

# Appendix I

## Adverse Long-term Impact Indicators

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# ADVERSE LONG-TERM IMPACT INDICATORS

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As described in Chapter 4 of the Draft Chehalis Basin Strategy Programmatic Environment Impact Statement (EIS), adverse long-term impacts, if any, would be considered minor, moderate, or significant depending on their magnitude. Although an impact could be considered minor or moderate at the Basin-wide scale, it could be a significant impact locally or for cultural or tribal resources. The Washington State Department of Ecology (Ecology) expects that during project-level environmental review, a more detailed evaluation of project impacts would be required.

Potential long-term adverse impacts were determined by identifying the impacts that could be applicable to one or more action elements and combined alternatives. The factors (or indicators) that were used to evaluate the degree of adverse impacts for each element of the environment are described in the following table. Some of the impact indicators (such as land settlement) are not applicable to every action element.

## Degree of Adverse Impacts

**Minor** – Minimal and/or easily mitigated

**Moderate** – Adverse but limited in scope and effect; limited in extent on a Basin-wide scale (smaller footprint and would result in limited changes); potentially consistent with regulatory standards; mitigation requirements would be straightforward and reasonably achievable

**Significant** – Adverse and larger in scope; greater magnitude and extent of impact across the Chehalis Basin (larger footprint and would result in greater changes); potentially inconsistent with regulatory standards; mitigation requirements would be extensive

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
<p><b>SURFACE WATER QUALITY</b></p> <p>Receiving waters water quality and compliance with Washington State Water Quality Standards (Washington Administrative Code 173-201A)</p>	<p><u>Minor</u>: Receiving water predicted to meet existing Washington surface water quality standards and/or receiving water predicted to be within existing background or ambient conditions as a result of implementation of action elements.</p> <p><u>Moderate</u>: Receiving water predicted to deviate from existing background water quality conditions. Short-term and/or local exceedances of water quality standards may occur; however, parameters are still predicted to meet Washington surface water quality standards (see Appendix D for receiving water criteria). The allowable increases due to human activity per Washington standards are as follows:</p> <ul style="list-style-type: none"> <li>• Temperature: up to 0.3°C increase</li> <li>• Turbidity: 5 Nephelometric Turbidity Units over background</li> <li>• Dissolved Oxygen (DO): decrease of no more than 0.2 milligrams per liter (mg/L)</li> </ul> <p><u>Significant</u>: Water quality conditions are predicted to not meet Washington surface water quality standards or are predicted to degrade existing background or ambient conditions (beyond what is allowable by Washington standards) as a result of implementation of action elements for an extended period of time.</p> <p>Impacts would be widespread and extend beyond the footprint of the activity. Specific receiving water quality criteria are identified in Appendix B of the EIS for water temperature, DO, and turbidity. Activities that have the potential to increase sediment in receiving waters have the potential to create conditions that do not meet Washington water quality criteria.</p>
<p>Pollutant loading</p>	<p><u>Minor</u>: Receiving water pollutant loading predicted to be within existing background variation or ambient conditions as a result of implementation of action elements; and/or meet existing Washington surface water quality standards (if applicable) to pollutant load concentrations.</p> <p><u>Moderate</u>: Receiving water pollutant loading predicted to exceed existing ambient conditions but still meet existing Washington surface water quality standards (if applicable) to pollutant load concentrations.</p> <p><u>Significant</u>: Receiving water predicted to experience an increase in pollutant loadings beyond the existing condition for an impact would be widespread and extend beyond the footprint of the action elements. This may include widespread violations of existing Washington surface water quality standards (where applicable).</p>

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
Downstream flow augmentation (Impacts on water temperature DO)	<p><u>Minor:</u> Receiving water predicted to meet existing Washington surface water quality standards (temperature and DO) and/or receiving water predicted to be within existing background or ambient conditions as a result of implementation of action elements.</p> <p><u>Moderate:</u> Receiving water predicted to deviate from existing background water quality conditions. Short-term and/or local exceedances of water quality standards (temperature and DO) may occur, however parameters are still predicted to meet Washington State surface water quality standards (see Appendix B for receiving water criteria). The allowable increases due to human activity per Washington standards are as follows:</p> <ul style="list-style-type: none"> <li>• Temperature: up to 3°C increase</li> <li>• DO: decrease of no more than 0.2 mg/L</li> </ul> <p><u>Significant:</u> Water quality conditions are predicted to not meet Washington surface water quality standards (temperature and DO) or are predicted to degrade existing background or ambient conditions (beyond what is allowable by Washington standards) as a result of implementation of action elements for an extended period of time.</p>
SURFACE WATER QUANTITY	
Inundation upstream of the Flood Retention Facility flow regime outside flood operations	<p><u>Minor:</u> Minor loss of riverine function along the Chehalis River and tributaries with conversion of the river to open water reservoir with little to no impacts on habitat and water quality.</p> <p><u>Moderate:</u> Short-term loss of riverine function along the Chehalis River and tributaries with conversion of river to open-water reservoir resulting in loss of existing habitat function and impacts on water quality (changes over baseline conditions) during times of inundation (up to 32 days).</p> <p><u>Significant:</u> Long-term, permanent loss of riverine function along the Chehalis River and tributaries with conversion from river to open-water reservoir resulting in loss of existing habitat function and long-term changes to water quality.</p>

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
<p>Flooding and change in 100-year flood extents (water quantity) and changes in downstream flow regime</p>	<p><u>Minor</u>: Minimal change to existing floodplain extents or flood frequency as a result of implementation of action elements.</p> <p><u>Moderate</u>: Predicted increase in local flood extents, flood elevations, or flood frequency as a result of implementation of action elements. Impact would be local to the project footprint and occur in the immediate vicinity of the project and/or occur for a short, temporary duration. Increase in flood extents is predicted to result in detrimental effects to water quality.</p> <p><u>Significant</u>: Predicted increase in flood extents, flood elevations, or flood frequency as a result of implementation of action elements. Impact would be widespread and extend beyond the footprint of the project site or activity, and may occur for a long duration.</p>
<p>Alteration(s) to water rights for designated uses</p>	<p><u>Minor</u>: Minimal change to the current allocation of water that would affect existing rights as a result of implementation of action elements.</p> <p><u>Moderate</u>: Predicted impacts on the current allocation of water that would affect existing rights as a result of implementation of action elements at the project site or in the immediate vicinity.</p> <p><u>Significant</u>: Predicted impacts on the current allocation of water that would affect existing rights as a result of implementation of action elements would be widespread and extend beyond the footprint and vicinity of the project, on the sub-basin or Basin-wide scale.</p>
GROUNDWATER	
<p>Changes in groundwater recharge in the reservoir footprint</p> <p>Changes in groundwater flow regime in downstream floodplain areas</p>	<p><u>Minor</u>: Minimal change to the groundwater flow regime (including hyporheic flows) as a result of implementation of action elements. Structures that require extensive subsurface excavation have the potential to the disrupt groundwater flow regime locally.</p> <p><u>Moderate</u>: Disruption of the groundwater flow regime (including groundwater recharge) as a result of implementation of action elements at and in the vicinity of the project site(s). Disruption in the groundwater flow regime would be limited to the project site and not on a Basin-wide scale (not widespread). Groundwater flow regimes can be altered by placement of subsurface structures, such as levee toes.</p> <p><u>Significant</u>: Large-scale disruption of the groundwater flow regime (including groundwater recharge) as a result of implementation of action elements. This would occur as a widespread impact outside of the project footprint on Basin-wide scale (or greater).</p>

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
<b>GEOLOGY</b>	
Occurrence of landslides and slope instability	<p><u>Minor</u>: Minimal change to the occurrence or frequency of landslides (from existing conditions) as a result of implementation of action elements.</p> <p><u>Moderate</u>: Potential localized increase in landslides (landslide risk is limited to a geographic area) as a result of implementation of action elements. These landslides have the potential to increase the sediment load to parts of the reservoir and reservoir footprint, increasing sediment and turbidity and causing localized, temporary turbid conditions.</p> <p><u>Significant</u>: Potential for a widespread increase in landslides as a result of implementation of action elements. Landslides have the potential to increase the sediment load to the reservoir and reservoir footprint, thereby increasing water turbidity and violating Washington surface water quality standards over a wide area for an extended period of time and affecting habitat areas and water quality. These landslides have the potential to break loose large chunks of earth (million cubic yards scale).</p>
Land settlement	<p><u>Minor</u>: Minimal change to the occurrence or frequency of land settlement as a result of implementation of action elements. Impact is easily mitigated.</p> <p><u>Moderate</u>: Potential localized increase in land settlement as a result of implementation of action elements, such as levee placement.</p> <p><u>Significant</u>: Potential increase in land settlement that may result in significant consequences and cannot be mitigated.</p>
Shoreline and slope erosion	<p><u>Minor</u>: Minimal impact as a result of reservoir shoreline erosion or wave action as a result of implementation of action elements.</p> <p><u>Moderate</u>: Shoreline erosion or wave action as a result of implementation of action elements (i.e., reservoir pool), which has the potential to deliver sediment and wood material to the reservoir. This erosion or wave action may occur as a short-term impact from a transient reservoir pool of a smaller scale.</p> <p><u>Significant</u>: Extensive shoreline erosion predicted as a result of implementation of action elements. Potential would exist with a permanent pool of the reservoir (constant wave action along the entire reservoir perimeter), thereby increasing turbidity in the reservoir and violating Washington surface water quality standards for turbidity for an extended period over a larger reservoir pool.</p>

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
Low-level induced seismicity	<p><u>Minor</u>: Minor occurrence of low-level seismicity as a result of implementation of action elements and can be addressed with avoidance and minimization measures.</p> <p><u>Moderate</u>: Implementation of action elements introduce a moderate level of seismicity. This may be limited in scale (i.e., temporary increase potential and partial reservoir footprint.)</p> <p><u>Significant</u>: Implementation of action elements introduce a significant risk of low-level seismicity over the entire reservoir footprint.</p>
<b>GEOMORPHOLOGY</b>	
Large wood load, transport, or recruitment potential	<p><u>Minor</u>: Minimal change to wood load, transport, or recruitment as a result of implementation of action elements.</p> <p><u>Moderate</u>: Decrease in wood load or recruitment potential (compared to existing conditions) as a result of implementation of action elements. Wood load decrease or decrease in recruitment potential would be limited to the project site, not on a reach scale (not widespread).</p> <p><u>Significant</u>: Large decrease in wood load as a result of implementation of action elements (compared to existing conditions). Wood load decrease or decrease in recruitment would have a widespread impact beyond the project site or activity. Implementation of action elements would decrease the existing wood load and recruitment potential and have significant impacts on habitat or to geomorphic function (reach/sub-basin scale).</p>
Sediment load and sediment transport processes	<p><u>Minor</u>: Minimal change to sediment load or sediment transport processes as a result of implementation of action elements.</p> <p><u>Moderate</u>: Decrease in sediment load or modification of sediment transport potential (compared to existing conditions) as a result of implementation of action elements. Decrease in sediment load or sediment transport processes would be limited to the project site, not on a reach scale (not widespread).</p> <p><u>Significant</u>: Decrease in sediment load or modification of sediment transport potential (compared to existing conditions) as a result of implementation of action elements. Decrease in sediment load or sediment transport processes would be widespread, reach scale, extend beyond the project limits, and have significant impacts on habitat or to geomorphic function (reach/sub-basin scale)</p>

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
Channel complexity and geomorphic function (including channel migration and floodplain connectivity)	<p><u>Minor</u>: Minimal change to river and stream geomorphic function or character as a result of implementation of action elements; changes would be local to the area of the action.</p> <p><u>Moderate</u>: Decrease in channel complexity or geomorphic function (compared to existing conditions) as a result of implementation of action elements. Decrease in geomorphic function (e.g., channel migration, channel processes) would extend beyond the project site, up to a reach scale, such as placement of a bank hardening feature or habitat structures that locally limits lateral migration of the channel throughout its floodplain.</p> <p><u>Significant</u>: Large decrease in channel complexity or geomorphic function as a result of implementation of action elements (compared to existing conditions). Decrease in geomorphic function (e.g., channel migration, channel processes) would have a widespread impact beyond the project site, including impacts on aquatic habitats. Limits lateral channel migration on a wider reach/sub-basin scale.</p>
WETLANDS	
Loss of wetlands, or change in function of wetlands through filling, draining, or inundation	<p><u>Minor</u>: Permanent impacts on wetlands that can be authorized through one or more of the U.S. Army Corps of Engineers Nationwide Permits (0.5-acre).</p> <p><u>Moderate</u>: Permanent impacts on wetlands that are less than 5 acres and do not include impacts on Category 1 wetlands. Mitigation opportunities through wetland creation, restoration, or enhancement are available to address impacts within the same watershed/drainage in accordance with regulatory standards.</p> <p><u>Significant</u>: Permanent impacts on wetlands that are greater than 5 acres and/or any impacts on Category 1 wetlands.</p>
VEGETATION	
Loss of vegetation or change in function of vegetated areas through land clearing or inundation	<p><u>Minor</u>: Permanent impacts on vegetation that is less than 2 acres.</p> <p><u>Moderate</u>: Permanent impacts on native upland vegetation that is less than 10 acres and does not include impacts on special status lands (e.g., parks, preserves). Mitigation opportunities through re-vegetation are available to address impacts within the same watershed/drainage in accordance with regulatory standards.</p> <p><u>Significant</u>: Permanent impacts on native upland vegetation that is greater than 10 acres and/or that adversely affect special status lands.</p>



IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
<b>FISH</b>	
Change in habitat function	<p><u>Minor</u>: A change in habitat function that is temporary or occurs across a small geographic area (e.g., within one stream reach) and the change in habitat function would be minor (e.g., less than 20% change in shading by riparian vegetation) for the existing species. The newly inundated floodplain areas are not different in habitat function, degree of human development, or connectedness to the main channel than areas previously inundated during floods. Degree of fish stranding and exposure to toxic pollutants would not change due to the change in inundation extents or changes occur within a small geographic area (e.g., within one stream reach). Adverse impacts could be fully mitigated.</p> <p><u>Moderate</u>: A change in habitat function that is permanent or reoccurring and occurs across a moderately sized geographic area (e.g., more than one stream reach) or the change in habitat function would be moderate (e.g., greater than 20% change in shading by riparian vegetation) for the existing species. The newly inundated floodplain areas have less habitat function, more human development, or worse connectedness to the main channel than areas previously inundated during floods. A possibility exists that degree of fish stranding and exposure to toxic pollutants may change due to the change in inundation extents and changes occur across a moderately sized geographic area (e.g., more than one stream reach). Adverse impacts described are in excess of mitigation.</p> <p><u>Significant</u>: A change in habitat function in excess of mitigation actions that is permanent or reoccurring and occurs across a large geographic area (e.g., an entire sub-basin) or the change in habitat function would be large (e.g., greater than 60% change in shading by riparian vegetation) for the existing species. The newly inundated floodplain areas have less habitat function with worse connectedness to the main channel than areas previously inundated during floods. Degree of fish stranding and exposure to toxic pollutants is certain to change due to the change in inundation extents and changes occur across a large geographic area (e.g., an entire sub-basin). Any loss of an area that contains unique or highly valuable habitat features that cannot be protected or restored elsewhere in the Chehalis Basin or that would trigger regulatory changes. Adverse impacts described are in excess of mitigation.</p>

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
Fish passage	<p><u>Minor</u>: Minor or undetectable change in fish passage rate or success and affecting access to habitat in a small geographic area (e.g., within one stream reach).</p> <p><u>Moderate</u>: Any change in fish passage rate, success, or survival and affecting access to a moderately sized geographic area (e.g., more than one stream reach).</p> <p><u>Significant</u>: Any change in fish passage rate, success, or survival and affecting access to a large geographic area (e.g., an entire sub-basin).</p>
Modeled fish response	<p><u>Minor</u>: A negative change in modeled fish response that is temporary or would affect a small geographic area (e.g., one stream reach) and affects less than 1% of the total Chehalis Basin population of a given species. Would not affect resilience of Chehalis Basin fish populations and would not trigger protective regulatory action, such as an Endangered Species Act (ESA) listing or changes to fishery regulations. Adverse impacts could be fully mitigated.</p> <p><u>Moderate</u>: A negative change in modeled fish response from actions that are permanent or occur in fish populations across a moderately sized geographic area (e.g., more than one stream reach) and affects 1% to 5% of the total Chehalis Basin population of a given species. Would not cause protective regulatory actions, such as ESA listing or changes to fishery regulation. Adverse impacts described are in excess of mitigation.</p> <p><u>Significant</u>: A modeled negative fish response that is permanent and affects greater than 5% of the total Chehalis Basin population of a given species or affects species diversity and spatial structure by affecting fish populations across a large geographic area (e.g., an entire sub-basin) or affects resilience of Chehalis Basin fish populations by any amount or causes protective regulatory actions, such as ESA listing or changes to fishery regulation. Adverse impacts described are in excess of mitigation.</p>

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
<b>WILDLIFE</b>	
<p>Change in habitat conditions and functions</p>	<p><u>Minor</u>: A change in potential habitat conditions and functions that is temporary or occurs across a small geographic area (e.g., within one stream reach or in a relatively small portion of the potential habitat of an affected species) and the change in habitat conditions or functions would be limited for the existing species. Adverse change could be fully mitigated or restored.</p> <p><u>Moderate</u>: A change in potential habitat conditions and functions that is permanent or reoccurring and occurs across a moderately sized geographic area (e.g., more than one stream reach or a moderate portion of the potential habitat of an affected species) or the change in habitat function would be moderate for an existing species. Adverse impacts described are in excess of opportunities for mitigation or restoration.</p> <p><u>Significant</u>: A change in potential habitat conditions and functions that is permanent or reoccurring and occurs across a large geographic area (e.g., an entire sub-basin or large portion of the potential habitat of an affected species) or the change in potential habitat conditions and functions would be substantial for an existing species. Any loss, protection, or restoration of an area that contains unique or highly valuable habitat features that cannot be protected or restored elsewhere in the Chehalis Basin or that would trigger regulatory changes. Adverse impacts described are in excess of opportunities for mitigation or restoration.</p>
<p>Change in migratory pathways</p>	<p><u>Minor</u>: Wildlife movement (short- or long-range) is affected temporarily and does not change the ability of species to carry out necessary functions for survival, such as breeding, foraging, and seeking refuge.</p> <p><u>Moderate</u>: Wildlife movement is affected permanently and, if alternative routes exist, may result in different levels of energy expended or exposure to predation during migration. The energy expended is anticipated to have a minor effect on necessary functions for species survival, such as breeding, foraging, and seeking refuge, but is unlikely to cause direct mortality.</p> <p><u>Significant</u>: Wildlife movement is affected permanently and alternative routes do not exist or the energy expended and exposure to predators prevents species from carrying out necessary functions for survival, such as breeding, foraging, and seeking refuge, or is likely to result in some mortality.</p>

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
<b>TRIBAL RESOURCES</b>	
Actions that may result in restricted or reduced access of tribal members to treaty reserved resources and usual and accustomed areas	Undetermined
Actions that may result in restricted or reduced access of tribal members to traditional hunting areas or to culturally significant areas for gathering of plant material or other activities	Undetermined
Actions that result in the diminishment in the number of fish that would otherwise be available for tribal harvest as well as wildlife and plants that are identified as a tribal resource	Undetermined
<b>AIR QUALITY</b>	
Particulate matter (e.g., dust) and emissions	<p><u>Minor</u>: Project would result in operation-related particulate matter or emissions below Washington Ambient Air Quality Standards (WAAQS).</p> <p><u>Moderate</u>: Project would result in operation-related particulate matter or emissions at or above primary WAAQS in a given year, but would implement best management practices (BMPs) to reduce dust and emissions.</p> <p><u>Significant</u>: Project would result in operation-related particulate matter or emissions at or above WAAQS in a given year and would not implement BMPs to reduce particulate matter or emissions.</p>

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
<b>CLIMATE CHANGE</b>	
<p>Adverse impacts from the proposed action may contribute to the effects of climate change (e.g., new sources of GHG emissions)</p>	<p><u>Minor</u>: Annual greenhouse gas (GHG) emissions are expected to be below the threshold where emissions should be disclosed, as established by Ecology (below 10,000 metric tons of carbon dioxide per year [MT CO<sub>2</sub>/yr]).</p> <p><u>Moderate</u>: Annual GHG emissions are only temporarily above the threshold of significance established by Ecology and would not continue for more than 2 to 3 years. These temporary emissions would not exceed the annual GHG emission reduction goals for the Chehalis Basin (as established from state/county agencies). Annual GHG emissions are expected to be above the threshold where emissions should be qualitatively disclosed, as established by Ecology (at least 10,000 MT CO<sub>2</sub>/yr, but less than 25,000 MT CO<sub>2</sub>/yr).</p> <p><u>Significant</u>: Future annual GHG emissions are expected to above the threshold of potential significance established by Ecology, without mitigation measures to reduce emissions, for the duration of the project (above 25,000 MT CO<sub>2</sub>/yr). Predicted annual GHG emissions would exceed the GHG reduction goals for the Chehalis Basin.</p> <p><i>Note that though the above descriptions provide degree of impact based on Ecology guidance for assessing adverse effects, the same thresholds can be used to identify benefits from projects for GHG reductions through additional carbon sequestration (e.g., new vegetation).</i></p>
<p>Effects of climate change may impact the proposed action (e.g., increased sea levels, reduced snowpack, changes in water availability, changes in stream flow timing, increased forest fires, more extreme precipitation events and flooding)</p>	<p><u>Minor</u>: Effects of climate change would not affect the implementation or effectiveness of the proposed action.</p> <p><u>Moderate</u>: Effects of climate change may impact the proposed action and modifications to the project design are capable of addressing predicted impacts. However, some uncertainty remains on the ability of the proposed action to withstand extreme events and/or increasing effects of climate change.</p> <p><u>Significant</u>: Effects of climate change may impact the proposed action and modifications to the project design are not capable of addressing predicted impacts. The proposed action may experience unavoidable damage through loss of property or habitat, or climate change impacts render the project ineffective.</p>

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
<b>VISUAL QUALITY</b>	
Long-term change or reduction in visual quality	<p><u>Minor</u>: Minor changes to views in specific locations.</p> <p><u>Moderate</u>: Changes to visual quality that would moderately contrast with the existing visual character.</p> <p><u>Significant</u>: Large-scale changes to visual quality that would significantly contrast with the existing visual character, including the following:</p> <ul style="list-style-type: none"> <li>• Large-scale permanent clearing of vegetation</li> <li>• Inundation of an area that currently is not inundated</li> <li>• Construction of a large structure in a previously undeveloped area</li> <li>• Construction of a structure that would block existing views</li> </ul>
<b>NOISE</b>	
Increased noise levels	<p><u>Minor</u>: Implementation of action elements would generate operational noise consistent with local ordinances.</p> <p><u>Moderate</u>: Implementation of action elements would generate operational noise consistent with local ordinances and would increase noise levels by less than 5 A-weighted decibels (dBA).</p> <p><u>Significant</u>: Implementation of action elements would generate operational noise that would conflict with local ordinances or would increase noise levels by 5 dBA or greater.</p>
<b>LAND USE</b>	
Land use conversions that disrupt communities, either natural or human-caused	<p><u>Minor</u>: Conversion of an existing land use occurs, but the role and function of a community is not affected. No loss of a home or business occurs.</p> <p><u>Moderate</u>: Conversion of existing land uses are not widespread across the Chehalis Basin within a particular community. Conversion of residential, farm, or business communities to a natural setting may occur, or vice versa, but there is not an associated negative economic or environmental effect.</p> <p><u>Significant</u>: Conversion of existing land uses causes disruption on a Basin-wide scale for any single land use. Conversion of residential, farm, or business communities to a natural setting may occur, or vice versa, with a negative economic or environmental impact.</p>

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
Land use restrictions or changes that may occur as a result of new facilities or programs	<p><u>Minor</u>: No land use changes are anticipated as a result of implementation of action elements, or the changes are temporary (e.g., access restrictions during construction) and not detected on a Basin-wide scale.</p> <p><u>Moderate</u>: Some land use changes may occur as a result of implementation of action elements, such as new riparian designations within existing agricultural properties or new development within existing floodplains. These changes would not cause disruption to natural or built environment land uses on a Basin-wide scale.</p> <p><u>Significant</u>: Land use changes as a result of implementation of action elements would be detectable at a Basin-wide scale.</p>
<b>RECREATION</b>	
Loss of access to or quality of recreation facilities or agritourism sites	<p><u>Minor</u>: Localized loss of access to recreational facilities (such as private docks) or minor increases in flood elevations at recreational facilities.</p> <p><u>Moderate</u>: Reduction of recreation quality at recreational facilities or opportunities due to implementation of action elements, increased flood inundation, or structures.</p> <p><u>Significant</u>: Permanent loss of heavily used recreational facilities due to implementation of action elements, increased flood inundation, or structures.</p>
Increased flood damage to recreation facilities or agritourism sites	<p><u>Minor</u>: Increased flood elevations at recreational facilities or agritourism sites of less than 1 foot.</p> <p><u>Moderate</u>: Increased flood elevations at recreational facilities or agritourism sites greater than 1 foot, or increase of flood damages at recreational facilities or agritourism sites. Increased inundation of roads that provide access to recreational facilities.</p> <p><u>Significant</u>: Increased flooding at recreational facilities or agritourism sites greater than 2 feet. Increased inundation of roads, blocking access to recreational facilities for more than 2 weeks.</p>
Changes to in-water recreation	<p><u>Minor</u>: Installation of large woody material (LWM) in a river channel in limited areas, causing minor safety issues that could be mitigated with adequate signage.</p> <p><u>Moderate</u>: Permanent loss of in-water recreation opportunities in a river reach with moderate recreational use.</p> <p><u>Significant</u>: Permanent loss of in-water recreation opportunities in a river reach with heavy recreational use. Installation of LWM at a density that would make a river reach inaccessible or unsafe for in-water recreation to a degree that could not be mitigated by installation of signs.</p>

IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
<b>HISTORIC AND CULTURAL PRESERVATION</b>	
<p>Destruction, damage to or alteration of a cultural resource</p> <p>Necessary removal of a cultural resource from its original location</p> <p>Changes to the use or physical features of a cultural resource</p> <p>Introduction of visual, atmospheric, or audible elements that diminish the integrity of the significant features of a cultural resource</p>	<p><u>Minor</u>: No known historic properties or other cultural resources are present within the vicinity of the proposed action; the potential for encountering archaeological deposits is low per the Washington Statewide Archaeological Predictive Model (WSAPM).</p> <p><u>Moderate</u>: No known historic properties or other cultural resources are present within the vicinity of the proposed action; the potential for encountering archaeological deposits is moderate per WSAPM.</p> <p><u>Significant</u>: Historic properties, including buildings or archaeological sites, have been identified in the vicinity of the proposed action, and/or the potential for encountering archaeological deposits is high to very high per WSAPM.</p>
<b>TRANSPORTATION</b>	
<p>Changes to flooding of transportation systems, including roadways, railroads, and airports</p>	<p><u>Minor</u>: Minor, localized change in flood elevations.</p> <p><u>Moderate</u>: Moderate increased flood elevations at roadways, rail lines, or airports, increasing the time transportation systems are closed during 100-year floods.</p> <p><u>Significant</u>: Significant increased flood elevations at roadways, rail lines, or airports, increasing closures of systems.</p>
<b>PUBLIC SERVICES AND UTILITIES</b>	
<p>Changes to demand for public services and utilities</p>	<p><u>Minor</u>: Implementation of action elements would cause little or no change in demand for public services and utilities.</p> <p><u>Moderate</u>: Implementation of action elements would increase the demand for public services and utilities, resulting in localized, temporary interruptions of service, or constraints on operation.</p> <p><u>Significant</u>: Implementation of action elements would increase the demand for public services and utilities, resulting in widespread or substantial interruptions of service or other constraints, and restoration would be difficult.</p>
<p>Relocation of public services and utilities</p>	<p><u>Minor</u>: Implementation of action elements would cause localized relocation of public services and utilities on the current site.</p> <p><u>Moderate</u>: Implementation of action elements would require relocation of public services and utilities off the current site.</p> <p><u>Significant</u>: Implementation of action elements would require extensive relocation of public services and utilities, requiring extension of services and utilities outside the existing service area.</p>



IMPACT INDICATOR	DETERMINING DEGREE OF ADVERSE IMPACT
Changes to flooding of public services and utilities	<p><u>Minor</u>: Changes to flood extent and frequency would not noticeably increase likelihood that public services and utilities would be flooded.</p> <p><u>Moderate</u>: Changes to flood extent and frequency would noticeably increase the likelihood that public services and utilities would be flooded.</p> <p><u>Significant</u>: Changes to flood extent and frequency would make the continued provision of public services and utilities infeasible.</p>
<b>ENVIRONMENTAL HEALTH AND SAFETY</b>	
Change in flooding that would affect emergency response (fire, police, or medical response services)	<p><u>Minor</u>: Changes in flooding would cause localized and temporary increases in demand for emergency response services.</p> <p><u>Moderate</u>: Changes in flooding would cause increases in demand for emergency response services that require regional response providers to assist local response. Temporary or short-term changes in response times would be noticeable and may require providers to make service adjustments, but there would be no long-term changes.</p> <p><u>Significant</u>: Changes in flooding would cause permanent increases in demand or changes in response times that could tax the ability to provide adequate emergency response services.</p>
Changes in flooding patterns, resulting in increased or reduced risk of contamination	<p><u>Minor</u>: Changes to flooding patterns would not increase the risk that floodwaters would be contaminated by hazardous materials.</p> <p><u>Moderate</u>: Changes to flooding patterns would slightly increase the risk that floodwaters would be contaminated by hazardous materials.</p> <p><u>Significant</u>: Changes to flooding patterns would greatly increase the risk that floodwaters would be contaminated by hazardous materials.</p>
Change in threats to human health and safety	<p><u>Minor</u>: Implementation of action elements would change flooding, resulting in little or no increase in threats to human health and safety.</p> <p><u>Moderate</u>: Implementation of action elements would change flooding, resulting in a noticeable increase in threats to human health and safety.</p> <p><u>Significant</u>: Implementation of action elements would change flooding, resulting in a substantial increase in threats to human health and safety.</p>