



SUSITNA-WATANA HYDRO

12-09-14 SuWa Fish Passage Technical Team Design Team Meeting

**Downstream Collector Component Organization for Anadromous Salmon
based on the Brainstorm Concepts Tally presented at FPTT Mtg#5**

Categories:

1 - Tributary Based (not influenced by the reservoir)

2 - Reservoir Collector

a. Head of reservoir

b. Body of reservoir

3 - Dam Based

Secondary Considerations for Other Species

Rely on salmon Collector

Supplemental Devices

- Tributaries

- Reservoir

- Dam



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Brainstorm Components List: Priority 1 & 2							
Location/Technology	#	Priority		Component Category	Feature	System	Other Species
Tributaries	119	1	Kosina & Oshetna	1			
Head of reservoir: above high pool upstream of Oshetna	121	1	~PRM 235.3	1			
Head of reservoir: above high pool downstream of Oshetna	122	1	~PRM 234	1			
Tributaries and Upper Mainstem Susitna	123	1	Combination of #119 and #121	1			
Temporary portable trap Screw trap/inclined plane/fyke	127	1	For tributary locations, component of larger system and guidance elements to increase efficiency. CONSIDER FOR USE DURING CONSTRUCTION.	1		X	
Off-channel with weir/rubber dam	130	1	Exclusionary (NOAA criteria) and directs fish and flow to bypass screen. Tributary collection style/type.	1		X	
Off-channel with weir/rubber dam with FCA (farmers...) screen/Coanda	131	2	Exclusionary which directs fish and flow to a FCA or coanda screen.	1		X	
Head of reservoir: below low pool	124	1	~PRM 222. As far upstream as possible.	2b			
Reservoir below Kosina/ mid-reservoir	125	1		2b			
Merwin-type trap in reservoir	128	1	Net pen with guide nets, floating deck, reservoir/low-velocity locations. CONSIDER FOR USE DURING CONSTRUCTION.	2b		X	
Picket rack	129	1	In channel, with upstream and downstream collection boxes. Suitable for smaller streams. CONSIDER FOR USE DURING CONSTRUCTION.	2b	X		
Two-vessel trawl in reservoir	172	1		2b		X	
Nature-like channel	168	2	Kwoiek project listed as example in brainstorm list - channel from tribs to dam along reservoir? (I'm not sure about this one) - move to deferred?	2b		X	
Moveable in reservoir	126	1	For placement anywhere in reservoir	2a, 2b			
Collection tower, in Reservoir near tribs	136	1	Fixed concrete tower, requires power, multiple fixed ports or movable screens.	2a, 2b		X	
Coffer dam remnant use	156	1	Coffer dam utilized as a potential base of a structure. Used for burbot , upstream cofferdam.	3	X		X
Movable screen inside tower - at Dam with or without pumps	137	1	Traditional screen inside tower near dam, movable screens to track water surface.	3		X	
Partial screen collector	139	1	Columbia River SBS, STS, etc. Turbine based or cone valve based	3		X	
Turbine passage/ cone valves	144	1	High head so likely very low survival. Baseline if nothing else is done.	3		X	

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Modification of existing spillway	147	1	This will requires a safe route downstream and needs to accommodate a fluctuating pool. Notched feature.	3		X	
Dedicated spillway feature	148	1	This will requires a safe route downstream and needs to accommodate a fluctuating pool. Design will consist of a 30 percent slope down face of dam with multiple intake ports in pool. No screening involved.	3	X		
Surface flow outlet/Corner collector	149	1	Could be full flow unscreened source or fully screened. Fixed height.	3		X	
Turbine intake screen collection	150	1	Similar to #141 and 139.	3		X	
Cycling lock (low level pressurization chamber)	151	1	Conduit under dam with gates at both ends for benthic species. Not standalone for salmon species. Downstream Migrant Lock	3		X	X
Simulated Wells intakes	153	1	Location above turbine, can be combined with many elements. Uses bulk flow towards intake (turbines near intake). Entrance type for collection system. Form of Surface Flow Outlet (SFO). Vertical slot collection device.	3		X	
Floating ice/trash sluiceway	154	1	Could be positioned over intake or spillway. Higher flows, surface water, dewatering screens or not.	3		X	
Rearrange intake location	158	1	Slide intakes towards left bank with diagonal penstocks to current powerhouse location. Move spillway-cone valve inlets near turbine outlets to maximize bulk flow. Example of #148. put intakes in corner.	3	X		
MIS/Eicher screen	142	2	Passage flow is pressurized in a conduit.	3	X		
Screened facility	132	1	Screens in river, assuming exclusionary screening. Tributary. Ice, debris concerns.	all	X		
Louvers	133	Supplemental (1)	In tributaries, could be combined with other facility. Off channel use. Use at dam. More guidance than exclusionary. Doesn't meet NMFS criteria. Mayfield Dam, Holyoke MA, Seton Dam, trib of Frazier River BC (~10 yrs ago), Skinner & Tracy in CA.	all	X		
Floating surface collector	138	1	FSC – often has guide nets in reservoir to assist in directing fish to collector. ice concerns - low/high pool issues	all		X	
High velocity screens	141	1	Do not comply with NMFS criteria for fish screens. Smolt screens, not for fry, 0.8 fps	all	X		
Conventional screen	143	1	Low velocity, NOAA criteria screens	all	X		



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Brainstorm Components List: Deferred, Supplemental, & Features							
Location/Technology	#	Priority		Component Category	Feature	System	Other Species
Floating Guide walls/curtains in forebay	155	Supplemental		3	X		
Guidance circulation	160	Supplemental	Induced flow, B2 powerhouse corner collector, turbulence signature.	3			
Guide nets	161	Supplemental	Duplicate to 134	3	X		
Simulated lake outlet	162	Supplemental	Baker FSC, RSW's in Columbia. Velocity, shape, acceleration, substrate/texture.	3	X		
Modified valves or dedicated fish turbine	163	Supplemental	Use cone valve discharge to drive collector. Function of frequency, need flow conveyance. Consider use of valve for collector, dedicated or supplement for flow when flow being bypassed anyway.	3	X		
Associated sampling/sorting facilities	174	Supplemental		1, 3	X		
Modified operations for passage – pool level modification	145	Supplemental		2b			
Shoreline alteration to shape flow	159	Supplemental		2b			
Guide nets/Barrier nets	134	Supplemental		2b, 3	X		
Behavioral guidance (strobe, noise, bubbles, turbulence)	135	Supplemental		all	X		
Small turbine-like shallow intake Surface collector to attract and pass	171	Feature	Cowlitz Falls North Shore Collector. Multi port collector, CleElum concept by USBR.	3	X		
Sluice tunnel through dam	173	Feature	Conveyance piece of burbot passage. Could be standalone for deep species.	3	X		
Full flow vs partial flow (screening)	164	Feature	Feature. Removable Spillway Weir (RSW) on Columbia vs. STS/SBS (partial). Using full collection flow to convey fish to tailrace vs dewatering.	1, 3	X		
Continuous vs discrete batch	165	Feature	Bypass running all the time, vs. haul (lock/tram/helicopter/truck, etc.). Two categories.	1, 3	X		
Truck/boat/float plane/tram/heli	166	Feature	Conveyance means.	2a, 2b	X		
Channel/pipe or trough around dam	167	Feature	Continuous, what you put it in. Clackamas pipeline, Green Peter, B2 Corner collector, bypass at many dams.	2b	X		



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Location/Technology	#	Priority		Component Category	Feature	System	Other Species
Fish friendly turbines	140	Defer	High head of this dam is a fatal flaw				
Spillway passage	146	Defer	Fatal flaw is that the spillway not used regularly.				
Decompression raceway	152	Defer	Experimental technology, not tested, concern for debris, difficult access if something goes wrong.				
Rearrange dam axis	157	Defer	Fatal flaw is that it is structurally challenging for foundation needs. Outside scope of study. Other means may accomplish same goal, such as guidance devices.				
Tributary channel	169	Defer	Release into a tributary downstream, and allow them to move volitionally. Could imprint on non-natal tributary.				
Traveling or fixed bar screens	170	Deleted (Moved to Defer)	Redundant with other features				