

# LOWER LAKE CREEK FISH PASSAGE ASSESSMENT

Presented to  
Packwood Lake Aquatics Subcommittee  
January 10-11, 2008

## Objectives

- Determine if Lower Lake Creek (below the Highway 12 Bridge) meets passage criteria for:
  - Chinook Salmon
  - Coho Salmon
  - Steelhead Trout
  - Sea-run Cutthroat Trout
  - Rainbow Trout

## Objectives (cont'd)

- Analysis of flows, as measured at Study Site 1, from:
  - 19 – 57 cfs
- As measured at:
  - Transects 1 – 4, Study Site 1 (RM 0.0 – 0.3)

## Methods

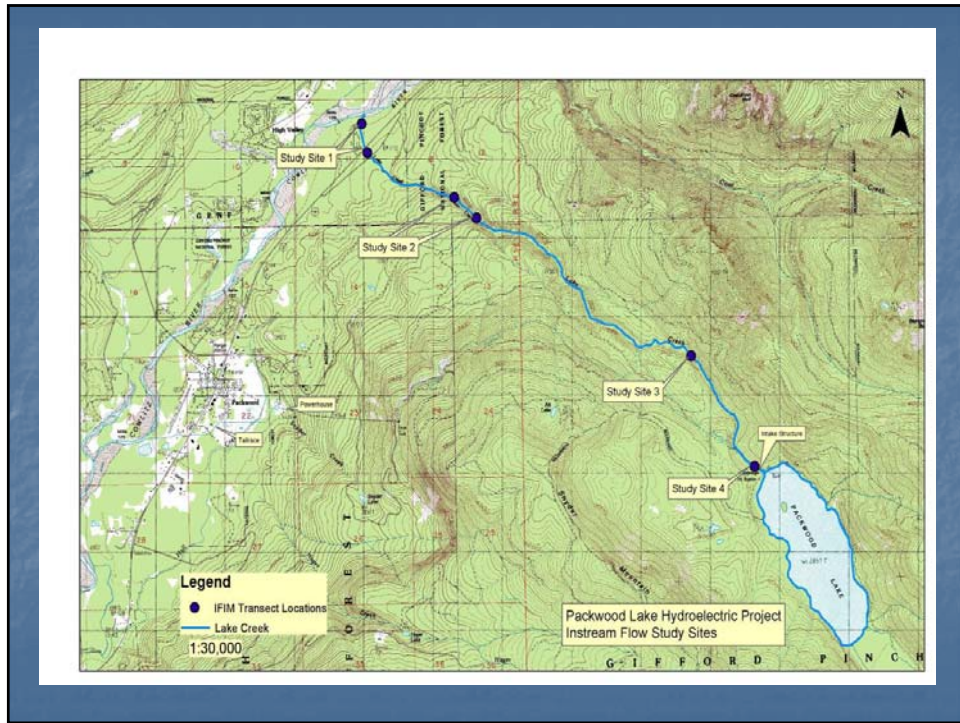
- Energy Northwest Used the “Oregon Method” as per Thompson (1972)
  - Used to determine passage for salmon and trout
  - Used throughout the Northwest
  - Used to determine passage at Peshastin Creek (Wenatchee River tributary) in 2007.

## Oregon Method

- Thompson's Minimum Depth Recommendations:
  - Salmon – 0.8 ft
  - Large Trout – 0.6 ft
- Width Criteria:
  - 25% of the Wetted Width
  - 10% Contiguous Width

## Field Measurements

- Taken from the Instream Flow Study conducted for Lake Creek
  - 4 stage/discharge measurements taken
  - Bed profile developed from surveying
  - Data derived from RHABSIM program
- MEASUREMENTS ARE FOR NON-TRANSFORMED TRANSECTS FROM IFIM STUDY; ARE NOT ENHANCED



### Final Transect Weighting for Study Site 1 (from EES Consulting 2007)

Transect	Transect Description
1	Glide
2	Run
3	Low Gradient Cascade/Run
4	Plunge Pool Tailout

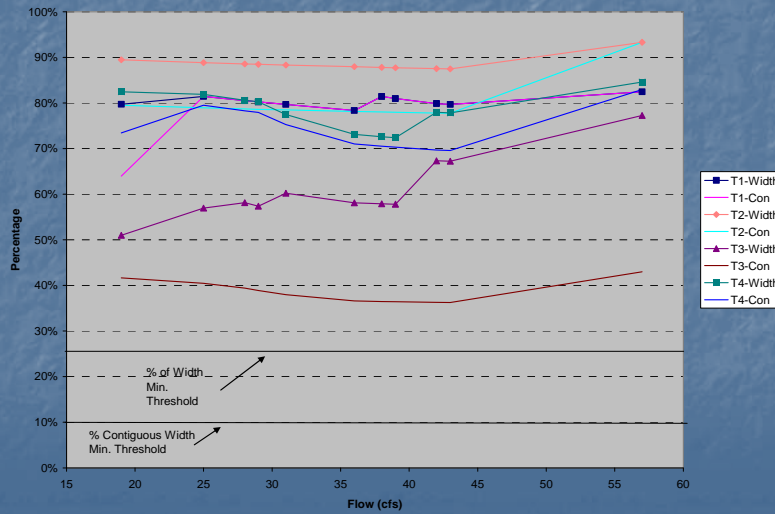
## RESULTS

- Trout (0.6 ft):
  - Criteria of 25% of total width was met at all flows analyzed
    - 51% at Transect 3 (19 cfs) to 93% at Transect 2 (57 cfs)
  - Criteria of 10% contiguous width was also met on all transects at all flows examined.
    - 36% at Transect 3 (38 - 43 cfs) to 93% at Transect 2 (57 cfs).

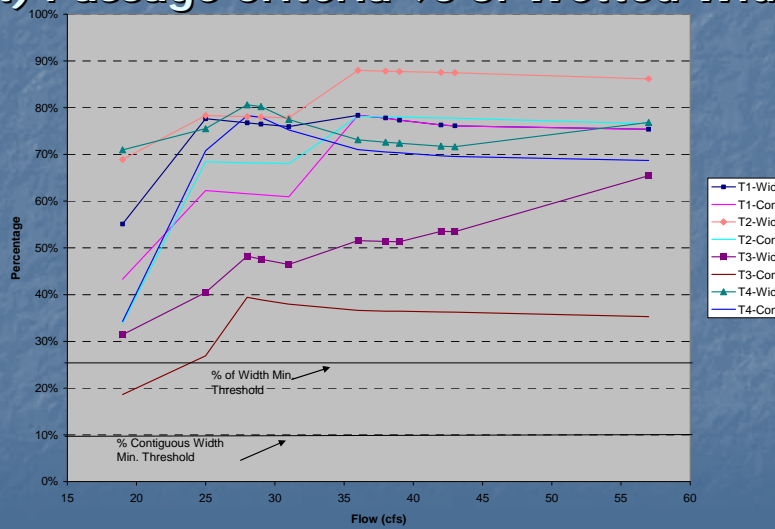
## RESULTS, cont'd

- Salmon (0.8 ft):
  - Criteria of 25% of total width was met at all flows analyzed
    - 31% at Transect 3 (19 cfs) to 88% at Transect 2 (36 - 42 cfs)
  - Criteria of 10% contiguous width was also met on all transects at all flows examined.
    - 19% at Transect 3 (19 cfs) to 78% at Transect 1 (36 - 38 cfs), Transect 2 (36 - 43 cfs) and Transect 4 (28 - 29 cfs)

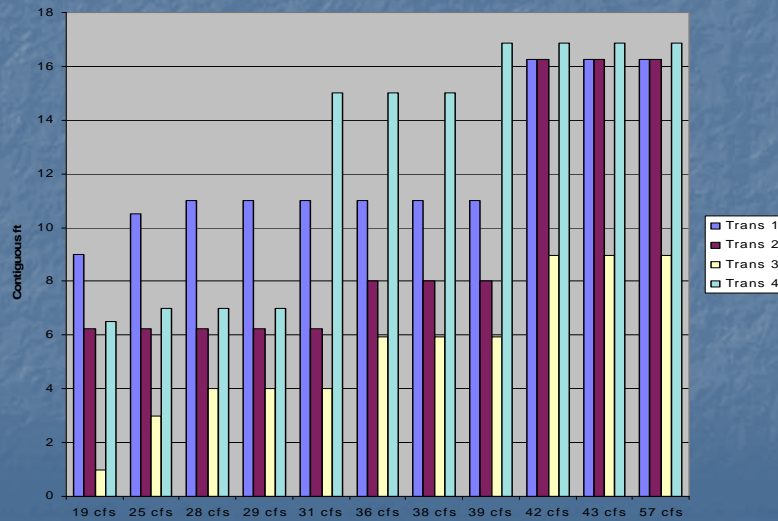
## Lower Lake Creek Trout Depth (0.6 ft) Passage Criteria % of Wetted Width



## Lower Lake Creek Salmon Depth (0.8 ft) Passage Criteria % of Wetted Width



## Contiguous width using 1 ft depth criteria



## Conclusions

- Using Thompson's methods, all transects meet depth and wetted width criteria for all flows analyzed for existing transects
- Using agency recommendation of 1.0 ft depth and 3 ft contiguous, all flows and transects meet criteria with the exception of Transect 3, 19 cfs.

## Conclusions, cont'd

- The *current condition* was modeled for Transects 1 – 4, Study Site 1.
- Enhanced transects could reflect residual depths to meet agency criteria.