

ODFW & NMFS Fish Passage Criteria

	NMFS	ODFW
Fish Passage Design Flows	95%-5%	95%-5%
Fishway Attraction Flow	> 5-10% of stream flow	no criteria- see NMFS
<b>Fishway Entrance Hydraulic Drop</b>	<b>1.0-1.5 ' </b>	<b>1.0' for adult salmon/steelhead ; .5' for other species/lifestages</b>
Transport Channel Velocity	1.5-4.0 fps	1-2 fps
<b>Minimum Depth/ pool dimension Requirements</b>	<b>8'L x 6'w x 5' deep (5' deep x 4 wide in transport channels) ; min. 1.0' depth over weirs</b>	<b>1.0' for adult salmon/steelhead ; .5' for other species/lifestages; min. 2.0' below any location where fish are required to jump. ODFW does not have pool dimension requirements, rather bases pool dimensions on EDF and fish size/crowding</b>
<b>Maximum Hydraulic Drop (jump height)</b>	<b>1.0' for adults, .5' for juveniles</b>	<b>1.0' for adult salmon/steelhead ; .5' for other species/lifestages; 0.0' for <i>Catostomus sp.</i> , Sturgeon, Chum Salmon</b>
Turning Pools	Double flow path of typical pool	Double flow path of typical pool
Trash Rack Bar Spacing	10" if adult chinook present, 8" in all other cases	10" if adult chinook present, 9" in other cases, 4" if only juveniles
Energy Dissipation Criteria	Max 4 ft/lbs; should be 2 ft/lbs for juveniles	Max 4 ft/lbs
Baffled Chute Fishways (denils, steepasses)	Min. Depth 2.0' for denil, 1.5' for steepass	Min Depth 2.0', max 25' length between resting pools
Roughened Channels	Max 150' long, max 6% slope, 1.0' depth minimum for adult passage	either stream simulation or meet hydraulic fish passage criteria (see above velocities and jump heights, depth)
<b>Juvenile Fish Passage</b>	<b>.5' max hydraulic drop, or fishway should be pool&amp;chute or roughened channel w/ max hydraulic jumps .7-1.0' velocities for swimming less than 1 foot 1.5-4.5 fps (dependant on size of juv. Fish)</b>	<b>.5' max hydraulic drop, 2.0 fps max, .5' of depth minimum (for both juveniles and resident species, with exception to suckers, chum, sturgeon, and lamprey</b>
<b>Culverts:</b>		
Stream Simulation	> bankfull width	>/= Active Channel Width
<b>Hydraulic Method</b>	<b>Dependant on culvert length and species/lifestage: 2-6 fps, except 2-5 fps when pink and chum are present; 1 fps for juveniles. 1.0' max hydraulic drop, except .5' for juveniles</b>	<b>Max 1.0 hydraulic drop if only adult salmon/steelehad present. .5' in all other cases. Max 2 fps velocities. Min. 1 ft depth for adults, min .5 ft depth if juveniles present</b>
Embedment	20%-40%	20%-50%

Minimum Clearance to culvert ceiling	6 feet from bed to ceiling	3 feet from active channel width water surface elevation to ceiling
--------------------------------------	----------------------------	---