

Environmental Effects of High Water Events Middle Skagit River, Washington

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DRAFT – For Discussion Purposes Only

Flow Level

(Skagit River Near
Concrete)

Potential Environmental Effects

>10,000 cfs

Small net change in salmonid rearing (WUA)

24,000-32,000 cfs

Chinook spawning activity suspended

>28,000 cfs

Chinook spawning habitat (WUA) declines

>35,000 cfs

Off-channel habitats connected to mainstem

>41,000 cfs

Chinook spawning substrates mobilized

58,000 cfs

Channel maintenance (1.5-year flow event)

62,000 cfs

Overbank flow (Phase 1 Flooding)

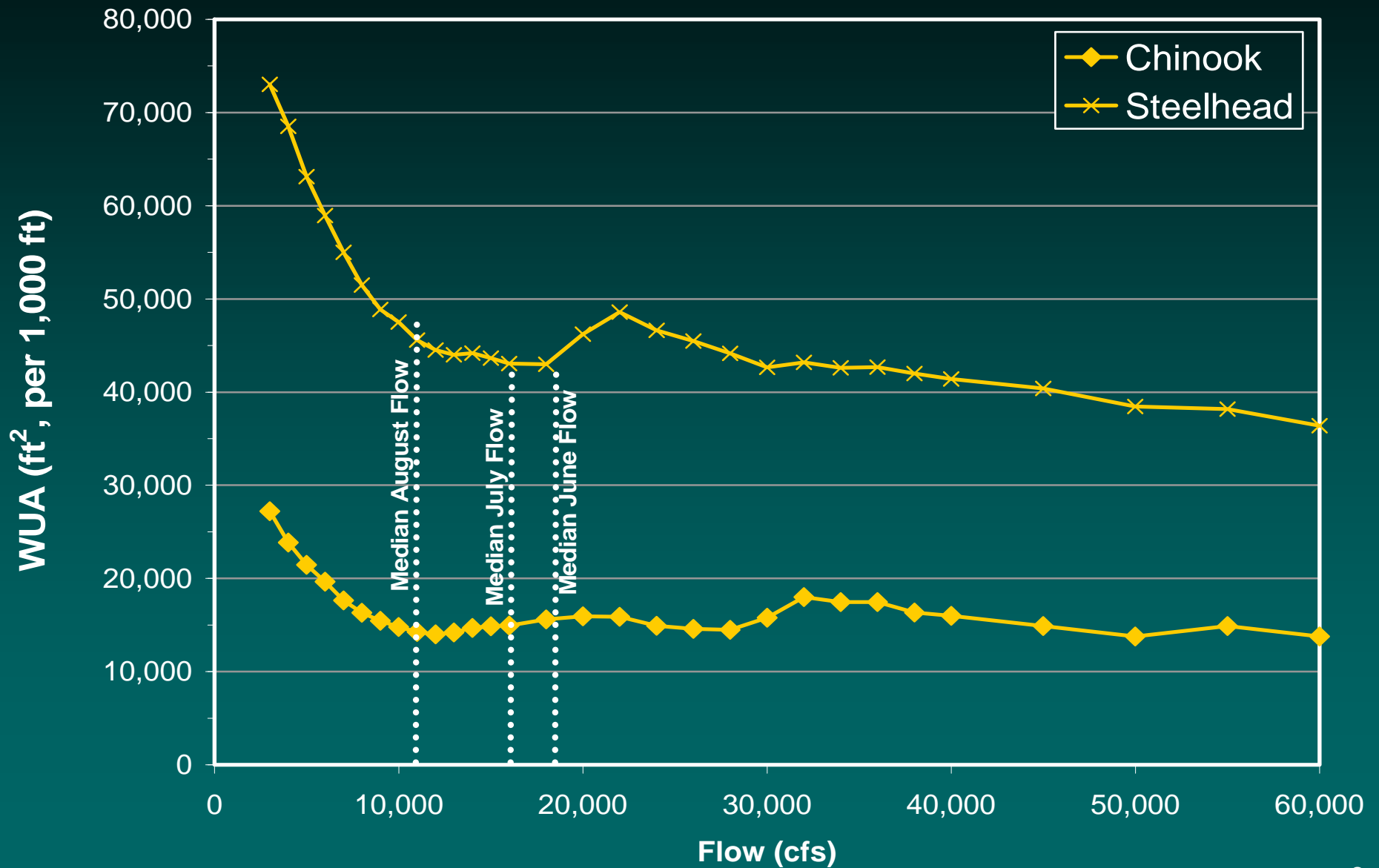
87,000 cfs

Channel migration more likely (Phase 2 flooding)

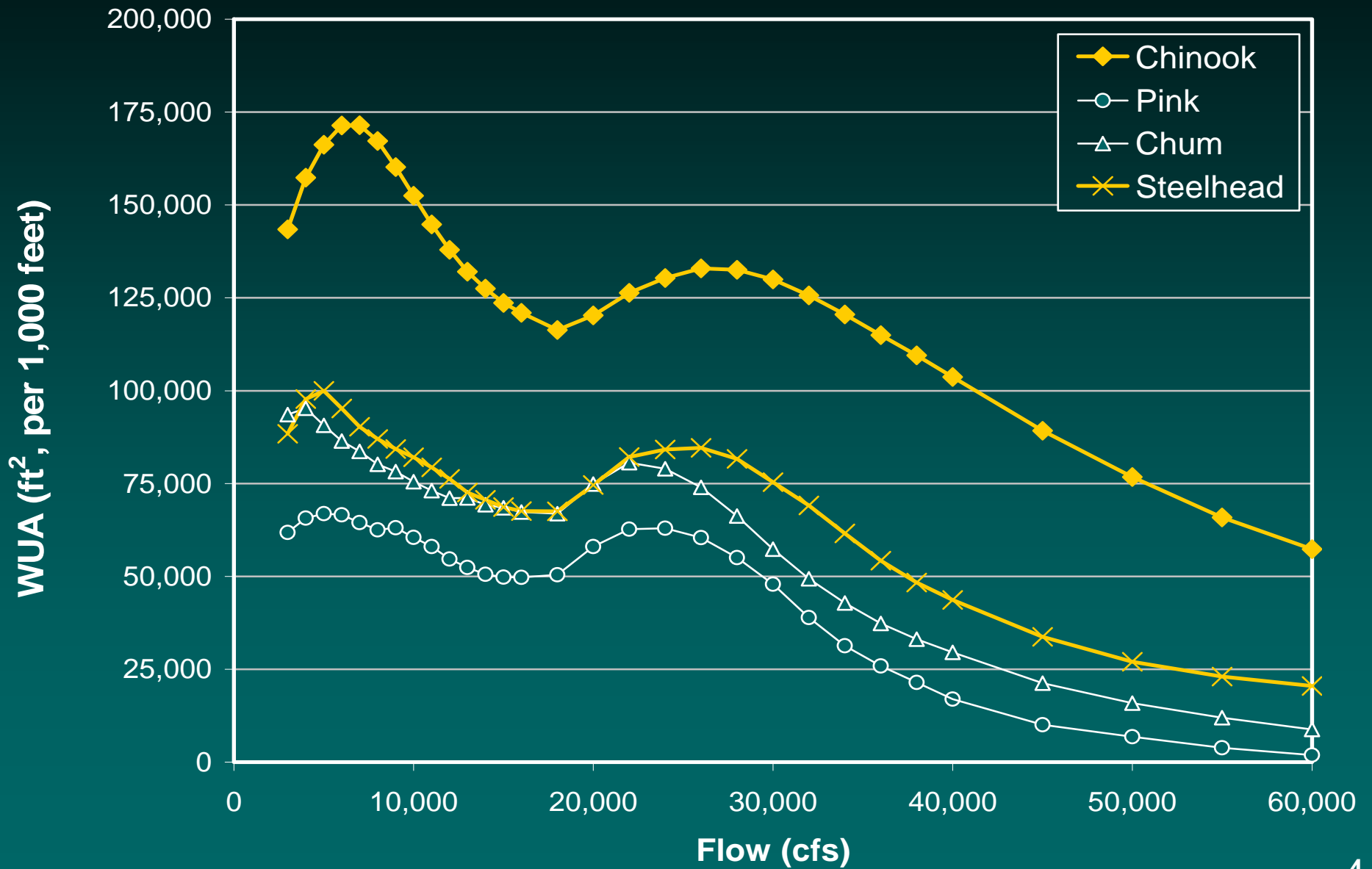
123,000 cfs

Pollution treatment facilities compromised
(Phase 3 flooding)

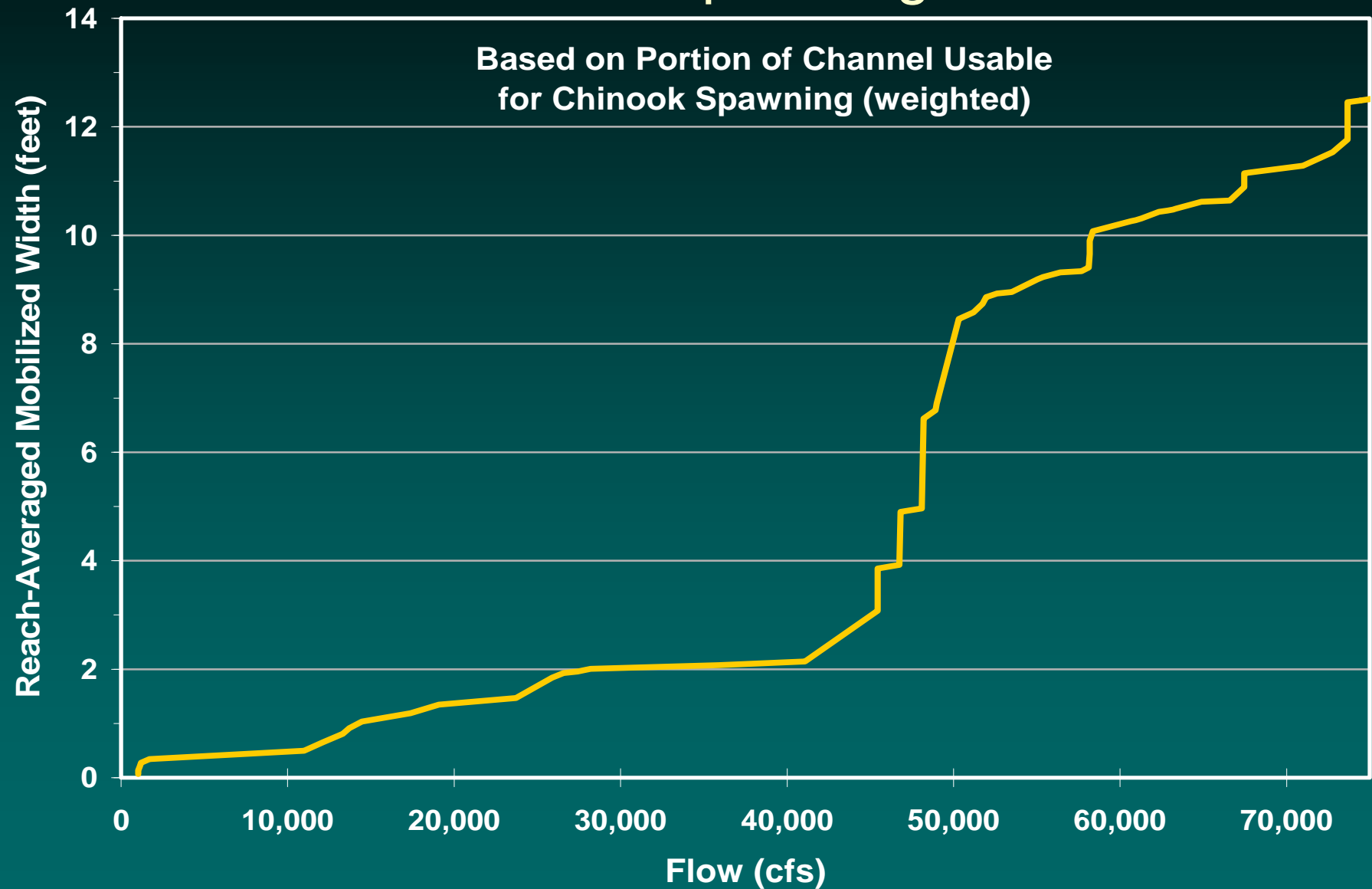
Salmonid Rearing: Weighted Usable Area (WUA)



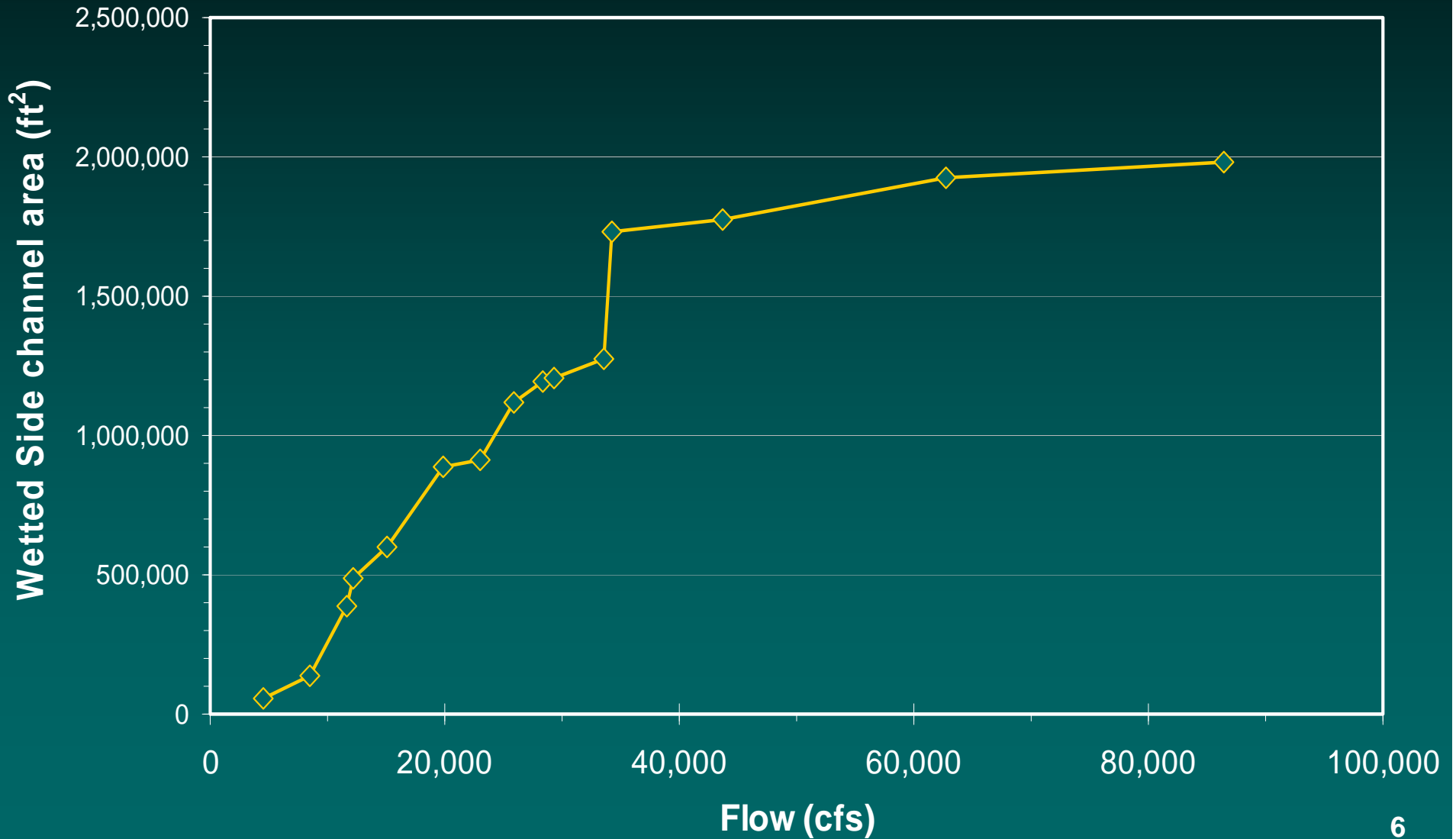
Salmon Spawning: Weighted Usable Area (WUA)



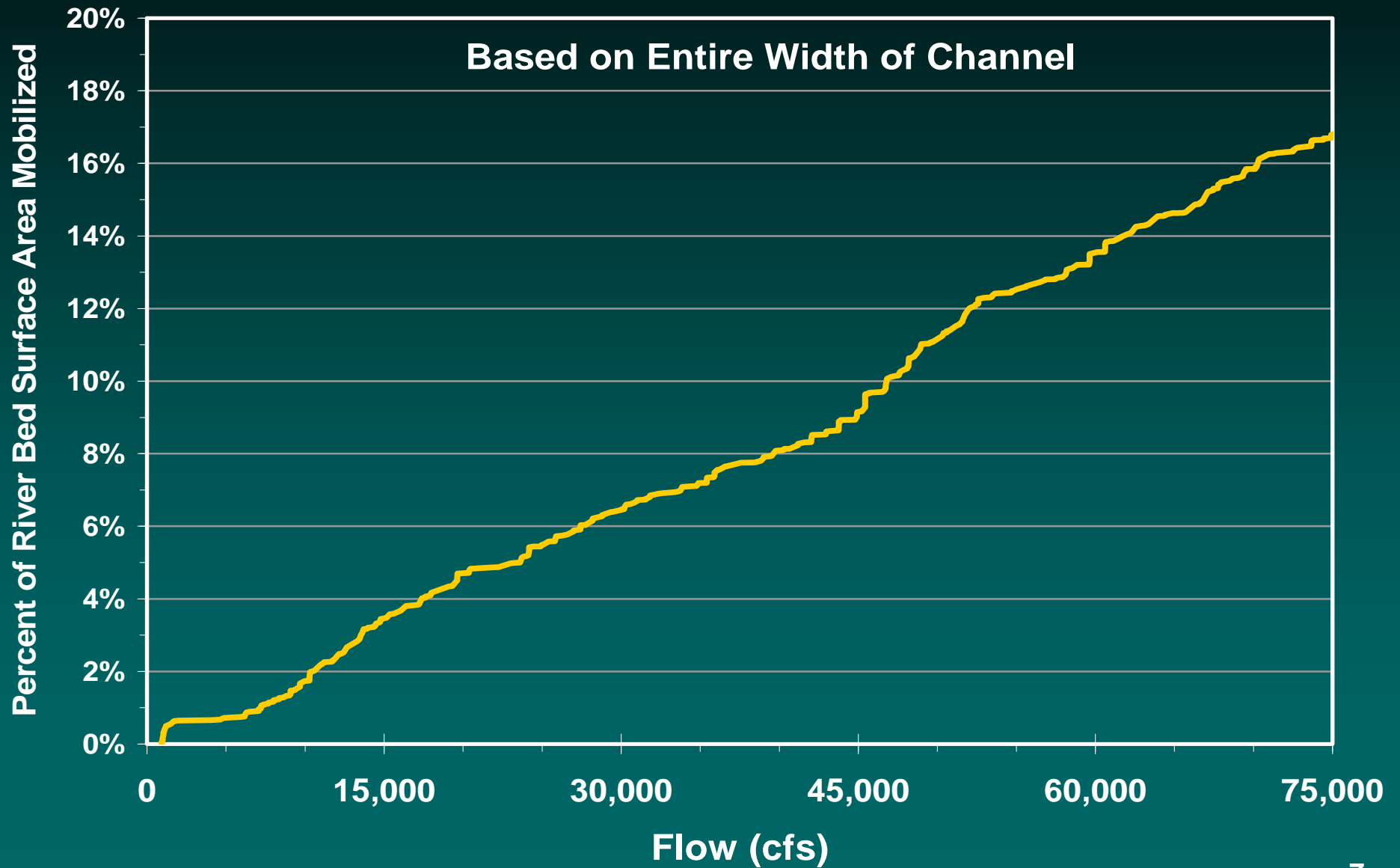
Mobilization of Substrates at Chinook Spawning Areas



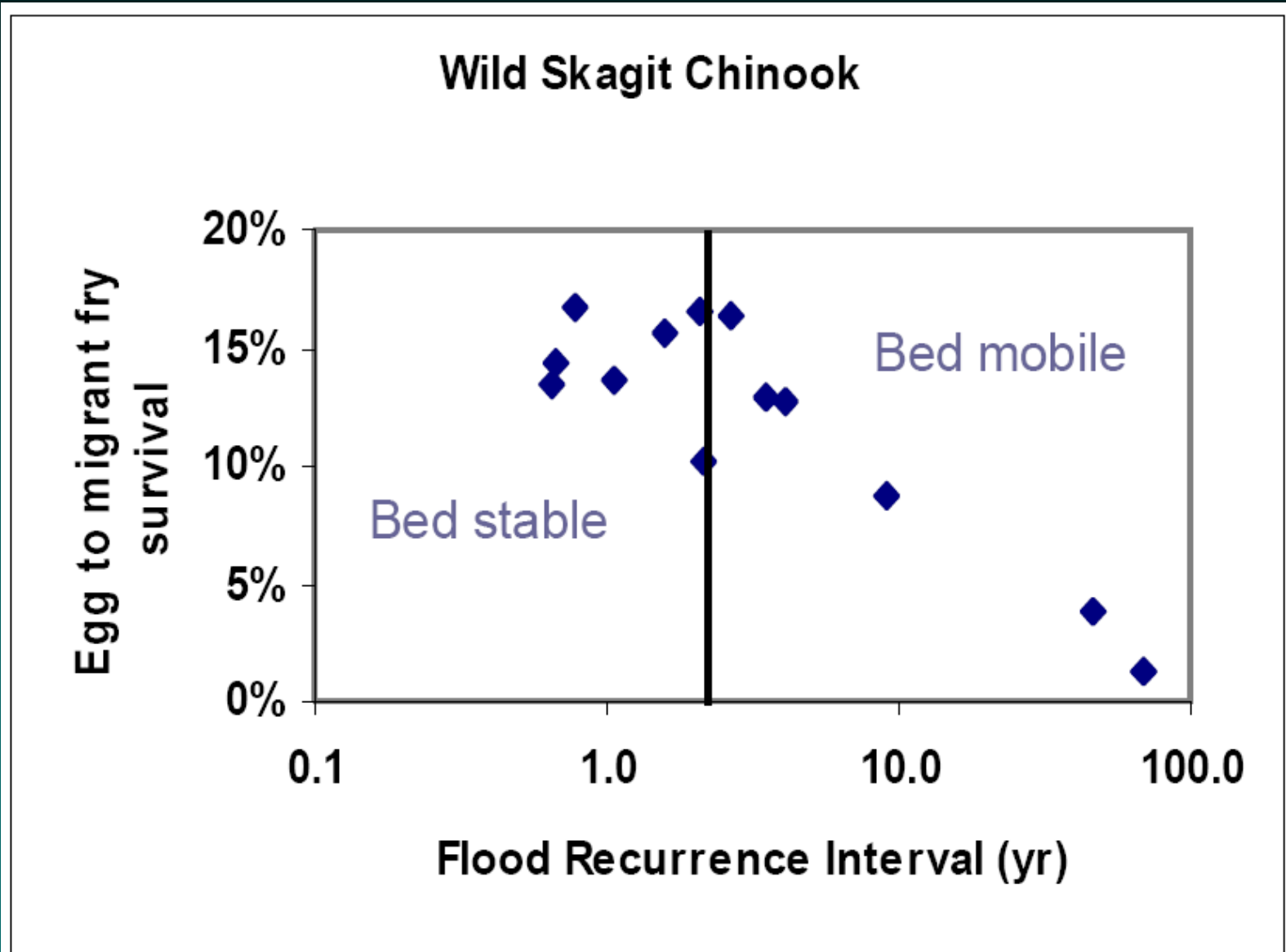
Middle Skagit River: Cumulative Potentially Accessible Side Channel Area



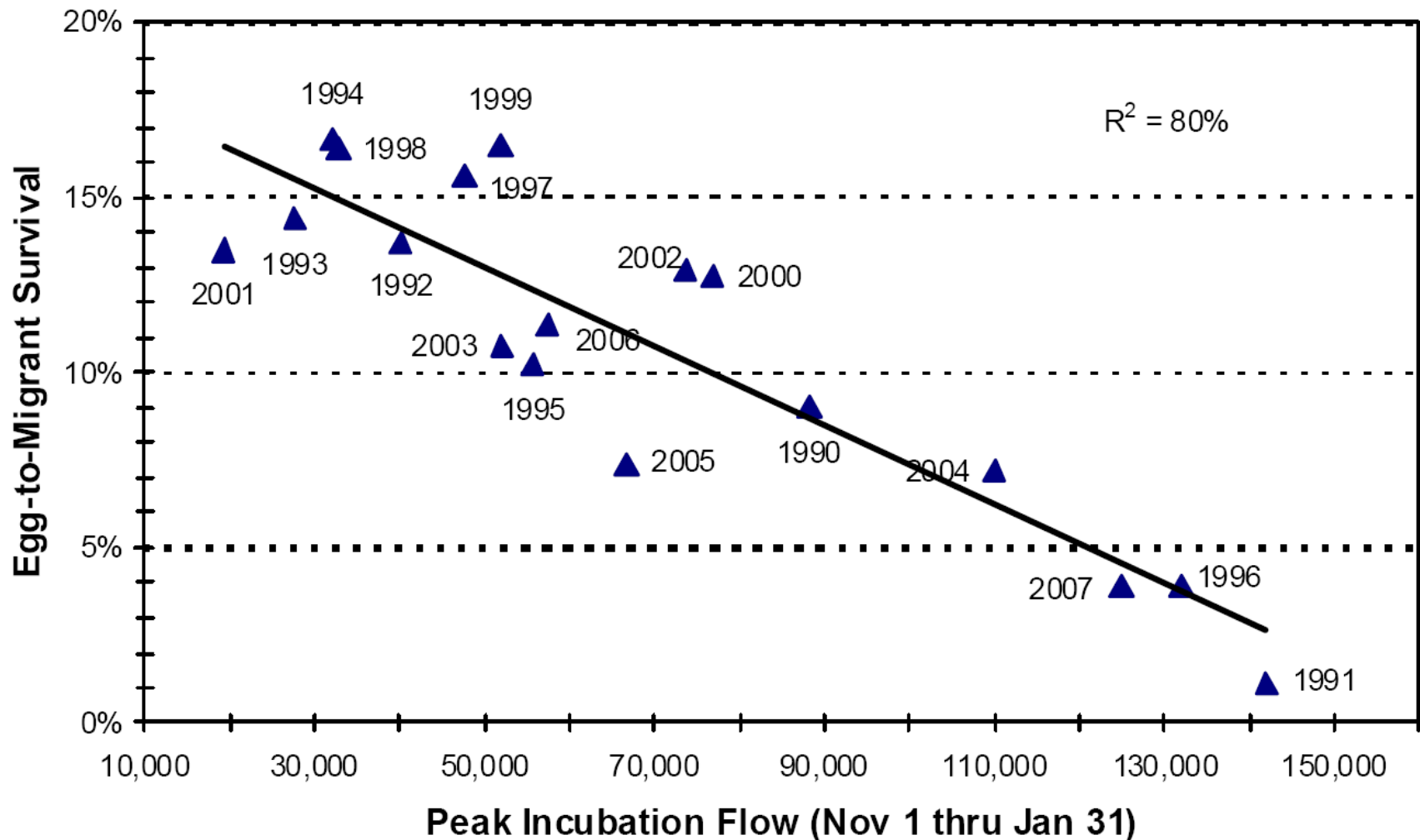
Middle Skagit River: Bed mobilized vs. flow



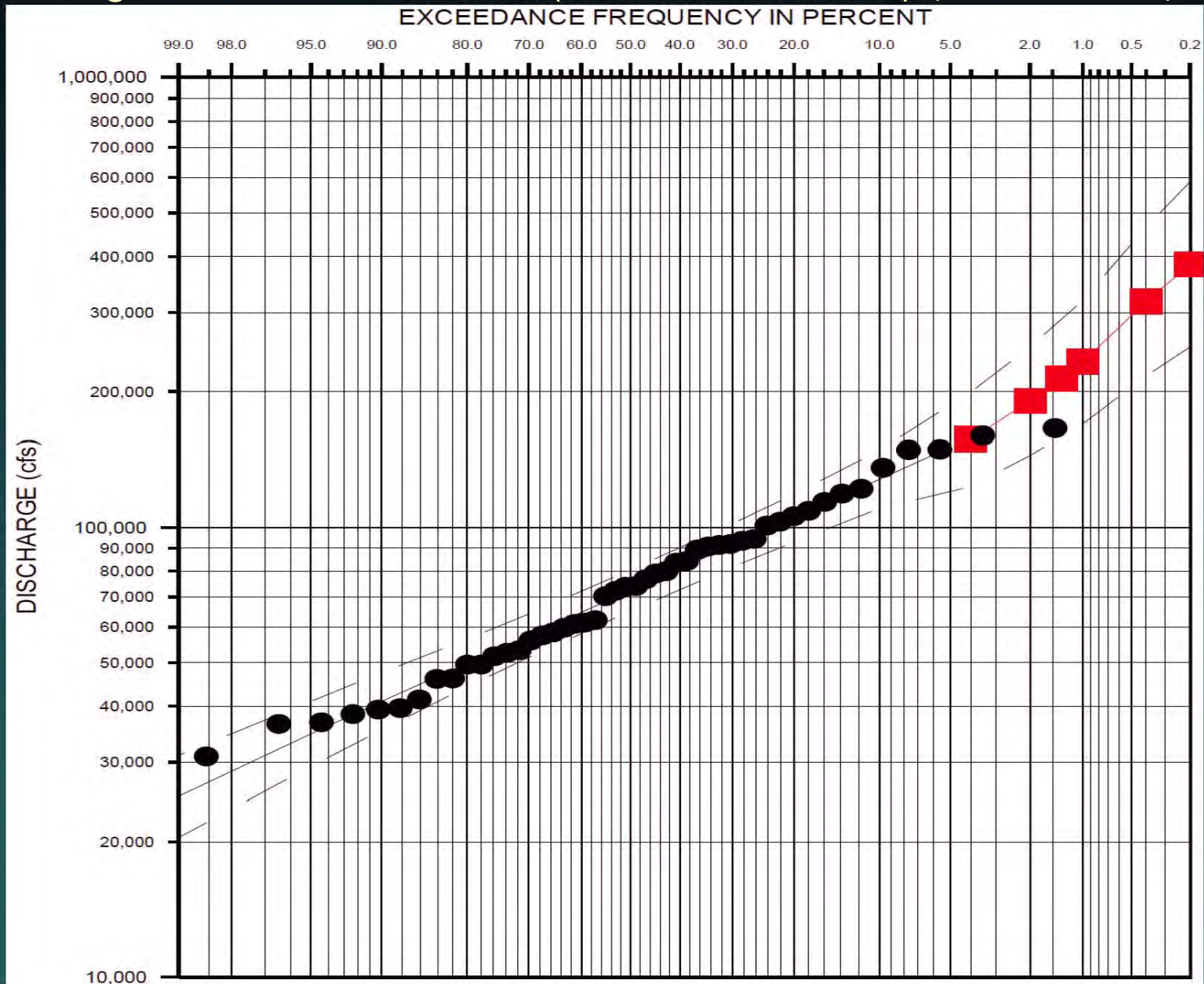
Skagit River Chinook salmon: Egg-to-migrant fry survival vs. Flood return interval (Beamer et al. 2005)



Skagit River Chinook salmon: Egg-to-migrant fry survival vs. Streamflow [USGS Mt. Vernon Gage 12200500] (Kinsel et al. 2008)



Regulated Peak Flow Frequency Curve: Skagit River near Concrete (USGS #12194000) (USACE 2009)



Computed Peak Flows for the Skagit R. at the Concrete and Sedro-Woolley Gages (USACE 2009)

	Concrete		Sedro- Woolley	
	Unregulated	Regulated	Unregulated	Regulated
10-yr	159,000	116,300	156,920	123,610
50-yr	241,000	180,260	233,290	183,780
100-yr	278,000	209,490	272,220	215,270
500-yr	373,000	316,530	371,670	322,900