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State of Washington, Energy Facility Site Evaluation Council
P.O. Box 43172
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https://ts.efsec.wa.gov

RE: Tesoro Savage, Vancouver Energy Project – Application No. 2013-01

Dear Mr. Posner:

The Columbia River Inter-Tribal Fish Commission (CRITFC) appreciates the opportunity to provide comments to Washington's Energy Facility Site Evaluation Council (EFSEC) on the Vancouver Energy Project proposed by the Tesoro and Savage companies (Project). CRITFC is a consortium of the four Columbia River treaty tribes, the Yakama, Nez Perce, Warm Springs and Umatilla, who established CRITFC in 1977 for the tribes to coordinate their management and regulation of off-reservation treaty fishing activities in and along the Columbia River. CRITFC maintains technical capabilities to assist its member tribes in these matters.

The four treaty tribes of the Columbia River have been a part of this region since time immemorial. These tribes reserved the right in their treaties to "take fish at all usual and accustomed" fishing locations. EFSEC must understand that these federally-protected treaty fishing locations are anywhere on the river, at any location where there are fish.

The tribal people of the Columbia River have a unique relationship with this great resource. The water, fish and other resources of the Columbia have sustained tribal people since time immemorial. Yet, for the last two centuries, tribal people have born the greatest burdens from development and resource extraction.

The proposed Vancouver Energy Project is the latest in a long line of developments where the tribes will unfairly carry the risks at a cost to their river resources, their treaty fishing rights, and their home. The Project will pose significant risks to aquatic resources of the river, threaten the safety of tribal members exercising their treaty rights, and add more burden to the ecosystem of the Columbia River. Washington, Oregon, tribes, and the federal government are working hard and spending billions of dollars to restore Columbia River ecosystem functions so that this

region can face the challenges of climate change. The Project is in absolute conflict with these efforts, and should not be approved.

CRITFC has diligently sought to analyze the multi-volume DEIS and provide these comments within the sixty days provided for review. The time and resources available to CRITFC and its member tribes to complete this review are very limited. We reserve the right to supplement our comments, particularly after reviewing the information submitted by other commenters on the DEIS. For example, our attached technical comments do not focus on important aspects of tank car and rail crossing safety or addressing gaps in first response. This is not due to the absence of tribal concerns, but due to the lack of resources available to CRITFC and its member tribes to address these complex matters in the time allotted.

The DEIS Fails to Adequately Analyze the Aquatic Resources, Upon Which the Tribal People Depend.

In the words of EFSEC Chair William Lynch, "what is the risk here for the Columbia River?"[1] The DEIS is deficient in analyzing various risks and threats to resources of the Columbia River, all the while ignoring many of the effects the project will have on the tribes. Further, the DEIS frequently underestimates the level and scope of impacts to resources it does analyze.

The DEIS's analyses of oil spill risk and consequences to important resources of the Columbia River are not adequate. The DEIS apparently assumes that a small or medium oil spill on the Columbia River can be contained, affecting no more than two to seven miles of this great river. Yet, actual experience from a 1984 spill demonstrates that a small oil spill can spread quickly and cause widespread damage. This spill, which occurred just downstream from Vancouver, Washington, oiled beaches within three days far downriver as the mouth of the Columbia River, as well as on the Washington coastline, and in Willapa Bay.

The DEIS neglects to analyze important aquatic species that would be very sensitive to the effects from the Project. Interestingly, the DEIS addresses pink salmon and green sturgeon, neither of which are focal species in Columbia River resources management. Yet, the DEIS fails to analyze effects to white sturgeon and Dungeness crab, both of which are iconic species of the Columbia River. Similarly, chum salmon, which are listed has threatened under the Endangered Species Act and whose spawning grounds are near the Washington shoreline adjacent to rail shipping lines and in the estuary in Washington's Grays River, are barely addressed in the DEIS.

The in-water work window for construction at the Project terminal is proposed to occur during the peak fall chinook run in the Columbia River, which last year totaled over 900,000 fish at Bonneville Dam. The DEIS does not consider the effects of constructing the project on these fish, nor does it consider that Pacific lamprey, an important tribal resource that has suffered a serious decline in numbers, may also live in the area around the terminal. Recent studies have demonstrated lamprey spawn in rear at locations in the Columbia River near the proposed project site that were unknown previously.

[1] See, Verbatim Transcript of Monthly Council Meeting Washington State Energy Facility Site Evaluation Council (Buell Realtime Reporting LLC) at 30, lines 16 – 19 (Nov. 24, 2015).

For all of these omissions, it is clear that the DEIS is not close enough to be finalized. EFSEC's work is not done; the DEIS must be supplemented – and reviewed – to analyze the effects of the project on these species.

The DEIS Fails to Analyze the Unique Impacts to Tribal People.

There are currently hundreds of tribal fishing families that use in-lieu and treaty fishing access sites. Many tribal people lost their homes when the United States built its series of hydropower dams and flooded villages and towns along the river. Now those who live along the river and the rail are concerned about their safety and welfare affected by fossil fuel transportation proposals.

The railroads on both sides of the river were constructed a millennia after the tribes were here, and the railroads do not hold greater rights than the tribal people who are exercising their treaty rights. The Project will add significantly more unit trains carry crude oil through the Columbia River Gorge which will have profound impacts to tribal members and their access to the river. Currently, the risk of train strike to tribal members crossing the railroad is too high; more trains will make this access even more treacherous.

Washington State has noted in various documents that the BNSF railroad through the Columbia River Gorge is nearing capacity, so that means building more railroad tracks in a national scenic area along our sacred river. That is unacceptable. Union Pacific is already shipping Bakken crude on the south side of the Columbia River and any assumption that all oil shipments to the Vancouver Energy facility would occur only on rail lines located in Washington challenges common sense.

Trains derail for various reasons, but the Gorge presents some very high risk challenges. The fact that these trains also carry highly volatile, toxic, and potentially damaging material elevates the risk to the environment by a magnitude. If a crude train derails carrying volatile Bakken crude, the explosion and fire could be devastating to our tribal members living along the river, our fishing communities, and the river that sustains them.

There are not enough first responders and related resources along the Columbia River to respond to any catastrophic event. Most of the communities in the area are supported by volunteer fire departments with few resources. It would take hours for any services to arrive on site. The fisheries enforcement department of CRITFC provides important first responder capabilities on the Columbia River itself and at treaty fishing access sites and In Lieu sites along the Columbia River. Their capabilities would be overwhelmed by an oil train derailment in the Columbia River Gorge.

We appreciate your time to review our comments. Attached to this cover letter are CRITFC's technical comments on the DEIS for the Vancouver Energy Project. We also herein incorporate by reference and adopt the comments of CRITFC's member tribes. Any questions regarding these comments may be directed to Julie Carter at CRITFC's offices.

Sincerely,

Babtist Paul Lumley
Executive Director

Attachment

Tesoro Savage Vancouver Energy Distribution Terminal
Draft Environmental Impact Statement
Technical Comments - Columbia River Inter-Tribal Fish Commission

The Vancouver Energy site is nearly 100 miles upstream from the ocean, on a dynamic river that has fourteen anadromous fish species listed under the Endangered Species Act (ESA). The environmental impacts to develop and operate the proposed action on this site, particularly in the face of certain climate change impacts, will be significant and are unwarranted.

The following comments are preliminary. The information gaps in the DEIS are so significant that the capability to fully address the gaps in this limited comment period was beyond the tribes' current means. The burden of filling these information gaps should rest on the applicant and the Energy Facility Site Evaluation Council, not the tribes.

I. THE DEIS DOES NOT ADEQUATELY CONSIDER THE PROJECT'S EFFECTS ON TRIBES AND TRIBAL RESOURCES.

The treaty tribes of the Columbia River have been a part of this region since time immemorial. There are hundreds of tribal fishing families' members that use in-lieu and treaty fishing access sites. Many tribal people lost their homes when the U.S. built its series of hydropower dams and flooded villages and towns along the river. Now those who live along the river and the rail are concerned about their safety and welfare.

1. Usual and Accustomed Fishing Places

Treaty protected Usual and Accustomed fishing places within the rail corridor are extensive and certainly not limited to the few sites noted in the DEIS. In negotiating and assenting to the their treaties, the Columbia River tribes reserved not only the right to take fish at their usual and accustomed places, but also retained a property right in adjacent lands "to the extent and for the purpose mentioned" in the treaties. *U.S. v. Winans*, 198 U.S. 371, 381 (1905). *Winans* affirms the rights of tribal members to make such use of the land surrounding the usual and accustomed sites as is essential to the full exercise of their treaty fishing right. The *Winans* Court considered the treaty language as a whole, and found that this language, taken together with the social and factual setting of the treaty negotiations, supported the right of access.

> The contingency of the future ownership of the lands, therefore, was foreseen and provided for -- in other words, the Indians were given a right in the land -- the right of crossing it to the river -- the right to occupy it to the extent and for the purpose mentioned. No other conclusion would give effect to the treaty.

Winans at 381. The circumstances of the treaty negotiations and the specific language of the treaties illustrate the dependence of the Indian's way of life on the salmon harvest, and the emphasis they placed on protecting their existing fishing activities on the Columbia River.

Although the DEIS notes the existence of the tribes' treaty rights, DEIS 3.13.2 (page 3.13-14), the discussion of impacts is fatally flawed. The one paragraph statement that increased rail traffic will not have much impact on access or treaty protected resources is devoid of any analysis. DEIS 3.13.3.2 (page 3.13-17). There are hundreds of gillnet sites within this area and many of these are accessed by both land and water. Almost all land access in the area requires crossing the railroad tracks. Many of the crossings are dangerous.

2. Train strike

Over the years, tribal fishers transiting to or from fishing sites have been killed or injured by trains. In addition, a CRITFC Enforcement Officer was also killed by a train while on duty. In many of the areas along the river, when the wind is blowing, one cannot hear a train coming until it is too late. The inability to hear the trains, coupled with difficult lines of site in many places leads to very dangerous areas that tribal fishers encounter on a regular basis. Increasing the numbers of trains through this area will magnify an existing, deadly risk to tribal fisheries as well as CRITFC's enforcement officers and site maintenance staff.

On the Washington side of the Columbia River there are nine In-lieu and Treaty Fishing Access sites with at grade crossings, four more sites adjacent to the railroad tracks, and all other sites within the vicinity of the railroad. On the Oregon side of the Columbia River, there are 10 more in lieu and treaty fishing access sites. These sites provide vital access to the river for treaty fishers, they are key sites for commercial buyers and several of the sites are occupied year round by tribal members and their families. http://www.critfc.org/for-tribal-fishers/in-lieutreaty-fishing-access-sites/ The DEIS fails to recognize that the ability to cross the railroad to get on these sites or access the River is already encumbered by rail transportation through the corridor. While there is a cursory acknowledgement in the DEIS that adding more trains could further reduce access to the sites, there is no discussion of the impacts reduced access will have on tribal members, their families, their commercial enterprises or the staff that patrol and service the sites.

3. Water quality and Tribal Fish Consumption Rates

The DEIS evaluates the risks of crude oil spills related to operations at the terminal and in the rail and vessel transport corridors. The DEIS considers actions in the event of potential crude oil spills and acknowledges the need for cleanups to meet Federal and state regulations. An important factor to consider in any cleanup liabilities along the Columbia River corridor and the terminal facility will be the requirement to use tribal fish consumption rates as the basis for cleanup levels and discharge limits, which the DEIS fails to acknowledge. Fish consumption rates are parameters in human health risk assessments and are used making regulatory decisions under the Clean Water Act and by states to establish minimum cleanup levels. In 1994 CRITFC

published a report entitled “A Fish Consumption Survey of the Umatilla, Nez Perce, Yakama, and Warm Springs Tribes of the Columbia River Basin” and reported that fish consumption rates of tribal people is significantly higher than the default vales used in most federal regulations. Surveys of tribal people in Washington indicate that fish consumption rates at the 95th percentile range from 176 – 306 grams/day.

Washington State is currently in the process of revising the fish consumption rates used in setting its water quality standards and environmental cleanup regulations. These changes will have considerable impact on the ability of the Facility to demonstrate the financial ability to compensate state and local governments for damages arising from a worst-case spill. Washington’s Model Toxics Control Act (MTCA) Cleanup Regulation which are referenced in the Draft EIS, establishes cleanup levels for surface waters using a fish consumption rate of 54 grams/day (g/day) and a fish diet fraction of 0.5 (WAC 173-340-730, Equations 730-1 and 730-2). The default fish consumption rate and fish diet fraction results in an effective fish consumption rate of 27 g/day. For spills from the proposed Facility and along the transport corridors which are located in tribal usual and accustomed fishing areas, cleanups will require the use of higher fish consumption rates based on tribal data. WAC 173-340-730 (1)(e) states that “[t]he department may require more stringent cleanup levels than specified in this section where necessary to protect other beneficial uses or otherwise protect human health and the environment.” WAC 173-340-708 (10) allows for the default fish consumption rate to be changed under MTCA “when necessary to establish a more stringent cleanup level to protect human health.” Ecology provided this flexibility to change the default fish consumption rate in recognition of new evolving information that may become available for different fish-consuming populations and site-specific conditions.

II. THE DEIS GENERALLY UNDERESTIMATES THE EFFECTS OF THE PROJECT ON THE ENVIRONMENT.

The DEIS underestimates the scope and level of effects from this enormous proposal. The proposed terminal is very large and will be served by four unit trains (of 120 tank cars) per day, each carrying 30,000 gallons of crude oil. The shipping required to serve the terminal would result in a 223% increase in large deep-draft vessels in the lower Columbia River. Moreover, the project is contemplated to have a lifespan of multiple decades. Generally speaking, there is significant environmental risk associated with the project, chemically and physically, to aquatic species, water quality, air quality, and the area habitat.

The increased risk ranges from the small relatively subtle changes (that result from chronic chemical or physical damage such as PAH releases or wake stranding) to large but less likely spills. Both types of events can affect species and habitats for many decades, as shown in previous spill experiences in other locations. The existence of “increased risk” is relatively easy to identify and list (e.g. small spills, wakes, large spills, clean-up procedures), but these risks are very difficult to evaluate over a decadel periods. Some risk statistics can be helpful, such as frequency of spills and volumes of oil spilled from previous events (measureable parameters),

yet the biological significance of such events are very difficult to understand and quantitatively estimate. For example, the 1984 *Mobiloil* spill near RM 88 (arguably the most relevant spill to the proposed project), where the volume of oil spilled was estimated (over 3000 barrels) yet the number of birds killed remains unknown because collected carcasses were not enumerated, and bird populations were not monitored before or after the spill. The evaluation of risk for any future project is a very imprecise measure at best. High levels of risk and uncertainty merit precautionary approaches when important biological resources may be impacted.

III. THE DEIS UNDERESTIMATES THE SEVERITY AND SCOPE OF EFFECTS THAT AN OIL SPILL COULD HAVE IT WILL HAVE ON THE ENVIRONMENT.

Since the Exxon-Valdez oil spill in 1989, which affected Prince William Sound and the Kenai Peninsula, the scientific understanding of the effects of oil on fish, including salmon, has grown significantly. The effects of this spill were extensively studied and many papers were published in various scientific journals. This tragedy in Prince William Sound allowed a unique opportunity for scientists to evaluate the effects of a crude oil spill in a relatively pristine environment, as opposed to other developed regions where other pollutants can confound results. It is important to consider the scientific publications addressing the effects of the Exxon-Valdez spill, which the DEIS largely fails to do.

Effects of crude oil spills will vary based on where the spill occurs, the amount and type of crude oil spilled, and the ecosystem in which the spill occurs. Therefore, it is very important to review literature for a number of studies, which this DEIS fails to do. The Gulf of Alaska is different than the Gulf of Mexico, just as both of these places are different than the Columbia River. A list of pertinent studies can be found in the table of references following these comments with special regard to the physiological effects of crude oil on fishes and other aquatic organisms

In 2003, the journal *Science* published an article co-authored by seven scientists who studied the effects of the Exxon-Valdez oil spill over a multi-year period. (Peterson, 2003). The article synthesizes fourteen years of research following the Exxon Valdez oil spill and presents an emerging understanding of the potential long-term effects of an oil spill on aquatic organisms.

Often the most noticeable effects of a crude oil spill are the acute effects that occur shortly after a spill. In the case of the Exxon-Valdez spill, these acute effects were observed in a variety of sea mammals and sea birds that were either sickened or killed due to oil exposure (oiling) or ingestion. While acute effects on fish and wildlife are significant, these are the effects that we can usually see, because they are external in nature (e.g. oil in the fur or feathers). We know far less about the effects of oil that are internal, especially over long exposure periods. Below, Table 1 from that report is reproduced:

Old paradigm	Emerging appreciation
Physical shoreline habitat	
Oil that grounds on shorelines other than marshes dominated by fine sediments will be rapidly dispersed and degraded microbially and photolytically.	Oil degrades at varying rates depending on environment, with subsurface sediments physically protected from disturbance, oxygenation, and photolysis retaining contamination by only partially weathered oil for years.
Oil toxicity to fish	
Oil effects occur solely through short-term (~4 day) exposure to water-soluble fraction (1- to 2-ringed aromatics dominate) through acute narcosis mortality at parts per million concentrations.	Long-term exposure of fish embryos to weathered oil (3- to 5-ringed PAHs) at ppb concentrations has population consequences through indirect effects on growth, deformities, and behavior with long-term consequences on mortality and reproduction.
Oil toxicity to seabirds and marine mammals	
Oil effects occur solely through short-term acute exposure of feathers or fur and resulting death from hypothermia, smothering, drowning, or ingestion of toxics during preening.	Oil effects also are substantial (independent of means of insulation) over the long-term through interactions between natural environmental stressors and compromised health of exposed animals, through chronic toxic exposure from ingesting contaminated prey or during foraging around persistent sedimentary pools of oil, and through disruption of vital social functions (care giving or reproduction) in socially organized species.

Oil impacts on coastal communities	
Acute mortality through short-term toxic exposure to oil deposited on shore and the shallow seafloor or through smothering accounts for the only important losses of shoreline plants and invertebrates.	Clean-up attempts can be more damaging than the oil itself, with impacts recurring as long as clean-up (including both chemical and physical methods) continues. Because of the pervasiveness of strong biological interactions in rocky intertidal and kelp forest communities, cascades of delayed, indirect impacts (especially on trophic cascades and biogenic habitat loss) expand the scope of injury well beyond the initial direct losses and thereby also delay recoveries.

Table 1. Changing paradigms in oil ecotoxicology, moving from acute toxicity based on single species toward an ecosystem-based synthesis of short-term direct plus longer-term chronic, delayed, and indirect impacts

These observations are sound. The authors are leaders in this field of study and their results have been published in peer-reviewed journals. The authors represent teams of researchers from their respective institutions who aided them in their studies. The following general conclusions from this body of information are applicable to the proposed Vancouver energy project yet, are not synthesized in the DEIS or adequately analyzed with regard to potential effects of the project.

- After a crude oil spill a period of acute mortalities is often observed. These acute mortalities can affect the entire foodweb from phytoplankton to apex predators (Peterson, 2003). Acute exposure is also very damaging to organisms during early development, such as invertebrate and fish larvae (Incardona et al. 2014).

- Chronic long-term exposure of salmon to small amounts of residual oil, particularly multi-ringed polycyclic aromatic hydrocarbons (PAHs), has been associated with reductions in salmon and herring survival (Blanc et al. 2010; Carls et al. 2000). Laboratory experiments demonstrated that sublethal exposure of salmon embryos to crude oil reduced survival to adulthood by 50% compared to non-exposed groups of fish, although it is important to note that the period of sampling is also important (Brannon et al. 2001; Brannon et al. 2007).

- There are complex food web interactions that may be negatively and indirectly affected by an oil spill, which are generally effects that are not immediately obvious. In considering oil spill effects, it is important to consider indirect effects

that occur throughout the food web. (Peterson, 2003) Scientists from NOAA have developed food web understandings for the Columbia River estuary. (Diefenderfer, 2012, Coleman, 2015)

- Oil may be very difficult to remove from the environment. As has been shown, oil can remain in an environment long after the spill has occurred (>30 years). The residence of oil in an area will depend on a multitude of factors that will always be site specific, such as geology, climate, and geography (located close to a city or pristine environment).

IV. THE DEIS FAILS TO EXAMINE INFORMATION FROM THE MOST RELEVANT PREVIOUS SPILL ON THE COLUMBIA RIVER IN ORDER TO EVALUATE BEHAVIOR OF SPILLED OIL, OR BIOLOGICAL RISK.

The 1984 spill in the Columbia River caused by the grounding of the tanker *Mobiloil* at RM 88 yielded several key pieces of information that did not make it into the DEIS. Over 3000 barrels (equivalent to 4-5 rail tanker cars in this proposed project) of crude oil were released, although much of the cargo was pumped out prior to further releases. Several critical observations were evident (Kennedy and Baca 1985): (1) Oil behavior in the current mixed oil vertically and transport downstream was rapid; and (2) there were significant biological effects to birds, fish, and habitat.

Because of the current and shallowness of the Columbia River, oil can be expected to be mixed vertically throughout the water column. Oil from the *Mobiloil* spill was observed to be transported downstream on the surface, in the water column, and along the River bottom (Kennedy and Baca 1985). The current was estimated at 2 knots at the spill site, but slowed in the lower River on flood tides, increased on ebb tides, and influenced by release rates through the dams. The *Mobiloil* spill experience indicates that River currents will likely preclude containment by boons (observations demonstrated that oil was carried under the booms), and oil transport downstream will be rapid (2 knots meant that 48 nautical miles were contaminated in about 24 hours). The oil can be expected to mix into the water and contaminate the surface, water column, and bottom sediments (as was observed), as well as contaminating shorelines. Wind was not the dominant spreading force in the river compared to current, but the wind (from the south in this case) did determine which shoreline was most impacted in the river, and influenced the direction of the oil spread after exiting the river (contaminated many miles of Washington beaches). None of this information was presented in the DEIS.

The DEIS's projections of possible contamination are in conflict with the real life spill event reported in the *Mobiloil* spill report (Kennedy and Baca 1985). The DEIS attempts to "limit" the effects of different sized spills to relatively low numbers of river miles affected; for example, the DEIS in table 4-13 indicates that a small-medium vessel spill (up to 2,200 barrels) would only

impact “2 RM”, which directly conflicts with the field observations of the *Mobiloil* spill. The DEIS also indicates a large spill (up to 5,000 barrels) from the facility would only affect 7 RM contrast sharply with the field data from the *Mobiloil* spill, where shorelines more than 90 miles from the spill were impacted. This includes Washington coastal shorelines outside the Columbia River. Oil was transported from mile RM 88 to the mouth in 3 days. The estimates in Table 4-13 are inconsistent with the real life *Mobiloil* experience in 1984.

Biological effects of the *Mobiloil* spill were significant. Hundreds of birds mortalities were documented, though possibly thousands of birds were killed but not reported due to monitoring limitations, many bird carcasses were picked up and discarded, without identifying either species or enumerating the quantity. Some live birds were picked up for cleaning, and subsequent release, with some success.

White sturgeon were sampled in the lower Columbia by gill net (Kennedy and Baca 1985). Of the 55 sampled, one fourth had oil in their mouths, and PAH was detected chemically in their tissues. The biology of sturgeon (bottom dwelling life style), long lived prior to the onset of reproduction, and reproductive life stages in the Columbia make this species very vulnerable when oil is mixed down to the sediments. White sturgeon live in constant contact and often get their prey from sediments*. Corophium spp,* are amphipods, common in the estuary and are very important food for juvenile salmon and sturgeon. They live in the sediments and migrate vertically into the water column to feed, which could be expose them to oil constantly during a spill episode*.*

This oil behavior and transport will complicate containment and clean-up (as observed in the *Mobiloil* spill), and ensure that damages to birds, fish, and habitat can be expected from spills, at greater levels than predicted in the DEIS.

V. **THE DEIS ANALYSIS OF AQUATIC RESOURCES IS INADEQUATE AND MISSING INFORMATION**.

The DEIS fails to analyze impacts of the project on two regionally significant aquatic species, Dungeness crab and white sturgeon. Both are iconic members of the Columbia River ecosystem, support valuable commercial and subsistence fisheries, and have been affected by oil spills in the past. The omission of both the Dungeness crab and white sturgeon from the DEIS is a critical flaw and representative of other significant omissions from the DEIS.

Green sturgeon, an ESA-listed species, is mentioned in the document, but this fish is rarely found in the upper reaches of the Columbia River and it apparently does not reproduce in the Columbia River in stark contrast to the white sturgeon. In addition, green sturgeon are improperly lumped under the “groundfish” designation, which is generally reserved for ocean commercial species. In the section on stream crossings (DEIS 3.6.6 and 3.6.7) the DEIS neglects the crossings include habitat for Listed Kootenai River White Sturgeon in the Kootenai River and the Pallid Sturgeon in the Missouri River. The DEIS also fails to identify all the salmonid stocks

that are part of the Pacific Coast Salmon Essential Fish Habitat which includes sockeye, chum, and steelhead (in addition to chinook, chum, and pink).

1. **Both White Sturgeon and Dungeness Crab Would be Severely Impacted by Any Oil Release**.

The lack of discussion of white sturgeon in the DEIS is very concerning considering the value that the tribes of the region place on this ancient species. Both Oregon and Washington are heavily invested in management of white sturgeon.[1] (Jones et al. 2011; DeVore and James, 1999).

White sturgeon will be particularly sensitive to the effects of any oil that could spill from these trains. In the case of an oil spill, the mixing behavior of oil in river currents means that oil will mix vertically into the water column, and contaminate the sediments that are in intimate contact with sturgeon. The exposure potential was demonstrated in the *Mobiloil* spill (oil in mouths of one fourth of the gill netted white sturgeon sampled, and PAH were detected chemically in their tissues). The biology of sturgeon also contributes to their vulnerability. The benthic-focused life style on and near river sediments greatly increases their exposure potential, and their long lived reproductive biology (first reproduction delayed until +25 years for females, +15 years for males), will contribute to their slow recovery potential if impacted.

White sturgeon spawning zones have been diminished because of the lakes created by the dams. Sturgeon require high flows for spawning and use the substrate in the dam tailrace, therefore they are particularly vulnerable if the spawning substrate is contaminated by oil. Given the long term prognosis of oil remaining after a spill, and particularly if there is a rail car spill immediately upstream of critical spawning habitat, those spawning sites could be contaminated for generations. The embryo sensitivity detected in many other species applies to sturgeon embryos. Newly hatched larval sturgeons greatly resemble frog tadpoles and over the course of several weeks they gradually grow the fins, scutes, and body shape of the adult form. During this time they spend considerable periods in direct contact with the substrate and are very vulnerable to a number of abiotic and biotic factors (Parsley et. al. 2002).

Dungeness crab also has an intimacy with shallow sediments, and may be vulnerable to oil contaminated sediments because they often bury themselves when not actively feeding. Further, their embryos, incubated for several months on the underside of the female, will also be in intimate contact with sediments. The lengthy incubation of embryos in contaminated sediments will likely have reduced survival of released larvae, given the general sensitivity of early life stages.

The Invertebrates (3.6.2.5) category is given very little space in this section of the DEIS. Given that many of these animals are the bottom of the food webs. They are more delicate than most of the other species mentioned and most likely to suffer catastrophic losses in the event of

[1] See, generally, http://wdfw.wa.gov/publications/00936/wdfw00936.pdf, http://www.dfw.state.or.us/fish/crp/docs/lower_columbia_sturgeon/LCR_white_sturgeon_conservation_plan.pdf

accidents, construction activities, and oil spills. Many pages are given to other species that will likely have little or no impact from this project (ocean fish species, whales and other marine mammals).

2. **Work Window for Facility Construction**.

The work window of September 1 through January 15 is not consistent with full protection for spawning eulachon (smelt), juvenile sturgeon, and migrating adult salmonids. Eulachon may stage in the lower river weeks prior to spawning and therefore are vulnerable to impacts from the project outside of the work window. Fall runs of Chinook, Coho and Steelhead are fully underway by September 1 and the noise and construction impacts to these runs could be very significant and stressful to these fish, particularly in low flow years. In 2015, more than 900,000 adult salmon and steelhead passed by the proposed project area between September 1 and November 30. The proposed work window is inconsistent with the work window used by the Corps of Engineers at its dams on the Columbia River. The work window is inconsistent with the policy of the Oregon Department of Fish and Wildlife.[2] The DEIS's failure to properly describe Columbia River in water work windows is symptomatic of the many failings within the document. It appears that the DEIS's preparers simply were not familiar with the Columbia River's ecosystem and its management. The work window must be re-assessed in cooperation with Columbia River Treaty Tribes and CRITFC biologists.

3. **Avoiding Pacific Lamprey During Facility Construction**.

Adult abundance of Pacific Lamprey in the Columbia River Basin has been dramatically reduced in the proposed project area to such low levels that Oregon has designated lamprey a sensitive species. (Pacific lamprey are currently a federal species of concern and are a "monitored" species in Washington). Adult and juvenile lamprey use the area around proposed terminal site as a migration corridor (Keefer et al. 2013, Weitkamp et al. 2015). They may also be present and use the area – or some areas nearby – as rearing habitat and could be negatively affected by pile-driving and turbidity related to the dock construction (Parametrix et al. 2010, Jolley et al. 2012a, Jolley 2012b).

The Vancouver USFWS Fisheries Assistance Office staff has employed a combination electrofishing/suction apparatus, developed to sample larval lamprey in the Great Lakes, in the Willamette, and the lower Columbia river. (Jolley et al. 2010; Jolley et al. 2011a; Jolley et al. 2011b, Jolley et al. 2012a, Jolley 2012b). These researchers found larval and juvenile lamprey in bottom sediments while randomly surveying the Columbia River near Portland International Airport, about two miles upstream of the proposed dock construction site, showing that it is possible that larval and juvenile lamprey may be rearing area. At a minimum, the applicant should survey the construction area for Pacific Lamprey presence. Such survey would include:

[2] http://www.dfw.state.or.us/lands/inwater/oregon_guidelines_for_timing_of_%20InWater_work2008.pdf.

- Conduct seasonal larval and juvenile lamprey surveys within the entire project footprint before, during, and after project completion using a systematic sampling design such as that employed by Jolley et al. (2010-2012b).
- Conduct multiple surveys throughout the year to assist in understanding temporal changes in larval and juvenile lamprey abundance and distribution. This could provide an indication when larval and juvenile lamprey would be most affected by the proposed project (e.g., in the in-water work period) and help understand hydraulic changes on lamprey distributions within the area post construction.
- Assure that mitigation efforts are designed to provide a variety of habitats for lamprey at all life history stages (e.g., back water, depositional areas for larval and juvenile lamprey).
- Obtain other information from these surveys (e.g., lamprey distribution, toxicology loads, and genetics).

4. **Predators**.

The expansion of overwater habitat and trusses creates the potential for roosting habitat of Double Crested cormorants which is a key predator of juvenile salmonids will migrate by the terminal and thereby increase the potential for additional predation impacts. Additionally, an increase in overhead cover and shading by the expansion has the potential to create habitat for a number of predatory fish species and thereby increase predation on out-migrating juvenile salmonids.

5. **Lighting at the Terminal Facility**.

Similar to overhead cover, the additional lighting resources in the project area projected to be continuous creates permanent predation opportunities for both fish eating birds and piscivorous fishes that prey on juvenile salmonids. Juvenile salmonids migrate more actively at night and that combined with the attractive effect of lights has the potential to increase the predation impacts on listed salmonids.

VI. THE DEIS' ANALYSIS OF OIL SPILL RISK, SPECIFICALLY RISK TO EMBRYO SENSITIVITY, IS INADEQUATE.

The DEIS does not adequately analyze embryo sensitivity (as compared with juvenile or adult fish sensitivity) and fails to assign an appropriate significance. Three spills (1989 *Exxon Valdez*, 2007 *Cosco Busan*, and 2010 Gulf of Mexico spill) have documented high sensitivity of fish embryos to low concentrations of PAH. That research is absent from the DEIS's analysis. The significance is that the embryo life stage is the "weak link" in the survival chain, not by a little bit, but by three orders of magnitude, from acute toxicities of PAH in the parts per million for juvenile and adult life stages to toxicities in the parts per billion for embryos.

The DEIS report is misleading by reporting the acute toxicities of some PAH to juveniles/adults, but not embryos. Page 4-35, cites a table of acute toxicities of crude and PAH to invertebrates

and fish (LC50s). Data are in the PPM for the most part. The DEIS narrative indicates that fish embryos are more sensitive than other life phases but then does not present any data. The reader is left with the visual presentation of PPM toxicities in the table. The significant literature from *Exxon Valdez, Cosco Busan*, and Gulf of Mexico spills on embryo sensitivities in the parts per billion PAH is ignored.

The DEIS, page 4-77, cites Neff for the proposition that PAH contamination from the *Exxon Valdez* spill below the surface was low, in the parts per billion, and did not exceed acute toxicity levels, but fails to cite the papers by the Alaska Department of Fish & Game (ADFG) that measured elevated pink salmon embryo mortalities in streams with oiled banks for four years after the spill (Bue et al. 1996, & 1998; Rice 2010). The DEIS treatment of the scientific literature is unprofessionally one-sided. The DEIS cites only to literature that minimizes risk characteristics of the potential for toxicity and exposure. (Note: The table cites Moles and Rice 1983; Carls, et al 1999, but none of the species tested by these authors are in the table).

The DEIS ignores the sensitivity of fish embryos of multiple species measured from the 1989 *Exxon Valdez spill*, 2007 *Cosco Busan* spill, or the 2010 Gulf of Mexico spill. Embryo sensitivity emerged out of the Exxon Valdez damage assessment studies as part of the paradigm shift of oil spill damages as discussed by Peterson et al. 2003; this review noted the new findings of long term oil persistence, high sensitivity of fish embryos, and the long term damage in several species (fish, birds, sea otters, whales). Field studies by ADFG measured elevated pink salmon embryo mortalities over a four year period in streams with oiled banks (Bue et al 1996,1998), and stimulated laboratory studies to confirm that oil was the cause of the elevated embryo mortalities, at parts per billion PAH (Heintz et al. 1999). Concentrations as low as 5 ppb caused increased mortality, poor growth, but the most important study documented a 20% and 40% decrease in adult returns of embryos exposed to 5 and 18 ppb PAH during development (Heintz et al 2000). Exxon researchers (Brannon et al. 2001, 2007) contested these studies, but later studies have confirmed low parts per billion sensitivity in embryos from other fish species (herring; Carls et al.1999, Incardona et al. 2012; zebra fish, Hicken et al 2011); Gulf of Mexico species and an Australian tuna, Incardona et al. 2014, Mager et al 2014). White sturgeon embryos have been shown to be more sensitive to some chemicals than salmonids (Brannon et. al. 1985)

It is the life stage that is sensitive, not the specific oil used, nor the species. The source oil and type were found to be unimportant by Incardona et al. (2013); North Slope crude and the lighter Gulf of Mexico crude were similar in toxicity levels (measured as PAH in the exposure) and in the detailed effects on the developing hearts of fish embryos. The impact of PAH on developing fish embryo hearts (slowing of heart beats, malformations in hearts), has been similar to a variety of fish embryos (herring, pink salmon, zebra fish, several species of tunas), no matter the source oil. Not much has been done with invertebrate embryos in recent years, but similar sensitivities and mechanisms are likely to yield similar results.

Reliance on acute toxicity data can be misleading in general. Acute toxicity protocols were developed to compare toxicities of contaminants, such as different pesticide formulations,

using one species. They are adequate for that function, but inadequate to compare sensitivities across different species and life stages. Tests with embryos are an example of the inadequacy of short term acute toxicity to assess vulnerability: A "classical four day acute test with an embryo may find the organism alive at the end of four days (heart is beating), but fails to find abnormal heart morphology, or abnormally slow beat rates, or there is no assessment for future survival based on deformed skeletal abnormalities. The ability of embryos and larvae to cope with toxicity loads and interruptions in their developmental sequence are marginal at best, although short term survival may appear unaffected. The study of long term fitness following PAH exposures to pink salmon embryos was most revealing; exposures of embryos to 5 and 18 ppb PAH, then tagged and released to the environment, reduced adult salmon returns by 20% and 40% respectfully (Heintz et al 2000). Mager et al. (2014) assessed swimming performance of juvenile Mahi Mahi 30 days after the embryos had been exposed to 1.45 ppb PAH; swimming performance was reduced compared to controls. Subtle and difficult to measure impacts to embryos exposed to low PPB PAH can affect their ability to acquire prey and avoid predators, and have negative effects on their recruitment to the population.

The likelihood of oil spill exposure to salmon or sturgeon embryos below the facility as well as the miles of opportunity in the rail corridor where spawning habitat may be vulnerable to rail car spills was not meaningfully addressed by the DEIS. As pointed out, it is the life stage that is vulnerable, and there certainly will be embryos of other species in the lower river that could be exposed to any up-river spill.

Sensitive life stages have orders of magnitude more sensitivity than adult life stages for multiple reasons. The DEIS should thus focus on these life stages when assessing vulnerability. Instead, the DEIS underestimates the toxicity potential of oil spills by reporting the acute toxicity studies of the past, and omitting the more modern literature documenting embryo sensitivities. Embryos have long been recognized as a sensitive life stage, but the recent studies have quantified the three orders of magnitude increase in sensitivity to PAH. Because of their small size and intimacy with the environment, damaging exposures can be in the range of minutes, although effects may not be measureable in terms of survival for days or even months. Embryos in general are fragile, have limited energy reserves, and seldom have the tools to either cope or avoid a pollution load. The best evidence is for fish embryos, but embryos of other species types can be expected to be more sensitive than older life stages. The biological principles will be similar.

The concept of time and exposure are difficult to assess, but past experience indicates they can be significant, and should not be underestimated. Time lines of an oil spill are easily discounted from a "one time" event, once the gross cleanup has been finished. Experience from the 1979 *Florida* spill near West Falmouth, 1989 *Exxon Valdez*, and the 2010 Gulf of Mexico spill have demonstrated that oil can persist in sediments and wetlands for years (Short et al 2004, 2007; Reddy et al 2002, and Turner et al. 2014a,b). Without oxygen, oil degrades very slowly, if at all. When re-exposed at a later date through disturbance (possibly biological disturbance), the oil

can continue to cause harm to the habitat or toxicity to species. Sediment and wetland habitats are very difficult to clean without large scale damage.

Persistence of oil retention in habitats, coupled with destructive cleanup scenarios promote the potential use of dispersants, with the assumption that the increased toxicity because of dispersed oil (and increased dilution and flushing) is the lesser of evils (e.g. gulf spill where a million gallons of dispersant were applied). While attempts at booming and oil removal are a desired goal, they seldom are effective at more than about 10%. Habitat contamination will last many decades.

Oil contamination of sediments and wetlands will persist a long time. A "one time" oil spill event should be thought of in terms of a long lasting event, and not a short term. Oil is still present in West Fallmouth wetland and Prince William Sound beach sediments, some 27 and 37 years after those spills. Given the time span of this project, there will be risk to the Columbia River habitat and species for many decades.

VII. THE DEIS UNDERESTIMATES THE IMPACTS FROM ADDING MORE DEEP DRAFT VESSELS TO THE RIVER.

This project will increase the deep-draft vessel traffic in the Columbia River Estuary by 223%. This increase must also consider the potential increase in vessel traffic generally from other similar proposed crude-by-rail, crude refinery, and coal export terminals currently being evaluated in this area. Conservatively the number of vessels could triple from the current levels.

As the DEIS appropriately notes, the lower Columbia River estuary provides essential rearing habitat for many stocks of salmonids and other aquatic species. In the Biological Opinion for the Federal Columbia River Hydropower System, the estuary is given great weight for its value in recovering ESA-listed salmonids.[3] There is general concern that high numbers of outmigrating salmonid smolts are lost between the dams and the ocean. Increasing vessel traffic in the estuary could result in moderate to major long-term changes to tidal wetland, shallow water, and tidal flats. It makes no sense to continue degrading estuarine habitat and contributing more mortality by adding more deep-draft vessels to the estuary.

1. Wake Stranding.

Juvenile salmonids and eulachon, some of which are listed under the ESA, may be stranded on the Columbia River shorelines due to the wakes of passing vessels. Wake stranding occurs when juvenile salmonids become caught in a vessels wake. The fish are then deposited on shore by

[3] See, generally, http://www.salmonrecovery.gov/Files/BiologicalOpinions/2008/2008%20BiOp.pdf, http://www.westcoast.fisheries.noaa.gov/publications/hydropower/fcrps/2014_supplemental_fcrps_biop_final.pdf. See also http://www.westcoast.fisheries.noaa.gov/publications/hydropower/fcrps/rpatableappendix.pdf, at 84 – 87.

the wave generated by the vessel wake. Stranding typically result in mortality unless another wave carries the fish back into the water. Generally, a set of interlinked factors act together to produce stranding during ship passage:

- River-surface elevation low tides are generally more likely to result in strandings than high tides;
- Beach slope low-gradient beaches are generally more likely stranding locations than higher gradient ones;
- Wake characteristics, ship wakes that result in both the greatest draw-down and run-up on the beach are generally most likely to result in strandings. Wake characteristics are influenced by a number of dynamics included vessel size and hull form (short and fat vessels have a great displacement effect and generate larger wakes than long and thin vessels).
- Vessel draught – the smaller the under-keel clearance, the larger the wakes, thus loaded vessels are more likely to result in strandings than unloaded vessels;
- Vessel speed – fast moving vessels generate larger wakes than slow vessels;
- Distance between the passing vessel and the beach, where strandings are generally more likely.

The applicants stated that wake stranding studies have focused on deep-draft vessels. There has been at least one study that examined the stranding effects on salmonids by a variety of vessels. Ackerman (2002) found that 21 juvenile Chinook (and 174 other species) were stranded in the lower Columbia River by 35 tug/barges and 56 deep draft vessels. For the Ackerman study, three locations were surveyed on two occasions.

Furthermore, it may be inappropriate to draw reader's attention to deep water vessels, while neglecting the effects of smaller vessels. Pearson and Skalski (2011) report, "At both river and beach scales, no one factor produces stranding; rather interactions among several conditions produce a stranding event and give stranding its episodic nature." Wake stranding also has the potential to result in make fish easier prey for avian predators.

NOAA's estuary recovery module identifies 23 management actions to improve the survival of salmon and steelhead migrating through and rearing in the estuary and plume environments.[4] With regard to ship wakes, the recovery module developed for Endangered Species Act implementation calls for "reduc[ing] the effects of vessel wake stranding in the estuary." In contrast, the proposed project would increase wake stranding in the estuary.

2. **Ballast Water Discharge**.

The DEIS fails to adequately analyze the impacts of ballast water discharges, including the chemical, physical, and biological impacts of dumping millions of cubic meters of foreign water

[4] http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/estuary-mod.pdf.

into the Columbia River. The DEIS doesn't analyze the changes in salinity in cases of low river flow that can change hydrology.

Ships are required to conduct open water ocean exchange or utilize an onboard ballast water treatment to ensure that foreign low salinity organisms are not transported into the Columbia. However, these treatment options are not always conducted successfully, and the risk is compounded by the tremendous annual releases of ballast water. Additional studies are needed to determine whether the ballast water releases would create deleterious chemical and biological impacts to the Columbia River ecosystem.

In addition to the direct chemical impact of the seawater, there is the high potential for the release and possible colonization of invasive plants, animals and pathogens, including those harmful to human health. Untreated ballast water is responsible for the introductions of numerous invasive species on the Pacific coast, Zebra and Quagga mussels in the Great Lakes, and potential human health risks like typhus. To prevent the potential introduction of foreign plants, animals and pathogens, all ballast water releases must be filtered of all organisms, including pathogens.

The introduction of Quagga and Zebra mussels to the North American continent originated from ballast water releases in the Great Lakes in the late 1980's, and their effects on the invertebrate community has been devastating. Mussels have spread to most areas of the United States except for the Pacific Northwest. If they arrive in this habitat, it could cause millions of dollars in damage to municipalities as well as potentially change entire ecosystems.

The DEIS estimates that the annual ballast water discharge volume of 6 million cubic meters. To put this amount in context, this would represent approximately 50% of the entire volume of ballast water currently discharged into the Columbia downstream of Bonneville dam, which is currently discharging at 12 million cubic meters.

3. **Shoreline Erosion and Propeller Scour**.

Prop wash from vessels as well as ship wakes breaking on shore could cause increased erosion along the shoreline and resuspend the eroded material within the water column. Vessel wake and propeller scour could injure or otherwise impact substrate and invertebrates, as well as benthic-based fishes such as white and green sturgeon.

4. **Noise**.

The DEIS draws no distinction between pressure waves and particle motion sound vibration, referring to it only as "Noise". There is, however, an important distinction between pressure waves and particle motion, and how they affect salmonids. Criteria (and monitoring) for minimizing the effects of sound on fish in the DEIS rely solely on measurements of pressure. However, current scientific literature suggests that salmonids are very sensitive to particle motion sound vibration and less so to pressure waves. Consequently, a salmon may be much more sensitive to sounds generated in the water (e.g., piles being driven into substrate).

If the DEIS intends to only measure the effects of pile drivers on salmonids using pressure wave detection devices, a serious deleterious effect go unaddressed. Particle motion sound and their effects on adult salmon are currently being studied by the U.S. Corps of Engineers at Lower Granite Dam. In association with the study at Lower Granite, a thorough literature review has been and should be considered in the DEIS (Hawkins 2015).

VIII. **THE DEIS NEEDS TO CAREFULLY CONSIDER CLIMATE CHANGE EFFECTS**.

The State of Washington has been a leader in defining impacts of future climate change and has been moving to establish renewable energy alternatives to fossil fuel consumption. The Tesoro Savage project is in direct conflict with these efforts.

1. **Greenhouse Gases**.

The DEIS states that the proposed project would cause 61 million tons per year increase in carbon dioxide emissions or a 12.3% increase over the life-cycle greenhouse gas ("GHG") emissions of the 2005 U.S. GHG emissions target. The total operational GHG emissions from proposed project operation is estimated by the DEIS at 512,350 metric tons per year, or 10,246,995 metric tons over the proposed 20 year project lifespan. The total project is stated to increase U.S. generated GHGs by 1.0% and world GHGs by 0.1%.

However, DEIS estimates of GHGs from the proposed project do not contain GHG emissions from vessels after they leave the 3 mile State of Washington boundary and engage in round trip excursions to destinations hundreds of miles away. These may not be included in the Washington State emission criteria, but will contribute to U.S. and global GHG emissions. The DEIS states that nitrous oxide and sulfur dioxide emission from vessels in the open ocean within the 200 mile coastline of the U.S. would be controlled by the MARPOL Convention, and be reduced over time, however, carbon emissions from vessels beyond the 3 mile coast of Washington are not addressed. If vessels route oil shipments beyond the 200 mile coastline limit there are no restrictive actions or limits or mitigation in place to control any emissions from vessels in the DEIS.

The proposed project emissions are stated to be above the 2011, 25,000 metric ton/yr emission criteria from Ecology. Thus, mitigation requirements are stated to be required so that measures are instituted to reduce proposed project emissions by 11%. Again, these requirements are based upon older climate projections showing far less change than more recent projections.

2. **Lack of Updated Climate Change Information and Consequences in DEIS**.

More recent scientific climate change information indicates that the foregoing measures may likely not be adequate to reduce GHG emissions necessary to avoid serious climate change consequences. The DEIS apparently uses downscaled projections for the Columbia Basin from the older Coupled Model Intercomparison Project (CMIP 3) which is based climate impacts from carbon emissions (Figure 1). More recent climate global circulation models from the

International Panel on Climate Change (CMIP 5) includes atmospheric and oceanic circulation models and treats GHGs as representative concentration pathways (RCPs) that include methane, aerosols and other climate change gases. The additional warming effect that will influence Columbia River hydrology and flooding is likely substantial (Figure 2).

The proposed project creation of GHGs must be reexamined in context with updated Washington State emission limit criteria that comports with updated climate science and international assessments. This includes the recent global climate change pacts that indicate that without substantial reductions of GHGs, global temperatures are projected to increase by 2 degrees C which would cause melting of global ice sheets, sea level rise, extreme droughts and floods and other serious consequences for the world community. The DEIS is dated as it does not contain information recently generated from the historical Paris international climate change pact. The Pact, strongly advocated by the U.S., calls on the developed countries to "achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gasses in the second half of this century", indicating that much of the world's remaining reserves of coal, gas and oil must remain in the ground. For the Pacific Northwest, such impact projections include extreme low river flows and summer temperatures with major consequence for human and ecological systems.

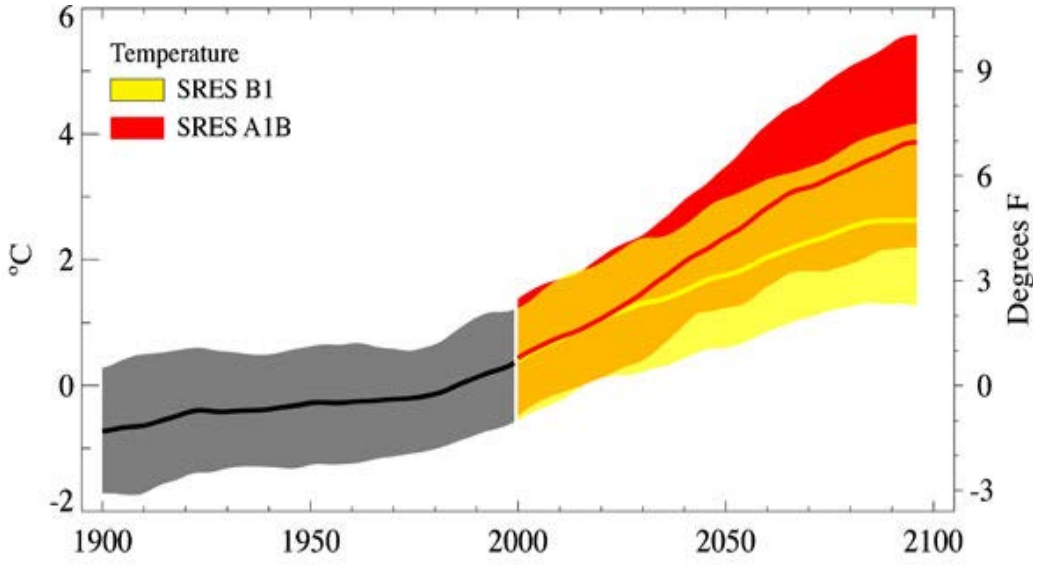

Figure 1. Air temperature projections from two CMIP 3 future climate global circulations models based upon CO2 emissions downscaled for the Pacific Northwest relative to the 1970-1999 mean air temperature. This projection indicates that air temperatures could increase by about 5 degrees C. From Mote and Salathe 2010.

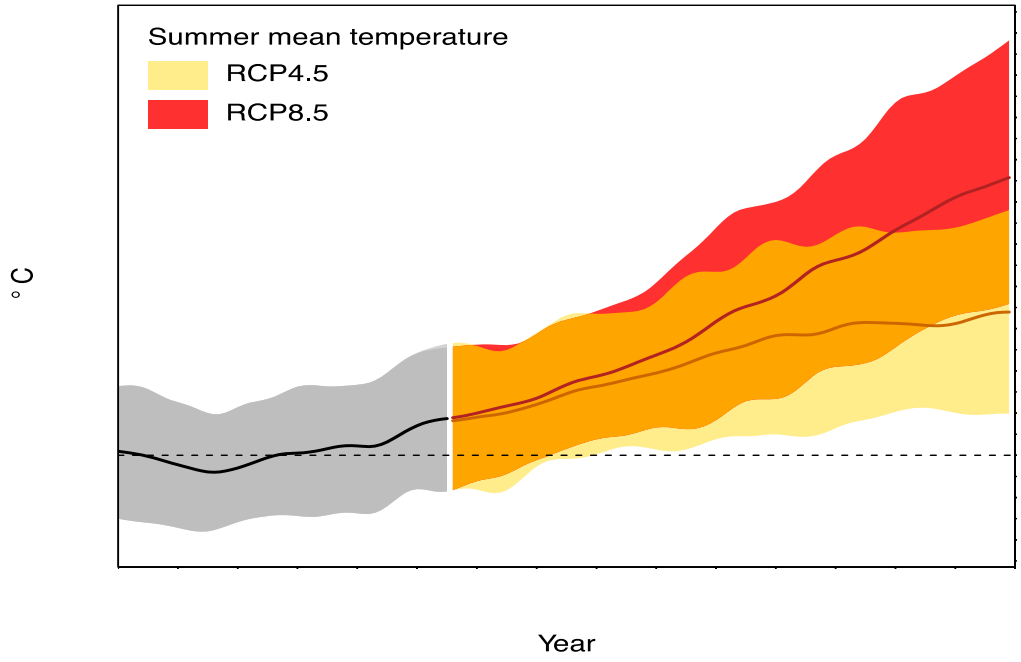

Figure 2. Projected Air Temperatures in the Pacific Northwest under two representative concentration pathways downscaled from CMIP 5 global circulation models. The current path based upon updated GHG emissions is the RCP 8.5 trend line that would result in air temperatures increasing by about 11 degrees C by the end of the century. From D. Rupp, Oregon Climate Change Research Institute 2014.

The DEIS does not include reference to the State of Washington's integrated climate response strategy, "Preparing for a Changing Climate" (Ecology 2012; Publication No. 12-01-004) that notes that if substantial actions are not taken to reduce GHGs, impacts to Washington State are projected to reach "nearly $10 billion per year in costs to human health, storm damage, coastal destruction, rising energy cost, increased wildfires, drought and other impacts." As evidenced in 2015, impacts from low flows and high temperatures resulted in massive salmon losses that directly impacted CRITFC's member treaty resources. Ecology, in a report to the Washington Legislature, recommended that Washington State GHG emission limits need to be adjusted to better reflect current science and that the results of the December 2015 Paris Climate Change Pact should be used to better inform how Washington's limits should be adjusted to meet state, national and international targets (Ecology 2014- Publication 14-01-007). This is consistent with the recommendation of the Carbon Emissions Reduction Taskforce (CERT) Report to the Washington State Governor's Office (CERT Final Report, November 14, 2014) that emission limits need to be "updated based on the science on human-caused climate change reported in global or national assessment of climate change science". The emission criteria guidance stated in the DEIS is dated from a 2011 Ecology report and is not likely consistent with new GHG emission limits from new scientific assessments.

In Executive Order 14-04, Washington State Governor Jay Inslee established the Carbon Emissions Reduction Taskforce (CERT). Among other things, the task force needs to respond to the University of Washington's finding that "decisions made today about greenhouse gas emissions will have a significant effect on the amount of warming that will occur after mid-century". The Taskforce responded by creation of a report to the Governor's office submitted on November 14, 2014. A major tenet of the report was the creation of a carbon reduction emissions program to "establish a cap on carbon pollution emissions with binding requirements to meet statutory emission limits" established by the legislature.

Figure 2. Washington's Historical GHG Emissions, Business-As-Usual Projection, and Emissions Limits.[8]

Shaded areas show expected reductions from existing[9] and potential policies[10] and the remaining "gap"[11].

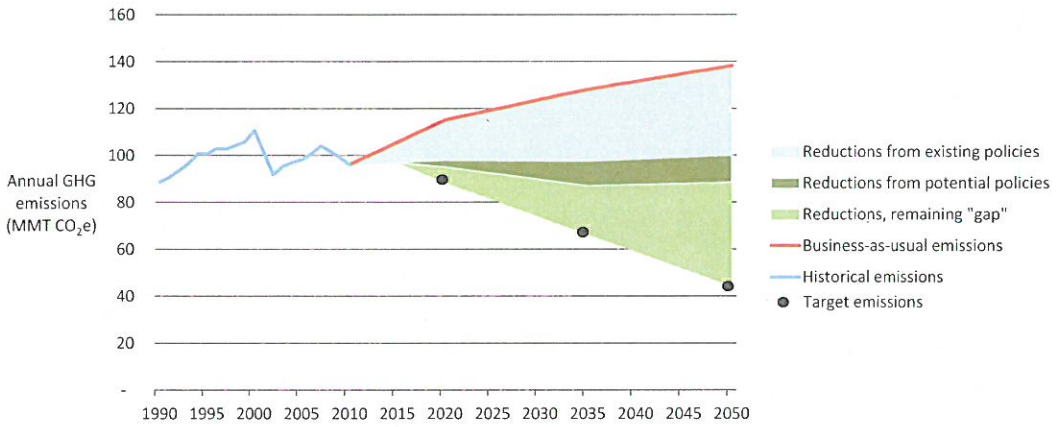

Figure 3. Washington State GHG Historical and Future Projections and Emission Limits. From Washington State Carbon Emission Removal Task Force Final Report to the Washington State Governor's Office, November 2014).

In a November 10, 2014 letter to the Governor from the Taskforce, the group stated that Washington State was not on track to meet Washington State GHG emission limits, committed to by state law. The group identified transportation as the largest source of GHG emissions in the State, comprising almost 50% of the State's emissions. Without a proper compensatory offset that could likely be more than the 12% stationary source reduction based on updated climate and GHG emission science and intergovernmental obligations, the proposed project could substantially violate updated emissions restrictions, setting the State further from necessary and legal limits.[5]

[5] In fact, the Project appears to fail to account for GHGs emissions from vessels traveling back and forth hundreds or even thousands of miles to and from refineries.

While increased summer temperatures are also mentioned in several recent reports as an impact of future climate projections,[6] the DEIS in Section 3.2.4.5 (Climate Change) does not identify this impact. With respect to cumulative project effects, the DEIS fails to mention, much less analyze likely synergistic effects of high river temperatures, with corresponding extreme low flows on fish habitat and populations, particularly in concert with other proposed project impacts such as release of saltwater ballasts from vessels and dredging and vessel disruption of critical fish habitat.

3. **Lack of Updated Energy Demands and Projections in the DEIS**.

The DEIS is dated with respect for the need for oil and future energy needs particularly for the Columbia River basin that is being specifically proposed to suffer physical, chemical, biological and socio-economic impacts from the proposed project.

The DEIS states that U.S. refineries will source more crude oil from the Bakken area oil shale formation in North Dakota in recent years and this is a major source, along with Canadian sources. This information is dated. Recent worldwide global markets, including increased oil placed on the market by Middle East sources has substantially reduced world- wide demand for oil and wholesale oil prices have become extremely depressed. For example, the NY Times recently reported that oil futures of American benchmark settled at $35.62 a barrel, down 3.1 % - the lowest level since December 2008 (NY Times December 12, 2015). They further reported that energy markets are reacting to a glut of oil driven in part by Saudi Arabia and other major producers continuing to "pump flat out" and that this action will remain for the "foreseeable future". As a result, it is no longer profitable to extract oil from oil shale regions and many operations are closing down.

The DEIS failed to examine the role of increased renewable energy in reducing oil demand and GHGs caused by oil extraction, transportation, refinement and consumption. For example, the recent draft Northwest Power and Conservation Council 7th Power Plan expects that even with climate change impacts, current energy generation in the Pacific Northwest will be sufficient at least until 2026 largely due to the influx of solar, wind and other renewable energy sources.

4. **Floodplains under Climate Change**.

DEIS Table 3.3.1 notes that portions of the proposed facility site are located within the 500-year floodplain and within the 100-year floodplain of the main river channel. The proposed facility elevation at the top of the riverbank is at 30 feet. The DEIS notes that in the post dam era (i.e. 1996) the maximum flood level of the river was 27.2 feet. Further, the DEIS notes that there are rail routes for the proposed transport of oil within 0.25 and 0.5 miles of the 100 year floodplain for substantial areas (i.e. over the Lower Columbia River). The DEIS further states that 9,949

[6] *Preparing for a Changing Climate* (Ecology 2012; Publication No. 12-01-004; National Climate Assessment (2014); Northwest Climate Assessment Report 2013; Climate Change in the Northwest- *Implications for our landscapes, waters and communities* (Dalton et al. 2013).

acres of 100 year floodplains are within the proposed project rail corridor and that in rural areas, floodplain mapping is incomplete and that additional areas of floodplain may be present. The project applicant assumes that since the railroad bed is "generally elevated above floodplains the risk of flood hazard is typically low, aside from crossing point where rail abutments could be vulnerable to flooding".

While the DEIS states that quantitative analyses and information are provided for water resources, quantitative analysis of floodplain damage either at the proposed site or along railroad corridors necessary for the proposed project is completely lacking.

The current 100 year and 500 year floodplains that would be occupied by the proposed project facility and rail corridors are designated by FEMA based upon the historical flow records from the Willamette and Columbia Rivers. These floodplain statistics fail to take into account the impacts of changing climate and the best available future hydrologic projections based on climate projections. In general, winter precipitation will increase and snow lines will drop as the region and proposed project site change from a transition snow/rain climate to a rain dominated climate. Areas above the project, such as the Snake River Basin that have little storage, will have likely have runoff earlier in the year, and the Willamette System will also have runoff earlier in the year due to a change from snow/rain to rain dominated climate (National Climate Assessment- Northwest 2014; Dalton et al, 2013; "Preparing for a Changing Climate" (Ecology 2012; Publication No. 12-01-004).

The DEIS perception that flows are controlled by upriver dams is not correct for at least two reasons. First, the guaranteed Canadian flood control operations for the Columbia River flows at Portland/Vancouver ends in 2024. Second, the scientific evidence clearly indicates that under future climate conditions there will be more variability in flows and little capacity to store water, particularly in the Snake River basin and lower Columbia River. This will increase the frequency, magnitude and duration of flood risk at the proposed project site. Dalton et al. 2013 state:

> The Columbia River Basin, whose reservoir storage capacity is much smaller than its annual flow volume, is ill-equipped to handle the projected shift to earlier snowmelt and peak flow timing and will likely be forced to pass much of these earlier flows out of the system, under current operating rules.

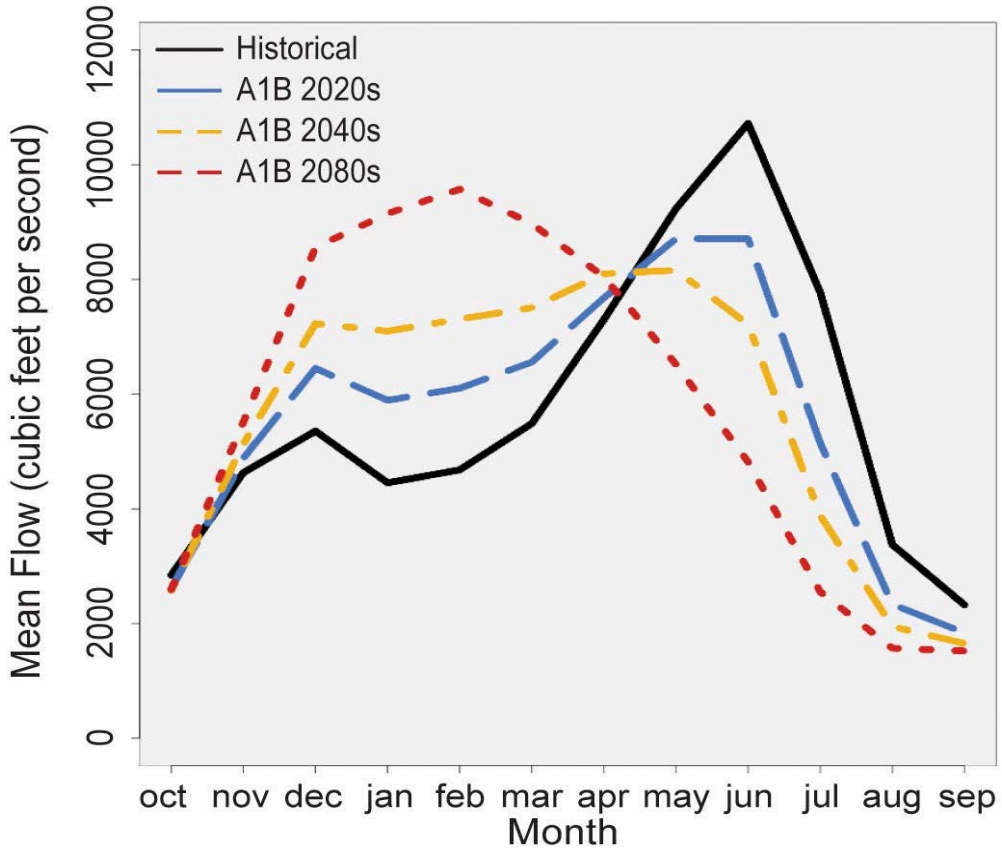

Figure 4. General trends for the historical hydrograph of the Columbia, Willamette and Snake Rivers compared to a range of projected future hydrographs from global circulation models downscaled for the Pacific Northwest (National Climate Assessment- Northwest Chapter, 2014).

In addition, extreme weather events, such as atmospheric rivers in the Pacific Northwest and lower Columbia will become more frequent in duration and intensity ("Preparing for a Changing Climate" (Ecology 2012; Publication No. 12-01-004; Dalton et al. 2013; Mauger et al. 2015). These events, along with reduction of snow lines and increased overall winter precipitation will likely increase overall flood risk and change the frequency of flood risk designations.

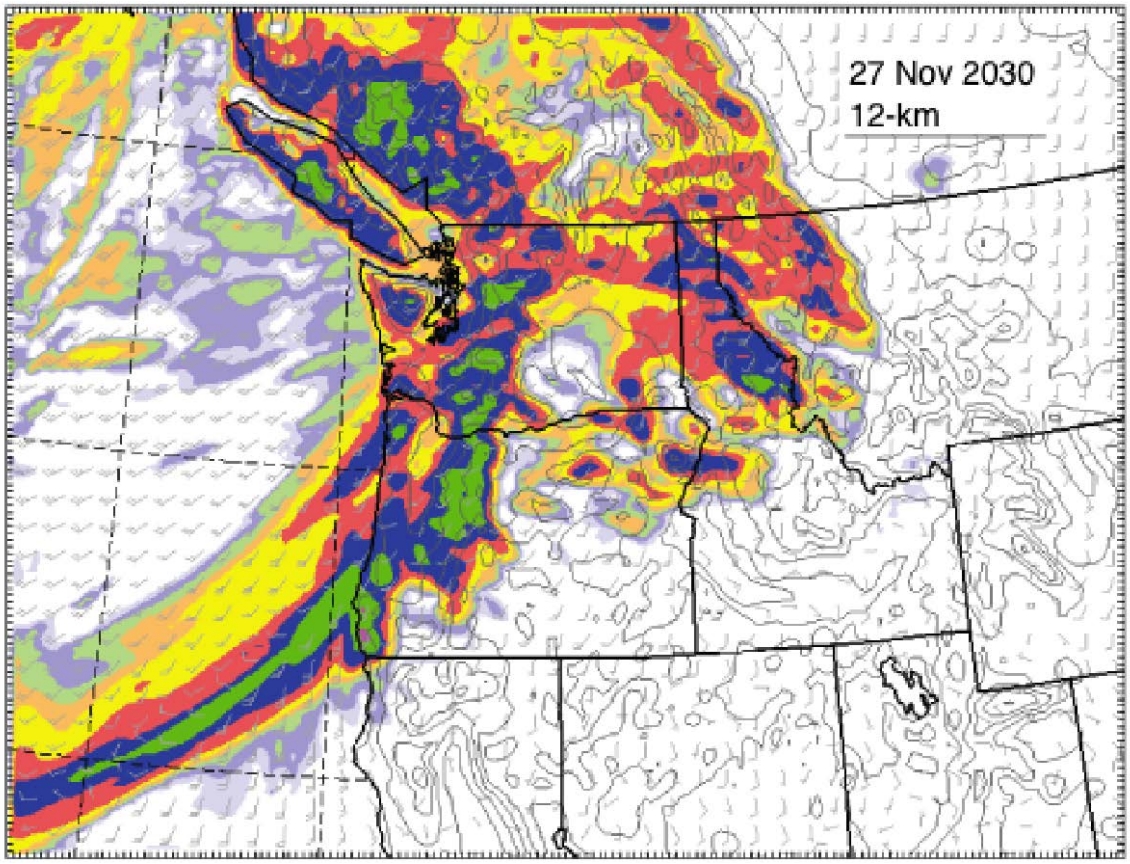

Figure 5. Simulated future atmospheric river storm from a regional climate model. There is growing evidence that the frequency, magnitude and intensity of such events are already occurring and will increase in the future. From Mauger et al. 2015.

Rain/snow dominated basins show a high sensitivity to change across the Northwest, with some under future climate change scenarios showing a 30% increase in flood magnitude and frequency (Dalton et al. 2013). For example, Mauger et al. (2015) project that by the 2040's the 10 year flood event will occur every 5 years and the 100 year event will occur as a 30 year event. Tohver and Hamlet (2010), using CMIP3 future climate projections downscaled for the Columbia Basin, estimated flood frequency magnitudes for 20 and 100 year flood events. Flood ratios for Columbia basin rain/snow basins, including the Columbia River were well above 1.0 for both the 20-year and 100 year flood metric (See Figures 5 and 6 below).

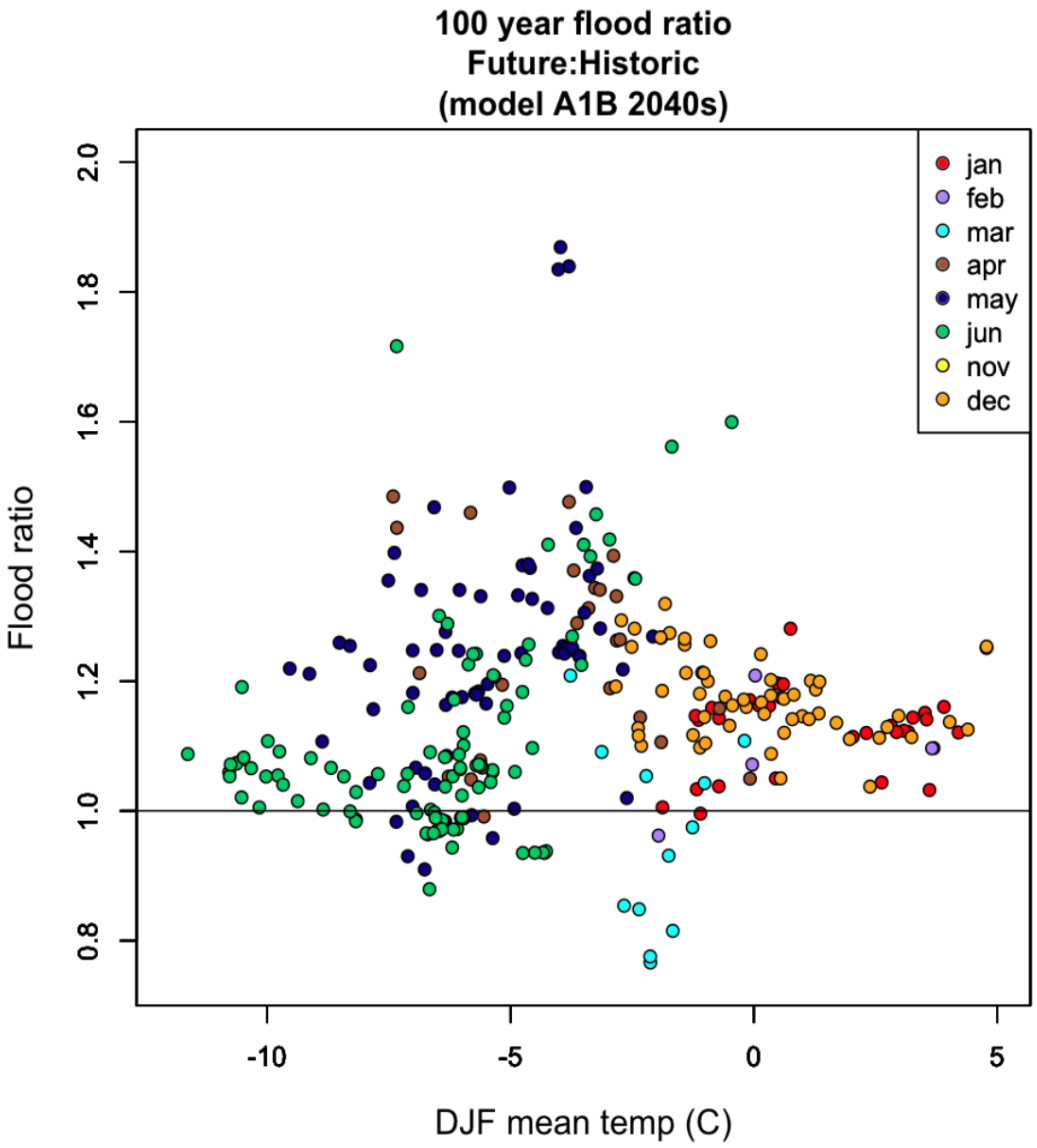

Figure 6: Plots of the mean winter temperature and flood magnitude ratio of the projected future and the historical 100-year floods for each basin. Colors of dots indicate month of historical flood occurrence.

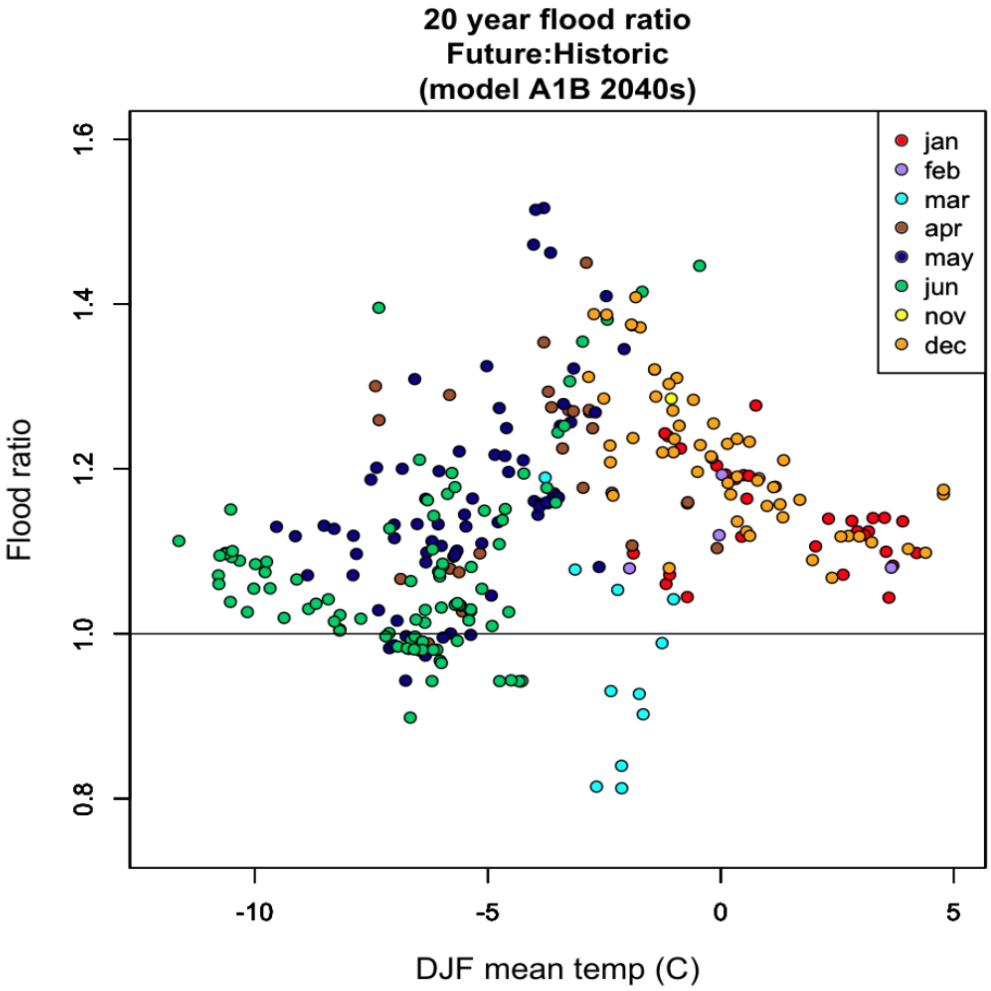

Figure 7. Plots of the mean winter temperature and flood magnitude of projected future and historical 20 year flood for Columbia River subbasins. Dot colors indicate month of historical flood occurrence. This Figure and Figure 6 (above) from Tohver and Mote (2010).

To address these climate impacts, the Washington State Department of Ecology issued a comprehensive report on climate change and response with recommended actions (Preparing for a Changing Climate, Ecology 2012).

- raising or elevating infrastructure to prevent it from flooding
- develop a common framework and methodology for transportation infrastructure risk assessment for all transportation modes
- encourage owners and operators to evaluate vulnerability to the impacts of climate change including risks of damage and potential for disruptions and outages fro flooding and extreme weather events

- gather and provide the best scientific information on climate impacts and areas at high risk of flooding…use to assist in making informed decisions to prepare for and adapt to climate change
- accelerate modernized flood mapping and implement fundamental reforms to incorporate risk from climate change

The risks of flooding from both the proposed project facility and rail transportation area have not been adequately assessed in the DEIS. Under flooding conditions, toxic materials and other pollutants from these areas would enter into the waterways of the Columbia River, in violation of clean water laws and regulations and would negatively impact tribal treaty fisheries resources and essential fish habitat.

We understand that the Corps of Engineers and FEMA are in the process of reassessing floodplain risks and adaptation under climate change scenarios. Among other things, this work must be completed and incorporated into regional planning before there is any consideration of floodplain development in the proposed areas.

5. **Floodplains under Columbia River Treaty**.

The Columbia River Treaty (CRT), signed between Canada and the United States in 1964, provides for the operation of CRT dams to provide flood control and hydropower benefits to both countries in the Columbia River Basin. Under the CRT, Canada was pre-paid to build dams and operate for 8.45 (now 8.95) Maf of storage to minimize flood damages in both Canada and the U.S. until September 2024. The 8.95 MAF of guaranteed Canadian storage represents more than 50% of the total flood storage in the Columbia Basin. The agreement also calls for Canada to provide additional Canadian storage, at additional cost, if “Called Upon” by the U.S. when potential flooding could reach peak discharges in excess of 600 kcfs at The Dalles.

After 2024, Canada’s obligation to provide up to 8.95 Maf for flood control ends. The U.S. may still call upon Canada for flood control assistance, at a high cost, but it must first attempt to control the flood with its own reservoirs. Significant changes will have to be made to dam operating procedures to address flood risk under this changed regime. These changes and future flood risk management needs are not yet known. Moreover, discussions are currently underway between the countries to modify the treaty to rebalance CRT benefits, particularly to include ecosystem-based function, and associated higher flows, in the priorities and provide benefits for fish and wildlife and other water-related resources.

The change in assured flood control and the rebalancing of priorities are both likely to allow for increased flood risk to the lower Columbia River. This increased flood risk may take the form of higher regulated flows in normal years and/or greater risk of exceeding the 600 kcfs mark at The Dalles during high flow events.

IX. **ADDITIONAL COMMENTS**.

1. **Water Quality**.

The DEIS, chapter 3, discusses construction (pile removal, new piles driven, etc) and notes that those sediments will be disturbed, and probably re-suspended. Given that there are unknown legacy contaminants, and the potential for new PAH contaminant release during operation, some level of passive sampling on-site and down-stream should be considered (along with an up-stream control). Some level of salinity monitoring should be conducted to describe the saltwater plume of discharge and confirm the rapid level of dilution during ballast water discharge.

The DEIS does not consider long-term impacts of oil and other contaminants moving into the river and associated aquatic habitats via stormwater runoff from the rail tracks and surrounding rail bed. In addition, the DEIS does not propose mitigation for chronic discharges from rail transport into waterways along rail routes.

2. **Habitat**.

Changes in habitat, with or without mitigation elements should be monitored through habitat mapping over time, starting prior to construction. Some sites would be down river to monitor wet land stability from increased wakes. Habitat changes are often slow and subtle; this effort needs to have some long term aspect to the design.

3. **Crude Oil Composition**.

Chapter 4.5 of the DEIS describes the physical/chemical composition in two major oils that are intended to be transported; (1) Bakken oil, which is light and "sweet"; and (2) Dilbit, which is a diluted bitumen for transport, and that is heavy, and not sweet. These two primary types of crude oil present the extreme range of crude oils in terms of response, acute toxicity challenges, persistence, chronic long term toxicity, and habitat damage. From a response view point, the light oil is more dangerous, more volatile, more flammable, more explosive, and more of inhalation risk. From a toxicity view point, the light oil has more *acute* toxicity potential, because the low viscosity permits easier mixing in to the water column, and release the more soluble BTEX aromatic compounds. Surface slicks will be more toxic to the surface air breathers because of the volatility of BTEX in the Bakken oil.

The Dilbit has less acute toxicity potential, less mixing potential in to the water column, but has more persistence potential (larger heavier PAH that are toxic and difficult to breakdown), more habitat damage potential, more *chronic* long term toxicity potential.

4. **Weathering of Crude Oil**.

Weathering is an important process, but the picture reported in the DEIS pages 4-36 to 4-39 is incomplete and misleading. This part of the DEIS describes weathering processes and how oil is

eliminated from the environment, through a varied set of processes. However, the DEIS fails to mention a few very important points: First, the most important process that occurs in addition to the weathering processes is dilution. Dissolution, photo oxidation, and dispersives increase the dispersion of oil horizontally and vertically in the water, and increase dilution.

The DEIS also fails to mention that there are processes at work that retain crude oil. If oil is entrained in sediments, or in wetlands, where oxygen is limited, the oil will persist for decades, and is difficult to clean or remove. This retention leads to chronic toxicity. Although the photo oxidation process tends to breakdown oil into more soluble products, the DEIS fails to discuss that photo oxidation can have a biologically harmful effect of increasing toxicity, particularly to PAH that are already *in* tissues of relatively transparent eggs or larvae. Importantly, and not addressed in the DEIS, processes that tend to disperse crude oil, tend to limit the physical recovery of the oil for permanent removal from the environment.

5. **Effects to Marine Mammals and Birds**.

The DEIS does not adequately review effects of the project to marine mammals and birds. The air breathing biology of marine mammals and birds (air breathing of the vapors immediately above the oil slick), makes them acutely vulnerable to oil spills, and their fitness over a longer period of time can be impacted by ingestion of crude oil, further degrading their health and energy reserves. Long-lived marine mammals with low reproductive rates may take decades for populations to recover

The DEIS at page 4-81 cites Matkin et al 2008 ("Consumption of oiled prey is bad"), but fails to mention the primary point of the paper, which identified the mortality losses from two pods of killer whales resulting from the *Exxon Valdez* spill. The losses led to decades of poor population recovery of one pod and *no* recovery of the second pod (i.e., no surviving reproductive females). The second pod will become extinct. The mortality losses occurring after the Exxon Valdez spill are well documented for more than two decades because there were population baselines prior to the spill based on individual identifications. The mechanism of toxicity is unknown, however, since killer whales sink when dead and do not often beach themselves. No autopsies on these killer whales have been reported. A likely mortality scenario may be inhalation damage to lungs leading to poor fitness for survival over the following year.

Large numbers of birds have been lost in several oil spills (e.g., 250,000 *Exxon Valdez* spill, Esler et al. 2002), probably because of the vulnerability to heat loss from oil contaminated feathers that impairs their heat retention. Unlike most marine mammals, who have a well-developed fat layer circling the core of their body, birds rely on well-groomed feathers to keep their surface skin dry; oil coating severely damages their heat retention abilities. Unfortunately, the estimates for the 1984 *Mobiloil* spill are sketchy; bird carcasses were collected and disposed of, but were not enumerated (Kennedy and Baca 1985), but are suspected to over a 1000. Birds are probably more vulnerable because of the oil coating potential and hypothermic stress compared to marine mammals, but many of the marine mammals are long lived with low

reproductive rates (Matkin et al. 2008), so damages to these populations can have long recovery times.

Dispersants tend to shift the environmental burden of oil from the surface to the water column; probably a net benefit to birds and marine mammals, but a potential detriment to fish and other organisms inhabiting the water column.

6. **Miscellaneous Comments**.

- The 0.5 mile corridor designation for rail traffic impact is inadequate given the dangerous nature of the cargo and how easily it can spread through the air, water, and soil. When transported along water, the effective corridor should be the distance downstream cargo can travel and impact resources, water quality and human health once it has been introduced into the environment.
- Under the *Man-Made Structures* section, the DEIS refers to tribal fishing weirs. Is this a reference to tribal scaffolds and platforms?
- The DEIS should analyze the proposed project impacts to socioeconomic resources including employment, tax revenue and economic conditions. In addition, the DEIS does not identify disproportionate effects for environmental justice populations, specifically, it does not mention impacts to tribal economies.
- The DEIS should include oil spill fires, explosions at facility and along transportation routes to the list of significant unavoidable impacts.
- For reasonably foreseeable actions that contribute to cumulative impacts, the DEIS should add continual dredging on salmon and lamprey habitat, lack of flood assessment, lack of climate change assessment based on updated best scientific information
- There is no potential of reclaiming floodplains at proposed project site for fish habitat or flood mitigation
- Under No Action Alternative, the DEIS states that current demand by West Coast refineries for midcontinent crude oil would continue and that this demand would be satisfied by existing facilities or new sources. However the demand for crude oil has been greatly diminished due to gluts and reduced demands from world markets. This assumption is not correct.

X. **CONCLUSION**.

Although the DEIS lays out the project, provides many details of the operation, and identifies an inventory of risks, the document is unsatisfactory in evaluating the risks. While many possible impacts are listed, the DEIS fails to synthesize from published literature the most significant or important impacts. These risks are difficult to evaluate, to be sure, and the literature is voluminous, but better use can be made of the literature to provide a better focus on some of the risks. The information from other spills was generally not used in this EIS, including the

Mobiloil spill at Warrior Rock (RM 88, in 1984), or the embryonic sensitivity literature, thus undermining the credibility of the document.

This project will result in the transfer of billions of gallons of oil over a long period of time. Given experience with other spills, the damage that may result may be significant, and last a significant length of time. The persistence time factor does not receive the attention in this report. The “acute aspect” of a spill event may last days to weeks, yet the persistence of oil, the impacts to habitat, and the impacts to some species may last for decades, as has been observed in previous spills.

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