What is going wrong with BC salmon?

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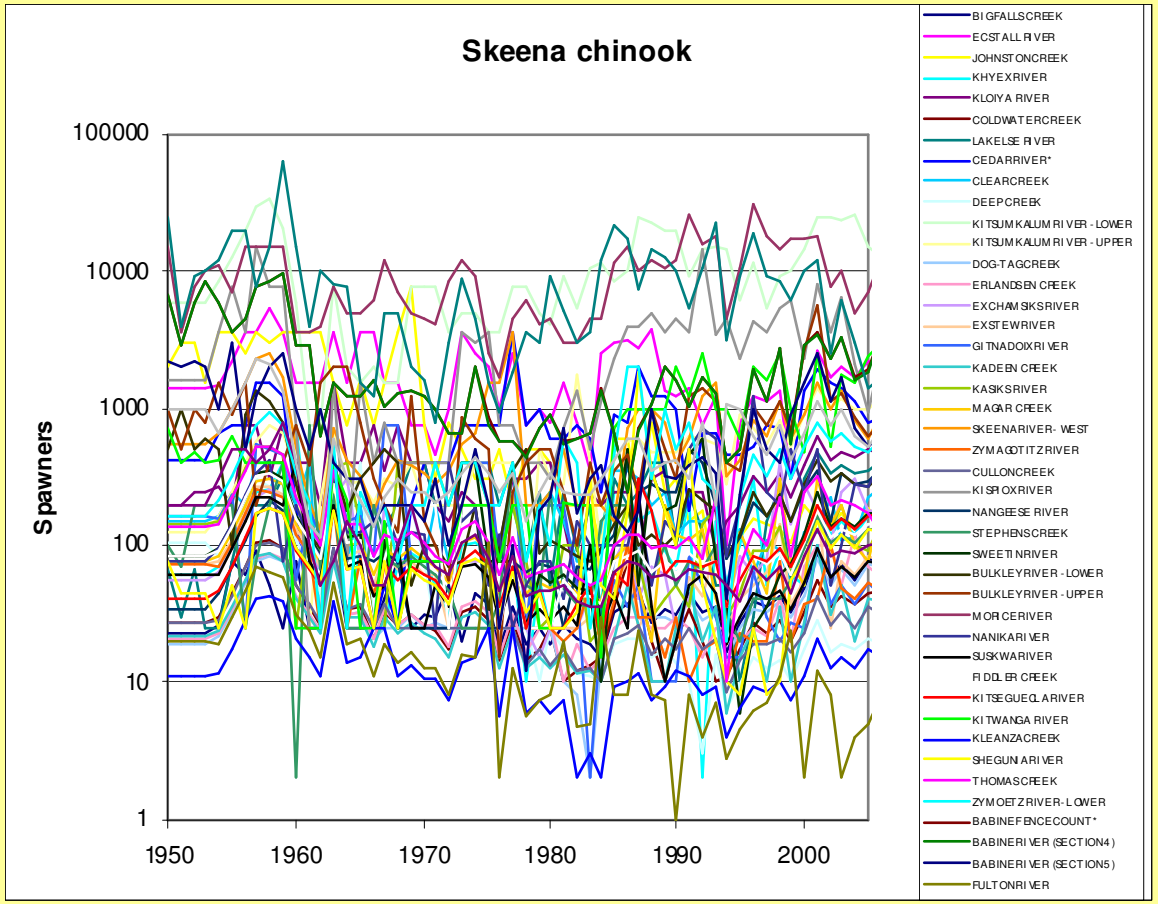
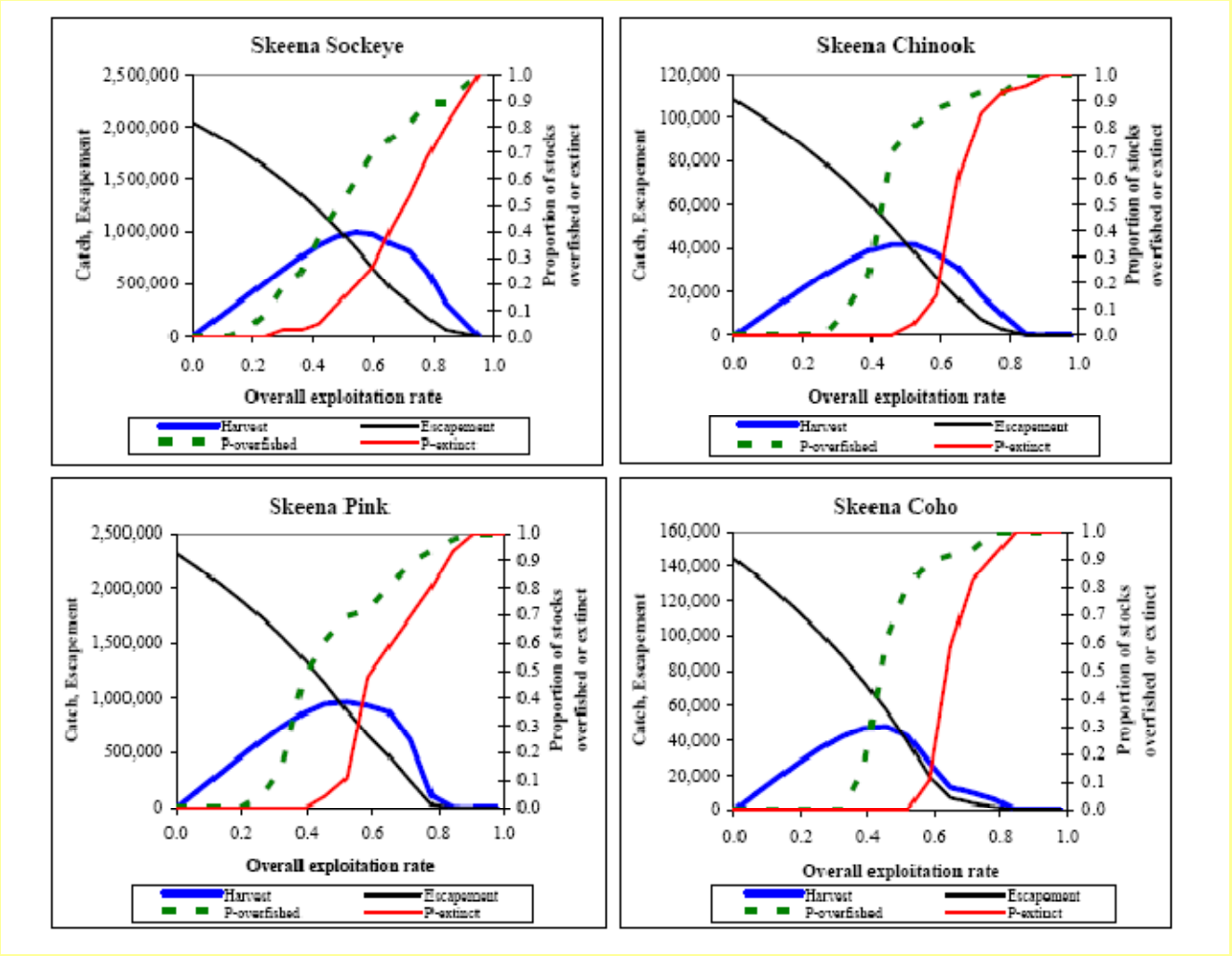
Regional variation in stock health and biodiversity: the picture is not all bad

- Stocks in Northern B.C. are quite healthy, and the main policy issue is the tradeoff between fishing and biodiversity
- There have been severe declines in chinook and coho in Southern B.C., with biodiversity threatened by factors other than fishing

Healthy stocks and stock structure in the North



A key tradeoff between maximizing catch and preserving biodiversity: maximizing catch would likely cause extinction of 10-20% of stocks

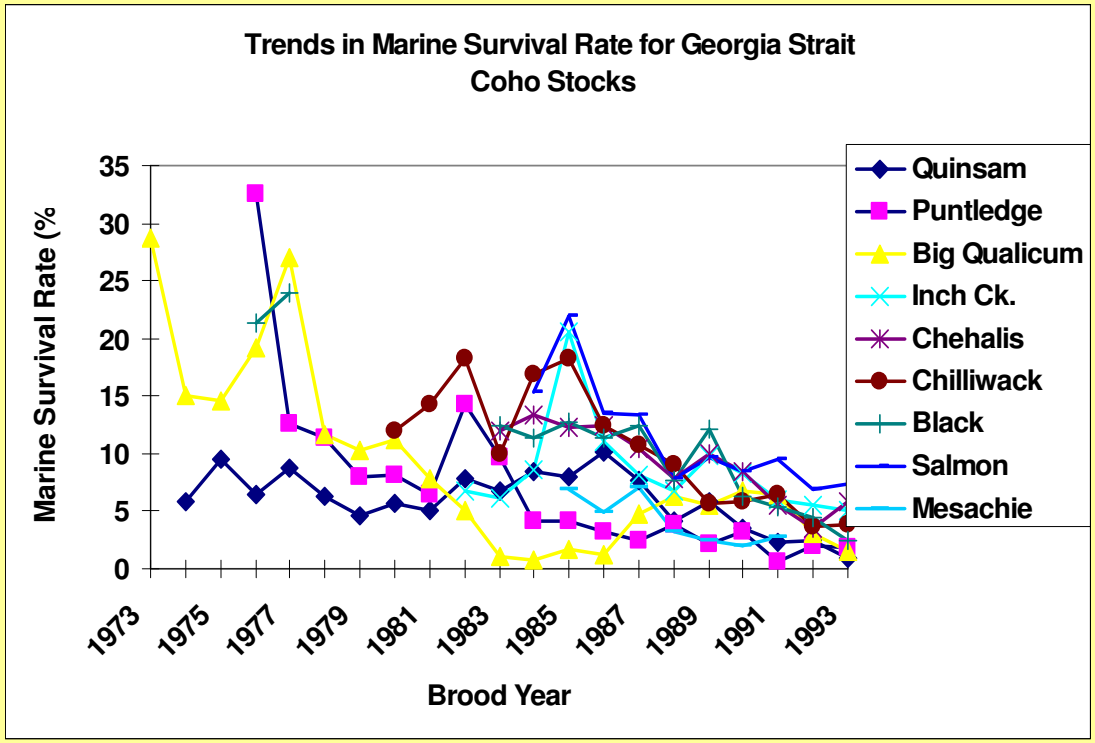


Sad declines in the South

- The declines are associated with changes in marine survival
- There has been no substantial habitat loss over the period of recent decline (1990 ff)
- Declines have not been reversed by closing the fisheries (overfishing was not the problem)

Declining marine survivals are the biggest risk for wild salmon in southern BC today:

COHO, BOTH HATCHERY AND WILD



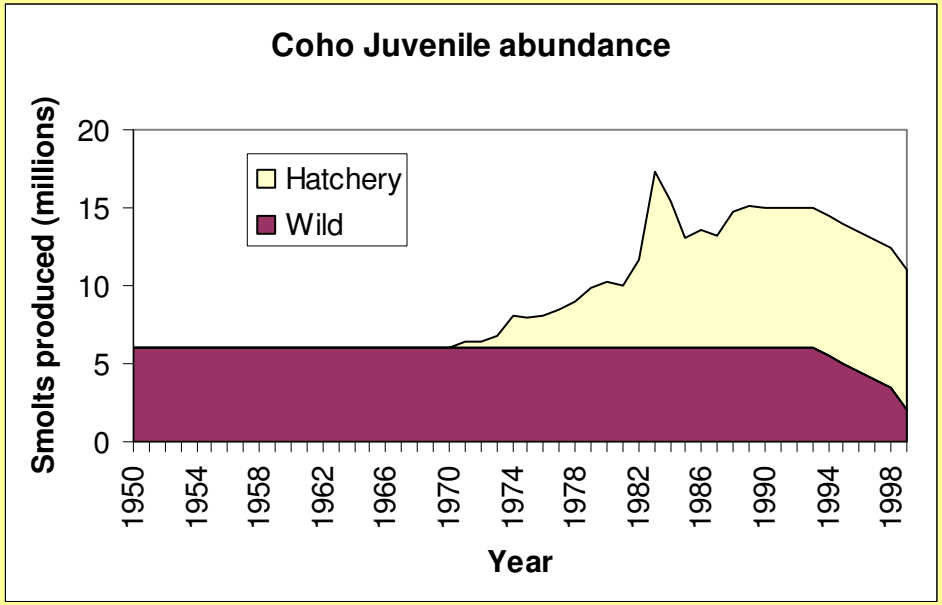
It isn't just coho:

-Rivers/Smith sockeye

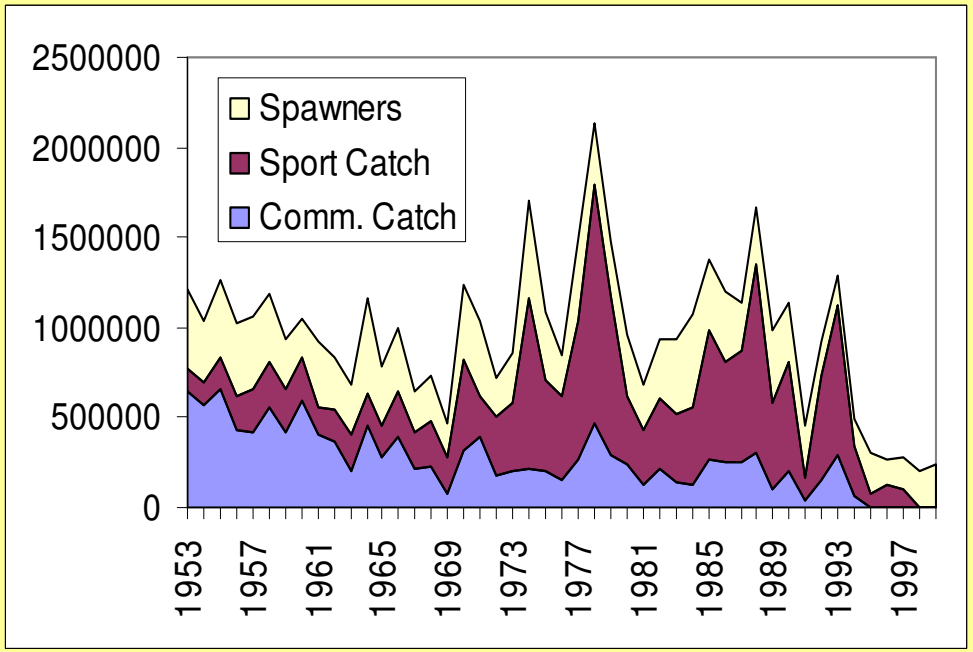
-Broughton pink

-Vancouver Island chinook

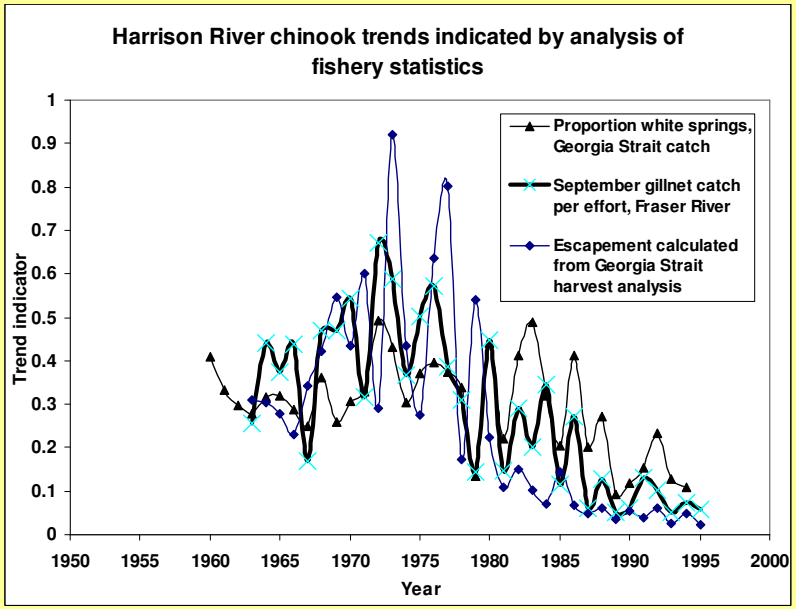
We confidently predicted that coho would double:

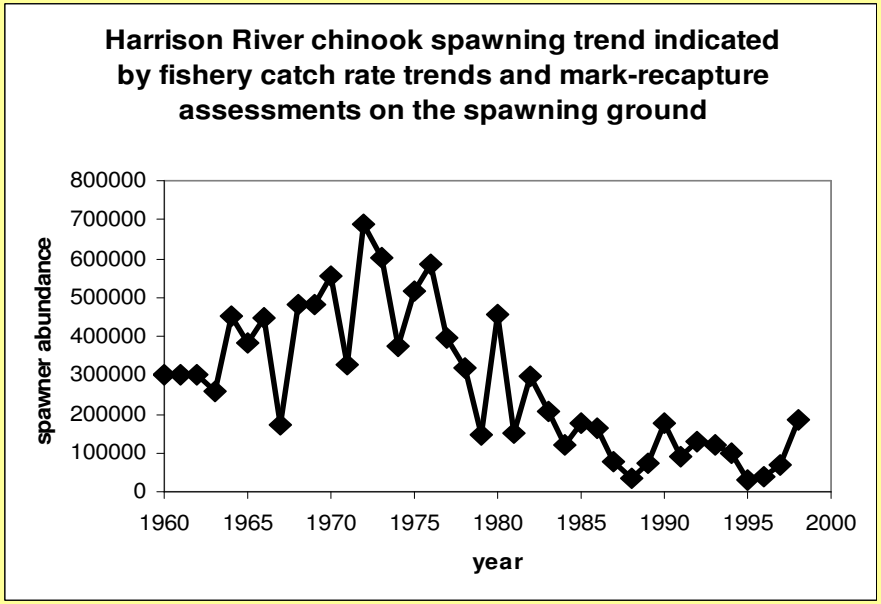


Here is what we finally got:



Chinook have shown the same basic pattern in southern BC as coho, but with decline starting earlier





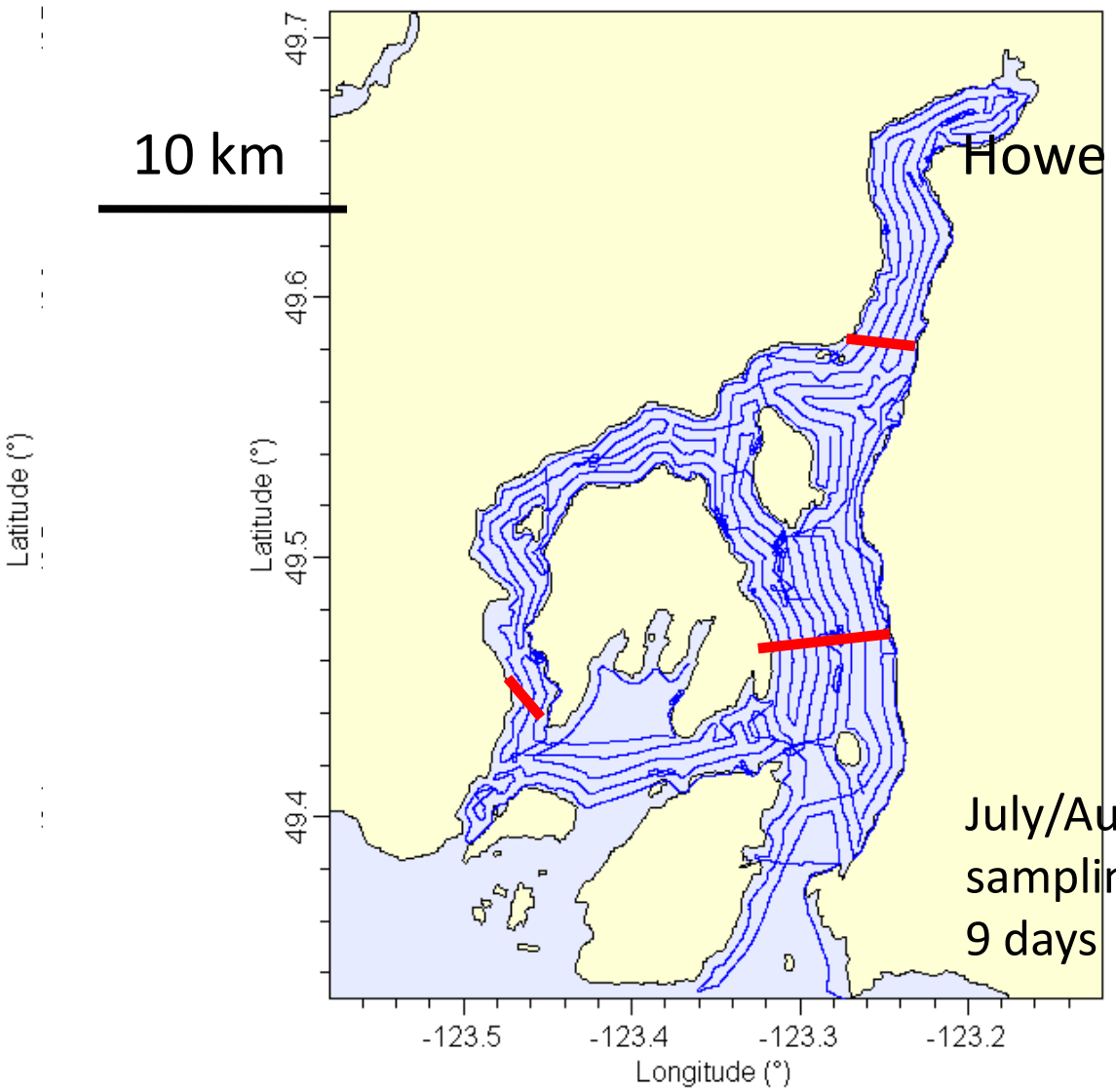
Misdirection of resources

- Restoring habitat that doesn’t need it
- Chasing trivial, local problems like fish farming
- Ignoring potentially huge problems like public hatcheries

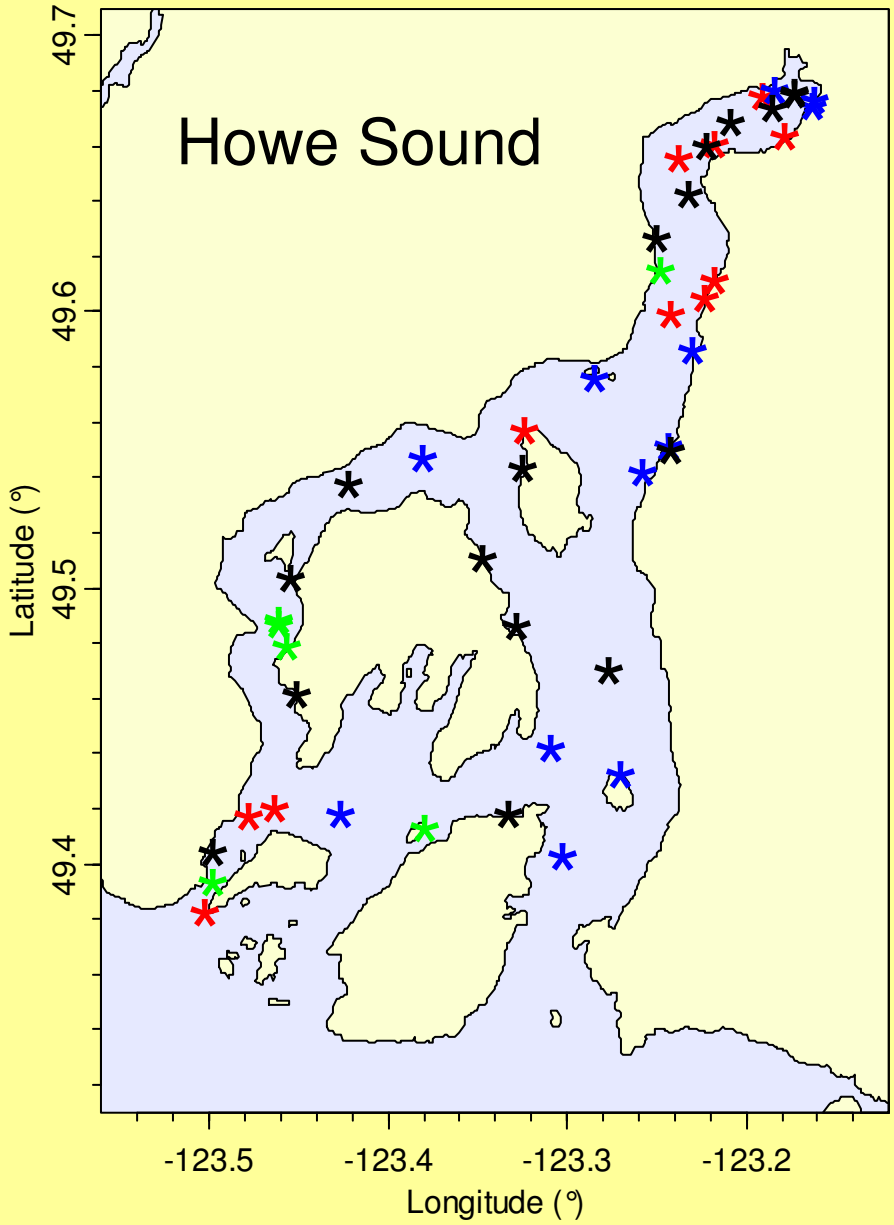
Why don’t we know what is going wrong in the ocean?

- We do not even know where and when the mortality is occurring
- Costs of monitoring where/when mortality is occurring have been prohibitive

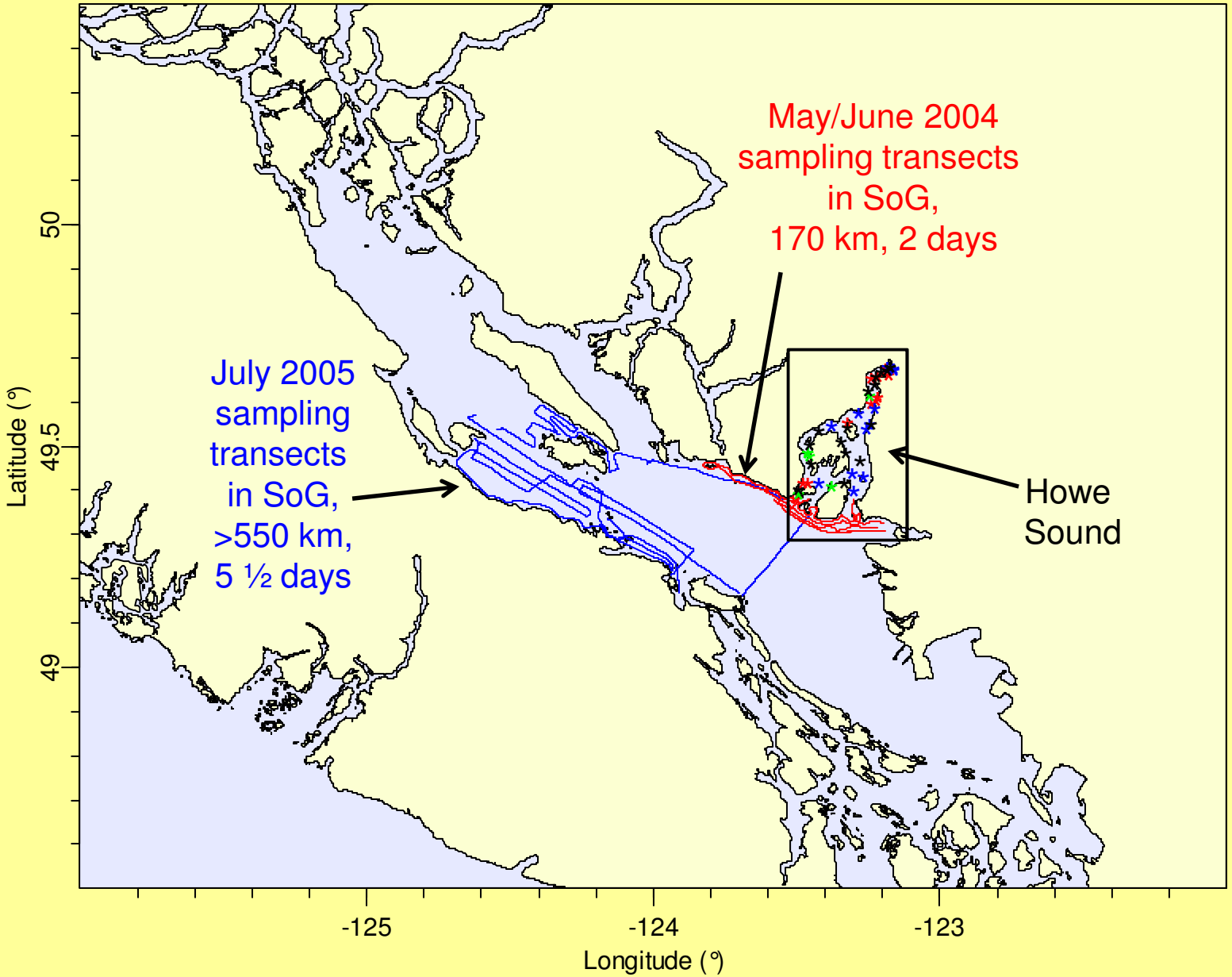
Mobile tracking for coho mortality locations

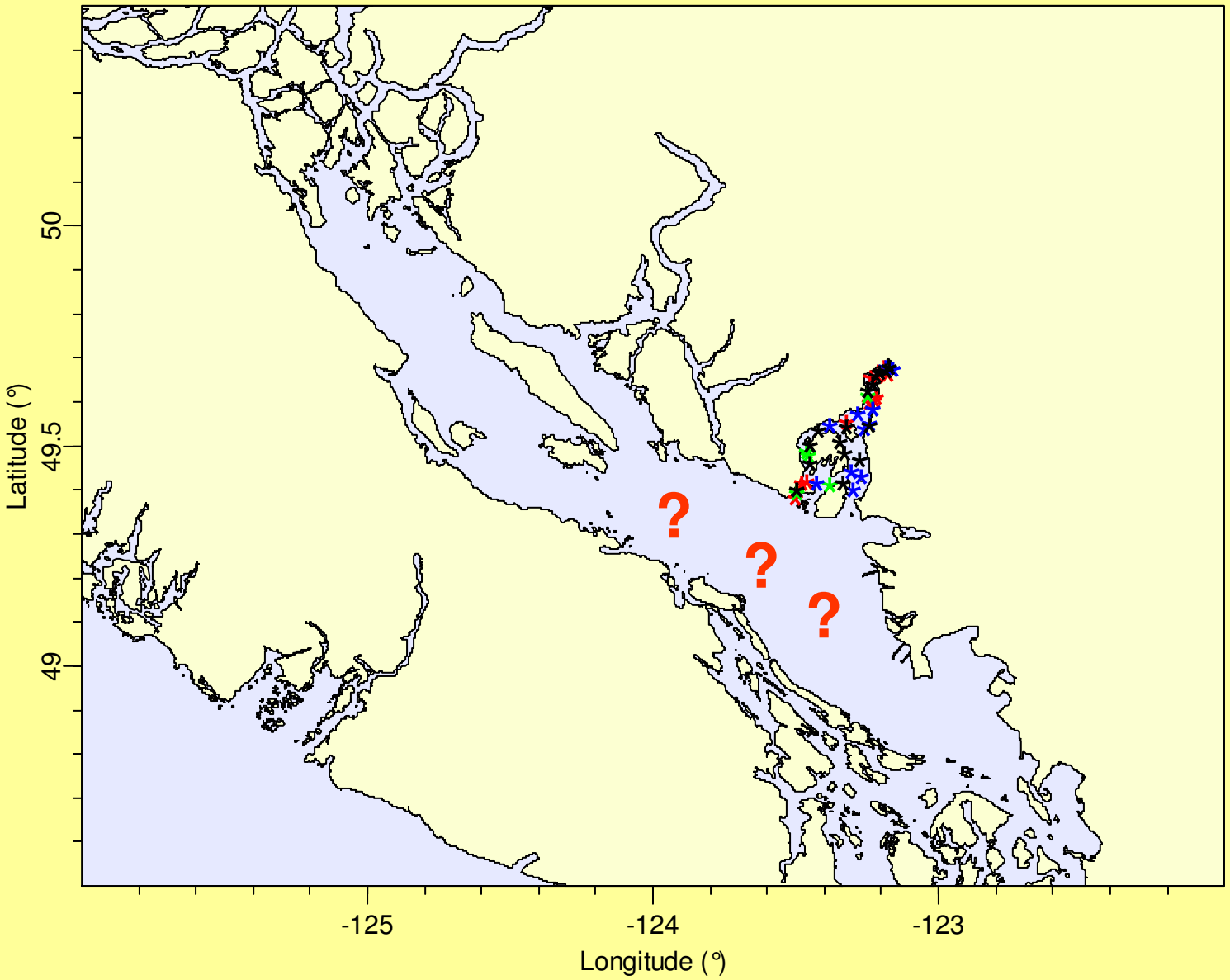


Locations where coho tags stopped moving



* 2004 (100 tags)
* 2005 (100 tags)
* 2006 (120 tags)
* 2007 (199 tags)


May/June 2004
sampling transects
in SoG,
170 km, 2 days
July 2005
sampling
transects
in SoG,
>550 km,
5 ½ days
Howe
Sound
Latitude (°)
50
49.5
49
-125
-124
-123
Longitude (°)


Latitude (°)
50
49.5
49
-125
-124
-123
Longitude (°)
?
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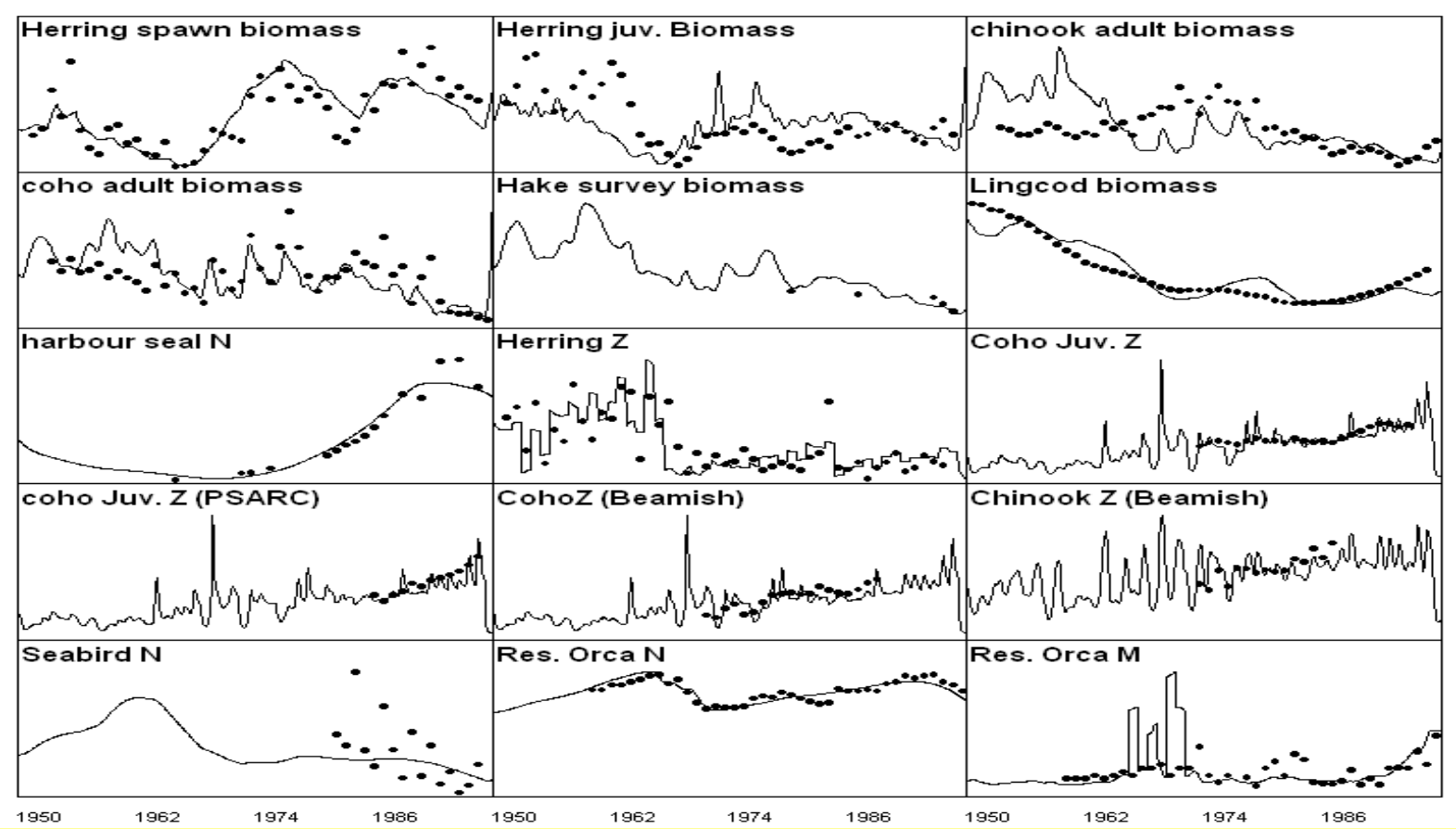
Ocean survival hypotheses

- Hatcheries (disease transmission)
- Thermal regimes (ocean is warmer)
- Fish predators (no known major increases)
- Mammal predators (“harvest” of fish mainly by harbour seals)

How serious is the marine mammal impact?

- Huge growth in harbour seal populations over the period of marine survival decline
- Seals in Georgia Strait “harvest” about 60,000 metric tons of fish per year (maximum take by the fisheries never exceeded 30,000 tons per year)
- Models explain the salmon survival decline by having only 3-4% of the seal diet be juvenile coho salmon

Ecosystem models estimate large impact of seals on several fish species



But these models also warn that seal culling could backfire, by allowing increases in salmon competitors/predators like hake

What is next?

- Vested interest in continuing to spend money on the wrong things
- Cost of ocean research at the right scales is prohibitively expensive
- Experimental cull of marine mammals is not socially acceptable
- So about all we can do at this point is to keep our fingers crossed that the “problem” will solve itself
- And I will be back in five years, with the same sad story…