8. FINDING OF EFFECT - SUMMARY

Table 8-1 summarizes the determinations of effects to all of the species and critical habitats addressed in this BA. The impacts to these ESUs and DPSs are detailed in Section 6 of this document.

Table 8-1. Summary of Effect Determinations for Species and Critical Habitat

ESU/DPS	Determination of Effects to Species	Determination of Effects to Critical Habitat
Lower Columbia River **Chinook** *Oncorhynchus tshawytscha*	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Upper Columbia River Spring-Run **Chinook** *Oncorhynchus tshawytscha*	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Snake River Fall-Run **Chinook** *Oncorhynchus tshawytscha*	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Snake River Spring/Summer-Run **Chinook** *Oncorhynchus tshawytscha*	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Upper Willamette River **Chinook** *Oncorhynchus tshawytscha*	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Lower Columbia River **Steelhead** *Oncorhynchus mykiss*	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Middle Columbia River **Steelhead** *Oncorhynchus mykiss*	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Upper Columbia River **Steelhead** *Oncorhynchus mykiss*	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Snake River **Steelhead** *Oncorhynchus mykiss*	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Upper Willamette River **Steelhead** *Oncorhynchus mykiss*	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Snake River **Sockeye** *Oncorhynchus nerka*	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Lower Columbia River **Coho** *Oncorhynchus kisutch*	May Affect, Likely to Adversely Affect	N/A
Columbia River **Chum** *Oncorhynchus keta*	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Columbia River DPS, conterminous US **Bull trout** *Salvelinus confluentus*	May Affect, Not Likely to Adversely Affect	Will Not Destroy or Adversely Modify, May Affect, Not Likely to Adversely Affect

ESU/DPS	Determination of Effects to Species	Determination of Effects to Critical Habitat
Eastern DPS **Northern (Steller) Sea Lion** *Eumetopias jubatus*	May Affect, Likely to Adversely Affect	N/A
Southern DPS **Green Sturgeon** *Acipenser medirostris*	May Affect, Not Likely to Adversely Affect	N/A
Southern Resident Population **Killer Whale** *Orcinus orca*	May Affect, Not Likely to Adversely Affect	N/A
Southern DPS **Eulachon** *Thaleichthys pacificus*	May Affect, Likely to Adversely Affect	N/A

8.1 SPECIES

8.1.1 Salmon and Steelhead

The project **may affect,** and is **likely to adversely affect,** LCR Chinook, UCR spring-run Chinook, SR fall-run Chinook, SR spring/summer-run Chinook, LCR steelhead, MCR steelhead, UCR steelhead, SR steelhead, SR sockeye, LCR coho, and CR chum.

The project **may affect** these ESUs/DPSs based on the following:

- There are numerous documented detections of individuals from these ESUs/DPSs in the action area.
    - Suitable migration and juvenile rearing habitat occurs within all of the action area water bodies for the salmon and steelhead ESUs/DPSs listed above.
    - Suitable spawning habitat for CR chum occurs in upriver portions of the action area in the Columbia River.
    - Suitable spawning habitat for LCR Chinook and LCR coho occurs in the Hood River at the proposed mitigation site.
- The project will generate noise above ambient levels in the Columbia River and North Portland Harbor.
- The project will temporarily and permanently alter water quality and quantity in the action area water bodies.
- The project will conduct in-water and over-water construction activities in the Columbia River, North Portland Harbor, Hood River, and Lewis River that may result in behavioral harassment, injury or mortality.
- The project will place numerous in-water and over-water structures in the Columbia River and North Portland Harbor, making both permanent and temporary alterations to in-stream habitat, including physical loss, shading, and hydraulic shadowing.
- The project will remove riparian vegetation and revegetate disturbed riparian areas alongside the Columbia River and North Portland Harbor.

- Land use changes may result in added PGIS, in-water work, and loss of in-stream habitat features.
- Spawning and rearing habitat will be increased for LCR Chinook, LCR coho, and LCR steelhead at the Hood and Lewis River mitigation sites. Spawning and rearing habitat may be increased for CR chum at the Lewis River mitigation sites.
- Foraging, rearing, migrating, and holding habitat will be improved with additional allochthonous material, cover, and shade for adult and juvenile LCR Chinook, LCR coho, and LCR steelhead provided by riparian, side-channel, and wetland restoration at the Hood River mitigation site.
- Rearing habitat will be improved with additional allochthonous material, cover, and shade for migrating adult and juvenile LCR Chinook, CR chum, LCR coho, and Lower CR steelhead provided by riparian and side-channel restoration at the Lewis River mitigation site. Foraging, migrating, and holding habitat will be improved for the preceding reasons for all adult and juveniles of the ESUs/DPSs at the Lewis River mitigation site.
- Side channel and wetland restoration at the Hood River mitigation site will provide high-flow refuge, improved hydrologic function for in-river flows, and potentially improved water quality through wetland restoration for adult and juvenile LCR Chinook, LCR coho, and LCR steelhead. This represents a benefit for these fish.
- Side channel restoration at the Lewis River mitigation site will provide high-flow refuge, improved hydrologic function for in-river flows, and potentially improved water quality (cool-water refugia from warmer Columbia River flows) for adult and juveniles of all ESUs/DPSs, but especially for juvenile LCR Chinook, LCR coho, and LCR steelhead.

The project is **likely to adversely affect** these ESUs/DPSs based on the following:

- Noise levels may exceed thresholds for behavioral disturbance and onset of injury. This may potentially delay migration, damage tissues, produce TTS (fatigue of hair cells in the inner ear) or PTS (permanent hearing loss), cause mortality, and increase the potential for predation in the Columbia River and North Portland Harbor.
- The project may temporarily increase turbidity above baseline levels during in-water construction in the Columbia River and North Portland Harbor, potentially resulting in injury or behavioral harassment.
- The project may temporarily increase turbidity above baseline levels during in-water construction in the Hood and Lewis Rivers as side channels are connected to the mainstem lower Hood River and the Columbia River, respectively, and while restoration plantings are being established potentially resulting in injury or behavioral harassment.
- In the Columbia River, North Portland Harbor, and Columbia Slough, increased PGIS may result in increased exposure to contamination during events exceeding the design storm. Exposure during these events may cause injury or behavioral disturbance to fish, but is likely to be lower than the preproject exposure.

- In Burnt Bridge Creek, increased PGIS may result in increased exposure to contamination and altered flow regime during all storm events. Exposure during these events may cause injury or behavioral disturbance to LCR coho and steelhead, but is likely to be lower than preproject exposure.
- Direct handling of fish during salvage poses the risk of injury or mortality in the Columbia, Hood, and Lewis River mitigation sites.
- Fish may become entrained in cofferdams in the Columbia River, where they will likely experience mortality.
- In the Columbia River and North Portland Harbor, temporary physical loss of habitat, increased in-water shade, and changes in hydraulic shadowing could temporarily increase exposure of migrating juveniles to predation and delayed migration.
- In the Columbia River and North Portland Harbor, permanent physical loss of habitat, increased in-water shade, and changes in hydraulic shadowing may result in increased exposure of migrating juveniles to predation and delayed migration.

The project **may affect** UWR Chinook and UWR steelhead based on:

- Suitable migration and rearing habitat occurs near the western extent of the action area in the Columbia River and may be subjected to temporary noise above ambient levels.

The project is **likely to adversely affect** UWR Chinook and steelhead based on**:**

- Noise levels may exceed thresholds for behavioral disturbance. This may potentially delay migration and hinder rearing in the Columbia River.

8.1.2 Bull Trout

The project **may affect** bull trout based on:

- Marginally suitable migration habitat is present in the action area in the Columbia River and North Portland Harbor. Bull trout have the potential to occur in the Columbia River and North Portland Harbor portions of action area, but detections are very few, limited to less than 20 individuals in the entire lower Columbia River over a period of approximately 60 years. This indicates that presence in the action area is extremely limited. Presence is likely limited to the months of September through June.
- Suitable migration habitat is present in the action area at the lower Hood River and Lewis River mitigation sites. Extremely limited numbers of individuals are documented at these sites.
- The project will generate noise above ambient levels in the Columbia River and North Portland Harbor.
- The project will temporarily and permanently alter water quality in the Columbia River and North Portland Harbor.
- The project may temporarily increase turbidity above baseline levels during in-water construction in the Hood and Lewis Rivers as side channels are connected to the mainstem lower Hood River and the Columbia River, respectively, and while restorations plantings are being established.

- Direct handling of fish during salvage poses the risk of injury or mortality in the Columbia, Hood, and Lewis Rivers.
- The project will conduct in-water and over-water construction activities in the Columbia River and North Portland Harbor that may result in behavioral harassment, injury or mortality.
- The project will place numerous in-water and over-water structures in the Columbia River and North Portland Harbor, making both permanent and temporary alterations to in-stream habitat, including physical loss, shading, and hydraulic shadowing.
- The project will remove riparian vegetation and revegetate disturbed riparian areas alongside the Columbia River and North Portland Harbor.
- Land use changes may result in added PGIS, in-water work, and loss of in-stream habitat features.
- Foraging, rearing, migrating, and holding habitat will be improved with additional allochthonous material, cover, and shade by provided by riparian, side-channel, and wetland restoration at the Hood River mitigation site, and potentially in the future, at the Lewis River site if adfluvial bull trout are present in the Lewis River in future years.
- Side channel and wetland restoration at the Hood River mitigation site will provide high-flow refuge, improved hydrologic function for in-river flows, and potentially improved water quality through wetland restoration.
- Side channel restoration at the Lewis River mitigation site will provide high-flow refuge, improved hydrologic function for in-river flows, and potentially improved water quality (cool-water refugia from warmer Columbia River flows).

The project is **not likely to adversely affect** bull trout based on the following:

- Due to the extremely limited numbers of individuals present in the action area, risk of exposure to all of these effects is discountable.

8.1.3 Green Sturgeon

The project **may affect** green sturgeon based on:

- Suitable habitat for adults occurs within the action area in the Columbia River, North Portland Harbor, and Lewis River. However, detections in the action area are rare, and presence is expected to be extremely limited.
- The project will generate noise above ambient levels in the Columbia River and North Portland Harbor.
- The project will temporarily and permanently alter water quality in the Columbia River and North Portland Harbor.
- The project may temporarily increase turbidity above baseline levels during in-water construction in the Lewis River as side channels are connected to the mainstem lower Columbia River and while restorations plantings are being established.
- Direct handling of fish during salvage poses the risk of injury or mortality in the Columbia and Lewis Rivers.

- The project will conduct in-water and over-water construction activities in the Columbia River and North Portland Harbor that may result in behavioral harassment, injury or mortality.
- The project will place numerous in-water and over-water structures in the Columbia River and North Portland Harbor, resulting in both permanent and temporary physical loss of habitat.
- Land use changes may result in added PGIS, in-water work, and loss of in-stream habitat features.

The project is **not likely to adversely affect** green sturgeon based on:

- Due to the extremely limited numbers of individuals present in the action area, risk of exposure is discountable.

8.1.4 Steller Sea Lion

The project **may affect** the northern (Steller) sea lion based on:

- Steller sea lions are known to transit through the action area in the Columbia River and North Portland Harbor. They will likely be exposed to temporary noise above ambient levels.

The project is **likely to adversely affect** the Steller sea lion based on:

- Noise levels will likely be above disturbance thresholds and may cause behavioral harassment to Steller sea lions transiting in the Columbia River and North Portland Harbor.
- Noise levels will likely be above injury thresholds, but effects will be limited to temporary harassment to Steller sea lions transiting in the Columbia River and North Portland Harbor. The project will avoid injury by monitoring Steller sea lion presence and curtailing pile driving when Steller sea lions approach the potential injury zone.

8.1.5 Killer Whale

The project **may affect** the Southern Resident DPS of killer whale based on:

- The project will have adverse effects on the Chinook prey base of the Southern Resident DPS.

The project is **not likely to adversely affect** the killer whale based on:

- The project will adversely impact a small percentage of the Columbia River Chinook salmon population. This represents a negligible proportion of the entire Chinook population occurring in the marine portion of the action area. Therefore, the resulting impact to the Chinook prey base and killer whale is insignificant.

Additional information on Southern Resident DPS killer whale is located in Appendix H of this document.

8.1.6 Eulachon

The project **may affect** eulachon based on:

- Suitable habitat and documented detections occur in the action area in the Columbia River, North Portland Harbor, and lower Lewis River.
- The project will generate noise above ambient levels in the Columbia River and North Portland Harbor.
- The project may temporarily increase turbidity above baseline levels during in-water construction in the Lewis River as side channels are connected to the mainstem lower Columbia River and while restoration plantings are being established.
- Direct handling of fish during salvage poses the risk of injury or mortality in the Columbia River.
- The project will temporarily and permanently alter water quality in the Columbia River and North Portland Harbor.
- The project will conduct in-water and over-water construction activities in the Columbia River and North Portland Harbor that may result in behavioral harassment, injury or mortality.
- The project will place numerous in-water and over-water structures in the Columbia River and North Portland Harbor, making both permanent and temporary alterations to in-stream habitat, including physical loss, shading, and hydraulic shadowing.
- The project will remove riparian vegetation and revegetate disturbed riparian areas alongside the Columbia River and North Portland Harbor.
- Land use changes may result in added PGIS, in-water work, and loss of in-stream habitat features.
- Side-channel restoration at the Lewis River mitigation site will provide high-flow refuge, improved hydrologic function for in-river flows, and potentially improved water quality (cool-water refugia from warmer Columbia River flows).

The project is **likely to adversely affect** eulachon based on:

- Noise levels may exceed thresholds for behavioral disturbance and onset of injury. This may potentially delay migration, damage tissues, produce TTS or PTS, and increase the potential for predation in the Columbia River and North Portland Harbor.
- The project may temporarily increase turbidity above baseline levels during in-water construction in the Columbia River and North Portland Harbor, potentially resulting in injury or behavioral harassment.
- In the Columbia River and North Portland Harbor, increased PGIS may result in increased exposure to contamination during events exceeding the design storm. Exposure during these events may cause injury or behavioral disturbance, but is likely to be lower than preproject exposure.
- Direct handling of fish during salvage poses the risk of injury or mortality in the Columbia River.

- Fish may become entrained in cofferdams in the Columbia River, where they will likely experience mortality.
- In the Columbia River and North Portland Harbor, temporary physical loss of habitat, increased in-water shade, and changes in hydraulic shadowing could temporarily increase exposure of migrating larvae to predation and could alter primary and benthic productivity.
- In the Columbia River and North Portland Harbor, permanent physical loss of habitat, increased in-water shade, and changes in hydraulic shadowing may result in increased exposure of migrating larvae to predation and may alter primary and benthic productivity.

8.2 CRITICAL HABITAT

8.2.1 Designated Critical Habitat for Listed Salmon and Steelhead

The project **may affect** designated critical habitat for LCR Chinook, UCR spring-run Chinook, SR fall-run Chinook, SR spring/summer-run Chinook, UWR Chinook, LCR steelhead, MCR steelhead, UCR steelhead, SR steelhead, UWR steelhead, SR sockeye, and CR chum based on:

- Designated critical habitat occurs within the action area in the Columbia River, North Portland Harbor, and Columbia Slough for all runs listed above.
- Designated critical habitat occurs within the action area in the Hood River for LCR Chinook and LCR steelhead.
- Designated critical habitat occurs within the action area in the Lewis River for LCR Chinook, CR chum, and LCR steelhead.
- For the 2005 critical habitat designation (LCR Chinook, UCR spring-run Chinook, UWR Chinook, LCR steelhead, MCR steelhead, UCR steelhead, SR steelhead, UWR steelhead, and CR chum), PCEs occurring in the action area include:
    - Freshwater spawning sites in the Columbia River (for CR chum only), the Lewis River (LCR Chinook and LCR steelhead), and the Hood River (LCR Chinook and LCR steelhead),
    - Freshwater rearing areas (for LCR Chinook, UCR spring-run Chinook, UWR Chinook, LCR steelhead, and CR chum),
    - Freshwater migration corridors (for all runs).
- For the 1993 critical habitat designation (SR spring/summer-run Chinook, SR sockeye, and SR fall-run Chinook), PCEs occurring in the action area include:
    - Juvenile migration corridors (for all runs)
    - Adult migration corridors (for all runs).
- The project will generate noise above ambient levels in the Columbia River and North Portland Harbor.
- The project will temporarily and permanently alter water quality in the Columbia River, North Portland Harbor, and Columbia Slough.

- The project will temporarily alter water quality in the Lewis and Hood Rivers.
- The project will place numerous in-water and over-water structures in the Columbia River and North Portland Harbor, making both permanent and temporary alterations to in-stream habitat, including physical loss, shading, and hydraulic shadowing.
- The project will remove riparian vegetation and revegetate disturbed riparian areas alongside the Columbia River and North Portland Harbor.
- Land use changes may result in added PGIS, in-water work, and loss of in-stream habitat features, potentially altering the migration and rearing PCEs.
- The 21 acres of restored side-channel habitat at the Hood River mitigation site will provide additional spawning habitat and larval development. Reconnection of the main channel Hood River with the wetland and side-channel area will restore a more natural hydrograph and may prevent high-flow events from scouring redds.
- The 18.5 acres of restored side-channel habitat at the Lewis River mitigation site will provide spawning habitat for LCR Chinook, LCR steelhead, and potentially CR chum. Reconnection of the side-channel areas will restore a more natural hydrograph and may prevent high-flow events from scouring redds.
- Reconnection of Hood River floodplain habitat with the 21 acres of side channel and associated wetland area will increase rearing area for juveniles, high flow refuge, potentially improving base flows and attenuating peak flow, and likely improved water quality and quantity from flow attenuation and wetland reconnection. Riparian and wetland plantings and addition of large woody debris will provide allochthonous inputs into the channel, cover, and shade which will improve rearing habitat by increasing forage and natural cover.
- Reconnection of the Lewis and Columbia Rivers to floodplain habitat in the side channels at the Lewis River mitigation site will increase rearing area for rearing LCR, CR chum, and LCR steelhead juveniles. High flow refuge, potential improvements to base flows and attenuation of peak flows, and likely improvements to water quality and quantity from flow attenuation with the additional side channel acreage will occur for lower river ESUs and DPS, but will also occur for all other ESUs and DPSs as well. In addition, riparian plantings and addition of large woody debris will provide allochthonous inputs into the channel, cover, and shade which will improve rearing habitat by increasing forage and natural cover for all LCR Chinook, CR chum, and LCR steelhead.
- Reconnection of Hood River floodplain habitat with the 21 acres of side channel and associated wetland area will increase migrating area for adults and juveniles, as well as provide a high flow refuge during migration, potentially improve base flows and attenuating peak flow, and likely improve water quality and quantity from flow attenuation and wetland reconnection. Restoration of the riparian and wetland area through reconnection with the river, plantings, and addition of large woody debris will provide allochthonous inputs into the channel, cover, and shade which will improve migration habitat by increasing forage and natural cover, and overall habitat complexity.
- Reconnection of the 18.5 acres of side channels along the Lewis River will increase migrating area for adults and juvenile LCR Chinook and LCR steelhead in the Lewis River, as well as provide high flow refuge during migration, potentially improve base

flows and attenuate peak flows, and likely improve water quality and quantity from flow attenuation and the additional acreage of the side channels for lower river ESUs and DPS, but will also occur for all other ESUs and DPSs as well. Restoration of the riparian and wetland area through reconnection with the river, plantings, and addition of large woody debris will provide allochthonous inputs into the channel, cover, and shade which will improve migration habitat by increasing forage and natural cover, and overall habitat complexity.

The project is **likely to adversely affect** these critical habitat units based on:

- Noise levels may exceed thresholds for behavioral disturbance and injury to fish. This may temporarily degrade the migration PCEs for all ESUs/DPSs and the rearing PCE for LCR Chinook, UCR spring-run Chinook, LCR steelhead, and CR chum.
- Noise levels may degrade the spawning PCE for CR chum, but this PCE will likely still be functional during periods of elevated underwater noise.
- The project may temporarily increase turbidity above baseline levels during in-water construction in the Columbia River and North Portland Harbor, potentially degrading discrete portions of the migration and rearing PCEs for a period of no more than 12 hours per day during operations that disturb sediment.
- The project may temporarily increase turbidity above baseline levels during in-water construction in the Hood and Lewis Rivers, potentially degrading discrete portions of the migration and rearing PCEs for short durations 100 feet upstream and 300 feet downstream of where new side channels are reconnected to the main river channels.
- In the Columbia River, North Portland Harbor, and Columbia Slough, increased PGIS may degrade water quality during events that exceed the design storm. This may degrade the migration and rearing PCEs, but discharge of pollutants will likely be lower than preproject conditions.
- In the Columbia River and North Portland Harbor, temporary physical loss of habitat, increase in in-water shade, and changes in hydraulic shadowing could temporarily increase predation pressure and could alter primary and benthic productivity. This may temporarily degrade the migration and rearing PCEs.
- In the Columbia River and North Portland Harbor, permanent physical loss of habitat, increase in in-water shade, and changes in hydraulic shadowing may result in increased exposure of migrating juveniles to predation and may alter primary and benthic productivity. This may permanently degrade the migration and rearing PCEs.

8.2.2 Designated and Proposed Critical Habitat for Bull Trout

Proposed critical habitat for bull trout occurs within the action area in the Columbia River, North Portland Harbor, Hood River, and Lewis River. The project will have the following effects on the PCEs that occur within the action area:

- The project will generate noise above ambient levels in the Columbia River and North Portland Harbor. This may degrade the migratory habitat PCE.
- The project will temporarily and permanently alter the water quality PCE in the Columbia River and North Portland Harbor.

- The project will place numerous in-water and over-water structures in the Columbia River and North Portland Harbor, making both permanent and temporary alterations to in-stream habitat, including physical loss of substrate and increased in-water shading. This may potentially affect the complex aquatic habitat and food base PCEs.
- The project will remove riparian vegetation and revegetate disturbed riparian areas alongside the Columbia River and North Portland Harbor. This may potentially affect the temperature and complex aquatic habitat PCEs.
- Land use changes may result in added PGIS, in-water work, and loss of in-stream habitat features. This may potentially affect the migratory habitat and water quality/quantity PCEs.

Although the project will have effects to the PCEs, impacts **will not destroy or adversely modify** proposed critical habitat for bull trout based on:

- Noise above ambient levels will be temporary, limited to the duration of in-water pile driving.
- Temporary impacts to water quality will be limited to no more than periods of about 12 hours per day during operations that disturb sediment. Permanent impacts to water quality will be largely beneficial due to the high level of stormwater treatment.
- Physical loss of substrate is extremely small relative to the remaining substrate available.
- Increase in underwater shading will have only negligible and temporary effects on primary productivity and the food web.
- Temporary shading may have a beneficial effect on water temperature. Permanent shading is likely to have only negligible effects on water temperature.
- Removal of riparian vegetation will have only slight and temporary effects to water temperature.

If proposed critical habitat for bull trout is designated before the completion of the project, a provisional effect determination of **may affect, not likely to adversely affect** is warranted.

Designated critical habitat for bull trout occurs in the Hood and Lewis Rivers. The effect determination of may **affect, not likely to adversely affect** also applies for to this designated critical habitat

The project **may affect** critical habitat for bull trout based on:

- The project will generate noise above ambient levels in the Columbia River and North Portland Harbor. This may degrade the migratory habitat PCE.
- The project will temporarily and permanently alter the water quality PCE in the Columbia River and North Portland Harbor.
- The project will place numerous in-water and over-water structures in the Columbia River and North Portland Harbor, making both permanent and temporary alterations to in-stream habitat, including physical loss of substrate and shading. This may potentially affect the complex aquatic habitats and food base PCEs.

- The project will remove riparian vegetation and revegetate disturbed riparian areas alongside the Columbia River and North Portland Harbor. This may potentially affect the temperature and complex aquatic habitats PCEs.
- Land use changes may result in added PGIS, in-water work, and loss of in-stream habitat features. This may potentially affect the migratory habitat and water quality/quantity PCEs.
- Springs, seeps, groundwater sources PCE: The proposed Hood River mitigation will reconnect a 21-acre wetland and isolated river side channel with the mainstem Hood River. The reconnection of the wetland to the main channel is expected to improve subsurface water connectivity, contribute to water quality improvements through reconnection of wetland water quality functions and contribute to thermal refugia from the increase in subsurface flow connections. The proposed Lewis River mitigation will reconnect 18.5 acres of side channels with the Lewis and Columbia Rivers. The reconnection of the side channels is expected to improve subsurface water connectivity and contribute to thermal refugia.
- Food base PCE: The proposed mitigation at the Lewis and Hood River mitigation sites will allow contribution of allochthonous input from side channel and wetland productivity, which contribute to stream productivity. Benefits to salmonids spawning, rearing, and migration habitat will benefit the bull trout prey base. These benefits include: side channel improvements for habitat complexity, including placement of large woody debris, increased shading, off-channel refugia, hydrology benefits (likely increases in base flows and reductions in peak flows), and the increase in spawning and rearing habitat for salmon and steelhead.
- Complex aquatic habitats: The proposed Hood River mitigation will reconnect one mile of side channel and a 21-acre wetland with the mainstem Hood River. Channel enhancing restoration, such as the addition of large woody debris, will add complexity resulting in channel-forming processes creating a variety of depths, gradients, velocities, and structures. The proposed Lewis River mitigation will reconnect 21,100 linear feet of side channels with the Lewis and Columbia Rivers. Channel enhancing restoration, such as the addition of large woody debris, will add complexity resulting in channel-forming processes creating a variety of depths, gradients, velocities, and structures.
- Temperature PCE: At the Hood River mitigation site, reconnection to the historic wetland will help maintain base flows, which benefit stream summer temperatures. Riparian restoration plantings will shade the mainstem and off-channel areas, which will help maintain in-stream temperatures. At the Lewis River mitigation site, reconnection of the historic channels will allow access to thermal refugia in the cooler Lewis River waters for fish in the Columbia River during high summer temperatures. Riparian restoration plantings will shade the off-channel areas, which will help maintain in-stream temperatures.
- Natural hydrograph PCE: At the Hood River mitigation site, reconnection of one mile of side channel and connection of the main river channel to the wetland will result in a more natural hydrograph as the main stem river will be more connected to the floodplain. Reconnection to the wetland area may enhance base flows and alleviate channel incision

caused from high flows. At the Lewis River mitigation site, reconnection of the side channels will result in a more natural hydrograph because the mainstem Lewis and Columbia Rivers will be more connected to their floodplain. Reconnection of the side channels may enhance base flows and alleviate channel incision caused from high flows.

- Water quantity/quality PCE: At the Hood River mitigation site, wetlands provide retention of peak flows, replenish base flows and provide function to filter sediment and toxicants from entering waterways. The side channel proposed as part of the project will offer refuge from high flows, and provide greater connectivity so that water quantity during high flows is attenuated with the extra volume provided by the side channel. At the Lewis River mitigation site, the side channels will offer refuge from high flows, and provide greater connectivity so that water quantity during high flows is attenuated with the extra volume provided by the side channel.

The project is **not likely to adversely affect** critical habitat for bull trout based on:

- Elevated noise will be limited in duration to 40 minutes per in-water work day and is not likely to occur when bull trout are present. Therefore, elevated noise does not represent significant degradation to the migratory PCE.
- Effects to other PCEs will be either extremely slight or beneficial. Thus, these effects will not measurably degrade the PCEs and will therefore be insignificant.

8.3 CONCLUSION

Due to these findings of effect, FHWA and FTA are requesting initiation of **formal consultation** and an **incidental take statement** in accordance with Section 7 of the ESA for the following listed species: LCR Chinook, UCR spring-run Chinook, SR fall-run Chinook, SR spring/summer-run Chinook, UWR Chinook, LCR steelhead, MCR steelhead, UCR steelhead, SR steelhead, UWR steelhead, SR sockeye, LCR coho, and CR chum. **Formal consultation** is also requested for the Eastern DPS of Steller sea lion and eulachon.

Additionally, FHWA and FTA are requesting **formal consultation** for the following designated critical habitats: LCR Chinook, UCR spring-run Chinook, SR fall-run Chinook, SR spring/summer-run Chinook, UWR Chinook, LCR steelhead, MCR steelhead, UCR steelhead, SR steelhead, UWR steelhead, SR sockeye, and CR chum.

Informal consultation is requested for the Southern DPS of green sturgeon, the Columbia River DPS of bull trout, and the Southern Resident DPS of killer whale.

FHWA and FTA also request **formal conferencing** for proposed critical habitat for bull trout.