-19th Century: Implications for Chinook and Coho Salmon. Report Funded by the Tulalip Tribes with some additional funding from Snohomish County, 2001.

[17] SSHIAP, State of Our Watersheds Report - Principle Findings, 2011, p. 3.

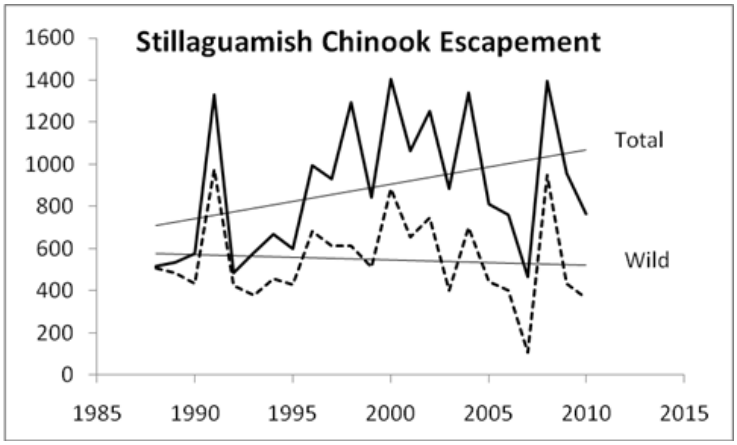
[18] Id. at p. 4.

[19] Id at 5.

[20] The Boldt decision was largely affirmed by the United States Supreme Court in *Washington V. Fishing Vessel Assn.***,** 443 U.S. 658 (1979)

[21] Harvest Rates and Graphs in this section are based upon the following: NWIFC, Analysis of Harvest Data from Tribal Online Catch Accounting System (TOCAS), 2011

[22] Despite dramatic reduction in the harvest rate of Stillaguamish Chinook, which has resulted in an increasing trend in the total number of spawners (escapement), the number of wild fish returning has not increased. Wild productivity is constrained by degraded habitat.



[23] To the extent that conservation-based restrictions on treaty fisheries are necessary, these are governed by the conservation necessity principles established in federal case law and reflected in Secretarial Order 3206.

[24] *See National Wildlife Federation v. NMFS*, 524 F.3d 917, 931 (9th Cir. 2008) (amended opinion) where the court held that NMFS read the species recovery requirement out of the ESA.

[25] *See* NMFS, Supplemental Comprehensive Analysis (May 5, 2008) at 7-5.

[26] *See* NMFS, Proposed Evaluation and Determination on Chinook Plan (12/14/10) (E&D) at 38-39.

[27] *Id*. at 69.

[28] *See* NMFS, Puget Sound Chinook Salmon Recovery Plan – 2011 Implementation Status Assessment Final Report, 2011, at 45 (Harvest plans have been implemented as anticipated. Harvest being managed to meet or exceed established thresholds); *see id*. at 43 (Habitat quality continuing to decline. Current habitat protection tools generally the same as those that failed to forestall ESA listing).

[29] *See* NMFS, ESA Section 7 Consultation Final Biological Opinion: Implementation of the National Flood Insurance Program in the State of Washington, Phase One Document – Puget Sound Region, NMFS Tracking No. 2006-00472) (September 22, 2008) at 3. *See also National Wildlife Federation v. FEMA*, 345 F. Supp. 2d 1151, 1163-65 (W.D. Wash. 2004).

[30] *See* NMFS, ESA Section 7 Consultation Final Biological Opinion: Implementation of the National Flood Insurance Program in the State of Washington, Phase One Document – Puget Sound Region, NMFS Tracking No. 2006-00472) (September 22, 2008) Appendix 4 at 222-223.

[31] NMFS requires that harvest management contribute to recovery by assuring that sufficient escapement occurs to make optimal use of current habitat conditions. Further harvest constraint, to produce higher escapement, would not result in higher productivity beyond the capacity of habitat. In concluding this is sufficient constraint of harvest NMFS, has stated that rebuilding to higher abundance, en route to recovery goals, is contingent on alleviating the habitat constraints, but federal consultations on actions affecting habitat are failing to require that habitat conditions improve.

[32] Public statements by NMFS staff at May 2, 2011 workshop instructing local governments how to comply with the RPA and flood insurance requirements. *See also* Letter from Dan Siemann, National Wildlife Federation, to Will Stelle, NMFS, and Ken Murphy, FEMA (May 17, 2011).

[33] As recently conceded by the Washington Department of Ecology: "Estimates of mitigation success vary, but local, regional, and national studies show that most mitigation projects fail to fully achieve their intended goals and are not effectively replacing lost or damaged resources, habitats, and functions. We are not even close to achieving the goal of no net loss for wetlands and other aquatic habitats." *See* WDOE, Making Mitigation Work: Report of the Mitigation that Works Forum (December 2008) at 1. This report is available at: www.ecy.wa.gov/biblio/0806018.html

[34] FEMA's Model Ordinance, and apparently NMFS' interpretation of its RPA, allows local governments to decide (regardless of expertise): (a) whether a given piece of floodplain or riparian habitat retains any fish habitat functions (*See* FEMA Revised Model Ordinance at 46 (commentary)); (b) whether a proposed action may affect any of these habitat functions (*Id*. at 52, §7.7(d)); and (c) how those impacts should be mitigated (*Id*. at 52-53, §7.8).

[35] While it is not yet fully recognized in the land management realm, harvest managers have long understood that they have a duty to manage salmon as needed to perpetuate harvestable runs. *See e.g., Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n*, 443 U.S. 658, 684 (1979).

[36] See NMFS, Puget Sound Chinook Salmon Recovery Plan – 2011 Implementation Status Assessment Final Report, 2011

[37] *See* NMFS, Recovery Plan for Southern Resident Killer Whales (Orca) (2008) at II-87-96.

[38] *See e.g*., NMFS, ESA Section 7 Biological Opinion on the Effects of EPA Registration of Pesticides Containing Carbaryl, Carbofuran, and Methomyl (April 20, 2009) (finding that registration of such pesticides would result in both jeopardy and adverse habitat modification to Puget Sound Chinook); *see also* NMFS, DRAFT ESA Section 7 Biological Opinion on the Effects of EPA Registration of Pesticides Containing 2,4-D, Triclopyr BEE, Diuron, Linuron, Captan, and Chlorothalonil (May 2011 DRAFT) (finding that registration of pesticides containing 2,4-D jeopardizes Puget Sound Chinook and that adverse modification of habitat results from use of pesticides containing diuron, and chlorothalonil).

[39] The Departments of the Interior and Commerce have some familiarity with the conservation necessity principles. They are referenced in Principle 3 of Department of the Interior Secretarial Order 3206, American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act (June 5, 1997).

[40] Governors Salmon Recovery Office, State of Salmon in the Watersheds Report, 2010, at p. 20.

[41] Based upon correspondence with Washington State's CREP coordinator

[42] Based upon correspondence with Department of Ecology's nonpoint source pollution (CWA § 319) coordinator

[43] NMFS, Puget Sound Chinook Salmon Recovery Plan – 2011 Implementation Status Assessment Final Report, 2011, at 43.

[44] *Id*.

[45] Department of Ecology, *Managing Washington's Coast, Washington's Coastal Zone Management Program*, Publication 00-06-029, February 2001, at p. 98.

[46] *Biggers v. City of Bainbridge Island*, 162 Wash.2d 683 (2007).

[47] *Id* at 698.

[48] National Oceanic and Atmospheric Administration - Ocean and Coastal Resource Management, Washington State Shoreline Master Program Guidelines Programmatic Biological Assessment, March 15, 2005.Page 7-12, emphasis added

[49] Letter From Steven W. Landino, Washington State Director for Habitat Conservation Division of the National Marine Fisheries Service to John King, Chief Coastal Programs Division NOAA Office of Ocean and Coastal Resource Management, re: Endangered Species Act Section 7 Informal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for NOAA's proposed approval of the Washington State Shoreline Master Program guidelines promulgated by the Washington State Department of Ecology, April 23, 2009.

[50] In Washington State Department of Ecology's response to comments on Coastal Zone Management Section 309 Program Assessment and Strategy 2011-2015, the agency stated the following: "The [shoreline master program] SMP process involves conducting a cumulative impact analysis to determine whether or not the SMP will result in no net loss of ecological functions…However, at this time there are no broad tools available to quantitatively measure cumulative impacts, and jurisdictions are responsible for developing their own analysis."

[51] According to a recent meeting with the Corps in the Seattle district regarding renewal of nationwide permits

[52] Toft, J.D., Cordell, J.R. Simenstad, C.A. and stamatiou, L.A. 2007 fish distribution, abundance, and behavior along city shoreline types in Puget Sound: North American Journal of Fisheries Management, v. 27, p 465-480.

[53] On June 15, 2011, Darigold, Inc., pleaded guilty to dumping ammonia from its milk-processing plant into an adjacent creek, which resulted in the death of several ESA-listed Puget Sound chinook salmon. The corporation signed an agreement to pay a $10,000 fine and to donate $60,000 to a non-profit foundation to pay for habitat restoration work. In addition, the corporation committed to develop an environmental compliance plan to address risks at the half dozen plants it operates in five western states. EPA agents involved in the enforcement action noted that Darigold has a history of spills over the last decade in Washington streams. Seattle Times, Darigold Pleads Guilty to Federal Polluting Charges (June 16, 2011), http://seattletimes.nwsource.com/html/localnews/2015331678_darigold16m.html (accessed June 16, 2011).

[54] 65 Fed Reg 42472 (July 10, 2000) (NMFS Take Guidance).

[55] *See* Price, D., Quinn, T., and Barnard, J. Fish Passage Effectiveness of Recently Constructed Road Crossing Culverts in the Puget Sound Region of Washington State, North American Journal of Fisheries Management 30:1110–1125 (2010).

[56] *See* RCW 90.58.030(3)(e)(ii) (Shoreline Management Act exempts from regulation "construction of the normal protective bulkhead common to single family residences").

[57] *See* Seattle Times "Beaches Suffer as Walls Go Up" by Warren Cornwall and Justin Mayo (May 13, 2008) found at http://seattletimes.nwsource.com/html/localnews/2004409777_growth_shorelines15m1.html.

[58] *See e.g.* Washington State Department of Ecology, Stillaguamish River Watershed Temperature Total Maximum Daily Load Study, March 2004, Publication No. 04-03-010, at p. 71 *stating* that the load allocation for effective shade for all perennial streams in the Stillaguamish River watershed is the maximum potential effective shade that would occur from mature riparian vegetation.

[59] Washington State Department of Ecology, SFY 2012-2013 Water Quality Financial Assistance Guidelines, August 2010.

[60] *See e.g.* Lummi Nation letter to EPA, or Upper Skagit Tribe letter to Governor Gregoire.

[61]Government Management Accountability & Performance regarding Puget Sound, April 06, 2011 8:30am available at

http://www.tvw.org/media/mediaplayer.cfm?EvID=2011041010&CFID=4788631&CFTOKEN=15725173&bhcp=1

[62] *Id.*

[63] 16 USC § 1455b (a)(1)

[64] NOAA and EPA's Findings For The Washington Coastal Nonpoint Program

Scoping Memorandum concerning the Pacific Gateway Terminal

Tourism Matters to the San Juan Islands

Prepared By: Dean Runyan Associates
Prepared For: Washington State Tourism Office

2010

Tourism Matters to the San Juan Islands

Tourism infuses "new" dollars into San Juan County's economy which are disbursed throughout our Island communities. In 2009, visitors spent $116.5 million in the Islands. The San Juan Islands Visitors Bureau and the Islands' tourism industry recognize that the economic vitality of tourism is only sustainable if our natural beauty, rural character and watchable wildlife are preserved. Our goals and missions guide us all to instill an environmental stewardship ethic in our visitors, promoting responsible, low-impact visitation to our beautiful Islands.

What does tourism mean for Washington State?

- Tourism is Washington State's 4th largest export industry, following software, aerospace and agriculture/food.
- Total direct visitor spending in Washington was $14.1 billion in 2009. Visitor spending accounted for just under $1 billion in local and state tax revenue in 2009.
- Tourism supports 144,000 jobs and $4.1 billion in earnings in Washington State.

What does tourism mean for San Juan County?

- **Visitors Spend "New" Money in our County:** In 2009, visitor spending in San Juan County was $116.5 million.

- **Visitors Create Small Businesses & Jobs:** In 2009, 1,580 jobs were generated by travel spending. Industry earnings generated by travel spending were $39.4 million in 2009. San Juan County is one of six non-urban counties in Washington with more than 10 percent of travel-generated jobs.

- **Visitors Help Support Our County Through Taxes:** In 2009, visitors generated $2.1 million in local tax receipts to help support our parks, museums, community centers/theaters, county fair grounds and essential services such as roads, schools, etc. Visitors' tax dollars help keep resident-paid taxes lower. Visitors to our county generated $6.2 million in state tax receipts.

- **In 2009 visitors spent their money on the following in San Juan County:**
  - $37.9 million on food and beverage services
  - $30.3 million on accommodations
  - $17.8 million on arts, entertainment and recreation
  - $16.4 million on retail sales
  - $ 7.8 million on food stores
  - $ 6.2 million on local transportation and gas

Source: Washington State County Travel Impacts 1991-2009, prepared by Dean Runyan Associates for the Washington State Tourism Office

Scoping Memorandum concerning the Pacific Gateway Terminal

San Juan Tourism

Prepared By: Deborah Hopkins Buchanen
Executive Director
San Juan Islands Visitors Bureau
For: Friends of the San Juan

January 2013

Deborah Hopkins Buchanan
Executive Director
San Juan Islands Visitors Bureau

1. **1. 700,000-1,600,000 visitors to the San Juan Islands between annually.**

According to the Washington State Office of Financial Management, average annual visitation to all state parks in San Juan County typically ranges from around 1,300,000 to around 1,600,000. This includes visitation to more than fifteen sites managed by Washington State Parks in the islands—Moran State Park on Orcas, Lime Kiln Point State Park on San Juan, and various other smaller parks and marine parks on other islands. State parks visitation in the county reached a high of 2.24 million in 2004. Visits are calculated as visitor "days"—one visitor's presence during a single day in a state park. Moran State Park visitation reaches to nearly 700,000 annually (including travelers passing through the park) and Lime Kiln Point State Park visitation is typically above 200,000. The visitation includes residents of the islands as well as day-use and overnight visitors. (*Source: Dean Runyan Associates, Economic Impacts to Visitors of Washington State Parks*).

My source for numbers is our Scenic Byways Corridor Management Plan, Section 5, found here:
http://sanjuanco.com/ScenicByWay/Default.aspx

2. **2. San Juans are an international Destination**

New York Times: The 41 Places to Go in 2011—listed as the number 2 place to visit in the world, in between Santiago, Chile as number 1 and Koh Samui, Thailand as number 3. (Editor's tagline related to the San Juan Islands: "Bold-face restaurateurs vie with unspoiled nature. Nature wins."), National Geographic Traveler: The world list featured San Juan Islands as number 3 in the 10 Best Trips of Summer 2011, "all about weather, whales, and water", Travel + Leisure: World's Best List in 2011 and 2010, the number 4 position for Top Islands (moving up from number 5 in 2009), Life: 100 Places to See in Your Life Time, July 2011, USA Today: Best Wildlife Watching Spots in Each State, July 2011, Lonely Planet: US Islands that Won't Break the Bank, July 2011, New York Times: A Directory of Rare Wonders, May 2011, HUFFPOST TRAVEL: 10 Best Whale Watching Destinations Around the World, April 2011, The TODAY Show, NBC: Affordable Secret Island Getaways, April 2011, AOL Travel: Six Best Beach Vacation Spots in the Pacific Northwest, February 2011, Sunset magazine: "One of the Best Coastal Vacation Spots in the West 2010"

There's even more articles & info on our website under "San Juans in the News" at
http://www.visitsanjuans.com/media/san-juans-in-the-news?utm_source=www.VisitSanJuans.com&utm_medium=Teaser%2BAd&utm_content=Front%2BPage

3. **Outdoor industry generates $116.5 million dollars to SJ County and creates 669 local jobs.**

Dean Runyan, 2009. A National Park Service Visitation and Payroll Study for the San Juan Island National Historic Park identified 209 jobs and approximately $33 million from income were generated by visitors to the SJINHP in 2010. A multiplier of 3 was used to normalize this information for 700,000 visitors to the county.

We don't have specifics re: the outdoor industry, but I recall that the EDC did a study on kayaking re: the west side and new NOAA regulations 2-3 years ago which Victoria Compton should have.

4. Outdoor industry generates $8.5 Billion dollars to Washington State, creates 115,000 jobs.

In Washington State: Active outdoor recreation: $8.5 billion in retail sales and services (3.5% of gross state product) 115,000 jobs $650 million in sales tax revenue. (3.5% of gross state product) 115,000 jobs $650 million in sales tax revenue (Source: Outdoor Industry Foundation study, 2006)

Forest Ethics estimates recreation contributes $10.8 billion to our state economy and creates 165,000 jobs. (Source is the Washington Department of Ecology, year ???).

"In nonmetropolitan America today, areas with significant natural amenities, recreational opportunities or quality of life advantages have new prospects for growth and development. Many nonmetropolitan areas that are seeing significant population growth benefit from scenic landscapes, mild climates, proximity to rapidly growing metropolitan areas, or a combination of these elements." (Source: Carsey Institute, Univ. of New Hampshire. Demographic Trends in Rural and Small Town America 2006).

Scoping Memorandum concerning the Pacific Gateway Terminal

Brief Description of Examples of Federal and State Protected Lands in San Juan County

Prepared By: Friends of the San Juans

January, 2013

FEDERALLY PROTECTED LANDS IN SAN JUAN COUNTY

San Juan Island National Historical Park

This Park encompasses 1752 acres and 6.1 miles of shoreline, the most extensive publicly accessible shoreline in the San Juan Islands. The National Park Service mission is to preserve park resources unimpaired and provide for visitor enjoyment of this precious place. The park receives more than 250,000 visitors each year and is an important piece in the mosaic of attractions that draws tourists to the islands.

San Juan Islands National Wildlife Refuge

San Juan Islands National Wildlife Refuge ("SJNWR") consists of 83 rocks, reefs, grassy islands, and forested islands scattered throughout the San Juan Islands of northern Puget Sound. These islands, totaling almost 450 acres, were set aside to protect colonies of nesting seabirds, including pigeon guillemots, double-crested cormorants, and pelagic cormorants.

The San Juan Islands National Wildlife Refuge is comprised of 83 specks of land of which 80 have been designated Wilderness. It is a sanctuary for gulls, cormorants, guillemots, puffins, brants, oystercatchers, auklets, and bald eagles and attracts a variety of other wildlife, including bald eagles and harbor seals. In order to help maintain the natural character of these islands, all the refuge islands except Matia and Turn are closed to the public. These two see considerable public use and are managed by cooperative agreement with Washington Department of Parks and Recreation. On Matia Island, only 5 acres are considered Marine State Park, with the remaining 140 acres included in the San Juan Islands Wilderness. Many of the SJNWR islands are adjacent to shipping lanes that vessels will pass transiting through the San Juans

The United States Bureau of Land Management (BLM) manages about 1,000 acres in the San Juans. Spread over about 75 sites including dozens of small islands and reefs that provide breeding grounds for birds and safe refuges for everything from harbor seal pups to rare plants. These lands also shelter historical sites - from ancient fishing sites and camas gardens to pre-automation light houses on Patos Island and Turn Point. And they include popular recreation destinations like Iceberg Point, Chadwick Hill and Watmough Bight on Lopez; the campgrounds on Patos Island, Posey Island and Blind Island; and the site of the Cattle Point lighthouse on San Juan Island.

THE FRIDAY HARBOR MARINE PRESERVE[1]

The Friday Harbor Marine Preserve is one of the five San Juan Marine Preserves created in 1990 in conjunction with the University of Washington's Friday Harbor Laboratories (FHL). Washington Department of fish and Wildlife (WDWF) created these partial-take reserves after FHL requested that the intertidal and subtidal waters adjacent to their upland biological preserves be protected from harvesting pressure for bottomfish and invertebrates.

The primary goals of this reserve are to foster stewardship of unique or important resources or habitats, provide research and education areas, and provide baseline areas or reference sites. Research and monitoring is actively conducted in this reserve by WDFW and UW scientists and students.

The Friday Harbor Marine Preserve is the second largest WDFW marine reserve in inland marine waters of Washington. The University of Washington and its FHL own almost all of the uplands. Most of the shore habitat consists of bedrock cliffs and ridges with sand or rocky grottos punctuating small headlands. The rocky shore habitat steeply descends as bedrock walls and boulder fields into the subtidal zone. Unconsolidated substrates meet the walls and boulder fields at various depths. Inside Friday Harbor, sand and mud substrates predominate and meet the rocky habitats at depths of 15 feet (mllw). However, in San Juan Channel, the rocky slopes may extend to depths greater than 100 feet before coarse unconsolidated sediments are found. The unconsolidated sediments likely dominate the offshore extensions of the reserve to depths of over 400 feet (mllw), and boulders and cobbles likely occur throughout the deeper habitat.

The nearshore subtidal habitats have a variety of marine vegetation. In the shallow sections inside Friday Harbor, patches of eelgrass (*Zostera marina*) persist. As the habitats become more rocky toward San Juan Channel, bladed kelps such as *Laminaria saccharina* and *Costaria costatum* and foliose red algae become abundant in the photic zone.

The rocky habitats support rockfishes, lingcod, and greenlings. The pelagic and schooling Puget Sound rockfish (*Sebastes emphaeus*) is the most abundant rockfish followed by the demersal copper rockfish (*S. caurinus*). Lingcod (*Ophiodon elongatus*) are very common in this

[1] **The Washington Administrative Code (WAC 220-16-440(2)** established the Friday Harbor Marine Preserve for "Those tidelands and bedlands adjacent to San Juan Island within a line beginning on the shore 500 yards west of Point Caution, thence 500 yards offshore, thence south and east following the shoreline to the intersection with a line projected from a University of Washington marker located 100 feet north of the north entrance of the floating breakwater of the Port of Friday Harbor and projected towards Reid Rock Buoy, thence along said line to shore on San Juan Island." *Effective since **3/31/1990***.

reserve and use the rocky habitats for nesting to a high degree. Other large species present at the site include kelp greenling (*Hexagrammos decagrammus*), cabezon (*Scorpaenichthys marmoratus*), tiger rockfish (*S. nigrocinctus*), and black rockfish (*S. melanops*). Small fishes present inside the reserve include longfin sculpin (*Jordania zanope*), scalyhead sculpin (*Artedius harringtoni*), and blackeye goby (*Coryphopterus nicholsii*).

The Friday Harbor Marine Preserve contains a high diversity of marine invertebrates dominated by a rich community of encrusting organisms. Large macro-invertebrates that are common include Puget Sound king crab (*Lopholithodes foraminatus*), red sea urchin (*Stronglylocentrotus franciscanus*), red sea cucumber (*Parastichopus californicus*), sunflower star (*Pycnopodia helianthoides*), and shrimp (*Pandalidae*). Harbor seals (*Phoca vitulina*) and northern sea lions (*Eumetopias jubatus*) are observed within the reserve boundaries.

WDFW manages the site as partially-protected marine reserve for non-tribal citizens. WDFW regulations prohibit commercial and recreational fishing for bottomfish and classified shellfish. Recreational and commercial fishing may occur for the harvesting of salmon, trout, and forage fishes except that commercial fisheries for forage fishes are limited to Pacific herring (*Clupea harengus pallasi*).

WDWF scientists actively study the response of marine fish to the marine reserves at this site and have engaged in survey activity since the early 1990's. The site is visited during the winter when special surveys are conducted to assess lingcod abundance and nesting activity. Another series of springtime surveys is conducted on a periodic basis to assess the species composition, density, and size of bottomfishes inside the reserve.