Distribution and CPUE trends of Pacific salmon, especially in sockeye salmon in the Bering Sea and Adjacent waters

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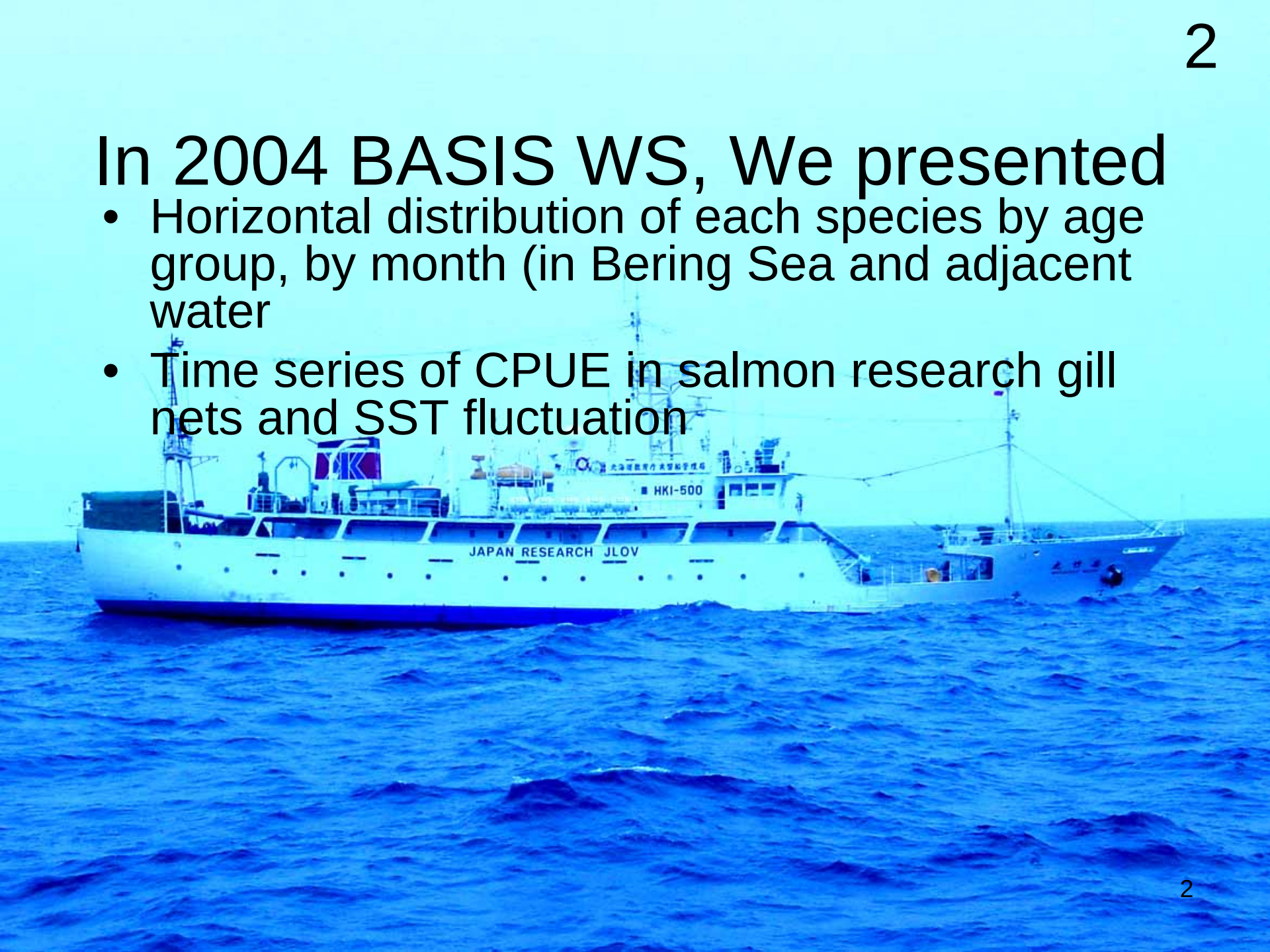
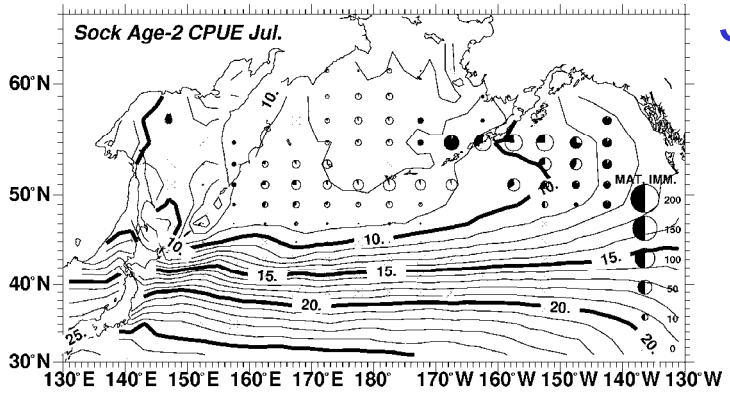
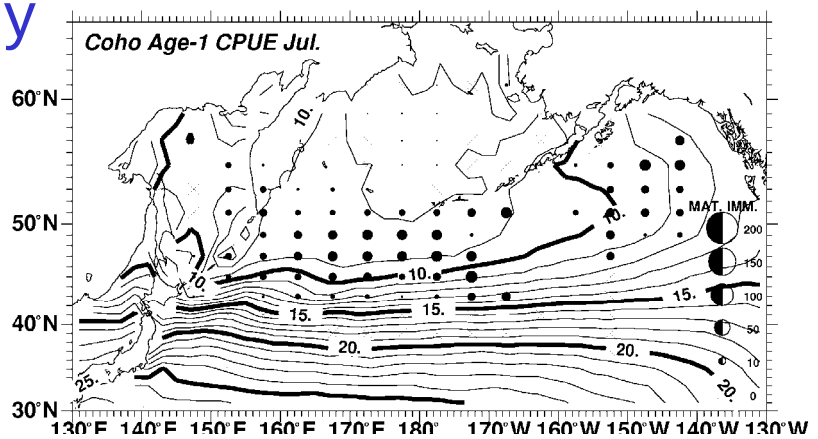
In 2004 BASIS WS, We presented

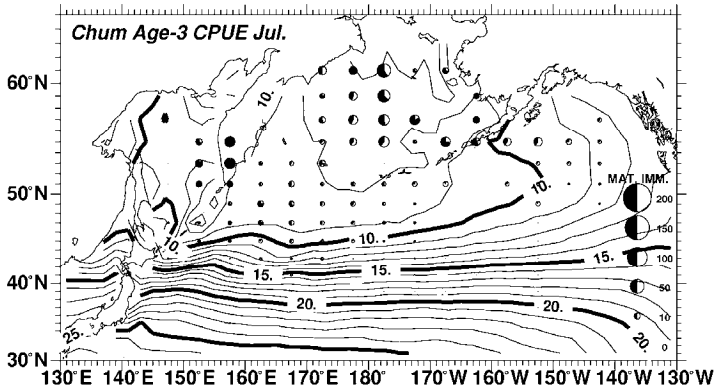
- Horizontal distribution of each species by age group, by month (in Bering Sea and adjacent water
- Time series of CPUE in salmon research gill nets and SST fluctuation

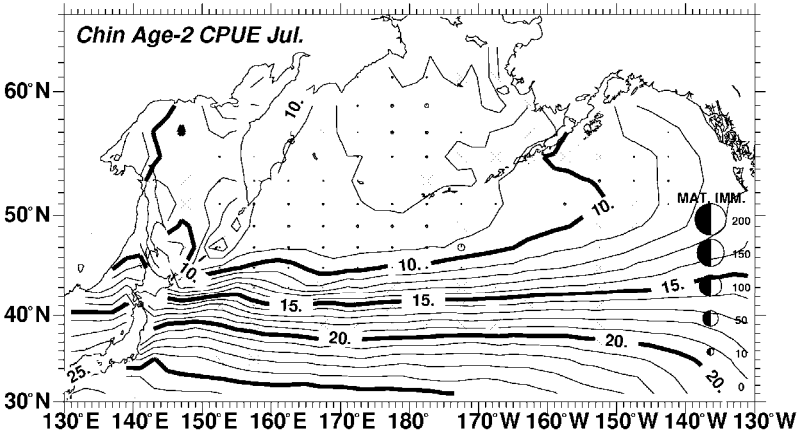


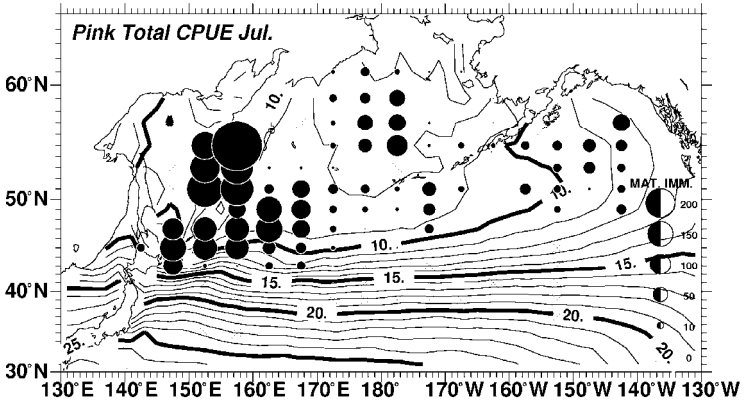
July











5 Pacific salmon

BS is not important for coho salmon as feeding area

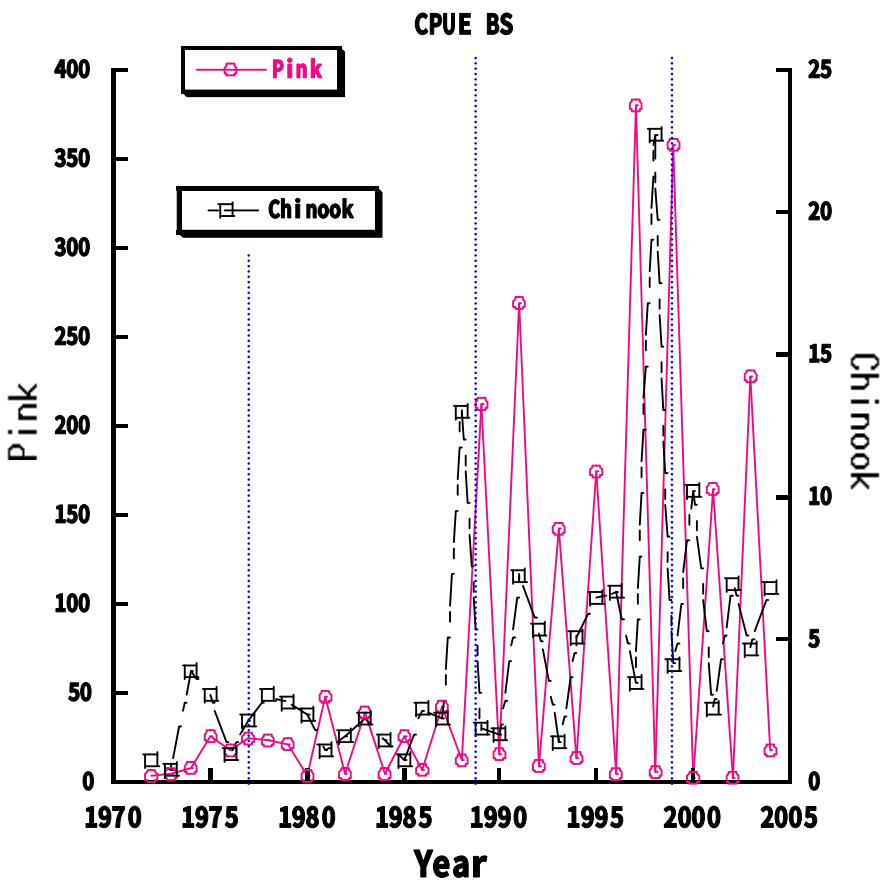
Chinook salmon inhabit both NP and BS, but abundance is low

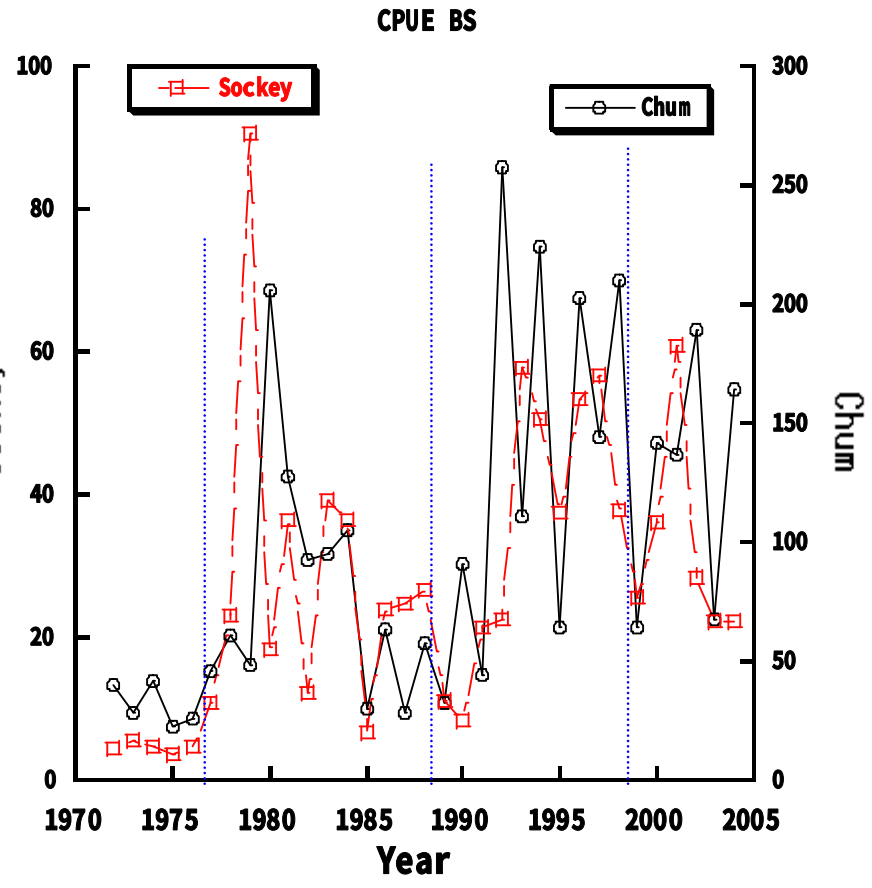
How about it for other three salmon species?

Bering Sea is important for ……

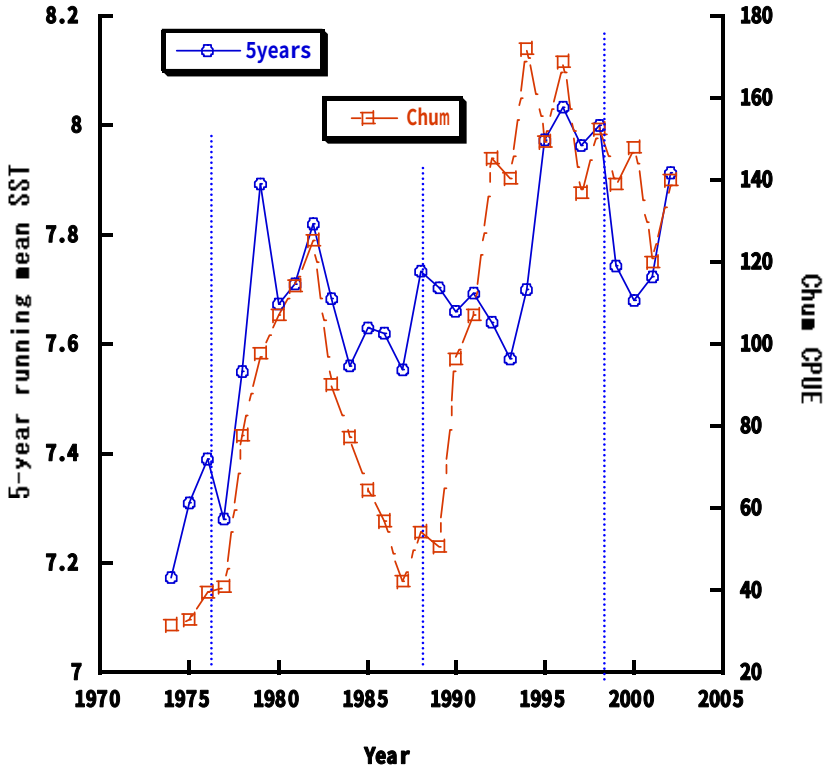
- Coho salmon → rare, Western Alaska and Eastern Kamchatka Population in summer
- Chinook salmon → immature and maturing use all season (but not abundant)
- Sockey salmon→ Immatured and maturing (E. Kam.+C. Alaska) in Summer
- Chum salmon→Immatured and maturing in summer (more in older age)
- Pink salmon →Maturing (E. Kam. +W.Alaska)

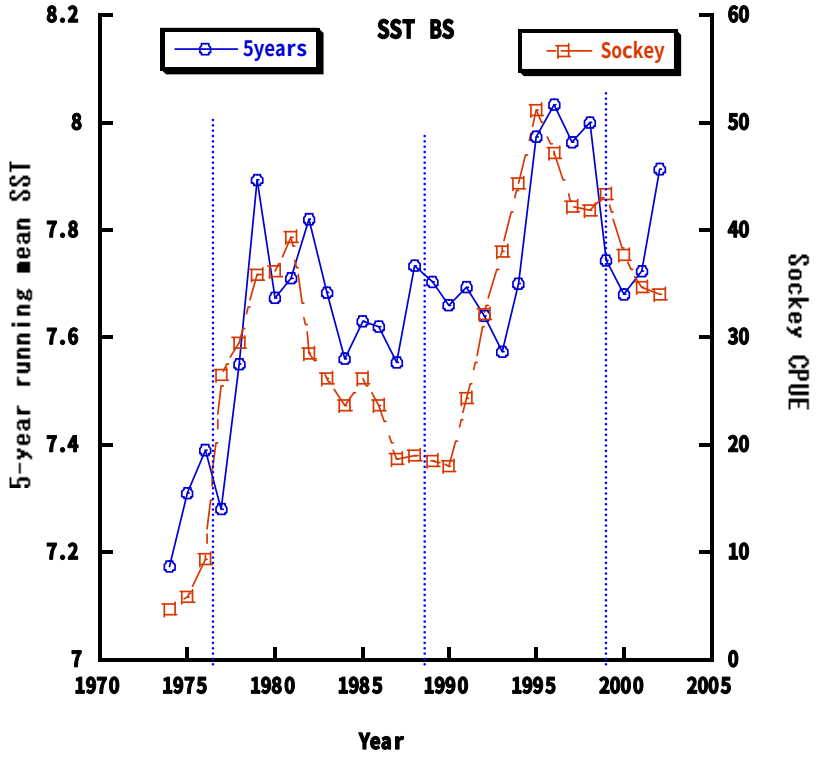
Time series of CPUE

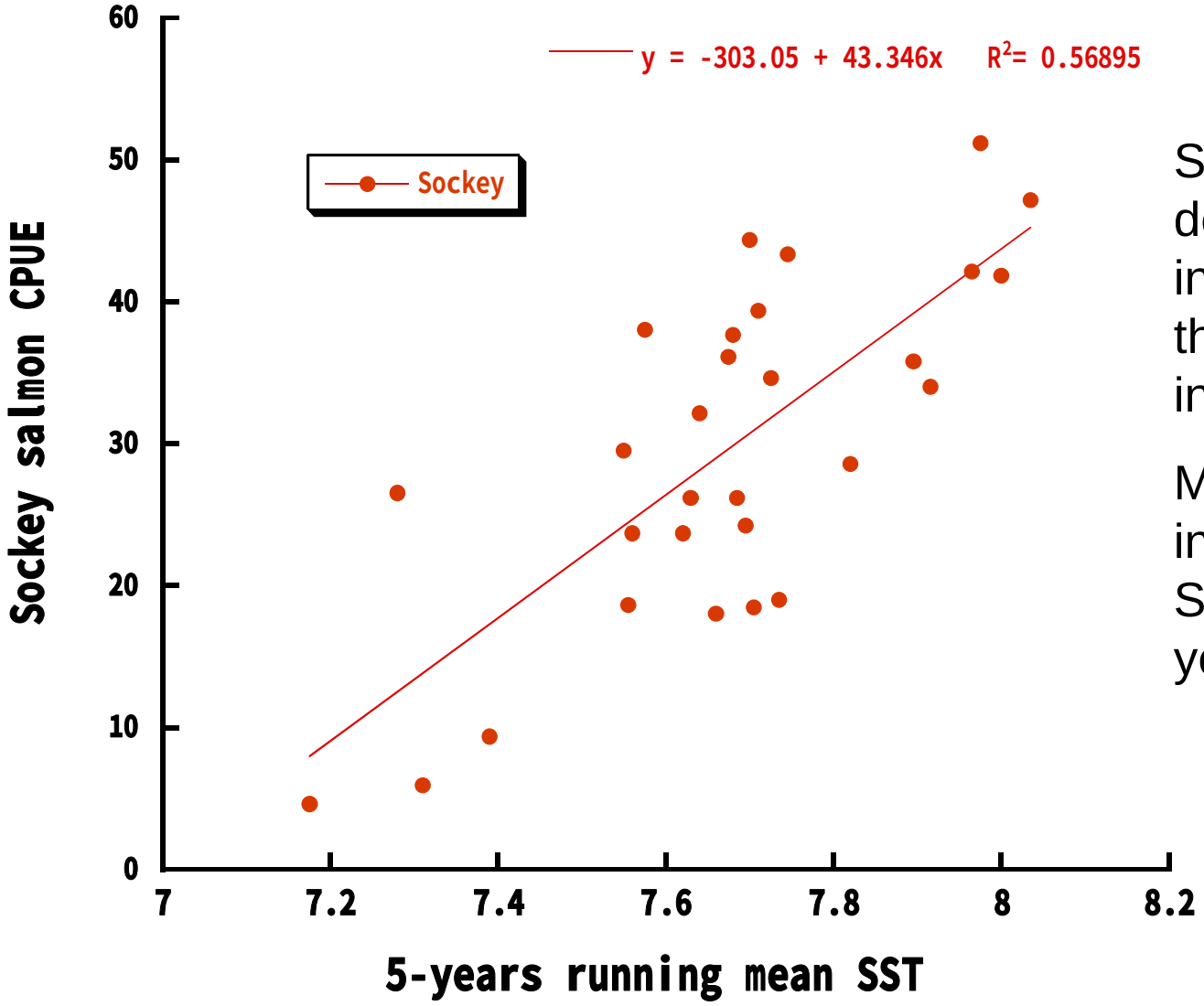




Mean SST and CPUE (5-year running)

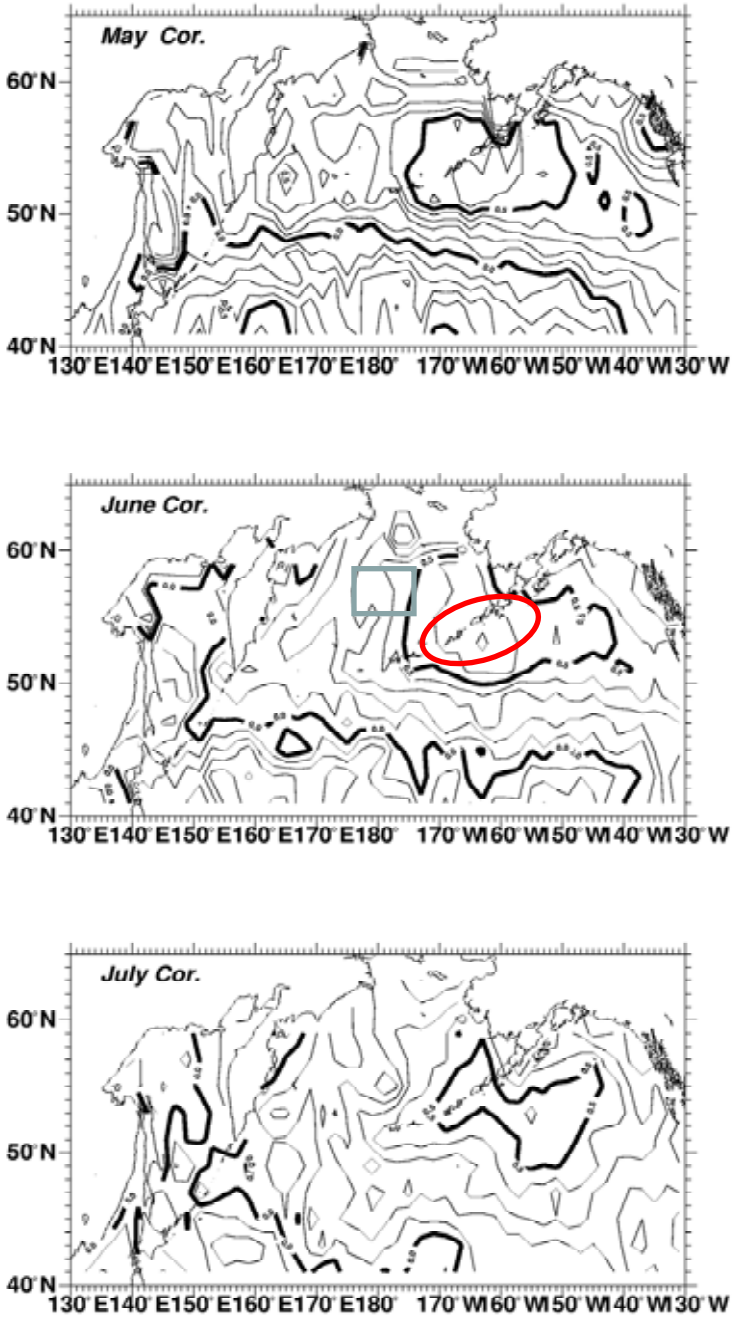


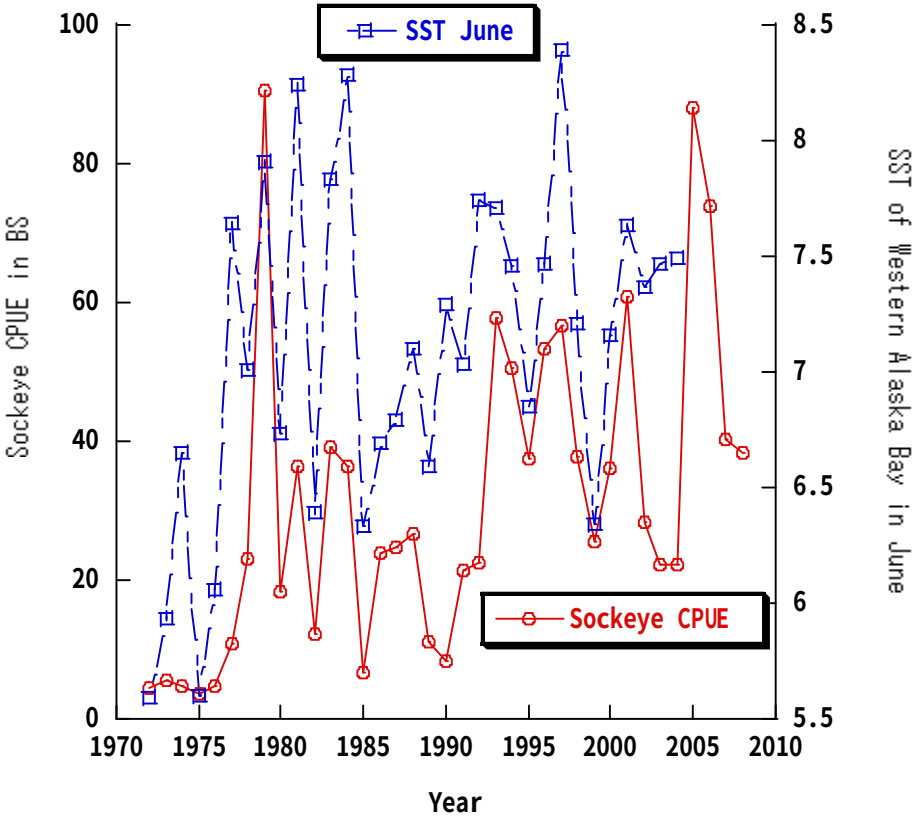




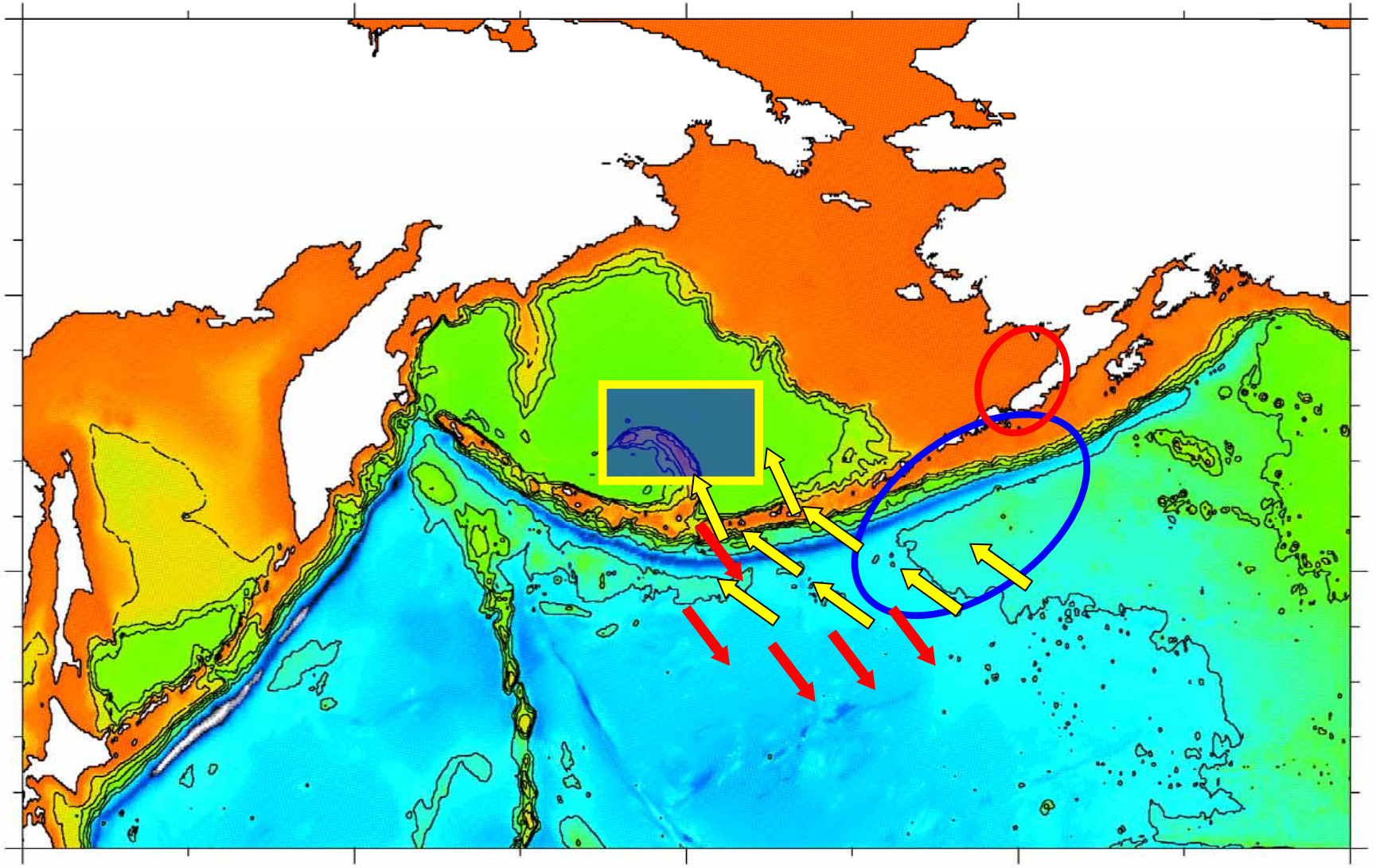
Sockey salmon density is higher in warm period than cool period in Bering Sea

Many salmon intrude Bering Sea in warm year?



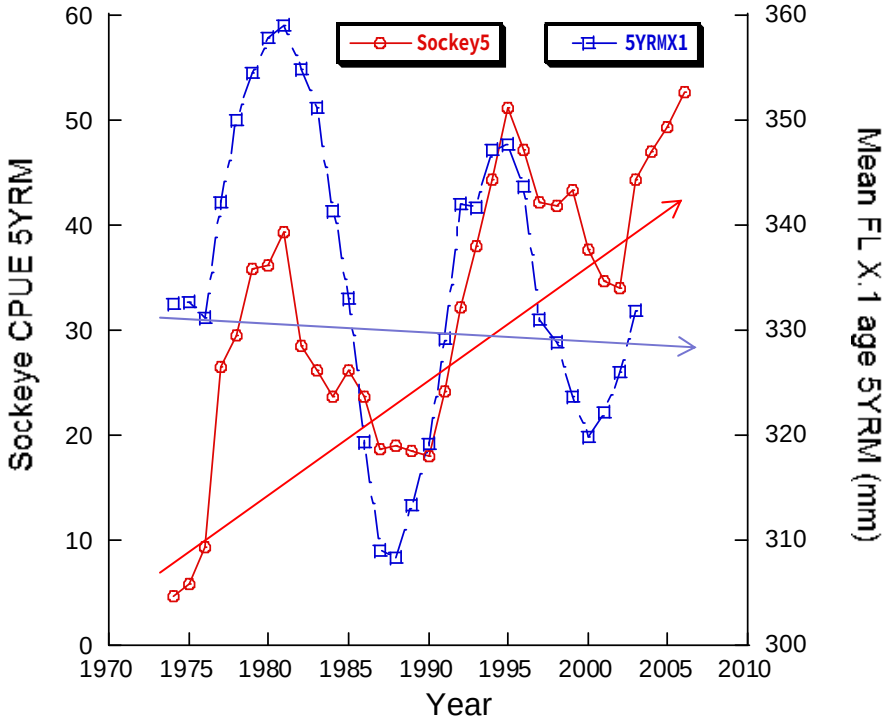


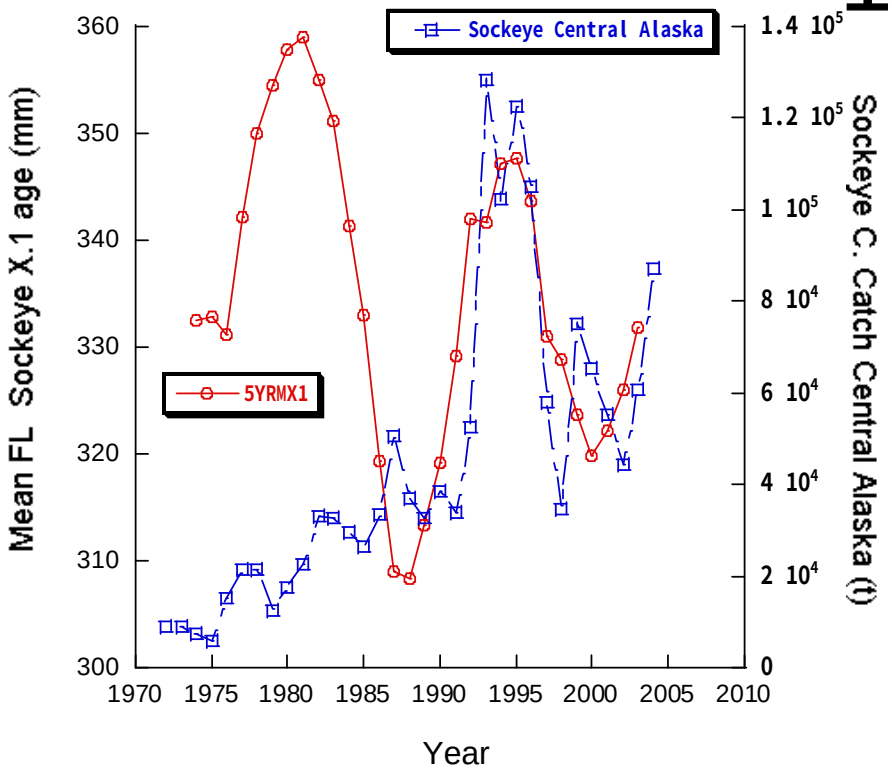
Time series of Sockeye CPUE in the Bering Sea and mean SST in June at western part of the gulf of Alaska



Surveyed area and main migration route of Sockeye salmon (French et al. 1976)

Central Alaskan population (Bristol Bay) is dominant

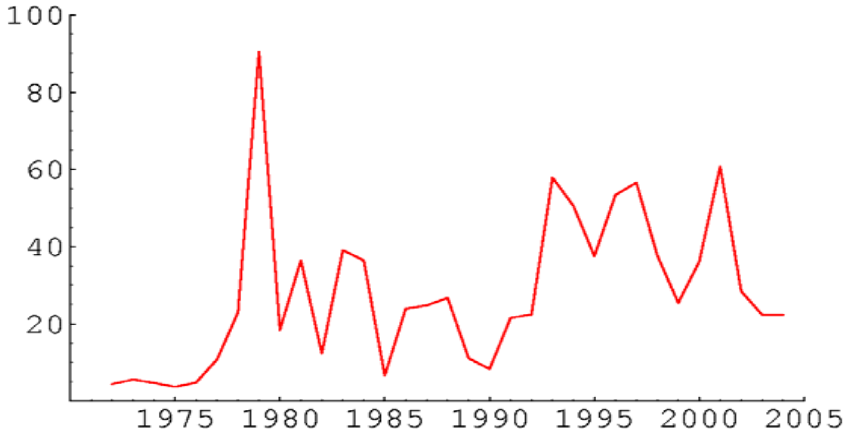




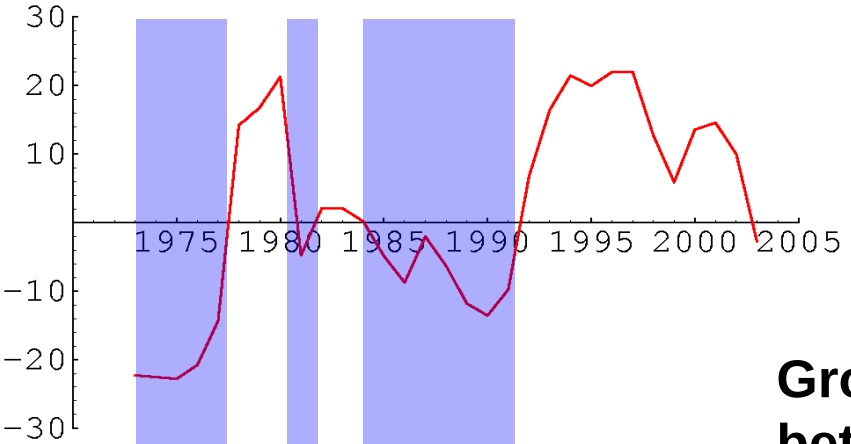
BS Sockeye CPUE VS Mean FL X.1 age

Bigger is Better !!?

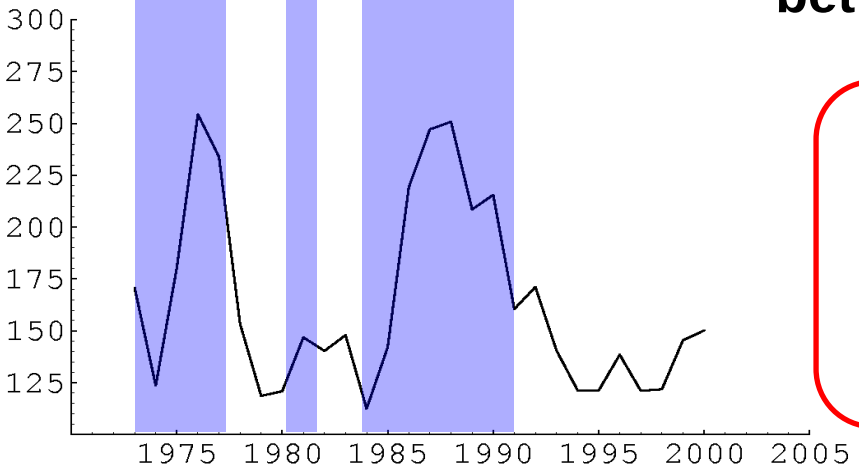
After 1989, X.1 age size fluctuation have been synchronized with those of commercial catch of Central Alaska (Bristol Bay)



Sockeye salmon CPUE time series in the Bering Sea



Deviation from mean abundance of Sockeye Salmon in the Bering Sea



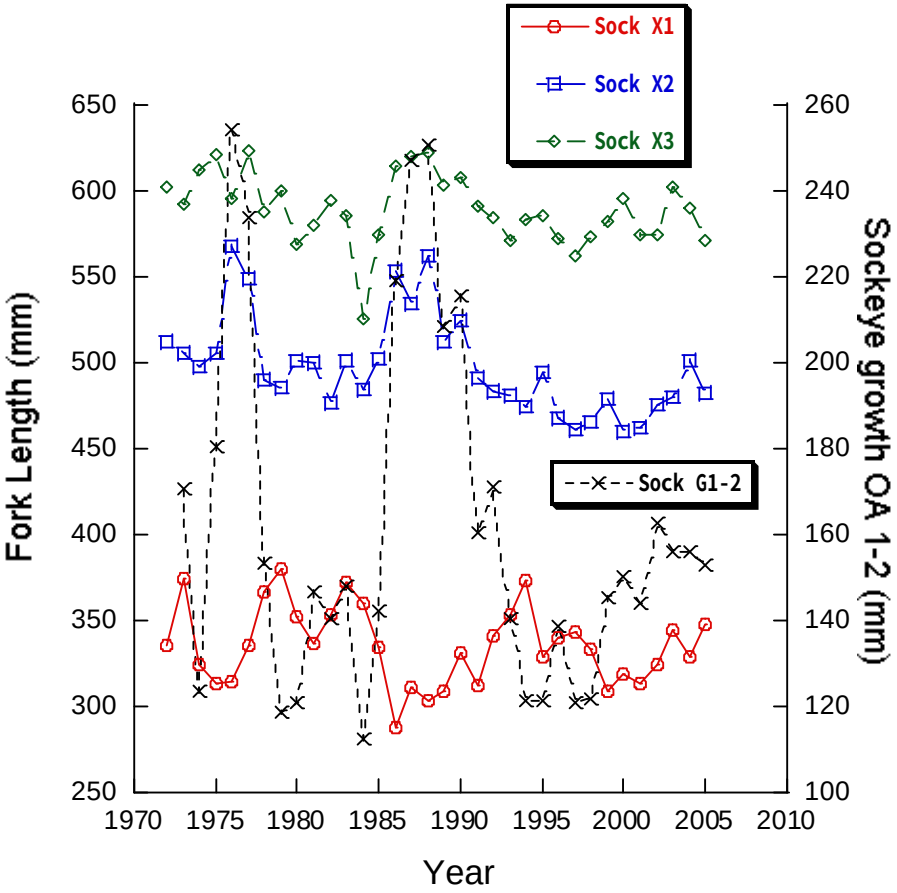
Growth trend of Sockeye Salmon between from X.1 age and X. 2 (mm)

High (abundance) density

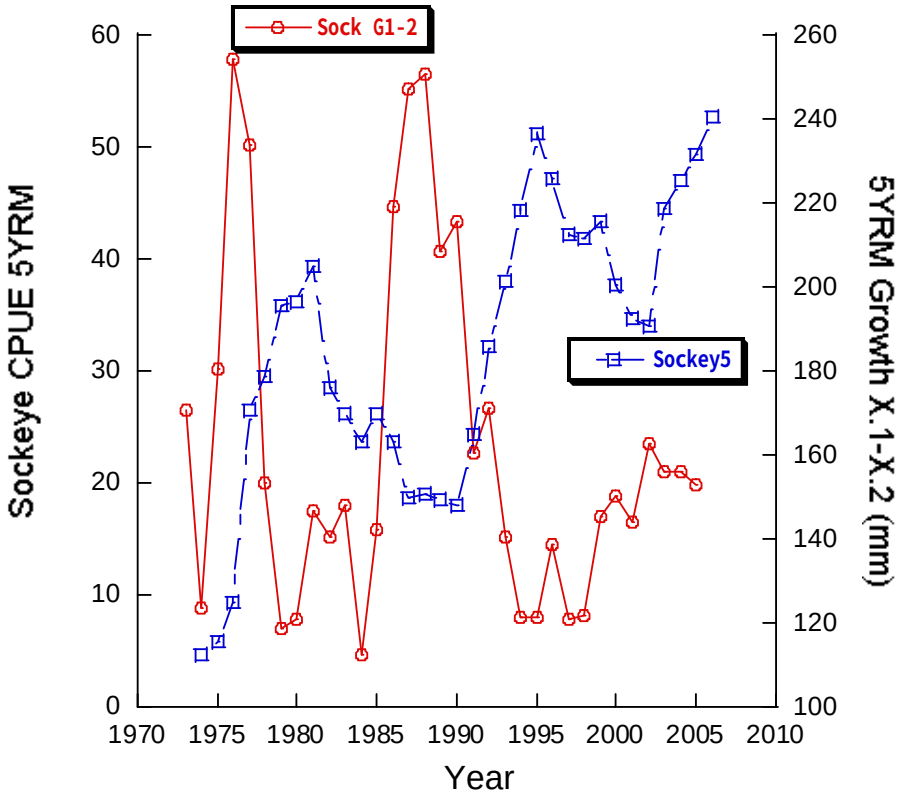
⇩

Low growth

Density depend effect?



When X .1 age sockeye salmon is large, X.2 and older fish is smaller than usual years



High (abundance) density
Low growth for over X.1
Density depend effect?

What has been happened ????

Warm period

High growth rate in early sea life, prior to X.1 age

High survival Rate in the sea

Bigger is Better

To the Bering Sea ?

High abundance in X.1 age in the Bering Sea

Low growth rate between X.1 age and X.2 age

influenced to reproduction ??

Commercial catch (population size) increase

Conclusions

- Bering Sea is important feeding area for salmon which has long ocean life period(**chum**, **sockeye** and chinook).
- When SST at the Western part of Gulf of Alaska was high, CPUE of sockeye salmon in the Bering Sea was also high.
- In the warmer period, early growth rate of sockeye is accelerated, and survival rate is raised (bigger is better!!).
- In the high abundant period, growth rate after X.1 age, of sockeye salmon in the Bering sea may be restricted
- Low growth rate after X.1 age maybe result of the intra-population density dependent effect

Photo by Tobe

Thank you

I like field survey !!