Mill Creek Fish Passage

"I never thought I would ever see it happen...."

PACIFIC NORTHWEST FISH SCREENING AND PASSAGE WORKSHOP

September 17, 2019



Brian Burns Executive Director Tri-State Steelheaders Salmon Enhancement Group

Mill Creek Watershed Walla Walla County, WA



Mill Creek Flood Control Channel – Brief History

Mill Creek flood control channel was constructed following flooding in the town's early days. Completed by Corps in 1948, and turned over to the Walla Walla Flood Control Zone District.



Mill Creek Flood Control Channel – Brief History



Flood of 1931, prior to construction of flood control channel.

Approx. 6,000 cfs peak flow both events.

Flood of 1996, showing flow in the flood control channel.



Two Channel Types







Mill Creek Channel Types



Mill Creek Passage Perspective

Fish Resources

- Summer Steelhead threatened
- Bull Trout threatened
- Spring Chinook reintroduced

Upper Mill Creek

- Good to pristine habitat over 40 miles
- Underutilized for salmonid production

Salmon Recovery

- Snake River Salmon Recovery Plan
- Spatial structure (distribution) part of recovery criteria
- De-listing of steelhead
- Sustainable fisheries





Mill Creek Work Group

Managers, cooperators, and implementers with interests in Mill Creek water resources

US Army Corps of Engineers City of Walla Walla Walla Walla County (including Public Works) Walla Walla County Conservation District US Fish & Wildlife Service National Marine Fisheries Service Confederated Tribes of the Umatilla Indian Reservation Washington State Dept. of Fish & Wildlife Washington Dept. of Ecology Walla Walla Community College Gardena Farms Irrigation District Snake River Salmon Recovery Board Walla Walla Water Management Partnership Kooskooskie Commons Tri-State Steelheaders (RFEG)

Mill Creek Fish Passage Assessment

Analyzed passage using hydraulic model & energetics model

At a range of flows

For the three salmonid species – adults and juveniles

Design Parameters:

Species	Steelhead	Chinook	Bull Trout				
Migration Timing	Jan - May	May - June	March – July				
10 / 90% exceedence flows (cfs)	320 / 36	148 / 10	194 / 36				
50% exceedence flow (cfs)	92 cfs						
10 / 90 percentile fish sizes (inches)	22 / 30	24 / 29	7 / 17				

Passage Assessment Results

Hydraulic and energetics models used together to describe fish passage

Reach	Steelhead	Chinook	Bull Trout	Average
5	33%	40%	0%	24%
7	33%	40%	0%	24%
8	39%	42%	4%	28%
2	44%	43%	0%	29%
9	47%	50%	0%	32%
12	37%	30%	31%	33%
6	59%	50%	0%	36%
3	60%	50%	0%	37%
4	60%	50%	0%	37%
10	68%	67%	0%	45%
11	69%	70%	39%	59%
1	<u>59%</u>	42%	<u>89%</u>	<u>63%</u>
Ave	51%	48%	14%	37%

Mill Creek Fish Passability Summary																		
	6 cfs		20 cfs		60 cfs		100 cfs			200 cfs			400 cfs					
Reach	n St	Ch	вт	St	Ch	BT	St	Ch	BT	St	Ch	BT	St	Ch	BT	St	Ch	BT
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		

Passage Assessment Results

Every reach type has a barrier at some flow There are barriers somewhere at any flow

Sills

Depth over sills – low flow problem

No problem at high flow

Flume

Depth problem - low flow

Velocity problem and stamina failure - high flow

Progress & 'Design Paths'



Progress & 'Design Paths'



Sills Passage Construction







Sills Passage Construction



Progress & 'Design Paths'



Physical Model Study

Constructed and tested by Northwest Hydraulic Consultants in Seatac

- 50 foot long model
- 1:8 scale of a typical section of flume
- Detailed velocity and depth measurements throughout model
- Allows for opportunity to try various tweaks to design
- Results factor into final passage designs



Physical Model Study

Dye test at 194 cfs – resting pool shown



Physical Model Study

Dye test at 92 cfs – surface roughness, resting pool, plunge pool shown







Mill Creek Passage Implementation

Model Results Showing Velocity Reduction



Mill Creek Fish Passage Energetics Modelling



Mill Creek Fish Passage Energetics Modelling



Flume Transition Construction 9th Avenue



Flume Transition Construction Roosevelt Street



Flume Transition Construction Roosevelt Street



Mill Creek Passage Implementation

Reach Type 6

Selected due to location near mid-channel, and flat overbank channel type.







Mill Creek Fish Passage – 9th Ave Extension

De-watered channel (left), preparation for panels (right).





Mill Creek Fish Passage – 9th Ave Extension

Placement of panels (left), and poured in place concrete (right).





Mill Creek Fish Passage – 9th Ave Extension Completed project



Mill Creek Fish Passage Completed and Proposed Work



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