

Balancing benefits and risks of large scale hatchery salmon production in Alaska

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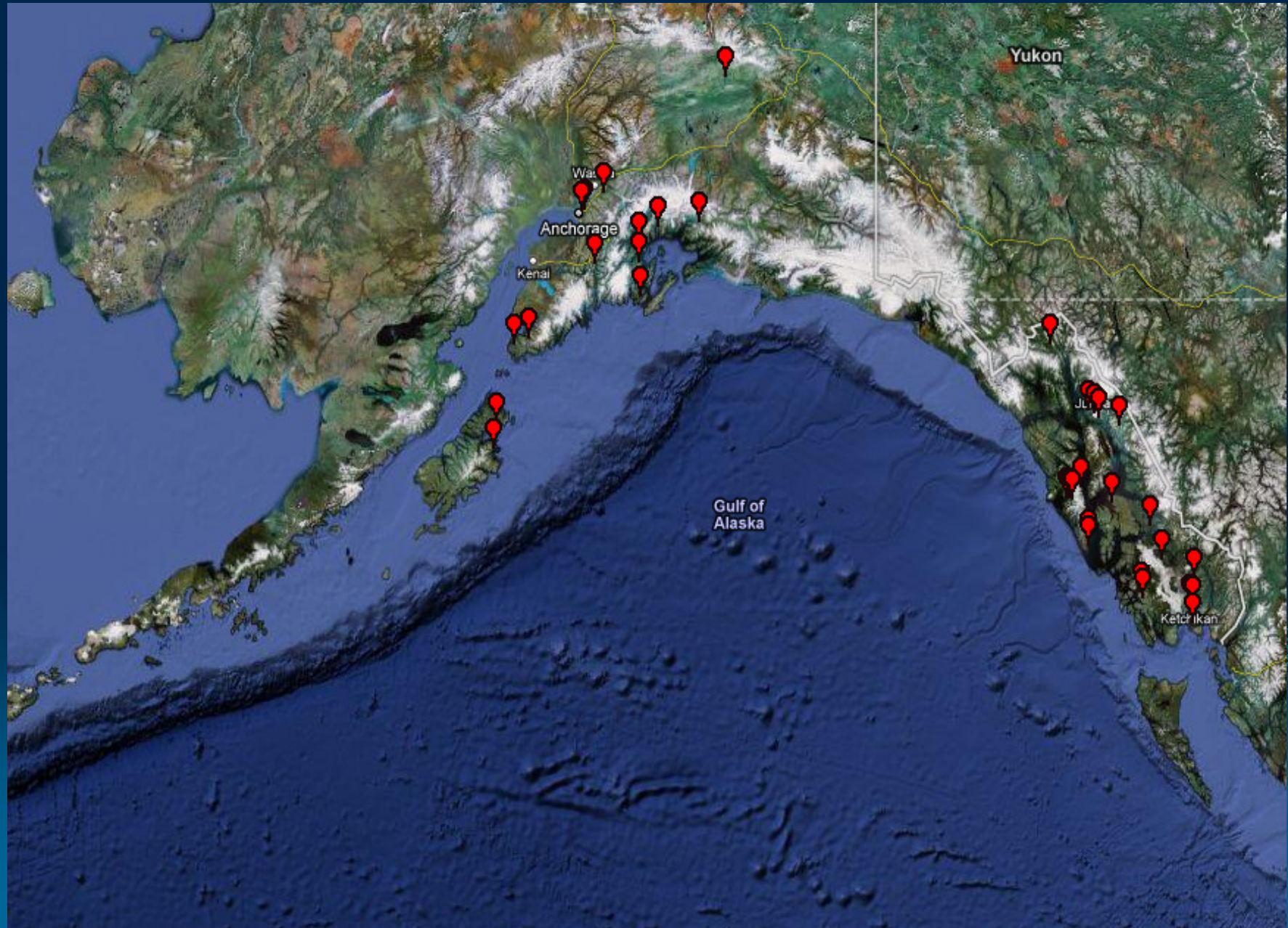


Outline

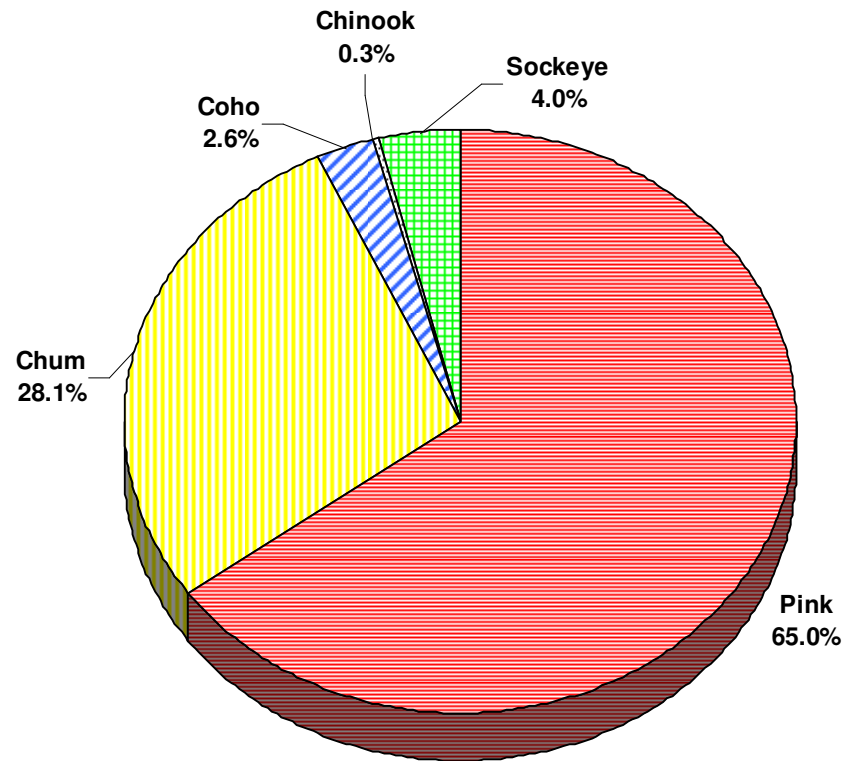
- Overview of enhanced salmon contributions to harvest and economic benefits
- Statutory and policy framework
- Risk indicators/information needs
- Research efforts to inform issues



Hatchery and Release Locations in Alaska

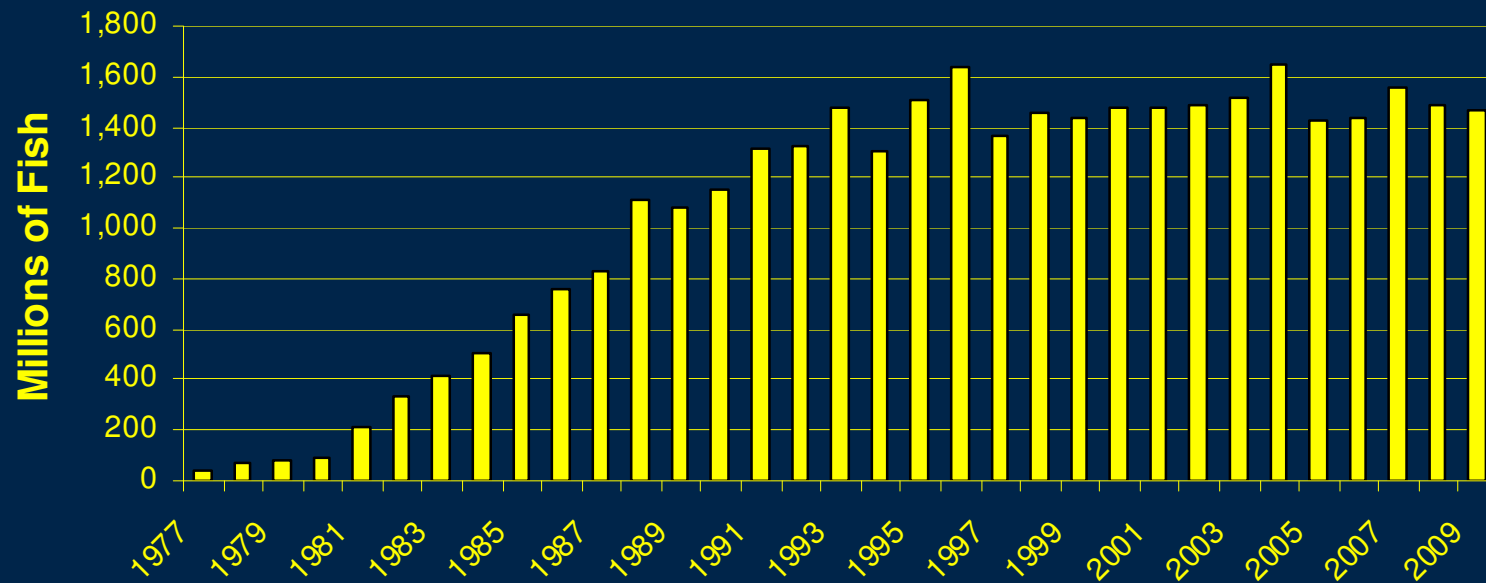


Alaska Salmon Hatchery Returns by Species, 2009



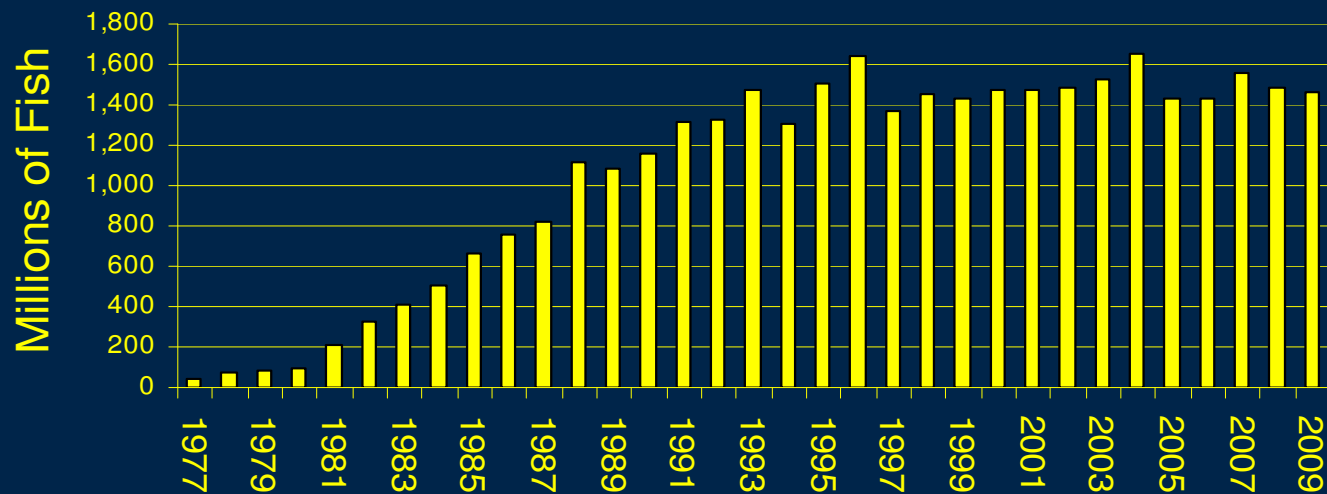
From White, 2010

Total Releases from Alaska Hatcheries

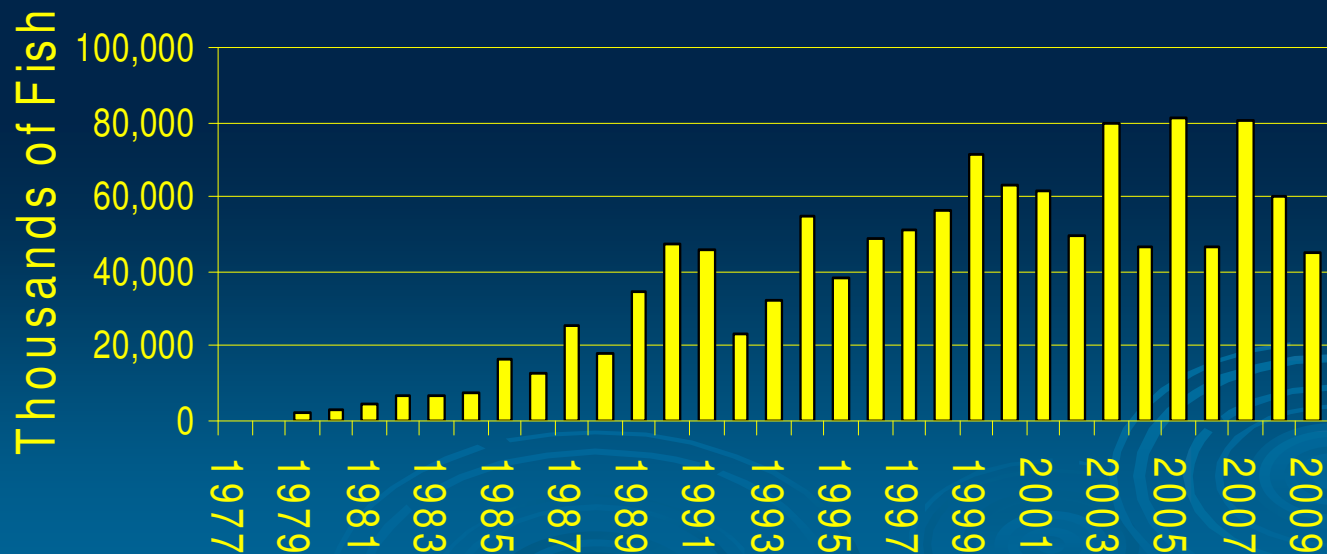


From White, 2010.

Total Releases from Alaska Hatcheries

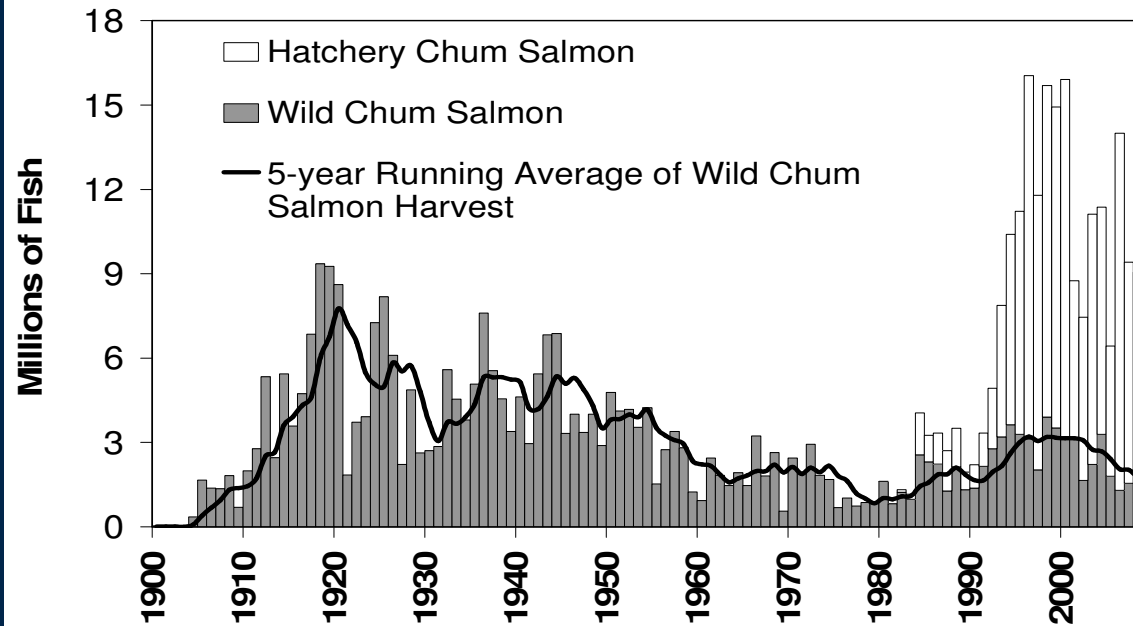


Total Returns in the Alaska Salmon Hatchery Program

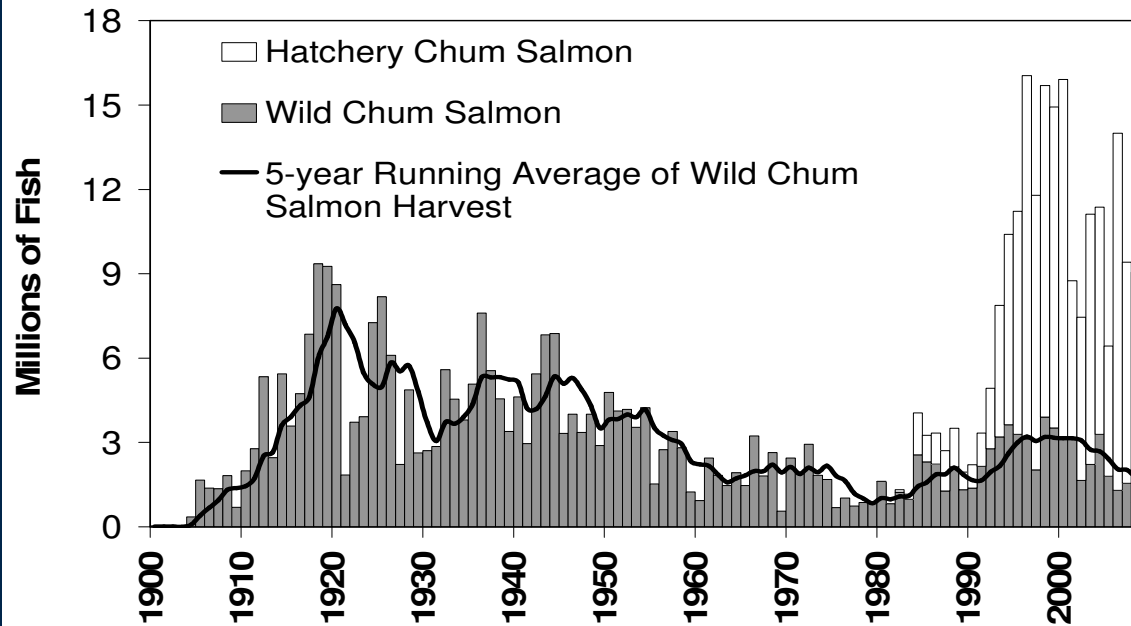


From White, 2010.

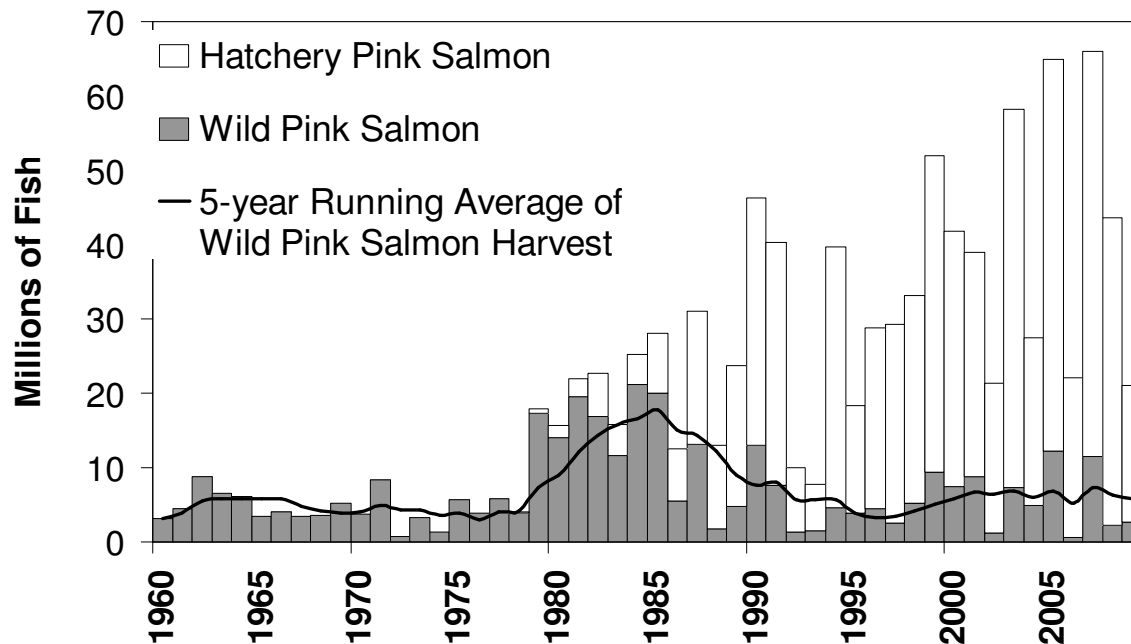
Southeast Alaska Chum Salmon Harvest



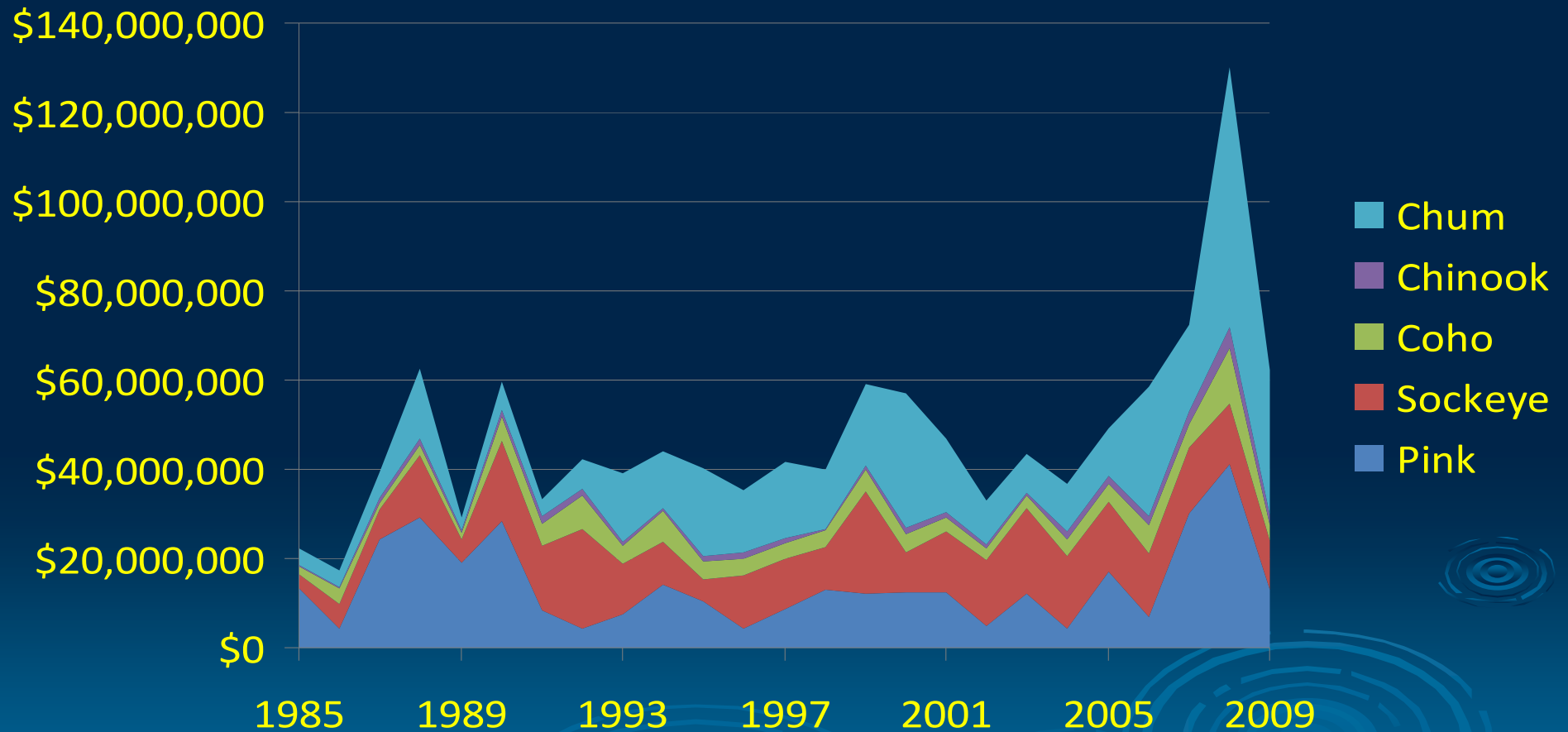
Southeast Alaska Chum Salmon Harvest



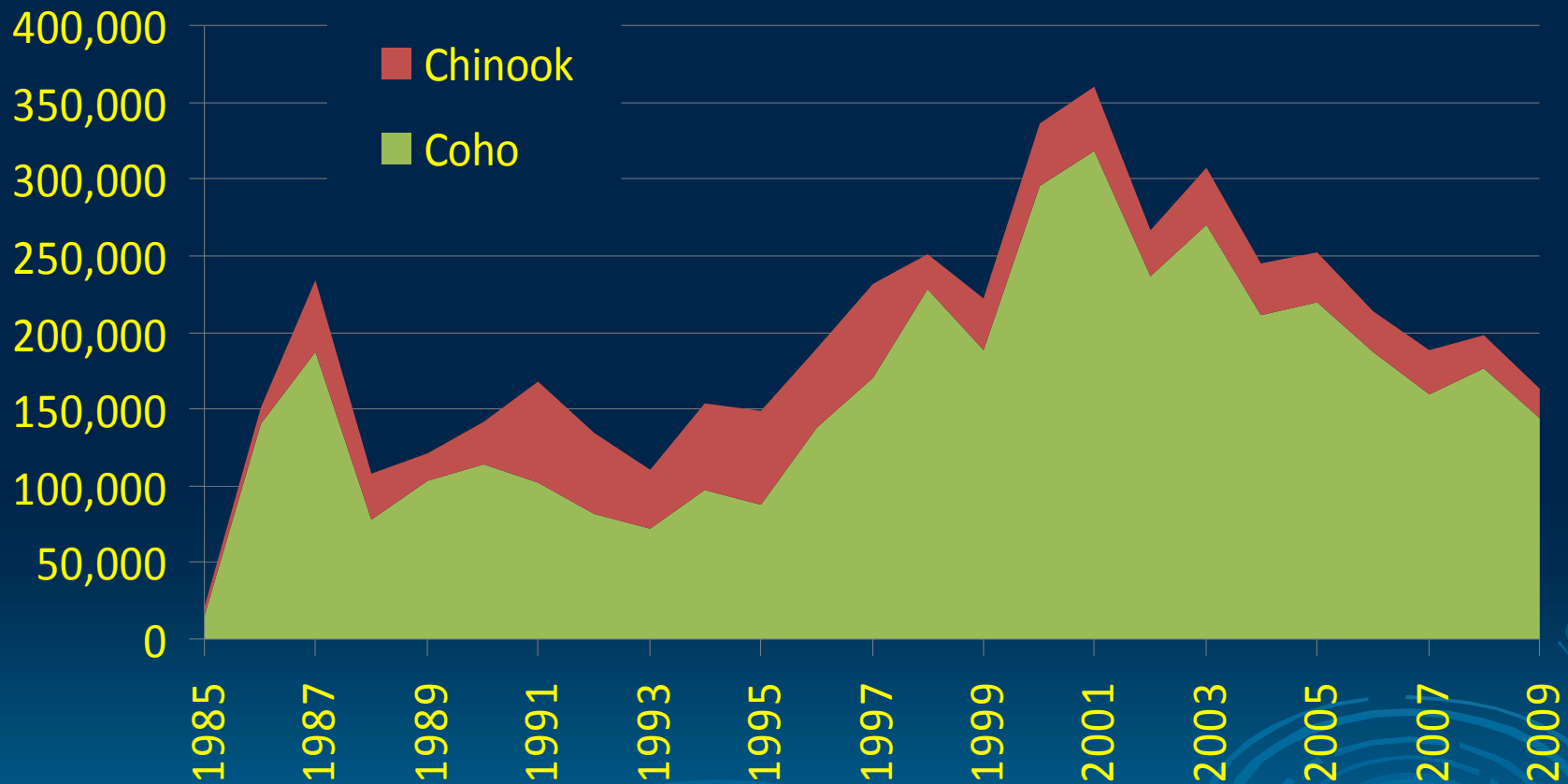
Prince William Sound Pink Salmon Harvest



Commercial Ex-Vessel Harvest Value for Alaska Hatchery Salmon



Harvest of Alaska Hatchery Chinook and Coho Salmon by Sport Fishermen




Providing for Sustained Yield



Article VIII, Sec(4). Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses.

Mandates for Balancing Priorities

Private Non-Profit Hatcheries Act (1974)

- *Rehabilitate the state's depleted and depressed salmon fishery*
 - *Operate without adversely affecting natural stocks of fish in the state*
 - *Reasonably segregate returning hatchery-reared salmon from naturally occurring stocks*
- 

Mandates for Balancing Priorities

Management of Wild and Enhanced Stocks of Fish (AS 16.05.730)

- *Fish stocks in the state shall be managed consistent with sustained yield of wild fish stocks*
- *May be managed consistent with sustained yield of enhanced fish stocks*



Mandates for Balancing Priorities

Policy for the Management of Mixed Stock Salmon Fisheries (5 AAC 39.220)

➤ *...conservation of wild salmon stocks consistent with sustained yield shall be accorded the highest priority*



Mandates for Balancing Priorities

Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222)

- *Effects and interactions of introduced or enhanced salmon stocks on wild salmon stocks should be assessed*
- *Wild salmon stocks and fisheries on those stocks should be protected from adverse impacts from artificial propagation and enhancement efforts*



Challenges

➤ Harvest management

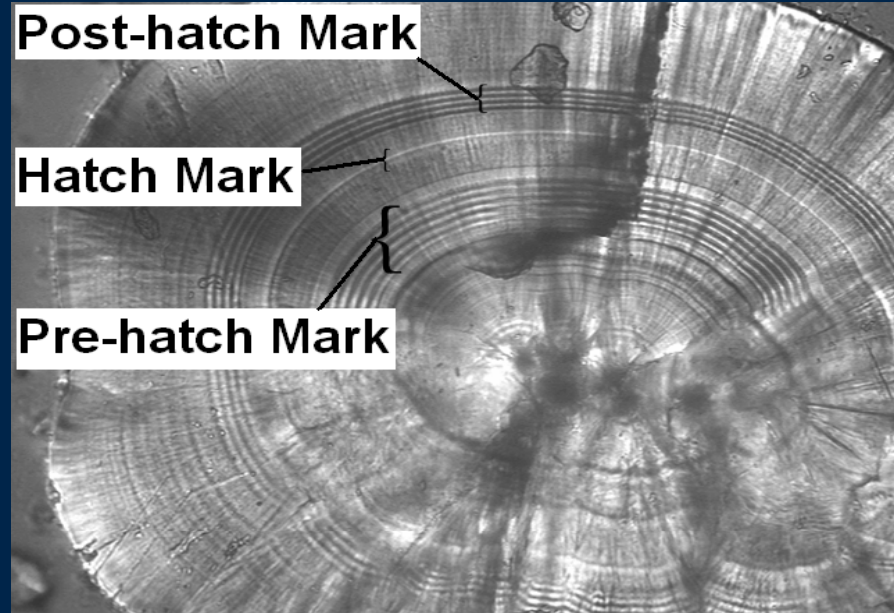
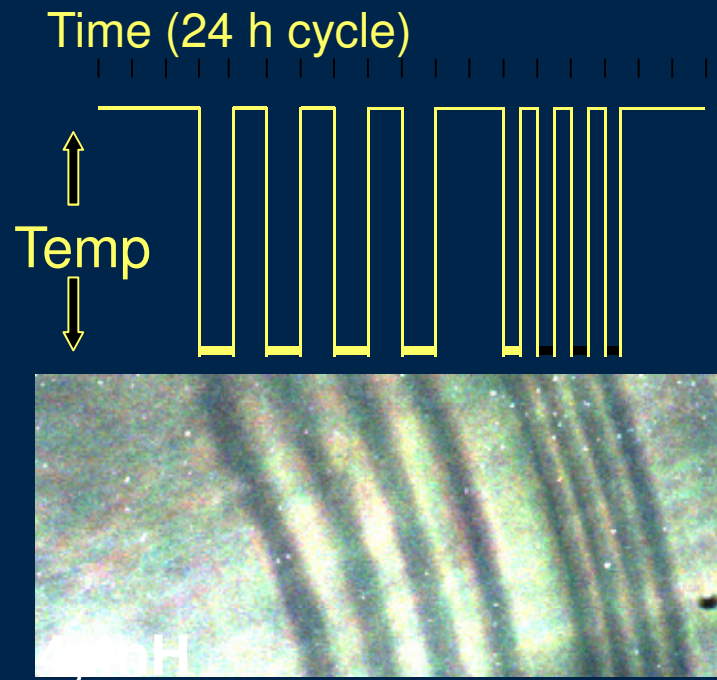
- Maximize harvest of enhanced stocks
- Sustainable harvest of wild stocks

➤ Effects of straying

- Wild stock assessments and escapement goals
- Ecological and genetic interactions

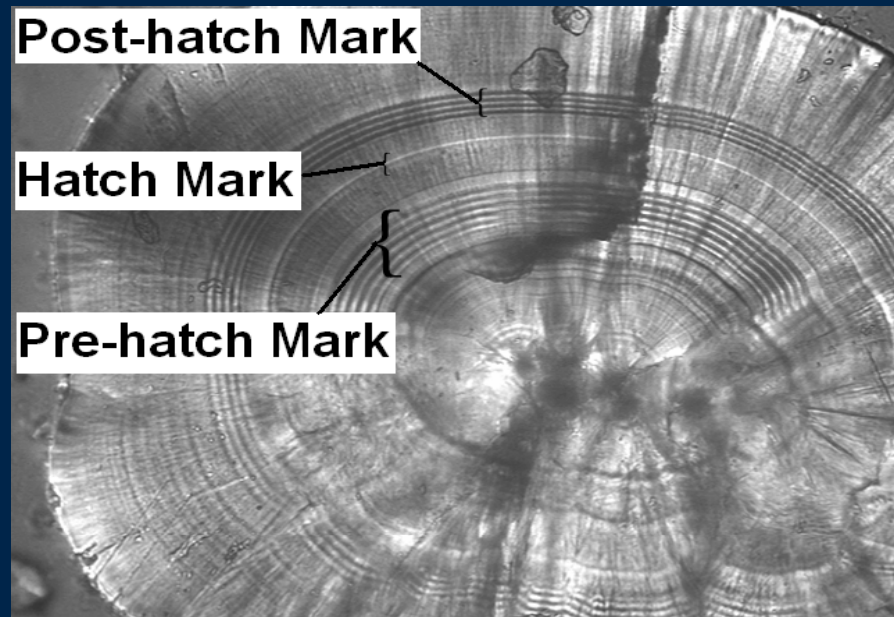
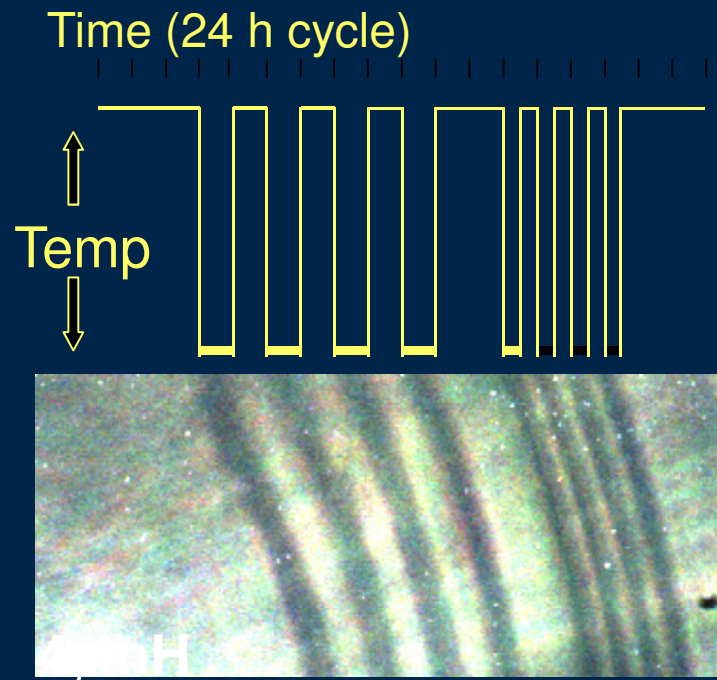


Otolith Thermal Marking



■ NPAFC Voucher DB (Images & Data): <http://npafc.taglab.org/MarkSummary.asp>

Otolith Thermal Marking

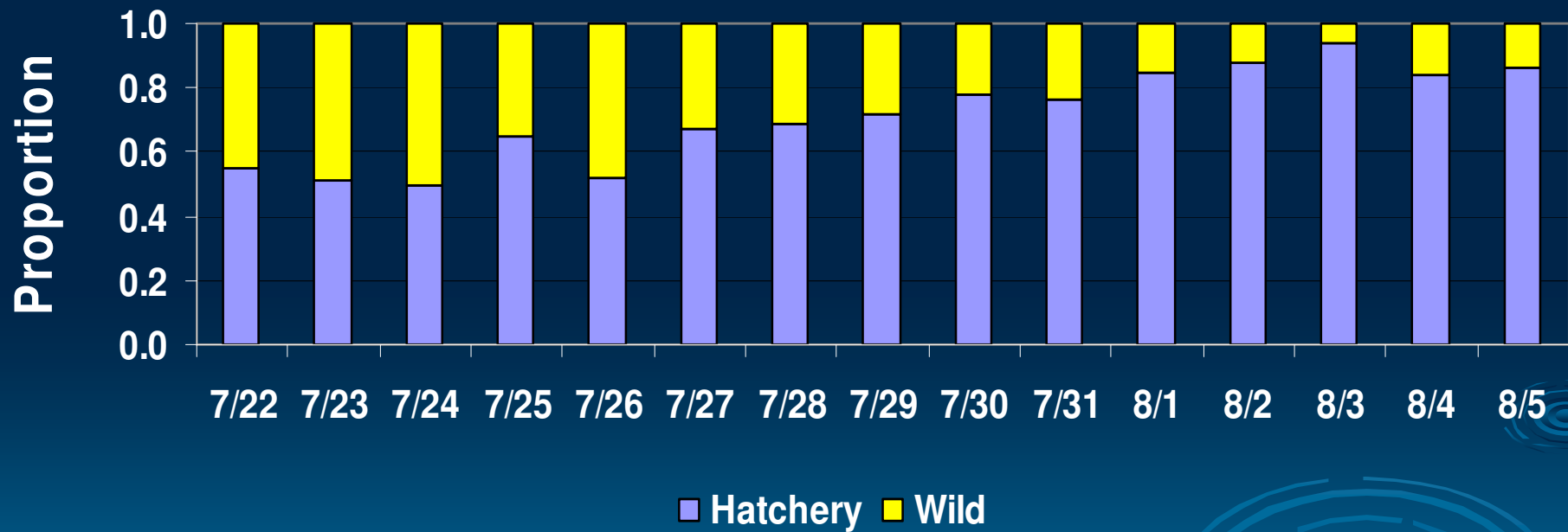


Alaska marks > 80% of hatchery fish ~ 1.2 Billion

■ NPAFC Voucher DB (Images & Data): <http://npafc.taglab.org/MarkSummary.asp>

In Season Harvest Monitoring

Prince William Sound Test Fishery



Quantify Spatial and Temporal Extent of Straying

➤ Southeast Alaska chum

- Heinl and Piston (2008-2010)

➤ Prince William Sound pink, chum and sockeye

- Joyce and Evans (1997-1999)
- Moffitt and Brenner (2004-2010)

➤ What is an acceptable level of straying?

2%...5%...10%



Genetic Assessments

Are hatchery fish genes introgressing into wild fish?

➤ Compare pre-hatchery and contemporary genetic structure of PWS chum salmon (Brenner and Habicht, ADF&G)

H_0 : Genetic structure of wild populations has not changed

H_0 : No genetic convergence between hatchery and wild populations

- DNA from archived scales



Genetic Assessments

What are the effects of supplementation on productivity?

- Auke Lake Sockeye Supplementation Project
(UAF, NOAA, ADF&G)

H_0 : Supplementation does not affect productivity

- Multi-generation study
- Parental based tagging



Summary

- Substantial economic and social benefits from enhancement
- Balance between enhancement and wild stock protection
- Recent capacity to address significant information needs
- Collaborative approach to issues
- Decisions must be made with incomplete information



Questions?

