
The background image is a scenic view of a wide river, likely the Skagit River, flowing through a lush, forested landscape. The water is calm, reflecting the sky and the surrounding trees. The sky is a clear blue with a few wispy white clouds. The trees on the banks are dense and green, with some showing signs of autumn. The overall atmosphere is peaceful and natural.

Migration Studies of Bull Trout and Steelhead in the Skagit River, Washington

Ed Connor – Seattle City Light
Fred Goetz – Army Corps of Engineers
Dave Pflug – Seattle City Light
Eric Jeanes – R2 Resource Consultants

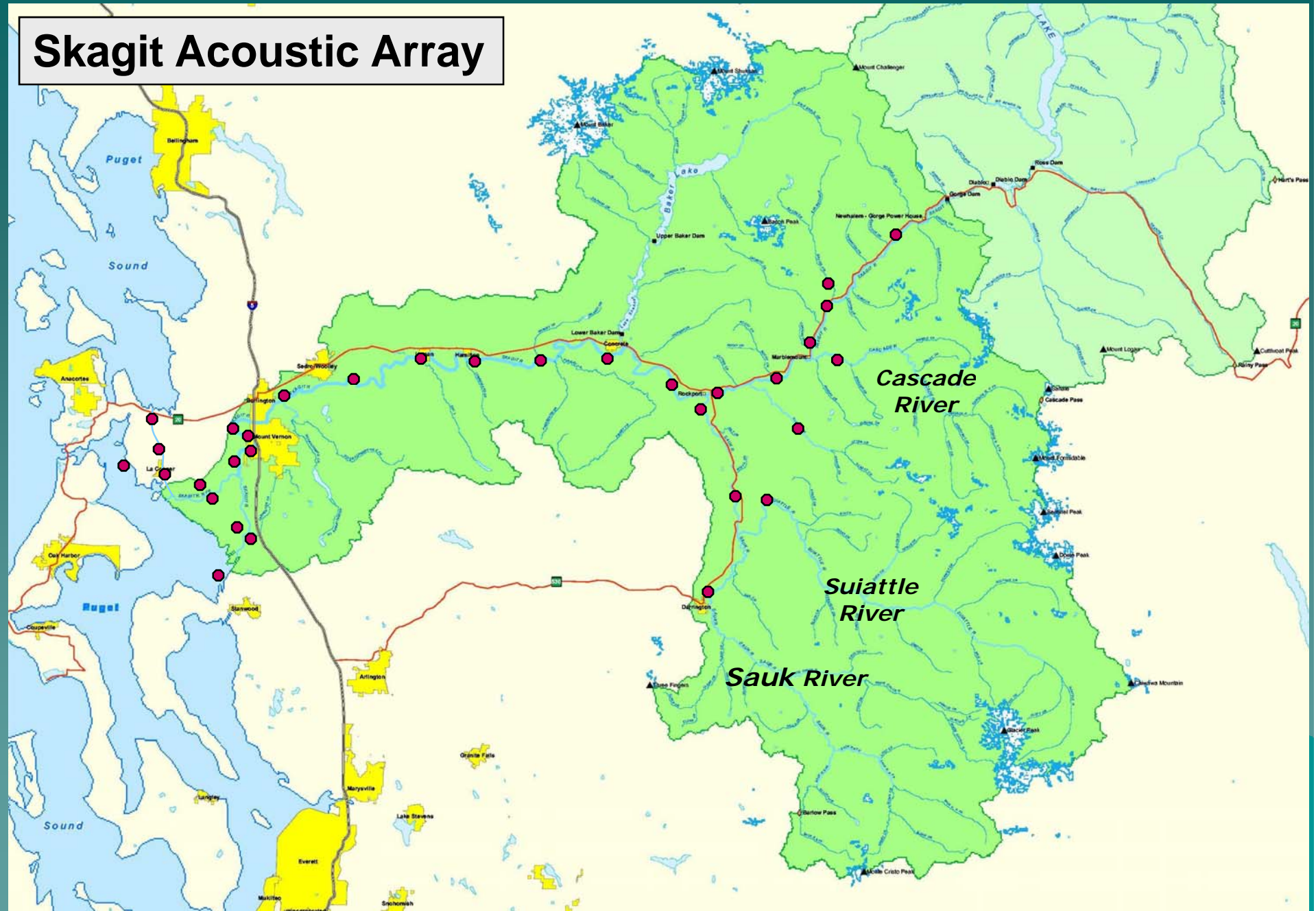
Key Research Questions

- ◆ What life history types of bull trout are present in the Skagit?
 - ◆ When and where do bull trout migrate in the Skagit and among Puget Sound Watersheds ?
 - ◆ What is migratory behavior of wild and hatchery steelhead smolts in the Skagit?
 - ◆ What is migratory behavior of adult chum salmon and steelhead (pre- and post-spawning) within the Skagit watershed?
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- A stylized, layered mountain range graphic in shades of teal and blue, located in the bottom right corner of the slide.

Skagit Acoustic Monitoring

- ◆ Bull Trout: 2003 – Present
- ◆ Steelhead Smolts: 2006 - Present
- ◆ Steelhead Adults: 2008 – 2009
- ◆ Chum Salmon Adults: 2007-2008

Skagit Acoustic Array



Bull Trout Migration Study

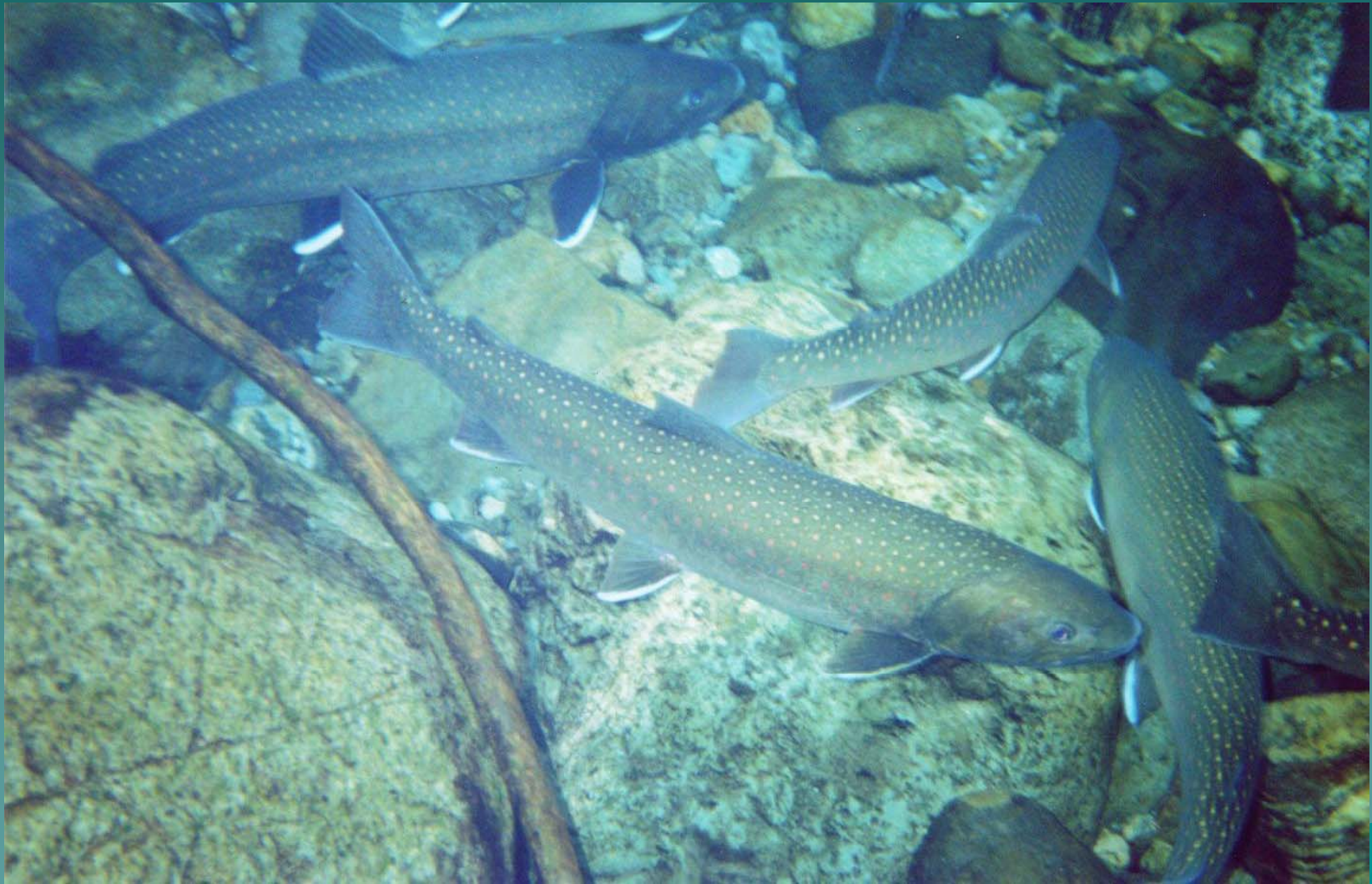
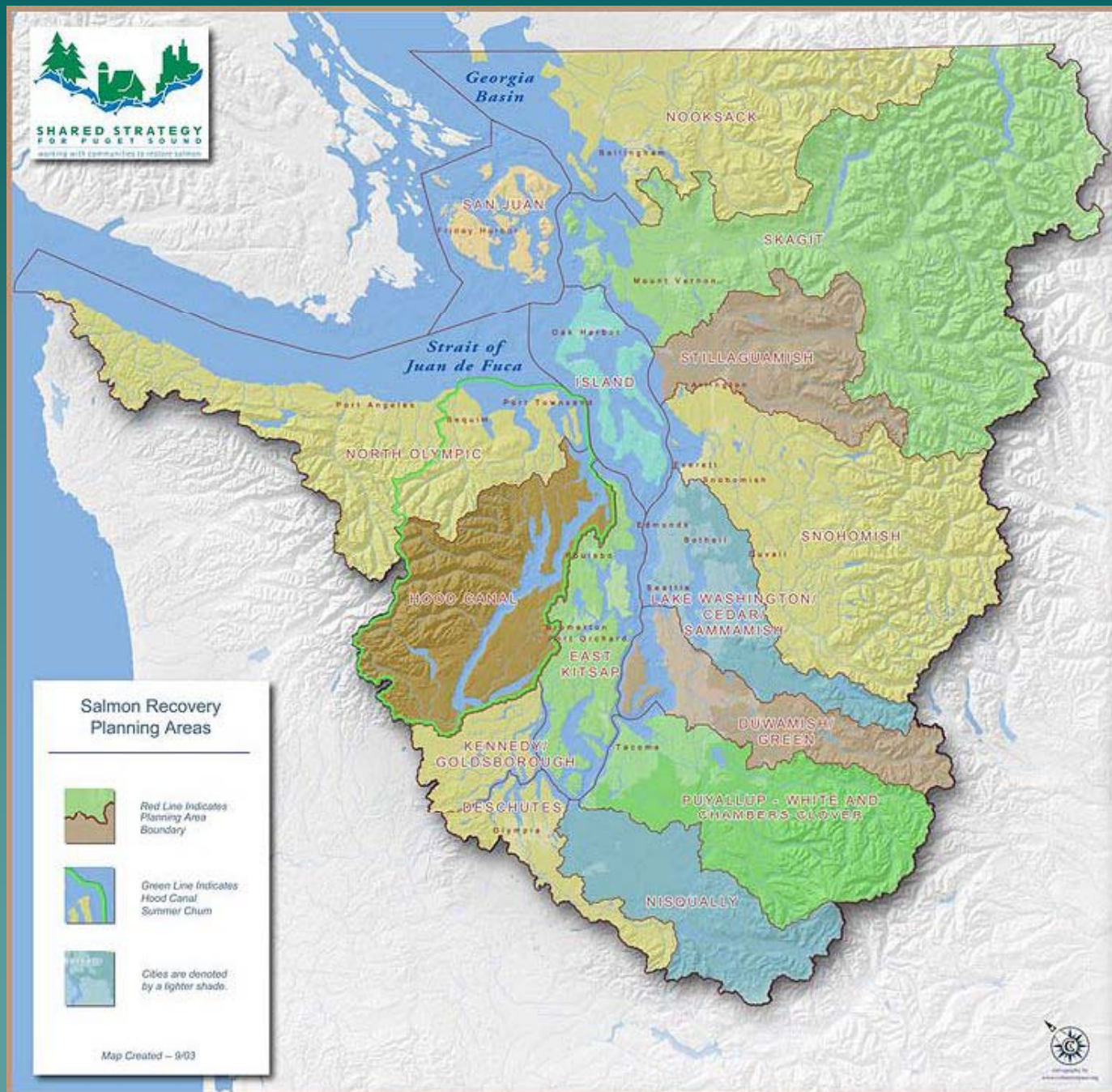
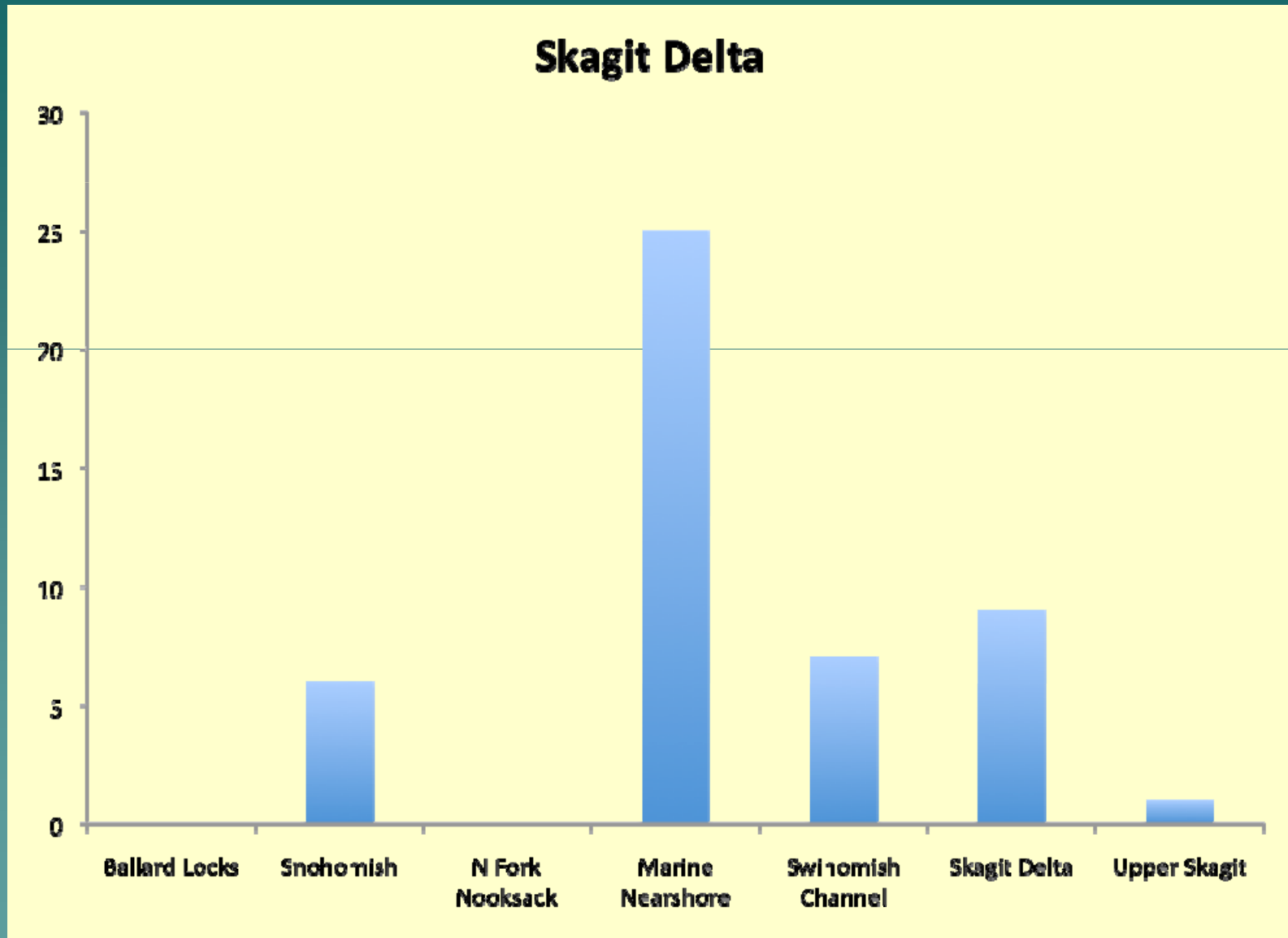


Photo credit: Mark Downen

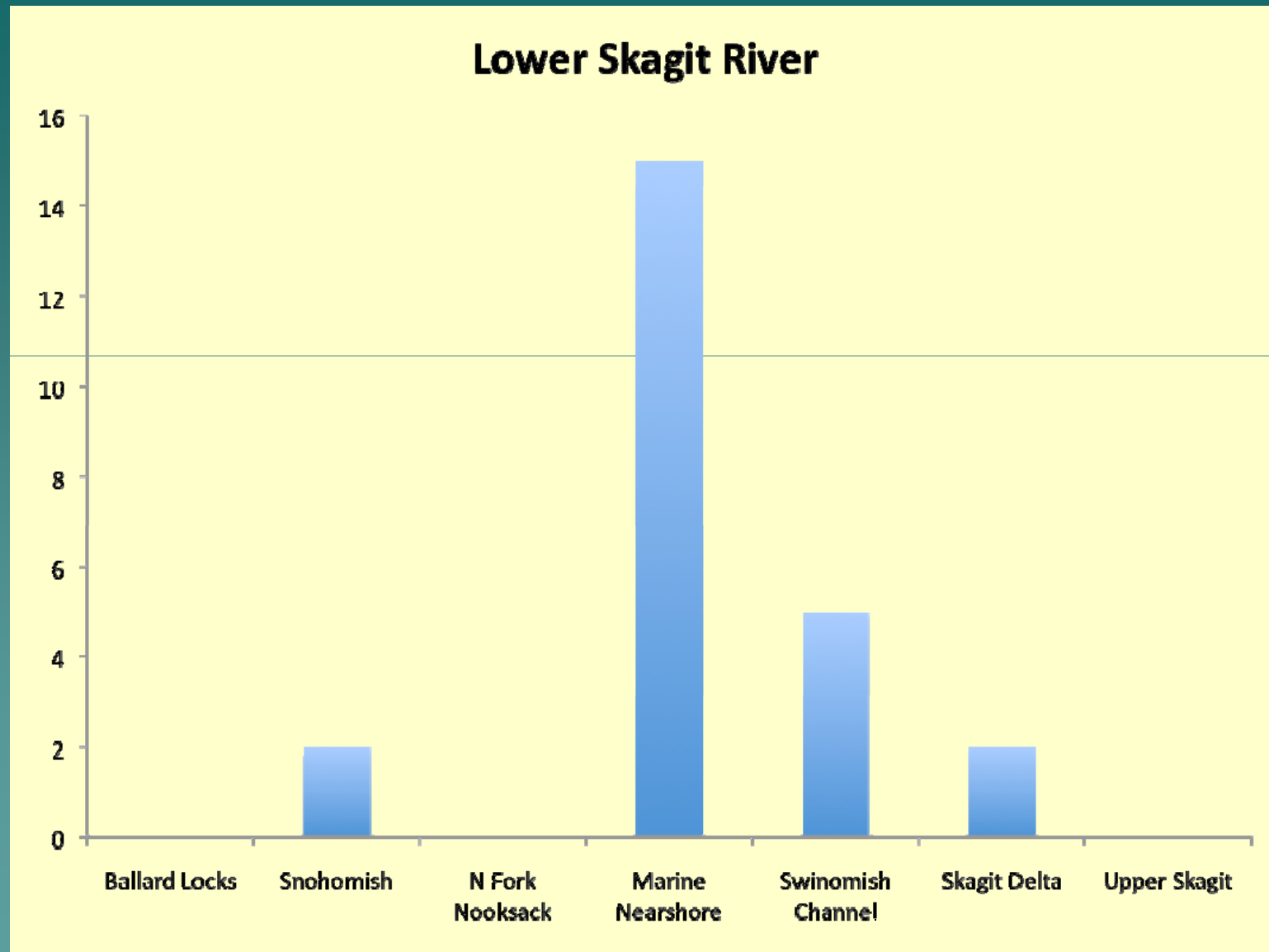


Skagit Bull Trout Immigration



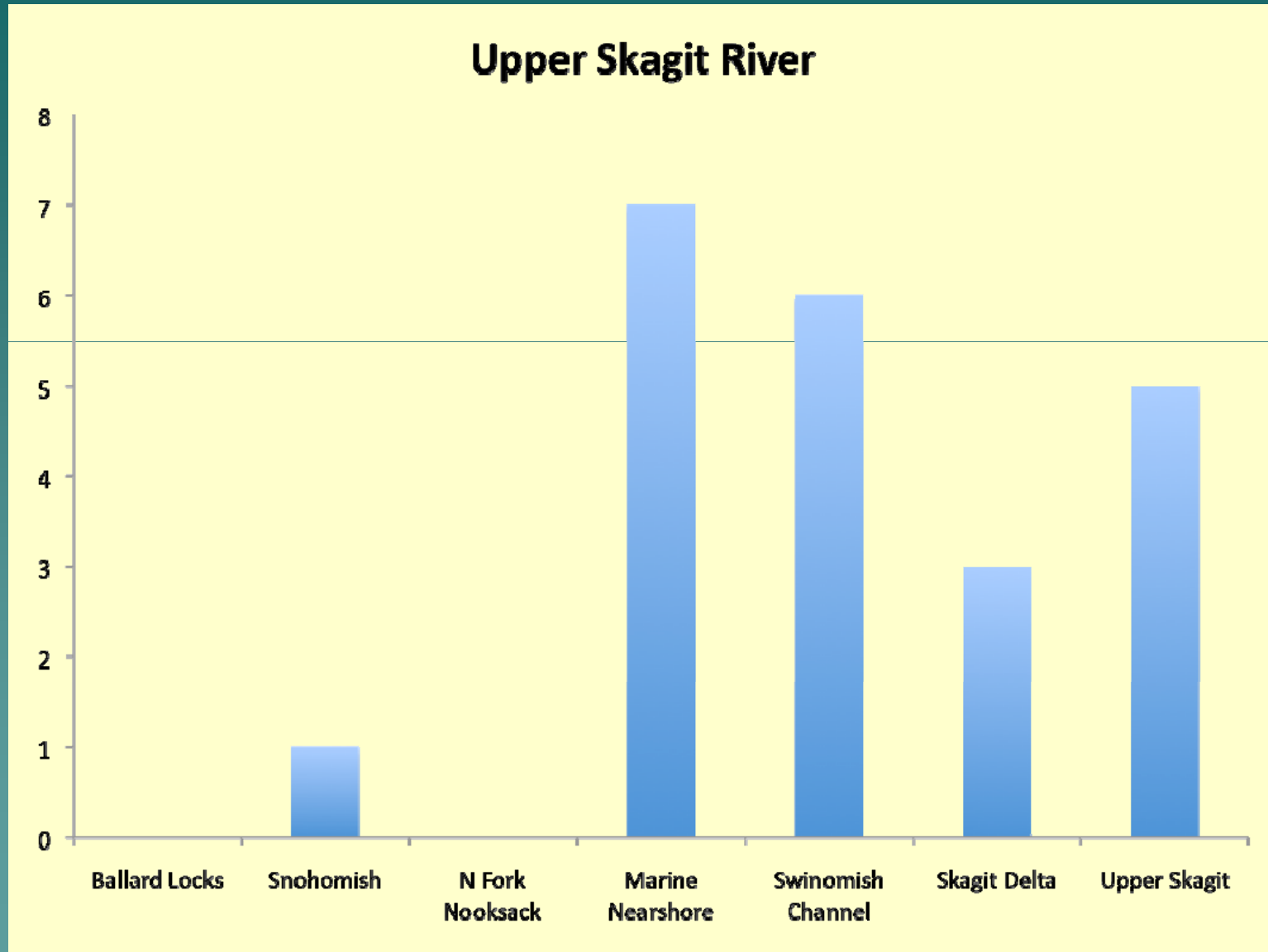
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Skagit Bull Trout Immigration



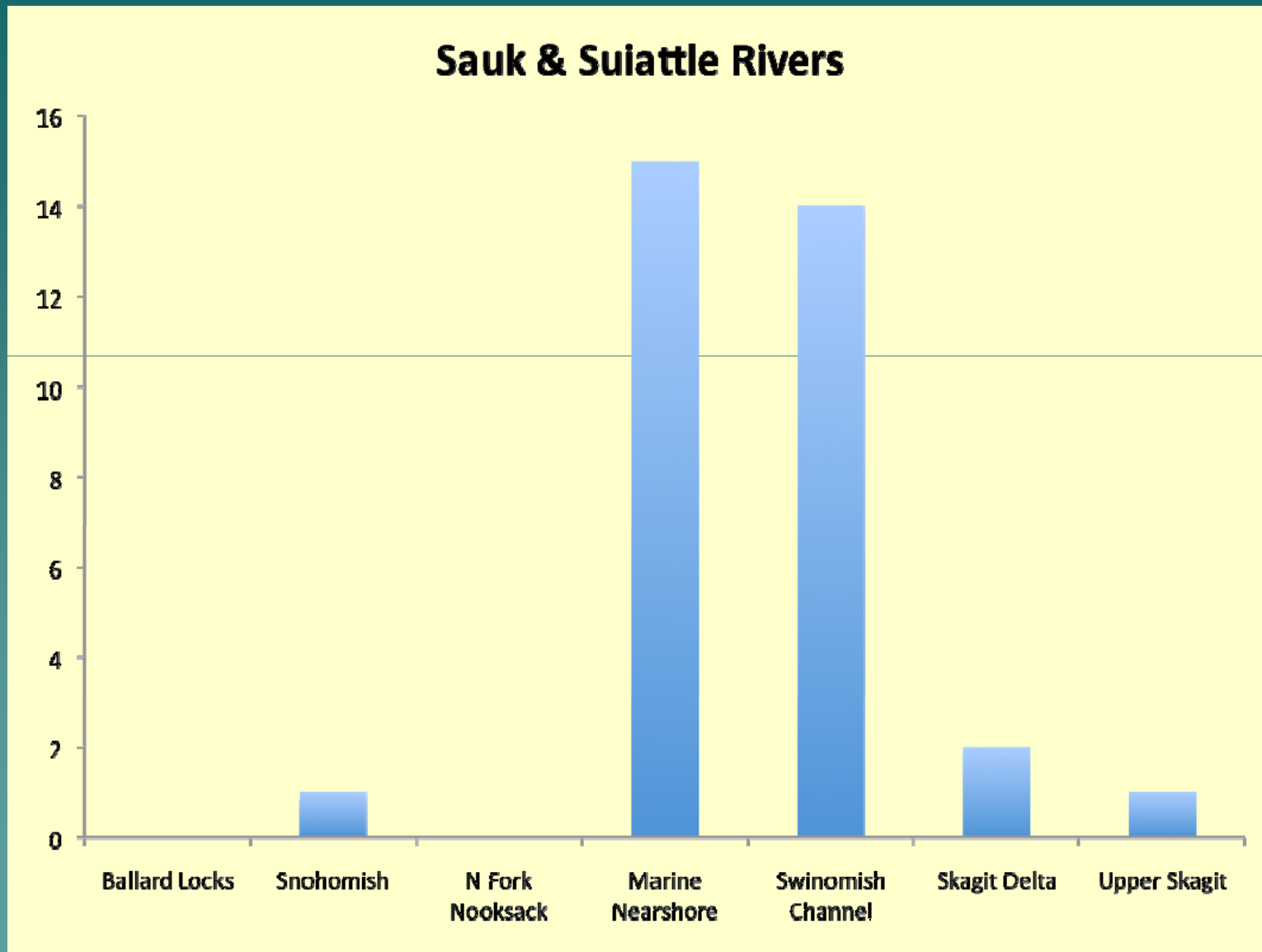
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Skagit Bull Trout Immigration



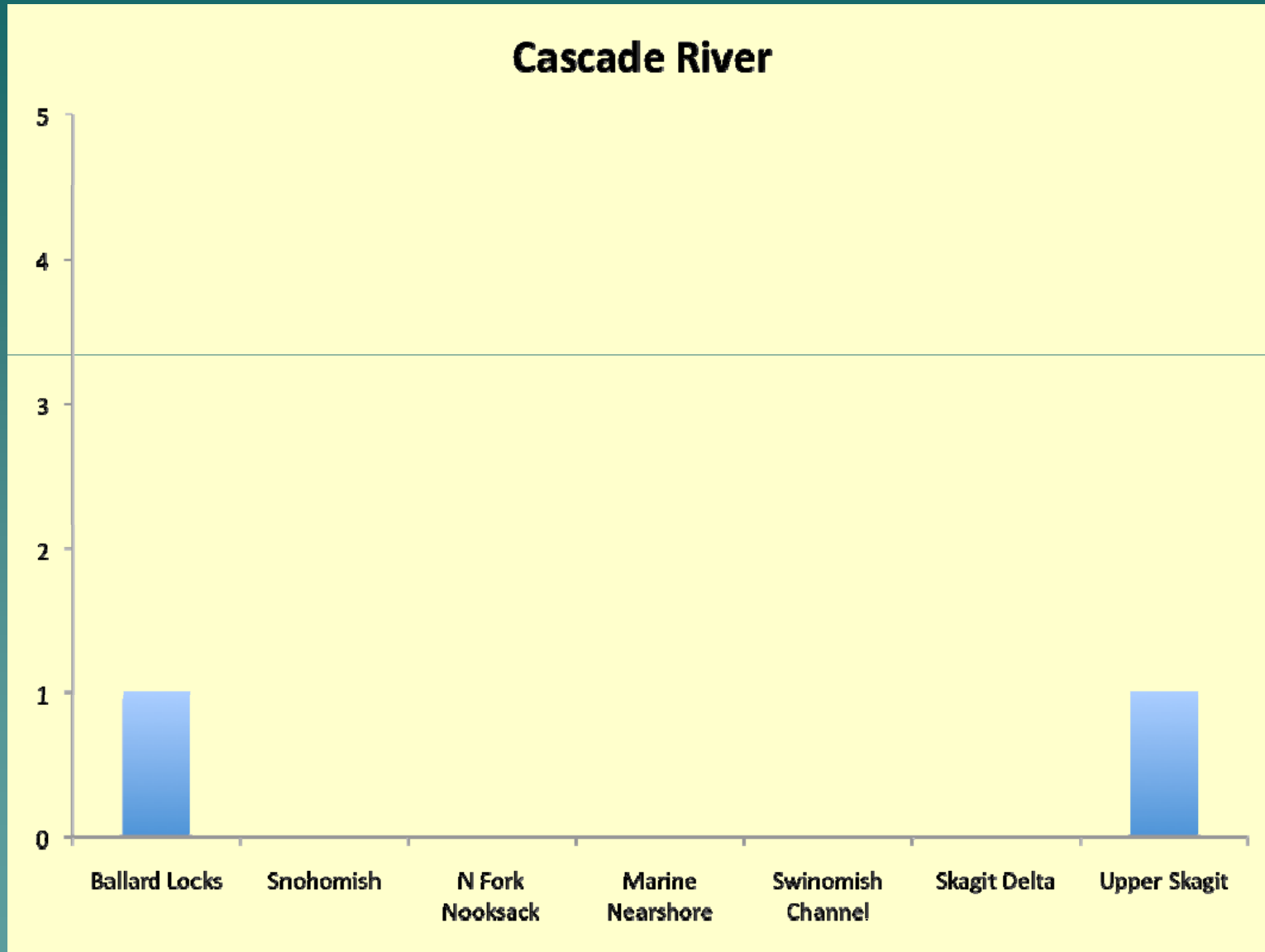
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Skagit Bull Trout Immigration



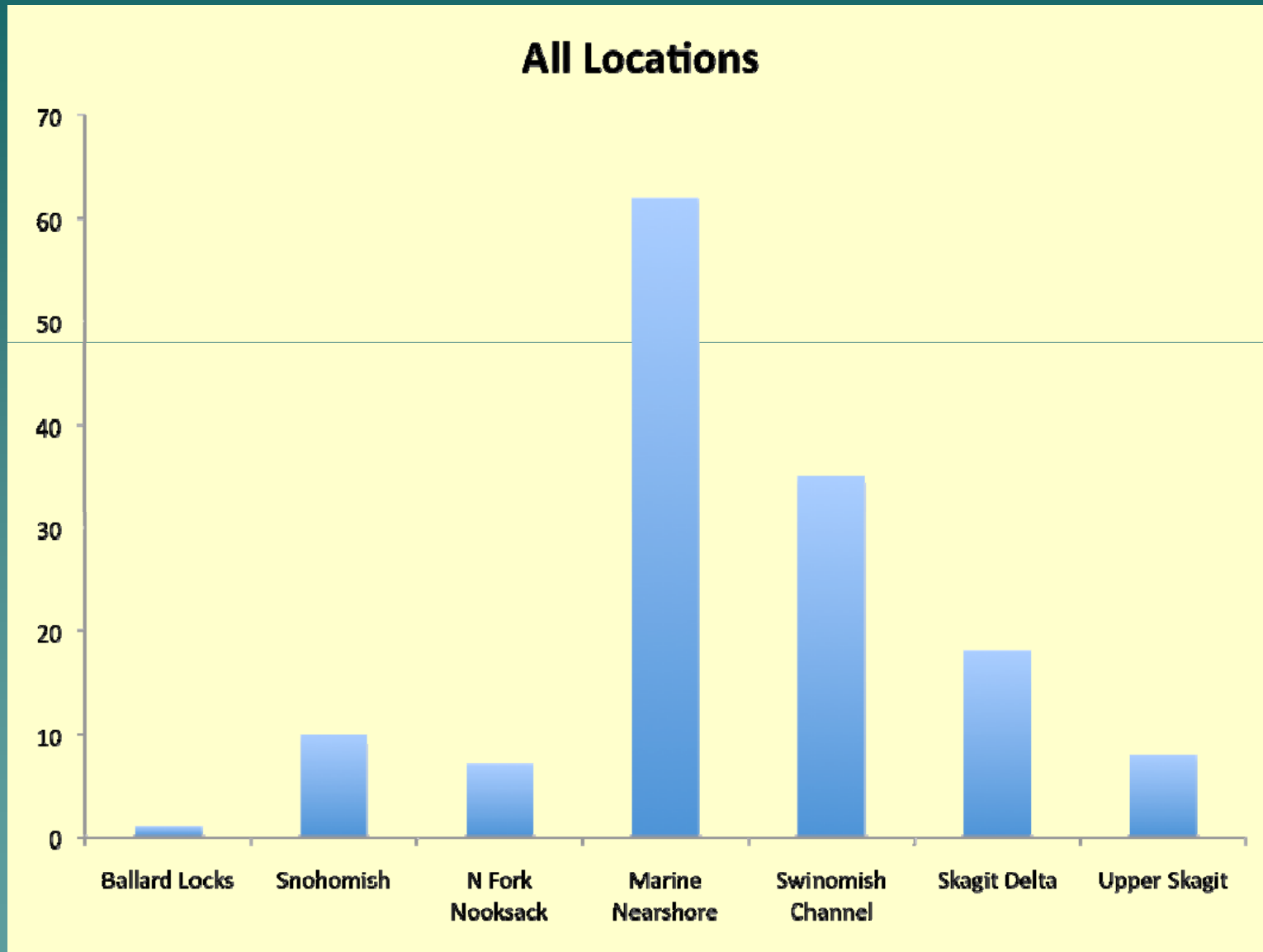
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Skagit Bull Trout Immigration



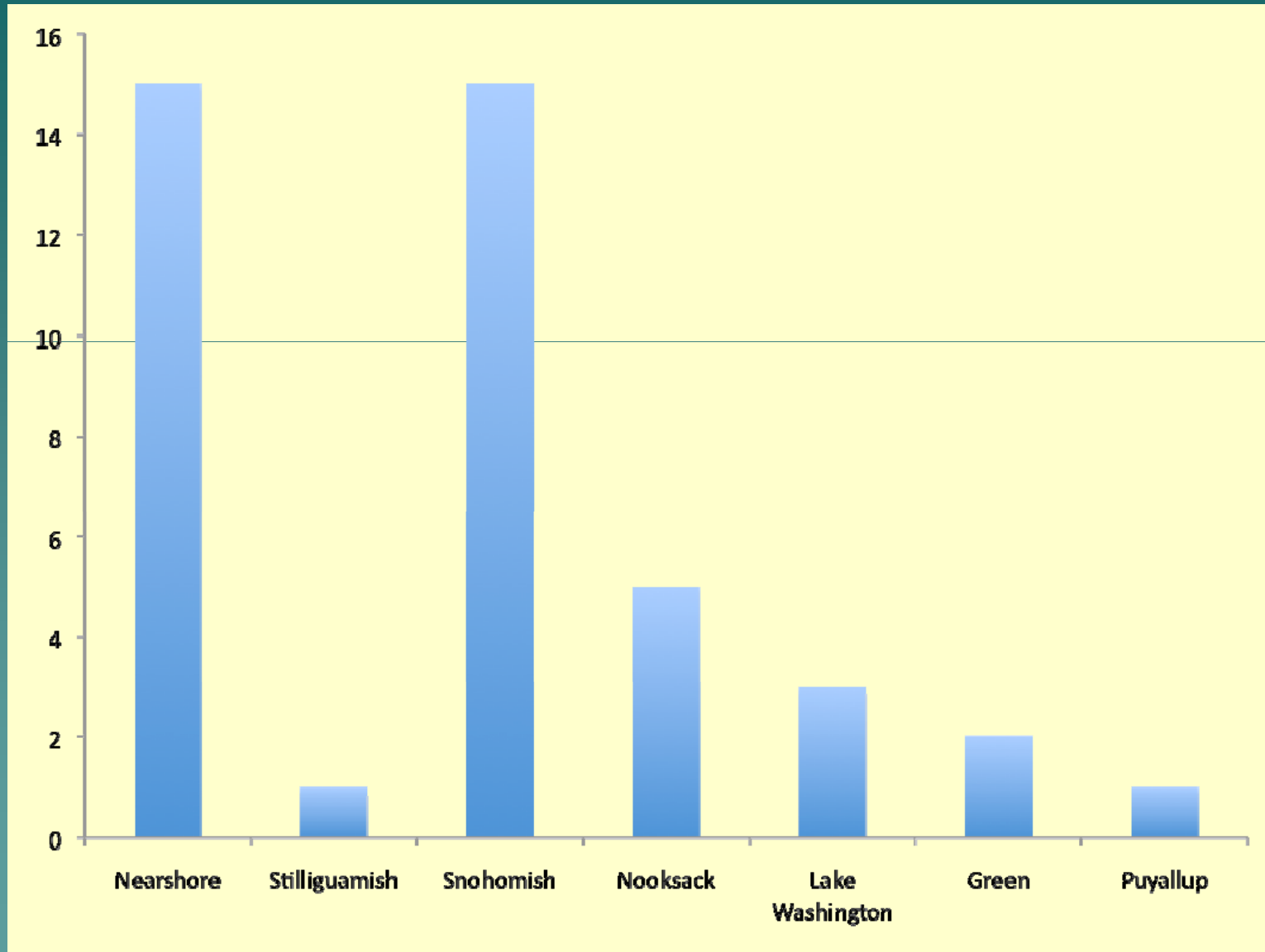
N = 2

Skagit Bull Trout Immigration



N = 141

Skagit Bull Trout Emigration




N = 42

Non-migratory Bull Trout of Upper Skagit


- ◆ Thirty bull trout implanted with tags
- ◆ Only four detected downstream
- ◆ Fish frequently recaptured, indicating that fish are maintaining territories in upper river
- ◆ Non-detections are just as important as detections!




Skagit Bull Trout Migratory Patterns

- ◆ Stream Resident: stay in tributaries
 - ◆ Fluvial Resident: Hold position in mainstem river except to spawn
 - ◆ Fluvial Nomadic: Move to lower river and estuary, “setting up camp” for extended periods
 - ◆ Anadromous: Migrate to marine nearshore and adjacent watersheds
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- A stylized, dark teal silhouette of a mountain range is positioned in the bottom right corner of the slide, partially overlapping the text of the last bullet point.

Skagit Bull Trout Migration Timing

- ◆ Upmigration through lower river: May through July (peak in late June)
 - ◆ Upmigration into upper river: July and August (peak in mid July)
 - ◆ Post-spawn downstream migration: October through November
 - ◆ Outmigration to estuary: February through April (peak in mid-March)
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Key Bull Trout Findings

- ◆ Delta and estuary is “transportation hub” for Skagit bull trout
 - ◆ Many bull trout reside in delta and estuary on year-round basis
 - ◆ Sauk/Suiattle populations appear to be linked to marine nearshore and estuary areas: anadromy dominant
 - ◆ Bull trout in upper Skagit are much less prone to migrate: fluvial life history appears to be dominant
 - ◆ Skagit is “mother ship” for bull trout in Puget Sound
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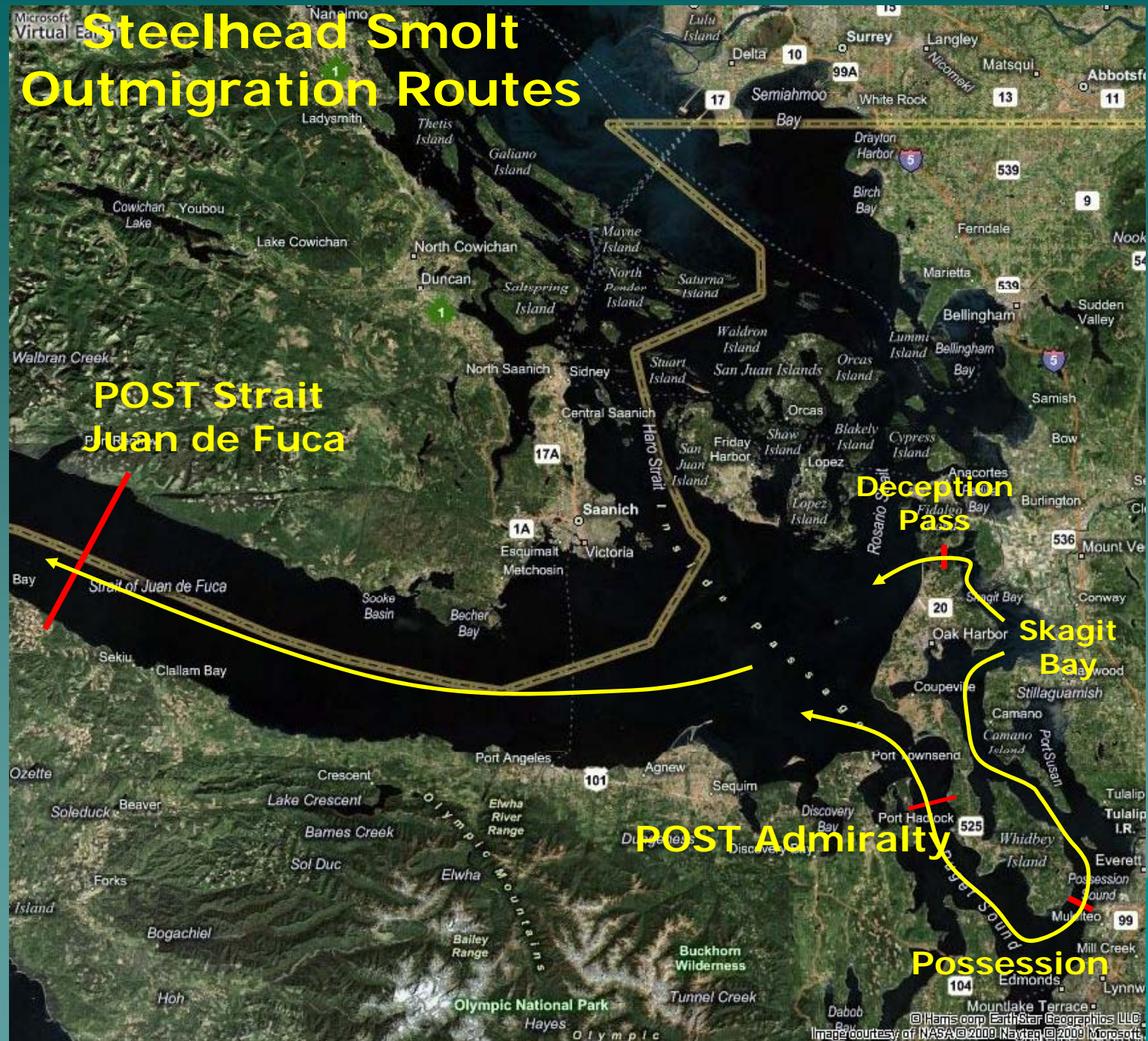
Steelhead Smolt Migration



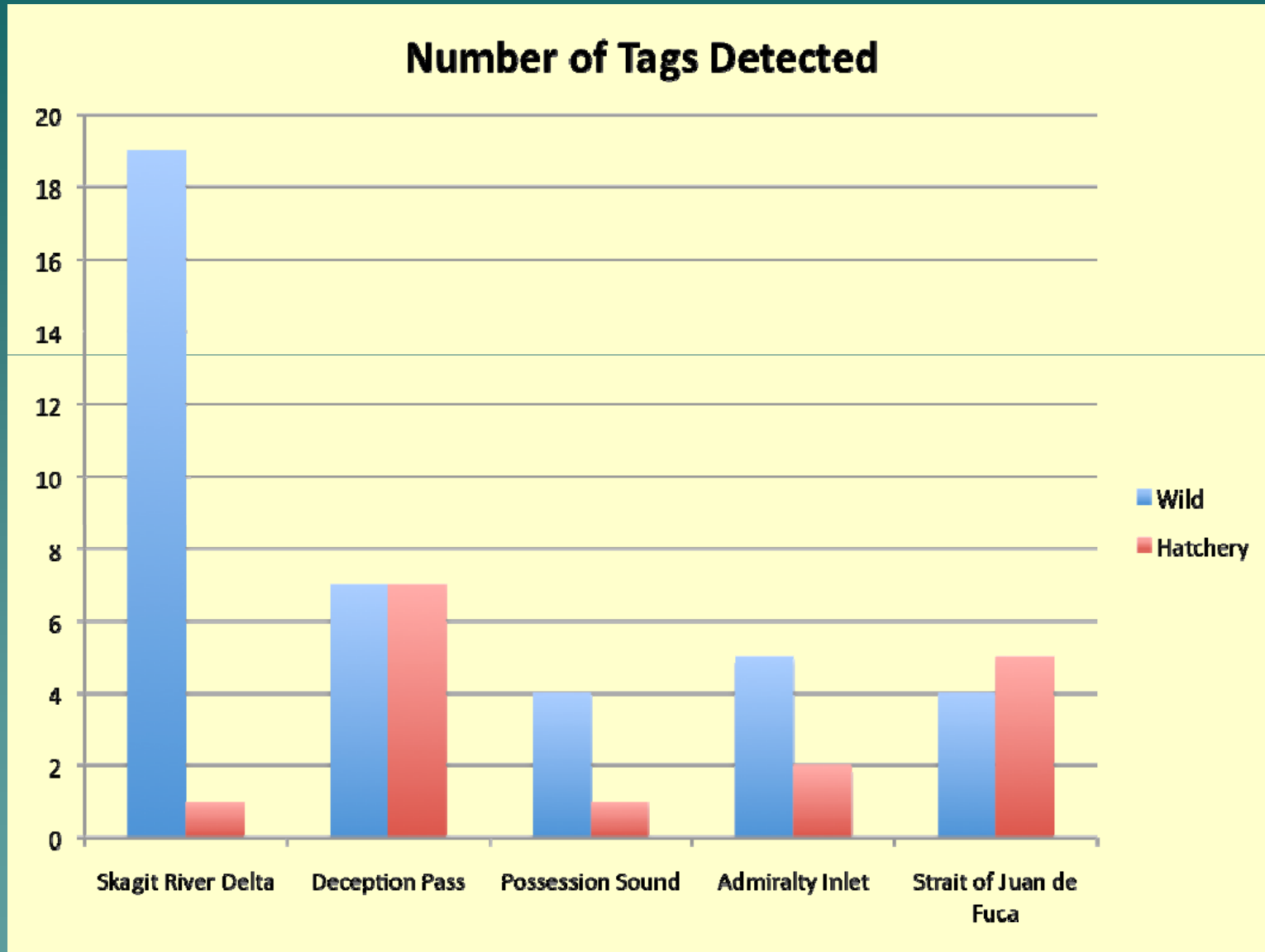
Skagit Smolt Trap



Steelhead Smolt Outmigration Routes

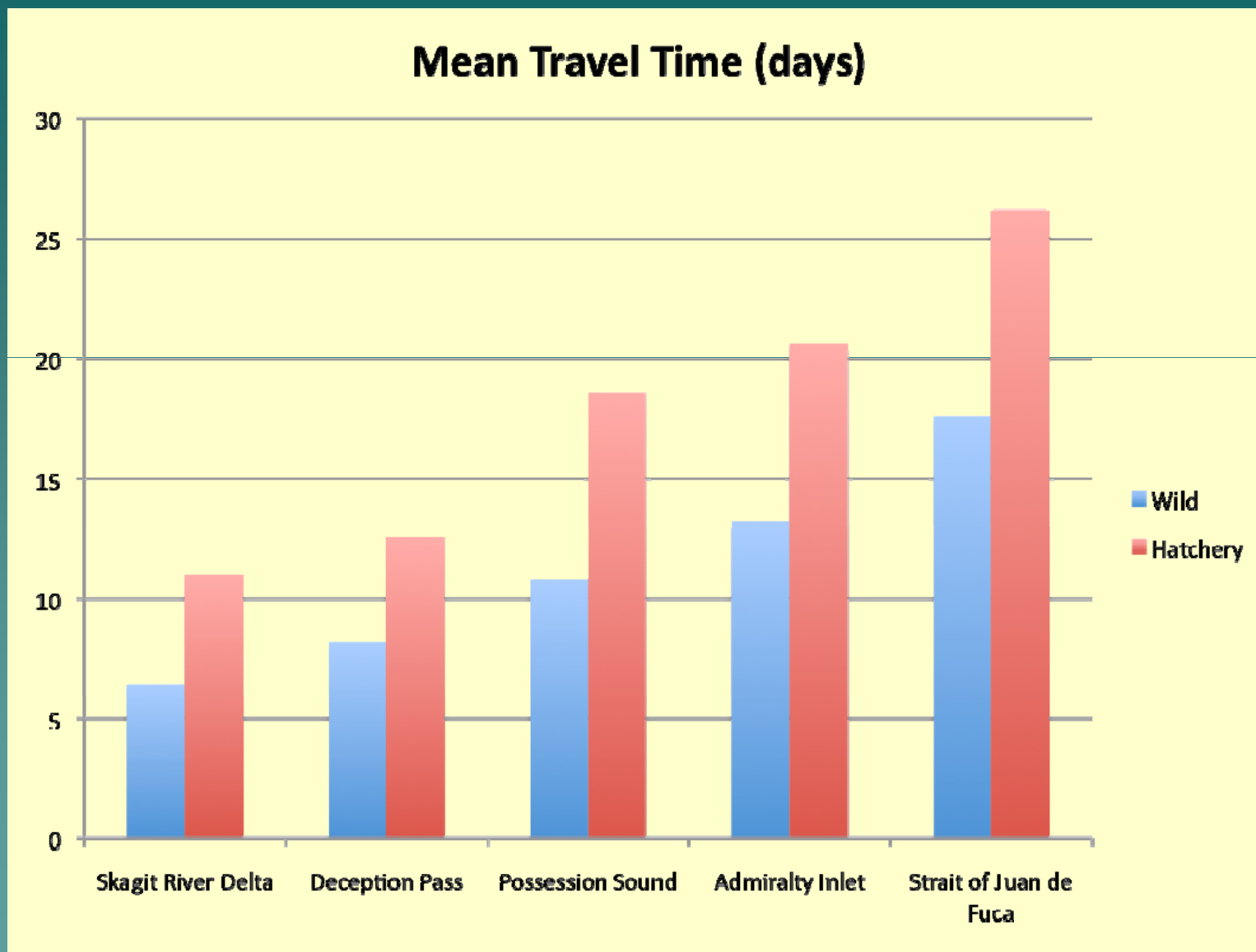


Steelhead Smolt Tag Detections 2008




N = 100 (50 Wild + 50 Hatchery)

Steelhead Smolt Travel Times 2008



N = 100 (50 Wild + 50 Hatchery)

Steelhead Migration Findings

- ◆ Wild steelhead smolts migrate through lower river and estuary quickly (few hours to less than week)
 - ◆ Most smolts head north through Deception Pass and then out Strait of Juan de Fuca
 - ◆ Hatchery smolts remain in river about one week
 - ◆ Total travel time to Pacific Ocean is two to three weeks
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