

E. Beamer (ebeamers@skagitcoop.org) and R. Henderson. 2004. Distribution, abundance, timing, size of anadromous bull trout in the Skagit River Delta and Skagit Bay. Skagit River System Cooperative, PO Box 368, LaConner WA 98257.

We have conducted bi-weekly fish sampling in habitat potentially utilized by anadromous bull trout in the Skagit estuary annually since 1995. We used beach seine and fyke traps depending on the habitat types from February through August (delta) or February through October (Skagit Bay). We sampled year round in 2003.

Bull trout use delta blind tidal channels, but may not directly use smaller and shallower channels, or channels more distant from river distributaries. There was no annual increasing or decreasing trend in abundance. There is significant annual variation in timing, but the peak is usually in June while the primary period of presence runs from April through August.

Bull trout are also present in Skagit Bay. However, presence in shallow intertidal habitat was very low compared to the deeper intertidal-subtidal fringe. Bull trout are present in the deeper intertidal-subtidal habitats year round. Peak abundance occurs in May or June. In recent years, we observed a bi-modal distribution with the second peak during fall months. Bull trout abundance from February through October in Skagit Bay increased four-fold from 1995 through 2001. The bull trout population in Skagit Bay has also increased in length frequency complexity over the sampling period. From 1996 through 1998, 95% of the population was sub-adult sized, and too young to reproduce. From 1999 through 2003, a tri-modal length distribution is evident that includes sub-adult, first year spawner, and mature spawner sized fish.

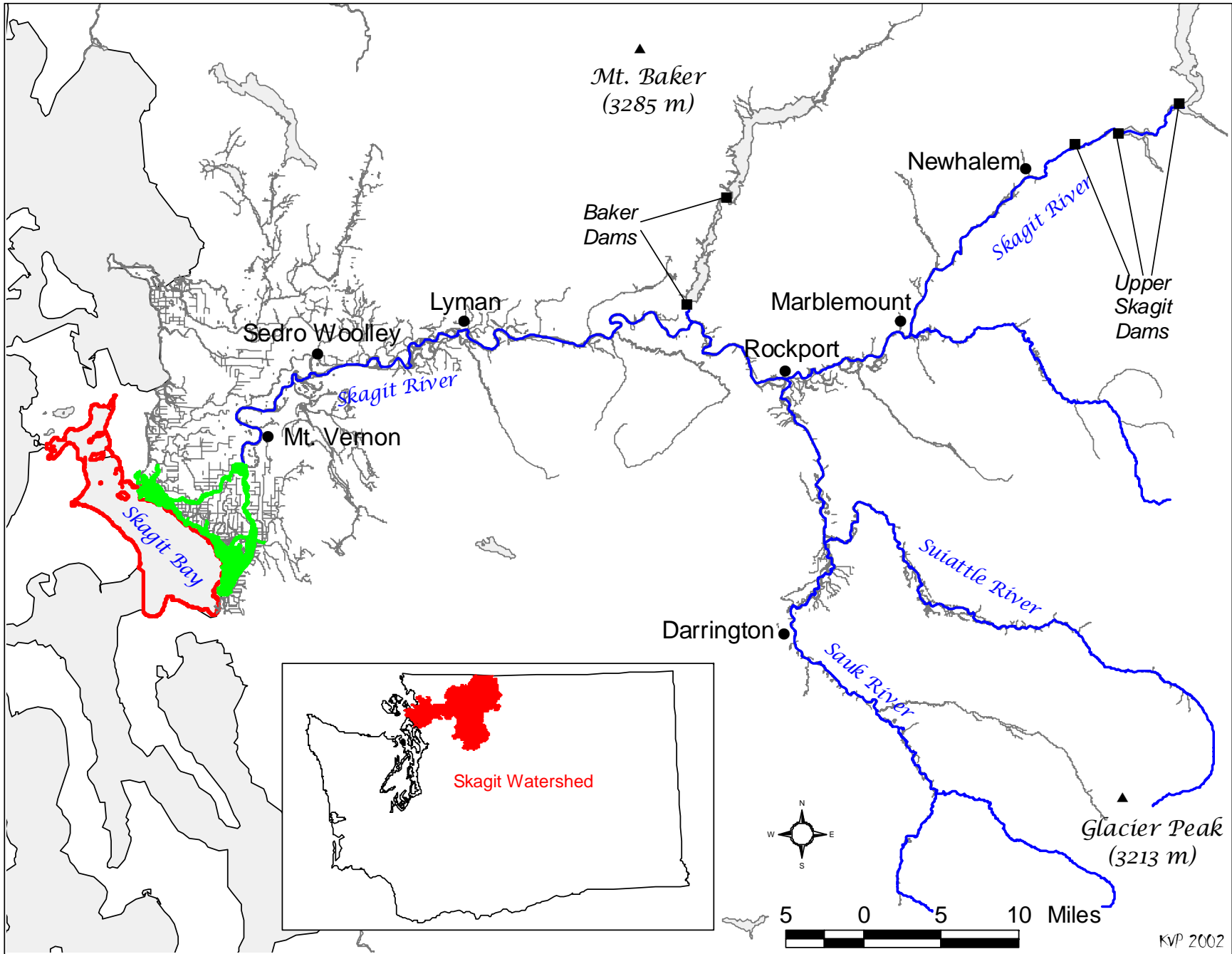
A photograph showing two researchers in a boat measuring a large bull trout. The fish is held in a white mesh net. One researcher in a blue shirt is holding the fish's head, while the other in a green shirt is using a yellow measuring tape to measure its length. Several other fish are visible in the net. The background shows the boat's interior with white floats.

Distribution, abundance, timing, and size of anadromous bull trout in the Skagit estuary

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Analysis Framework

Used existing data

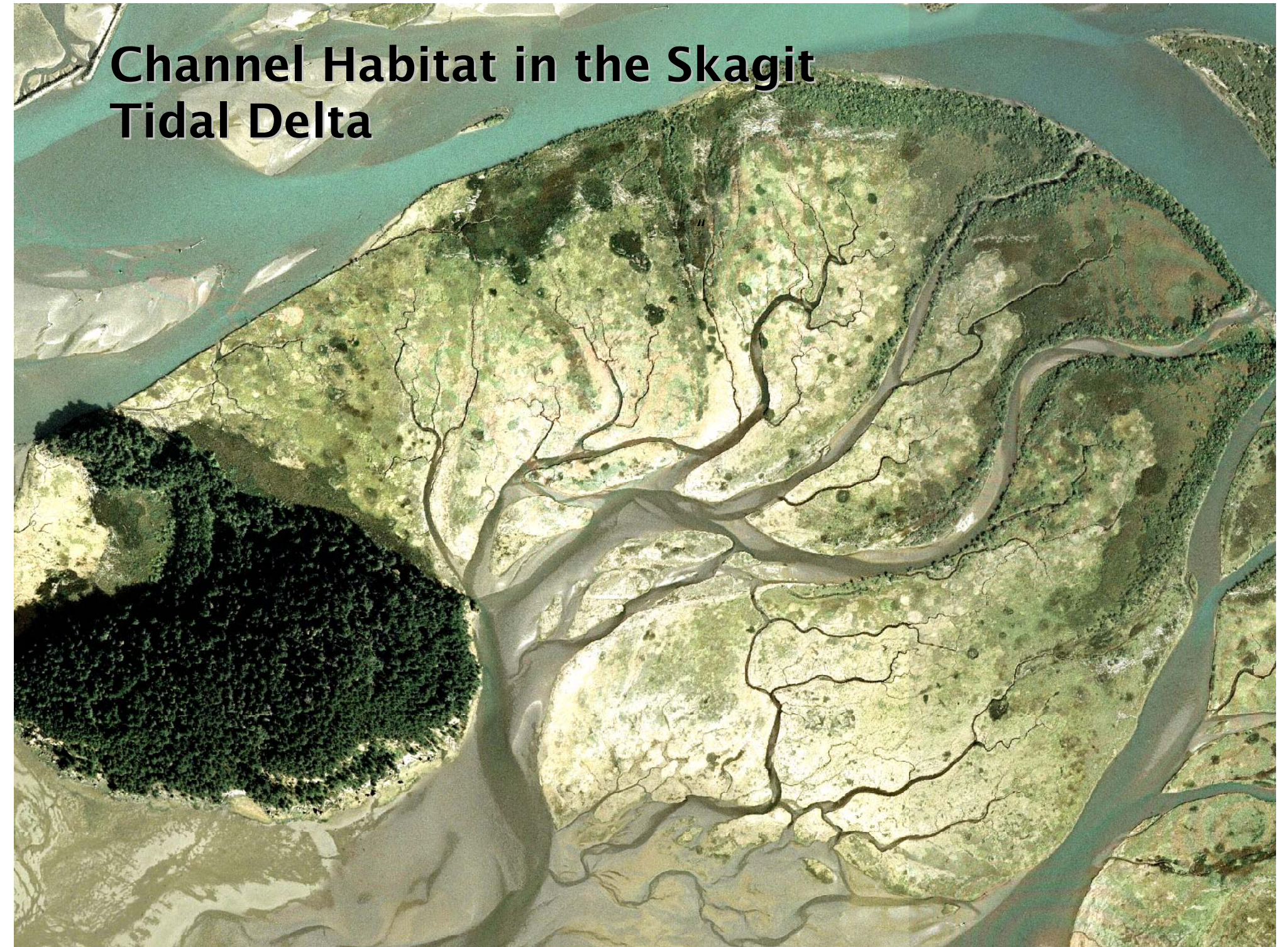
Multiple habitat types require use of different gear types:

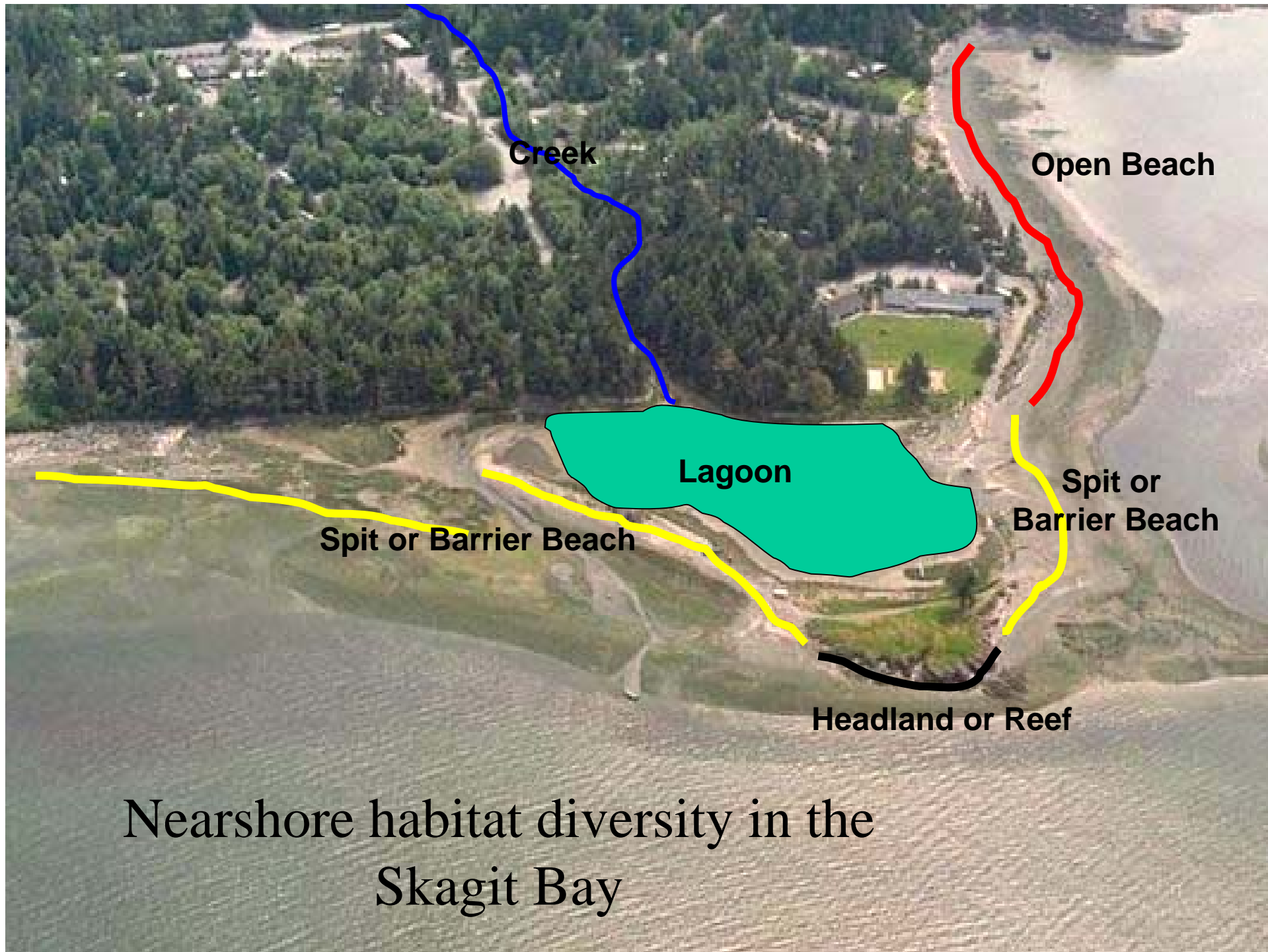
- Delta - blind channels (fyke net)
- Delta - distributary channels (small beach seine)
- Bay - shallow intertidal (small beach seine)
- Bay – intertidal/subtidal fringe (large beach seine)

Results:

- Presence/absence of bull trout
- Abundance of bull trout
- Size (inferred age) of bull trout

Channel Habitat in the Skagit Tidal Delta



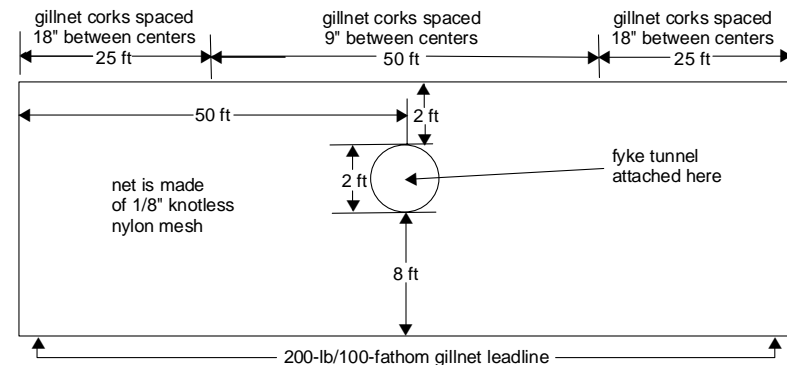


Nearshore habitat diversity in the
Skagit Bay

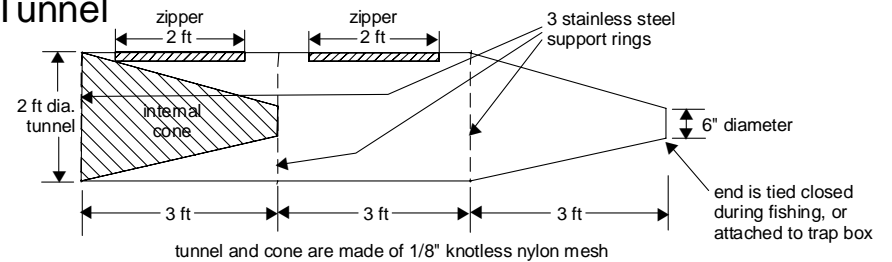
Blind tidal channels (mostly in delta)

- Fyke net method
- Fished during ebb tide
- Channels mostly dewatered at low tide

A - Fyke Net



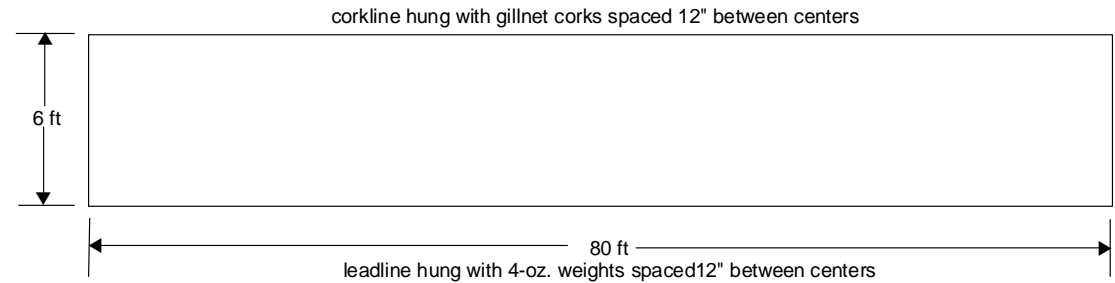
B - Fyke Tunnel



Shallow intertidal and delta distributary channels

A - Small Net Beach Seine

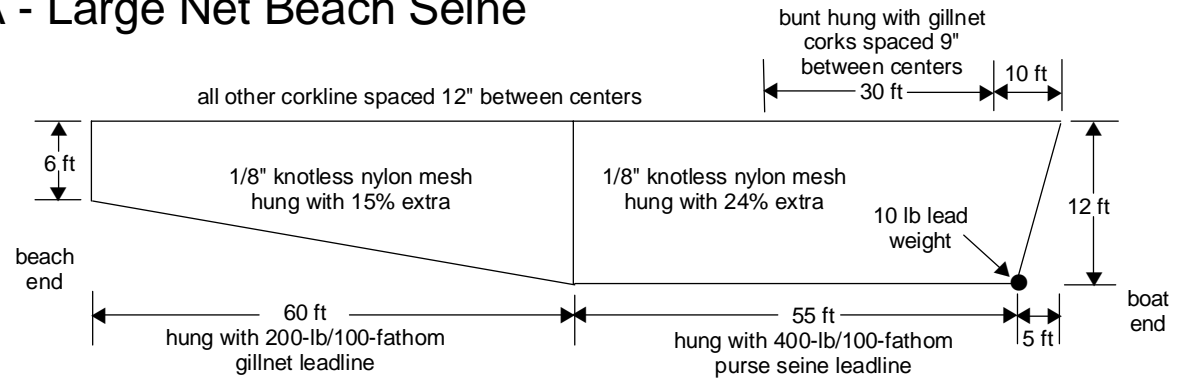
- Small shallow net
- Shallow habitat (~0.75 m deep)



Intertidal-subtidal fringe

- Larger net
- Deeper habitat (~2.5 m deep)

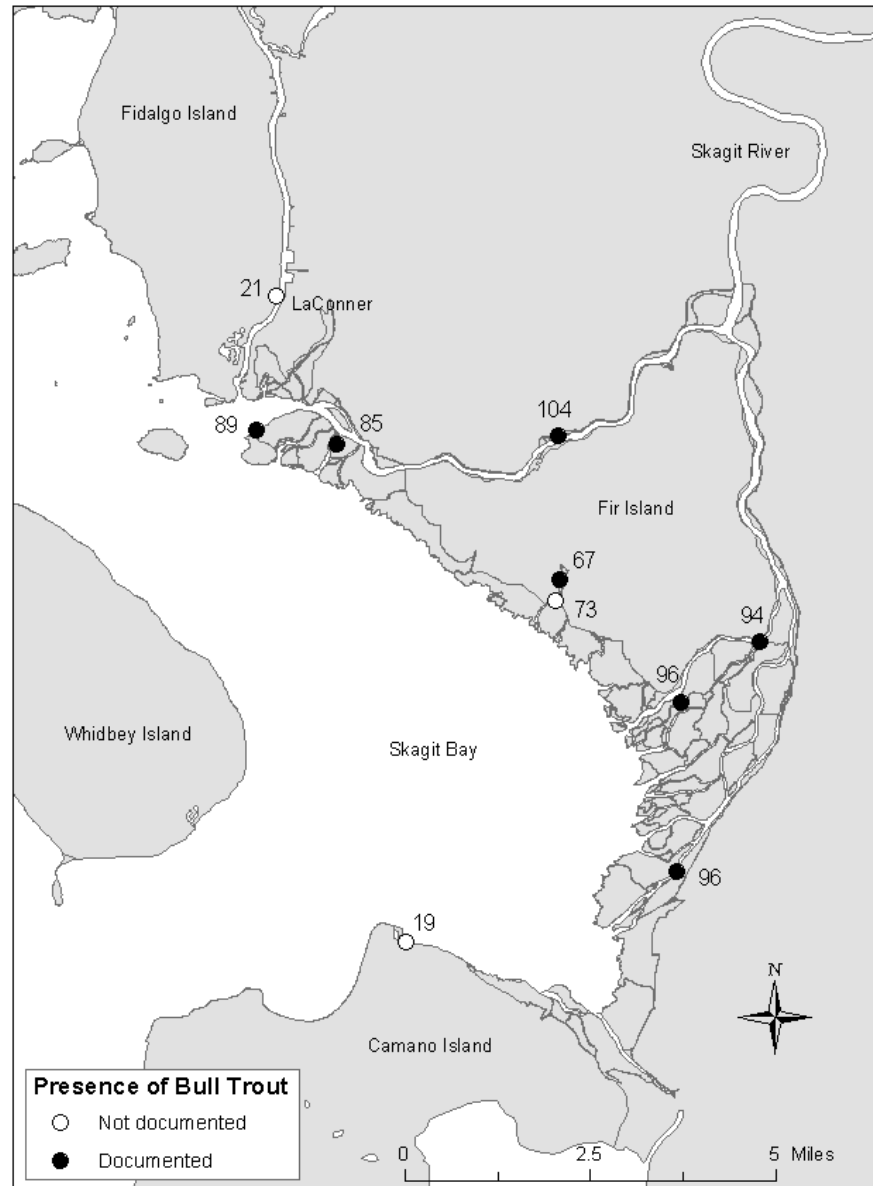
A - Large Net Beach Seine



Presence of Bull Trout within blind tidal channels



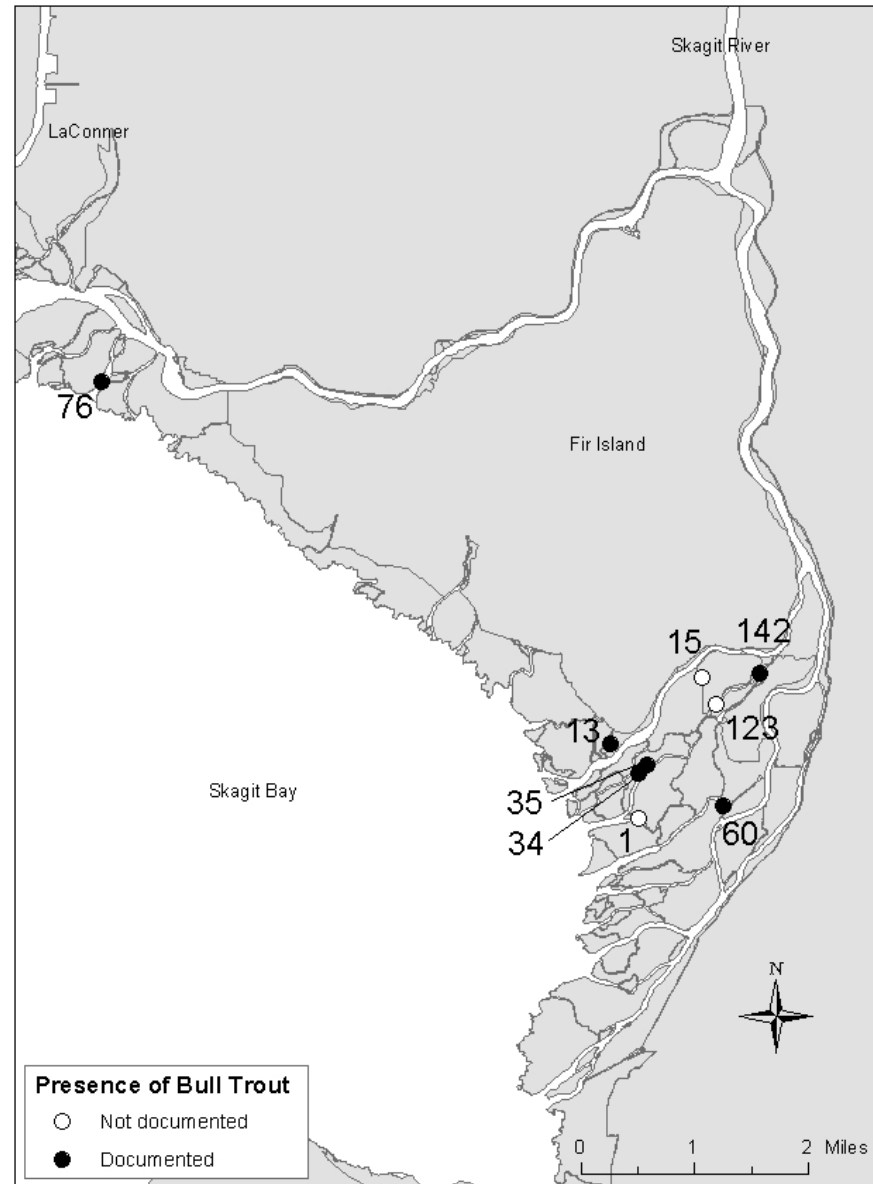
Fyke Trap Methods in Blind Tidal Channels



Presence of Bull Trout within delta distributary channels



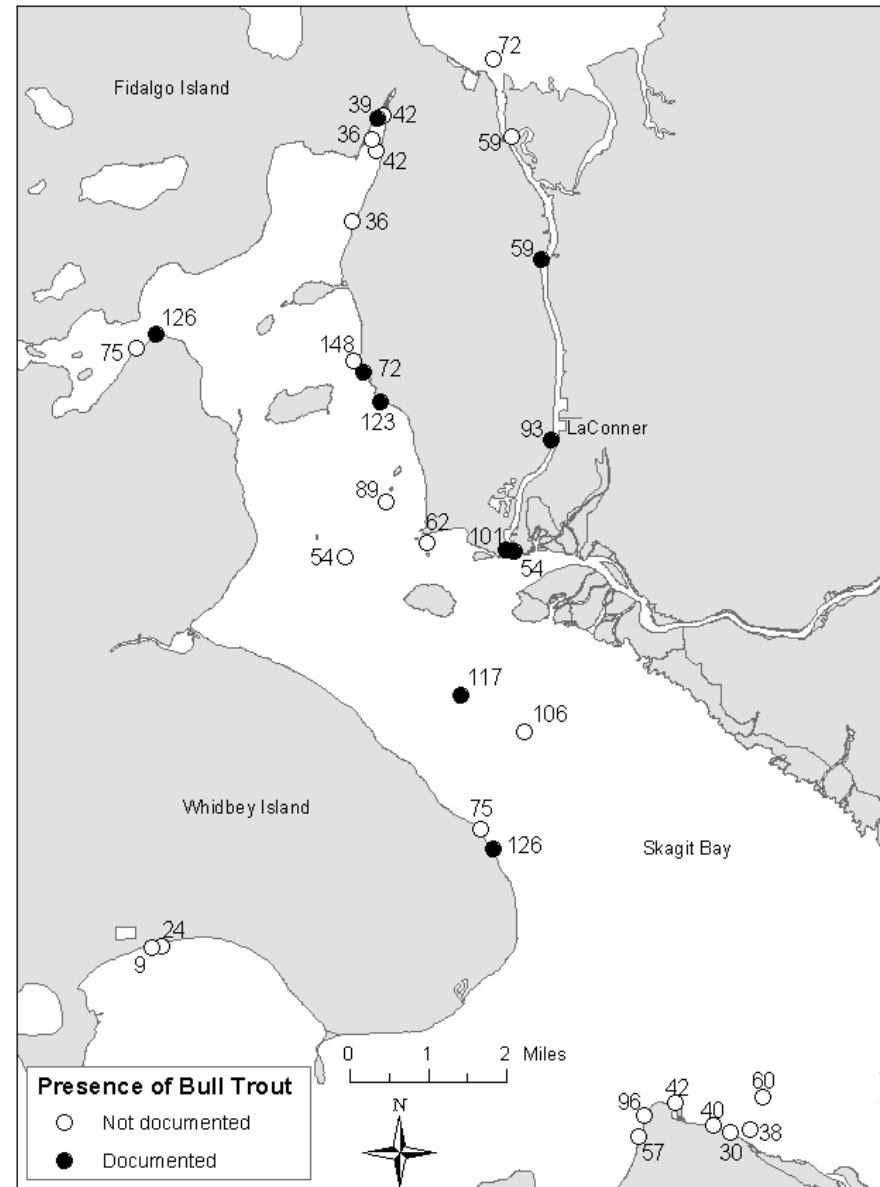
Beach Seine Methods in Delta Channels



Presence of Bull Trout within shallow intertidal nearshore



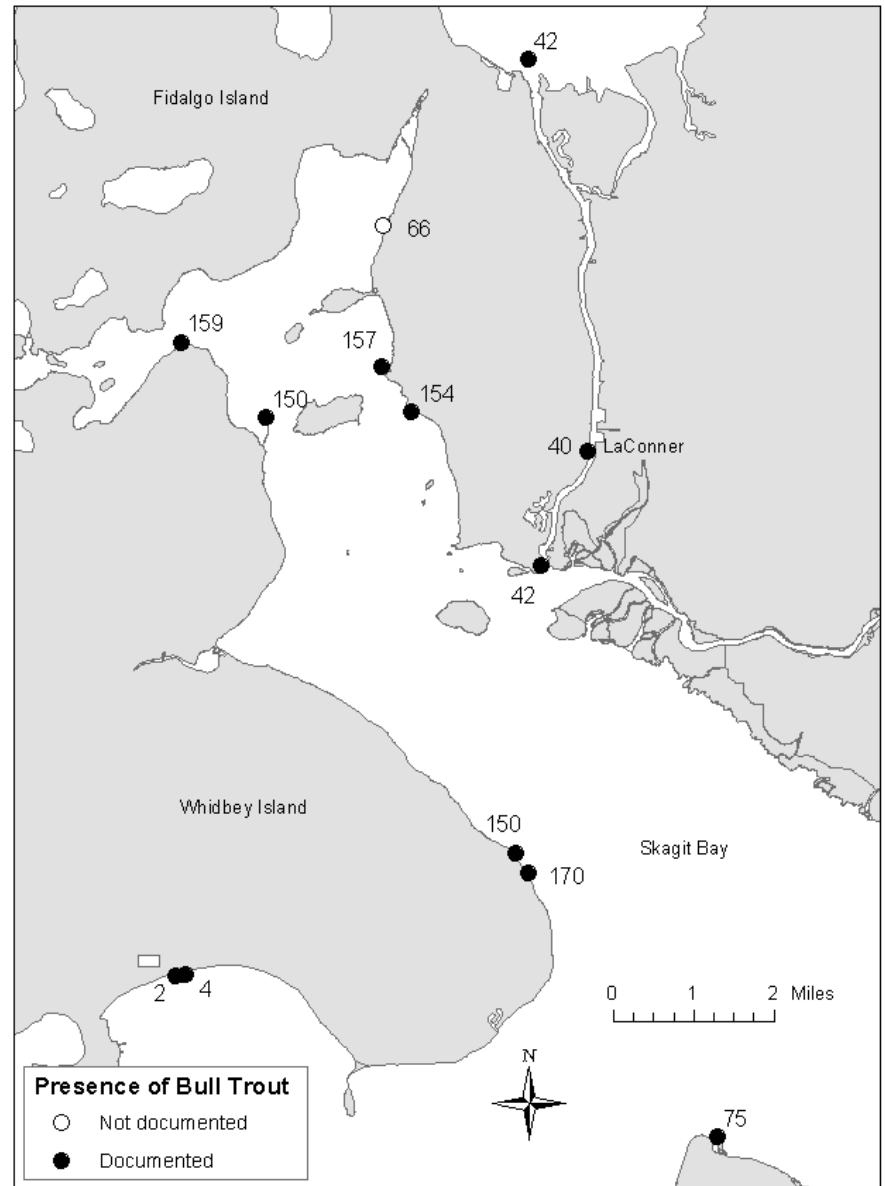
Beach Seine Methods in Shallow Intertidal Habitat



Presence of Bull Trout within intertidal-subtidal nearshore

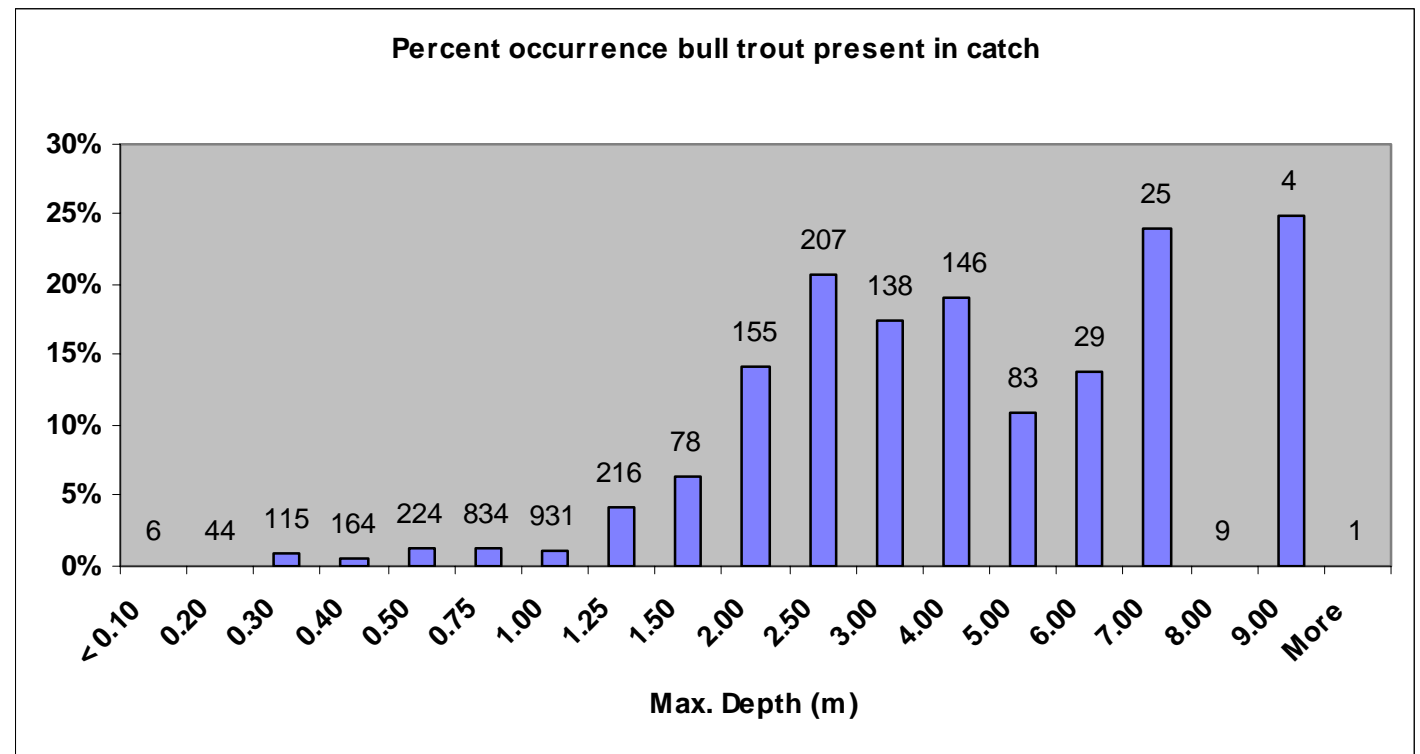


Beach Seine Methods in Intertidal-Subtidal Fringe Habitat



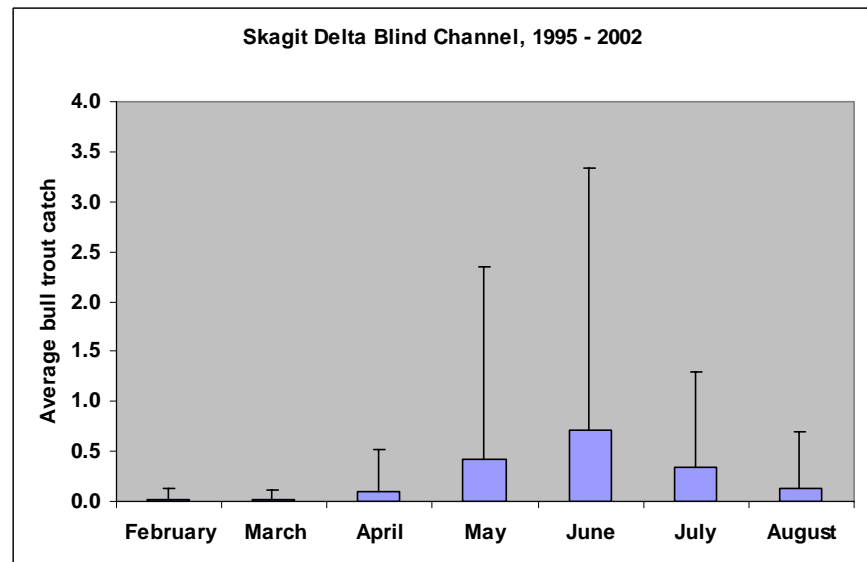
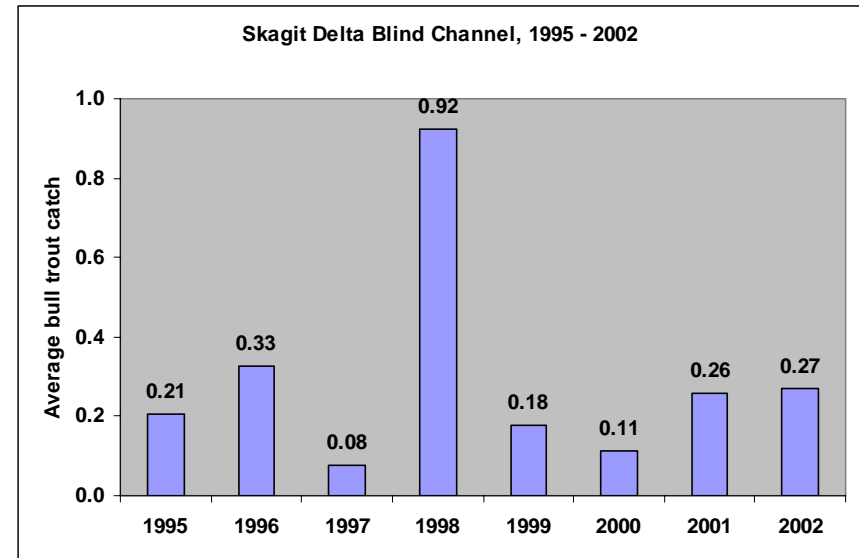
Presence of Bull Trout within the Skagit Estuary: Depth is a factor related to presence

- No bull trout < 0.3 m
- Bull trout infrequent 0.3-1.0 m
- Bull trout presence increased 1.0-2.5 m
- Bull trout most frequent > 2.5 m



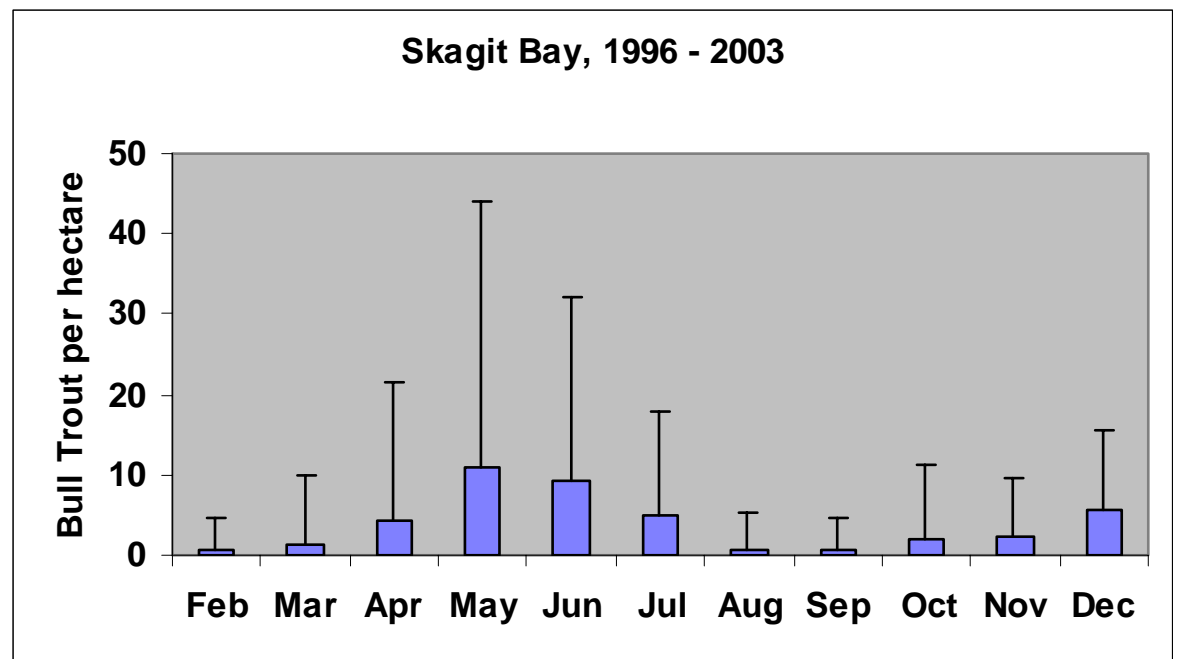
Abundance and timing trends in delta blind channel habitat

- 7 sites, sampled bi-weekly from February through August
- 1998 had more bull trout than all other years
- No overall increasing or decreasing abundance trend since 1995
- Significant annual variation in timing, but the peak is usually in June
- Bull trout presence runs from April through August



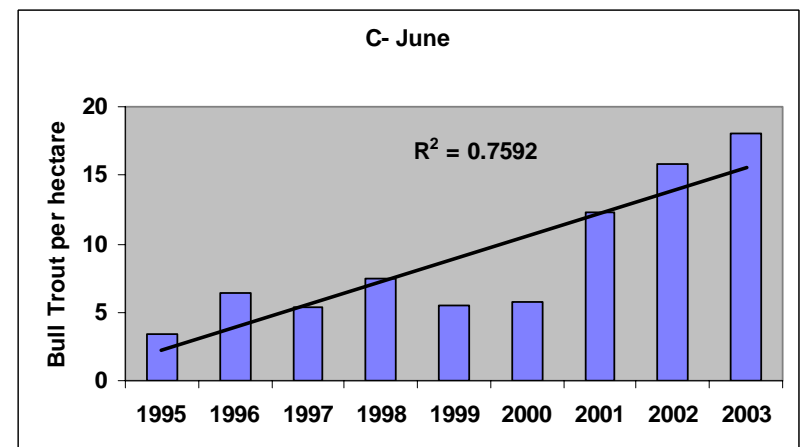
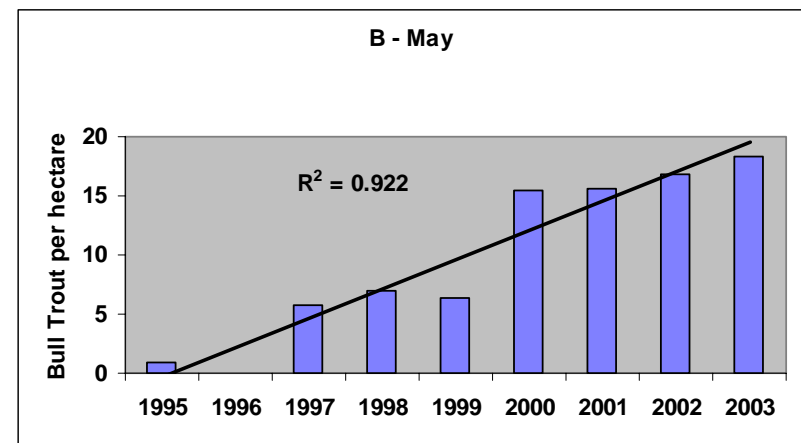
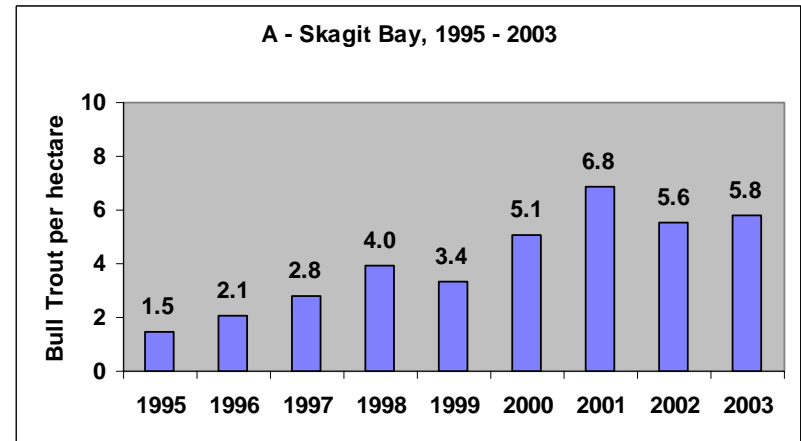
Timing in Skagit Bay intertidal-subtidal fringe habitat

- 6 sites, bi-weekly sampling, February through October
- Bull trout in Skagit Bay essentially year round
- Peak abundance in May or June
- Bimodal distribution in recent years



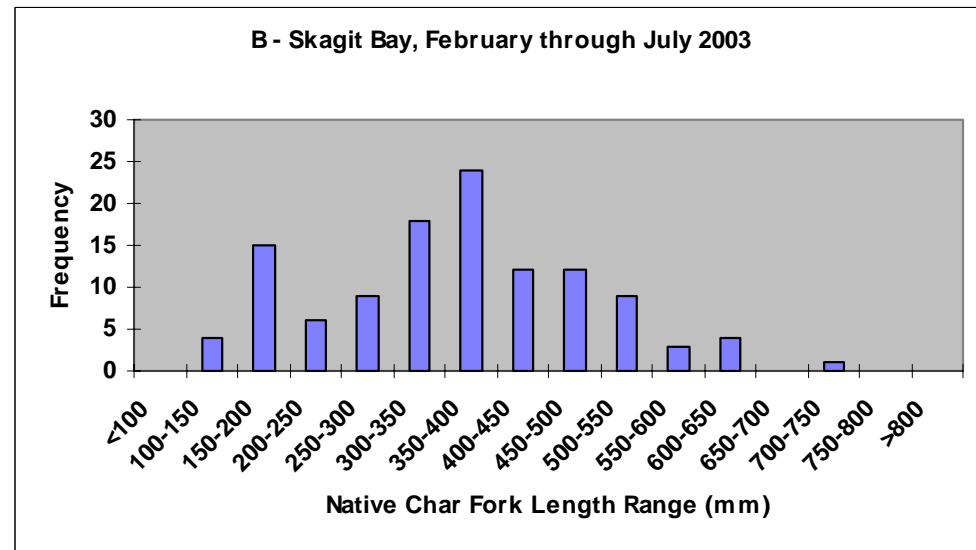
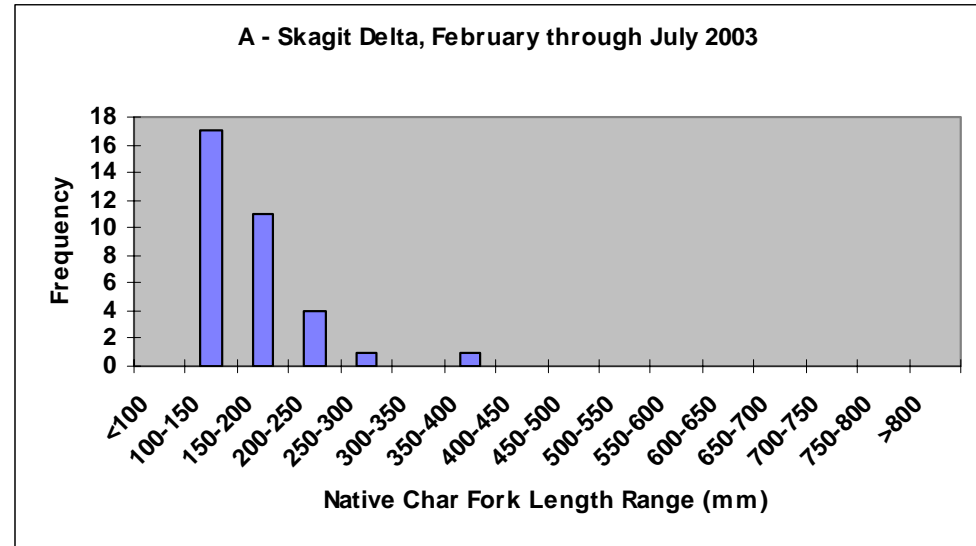
Abundance trend in Skagit Bay intertidal-subtidal fringe habitat

- Seasonal abundance (February through October) in Skagit Bay increased steadily from 1995 through 2001 (may have leveled off post 2001)
- By looking at abundance during “peak” months alone, we might still be observing an increasing abundance trend



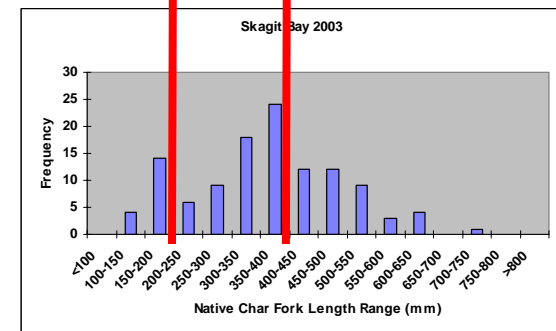
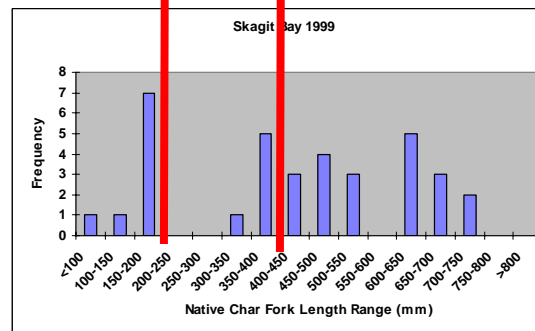
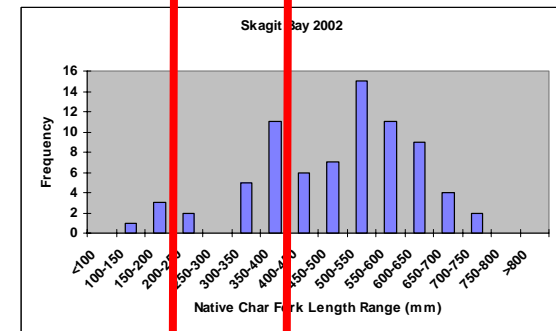
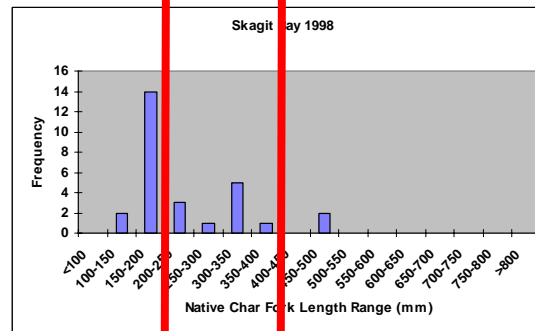
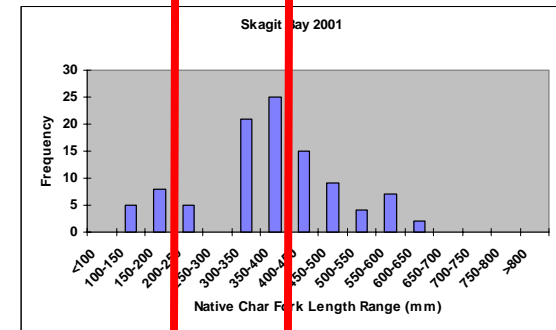
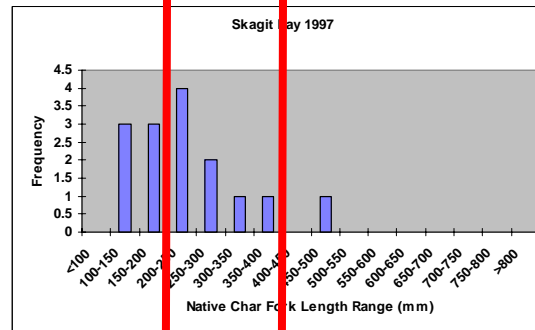
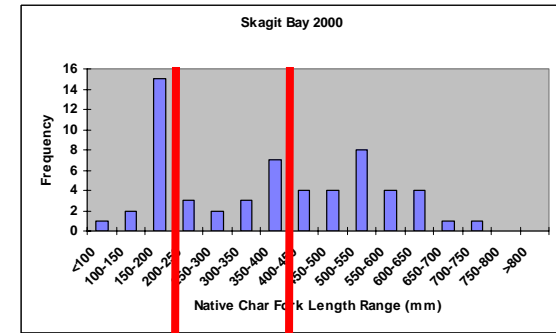
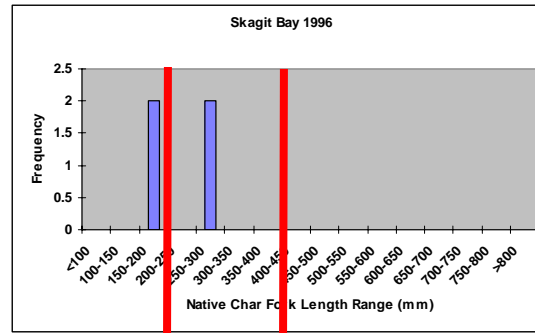
Size of bull trout in the Skagit estuary

- Bull trout rearing in delta distributaries and blind channels tend to be smaller (sub-adult sized)
- Bull trout in Skagit Bay nearshore habitats include larger fish



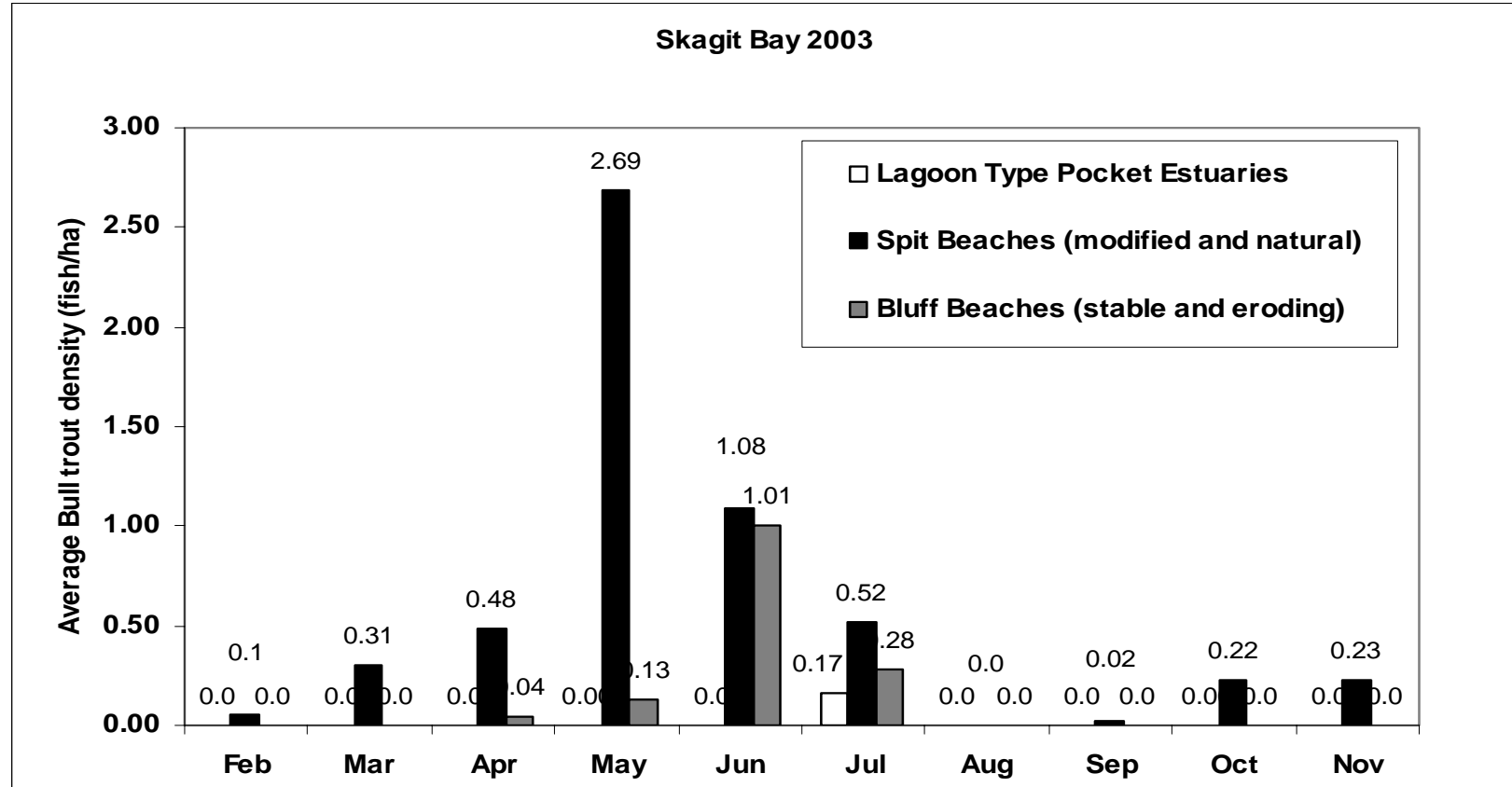
Size trend in Skagit Bay intertidal-subtidal fringe habitat

- The bull trout population in Skagit Bay has increased in length frequency complexity
- 1996-1998, much of the population too young to spawn
- 1999-2003, a tri-modal length distribution is evident



Habitat selection of bull trout in the nearshore

- Bull trout are more associated with spit habitat throughout the year than any other geomorphic nearshore type.
- Bull trout were never found in coastal lagoon habitat except in July



An aerial photograph of a river delta system. The river branches out into several smaller channels, creating a complex network of waterways. The surrounding land is a mix of green fields, some of which appear to be covered in plastic mulch, and brownish soil. A road or canal runs parallel to one of the river channels. The background shows a large body of water, possibly a bay or estuary, under a hazy sky.

Acknowledgements

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