Fish Habitat Status in the Upper Columbia

S. Fortney[1] & M. Ward[1]

Objective: summarize fish habitat data at various spatial scales

Utilize CHaMP data collected during 2011 and 2012 pilot field seasons

**Four examples of ways to display fish habitat status:**

- **Fish-Habitat Modeling**

  - Display several metrics at 3 spatial scales (site, assessment unit, watershed)

- **Expert Panel**

  - Display one metric for multiple assessment units in one watershed

- **IMW & science-based restoration project planning**

  - Display channel complexity metrics for the Entiat watershed

- **BiOp check in/recovery planning**

  - Comparison of 4 metrics across three watersheds in the Upper Columbia

[1] Terraqua Consulting

Fish Habitat Modeling (watershed scale)

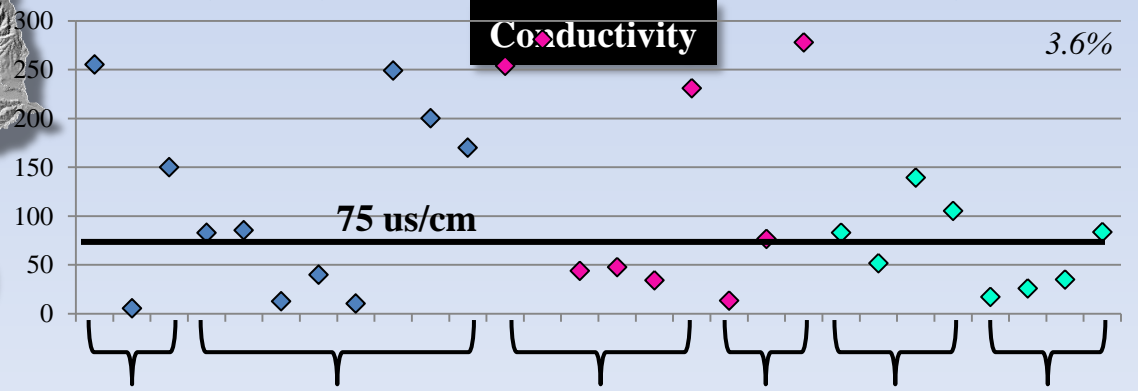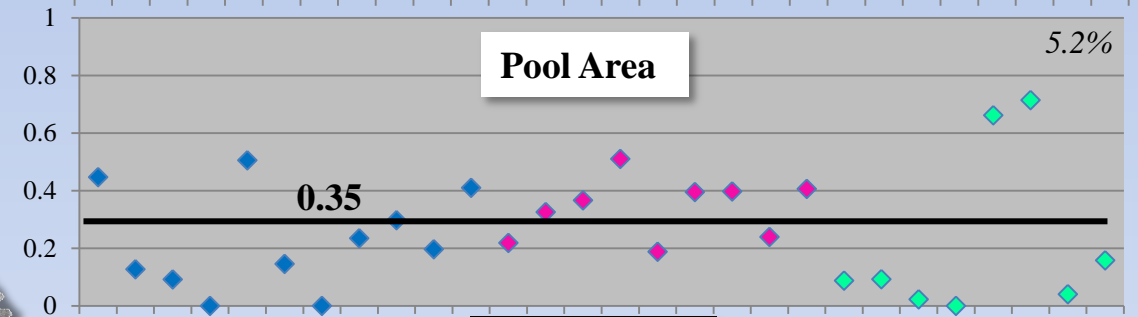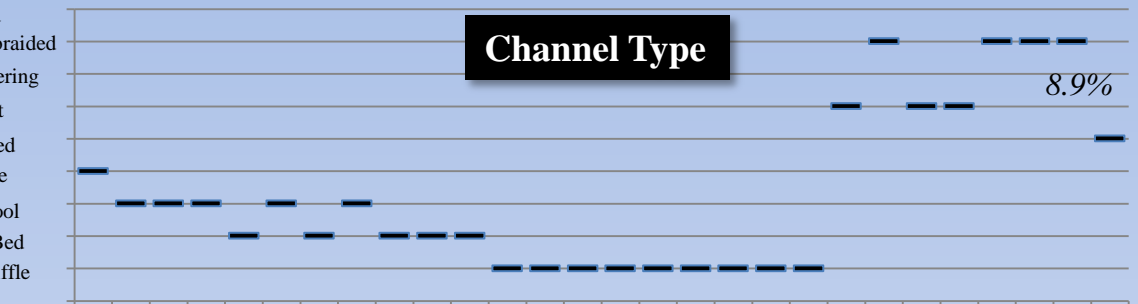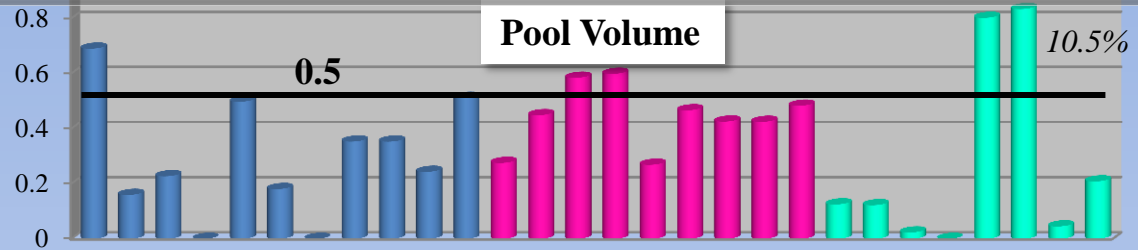## Wenatchee River watershed

transport
source
depositional

Braided
Island-braided
Meandering
Straight
Confined
Cascade
Step-Pool
Plane-Bed
Pool Riffle

Pool Volume — *10.5%*

0.5

Channel Type — *8.9%*

Pool Area — *5.2%*

0.35

Conductivity — *3.6%*

75 us/cm
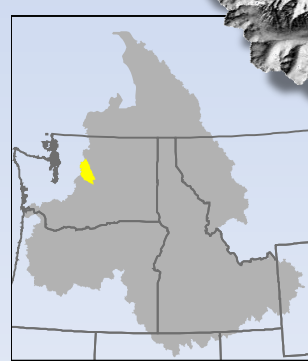
Source-Private | Source-Public | Transport Private | Transport Public | Depositional Private | Depositional Public

0   5   10   20 Kilometers

Fish Habitat Modeling (assessment unit scale)

Chiwawa HUC5 (1702001103)

transport
source
depositional
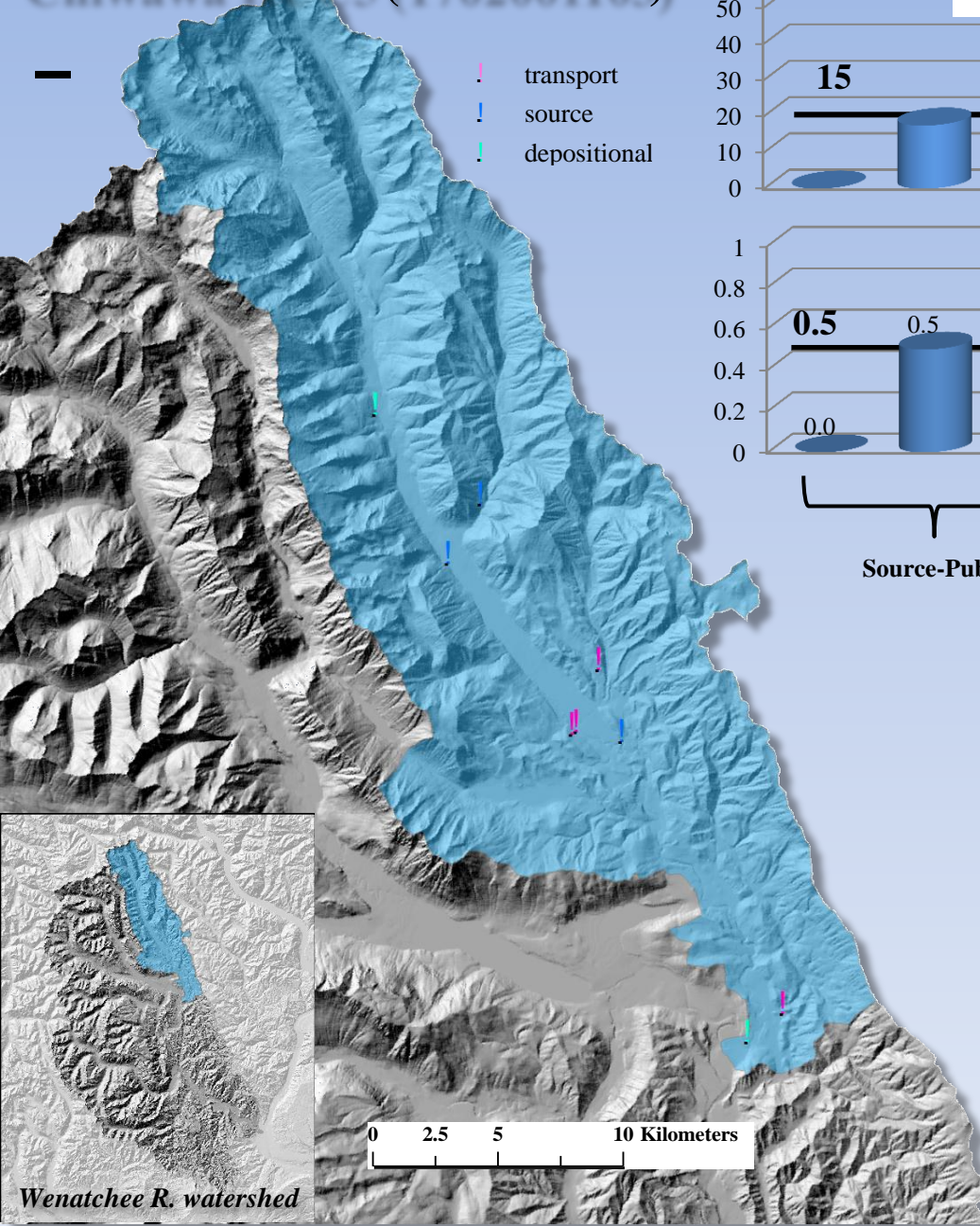
Bankfull Large Wood Volume in Pools

15

Pool volume

0.5

| | 0.0 | 0.5 | 0.0 | 0.6 | 0.3 | 0.5 | 0.4 | 0.0 | 0.8 |

Source-Public

Transport Private

Transport Public

Depositional Private

Depositional Public

channel units (% area) n=9

86

12

1

- pool
- fast turb
- fast nonturb

0   2.5   5   10 Kilometers

Wenatchee R. watershed
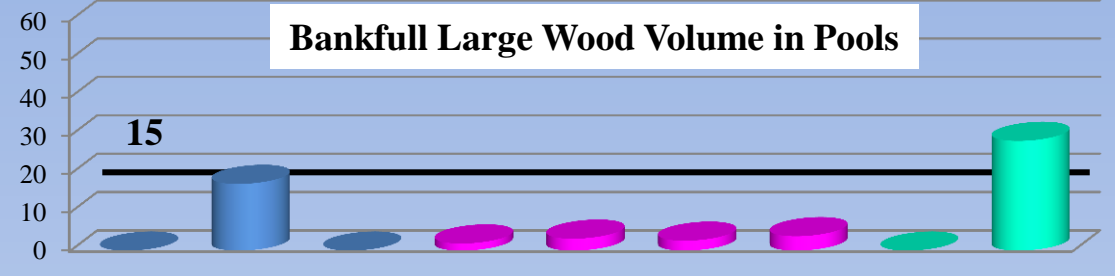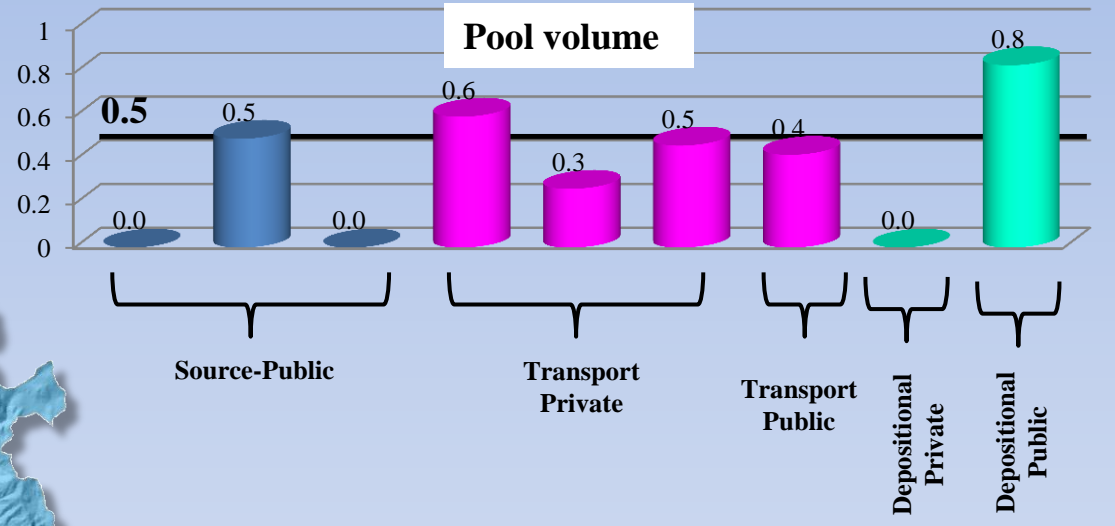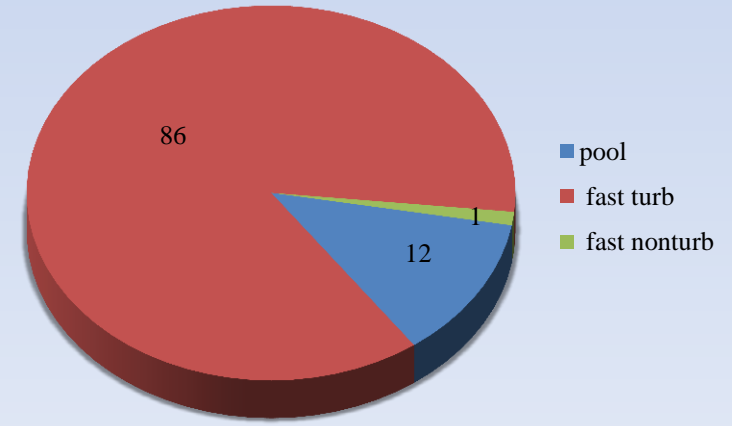
Fish Habitat Modeling (site scale)

Rock Creek — 0 5 10 20 Meters

Chikamin Creek — 0 5 10 20 Meters

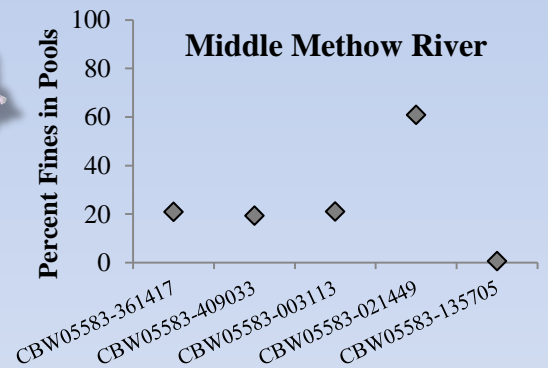Chiwawa River — 0 25 50 100 Meters

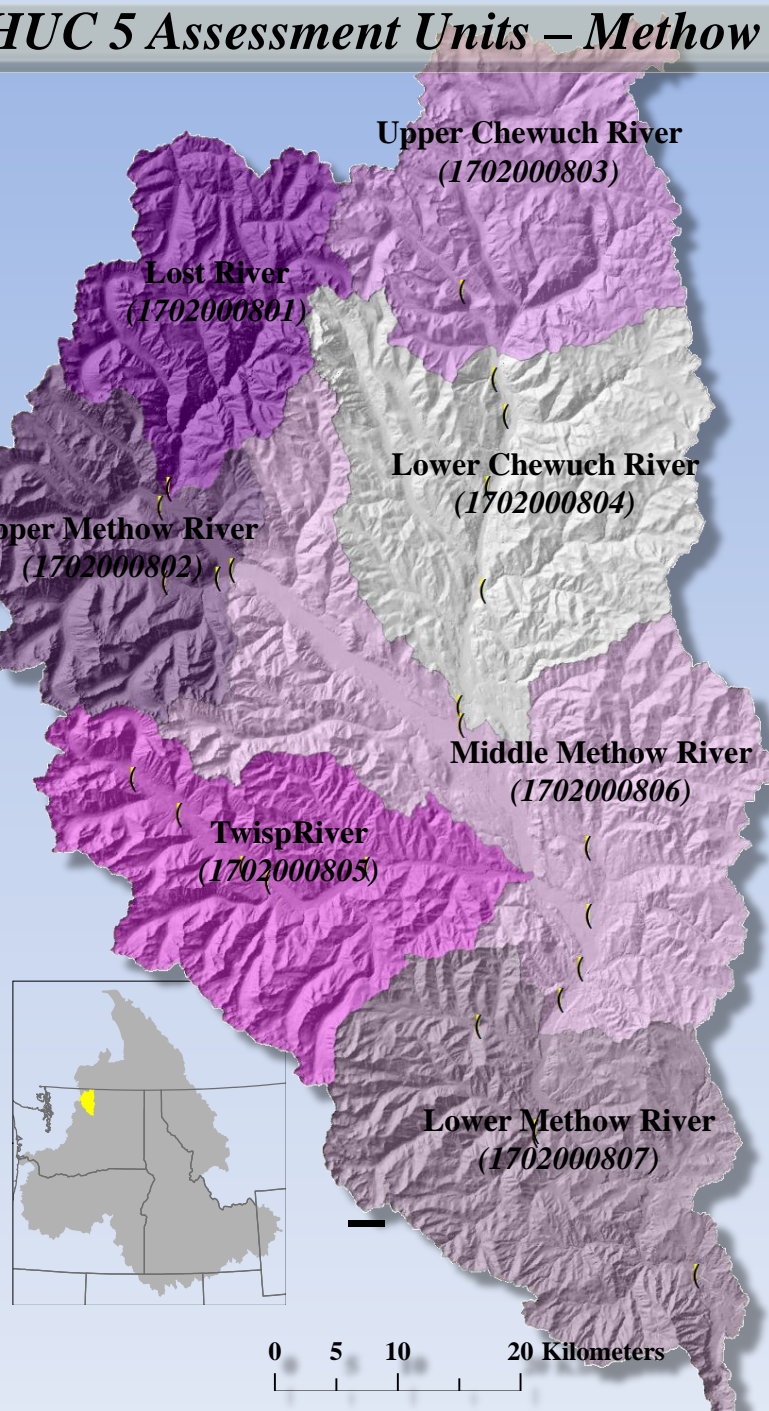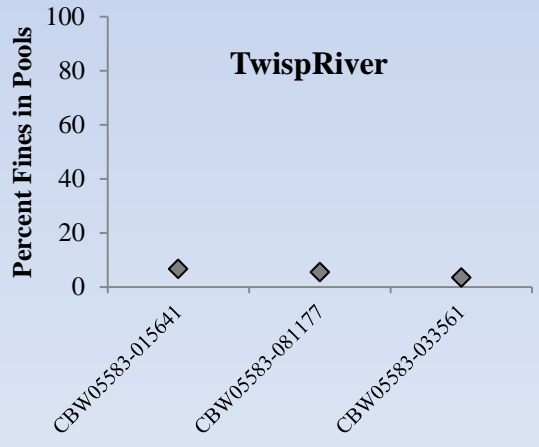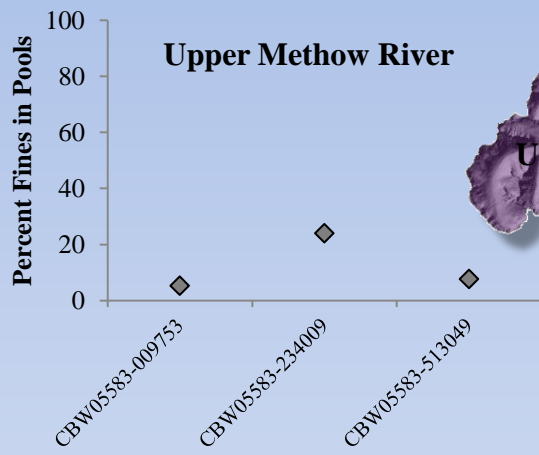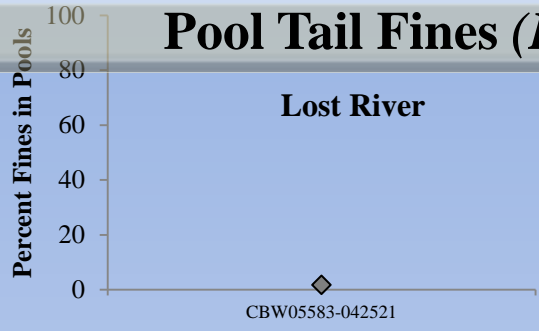| metric	rel importance (%)	Rock Creek	Chikamin Creek	Chiwawa River	thresholds
valley class	-	source-public	transport-private	depositional-private	
site length bf (m)	-	172	112	580	
site gradient (m/m)	-	.041	0.009	0.007	
Flow (m³/s)	18.1	6.0	1.6	1.6	20
pool volume (m³/m³)	10.5	0.0	0.6	0	0.5
beechie class	8.9	Step-pool	Pool-riffle	Straight	con, i-b, p-r, s-p, str
pool area (m²/m²)	5.2	0.0	0.5	0	0.35
Conductivity (us/cm)	3.6	82.9	47.8	105.4	25
gravel similarity D16/D84 (mm)	3.4	0.03	0.07	0.09	0.1
non woody vegetation (%)	3.1	27	18.2	15.9	70
artificial fish cover (%)	2.8	0	0	0	1
wood in pools (m³)	2.8	0	1.9	0	15

Pool Tail Fines *(HUC 5 Assessment Units – Methow River watershed)*

Lost River

Upper Chewuch River
(1702000803)

Lost River
(1702000801)

Upper Methow River

Upper Methow River
(1702000802)

Lower Chewuch River
(1702000804)

TwispRiver

TwispRiver
(1702000805)

Middle Methow River
(1702000806)

Lower Methow River
(1702000807)

Upper Chewuch River

Lower Chewuch River

Middle Methow River

Lower Methow River

0   5   10   20 Kilometers
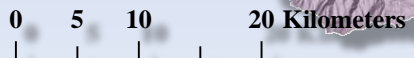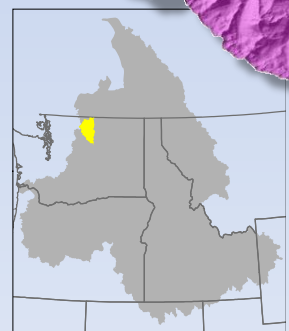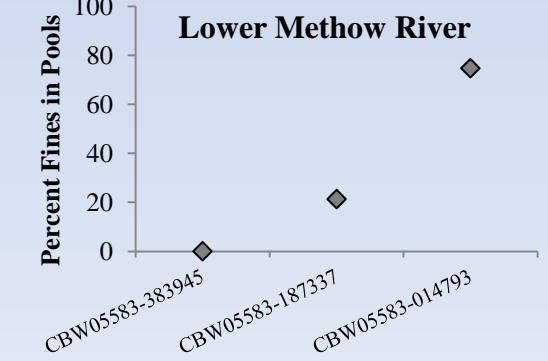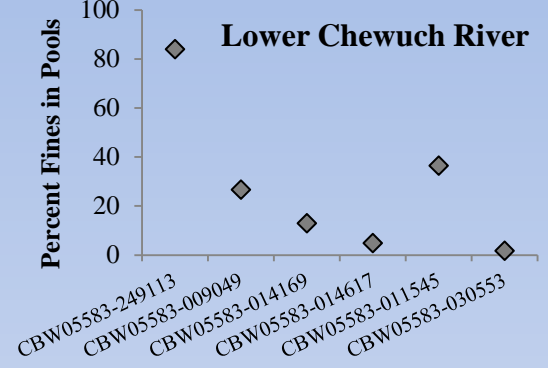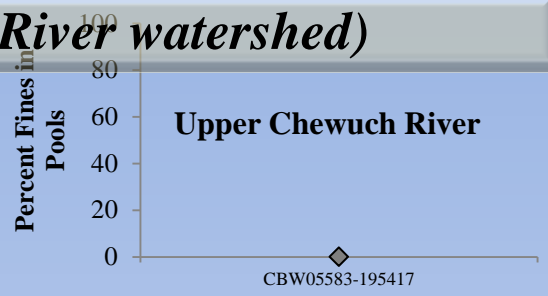
Science driven stream "restoration" project design & the Entiat IMW
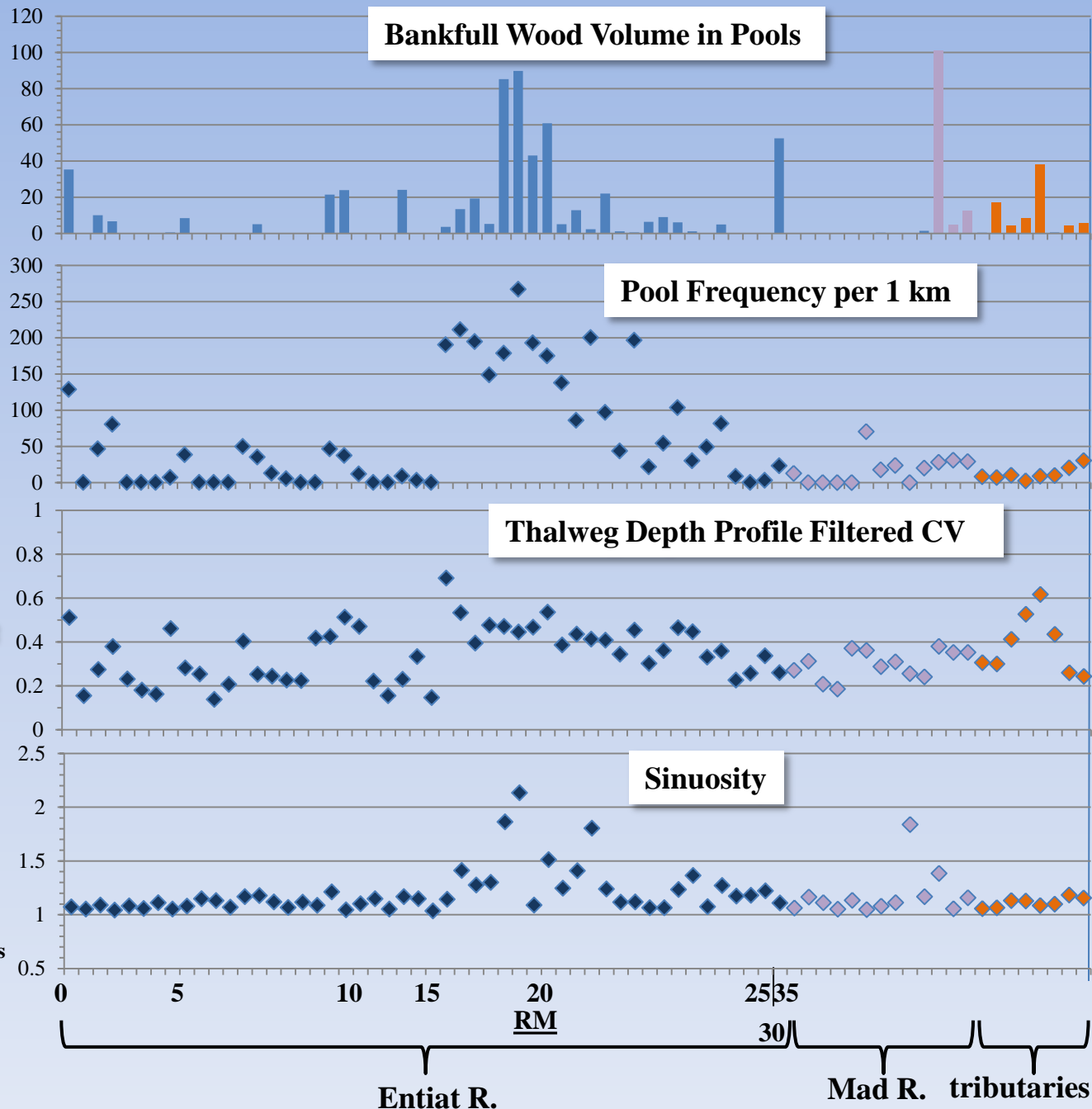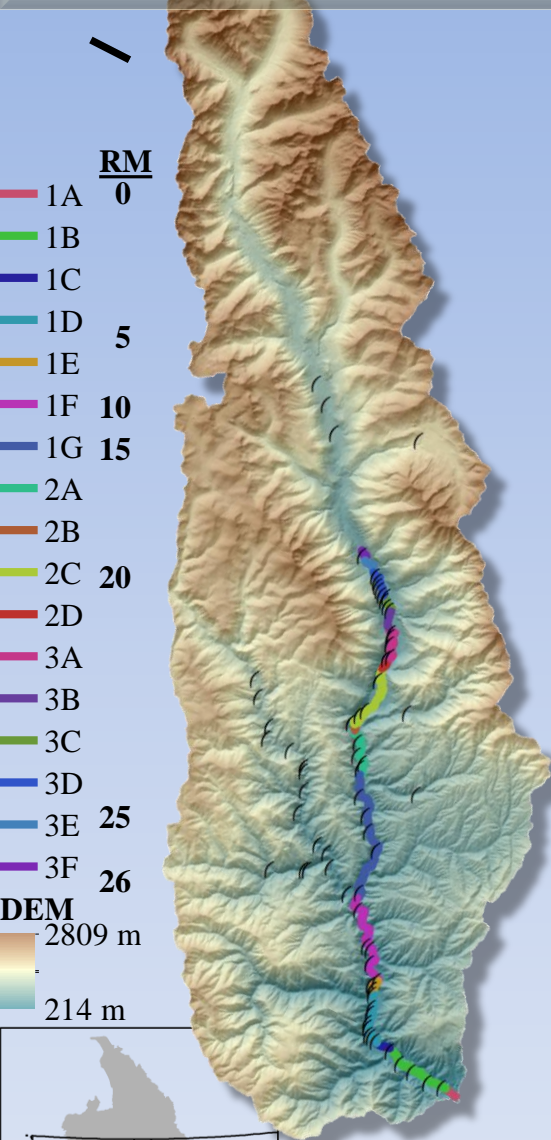
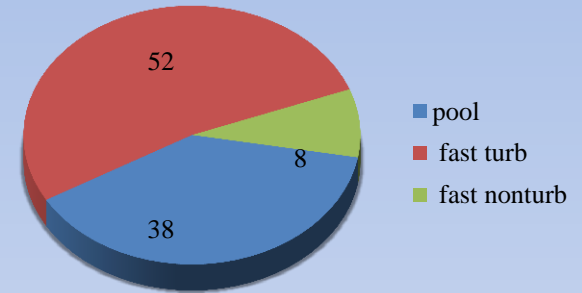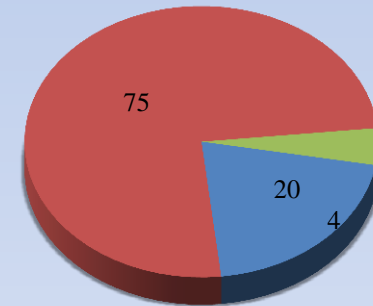# Salmon Recovery in the Upper Columbia – identification of limiting factors

Methow *(n=24)*

Metric	Methow	Entiat (just S/T)	Wenatchee
Average pool frequency (per 100 m)	1.0	1.6	2.0
Average bf wood frequency (per 100 m)	8	25	18
Median particle size in riffles (D50)	89	80	44

Wenatchee *(n=28)*

Entiat *(n=27)*

0 5 10   20 Kilometers

Channel Unit Diversity (% area)

Methow

52 · 38 · 8

- pool
- fast turb
- fast nonturb

Entiat

75 · 20 · 4

Wenatchee

56 · 21 · 23

Closing Remarks/Questions

CHaMP data is the building block for making salmon recovery policy decisions

In addition to results from models such as LCM, BRT, & SEM, static display of fish habitat across multiple spatial scales may be useful for:

- Informing expert panel decision

- Prioritizing stream restoration actions

- Salmon recovery planning at the regional scale

- Meeting the requirements set forth in the Federal BiOp