Lessons from Long-term Studies

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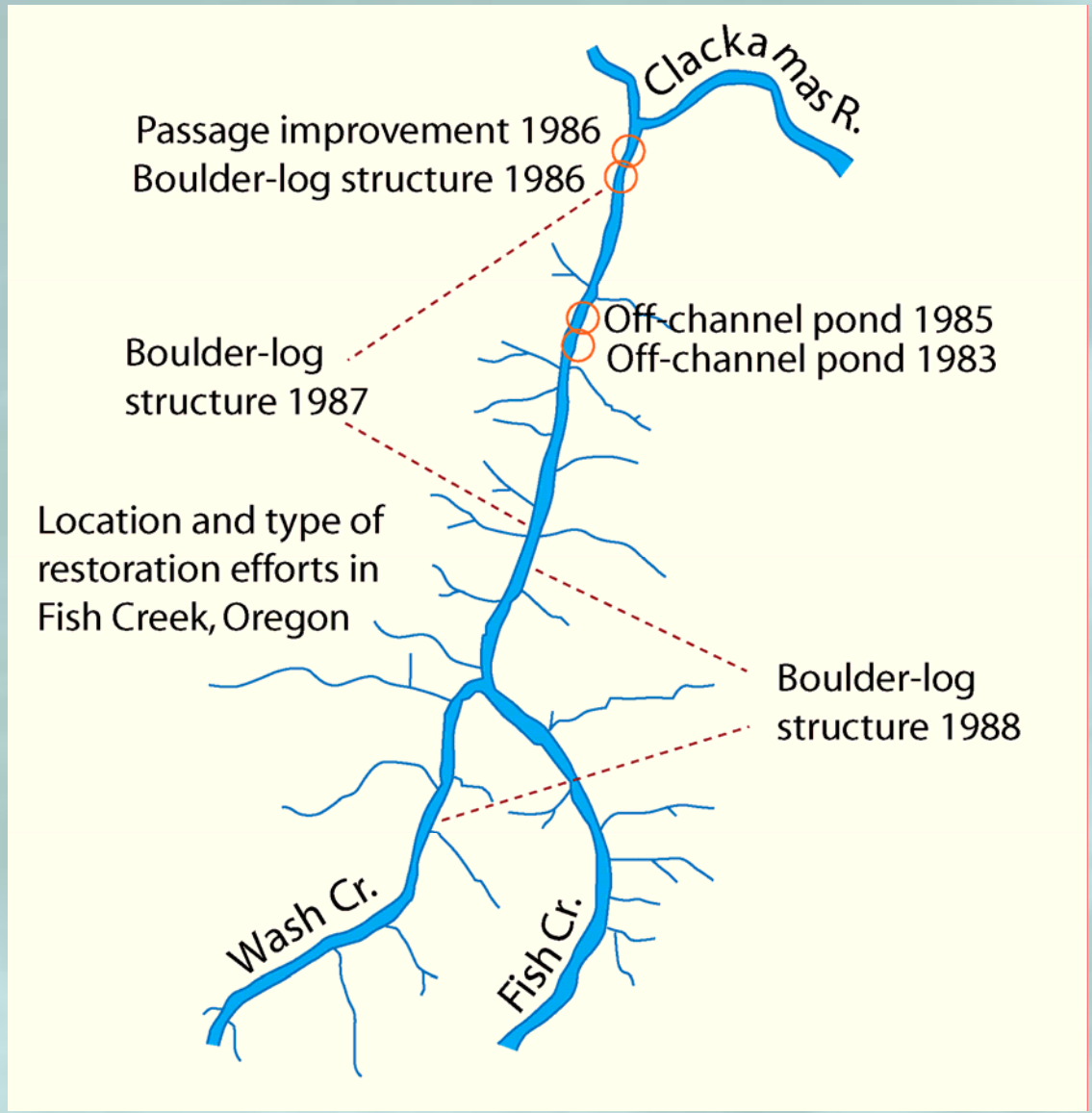
Fish Creek	1982-1995	Restoration
Elk River	1985-2001	Variability
Upper Clackamas Oregon Coast	1985-2006	Productivity

Fish Creek

- 500 structures
- 1982-88 prototypes/ pretreatment
- 1989-1995 annual surveys
- $240,000



Measures at Fish Creek

- smolt output
- summer population
- summer habitat

Fish Creek Results

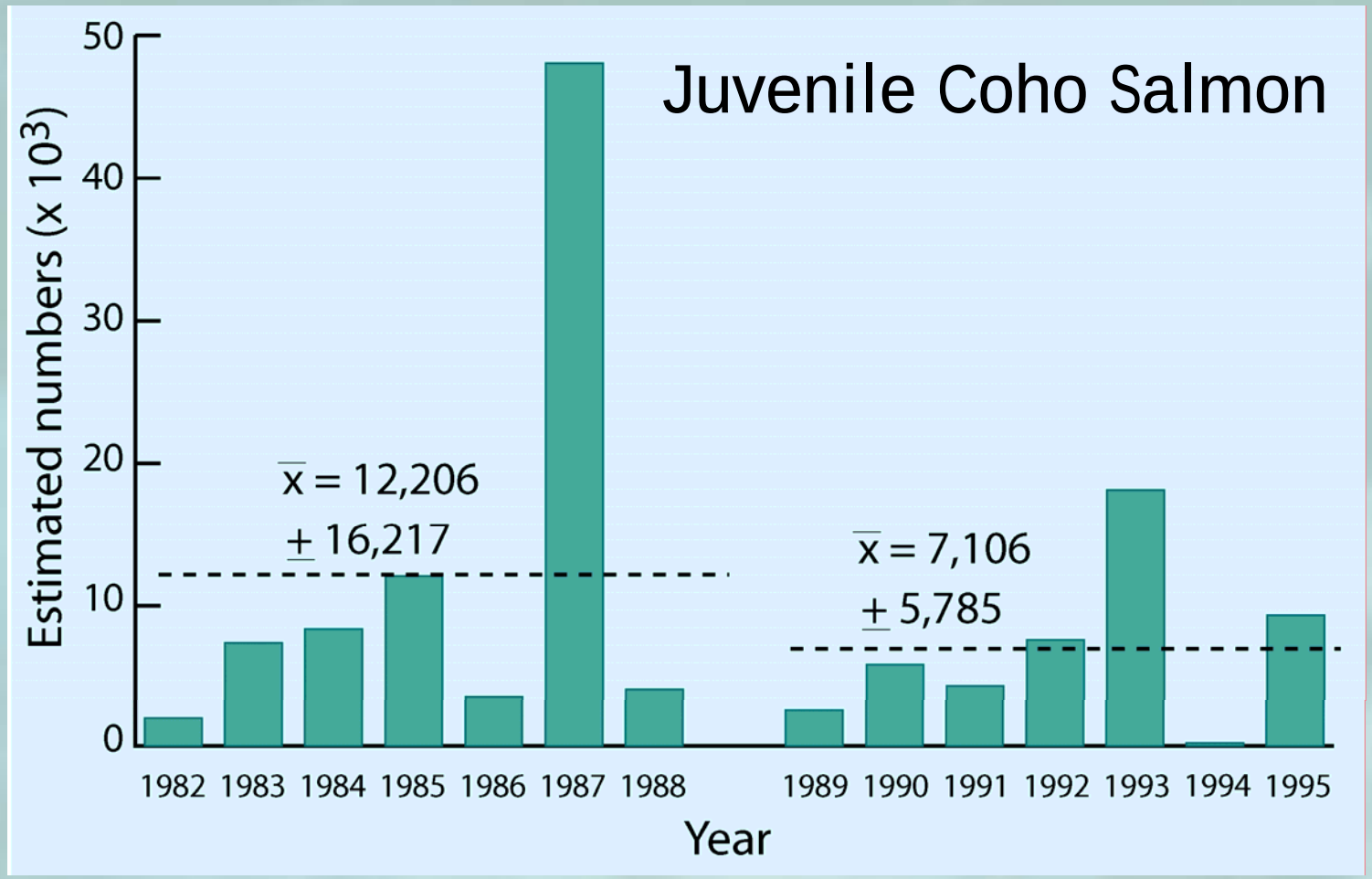
- Pools
  - before: 8-20% of total
  - After: 19-39% of total

Fish Creek Results

- Fish

Steelhead	Number	Size	Clackamas No.
0+	-53%	+12.5%	
1+	+11.7%	+4.1%	
smolts	+27.7%	+3.2%	0%
Coho Salmon			
0+	-42%	+14.8%	
smolts	+12.7%	+6.8%	-20%

Why?


Juvenile Coho Salmon
Estimated numbers (x 10³)
50
40
30
20
10
0
x̄ = 12,206
± 16,217
x̄ = 7,106
± 5,785
1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995
Year

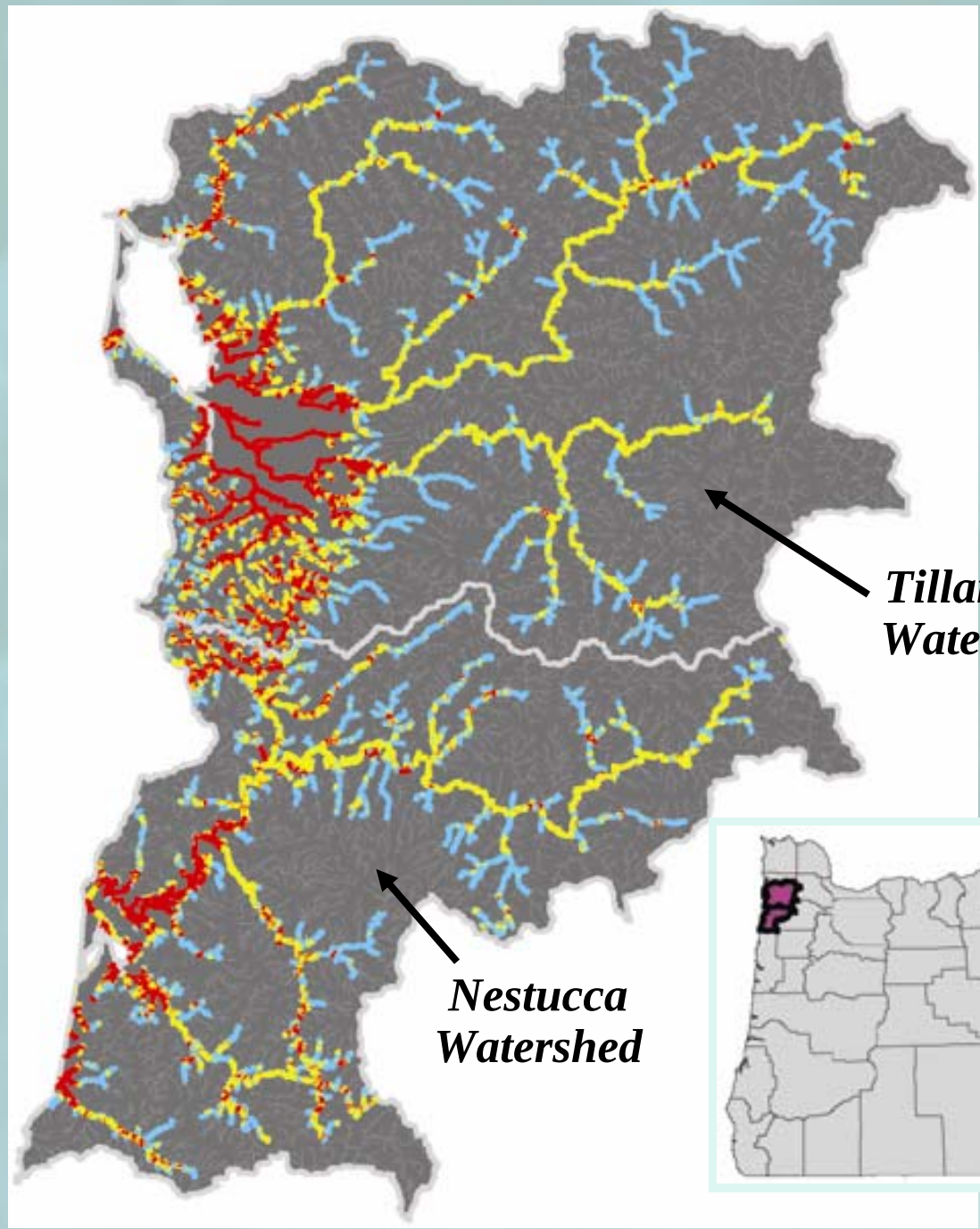
1996 Clackamas Flood

- 50% of structures lost/destroyed
- Wood amount remained the same
- Smolt numbers were 5% of pre-flood average

Lessons from Fish Creek

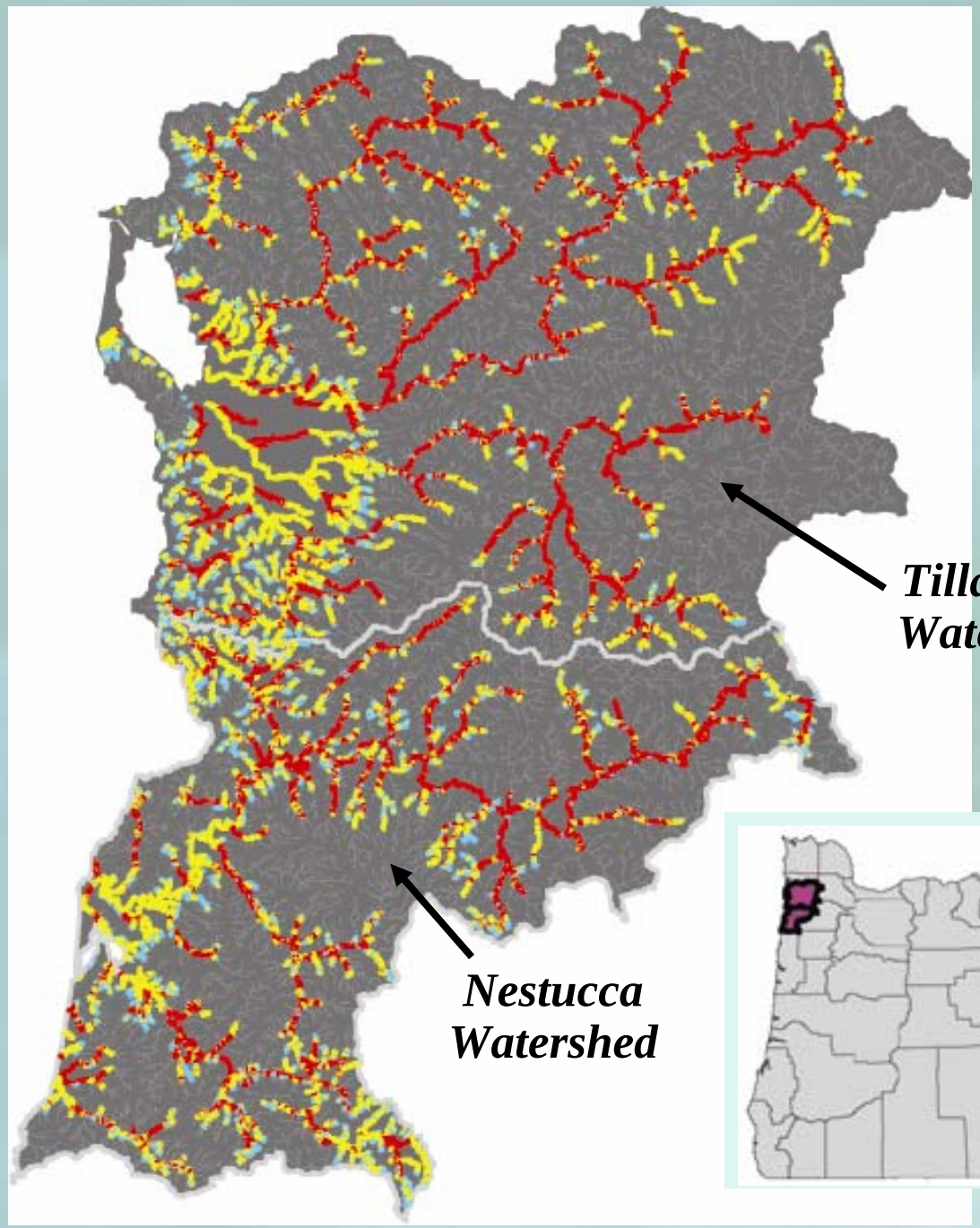
- Habitat responses are fast
- Biological responses are variable
  - species
  - age-class
  - difficult to discern statistically-significant responses
- In-stream work is a catalyst to begin restoration, not an end-point

Inherent Potential of the Watershed to Provide Habitat for Coho Salmon

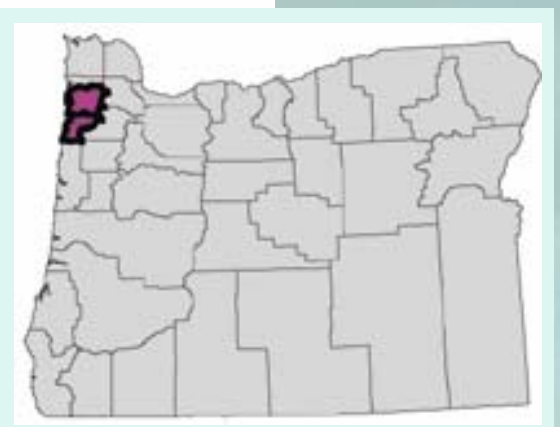


Constrained Reaches

Inherent Potential of the Watershed to Provide Habitat for Steelhead



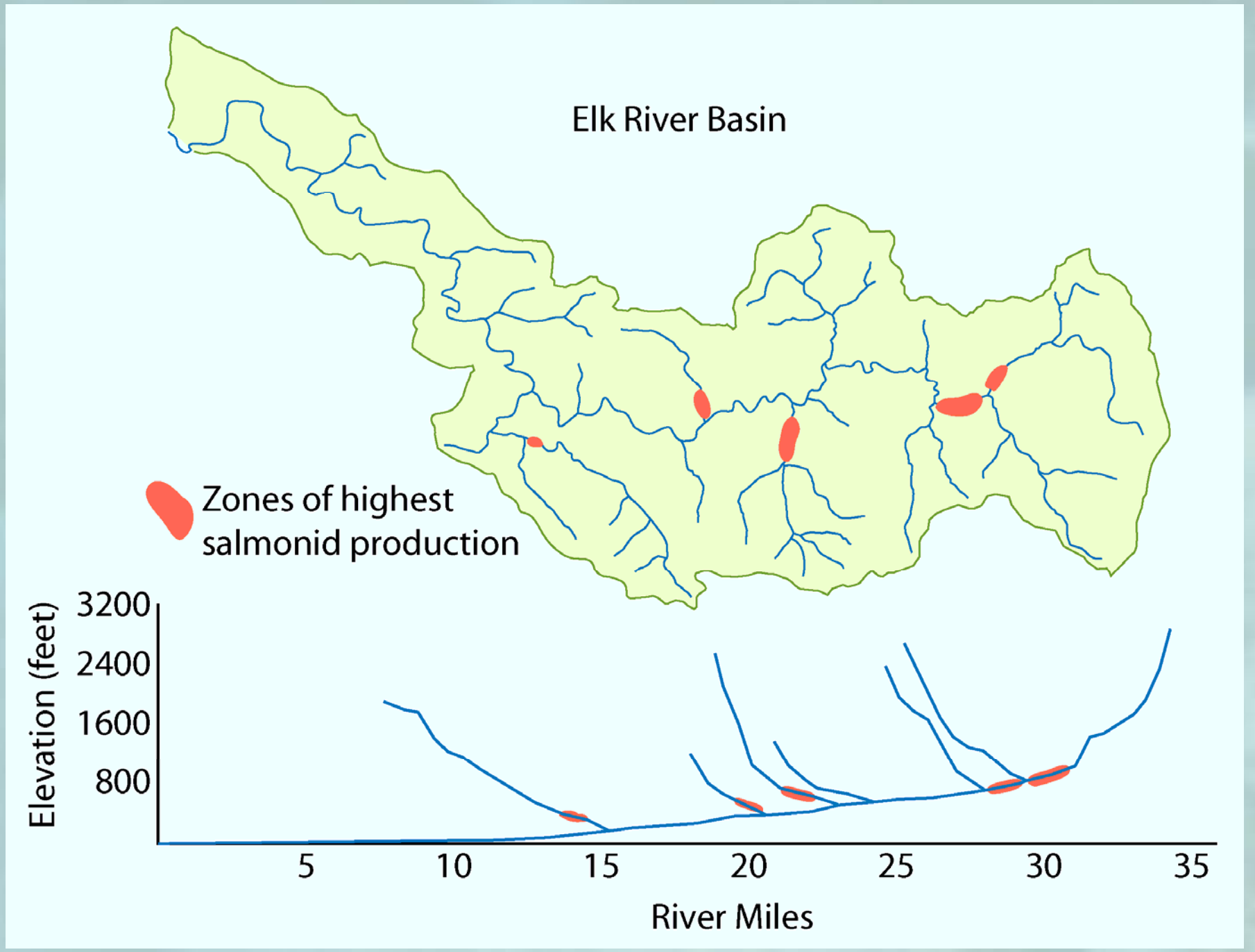
High
Moderate
Low



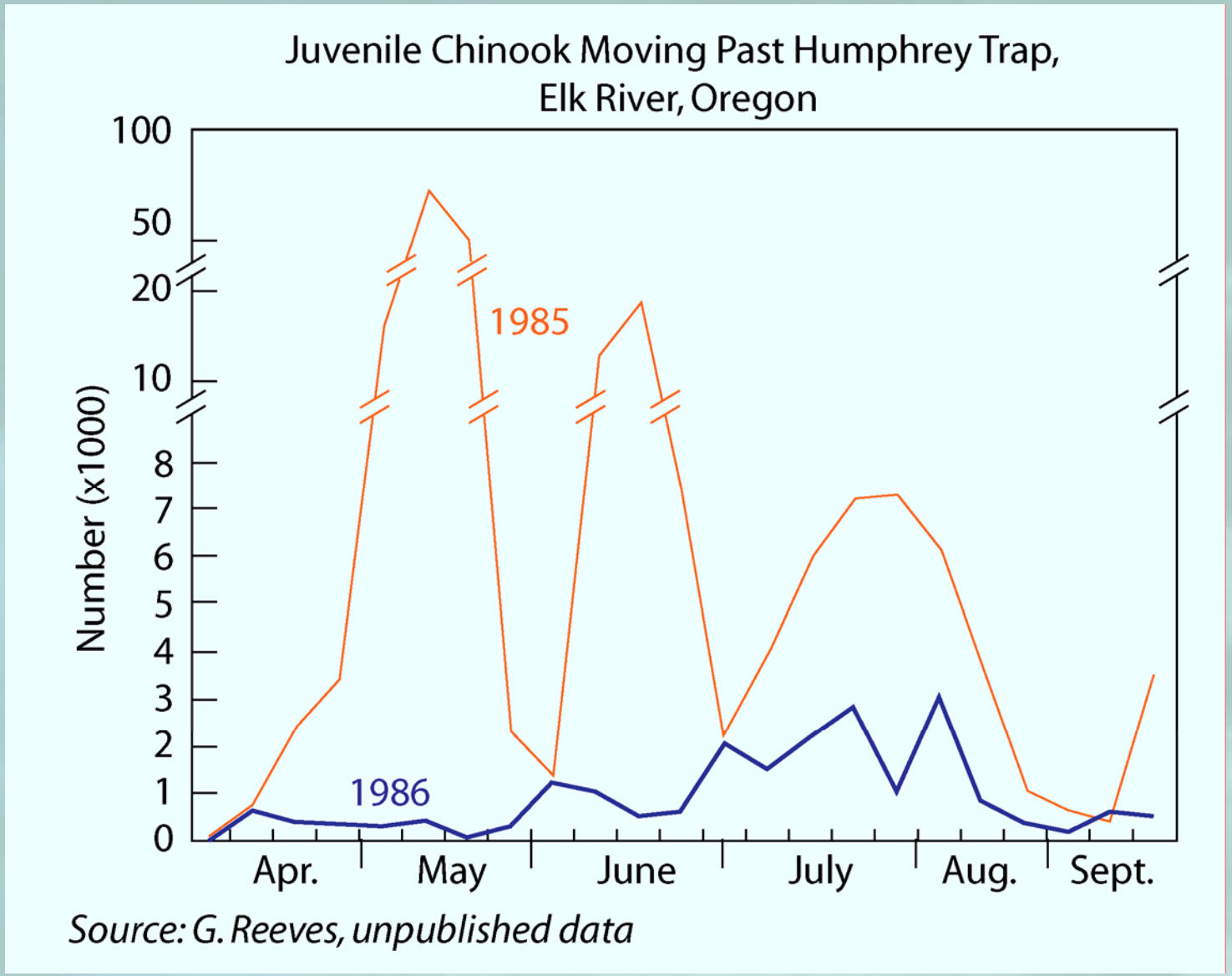
Unconstrained Reaches

Lessons from Intrinsic Potential

- Production potential varies within and among basins
- Potential for a watershed and reaches to produce fish depends on inherent features

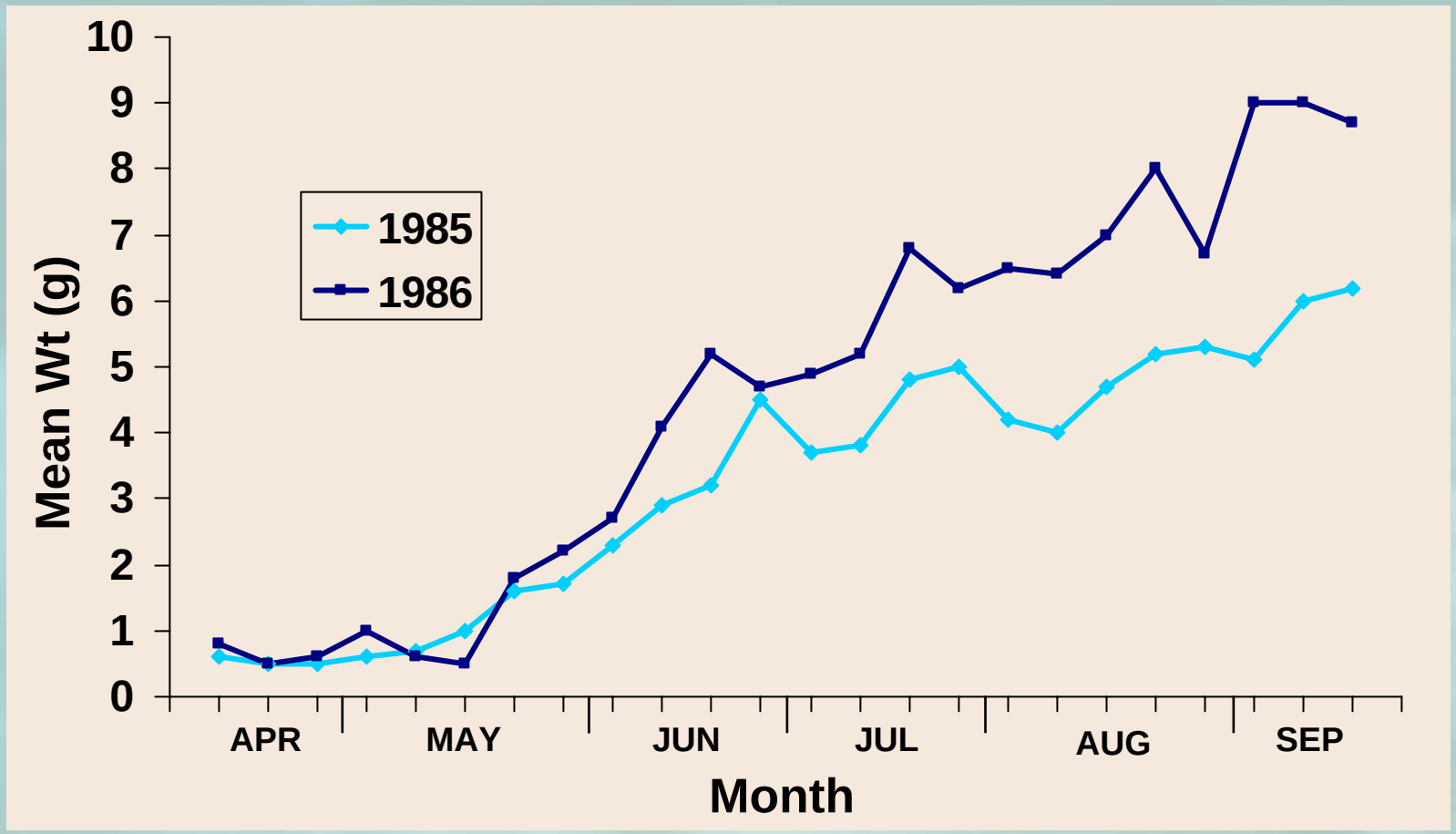

Elk River Basin
Zones of highest
salmonid production
Elevation (feet)
3200
2400
1600
800
5
10
15
20
25
30
35
River Miles

Elk River Chinook Salmon Numbers



Elk River Smolt Weight

Mean Weight of Juvenile Chinook Salmon
Sampled in Upper Elk River Migrant Trap



Source: G. Reeves, unpublished data.

Lessons from Elk River

- Biological productivity varies
  - location within basin
  - production centers for species varies within basin
- Variability in biological production
  - life-history types

Lessons from Long-term Studies

- Habitat responds quickly
- Biological response variables
  - difficult to obtain statistically-significant results
  - establish expectations up-front
  - may use standard other than adults
- Variation in potential responses of systems
- In-channel restoration is the first step, not the last