3.7 Fisheries

An Endangered Species Act Biological Evaluation (BE) has been prepared for the proposed Cogeneration Project, including information ~~regarding~~ on fisher~~ies~~y resources in the area (Appendix H). The BE discusses impacts to federally listed and candidate species. The following paragraphs provide a summary of the BE findings related to fisher~~ies~~y resources.

The following list of listed and candidate species for inclusion in the BE was compiled from the NMFS, USFWS, and Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) lists.

- Chinook salmon (*Onchorhynchus tshawytscha*) – Federally Threatened
- Bull trout (*Salvelinus confluentus*) – Federally Threatened
- Coho salmon (*Onchorhynchus kisutch*) – Federal Candidate

The following *recommended* determinations for the effects on listed and candidate species are made in the BE.

- Chinook salmon – No effect
- Bull trout – No effect
- Coho salmon – No jeopardy and, if listed, no effect

3.7.1 Existing Conditions

3.7.1.1 Plant Site

The proposed project is located on fallow agricultural land that is a mosaic of herbaceous uplands and emergent wetlands (See Figure 3.4-4). There are no streams or creeks located in the immediate vicinity of the project. There are man-made channels that traverse the property, but these do not hold permanent water and served historically to drain the wetlands for agricultural use. Though inundated for portions of the wet seasons, these channels do not serve as habitat for resident or anadromous fish.

Priority wetland and riparian habitat areas were identified in and along Terrell Creek, which flows within a half mile to the east and to the north of the proposed project site and which would receive treated stormwater discharges from the Cogeneration Project site. Terrell Creek is an 8.7-mile long, third order stream that discharges to Birch Bay. Fingalson Creek, also located within one half mile of the proposed project location, has associated priority wetland and riparian habitats and is known to support searun cutthroat and winter steelhead (Williams et al., 1975).

As discussed in Section 3.6, USFWS has identified bull trout as occurring in the vicinity of the proposed project area. In addition to the bull trout, NMFS has identified the following listed and candidate species for inland marine waters of Washington:

- Chinook salmon (*Oncorhynchus tshawytscha*)

- Coho salmon (Puget Sound/Strait of Georgia Evolutionarily Significant Unit [ESU]) (*Oncorhynchus kisutch*)

Although not listed as threatened or endangered, WDFW has identified the following anadromous fish in the vicinity of the proposed project:

- Coho salmon (*Oncorhynchus kisutch*) Terrell Creek
- Searun cutthroat (*Oncorhynchus clarki*) Terrell Creek
- Winter steelhead (*Oncorhynchus mykiss*) Terrell Creek

In addition to the anadromous species listed above, the WDFW has identified the following resident fish species to be present in the vicinity of the proposed project:

- Resident cutthroat (*Oncorhynchus clarki*) Terrell Creek
- Spiny ray fish (e.g. large mouth bass) Terrell Creek

Finally, the following federal species of concern may occur in the vicinity of the project (USFWS 2001):

- Pacific lamprey (*Lampetra tridentate* now *Entosphenus tridentatus*)
- River lamprey (*Lampetra ayresi*)

A summary of fish species that may be present in the vicinity of the proposed project is given in Table 3.7-1.

TABLE 3.7-1

Fish Species that May Occur in the Proposed Cogeneration Project Area or the Immediate Vicinity and Their Status

Common Name	**Scientific Name**	**Federal Status**	**State Status**
Bull trout	*Salvelinus confluentus*	Threatened	Candidate
Chinook salmon	*Oncorhynchus tshawytscha*	Threatened	Candidate
Coho salmon	*Oncorhynchus kisutch*	Candidate	None
Searun cutthroat	*Oncorhynchus clarki*	None	Priority Species
Winter steelhead	*Oncorhynchus mykiss*	None	None
Resident cutthroat	*Oncorhynchus clarki*	None	None
Spiny ray fish	Various	None	None
Pacific Herring	*Clupea pallasi*	Candidate	Candidate

Common Name	Scientific Name	Federal Status	State Status
Cherry Point Stock			
Surf Smelt	*Hypomesus pretiosus*	None	State Forage Fish
Pacific lamprey	*Entosphenus tridentatus*	Species of Concern	None
River lamprey	*Lampetra ayresi*	Species of Concern	Candidate

The following sections present species accounts for those federal and state listed, candidate species, federal species of concern, and important state species identified to potentially occur within the proposed project area or in the immediate vicinity.

Species: Puget Sound ESU Chinook salmon (*Oncorhynchus tshawytscha*)

Status: Federally Threatened, State Candidate

The ESU includes all naturally spawning populations of chinook salmon from rivers and streams flowing into Puget Sound including the Strait of Juan De Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington. Waters off Cherry Point may be used for migrating juveniles (NMFS, 2000).

The nearest stream used by chinook salmon for spawning is the Nooksack River (Berger/ABAM 2000, Williams et al. 1975). Adult chinook salmon use offshore waters for feeding or during migration. Some adult fish could be found along Cherry Point and Birch Bay from March through October, including both runs (Myers et al. 1998, Williams et al. 1975).

Juveniles of chinook salmon would be expected to use nearshore marine habitats off Cherry Point for feeding and refuge during migration (Phillips 1984). These juveniles could be expected to be found along Cherry Point and Birch Bay from March through August (Williams et al. 1975, Thom et al. 1989).

Chinook salmon are not known to use Terrell Creek or Lake Terrell for spawning purposes. Use of Terrell Creek by chinook salmon adults or juveniles has not been observed by WDFW (Huddle 2002).

Species: Bull Trout (*Salvelinus confluentus*)
Status: Federally Threatened, State Candidate

Bull trout live in cold mountain waters spanning from the northern United States into Canada. The nearest and only known stream that contains anadromous bull trout and that drains into the Southeast Strait of Georgia is the Nooksack River, which drains into and whose estuary includes Bellingham Bay (WDFW 1998). The WDFW bull trout Salmonid Stock Inventory (SSI) indicated that of the stocks in the Nooksack River watershed, only the Lower Nooksack stock "could be composed" of anadromous fish together with fluvial and resident life history forms. If anadromous bull trout are

present in the lower Nooksack River, the SSI indicates that adults would enter fresh water in early June for spawning from September through mid-November. The SSI also indicates that anadromous adults return to and remain in the estuary until the next spawning migration.

Other streams in the vicinity of Cherry Point are Terrell Creek draining into Birch Bay, and California and Dakota creeks, draining into Drayton Harbor. These streams are not expected to have the cold water habitats required by bull trout for spawning (Essig and Hillman 1998) because their watersheds are relatively small and restricted to low elevations west of the Cascade foothills (Williams et al. 1975).

Although there are no known populations of bull trout within the project areas, it is possible (though unlikely) that adult bull trout from the Nooksack River or Fraser River could occur in the marine waters off Cherry Point. These adults could use near shore waters and habitats for feeding (Berger/ABAM 2000). Adults or juveniles could incidentally use Terrell Creek for feeding (Huddle 2002). However, Terrell Creek does not offer suitable spawning habitat for bull trout (Huddle 2002).

Species: **Coho salmon (Puget Sound/Strait of Georgia ESU)**
Oncorhynchus kisutch
Status: Federal Candidate

The Puget Sound/Strait of Georgia ESU includes all naturally spawning populations of coho salmon from drainages of Puget Sound and Hood Canal, the eastern Olympic Peninsula, and the Strait of Georgia from the eastern side of Vancouver Island and the British Columbia mainland (north to and including the Campbell and Powell Rivers) (NMFS, 1995).

Coho salmon may use Terrell Creek for spawning (Williams et al. 1975). However, no actual spawning has been observed (Huddle 2002). If spawning occurred, adult fish would be expected in Terrell Creek in November through January. Juvenile coho salmon would be expected in the near shore waters off Cherry Point in March through July (Weitkamp et al. 1995).

Species: **Pacific lamprey (*Lampetra tridentata*)**
Status: Federal Species of Concern

The Pacific lamprey ranges from Baja California, to the Bering Sea in Alaska and Asia. This anadromous fish enters streams from July to October.

Species: **River lamprey (*Lampetra ayresi*)**
Status: Federal Species of Concern, State Candidate

The anadromous river lamprey is found in coastal streams from San Francisco Bay to Alaska.

Species: **Cherry Point Pacific Herring (*Clupea pallasi*)**
Status: ~~State Candidate~~ Washington State Priority Species

Herring stocks are defined by WDFW by spawning grounds, one of which is the Cherry Point shoreline from Birch Bay to Sandy Point in the southeast Strait of Georgia. Most

Washington state herring stocks spawn from late January through early April. The Cherry Point stock is an exception to this spawning time, spawning from early April through early June. Herring deposit their eggs on subtidal eelgrass and marine algae.

Species: **Searun cutthroat (*Oncorhynchus clarki)***
Status: Washington State Priority Species

Searun cutthroat occur in rivers and streams and associated riparian areas of contributing waters. According to the WDFW PHS database, this species is known to spawn in Terrell Creek. However, WDFW regional habitat biologists (Warinner, 2002; Huddle, 2002) have found only sparse cutthroat juveniles in the stream. Adult spawning activities have not been observed.

Species: Spiny ray fish (various species including large mouth bass)
Status: None

Warriner (2002) and Huddle (2002) stated that various introduced species of spiny ray fish including large mouth bass have been caught in smolt traps near the mouth of Terrell Creek. The presence of spiny ray fish in Terrell Creek strongly indicates that the stream habitat is marginal if not unsuitable for native salmonids that require colder and more oxygenated waters.

Species: **Surf smelt (*Hypomesus pretiosus*)**
Status: State Forage Fish

These fish occur within the upper intertidal zone within gravel beaches. There are known spawning areas on beaches north of Cherry Point.

3.7.2 Environmental Impacts of the Proposed Action

No fishery resources would be adversely impacted from construction and operation of the Cogeneration Project. Potential affects of water use, wastewater and stormwater on Terrell Creek are unlikely as described below.

The Whatcom County Public Utility District No. 1 (PUD), BP and Alcoa Intalco Works entered into a letter of intent to develop an industrial water reuse project. The Cogeneration Project would fund the project, which would be implemented by the PUD at the Alcoa Intalco Works. Alcoa would return 2,870 gpm of water that is used in a non-contact, once-through cooling process. The PUD would then provide that water for use in the Cogeneration Project and the Refinery.

The Cogeneration Project would require an average of 2,244 to 2,316 gallons per minute (gpm) of water for operation. On an annual average basis, the Cogeneration unit would use 484 to 556 gpm less water than would be recycled from Alcoa. "Leftover" recycled water from Alcoa will be routed to the refinery. This will reduce the refinery's fresh water demand. As a result of the water recycling, the Cogeneration Plant, the Refinery, and Alcoa will use less water on average than the refinery and Alcoa currently use.

The second source of water for the Cogeneration Plant will be water returned from the Refinery in the form of hot condensate.

Three sources of effects from wastewater on surface water are possible. First, the quantity or quality of surface water currently draining from or through the proposed site to Terrell Creek could be altered. However, the proposed Cogeneration Project has been designed to divert surface and stormwater from unaffected areas around the plant in order to prevent alteration of quality or quantity. This surface water would continue to drain into a ditch along Blaine Road leading to Terrell Creek.

Second, stormwater from the Cogeneration project site will be routed through treatment facilities and detention ponds to the wetland mitigation area north of Grandview Road. This treated stormwater will co-mingle with other surface water drainages that may eventually drain into Terrell Creek under high flow conditions. Although the proposed Cogeneration Project will not directly or indirectly affect Terrell Creek, a "Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s)" (NMFS 1996: 13) is included in the Cogeneration Project BE. Information for several of the parameters in this table was not collected during the stream survey discussed in the BE. However, the fact that Terrell Creek is currently used by resident coho salmon indicates that conditions in the stream are likely properly functioning. In addition, sufficient control methods and distance between the proposed project and the stream will result in no effect on the stream. No component of the proposed Cogeneration Project would be built near the stream and no storm or other surface water will be discharged directly to it.

The third source of effects could come from discharge of contaminated stormwater and industrial wastewater from the Cogeneration Project. As discussed in the BE, wastewater or stormwater that could carry trace oil or chemicals from secondary containment areas will be routed to the Refinery and treated with the Refinery's NPDES wastewater stream in the plant's wastewater system treatment facility. Treated water would be discharged through the BP Refinery's NPDES permitted outfall. Table 3.7-2 presents the flows and chemical composition of the Cogeneration Project's wastewater. Net process wastewater from the Cogeneration Project to the Refinery wastewater treatment plant will be 190 gpm, assuming 15 cycles of concentration in the cooling tower. An analysis of the proposed wastewater that would be produced by the Cogeneration facility shows that the Refinery wastewater treatment system has the capacity to treat the facility's wastewater. The Cogeneration wastewater component of the total Refinery's NPDES wastewater stream will be about 8.1 percent. Table 3.7-3 presents a numerical analysis of the potential impact of the Project wastewater on the Refinery's wastewater stream. The impact analysis is based on the average discharge from the Refinery over the months of July, August, and September 2001. Because the volume of Cogeneration wastewater is small and contains very low levels of contaminants, it would have little to no effect on the quality of water discharged.

~~Three sources of effects from wastewater discharges or surface water are possible; first, the quantity or quality of surface water currently draining from or through the proposed site to Terrell Creek could be altered. The design of the proposed Cogeneration Project includes diversion of surface water around the plant to prevent alteration of quality or quantity. This surface water would continue to drain into mitigation wetlands north of Grandview Road, which, in turn, drain to Terrell Creek.~~

~~Second, wastewater generated as stormwater from impervious surfaces within the Cogeneration Project plant will be routed to treatment facilities and retention ponds and~~

~~discharged to wetlands north of Grandview Road. This stormwater will commingle with surface waters and drain to Terrell Creek.~~

~~The third source of effects could come from discharge of contaminated storm or other wastewater from the Cogeneration Project plant. As discussed in the Cogeneration Project BE, oily or otherwise contaminated wastewater will be routed to the BP Refinery and commingled with the refinery's oily wastewater stream upstream of the treatment facility. Treated Cogeneration Project plant wastewater will be discharged as a commingled stream from the BP Cherry Point industrial NPDES outfall.~~

3.7.3 Environmental Impacts of the No Action Alternative

Under the no action alternative, no direct or indirect impacts to fisheries resources are anticipated. However, the positive impacts associated with the creation of and enhancement of wetlands north of Grandview Road and near Terrell Creek would not occur under the no action alternative. Further, water reuse benefits, including reduced withdrawal from the Nooksack River and significant reductions of discharges to marine waters, would not be realized under the No Action Alternative.

3.7.4 Mitigation Measures

Because there are no anticipated impacts to fisheries, no mitigation measures are proposed. Construction methods and timing will not affect the fishery resources in the proposed project vicinity.

Appropriate silt fencing and BMPs (See Section 3.3 for details) will be used to control potential sediment runoff to down gradient watershed including those containing Terrell Creek and associated tributaries.

Stormwater and runoff increases due to increases in impervious surface area will be contained in stormwater detention ponds and then treated before being discharged into down gradient watersheds, including wetland mitigation sites. Because the location of this project is within 2 miles of known listed salmonid habitat, proper design and maintenance of stormwater containment structures and associated treatment mechanisms is a priority of the project proponents.

Wastewater from the Cogeneration project will be retained, treated, and monitored prior to discharge via the BP Refinery outfall #001. Current treatment facilities at the Refinery are sufficient to ensure potential impacts associated with the wastewater from the Cogeneration Project are fully mitigated.

3.7.5 Cumulative Impacts

Within the project area, the BP Cherry Point Refinery is adjacent to the proposed Cogeneration Project site. In addition, Alcoa Intalco Works, an aluminum smelter; the Conoco-Phillips Ferndale Refinery; and a number of other industrial facilities are within a few miles of the site. The addition of the proposed Cogeneration Project would add impervious surfaces to the vicinity and create wastewater. Runoff and wastewater would be contained and treated before entering mitigation wetlands. Therefore, this project would not contribute to adverse impacts on fisheries in the area.

3.7.6 Significant Unavoidable Impacts

There would be no significant unavoidable adverse impacts on fisheries resources as a result of construction and operation of the Cogeneration Project facility.

Table 3.7-2
(NEW APRIL, 2003)

Wastewater Flows and Chemical Composition

	Denim Plant Regeneration Water (Includes Filter Backwash)	Equipment Drain and Washdown Oily Wastewater	Cogeneration Cooling Tower Blowdown
Average Flow (gpm)	54	5	131 – *Note 10*
Peak Flow	300 gpm	50 gpm	400 gpm
Duration	1 hr / day	30 min / day	8 hrs / day
General Parameters			
pH (pH units)	6.5 – 8.5	7.0 – 7.5	8.0 – 9.5 *Note 13*
Dissolved Oxygen (mg/L)	8	8	8
COD	*8 – Note 1*	*65 – Note 1*	*200 Note 12*
BOD	*4 – Note 1*	*33 – Note 1*	*81 Note 12*
Oil & Grease (mg/L)	2	20	0.3
TDS (mg/L)	5000	62	2200
TSS (mg/L)	28	20	50
Temperature (°F)	< 80	< 80	< 100
Major Cation Conc. (mg/L)			
Ca	54	14	207
Mg	20	5	77
Na	1688	11	165
K	3.6	1	14
Major Anions Conc. (mg/L)			
HCO_3	62	67	200
CO_3	0	0	0
Cl	12	3.2	287 – *Note 9*
SO_4	2950	14	1024 – *Note 9*
Trace Metals Conc. (mg/L)			
Ag (Note 2a)	0.004	0.001	0.015
Al (Note 2)	3.0	0.75	11.25
As (Note 2a)	0.004	0.001	0.24 (0.512) – *Note 7*
Ba (Note 2)	0.072	0.018	0.27

Continued

Wastewater Flows and Chemical Composition
(NEW APRIL, 2003)
CONTINUED

	Demin Plant Regeneration Water (Includes Filter Backwash)	Equipment Drain and Washdown Oily Wastewater	Cogeneration Cooling Tower Blowdown
Trace Metals Conc. (mg/L)			
Be (Note 2a)	0.004	0.001	0.015
Cd (Note 2a)	0.004	0.001	0.015
Cr (Note 2)	0.008	0.002	0.20 (0.918) – *Note 7*
Co (Note 2a)	0.02	0.005	0.075
Cu (Note 2a)	0.02	0.005	0.23 (0.291) – *Note 7*
Fe (Note 2)	0.308	0.077	1.16
Hg (Note 2a)	0.002	0.0005	0.0075
Mn (Note 2)	0.588	0.147	2.205
Ni (Note 2a)	0.004	0.001	0.015
Pb (Note 2a)	0.004	0.001	0.015
Sb (Note 2a)	0.004	0.001	0.015
Se (Note 2a)	0.004	0.001	0.015
Sn (Note 2a)	0.16	0.04	0.6
Tl (Note 2a)	0.004	0.001	0.015
V (Note 2)	0.036	0.009	0.135
Zn (Note 2)	0.04	0.01	2.0 – *Note 9*
Other Anions Conc (mg/L)			
SiO_3	40	10	150
PO_4	2.0	0.5	10 – *Note 9*
F (Note 2a)	2.0	0.5	7.5
NO_3 / NO_2	4.0	1.0	15
NH_3 / NH_4	*Note 3*	*Note 3*	*Note 3*
Br (Note 2a)	0.02	0.005	0.075
Organics Conc. (mg/L)			
Dissolved Organic Carbon	*Note 4*	*Note 4*	*Note 4*
Polymers (polyquarternaryamine)	19 – *Note 5*	0	0
Polymers (polyacrylamide)	0	0	10 – *Note 8*
Total Organic Carbon	*48 – Note 6*	*12*	*50 - Note 11*

Source: Bechtel, Edge Analytical Test (Reference # 01-4184, 08/29/2001)

Notes for Table 3.7-2: Wastewater Flows and Chemical Composition

Note 1: Based on typical ratio between oil and grease, COD and BOD in industrial wastewaters.

Note 2: Trace metal data reported, except Aluminum (Al), are based on a single test report by Edge Analytical (Ref 01-4184, 08/29/2001). Actual quantities will be related to background concentrations as follows:

For **Denim Plant Regeneration Water (Includes Filter Backwash)**, the actual concentration will be approximately 4 times the background concentration in the Whatcom PUD water.

For **Equipment Drain and Washdown Oily Wastewater**, the actual concentration will be the background concentration in the Whatcom PUD water.

For **Cogeneration Cooling Tower Blowdown**, the actual concentration will be approximately 15 times the background concentration in the Whatcom PUD water.

Values for Aluminum are based on historical average values as supplied by Whatcom County PUD and concentrated on the same basis as the rest of the trace metals.

Note 2a: The Edge Analytical test showed no detectable quantity of this component. The quantities shown are based on the detection limit for the analytical test and are concentrated by 1, 4, or 15 times as described in Note 2.

Note 3: Not detected in site samples; not normally present in surface waters at detectable levels.

Note 4: Included with Total Organic Carbon concentration value.

Note 5: This type of polymer may be used to treat makeup water, which is filtered prior to demineralization.

Note 6: This is an assumed value and is based on (4) times the value typical for surface waters subject to elevated TOC due to seasonal runoff.

Note 7: This is an estimated value, and is 15 times the value obtained in a test performed by Edge Analytical (Reference # 01-4184) plus the highest anticipated leachate rate from CCA-C wood used in cooling tower construction. This highest concentration occurs initially upon cooling tower startup. Over a period of about one year, this initial concentration would decrease about 40–80%. The number in parenthesis is the highest initial concentration; the other number in the cell is the longer-term concentration.

Note 8: This type of polymer may be used as a dispersant in the cooling tower recirculating water.

Note 9: This value reflects addition of this substance to the cooling tower recirculating water to control pH and limit biofouling and corrosion.

Note 10: This value could increase to 203 GPM if the cooling tower is operated at 10 cycles of concentration as opposed to 15. Concentrations of chemical species relating to the cooling tower would then be reduced in inverse proportion. Total mass flow of species listed would remain constant. Since 10-cycle operation requires 72 gpm more make-up water on an average basis than 15-cycle operation, fresh water requirements for the Cogeneration Project in this ASC are given for 10-cycle operation.

Note 11: This value is based on a typical average surface water TOC concentration of 3 to 4 mg/L, with the cooling tower operating at 15 cycles of concentration.

Note 12: Based on typical ratios between TOC, COD, and BOD in municipal waste waters; which represent these relationships when the TOC, COD, and BOD are not derived from petrochemical wastes.

Note 13: Normal control range: 8.2 to 8.8 pH

TABLE 3.7-3
(NEW APRIL, 2003)

Potential Impact of Proposed Cogeneration Project On The Existing Refinery Wastewater Discharge To Outfall 001 To The Strait of Georgia

Parameter	Cogen Project contribution (averages, converted to unit of measure used in NPDES limit)	Percent increase due to Cogen contribution	Combined Flow, Percent of NPDES Limit
Discharged Flow (gpm)	190	8.1%	NL
Discharged Flow (mgd)	0.27	8.1%	NL
Production (bbls/day)	---	---	NL
Temperature (°F, max.)	---	---	a
Biochemical Oxygen Demand (lbs/day)	132	1.0%	22%
Chemical Oxygen Demand (lbs/day)	323	0.6%	26%
Total Suspended Solids (lbs/day)	98	14.9%	50%
Oil & Grease (lbs/day)	3.0	0.1%	32%
Phenolic compounds (lbs/day)	0.0	0.0%	27%
Ammonia as N (lbs/day)	0.0	0.0%	13%
Sulfide (lbs/day)	0.0	0.0%	10%
Total Chromium (lbs/day) (d)	.32(1.45)	b	2.6%(12%)
Hexavalent Chromium (lbs/day)	0.0	0.0%	0%
Fecal Coliform (organisms/100mls)	0.0%	0.0%	0%
pH (maximum)	6.5-9.5	-1.0%	c

(a) No Change
(b) Not calculated because denominator equals zero
(c) Not calculated because pH is a logarithmic scale
(d) The number provided is the long term average. The number in the parentheses is the 1st year average, due to potential leachate from the treated timbers used in the cooling tower construction