

i hate rules

i love rules

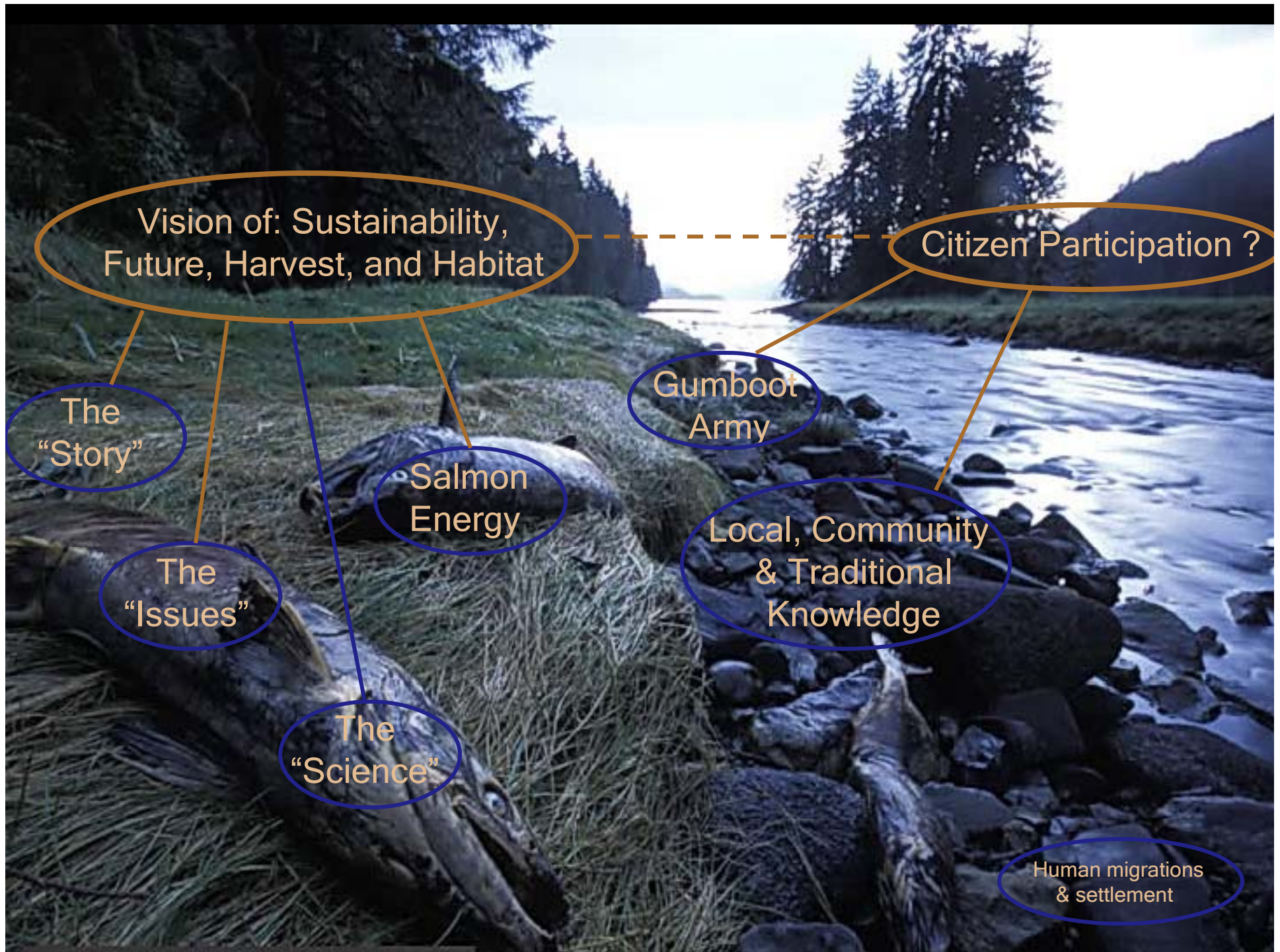
i am human

Fraser Sockeye:

*...if you're not part of the problem
you can't be part of the solution...*



David Loewen
www.salmonguy.org



The
"Story"

The
"Issues"

Salmon
Energy

The
"Science"



Salmon have been around a long, long time... *not always like this:*

Original Distribution of Genus *Oncorhynchus* (Pacific Salmon)

© 2005 State of the Salmon, a joint program of Wild Salmon Center and Ecotrust



From: *Atlas of Pacific Salmon* <www.stateofthesalmon.org>

Prior to current range... involved a lot of this:

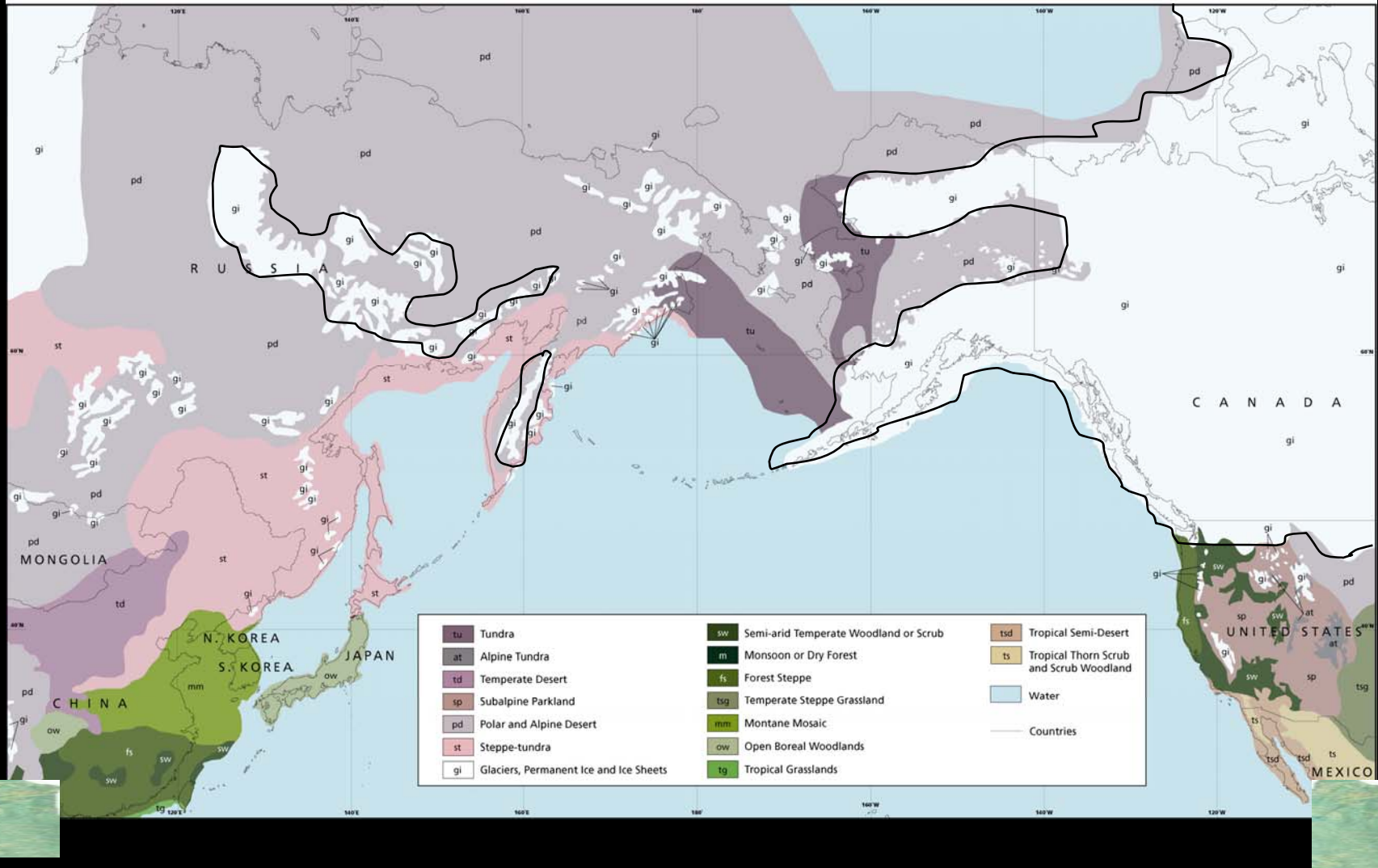


And this:

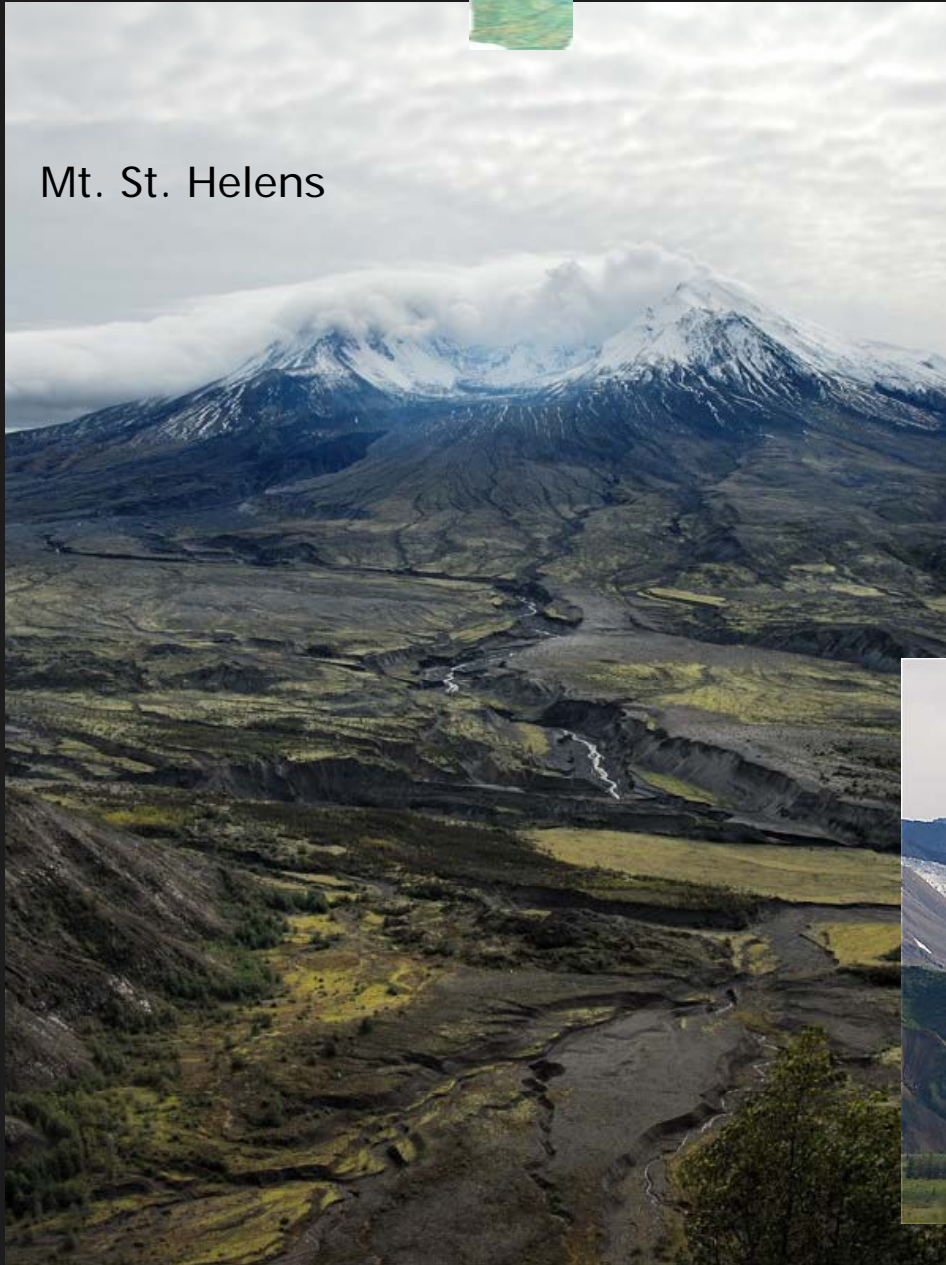


Extent of Glaciation (Last Glacial Maximum, 18,000 years ago)

© 2005 State of the Salmon, a joint project of the Wild Salmon Center and the University of Washington



Mt. St. Helens



As ice receded...

...to get from this:

Matanuska Glacier, Alaska



To this....

Copper River, Alaska



Or this....

Jiinanga

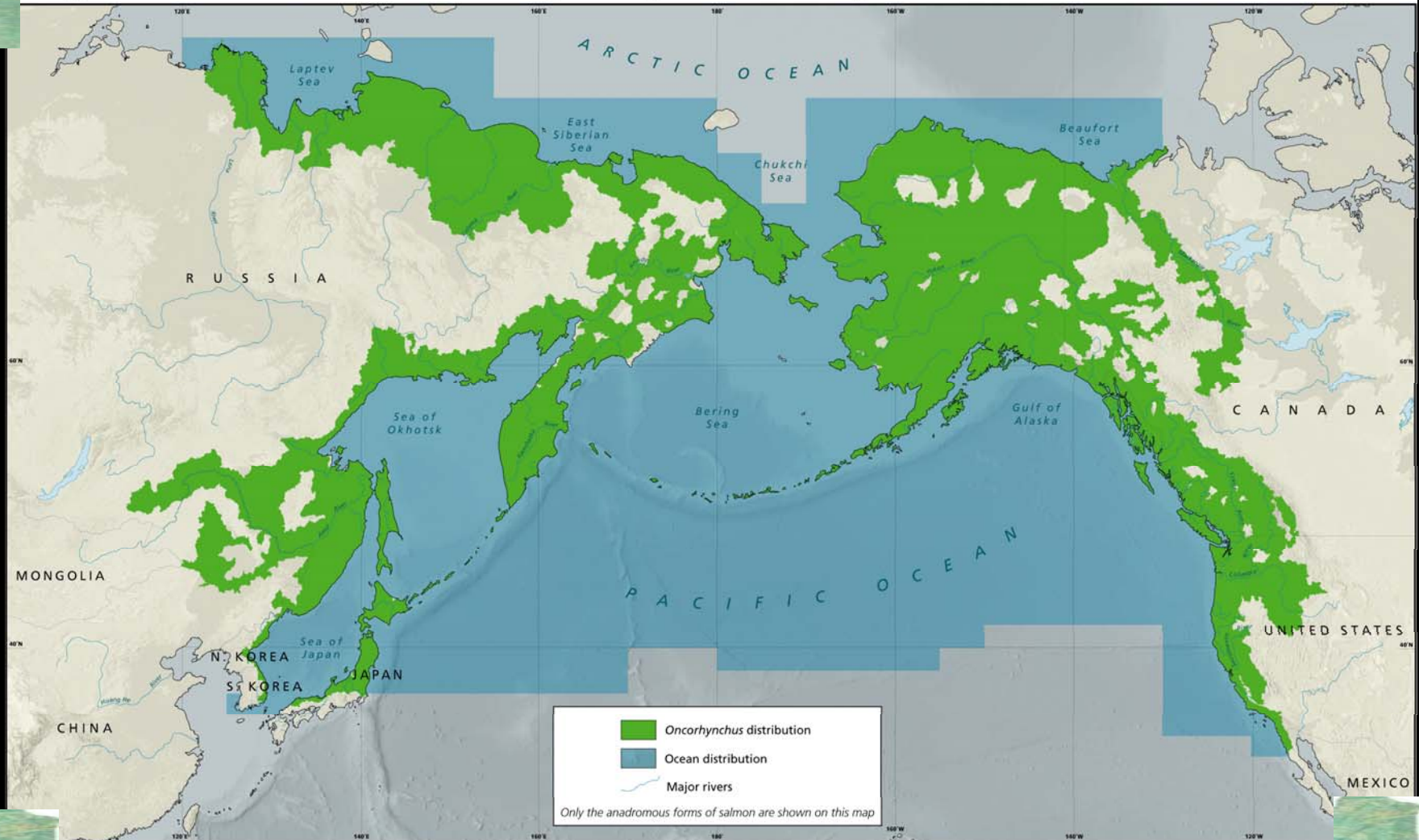
- Government Creek, Haida Gwaii –
Old growth, unlogged
Haida Protected Area

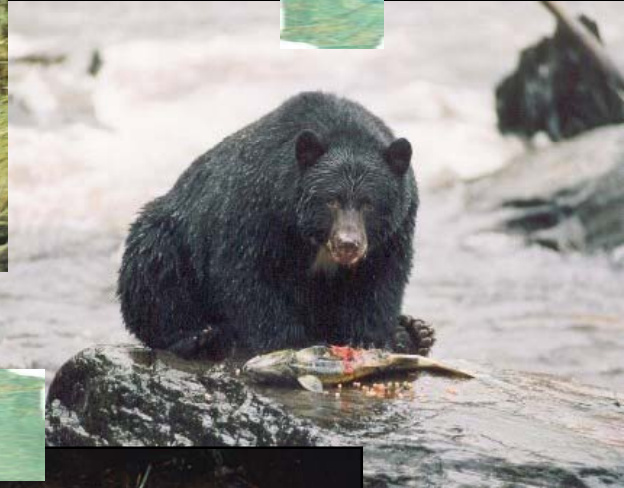


Which looks something like this now... but dwindling...

Original Distribution of Genus *Oncorhynchus* (Pacific Salmon)

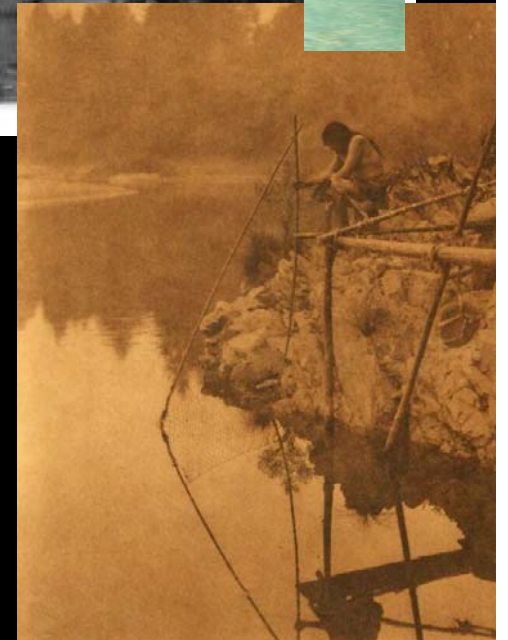
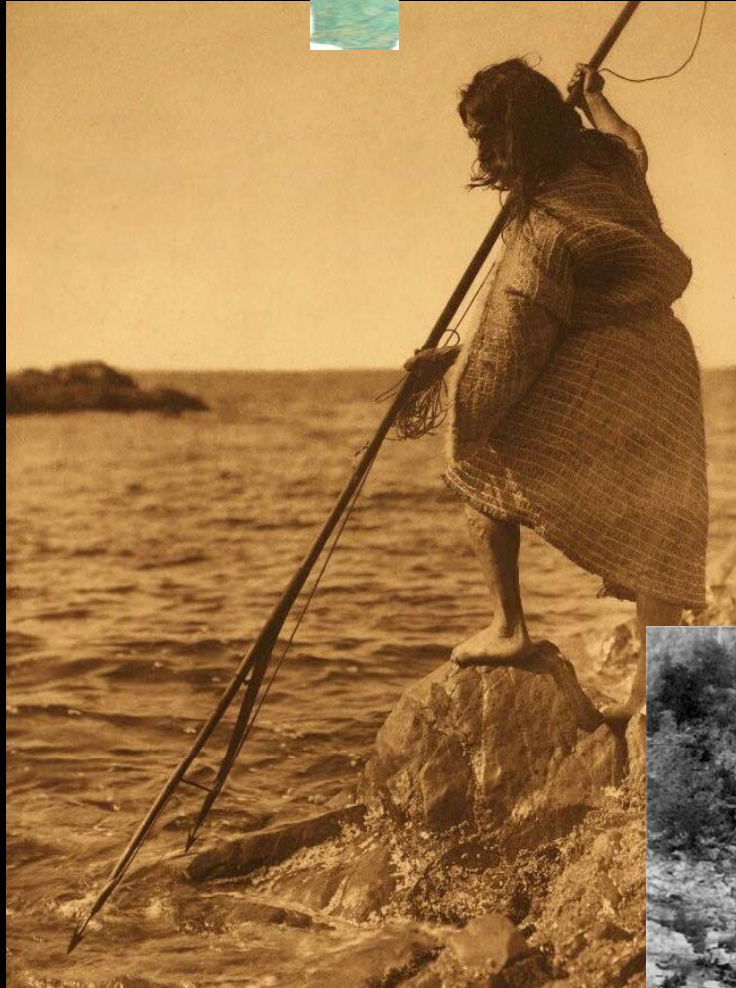
© 2005 State of the Salmon, a joint project of Wild Salmon Center and Ec





Probably involved a lot of this...

But also very importantly... a lot of this:



People.

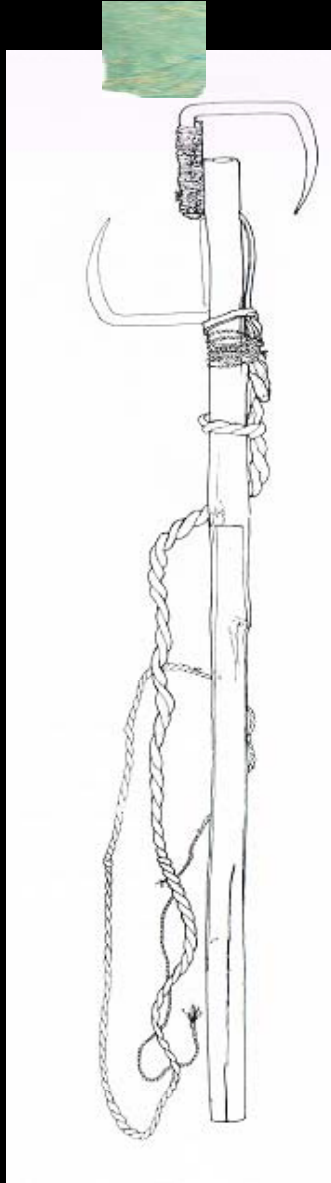
Coastal First Nations people in present-day British Columbia “obtained about 90% of their protein from marine sources.

-- from Garner and Parfitt, 2006 report to PFRCC

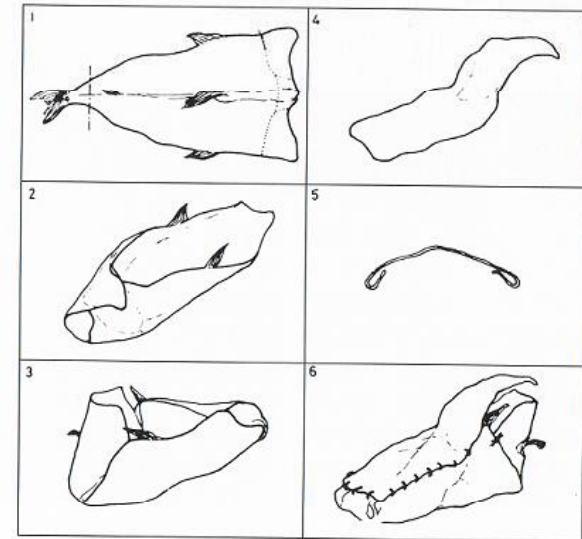
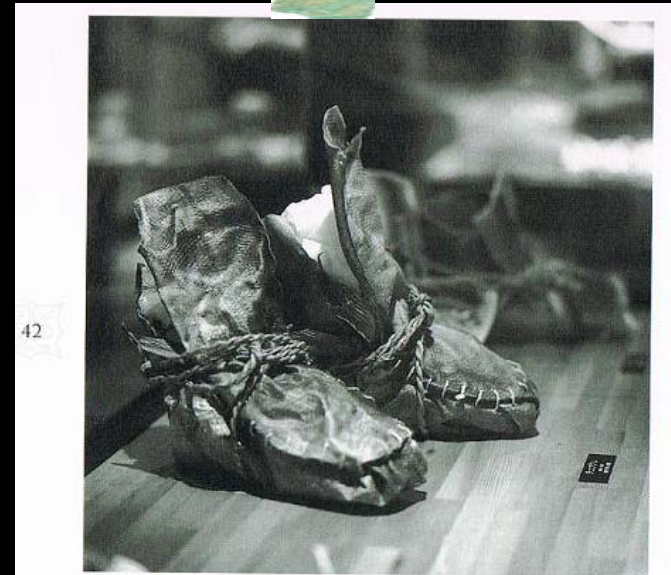
It is said that the Nisga'a, people of the mighty river, are so connected to fish that their bones are made of salmon.

-- BC Treaty Commission

Ainu: Salmon Spear

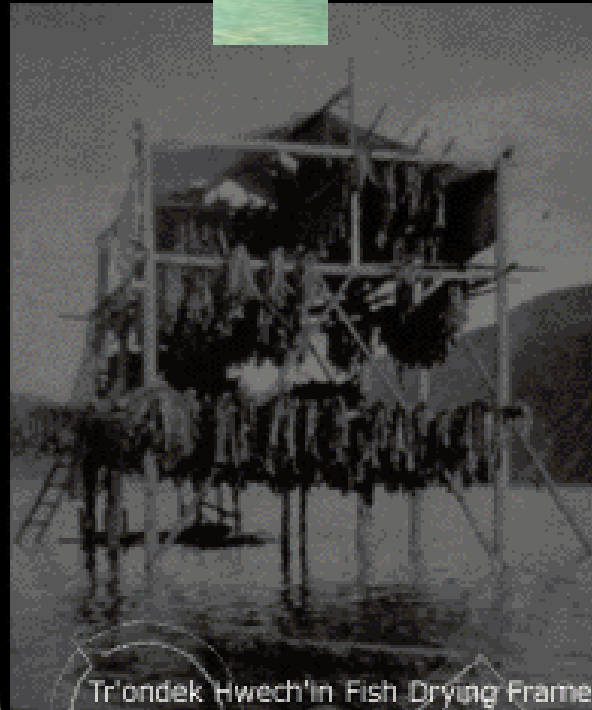


Advanced marine-based societies in Japan for over 50,000 years



Ainu: Salmon Shoes

Tr'ondek Hwech'in, Dawson City, Yukon

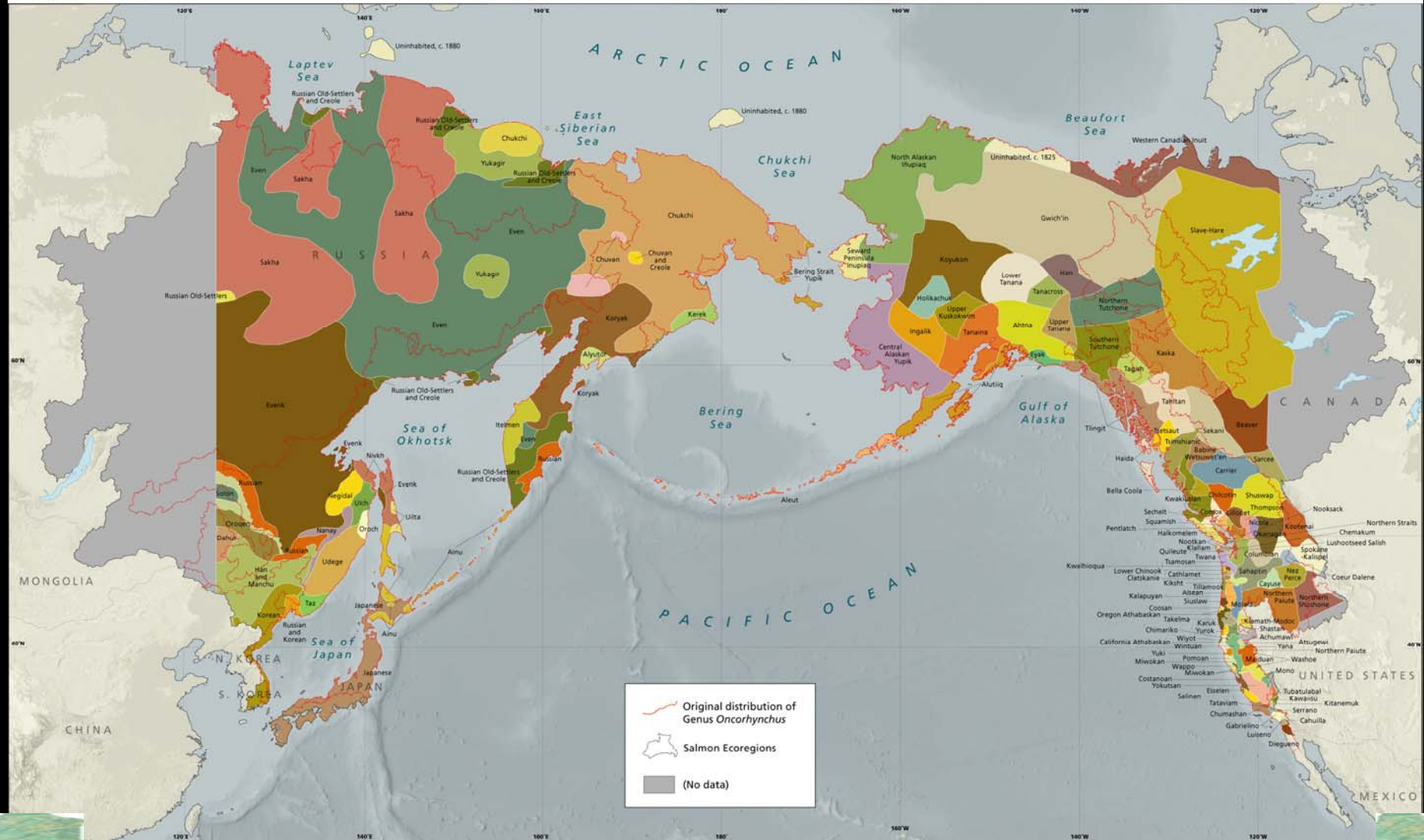


Tr'ondek Hwech'in Fish Drying Frame



Indigenous Peoples of the North Pacific, c.1880

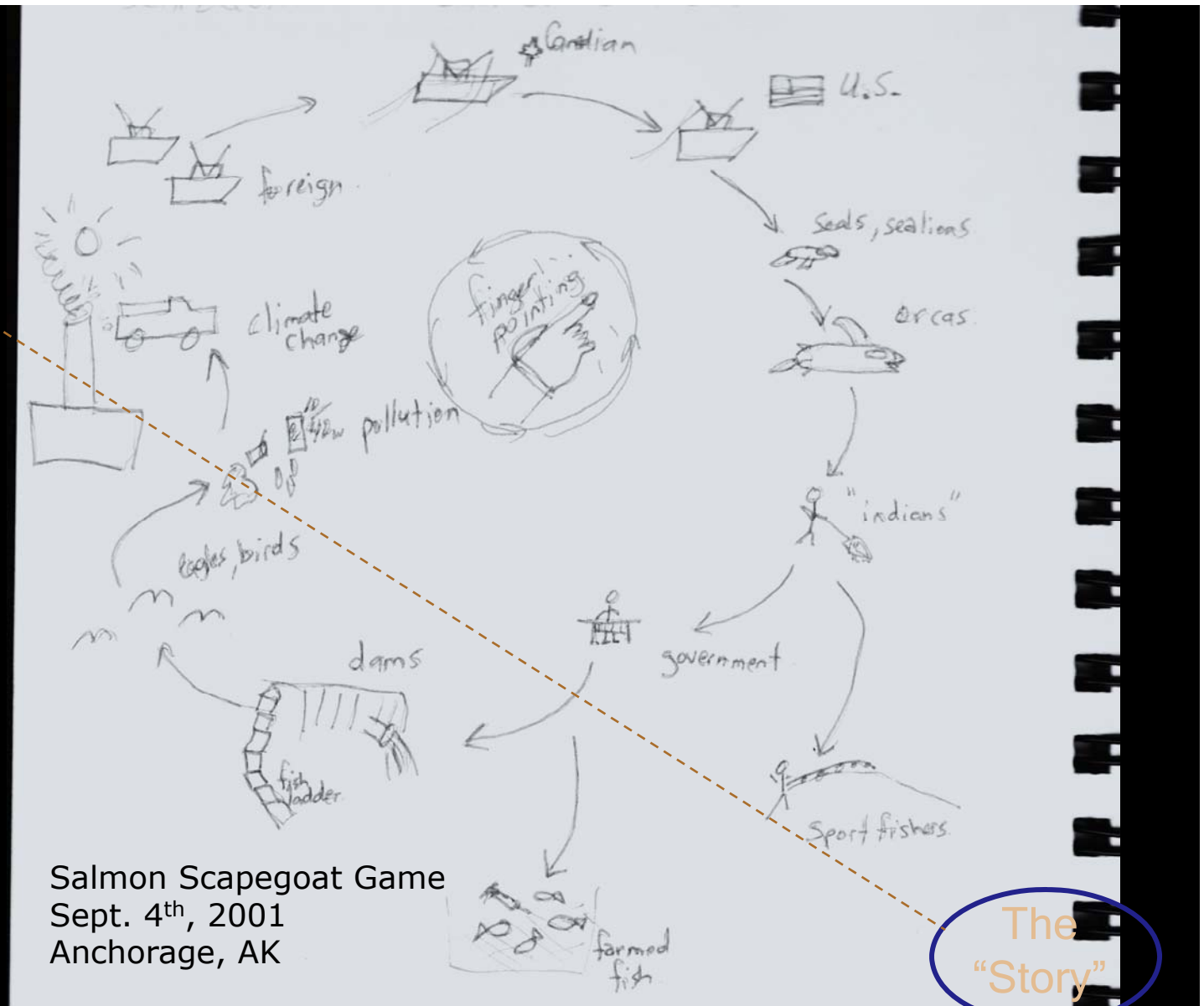
© 2005 State of the Salmon, a
of Wild Salmon Center and Ecotrust



Incredible diversity...language groups

The
“Issues”

The
“Science”



“The argument is circular: everybody blames somebody, and nobody perceives the scene’s underlying absurdity”



Growing up
Haida Gwaii

Logging
impacts



Solution?

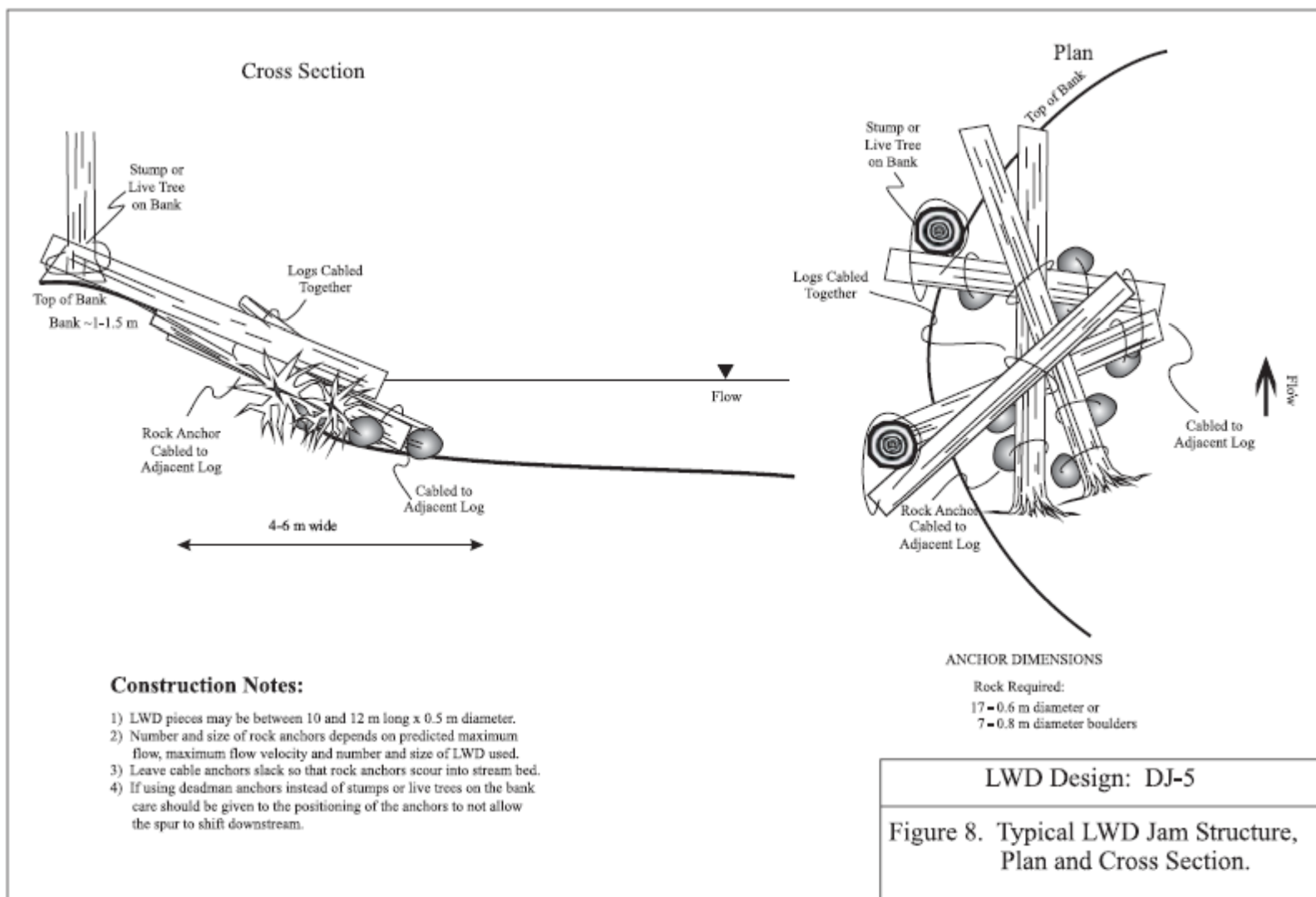
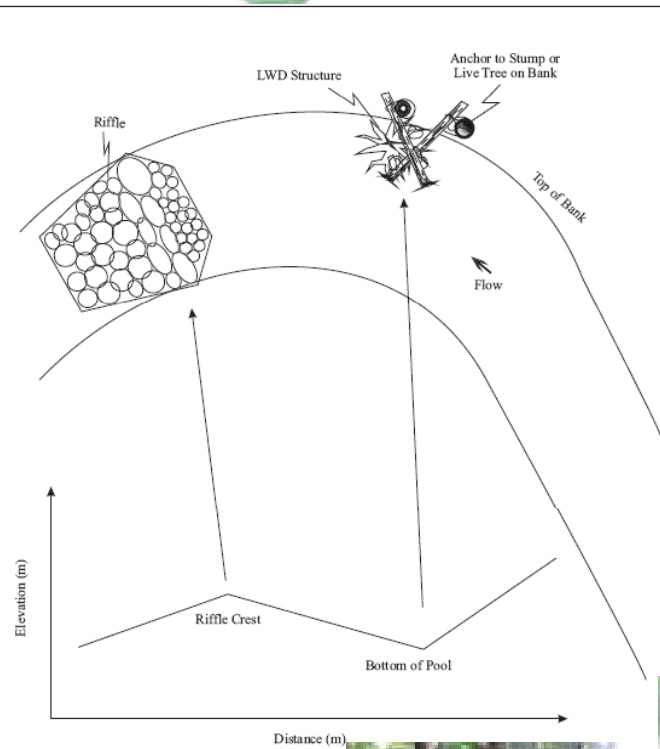


Figure 8. Typical LWD Jam Structure, Plan and Cross Section.



Fig

No-Net-Loss to Habitat?

Mitigation?

Restoration?

Reclamation?



Pretty tough to “restore” these...



Lynn Valley, Vancouver



Cowichan River, BC



Pretty tough to “restore” this:



Jiinanga,
Haida Gwaii
Old growth, unlogged

And this:



~90 lb Chinook, Sacramento River, CA

In the last three decades ... roughly \$850 million has been spent on habitat restoration in the Columbia River basin alone.

One group of researchers pegged the total cost of river restoration projects nationwide at more than \$1 billion — annually.

...it became apparent that scarcely 10 percent
indicated any monitoring at all...

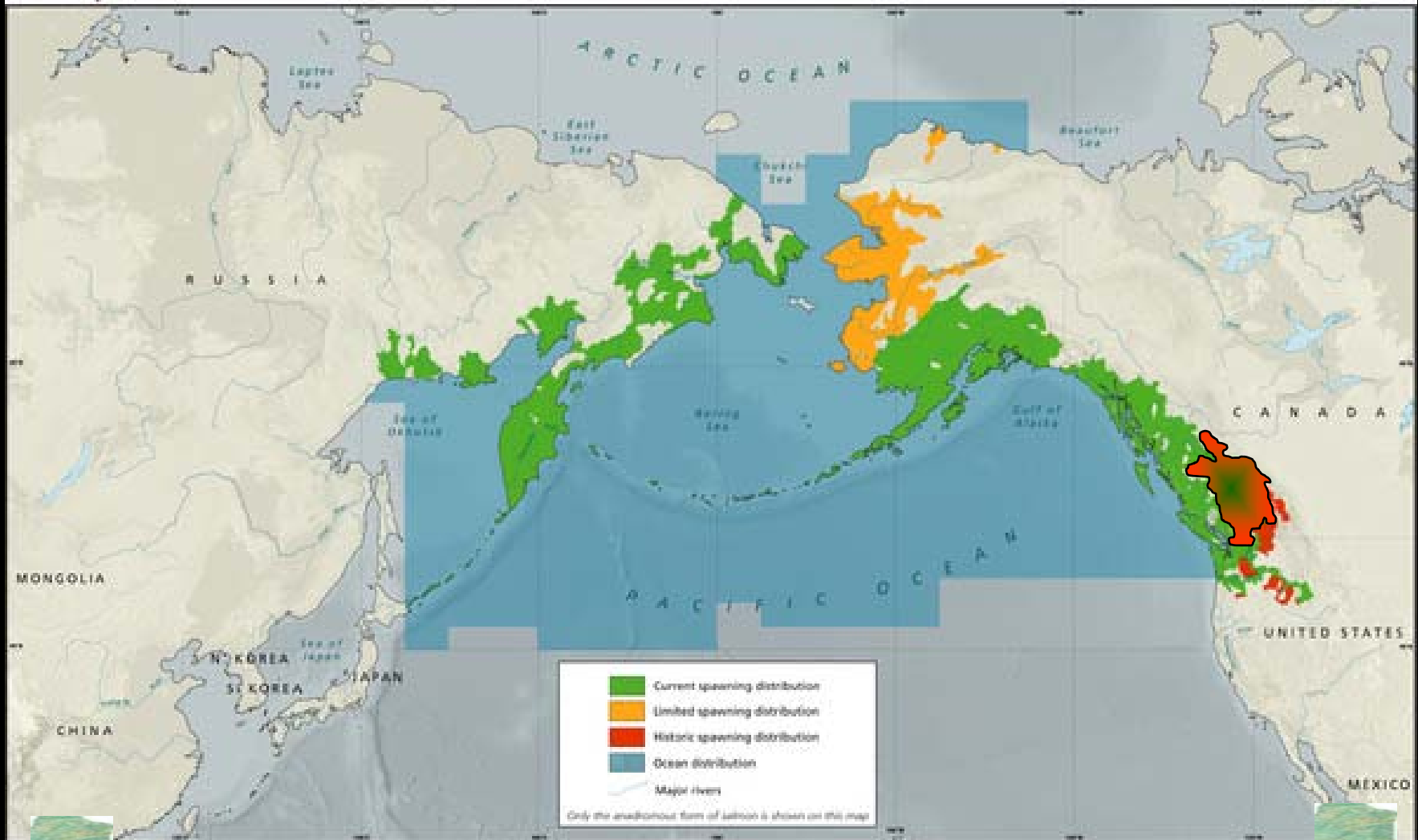
-- "Tracking the Results of Salmon Habitat Restoration"
<http://www.usnews.com/science/articles/2009/04/13/>

Preservation is cheaper than repair...

Bringing the story closer to home...

Sockeye Distribution

© 2005 State of the Salmon, a joint program of Wild Salmon Center and Econrust



The
"Science"

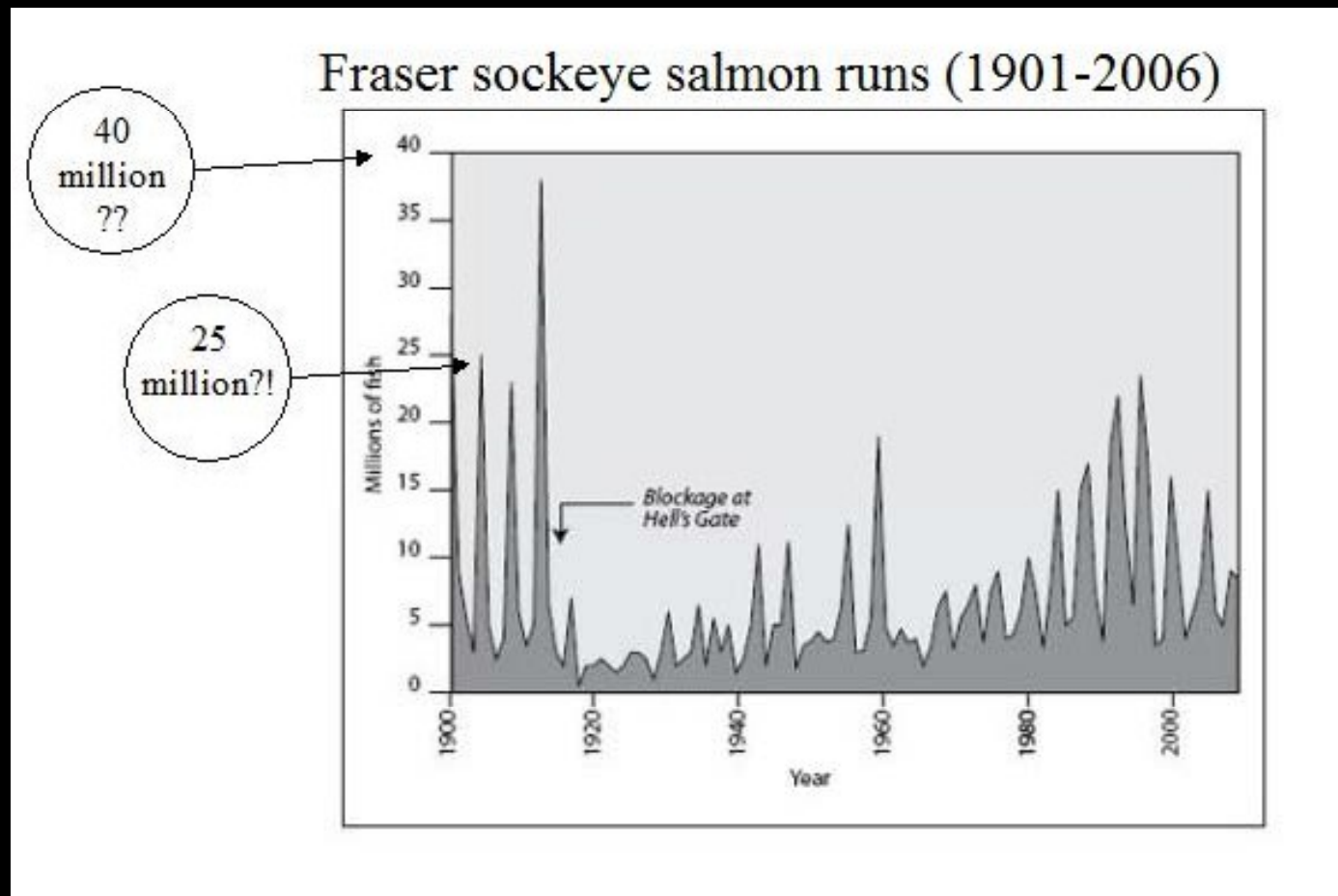
The
"Story"

Fraser

The
"Issues"



First things first...



Mekong Water Commission; Cohen Commission; Pacific Salmon Commission

2-3 EDWARD VII.

SESSIONAL PAPER No. 22

3170

A. 1903

THIRTY-FIFTH ANNUAL REPORT

OF THE

DEPARTMENT OF MARINE AND FISHERIES

1902

FISHERIES

PRINTED BY ORDER OF PARLIAMENT



W

OTTAWA

PRINTED BY S. R. DAWSON, PRINTER TO THE KING'S MOST
EXCELLENT MAJESTY
1903

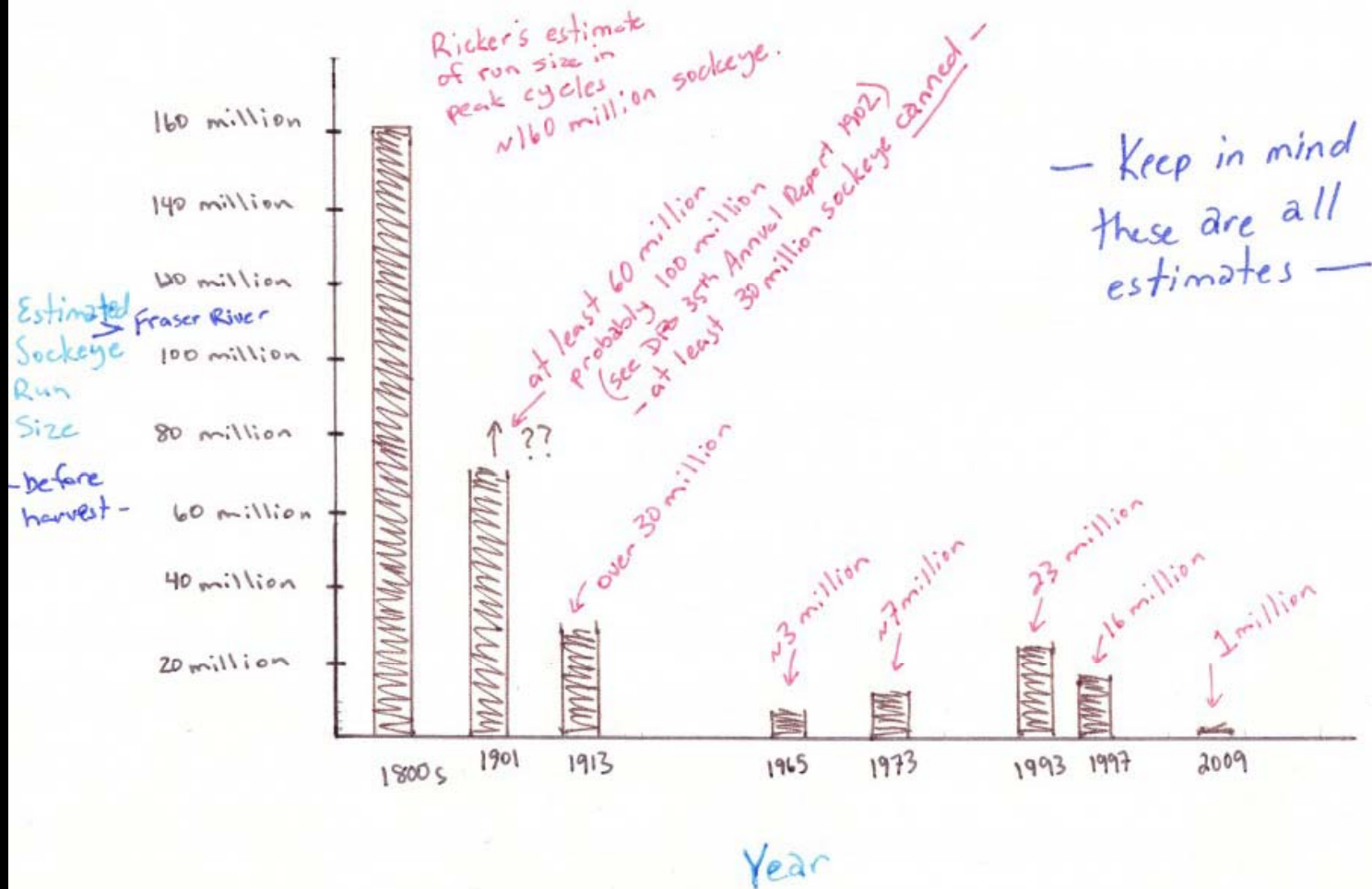
[No. 22—1903]

“This year's pack has been the largest known in the province ... 1,154,717 cases were sockeye salmon exceeding the total pack of 1897 of all kinds of salmon.”

“[In 1902] 1,154,717 cases were sockeye salmon exceeding the total pack of 1897 of all kinds of salmon.”

“Large as this amount is, representing 30,000,000 fish it could have been largely increased, possibly doubled had the canneries had capacity enough to have handled all the fish available during the run.

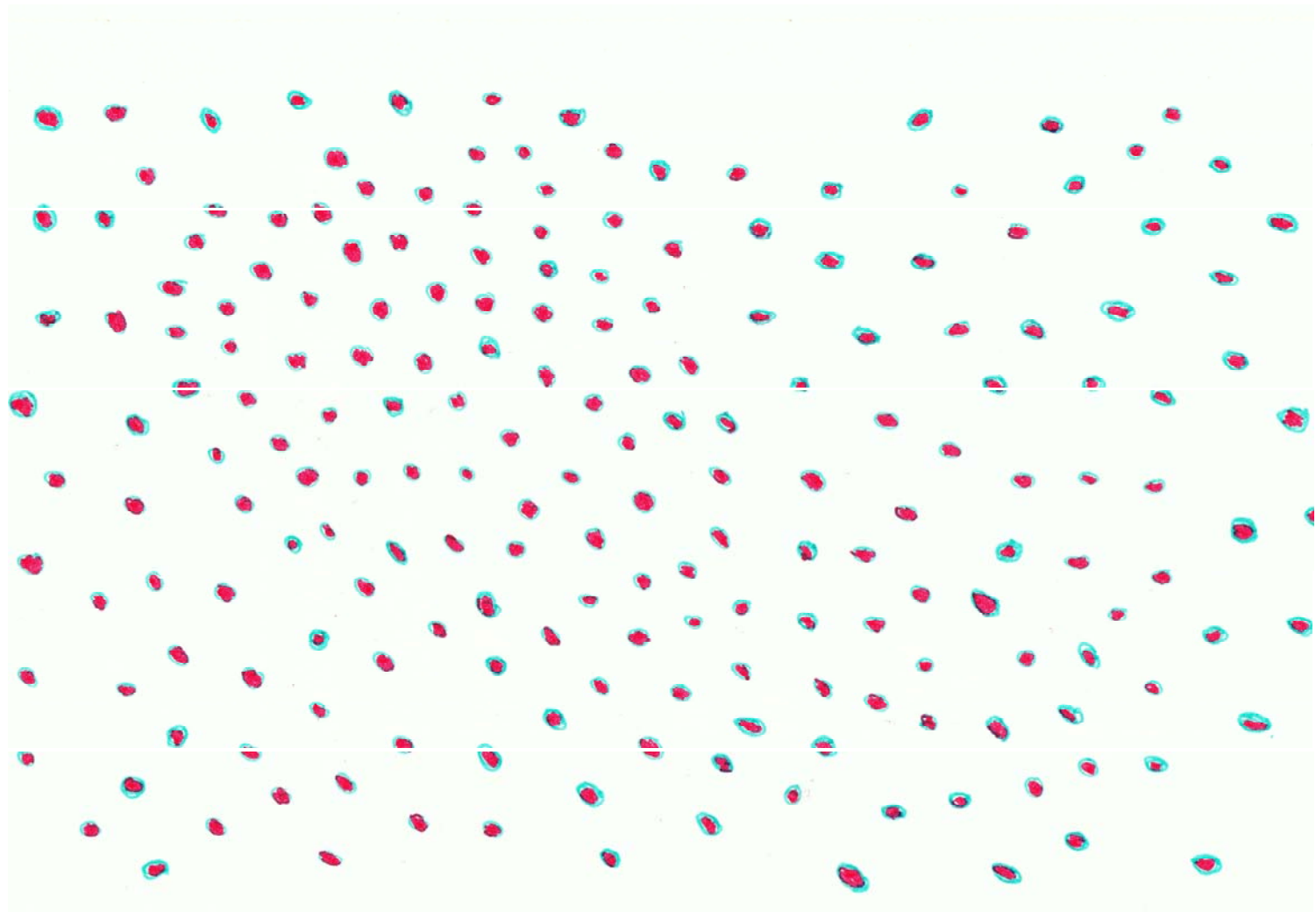
On Fraser river, the canneries placed 200 as the maximum number of fish they could guarantee to take from each boat and for 12 days...this limit was enforced”



200

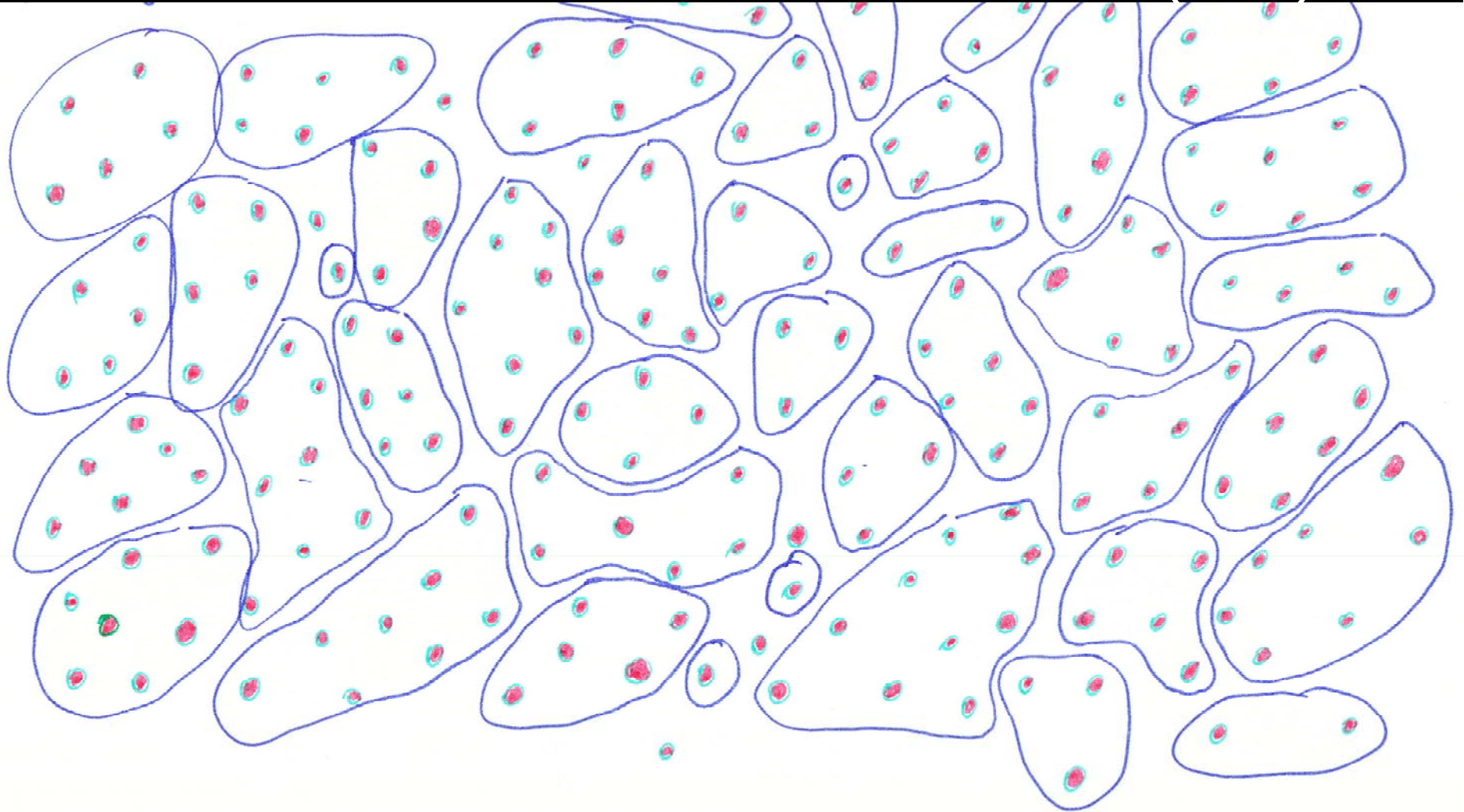
unique & distinct
sockeye stocks





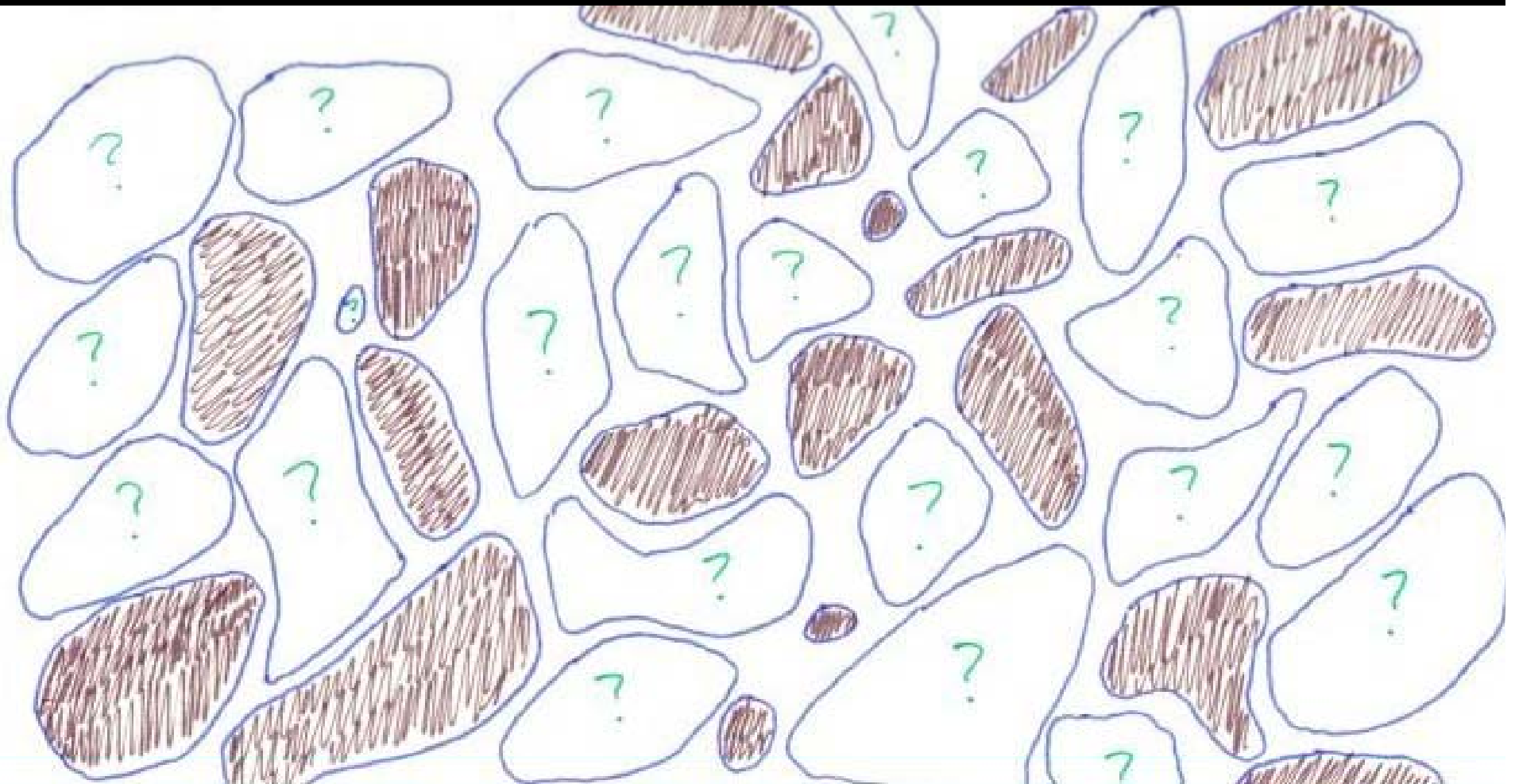
Canada's "*Wild Salmon Policy*":

200 Stocks
divided into 35-40 Conservation Units (CUs)



Some individual stocks forgotten...

only enough information from last fifty yrs to track:
19 Stocks/CUs



Data on many stocks, spotty at best... fifty yrs = ~ 12 to 14 life cycles (Not a big data set)

DFO Fraser River Spawning Sockeye Initiative (FRSSI):

2010_FraserSockeyeEscapementMem

Table 2. Fraser River Sockeye

413 different streams

ID	Stock	Smallest	Lower Quarter	Escapement
2 CUs → 1	E. Stuart	1,522	21,044	
1 CU → 4	Bowron	916	2,560	
? → 14	Fennell	<100	1,681	
1 CU → 16	Gates	<100	2,582	
1 CU → 17	Nadina	1,723	3,666	
1 CU → 18	Pitt	3,560	13,412	
1 CU → 5	Raft	464	2,714	
1 CU → 15	Scotch	107	2,156	
1 CU → 8	Seymour	1,237	5,709	
	total	7,091	31,920	
1 CU → 7	Chilko	17,308	120,104	30
1 CU → 2	Late Stuart	15,763	42,099	8
1 CU → 6	Quesnel	<100	392	
1 CU → 3	Stellako	<100	6,315	
	total	33,071	168,910	42
1 CU → 10	Birkenhead	11,905	30,656	4
1 CU → 11	Cultus*	<100	1,227	
1 CU → 19	Harrison	313	4,239	
1 CU → 12	Portage	<100	1,105	
1 CU → 13	Weaver	2,756	25,442	
1 CU → 9	L. Shuswap	164	3,606	
	total	3,233	34,391	

Early Summer

Summer

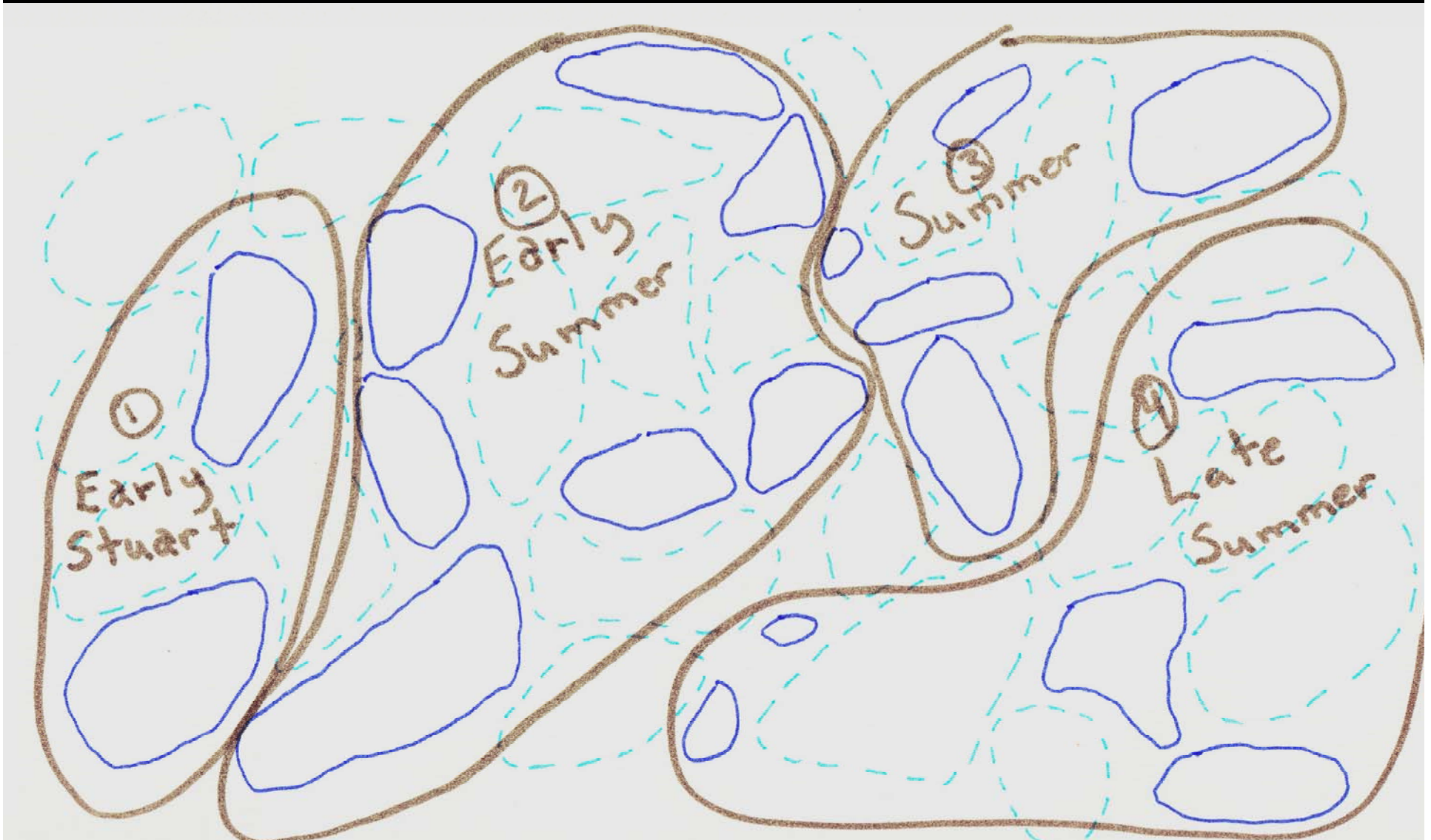
Late Summer

19 stocks tracked
don't necessarily
match up with CUs...

The Early Stuart complex:
Over 40 separate
spawning streams
listed as:

2 Conservation Units (??)

CUs and Stocks aggregated into 4 Groups for “management purposes”



Small stocks, endangered stocks... largely forgotten... managed to extinction (eg. Bowron)

Would you invest in a mutual fund run this way?

- 200 individual stocks
- 35-45 common units
- 4 “Groups” for “management purposes”
- “in-season” mngmt based on 4 Groups

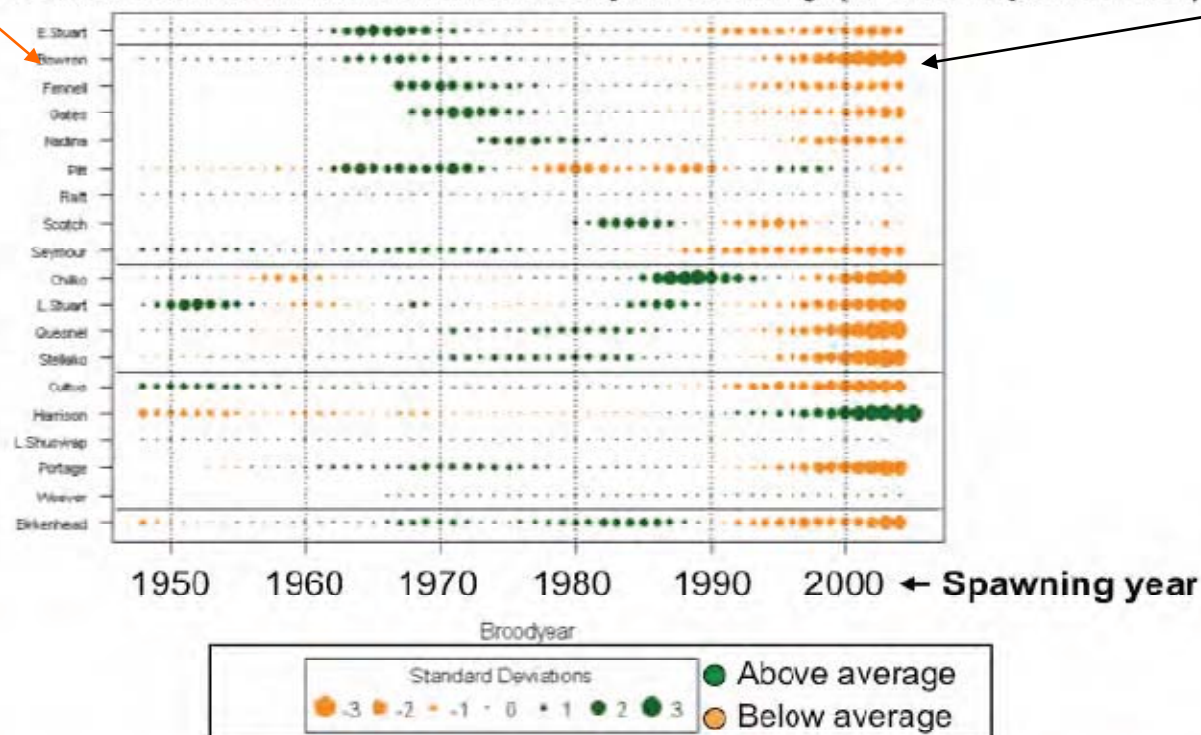
Silver lining...?!

Bowron

--SFU 2010 Summit on Fraser Sockeye

Productivity of Fraser River sockeye stocks

Smoothed Kalman filter estimates of productivity (Ricker a parameter)



Method used is from Dorner et al. (2008) CJFAS 65:1842

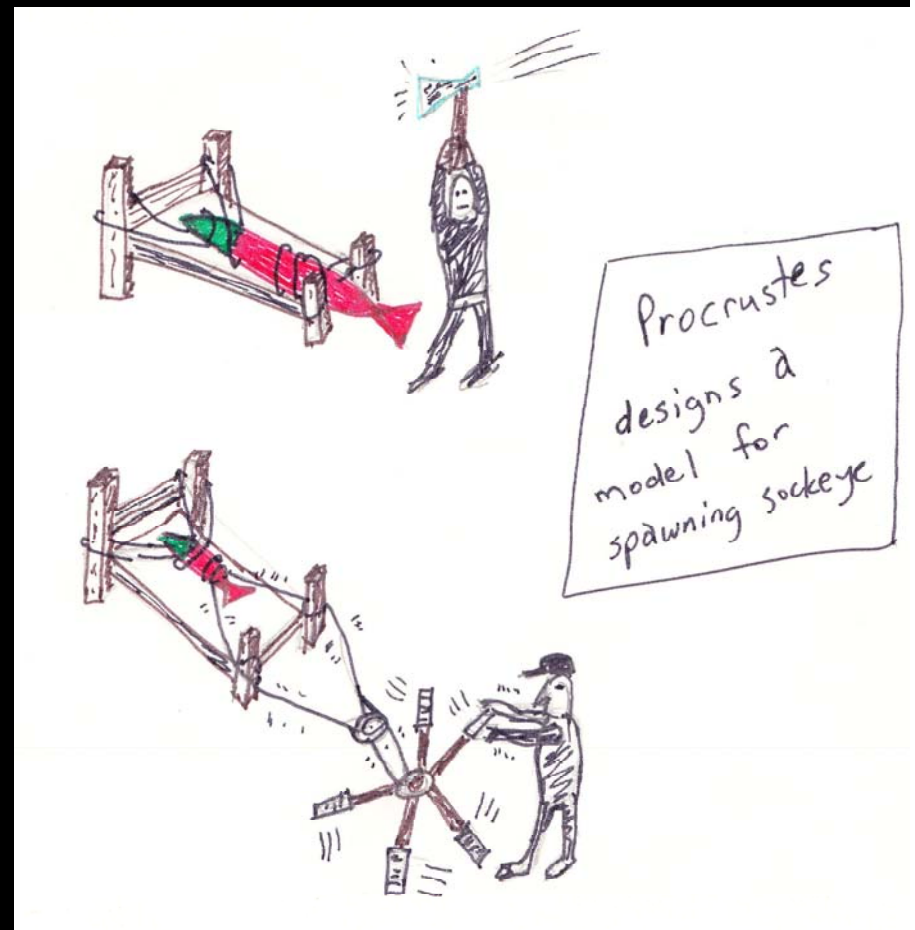
(Catherine Michielsens)

Figure 10. Productivity of Fraser River sockeye stocks; figure courtesy of Catherine Michielsens at the Pacific Salmon Commission.

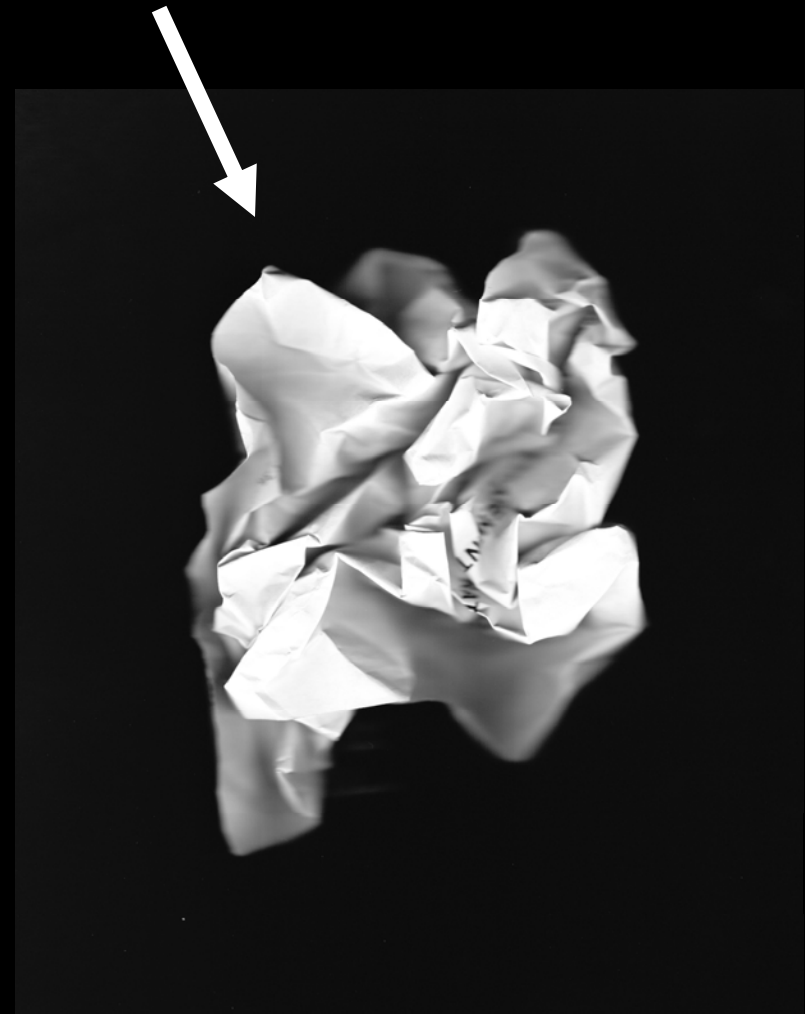
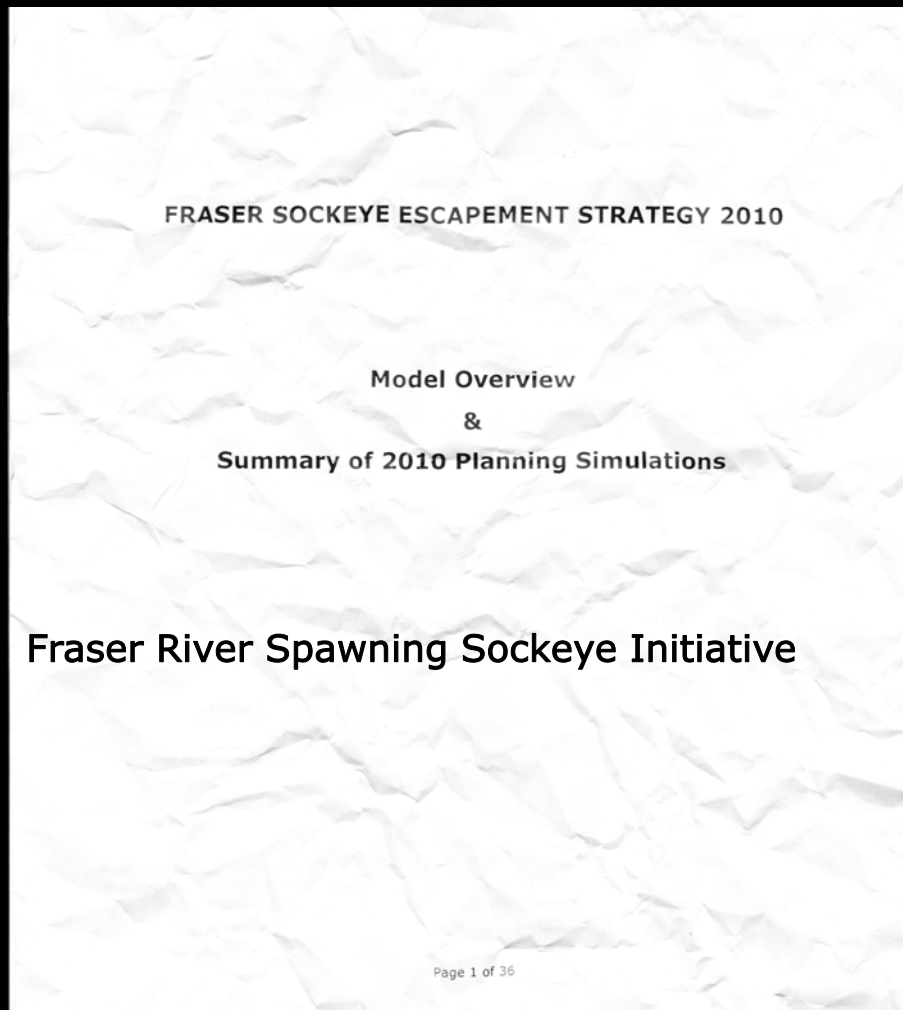
Models...



<www.salmonguy.org>



F.R.S.S.I. – DFO Pilot Study (?)



Ecosystem Based Management ?

Best we have right now:

Management Adjustment (MA)

...based on Fraser River flows and temperatures...

Sadly...



A photograph of two salmon on a rocky riverbank. One salmon is lying on its side, facing left, with its mouth open. The other salmon is standing upright, facing right, with its mouth open. The background shows a rocky riverbank with some green moss and a small stream of water.

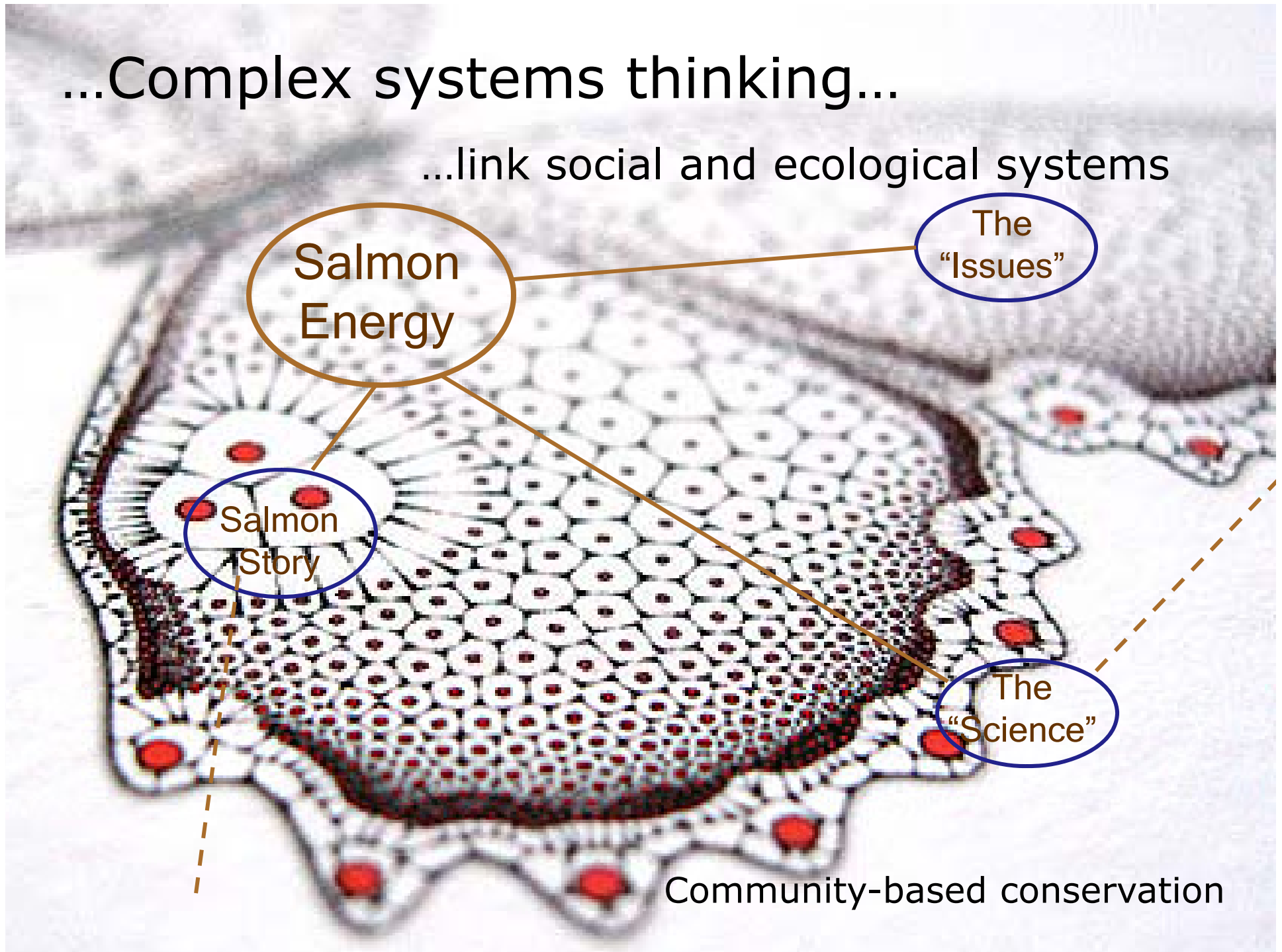
Securing
the future?

Improvements?

Sustainability?

...Complex systems thinking...

...link social and ecological systems



Laws of Thermodynamics:

First Law of Thermodynamics: Conservation.

Energy cannot be created or destroyed; it can only be changed from one form to another.

Second Law of Thermodynamics: Entropy.

In all energy exchanges, if no energy enters or leaves the system, the potential energy of the state will always be less than that of the initial state... entropy.

Salmon are Energy



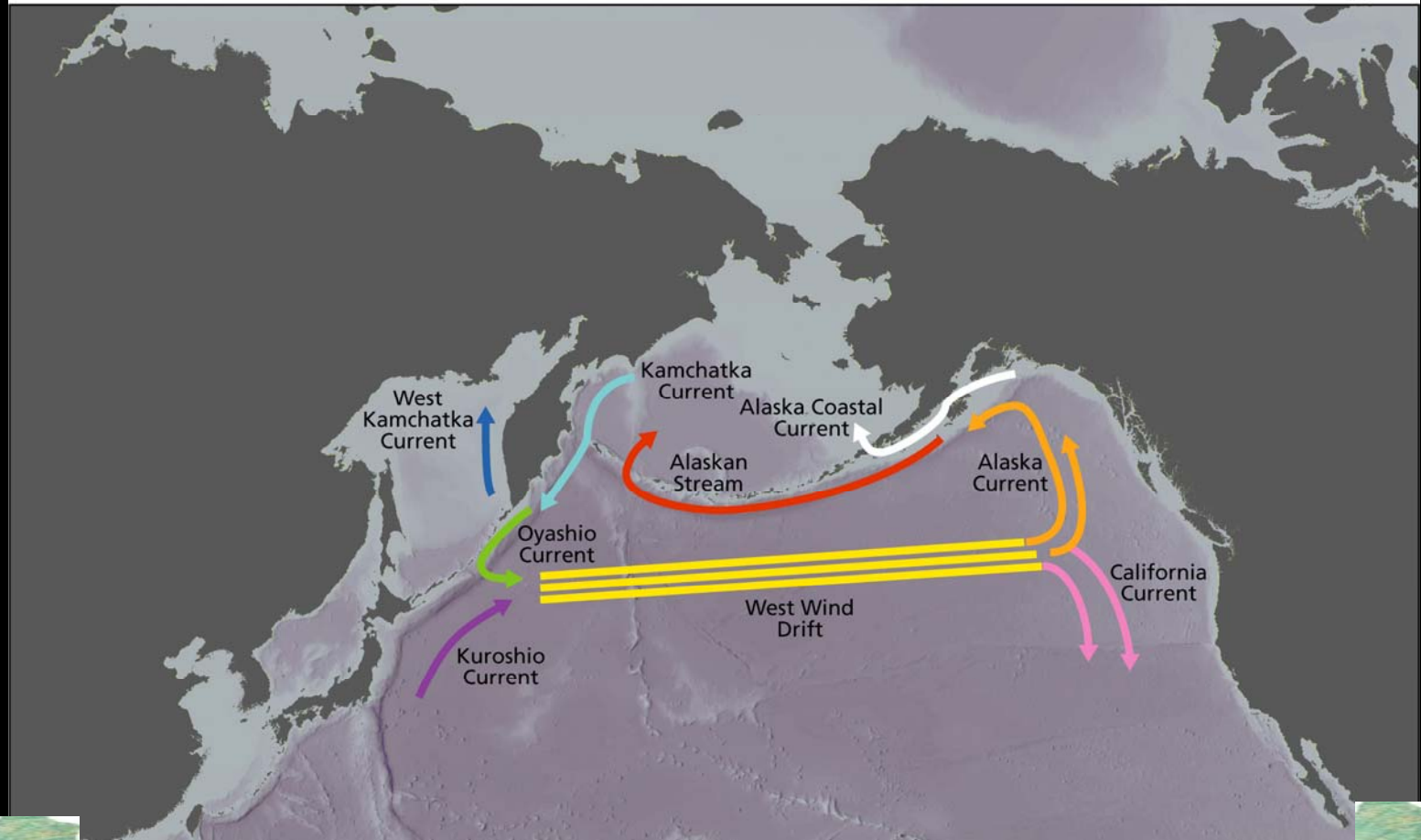
The question is conservation or entropy?

And who should consume and remove the energy?

Out to the North Pacific...

Ocean Currents of the North Pacific

© 2005 State of the Salmon, a joint program
of Wild Salmon Center and Ecotrust



...home to spawn and die



We can trace it through isotopes of Nitrogen (N) and Carbon (C)

N_{15} and C_{13}

-- which only come from the ocean --



Please see work of Reimchen, Bilby, Cederholm, and more...

137 species rely on Pacific salmon

Pacific salmon do a strange thing. After they spawn, they die.

In evolutionary terms, it seems counterproductive. Wouldn't it be better if each fish lived to rear its young, and perhaps even get a second shot at spawning?

It turns out that Pacific Salmon, in their own way, are providing for their offspring. When salmon swim upstream, they are returning to the waters where they themselves hatched years before — their bodies plump with eggs as well as the bounty of the seas.

After spawning, they leave their nutrient-rich carcasses behind. Many of the tiny creatures that nibble on the carcasses eventually become prey for the next generation of fish. And so the parents nourish the young.

But salmon provide more than an indirect food source for baby salmon. At least 137 different species — from grizzly bears to gray wolves — depend on salmon for part of their diet. Even trees and plants benefit from the nutrients brought back by salmon from the seas.

It is awe-inspiring when you think about it. This mighty fish struggles up stream, jumping waterfalls, and its last act is sacrificing its body to ensure that the community that will raise its children will be thriving, teeming with life.

Which begs the question, what are we doing for our community, for the next generation?

Imagine what could be accomplished if we devoted our energies to the future the way that salmon do. Imagine if you will, a Nation of such salmon-people, leaping great obstacles to make a better place for their offspring and their ecosystem.



Isn't it time you put
your carcass to work?

Thurloggen Duck • Osprey • Bald Eagle • Cassin Tern • Black Bear • Grizzly Bear
• Northern River Otter • Steller Whale • Cape's Giant Salamander • Pacific Giant
Salamander • Pacific Coast Aquatic Garter Snake • Red-throated Loon • Pink-billed Grebe
• Clark's Grebe • American White Pelican • Brandt's Cormorant • Double-crested Cormorant
• Pelagic Cormorant • Great Blue Heron • Black-crowned Night-heron • Turkey Vulture • California
Condor • Common Merganser • Red-breasted Merganser • Golden Eagle • Bonaparte's Gull • Heermann's
Gull • Ring-billed Gull • California Gull • Herring Gull • Thayer's Gull • Western Gull • Glaucous-winged Gull
• Glossy Ibis • Common Tern • Arctic Tern • Forster's Tern • Elegant Tern • Common Murre • Murrelet
• Black-billed Murrelet • Rhinoceros Auklet • Tufted Puffin • Red-tailed Tropicbird • American Osprey • Steller's Jay • Black-
billed Magpie • American Crow • Northwestern Crow • Common Raven • Virginia Opossum • Winter Wren • Coyote
• Gray Wolf • Raccoon • Mink • Bobcat • Northern Fur Seal • Northern Seal • San Juan • California Sea Lion • Harbor Seal
• Pacific White-sided Dolphin • Gyrfalcon • Peregrine Falcon • Killdeer • Spotted Sandpiper • Snowy Owl • Willow Ptarmigan
• Tree Toad • Wood Frog • Western Terrestrial Garter Snake • Common Garter Snake • Pacific Loon • Common Loon • Yellow-billed Loon • Horned Grebe • Red-necked Grebe • Western Grebe • Sooty
Shearwater • Brown Pelican • Great Egret • Snowy Egret • Green Heron • Trumpeter Swan • Baldpate • Green-winged Teal • Canvasback • Greater Scaup • Scaup • White-winged Scoter
• Common Goldeneye • Barrow's Goldeneye • Hooded Merganser • Red-tailed Hawk • Great Horned Owl • Yellowlegs • Franklin's Gull • Blue Gull • Black-legged Kittiwake • Pigeon Guillemot • Ancient
Murrelet • Gray Jay • Winter Wren • American Robin • Varied Thrush • Spotted Towhee • Song Sparrow • Meadow Lark • Vagrant Shrew • Woodhouse Shrew • Fog Shrew • Pacific Shrew
• Pacific Water Shrew • Townsend's Shrew • Douglas's Squirrel • Northern Flying Squirrel • Deer Mouse • Red Fox • Gray Fox • Ringtail • American Marten • Fisher • Long-tailed Weasel
• Wolverine • Striped Skunk • Blackfoot Loon • White-tailed Eagle • Minke Whale • Sperm Whale • Humpback Whale • Northern Right Whale Dolphin

Source: Cederholm, C.J., et al. 2005. Pacific Salmon and 137 Species. Biological Services, Seattle, WA.
and Washington Wetlands Program. Species Status Technical Report, prepared for D. E. Johnson and T.
A. White. Washington Department of Fish and Wildlife, Olympia, Washington.

SALMON NATION

Isn't it time you put
your carcass to work?



Fishing Branch River, Yukon

...increased grizzly bear predation on Porcupine Caribou herd...

...coincidence that chum salmon run on Fishing Branch River had collapsed?

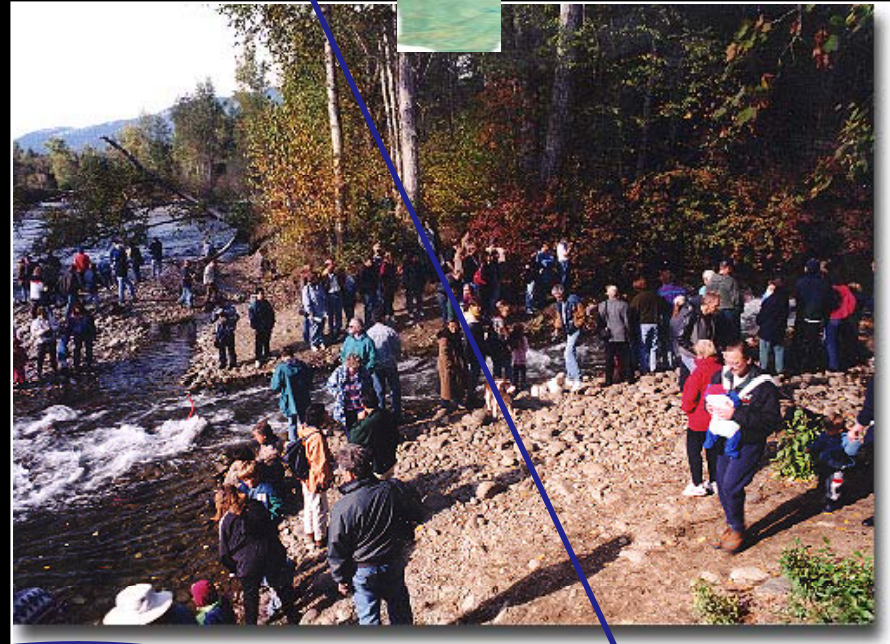


Far, far, far too complex

Modeling and computer simulations
are not the answer...

Citizen Participation ?

Gumboot
Army




In B.C. the Army is
100,000+

Local, Community
& Traditional
Knowledge



"George Farrell of the Hecate Strait
Streamkeepers explains stream
dynamics to school kids."



DANGER HOT WATER

Technical Information Overflow

Has become dominated
by researchers and
Scientists and
Bumpf

&

multiple 100s of pages
documents...

Most asking to do
...More research...

More \$\$
More Bumpf

Precedent?

Justice Thomas Berger
Mackenzie Valley Pipeline
Royal Commission
1970s

...35 Arctic communities over two years...
Recommends a ten-year moratorium
on development.

...until land claims-treaties settled...
& First Nations people could
participate effectively in process.

How different the ensuing conversation would sound if we eliminated the blame game by admitting culpability.

Debate could begin not with accusations and recriminations but with suggestions of how each group could admit their impact on salmon and salmon habitat, and the tired shibboleth of “sustained growth” would evaporate of its airy hypocrisy.

How different the solutions would look if we agreed to eschew technological panaceas.

*Making Salmon: An environmental
history of the Northwest fisheries
Crisis* (1999) -- Joseph E. Taylor III

Turn more to the folks
with their hands in the rivers
feets in the creeks.

Wealth of knowledge in communities...

[Precautionary approach]

+

[Preservation is cheaper than repair]

=

Much different approach
More community involvement
Truly “ecosystem”-based



Thanks for looking in...

www.salmonguy.org