

# PACIFICORP – Swift Floating Surface Collector and Downstream Passage Design

Swift FSC Design Criteria and Evaluation / Response Adjustments and Modifications

January 31, 2007

Note: **Importance** is a qualitative designation of probability and/or consequence of the evaluated item being an issue for collection.

Criteria, Guideline, or Concept Value	Design Value	Importance (N,L,M,H)	Notes	Potential Adjustments	Potential Modifications
<b>Swift FSC Entrance Criteria</b>					
Collection Depth	37.5 ft or 20.0 ft	M	37.5 ft is with the collection enhancement structure (CES) installed. Without the CES the depth of the FSC entrance is 20 ft.	Adjust CES deeper with same width, narrower width or different shape treatments	Add net to extend deeper
Collection Width	30 ft or 14.5 ft	M	30 ft is with the CES installed. Without the CES the width of the FSC entrance would be 14.5 feet.	Adjust CES wider with same depth, shallower or different shape treatments Add guidance nets	Enlarge guidance nets

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Collection Velocity	100%-200% of ambient velocity or minimum of 0.25 fps	M	The CES may need to be removed at lower reservoir levels to obtain an entrance velocity greater than the ambient velocity.	Increase FSC flow. (This could be accomplished by changing out the primary pump impellers and/or including additional primary pumps in the initial FSC design.)  Add turbulence inducers in the vicinity of the entrance to lead fish into the entrance  Adjust CES narrower and/or shallower, or different shape treatments  Add guidance nets  Add new module to increase FSC flow to 900 cfs.	Enlarge guidance nets  Increase FSC flow to above 900 cfs
Lighting	Maintain Ambient Conditions	L		Add overhead or floating shading structures	Add artificial lighting

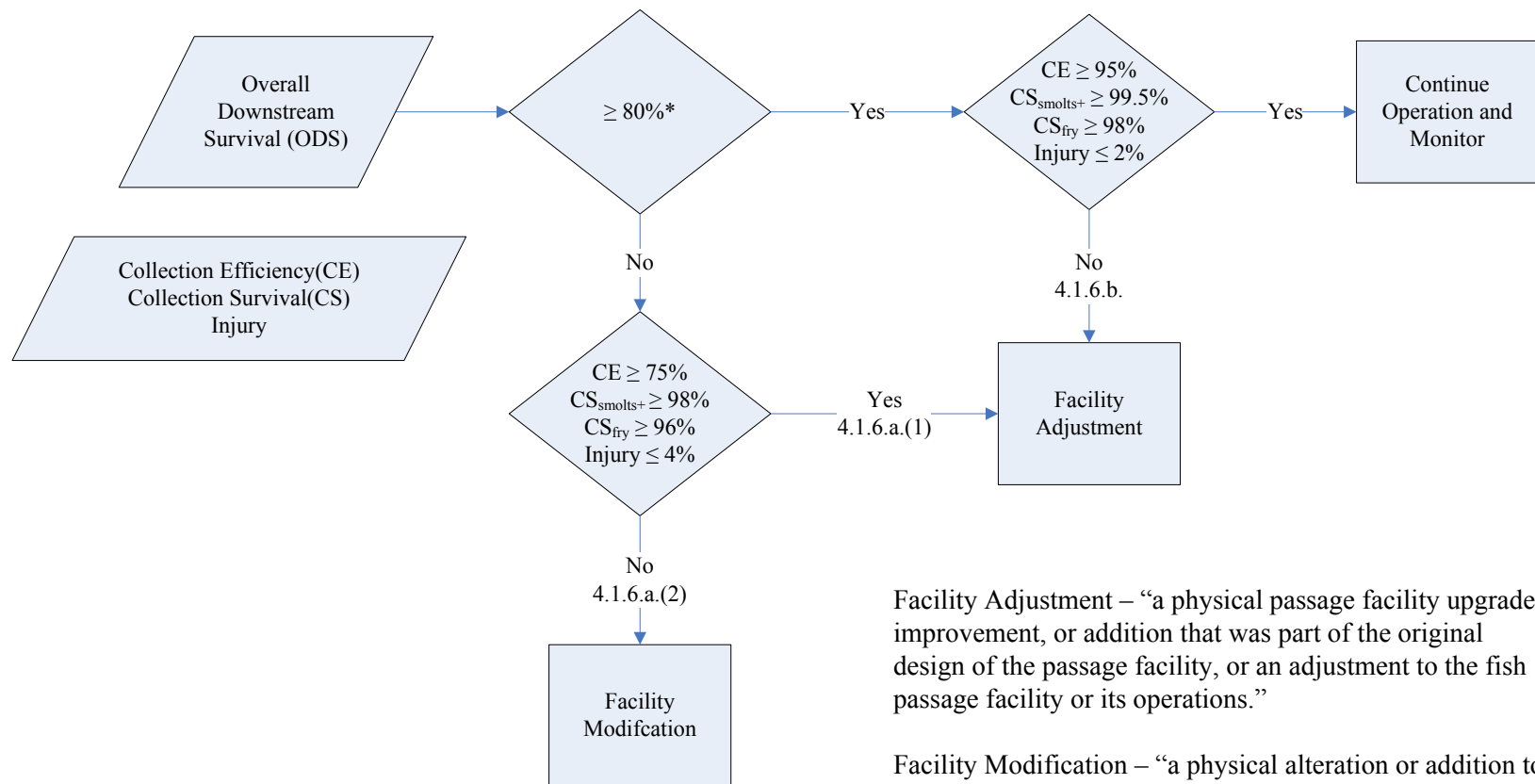
<b>Criteria, Guideline, or Concept Value</b>	<b>Design Value</b>	<b>Importance (N,L,M,H)</b>	<b>Notes</b>	<b>Potential Adjustments</b>	<b>Potential Modifications</b>
Maximum FSC Entrance Flow	600 cfs	H		Evaluate increased entrance flow. ( <i>See Collection Velocity Initial Adjustments</i> ) Add new module to increase FSC flow to 900 cfs. Add guidance devices	Increase FSC flow to above 900 cfs Enlarge guidance nets
Potential Expanded Entrance Flow	900 cfs	H		<i>see Maximum FSC Entrance Flow</i>	
Discharge Exit Velocity		L	_-inch spacing for discharge bar racks		
Discharge Flow Patterns	Create flow patterns that facilitate collection	H		Adjust the discharge gate settings (i.e. partially or fully closing select discharge gates to redistribute the discharge flow) Add exhaust manifolds or additional diffusers to modify the hydraulics of the FSC discharge based on site specific biological and hydraulic data and analysis	

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<b>Swift FSC Screen Criteria</b>					
Screen Approach Velocity	0.4 fps	N	Approach velocities may exceed 0.4 fps over isolated screen sections during tests of higher entrance flows or capture velocities.		
Uniform Approach Velocity	Nearly Uniform Distribution	N	Adjust baffles or pump operation for better distribution as part of startup	Modify baffles adjustment or pump operation for alternate distribution	
Minimum Sweeping Velocity	Greater than screen approach velocity	N			
Maximum Screen Exposure Time	<60 seconds	N	Assumes fish travel past the screen face at the speed of the sweeping velocity.		
Slotted Screen Opening Size	1.75 mm	N			

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Round-Hole Perforated Plate Opening Size	3/32-inch Diameter	N			
Screen Material	Corrosion Resistant	M	Stainless steel screens material may deter fish. Consider alternatives such as plastic traveling screens or etching to reduce brightness and reflection.		
Screen Cleaning	Automatic Screen Cleaning	L			
<b>Swift FSC Fish Transport Channel Criteria</b>					
Maximum Rate of Velocity Increase	0.2 fps/ft	L	Flow shall not decelerate upstream of the capture location	Adjust baffles to vary the rate of velocity increase	Modify secondary screening channel
Maximum Channel Velocity	7 to 8 fps	M	Actual capture should occur upstream of this maximum velocity point		Modify secondary screening channel

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Minimum Capture Width	2.25 ft	H			Modify secondary screening channel
Minimum Capture Depth	Dependant on the capture velocity	H	Minimum depth adequate to maintain subcritical flow through the channel		Modify secondary screening channel
Minimum Channel Depth	9 inches	M	Minimum depth after capture.		
Minimum Channel Width	15 inches	L	Minimum width downstream of capture		
Ratio of Centerline Bend Radius to Conduit Width	Greater than 5	L			
Avoid Hydraulic Jumps	Maximum Froude Number = 0.8	L			

## Adjustments or Modifications to Passage Facilities Section 4.1.6 of Lewis River Settlement Agreement



Facility Adjustment – “a physical passage facility upgrade, improvement, or addition that was part of the original design of the passage facility, or an adjustment to the fish passage facility or its operations.”

Facility Modification – “a physical alteration or addition to a fish passage facility that requires a new design.”

\* 80% before Yale Downstream Facility available and  
≥ 75% after Yale Downstream Facility available (4.1.4.A.)

+ Bull Trout and Cutthroat Trout have the same CS  
requirements as smolts.