



# Straying of Hatchery Pink Salmon into Streams in Prince William Sound, Alaska

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## INTRODUCTION

Prince William Sound Aquaculture Corporation (PWSAC) and Valdez Fisheries Development Association (VFDA) release ~690 million thermally marked pink salmon *Oncorhynchus gorbuscha* fry into Prince William Sound (PWS) from 4 release sites (**figure 1**).

The Alaska Department of Fish and Game (ADF&G) has management policies designed to protect wild stocks of salmon from harmful interactions with hatchery stocks (1,2).

Genetic and ecological impacts to wild salmon are possible when they interact or interbreed on the spawning grounds with hatchery strays (3, 4, 5, 6, 7).

Studies initiated after coded wire tag recoveries (early 1990s) and thermally marked otolith recoveries (1997–1999) showed hatchery fish were straying.

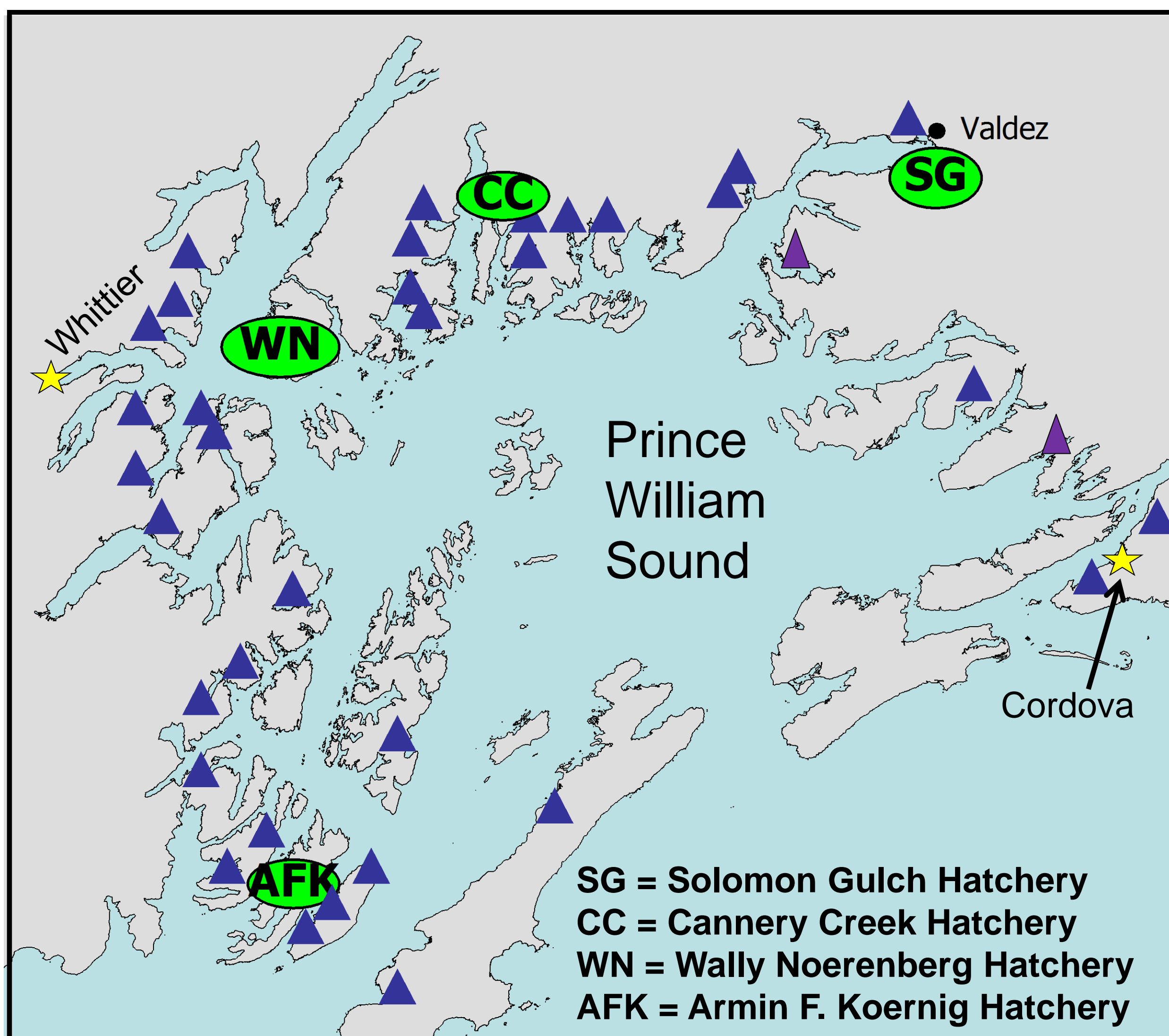
## STUDY GOALS (2008–2010)

1. Determine percentage of hatchery pink salmon in historically significant spawning streams.
2. Examine spatial and temporal extent of hatchery straying in PWS.

## METHODS

- Sample streams were selected with a stratified random design from 214 aerial survey index streams.
- Opportunistic sampling was also conducted at streams by weir crews.
- Otoliths were collected from dead salmon within streams.
- Streams sampled up to 3 times annually; sample goals were 128 otoliths per sampling event (384 total per stream each year).
- Otoliths were analyzed for thermal marks at the otolith laboratory in Cordova.
- Yearly total pink salmon proportions were weighted by stream abundance estimated from aerial surveys.
- Exponential decay models were used to estimate the proportion of hatchery strays in unsampled streams.

Figure 1. Pink salmon sample sites and hatcheries, PWS.



SG = Solomon Gulch Hatchery  
 CC = Cannery Creek Hatchery  
 WN = Wally Noerenberg Hatchery  
 AFK = Armin F. Koernig Hatchery

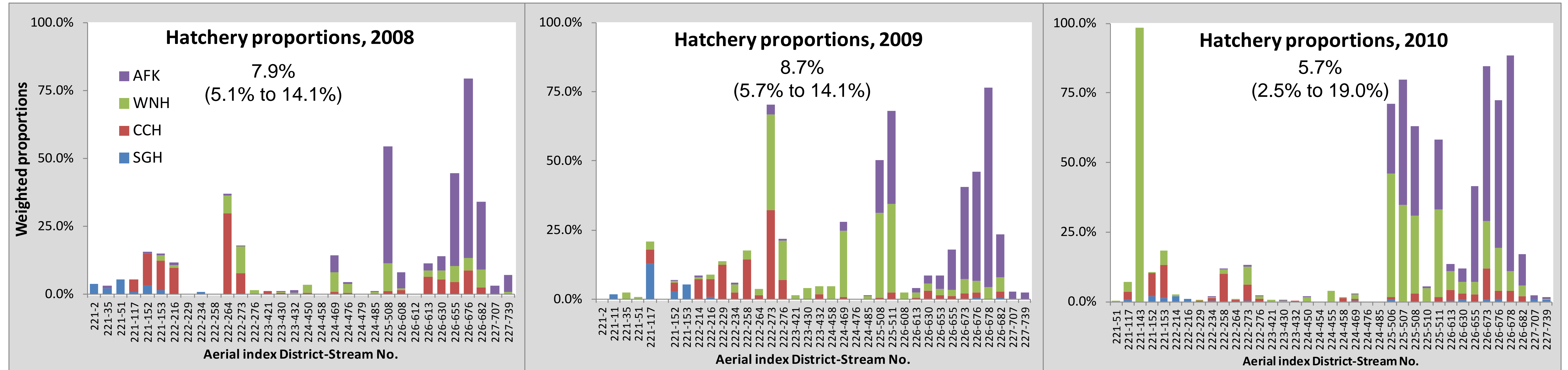


Figure 2. Weighted percentage of hatchery strays by district–stream and year. Inset boxes are weighted yearly percentage and 95% CI for all sampled streams.

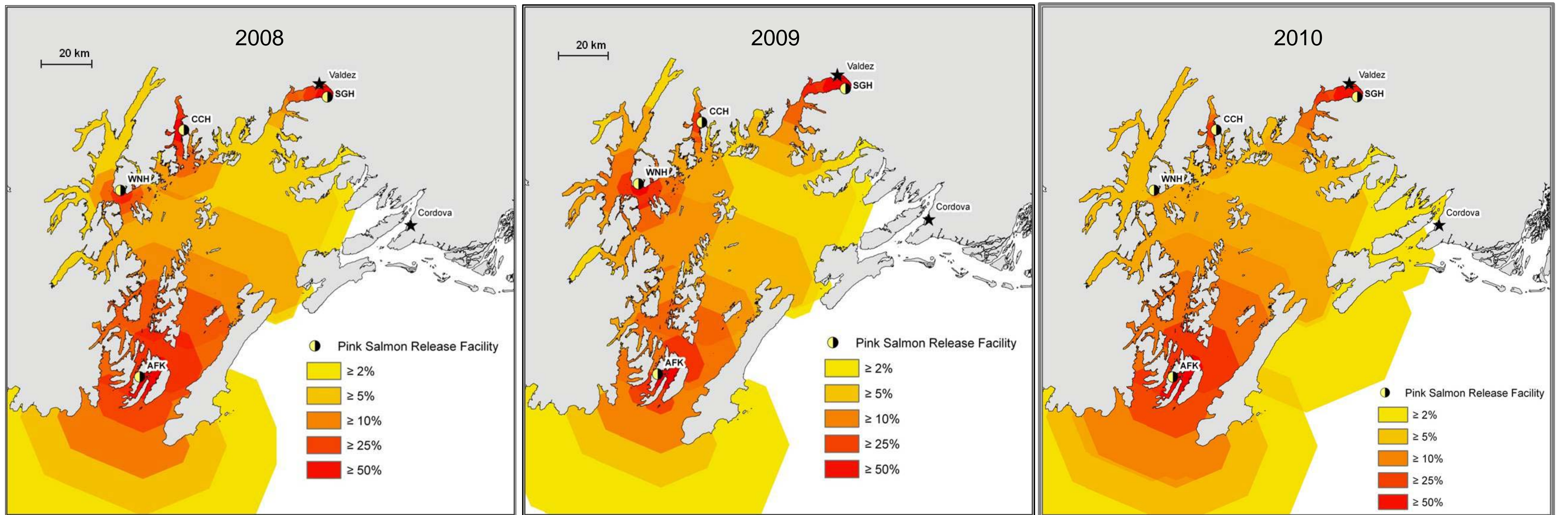


Figure 3. Exponential decay model predictions of the percentage of hatchery strays with distance from release sites.

## Results/Conclusions

- Otoliths (n = 28,020) were collected from 32 (2008), 35 (2009), and 37 (2010) streams. Weighted proportion of hatchery strays in all streams sampled ranged from 5.1% (2010) to 8.7% (2009; **figure 2**).
- Percentages of hatchery strays increased as the season progressed (data not shown)
- Across all years, 15 streams (35%) contained more than 20% hatchery strays and 22 streams (51%) contained more than 10% hatchery strays.
- Exponential decay models (**figure 3**) predict that from 24% (2009) to 29% (2010) of the 214 ADF&G aerial index streams will contain more than 10% hatchery strays.

Study results indicate straying of hatchery pink salmon is widespread in PWS and many streams exceed the 2% threshold set in the PWS-CR Phase 3 Comprehensive Salmon Plan (2). The percentage of stray hatchery fish increase through time. This could increase the superimposition of eggs from earlier spawning wild fish.

Future analysis will focus on evaluating the spatial & temporal relationships of hatchery salmon straying and incorporating relationships into a model that can be utilized by fisheries managers and hatcheries to better predict and minimize straying. A cooperative research effort including ADF&G, Alaska hatchery operators, and processors is in the planning stage.

## Selected References

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