



Hatchery Chum Salmon Straying in Southeast Alaska

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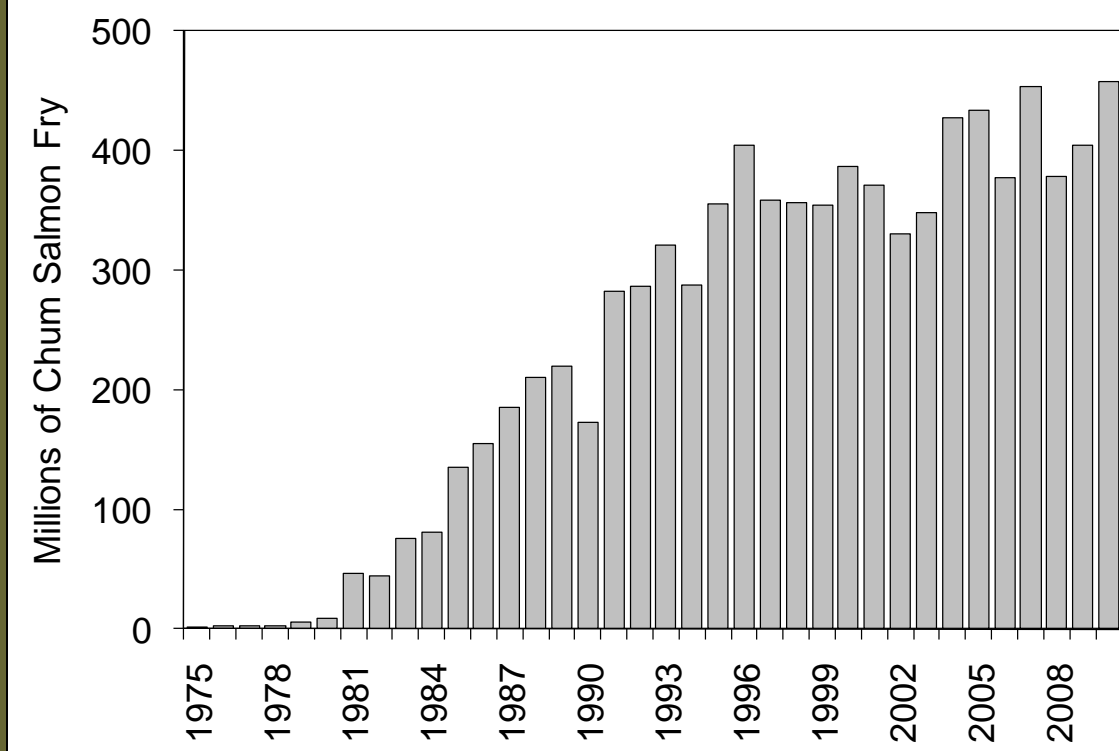


Figure 1. Hatchery chum salmon releases in Southeast Alaska, 1975–2010.



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INTRODUCTION

Hatchery production of chum salmon in Southeast Alaska increased dramatically over the last three decades, from 8.7 million fry released at eight locations in 1980, to 458 million fry released at 19 locations in 2010 (Figure 1). Hatchery fish accounted for an average of 73% of the common property commercial harvest of chum salmon—65 million fish—over the 10 years, 2001–2010 (Figure 2), and the total exvessel value of the commercial chum salmon harvest averaged \$32 million a year. The State of Alaska has numerous policies designed to minimize impacts of the salmon enhancement program on wild stocks, including a genetics policy, disease policies, a policy for the management of sustainable salmon fisheries (5 AAC 39.222), and a policy for management of mixed stock salmon fisheries, which gives the conservation of wild stocks, consistent with the sustained yield principle, the highest priority (5AAC 39.220).

Chum salmon spawning abundance is currently monitored through a series of peak survey estimates at 88 index streams upon which escapement goals are based. For summer chum salmon, escapement goals are based on peak survey counts to aggregates of streams in three broad subregions—Southern Southeast, Northern Southeast Inside, and Northern Southeast Outside. An obvious criticism of this approach, however, is that trends in the escapement indices may have been affected by an increase in hatchery strays. Limited sampling conducted by ADF&G between 1995 and 2007, primarily in northern Southeast Alaska, indicated that streams near major hatchery chum salmon release sites were likely to contain high proportions of stray hatchery fish. No such information existed for most of Southeast Alaska, and the degree of straying by hatchery fish outside the immediate vicinity of hatchery release sites was unknown.

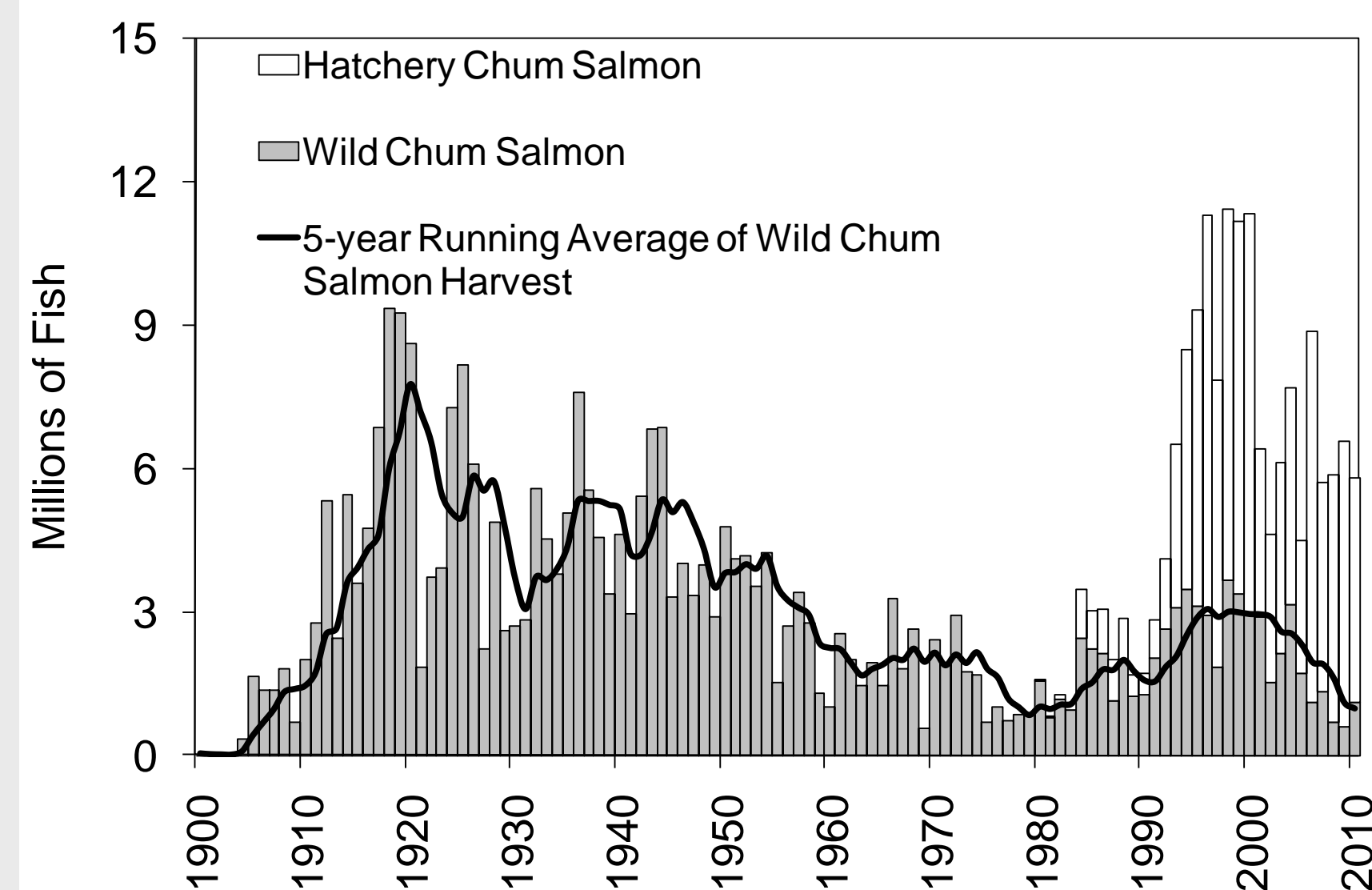


Figure 2. Historic Southeast Alaska chum salmon harvests.

METHODS

Our goal was to collect baseline samples from 50% of the 88 chum salmon wild stock index streams in Southeast Alaska over a three year period, 2008–2010. Otoliths were collected from chum salmon carcasses on the spawning grounds of each sampling location, and sampling was distributed throughout each system as much as possible. Sampling was conducted over at least two sampling events based on known run-timing in each stream, with a sample size goal of 96 otoliths per visit (192 otoliths per season). Otolith samples were processed, aged, and analyzed at the ADF&G Commercial Fisheries Tag, Mark, and Age Laboratory in Juneau, Alaska.

RESULTS and CONCLUSIONS

- From 2008 to 2010, we obtained samples of greater than 50 fish from 33 index streams, and smaller sample sizes from six additional streams.
- Results indicated that streams within 50 km water distance from hatchery release sites are likely to contain high proportions of stray hatchery fish. Twelve streams located within 50 km of release sites in which sample sizes were greater than 50 fish had an average sample proportion of approximately 28% (range: 3.5–87.5%) hatchery fish, and all samples of greater than 40% hatchery fish were from these streams. (Figures 3 and 4).
- The mean proportion of hatchery strays in samples from streams located 50–100 km from the nearest release site was 8.0% (range: 0.0%–17.8%). For streams greater than 100 km from the nearest release site, the mean proportion of hatchery strays in our samples dropped to 3.3% (range: 0.0%–16.6%).
- We observed considerable year-to-year variation in the proportion of hatchery fish in some streams that were sampled in multiple years.
- Approximately one-third of the 81 summer chum salmon index streams in Southeast Alaska are within 50 km of the nearest release site (Figure 5).
- The escapement index for the Northern Southeast Inside Subregion was the most influenced by hatchery strays and we estimated an overall proportion of approximately 14% hatchery strays for this index in 2010.
- In the NSEO escapement index, the overall proportion of strays was estimated to be less than 2% in all three years.

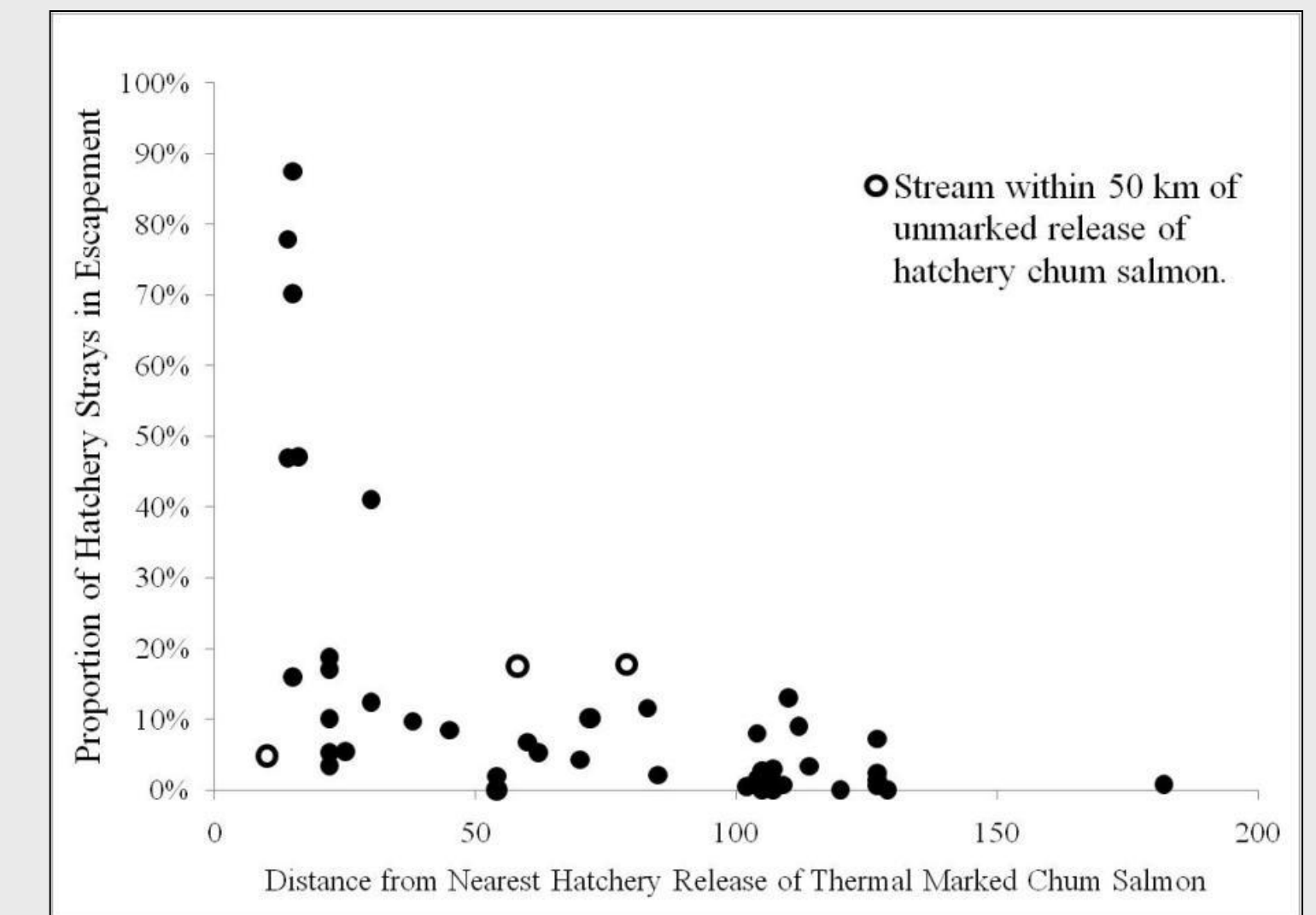


Figure 3. Proportion of stray hatchery fish by distance from release site.

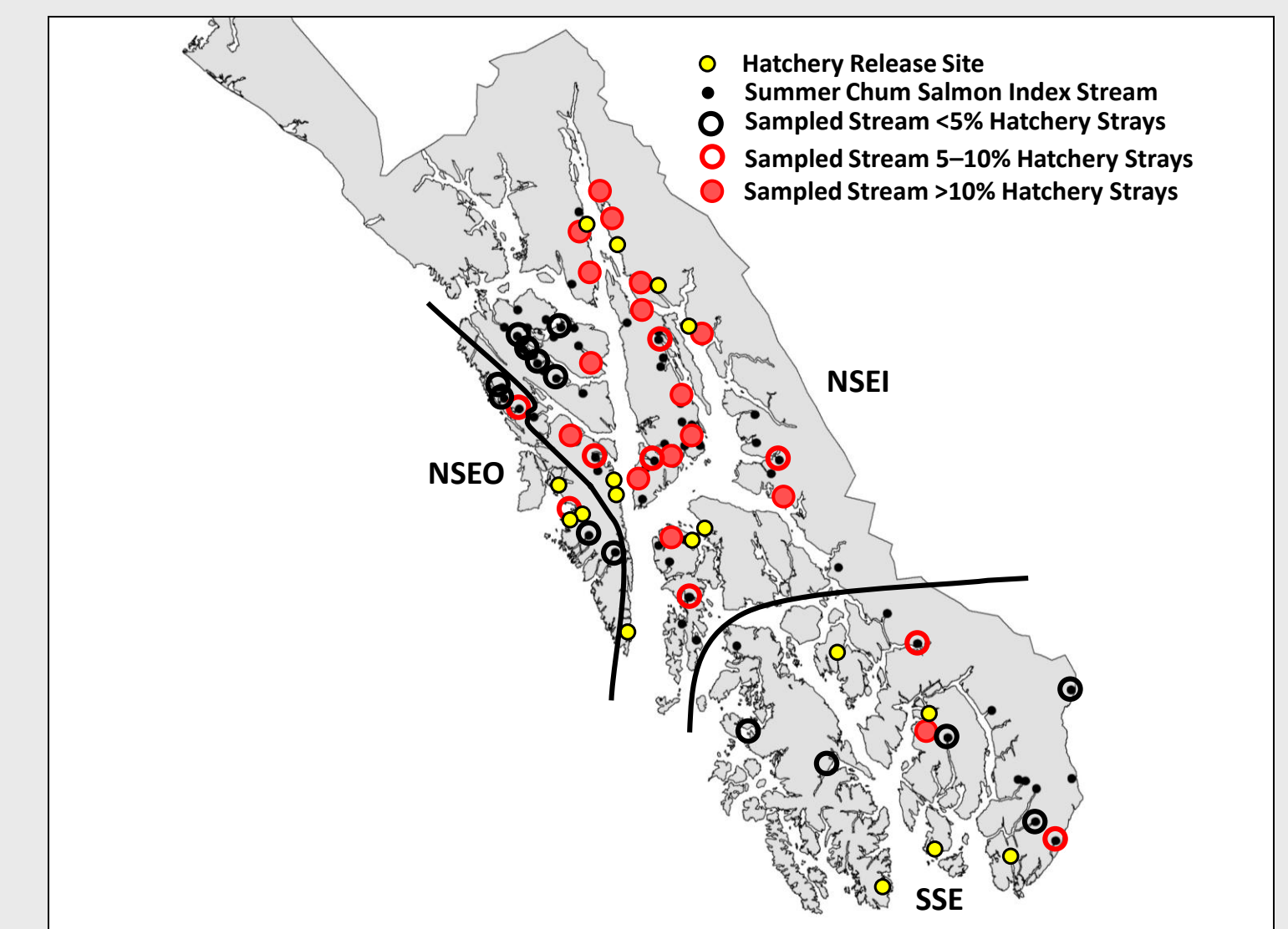


Figure 4. Chum salmon index streams sampled for hatchery strays.

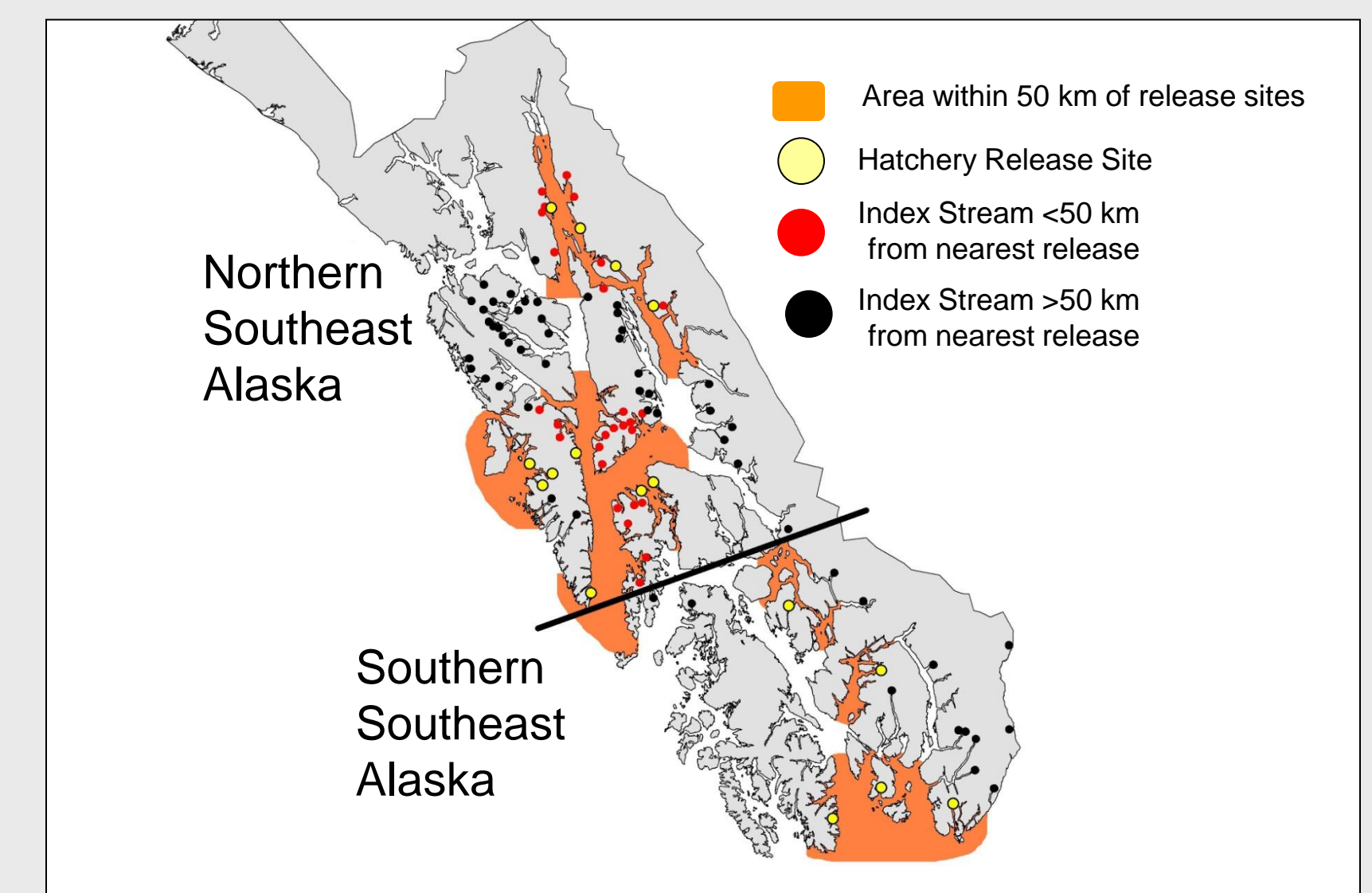


Figure 5. Chum salmon index streams in relation to hatchery release sites.