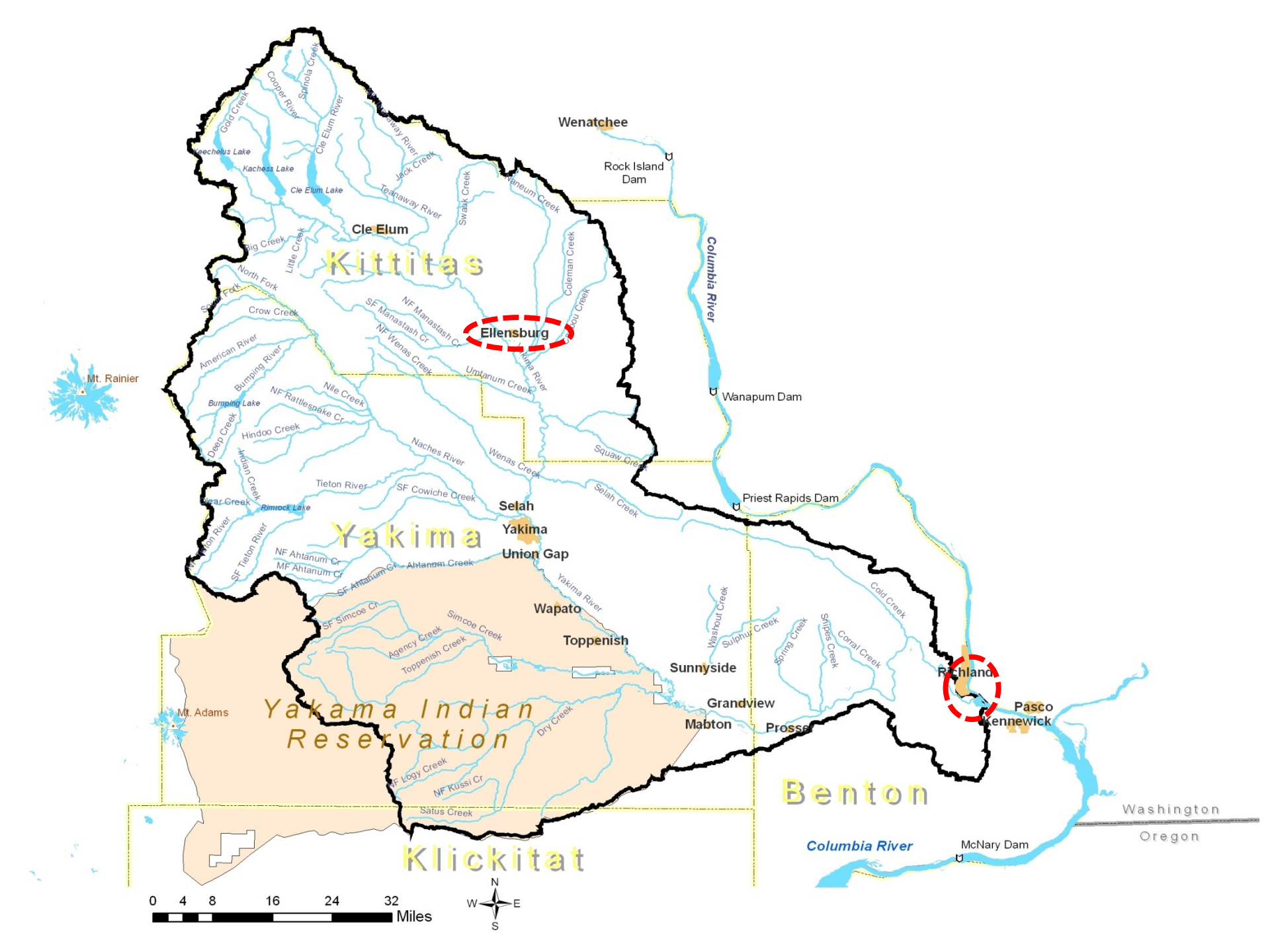
Yakima River Delta Habitat Assessment

SRFB PROJECT #10-1784

MID-COLUMBIA FISHERIES ENHANCEMENT GROUP
AND
BENTON CONSERVATION DISTRICT

With lots of help from
YAKAMA NATION
YAKIMA BASIN FISH AND WILDLIFE RECOVERY BOARD
YAKIMA DELTA TECHNICAL ADVISORY GROUP
INTERA, Inc.

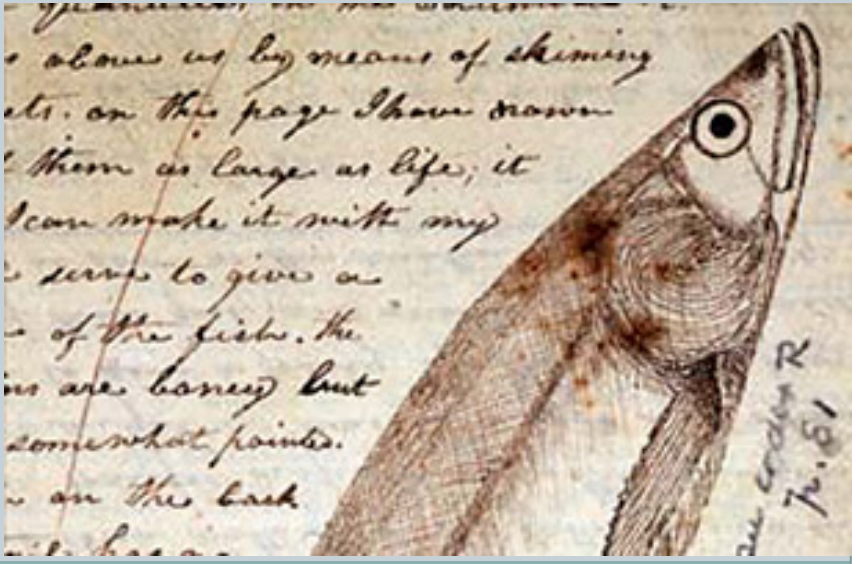
(Thanks!)

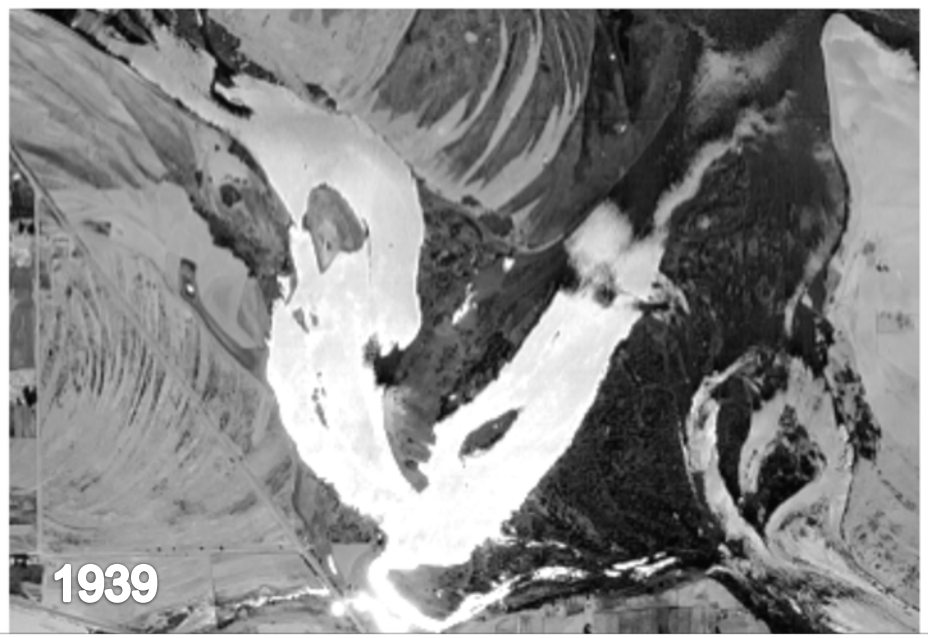

Wenatchee
Rock Island Dam
Columbia River
Cle Elum
Kittitas
Ellensburg
Wanapum Dam
Priest Rapids Dam
Selah
Yakima
Union Gap
Wapato
Toppenish
Sunnyside
Grandview
Mabton
Prosser
Richland
Pasco
Kennewick
Yakama Indian Reservation
Benton
Klickitat
Columbia River
McNary Dam
Washington
Oregon
Mt. Rainier
Mt. Adams
Cooper River
Gold Creek
Cle Elum River
Jack Creek
Teanaway River
Swauk Creek
Manastash Creek
Coleman Creek
Big Creek
Little Creek
North Fork
Crow Creek
American River
Bumping River
Bumping Lake
NF Rattlesnake Cr
Nile Creek
Hindoo Creek
Deep Creek
Indian Creek
Naches River
Wenas Creek
Squaw Creek
Tieton River
SF Cowiche Creek
Selah Creek
Rimrock Lake
SF Tieton River
NF Ahtanum Cr
MF Ahtanum Cr
SF Ahtanum Cr
Ahtanum Creek
Yakima River
SF Simcoe Cr
Simcoe Creek
Agency Creek
Toppenish Creek
Dry Creek
NF Logy Creek
NF Kussi Cr
Satus Creek
Washout Creek
Sulphur Creek
Spring Creek
Snipes Creek
Coral Creek
Cold Creek
0 4 8 16 24 32 Miles
N
W
E
S


George Washington Way
182
Columbia River
Rd 100
240
Yakima River
Bateman Island
© 2013 Google
Columbia Park Trail

The Delta in 1805

"I took two men in a Small Canoe and assended the Columbia river 10 miles to an Island [Bateman Island] near the Stard. Shore on which two large Mat Lodges of Indians were drying Salmon, ... there is no timber of any Sort except Small willow bushes in Sight in any direction - from this Island the natives showed me the enterance of a large Westerly fork which they Call Tâpetêtt [Yakima River] at about 8 miles distant . . . "
Clark Journals, Oct. 17, 1805



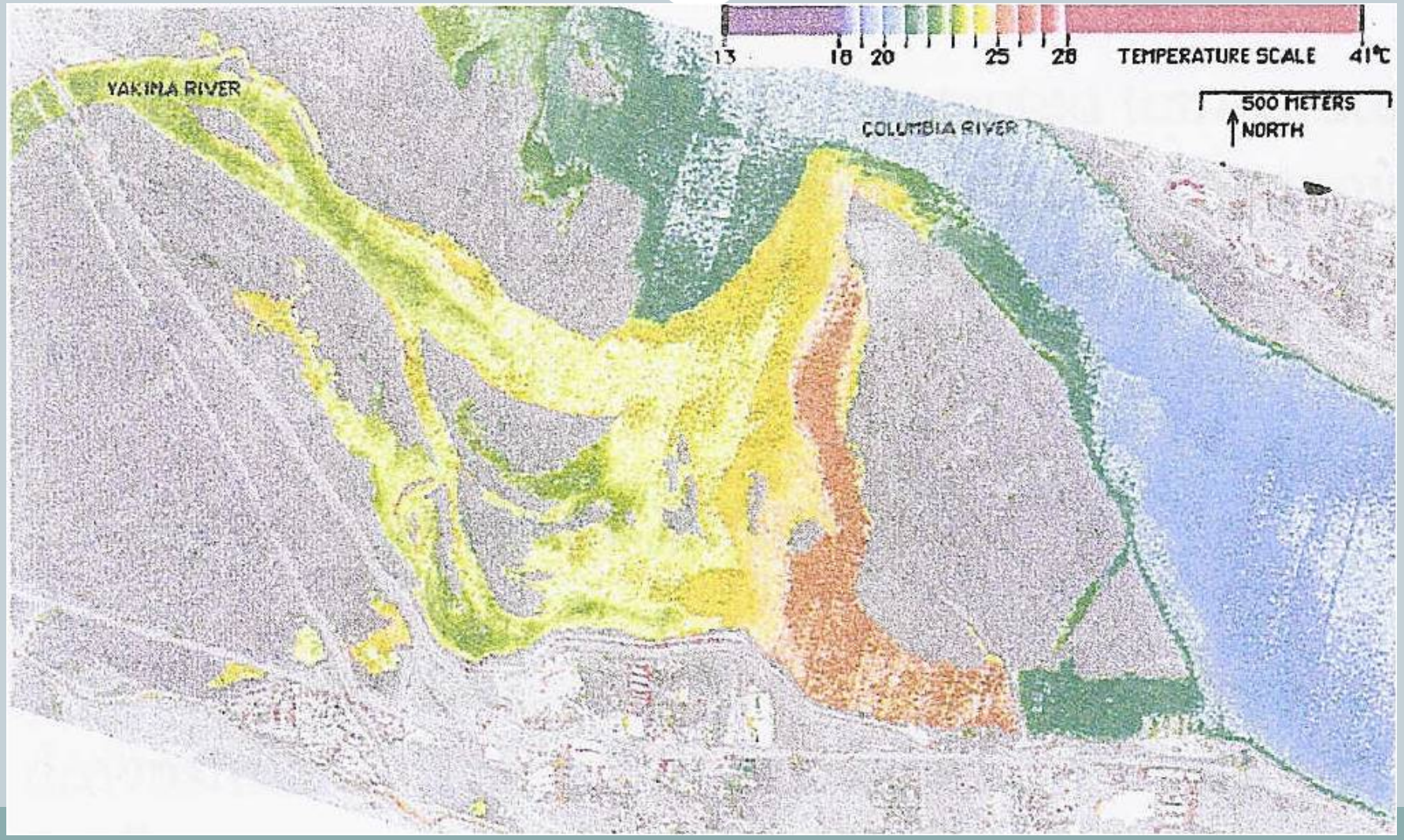

1939


September 13, 1945


1952


November 1964

1997 Aerial Thermography Data

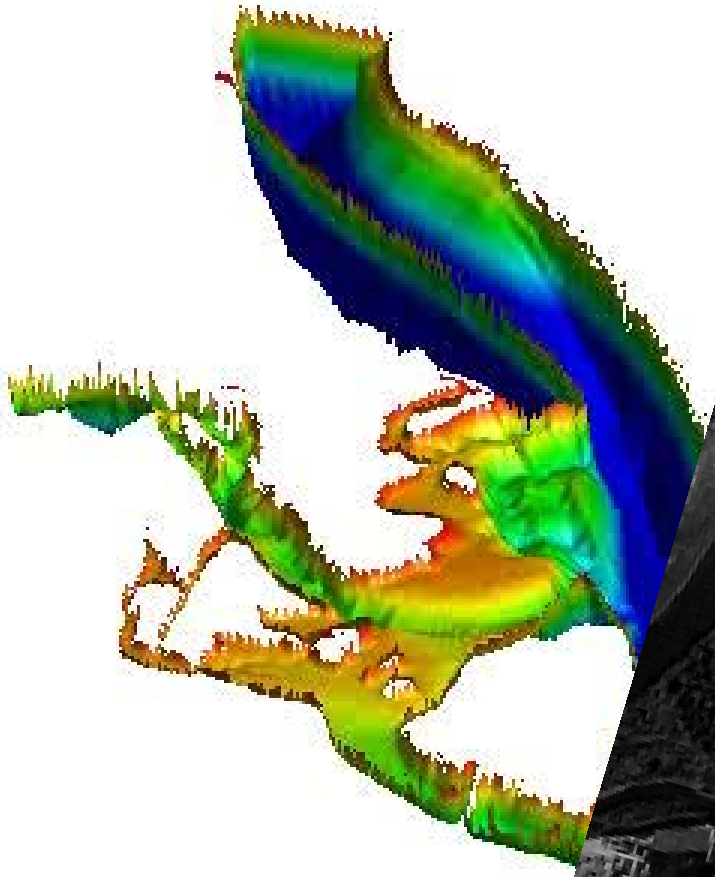


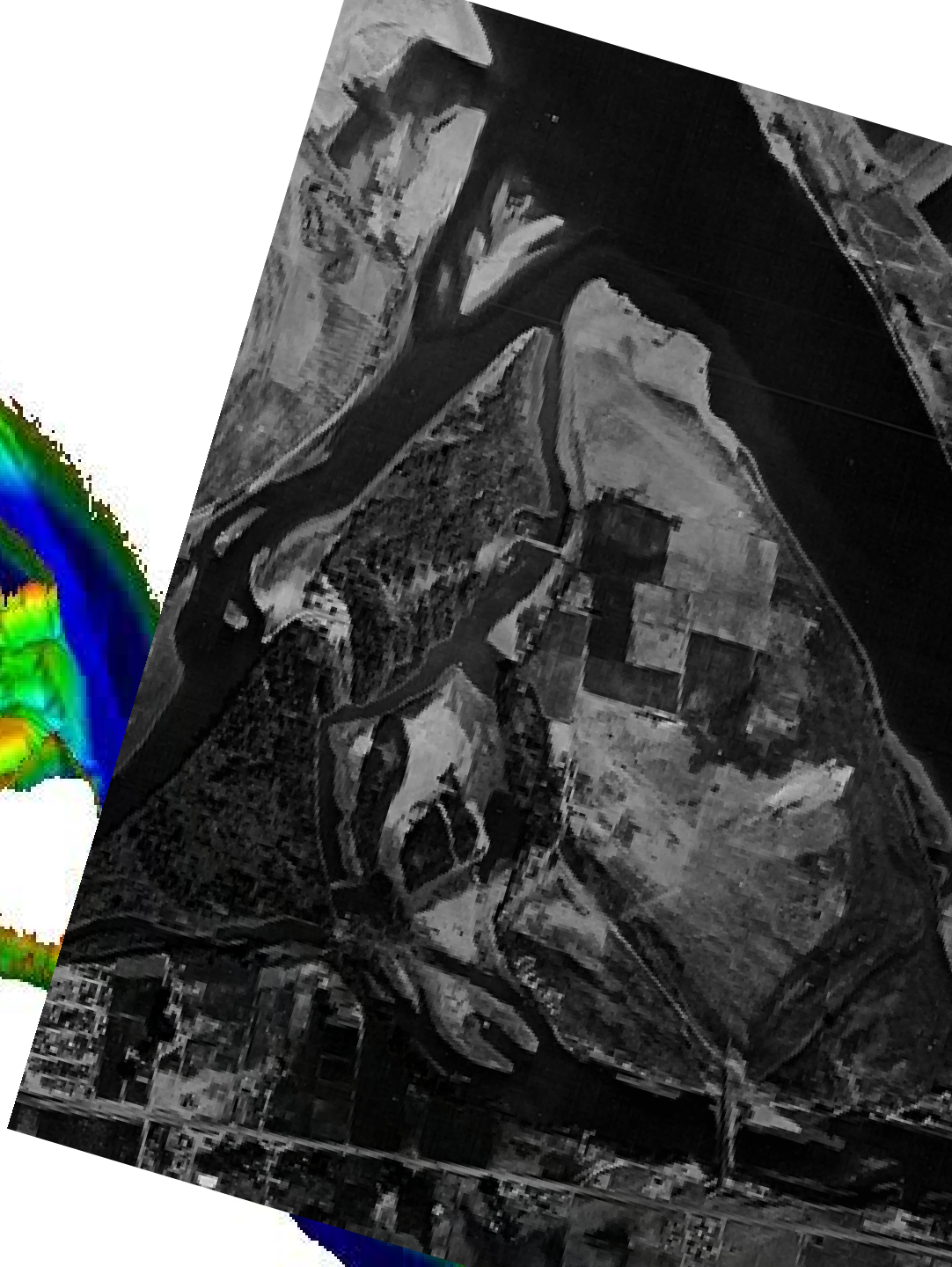
Data gaps

- Would removal or modification of the causeway improve passage, flow, and water quality conditions?
- Which fish are there now?
- What is the social and political feasibility of causeway modification?

Assessment Work To Date

- Bathymetry
- Flow Modeling
- Temperature and Dissolved Oxygen Monitoring
- Fish

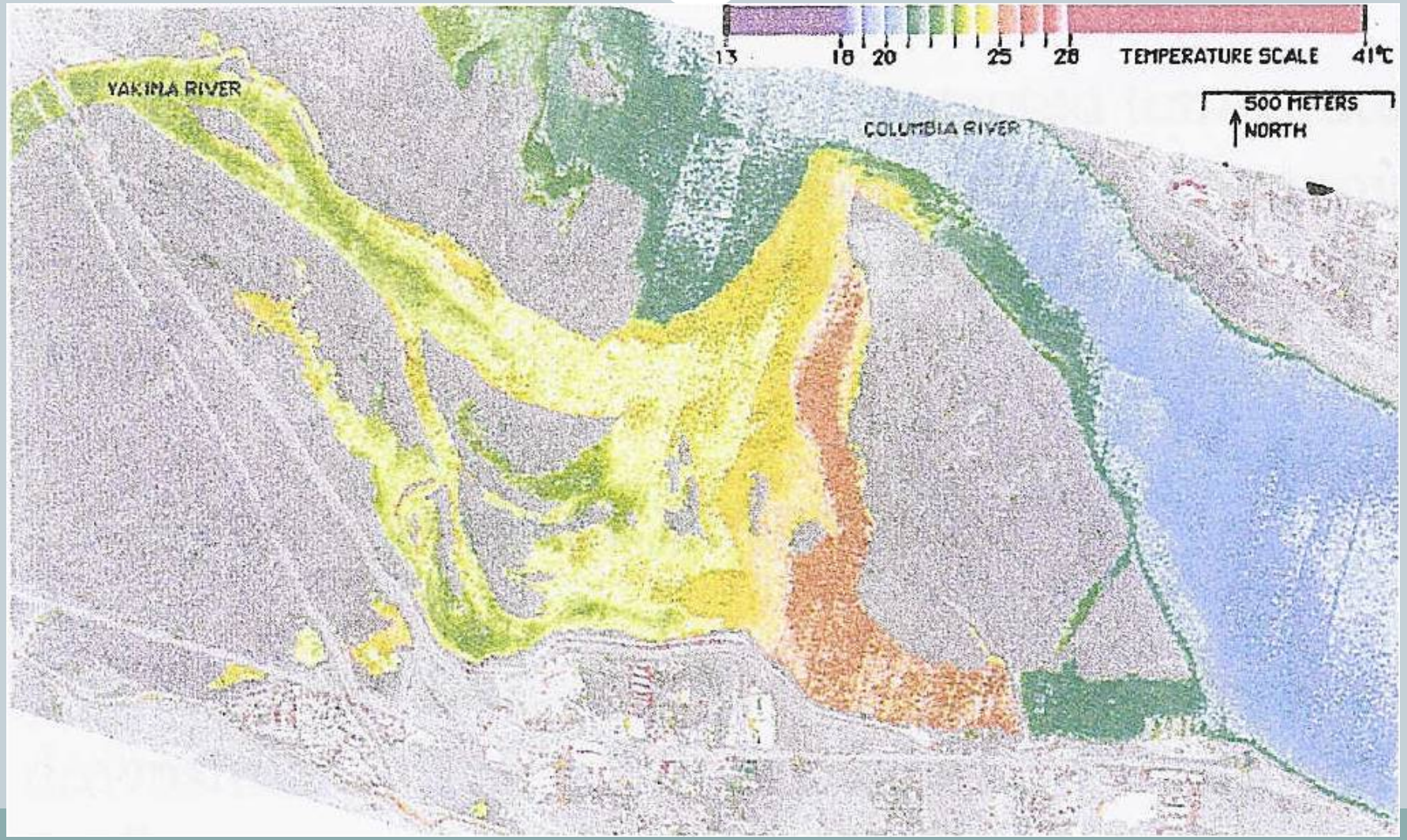




INTERA

EFDC Modeling

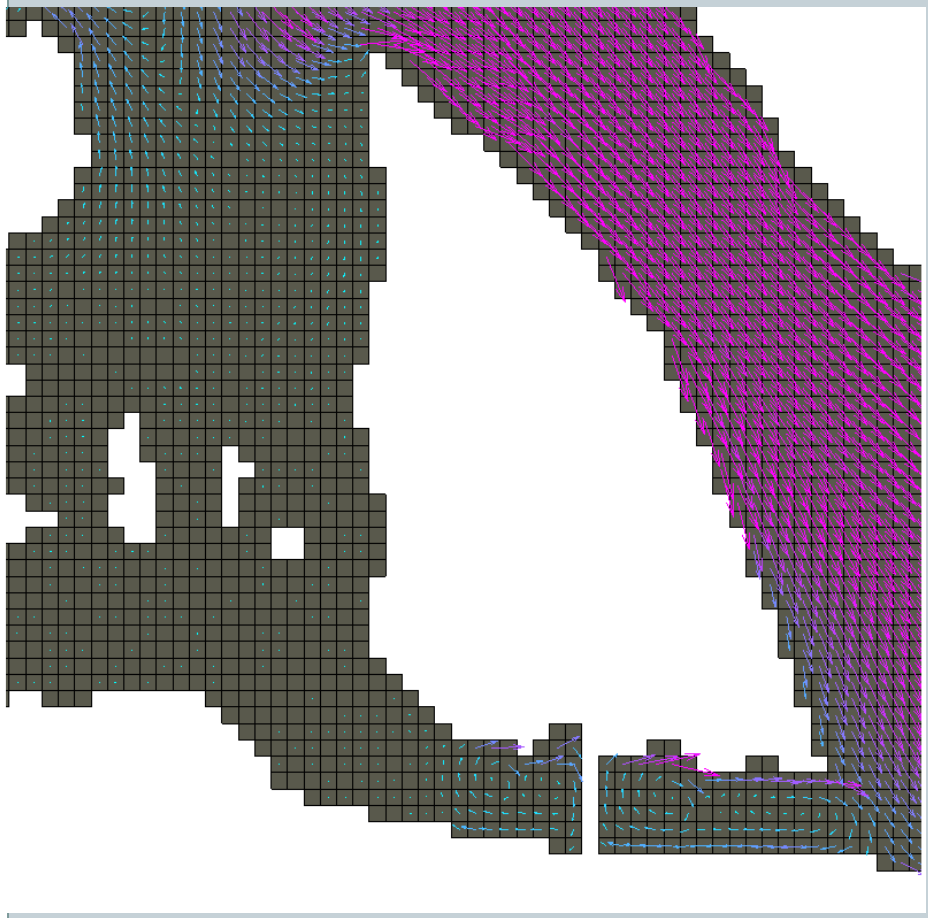
August 15, 1997

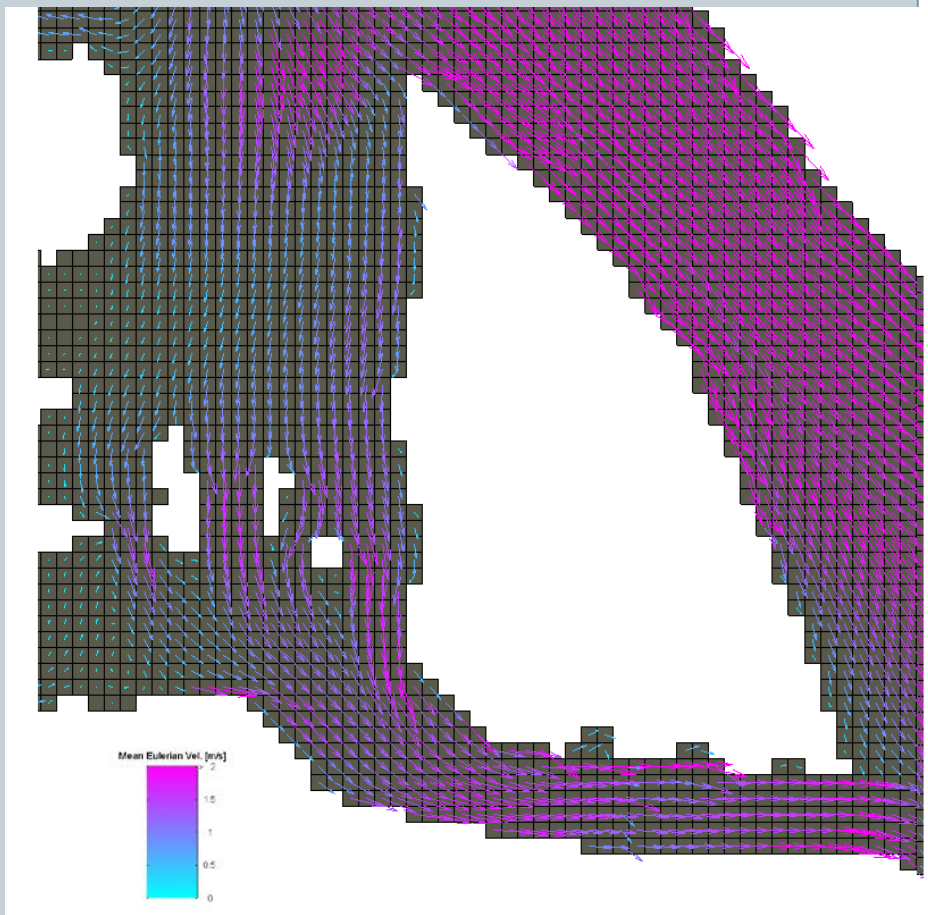


Full Breach: August 15, 1997

1997 conditions

With breached causeway

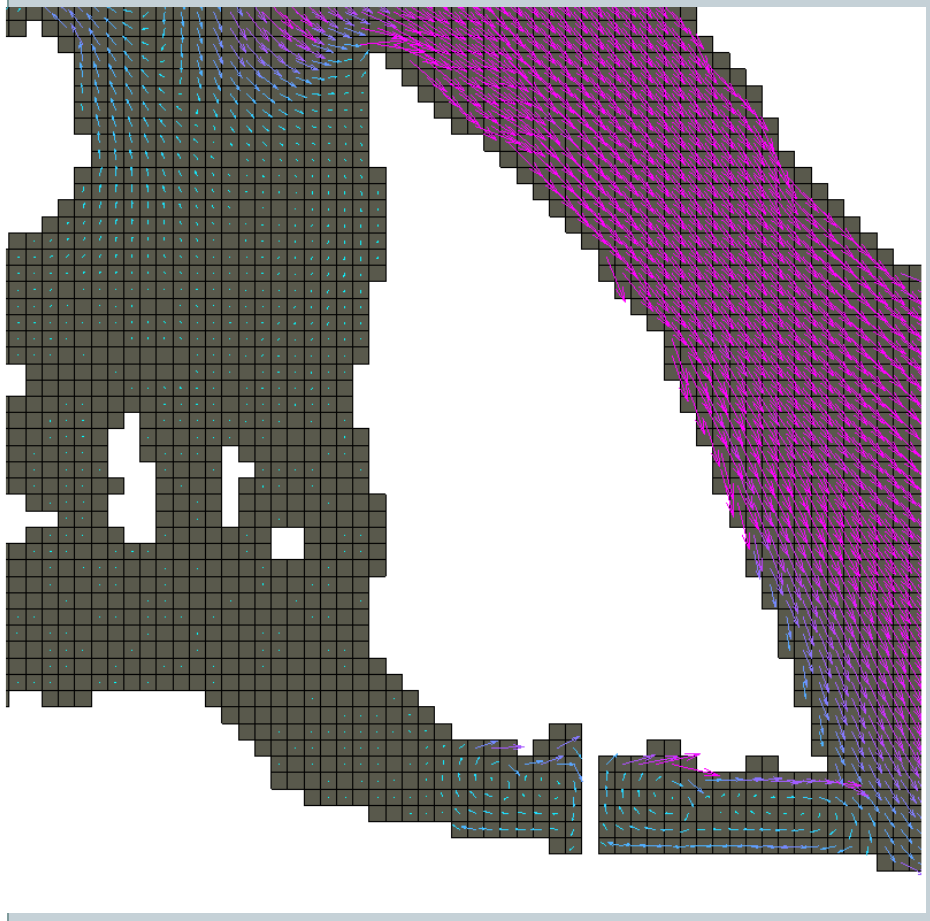




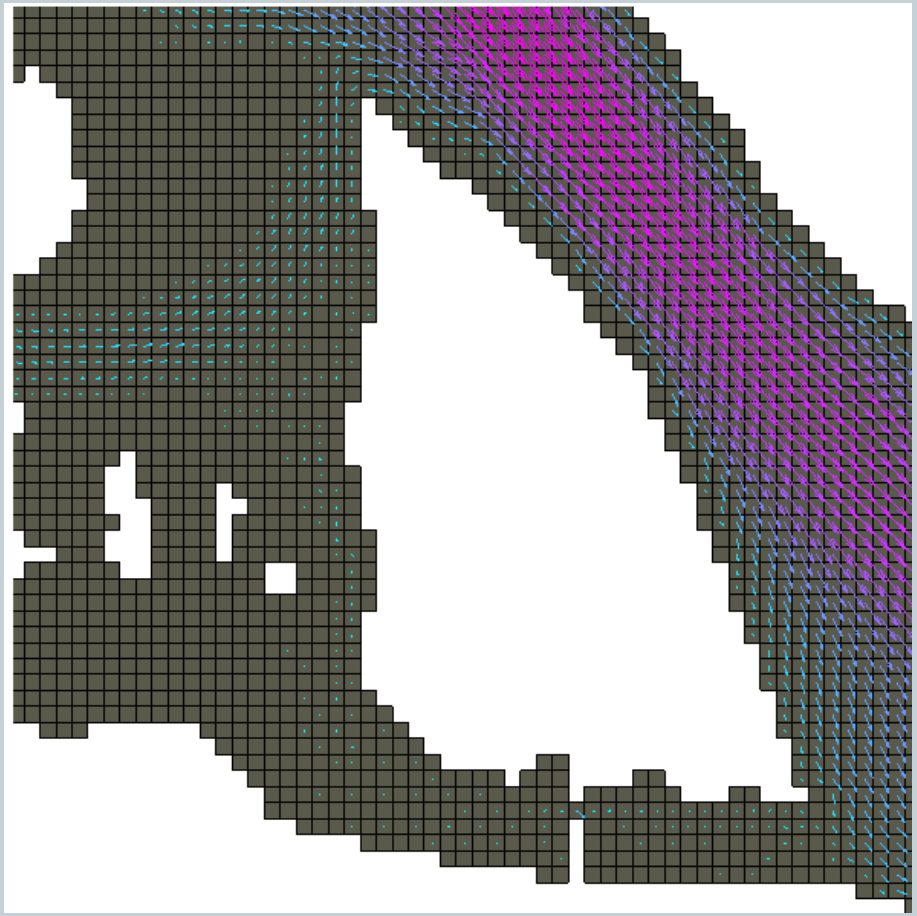
Yakima River: 1,840 cfs; Columbia River: 137,000 cfs

Partial Breach: August 15, 1997

1997 Conditions



With partially breached causeway

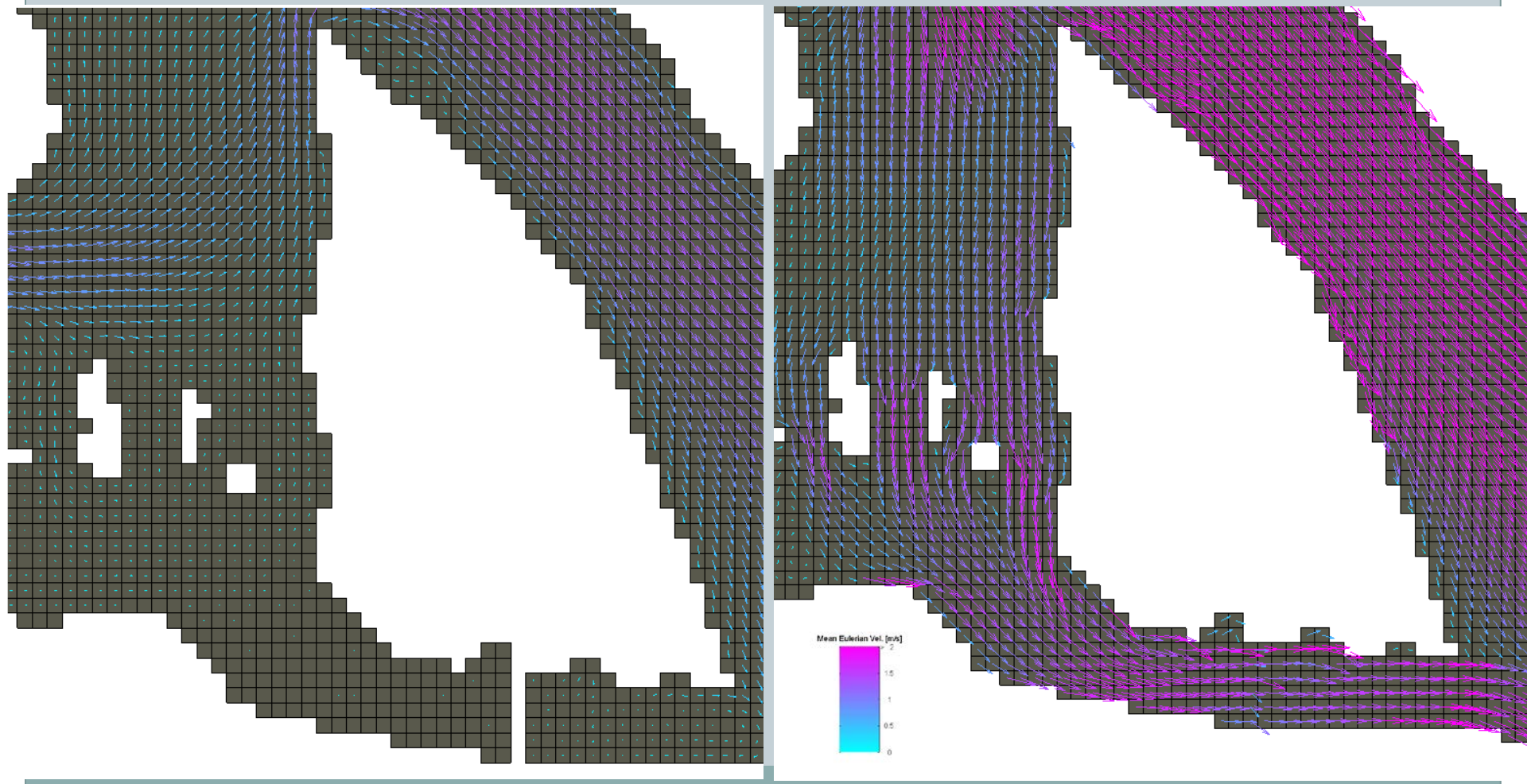


Yakima River: 1,840 cfs; Columbia River: 137,000 cfs

Full Breach: April 28, 2012

Current conditions

With breached causeway

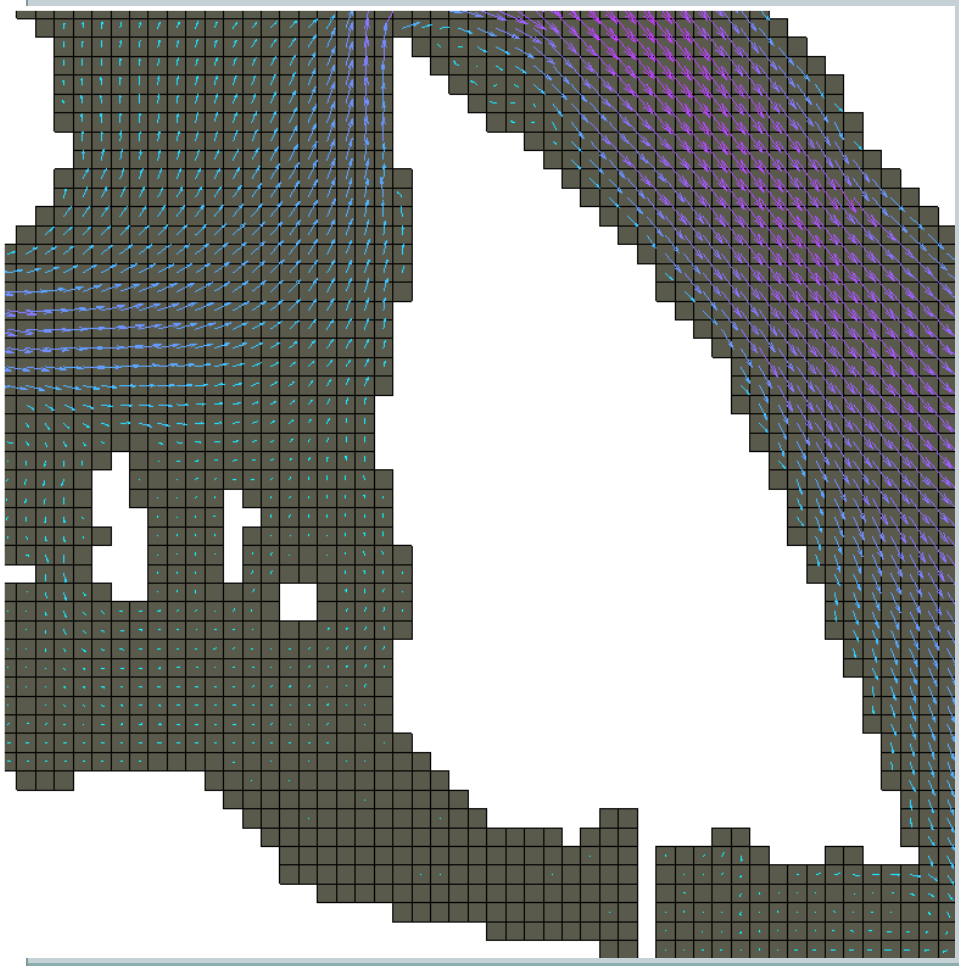


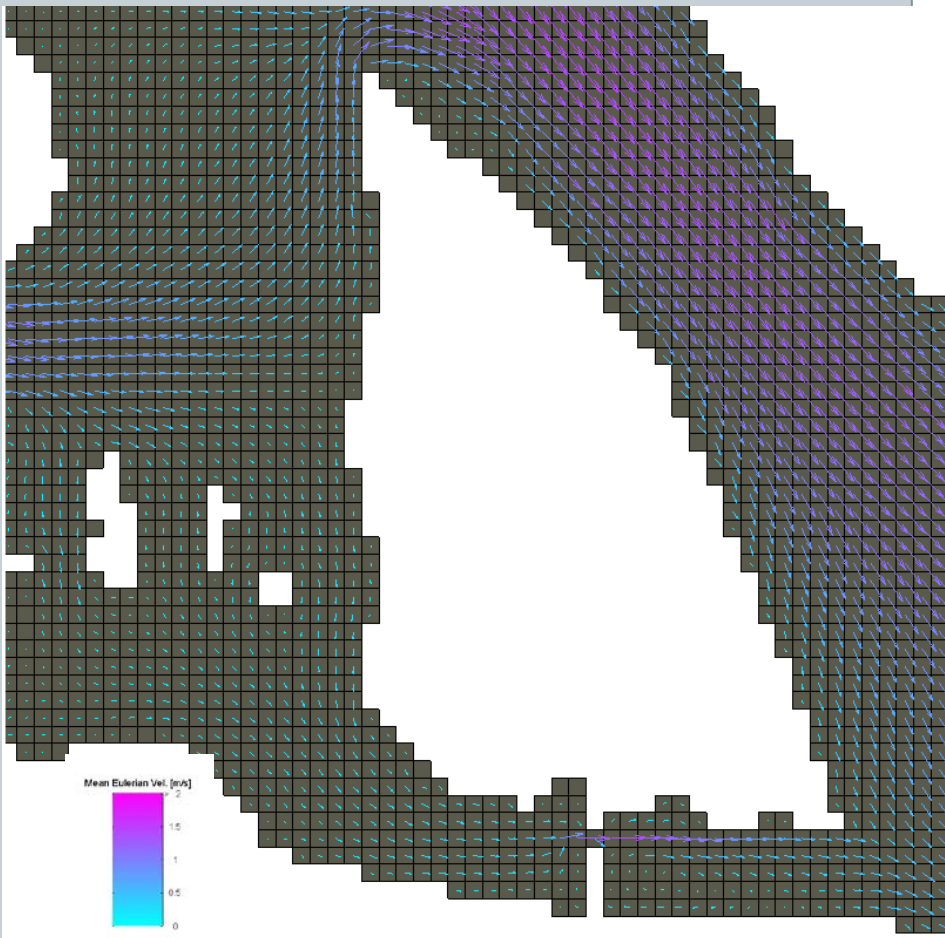
Yakima River: 18,400 cfs; Columbia River: 174,000 cfs

Partial Breach: April 28, 2012

Current conditions

With partially breached causeway





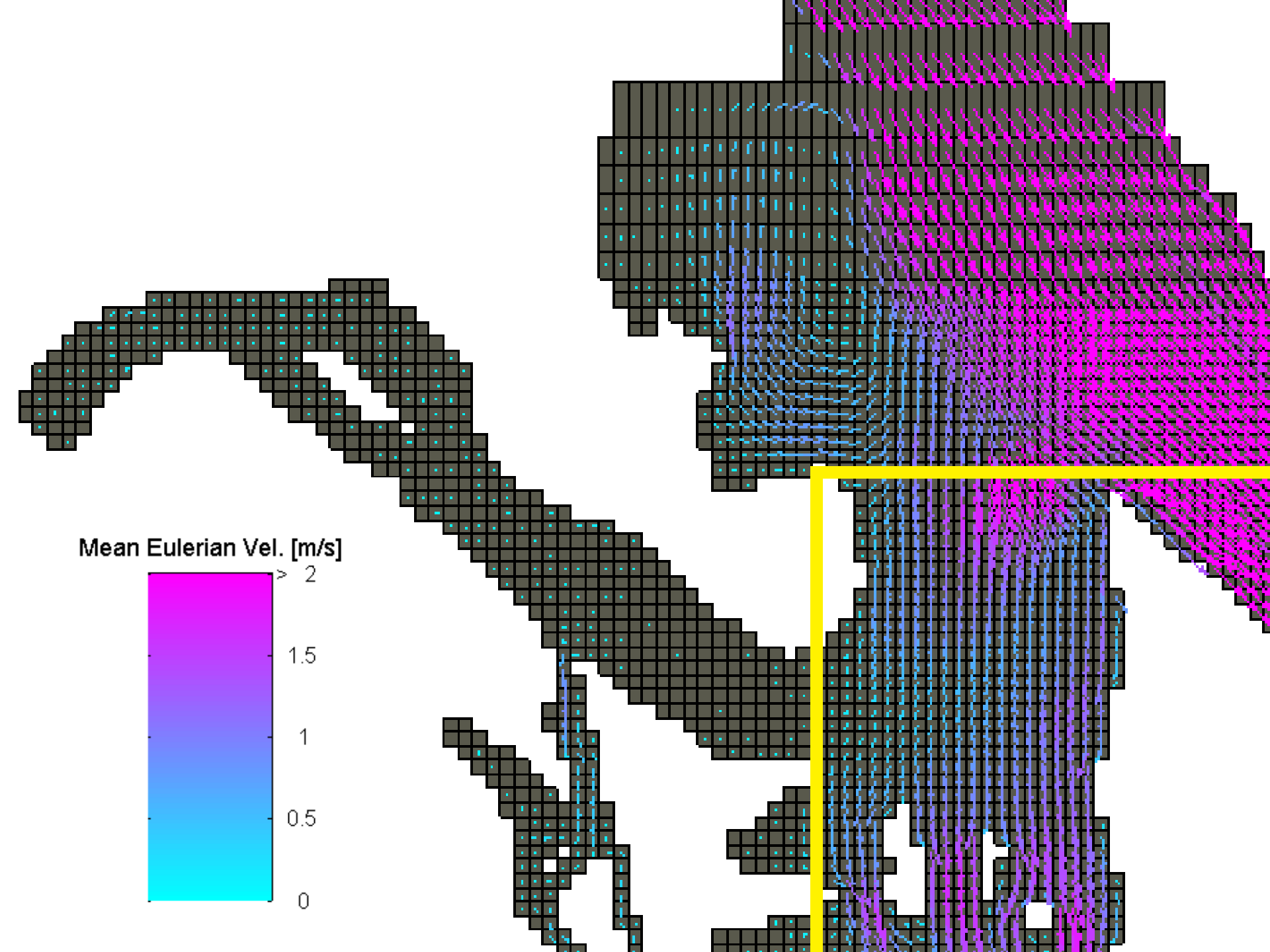
Yakima River: 18,400 cfs; Columbia River: 174,000 cfs

Upstream Effects: August 15, 1997

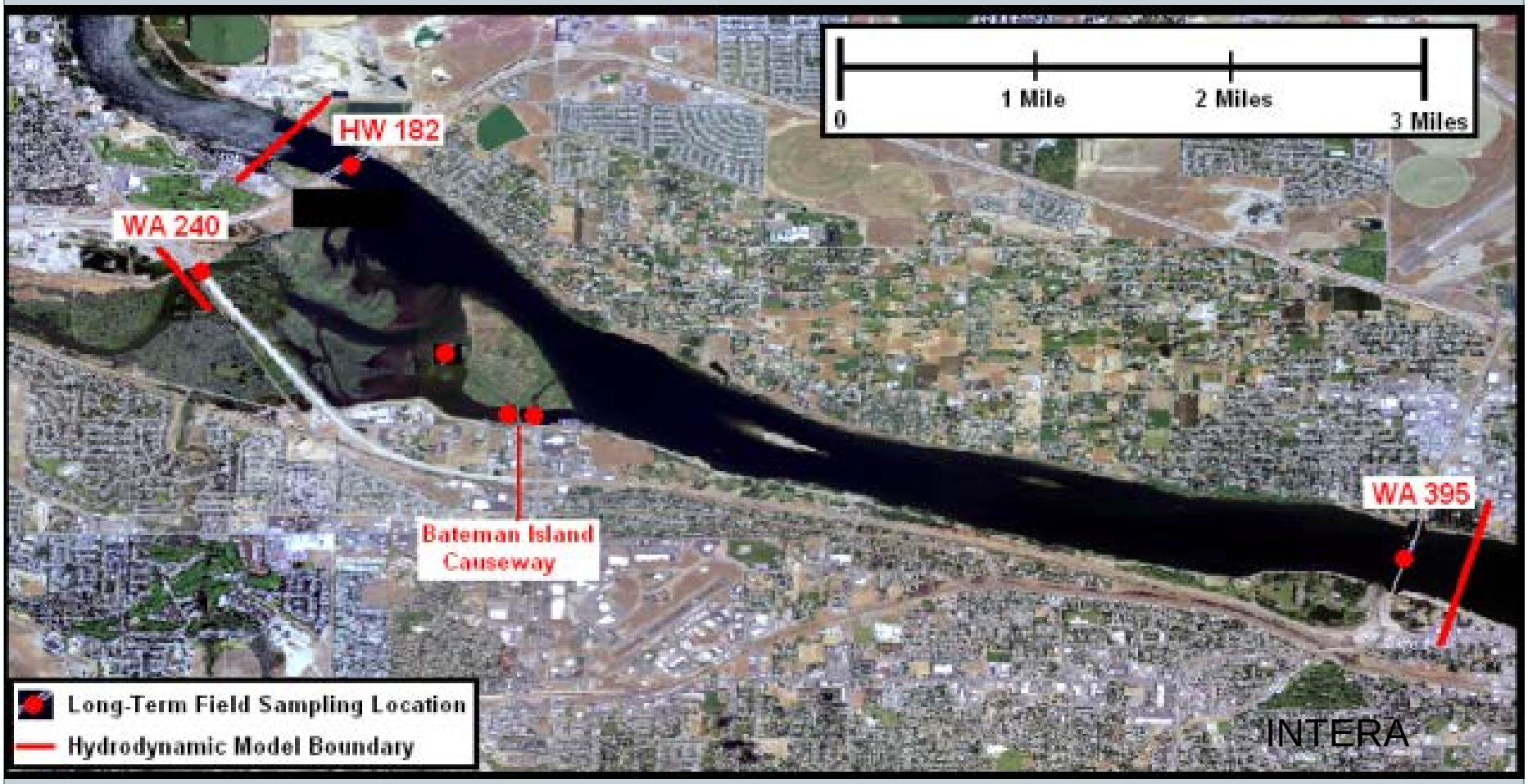
1997 Conditions

With fully breached causeway

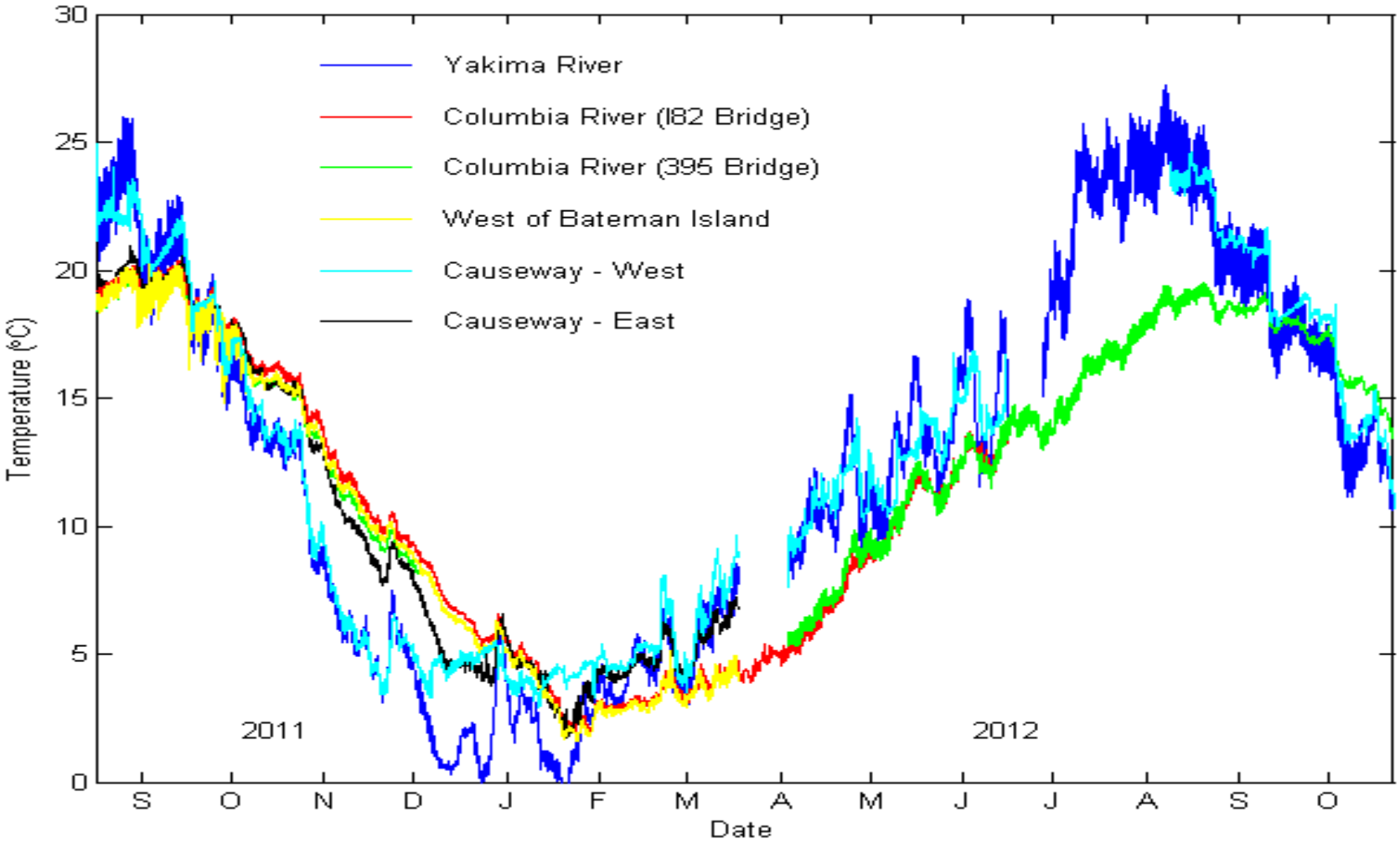
Yakima River: 1,840 cfs; Columbia River: 137,000 cfs


Mean Eulerian Vel. [m/s]
> 2
1.5
1
0.5
0

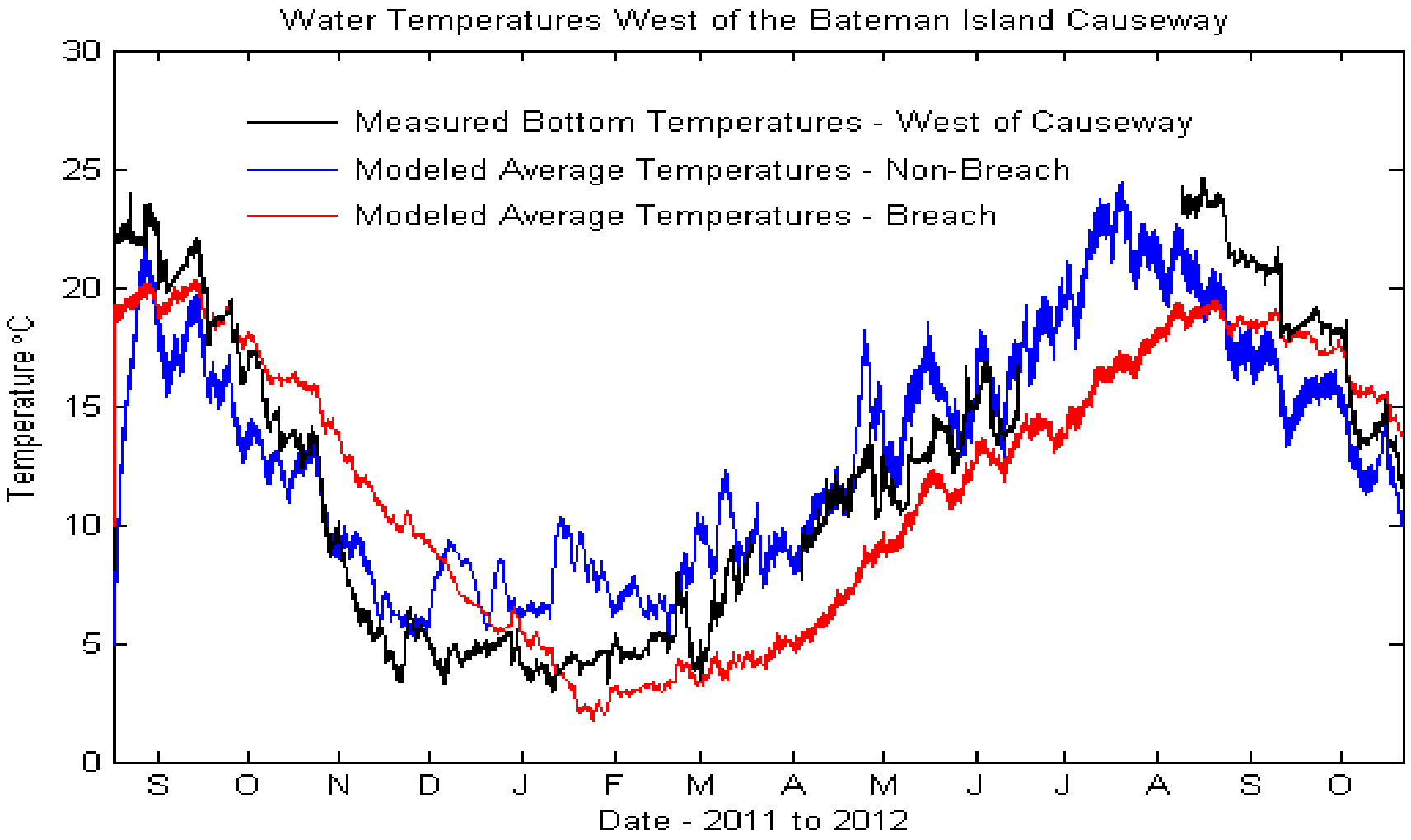
DO and Temperature Monitoring



Measured Temperature Data



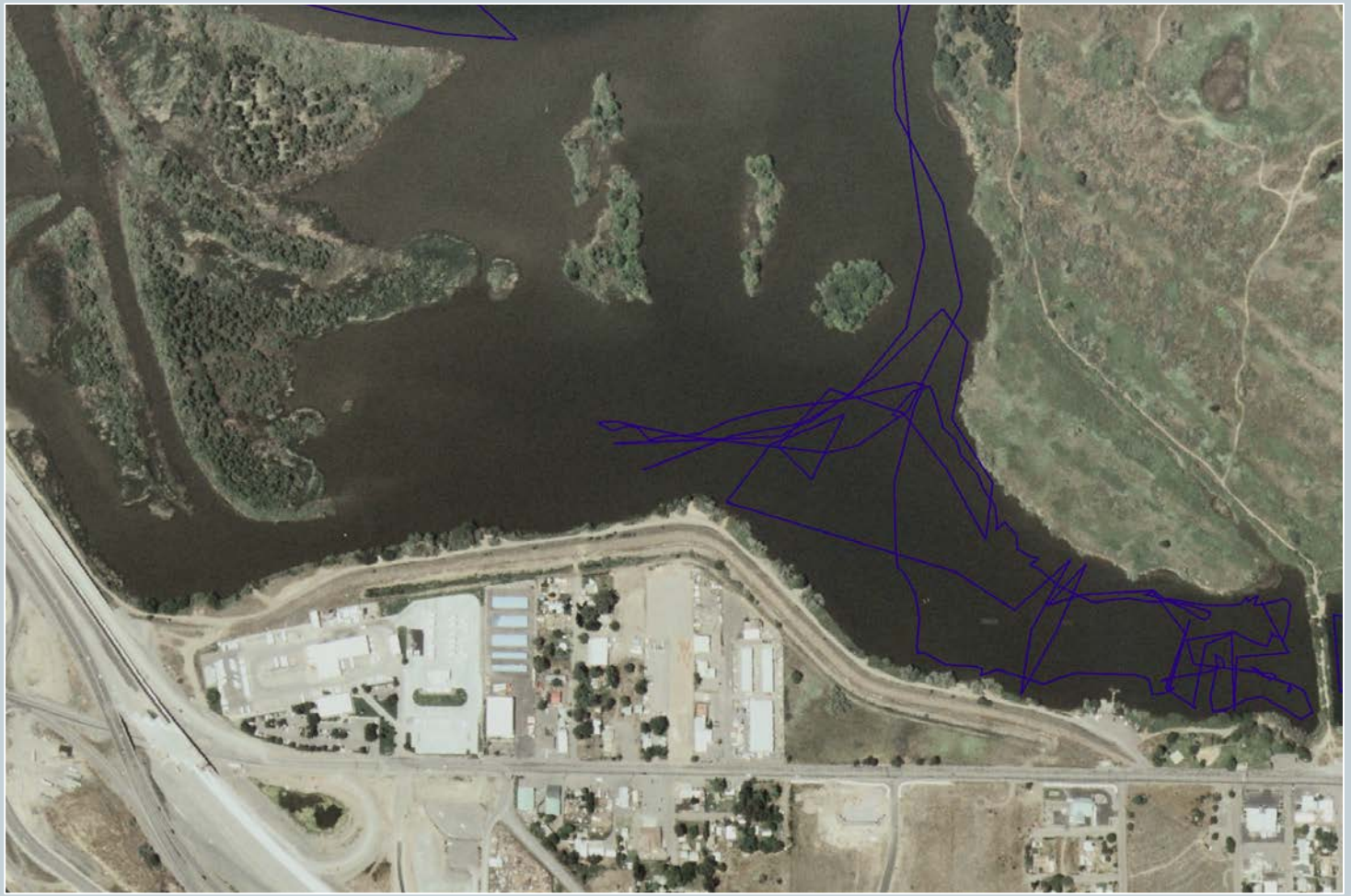
Modeled Temperatures West of Causeway

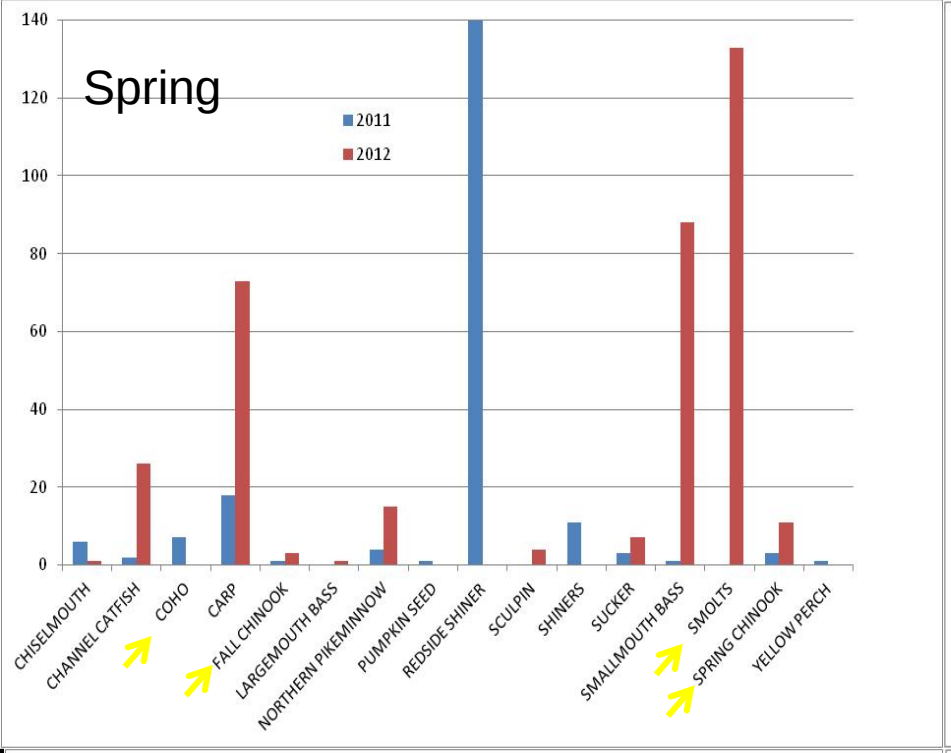


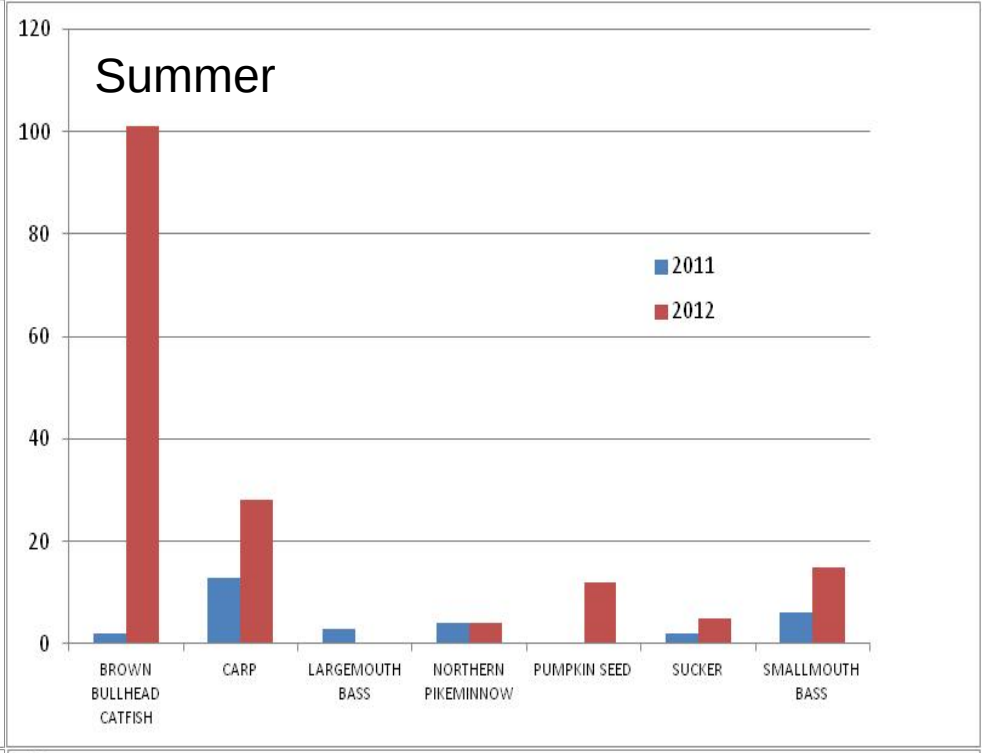
Migration and Salmonid Utilization Studies

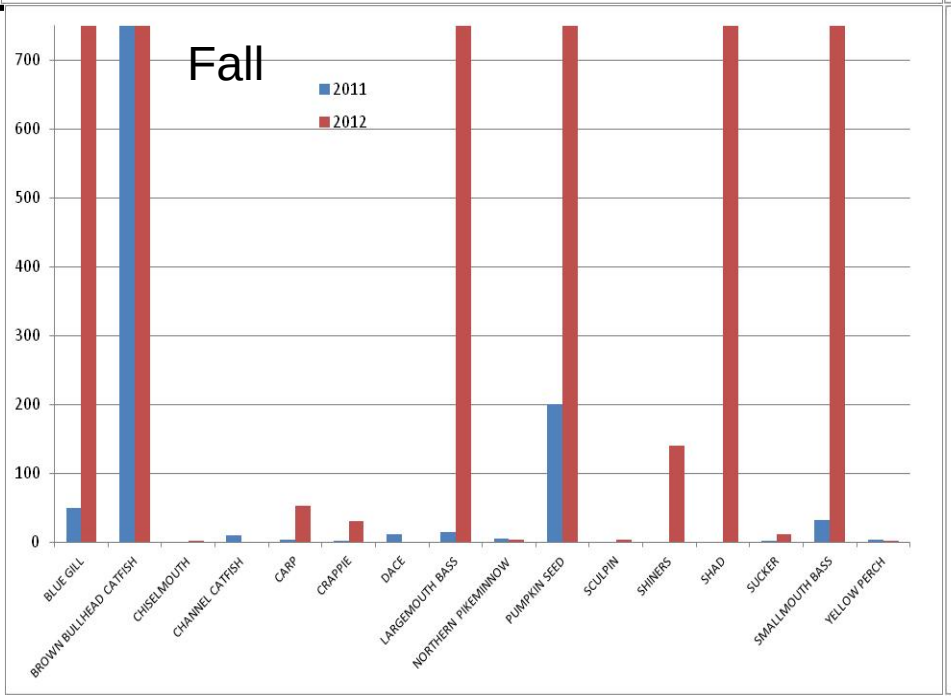
- Presence/absence and distribution of fish species
- Environmental information and GPS location for each sample site
- Sampling in smolt and adult migration timing periods

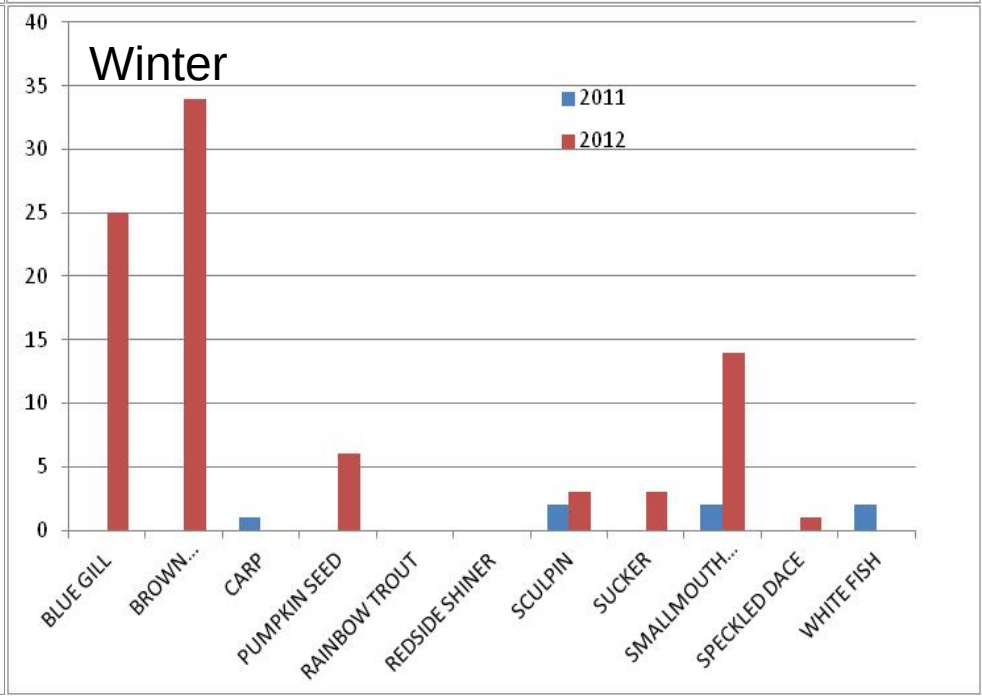
West of the Causeway




Spring
2011
2012
140
120
100
80
60
40
20
0
CHISELMOUTH
CHANNEL CATFISH
COHO
CARP
FALL CHINOOK
LARGEMOUTH BASS
NORTHERN PIKEMINNOW
PUMPKIN SEED
REDSIDE SHINER
SCULPIN
SHINERS
SUCKER
SMALLMOUTH BASS
SMOLTS
SPRING CHINOOK
YELLOW PERCH


Summer
2011
2012
120
100
80
60
40
20
0
BROWN BULLHEAD CATFISH
CARP
LARGEMOUTH BASS
NORTHERN PIKEMINNOW
PUMPKIN SEED
SUCKER
SMALLMOUTH BASS


Fall
2011
2012
700
600
500
400
300
200
100
0
BLUE GILL
BROWN BULLHEAD CATFISH
CHISELMOUTH
CHANNEL CATFISH
CARP
CRAPPIE
DACE
LARGEMOUTH BASS
NORTHERN PIKEMINNOW
PUMPKIN SEED
SCULPIN
SHINERS
SHAD
SUCKER
SMALLMOUTH BASS
YELLOW PERCH


Winter
2011
2012
40
35
30
25
20
15
10
5
0
BLUE GILL
BROWN...
CARP
PUMPKIN SEED
RAINBOW TROUT
REDSIDE SHINER
SCULPIN
SUCKER
SMALLMOUTH...
SPECKLED DACE
WHITE FISH

Proposed Conceptual Design Work

- Impacts on native and non-native fish utilization of the Bateman Island area?
- How would the causeway need to be modified in order to achieve the desired results while maintaining access to Bateman Island?
- How would causeway modification impact other resources in the area?
- How would causeway modification proceed?
- What are the anticipated costs of modifying the causeway?

More Thanks

- Salmon Recovery Funding Board
- Alex Conley and the YBFWRB
- Michael Porter, Dave Fast and Yakama Nation YKFP
- Members of the Yakima Delta TAG
  - David Child, Richard Visser, Paul LaRiviere, Dave Fast, Eric Bartrand, Geoff McMichael, Sean Gross, Matt Morgan, Adam Fyall, Elaine Brouillard, Mark Nielson, Tighe Stuart
- INTERA, Inc.: Jordan Furnans and Chris Magan
- City of Richland
- US Army Corps of Engineers
- Jason McCormick and Medora Robertson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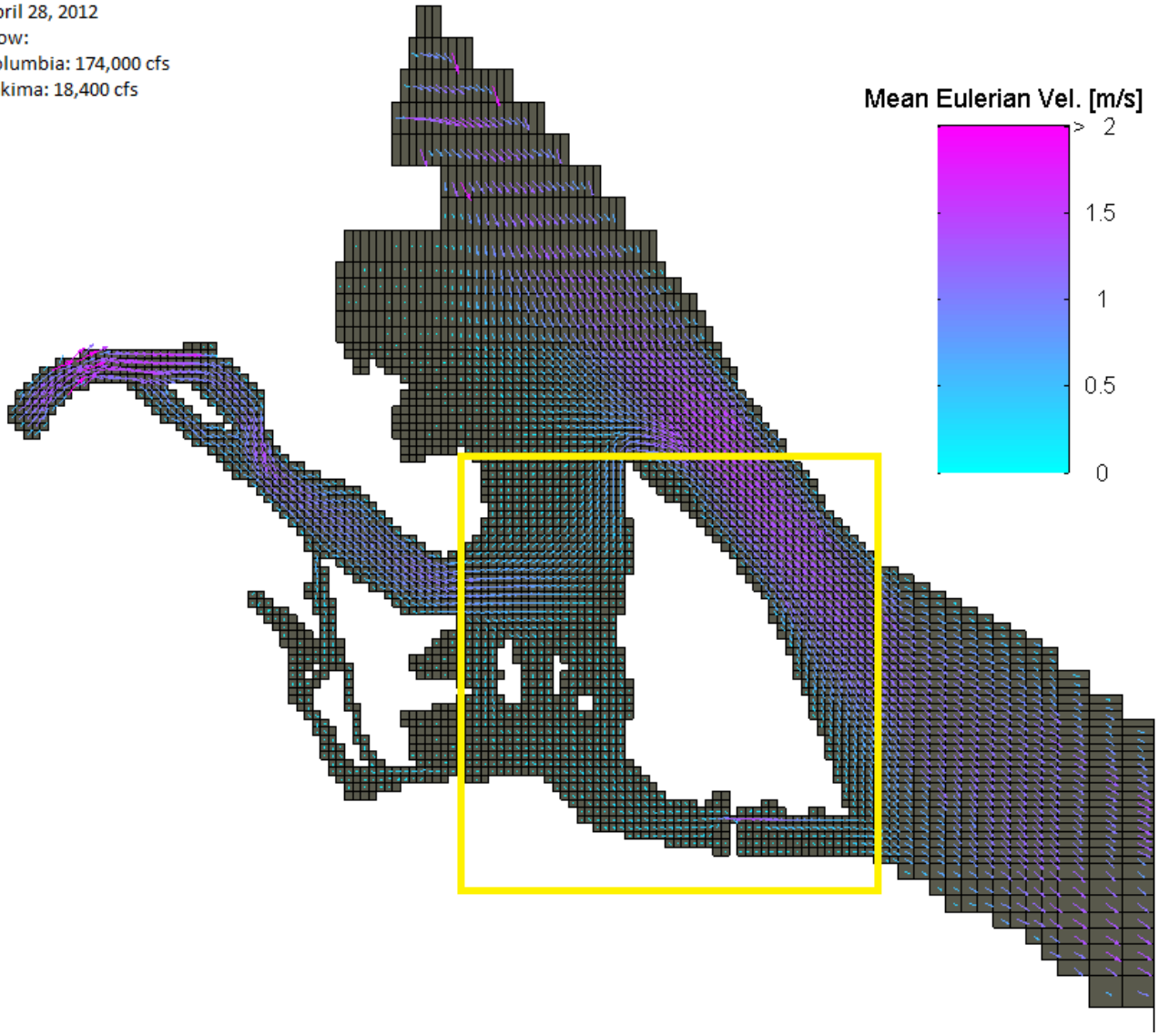
Environmental Fluid Dynamics Code

EFDC uses stretched or sigma vertical coordinates and Cartesian or curvilinear, orthogonal horizontal coordinates to represent the physical characteristics of a waterbody. It solves three-dimensional, vertically hydrostatic, free surface, turbulent averaged equations of motion for a variable-density fluid. Dynamically-coupled transport equations for turbulent kinetic energy, turbulent length scale, salinity and temperature are also solved.

EPA's Watershed and Water Quality Modeling Technical Support Center

http://www.epa.gov/athens/wwqtsc/index.html


April 28, 2012
Flow:
Columbia: 174,000 cfs
Yakima: 18,400 cfs
Mean Eulerian Vel. [m/s]
> 2
1.5
1
0.5
0