

ID	Ecological Concern	Definition	Included Categories	ID	Ecological Concern-Sub Category	Definition	Included Categories	VSP parameter effects	Primary Lifestages Affected
1	Habitat Quantity	Insufficient quantity of total habitat or habitat diversity due to the elimination of access	Connectivity, Access, Structure, Simplification, Availability	1.1	Anthropogenic Barriers	Loss of access to habitat and/or habitat sub-types due to anthropogenic activity. Includes partial or ephemeral barriers.	Access, Barriers, Flap Gates, Tidal Gates, Culverts, Obstacles, Obstructions, Passage Issues, Blocked	Compensation/Carrying Capacity/Spatial Structure and Diversity	1,4,5,8
				1.2	Natural Barriers	Lasting natural barriers to stream or estuary access, including waterfalls, sand bars, log jams, sufficiently steep gradients or	Water Falls, Sand Bar, Bar Breach, Log Jams, Steep Gradient, Thermal Barriers, Low Water	Compensation/Carrying Capacity	1,4,5,8
				1.3	HQ-Competition	Limited physical space and the protection from predators or physical forces it provides, due to the addition of competing	Refugia, Hatchery Fish, Predation, Stocking, Swamping	Compensation/Carrying Capacity/Spatial Structure and Diversity	4,5,6
2	Injury and Mortality	Lethal and sub-lethal effects due to other organisms, including human activities	Death, Injury, Predation	2.1	Predation	Introduced salmon predators or changes to the habitat that increase native predator numbers or increase predator success.	Invasive/Exotic Fish or Invertebrate Predators Native Fish, Native Bird, Native Pinnipeds, Fishing	Density Dependent-Positive and Negative-at Low Abundance/High Abundance Effects	1,2,3,4,5,6,7,8
				2.2	Pathogens	Increased mortality due to disease causing organisms or parasites.	Disease, Sea Lice, Introduced Diseases, Native Diseases, Whirling Disease, Myxobolus Cerebralis, Gyrodactylus, Sea Lice, Ulcerative dermal necrosis (UDN), IHNV, VHSV, Kudoa, Henneguaya, White Spot, Ich, Gill Amoeba	Negative Density Dependence- High Abundance Effects	1,2,4,5,6,7,8
				2.3	Mechanical Injury	Mortality or injury due to anthropogenic structures or as the result of mechanical forces due to anthropogenic structures	Inadequate screening, Barging, Snagging, Stranding, Entrainment	Compensation/Carrying Capacity	4,5,6,8
				2.4	Contaminated Food	Toxics substances found in prey that negatively affect salmon. Includes persistent toxic substances that are	Bioaccumulation Toxicity, PBDEs, PCBs, Oil, Organochlorides, Pesticides	Density Independent	4,5,6,7
3	Food	Insufficient or inadequate food for salmonids.	Competition, Prey Availability, Species Interactions	3.1	Altered Primary Productivity	Alteration of ecological dynamics affecting the quantity, quality and/or species composition of phytoplankton or detritus resulting in insufficient food	Micro and Macro-Detrital Inputs, Loss of Marine Derived Nutrients, Carcasses, Down-welling, Ocean Conditions, Detritus, Phytoplankton	Compensation/Carrying Capacity	4,5,6,7
				3.2	Food-Competition	Insufficient food due to the addition of competing salmonid stocks, species or hatchery produced	Hatchery Fish, Increased Natural Competitors, Invasive Species	Compensation/Carrying Capacity	4,5,6,7
				3.3	Altered Prey Species Composition and Diversity	Alteration of ecological dynamics affecting the species composition, distribution or nutritional quality of zooplankton, macroinvertebrates,	Species Diversity, Prey Species Abundance, Invasive Species, Altered Food Web Dynamics	Compensation/Carrying Capacity	4,5,6,7

ID	Ecological Concern	Definition	Included Categories	ID	Ecological Concern-Sub Category	Definition	Included Categories	VSP parameter effects	Primary Lifestages Affected
4	Riparian Condition	Degradation of the habitat adjacent to streams, rivers, lakes and nearshore environments. Impairment of the near-bank environment to support plants including large trees that help stabilize stream banks provide	Impaired Riparian Function/Condition, microclimate, lack of shade	4.1	Riparian Condition	Disturbance to streamside ecological relationships, including but not limited to, loss of flora, erosion and increased light and temperatures	Bank degradation, Cover, Canopy, Inability to supply organic matter and filter sediments, Insufficient buffers, Light, Loss of natural shade	Compensation/Carrying Capacity/High Abundance Effects	1,2,3,4,5,6,8
				4.2	LWD Recruitment	Loss of mature streamside trees that may become instream structures and associated decline in habitat complexity	LWD supply, Mature riparian, Mature trees	Compensation/Carrying Capacity	1,2,3,4,5,6,8
5	Peripheral and Transitional Habitats	Loss and/or degradation of the peripheral habitat of streams and rivers, including standing water, connected channels and areas that are periodically inundated during high flows.	High quality over-winter rearing habitat, Summer rearing habitat, Peripheral Habitat, Habitat Diversity, (Key) Habitat Quantity/Quality, Refugia Habitat	5.1	Side Channel and Wetland Conditions	Degradation, elimination and loss of access to peripheral freshwater habitat, including side-channels and	Side Channels, Loss of peripheral habitat, Freshwater Wetlands, Swamp, Oxbows, Ponds, Alcoves	Compensation/Spatial Structure and Diversity	4,5,6
				5.2	Floodplain Condition	Degradation, elimination and loss of access to the over or beyond bank habitat, of streams and rivers	Floodplain, Bank condition, Overbank area, Diking	Compensation/Spatial Structure and Diversity	4,5,6
				5.3	Estuary Conditions	Loss and degradation of saltwater transition zone	Estuary, Salt-water transition zone, Lagoon, Estuary plume, Delta, Slough, Pocket estuary	Compensation/Carrying Capacity	6,8
				5.4	Nearshore Conditions	Loss and degradation of shallow water nearshore habitat	Beaches, Tidal flats, Eelgrass beds, Eelgrass meadows, Kelp forest, Baifish spawning grounds	Compensation/Carrying Capacity	7,8
6	Channel Structure and Form	Changes to river, stream, lake, estuarine tributary and distributary channel form, including instream structural complexity, width to depth ratios, sinuosity and bedload movement such as the loss (scour) or fill	Channel Conditions, Channel Form, Channel morphology, Channel Instability, Channel Stability, Loss of Spawning Substrate due to high flow, Bedload Movement	6.1	Bed and Channel Form	Changes to river, stream, lake, estuarine tributary and distributary channel form, including width to depth ratios, sinuosity and bedload	Loss of sinuosity, Bank hardening, Channel incision, Channelized, Aggradation, Bed substrate stability, Armoring, Bridge crossings, Confinement, Nearshore sediment loss, Beach erosion	Compensation/Carrying Capacity	1,2,3,4,5,6,8
				6.2	Instream Structural Complexity	Decline of the instream habitat quality. Based on the degree of habitat complexity and variety, includes the quantity and variability	LWD, Pools, Boulders, Bank overhang, Cover, Habitat structure, Instream habitat, Habitat, Stream complexity, Habitat diversity, (Key) Habitat quantity/quality, Refugia habitat, Channel conditions, Instream roughness, Poor gravel/sediment sorting, Rugosity	Compensation/Carrying Capacity	1,2,3,4,5,6,8

ID	Ecological Concern	Definition	Included Categories	ID	Ecological Concern-Sub Category	Definition	Included Categories	VSP parameter effects	Primary Lifestages Affected
7	Sediment Conditions	Reduction of the quantity or quality of spawning habitat due to changes to the background (natural) quantity, rate, and size of sediment inputs to the stream system.	Sediment, Stream Spawning Habitat, Spawning Gravel, Beach Spawning Habitat (lake), Substrate, Benthic Habitat	7.1	Decreased Sediment Quantity	Decreased input of sediment to the stream system or some part of the	Substrate Quantity, Scour, Entrenchment, Loss of Spawning Habitat, Lack of spawning Gravel, Sediment transport	Compensation/Carrying Capacity	1,2,3,4,5,6
				7.2	Increased Sediment Quantity	Increased input of sediment to the stream system.	Bank Erosion, Excessive sedimentation, Aggradation, Sediment Load, Excess Fines, Embeddedness, Sediment Size Ratio	Compensation/Carrying Capacity/positive density dependence-high abundance effects	1,2,3,4,5,6
8	Water Quality	Degraded chemical, physical, and biological characteristics of water with respect to its suitability for a salmon, excluding toxins and pathogens.		8.1	Temperature	Water temperature deviations, either in intensity or duration, sufficient to have	High temperature	Density Independent	1,2,3,4,5,6,8
				8.2	Oxygen	Oxygen concentration deviations sufficient to induce adverse effects in listed salmonids.	Eutrophication, Excess nutrients, Oxygen depleted bottom water	Density Independent	1,2,3,4,5,6,8
				8.3	Gas Saturation	Pathological condition due to saturated gases leaving solution into an animals tissue.	Gas bubble disease (GBD), Dissolved gasses, Nitrogen	Density Independent	1,2,3,4,5,6,8
				8.4	Turbidity	Increased concentrations of suspended fine particulate matter sufficient to have adverse effects in	Suspended sediments, Plume Effects,	Density Independent	1,2,3,4,5,6,8
				8.5	pH	Acidity/alkalinity deviations sufficient to adversely effect salmonids or the	Alkalinity, Ocean acidification, CO2	Density Independent	1,2,3,4,5,6,8
				8.6	Salinity	Salinity at concentrations harmful to salmon	Refuge from salinity regimes	Density Independent	6
				8.7	Toxic Contaminants	Direct exposure to toxic substance in the water column.	Short-term Toxicity, Stormwater Discharge, Outfalls, Wastewater, Non-point Source Pollution, Spills, Marine Debris, Point Source Pollution, Copper, Mercury	Density Independent	1,2,3,4,5,6,8

ID	Ecological Concern	Definition	Included Categories	ID	Ecological Concern-Sub Category	Definition	Included Categories	VSP parameter effects	Primary Lifestages Affected
9	Water Quantity	Detrimental effects of deviations to the background (natural) amount and timing of water quantity instream, including lowered water quality and barriers to access.	Changes in Flow Regime, Spring Freshets, Piped Outfalls of Surface and Ground Water, Withdrawals, Flow-Related Plume Changes	9.1	Increased Water Quantity	Habitat disturbance associated with abnormally (compared to background) high water flow and increased "flashiness",	High flow, High volume, Flooding, Increased velocity, Increased peak flows, Decreased flood lag time, Redd scouring, Flashiness, Increased runoff, Water storage capability, Road density	Density Independent	1,2,3,4,5,6
				9.2	Decreased Water Quantity	Habitat disturbances associated with abnormally (compared to background) low water flow, including but not limited to, increased	Low Volume, Plume Changes, Redd Dewatering, Water Withdrawals, Surface Impoundments, Diversions, Lake Level	Carrying Capacity/Spatial Structure and Diversity/Density Independent	1,2,3,4,5,6,8
				9.3	Altered Flow Timing	Habitat changes associated with alterations to the background (natural)	Water Releases, Impervious Surfaces, Urbanization, Low Flows, Dewatering	Spatial Structure and Diversity/Density Independent	1,2,3,4,5,6,8
10	Population Level Effects			10.1	Reduced Genetic Adaptiveness	Genetic changes that result in the loss of adaptedness to the habitat or set of habitats a population experiences.	Domestication Selection, Harvest selection, Outbreeding depression, Loss of lifehistory types	Spatial Structure and Diversity/Density Dependent	1
				10.2	Small Population Effects	Reductions in reproductive rate, loss of genetic resilience or loss of genetic adaptedness in a	Depensation, Loss of genetic diversity, Inbreeding, Genetic Drift, Increased predator effectiveness	Spatial Structure and Diversity/Density Dependent	1,2,3,4,5,6,7,8
				10.3	Demographic Changes	Changes to the age, size or developmental makeup of a population that result in a reduction to	Smaller size at return/maturity, greater age at return/maturity, reduced egg quality	Spatial Structure and Diversity/Carrying Capacity	7,8
				10.4	Life History Changes	Changes to the behavior of individuals that result in a population wide loss of adaptedness, including changes in the composition of life-history types or the	Changes to migration timing, loss of reproductive strategies, loss of life-history types (timing of release), increased residual/precocial males/females, run timing, increased jacks/jills	Spatial Structure and Diversity/Density Dependent	4,5,6,8,1