Chinook salmon marine migration and production mechanisms in Alaska

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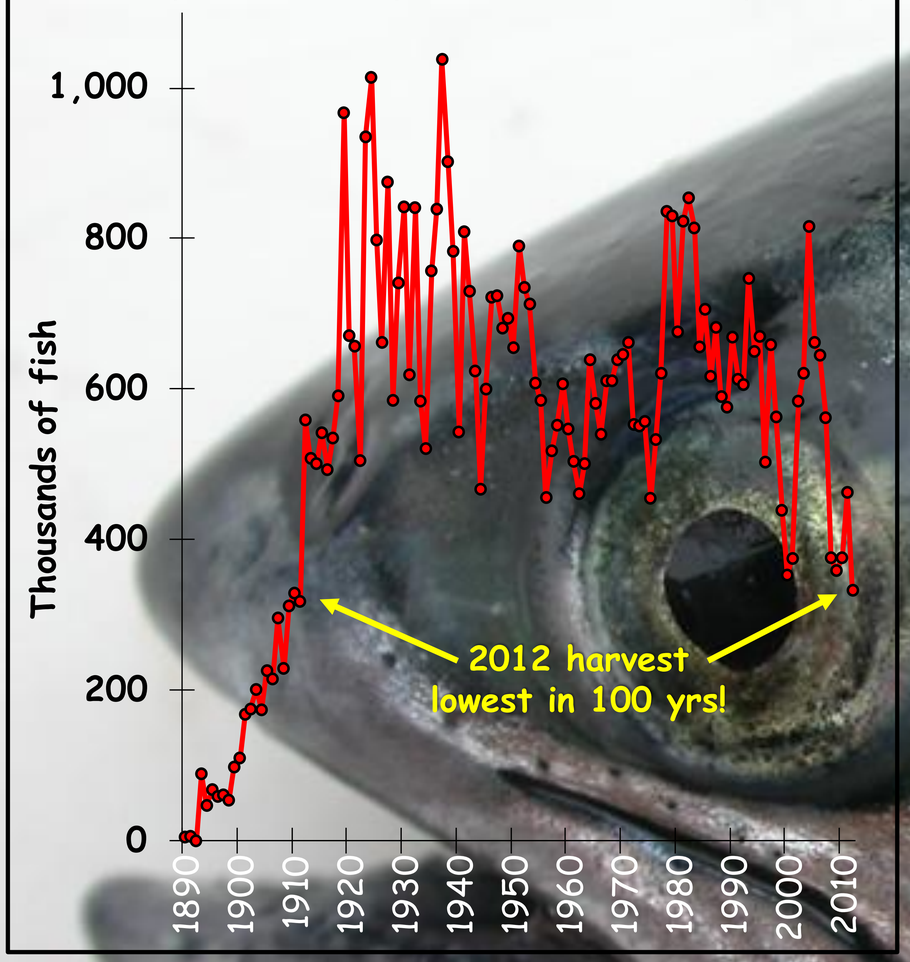
Alaska Commercial Catches of Chinook Salmon: 1890-2012*

Data courtesy of the Alaska Department of Fish and Game (*preliminary)



Southeast Alaska commercial salmon troller

The Problem:

Past Decades: Declining Chinook salmon production in Alaska commercial fisheries

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August 2012:
Chinook salmon commercial fishery disasters declared in Western and Southcentral Alaska

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October 2012:
Chinook Salmon Symposium hosted by the Alaska Department of Fish & Game in Anchorage to address problem

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Current Status:
Mechanism(s) responsible for production decline are largely unknown, but early ocean periods are implicated

Ocean Monitoring Research:

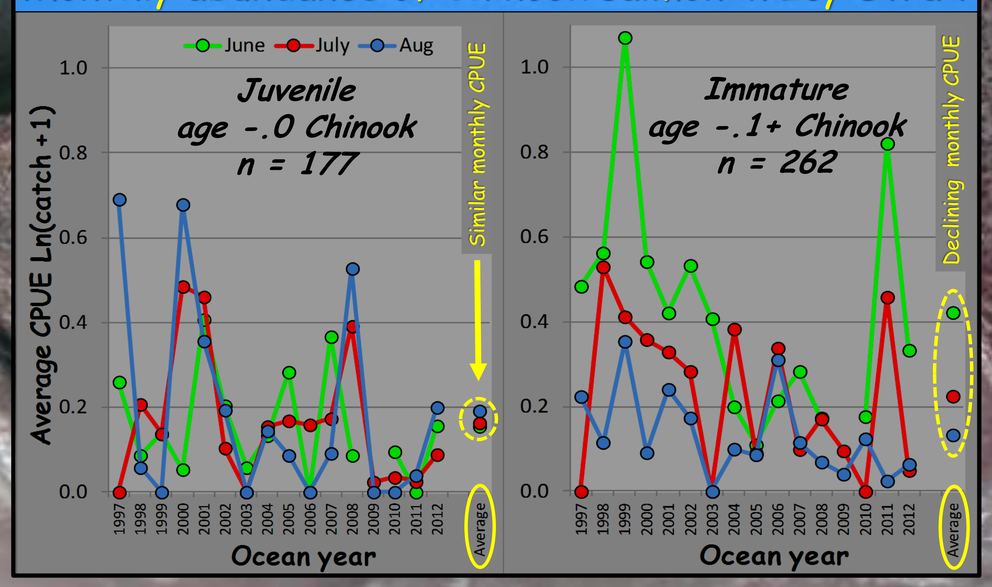
✓The Southeast Alaska Coastal Monitoring (SECM) project has conducted annual ocean surveys since 1997 and accrued a 16-yr time series of biophysical data

✓Chinook salmon migration and production mechanisms may be better understood by examining migration and catch data from the SECM time series

✓Trawl catches (CPUE) of juvenile and age -.1+ (one ocean winter) Chinook in June-July-August were examined for migration patterns in Icy Strait, a major seaward migration corridor in Southeast AK

✓Catches of Chinook salmon were correlated with marine survival data from wild and hatchery stocks by lagging brood year survivals to the corresponding years of ocean entry for each age group

Monthly abundance of Chinook salmon in Icy Strait



Correlations of juvenile and age -.1+ Chinook catches to wild and hatchery brood year survivals

Southeast AK Chinook Stock	Run	Number of brood year cycles	Average Chinook monthly CPUE Ln(20 min haul catch + 1) Juvenile age -.0 June	July	Aug	Immature age -.1+ June	July	Aug
Stikine	Wild	5	0.54	0.19	0.19	0.51	-0.80	-0.40
Taku	Wild	11	0.44	0.40	0.53	0.53	0.19	0.12
Chilkat	Wild	6	0.23	0.25	0.31	0.84*	0.00	-0.24
LPW	Hatchery	10	0.05	0.14	-0.09	-0.12	0.10	0.51
Hidden Falls	Hatchery	11	-0.14	0.34	0.11	0.70*	0.20	0.55
DIPAC	Hatchery	10	0.13	0.38	0.03	0.86**	0.47	0.40

Conclusions:

- This analysis of the SECM time series supports the hypothesis that a critical early marine period exists for Chinook salmon prior to their 2nd ocean summer
- Monthly catches suggest a protracted seaward migration of juveniles, in contrast to the emigration from Icy Strait of the more abundant age-.1+ fish
- Catches of age -.1+ Chinook in June were significantly ($p < .05$) correlated with marine survivals of three stock groups
- June catches of age -.1+ Chinook may be a useful ecosystem indicator for modeling production and for building future forecast models to help foster sustainable fisheries

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