Role of barriers in the distribution, abundance, and life history of coastal cutthroat trout in the Columbia River Gorge

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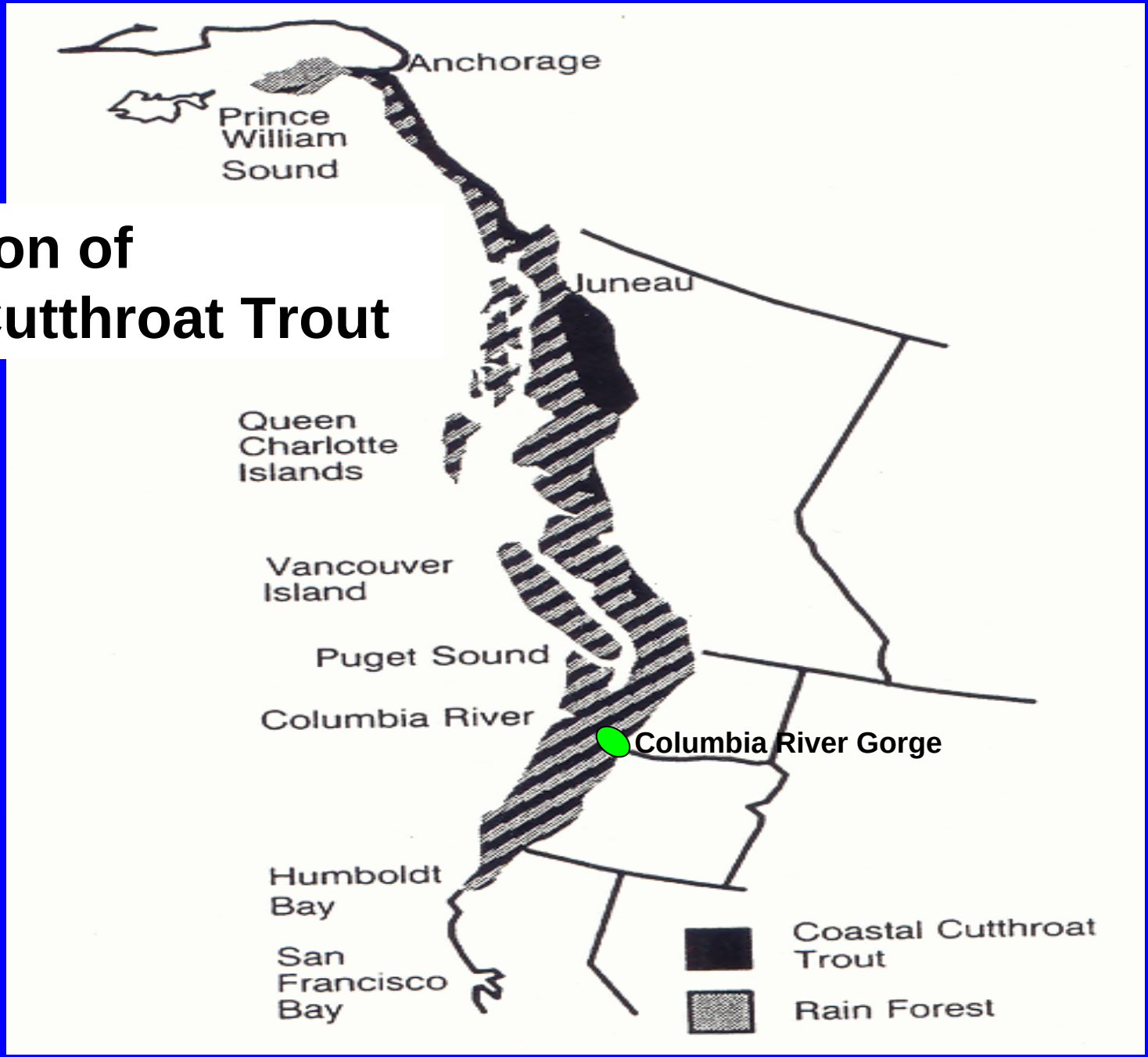
U.S. Department of the Interior
U.S. Geological Survey

Importance of Coastal Cutthroat Trout above barriers

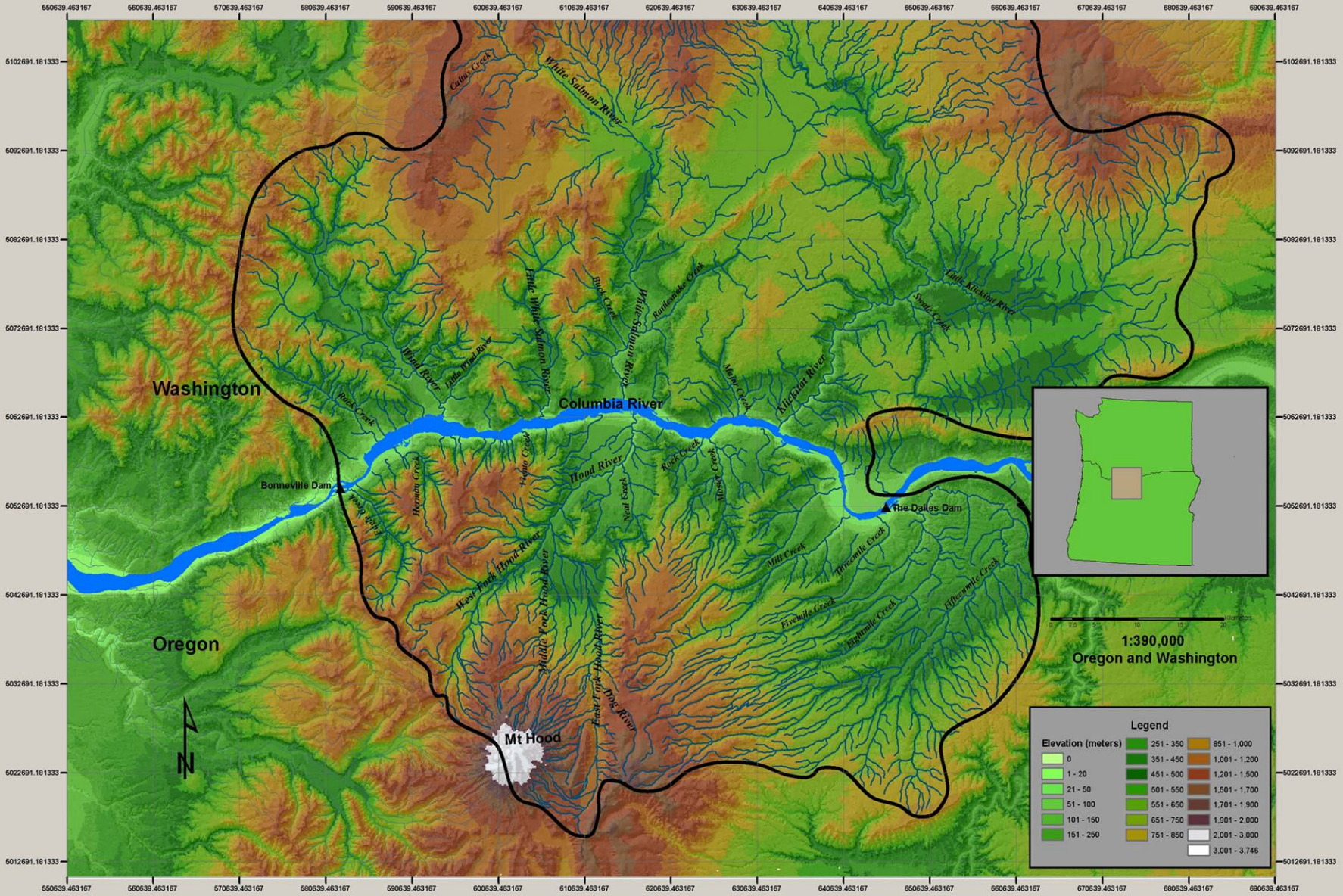
Importance of barriers to Coastal Cutthroat Trout

USGS

Distribution of Coastal Cutthroat Trout



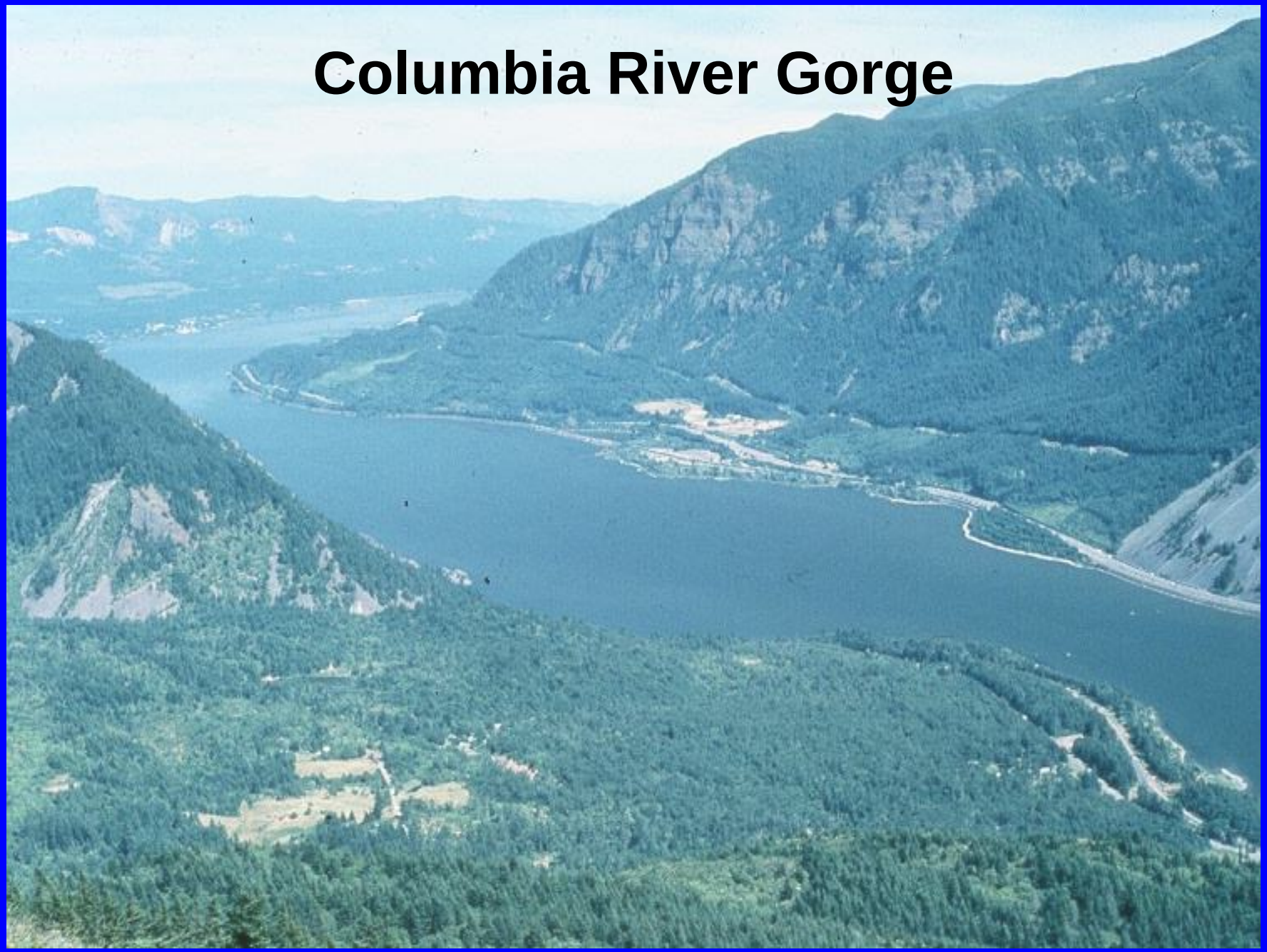
Adapted from Trotter 1997

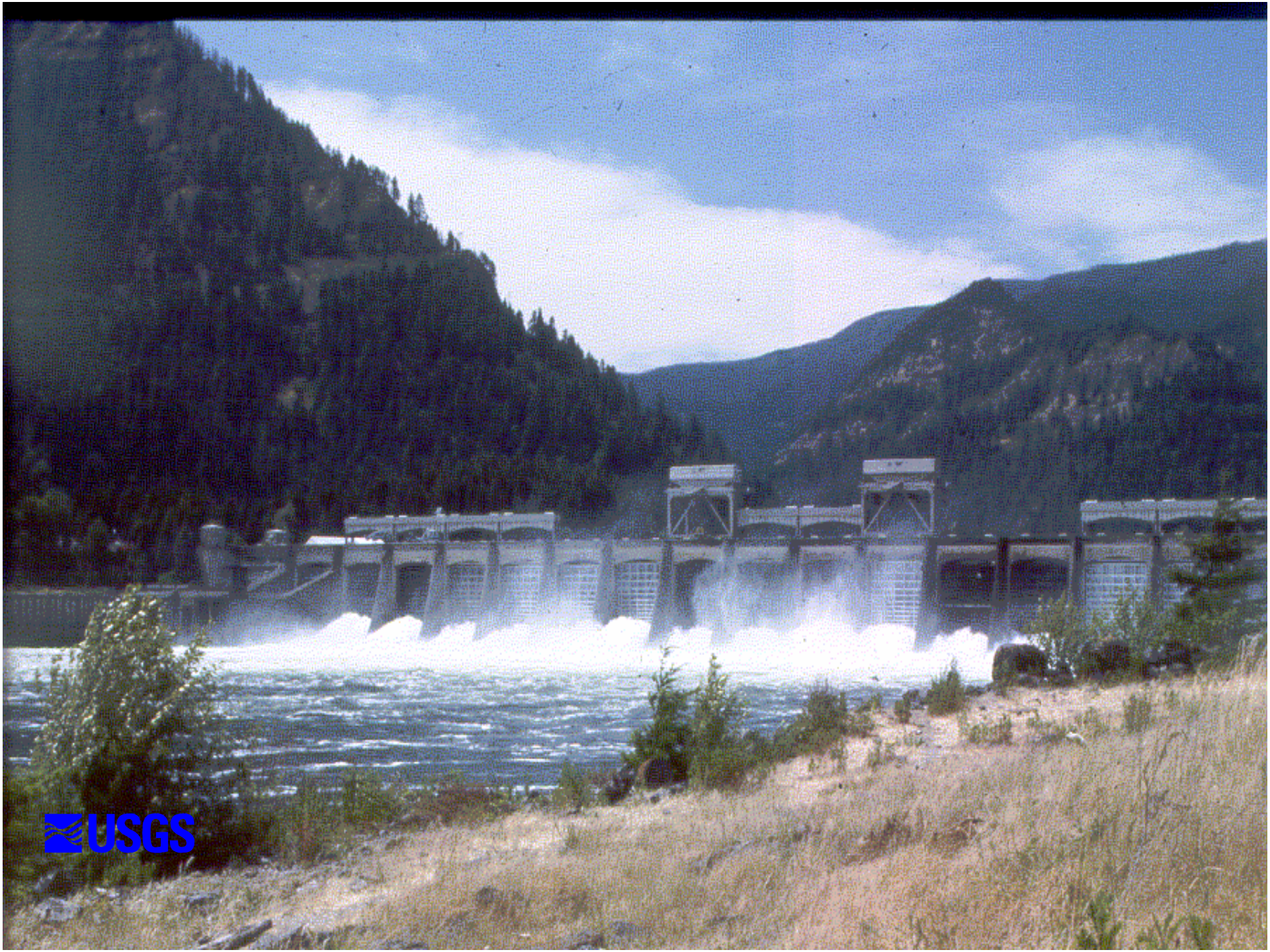


Washington
Oregon
Columbia River
Bonneville Dam
The Dalles Dam
Mt Hood
White Salmon River
Little White Salmon River
Wind River
Little Wind River
Rock Creek
Hood River
Hermon Creek
Viento Creek
Neal Creek
Mosier Creek
Mill Creek
Threemile Creek
Fivemile Creek
Eightmile Creek
Fifteenmile Creek
West Fork Hood River
Middle Fork Hood River
East Fork Hood River
Dog River
Klickitat River
Little Klickitat River
Swale Creek
Major Creek
Rattlesnake Creek
Buck Creek
Cultus Creek
1:390,000
Oregon and Washington
Legend
Elevation (meters)
0
1 - 20
21 - 50
51 - 100
101 - 150
151 - 250
251 - 350
351 - 450
451 - 500
501 - 550
551 - 650
651 - 750
751 - 850
851 - 1,000
1,001 - 1,200
1,201 - 1,500
1,501 - 1,700
1,701 - 1,900
1,901 - 2,000
2,001 - 3,000
3,001 - 3,746

USGS

Columbia River Gorge




USGS

Sea-run Cutthroat Trout Returns
Powerdale Dam, Hood River, OR

Decade	(yrs)	Mean	(Max)
1960s	(8)	68	(177)
1970s	(2)	31	(45)
--z--			
1990s	(8)	<1	(4)
2000s	(2)	6	(11)

USGS

Evaluate Status of Coastal Cutthroat Trout in the Columbia River Basin above Bonneville Dam

Annual Report for 2001
June 2002

By:

P.J. Connolly,

C. Sharpe,

and

S. Sauter

Cooperators:

USGS science for a changing world

Washington Department of FISH AND WILDLIFE

Funded by:

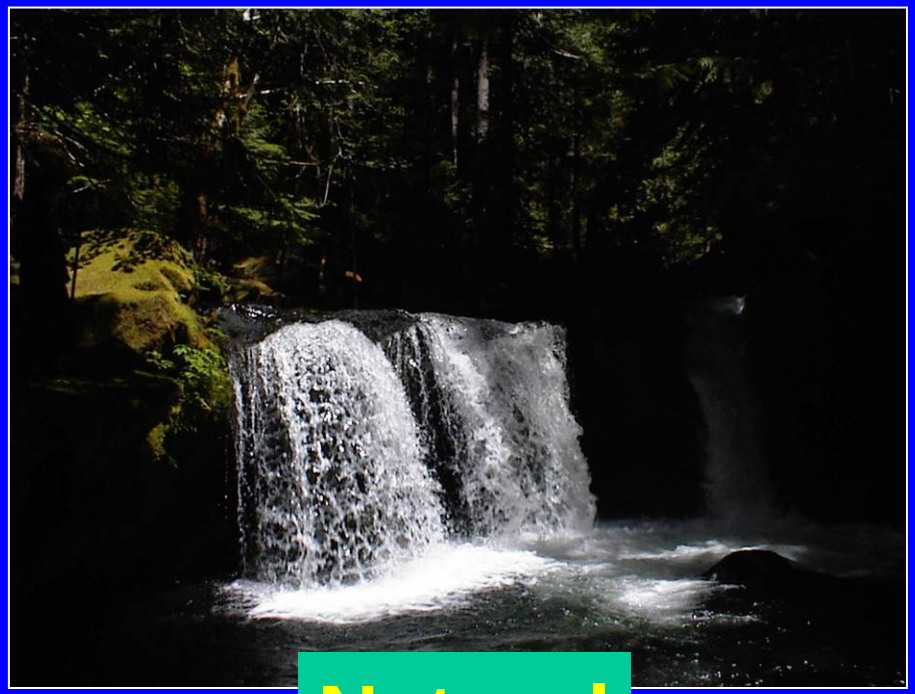
Bonneville Power Administration

Q: How friendly has Bonneville Dam been to coastal cutthroat trout?

Looks to be very unfriendly to the sea-run life history, but confounded by hatchery release pattern.

USGS

Barriers in tributaries



Natural

Artificial

USGS

Paired Reaches within a Stream

A: 100% Cutthroat | 100% Cutthroat

BARRIER

B: 100% Cutthroat | Cutthroat *O. mykiss* sculpin

USGS

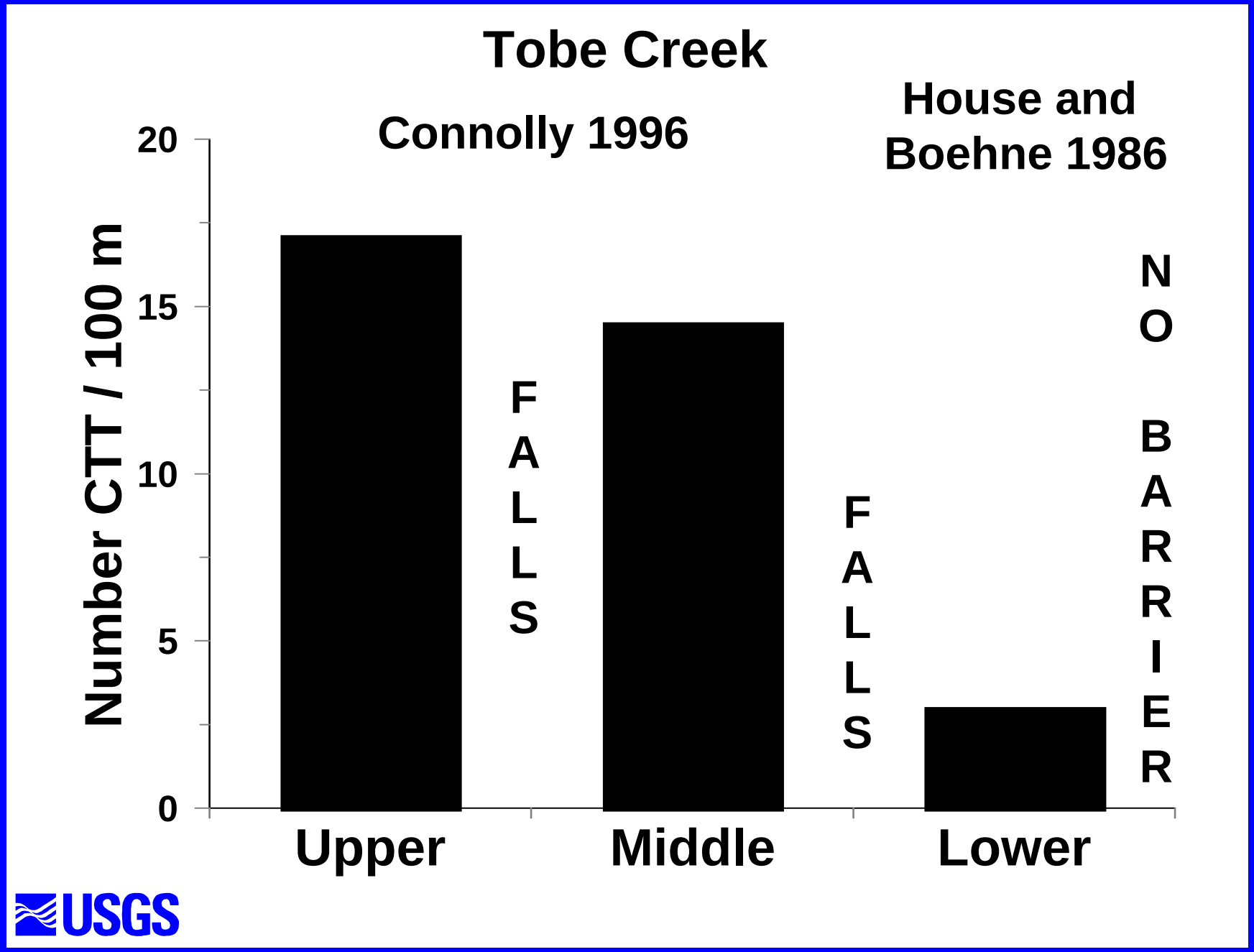
Coastal Cutthroat Trout in Lower Tobe Creek, OR

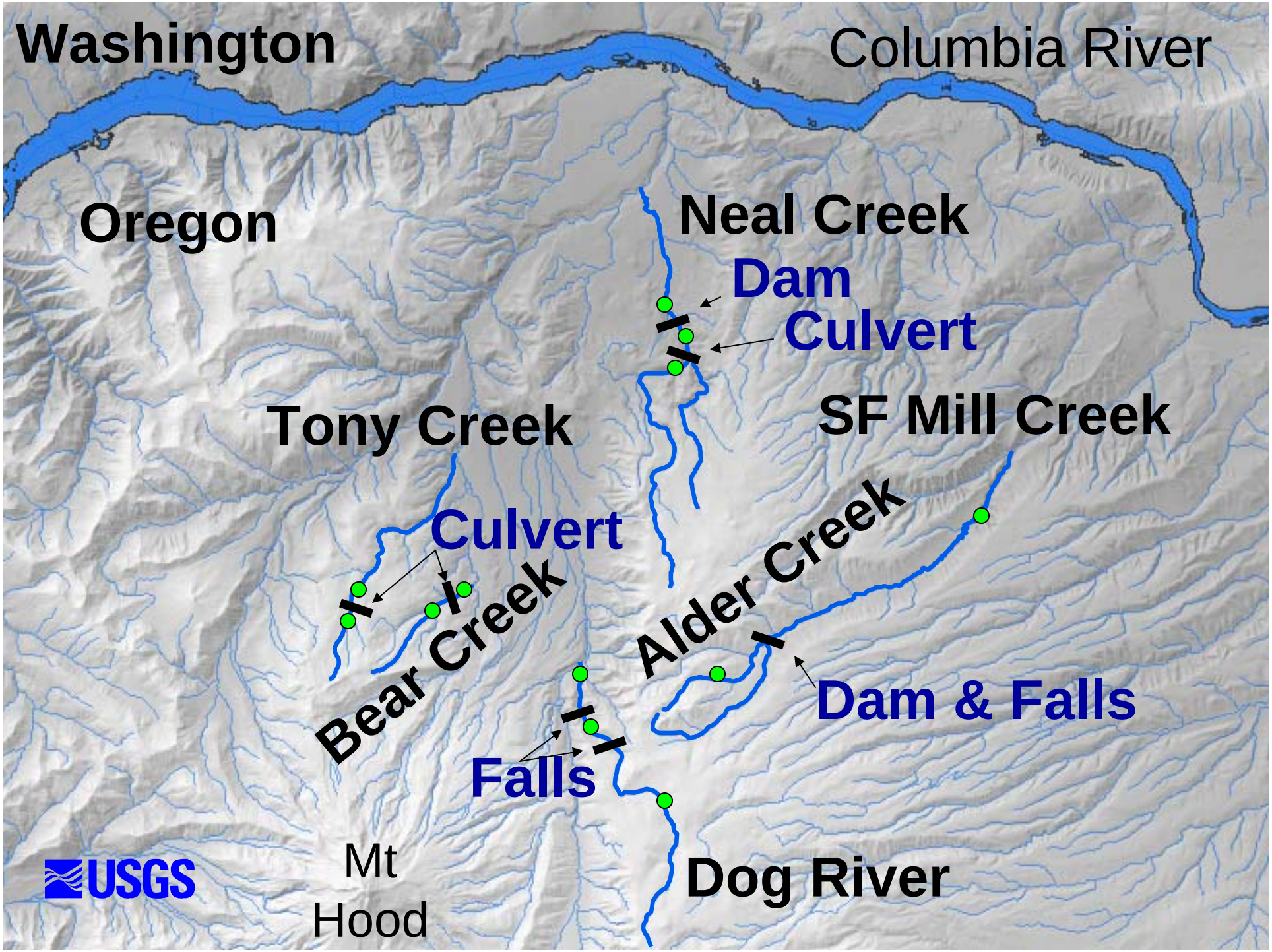
"Few cutthroat trout were caught in Tobe Creek."

"...their populations seemed to be suppressed by anadromous fish competition…"

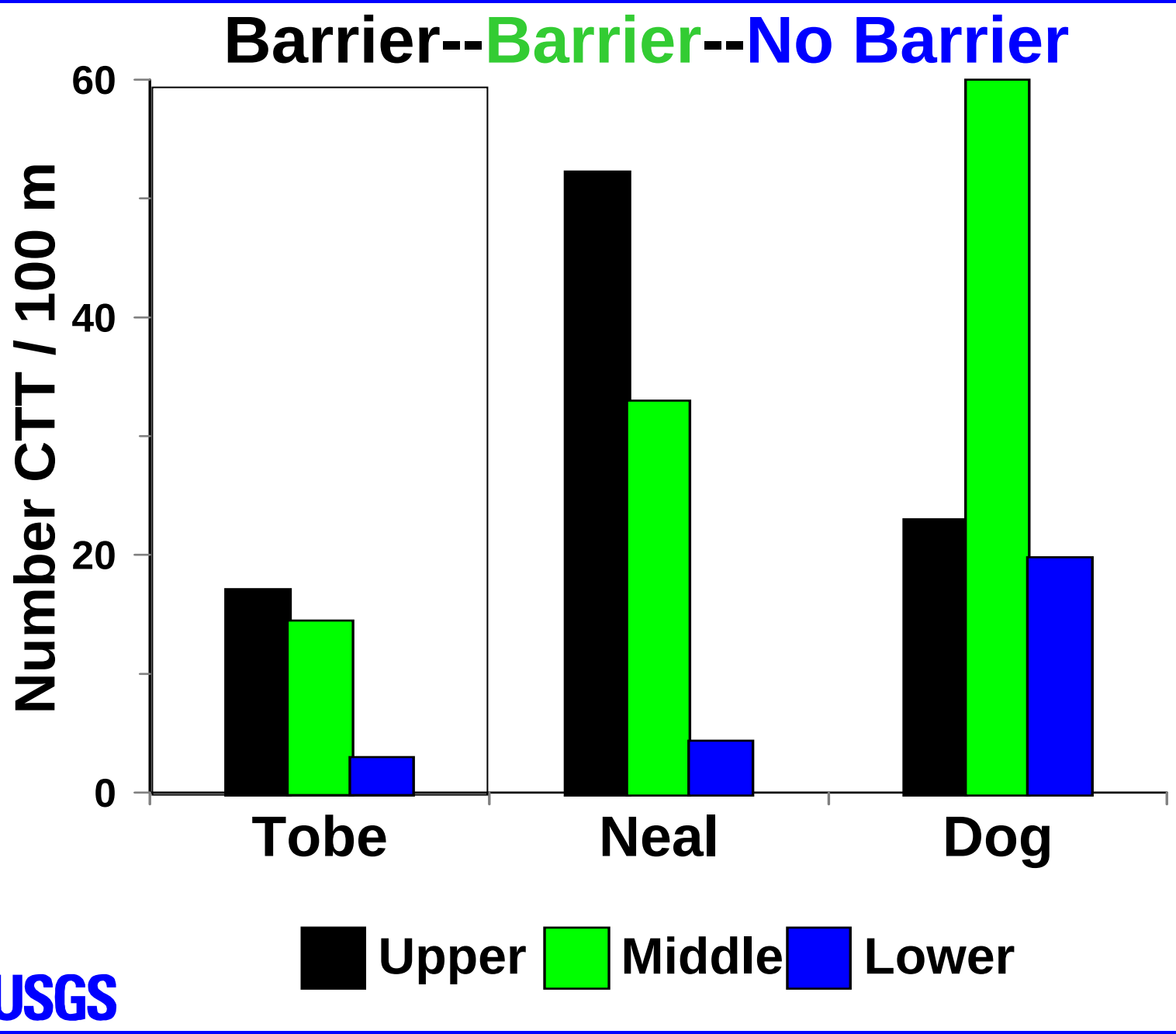
(House and Boehne 1986)

USGS

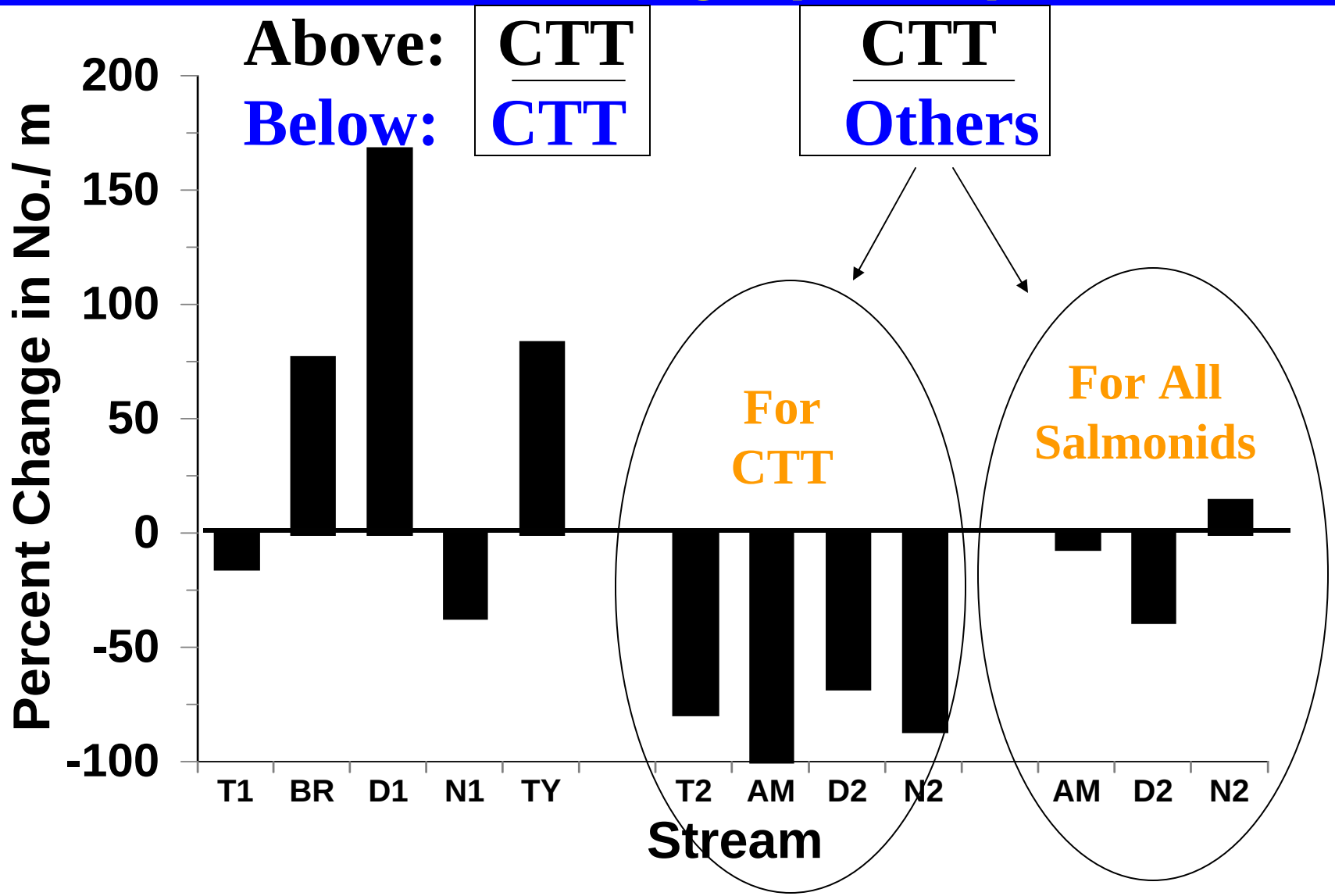

Tobe Creek
Connolly 1996
House and Boehne 1986
Number CTT / 100 m
20
15
10
5
0
FALLS
FALLS
NO BARRIER
Upper
Middle
Lower
USGS


Washington
Columbia River
Oregon
Neal Creek
Dam
Culvert
Tony Creek
SF Mill Creek
Culvert
Bear Creek
Alder Creek
Dam & Falls
Falls
Mt
Hood
Dog River
USGS

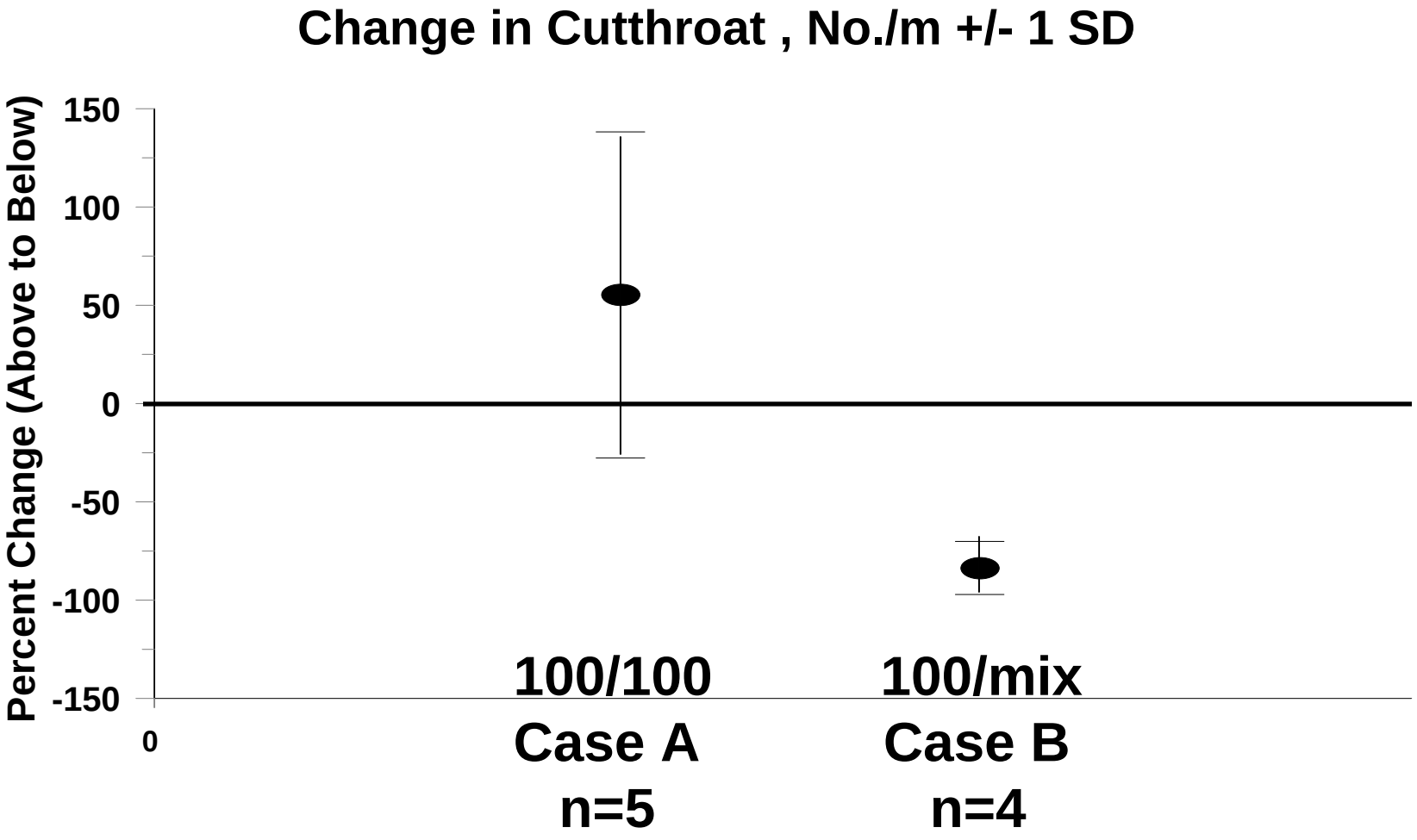
USGS


Barrier--Barrier--No Barrier
Number CTT / 100 m
60
40
20
0
Tobe
Neal
Dog
Upper
Middle
Lower
USGS

Percent Change (No./m)

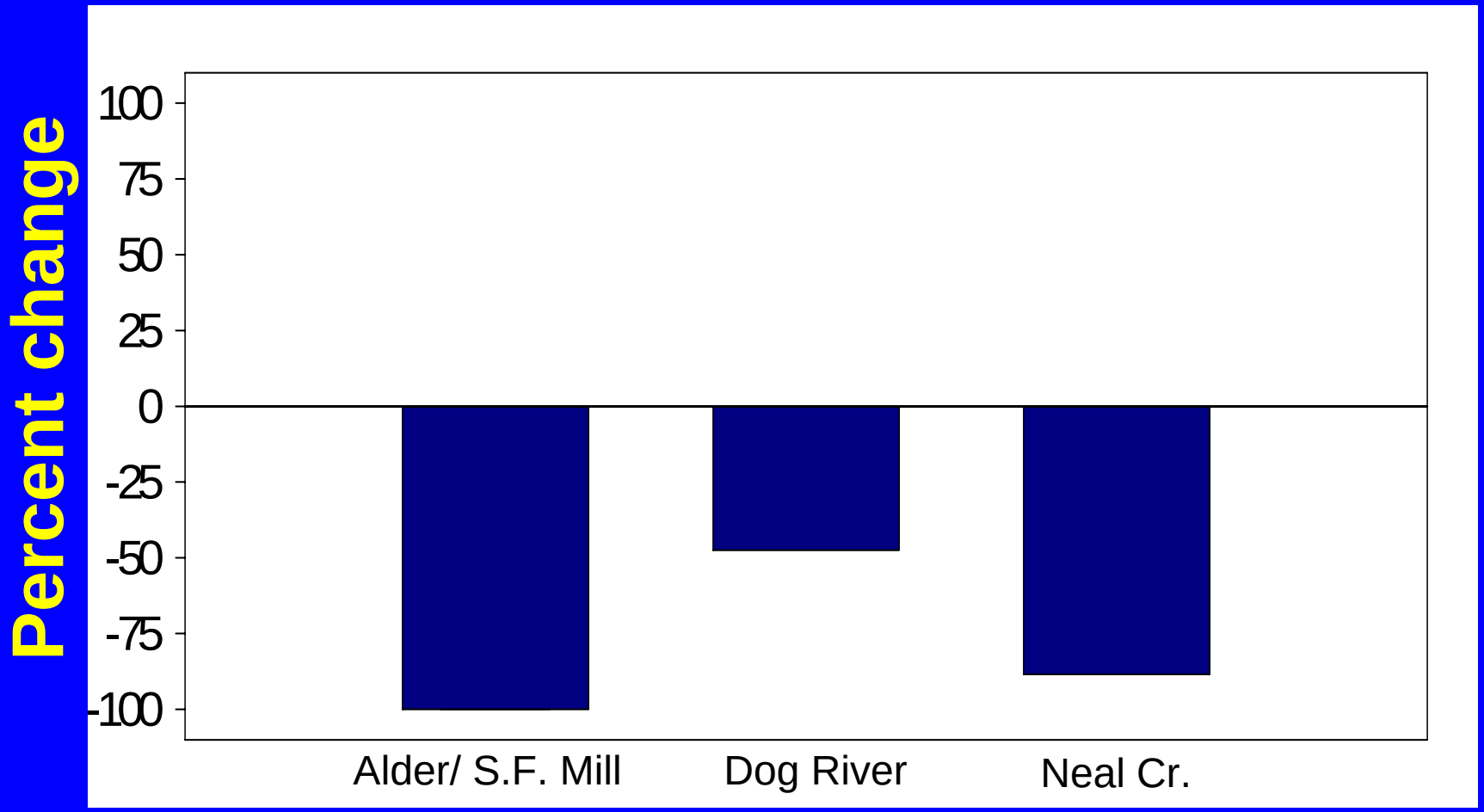


USGS


Change in Cutthroat , No./m +/- 1 SD
Percent Change (Above to Below)
150
100
50
0
-50
-100
-150
0
100/100
Case A
n=5
100/mix
Case B
n=4

USGS

Change in Contribution to Assemblage
Only CTT above, with RBT below



USGS

Cutthroat Trout Populations

1. When allopatric above barriers, found relatively high populations.

2. When sympatric below barriers, found much lower populations, if any at all.

USGS

Q: If tributaries
<u>did not have barriers,</u>
how healthy would coastal cutthroat trout populations be in the Columbia River Gorge above Bonneville Dam ?

My conclusion: Not very.

USGS

Why so limited below barriers?

In the absence of sea-run cutthroat trout, standing population may be highly reliant on those moving downstream from above barriers.

Once they get there, appear to have low reproductive success and/or low survival.

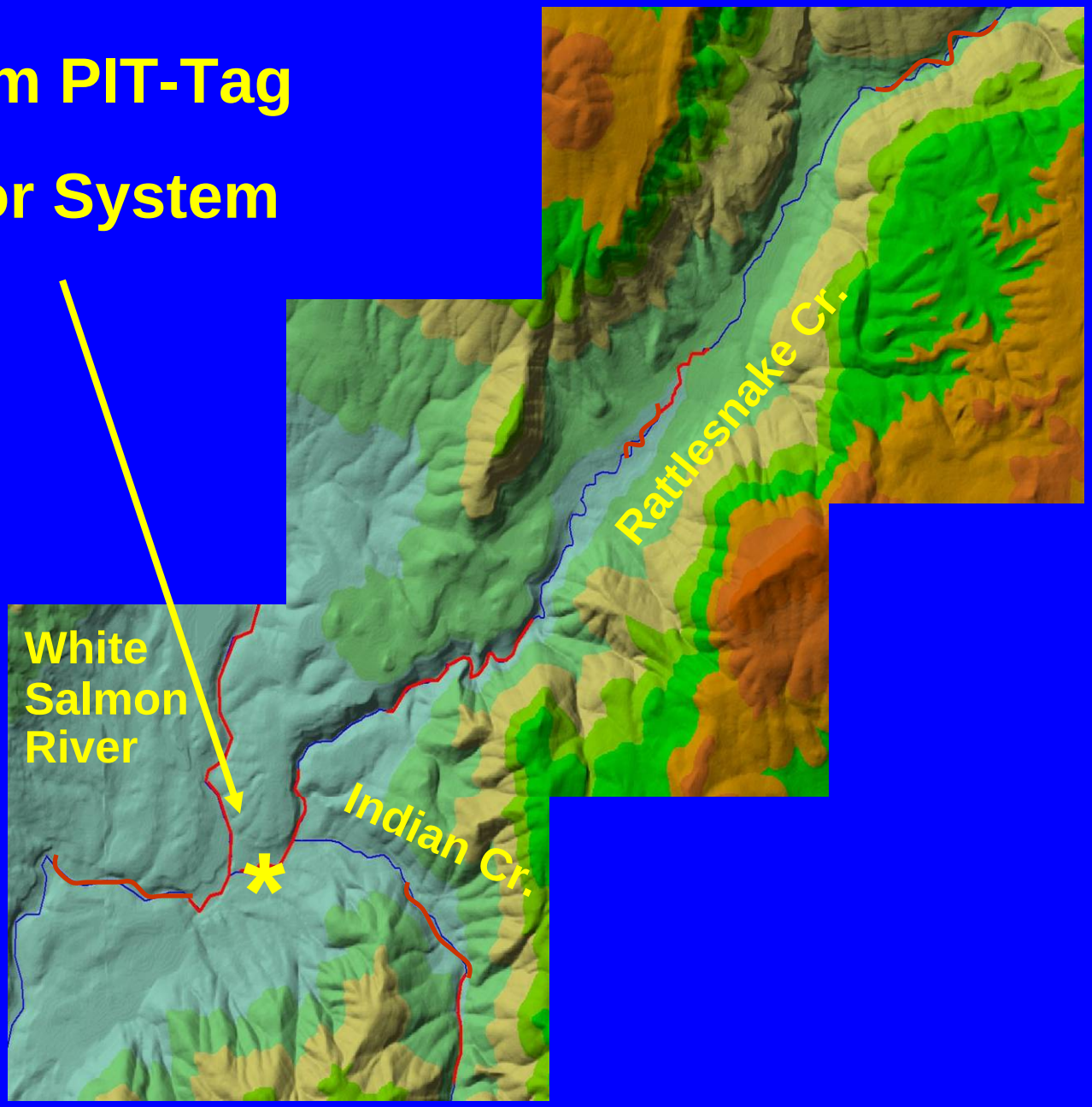
This needs further testing!

USGS

Passive Integrated Transponder tags
"PIT tags"
ISO FDX-B, 12 mm, 134.2 kHz

USGS

Instream PIT-Tag Detector System

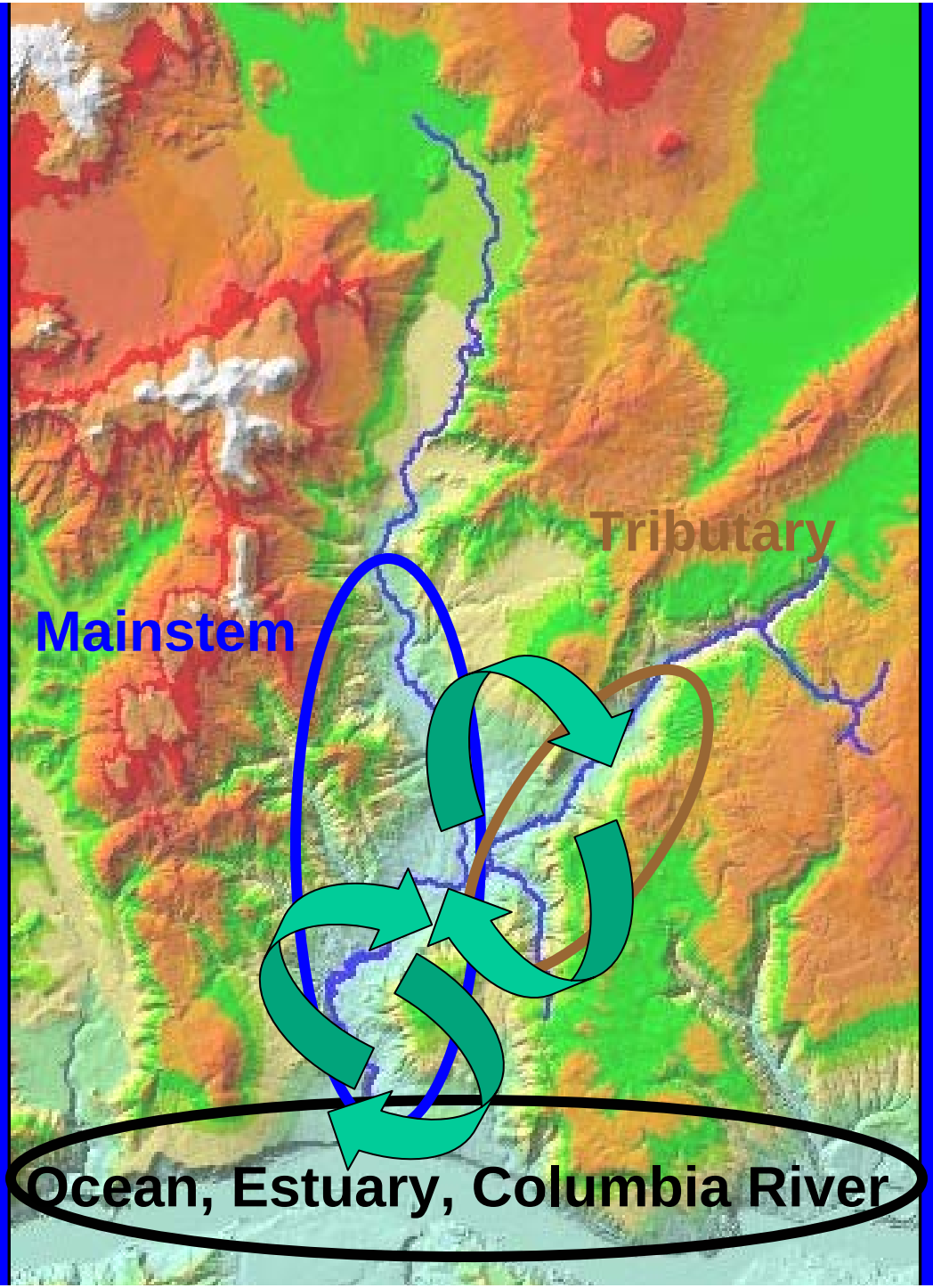


USGS

USGS

Connectivity

How do coastal cutthroat trout use the system?



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Washington Department of FISH AND WILDLIFE

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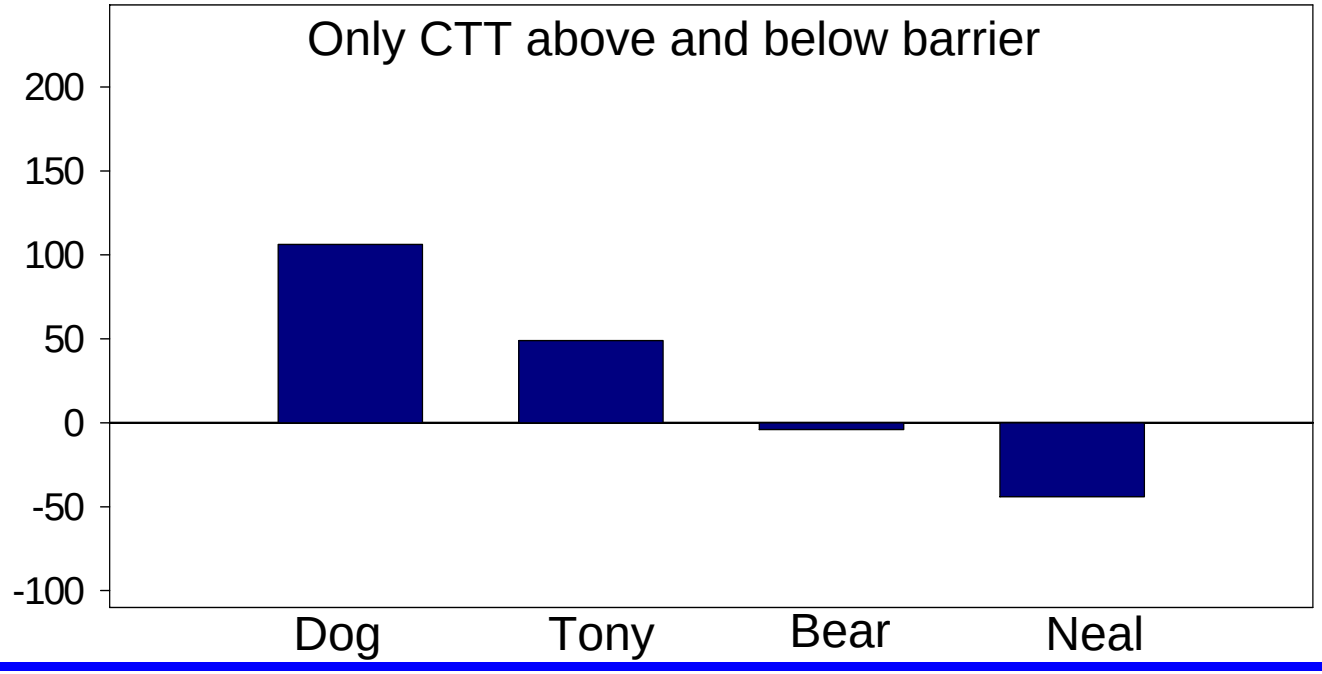
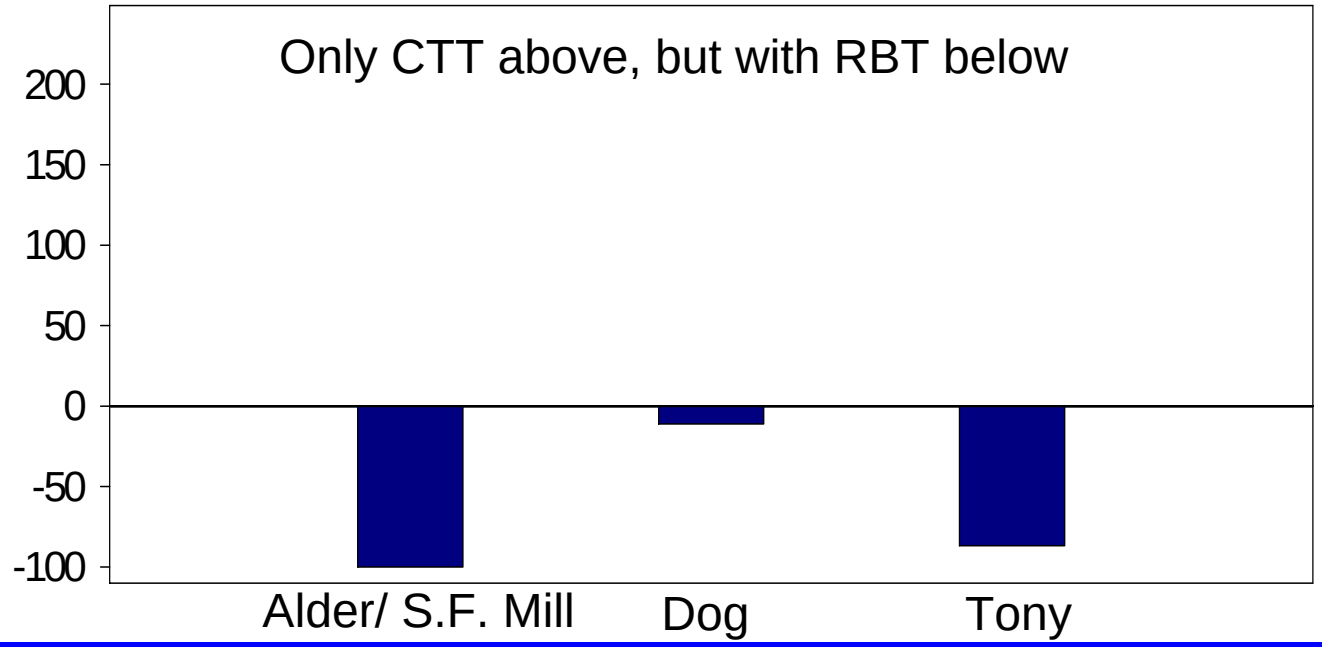
OREGON Fish & Wildlife

Percent change in CTT Biomass (g/m)





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