Biological Monitoring of Wood and ELJs in Western Washington

Roger Peters, Mark Celedonia, Meimei Li, Scott Sanders

U.S. Fish and Wildlife Service

George Pess, Holly Coe, Sarah Morley, Martin Liermann

NOAA, Northwest Fisheries Science Center

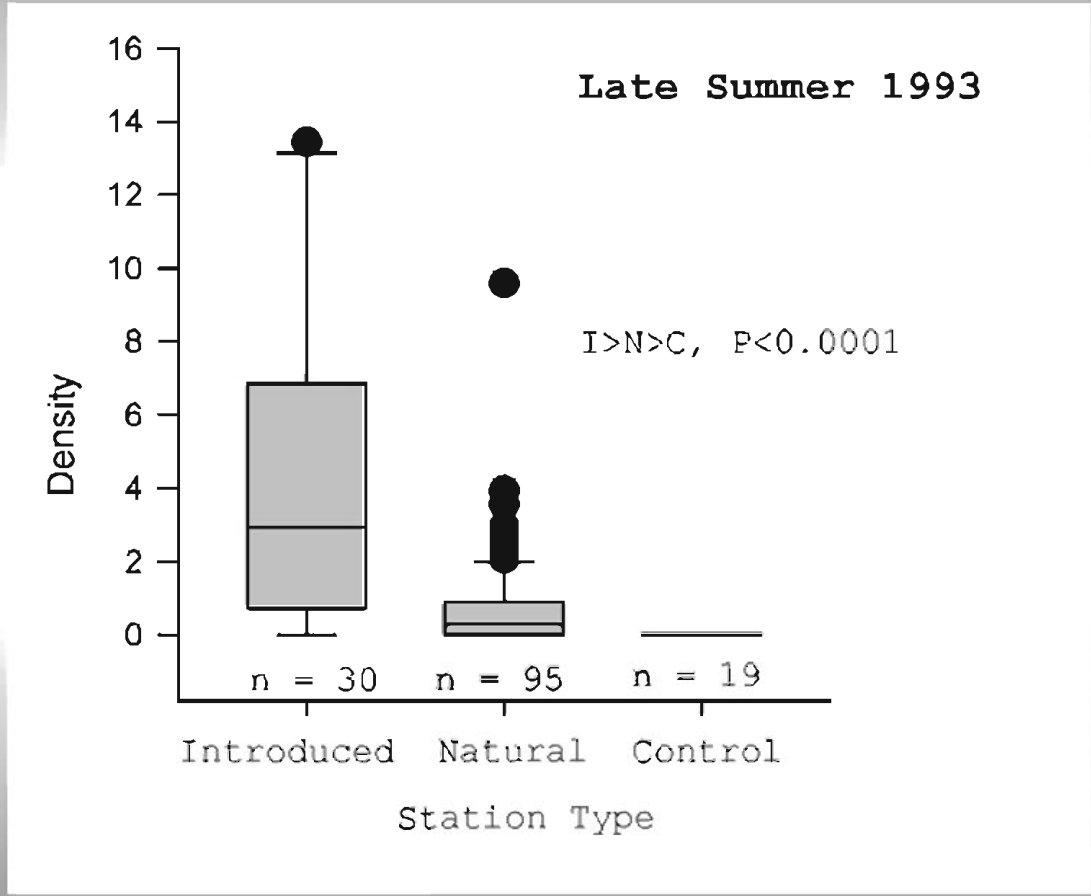
Mike McHenry

Lower Elwha Tribe

Outline

- Past Monitoring Results
  - Fish Abundance & Movement
  - Periphyton
  - Invertebrates
  - BFW - ~20-50 m
- Research Needs
- Future Monitoring

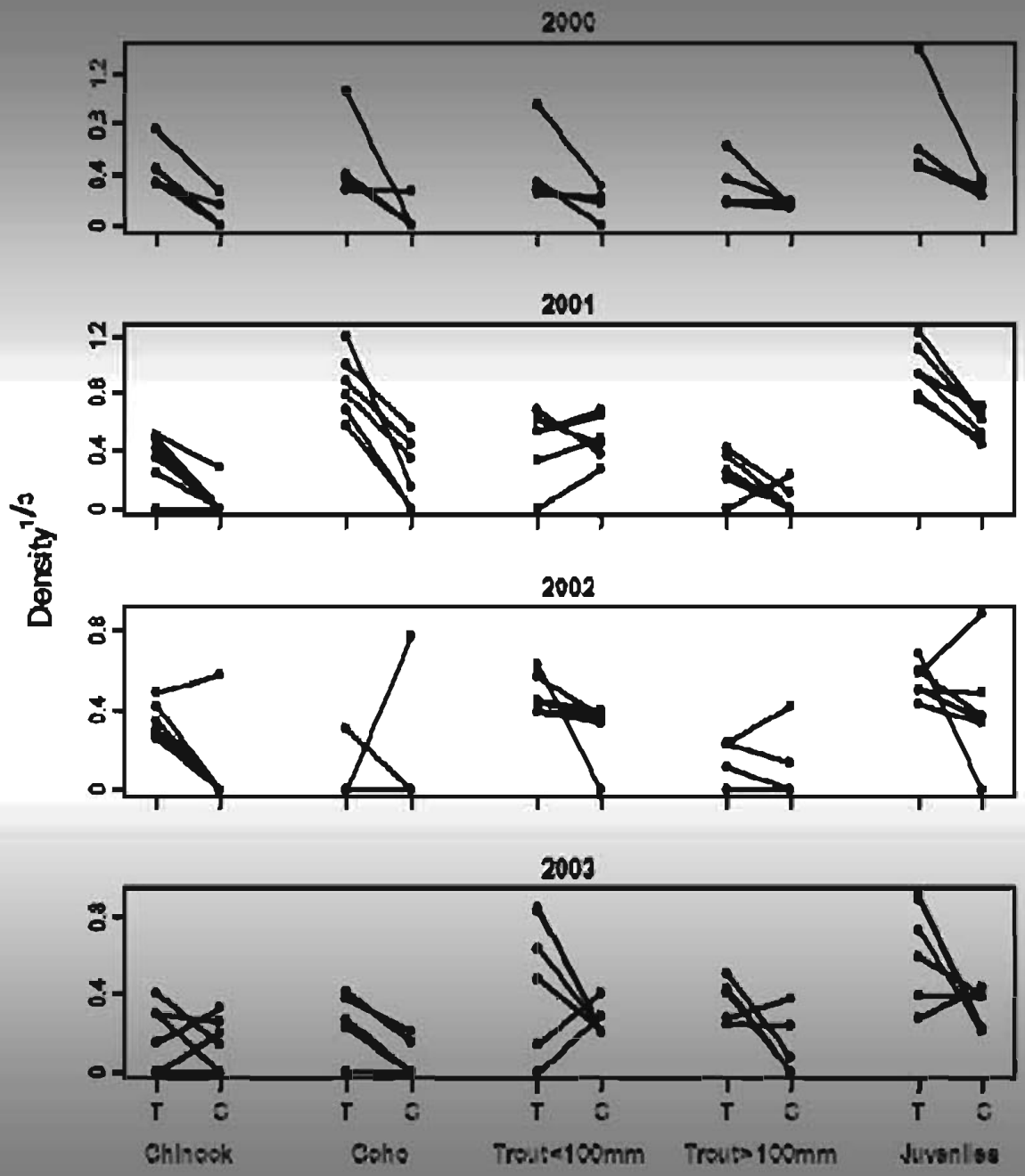
-Juvenile coho salmon distribution and abundance influenced by wood in a large river channel



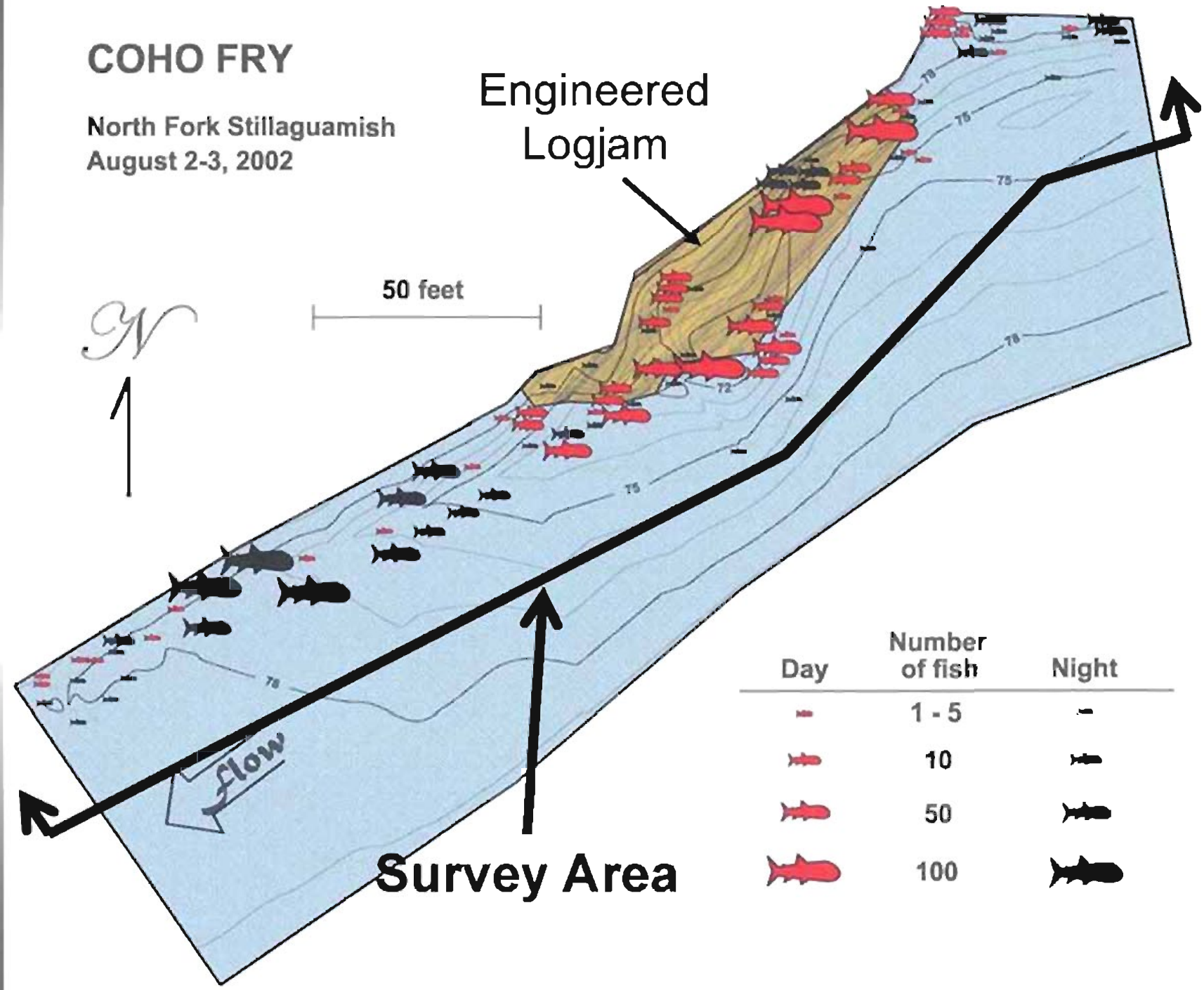
Peters 1996

Ph.D. Diss., UW

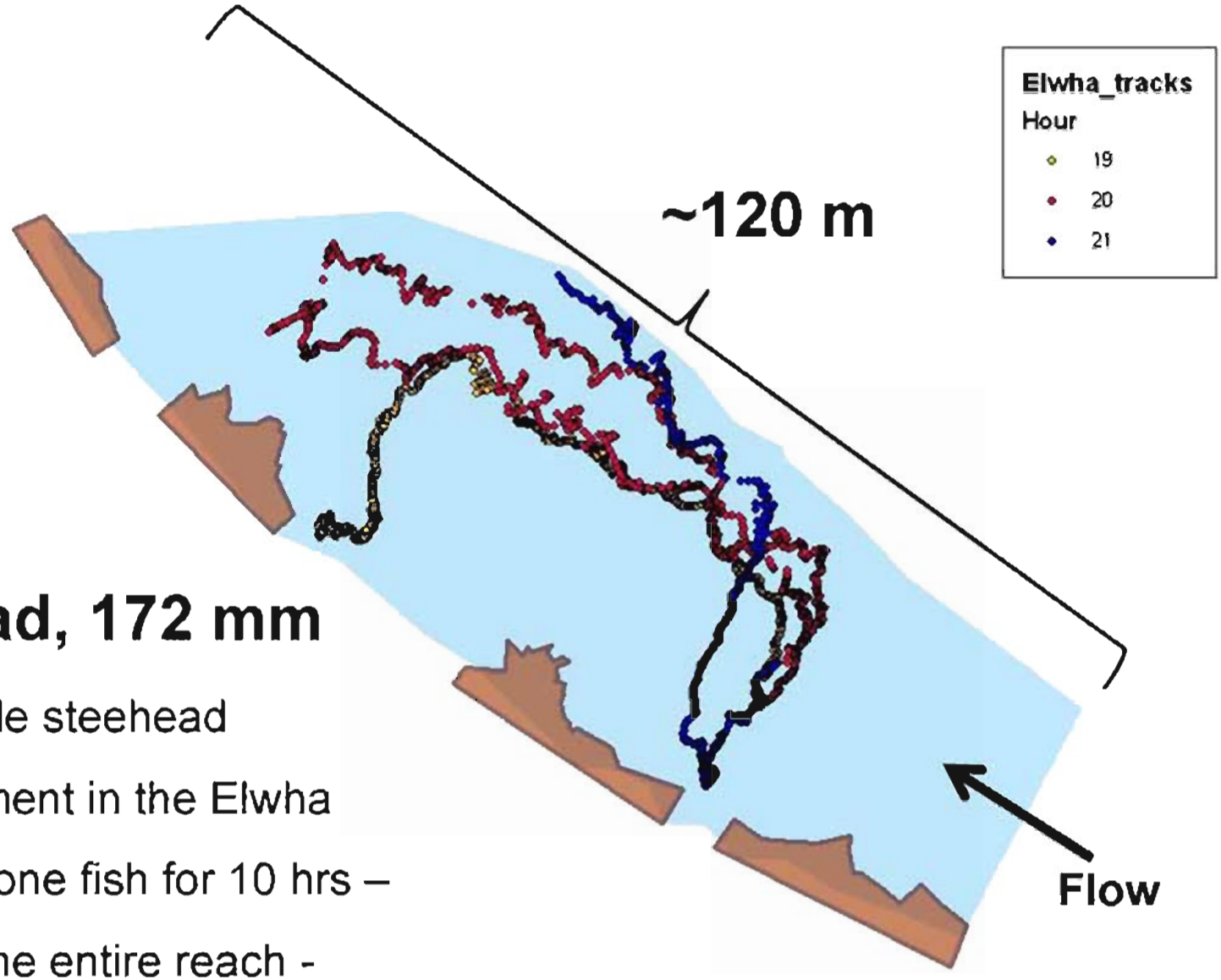
-Extends results re: importance of LWD (ELJs) to trout and Chinook



Pess et al. in press Riv. Res. Appl.

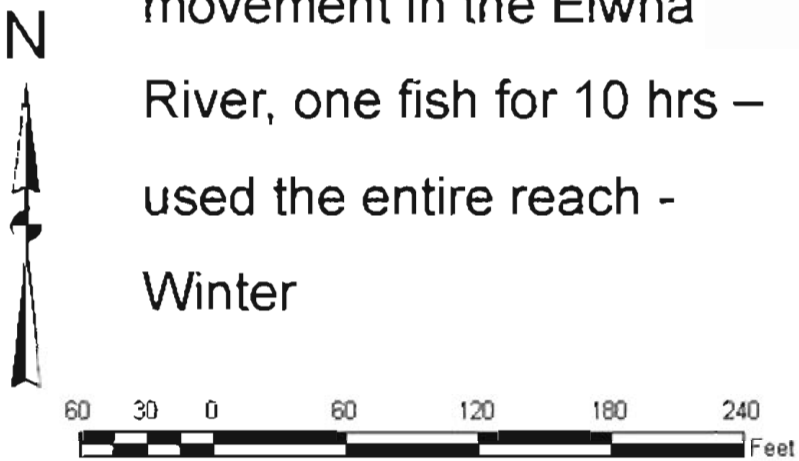

COHO FRY
North Fork Stillaguamish
August 2-3, 2002
Engineered Logjam
50 feet
N
Flow
Survey Area
Day
Number of fish
Night
1 - 5
10
50
100

2005 Elwha



Steelhead, 172 mm

- Juvenile steehead movement in the Elwha River, one fish for 10 hrs – used the entire reach - Winter



Peters et al.

Unpublished data

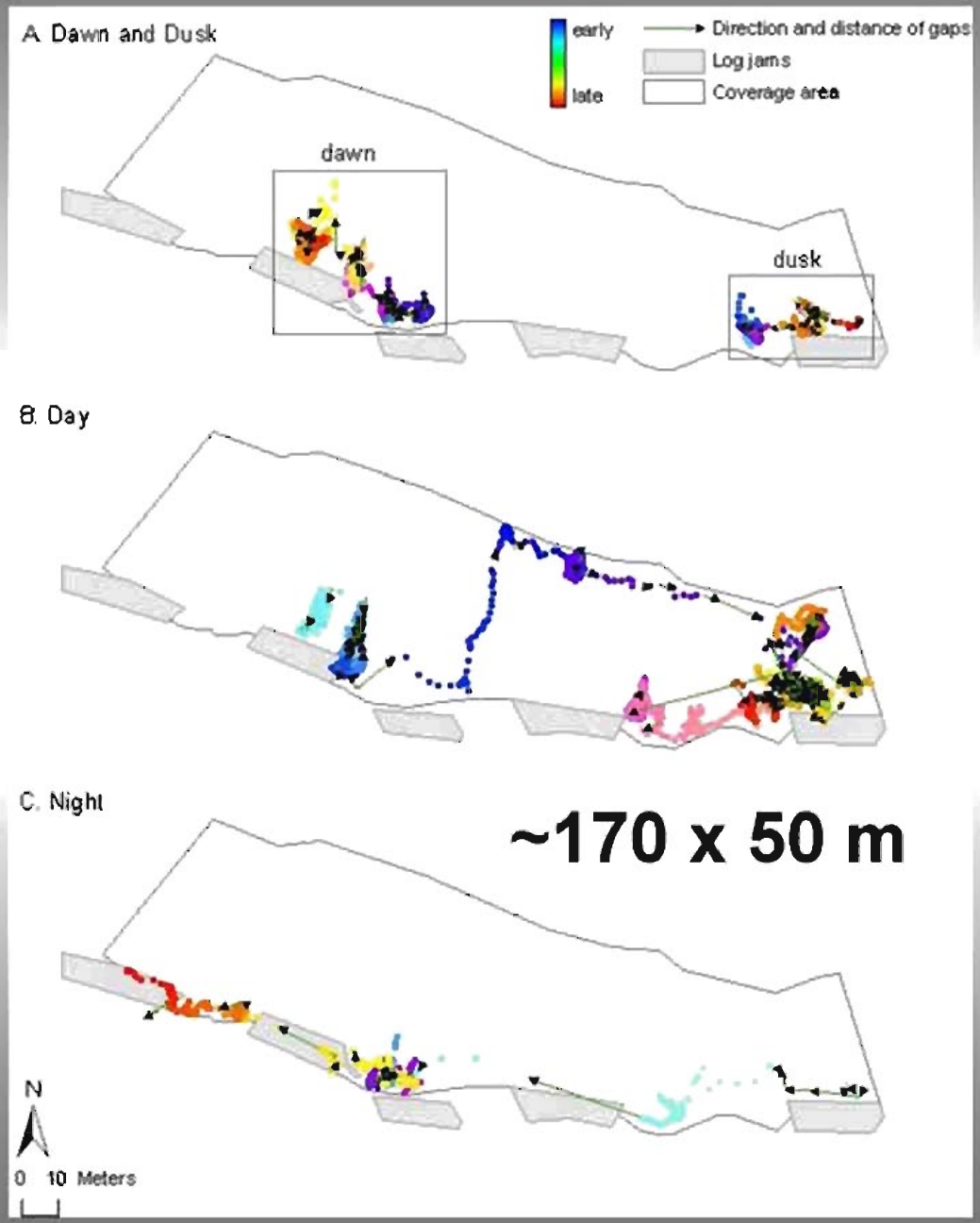
Fish #: 1990
Day 2 : 68
Time of day: night
Count : 3990

Fish Movement

-Steelhead movement in the Hoh River, one fish for 24 hrs – used the entire study reach - summer

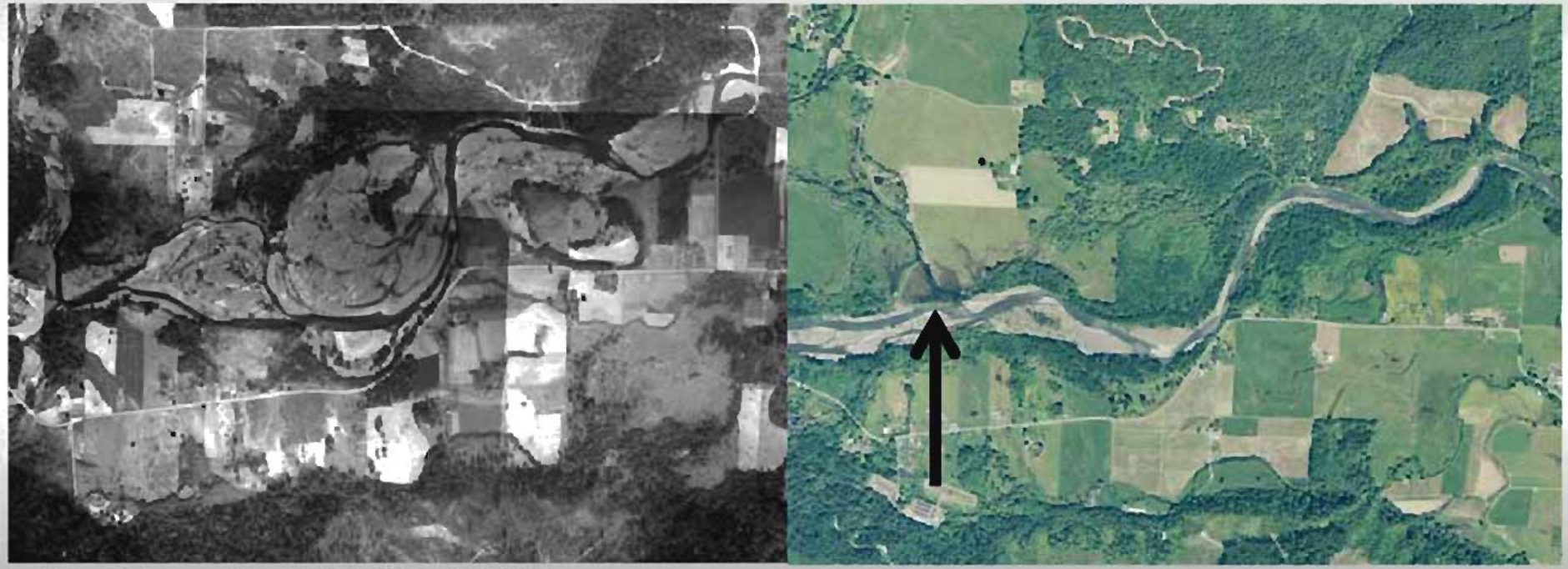
Peters et al. in prep

Final Report to WDOT



Reach Scale Channel & Wood Diversity
Skokomish River

1935 2007



Godaire et al. 2007, BOR

Richert (1964): "giant logjam…1891...three miles thick…18 months in wrecking the jam."

Habitat Use

Juvenile Chinook

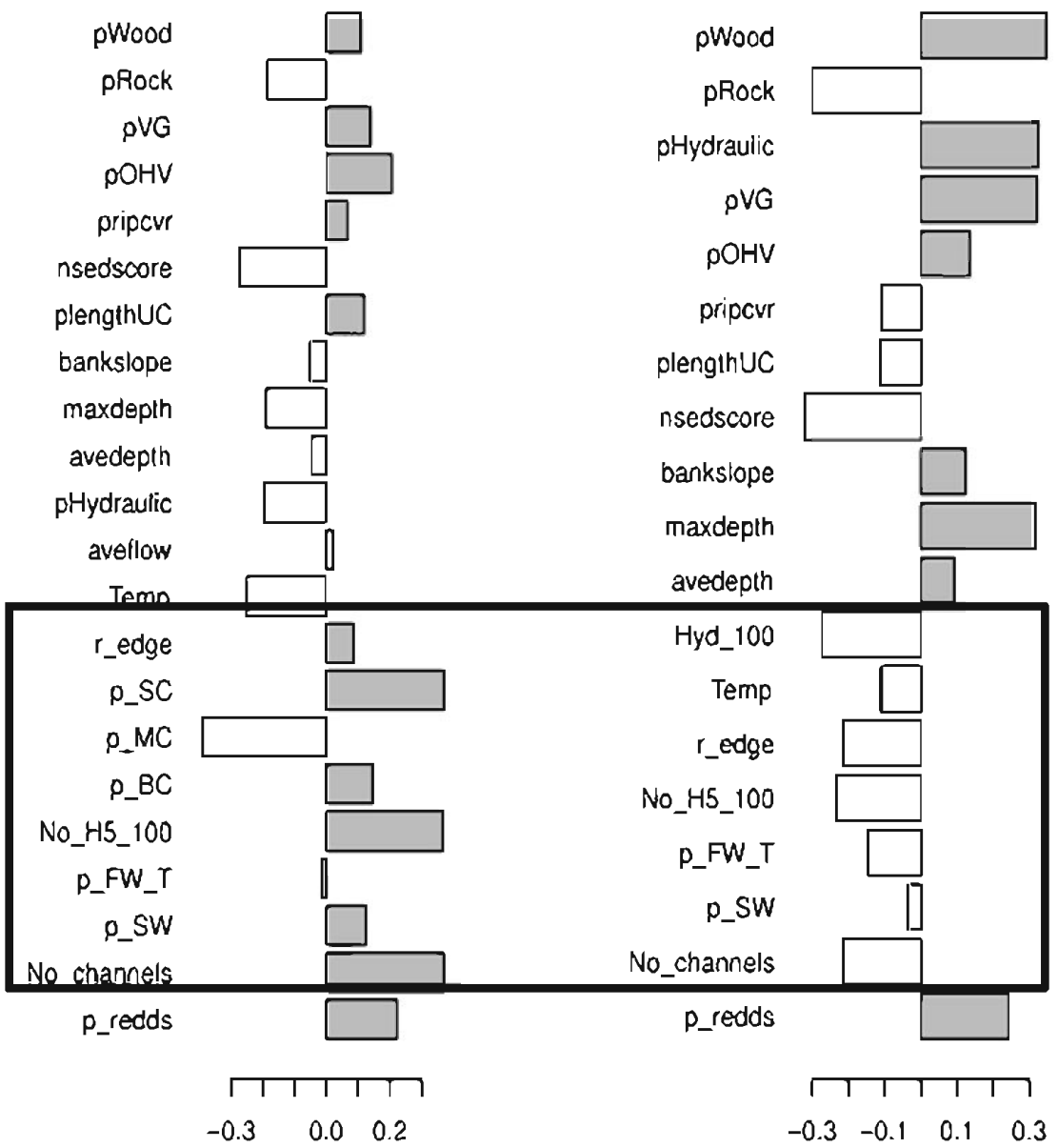
-Cedar River

Reach Scale

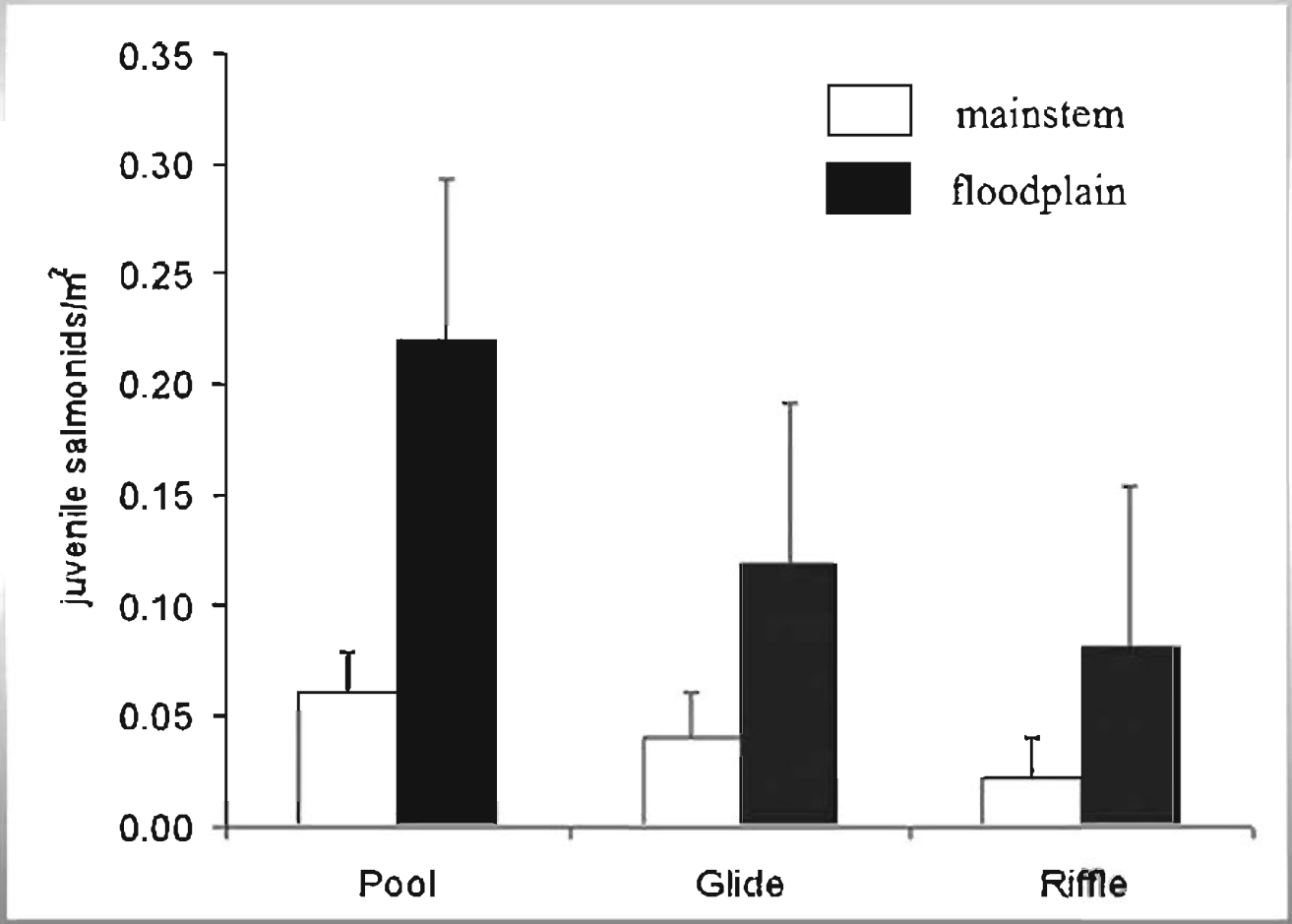
Channel Complexity

Peters et al. in prep

Final Report to City of Seattle

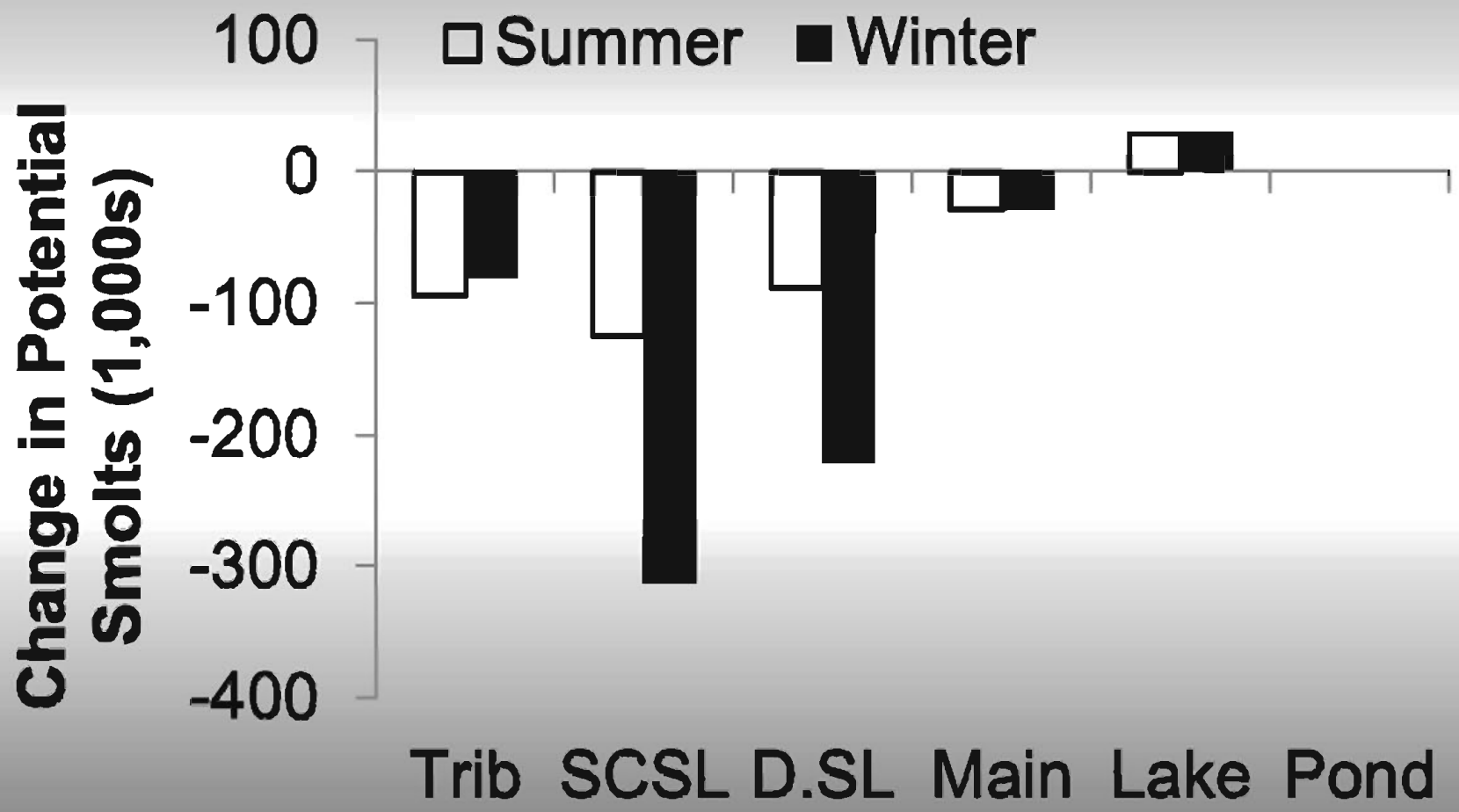


Floodplain Channel Use: Elwha



Pess et al. 2008

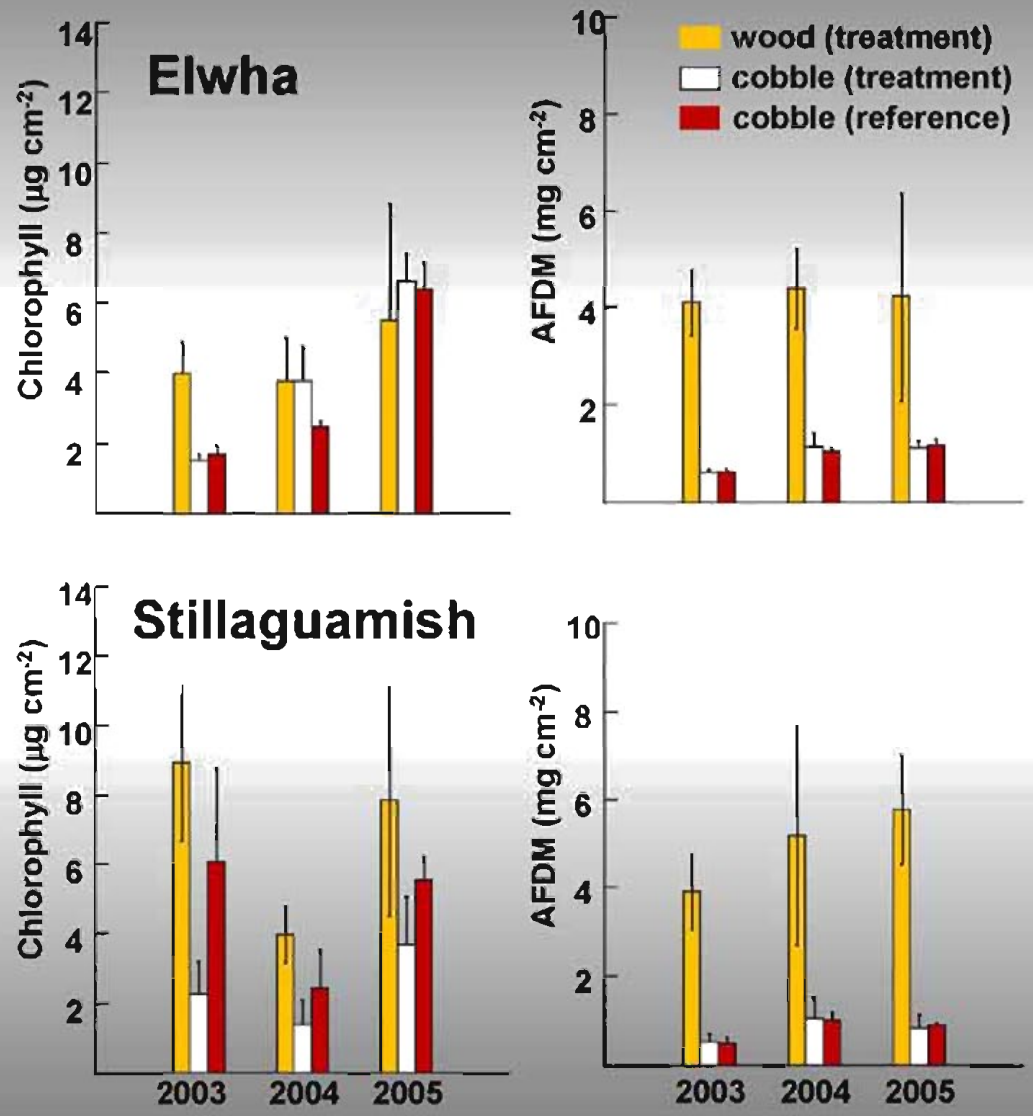
Influence of Lost Diversity: Skagit



Beechie et al. 1994, NAJFM

Periphyton Results

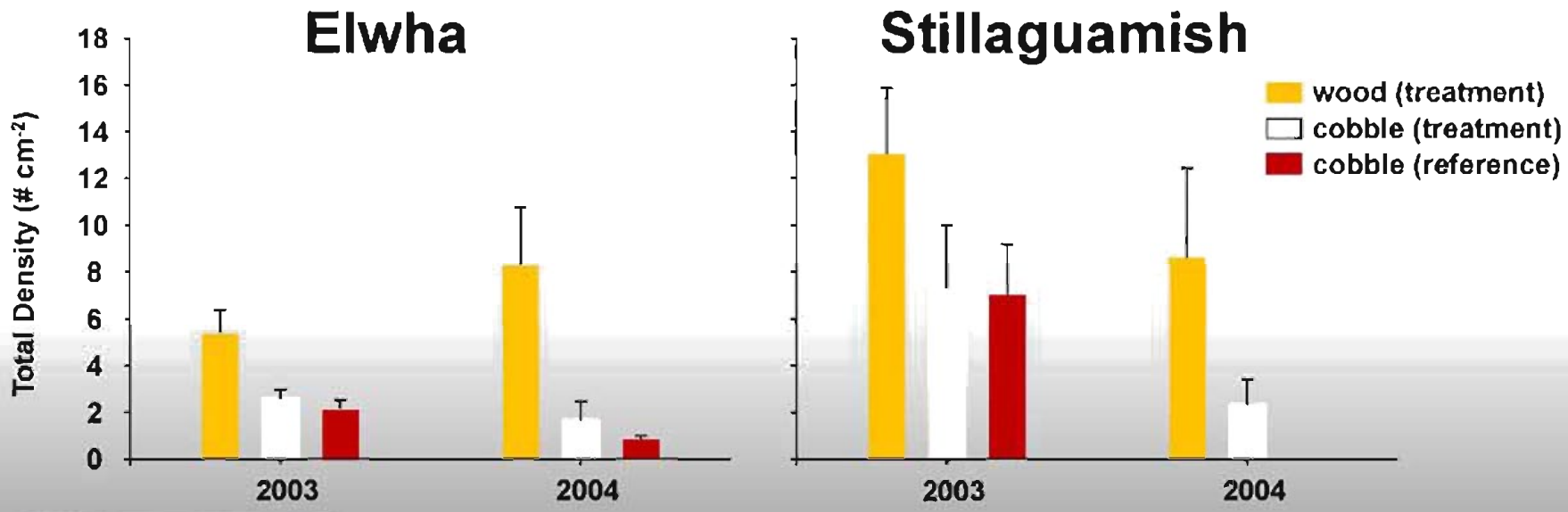
- Chlorophyll *a*
  - Greater on wood in 1 of 3 years
- Periphyton biomass and AFDM
  - Consistently greater on wood than cobble
  - No apparent reach affect



Coe et al. 2009, River Res. App.

Invertebrate Results

- Invertebrate densities greater on wood than cobble
- No apparent reach affect

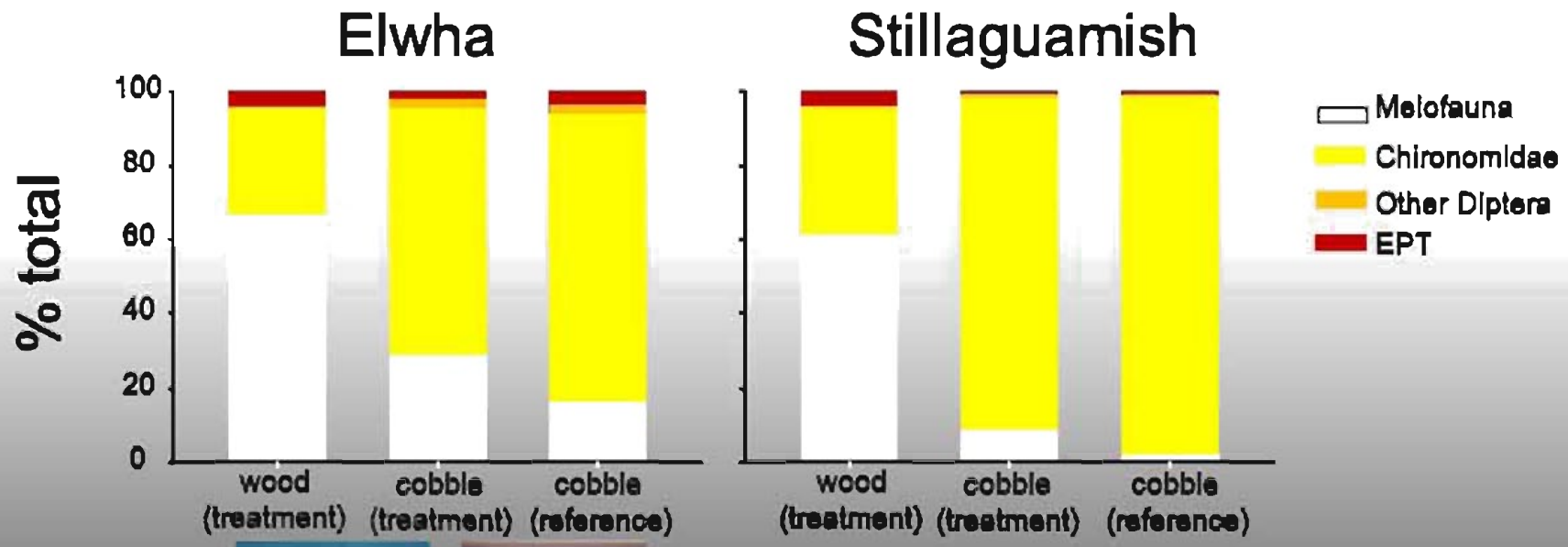


Coe et al. 2009, River Res. App.

Photo by John McMillan

Invertebrate Results

- Meiofauna (<500 µm) represented 60% of the invertebrate community on wood, ≤ 30% on cobble
  - Cyclopoid and harpacticoid copepods, ostracods, mites, oligochaetes, nematodes, and tardigrades



Coe et al. 2009, River Res. App.

Research Needs

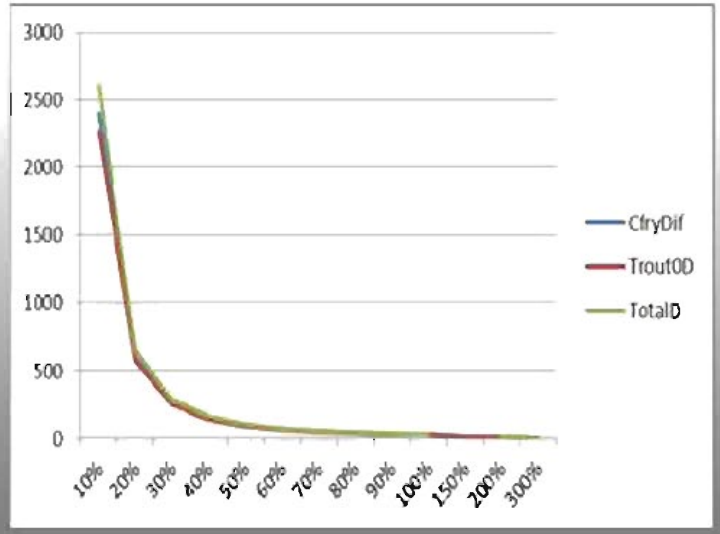
- Statistically valid assessment
- Reach, watershed Scale influence of wood
  - Fish Abundance, production Growth
  - Survival
- Fish/Habitat correlations
  - Physical/Biological Science
- Temperature
  - Hyporheic interactions
- Food web relations
  - Unique invertebrates = forage?
  - Predation

Potential Future Monitoring

- Extensive Assessment of ELJs
  - Objective – Extensive assessment of the physical and biological effects of ELJs
    - Adequate sample size for statistical comparison
  - Goal
    - Provide a common protocol (and assistance) those monitoring ELJs
  - Partners
    - USACOE ($), USFS, USFWS, NOAA

Potential Future Monitoring

- Protocol development – 2012
  - Define and assess metrics
    - Useful metrics?
    - Scale
    - Sample size analysis
    - Feasibility
- Protocol testing – 2012
  - S.F. Skokomish River
  - Feasible
    - Methods appropriate
    - Time limitation



Questions?

Thank You!