Fish Populations on the Bitterroot National Forest 10 Years After the 2000 Wildfires

2000

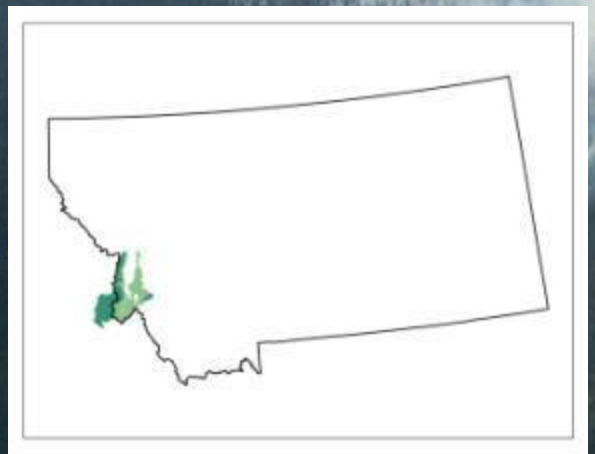
2010

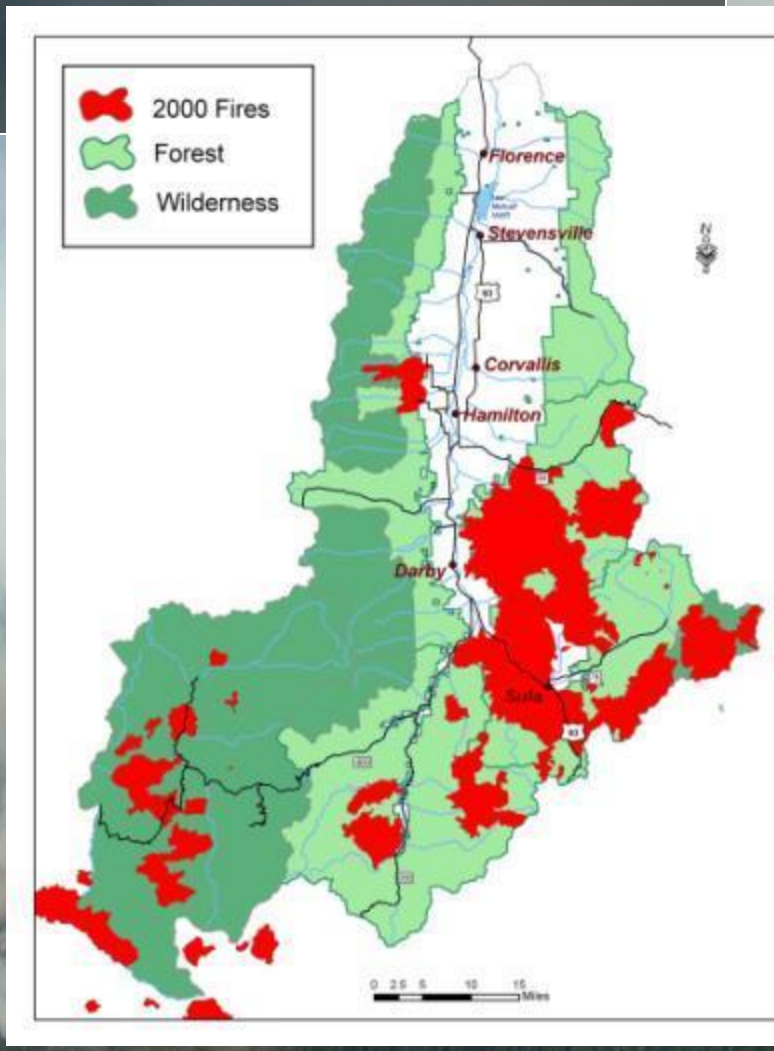
Key Contributors

- Clint Sestrich, Kootenai National Forest
- Mike Young, Rocky Mountain Research Station
- Tom McMahon, Montana State University
- Rob Brassfield, Bitterroot National Forest
- Chris Clancy, MT Fish, Wildlife, and Parks
- Leslie Nyce, MT Fish, Wildlife, and Parks

The 2000 Bitterroot Fires

307,000 acres burned- 22% of the Bitterroot National Forest land base





The Aftermath

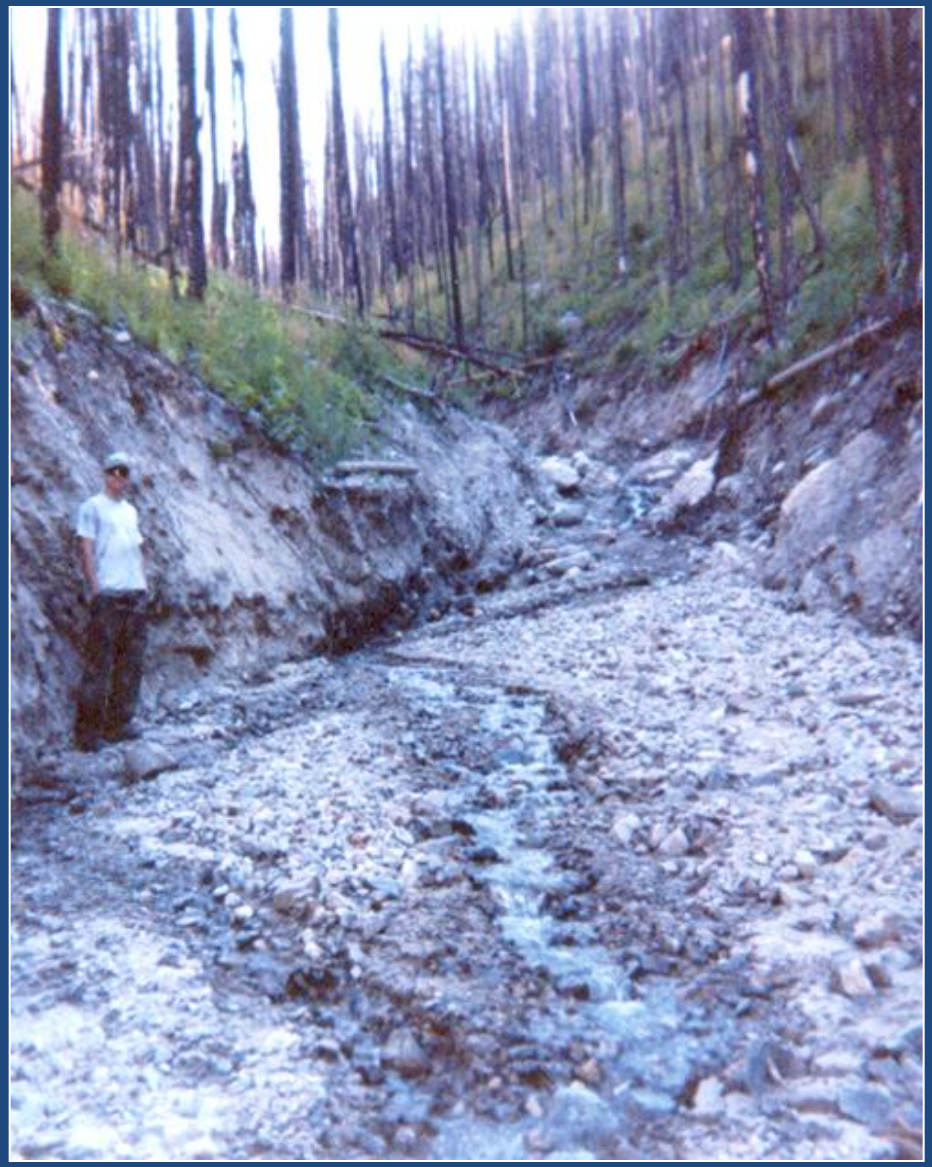
126 fish streams burned

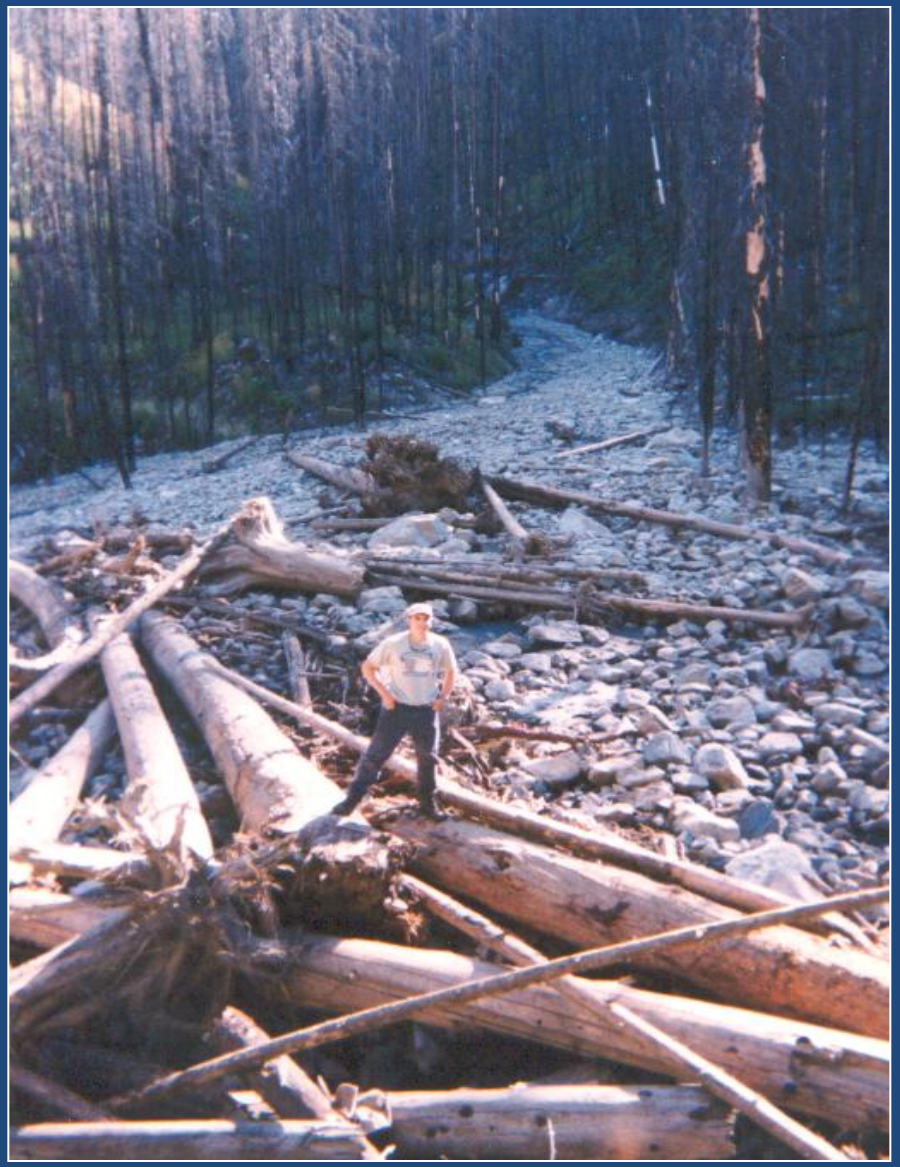
154 miles of fish streams burned at moderate to high severity

Major fish kills observed in seven streams

Widespread population declines

Debris Flows, July 2001






Laird Creek

Sestrich, Young, and McMahon
Does wildfire favor invasion of nonnative fish?

Repeated Pre-fire Mark –Recapture Surveys in 2001-03

Sestrich Study Reaches

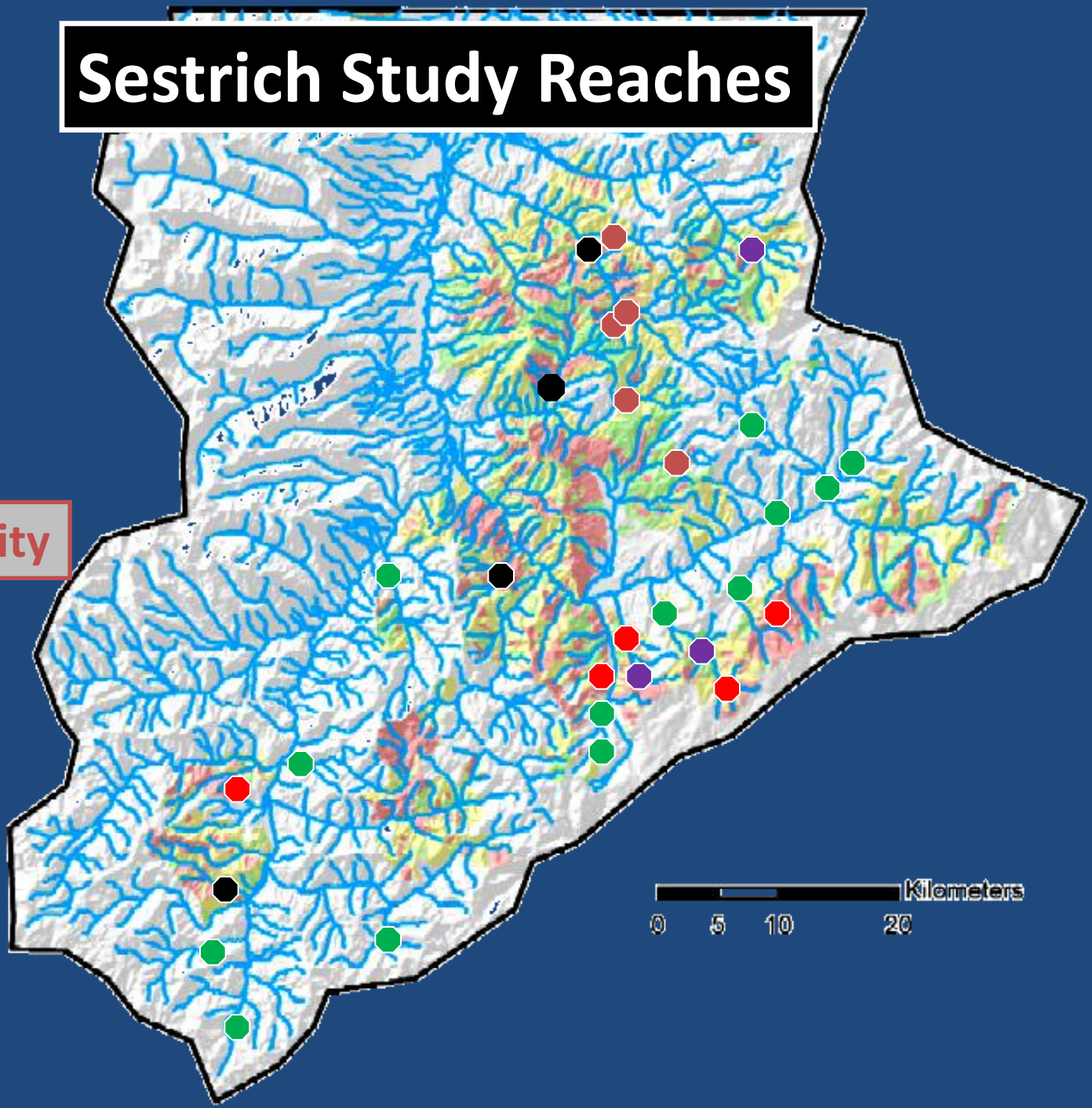
13 Unburned

3 low severity

5 moderate severity

5 high severity

4 debris flow



Findings of the Sestrich Study

Did the damaged westslope cutthroat trout and bull trout populations recover?

ANSWER: Yes. Most populations approached or exceeded their pre-fire abundance levels within three years post-fire.

Did brook trout increase in the burned streams and displace native trout?

ANSWER: In most streams, no. Brook trout recovery was suppressed in most of the burned streams. A notable exception was upper Rye Creek where brook trout invaded and increased post-fire.

Did non-native trout invade burned streams previously not occupied?

ANSWER: Yes. Non-native trout were detected for the first time in seven streams. Brown trout (5); brook and rainbow (1 each). The number of invaders was low – usually 1 or 2 fish. Invasion did not appear to be related to burn severity.

2004 Arrives – Now What?

Reaches Sampled, 2004-2011

Stream	Treatment	2004	2005	2006	2007	2008	2009	2010	2011
Laird Creek	Debris Flow	X	X				X		
North Rye Creek	Debris Flow	X	X	X				X	
Chicken Creek	Debris Flow	X			X			X	
Sleeping Child Cr	Debris Flow	X	X	X	X	X	X	X	X
Medicine Tree Cr	Debris Flow	X	X				X	X	
Little Blue Joint Cr	High Severity	X	X						X
Meadow Creek	High Severity							X	
Praine Creek	High Severity	X					X		
Reimel Creek	High Severity	X				X			X
Rye Creek	Moderate	X	X	X		X	X		

new fish per m/r survey

=

fish marked on marking run

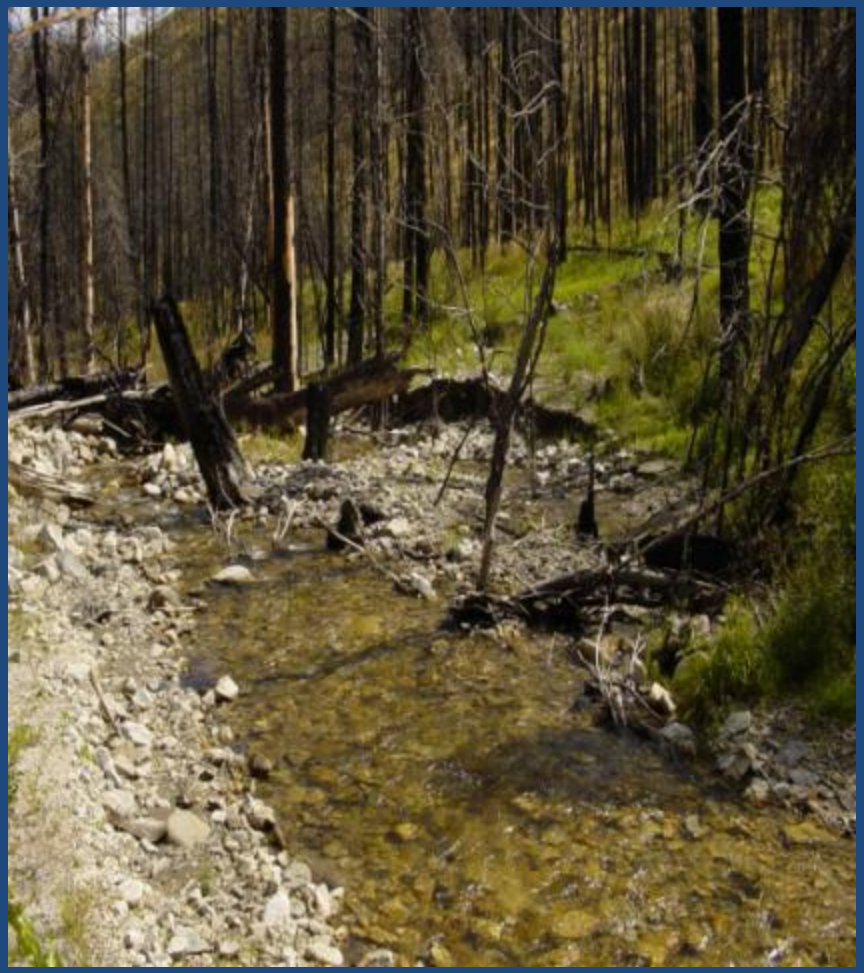
plus

fish captured on the recapture run

minus

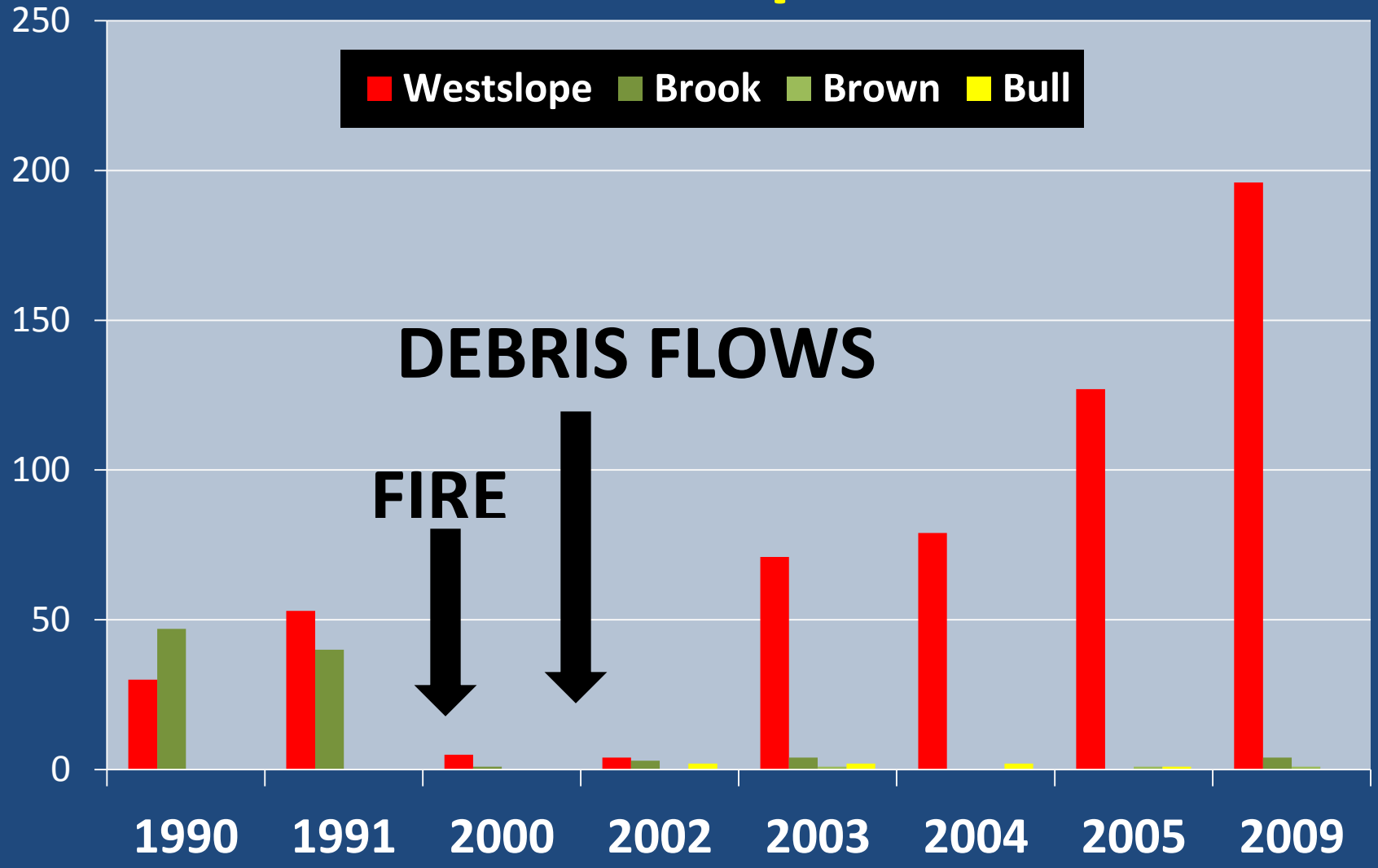
marked fish

Laird Creek (debris flow reach)
B4 channel, 16’ bkf, partially isolated



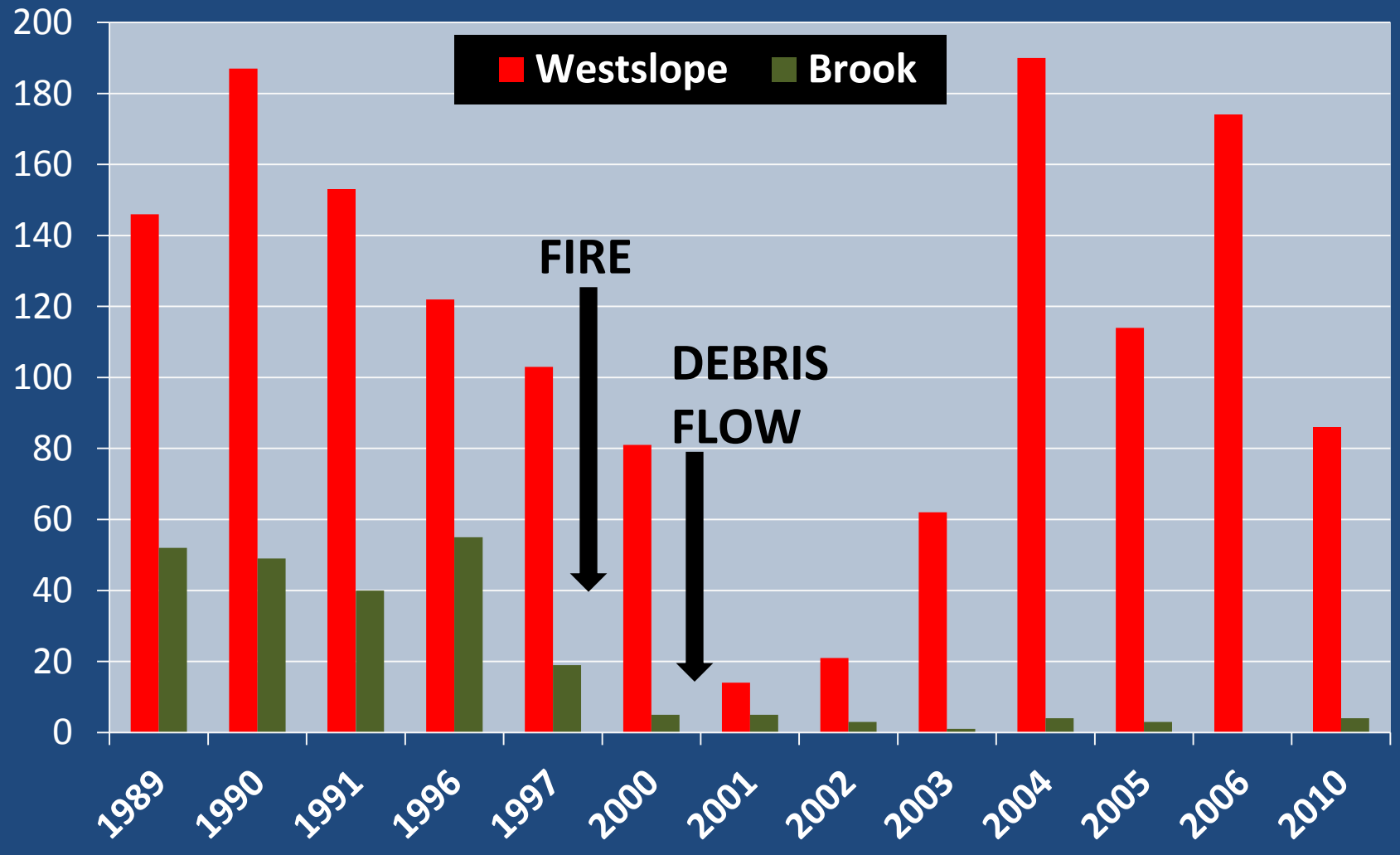
Mouth, US Hwy 93

Laird Creek
fish > 3 inches per 700 feet



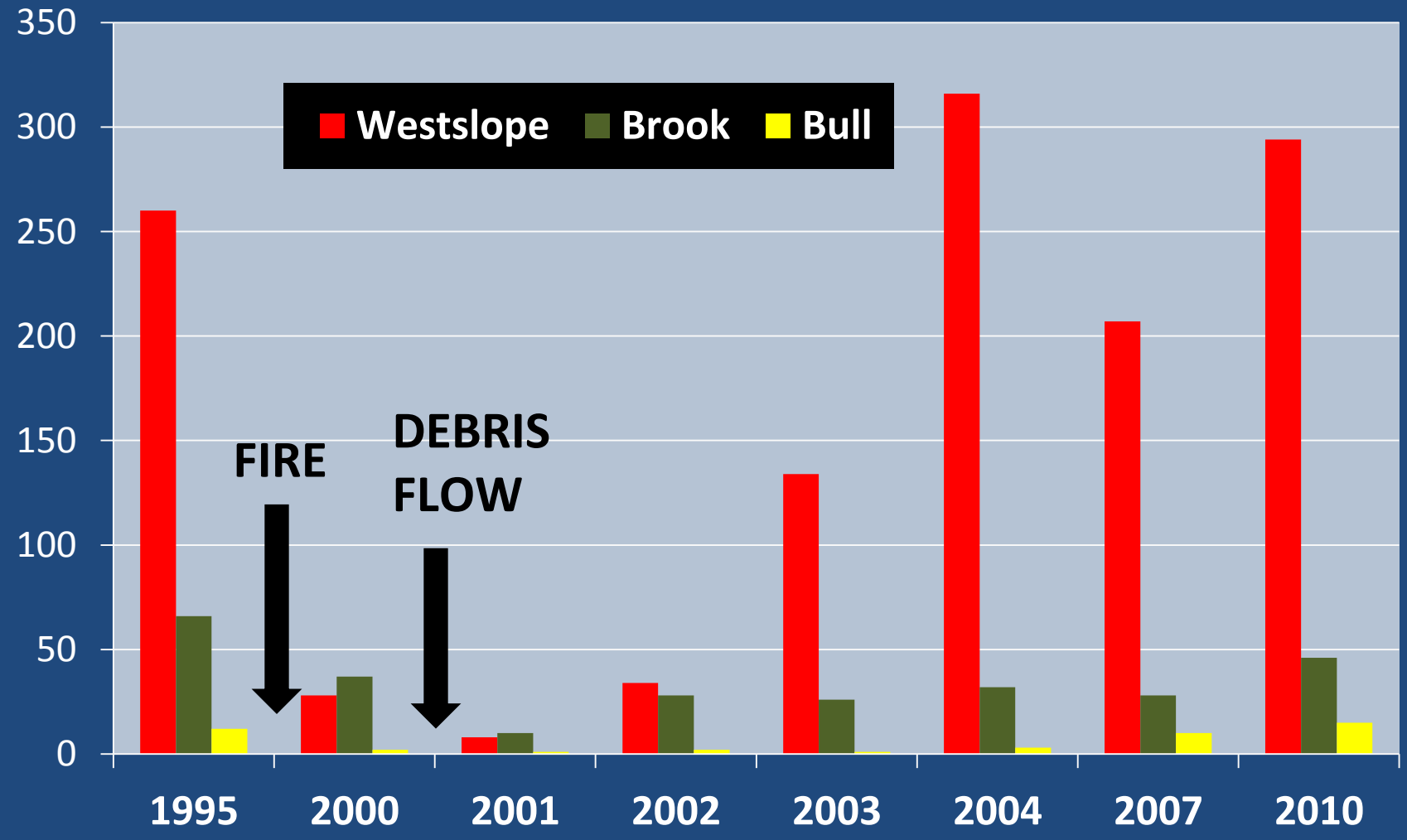

North Rye Creek (debris flow reach)
B4 channel, 14’ bkf, fragmented
09 . 16 . 2008 10 . 37

North Rye Creek
fish > 3 inches per 800 feet



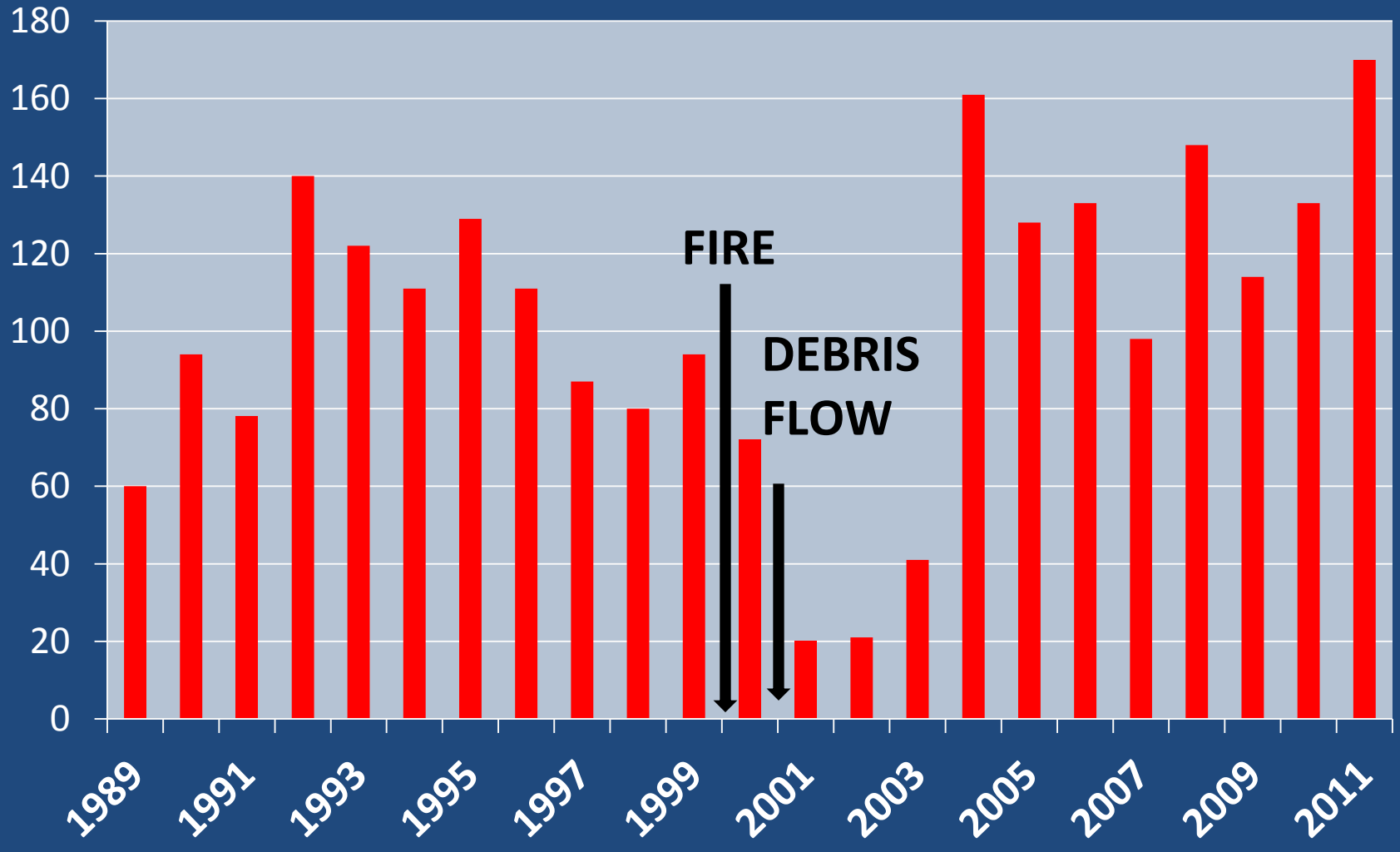

Chicken Creek (debris flow reach)
C4 channel, 12’ bkf, connected

Chicken Creek
fish > 3 inches per 1000 feet



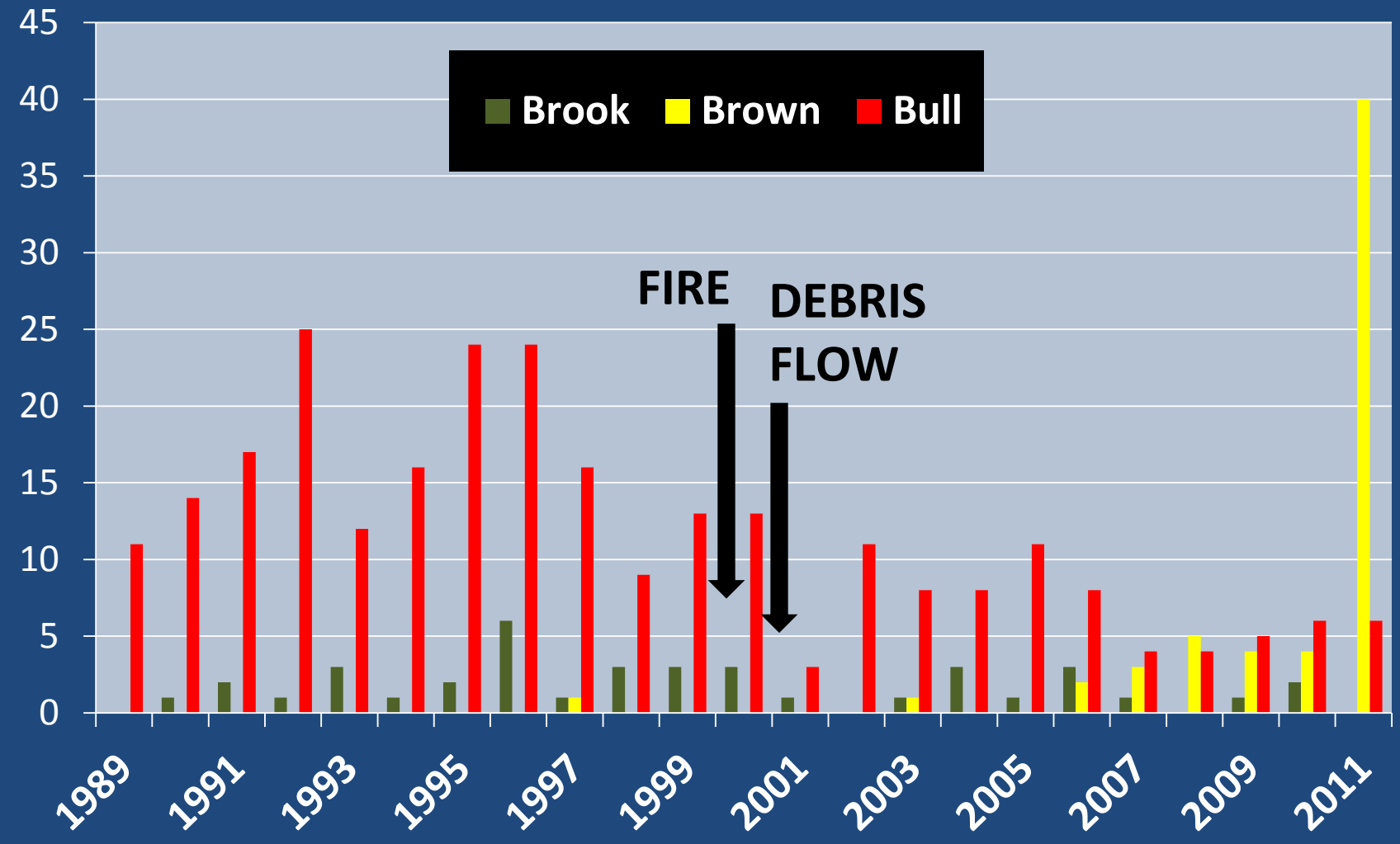

Sleeping Child Cr (debris flow reach)
B3 channel, 35’ bkf, connected

Sleeping Child Creek
westslope > 3 inches per 1000 feet

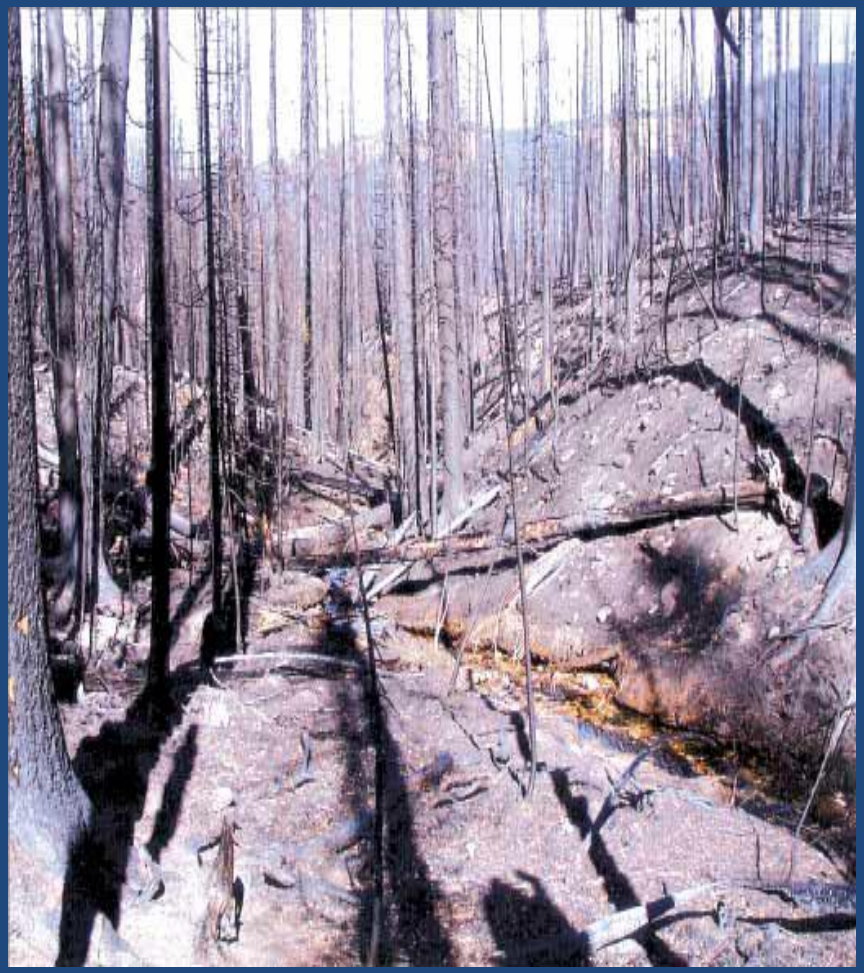


Sleeping Child Creek

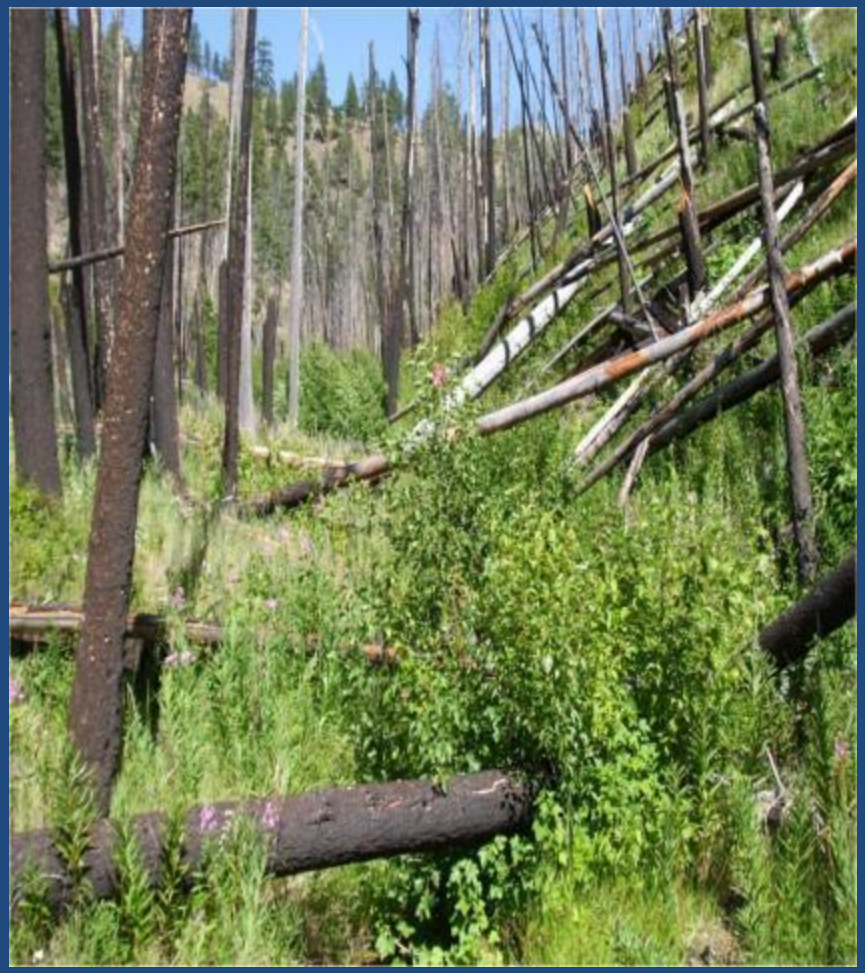
bull, brook, & brown > 3” per 1000 feet



Medicine Tree Cr (debris flow reach)
B5 channel, 5’ bkf, isolated

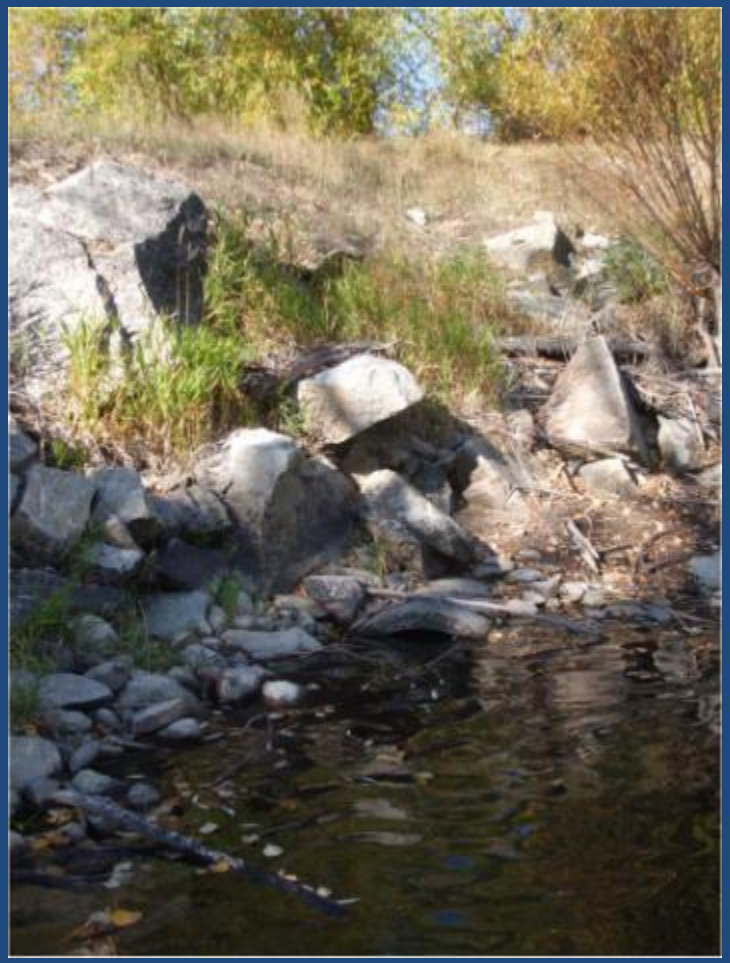


2000



2010

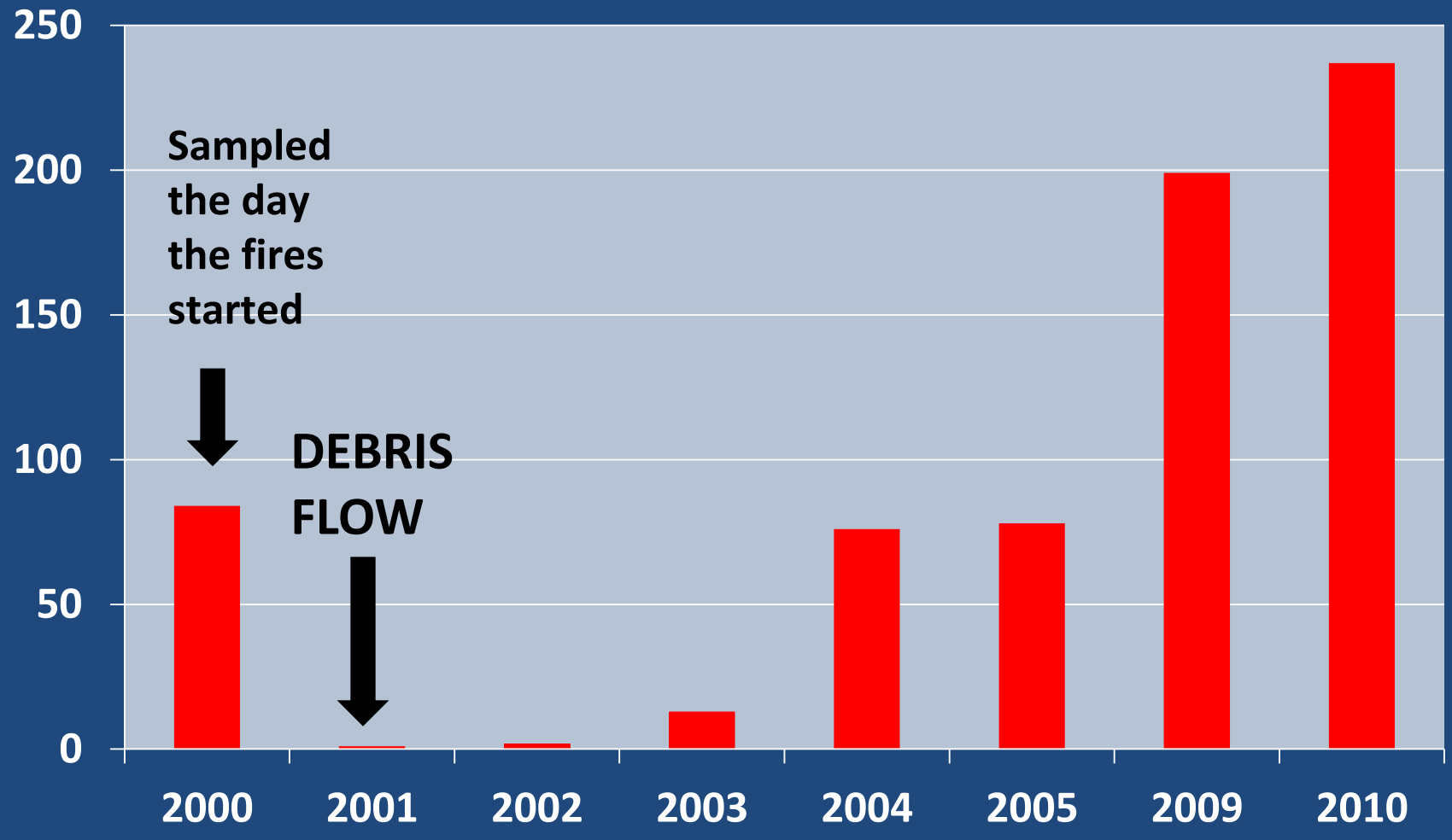
Medicine Tree Creek Culvert Barriers



Mouth, US Hwy 93

100 feet above mouth

Medicine Tree Creek
westslope > 3 inches per 1000 feet

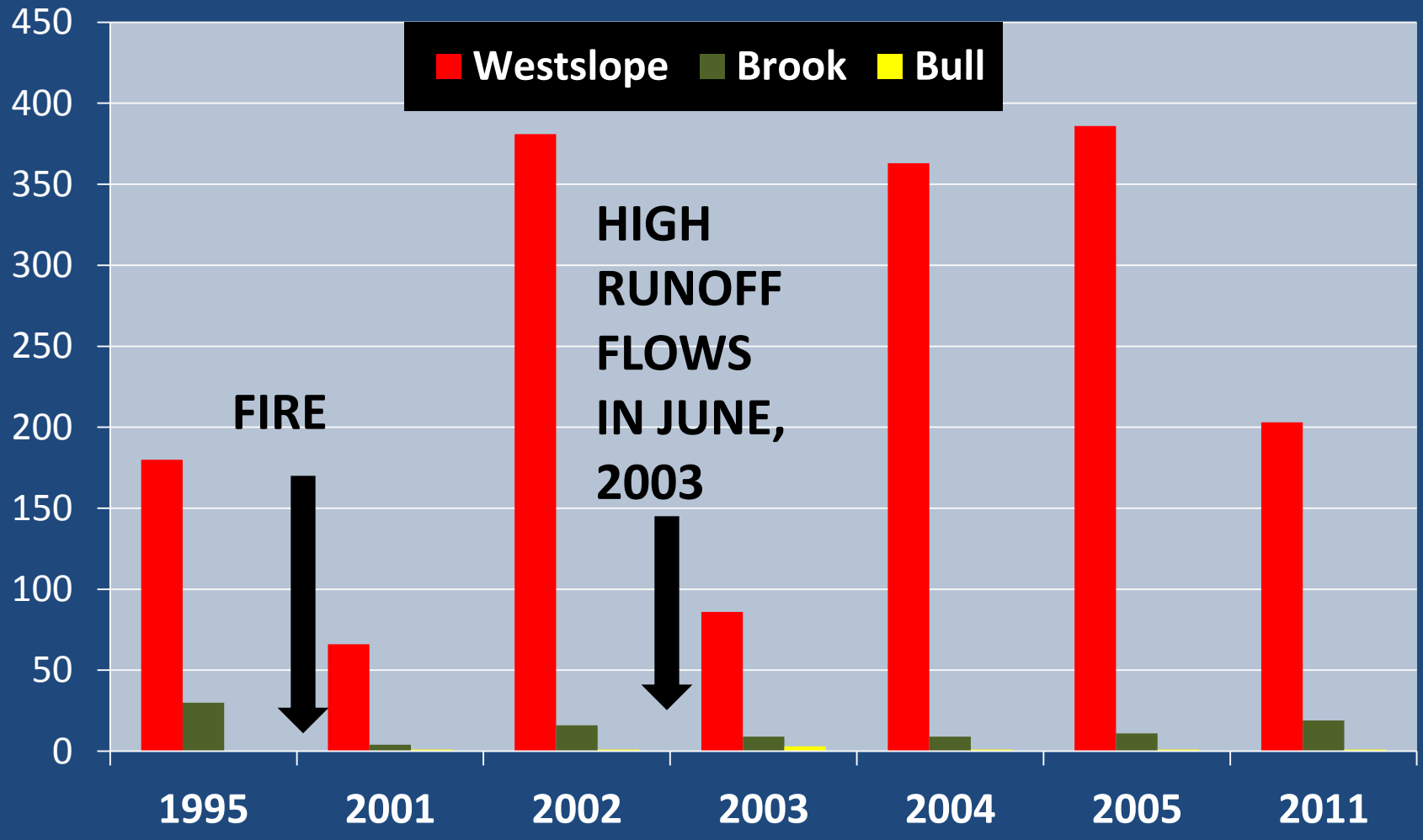


Little Blue Joint Cr (high severity reach)
B4 channel, 12’ bkf, connected

2000

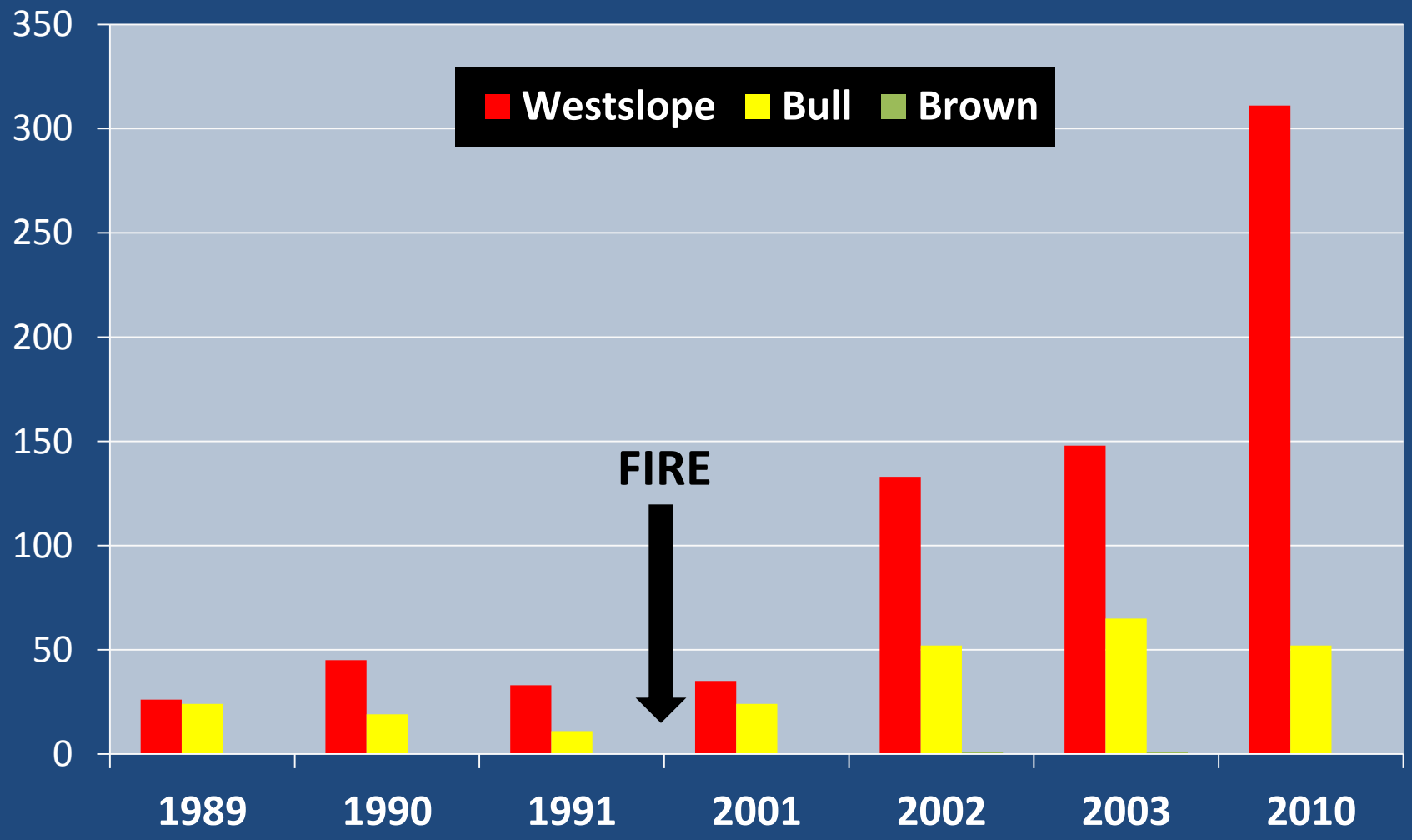
2008

Little Blue Joint Creek
fish > 3 inches per 1000 feet




Meadow Creek (high severity reach)
B3 channel, 18’bkf, connected

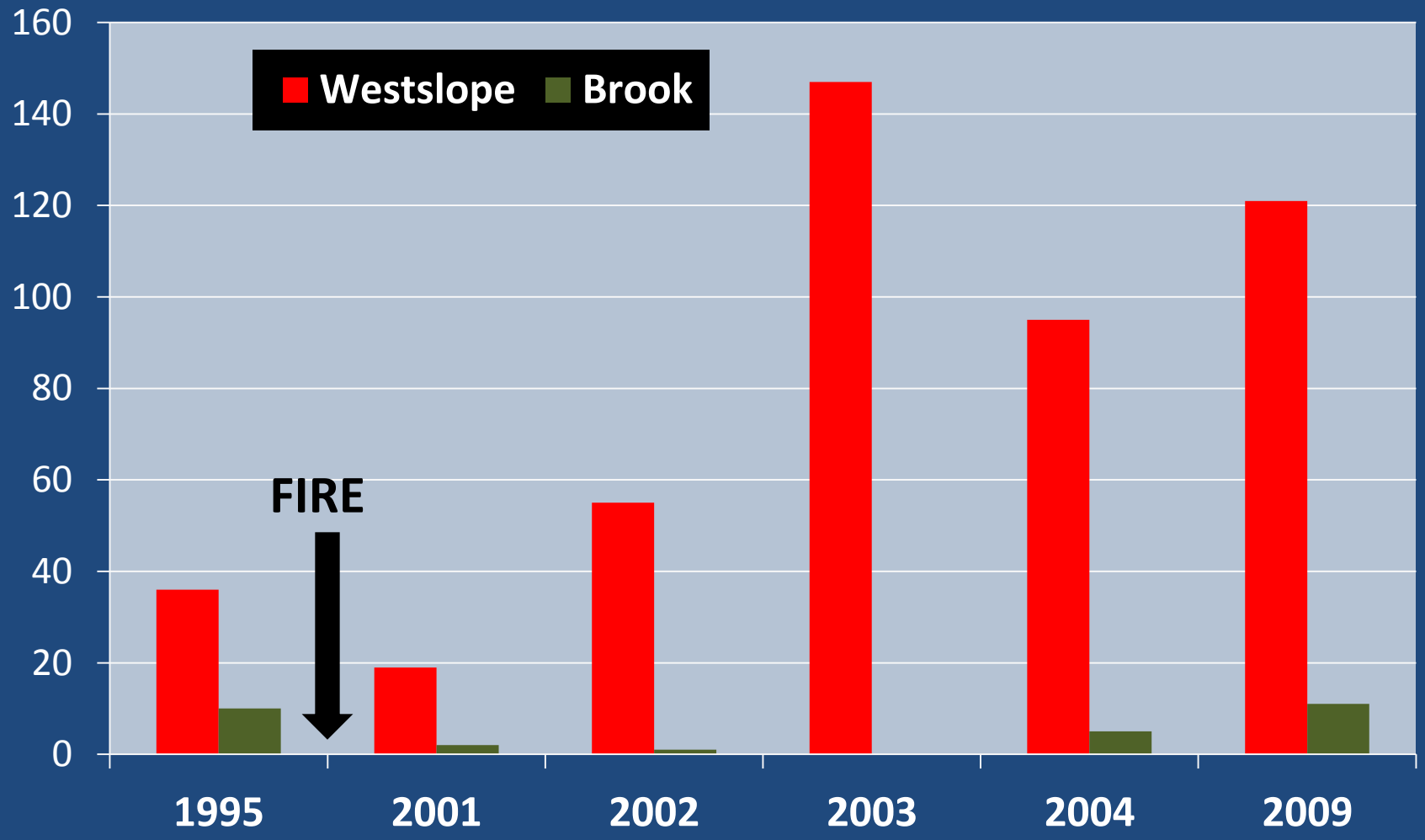
Meadow Creek
fish > 3 inches per 1000 feet




PRO ART

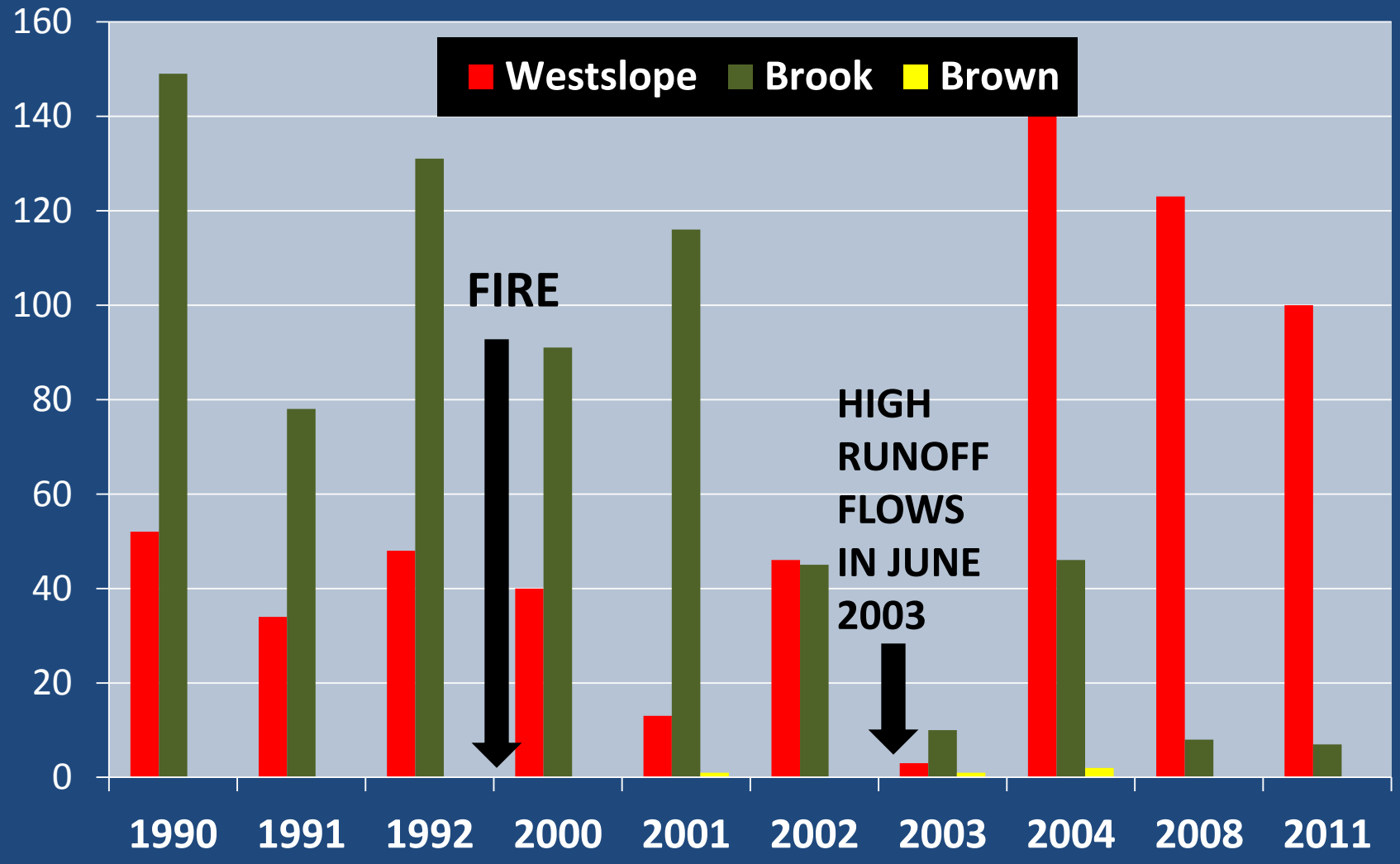

Praine Creek (high severity reach)
B4 channel, 8’ bkf, partially isolated

Praine Creek
fish > 3 inches per 400 feet



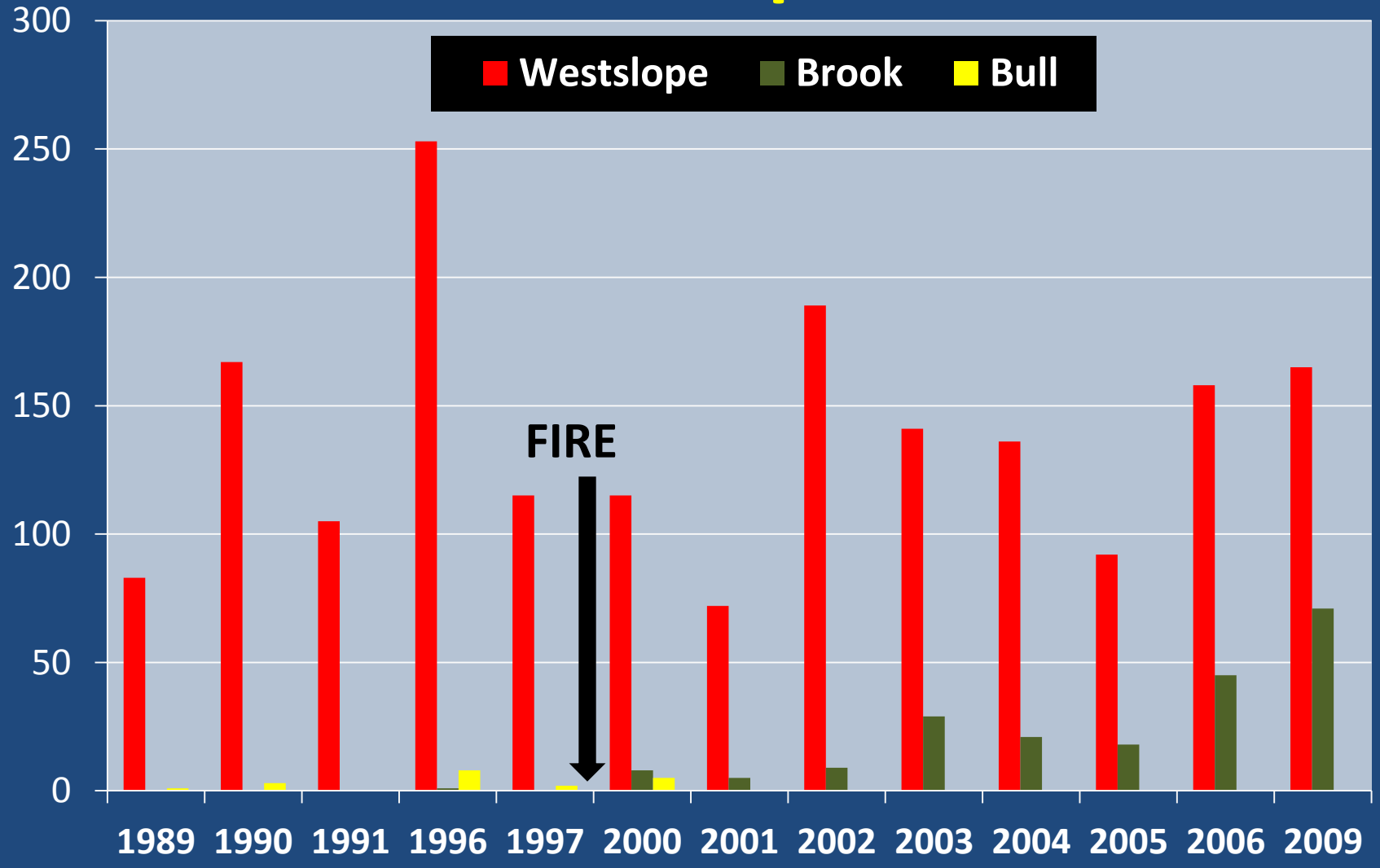

Reimel Creek (high severity reach)
C4 channel, 8’ bkf, isolated

Reimel Creek
fish > 3 inches per 600 feet




Rye Creek (moderate severity reach)
B5 channel, 15’ bkf, connected
07.02.2008 11:47

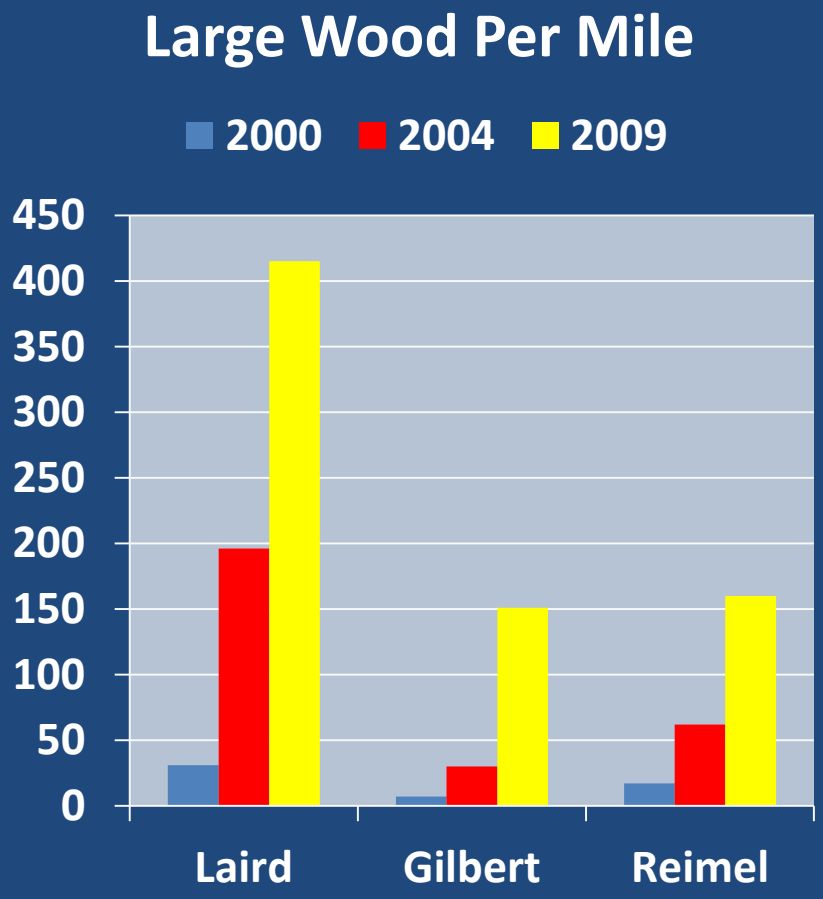
Rye Creek
fish > 3 inches per 800 feet

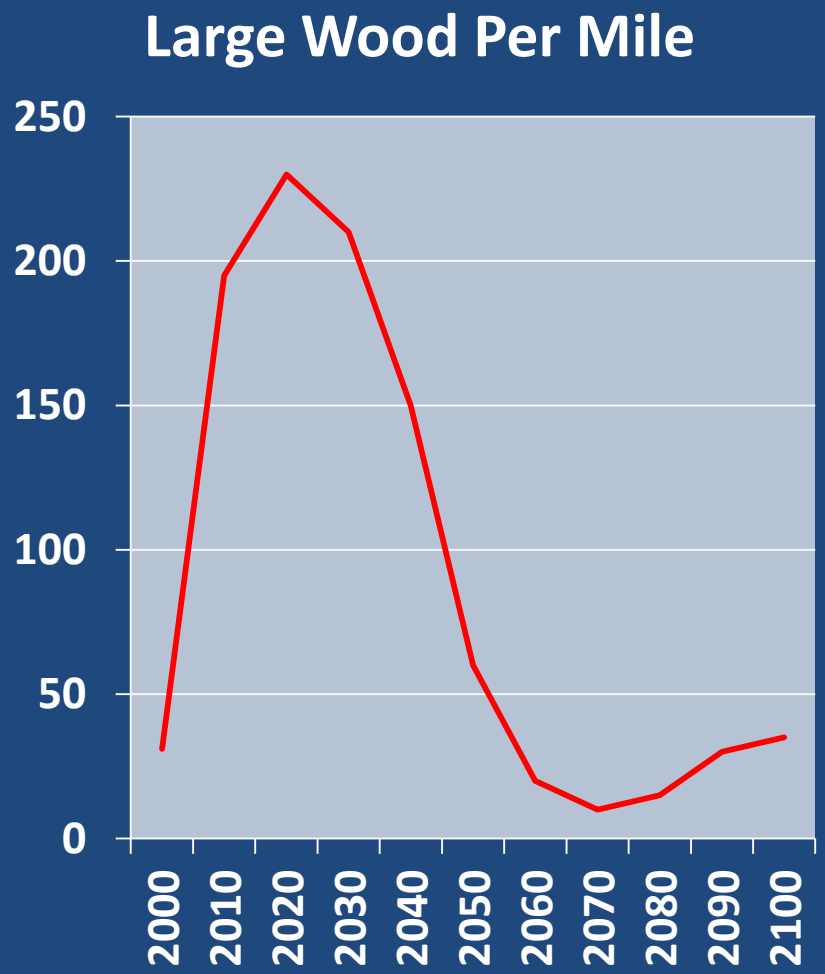


Summary of Population Changes

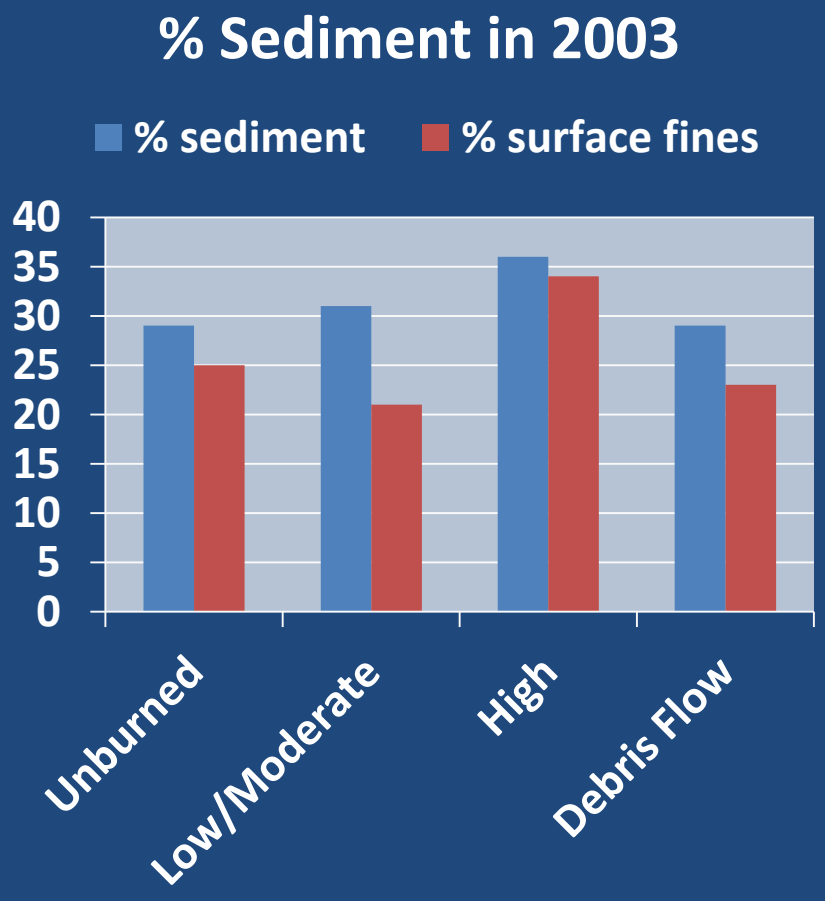
Stream	Treatment	Westslope	Brook	Bull	Brown
Laird Creek	Debris Flow				YES
North Rye Creek	Debris Flow			Absent	NO
Chicken Creek	Debris Flow				NO
Sleeping Child Creek	Debris Flow				YES!!!
Medicine Tree Creek	Debris Flow		Absent	Absent	NO
Little Blue Joint Cr	High				NO
Meadow Creek	High		Absent		YES
Praine Creek	High			Absent	NO
Reimel Creek	High			Absent	YES
Rye Creek	Moderate				NO

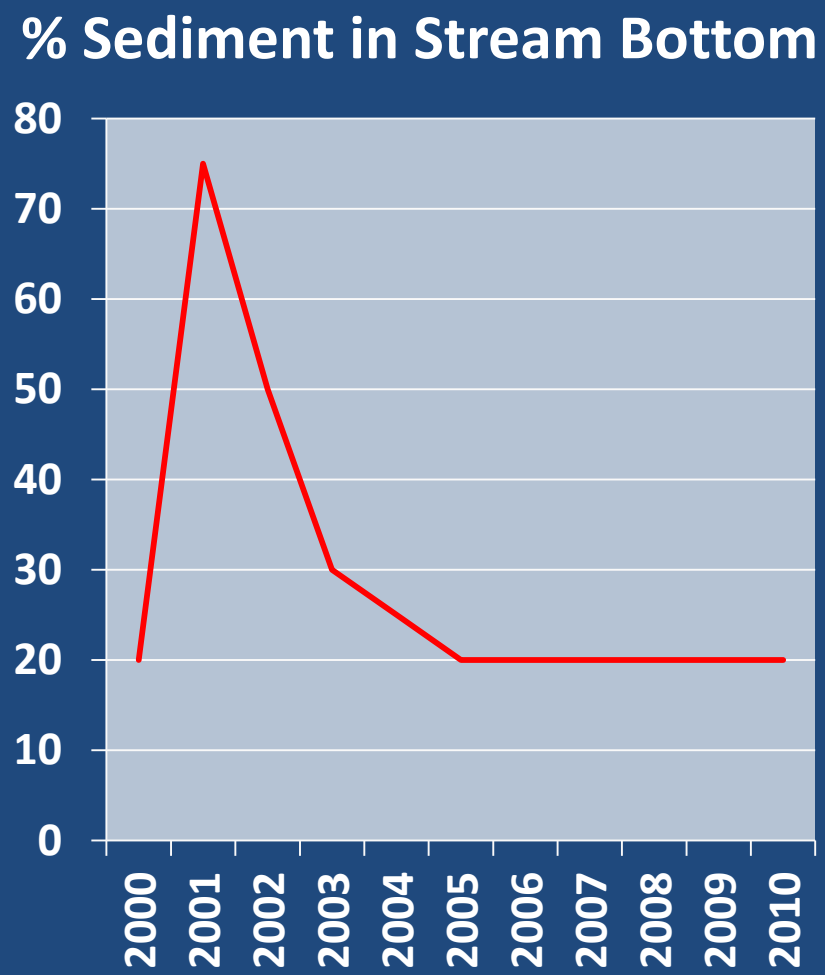
Changes in large wood over the past decade and the next century





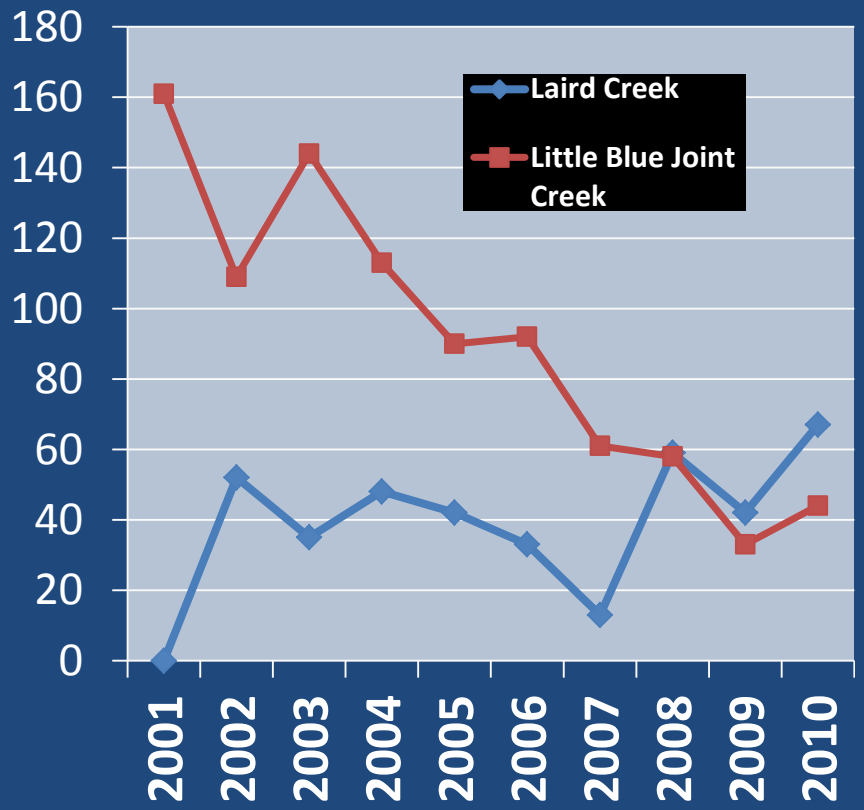
Changes in sediment over the past decade



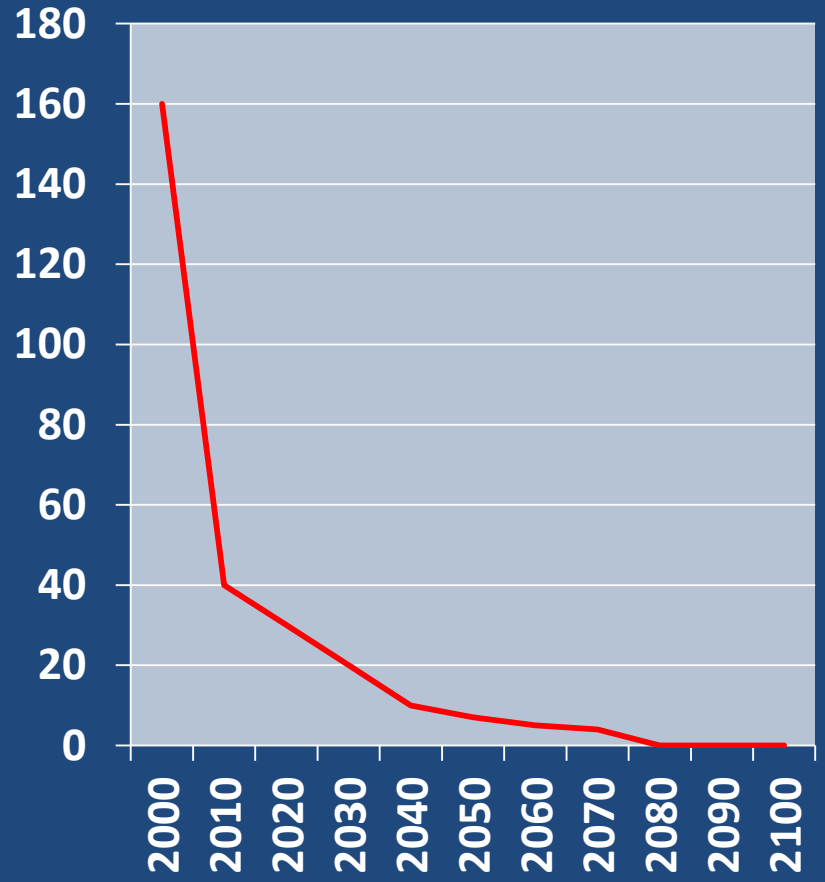


Changes in stream temperatures over the past decade and the next century

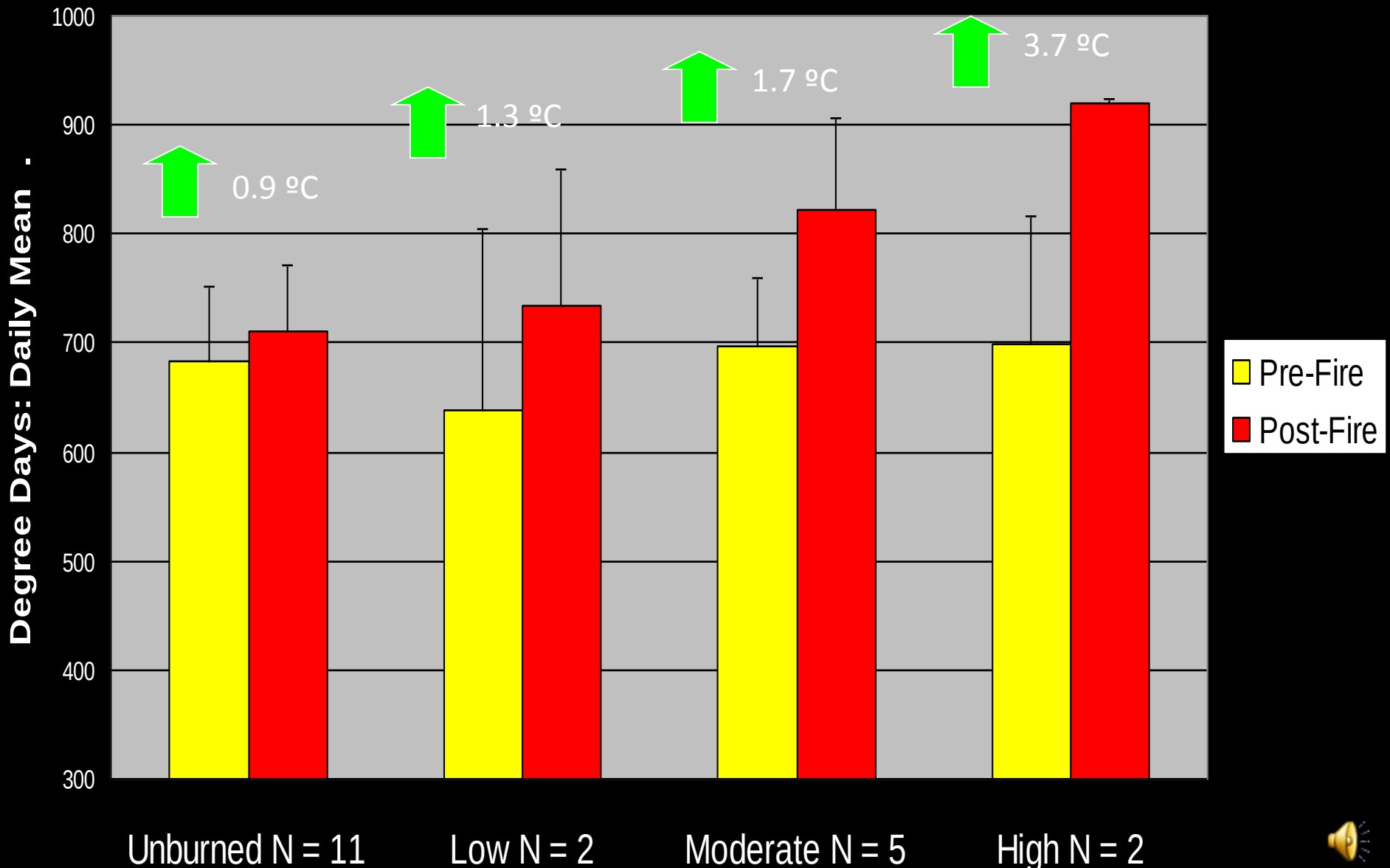
Temperature Recovery



Projected Recovery



Degree Days: Pre-Fire vs. Post-Fire



Laird Creek bottom of hydromulched hillslope - June, 2001
note the high percentage of fine materials in the gravels

Laird Creek – October, 2002
note the loss of fine materials in the stream bed

Laird Creek – June, 2007
note the recruitment of downed trees

Laird Creek – July, 2010
what has changed over time and do you think that fish habitat has improved? Why?