Not The Evergreen State

Why most of What We Know about the Landscape of the Salish Sea Is Wrong

Presentation for the

South Sound Chapter
Washington Native Plant Society

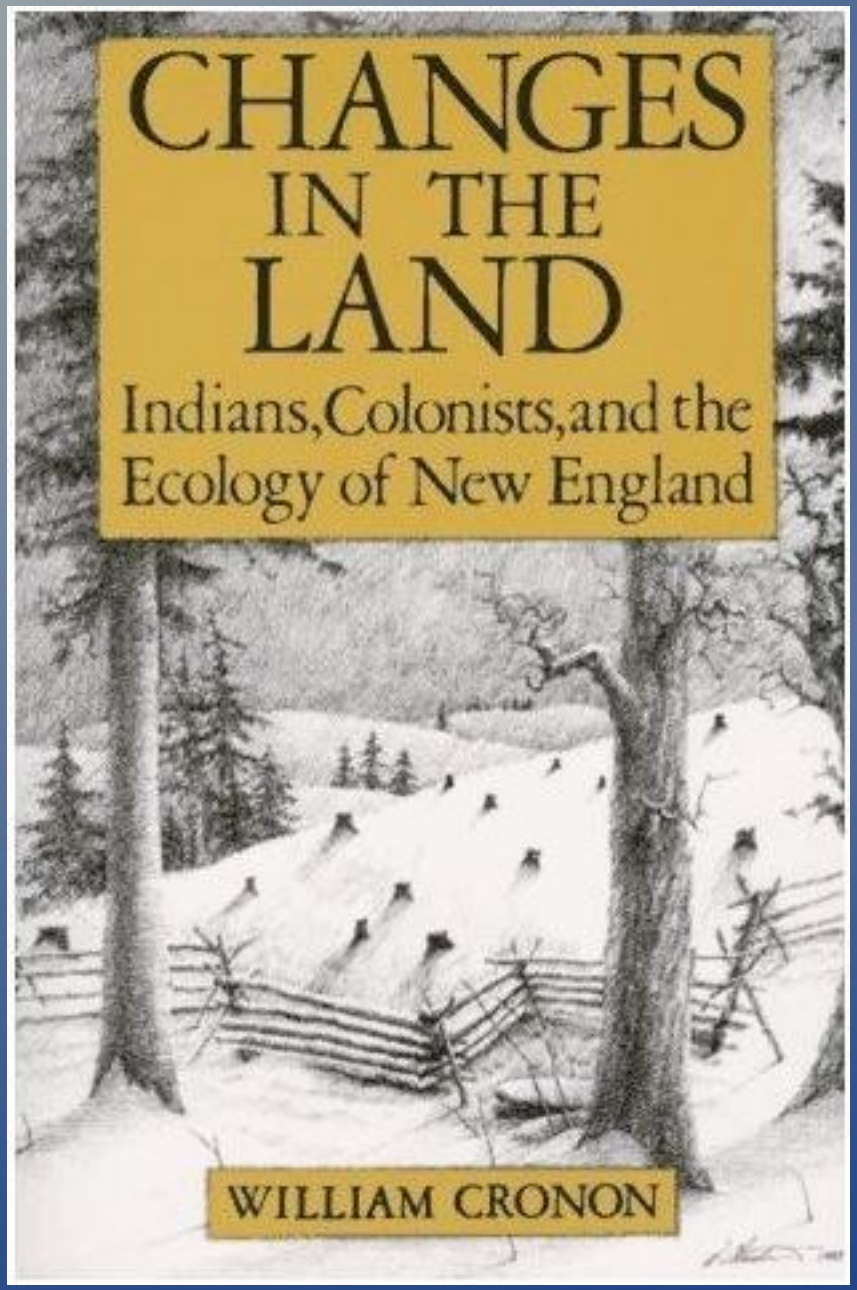
Michael Kucher

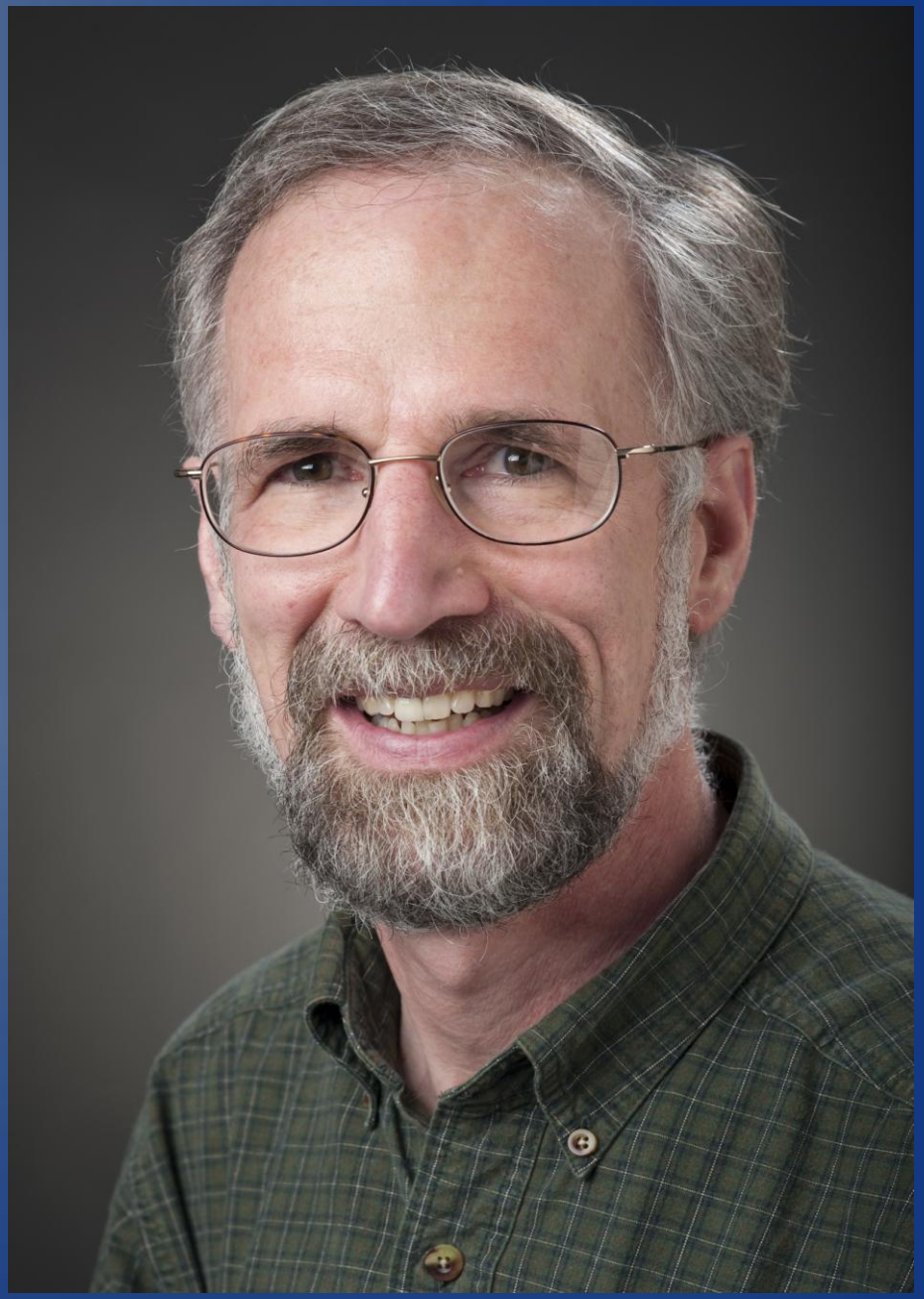
University of Washington, Tacoma

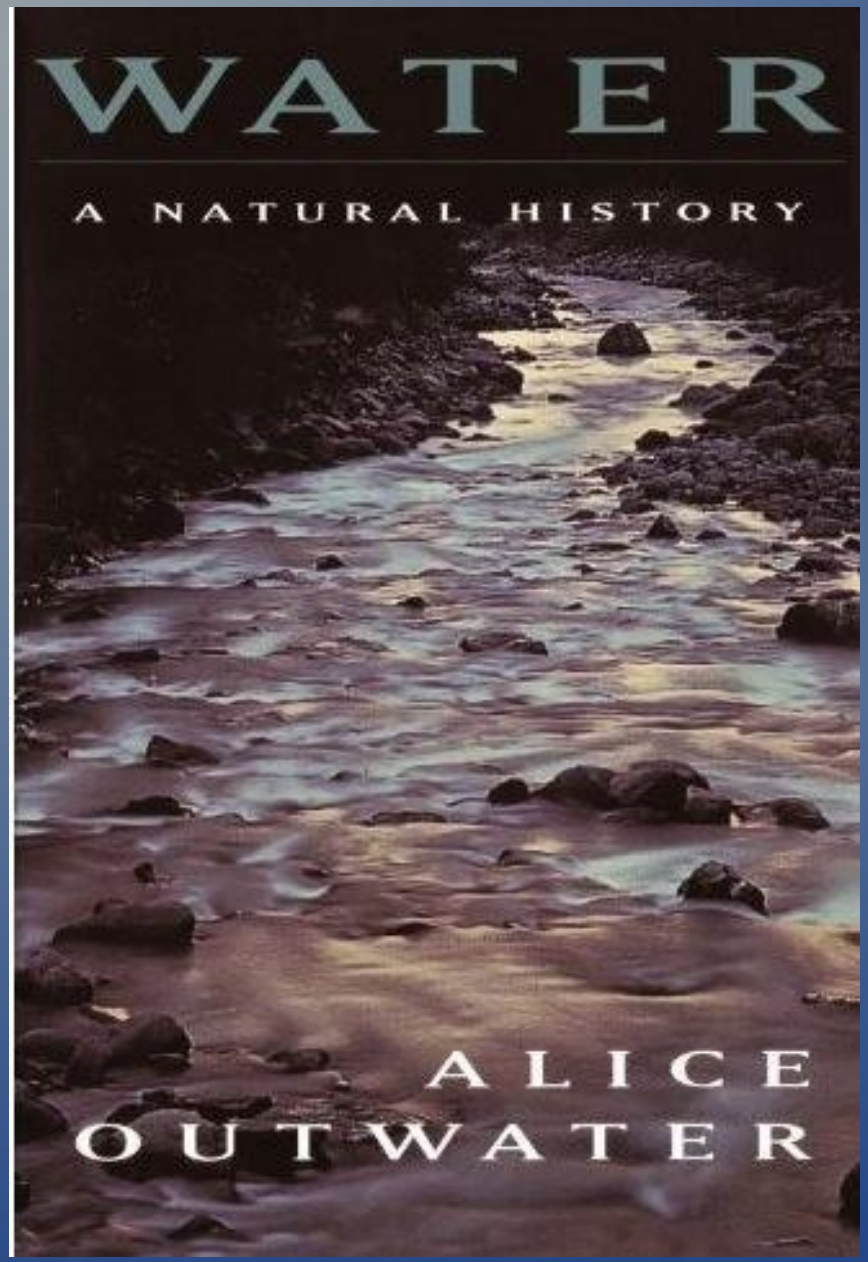
12 October 2011

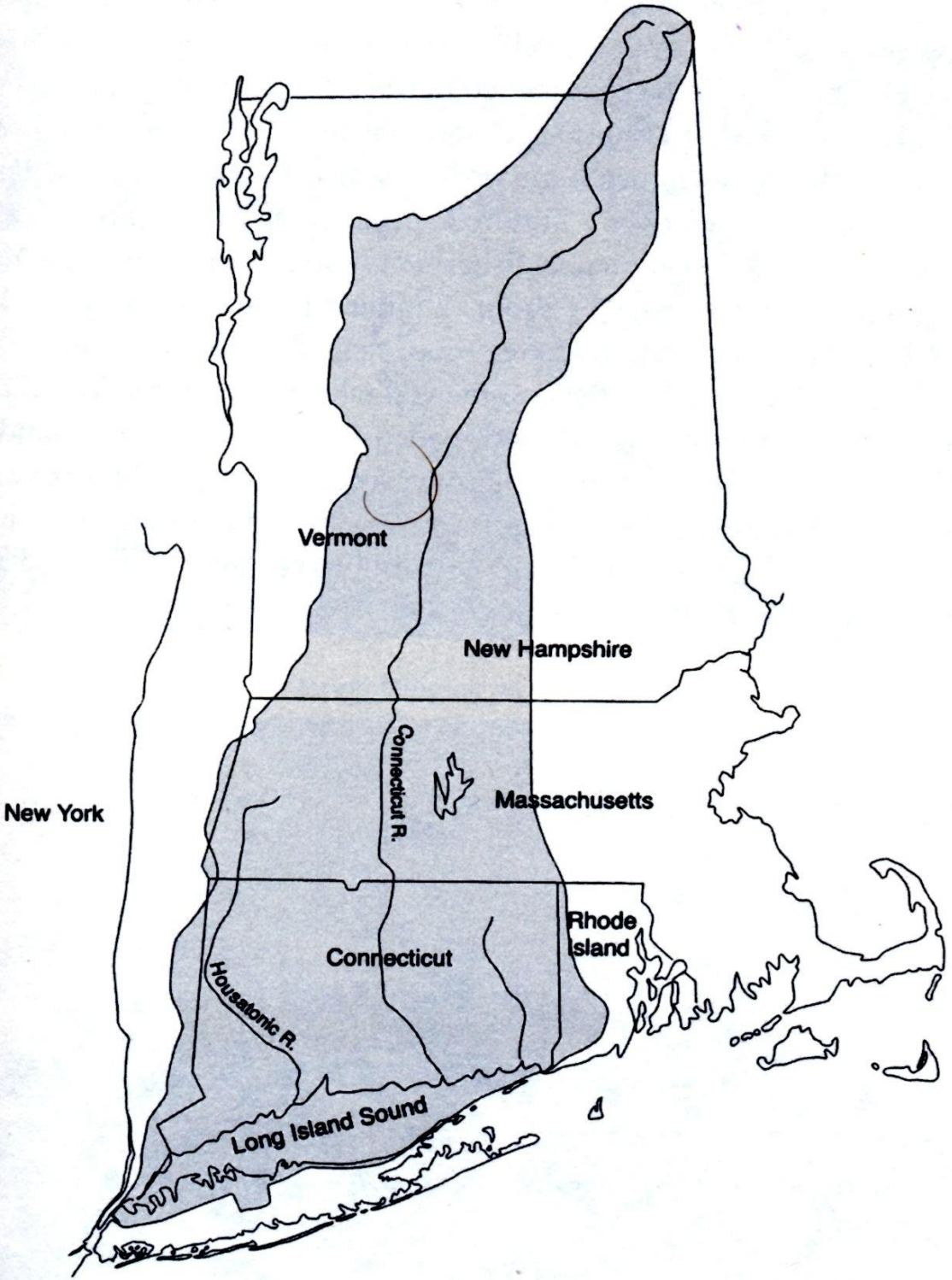
Oregon Country / Columbia District 1818-1846
Alaska (Russia)
54° 40' - extreme U.S. claim
Ft. Simpson
Ft. St. James
Ft. Alexandria
Ft. McLoughlin
Fraser
York Factory Express
Continental Divide
Rupert's Land (British)
Ft. Rupert
Ft. Thompson
Thompson
Columbia
49°
49°
Ft. Langley
Ft. Victoria
Ft. Colville
Ft. Okanogan
United States
Ft. Nisqually
Ft. Nez Perce
Astoria
Ft. Vancouver
Oregon City
Willamette
Ft. Umpqua
Snake
Ft. Hall
Oregon Trail
42° - extreme British claim
Mexico

The Salish Sea
& Surrounding Basin
The Salish Sea extends from the north end of the Strait of Georgia to the south end of the Puget Sound and west to the mouth of the Strait of Juan de Fuca
Mt. Waddington
Monmouth Mountain
Desolation Sound
Basin Boundary
N. Gulf Islands
Strait of Georgia
Vancouver Island
Fraser River
S. Gulf Islands
Mt. Baker
Skagit River
San Juan Islands
Cape Flattery
Strait of Juan de Fuca
Glacier Peak
Puget Sound
Pacific Ocean
Olympic Peninsula
Hood Canal
Mt. Rainier
N
0 50 100 km.
0 50 mi.
Data Sources:
SRTM (CGIAR-CSI), NOAA, Wa. DFW, Wa. DNR, BC Digital Atlas, ESRI
stefan freelan · 2009
http://staf.www.edu/ee/faculty/SalishSea.htm


CHANGES
IN THE
LAND
Indians, Colonists, and the
Ecology of New England
WILLIAM CRONON




WATER
A NATURAL HISTORY
ALICE
OUTWATER



Long Island Sound and Its Watershed

Anecdotes and the shifting baseline syndrome of fisheries

Fisheries have recently become a topic for media with global audiences – but then again, fisheries are a global disaster: one of the few that affect, in very similar fashion, developed countries with well-established administrative and scientific infrastructure, newly industrialized countries, and developing countries.

This is quickly summarized:

- Heavily subsidized fleets, exceeding by a factor of 2 or 3 the numbers required to harvest nominal annual catches of about 90 million tonnes.
- Staggering levels of discarded bycatch, representing about one third of the nominal catch, a large unrecorded catch that perhaps raises the true global catch to about 150 million tonnes per year, well past most previous estimates of global potential.
- The collapse, depletion or recovery from previous depletion of the overwhelming majority of the over 260 fish stocks that are monitored by the Food and Agriculture Organization of the United Nations.

Fisheries science has responded as well as it could to the challenge this poses by developing methods for estimating targets for management – earlier the fabled Maximum Sustainable Yield (MSY)[1], now annual total allowable catch (TAC) or individual transferable quotas (ITQ). If these methods are to remain effective, fisheries scientists need to follow closely the behavior of fishers and fleets, but this has tended increasingly to separate us from the biologists studying marine or freshwater organisms and/or communities, and to factor out ecological and evolutionary considerations from our models. There are obviously exceptions to this, but I believe the rule generally applies, and it can be illustrated by our lack of an explicit model accounting for what may be called the 'shifting baseline syndrome'. Essentially, this syndrome has arisen because each generation of fisheries scientists accepts as a baseline the stock size and species composition that occurred at the beginning of their careers, and uses this to evaluate changes. When the next generation starts its career, the stocks have further declined, but it is the stocks at that time that serve as a new baseline. The result obviously is a gradual shift of the baseline, a gradual accommodation of the creeping disappearance of resource species, and inappropriate reference points for evaluating economic losses resulting from overfishing, or for identifying targets for rehabilitation measures.

These are strong claims that I can illustrate best by using analogies. For example, astronomy has a framework that uses ancient observations (including Sumerian and Chinese records that are thousands of years old) of sunspots, comets, supernovae or other phenomena that were recorded by ancient cultures, and this has made possible the testing of pertinent hypotheses. Similarly, oceanography has had, since the days of Commodore F. Maury, protocols for consolidating scattered observations on currents and winds, and later on sea surface temperatures; the latter have enabled the extending of the Comprehensive Ocean and Atmospheric Data Set (COADS) back to 1870, and infer that, indeed, global warming is occurring.

In contrast, fisheries science does not have formal approaches for dealing with early accounts of 'large catches' of presently extirpated resources, which are viewed as anecdotes . Yet the grandfather of my colleague Villy Christensen did report being annoyed by the bluefin tuna that entangled themselves in the mackerel nets he was setting in the waters of the Kattegat in the 1920s, and for which no market then existed. This observation is as factual as a temperature record, and one that should be of relevance to those dealing with bluefin tuna, whose range now excludes much, if not all, of the North Sea.

I could list hundreds of such observations – drawn from the historical or anthropological literature and elsewhere – but here it may be more useful to highlight two small fisheries-related studies that have attempted to consolidate them, and which have led, I believe, to important new insights. In the first, a (female) scientist[2] compiled scattered observations of (male) anthropologists reporting on fishing in the South Pacific, and concluded that, despite cultural emphasis on the catching of large fish by men, the gleaning of smaller reef organisms by women and children often accounted for as much catch as the more spectacular activities of the men (even though it does not enter official catch statistics). This fact, now widely confirmed by field studies, should lead to a re-evaluation of the fisheries potential of coral reefs.

The authors of the second study[3] used the anecdotes in Farley Mowat's *Sea of Slaughter*[4] to infer that the biomass of fish and other exploitable organisms along the North Atlantic coast of Canada now represents less than 10% of that two centuries ago. Some colleagues will find it difficult to accept that the early fishing methods should have had such impact, given their relative inefficiency when compared to our factory ships. However, it must be remembered that the large animals of low fecundity at the top of earlier food webs must have been less resilient to fishing than the survivors that are exploited today. That is, the big changes happened way back, but all that we have to recall them are anecdotes.

Developing frameworks for incorporation of earlier knowledge – which is what the anecdotes are – into the present models of fisheries scientists would not only have the effect of adding history to a discipline that has suffered from lack of historical reflection[1], but also of bringing into biodiversity debates an extremely speciose group of vertebrates: the fishes, whose ecology and evolution are as strongly impacted by human activities as the denizens of the tropical and other rain forests that presently occupy center stage in such debates. Frameworks that maximize the use of fisheries history would help us to understand and to overcome – in part at least – the shifting baselines syndrome, and hence to evaluate the true social and ecological costs of fisheries.

Daniel Pauly

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1 Smith, T.D. (1994) *Scaling Fisheries*, Cambridge University Press
2 Chapman, M.D. (1987) *Hum. Ecol.* 15, 267–288
3 MacIntyre, F., Estep, K.W. and Noji, T.T. (1995) NAGA (the ICLARM Quarterly) 18(3), 7–8
4 Mowat, F. (1984) *Sea of Slaughter*, Atlantic Monthly Press

***Reviews* and *Perspectives* in forthcoming issues of *TREE*:**

- Ultra-violet photoreceptors in the animal kingdom, *M. Tovée*
- Natural and anthropogenic environmental changes and ecosystem processes at the catchment scale, *M. Hornung* and *B. Reynolds*
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Daniel Pauly and his 1995 “shifting baselines” paper

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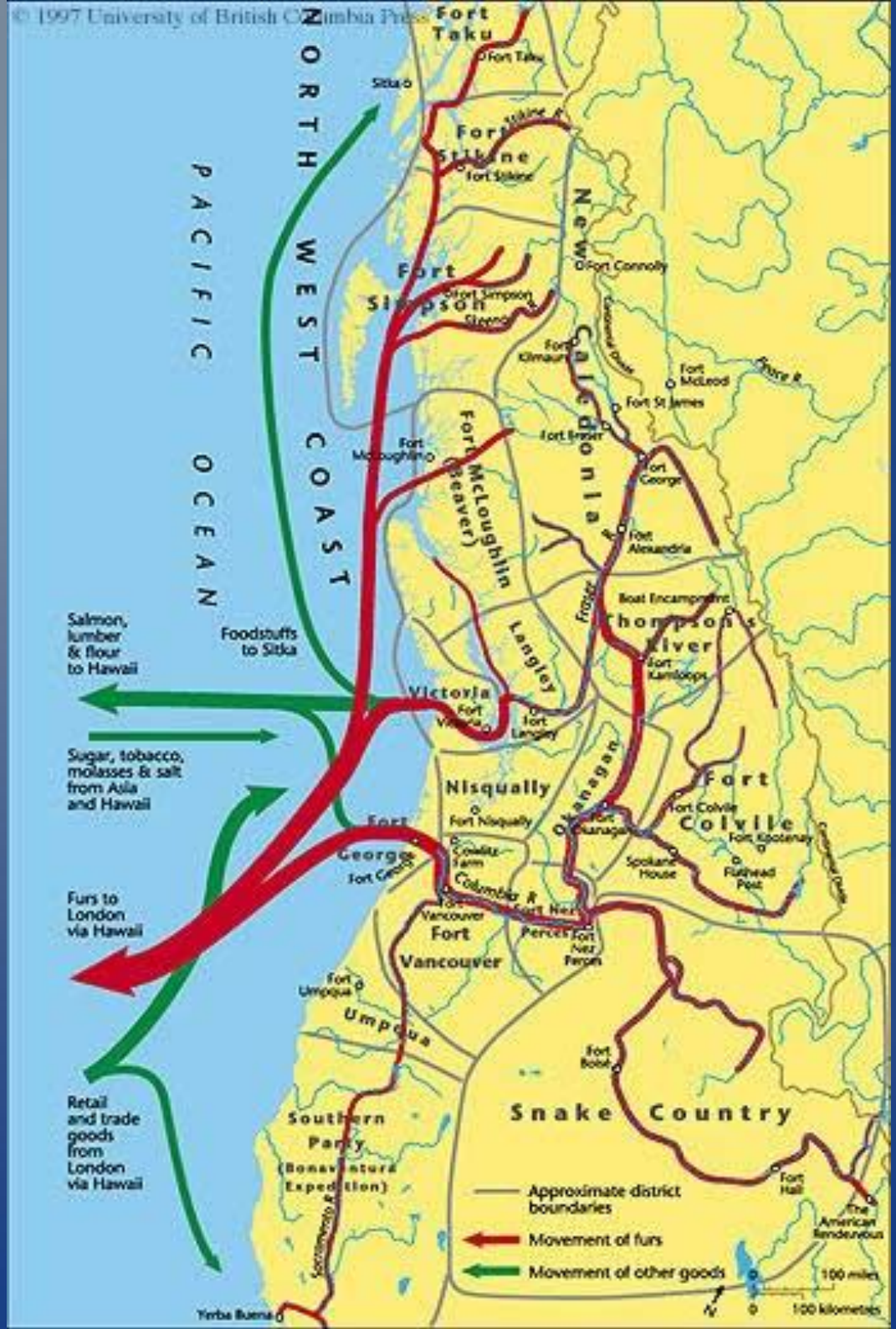

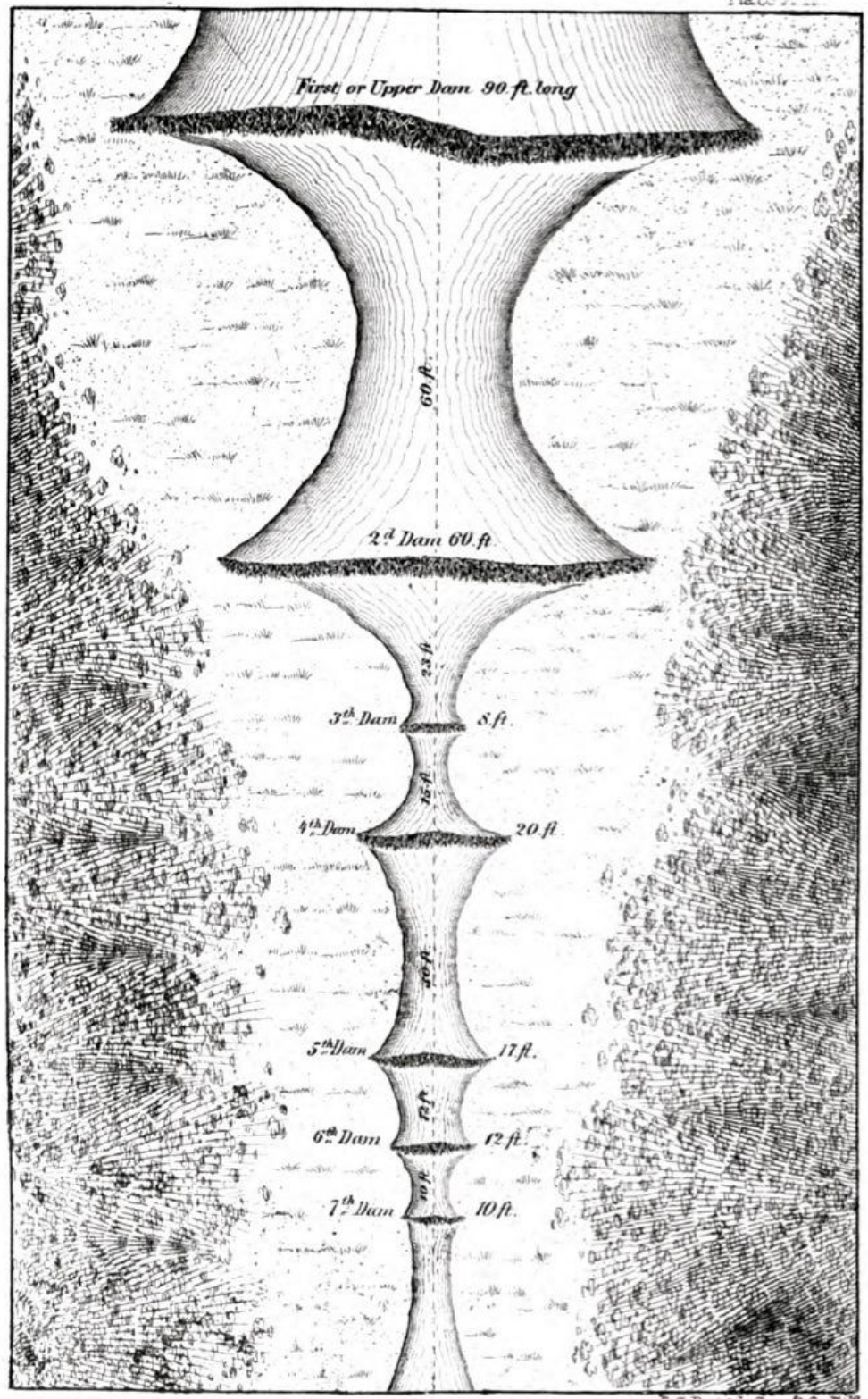

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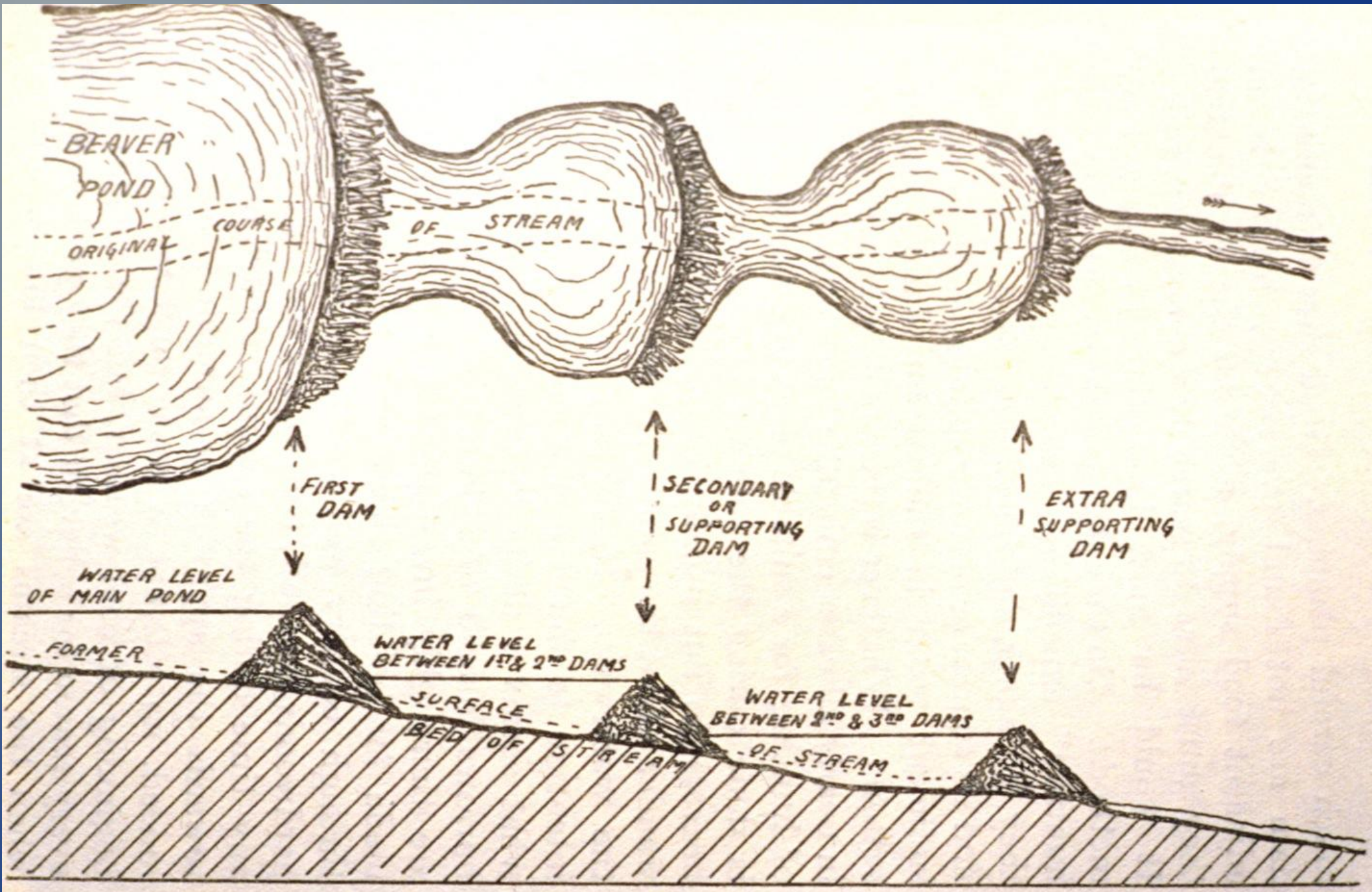

Arrangement of main and subsidiary dams in plan and section.

MIKE SIEGEL / THE SEA

A beaver *sniffs out a meal in Meadowbrook Pond in Seattle. The beaver family's nightly activities are drawing a lot of attention.*

Dam fine family builds a following

'The Cleavers' draw crowd to Meadowbrook Pond

BY LISA RIVERA
Seattle Times staff reporter

With a smile on her face, Bonnie Begalka carefully watched a big brown lump move quickly across Meadowbrook Pond, north of the Wedgwood neighborhood.

"Look how fast he swims," she said to a crowd of spectators, many of whom come almost daily to view a growing family of beavers some are calling the Cleavers.

When Seattle Public Utilities opened the Thornton Creek flood-water-holding facility in June 1998, beavers were among the many animals that found a home in the pond. The site across from Meadowbrook Community Center on 35th Avenue Northeast also is a natural area for people and urban wildlife.

PLEASE SEE *Family* ON B 4

Jeanette Merki, *left, enjoys the antics of t beavers along with granddaughters San left, Rachel Wood, 12, and family frien*

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1
2
3
kilometres
1 : 30 740
LEGEND
NAL DISTRICT OF NANAIMO
ISTRICT OF COWICHAN VALLEY
ROBERTS RD.
PRIEST LAKE
LONG LAKE
RD.
TONI CR.
JENNIFER DR.
LAGUNA VISTA RD.
LONG LAKE
BIG BEAR TER.
PAULSON RD
BEACH ACCESS
ROAD 32
Yellow
BEDFORD DR
TILLICUM LN
BARNEY RD
WESTBY R
34
Yellow Point Park
38
36
O BRIAN RD
KEENE
STONEWALL DR
SEIDEL RD
HILL S RD
NORTH OYSTER FIRE HALL

Long Lake
Image © 2011 IMTCAN
© 2011 Google
1201 ft
©2010 Google
Imagery Date: 7/16/2005
49°03'05.63" N 123°47'09.78" W elev -171 ft
Eye alt 5295 ft

The Seattle Times

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Scientist discovers beavers building prime salmon habitat in Skagit Delta

By Lynda V. Mapes
Seattle Times staff reporter

SKAGIT COUNTY — As sometimes happens with science, Greg Hood went looking for one thing, and found something else:

Tidal beavers.

Just about everyone knows about freshwater beavers, damming streams and gnawing down the forested uplands like furry chain-saw gangs. But what Hood found in the Skagit River Delta was something else. Not a different

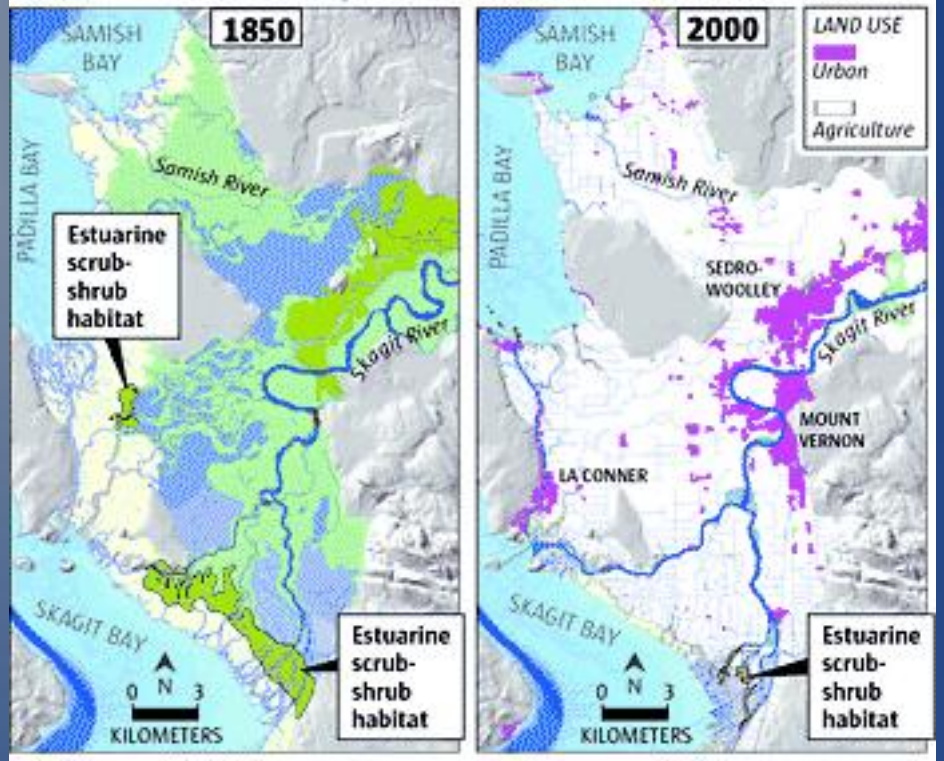
ALAN BERNER / THE SEATTLE TIMES

In a pool behind a beaver dam, Greg Hood, a senior research scientist with the Skagit River System Cooperative, nets fish to see what's in this tidal wetland. These dams help provide safe havens for young fish, increasing their chance of survival. Fish he netted were released.

Greg Hood in the Skagit Delta

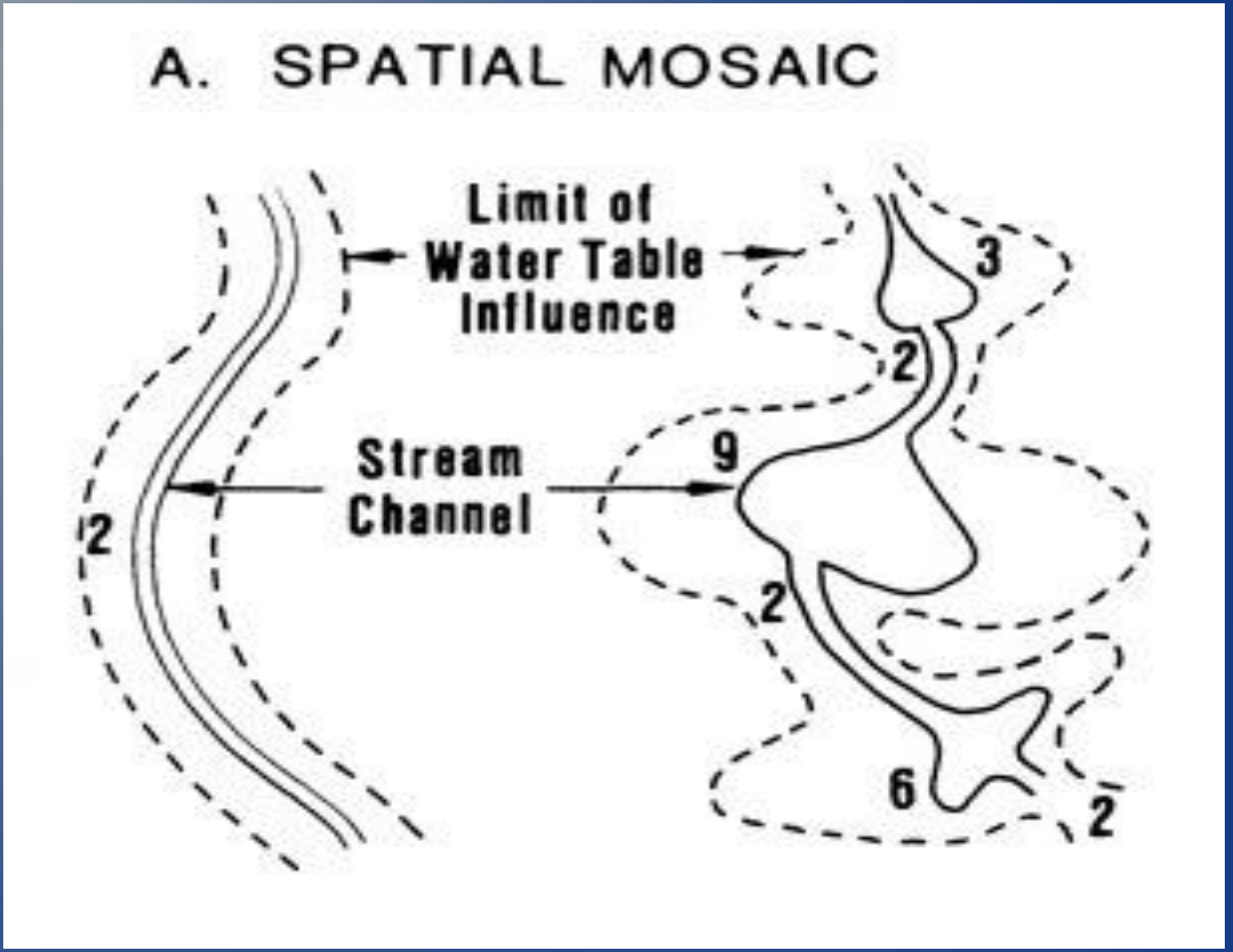
Ecological amnesia

Wetland habitat used to be much more abundant and complex in Puget Sound estuaries. Much of the Skagit Delta has been diked, drained and converted to farmland and development. Only about 6 percent of the estuarine "scrub shrub" habitat remains from what surveyors noted in the 1850s, re-created in this map.



Source: Brian Collins, University of Washington

MARK NOWLIN / THE SEATTLE TIMES



From Naiman, et al, 1988

TREES
OF SEATTLE

The Complete
Tree-finder's Guide to the
City's 740 Varieties

ARTHUR LEE JACOBSON

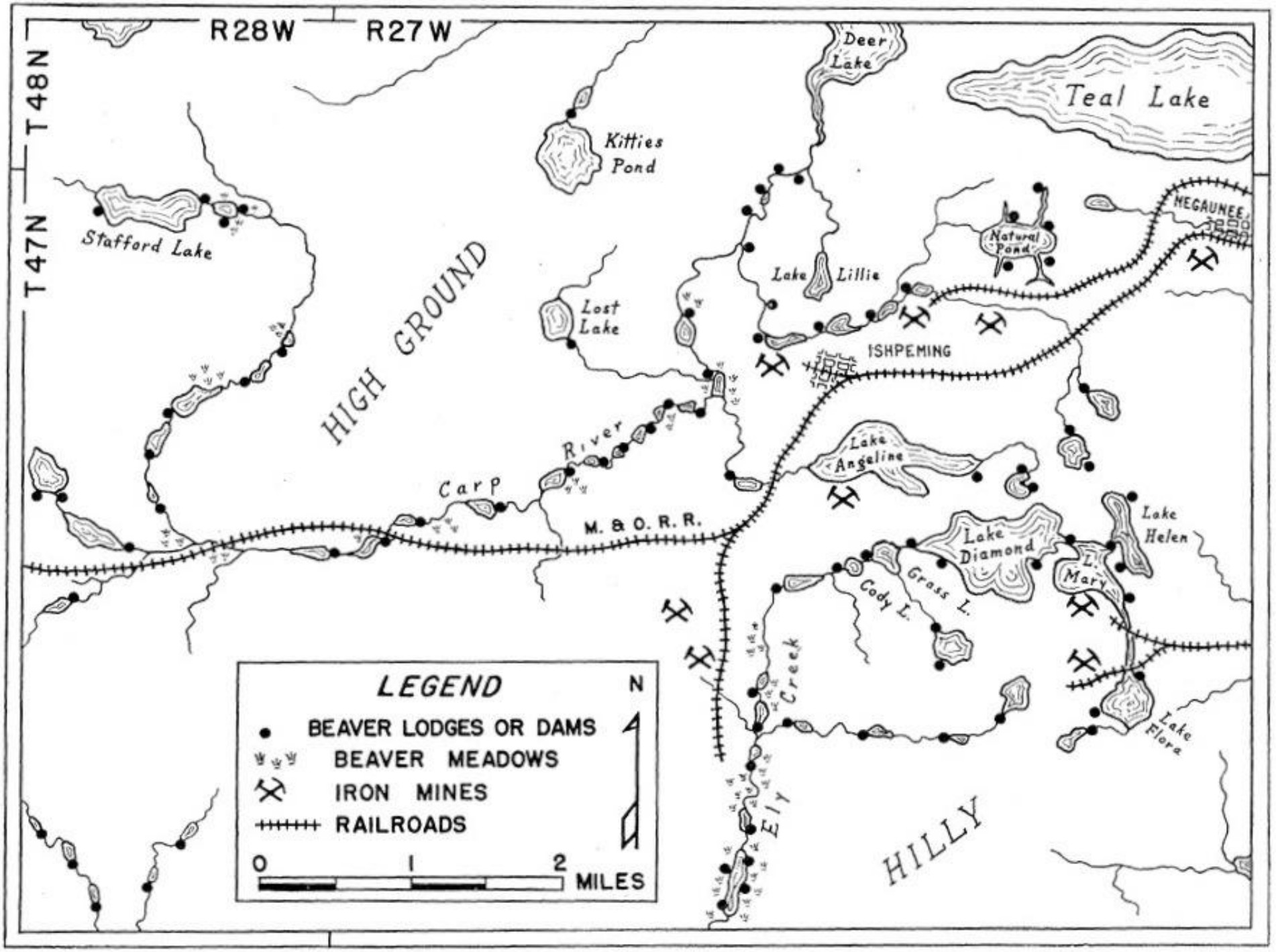


FIG. 1. The area of Morgan's observations in Marquette County, Michigan, about 1867. Modified from Morgan's map.

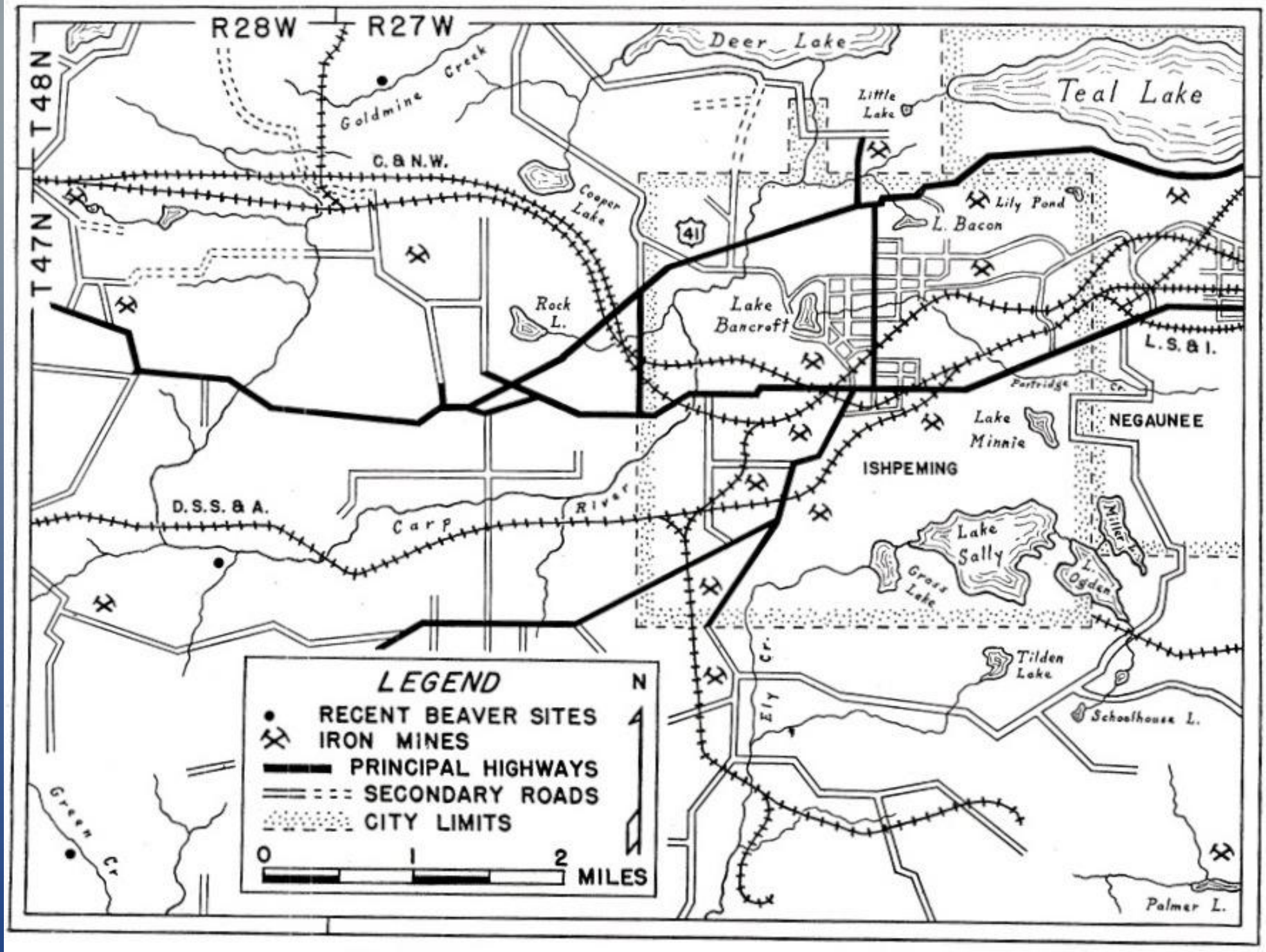


FIG. 2. The same area as shown in Figure 1, in 1948.

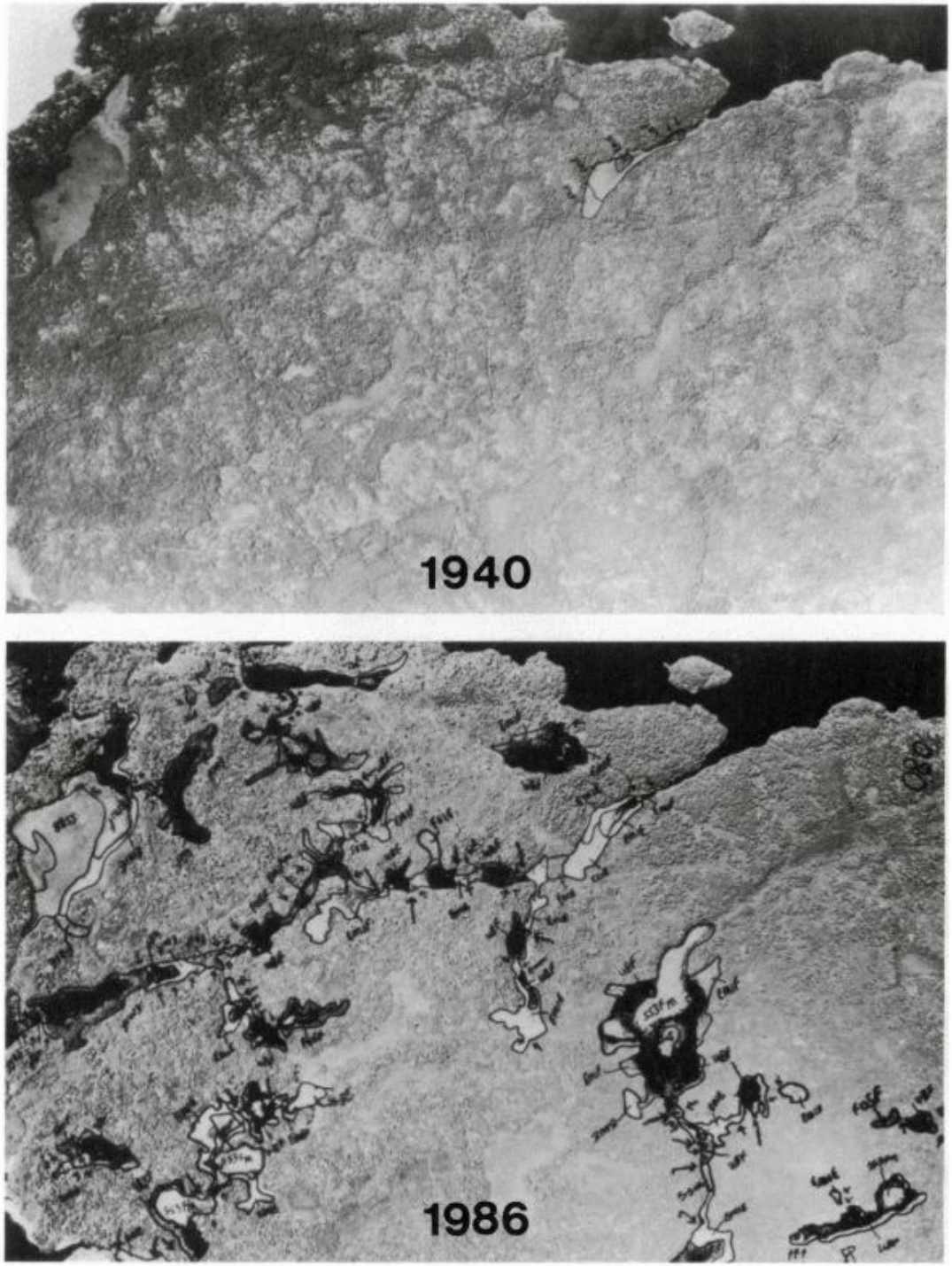
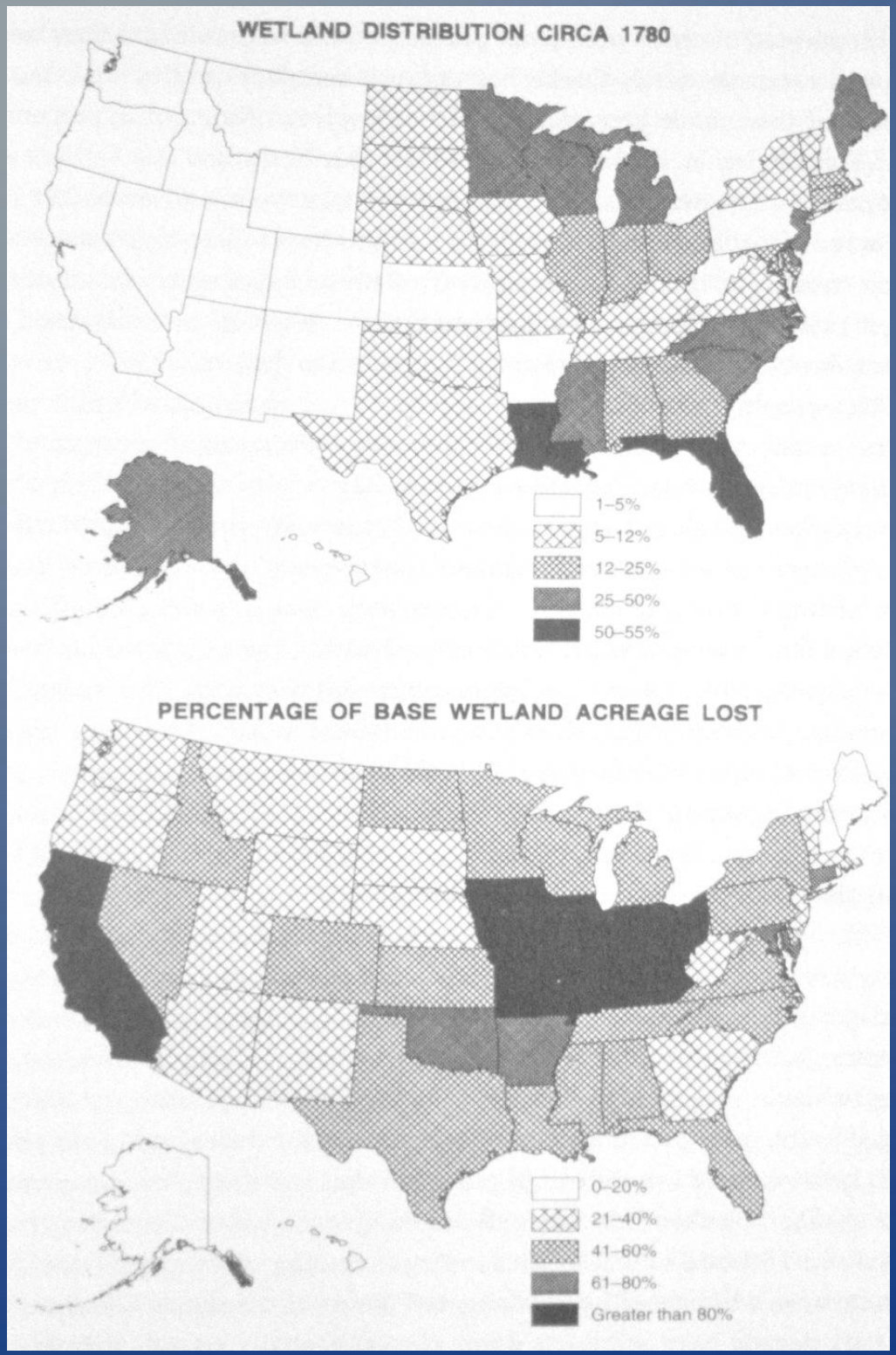
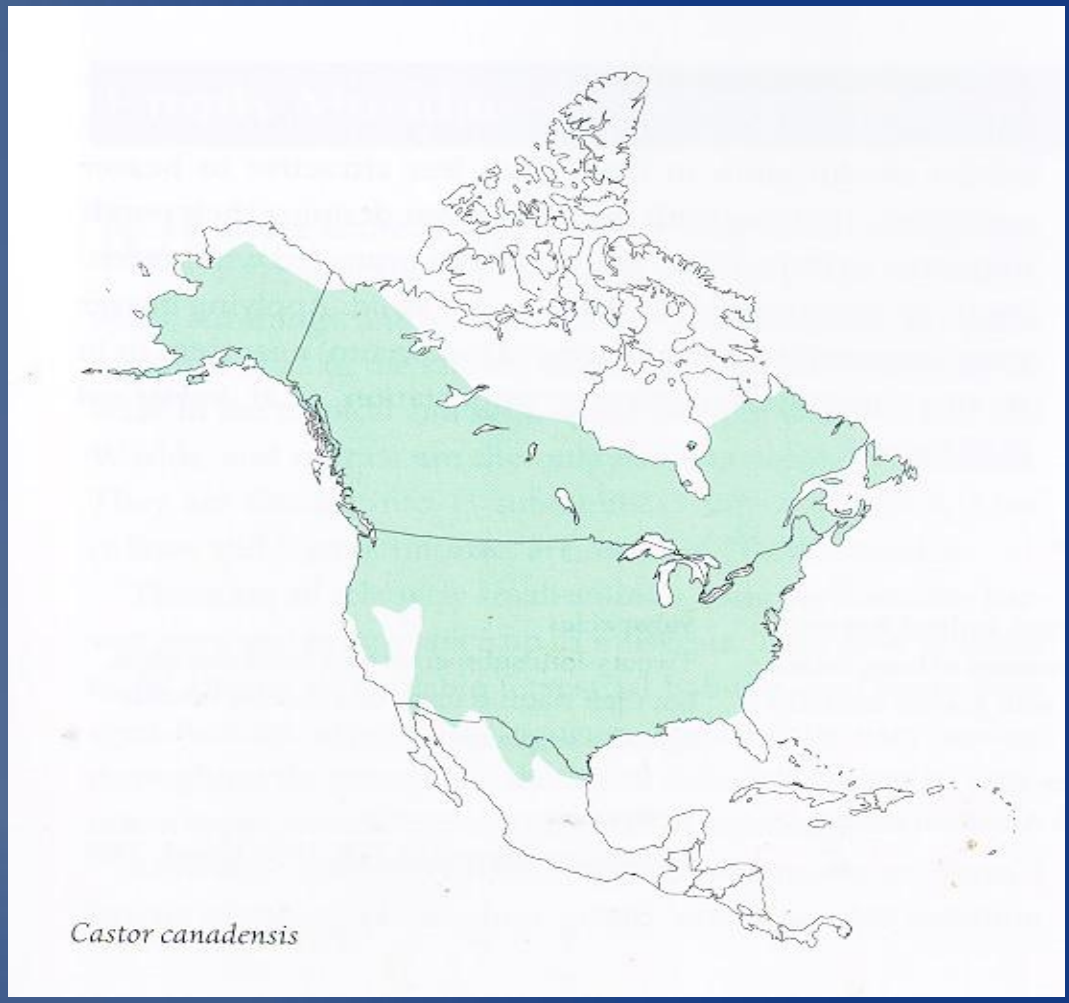
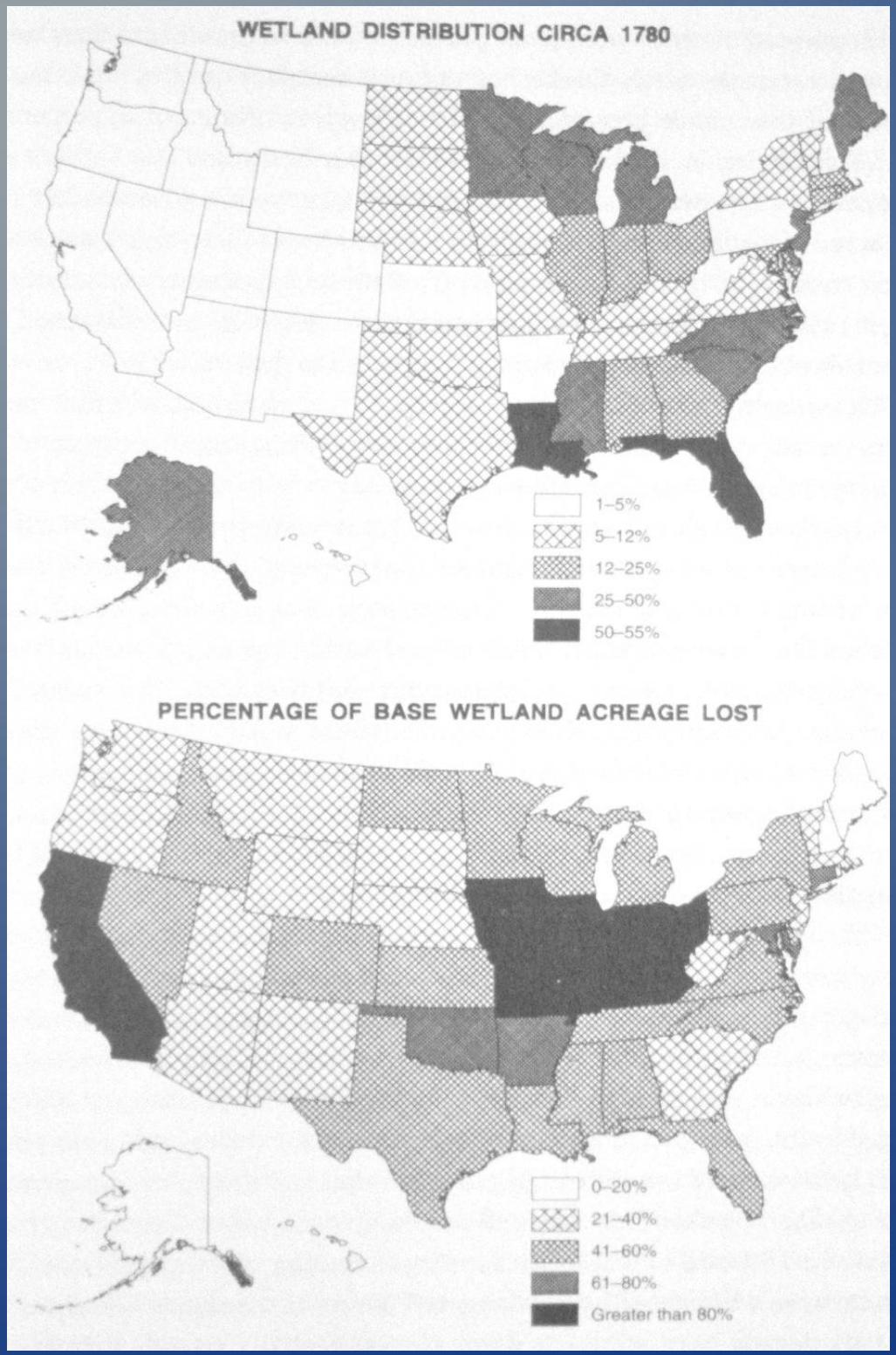


Figure 4. Beaver have had a substantial impact on the drainage network of the Kabetogama Peninsula, Minnesota, between 1940 and 1986. Shown is a representative area. The areas affected by beaver are enclosed by dark lines.


WETLAND DISTRIBUTION CIRCA 1780
1–5%
5–12%
12–25%
25–50%
50–55%
PERCENTAGE OF BASE WETLAND ACREAGE LOST
0–20%
21–40%
41–60%
61–80%
Greater than 80%


Castor canadensis

1-HR PHOTO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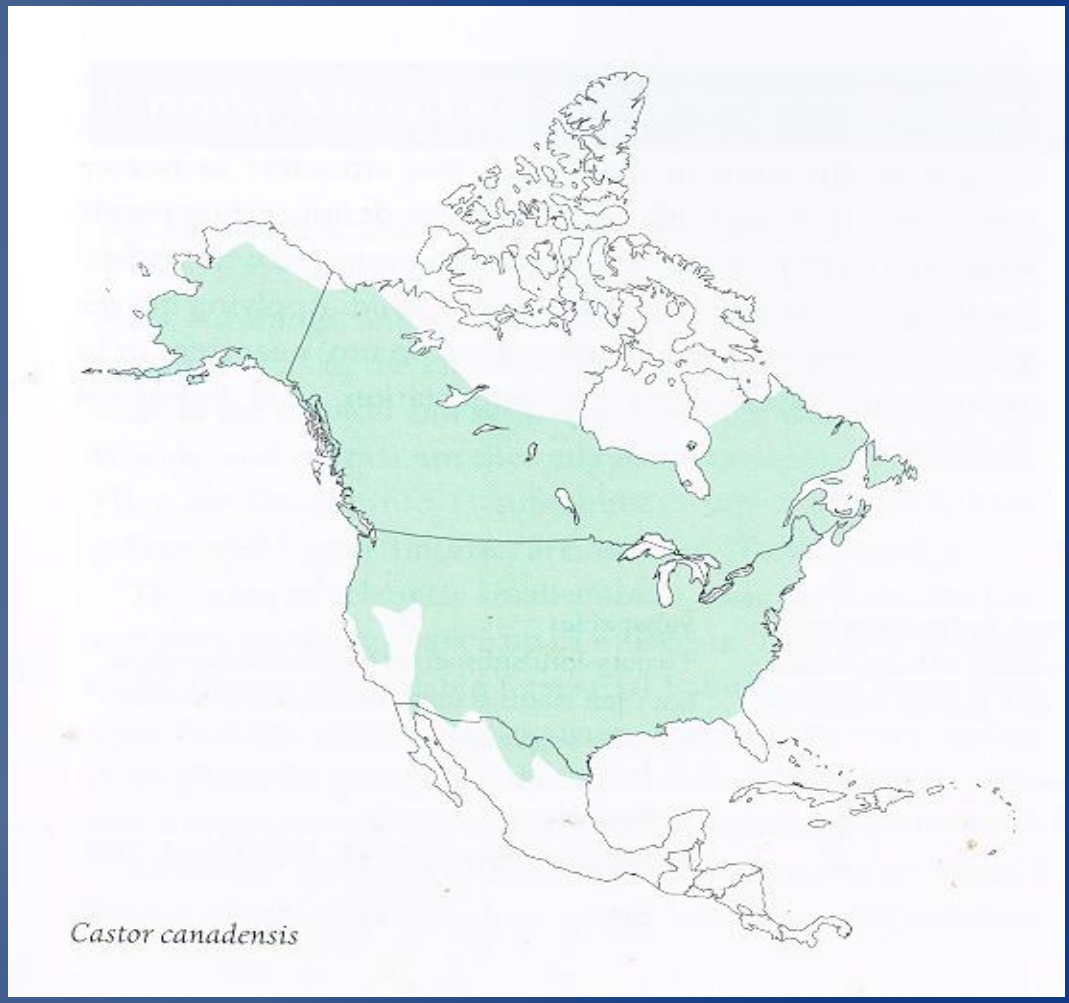
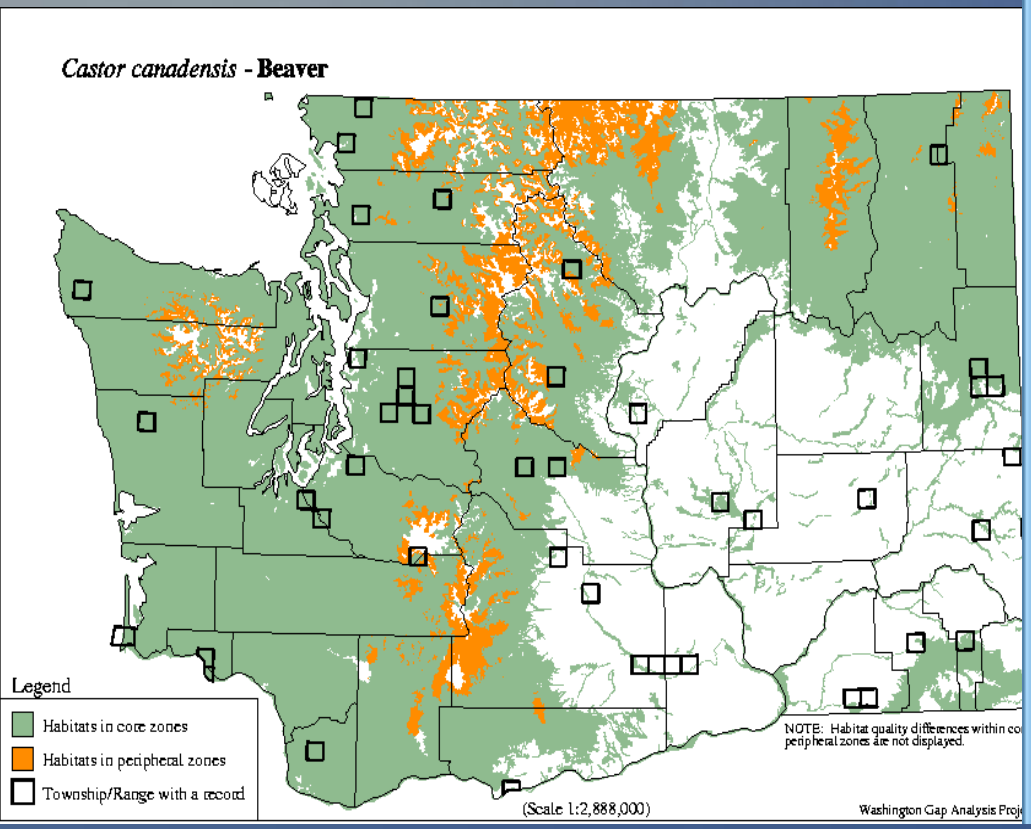
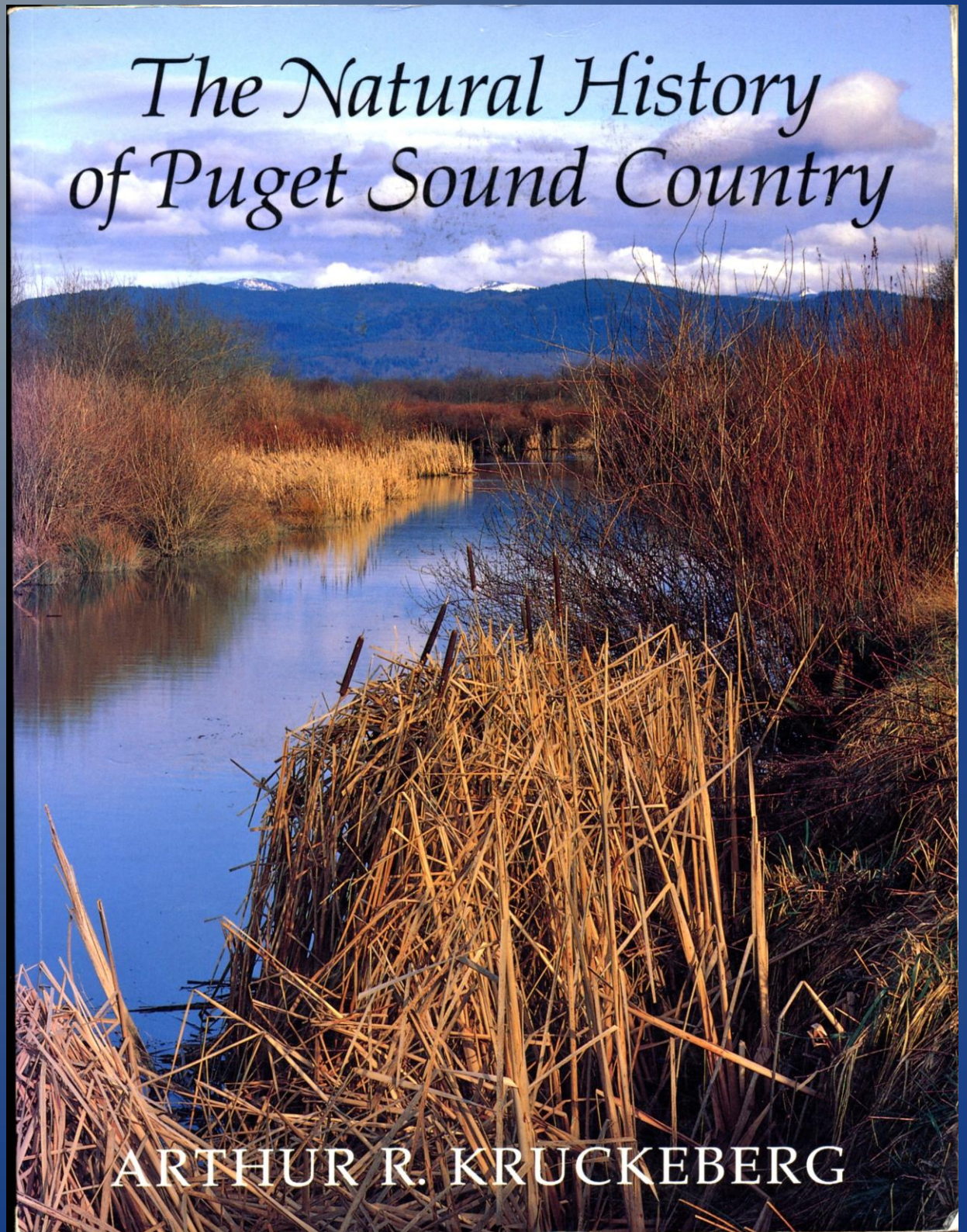

Castor canadensis



Green shading shows “core” zones.
Orange “peripheral” zones.

Red lines show movement of furs out of region.


The Natural History
of Puget Sound Country
ARTHUR R. KRUCKEBERG

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Buechne
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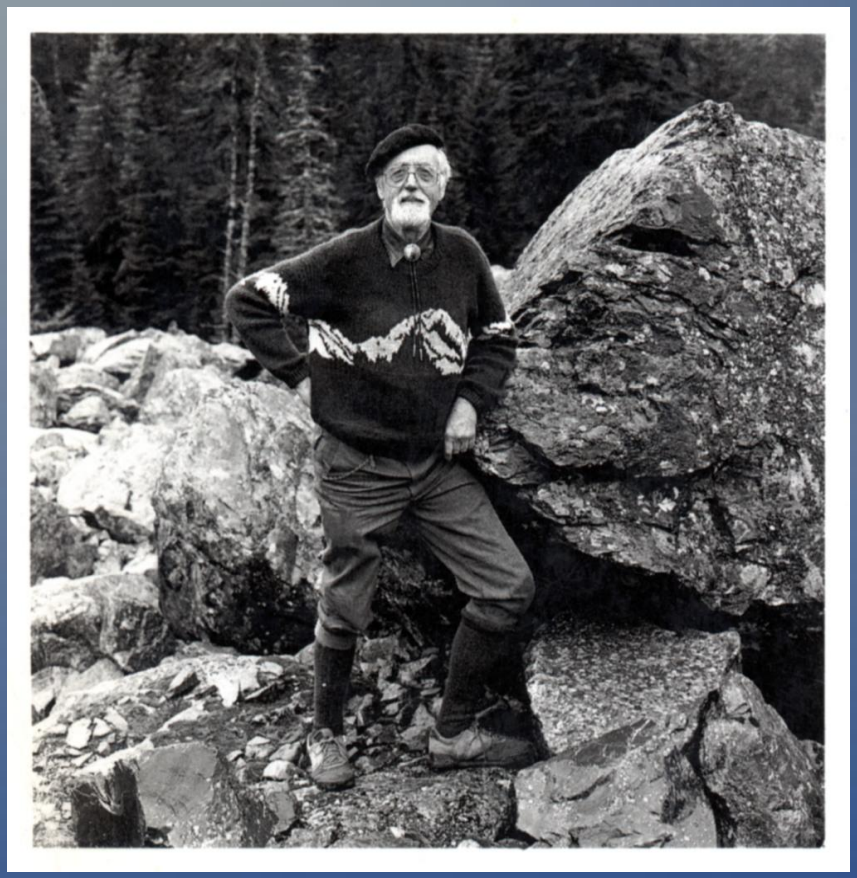
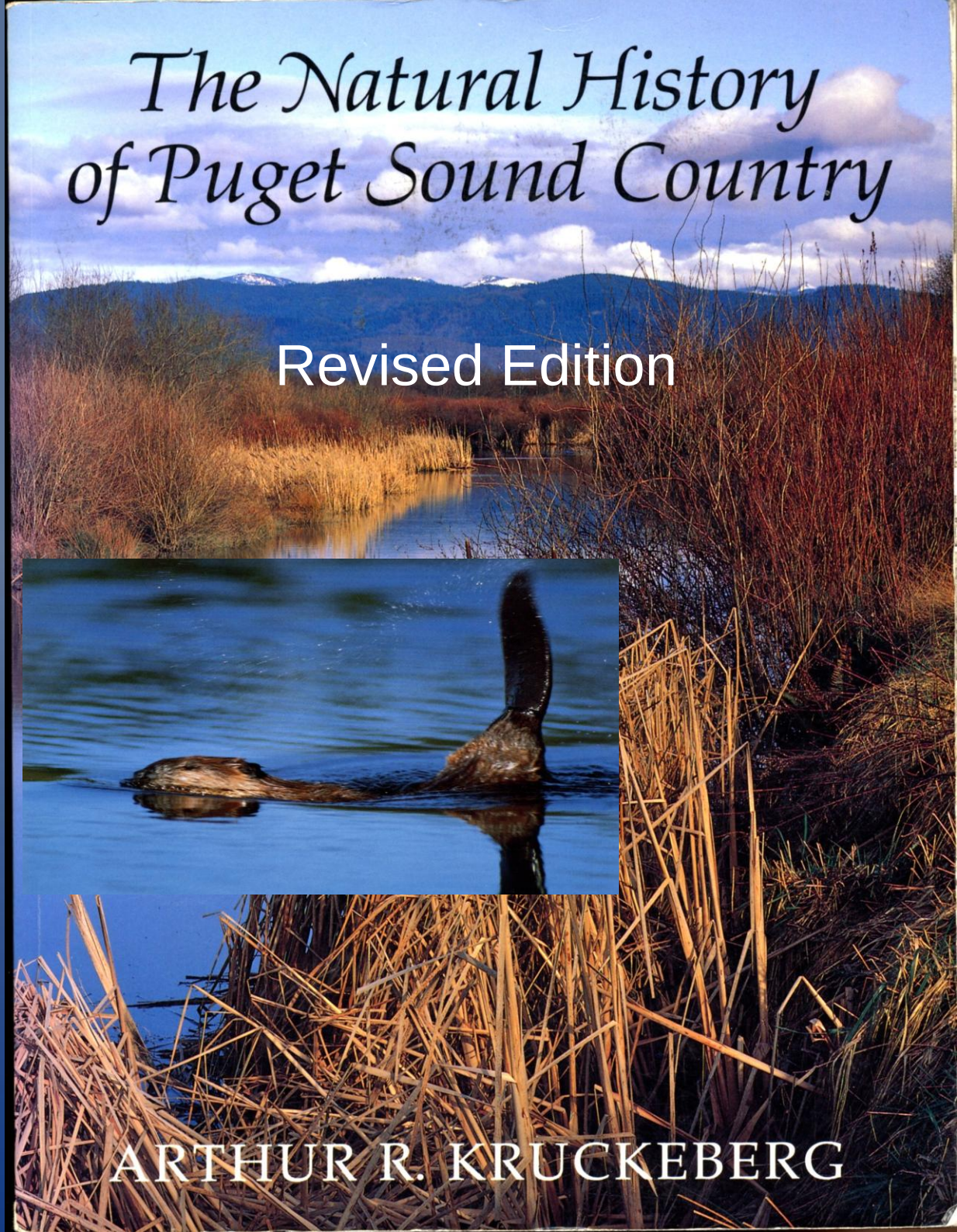
Bull kelp
83; epi
Bunchbe

“As I did stand my watch upon the hill,
I look'd toward Birnam, and anon, methought,
The wood began to move.”

Messenger in MacBeth Act V Scene 5

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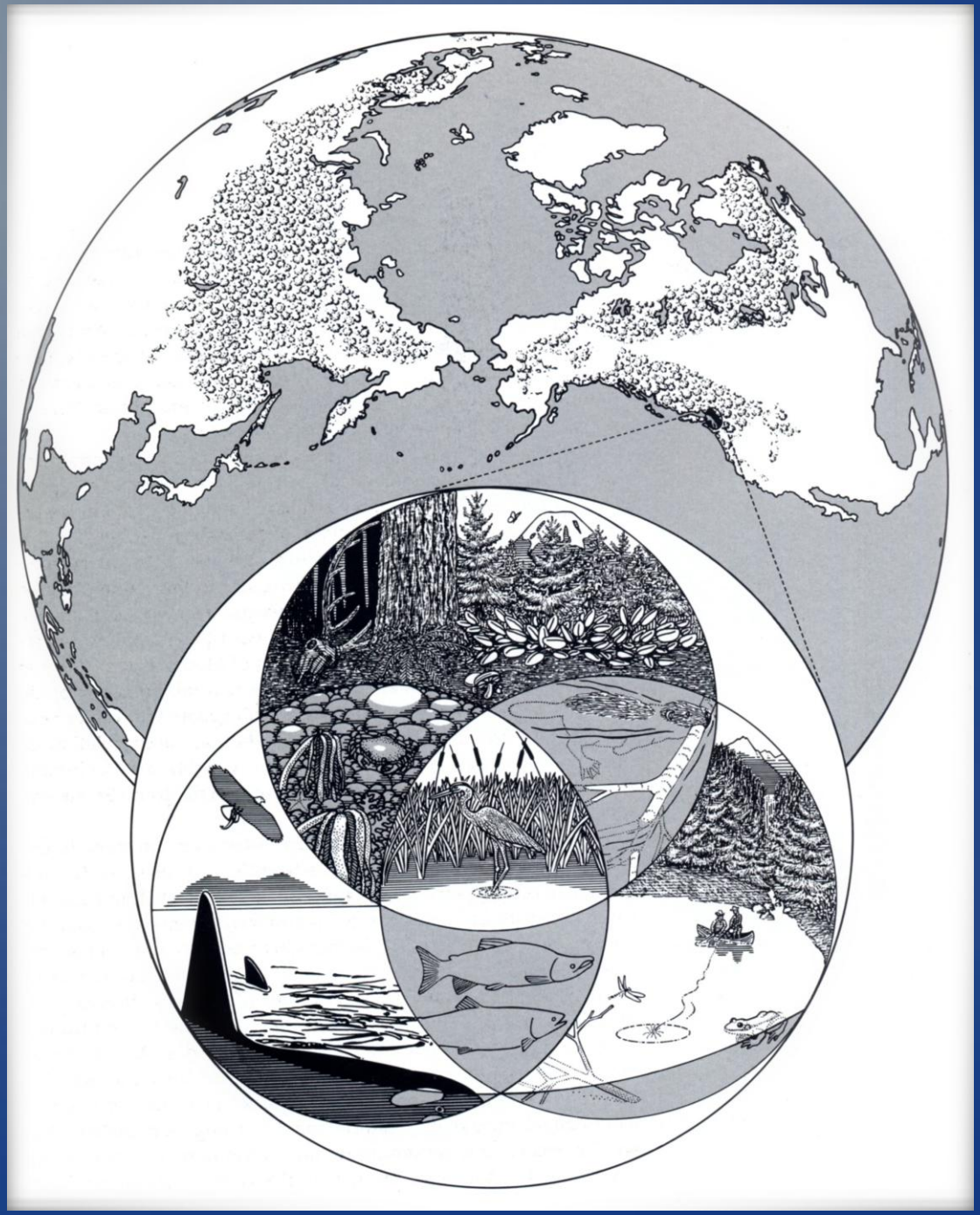
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