

Environmental Predictors of Spawn Timing and Spawner Abundance for Coastal Cutthroat Trout in South Puget Sound

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Objectives

- Establish spawning ground indexes to monitor coastal cutthroat trout (CCT) populations in South Puget Sound
- Determine the spawn timing of CCT across multiple years and streams
- Measure environmental variables to identify possible predictors of run timing variability



Islands

San Juan Islands

Hood Canal

South Basin

Whidbey Basin

Admiralty Inlet

Central Basin

Olympic Peninsula

Olympia

Seattle

Tacoma

Tacoma Narrows

Kitsap Peninsula

Poulsbo

Bainbridge Island

Bremerton

Dyes Inlet

Sinclair Inlet

Shelton

Harstine Island

Totten Inlet

Eld Inlet

Budd Inlet

Deschutes R.

Vashon Island

Federal Way

Green R.

White R.

Carbon R.

Puyallup R.

Lake Sammamish

Lake Washington

Cedar R.

Duwamish R.

Skokomish R.

Nisqually R.

Skagit R.

Snohomish R.

Stillaguamish R.

Port Susan

Skagit Bay

Camano Island

Whidbey Island

Deception Pass

Fidalgo Island

Padilla Bay

Samish Bay

Bellingham Bay

Mokelum R.

Bellingham

Mount Vernon

Everett

Edmonds

Seattle

Tacoma

Olympia

Bellingham

Mount Vernon

Everett

Edmonds

Seattle

Tacoma

Olympia

Deception Pass

Whidbey Island

Whidbey Island

Admiralty Inlet

Hood Canal

Hood Canal

Admiralty Inlet

Hood Canal

Hood Canal

Hood Canal

Hood Canal

Hood Canal

Strait of Georgia

Strait of Georgia

Strait of Georgia

Strait of Georgia

Strait of Georgia

Strait of Juan de Fuca

Strait of Juan de Fuca

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Canada

USA

Port Angeles

Port Townsend

Sequim Bay

Port Discovery

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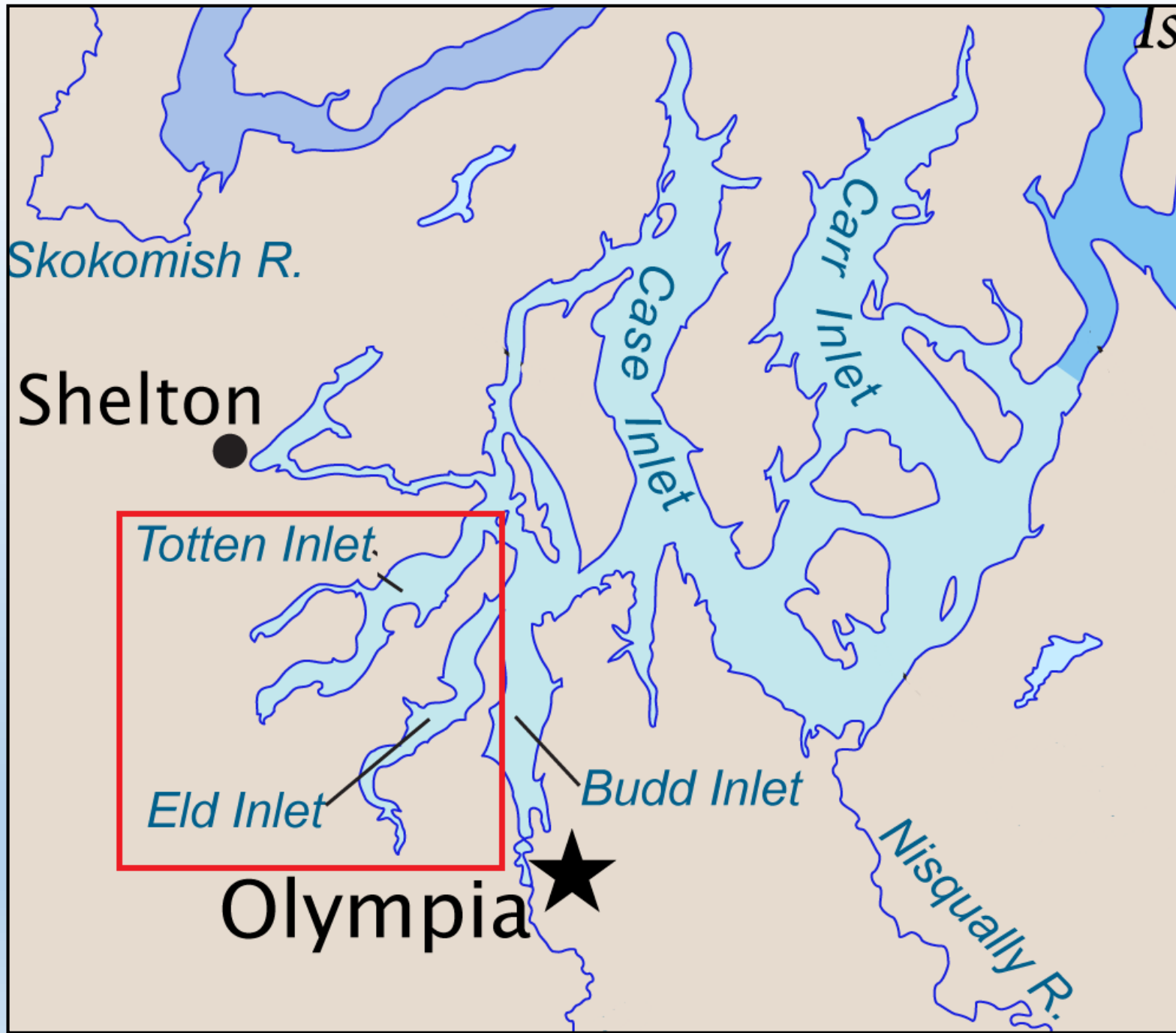
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Sequim Bay

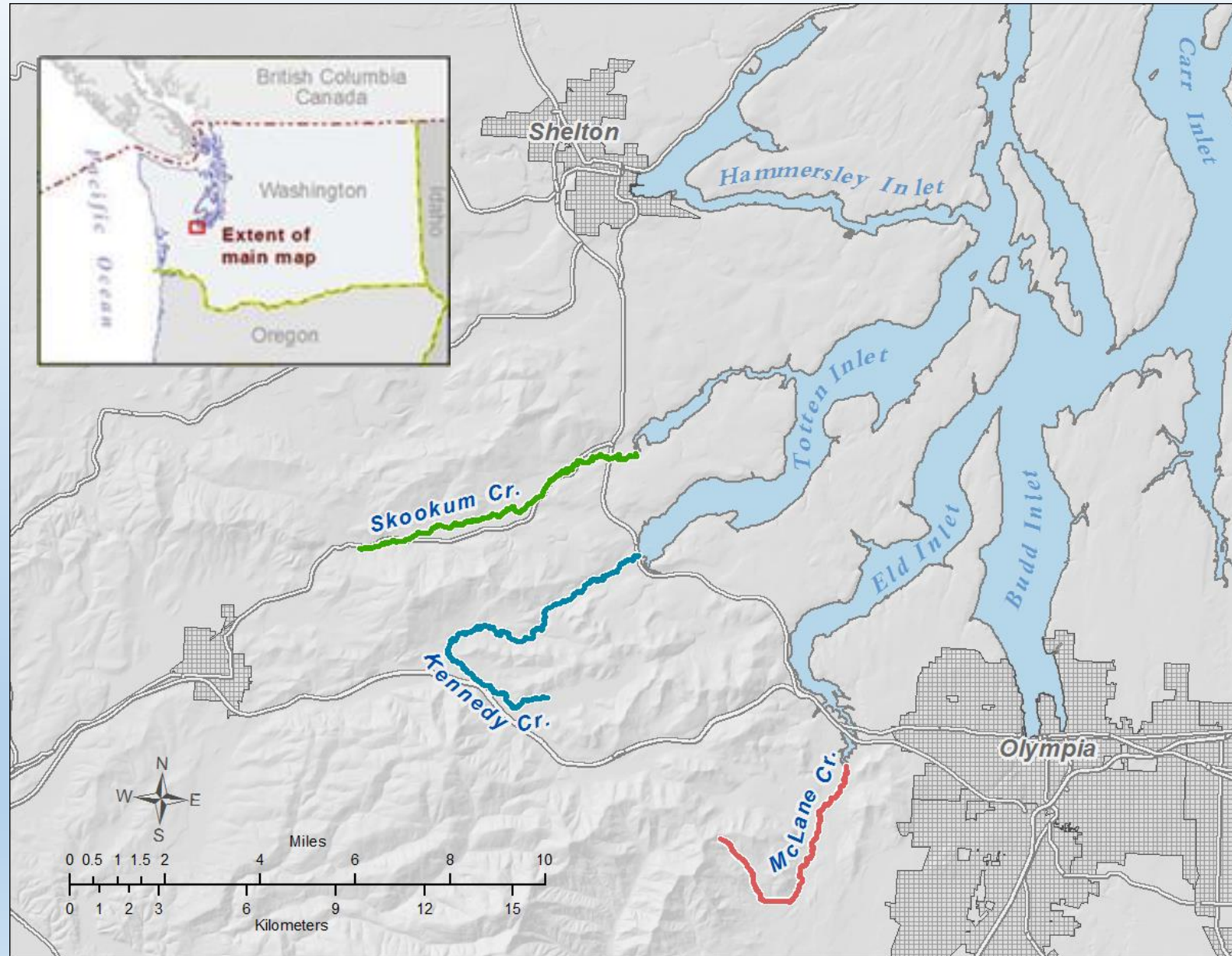
Port Discovery

Port Discovery

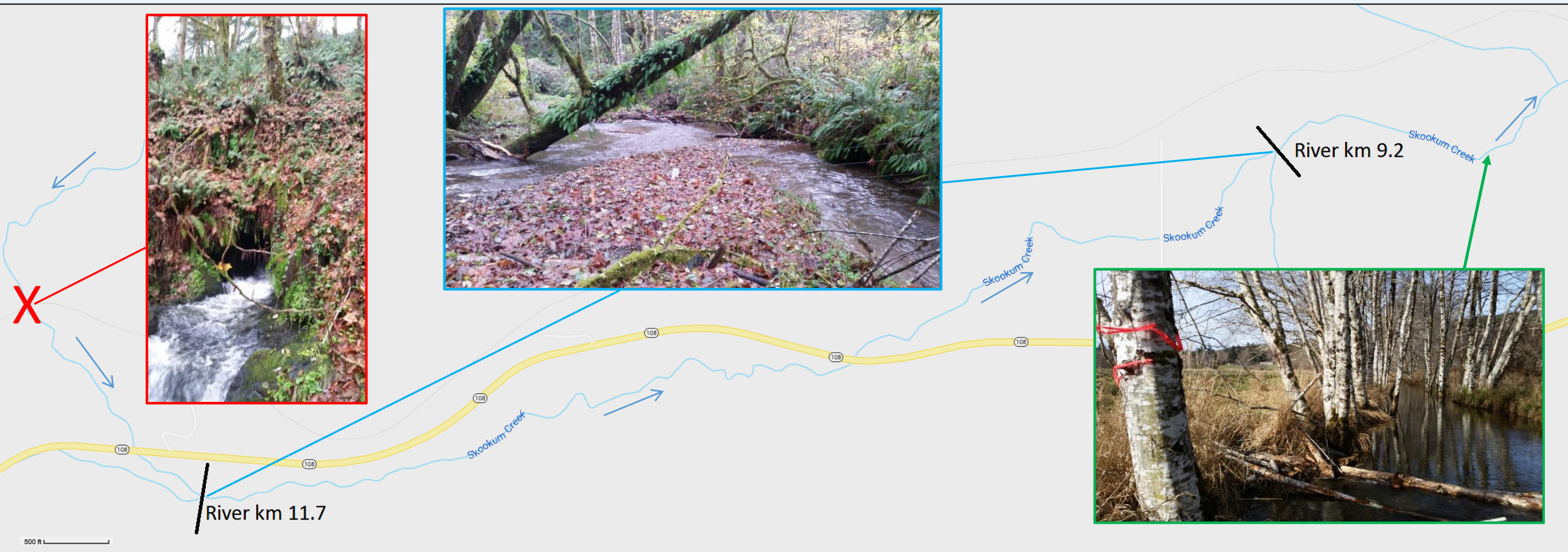
Port Discovery



Study Area



Skookum Cr. Index Area



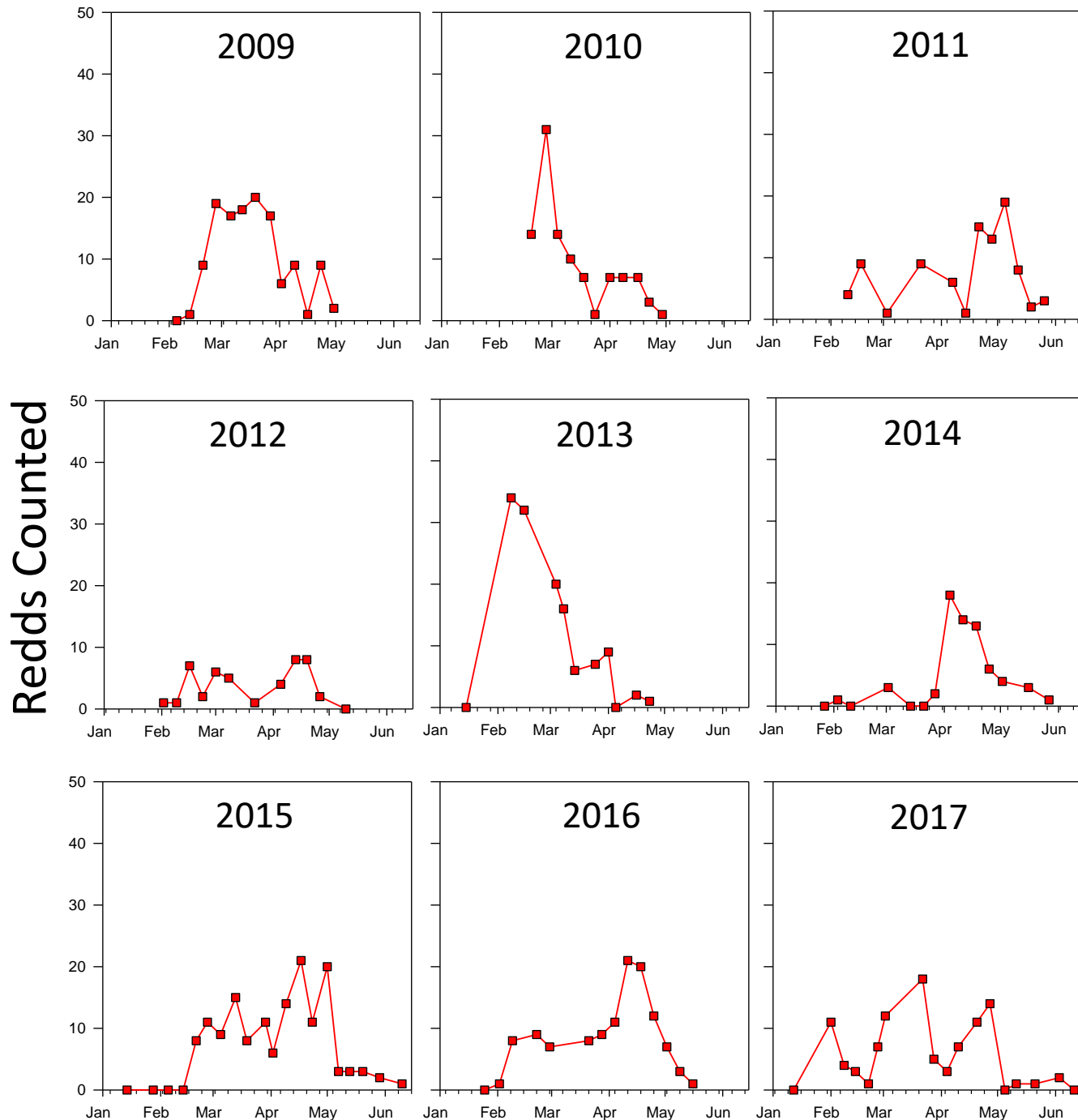
Methods: Redd Accounting Surveys

- Established index section that covered the majority of Skookum's spawning habitat
- Surveyed index weekly from January to June
- Marked new redds with flagging as per standard redd accounting protocols

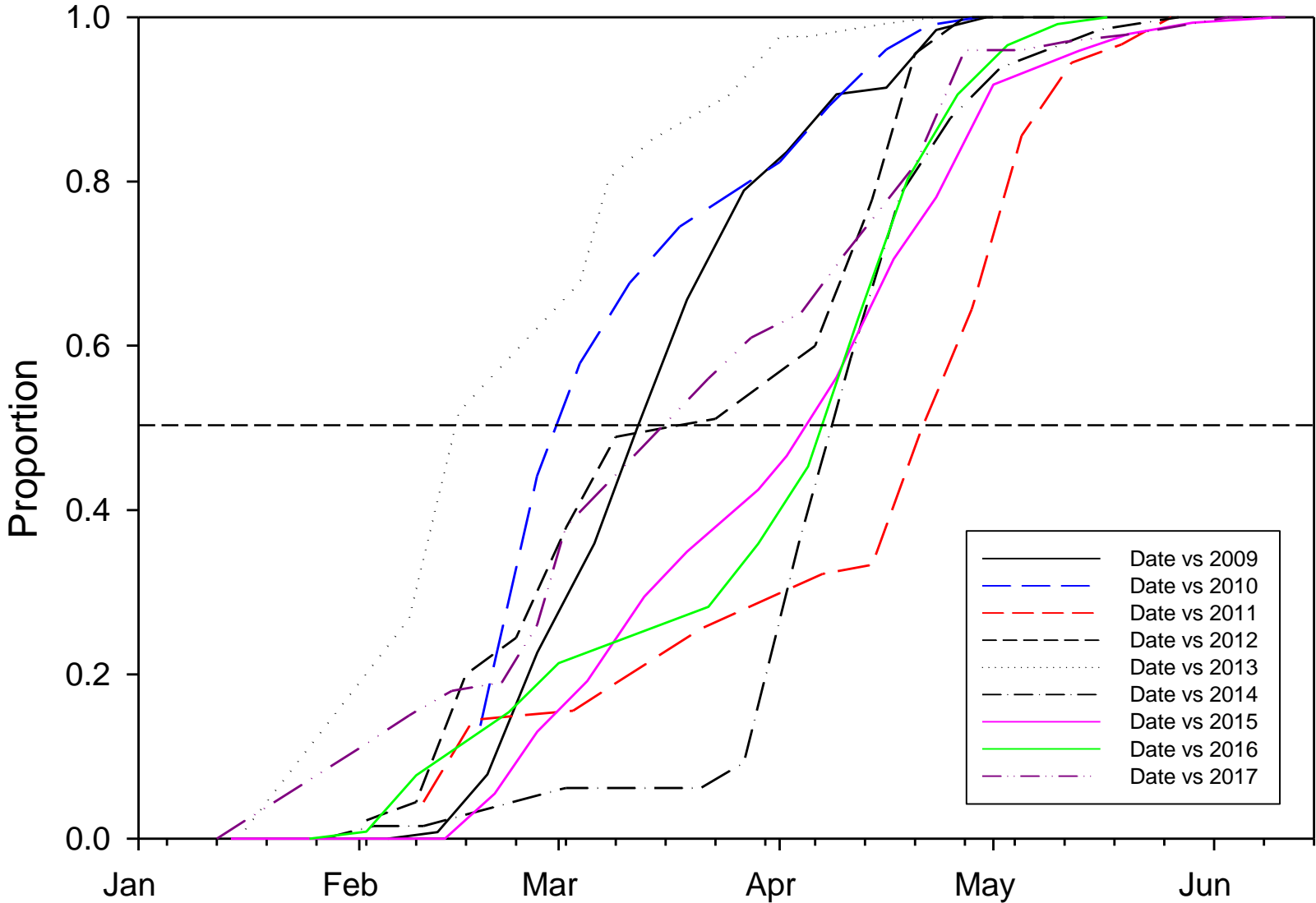


Results

- Highly variable spawn timing from year to year
 - Onset as early as Feb 1
 - Conclusion as late as June 10
- Total run size ranges from low of 45 redds to high of 146 redds
- Date of peak spawning inconsistent from year to year, with multiple peaks and troughs within a single run



Skookum Creek (2009-2017)



Study Question

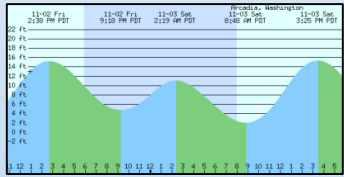
- Which environmental variable is the best predictor of spawn timing?
 - Surveyed 3 streams in 2015 and compared environmental variables to redd counts in each stream
- If flow is important then we will compare flow and redds for larger set of years for one stream.
 - Compare discharge in Skookum creek for all years redd counts were conducted (2009-2017)

Methods 2015



● Water Temp.
● Air Temp.
● Flow

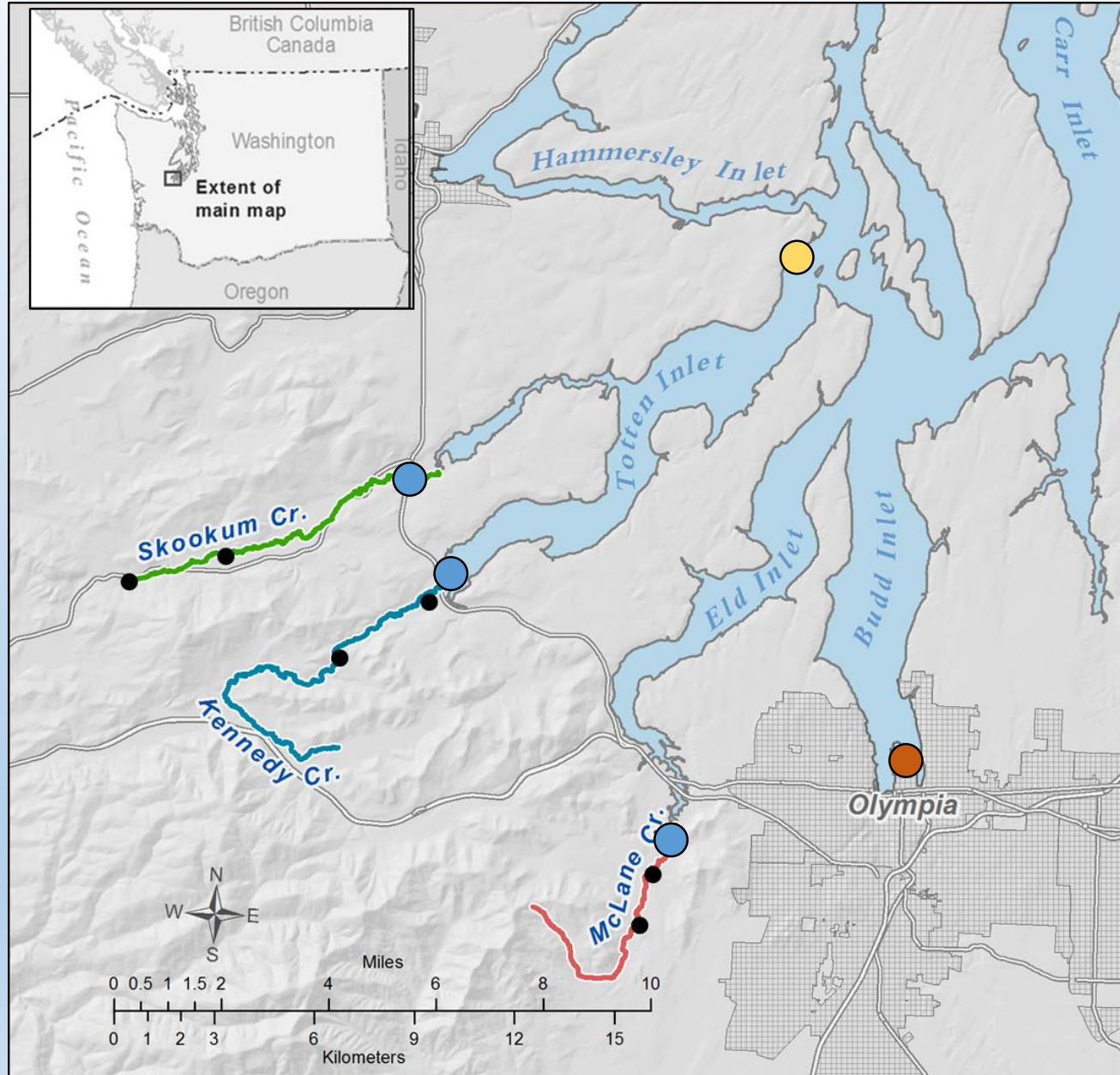
● Tide Exchange



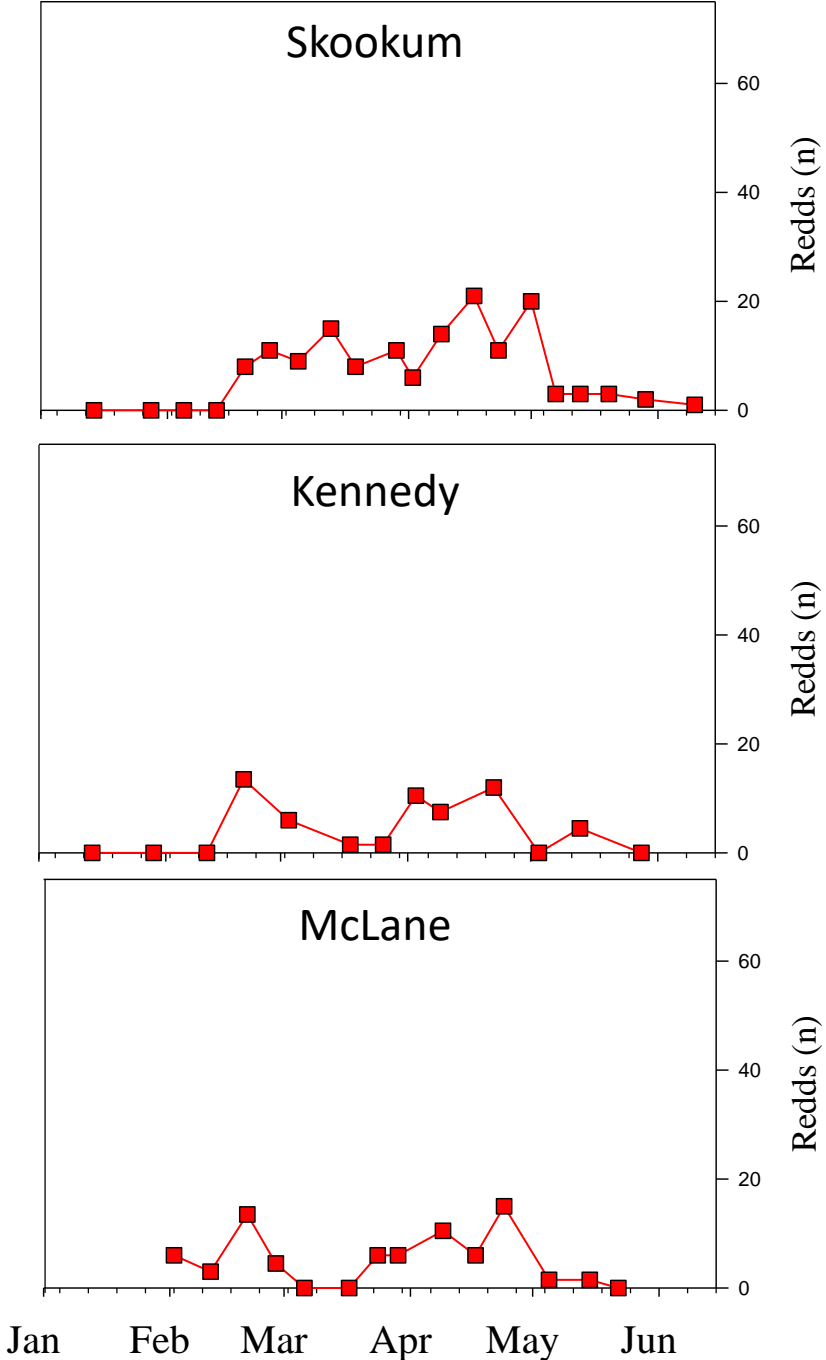
● Photoperiod



● ● Spawning Surveys



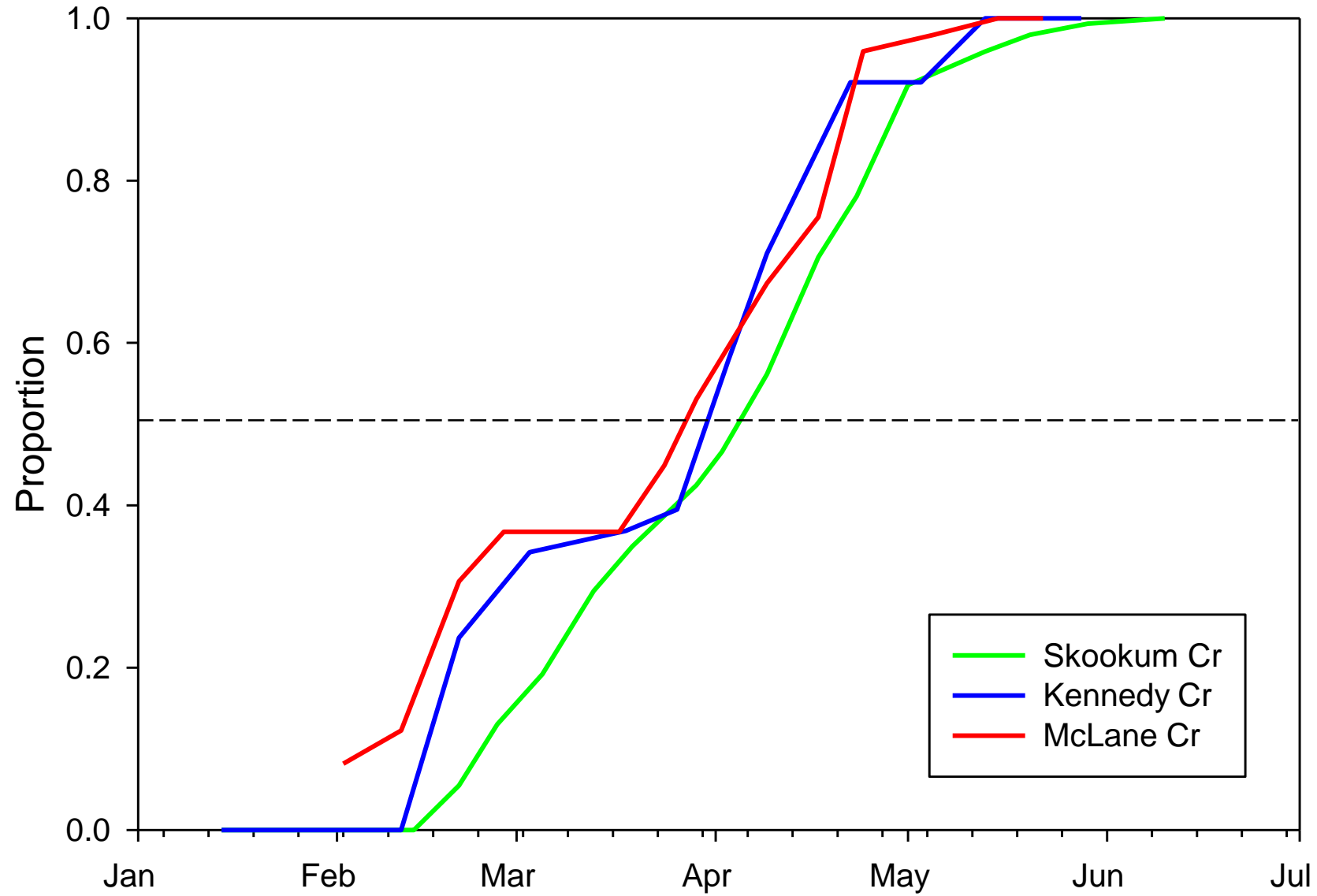
2015



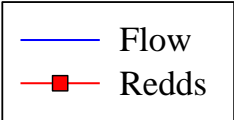
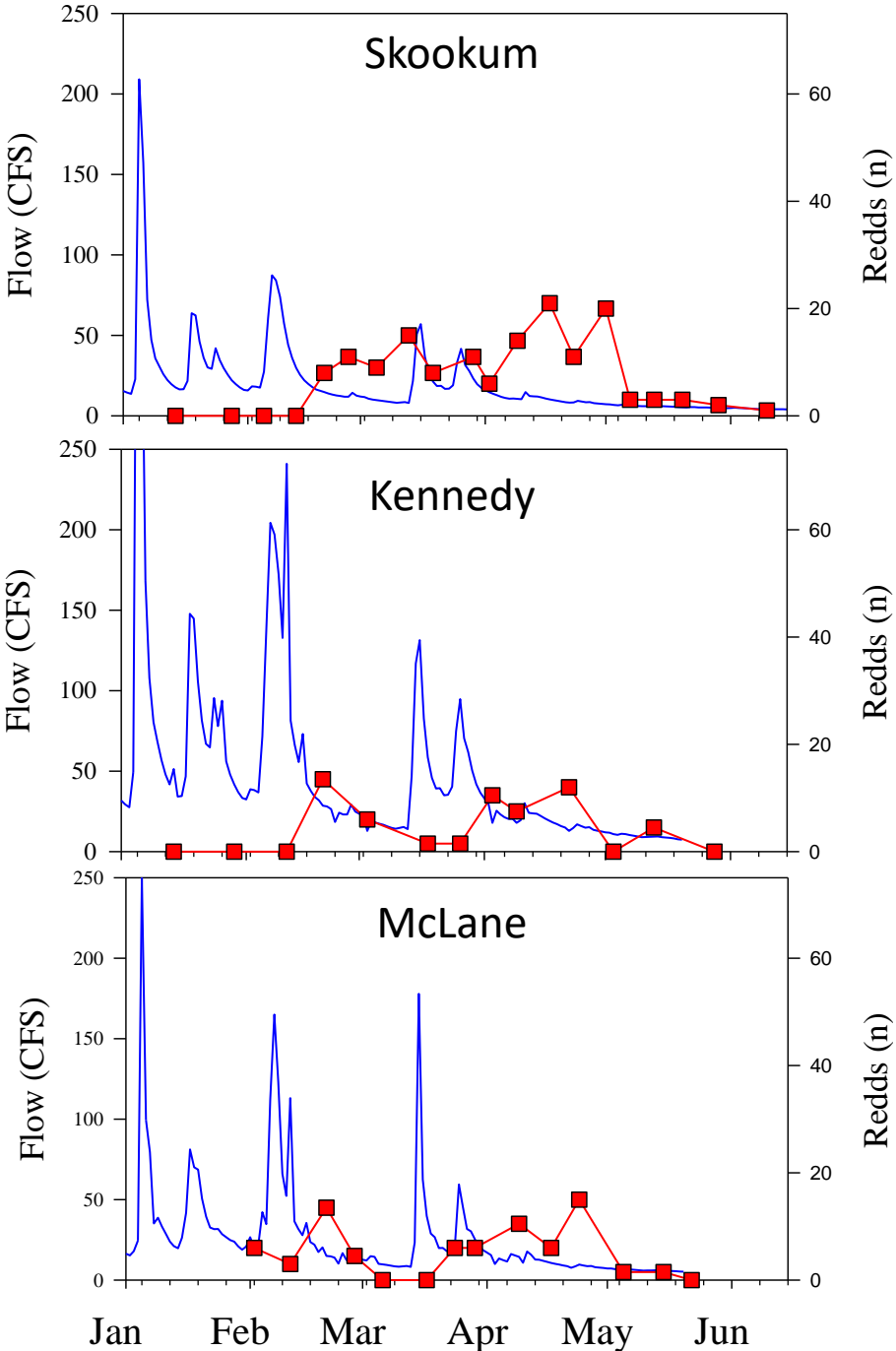
Redds



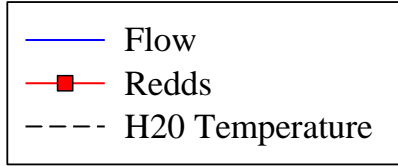
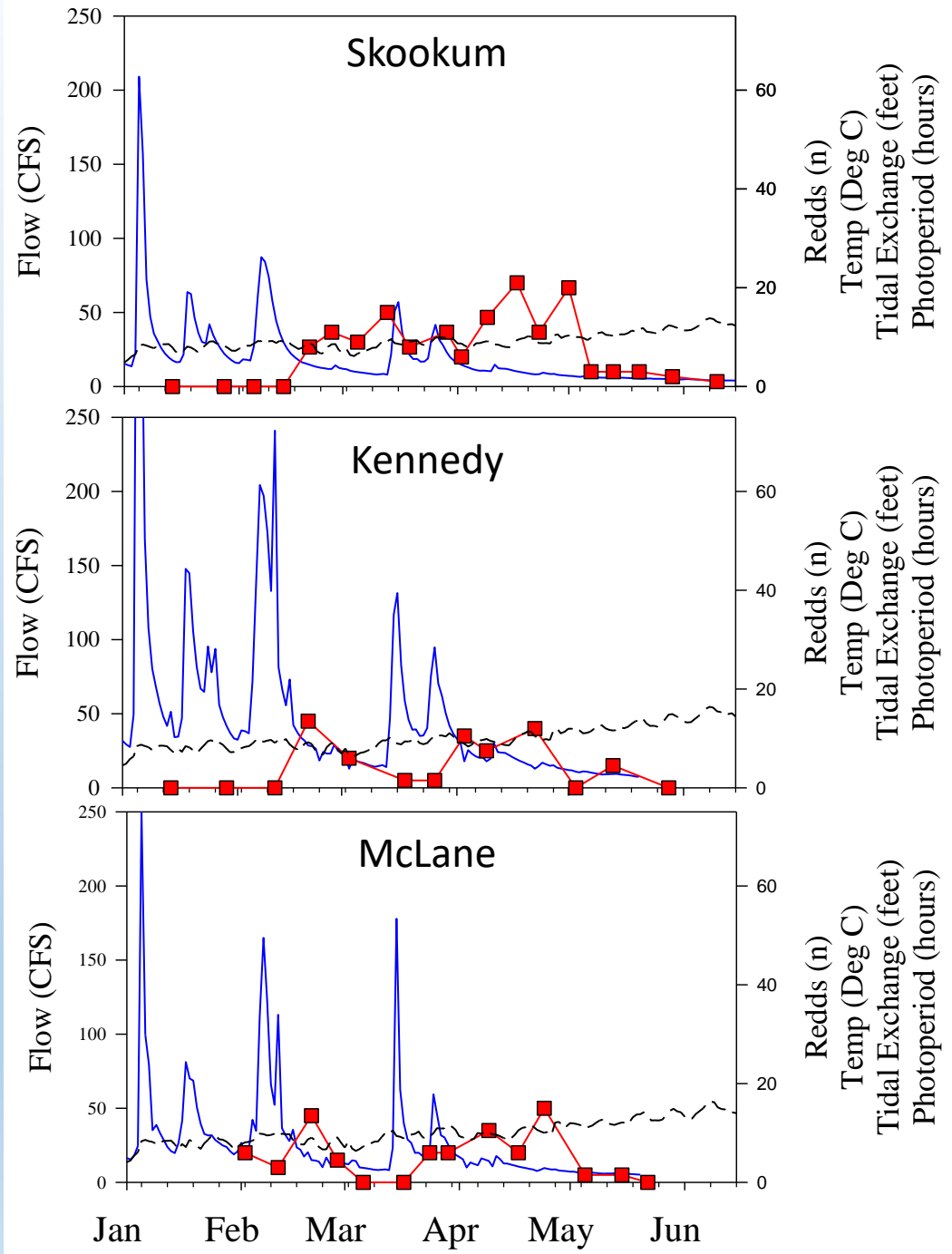
2015 Run Timing



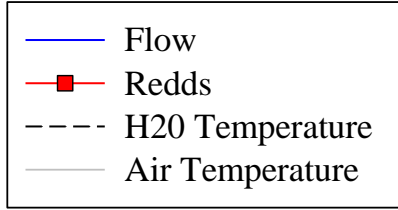
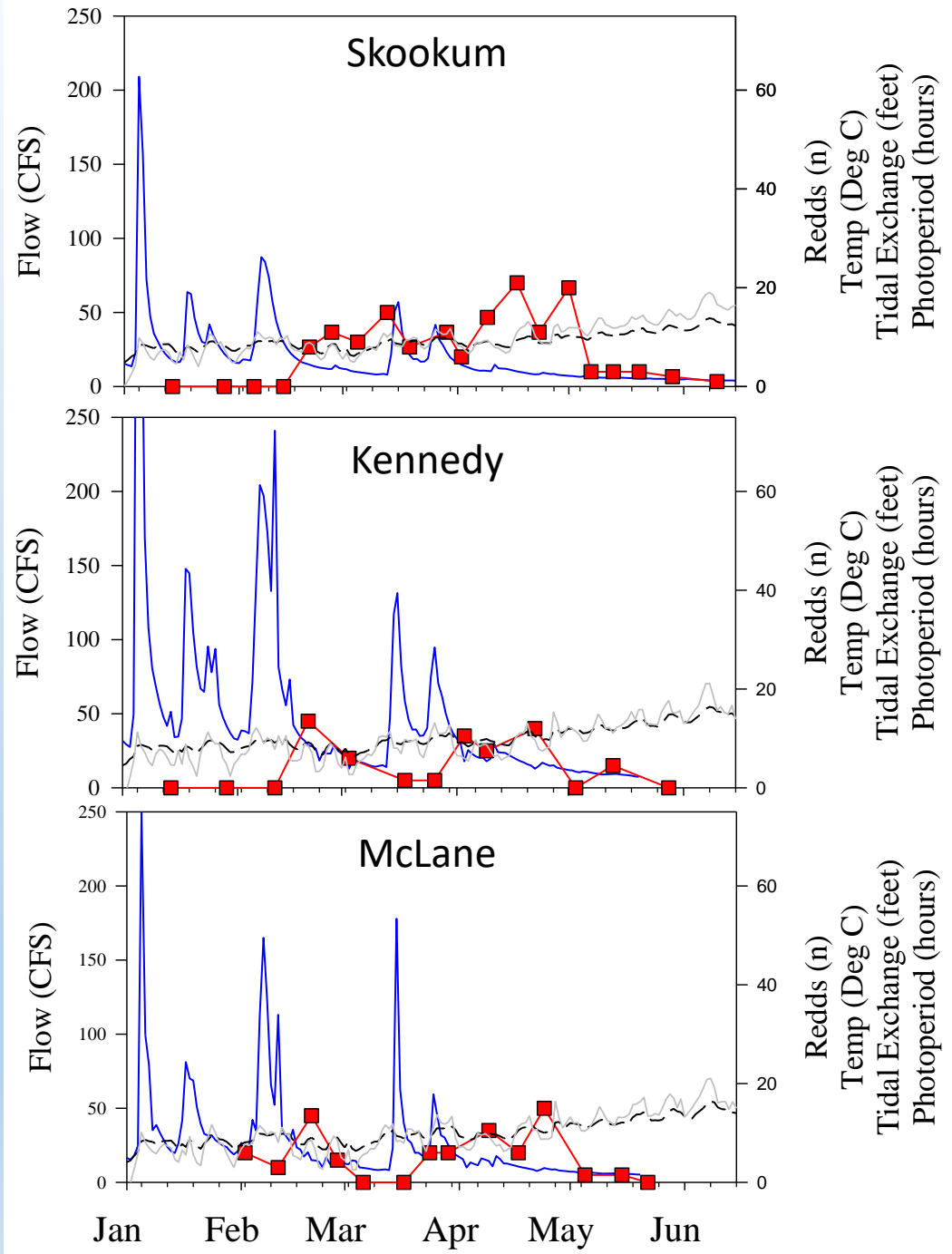
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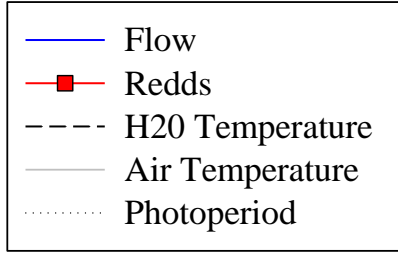
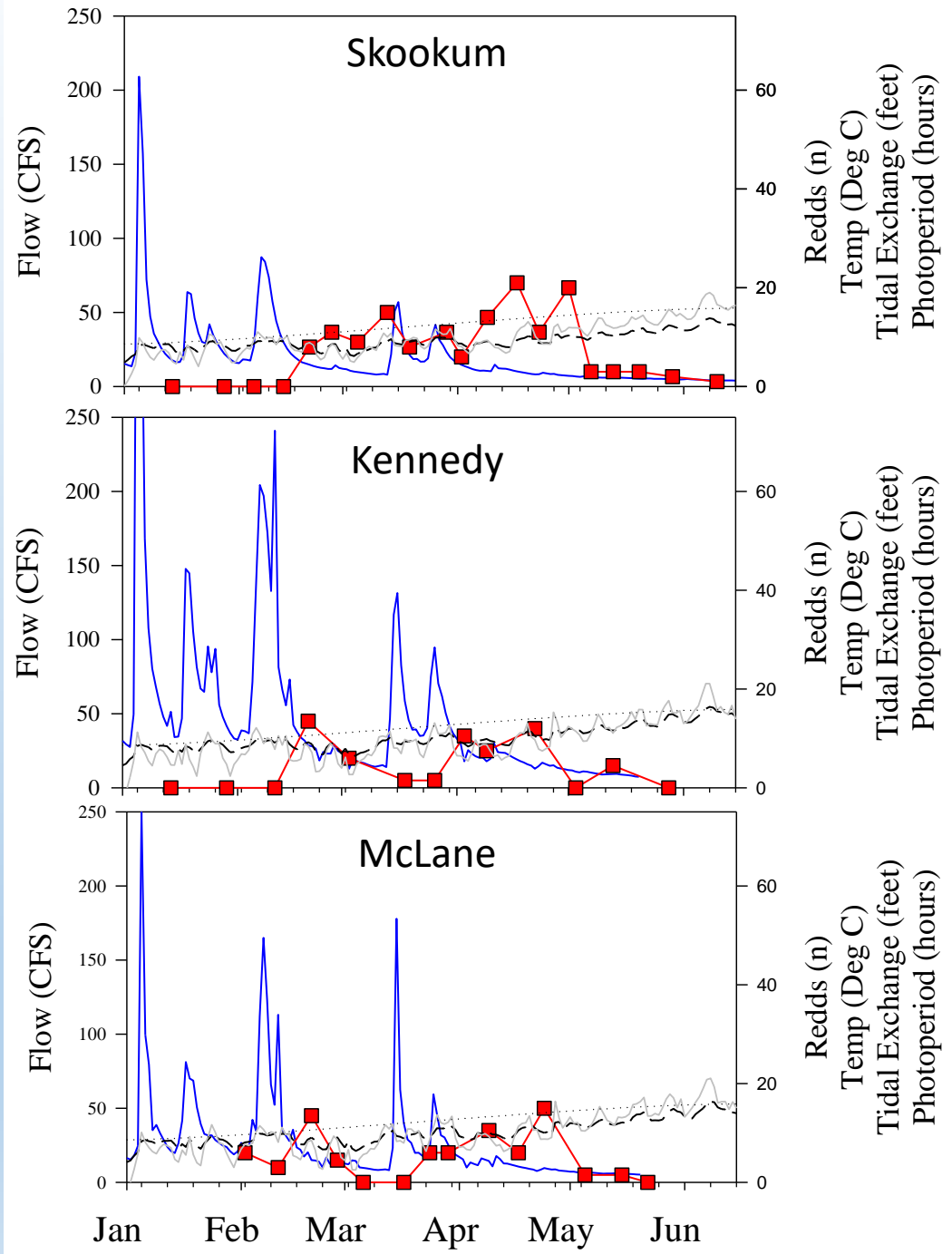
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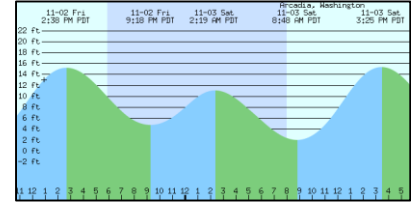
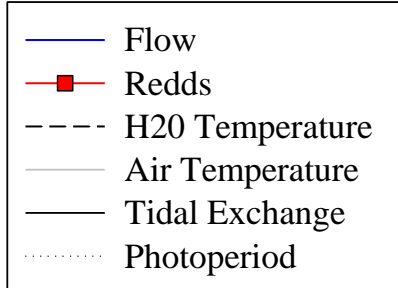
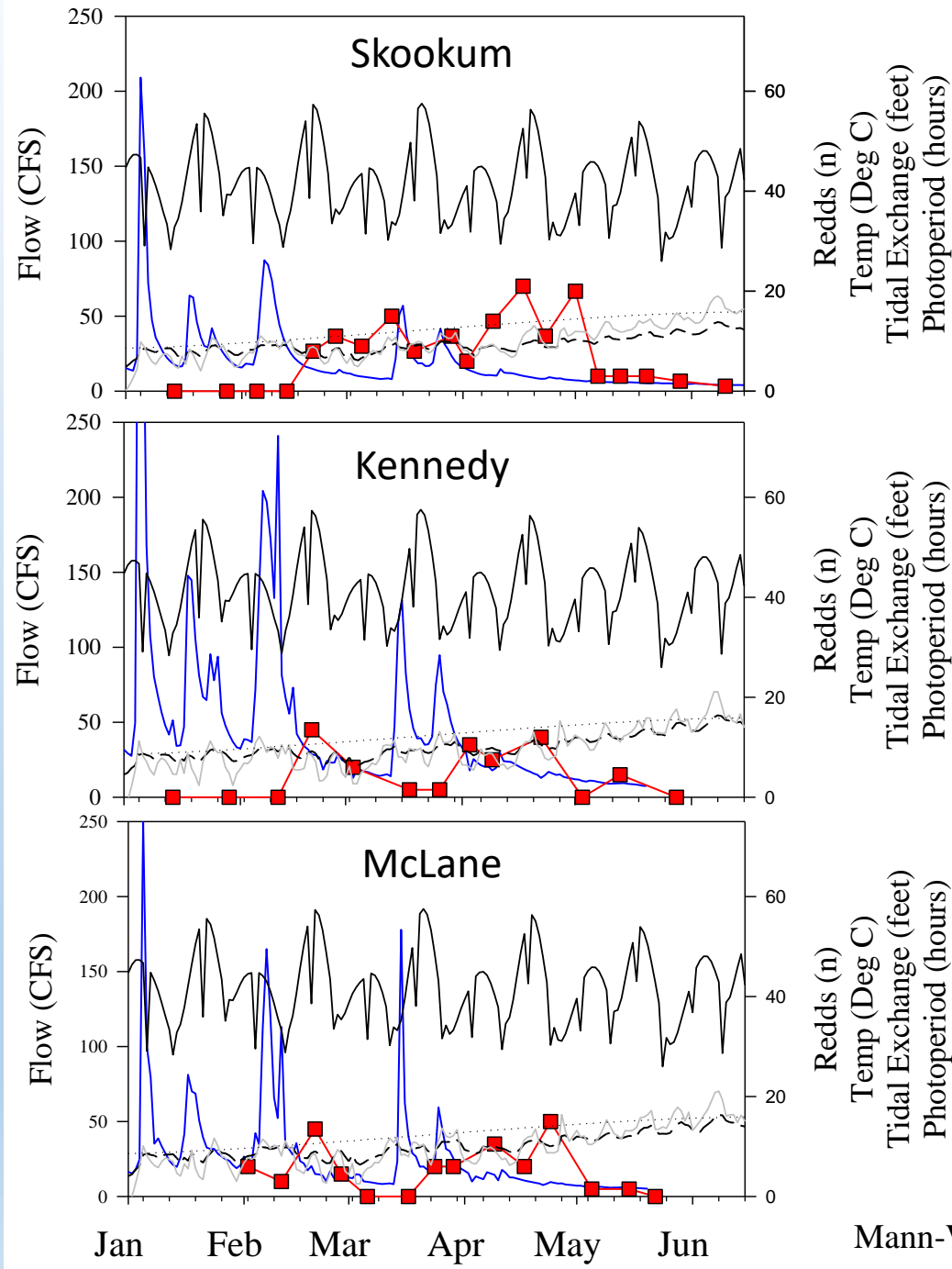
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2015

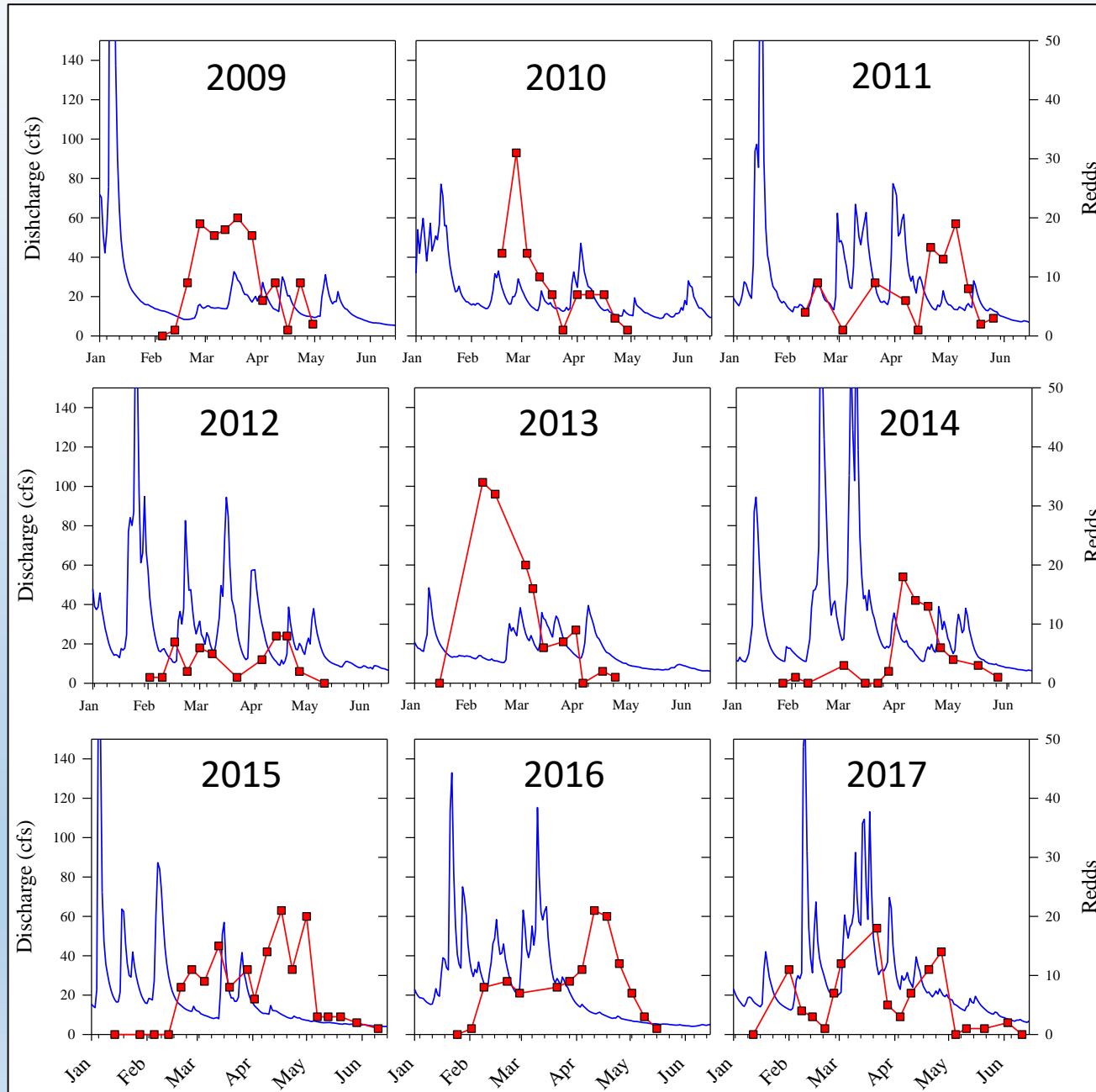


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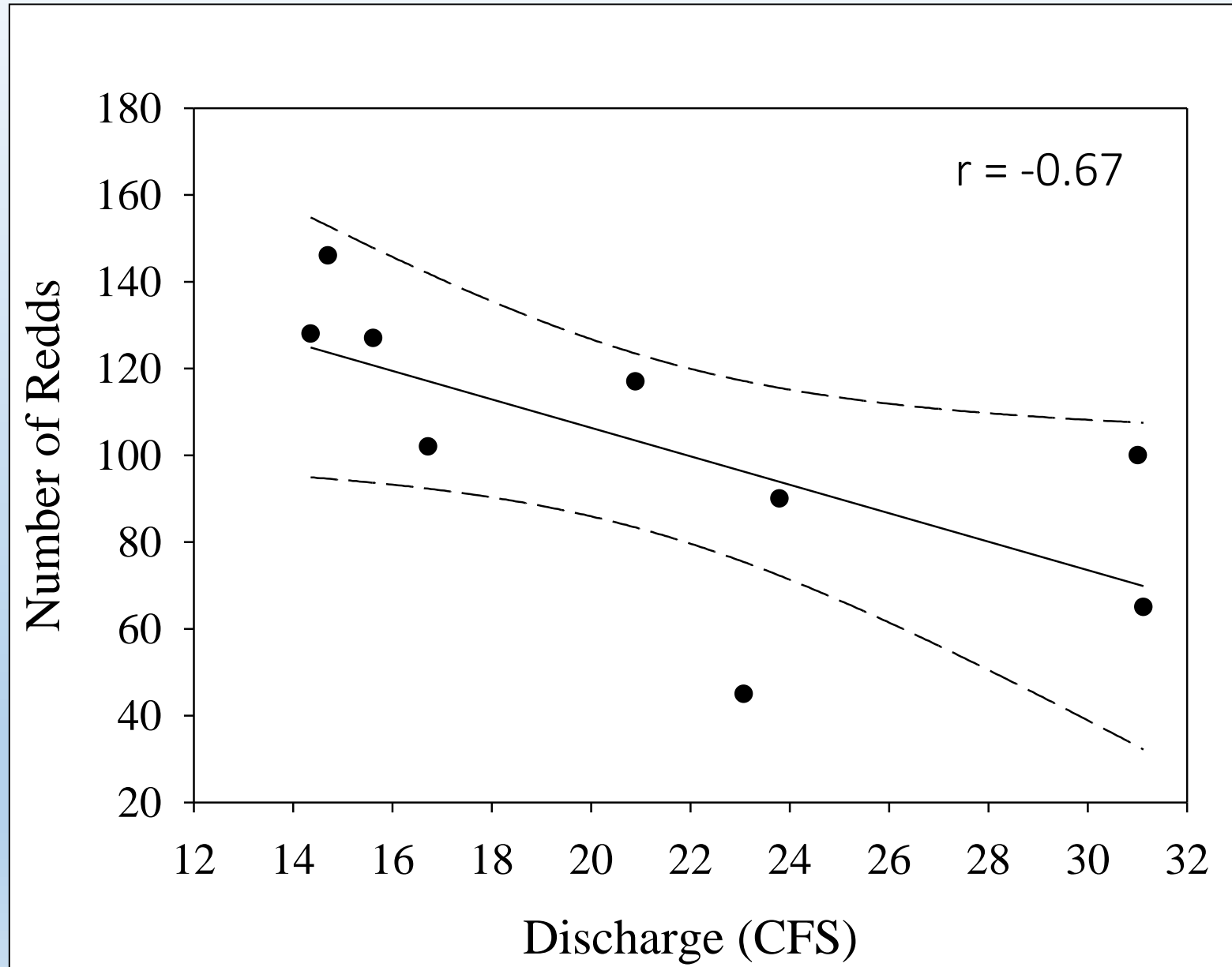


Mann-Whitney U test: $P < 0.05$

Skookum Cr (2009-2017)



Results: Skookum Cr (2009-2017)



Acknowledgements

Bill Young, Jack Havens, Greg Shimek, Brad Caldwell, Hal Beecher, Steve Boessow, Marisa Litz, Gabe Madel, Larry Phillips, John Rohr, William Evans, Erica Marbet, Joe Puhn

A photograph of a winter forest. The scene is filled with tall, dark evergreen trees, their branches heavily laden with snow. Sunlight filters through the canopy, creating a warm, golden glow on the left side of the image. In the foreground, a small stream flows through the center, its surface reflecting the light. The overall atmosphere is serene and quiet.

Questions?