

MARINE FISH

Study geographic boundaries: Marine terminal PDA, PEAA, CCAA.

Study time boundaries: Construction and operations phases.

Project works and activities considered in the study*:
 Construction – on-shore infrastructure site preparation (clearing, burning, grading, blasting); in-water infrastructure site preparation (dredging, blasting, pile drilling); in-water infrastructure construction (marine terminal, permanent jetty, construction jetty, pile installation); construction support vessels (barges, tugs, ocean disposal barges); construction vessel traffic (wake, noise).

Operations – in-water infrastructure (marine terminal, docking berth, underwater structures); moored tankers and associated combustion emissions, inert gas exchange, prop wash, noise, boom deployment; tanker traffic (wake, noise); tug traffic (wake, noise, prop wash).

Study methods: Fish surveys were undertaken in 2005/6 and 2008 using beach seine, gillnets and longlines; however, no

eulachon, Pacific herring or chum salmon were caught near the terminal site. Underwater surveys were conducted by scuba and with underwater video survey techniques to determine the presence, abundance and locations of aggregations of rockfish. For the most part, the presence of marine fishes was documented through government and scientific reports and Department of Fisheries and Oceans (DFO) landings statistics.

VEC	Key Issues	KIR	Baseline Results	Measurable Parameter	Potential Project Effects**	Proposed Mitigation	Residual Effects	Cumulative Effects
Marine Fish	<p>Eulachon is a culturally and ecologically important species in the region. Many marine species depend on it as a food source and the annual migration contributes to overall ecosystem health and productivity. Eulachon is a staple food source and valuable trade item for many First Nations along the coast, particularly the Haisla, the Nisga'a and the Tsimshian. The government of BC has listed eulachon as a blue-listed species, indicating it requires special attention to ensure it does not become threatened.</p> <p>Pacific herring play a central role in the marine food web, constituting a major portion of the summer diets of salmon, Pacific cod, lingcod and harbour seals. Herring eggs are an important part of the diets of migrating seabirds and grey whales, as well as invertebrates. Pacific herring have been one of the most important components of BC's commercial fishery over the past century.</p> <p>Rockfish are representative of the fish that live near the bottom of the sea and are ecologically important to marine food webs as both predators and prey. They are generally a long-lived, late maturing species that typically remain near where they were born for most of their lives. Because of these traits, rockfish are vulnerable to activities that alter their habitat or interfere with ecosystem dynamics.</p> <p>Chum salmon represent all other salmon because they have a very broad distribution and a lifecycle generally representative of other salmon species. Salmon are economically, culturally and ecologically important in the region. Salmon are fished commercially and recreationally, and for food, social and ceremonial purposes by coastal First Nations. Salmon are also an important food source for animals living on land, acting as a critical link between the land and sea.</p>	Eulachon	The largest density of eulachon will be present in the project area during migration and spawning, which typically occurs in the Douglas Channel and/or Gardner Canal area in February to March.	Change in habitat quality.	Sediment from construction activities could affect habitat quality for eulachon.	Use of specific dredging equipment and silt curtains.	Overall, the localized area of sediment deposition coupled with the high potential for reversibility will limit the TSS effects on eulachon such that no measurable environmental effects are anticipated.	Not applicable.
				Change in habitat availability.	Activities such as blasting, dredging, terracing along the underwater rock face and the introduction of structures (such as piles) will permanently alter eulachon habitat.	Currently being assessed.	Eulachon spawn in freshwater so habitat alteration will not directly affect their spawning habitat.	Not applicable.
				Acoustic disturbance.	Underwater noise will be created by activities such as blasting, dredging, pile construction and ship movement.	Currently being assessed.	Computer modeling indicates that the effects on eulachon will be limited.	Not applicable.
		Pacific herring	Pacific herring are resident in the terminal area; however, they typically spawn in Kitimat Arm and Douglas Channel during March through April, to as late as July.	Change in habitat quality.	Sediment from construction activities could affect habitat quality for Pacific herring.	Use of specific dredging equipment and silt curtains.	Overall, the localized area of sediment deposition coupled with the high potential for reversibility will limit the TSS effects on Pacific herring such that no measurable environmental effects are anticipated.	Not applicable.
				Change in habitat availability.	Activities such as blasting, dredging, terracing along the underwater rock face and the introduction of structures (such as piles) will permanently alter Pacific herring habitat.	Currently being assessed.	Because Pacific herring do not spawn at specific locations, their spawning behaviour should not be greatly affected by the increase in underwater structures.	Not applicable.
				Acoustic disturbance.	Underwater noise will be created by activities such as blasting, dredging, pile construction and ship movement.	Currently being assessed.	Computer modeling indicates that the effects on Pacific herring will be limited.	Not applicable.

*Refer to Figure 3.3 in section 3, Project description, for the full list of physical works and activities. **The effects of spills and malfunctions will be included in the update for the supplemental filing.

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MARINE FISH *continued*

VEC	Key Issues	KIR	Baseline Results	Measurable Parameter	Potential Project Effects**	Proposed Mitigation	Residual Effects	Cumulative Effects
Marine Fish		Rockfish	Rockfish are resident in the terminal area. Bocaccio rockfish juveniles tend to settle into coastal and shelf habitat from late spring throughout the summer. Newly hatched and juvenile (young-of-the-year) fish live near the surface for a few months and then settle in nearshore areas.	Change in habitat quality.	Sediment from construction activities could affect habitat quality for rockfish.	Use of specific dredging equipment and silt curtains.	Overall, the localized area of sediment deposition, coupled with the high potential for reversibility, will limit the TSS effects on rockfish such that no measurable environmental effects are anticipated.	Not applicable.
				Change in habitat availability.	Activities such as blasting, dredging, terracing along the underwater rock face and the introduction of structures (such as piles) will permanently alter rockfish habitat.	Currently being assessed.	Rockfish are expected to make use of the new habitats created by the blasting. In fact, environmental effects will be offset by the creation of these new structures, which can provide habitat for young fish to occupy before they disperse to other areas.	Not applicable.
				Acoustic disturbance.	Underwater noise will be created by activities such as blasting, dredging, pile construction and ship movement.	Currently being assessed.	Rockfish will only be disturbed initially by underwater explosions. However, computer modeling indicates that the effects on rockfish will be localized.	Not applicable.
		Chum salmon	Two chum salmon runs occur in the terminal area, in the summer and fall respectively. The summer chum migrate in June, July and August and spawn in September and early October. The fall chum migrate in September, October and November, spawning from October to January.	Change in habitat quality.	Sediment from construction activities could affect habitat quality for salmon.	Use of specific dredging equipment and silt curtains.	Overall, the localized area of sediment deposition, coupled with the high potential for reversibility, will limit the TSS effects on chum salmon such that no measurable environmental effects are anticipated.	Not applicable.
				Change in habitat availability.	Activities such as blasting, dredging, terracing along the underwater rock face and the introduction of structures (such as piles) will permanently alter Chum salmon habitat.	Currently being assessed.	Chum salmon spawn in freshwater so habitat alteration will not directly affect their spawning habitat.	Not applicable.
				Acoustic disturbance.	Underwater noise will be created by activities such as blasting, dredging, pile construction and ship movement.	Currently being assessed.	Computer modeling indicates that the effects on chum salmon will be localized.	