Northwest **Power** and **Conservation** Council

August 2, 2106

MEMORANDUM

TO: **Council members**

FROM: **Kerry Berg**

SUBJECT: **Presentation on Bull Trout Recovery Efforts in the Flathead Subbasin**

BACKGROUND:

Presenters: Les Evarts, Lynn DuCharme and Barry Hansen, Confederated Salish and Kootenai Tribes; Brian Marotz, Montana Fish, Wildlife & Parks.

Summary: Bull trout have declined in abundance due to habitat degradation, overharvest, and interactions with nonnative species and were listed as threatened throughout its U.S. range in 1999. Of all the salmonids in the Columbia River Basin, bull trout have some of the most specific habitat requirements, sometimes referred to as the four C's: cold, clean, complex, and connected. Staff from the Confederated Salish and Kootenai Tribes and Montana Fish, Wildlife, & Parks will provide an overview of bull trout status and actions being taken to address limiting factors for this and other resident focal fish species in the Flathead Subbasin.

Relevance: In the 2014 Fish and Wildlife Program, beginning on page 87, the Council calls for the protection and mitigation of freshwater and associated habitat of native fish populations, like bull trout, impacted by the hydrosystem. The Council's program recognizes the importance of all native resident fish and other freshwater species, in maintaining ecosystem diversity and function, and contributing to cultural aspects in the basin. It relies on a diversity of strategies to address those losses, including habitat mitigation, hatcheries, harvest augmentation, and modifying hydrosystem operations.

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Executive Director

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Background: Since 1991 the Confederated Salish and Kootenai Tribes and Montana Fish, Wildlife & Parks have formed a crucial partnership with the Council and BPA to aggressively understand and mitigate ecological harm caused by the construction, impoundment, and operation of Hungry Horse Dam. Hungry Horse Mitigation was Montana's first fisheries program established under authority of the Pacific Northwest Electrical Power Planning and Conservation Act of 1980 and the Council's Fish and Wildlife Program.

Bull Trout
in the
Flathead River Subbasin

Bull Trout
in the
Flathead River Subbasin

- Bull trout are the salmon of the Mountain Columbia Province
- Flathead Watershed is largely intact; 31 % is within parks & wilderness, but habitat concerns are very relevant
- The sudden and significant drop in the Flathead Lake bull trout population precipitated the species listing in 1998

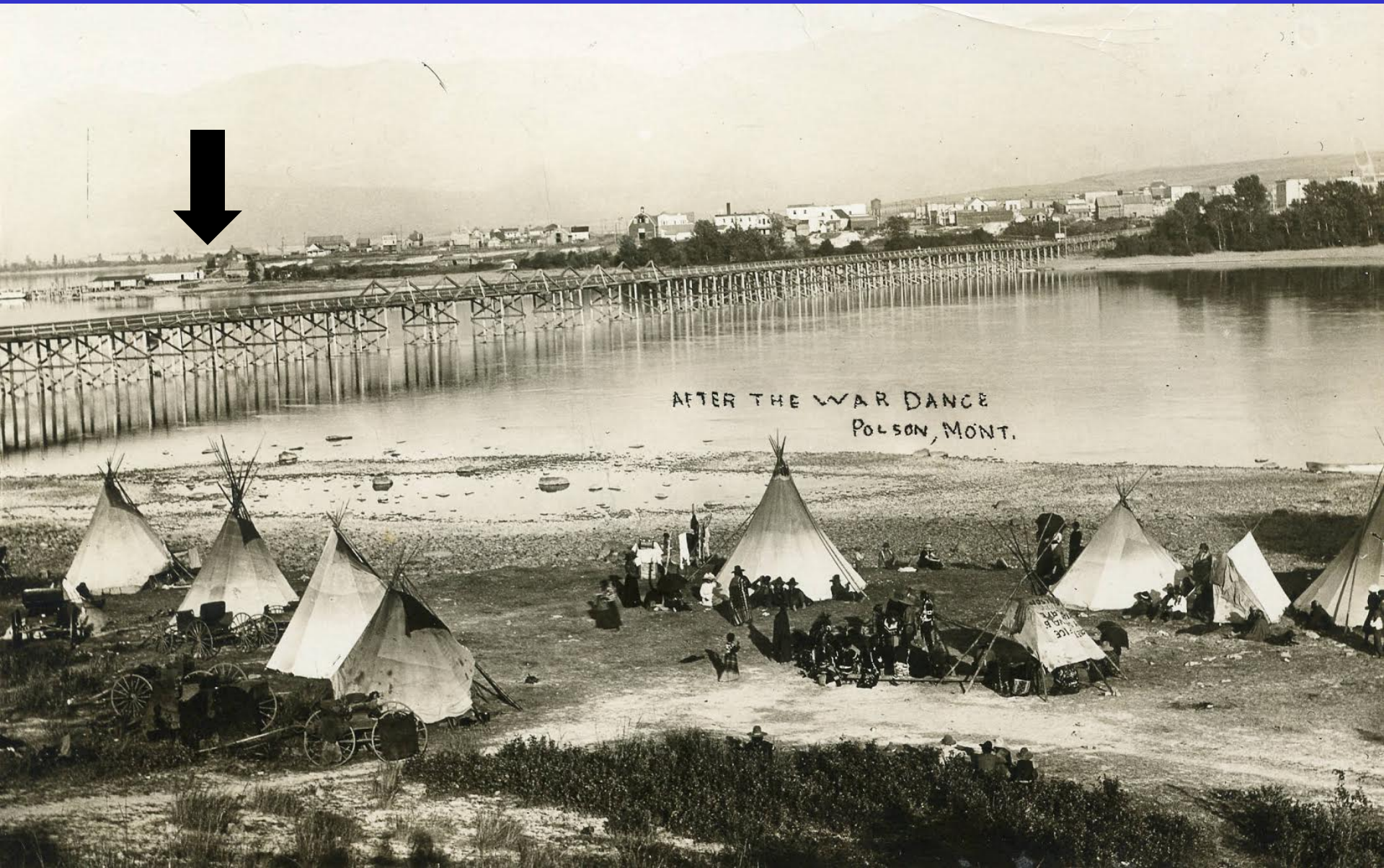
October 11, 2004

Flathead River Subbasin Management Plan

A Report prepared for the Northwest Power and Conservation Council

A vision, guiding principles, management objectives and strategies, and a research, monitoring, and evaluation program to protect, mitigate, and enahnce fish and wildlife resources of the Flathead River Subbasin

Tribal encampment, west side of Polson bridge, 1910. Courtesy Paul Fugleberg.



Isaac et al. 2015 *Global Change Biology.* The cold-water climate shield: delineating refugia for preserving salmonid fishes through the 21st century.

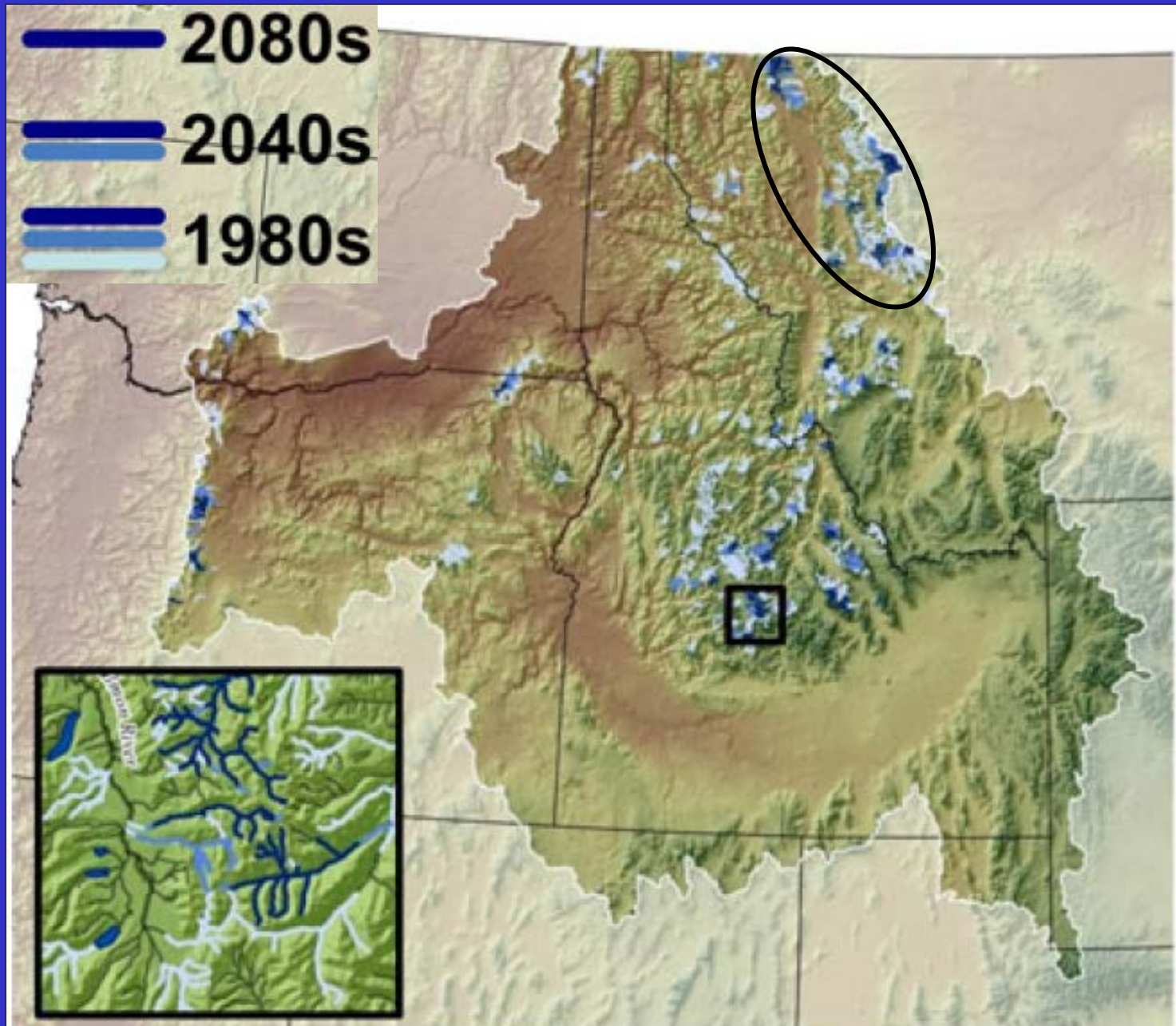


Figure 7 a. Distribution of refugia for bull trout where the probability occupancy exceeds 0.9 during three climate periods.

Crown of the Continent Ecosystem

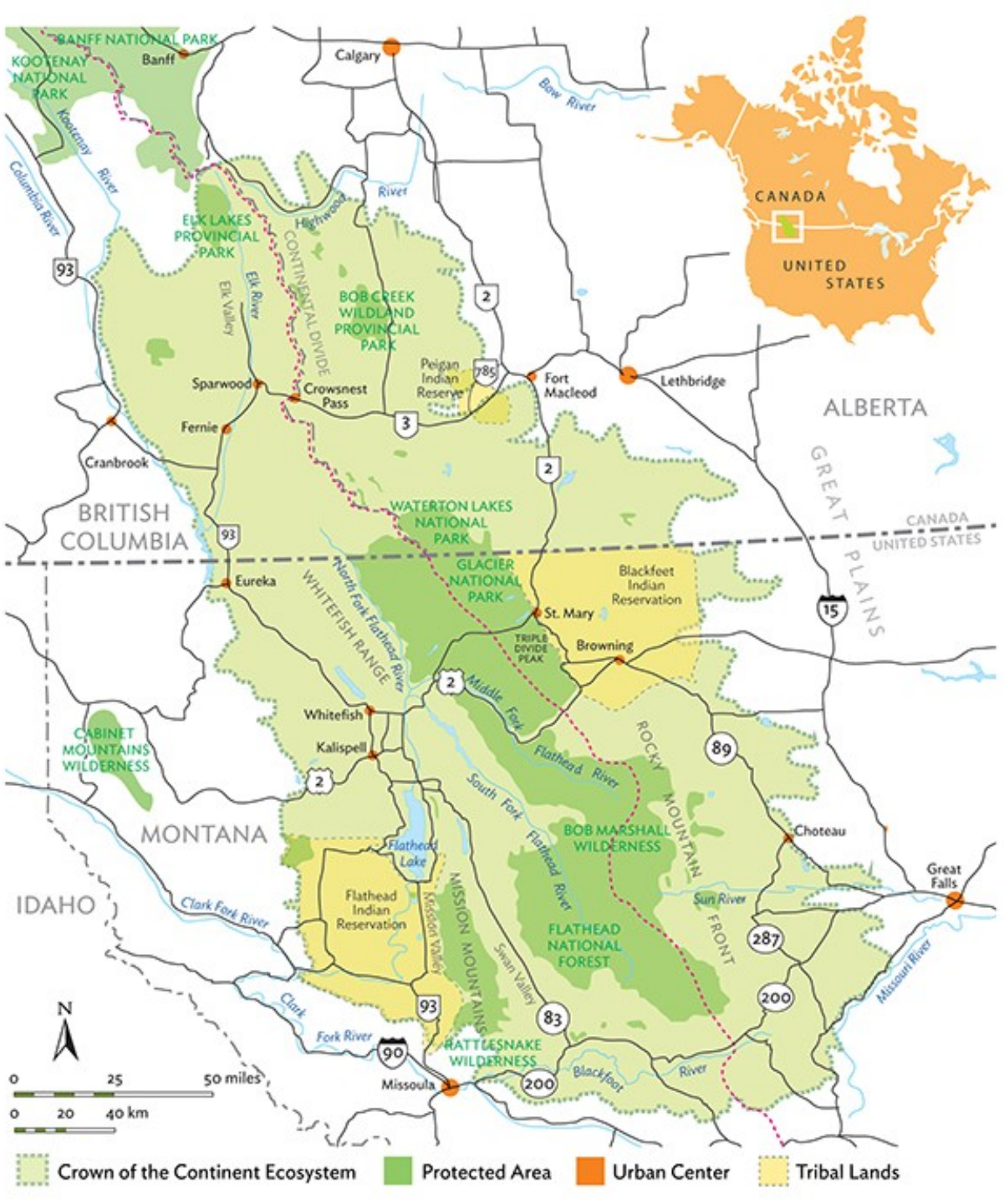
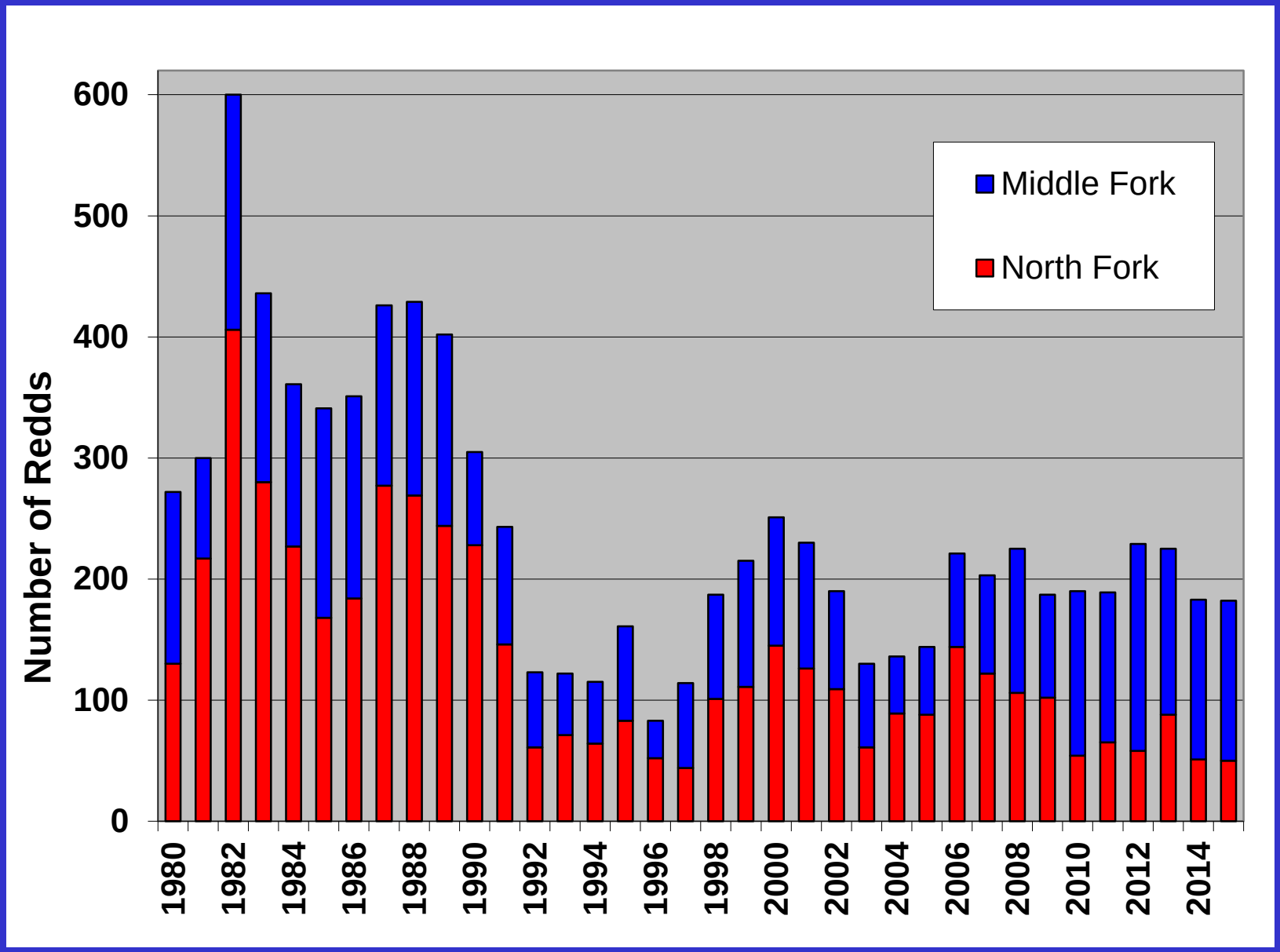
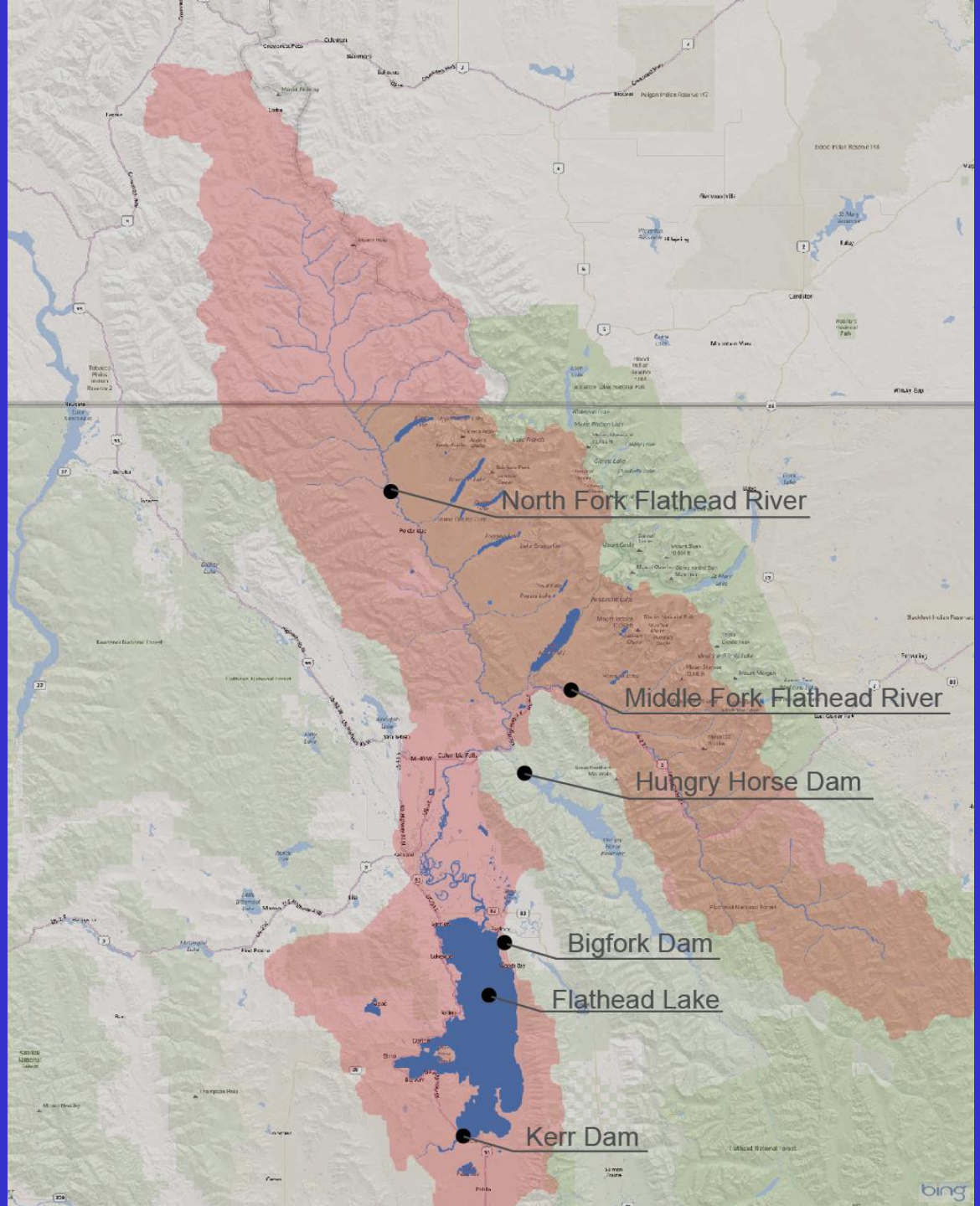
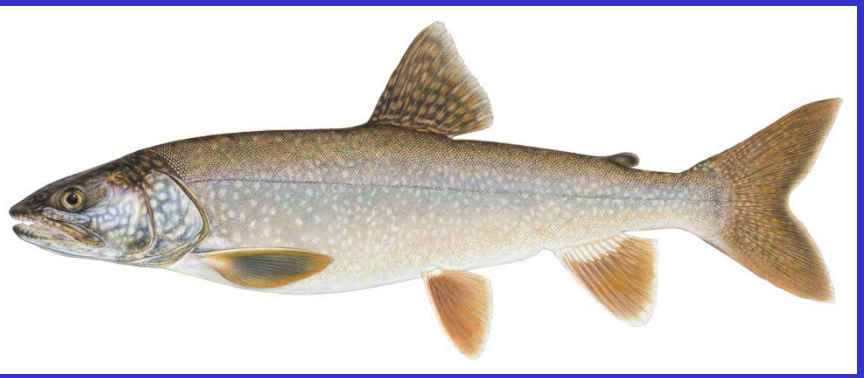


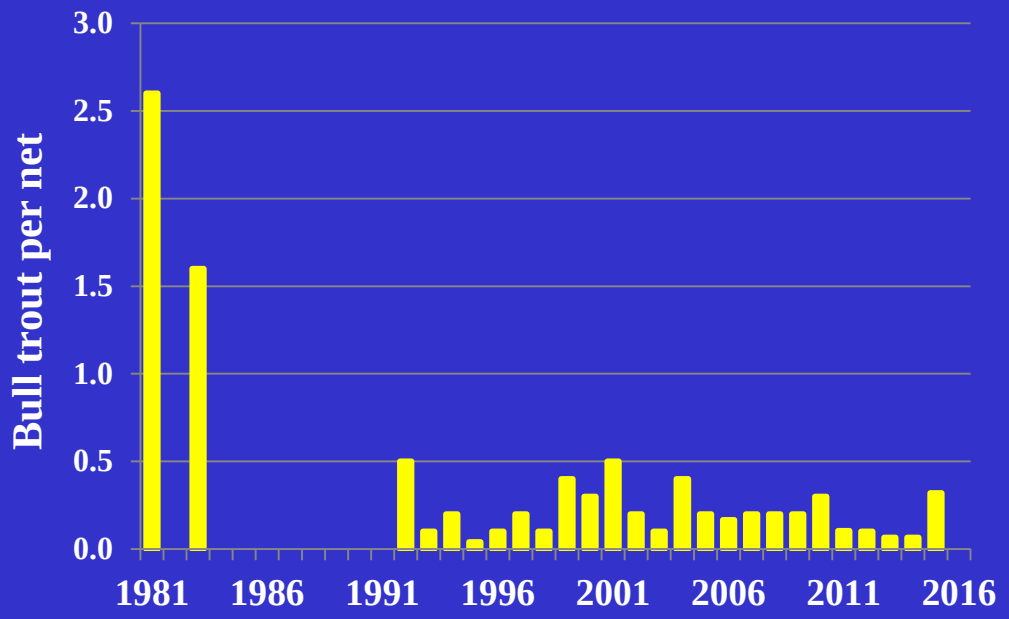
Photo credit: Joel Sartore/National Geographic stock with Wade Fredenberg

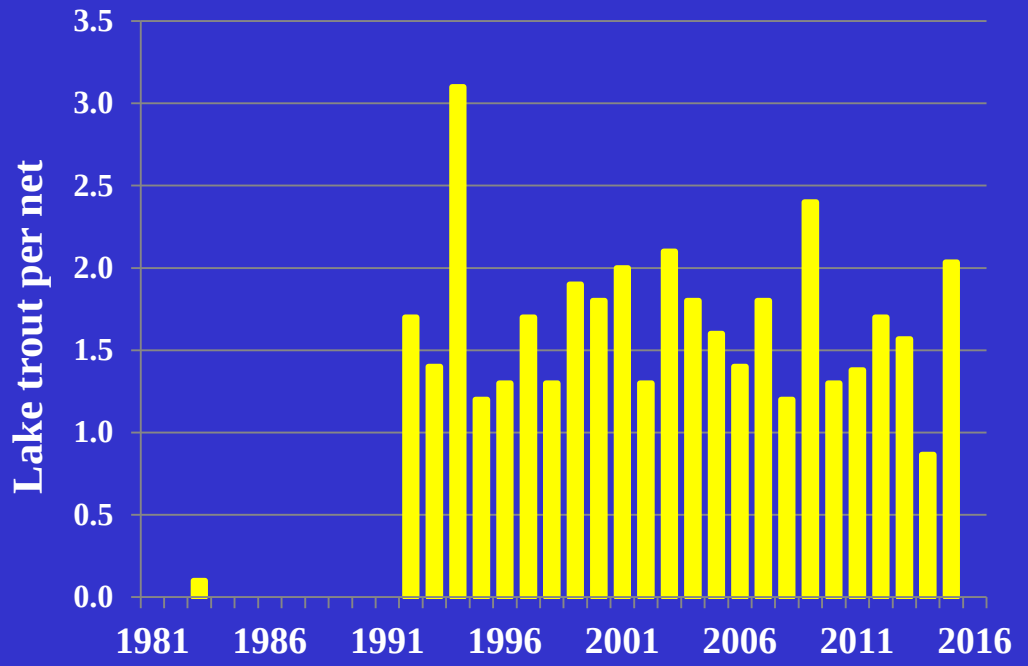
Adult Bull Trout Index




North Fork Flathead River
Middle Fork Flathead River
Hungry Horse Dam
Bigfork Dam
Flathead Lake
Kerr Dam




Bull trout per net
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1981
1986
1991
1996
2001
2006
2011
2016


Lake trout per net
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1981
1986
1991
1996
2001
2006
2011
2016

FLATHEAD LAKE AND RIVER FISHERIES CO-MANAGEMENT PLAN 2001-2010

View of Flathead Lake from Wild Horse Island

Montana Fish, Wildlife & Parks

Montana Fish, Wildlife & Parks
490 North Meridian Road
Kalispell, MT 59901
406-752-5501

Confederated Salish and Kootenai Tribes
P.O. Box 278
Pablo, MT 59855
406-675-2700

November 2000

FLATHEAD LAKE AND RIVER FISHERIES COMANAGEMENT PLAN 2001 - 2010

GOAL: Balance tradeoffs between native species conservation and nonnative species reduction to maintain a viable recreational/subsistence fishery

OBJECTIVE: Maintain or if needed increase harvest on nonnative fish to benefit native fish species

STRATEGY: Fish Population Management

A. Suppress Nonnative Fish Through Recreational Angling, B. Commercial, and C. Netting

FLATHEAD LAKE AND RIVER FISHERIES COMANAGEMENT PLAN 2001 - 2010

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STRATEGY: Fish Population Management

A. Suppress Nonnative Fish Through Recreational Angling, B. Commercial, and C. Netting

First Steps to Increase Harvest

Incrementally increased bag limit to 100 lake trout/day

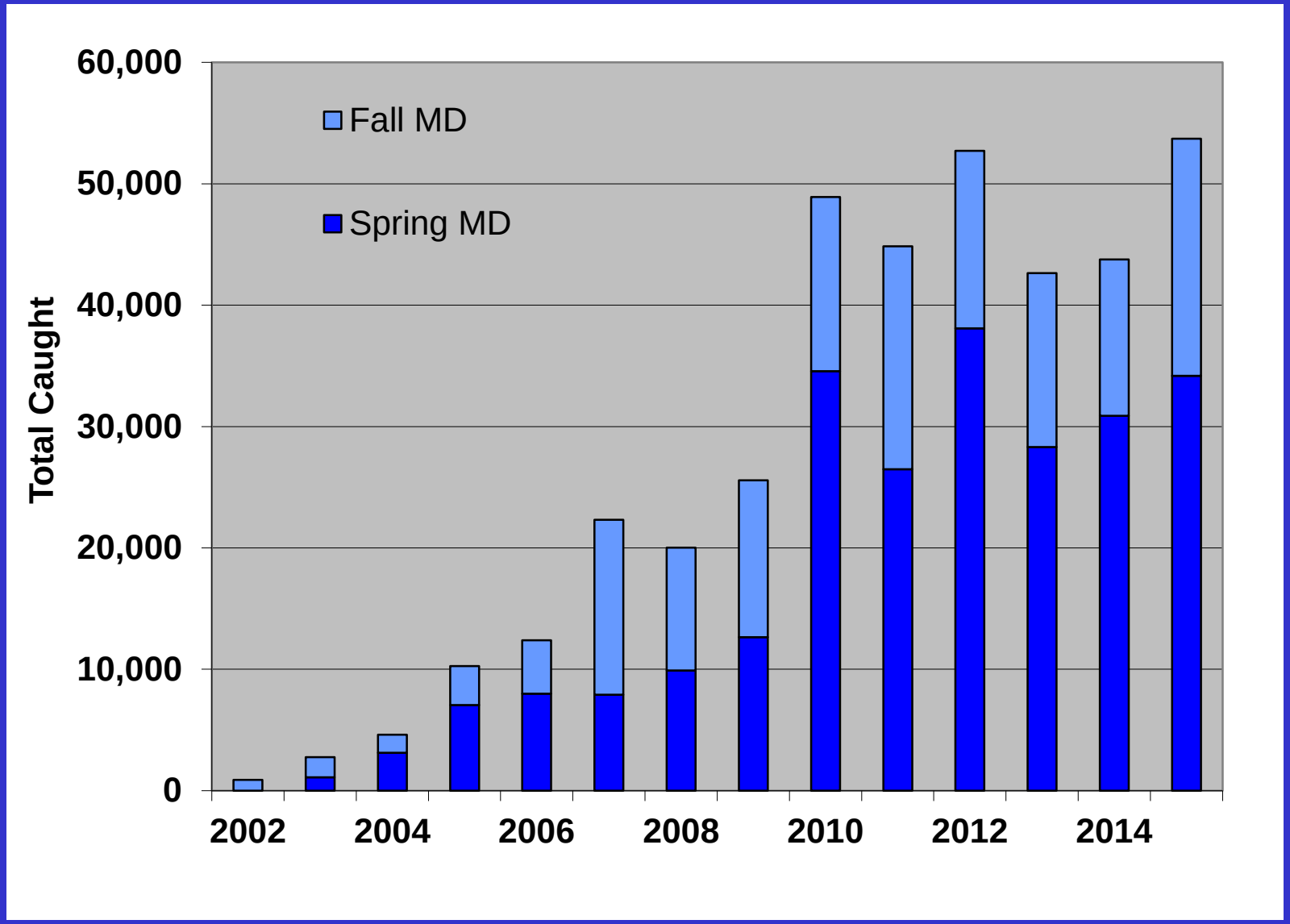
Increased to two rods per angler

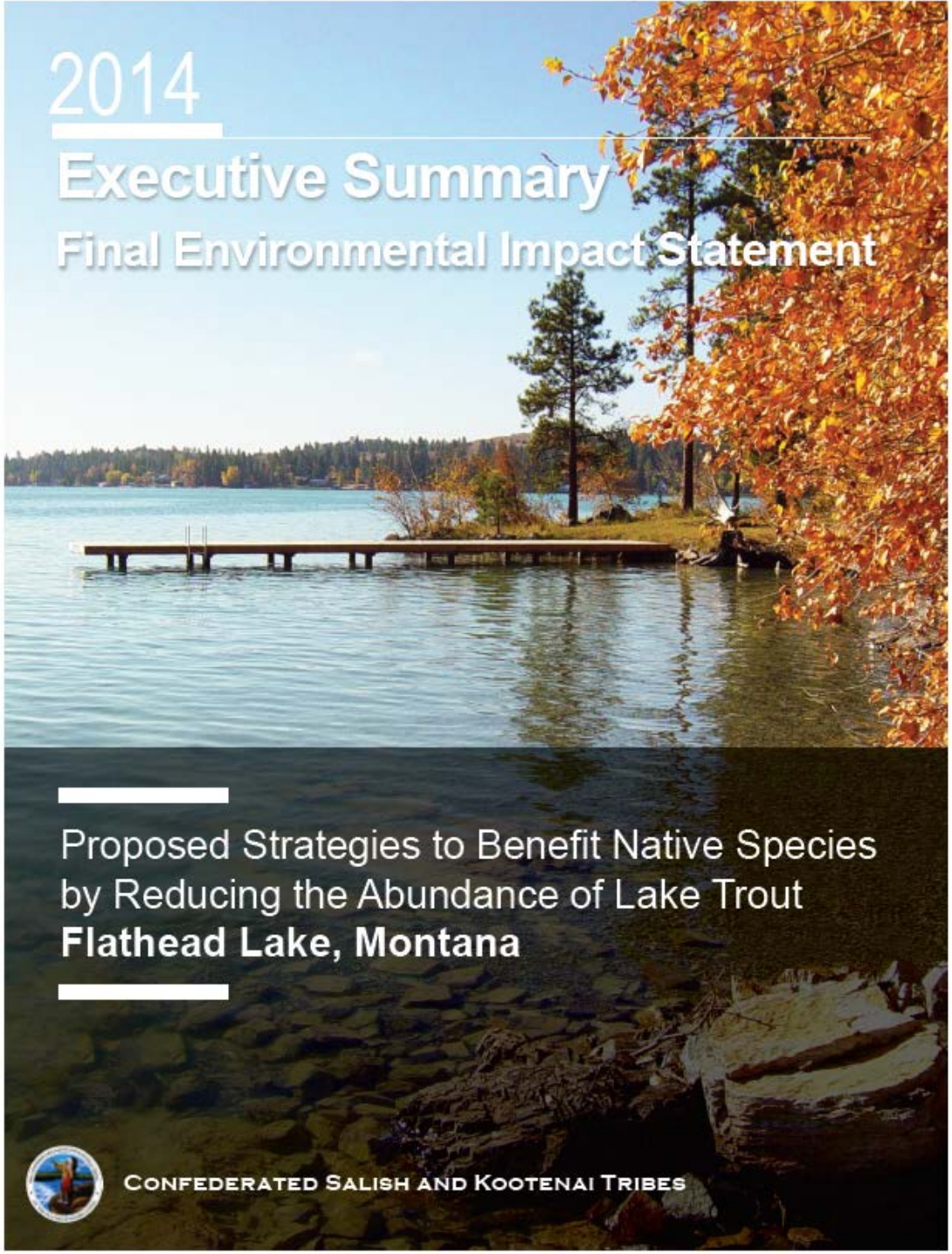
Reduced cost of licenses


FISHING
CONTESTS
Photo: Cindy Benson

Top 10 Anglers – Spring Mack Days

14,096 lake trout


60,000
50,000
40,000
30,000
20,000
10,000
0
Total Caught
Fall MD
Spring MD
2002
2004
2006
2008
2010
2012
2014



2014

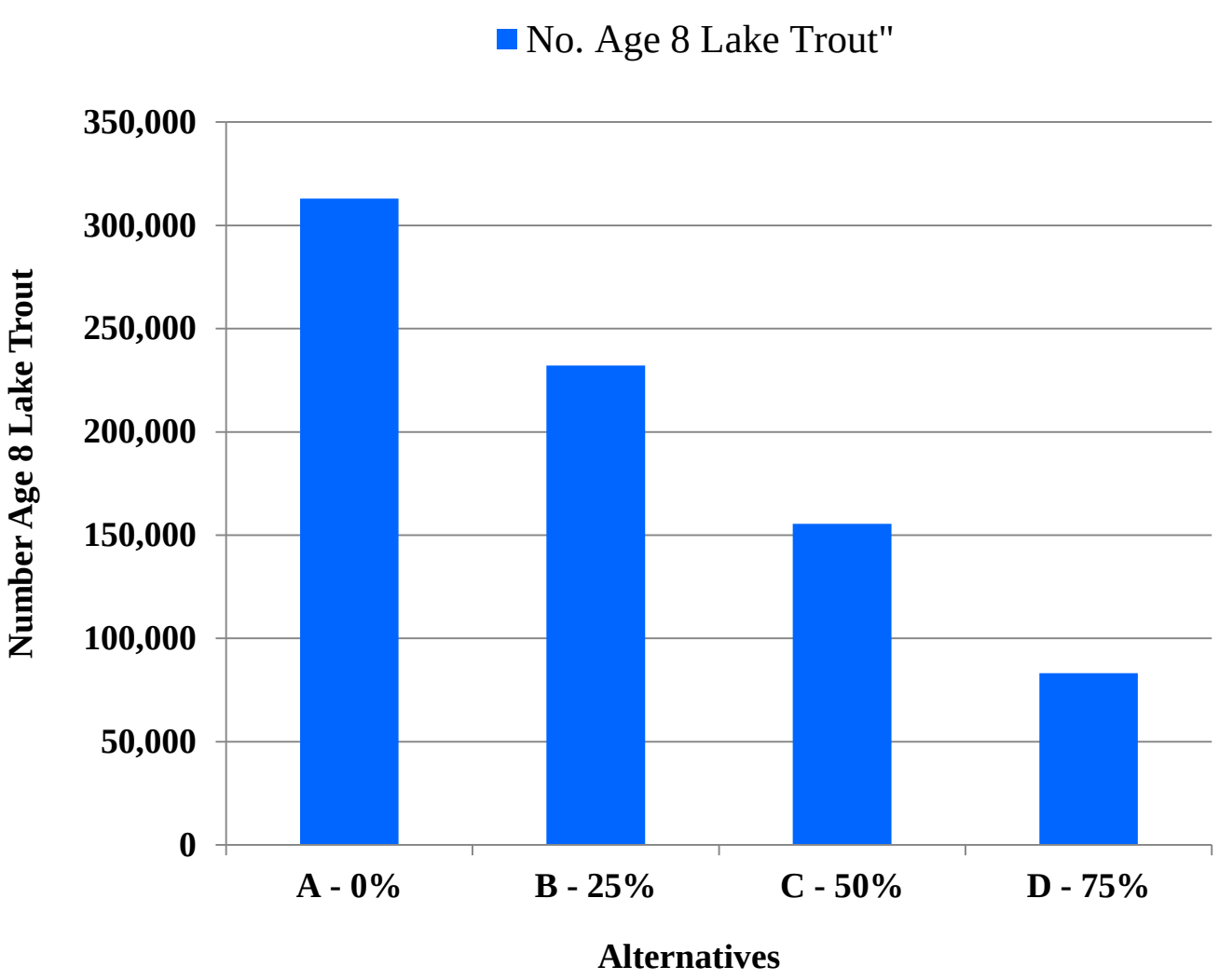
Executive Summary

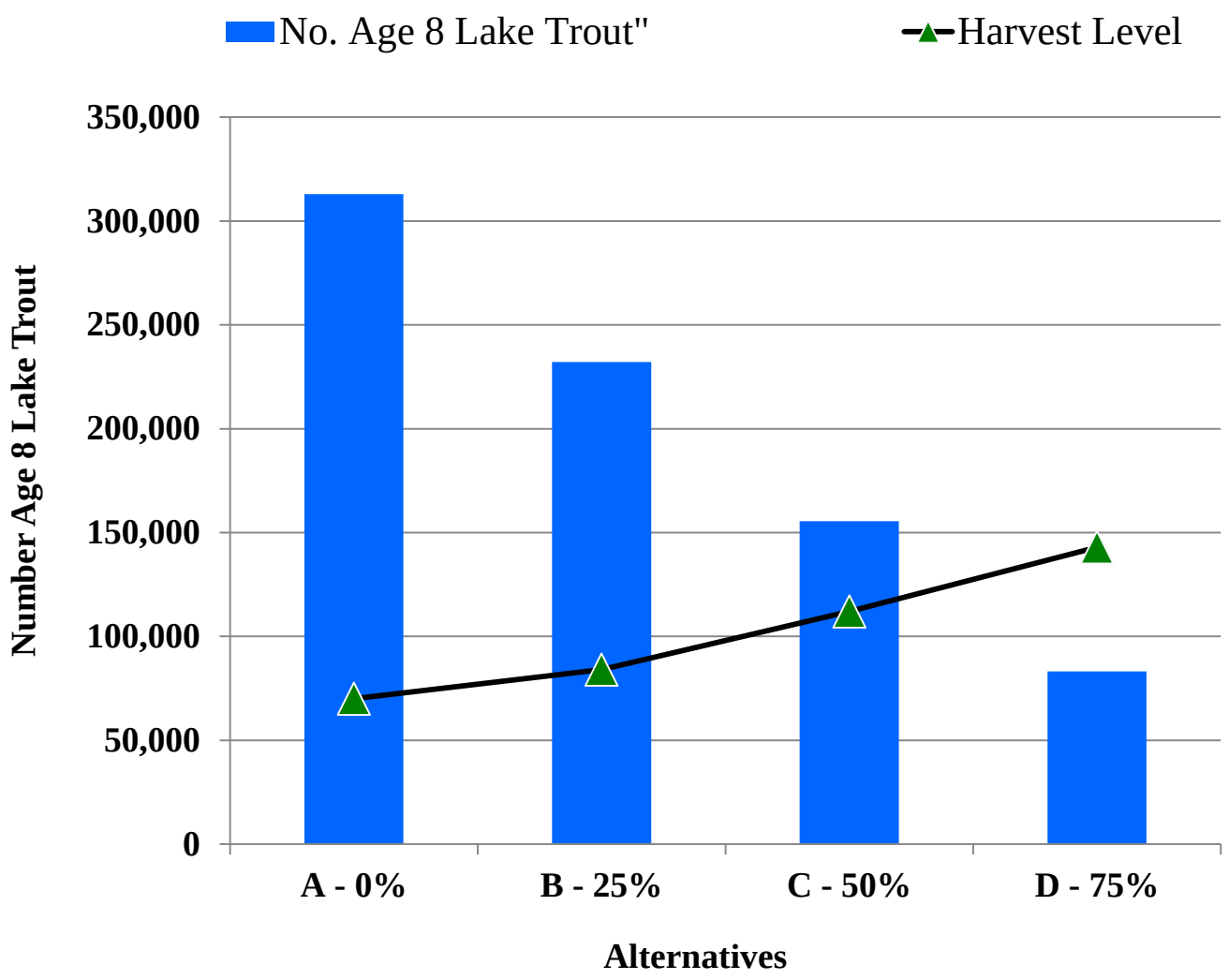
Final Environmental Impact Statement

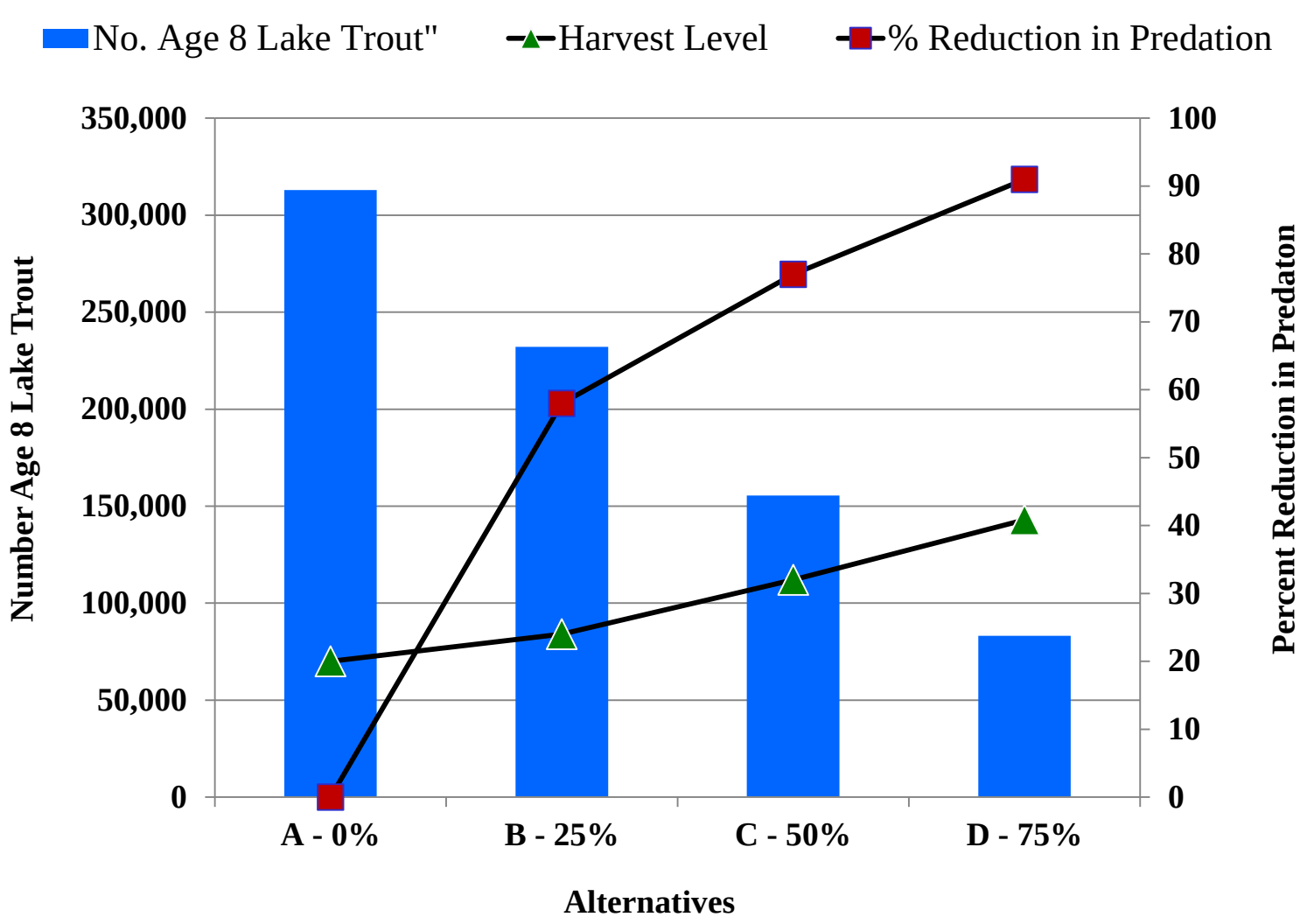
Proposed Strategies to Benefit Native Species by Reducing the Abundance of Lake Trout

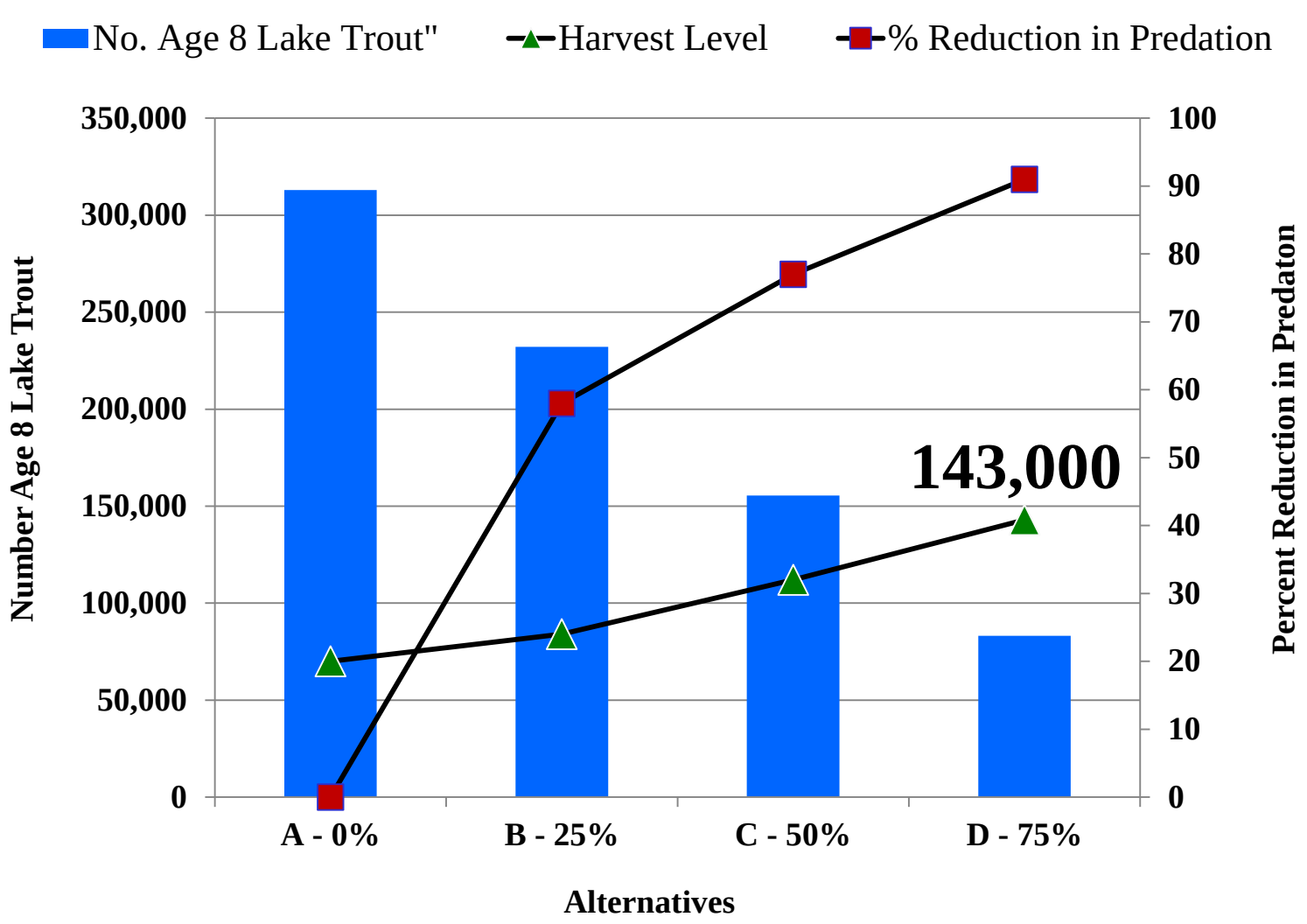
Flathead Lake, Montana

Confederated Salish and Kootenai Tribes


No. Age 8 Lake Trout"
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
Number Age 8 Lake Trout
A - 0%
B - 25%
C - 50%
D - 75%
Alternatives


No. Age 8 Lake Trout"
Harvest Level
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
Number Age 8 Lake Trout
A - 0%
B - 25%
C - 50%
D - 75%
Alternatives


No. Age 8 Lake Trout"
Harvest Level
% Reduction in Predation
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
Number Age 8 Lake Trout
100
90
80
70
60
50
40
30
20
10
0
Percent Reduction in Predaton
A - 0%
B - 25%
C - 50%
D - 75%
Alternatives

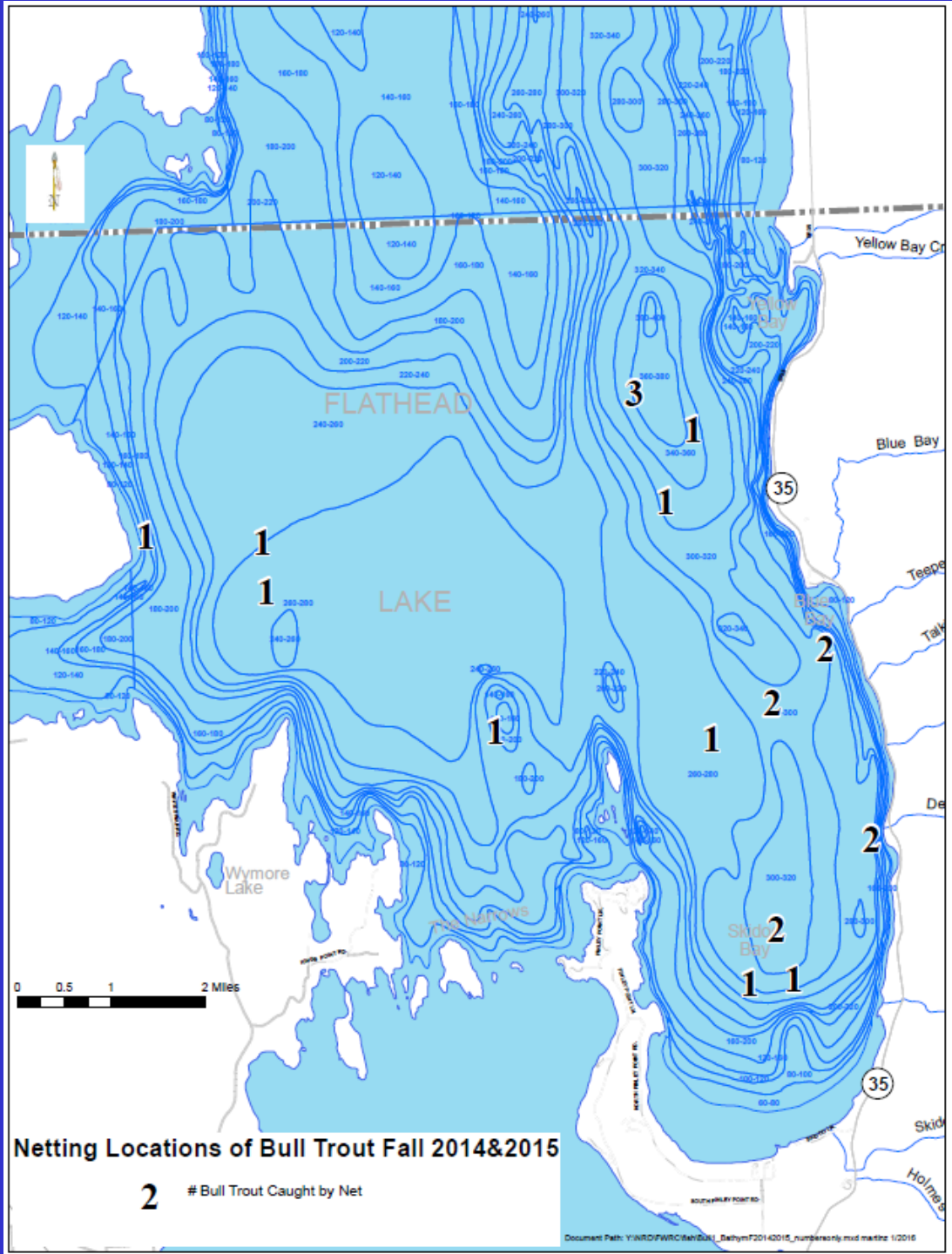

No. Age 8 Lake Trout"
Harvest Level
% Reduction in Predation
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
100
90
80
70
60
50
40
30
20
10
0
143,000
A - 0%
B - 25%
C - 50%
D - 75%
Alternatives
Number Age 8 Lake Trout
Percent Reduction in Predaton

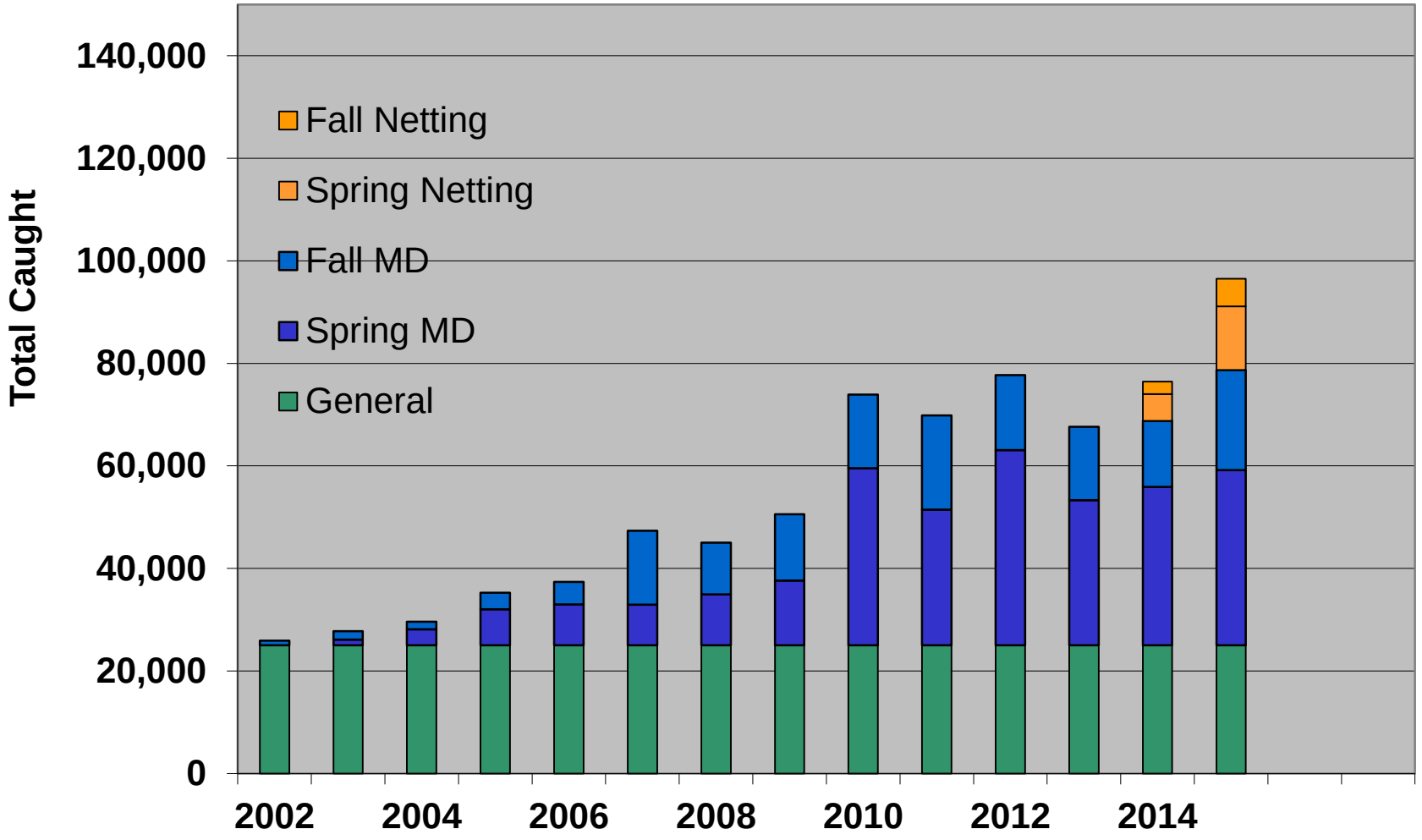

WS 8165HR

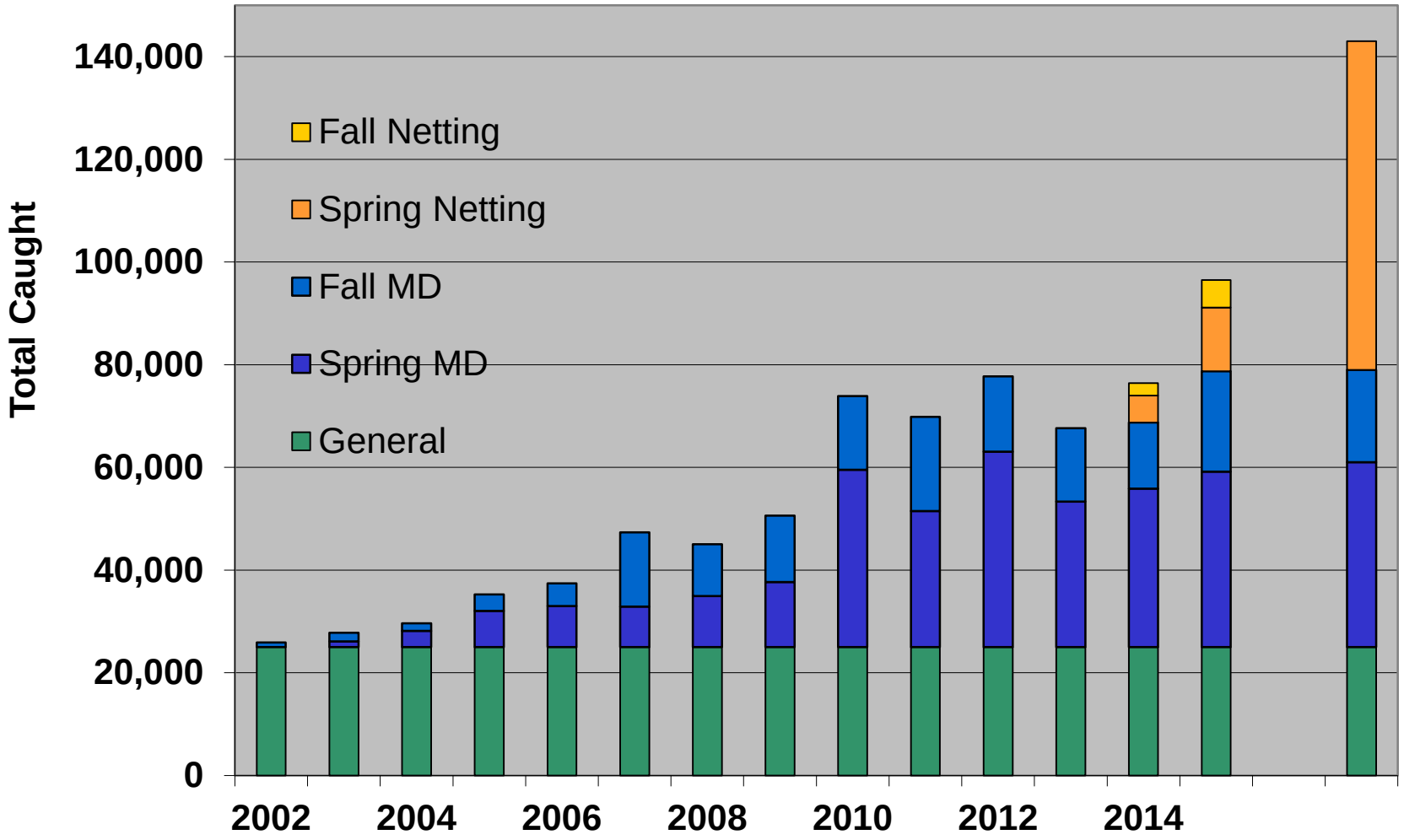
Suppression Netting Results

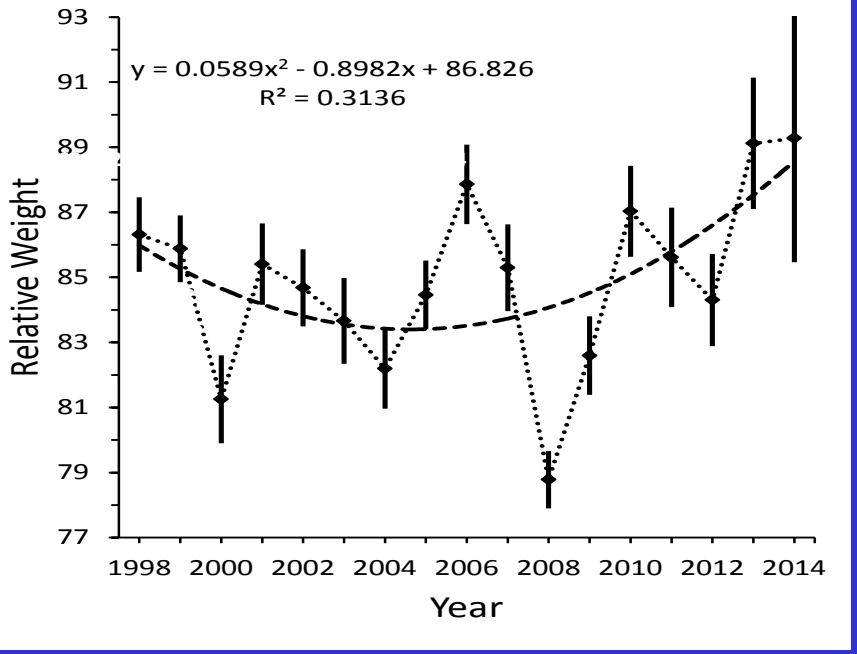
42,931 Lake trout

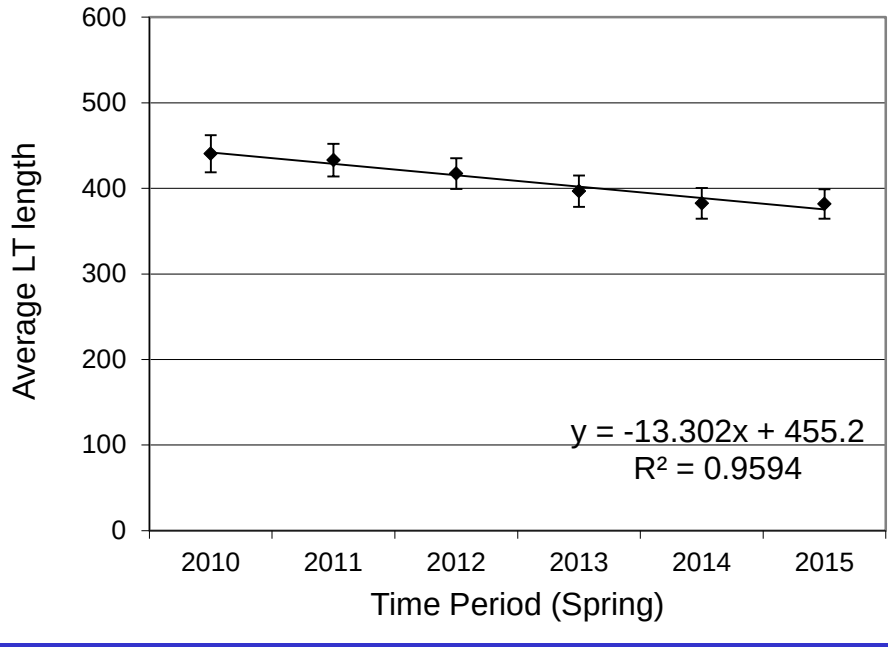
29 (14) Bull trout

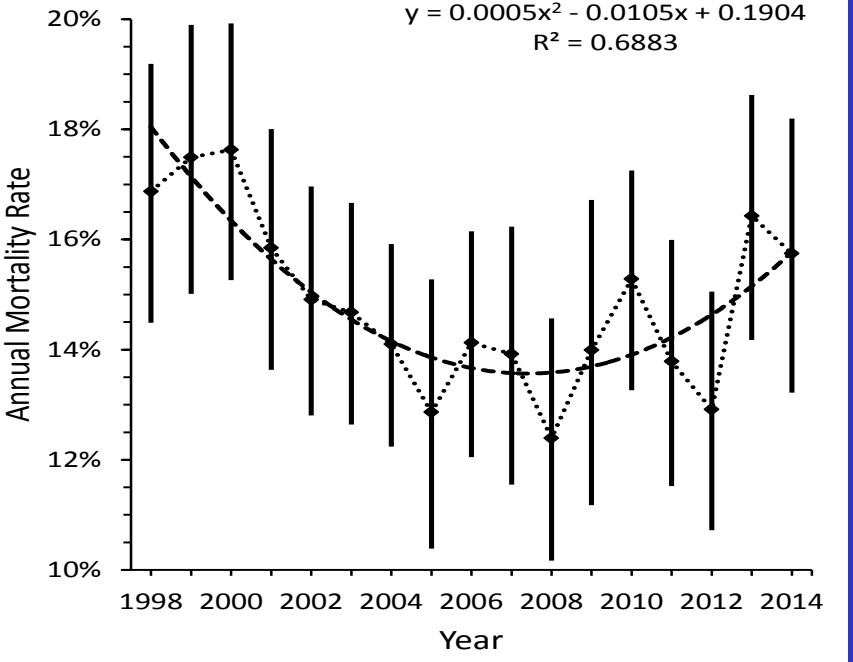


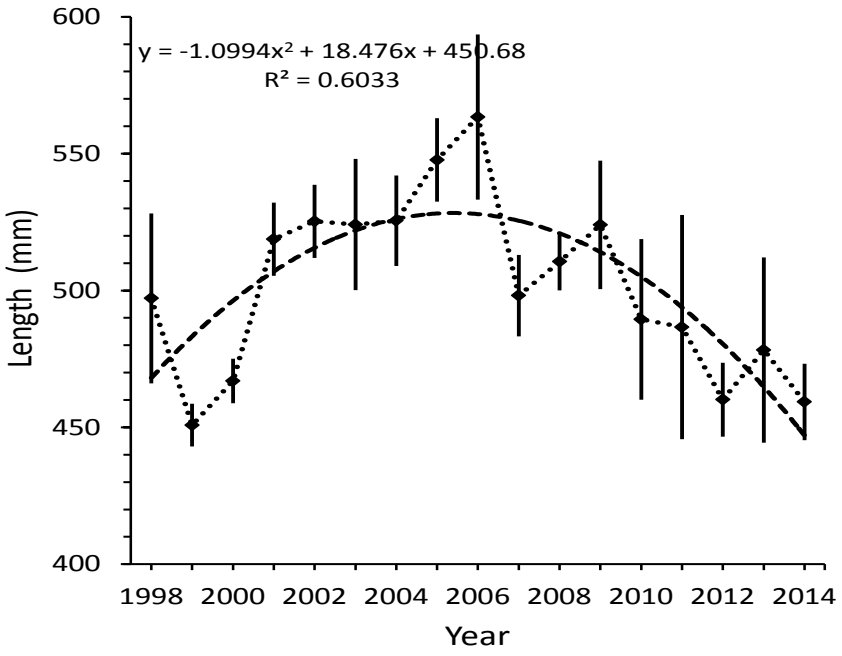

Total Caught
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Fall Netting
Spring Netting
Fall MD
Spring MD
General
2002
2004
2006
2008
2010
2012
2014


Total Caught
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
2002
2004
2006
2008
2010
2012
2014
Fall Netting
Spring Netting
Fall MD
Spring MD
General


y = 0.0589x² - 0.8982x + 86.826
R² = 0.3136
Relative Weight
Year
93
91
89
87
85
83
81
79
77
1998 2000 2002 2004 2006 2008 2010 2012 2014


y = -13.302x + 455.2
R² = 0.9594
Average LT length
Time Period (Spring)
600
500
400
300
200
100
0
2010 2011 2012 2013 2014 2015


y = 0.0005x² - 0.0105x + 0.1904
R² = 0.6883
Annual Mortality Rate
Year
20%
18%
16%
14%
12%
10%
1998 2000 2002 2004 2006 2008 2010 2012 2014


y = -1.0994x² + 18.476x + 450.68
R² = 0.6033
Length (mm)
Year
600
550
500
450
400
1998 2000 2002 2004 2006 2008 2010 2012 2014


PISCES

Photo credit: Joel Sartore/National Geographic stock with Wade Fredenberg

Habitat Protection/Restoration

40% of the historic spawning habitat for Flathead Lake native trout populations was blocked by Hungry Horse Dam

To date; 73 BPA projects have been completed

~ 51 km of stream protected to off-set the losses

11,296 acres of ecologically sensitive riparian/wetlands

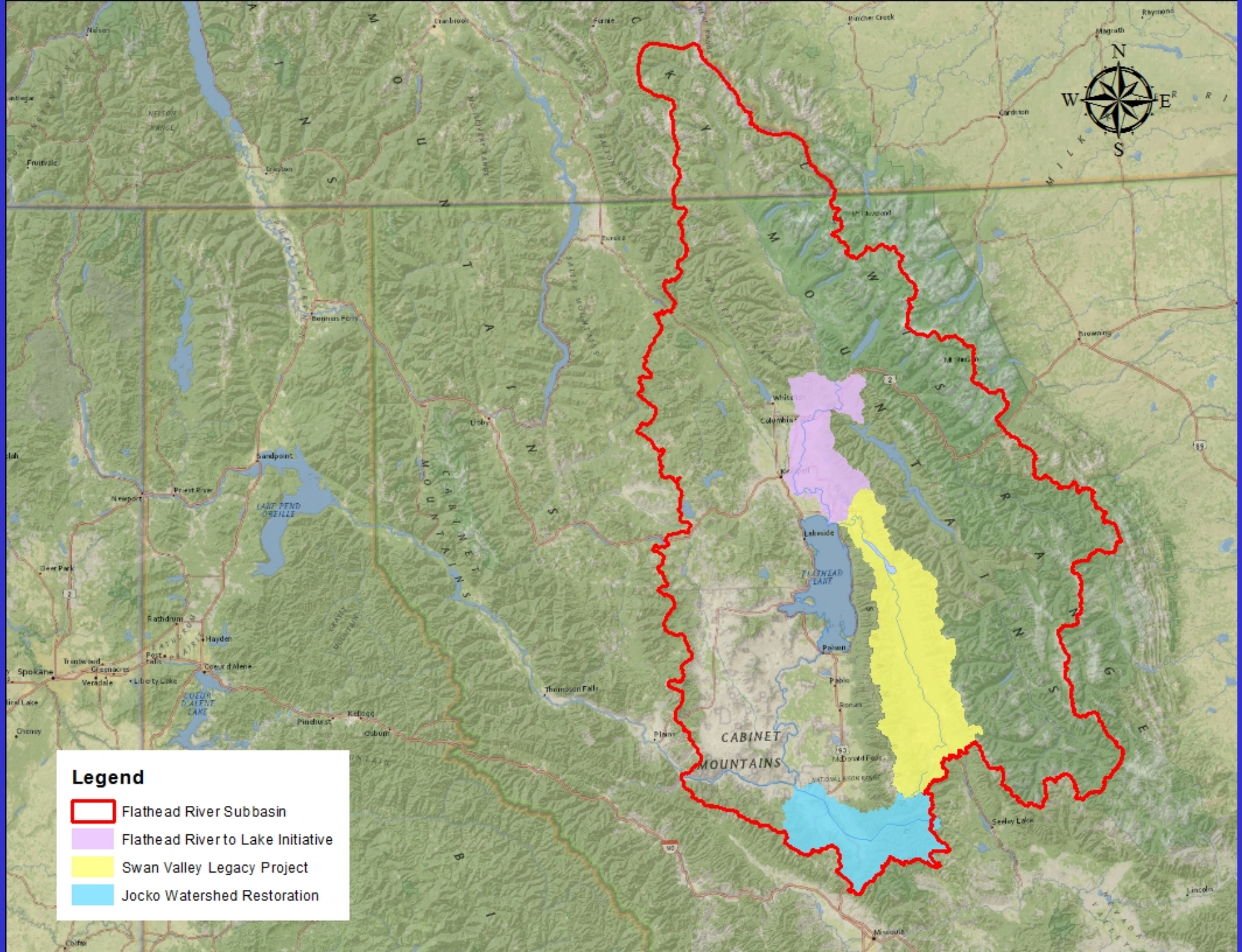
62.6 km of credit

Few examples of areas where we are achieving landscape level benefits to the entire life history of bull trout with multiple partners:

Jocko River Watershed

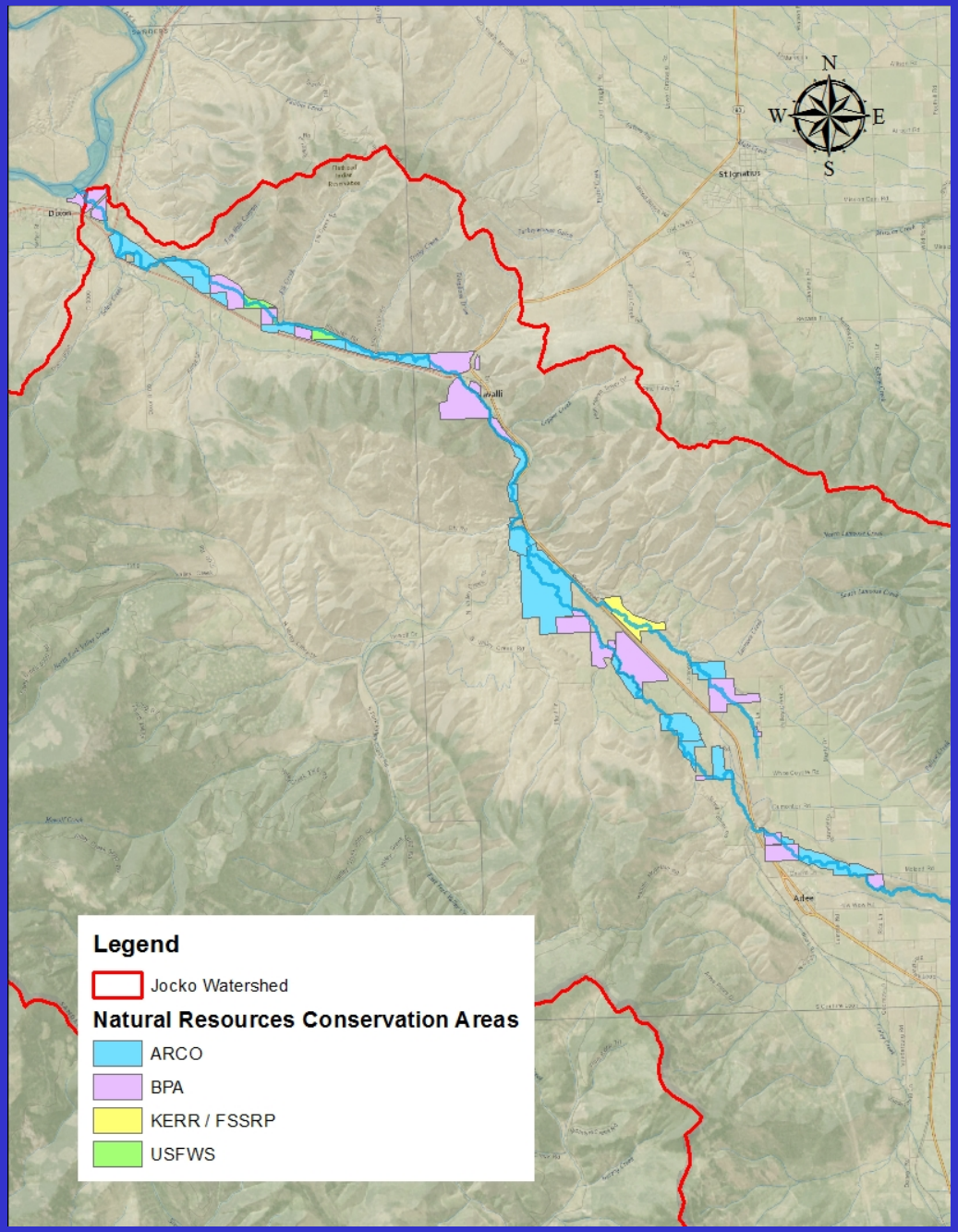
Flathead River to Lake Initiative

Montana Legacy Project – Swan Watershed


Legend
Flathead River Subbasin
Flathead River to Lake Initiative
Swan Valley Legacy Project
Jocko Watershed Restoration
CABINET MOUNTAINS
FLATHEAD LAKE
LAKE PEND OREILLE
COEUR D'ALENE LAKE
MISSION MOUNTAINS
SWAN MOUNTAINS
N
S
E
W

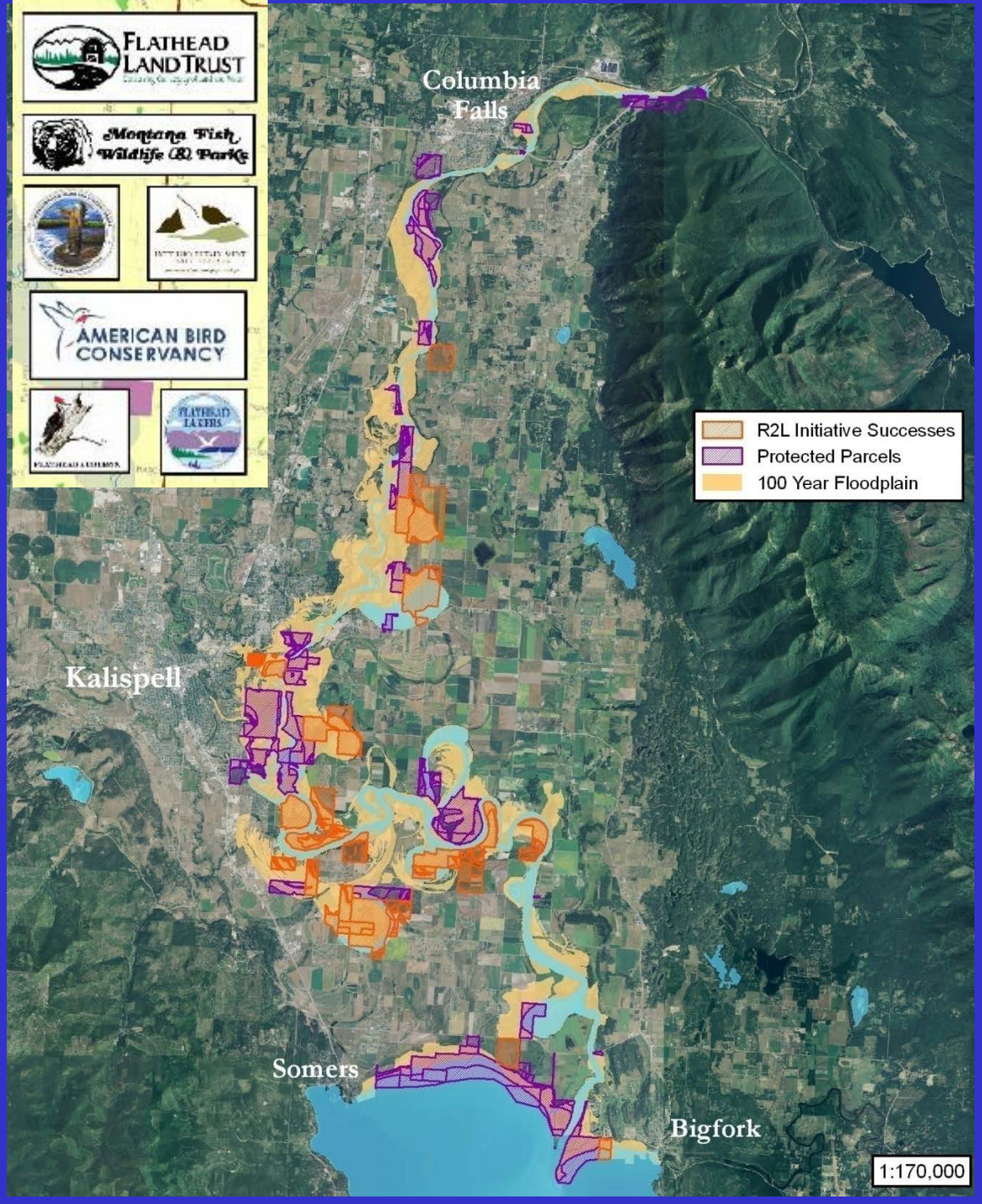
Jocko Watershed Restoration

- **40 projects (14 BPA funded)**
- **77% of stream protected (27 km)**
- **50% of ecological floodplain protected (2,128 ac.)**
- **12 home sites removed from floodplain**



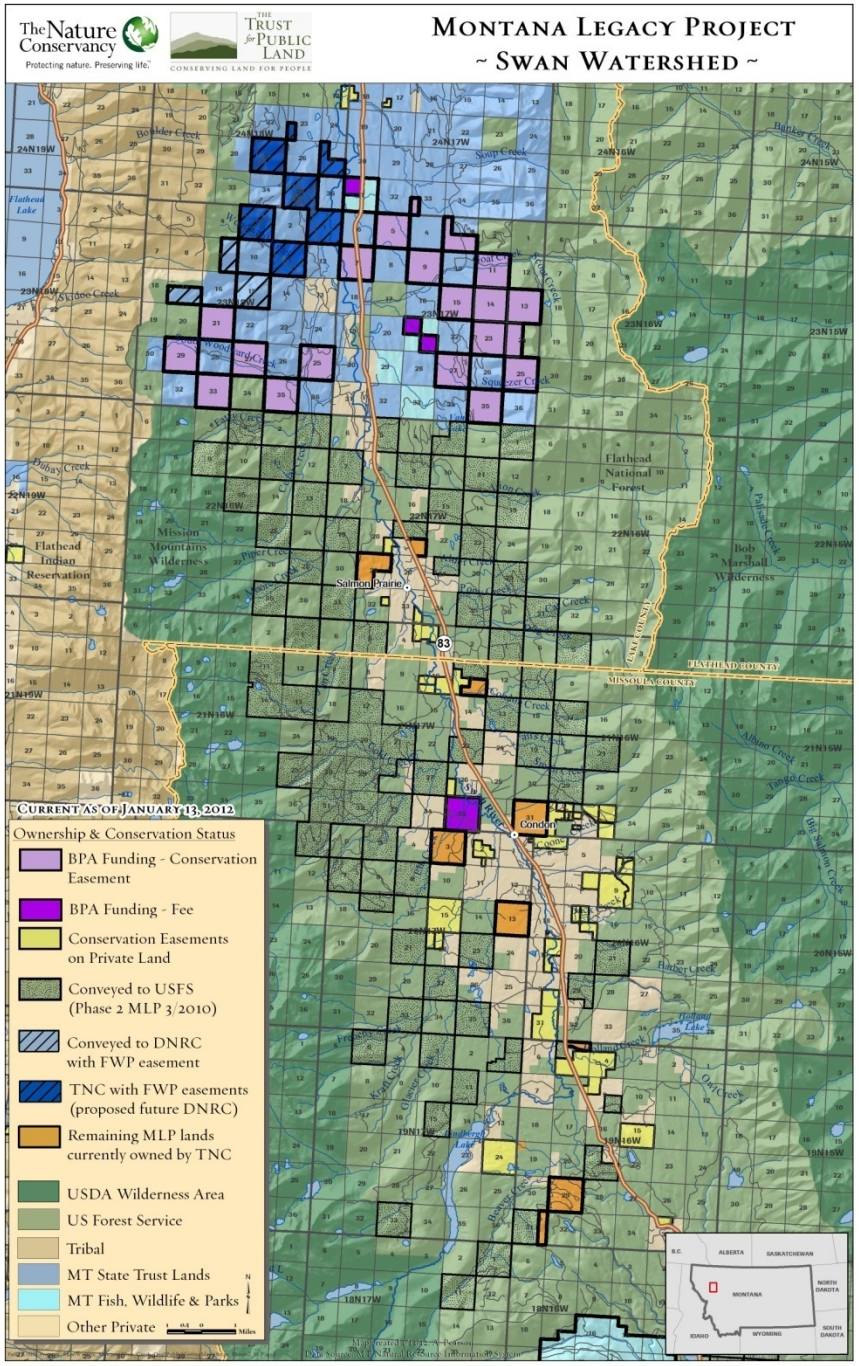
River to Lake Initiative

- 45 projects (10 BPA funded)
- 29% of Flathead River protected (11 km)
- 49% of ecological floodplain protected (5,000 acres)
- 4 miles of restoration projects completed
- 51% of wetlands protected
- Important shallow aquifer protected



Montana Legacy Project
Swan Watershed

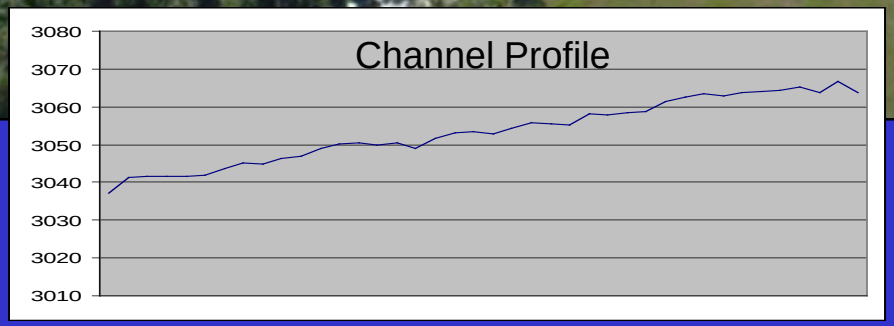
- **Protection began in 1997**
- **93% of the Swan drainage protected**
- **BPA contributed to 6 projects**
  - **6,806 acres**
  - **17 km of stream**
  - **Important bull trout spawning habitat**



Restoration Opportunities on Protected Sites

Before

After



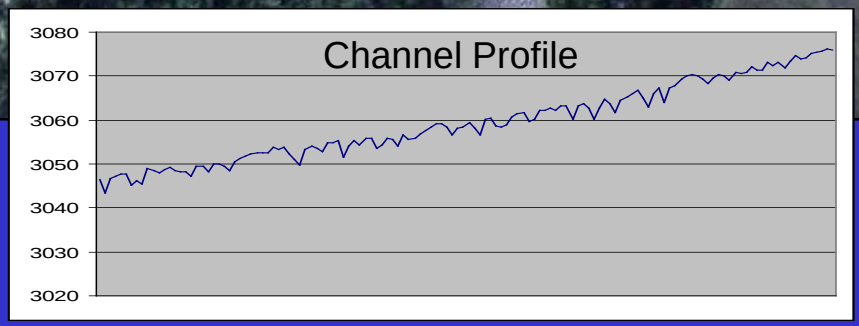


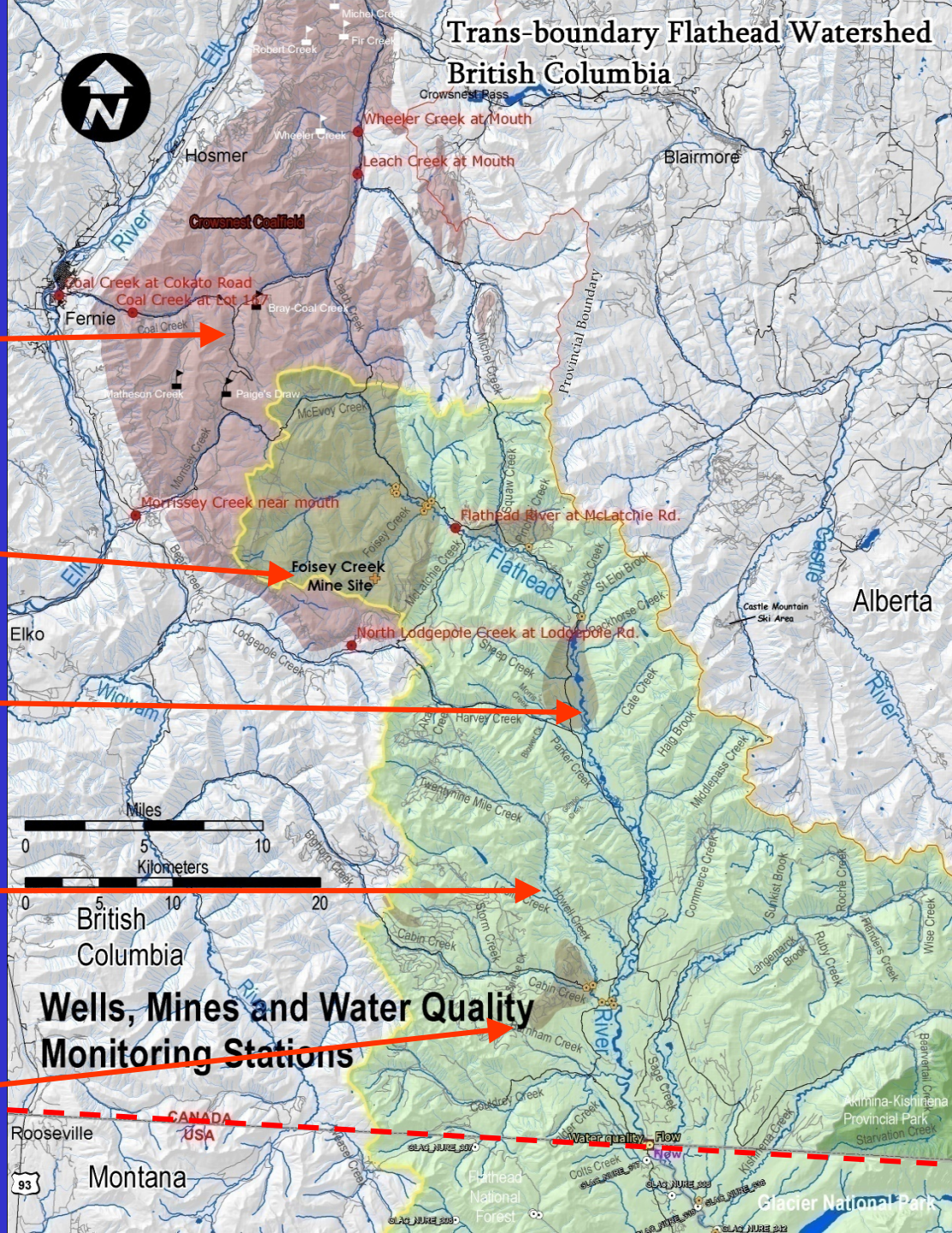
Photo credit: Joel Sartore/National Geographic stock with Wade Fredenberg

Transboundary Flathead River

PROPOSAL FOR DEVELOPMENT

(past and present)

- British Petroleum CBM (2007 – 2010)
- Cline Mine Foisey Creek (2004 – 2009)
- Lillyburt Coalfield (2005)
- Howell Creek Gold and Phosphate Exploration (2008 -2009)
- Cabin Creek Coal Mine (1977)

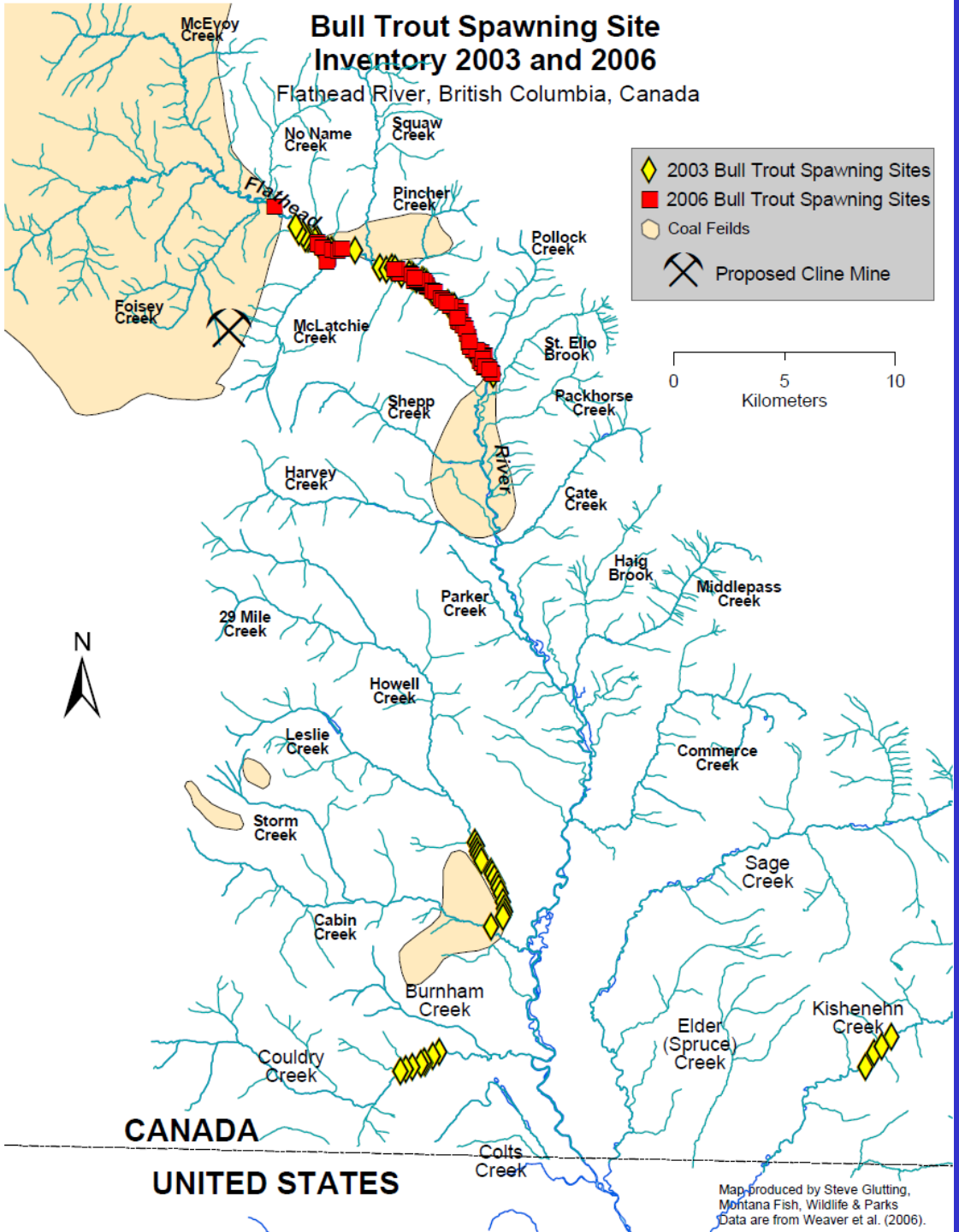



Mine tailing pond failures


Increased sedimentation and
water temperature


Greatly reduced aquatic insect diversity
and density

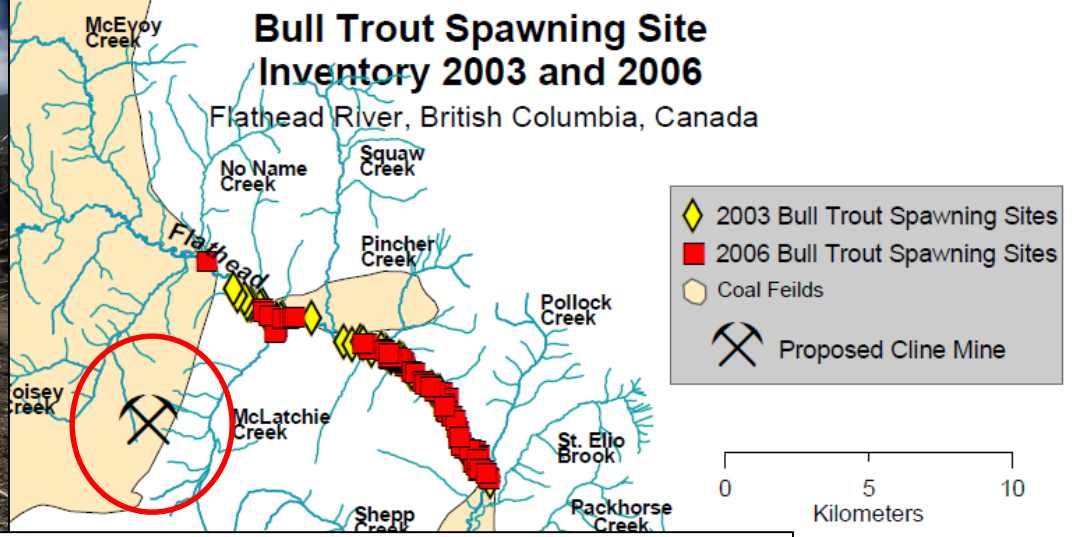

Increased selenium concentrations in fish tissue



- FWP, GNP, USGS, and BC crews collected fisheries data to inform policy decisions on energy exploration and development and in the BC Flathead.

MOU signed between Montana and BC

- Explicit declaration of cooperative fish and wildlife management
- ban on mining and coal, oil, and gas development in the North Fork Flathead



Memorandum of Understanding and Cooperation on

Environmental Protection, Climate Action and Energy

between

The Province of British Columbia

and

The State of Montana

The Province of British Columbia and the State of Montana,

Sharing a common border and desiring to renew and deepen our long-standing relationship of friendship and trust;

Acting on the obligation of our *Environmental Cooperation Arrangement* of 2003 "to identify, coordinate and promote mutual efforts to ensure the protection, conservation and enhancement of our shared environment for the benefit of current and future generations" and to "enter into specific arrangements necessary to effectively address shared environmental goals";

Recognizing the mutual commitment of British Columbia and Montana to sustaining environmental values in the transboundary Flathead River Basin, including its existing high water quality and aquatic biodiversity, and threatened and endangered species and species of special concern listed under United States and Canadian law;

Recognizing that the transboundary Flathead River Basin includes within its area Glacier National Park and Biosphere Reserve which is part of the world's first International Peace Park and a World Heritage Site, and that this unique area merits special protection in particular from risks posed by drilling, mining and

Agreed that the full engagement of our provincial and state governments with our respective federal governments, Ktunaxa Nation, Confederated Salish and Kootenai Tribes, and local governments and the support of local residents and citizens is crucial to acting on these concerns and enhancing a collaborative conservation ethic; and

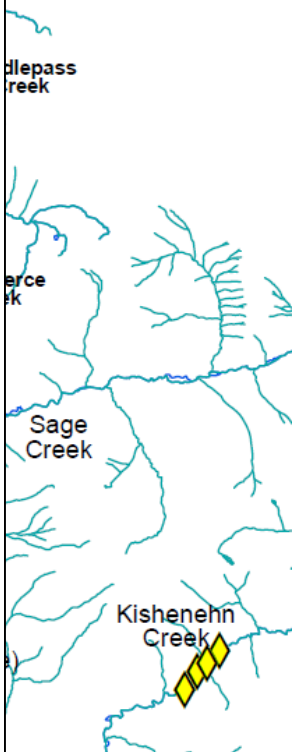
Committed to sharing information and communicating regularly to improve understanding, prevent degradation of water quality and reach mutually beneficial outcomes on environmental protection, climate action and clean and renewable energy;

Now Therefore Desire to Enter into this Memorandum of Understanding and Cooperation and Hereby Agree As Follows:

Environmental Protection

I. British Columbia and Montana commit to work together to:

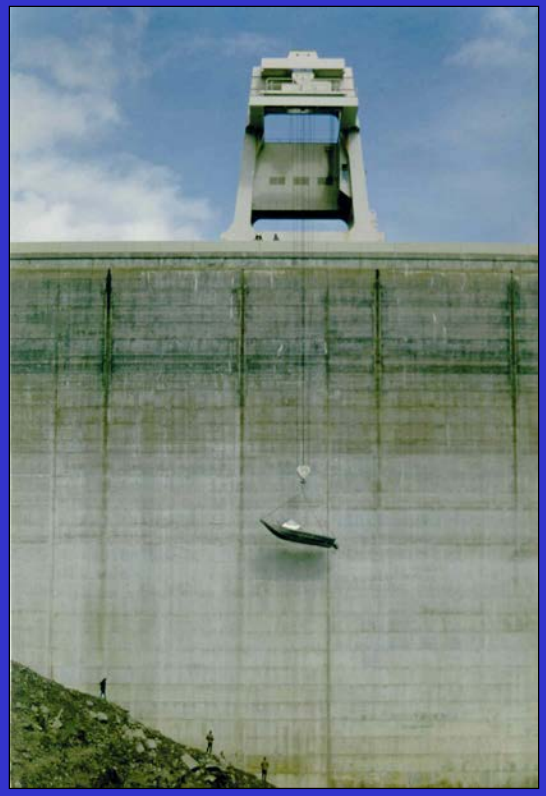
A. Remove mining, oil and gas, and coal development as permissible land uses in the Flathead River Basin.



Mitigating Dam Impacts

- Instream Flow Incremental Methodology (IFIM)
  - Muhlfeld et al. 2011, *River Research and Applications*
    - Informed dam operation with fish habitat requirements
      - Minimize rapid discharge fluctuations
      - Mimic normative regimes

Miller Ecological Consultants, Inc.

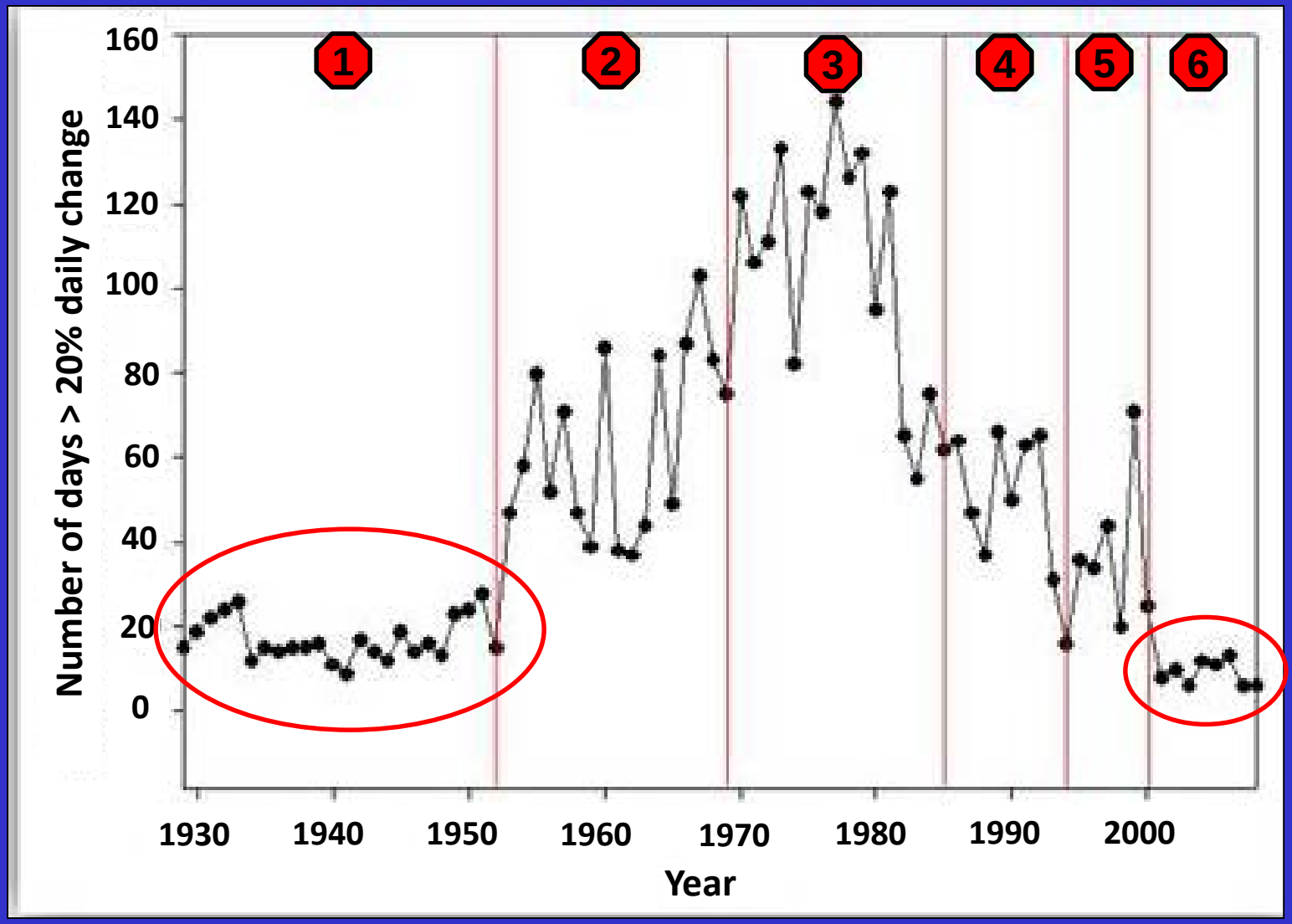


INSTALLATION OF SELECTIVE WITHDRAWAL – 1995

- Thermal regime now closer to pre-dam conditions

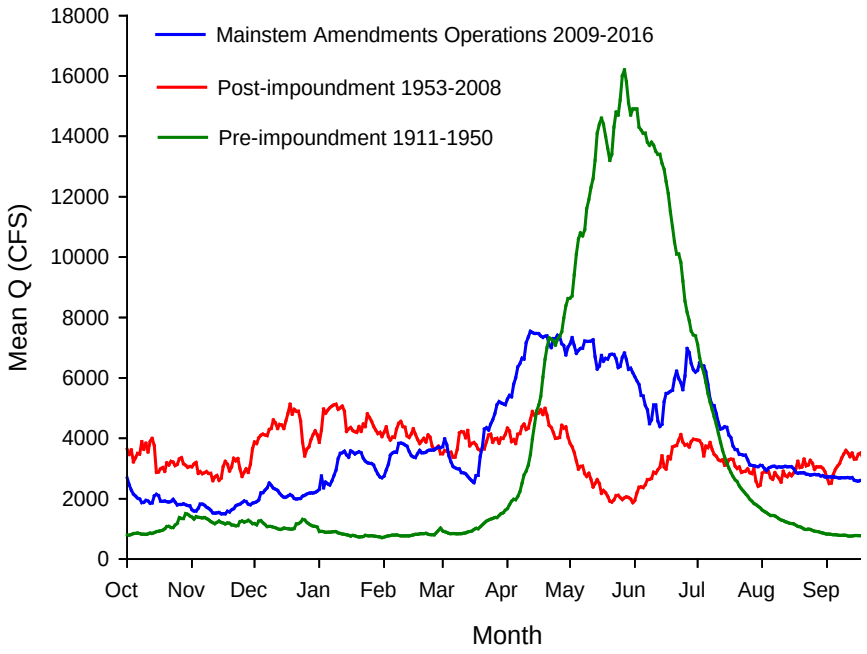
- Optimal trout growth period (10-15C) increased from 30 to 120 days

Mainstem Amendments implemented

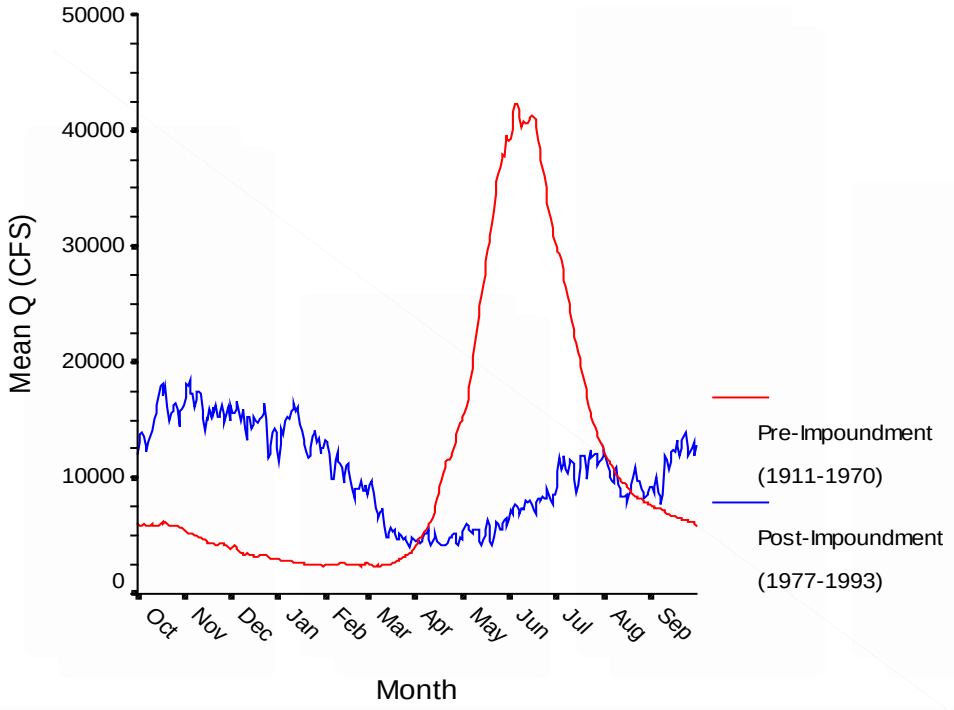


Montana operation (Mainstem Amendments) improved flows for fish

South Fork Flathead River



Kootenai River



Creating Secure Fish Populations

- Plans are underway to reestablish genetically unique native fish populations in secure habitats.
- Sites have been identified in Glacier National Park, where headwater lakes with suitable spawning streams can be reclaimed for native fish assemblages.
- Genetic reserves provide a source of native fish for restoration projects throughout their historic range.

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