

Life history characteristics of Snake River Fall Chinook salmon collected off the Oregon/Washington Coast

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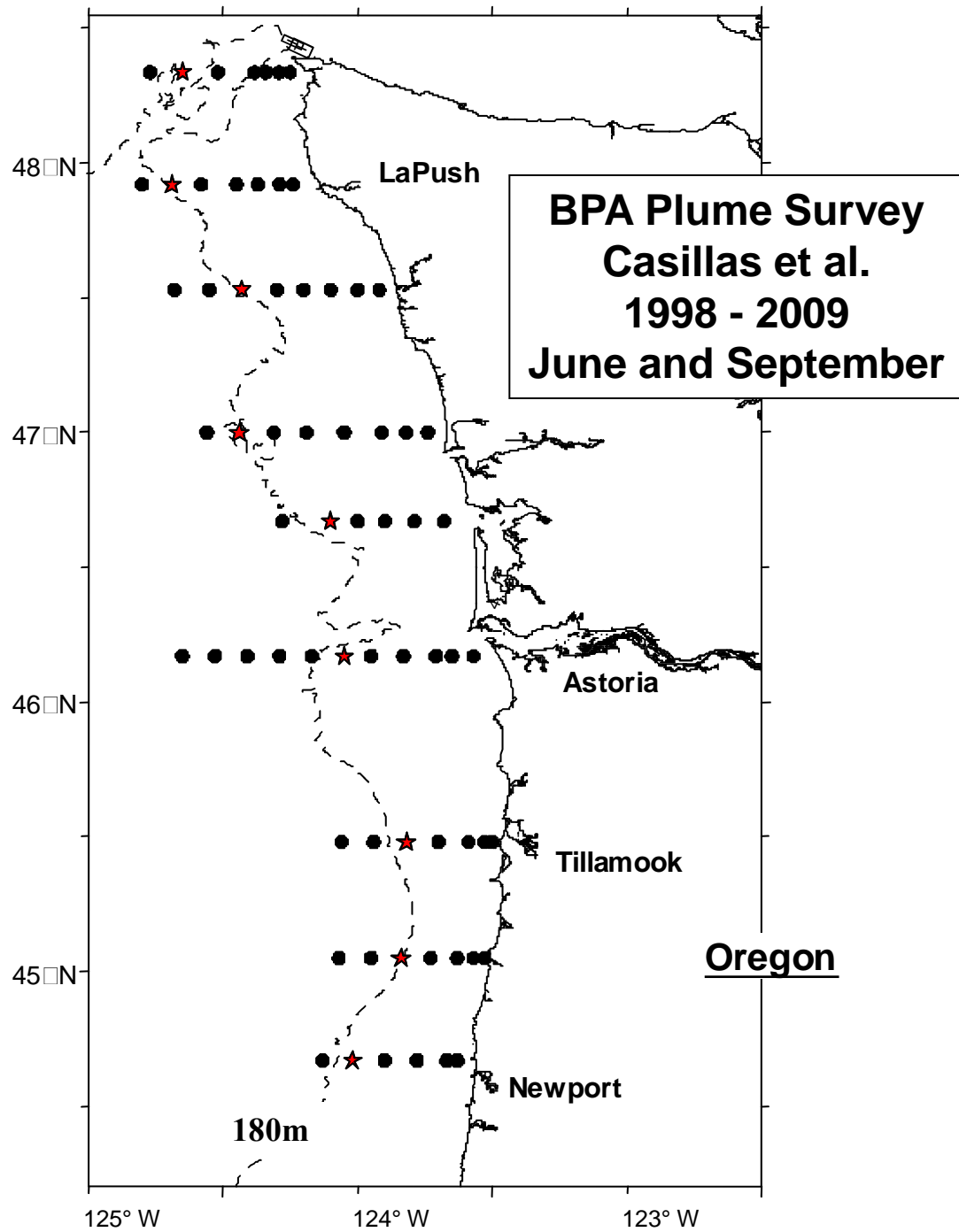
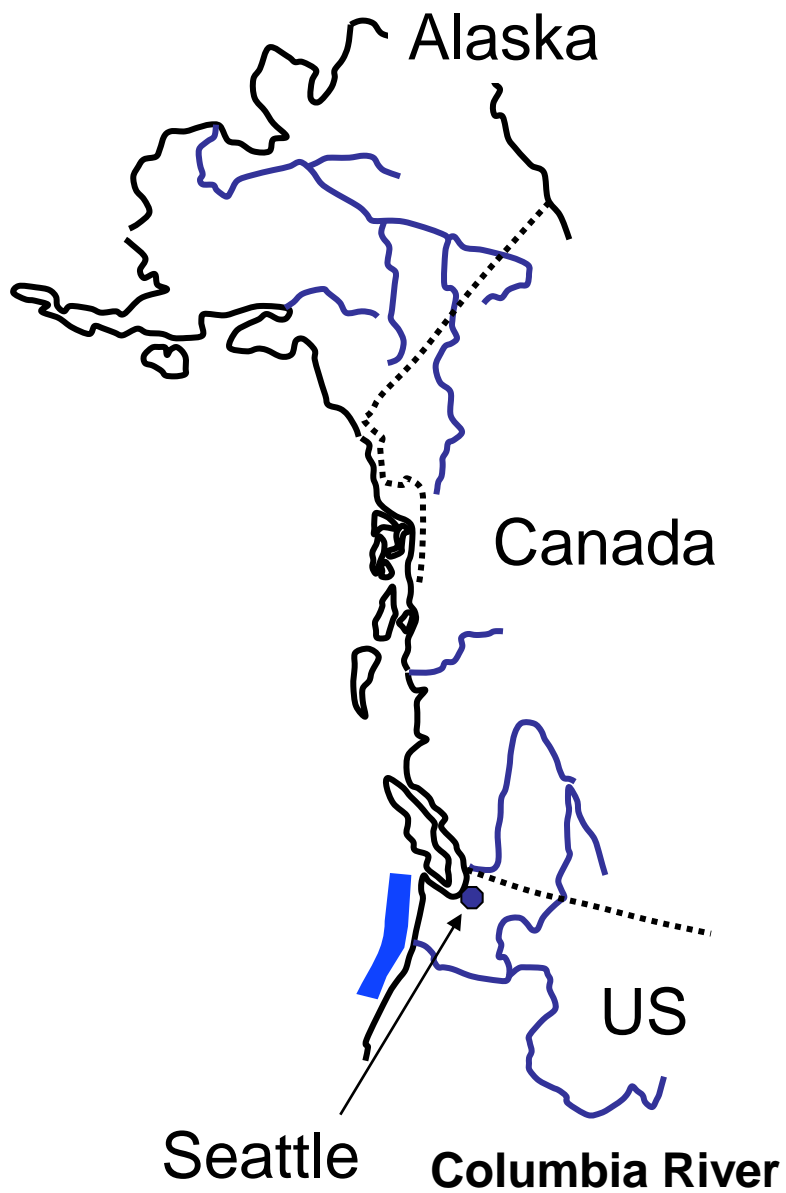
**NOAA Fisheries, NWFSC
Seattle, WA**

Funded by Bonneville Power and NOAA Fisheries

Juvenile salmon are collected at sea



**Overall goal: understand
mechanisms controlling
marine
survival of Columbia River
salmon**



Salmon data generated (partial list):

**abundance by species, age class
size**

population (microsat DNA)

hatchery tags and marks

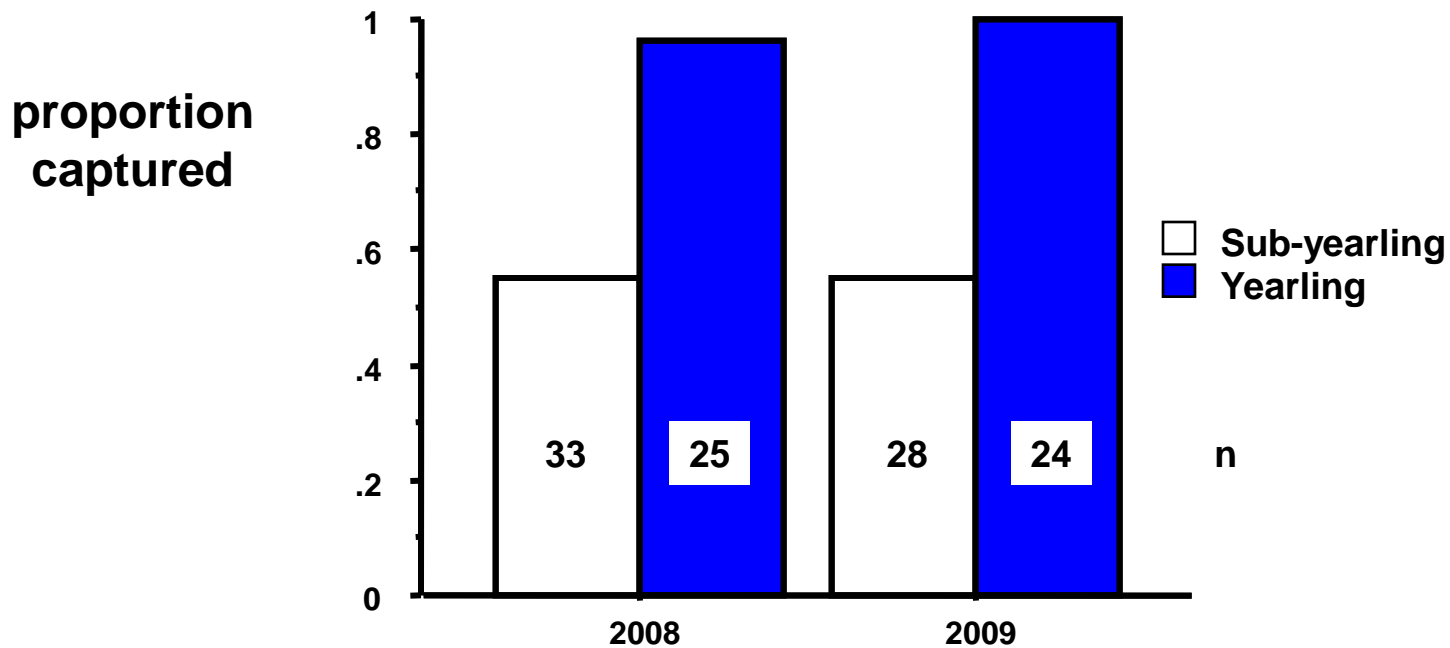
stomach contents

disease and parasites

hormones

scales and otoliths

Data tidbit: Proportion of ocean-captured juvenile Snake River fall Chinook salmon with hatchery marks



June and September catches combined

Goals of talk:

Inform about availability of information

Ocean affects on Snake River Fall Chinook abundance

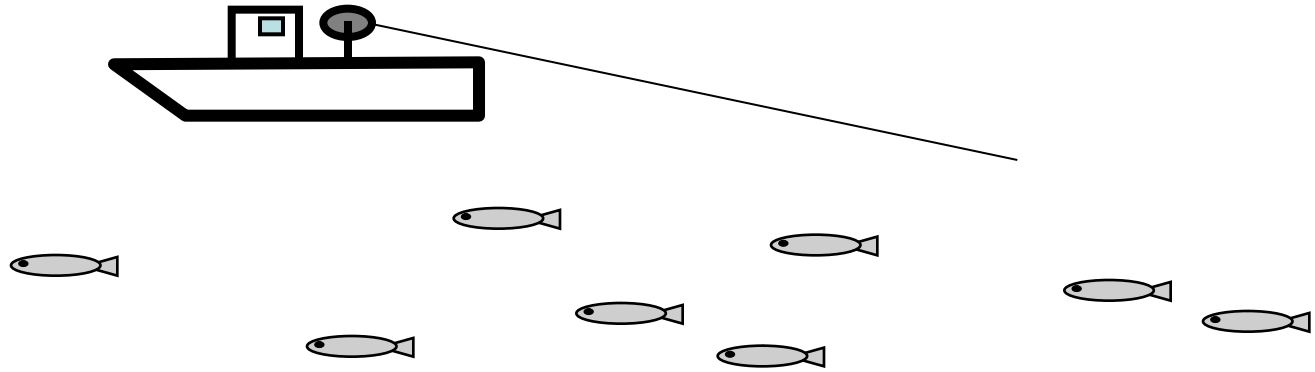
Life history of Snake River Falls in ocean

=> compare to Snake River springs, Tule Falls

Caveats:

**ocean-centric (I'll ignore Columbia River conditions)
simplistic data analysis**

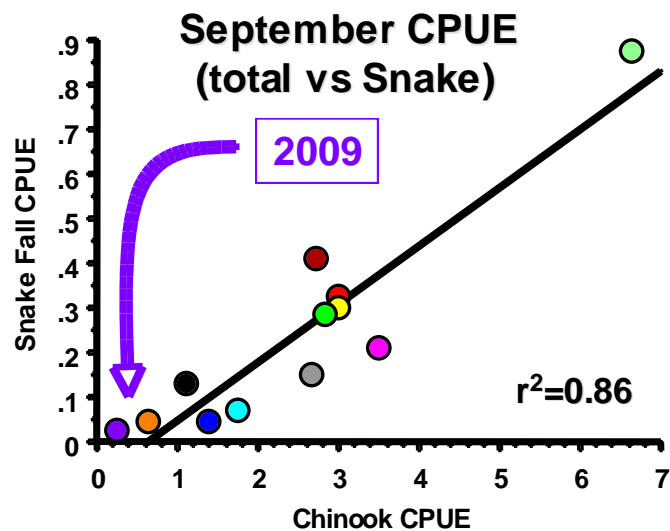
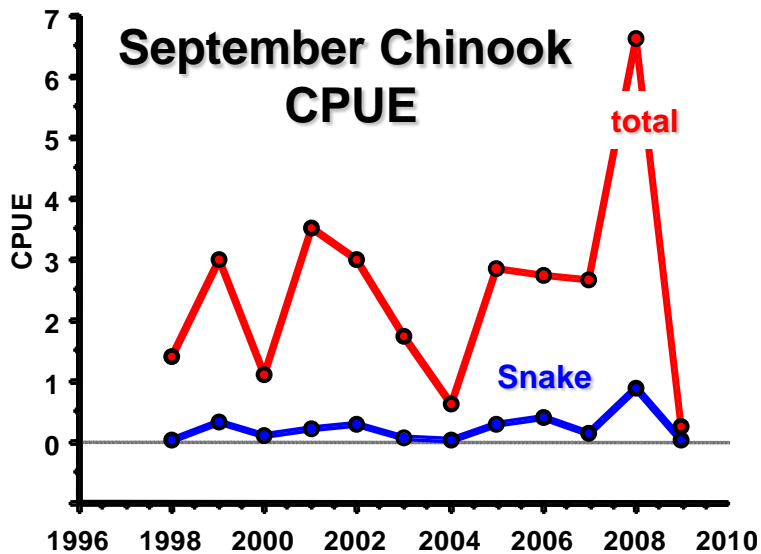
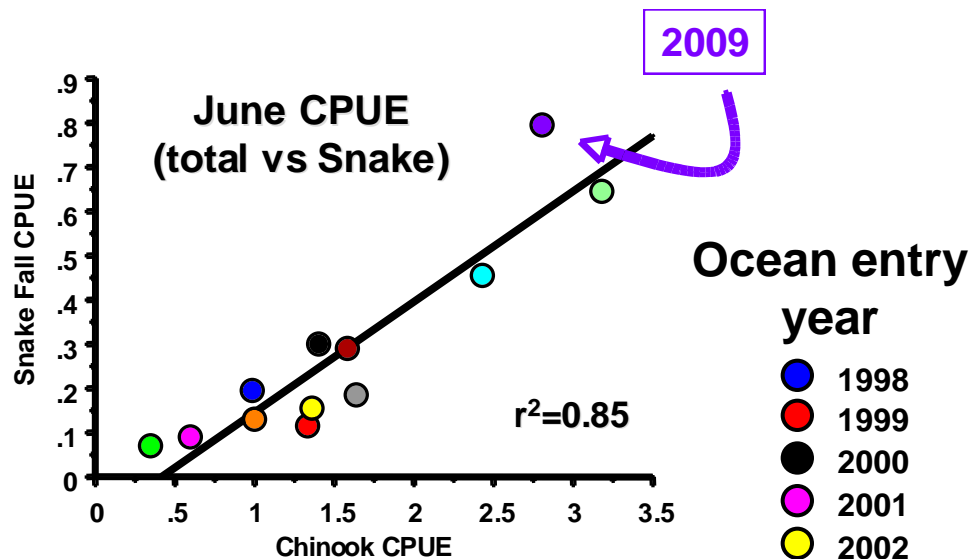
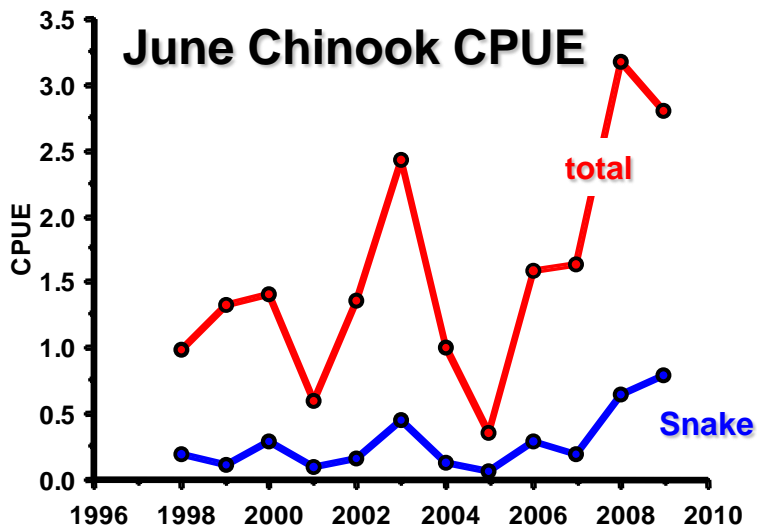
Juvenile abundance = catch (#) normalized for time trawled and speed (CPUE).



Salmon doctrine:

- Variation in marine mortality drives variation in adult abundance**
- Abundance “set” soon after ocean entry (1 month - 4 months)**
- abundance of juveniles in ocean may reflect adult return (jacks)**

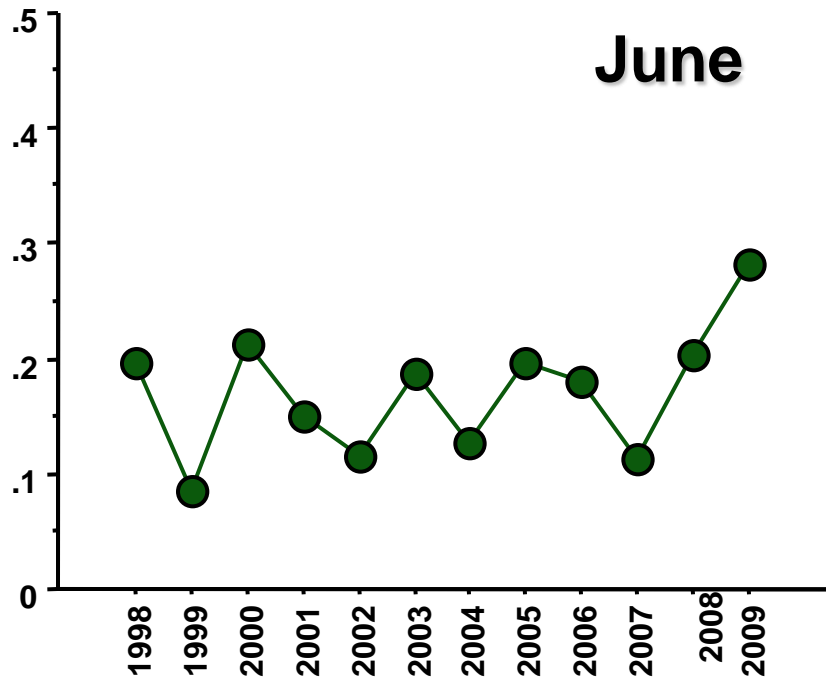
Snake fall Chinook catch similar to total Chinook catch



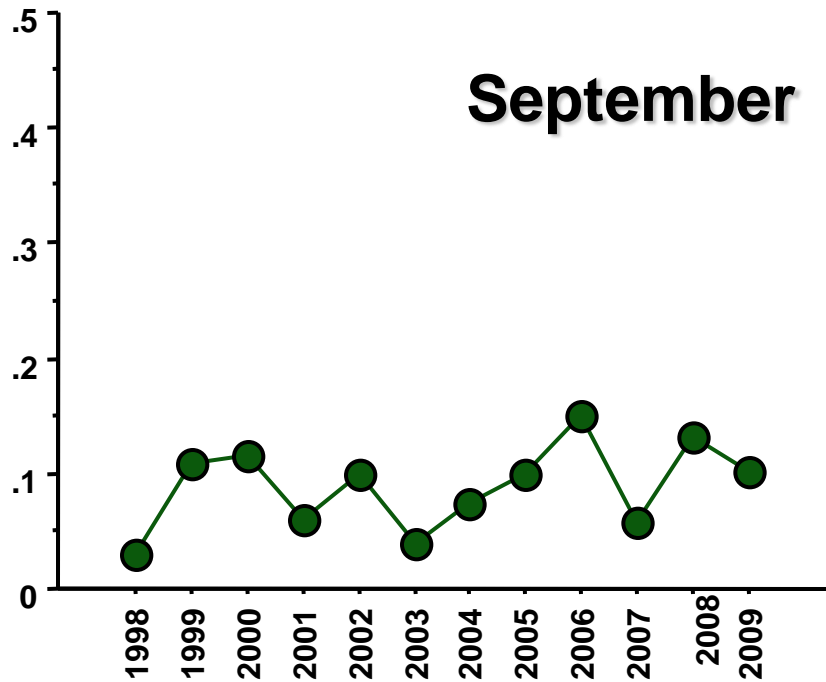
**Catch of Snake River fall Chinook
mirrors total Chinook catch**

**=> common ocean mechanisms
(good ocean vs bad ocean)**

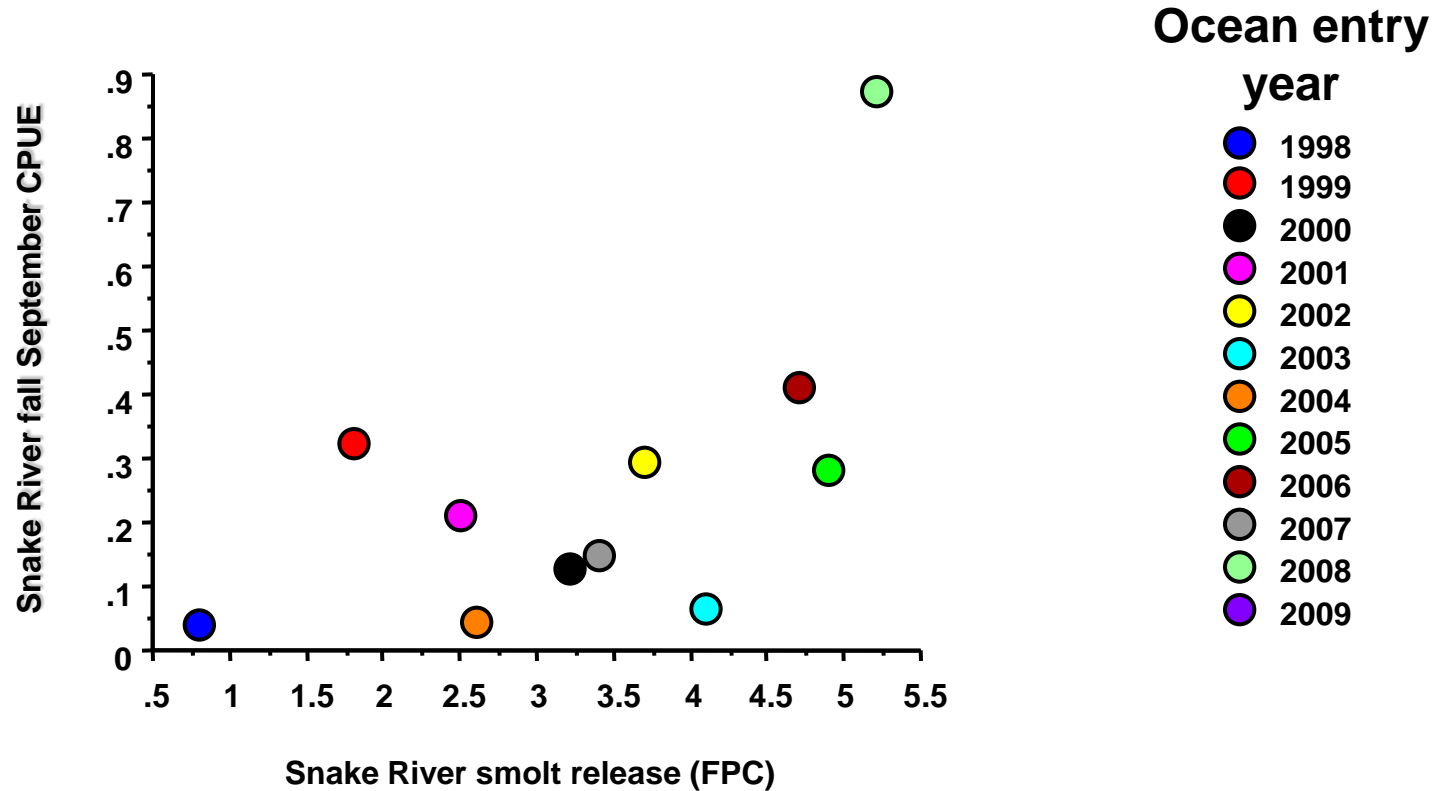
Proportion Snake River Fall



Proportion of total
Chinook catch that is
from Snake River Fall
Chinook population

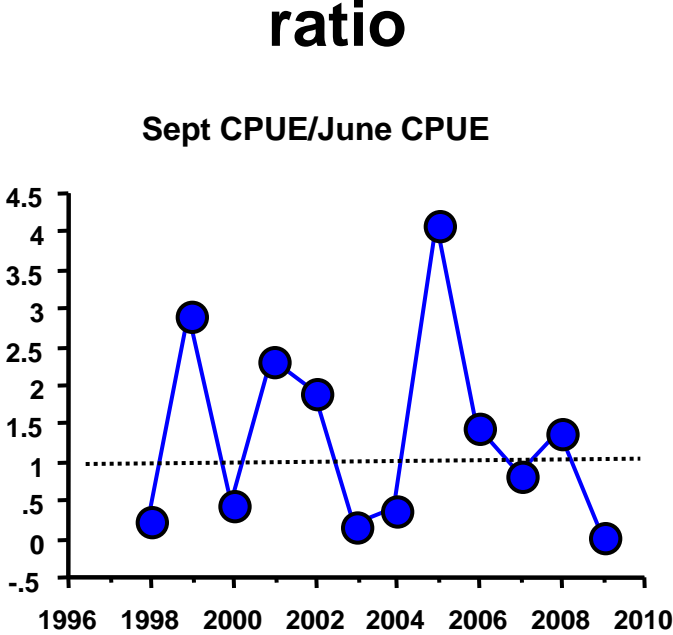
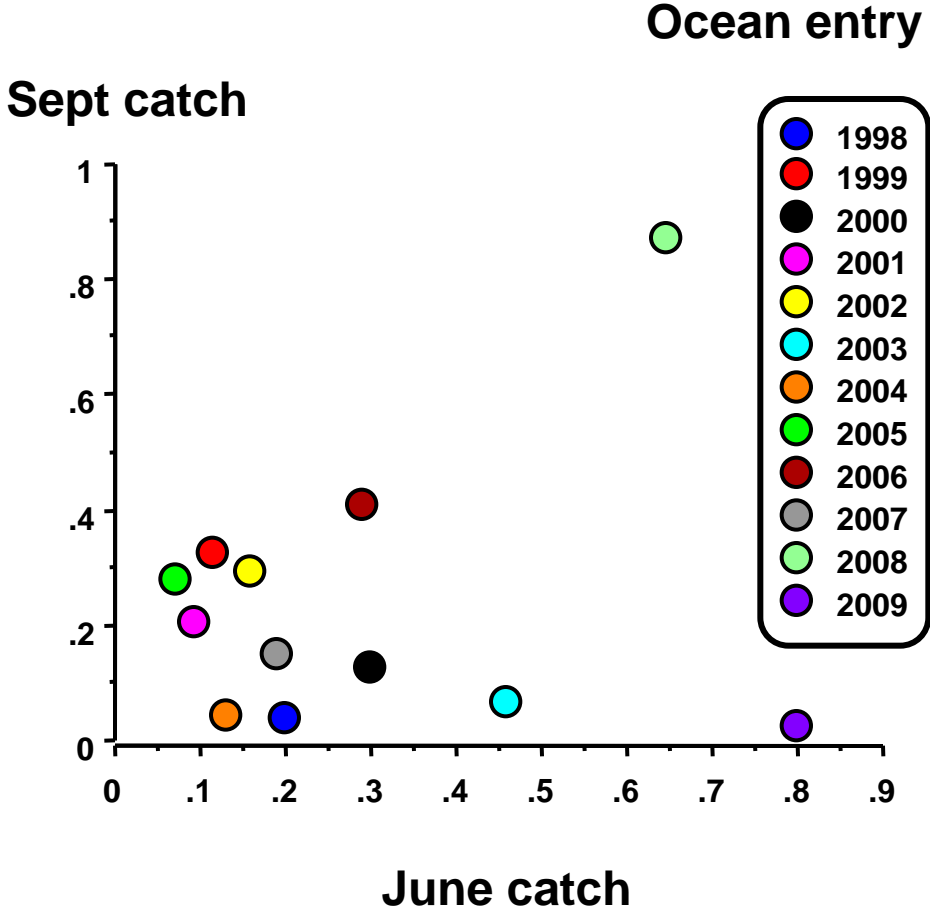


Does hatchery production have an affect on ocean abundance?



hatchery production is not correlated with ocean catch

September catch of Snake R fall Chinook is not related to June catch



Marine abundance is not set in June

**Does juvenile catch relate
to adult abundance?**

**Quick and dirty assessment of relation
between ocean catch and
Snake River fall Chinook salmon
adult abundance**

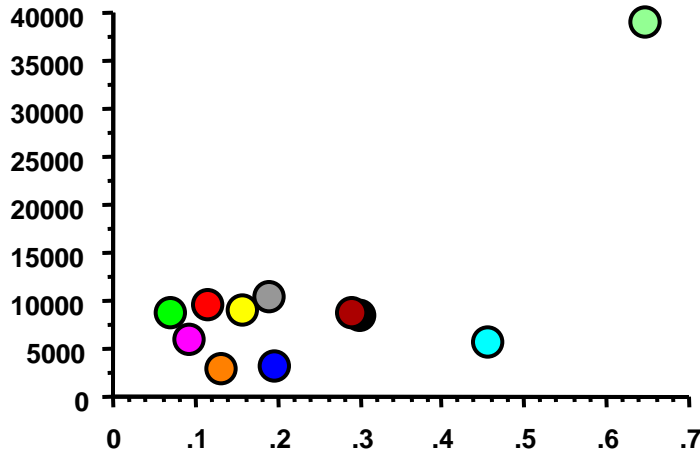
Proxy for Adult abundance = count at Lower Monumental

caveats:

no harvest

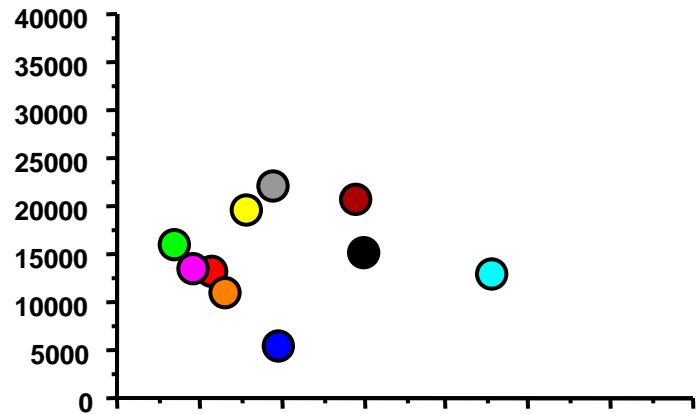
no accounting for age class

Jacks
at LoMo

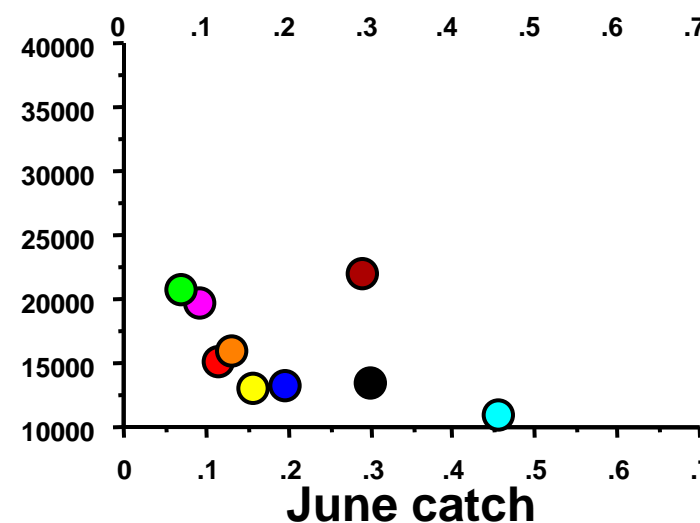


There is no relation between
juvenile abundance in June
and subsequent adult
abundance

Adults
(+2)
at LoMo



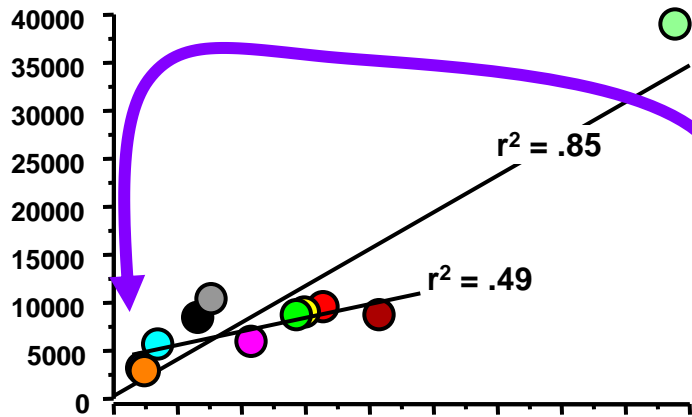
Adults
(+3)
at LoMo



Ocean entry year

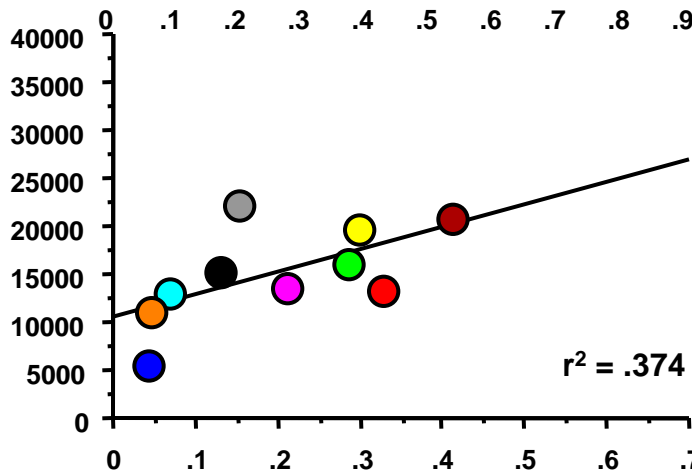
- 1998
- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009

Jacks
at LoMo



There is a significant
and positive relation between
juvenile abundance in Sept
and subsequent adult
abundance

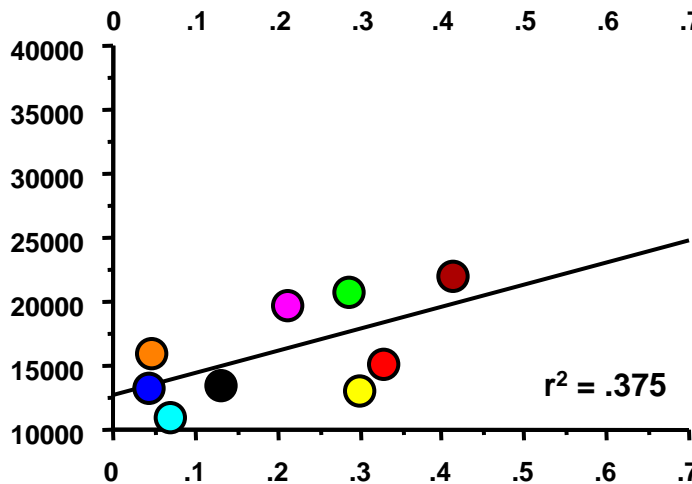
Adults
(+2)
at LoMo



Ocean entry year

- 1998
- 1999

Adults
(+3)
at LoMo



CPUE for Sept 2009
was very low
(0.026)

- 2007
- 2008
- 2009

A more sophisticated analysis, including:

ocean catch by age

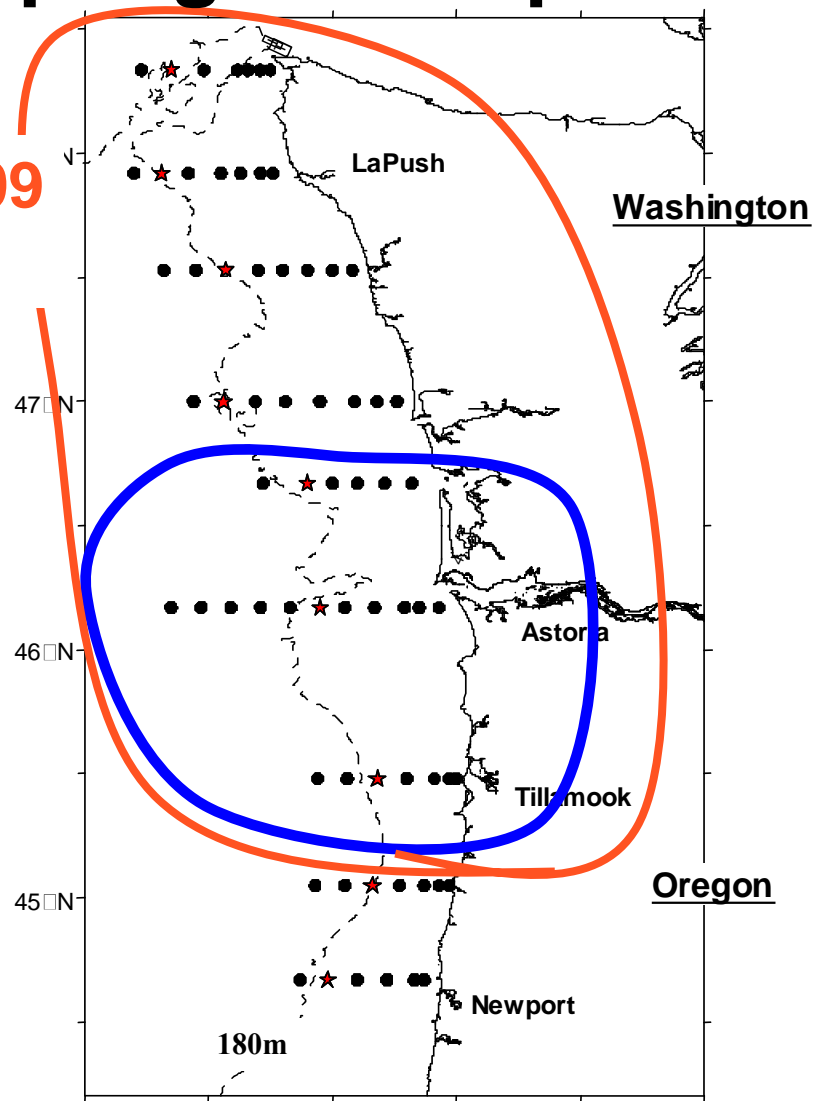
adult return by age and year of ocean entry,

**could provide a more useful set of tools for using
ocean abundance to predict adult return.**

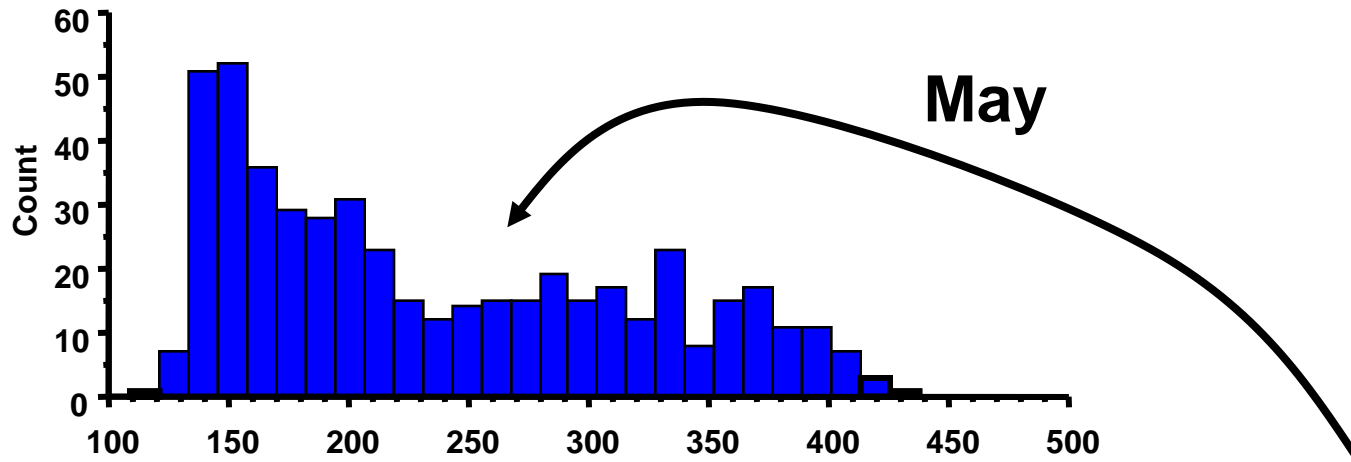
Adaptive management of the research program: May sampling was expanded

6 - 7 transects 2006 - 2009

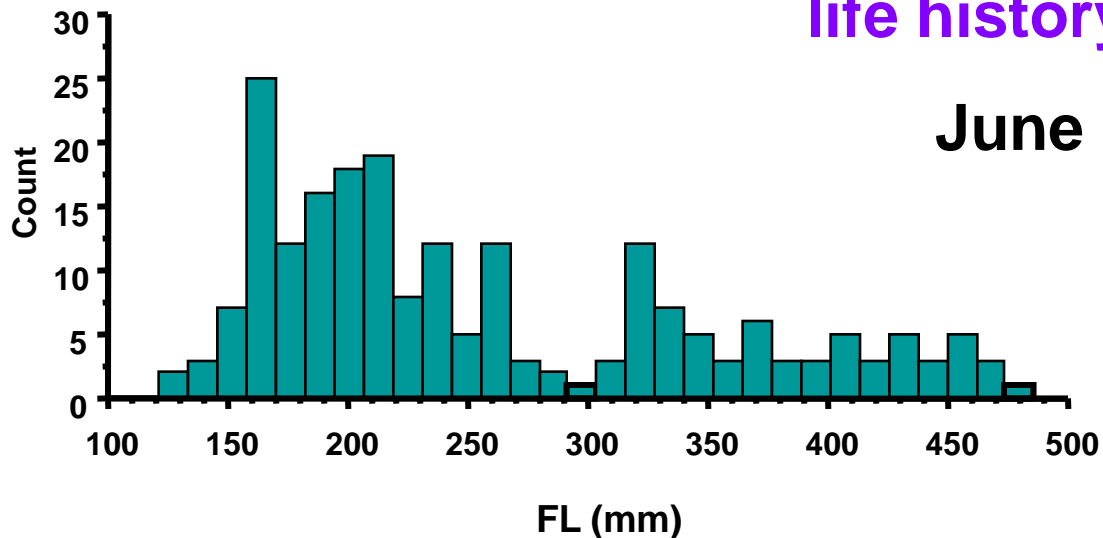
3 transects 1999 - 2005
(assumed fish were not widely dispersed)



Size Frequency of Chinook salmon in May and June (non-sub-yearlings)



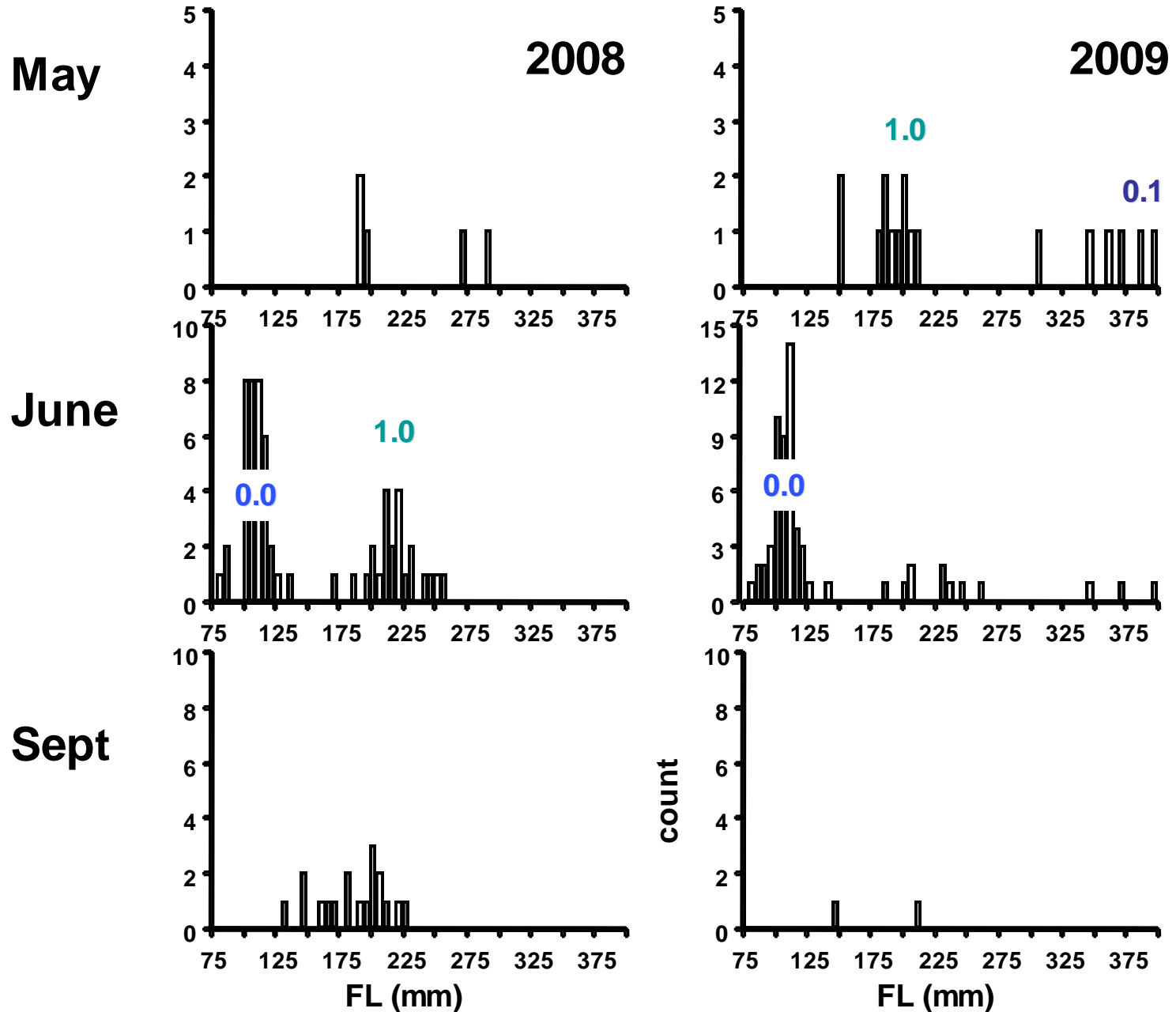
No clean modes demarcating life history types



Potential life histories of captured fish:
sub-yearling smolt (0.0)
yearling smolt (1.0)
sub-yearling smolt, 1 winter in ocean (0.1)

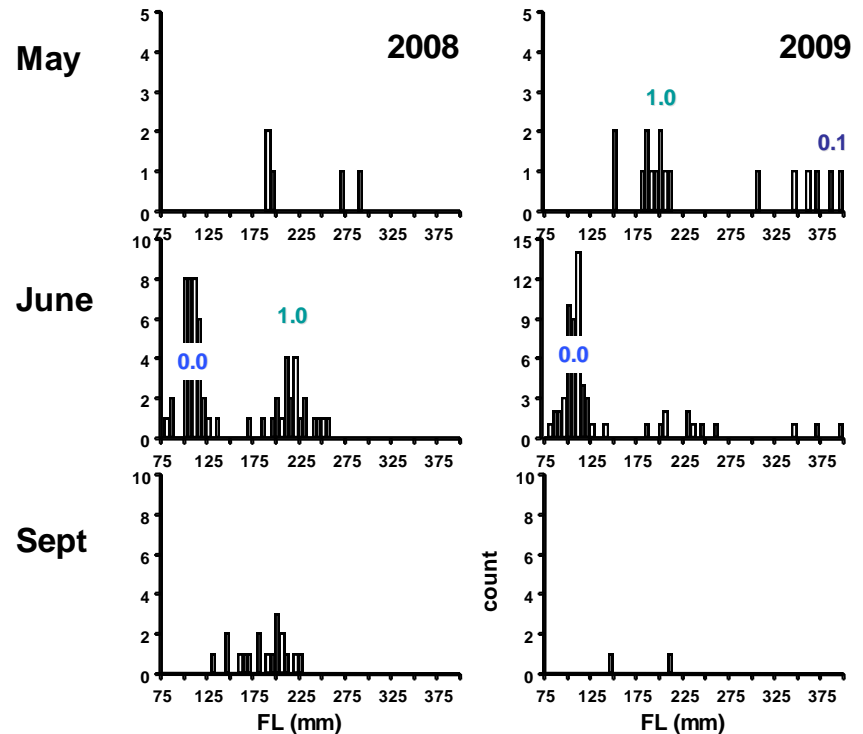
Defined by size, validated by CWT, scales

Size frequency of Snake R Fall Chinook salmon



Size frequency of Snake R Fall Chinook salmon:

- => some over-winter off the Washington coast
- 1.0 smolts “large” (~200mm, spring-run ~ 150mm)
- 0.0 smolts “abundant” in June
- older/larger fish absent in September



Comparative life history

yearling spring Chinook (stream-type)

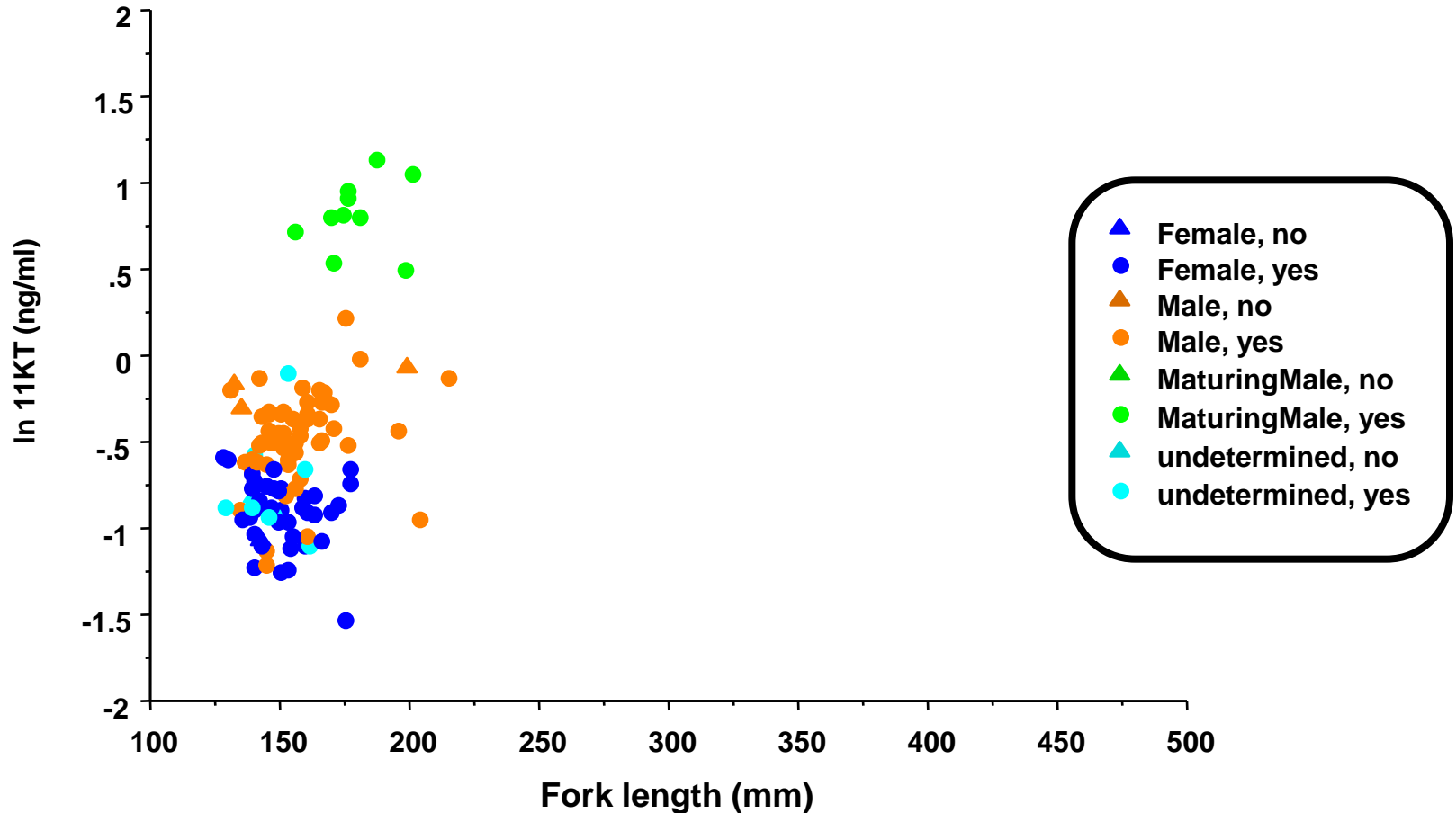
sub-yearling fall Chinook (ocean-type)

Snake River fall Chinook ??

Upper Columbia and Snake Spring Chinook , ESA listed ("classic" 1.0)

May and June 2009

Maturing male?



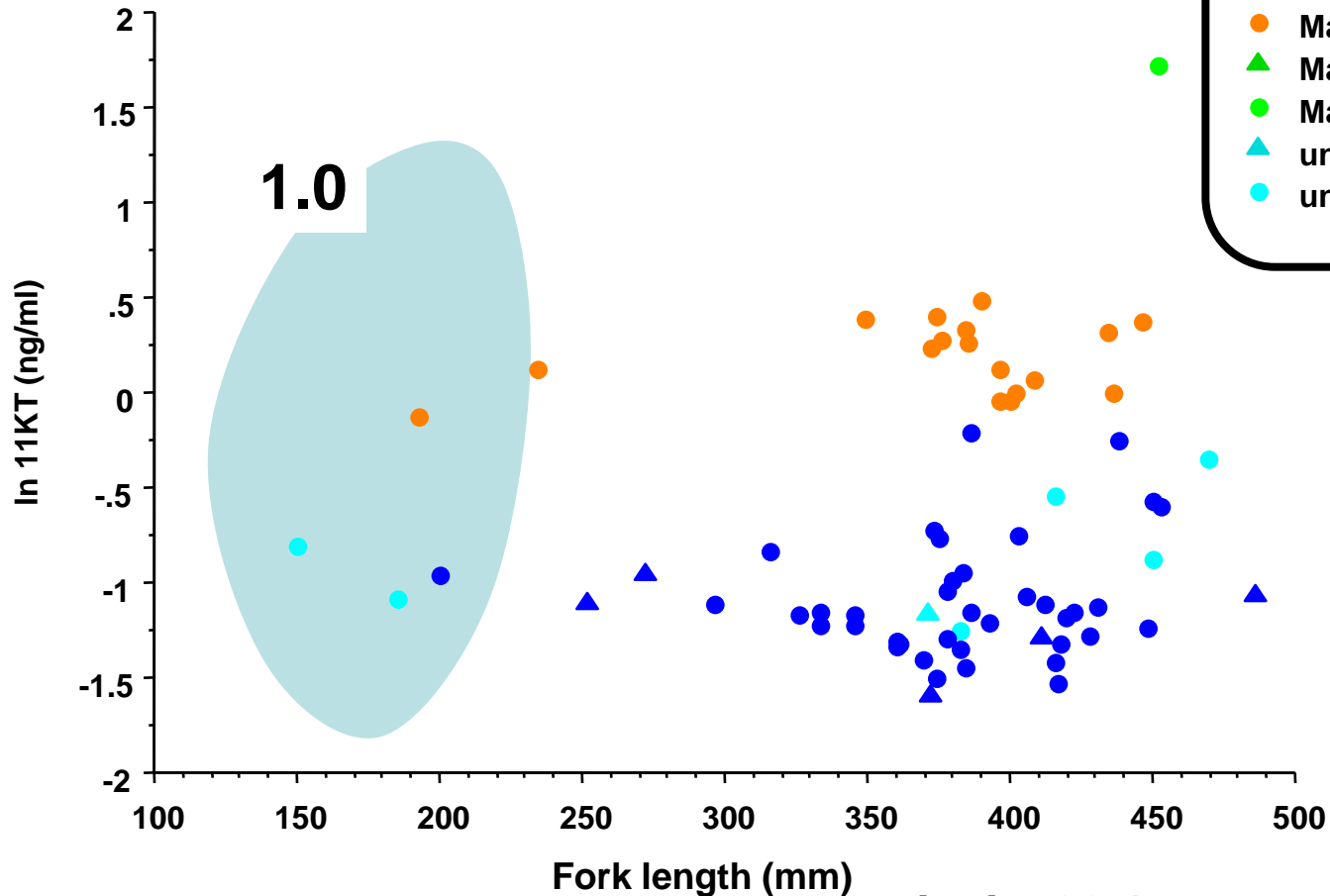
marked = 93%

female = 42%

maturing male (of males) = 16%

Spring Creek (Tule) fall Chinook (“classic” 0.1) May and June 2009

Maturing male?



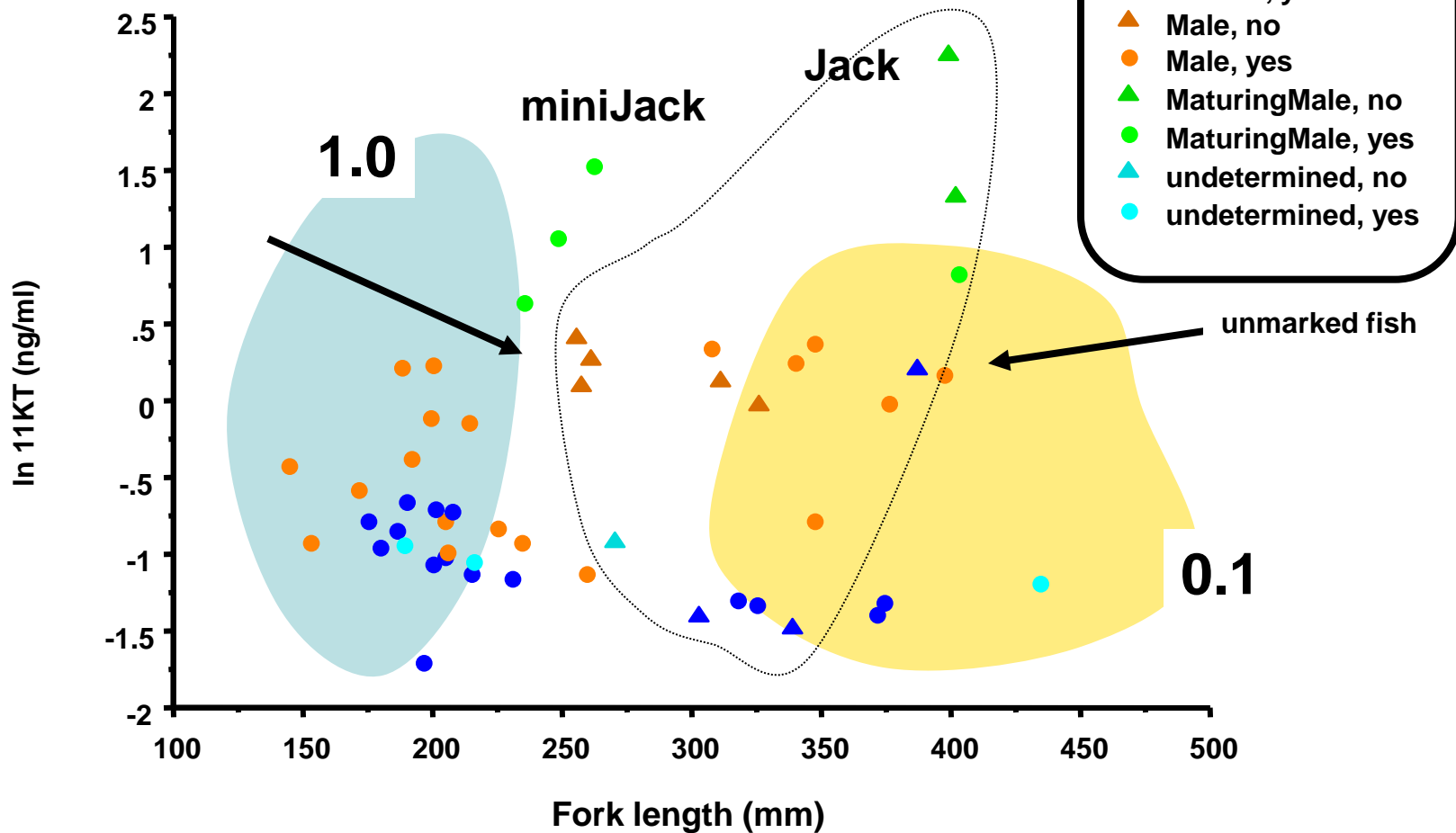
marked = 90%

female = 71%

maturing male (of males) = 4%

Snake River fall Chinook salmon May and June 2009

Maturing male?



marked = 81%
female = 43%
maturing male (of males) = 24%

Comparative life history

Relatively large proportion of males maturing at age 2

Yearling smolts relatively large

Unmarked fish have intermediate size at age characters

Conclusions

**Snake River fall Chinook are captured in
BPA Plume research program**

Sept abundance related to adult return

Life history traits variable