Wild Salmon in 2100:

Straight Talk About the Future

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Oregon State University

VISIONS Workshop - Quesnel
October 6, 2011

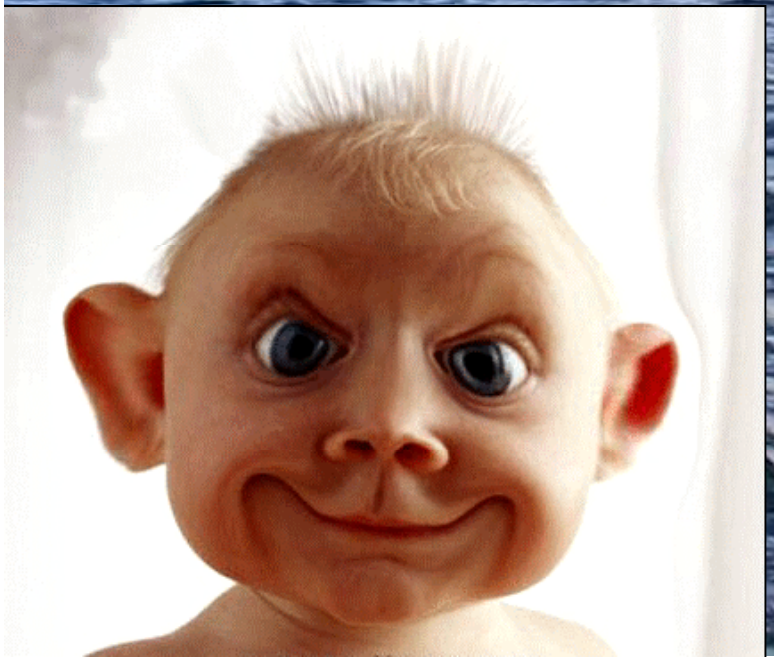
Topics

1. Brief history of the decline

2. Most likely status of PNW wild salmon in 2100

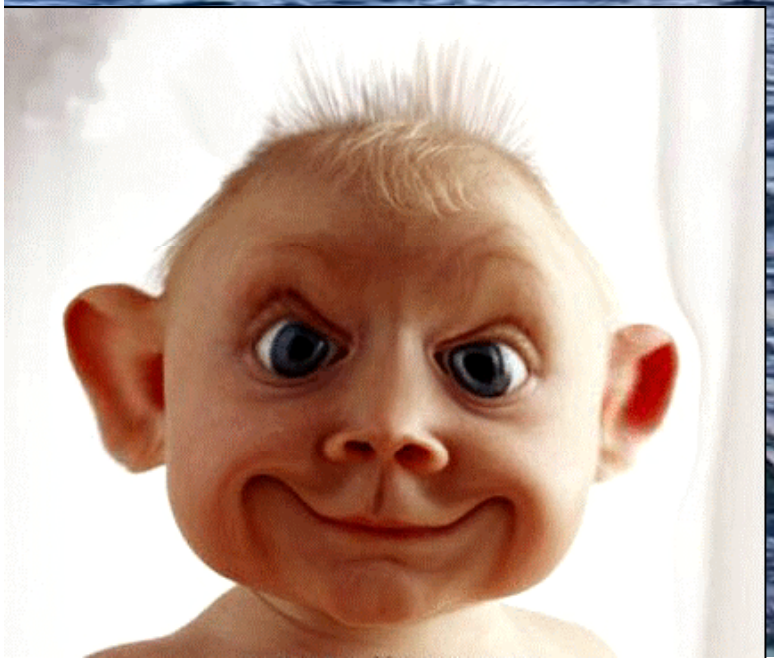
3. Alternative policies that would restore wild salmon

Points of Reference



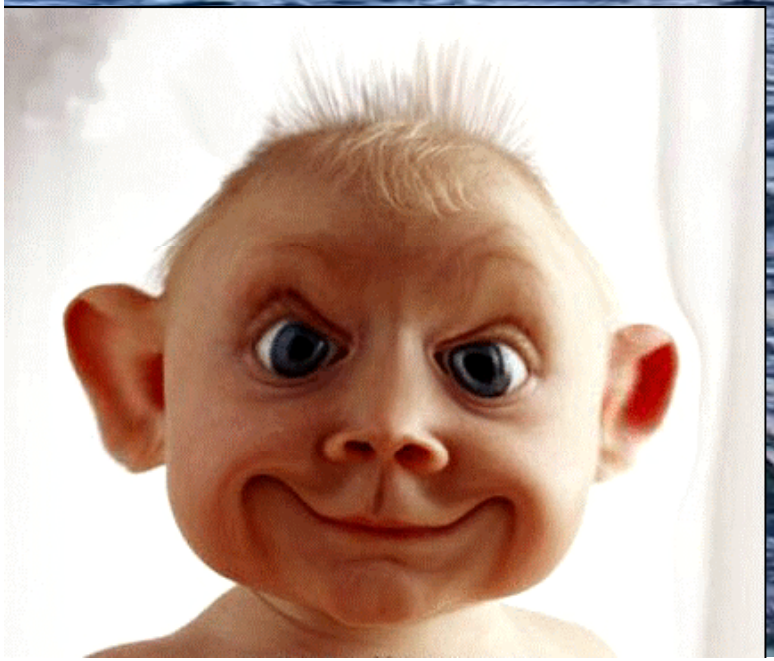
No one is, or has been, out to eradicate salmon!

Points of Reference



Easy to get lost in the technical weeds about salmon!

Points of Reference



No delusional reality about the future of wild salmon!

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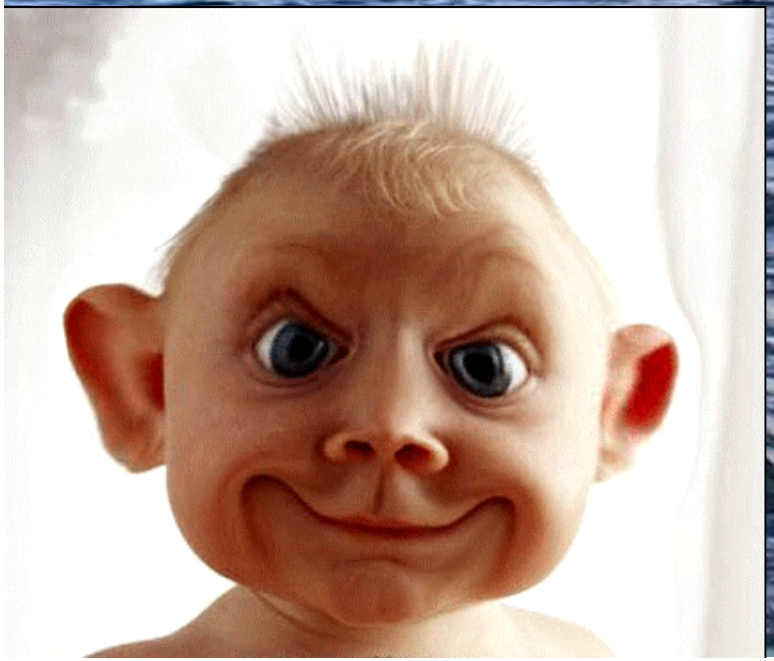

No doom and gloom about the future of wild salmon!

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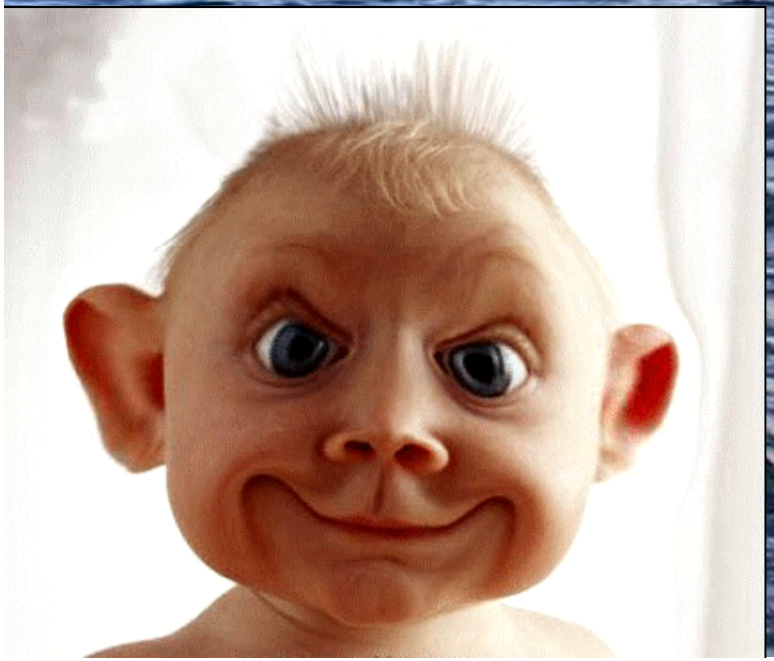

No cheering leading for a favored policy!

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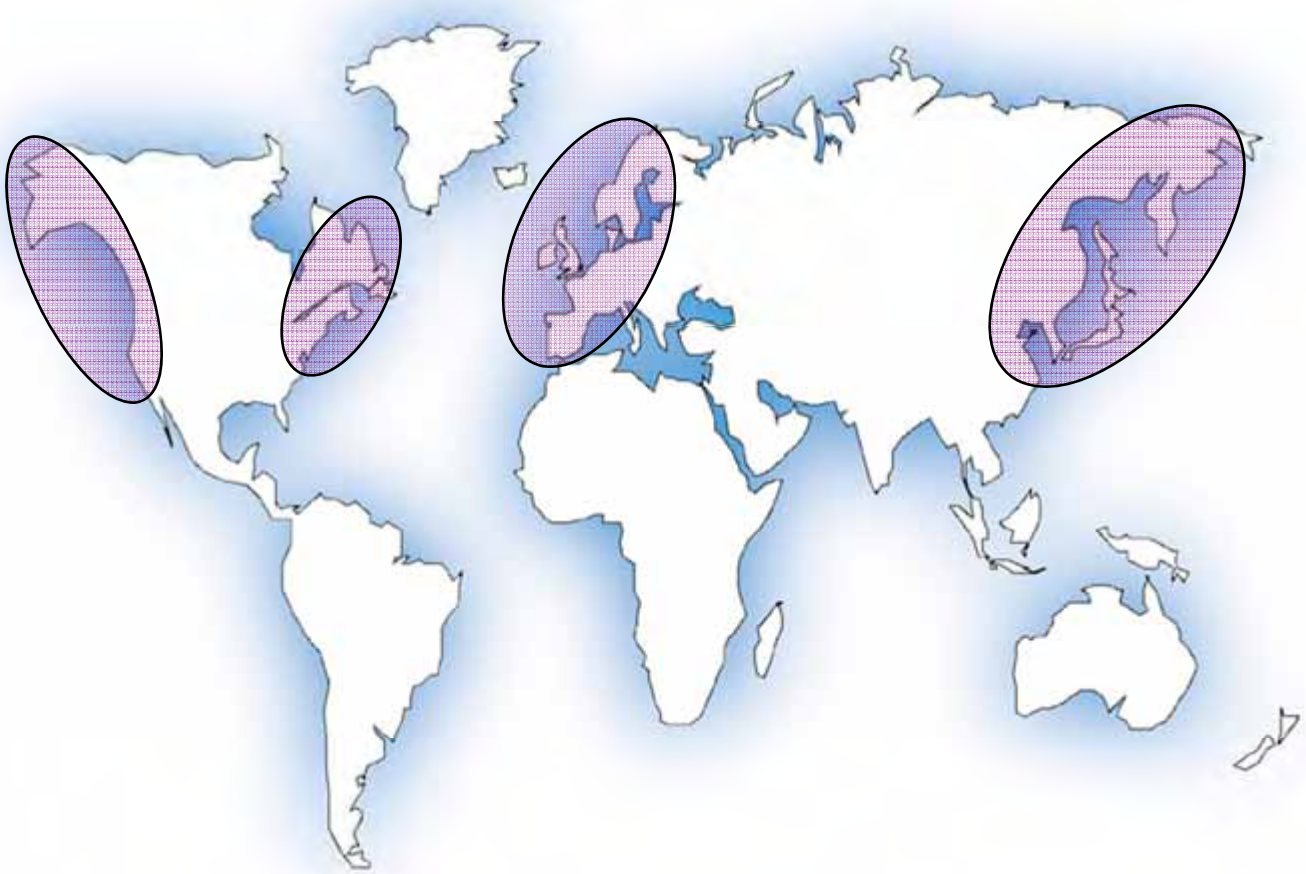
Historical Context

Status ~4,000 yrs ago



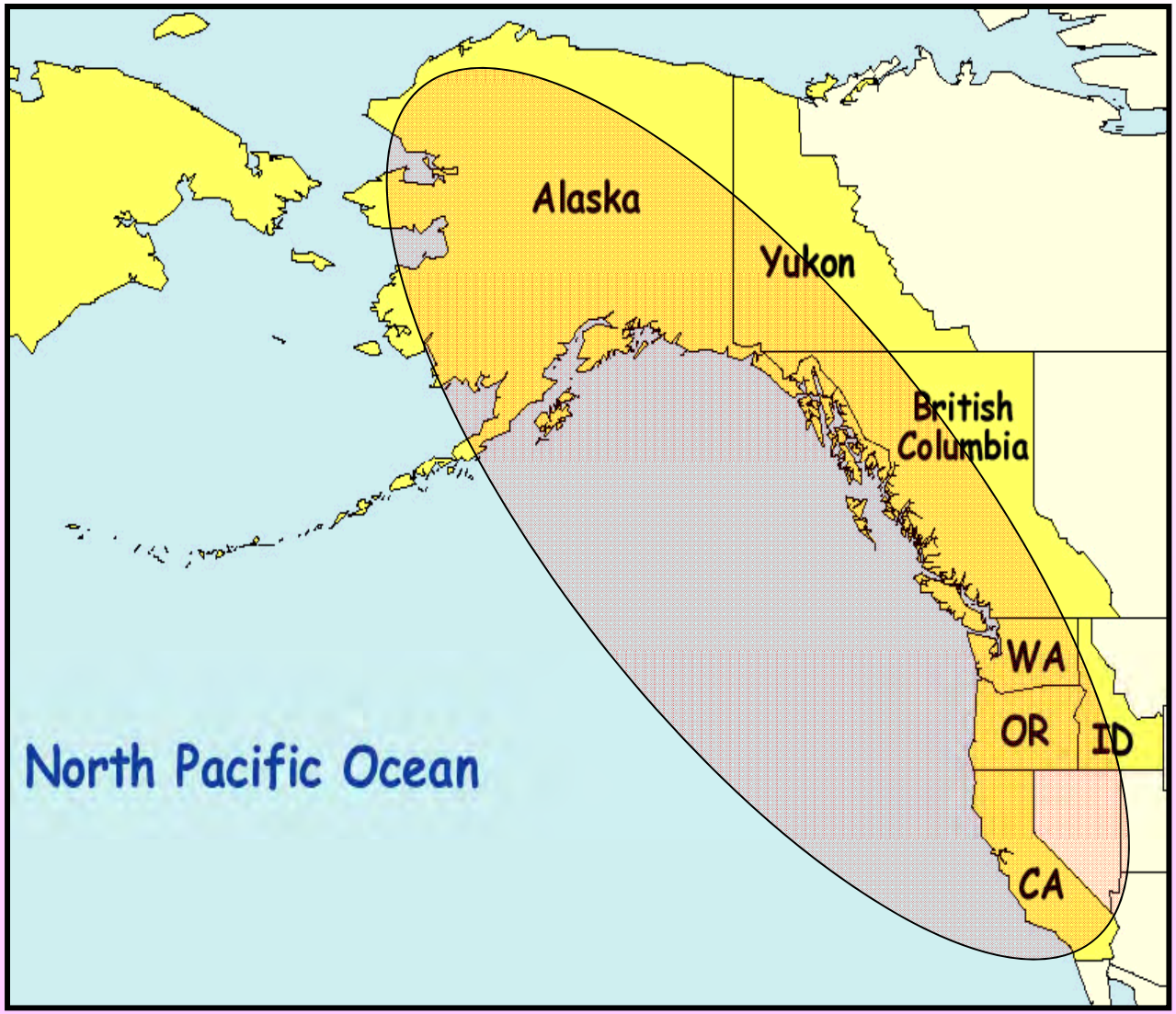
Status in 2011

Pattern of decline has been similar

1848

The “Modern” Era

Changing status of runs — *past 163 years*



1848

Changing status of runs — *past 163 years*

2011

Causes of the decline:

CA, OR, WA, ID, & southern BC







Three “types” of salmon

Hatchery

Farmed

Wild

Three “types” of salmon

Wild

“Wild” Salmon:

“those produced from parents who spawned naturally in natural habitat”

Changes in wild salmon numbers

Changes in wild salmon numbers

(historical vs. current) – 30 year averages

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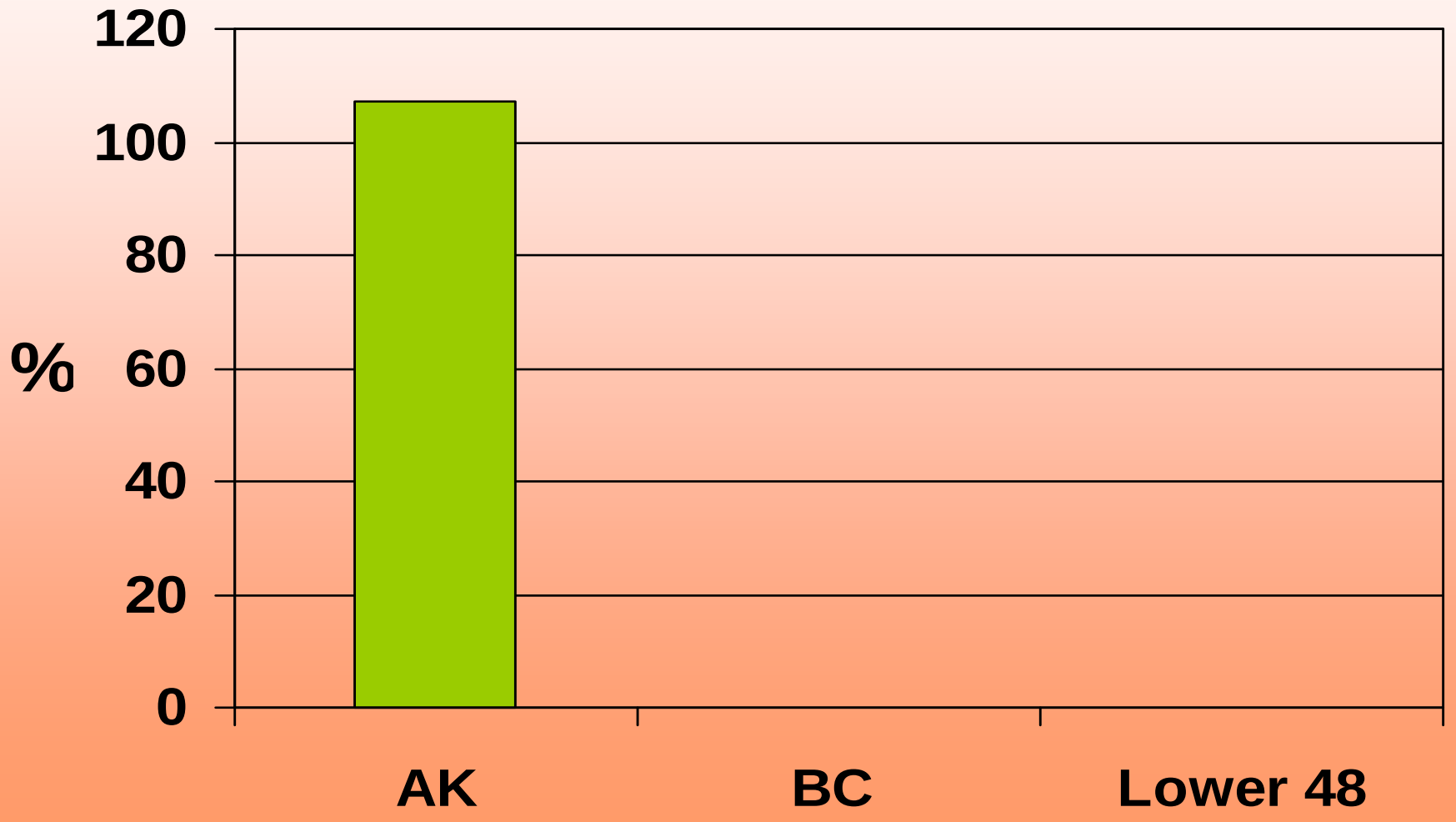
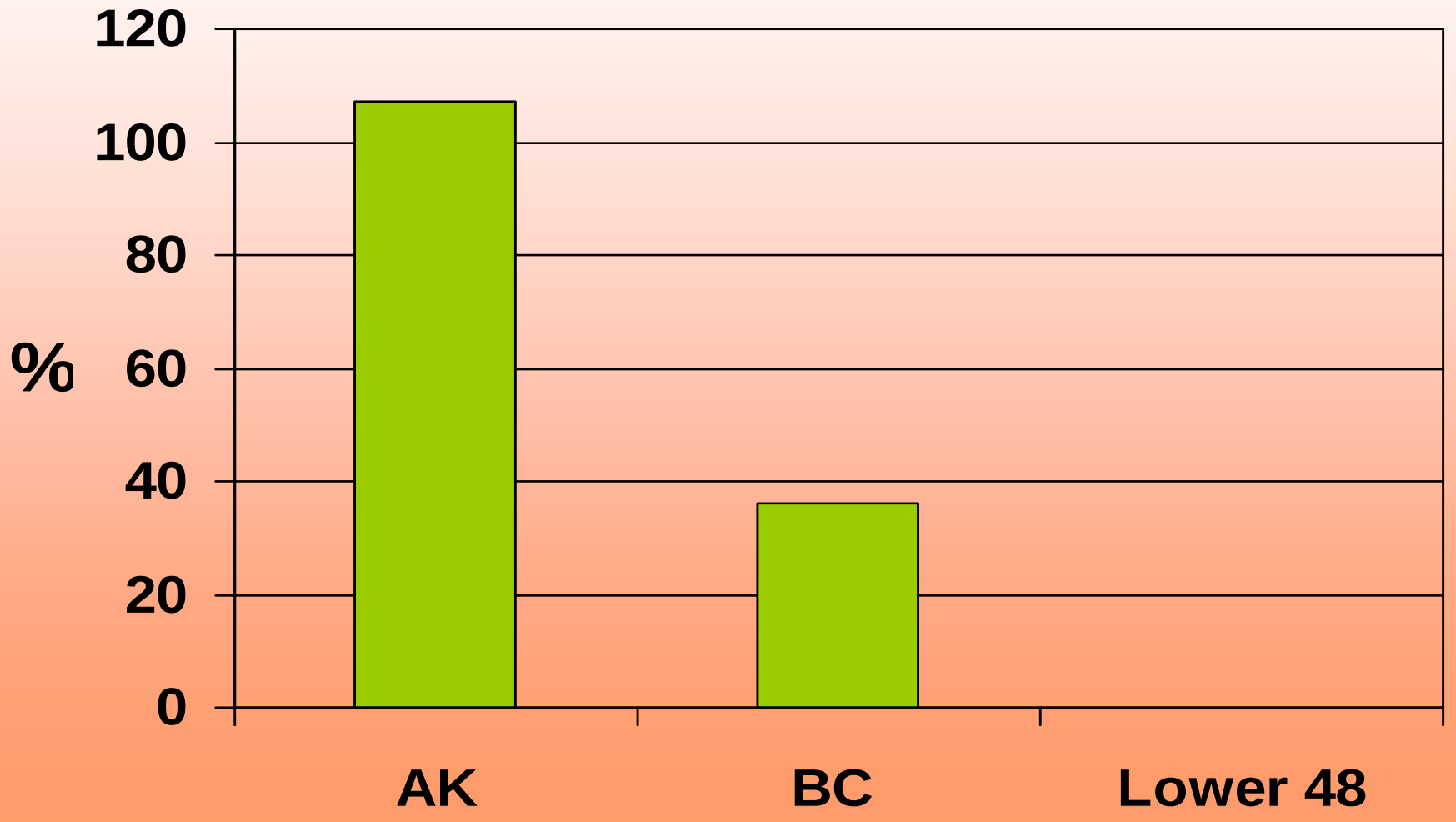
(historical vs. current) – 30 year averages



Changes in wild salmon numbers

(historical vs. current) – 30 year averages



Changes in wild salmon numbers

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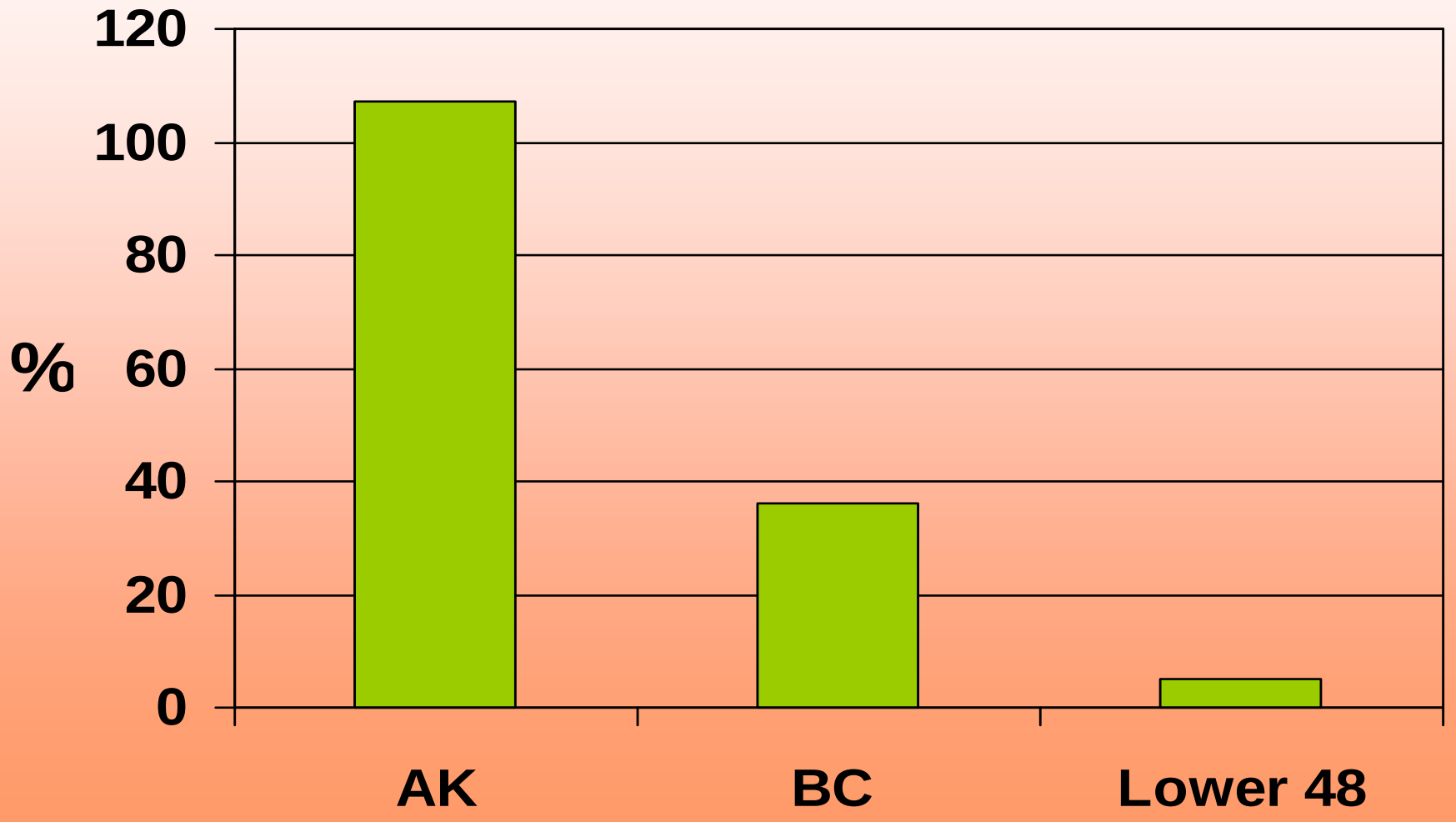
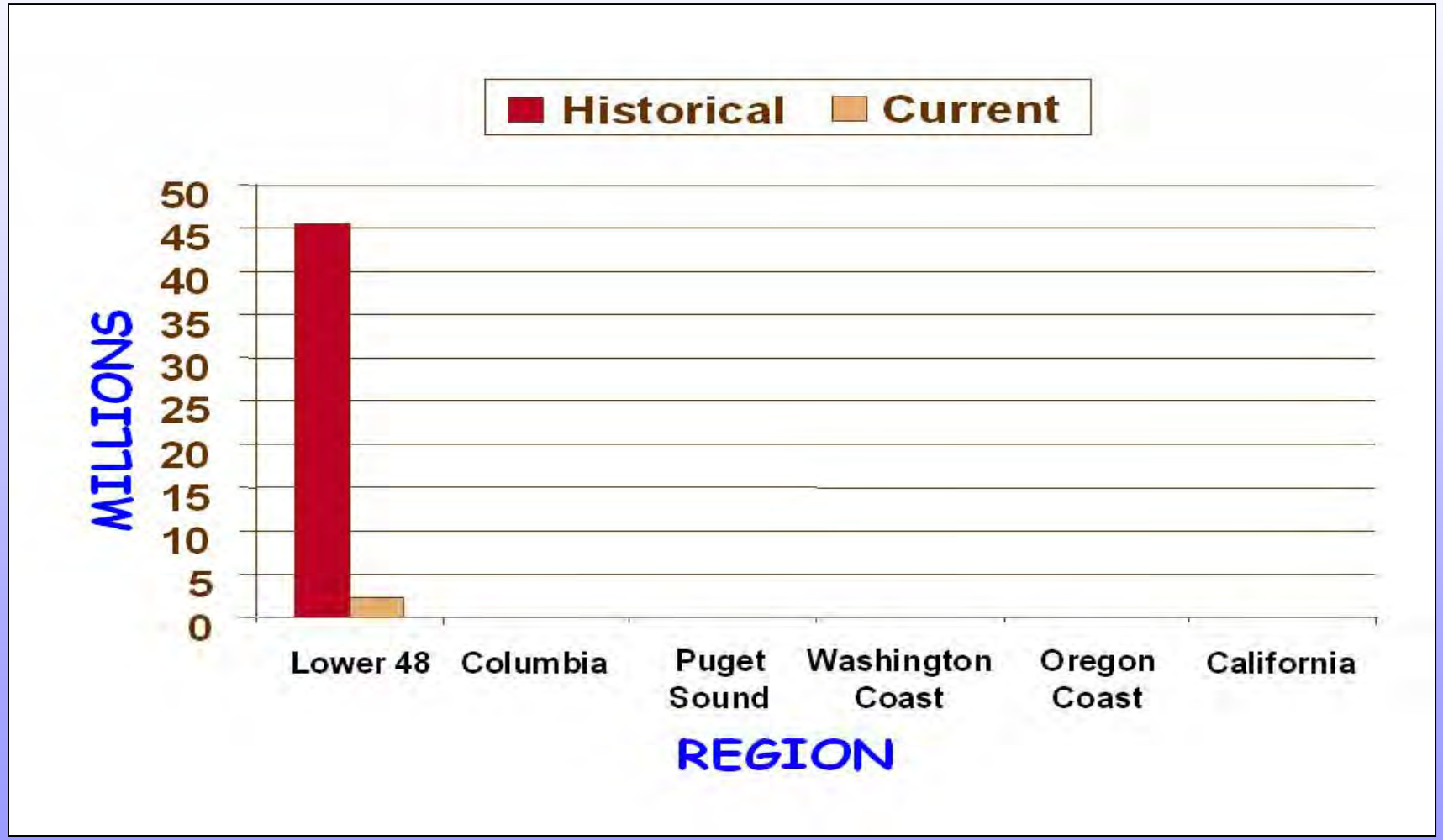
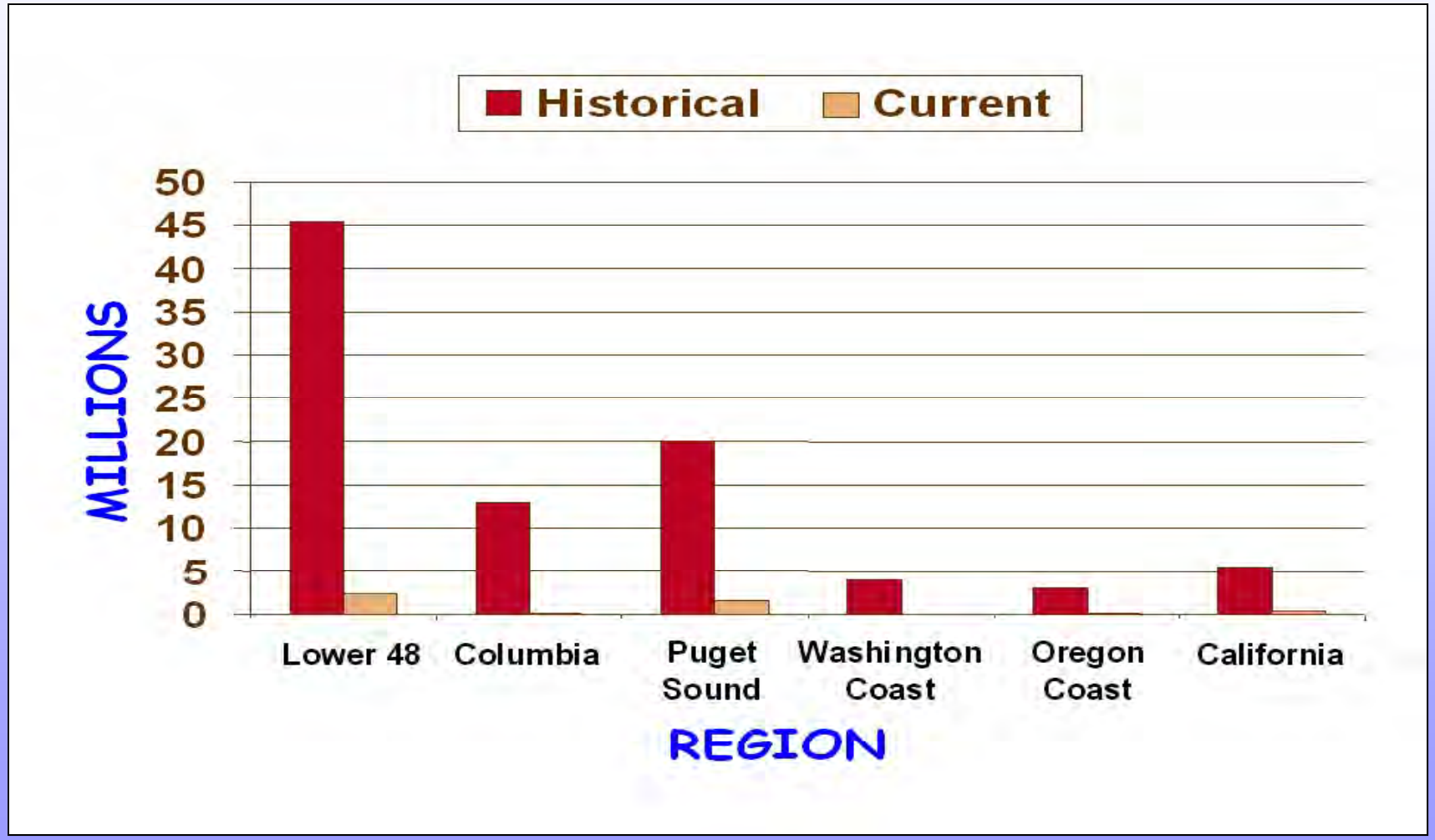
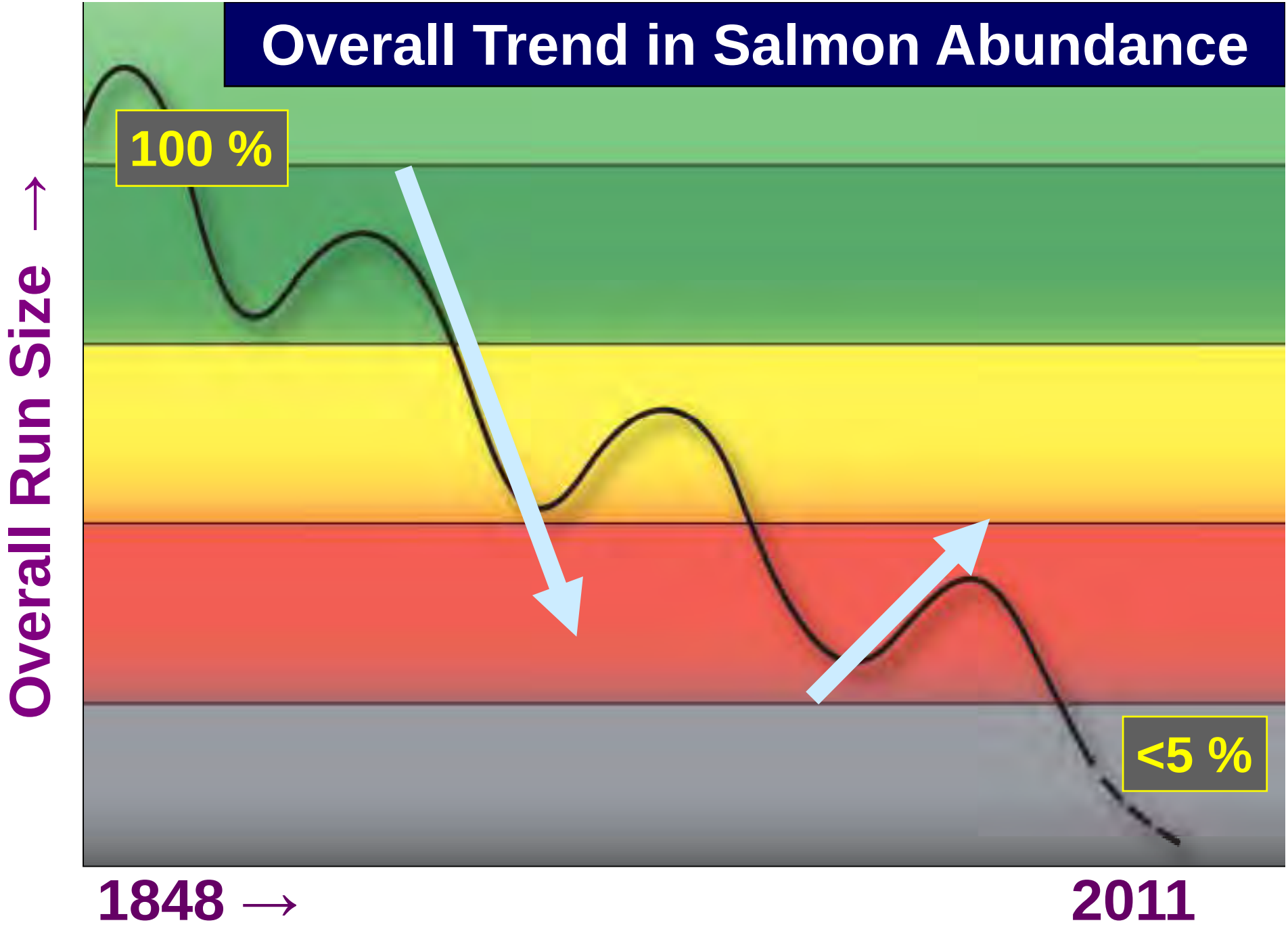


Wild salmon decline:



Wild salmon decline:




Overall Trend in Salmon Abundance
100 %
<5 %
Overall Run Size →
1848 →
2011

Recovery efforts (1848 – 2011) have been extensive and expensive

Long-term trend is still downward

That was the past

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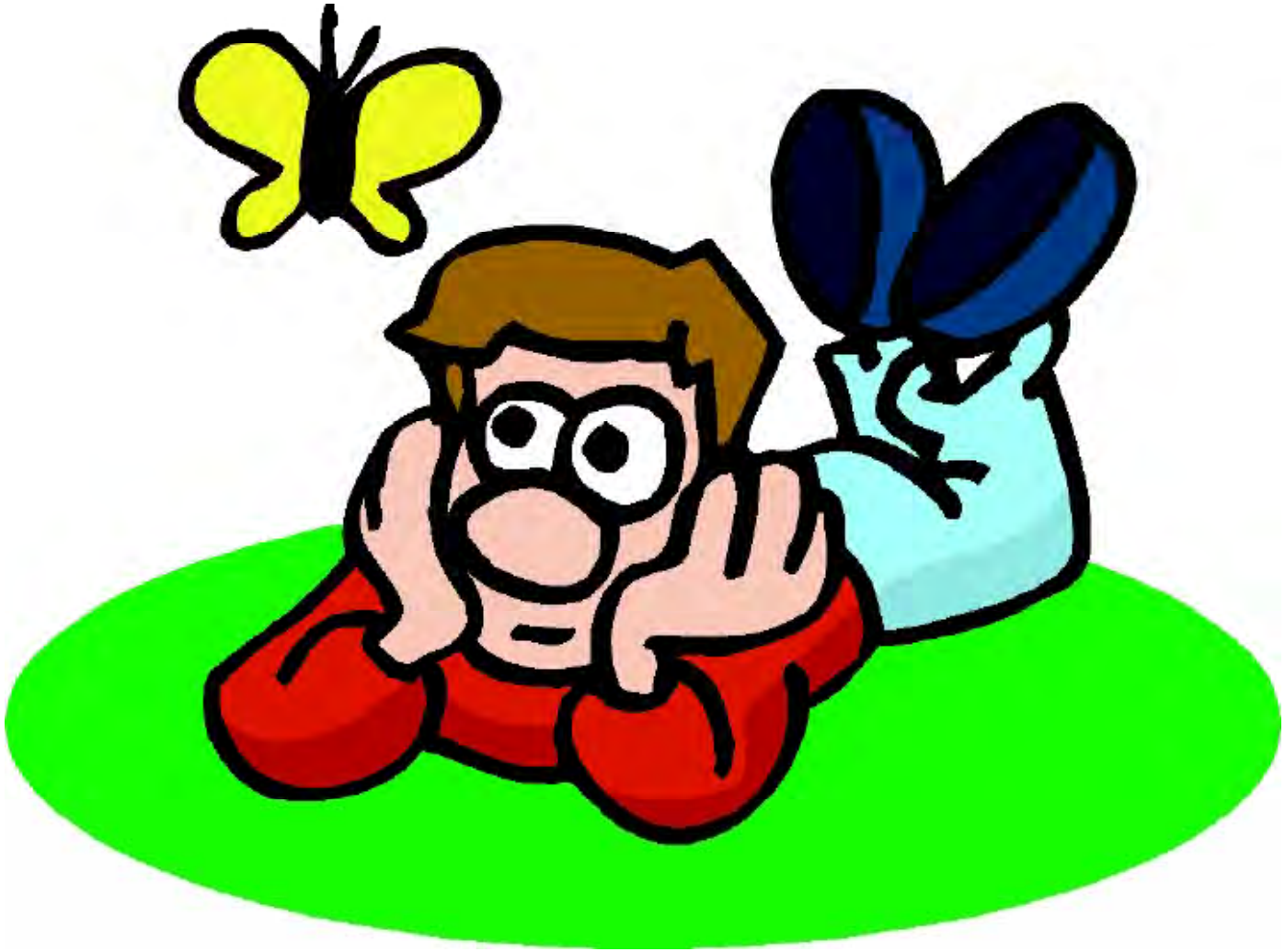
What will determine the future of wild salmon in this region?



Salmon Forecasting:

There are really big

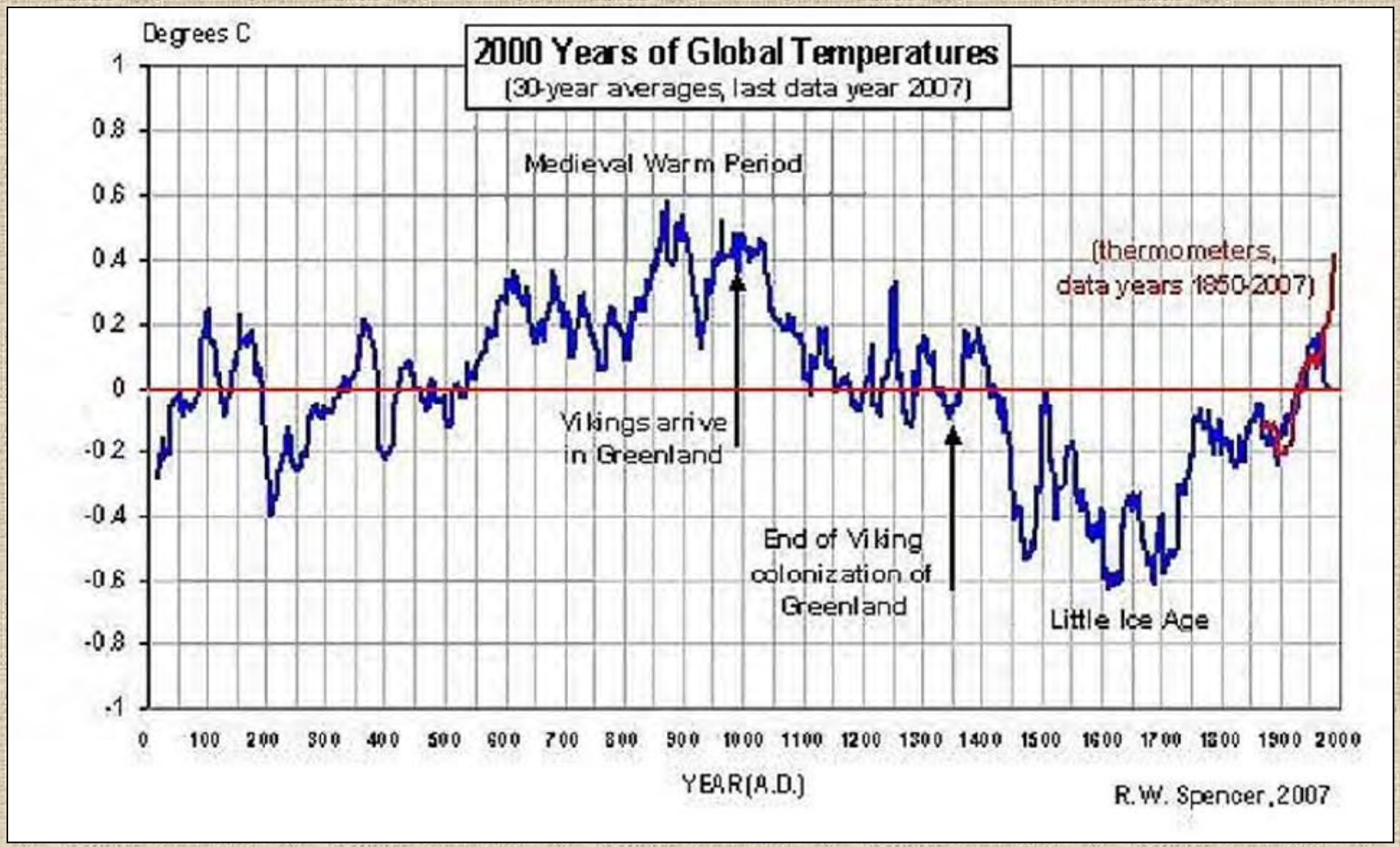
known unknowns

&

unknown unknowns

Climate Change

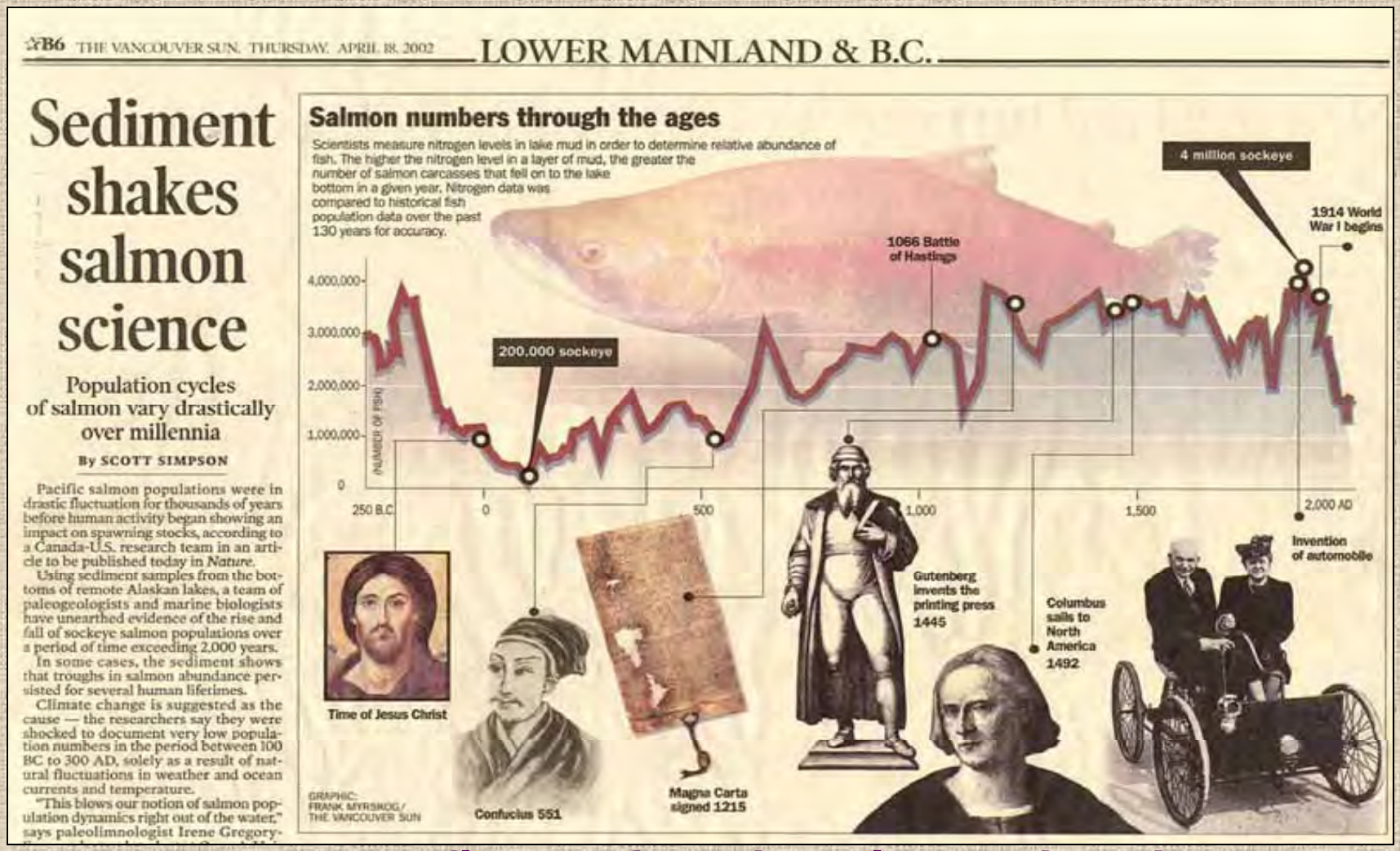
Known Unknown



To what extent are these changes due to humans?

Climate Change

Known Unknown



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Sediment shakes salmon science

Population cycles of salmon vary drastically over millennia

By SCOTT SIMPSON

Pacific salmon populations were in drastic fluctuation for thousands of years before human activity began showing an impact on spawning stocks, according to a Canada-U.S. research team in an article to be published today in *Nature*.

Using sediment samples from the bottoms of remote Alaskan lakes, a team of paleogeologists and marine biologists have unearthed evidence of the rise and fall of sockeye salmon populations over a period of time exceeding 2,000 years.

In some cases, the sediment shows that troughs in salmon abundance persisted for several human lifetimes.

Climate change is suggested as the cause — the researchers say they were shocked to document very low population numbers in the period between 100 BC to 300 AD, solely as a result of natural fluctuations in weather and ocean currents and temperature.

"This blows our notion of salmon population dynamics right out of the water," says paleolimnologist Irene Gregory-

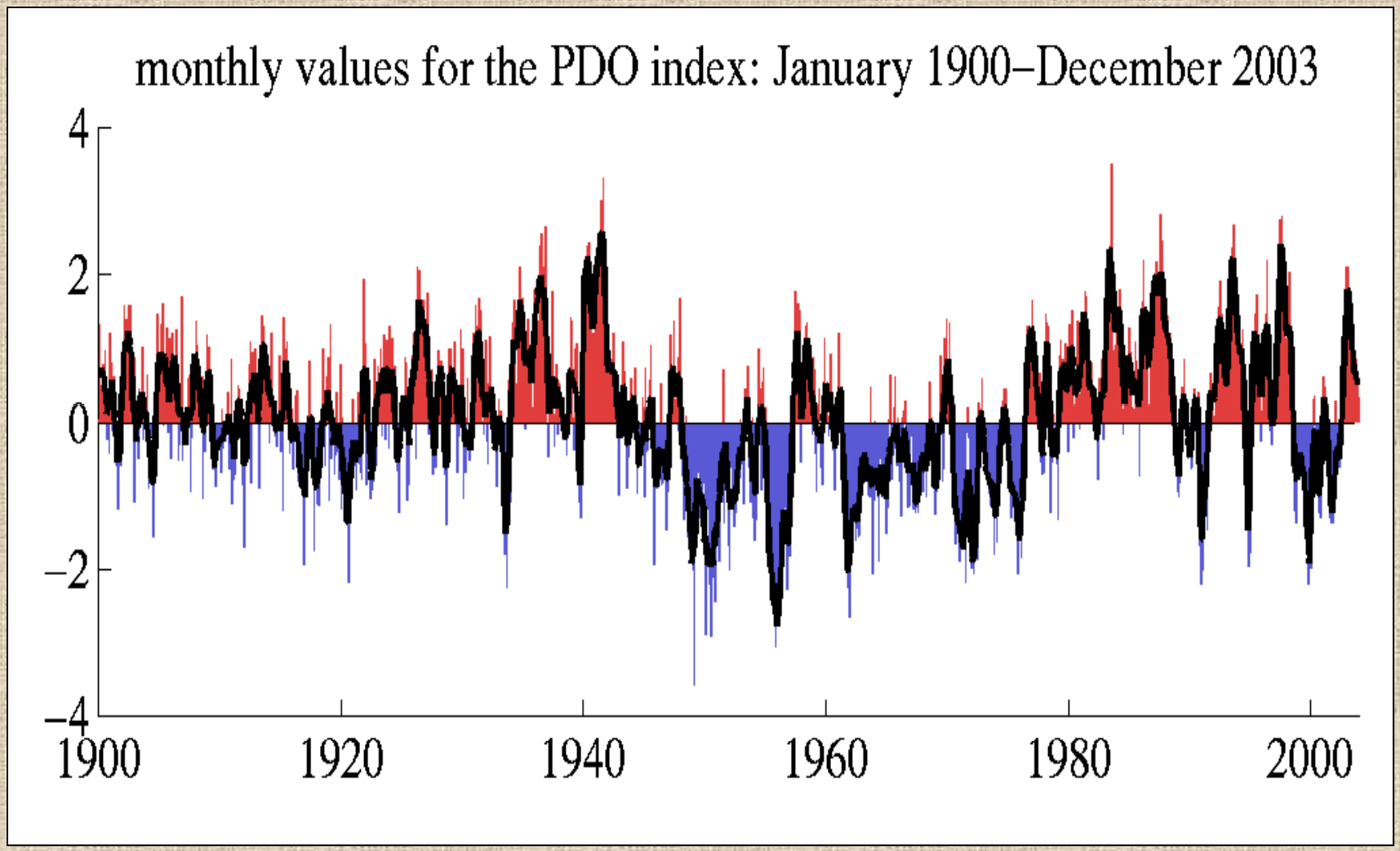
Salmon numbers through the ages

Scientists measure nitrogen levels in lake mud in order to determine relative abundance of fish. The higher the nitrogen level in a layer of mud, the greater the number of salmon carcasses that fell on to the lake bottom in a given year. Nitrogen data was compared to historical fish population data over the past 130 years for accuracy.

"Long-term" fluctuations in salmon abundance

Climate Change

Known Unknown

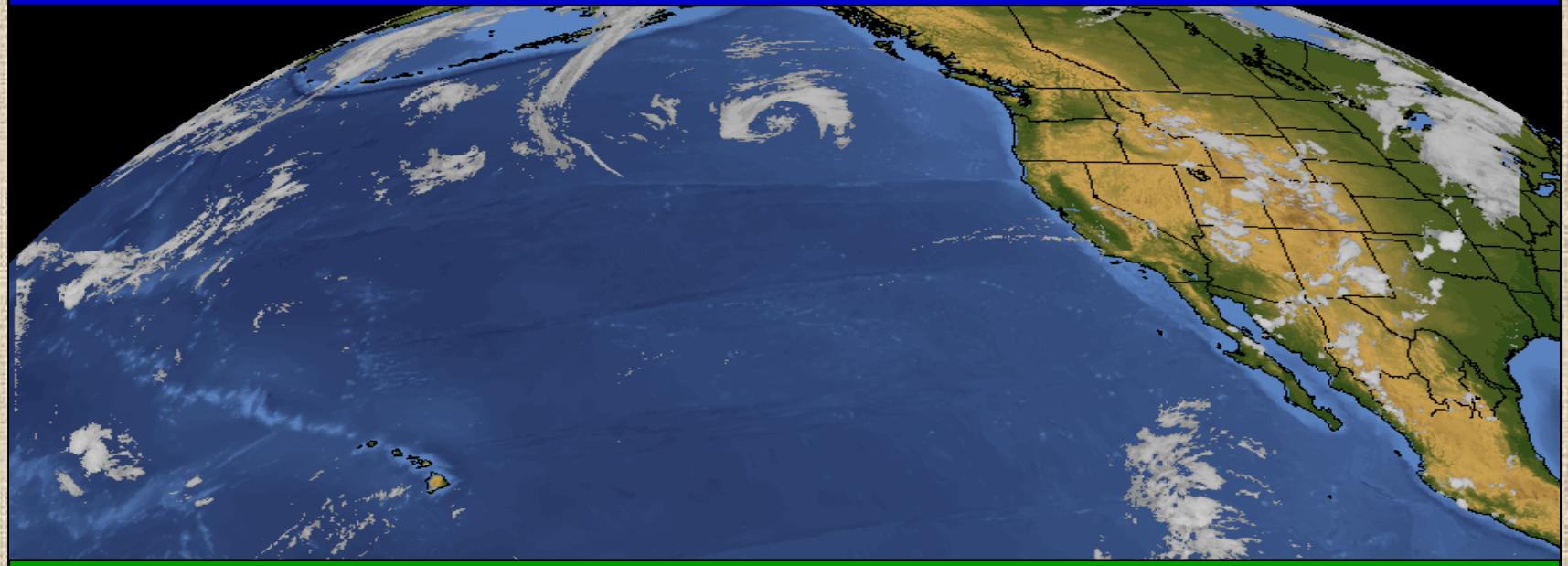


“Short-term” fluctuations in salmon abundance

Climate Change

Known Unknown

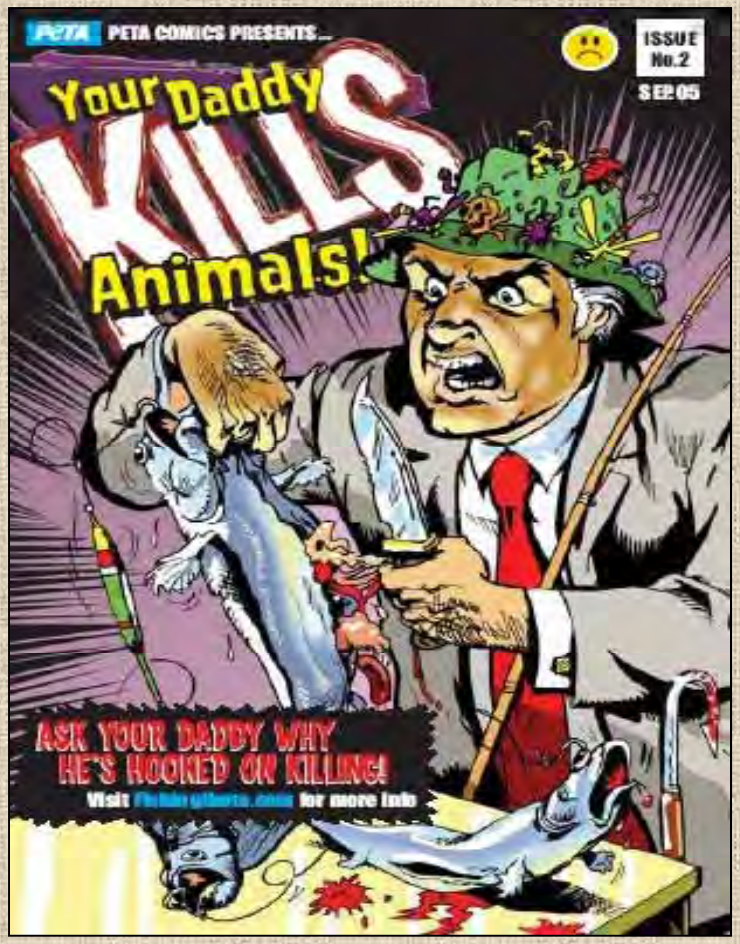
Human caused climate changes



BRIC and PIIGS Factors?

Near-term trajectory not likely to be changed greatly

Social Change
dramatic value shifts



Unknown
Unknown

Watch out for black swans in long-term assessments!