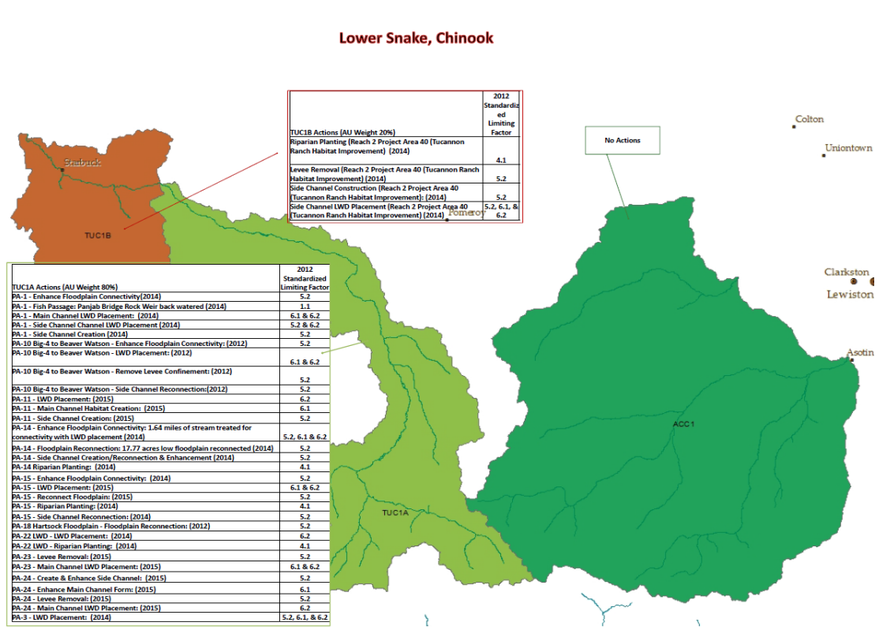
Draft 7-22-16

2015 Look Back QA-QC Comments from the review panel.

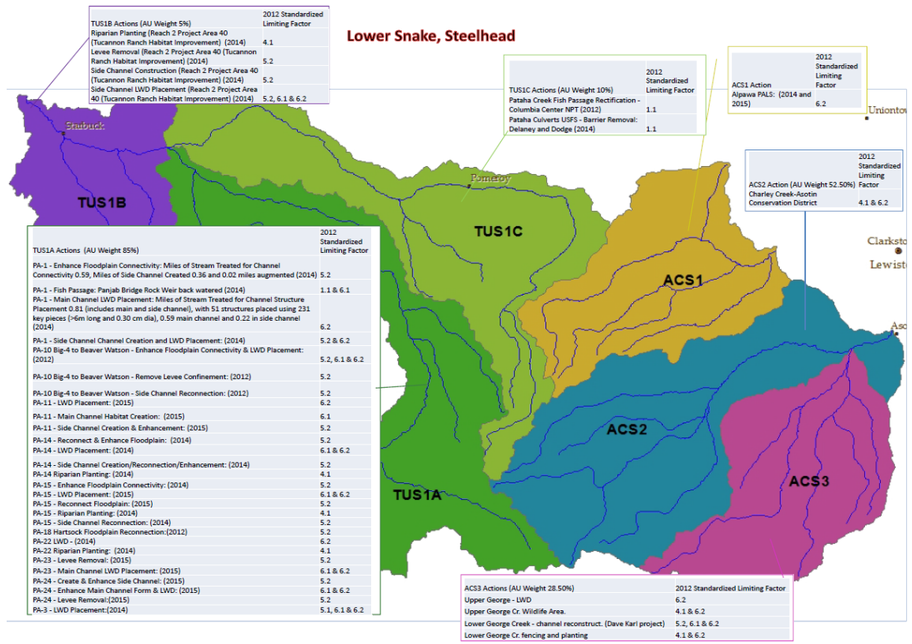
The expert panel comments and modifications to the look back calculator and notes are as follows:

In an effort to standardize how uplift is estimated across limiting factors and AU, the panel felt that it was important to standardize reach (denominators) for spring Chinook and Steelhead in all AU's. The panel also chose to update the uplift calculator (from the January version), so that it would reflect post project habitat function, in contrast to reach treated as was used in the initial panel estimates in October. This was the primary request of the panel discussion at the July 18, 2016, RTT meeting in Dayton. The panel felt that the calculator developed for the look forward process would be the best tool for standardizing across LF and AU and has adapted it, attached. Additional comment on the look back process have been captured on the attached spreadsheets. Bionotes spreadsheet in the columns highlighted in yellow.



TUC1B Actions (AU Weight 20%)	2012 Standardized Limiting Factor
Riparian Planting (Reach 2 Project Area 40 (Tucannon Ranch Habitat Improvement) (2014)	4.1
Levee Removal (Reach 2 Project Area 40 (Tucannon Ranch Habitat Improvement) (2014)	5.2
Side Channel Construction (Reach 2 Project Area 40 (Tucannon Ranch Habitat Improvement): (2014)	5.2
Side Channel LWD Placement (Reach 2 Project Area 40 (Tucannon Ranch Habitat Improvement) (2014)	5.2, 6.1, & 6.2

TUC1A Actions (AU Weight 80%)	2012 Standardized Limiting Factor
PA-1 - Enhance Floodplain Connectivity(2014)	5.2
PA-1 - Fish Passage: Panjab Bridge Rock Weir back watered (2014)	1.1
PA-1 - Main Channel LWD Placement: (2014)	6.1 & 6.2
PA-1 - Side Channel Channel LWD Placement (2014)	5.2 & 6.2
PA-1 - Side Channel Creation (2014)	5.2
PA-10 Big-4 to Beaver Watson - Enhance Floodplain Connectivity: (2012)	5.2
PA-10 Big-4 to Beaver Watson - LWD Placement: (2012)	6.1 & 6.2
PA-10 Big-4 to Beaver Watson - Remove Levee Confinement: (2012)	5.2
PA-10 Big-4 to Beaver Watson - Side Channel Reconnection:(2012)	5.2
PA-11 - LWD Placement: (2015)	6.2
PA-11 - Main Channel Habitat Creation: (2015)	6.1
PA-11 - Side Channel Creation: (2015)	5.2
PA-14 - Enhance Floodplain Connectivity: 1.64 miles of stream treated for connectivity with LWD placement (2014)	5.2, 6.1 & 6.2
PA-14 - Floodplain Reconnection: 17.77 acres low floodplain reconnected (2014)	5.2
PA-14 - Side Channel Creation/Reconnection & Enhancement (2014)	5.2
PA-14 Riparian Planting: (2014)	4.1
PA-15 - Enhance Floodplain Connectivity: (2014)	5.2
PA-15 - LWD Placement: (2015)	6.1 & 6.2
PA-15 - Reconnect Floodplain: (2015)	5.2
PA-15 - Riparian Planting: (2014)	4.1
PA-15 - Side Channel Reconnection: (2014)	5.2
PA-18 Hartsock Floodplain - Floodplain Reconnection: (2012)	5.2
PA-22 LWD - LWD Placement: (2014)	6.2
PA-22 LWD - Riparian Planting: (2014)	4.1
PA-23 - Levee Removal: (2015)	5.2
PA-23 - Main Channel LWD Placement: (2015)	6.1 & 6.2
PA-24 - Create & Enhance Side Channel: (2015)	5.2
PA-24 - Enhance Main Channel Form: (2015)	6.1
PA-24 - Levee Removal: (2015)	5.2
PA-24 - Main Channel LWD Placement: (2015)	6.2
PA-3 - LWD Placement: (2014)	5.2, 6.1, & 6.2



TUS1B Actions (AU Weight 5%)	2012 Standardized Limiting Factor
Riparian Planting (Reach 2 Project Area 40 (Tucannon Ranch Habitat Improvement) (2014)	4.1
Levee Removal (Reach 2 Project Area 40 (Tucannon Ranch Habitat Improvement) (2014)	5.2
Side Channel Construction (Reach 2 Project Area 40 (Tucannon Ranch Habitat Improvement) (2014)	5.2
Side Channel LWD Placement (Reach 2 Project Area 40 (Tucannon Ranch Habitat Improvement) (2014)	5.2, 6.1 & 6.2

TUS1C Actions (AU Weight 10%)	2012 Standardized Limiting Factor
Pataha Creek Fish Passage Rectification - Columbia Center NPT (2012)	1.1
Pataha Culverts USFS - Barrier Removal: Delaney and Dodge (2014)	1.1

ACS1 Action	2012 Standardized Limiting Factor
Alpawa PALS: (2014 and 2015)	6.2

ACS2 Action (AU Weight 52.50%)	2012 Standardized Limiting Factor
Charley Creek-Asotin Conservation District	4.1 & 6.2

TUS1A Actions (AU Weight 85%)	2012 Standardized Limiting Factor
PA-1 - Enhance Floodplain Connectivity: Miles of Stream Treated for Channel Connectivity 0.59, Miles of Side Channel Created 0.36 and 0.02 miles augmented (2014)	5.2
PA-1 - Fish Passage: Panjab Bridge Rock Weir back watered (2014)	1.1 & 6.1
PA-1 - Main Channel LWD Placement: Miles of Stream Treated for Channel Structure Placement 0.81 (includes main and side channel), with 51 structures placed using 231 key pieces (>6m long and 0.30 cm dia), 0.59 main channel and 0.22 in side channel (2014)	6.2
PA-1 - Side Channel Channel Creation and LWD Placement: (2014)	5.2 & 6.2
PA-10 Big-4 to Beaver Watson - Enhance Floodplain Connectivity & LWD Placement: (2012)	5.2, 6.1 & 6.2
PA-10 Big-4 to Beaver Watson - Remove Levee Confinement: (2012)	5.2
PA-10 Big-4 to Beaver Watson - Side Channel Reconnection: (2012)	5.2
PA-11 - LWD Placement: (2015)	6.2
PA-11 - Main Channel Habitat Creation: (2015)	6.1
PA-11 - Side Channel Creation & Enhancement: (2015)	5.2
PA-14 - Reconnect & Enhance Floodplain: (2014)	5.2
PA-14 - LWD Placement: (2014)	6.1 & 6.2
PA-14 - Side Channel Creation/Reconnection/Enhancement: (2014)	5.2
PA-14 Riparian Planting: (2014)	4.1
PA-15 - Enhance Floodplain Connectivity: (2014)	5.2
PA-15 - LWD Placement: (2015)	6.1 & 6.2
PA-15 - Reconnect Floodplain: (2015)	5.2
PA-15 - Riparian Planting: (2014)	4.1
PA-15 - Side Channel Reconnection: (2014)	5.2
PA-18 Hartsock Floodplain Reconnection:(2012)	5.2
PA-22 LWD - (2014)	6.2
PA-22 Riparian Planting: (2014)	4.1
PA-23 - Levee Removal: (2015)	5.2
PA-23 - Main Channel LWD Placement: (2015)	6.1 & 6.2
PA-24 - Create & Enhance Side Channel: (2015)	5.2
PA-24 - Enhance Main Channel Form & LWD: (2015)	6.1 & 6.2
PA-24 - Levee Removal:(2015)	5.2
PA-3 - LWD Placement:(2014)	5.1, 6.1 & 6.2

ACS3 Actions (AU Weight 28.50%)	2012 Standardized Limiting Factor
Upper George - LWD	6.2
Upper George Cr. Wildlife Area.	4.1 & 6.2
Lower George Creek - channel reconstruct. (Dave Karl project)	5.2, 6.1 & 6.2
Lower George Cr. fencing and planting	4.1 & 6.2

Chinook Assessment Units				Alternative Expert Panel Stream Mile Calculations (if different from Stream Net)			
Au Name	**Au Code**	**Watershed Area (mi^2)**	**Chinook Stream Miles (Stream Net)***	**Fish Bearing Length**	**Condition Length**	**AU Length**	**Action Length**
Asotin Creek	ACC1	454.3	0				
Upper Tucannon - Pataha up to Panjab	TUC1A	219.8	47.6				

Lower Tucannon - Mouth to Pataha	TUC1B	98	11.5				

** Includes stream miles designated with any life stage use by Chinook in the StreamNet GIS layer (2012)*

Steelhead Assessment Units

				Alternative Expert Panel Stream Mile Calculations (if different from StreamNet)			
AuName	**AuCode**	**Watershed Area (mi^2)**	**Stealhead Stream Miles (StreamNet)***	**Fish bearing Length**	**Condition Length**	**AU Length**	**Action Length**
Alpowa	ACS1	129.1	21.9				
Asotin Creek	ACS2	196.3	47.7				
George Creek	ACS3	129	36.1				
Upper Tucannon - Pataha up to Panjab	TUS1A	219.8	67.6				
Lower Tucannon - Mouth to Pataha	TUS1B	98	15.7				
Pataha	TUS1C	184.8	50.2				

** Includes stream miles designated with any life stage use by Steelhead in the StreamNet GIS layer (2012)*

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 insufficient water. May represent the end of good quality habitat	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 salmonid stocks, species or hatchery produced fish.	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, Henneguya, 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 concentrated as they are consumed and move to the next trophic level .	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 available for salmonids or prey species.	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 fish.	Hatchery Fish, Increased Natural Competitors, Invasive Species	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
				3.3	Altered Prey Species Composition and Diversity	Alteration of ecological dynamics affecting the species composition, distribution or nutritional quality of zooplankton, macroinvertebrates, forage-fish or other prey resulting in insufficient food for salmonids.	Species Diversity, Prey Species Abundance, Invasive Species, Altered Food Web Dynamics	Compensation/Carrying Capacity	4,5,6,7
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.	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, elemination and loss of access to peripheral freshwater habitat, including side-channels and freshwater wetlands.	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, elemination and loss of access to the over or beyond bank habitat, of streams and rivers that is periodically inundated during high flows.	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, Baitfish 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 (aggradation) of the channel.	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 movement such as the loss (scour) or fill (aggradation) of the channel.	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 of stream depth and pools of varying size and depth.	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
7	Sediment Conditions	Reduction of the quantity or quality of spawning habitat due to changes to the background	Sediment, Stream Spawning Habitat, Spawning Gravel, Beach Spawning	7.1	Decreased Sediment Quantity	Decreased input of sediment to the stream system or some part of the stream system.	Substrate Quantity, Scour, Entrenchment, Loss of Spawning Habitat, Lack of spawning Gravel, Sediment transport	Compensation/Carrying Capacity	1,2,3,4,5,6

ID	Ecological Concern	Definition	Included Categories	ID	Ecological Concern-Sub Category	Definition	Included Categories	VSP parameter effects	Primary Lifestages Affected
	Conditions	the background (natural) quantity, rate, and size of sediment inputs to	Habitat (lake), Substrate, Benthic Habitat	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 adverse effects on listed salmonids	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 listed salmonids, including reduction of their foraging ability and/or degradation of ecosystem function.	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 species on which they feed.	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
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", including loss of channel substrate and the flushing of young fish downstream.	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 temperature, loss of sediment, nutrients and barriers to passage and redd dewatering.	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) timing of water quantity instream.	Water Releases, Impervious Surfaces, Urbanization, Low Flows, Dewatering	Spatial Structure and Diversity/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
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 population due to reductions in abundance that result in further losses of abundance.	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 abundance, fecundity or reproductive rate.	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 timing of migration and reproduction.	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

TUC1A Upper Tucannon - Pataha up to Panjab, Chinook 1.1, 2.3, 4.1, 5.2, 6.2, 7.2, 8.1, 8.4, 9.2

Identify Your Denominator if there is a general one used

Chinook Miles	56.52	miles	The priority restoration reach designated in the Snake River Salmon Recovery Plan (2011) is 38.61 miles in length (includes mainstem only, see inset map 7.71+16.4+14.5 miles). We estimate potential chinook domian to be 56.52. This includes 38.61 miles of main stem + upper tucannon protection reach 9.57 miles, Panjab Protection Reach 4.52 miles, a section of lower most Hixon 0.73 miles (valley floor) Big Four Cyn Cr 0.6 miles (Vallley Floor only), the lower mile of Cummins Cr, Tumalumn to barrier 0.14 mile, Russel Cr 0.43 miles, Hartsock Springs Cr 0.92 miles StreamNet Includes stream miles designated with any life stage use by Chinook in the StreamNet GIS layer (2012) is 47.6 miles.

Comments

TUC1A-LF 1.1 (weight 5%)

LF 1.1 (Anthropogenic Barriers)

Action	**Miles**	**% Improvement****	**Realized Change in 2018 (%)**	
Panjab Bridge Weir (2014)	16.09	3.5%	28.5%	16 miles above the barrier improvement is based on the current partial passage at the site which failed WDFW criteria
Tucannon Hatchery Weir (2017)	26			Improvement to passage at the fish weir are not included in the current uplift estimate
Total Treatment (2012-2015)	16.09		28.5%	
Total Stream Miles (Denominator)	56.52			
Change Relative to Impaired Area (Change from above/low bookend)	1.00%		(Uplift)	

TUC1A-LF 2.3 (weight 2%)

LF 2.3 (Mechanical Injury - due to anthropogenic structures)

Action	**Design Flow of Screen (cfs)**	**Rel. Treatment Size**	
specific project		#DIV/0!	No screen projects were completed in this three year window
Total		#DIV/0!	
Total Flow (Denominator)	0	cfs	
Change Relative to Impaired Area (Change from above/low bookend)	#DIV/0!	(Uplift)	

TUC1A-LF 4.1 (weight 10%)

LF 4.1 (Riparian Condition)

Action	**ac. treated**	**est improvement% X Survival**	**% Est improvement by 20**	**Realized Change in 2018 (ac)**	
PA-22	2	54.0%	8%	1.161	2055 the number of acers used in the denominator was calculated using the length of the Chinook domain with a 150' buffer on each bank.
PA-1	2	54.0%	8%	1.161	% improvement is based on the relative benefit from the acres planted in the short term including survival; ex grass cover vs canopy forming LWD etc

PA-3	1	54.0%	8%	0.5805
PA-23 (Howards)	1	22.5%	5%	0.23625
PA-14 (Tuc Hatchery)	9.73	15.0%	8%	0.1094625
PA-11 (Beaver Watson LK to Deer Lk)	5	28.0%	8%	0.105
PA-15 (Russel)	8.1	15.0%	8%	0.091125
PA-24 (Janet Howard)	0.5	6.0%	8%	0.00225
PA-26	44.27	35.0%	18%	2.7115375
Total	73.6			2.9099125
Total Stream ac(Denominator)	1157	ac		
Change Relative to Impaired Area (Change from above/low bookend)	0.25%			

2.5% growth factor is multiplied by the estimated survival.

I have also included several other projects wich would have Riparian planting if

Denominator is 75% of total riparian area with the upper 14.1 protection reaches not included.

** The % improvement refers to the % treatment area X est % survival

TUC1A-LF 5.2 (weight 30%)

LF 5.2 (Floodplain Condition)

Action	Miles	% Improvement**	% Est improvement by 20	Realized Change in 2018 (mi)
PA-1	0.59	62%	6.0%	0.399725
PA-3	1.36	33%	6.0%	0.5338
PA-10	1.56	48%	9.0%	0.8814
PA-11	1.56	71%	4.5%	1.1817
PA-14	1.64	52%	6.0%	0.9553
PA-15	0.63	45%	6.0%	0.3213
PA-22	0	0%	0.0%	0
PA-23	0.98	26%	4.5%	0.30135
PA-24	0.86	71%	4.5%	0.65145
PA-26	0	38%	10.5%	0
PA-17&18 (2017-18)	1.08	38%	1.5%	0.4212
PA-28 (2016-18)	2	49%	1.5%	1.005
PA-6-9 (2017)	2	38%	1.5%	0.78
Total	9.18			5.226025
Total Stream Miles (Denominator)	42.42			
Change Relative to Impaired Area (Change from above/low bookend 2012-2015)	12.32%		Est Change Relative to Impaired Area (Change from low bookend 2012-2018)	17.52%

The work for this project would have been captured in 2011 Look Back effort

I have include the look forward project so we can see the entire set of work planned. They are not included in the estimated uplift

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The denominator in this case was reduced by the length of the protection reach 14.1 miles. This was done because much of the protection reach is in the Tucannon Wennaha Wilderness and has been relativily unimpacted.

Uplift was calculated by taking an estimate of reach treated for floodplain conectivity multiplied by the instant improvement (post project floodplain conectivity/function). Then a multiplier of 1.5%/year since completed up to 2018 was added to account for maturation of floodplain function.

** The % improvement refers to the % of the project reach treated for this metric x the %instant impacts

TUC1A-LF 6.1 (weight 0 %)

LF 6.1 (Bed and Channel Form)

Action	Miles	% Improvement**	%Est Improvement by 2018	Realized Change in 2018 (mi)
PA-1	0.59	62%	6.0%	0.399725
PA-3	1.36	18%	6.0%	0.3196
PA-10	1.56	25%	9.0%	0.5304
PA-11	1.56	62%	4.5%	1.0335
PA-14	1.64	62%	6.0%	1.1111
PA-15	0.63	43%	6.0%	0.30555
PA-22	1.01	9%	6.0%	0.1515
PA-23	0.98	26%	4.5%	0.30135
PA-24	0.86	62%	4.5%	0.56975
PA-26	3.2	13%	10.5%	0.736
PA-17&18 (2017-18)	1.08	40%	1.5%	0.4482
PA-28 (2016-18)	2	38%	1.5%	0.78
PA-6-9 (2017)	2	34%	1.5%	0.705
Total	13.39			5.458475
Total Stream Miles (Denominator)	42.42			
Change Relative to Impaired Area (Change from above/low bookend 2012-2015)	12.87%		Est Change Relative to Impaired Area (Change from low bookend 2012-2018)	17.42%

I have include the look forward project so we can see the entire set of work planned. They are not included in the estimated uplift

I have include the look forward project so we can see the entire set of work planned. They are not included in the estimated uplift

I have include the look forward project so we can see the entire set of work planned. They are not included in the estimated uplift

1.5% improvement / year added to 2018 figure

The denominator in this case was reduced by the length of the protection reach 14.1 miles. This was done because much of the protection reach is in the Tucannon Wennaha Wilderness and has been relativily unimpacted.

Uplift was calculated by taking an estimate of reach treated for channel shape multiplied by the instant improvement (post project side channel, width/depth, etc). Then a multiplier of 1.5%/freshet year since completed up to 2018 was added to account for maturation of channel function.

** The % improvement refers to the % of the project reach treated for channel form (physically increasing bars, tail outs, undercut banks,increased channel length, meanders etc..) multiplied by the est instantanious increase in channel complexity function

TUC1A-LF 6.2 (weight 30%)

LF 6.2 (Instream Structural Complexity)

Action	Miles	initial % Improvement**	over time % Est improvement by 2018	Realized Change in 2018 (mi)
PA-1	0.59	62%	6.0%	0.399725
PA-3	1.36	45%	6.0%	0.6936
PA-10	1.56	45%	9.0%	0.8424
PA-11	1.56	62%	4.5%	1.0335
PA-14	1.64	62%	6.0%	1.1111
PA-15	0.63	62%	6.0%	0.426825
PA-22	1.01	15%	6.0%	0.2121
PA-23	0.98	34%	4.5%	0.37485
PA-24	0.86	62%	4.5%	0.56975
PA-26	3.2	12%	7.5%	0.624
PA-18 (2017-18)	1.08	59%	1.5%	0.648
PA-28 (2016-18)	2	54%	1.5%	1.11
PA-6-9 (2017)	2	48%	1.5%	0.98

0.568421

PA-17 was excluded from this look forward as it will likely be completed in the summer of 2018.

1.5% improvement / year added to 2018 figure

Total		13.39			6.28785
Total Stream Miles (Denominator)		42.42 mi.			
Change Relative to Impaired Area (Change from above/low bookend 2012-2015)	14.82%		Est Change Relative to Impaired Area (Change from low bookend 2012-2018)	21.28%	

** The % improvement refers to the % of the project reach treated for complexity (physically increasing pools, LWD, pools, undercut banks, etc..) multiplied by the est instantanious increase in channel complexity function

The denominator in this case was reduced by the length of the protection reach 14.1 miles. This was done because much of the protection reach is in the Tucannon Wennaha Wilderness and has been relativily unimpacted.

Uplift was calculated by taking an estimate of reach treated for channel complexity multiplied by the instant improvement (post project LWD, pools, bars, off channel habitat, etc). Then a multiplier of 1.5%/freshet year since completed up to 2018 was added to account for maturation of complexity driven by increased floodplain and channel function.

TUC1A-LF 7.2 (weight 7%)

LF 7.2 (Increased Sediment Quantity)				
Action	**mi. treated**	**Rel. Treatment size**	**% Improvement**	**Realized Change in 2018 (mi)**
		#REF!	5%	0
		#REF!	5%	0
		#REF!	5%	0
		#REF!	5%	0
Total	0			0
Total Stream Miles (Denominator)	56.52	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%			

No projects were completed targeting fine sediments

TUC1A-LF 8.1 (weight 10%)

LF 8.1 (Temperature)					
Action	**Rel. Treatment size**			**% Improvement**	**Realized Change in 2018 proportion**
		0		0.01	0
	#REF!			0.01	#REF!
Total					
Total Stream Miles (Denominator)		56.52	(Uplift)*		#REF!
Realized Treatment (stream length)	#REF!		#REF!		

No restoration projects directly impact Temperature

TUC1A-LF 8.4 (weight 1%)

LF 8.4 (Turbidity)				
Action	**mi. Treated (or affected downs**	**Rel. Treatment size**	**% Improvement****	**Realized Change in 2018 (mi)**
specific project		0.0%	0%	0
specific project		0.0%	0%	0
Total	0			0
Total Stream Miles (Denominator)	56.52	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%			

** The % improvement refers to the % treated in this case not effectivness

No project were completed targeting turbidity over the work time frame

TUC1A-LF 9.2 (weight 5%)

LF 9.2 (Instream Flow)					
Action	**Lease (2012)**	**Lease (2013)**	**Lease (2014)**	**Lease (2015, cfs)**	**manent (cfs)**
specific project (lease)	0	0	0		
specific project (lease)					0
specific project (lease)					0
Total	***0***	***0***	***0***	***0***	***0***
			Average of leases ==>	0	
Total	0	cfs			
			Morgan Case (IDWR)		
Estimated water right diversions	386	cfs	summation of diversions		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)			

No projects targeted water conservation 2012-2015.

2055.568

TUS1A Upper Tucannon - Pataha up to Panjab 1.1, 2.3, 4.1, 5.2, 6.2, 7.2, 8.1, 9.2

Identify Your Denominator if there is a general one used

Steelhead Miles	89.68	miles	The priority restoration reach designated in the Snake River Salmon Recovery Plan (2011) is 63.7 miles in length (see inset map). If you add the reaches which are fish accessable but not prioritized the length is 89.68 miles which would includ Tumalum and Little tucannon as well as the spring cr tribs. StreamNet Includes stream miles designated with any life stage use by steelhead in the StreamNet GIS layer (2012) is 67.6 miles.

** Add little tucannon and tumalumn and all the tribs used for chinook tribs and beyond to include full extent

Comments:

TUS1A-LF 1.1 (weight 5%)

LF 1.1 (Anthropogenic Barriers)

Action	Miles	% Improvement**	Realized Change in 2018 (%)	
Panjab Bridge Weir (2014)	16.09	3.5%	17.9%	16 miles above the barrier
Tucannon Hatchery Weir (2017)	26			improvement is based on the current partial passage at the site which failed WDFW criteria Improvement to passage at the fish weir are not included in the current uplift estimate
Total Treatment (2012-2015)	16.09		17.9%	
Total Stream Miles (Denominator)	89.68			
Change Relative to Impaired Area (Change from above/low bookend)	0.63%		(Uplift)	

TUS1A-LF 2.3 (weight 2%)

LF 2.3 (Mechanical Injury - due to anthropogenic structures)

Action	Design Flow of Screen (cfs)	Rel. Treatment Size	
specific project		0.0%	No screen projects were completed in this three year window
Total		0.0%	
Total Flow (Denominator)	386	cfs	
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)	

TUS1A-LF 4.1 (weight 10%)

LF 4.1 (Riparian Condition)

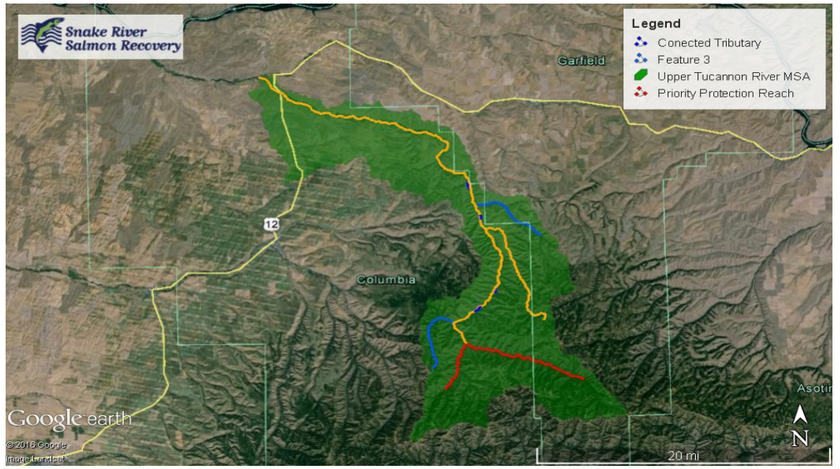
Action	ac. treated	est improvement% X Survival	%Improvement by 2018	Realized Change by 2018 (ac)	
PA-22	2	54.0%	8%	1.161	the number of acers used in the denominator was calculated using the length of the Chinook domain with a 150' buffer on each bank.
PA-1 Riparian Planting	2	54.0%	8%	1.161	
PA-3 Large Wood Placement	1	54.0%	8%	0.5805	
PA-23 Levee Removal (Howards)	1	22.5%	5%	0.23625	
PA-14 (Tuc Hatchery)	9.73	15.0%	8%	0.1094625	% improvement is based on the relative benefit from the acres planted in the short term including survival; ex grass cover vs canopy forming LWD etc
PA-11 (Beaver Watson LK to Deer Lk)	5	28.0%	8%	0.105	
PA-15 (Russel)	8.1	15.0%	8%	0.091125	
PA-24 (Janet Howard)	0.5	6.0%	8%	0.00225	
PA-26	44.27	35.0%	18%	2.7115375	2.5% growth factor is multiplied by the estimated survival. I have also included several other projects wich would have Riparian planting if
Total	73.6	20%	10%	3.4	
Total Stream ac(Denominator)	2062				Denominator is 75% of total riparian area with the upper 14.1 protection reaches not included.
Change Relative to Impaired Area (Change from above/low bookend)	0.17%				

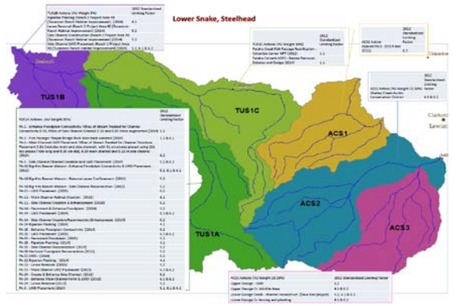
** The % improvement refers to the % treatment area X est % survival

TUS1A-LF 5.2 (weight 30%)

LF 5.2 (Floodplain Condition)

Action	Miles	% Improvement**	% Est improvement by 2018	Realized Change in 2018 (mi)	
PA-1	0.59	62%	6.0%	0.399725	
PA-3	1.36	33%	6.0%	0.5338	
PA-10	1.56	48%	9.0%	0.8814	
PA-11	1.56	71%	4.5%	1.1817	
PA-14	1.64	52%	6.0%	0.9553	
PA-15	0.63	45%	6.0%	0.3213	
PA-22	0	0%	0.0%	0	
PA-23	0.98	26%	4.5%	0.30135	
PA-24	0.86	71%	4.5%	0.65145	
PA-26	0	38%	10.5%	0	The work for this project would have been captured in 2011 Look Back effort
PA-17&18 (2017-18)	1.9	38%	1.5%	0.741	I have include the look forward project so we can see the entire set of work planned. They are not included in the estimated uplift
PA-28 (2016-18)	2	49%	1.5%	1.005	I have include the look forward project so we can see the entire set of work planned. They are not included in the estimated uplift
PA-6-9 (2017)	2	38%	1.5%	0.78	I have include the look forward project so we can see the entire set of work planned. They are not included in the estimated uplift





Total	9.18			5.226025
Total Stream Miles (Denominator)	89.68			
Change Relative to Impaired Area (Change from above/low bookend 2012-2015)	6.91%		Est Change Relative to Impaired Area (Change from low bookend 2012-2018)	10.26%

The denominator in this case was reduced by the length of the protection reach 14.1 miles

Uplift was calculated by taking an estimate of reach treated for the action X the instant improvement and then multiplied by annual improvement

** The % improvement refers to the % of the project reach treated x the %instant impacts

*consider adding LF6.1?

TUS1A-LF 6.1 (weight %) ** propose 1% LF weight

LF 6.1 (Bed and Channel Form)

Action	Miles	% Improvement**	%Est Improvement by 2018	Realized Change in 2018 (mi)	
PA-1	0.59	62%	6.0%	0.399725	
PA-3	1.36	18%	6.0%	0.3196	
PA-10	1.56	25%	9.0%	0.5304	
PA-11	1.56	62%	4.5%	1.0335	
PA-14	1.64	62%	6.0%	1.1111	
PA-15	0.63	43%	6.0%	0.30555	
PA-22	1.01	9%	6.0%	0.1515	
PA-23	0.98	26%	4.5%	0.30135	
PA-24	0.86	62%	4.5%	0.56975	
PA-26	3.2	13%	10.5%	0.736	
PA-17&18 (2017-18)	1.08	40%	1.5%	0.4482	I have include the look forward project so we can see the entire set of work planned. They are not included in the estimated uplift
PA-28 (2016-18)	2	38%	1.5%	0.78	I have include the look forward project so we can see the entire set of work planned. They are not included in the estimated uplift
PA-6-9 (2017)	2	34%	1.5%	0.705	I have include the look forward project so we can see the entire set of work planned. They are not included in the estimated uplift
Total	13.39			5.458475	1.5% improvement / year added to 2018 figure
Total Stream Miles (Denominator)	89.68				
Change Relative to Impaired Area (Change from above/low bookend 2012-2015)	7.22%		Est Change Relative to Impaired Area (Change from low bookend 2012-2018)	9.78%	denominator is reduced by 14.1 miles locked up in the protection reaches

** The % improvement refers to the % of the project reach treated for channel form (physically increasing bars, tail outs, undercut banks,increased channel length, meanders etc..) multiplied by the est instantanious increase in channel complexity function

TUS1A-LF 6.2 (weight 30%) ** propose 29% LF weight

6.2 (Instream Structural Complexity)

Action	Miles	% Improvement**	% Est improvement by 2018	Realized Change in 2018 (mi)	
PA-1	0.59	62%	6.0%	0.399725	0.29 propose reducing this limiting factor weight to suport LF 5.1
PA-3	1.36	45%	6.0%	0.6936	
PA-10	1.56	45%	9.0%	0.8424	
PA-11	1.56	62%	4.5%	1.0335	
PA-14	1.64	62%	6.0%	1.1111	
PA-15	0.63	62%	6.0%	0.426825	
PA-22	1.01	15%	6.0%	0.2121	
PA-23	0.98	34%	4.5%	0.37485	
PA-24	0.86	62%	4.5%	0.56975	
PA-26	3.2	12%	7.5%	0.624	0.568421
PA-18 (2017-18)	1.08	59%	1.5%	0.648	PA-17 was excluded from this look forward as it will likely be completed in the summer of 2018.
PA-28 (2016-18)	2	54%	1.5%	1.11	
PA-6-9 (2017)	2	48%	1.5%	0.98	
Total	13.39 mi.			6.28785	1.5% improvement / year added to 2018 figure
Total Stream Miles (Denominator)	89.68 mi.				The denominator in this case was reduced by the length of the protection reach 14.1 miles. This was done because much of the protection reach is in the Tucannon Wennaha Wilderness and has been relativily unimpacted.
Change Relative to Impaired Area (Change from above/low bookend 2012-2015)	8.32%		Est Change Relative to Impaired Area (Change from low bookend 2012-2018)	11.94%	Uplift was calculated by taking an estimate of reach treated for channel complexity multiplied by the instant improvement (post project LWD, pools, bars, off channel habitat, etc). Then a multiplier of 1.5%/freshet year since completed up to 2018 was added to account for maturation of complexity driven by increased floodplain and channel function.

** The % improvement refers to the % of the project reach treated for complexity (physically increasing pools, LWD, pools, undercut banks, etc..) multiplied by the est instantanious increase in channel complexity function

TUS1A-LF 7.2 (weight 8%)

LF 7.2 (Increased Sediment Quantity)					
Action	**mi. treated**	**Rel. Treatment size**	**% Improvement**	**Realized Change in 2018 (mi)**	
Total	0			0	No project considered increased sediment quantity
Total Stream Miles (Denominator)	89.68	mi.			
Change Relative to Impaired Area (Change from above/low bookend)	0.0%				

TUS1A-LF 8.1 (weight 10%)

LF 8.1 (Temperature)					
Action	**Rel. Treatment size**		**% Improvement**	**Realized Change in 2018 proportion**	
			0.01	0	No project considered increased sediment quantity
			0.01	0	
Total					
Total Stream Miles (Denominator)	89.68	(Uplift)*		0	
Realized Treatment (stream length)	0	0.00%			

TUS1A-LF 9.2 (weight 5%)

LF 9.2 (Instream Flow)						
Action	**Lease (2012)**	**Lease (2013)**	**Lease (2014)**	**Lease (2015, cfs)**	**Permanent (cfs)**	
specific project (lease)	0	0	0			No project considered increased sediment quantity
Total	***0***	***0***	***0***	***0***	***0***	
			Average of leases ==>	0		
Total	0	cfs				
			Morgan Case (IDWR)			
Estimated water right diversions		cfs	summation of diversions			
Change Relative to Impaired Area (Change from above/low bookend)	#DIV/0!	(Uplift)				

0.858421

TUC1B Lower Tucannon - Mouth to Pataha 1.1, 2.3, 4.1, 5.2, 6.2, 7.2, 8.1, 8.4, 9.2

Identify Your Denominator if there is a general one used

Chinook Miles	11.3	miles	The priority restoration reach designated in the Snake River Salmon Recovery Plan (2011) is 11.3 miles in length (includes mainstem only, see inset map). StreamNet Includes stream miles designated with any life stage use by Chinook in the StreamNet GIS layer (2012) is 11.5 miles.

Comments:

TUC1B-LF 1.1 (weight 5%)

LF 1.1 (Anthropogenic Barriers)

Action	**Miles**	**Realized Change in 2018 (%)**
N/A		0.0%
N/A		0.0%
Total Treatment	0	0.0%
Total Stream Miles (Denominator)	11.3	mi.
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)

No project in 2012-2015.

TUC1B-LF 2.3 (weight 2%)

LF 2.3 (Mechanical Injury - due to anthropogenic structures)

Action	**Design Flow of Screen (cfs)**	**Rel. Treatment Size**
None Planned		0.0%
Total		0.0%
Total Flow (Denominator)	1	cfs
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)

No projects in 2012-2015

TUC1B-LF 4.1 (weight 10%)

LF 4.1 (Riparian Condition)

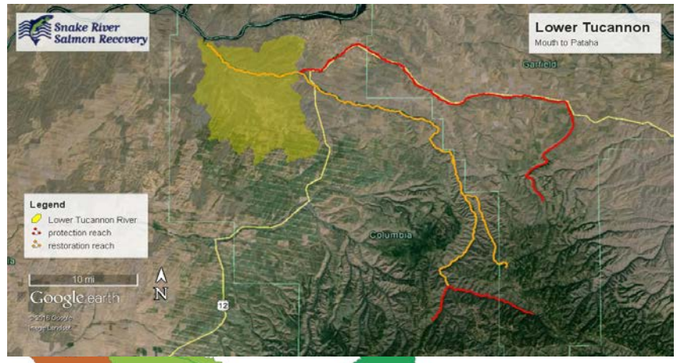
Action	**ac. treated**	**est improvement% X Survival**	**% Improvement****	**ized Change by 2018 (ac)**
PA-40 (Tucannon Ranch)	5.54	12.5%	8%	0.7444375
specific project			0%	0
Total	5.54			0.7444375
Total Stream ac (Denominator)	308			
Change Relative to Impaired Area (Change from above/low bookend)	0.2%	(Uplift)		

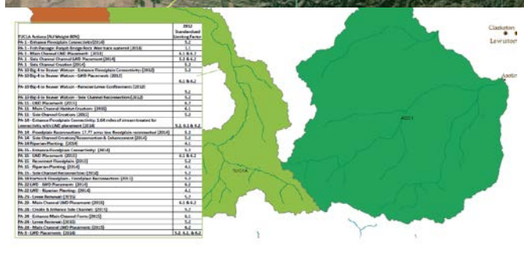
** The % improvement refers to the % treatment area X est % survival

We do not have project funding to complete projects in the LF between 2016 and 2018.

2.5% improvement based on annual growth of planting toward a mature tree which could become LWD

the denominator is 75% of maximum as set by the recovery goals





TUC1B-LF 5.2 (weight 30%)

LF 5.2 (Floodplain Condition)

Action	**Miles**	**% Improvement****	**% Est improvement by 2018**	**Realized Change in 2018 (mi)**
Tucannon Ranch levee Setback	0.64	62%	6%	0.4336
Total	0.64			0.4336
Total Stream Miles (Denominator)	11.3			
Change Relative to Impaired Area (Change from above/low bookend)	3.84%	(Uplift)		

** The % improvement refers to the % treated in this case not effectivness

TUC1B-LF 6.2 (weight 30%)

LF 6.2 (Instream Structural Complexity)

Action	**Miles**	initial **% Improvement****	over time **% Est improvement by 2018**	**Realized Change in 2018 (mi)**

Tucannon Ranch levee Setback	0.36	33%	3%	0.1278
Total	0.36			0.1278
Total Stream Miles (Denominator)	11.50			
Change Relative to Impaired Area (Change from above/low bookend)	1.11%	(Uplift)		

** The % improvement refers to the % of the project reach treated for complexity (physically increasing pools, LWD, pools, undercut banks, etc..) multiplied by the est instantanious increase in channel complexity function

TUC1B-LF 7.2 (weight 12%)

LF 7.2 (Increased Sediment Quantity)

Action	mi. treated	Rel. Treatment size	% Improvement	Realized Change in 2018 (mi)
specific project		#DIV/0!	5%	0
specific project		#DIV/0!	10%	0
Total	0			0
Total Stream Miles (Denominator)	11.3	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%			

No project identified fine sediments as a action

TUC1B-LF 8.1 (weight 5%)

LF 8.1 (Temperature)

Total				0.0%
	#DIV/0!	cfs (Uplift)*		#DIV/0!

No project identified Temperature as a direct action

TUC1B-LF 8.4 (weight 1%)

LF 8.4 (Turbidity)

Action	mi. Treated (or affec	Rel. Treatment size	% Improvement**	Realized Change in 2018 (mi)
specific project		#DIV/0!	5%	0
specific project		#DIV/0!	10%	0
Total	0			0
Total Stream Miles (Denominator)	11.3	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%			

** The % improvement refers to the % treated in this case not effectivness

No project identified turbidity as an action

TUC1B-LF 9.2 (weight 5%)

LF 9.2 (Instream Flow)

Action	Lease (2012)	Lease (2013)	Lease (2014)	Lease (2015, cfs)	rmanent (cfs)
specific project (lease)	0	0	0		
specific project (lease)					0
specific project (lease)					0
Total	***0***	***0***	***0***	***0***	***0***
			Average of leases ==>	0	
Total	0	cfs			
Estimated water right diversions		cfs			
Change Relative to Impaired Area (Change from above/low bookend)	#DIV/0!	(Uplift)			

No project targeted flow in the time period

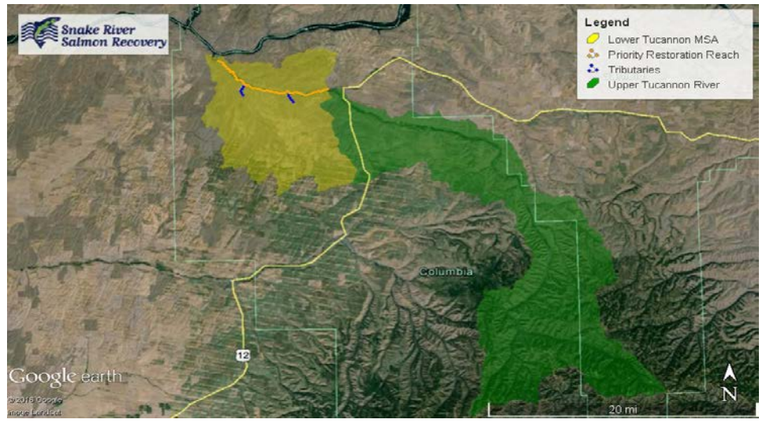
0%	**Sum of LF Weighting**

TUS1B Lower Tucannon - Mouth to Pataha 1.1, 2.3, 4.1, 5.2, 6.1, 6.2, 7.2, 8.1, 9.2

Identify Your Denominator if there is a general one used

Steelhead Miles	13.88	miles	The priority restoration reach designated in the Snake River Salmon Recovery Plan (2011) is 11.3 miles in length (includes mainstem only, see inset map). The non-priority reaches excessable to fish includes another 2.58 miles in Kellog and Smith Cr. StreamNet Includes stream miles designated with any life stage use by steelhead in the StreamNet GIS layer (2012) is 15.7 miles.

** use our 11.3 pluse kelloge and smith to barriers



TUS1B-LF 1.1 (weight 5%) ** change LF to 1%

LF 1.1 (Anthropogenic Barriers)

Action	Miles	Realized Change in 2018 (%)
specific project		0.0%
specific project		0.0%
Total Treatment	0	0.0%
Total Stream Miles (Denominator)	13.88	
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)

No barrier project were completed

TUS1B-LF 2.3 (weight 2%)

LF 2.3 (Mechanical Injury - due to anthropogenic structures)

Action	Design Flow of Screen (cfs)	Rel. Treatment Size
N/A		0.0%
Total		0.0%
Total Flow (Denominator)	386	cfs
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)

No screen project completed

TUS1B-LF 4.1 (weight 10%)

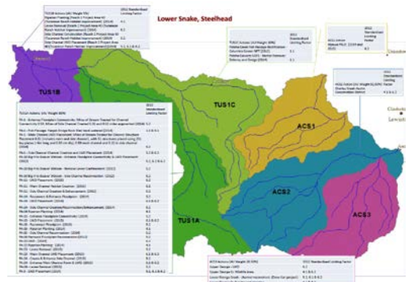
LF 4.1 (Riparian Condition)

Action	ac. treated	est improvement% X Survival	% Improvement**	Realized Change in 2018 (ac)
PA-40 (Tucannon Ranch)	5.54	12.5%	8%	0.7444375
			0%	0
Total	5.54			0.7444375
Total Stream Miles (Denominator)	393	ac.		
Change Relative to Impaired Area (Change from above/low bookend)	0.2%			

2.5% improvement based on annual growth of planting toward a mature tree which could become LWD

the denominator is 75% of maximum as set by the recovery goals

** The % improvement refers to the % treatment area X est % survival



*consider adding LF 5.1?

TUS1B-LF 5.2 (weight 30%) 0.29 no current actions to report, same as chinoook

LF 5.2 (Floodplain Condition)

Action	Miles	% Improvement**	%Improvement by 2018	Realized Change in 2018 (mi)
Tucannon Ranch levee Setback	0.64	62%	6%	0.4336
Total	0.64			0.4336
Total Stream Miles (Denominator)	13.88			
Change Relative to Impaired Area (Change from above/low bookend)	3.12%			

We have not identified funding for projects in this AU in the 2016-18 time frame

** The % improvement refers to the % treated in this case not effectivness

TUS1B-LF 6.1 (weight 10%) 0.07 reduced this to balance the LF to 1

LF 6.2 (Bed and Channel Form)

Action	Miles	% Improvement**	%Est Improvement by 2018	Realized Change in 2018 (mi)
Tucannon Ranch levee Setback	0.64	25%	6%	0.1984
Total	0.64			0.1984
Total Stream Miles (Denominator)	13.88			
Change Relative to Impaired Area (Change from above/low bookend)	1.43%			

We have not identified funding for projects in this AU in the 2016-18 time frame

** The % improvement refers to the % of the project reach treated for channel form (physically increasing bars, tail outs, undercut banks,increased channel length, meanders etc..) multiplied by the est instantanious increase in channel complexity function

TUS1B-LF 6.2 (weight 20%) 0.29

LF 6.2 (Instream Structural Complexity)

Action	Miles	% Improvement**	% Est improvement by 2018	Realized Change in 2018 (mi)
Tucannon Ranch levee Setback	0.64	25%	6%	0.1984
Total	0.64			0.1984
Total Stream Miles (Denominator)	13.88			
Change Relative to Impaired Area (Change from above/low bookend)	1.43%			

We have not identified funding for projects in this AU in the 2016-18 time frame

** The % improvement refers to the % of the project reach treated for complexity (physically increasing pools, LWD, pools, undercut banks, etc..) multiplied by the est instantanious increase in channel complexity function

TUS1B-LF 7.2 (weight 8%)

LF 7.2 (Increased Sediment Quantity)

Action	mi. treated	Rel. Treatment size	% Improvement	Realized Change in 2018 (mi)
specific project		#DIV/0!	5%	0
specific project		#DIV/0!	10%	0

No project identifed this action in 2012-2015

Total	0			0
Total Stream Miles (Denominator)	13.88	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%			

TUC1A-LF 8.1 (weight 10%)

LF 8.1 (Temperature)

Action	**Rel. Treatment size**		**% Improvement**	**Realized Change in 2018 proportion**
Total				
Total Stream Miles (Denominator)	13.88	(Uplift)*		0
Realized Treatment (stream length)	0	0.00%		

No project identifed this action in 2012-2015

TUS1B-LF 9.2 (weight 5%)

LF 9.2 (Instream Flow)

Action	**Lease (2012)**	**Lease (2013)**	**Lease (2014)**	**Lease (2015, cfs)**	**rmanent (cfs)**
specific project (lease)					0
Total	***0***	***0***	***0***	***0***	***0***
			Average of leases ==>	0	
Total	0	cfs			
Estimated water right diversions		cfs			
Change Relative to Impaired Area (Change from above/low bookend)	#DIV/0!	(Uplift)			

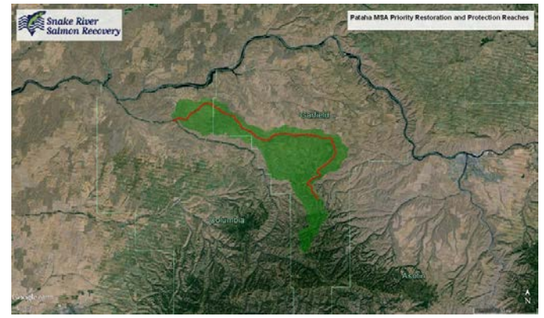
No project identifed this action in 2012-2015

TUS1C Pataha 1.1, 2.3, 4.1, 5.2, 6.1, 6.2, 7.2, 8.1, 8.4, 9.2

Identify Your Denominator if there is a general one used

Steelhead Miles	49.1	miles	The priority restoration reach designated in the Snake River Salmon Recovery Plan (2011) is 49.1 miles in length (includes mainstem only, see inset map). StreamNet Includes stream miles designated with any life stage use by steelhead in the StreamNet GIS layer (2012) is 50.2 miles.

Comments:



TUS1C-LF 1.1 (weight 5%)

LF 1.1 (Anthropogenic Barriers)

Action	**Miles Opened**	**% Improvement**	**Realized Change in 2018 (%)**
USFS Culverts	3.9	50%	7.9%
Total Treatment	3.9		0.1
Total Stream Miles (Denominator)	49.1		mi.
Change Relative to Impaired Area (Change from above/low bookend)	4.0%	(Uplift)	

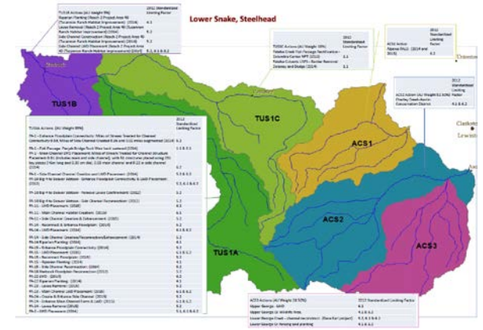
50% improvement is based on timing of steelhead passage

TUS1C-LF 2.3 (weight 2%)

LF 2.3 (Mechanical Injury - due to anthropogenic structures)

Action	**Design Flow of Screen (cfs)**	**Rel. Treatment Size**
specific project		0.0%
Total		0.0%
Total Flow (Denominator)	386	cfs
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)

No actions completed



TUS1C-LF 4.1 (weight 10%)

LF 4.1 (Riparian Condition)

Action	**mi. treated**	**est improvement% X Survival**	**% Improvement****	**Realized Change in 2018(mi)**
	0	0.0%	5%	0
	0	0.0%	5%	0
Total	0			0
Total Stream Miles (Denominator)	49.1	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)		

the denominator in the Pataha is being set at miles for total because restoration goals for the watershed were not set and I'm not sure if area is appropriate for the creek at this time.

** The % improvement refers to the % treatment area X est % survival

TUS1C-LF 5.2 (weight 30%)

LF 5.2 (Floodplain Condition)

Action	**Miles**	**% Improvement****	**% Est improvement by 2018**	**Realized Change in 2018 (mi)**
Total	0			
Total Stream Miles (Denominator)	49.1			
Change Relative to Impaired Area (Change from above/low bookend)	0.00%	(Uplift)		

** The % improvement refers to the treatment % survival in this case not proportion treated

TUS1C-LF 6.1 (weight 10%)

LF 6.2 (Bed and Channel Form)

Action	**Miles**	**% Improvement****	**%Est Improvement by 2018**	**Realized Change in 2018 (mi)**
Total	0.00			0
Total Stream Miles (Denominator)	49.10			
Change Relative to Impaired Area (Change from above/low bookend)	0.00%	(Uplift)		

No BPA funded actions in this catigory

the denominator in the Pataha is being set at miles for total because restoration goals for the watershed

** The % improvement refers to the % of the project reach treated for channel form (physically increasing bars, tail outs, undercut banks,increased channel length, meanders etc..) multiplied by the est instantanious increase in channel complexity function

TUS1C-LF 6.2 (weight 20%)

LF 6.2 (Instream Structural Complexity)

Action	**Miles**	**% Improvement****	**% Est improvement by 2018**	**Realized Change in 2018 (mi)**
Total	0.00			0
Total Stream Miles (Denominator)	49.10			
Change Relative to Impaired Area (Change from above/low bookend)	0.00%	(Uplift)		

No BPA funded actions in this catigory

the denominator in the Pataha is being set at miles for total because restoration goals for the watershed were not set and I'm not sure if area is appropriate for the creek at this time.

** The % improvement refers to the % of the project reach treated for complexity (physically increasing pools, LWD, pools, undercut banks, etc..) multiplied by the est instantanious increase in channel complexity function

*Consider adding LF 7.1

TUS1C-LF 7.2 (weight 5%)

LF 7.2 (Increased Sediment Quantity)

Action	mi. treated	Rel. Treatment size	% Improvement	Realized Change in 2018(mi)
specific project		#DIV/0!	5%	0
specific project		#DIV/0!	10%	0
Total	0			0
Total Stream Miles (Denominator)	49.1	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%			

No BPA funded actions in this catigory

TUS1C-LF 8.1 (weight 10%)

LF 8.1 (Temperature)

Total			Riparian Uplift (LF 4.1)	0.0%
		cfs		0.0%
	0.0%	(Uplift)*		

No BPA funded actions in this catigory

TUC1B-LF 8.4 (weight 3%)

LF 8.4 (Turbidity)

Action	mi. Treated (or affecte	Rel. Treatment size	% Improvement**	Realized Change in 2018(mi)
specific project		#DIV/0!	5%	0
specific project		#DIV/0!	10%	0
Total	0			0
Total Stream Miles (Denominator)	0	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	#DIV/0!			

** The % improvement refers to the % treated in this case not effectivness

No BPA funded actions in this catigory

TUS1C-LF 9.2 (weight 5%)

LF 9.2 (Instream Flow)

Action	Lease (2012)	Lease (2013)	Lease (2014)	Lease (2015, cfs)	rmanent (cfs)
specific project (lease)					
specific project (lease)					
specific project (lease)					
Total	***0***	***0***	***0***	***0***	***0***
			Average of leases ==>	0	
Total		cfs			
Estimated water right diversions		cfs			
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)			

No BPA funded actions in this catigory

ACC1 Asotin Creek 1.1, 4.1, 5.2, 6.2, 7.2, 8.1, 8.4, 9.2

Identify Your Denominator if there is a general one used

Steelhead Miles	47.9	miles	The priority restoration and protection reaches designated in the Snake River Salmon Recovery Plan (2011) is 47.9 miles in length (see inset map). StreamNet includes stream miles designated with any life stage use by Chinook in the StreamNet GIS layer (2012) is 0 (extripated?).

**Asotin mainstem protection reach and all restoration reach excluding Charlie Cr and George Cr

ACC1-LF 1.1 (weight 5%)

LF 1.1 (Anthropogenic Barriers)

Action	Miles	% Improvement	Realized Change in 2018 (%)
		6%	0.0%
			0.0
Total Treatment miles	0		
Total Stream Miles (Denominator)	47.9		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)	

Comments:

*consider adding LF 2.1?
*consider adding LF 2.2?
*consider adding LF 3.1?
*consider adding LF 4.2?

ACC1-LF 4.1 (weight 15%)

LF 4.1 (Riparian Condition)

Action	ac. treated	est improvement% X Survival	%Est Improvement by 2018	Realized Change in 2018 (ac)
				0
Asotin CREP Acres Enroled	0	0%	8%	0
Total	0			0.00
Total Stream acress (Denominator)	1,045			
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)		

** The % improvement refers to the % treatment area X est % survival

*consider adding LF 5.1?

TUC1A-LF 5.1 (weight %) **LF weight 21% This limiting factor was not added to TUC1A or ACC1

LF 5.1 (Side Channel and Wetland Condition)

Action	Miles	% Improvement**	%Est Improvement by 2018	Realized Change in 2018 (mi)
	0	0%		0
	0	0%		0
	0	0%		0
	0	0%		0
Total	0			0
Total Stream Miles (Denominator)	47.9			
Change Relative to Impaired Area (Change from above/low bookend)	0.00%	(Uplift)		

** The % improvement refers to the % treated in this case not effectivness

ACC1-LF 5.2 (weight 30%)

LF 5.2 (Floodplain Condition)

Action	Miles	% Improvement**	%Est Improvement by 2018	Realized Change in 2018 (mi)
		20%	3%	0.00
				0
				0
				0
Total	0			
Total Stream Miles (Denominator)	22	^the denominator was credited the 20.5 miles of protection		
Change Relative to Impaired Area (Change from above/low bookend)	0.00%	(Uplift)		

** The % improvement refers to the % treated in this case not effectivness

*consider adding LF 6.1?

TUC1A-LF 6.1 (weight %) ** propose 1% LF weight

LF 6.1 (Ibed and Channel Form)

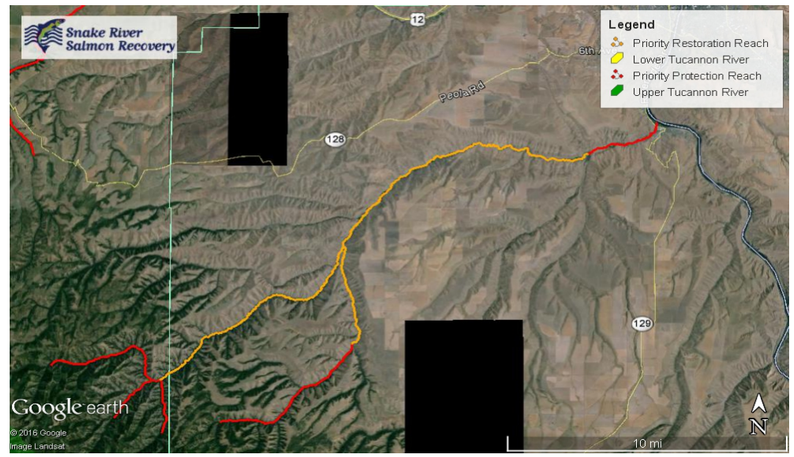
Action	Miles	% Improvement**	%Est Improvement by 2018	Realized Change in 2018 (mi)
		10%	3%	0
Total	0.00			
Total Stream Miles (Denominator)	27.40			
Change Relative to Impaired Area (Change from above/low bookend)	0.00%	(Uplift)		

** The % improvement refers to the % of the project reach treated for channel form (physically increasing bars, tail outs, undercut banks,increased channel length, meanders etc..) multiplied by the est instantanious increase in channel complexity function

ACC1-LF 6.2 (weight 30%)

LF 6.2 (Instream Structural Complexity)

Action	Miles	% Improvement**	% Est improvement by 2018	Realized Change in 2018 (mi)
		15%	3%	0
Total	0.00			0
Total Stream Miles (Denominator)	27.40			



Change Relative to Impaired Area (Change from above/low bookend)	0.00%	(Uplift)	

** The % improvement refers to the % of the project reach treated for complexity (physically increasing pools, LWD, pools, undercut banks, etc..) multiplied by the est instantanious increase in channel complexity function

*Consider adding LF 7.1

TUC1A-LF 7.1 (weight %) — ** set to 1% now but is not included as a limiting factor in the look back

LF 7.1 (Decreased Sediment Quantity)

Action	mi. treated	Rel. Treatment size	% Improvement	Realized Change in 2018 (mi)
		0.00%	50%	0
	0	#DIV/0!	0%	0
	0	#DIV/0!	0%	0
		#DIV/0!	0%	0
Total	0			0
Total Stream Miles (Denominator)	47.9	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)		

ACC1-LF 7.2 (weight 3%)

LF 7.2 (Increased Sediment Quantity)

Action	mi. treated	Rel. Treatment size	% Improvement	Realized Change in 2018 (mi)
specific project		#DIV/0!	5%	0
specific project		#DIV/0!	10%	0
Total	0			0
Total Stream Miles (Denominator)	47.9	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%			

ACC1-LF 8.1 (weight 10%)

LF 8.1 (Temperature)

ACC1-LF 8.4 (weight 2%)

LF 8.4 (Turbidity)

Action	mi. Treated (or affecte	Rel. Treatment size	% Improvement**	Realized Change in 2018 (mi)
Total	0			0
Total Stream Miles (Denominator)	0	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	#DIV/0!			

** The % improvement refers to the % treated in this case not effectivness

*consider adding LF 9.1 or 9.3?

ACC1-LF 9.2 (weight 5%)

LF 9.2 (Instream Flow)

Action	Lease (2012)	Lease (2013)	Lease (2014)	Lease (2015, cfs)	rmanent (cfs)
specific project (lease)					
specific project (lease)					
specific project (lease)					
Total	***0***	***0***	***0***	***0***	***0***
			Average of leases ==>	0	
Total	0	cfs			
Estimated water right diversions	386	cfs	Morgan Case (IDWR) summation of diversions		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)			

ACS1 Alpowa 1.1, 4.1, 5.2, 6.2, 7.2, 8.1, 8.4, 9.2

Identify Your Denominator if there is a general one used

Steelhead Miles	22	miles	The priority restoration and protection reaches designated in the Snake River Salmon Recovery Plan (2011) is 22 miles in length (see inset map). StreamNet Includes stream miles designated with any life stage use by steelhead in the StreamNet GIS layer (2012) is 21.9.

ACS1-LF 1.1 (weight 5%)

LF 1.1 (Anthropogenic Barriers)

Action	**Miles**	**% Improvement**	**Realized Change in 2018 (%)**
	0	0%	0.0%
specific project			0.0
Total Treatment	0		0.0%
Total Stream Miles (Denominator)	22		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)	

ACS1-LF 4.1 (weight 15%)

LF 4.1 (Riparian Condition)

Action	**ac. treated**	**est improvement% X Survival**	% Improvement by 2018	**Realized Change in 2018 (%)**
		5%	8%	0
Total	0			0
Total Stream acres (Denominator)	427			
Change Relative to Impaired Area (Change from above/low bookend)	0.00%	Uplift		

** The % improvement refers to the % treatment area X est % survival

ACS1-LF 5.2 (weight 30%)

LF 5.2 (Floodplain Condition)

Action	**Miles**	**% Improvement****	**Realized Change in 2018 (mi)**
specific project			0
specific project			0
specific project			0
specific project			0
Total	0		
Total Stream Miles (Denominator)	22		
Change Relative to Impaired Area (Change from above/low bookend)	0.00%	Uplift	

** The % improvement refers to the % treated in this case not effectivness

ACS1-LF 6.1 (weight %)

LF 6.1 (Ibed and Channel Form)

Action	**Miles**	**% Improvement****	**%Est Improvement by 2018**	**Realized Change in 2018 (mi)**
Total	0.00	0.00%		0
Total Stream Miles (Denominator)	22.00			
Change Relative to Impaired Area (Change from above/low bookend)	0.00%	Uplift		

** The % improvement refers to the % of the project reach treated for channel form (physically increasing bars, tail outs, undercut banks,increased channel length, meanders etc..) multiplied by the est instantanious increase in channel complexity function

ACS1-LF 6.2 (weight 30%)

LF 6.2 (Instream Structural Complexity)

Action	**Miles**	**% Improvement****	**% Est improvement by 2018**	**Realized Change in 2018 (mi)**
Upper Alpowa PALS (PCD with DOE Funding)	2.00	50%	5%	1.09
Total	2.00			1.09
Total Stream Miles (Denominator)	22.00			
Change Relative to Impaired Area (Change from above/low bookend)	4.95%	Uplift		

** The % improvement refers to the % of the project reach treated for complexity (physically increasing pools, LWD, pools, undercut banks, etc..) multiplied by the est instantanious increase in channel complexity function

*Consider adding LF 7.1

ACS1-LF 7.2 (weight 3%)

LF 7.2 (Increased Sediment Quantity)

Action	**mi. treated**	**Rel. Treatment size**	**% Improvement**	**Realized Change in 2018 (mi)**

Comments:

No Action in the time frame

No BPA funded Actions

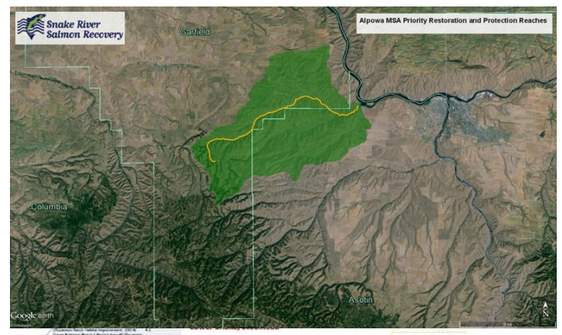
denominator is based on 75% of a 100' buffer each bank for the 22 miles as identified in the Recovery Plan 2011

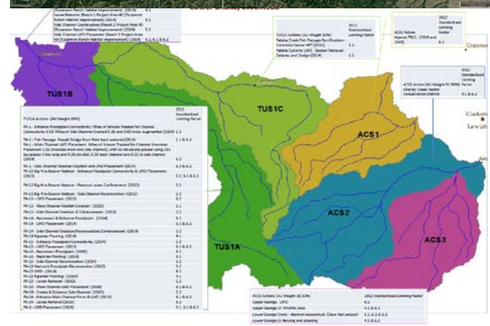
No Actions in the time frame

Denominator is the Steelhead length

This project had indirect match
est 95% of the complexity features
atributed to construction with 50%
improvement following construction
est 1.5% improvement each yr up to 2018

Denominator is the Steelhead length





specific project		#DIV/0!	5%	0	
specific project		#DIV/0!	10%	0	
Total	0			0	
Total Stream Miles (Denominator)	22	mi.			
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	Uplift			

No project identified this as an action

ACS1-LF 8.1 (weight 10%)

LF 8.1 (Temperature)					
Total			Riparian Uplift (LF 4.1)	0.0%	
				#DIV/0!	

No project identified this as an action

ACS1-LF 8.4 (weight 2%)

LF 8.4 (Turbidity)				
Action	**mi. Treated (or affected downstream?)**	**Rel. Treatment size**	**% Improvement****	**Realized Change in 2018 (mi)**
specific project		#DIV/0!	5%	0
specific project		#DIV/0!	10%	0
Total	0			0
Total Stream Miles (Denominator)	0	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	#DIV/0!	Uplift		

No project identified this as an action

** The % improvement refers to the % treated in this case not effectivness

*consider adding LF 9.1 or 9.3?

ACS1-LF 9.2 (weight 5%)

LF 9.2 (Instream Flow)					
Action	**Lease (2012)**	**Lease (2013)**	**Lease (2014)**	**Lease (2015, cfs)**	**rmanent (cfs)**
specific project (lease)					
specific project (lease)					
specific project (lease)					
Total	***0***	***0***	***0***	***0***	***0***
				0	
Total	0	cfs			
Estimated water right diversions		cfs			
Change Relative to Impaired Area (Change from above/low bookend)	#DIV/0!	(Uplift)			

I would consider droping this LF down to 1% because there is no water to lease or trust.

No project identified this as an action

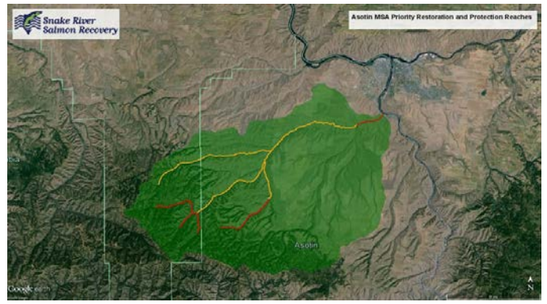
ACSS Asotin Creek 1.1, 4.1, 5.2, 6.2, 7.2, 8.1, 8.4, 9.2

Identify Your Denominator if there is a general one used			
Steelhead Miles	61.1	miles	Plan (2011) is 61.1 miles in length (see inset map). Not including George CreekStreamNet Includes stream miles designated with any life stage use by steelhead in the StreamNet GIS layer (2012) is 47.7.

ACS2-LF 1.1 (weight 5%)

LF 1.1 (Anthropogenic Barriers)			
Action	**Miles**	**% Improvement**	**Realized Change in 2018 (%)**
Headgate Fish Passage (12-1633)		5%	0.0%
specific project			0.0
Total Treatment	0		
Total Stream Miles (Denominator)	61.1		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)	

Headgate will be removed in 2016 and has all but 9.7 miles above it. It is not a full barrier but is being considered a 3% barrier for this exersize with Steelhead. A potential barrier at Charley Cr remains though it is not currently an issue.



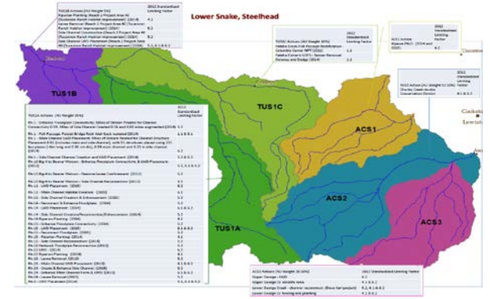
ACS2-LF 4.1 (weight 15%)

LF 4.1 (Riparian Condition)				
Action	**ac. treated**	**est improvement% X Survival**	**% Realized Change by 2018**	**Realized Change in 2018(ac)**
	0	0.00%	8%	0
	0	0.00%	7.50%	0
	0	0%		
Total	0			0
Total Stream ac (Denominator)	1110			
Change Relative to Impaired Area (Change from above/low bookend)	0.0%			

** The % improvement refers to the treatment % survival in this case not proportion treated

acs denominator is calculated from the length of miles and a 100 \' buffer each bank as has been used in Asotin

% realized change per year is 2.5% / yr is based on a 40yr old tree
** the denominator is in acres based on a 200 foot buffer 100' each side for the chinook extent. The 100' buffer was used due to previous discussions on narrow valley floor in Asotin Cr
the denominator is 75% of maximum as set by the recovery goals



ACS2-LF 5.2 (weight 30%)

LF 5.2 (Floodplain Condition)				
Action	**Miles**	**% Improvement****	**% Est improvement by 2018**	**Realized Change in 2018 (mi)**
	0	20%	3%	0.00
Total	0			
Total Stream Miles (Denominator)	61.1			
Change Relative to Impaired Area (Change from above/low bookend)	0.00%			

** The % improvement refers to the % treated in this case not effectivness

impacts on floodplain conectivity in the short term but they do impact

The protection reaches were subtracted from the denominator to calulate up lift because they are not currently part of the restoration objectives

ACS2-LF 6.2 (weight 30%)

LF 6.2 (Instream Structural Complexity)				
Action	**Miles**	**% Improvement****	**% Est improvement by 2018**	**Realized Change in 2018 (mi)**
		15%	3%	0
Total	0.00			0.00

No BPA funded projects were completed in Asotin for this LF

Total Stream Miles (Denominator)	40.60	
Change Relative to Impaired Area (Change from above/low bookend)	0.00%	

20.5 miles has been subtracted from the denominator for this LF when calculating the uplift, because this type of restoration action is not being applied to the protection reaches at this time

** The % improvement refers to the % of the project reach treated for complexity (physically increasing pools, LWD, pools, undercut banks, etc..) multiplied by the est instantanious increase in channel complexity function

ACS2-LF 7.2 (weight 3%)

LF 7.2 (Increased Sediment Quantity)

Action	**Ac. treated**	**Rel. Treatment size**	**Realized Change in 2015 (mi)**
Acres Enroled in Minimum Till	257.3	100.0%	257.3
		0.0%	0
Total	257.3		257.3
Total Crop Acres(Denominator)	15,964.10	AC	
Change Relative to Impaired Area (Change from above/low bookend)	1.6%		

value provided by ACCD and updated July 25, 2016

ACS2-LF 8.1 (weight 10%)

LF 8.1 (Temperature)

Total			Riparian Uplift (LF 4.1)	1.6%
			Instream Flow Uplift (LF 9.2)	0.0%
Total Flow (Denominator)		cfs		
Change Relative to Impaired Area (Change from above/low bookend)	1.6%	(Uplift)*		
* completed 4.1 and 9.2 first, then simply added the uplift from those limiting factors for 8.1			*Summed Riparian and Instream Flow Uplift scores	

No BPA funded projects were completed in Asotin for this LF

ACS2-LF 8.4 (weight 2%)

LF 8.4 (Turbidity)

Action	**mi. Treated (or a**	**Rel. Treatment si**	**% Improvement****	**Realized Change in 2015 (mi)**
specific project		#DIV/0!	5%	0
specific project		#DIV/0!	10%	0
Total	0			0
Total Stream Miles (Denominator)	0	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	#DIV/0!			

No BPA funded projects were completed in Asotin for this LF

** The % improvement refers to the % treated in this case not effectivness

ACS2-LF 9.2 (weight 5%)

LF 9.2 (Instream Flow)

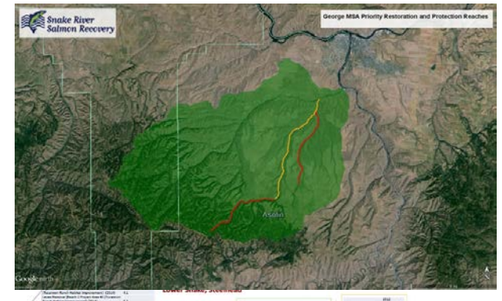
Action	**Lease (2012)**	**Lease (2013)**	**Lease (2014)**	**Lease (2015, cfs)**	**manent (cfs)**
specific project (lease)					
specific project (lease)					
specific project (lease)					
Total	***0***	***0***	***0***	***0***	***0***
			Average of leases ==>	0	
Total	0	cfs			
			Morgan Case (IDWR)		
Estimated water right diversions	386	cfs	summation of diversions		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)			

Not water for leasing

ACS3 George Creek 1.1, 4.1, 5.2, 6.2, 7.2, 8.1, 8.4, 9.2

Identify Your Denominator if there is a general one used

Steelhead Miles	33.3	miles	The priority restoration and protection reaches designated in the Snake River Salmon Recovery Plan (2011) is 33.33 miles in length (see inset map). StreamNet Includes stream miles designated with any life stage use by steelhead in the StreamNet GIS layer (2012) is 36.1.



ACS3-LF 1.1 (weight 5%)

no known barriers other than dewatering of subsurface flow

LF 1.1 (Anthropogenic Barriers)		
Action	**Miles**	**Rel. Treatment Size**
specific project		0.0%
specific project		0.0%
Total Treatment	0	0.0%
Total Stream Miles (Denominator)	33.3	mi.
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)

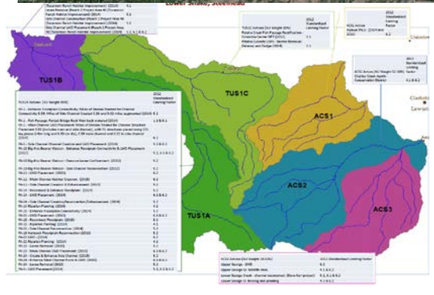
ACS3-LF 4.1 (weight 10%)

LF 4.1 (Riparian Condition)		**est improvement% X**	
Action	**ac. treated**	**Survival**	**Realized Change in 2018 (mi)**
Upper and Lower George Creek Treatments		0%	0
			0
Total	0		0
Total Stream Ac (Denominator)	908.25		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	No benefits assigned	

** The % improvement refers to the treatment % survival in this case not proportion treated

Buffer is based on 150' buffer each bank over the 33.3 mile priority reach *.75

52747200



ACS3-LF 5.2 (weight 30%)

LF 5.2 (Floodplain Condition)				
Action	**Miles**	**% Improvement****	**% Est improvement by 20**	**Realized Change in 2018 (mi)**
WDFW George Creek	0.75	62%	6.0%	0.508125
Total	0.75			0.508125
Total Stream Miles (Denominator)	33.3	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	1.53%			

** The % improvement refers to the % treated in this case not effectivness

ACS3-LF 6.2 (weight 30%)

LF 6.2 (Instream Structural Complexity)				
Action	**Miles**	**% Improvement****	**% Est improvement by 2018**	**Realized Change in 2018 (mi)**
WDFW Lower George Creek	0.75	62%	6.0%	0.508125
Total	0.75	61.75%		0.508125
Total Stream Miles (Denominator)	30.00	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	1.69%			

no project action proposed in this project reach

** The % improvement refers to the % of the project reach treated for complexity (physically increasing pools, LWD, pools, undercut banks, etc..) multiplied by the est instantanious increase in channel complexity function

ACS3-LF 7.2 (weight 3%)

LF 7.2 (Increased Sediment Quantity)				
Action	**AC. treated**	**Rel. Treatment size**	**% Improvement**	**Realized Change in 2015 (mi)**
No specific project but benefits from other limiting factors	3799.7	100.0%	5%	189.985
		0.0%	10%	0
Total	3799.7			189.985
Total Stream AC (Denominator)	34698.92	mi.		
Change Relative to Impaired Area (Change from above/low bookend)	0.5%			

value provided by ACCD and updated July 25, 2016

ACS3-LF 8.1 (weight 15%)

LF 8.1 (Temperature)				
Total			Riparian Uplift (LF 4.1)	0.5%
Total Flow (Denominator)		cfs	Instream Flow Uplift (LF 9.2)	0.0%
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)*		
* completed 4.1 and 9.2 first, then simply added the uplift from those limiting factors for 8.1			*Summed Riparian and Instream Flow Uplift scores	

ACS3-LF 8.4 (weight 5%)

LF 8.4 (Turbidity)				
Action	**mi. Treated (or affecte**	**Rel. Treatment size**	**% Improvement****	**Realized Change in 2015 (mi)**
specific project		#DIV/0!	5%	0
specific project		#DIV/0!	10%	0
Total	0			0

Total Stream Miles (Denominator)	0	mi.
Change Relative to Impaired Area (Change from above/low bookend)	#DIV/0!	

** The % improvement refers to the % treated in this case not effectivness

*consider adding LF 9.1 or 9.3?

ACS3-LF 9.2 (weight 2%)

LF 9.2 (Instream Flow)

Action	**Lease (2012)**	**Lease (2013)**	**Lease (2014)**	**Lease (2015, cfs)**	**rmanent (cfs)**
Total	***0***	***0***	***0***	***0***	***0***
			Average of leases ==>	0	
Total	0	cfs			
Estimated water right diversions	386	cfs	Morgan Case (IDWR) summation of diversions		
Change Relative to Impaired Area (Change from above/low bookend)	0.0%	(Uplift)			

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 insufficient water. May	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 salmonid stocks, species or	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, Henneguya, 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 concentrated as they	Bioaccumulation Toxicity, PBDEs, PCBs, Oil, Organochlorides, Pesticides	Density Independent	4,5,6,7
				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 available for salmonids	Micro and Macro-Detrital Inputs, Loss of Marine Derived Nutrients, Carcasses, Down-welling, Ocean Conditions, Detritus, Phytoplankton	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
3	Food	Insufficient or inadequate food for salmonids.	Competition, Prey Availability, Species Interactions	3.2	Food-Competition	Insufficient food due to the addition of competing salmonid stocks, species or hatchery produced fish.	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, forage-fish or other	Species Diversity, Prey Species Abundance, Invasive Species, Altered Food Web Dynamics	Compensation/Carrying Capacity	4,5,6,7
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 shade, add primary production to the aquatic	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, elemination and loss of access to peripheral freshwater habitat, including side-channels and freshwater wetlands	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, elemination and loss of access to the over or beyond bank habitat, of streams and rivers that is periodically	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, Baitfish spawning grounds	Compensation/Carrying Capacity	7,8

ID	Ecological Concern	Definition	Included Categories	ID	Ecological Concern-Sub Category	Definition	Included Categories	VSP parameter effects	Primary Lifestages Affected
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 (aggradation) of the	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 movement such as the loss	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 of stream depth and	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
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 stream system.	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 adverse effects on	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 listed salmonids, including	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 species on which they	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

ID	Ecological Concern	Definition	Included Categories	ID	Ecological Concern-Sub Category	Definition	Included Categories	VSP parameter effects	Primary Lifestages Affected
				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
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", including loss of	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 temperature, loss of sediment	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) timing of water quantity	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 abundance, fecundity	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 timing of migration and	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

ID	Threats:	Definition:	Included Categories:
1	Commercial Harvest	The catching or collecting of salmonid for sale.	size/age/timing selection, Tribal Harvest, Commercial Fishing
2	Incidental Mortality Commercial Harvest	Injury or death to a species or stock of salmonid due to commercial fishing directed at a different species or stock.	bycatch, Overharvest of mixed stocks, incident catch in hatchery targeted fishery
3	Sport Harvest	The catching or collecting of salmonids for recreation (not for resale)	Fishing
4	Catch and Release Mortality	The incidental injury or mortality to salmonids in a fishery that intends to leave fish unharmed.	Sport, Commercial
5	Illegal Harvest	Fishing in violation of laws, rules, regulations or management, including unreported and misreported catch	Poaching, Over-harvest, Exceeding of Quota
6	Research, Management or Monitoring Mortality	Mortality, incidental or directed, that occurs during sanctioned research, management or monitoring activities.	Trapping Mortality, Shocking Mortality, Weir Operation, Transportation survival
7	Prey Harvest	Insufficient salmonid prey due to human fishing.	Sand Lance
8	Return of Hatchery Fish to Freshwater	Threats due to the return of hatchery fish to freshwater, including threats due to ecological interactions and direct interaction with wild salmonids.	Genetic Masking, Hatchery Management, Redd Destruction by hatchery fish, Ineffective Harvest of Hatchery fish, Masking effects/inability to accurately count wild fish
9	Release of Hatchery Fish to Freshwater	Threats due to the release of hatchery produced salmonids into freshwater habitat, including threats due to ecological interactions .	Swamping i.e. excessive release numbers
10	Breeding Program	Threats to wild produced salmon due to differences in the genetic and demographic characteristics of hatchery produced salmonids.	Foreign Broodstock sources, Unnatural Hatchery rearing, domestication selection, Artificial Selection by hatchery personnel, limited Broodstock pairing, founder effects, Relaxed selection, increased stray rates, population mixing
11	Hatchery Facilities	Threats due to the structure and function of hatchery or aquaculture facilities.	Pollution, waste, drugs, Intake Mortality, passage, water withdrawals, Eutrophication, toxics,
12	Broodstock Collection	Threats due to the removal of wild produced salmonids for breeding programs.	Reduced wild population due to Broodstock collection, Catastrophic facility failure
13	Altered Daily and Seasonal Flow Patterns	Threats due to alterations in the typical or average, daily to yearly, flow regime. Including changes due to climate change.	hydrograph alterations, inappropriate flows, loss of spring freshet, loss of flooding, higher winter flows/reduced snowpack, channel changes
14	Reduced Water Quantity	Threats associated with absolute loss of water quantity (as opposed to flow timing) due to consumption, diversion or evaporation.	Reduced Spill, reduced flow, Consumptive losses from use of stored water, water loss due to increased evaporation, dewatering, lowered water table

ID	Threats:	Definition:	Included Categories:
15	Physical Barrier	Threats due to the particular effects of a physical barrier across a waterway. These include the retention of sediment and wood, blocked migration paths and habitat loss.	Migration Barriers, barrier to downstream transport of sediment (suspended and bedload), organic material, impede travel, obstructed and delayed passage, blocked access, blocked habitat, habitat availability, spawning and rearing habitat loss, habitat fragmentation, inundated habitat, habitat loss, juvenile competition, Fish weirs
16	Impoundment Effects	The harmful habitat and ecological changes due to the impounding of a stream or river behind a dam	Impoundment effects, Altered Ecosystems riverine to impoundment, species change/reduced biodiversity, ecological impoundments
17	Water Releases	Harmful habitat changes due to dam water releases	Gas disease, Cold Temperatures
18	Active mining and dredging	Harmful habitat changes due to active mining and dredging	Gravel bar skimming, Gravel Mining
19	Stockpiles and overburden captured during high flows	Harmful habitat changes due to the capture of mining stockpiles and overburden by changes to the river course	
20	Gravel removal	Harmful habitat changes due to the removal of gravel from a river bed	
21	Gravel Pits	Harmful consequences due to the presence of in-channel gravel pits	pit capture by river/Avulsion, "ponding" pond effects
22	Construction/Deconstruction of Temporary Dams	Harmful habitat and ecological changes due to the placing or removal of a temporary barrier across a waterway.	
23	Excess Nutrients	Increased introduction to water body of plant nutrients, i.e. nitrogen, phosphorus, potassium	sewage, urban runoff, Stormwater run-off, small cities, septic systems, increased sediment and nutrients, Eutrophication
24	Diking	An embankment of earth and/or rock built to prevent floods.	Habitat modification, levees, channelization
25	Filling	Filling low-lying areas with earth and/or rock. Generally to accommodate agriculture or shoreline structures.	Wetland Loss, estuary loss
26	Surface Runoff	Harmful habitat changes due to increased surface runoff	Altered Runoff, Grazing Impacts, Trampling, Sediment/substrate Compaction, Road Density, Increased Impervious Surfaces, Increased Runoff
27	Dredging	The excavation of bottom (underwater) sediments and disposal in another different location.	wood removal, obstacles to transportation, dredge spoils, man-made islands, channelization, channel straightening, release of toxic sediment, turbidity
28	Beach/shore line Alteration	The threats due to structural changes to the beach or shoreline, including armoring, the building of jetties and other structures that affect erosion and other shoreline processes.	Bulkhead, Jetty

ID	Threats:	Definition:	Included Categories:
29	Stream Bank/Channel Armoring	The threats due to structural changes to the banks of a waterway including armoring and other structures that affect hydrodynamic processes such as erosion and water velocity.	Riprap, Embankment Protection, Bulkheads, Channel lining
30	Water Diversions	Threats due to the physical structures used for water withdrawals, including screening mortality, ditches and culverts.	Water Management, Water Storage, Water Withdrawal, Irrigation, Drainage Network Alteration, Channelization, Water Allocation, Screening, Ground Water Withdrawals, Weirs, Culverts, Screening mortality, Fishways, Unscreened, Improperly Screened Diversions
31	Channel and Shore Structures	Habitat and ecological changes due to the presence of anthropogenic structures, including shoreline structures, floating structures and bottom fixed structures.	Haul-outs, Pilings, Docks, Wharfs, Piers, Boat slips, Navigational structures, Overwater structures
32	Tidal Gates	Threats due to the presence of tidal gates, including loss of habitat, salinity changes, ecological changes and changes to channel structure and form. changes	
33	Noise Pollution	Threats due to anthropogenic generated noise (primarily sub-surface).	Pile Driving, Barging of smolts and juveniles, Boat navigation, Sonar, Boating
34	Non-Point Source Pollution	The threats associated with the introduction of toxic contaminated water from multiple and unknown sources.	Runoff, Urban runoff, Pharmaceuticals, Heavy Metal , Herbicides, Pesticides, Oil, Insecticides, Fungicides, Rodenticides, Forest fire retardant
35	Point Source Pollution	Threats associated with the introduction of toxic contaminated water from a particular, identifiable source.	Abandoned mines, Industrial pollution
36	Earth Movement	Threats associated with the mass movement of earth due to gravity	Mass Wasting, Landslides, Debris flows, Slumps
37	Road Building	Threats due to the construction of roads, highways, thoroughfares and other access.	Road development
38	Streamside Development	Threats due to the removal of streamside habitat.	Land clearing, Riparian clearing
39	Riparian Grazing	Threats due to riparian grazing by livestock, including the presence of livestock instream and stream crossing.	Bank Erosion, Riparian Degradation. Foraging, Grazing impacts
40	Tilling	Threats associated with the preparation of soil by ploughing, ripping, or turning it.	Farm runoff, Farming,

ID	Threats:	Definition:	Included Categories:
41	Inadequate Fishery Management, Regulations, Technical Information, Authority or Inadequate Enforcement	Threats associated with the inability of human institutions to successfully manage a fishery	Over-allocation, Mixed stock species management, Operation without ESA approved Plan, Alaska-Canadian interceptions of US NW fish, Unidentified escapement goals
42	Wood/instream Structure Removal	Habitat and ecological changes due to the removal of large woody debris and other instream structures that provide structural relief to the stream channel	LWD removal, Stream clearing
43	Boat Interference	Threats associated with boat and ship traffic	Boating, Vessel effects, Harassment, Snagging, prop scour
44	Boat Wakes	The threats to the species or its habitats due to anthropogenic caused waves	Stranding, Bank Erosion
45	Beaver Removal	Habitat and ecological changes due to the removal of beavers and beaver dams	Beaver Eradication
46	Managed Game Fish	Threats due to the past or current introduction and management of game fish.	Bass, Walleye, Shad, Brown Trout
47	Protected Native Predators	Threats associated with the management of ESA protected salmonid predators.	double crested cormorants, marine mammals, arctic terns, Sea Lions, Harbor seals, California sea lions, Killer Whales
48	Native Predators	Threats due to predation by native species.	Pike Minnow
49	Invasive Species	Predation and other ecological changes due to accidentally, or non-managed introduced species.	ballast water introductions, Invasive Species, Exotic Species, Introduced Species
50	Disease Transfer	The transmission of pathogens to wild salmonids	Sea lice, Whirling disease
51	Ocean Productivity	Threats due to a decline in ocean primary production.	Ocean Acidification, Nutrients, Plankton, Food, Climate Cycles, Global Warming, Pacific Decadal Oscillation (PDO), El Nino/Southern Oscillation (ENSO)
52	Pervasive Temperature Changes	The threats associated with increased temperature changes across many or most of the habitats utilized by a salmonid species, including but not limited to, exclusion from or loss of habitat, predator-prey changes, lethal temperatures and behavioral changes	Global warming, Range Shifts, Climate Change
53	Sea level Rise	Habitat and ecological changes associated with the rapid rise in average sea level due to climate change.	Global warming, Climate Change
54	Improper Design of Instream Structures	Injury or death due to passage near or thr	Improper screening or filters, turbines

ID	Land Use/Activity:	Land Use/Activity Definition:	Included Categories:
1	Harvest	The direct mortality on fish by humans	Fishing, Recreational Fishing, Sport Fishing, Tribal Fishing
2	Salmonid Propagation	The artificial propagation of salmonids	Salmonid Aquaculture, Fish Farms, Net Pens, Ranching
3	Water Management	The activity of planning, developing, distributing, managing, and optimum use of water resources under defined water polices and regulations.	Irrigation, Diversions, Flood Control, Canals, Inter-Basin Water Transportation
4	Dams	A barrier constructed across a waterway to	Hydro, Storage, Hydroelectric Production
5	Temporary Dams	A barrier across a waterway meant to contain the flow, lasting up to a few (3) years	Splash Dams, Summer Dams, Temporary Dams, Pushup Dams
6	Low Head Hydropower	Small-scale hydro technology that can extract energy from small headwater dams	Micro Hydro, Low Head Hydropower, Low Head Micro Hydro, Low Head Water Turbines
7	Sediment Extraction	The extraction of sand, gravel or other sediment for commercial purposes from a waterway or adjacent areas	Gravel Mining, Dredging, Sand Mining, Gravel Bar Skimming
8	Mining	The process or business of extracting ore or minerals from the earth's crust	Upland Mining, Hardrock Mining, Underground Mining, Surface Mining
9	Maritime Infrastructure	The physical structures involved in the operation of vessel traffic, including changes to the river channel for navigational purposes	Water Transportation, Maritime Facilities
10	Vessel Effects	The threats to salmonids associated with the operation of boats and ships.	Shipping Traffic, Boating, Recreation, Interference, Harassment, Snagging, Prop Scour
11	Forestry	Forestry is the use and management of forests for the production of lumber and other resources.	Forest Management, Logging, Timber, Timber Harvest
12	Urban Development	The increase in the proportion of the population residing in towns, cities or metropolitan areas and the landscape changes associated with increased human density	Built Up Land, Residential Development, Urbanization, Residential Development, Urban Growth
13	Agriculture	The practice of producing crops and cultivating the soil from a tract of land	Agricultural Practices, Agricultural Land, Farming
14	Livestock Management	The production or maintenance of animals for use or profit	Rangeland, Grazing, Husbandry
15	Wild Species Management	The management of undomesticated species for recreation, conservation or eradication	Warm Water Game Fish, Beavers
16	Climate Change	Changes to the variability or average measures of atmospheric conditions over ecological time scales to millions of years.	Global Warming

ID	Land Use/Activity:	Land Use/Activity Definition:	Included Categories:
17	Roads	A public or private open way and the associated infrastructure for travel or transportation	Railways, Highways, Access Roads

Life stage/Transition ID	Salmon Life Stage	Life Stage/Habitat
1	Spawners, Adults and Eggs	Conditions for successful spawning and egg deposition
2	Eggs	Conditions for successful development of eggs to hatching
3	Alevins/Yolk-sac fry	Conditions for survival and development to emergance
4	Fry	Conditions for survival and development to fingerling stage
5	Parr/Fingerlying	Conditions for survival and development to smolting
6	Smolts/Yearling	Conditions for survival and development to freshwater departure
7	Adults/Ocean	Ocean conditions for survival and growth of adults
8	Adults/Freshwater Migration	Conditions for survival of adults to spawning grounds

Land Use/Activity Name x Threats	Threats:	Ecological Concerns x Threats
Harvest	Commercial Harvest	Small population effects, Demographic Effects, Mechanical Injury
Harvest	Incidental Mortality Commercial Harvest	Small population effects, Demographic Effects, Mechanical Injury
Harvest	Sport Harvest	Small population effects, Demographic Effects, Mechanical Injury
Harvest	Catch and Release Mortality	Small population effects, Demographic Effects, Mechanical Injury
Harvest, Roads	Illegal Harvest	Small population effects, Demographic Effects, Mechanical Injury
Harvest	Research, Management or Monitoring Mortality	Small population effects, Mechanical Injury
Harvest	Prey Harvest	Food, Altered Prey Species Composition and Diversity
Salmonid Propagation, Harvest	Return of Hatchery Fish to Freshwater	HQ-Competition, Sediment Conditions, Reduced Genetic Adaptiveness, Small population effects
Salmonid Propagation	Release of Hatchery Fish to Freshwater	HQ-Competition, Food-Competition, Predation
Salmonid Propagation	Breeding Program Flaws	Reduced Genetic Adaptiveness, Small population effects, Predation
Salmonid Propagation	Hatchery Facilities	Injury and Mortality, Water Quality, Anthropogenic Barriers, Small population effects, Water Quantity
Salmonid Propagation	Broodstock Collection	Injury and Mortality, Small population effects
Change, Roads, Urban Development, Agriculture, Livestock Management	Altered Daily and Seasonal Flow Patterns	Composition and Diversity, Riparian Condition, Peripheral and Transitional Habitats, Bed and Channel Form, Sediment Conditions,
Forestry, Climate Change, Urban Development, Agriculture, Livestock Management	Reduced Water Quantity	Composition and Diversity, Riparian Condition, Peripheral and Transitional Habitats, Bed and Channel Form, Sediment Conditions,
Dams, Temporary Dams	Physical Barrier	Productivity, Altered Prey Species Composition and Diversity,Peripheral and Transitional Habitats, Channel Structure and
Dams, Temporary Dams	Impoundment Effects	Species Composition and Diversity, Floodplain Condition, Side Channel and Wetland Conditions, Water Quality, Decreased Water
Dams, Water Management	Water Releases	Temperature, Oxygen, Gas Saturation, Toxic Contaminants
Sediment Extraction, Mining, Maritime Infrastructure	Active mining and dredging	Mechanical Injury, Sediment Conditions, Channel Structure and Form, Turbidity, Toxic Contaminants, Riparian Condition
Sediment Extraction	Stockpiles and overburden captured during high flows	Channel Structure and Form, Sediment Conditions, Turbidity
Sediment Extraction	Gravel removal	Channel Structure and Form, Sediment Conditions, Riparian Condition
Sediment Extraction	Gravel Pits	Temperature, Predation, Altered Prey Species Composition and Diversity
Temporary Dams, Agriculture	Construction/Deconstruction of Temporary Dams	Riparian Condition, Temperature, Predation, Turbidity, Sediment Conditions
Salmonid Propagation, Urban Development, Agriculture, Livestock Management, Roads	Excess Nutrients	Oxygen, pH, Behavioral changes, Altered Primary Productivity, Altered Prey Species Composition and Diversity
Urban Development, Agriculture, Livestock Management	Diking	Species Composition and Diversity, Floodplain Condition, Side Channel and Wetland Conditions, Water Quality, Behavioral changes,
Urban Development, Agriculture, Livestock Management	Filling	Species Composition and Diversity, Side Channel and Wetland Conditions, Water Quality, Behavioral changes, Sediment Conditions,
Urban Development, Agriculture, Livestock Management	Surface Runoff	Water Quality, Sediment Conditions, Altered Flow Timing

Land Use/Activity Name x Threats	Threats:	Ecological Concerns x Threats
Maritime Infrastructure	Dredging	Water Quality, Sediment Conditions, Peripheral and Transitional Habitats
Maritime Infrastructure, Urban Development	Beach/shore line Alteration	Predation, Sediment Conditions, Food
Urban Development, Agriculture, Livestock Management, Maritime Infrastructure	Stream Bank/Channel Armoring	Sediment Conditions, Food, Channel Structure and Form, Floodplain Condition, Riparian Condition
Urban Development, Agriculture, Livestock Management	Water Diversions	Water Quantity, Sediment Conditions, Food, Channel Structure and Form, Floodplain Condition, Riparian Condition, Mechanical Injury
Urban Development, Maritime Infrastructure	Channel and Shore Structures	Sediment Conditions, Food, Channel Structure and Form, Predation, Esturary Conditions, Nearshore Conditions
Agriculture, Livestock Management	Tidal Gates	Anthropogenic Barriers, Food, Channel Structure and Form, Predation, Esturary Conditions
Urban Development, Maritime Infrastructure	Noise Pollution	Behavioral changes, Mechanical Injury
Livestock Management, Roads, Maritime Infrastructure	Non-Point Source Pollution	Toxic Contaminants, Contaminated Food, Pathogens, Altered Prey Species Composition and Diversity
Mining, Salmonid Propagation, Urban Development	Point Source Pollution	Toxic Contaminants, Contaminated Food, Pathogens, Altered Prey Species Composition and Diversity
Forestry, Roads	Earth Movement	Natural Barriers, Bed and Channel Form, Sediment Conditions, Water Quality
Urban Development, Forestry, Roads	Road Building	Toxic Contaminants, Contaminated Food, Sediment Conditions, Turbidity, Toxic Contaminants
Urban Development, Agriculture, Livestock Management, Roads, Maritime Infrastructure	Streamside Development	and Channel Form, Toxic Contaminants, Contaminated Food, Sediment Conditions, Turbidity, Toxic Contaminants, Water Quantity
Livestock Management	Riparian Grazing	Floodplain Condition, Riparian Condition, Food, Temperature, Bed and Channel Form, Sediment Conditions, Turbidity
Agriculture	Tilling	Sediment Conditions, Turbidity
Harvest	Technical Information, Authority or Inadequate Enforcement	Injury and Mortality
Management, Roads, Maritime Infrastructure, Sediment Extraction, Forestry (Historically)	Wood/instream Structure Removal	Floodplain Condition, Riparian Condition, Food, Temperature, Bed and Channel Form, Sediment Conditions, Turbidity
Maritime Infrastructure, Vessel Effects	Boat Interference	Mechanical Injury, Sediment Conditions, Behavioral changes
Vessel Effects	Boat Wakes	Mechanical Injury, Sediment Conditions, Behavioral changes
Wild Species Management, Urban Development, Agriculture	Beaver Removal	Floodplain Condition, Riparian Condition, Food, Temperature, Bed and Channel Form, Sediment Conditions, Turbidity
Wild Species Management	Managed Game Fish	Predation, Food-Competition, Altered Prey Species Composition and Diversity
Wild Species Management, Maritime Infrastructure	ESA Protected Predators	Predation, Altered Prey Species Composition and Diversity
Wild Species Management, Urban Development, Agriculture, Sediment Extraction, Maritime Infrastructure	Native Predators	Predation, Altered Prey Species Composition and Diversity
Maritime Infrastructure, Vessel Effects	Invasive Species	Predation, Pathogens, Food, Estuary Conditions
Salmonid Propagation, Wild Species Management	Disease Transfer	Pathogens
Climate Change	Ocean Productivity	Predation, Food-Competition, Altered Prey Species Composition and Diversity
Climate Change	Pervasive Temperature Changes	Peripheral and Tansitional Habitats, Channel Structure and Form, Sediment Conditions, Water Quality, Water Quantity, Behavioral

Land Use/Activity Name x Threats	Threats:	Ecological Concerns x Threats
Climate Change	Sea level Rise	Esturary Conditions, Nearshore Conditions, Food, Predation