

Effect of flooding from Tropical Storm Irene on fish communities in the Upper Esopus Creek basin



Video Source: Mjanensch1. "Esopus river at Woodland Valley bridge in Phoenicia, NY 8/28/11 8am." *YouTube*. Web. 30 Aug. 2011.

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Cornell University
Cooperative Extension
Ulster County



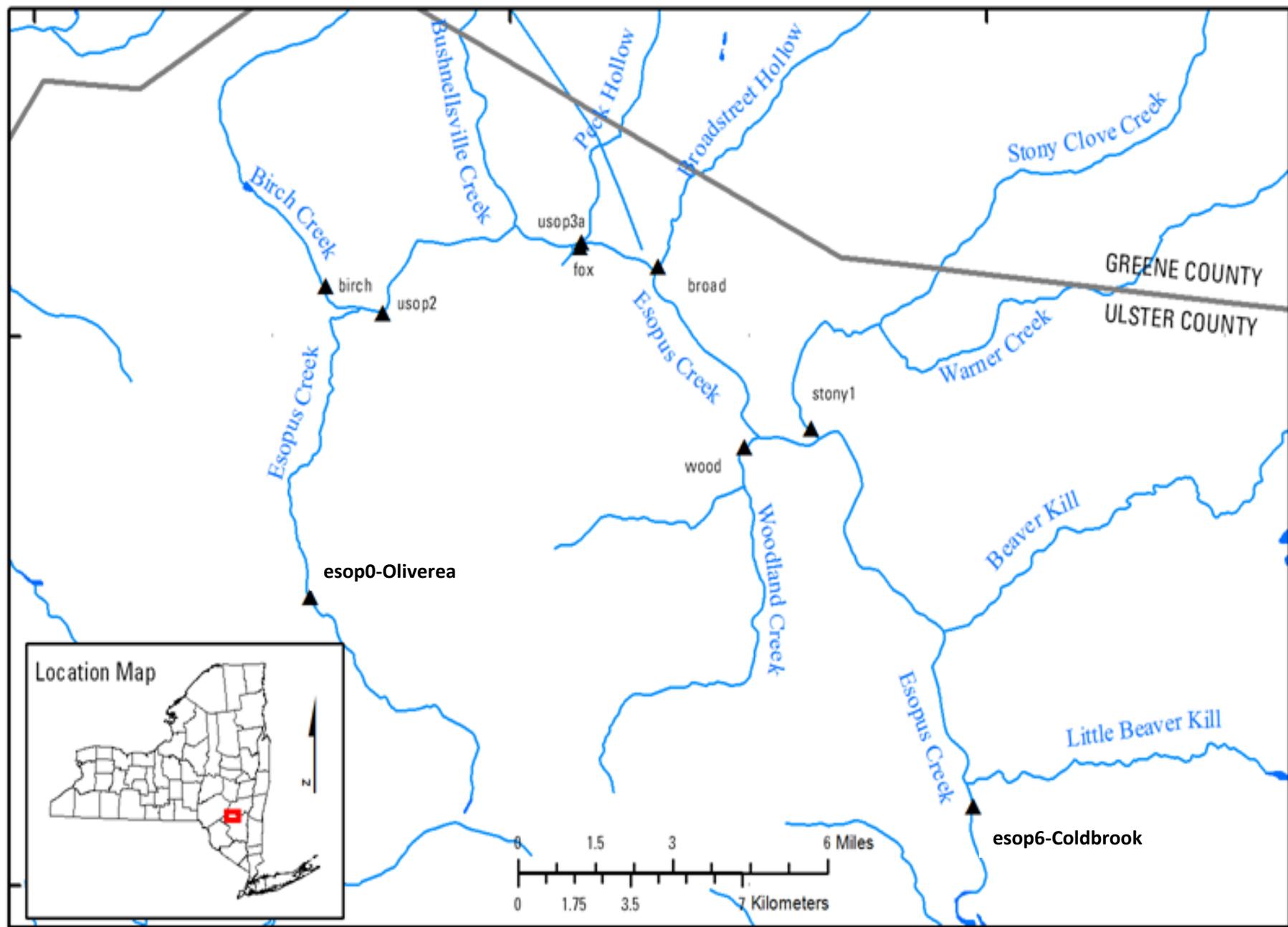
74°32' W

74°24' W

74°16' W

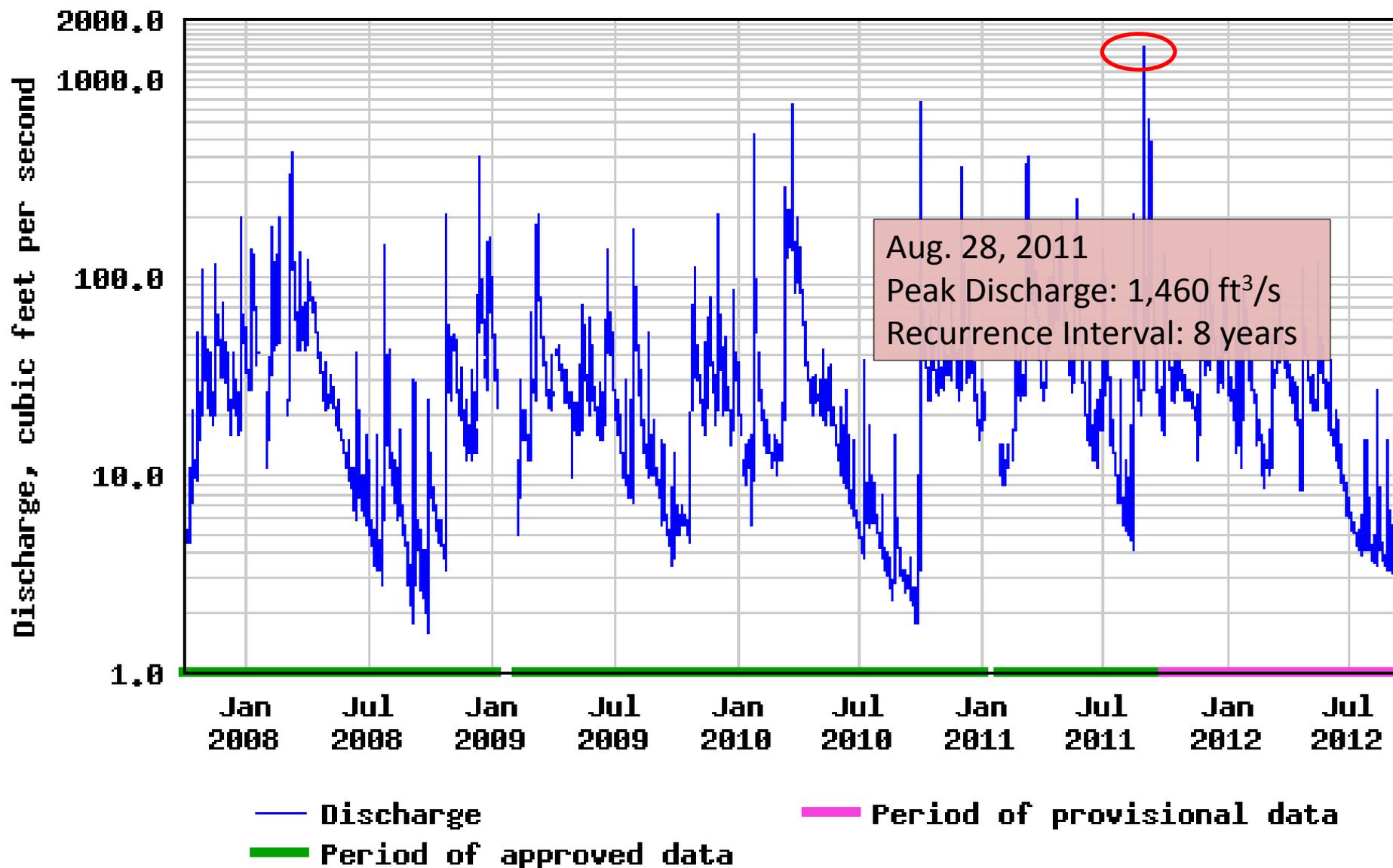
42°6' N

42°0' N

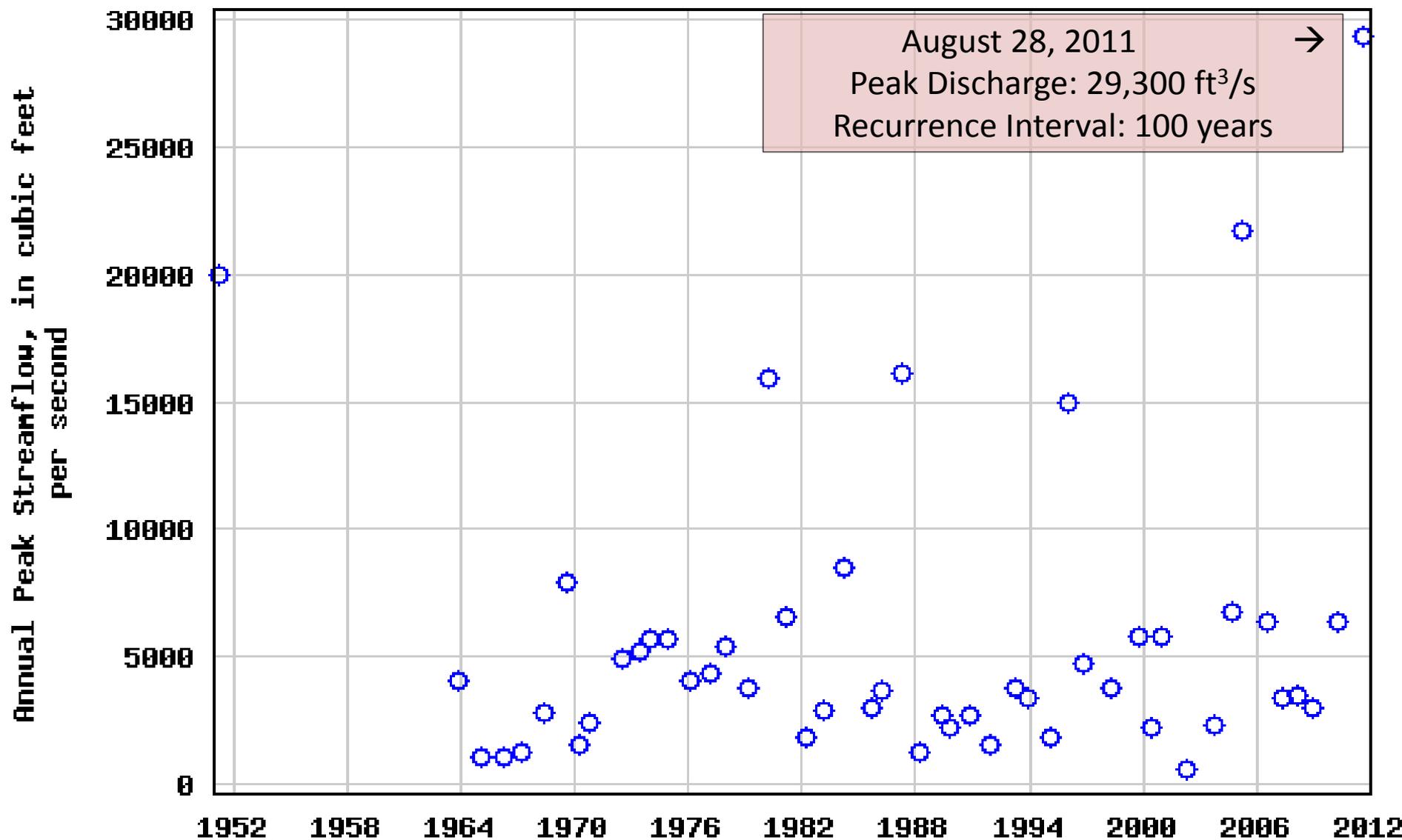


Base from U.S. Geological Survey Digital Data. Universal Transverse Mercator Projection, Zone 18N, NAD83

USGS 013621955 BIRCH CREEK AT BIG INDIAN NY



USGS 01362200 ESOPUS CREEK AT ALLABEN NY



Abstract
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Keywords
diving; sn
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Received 3

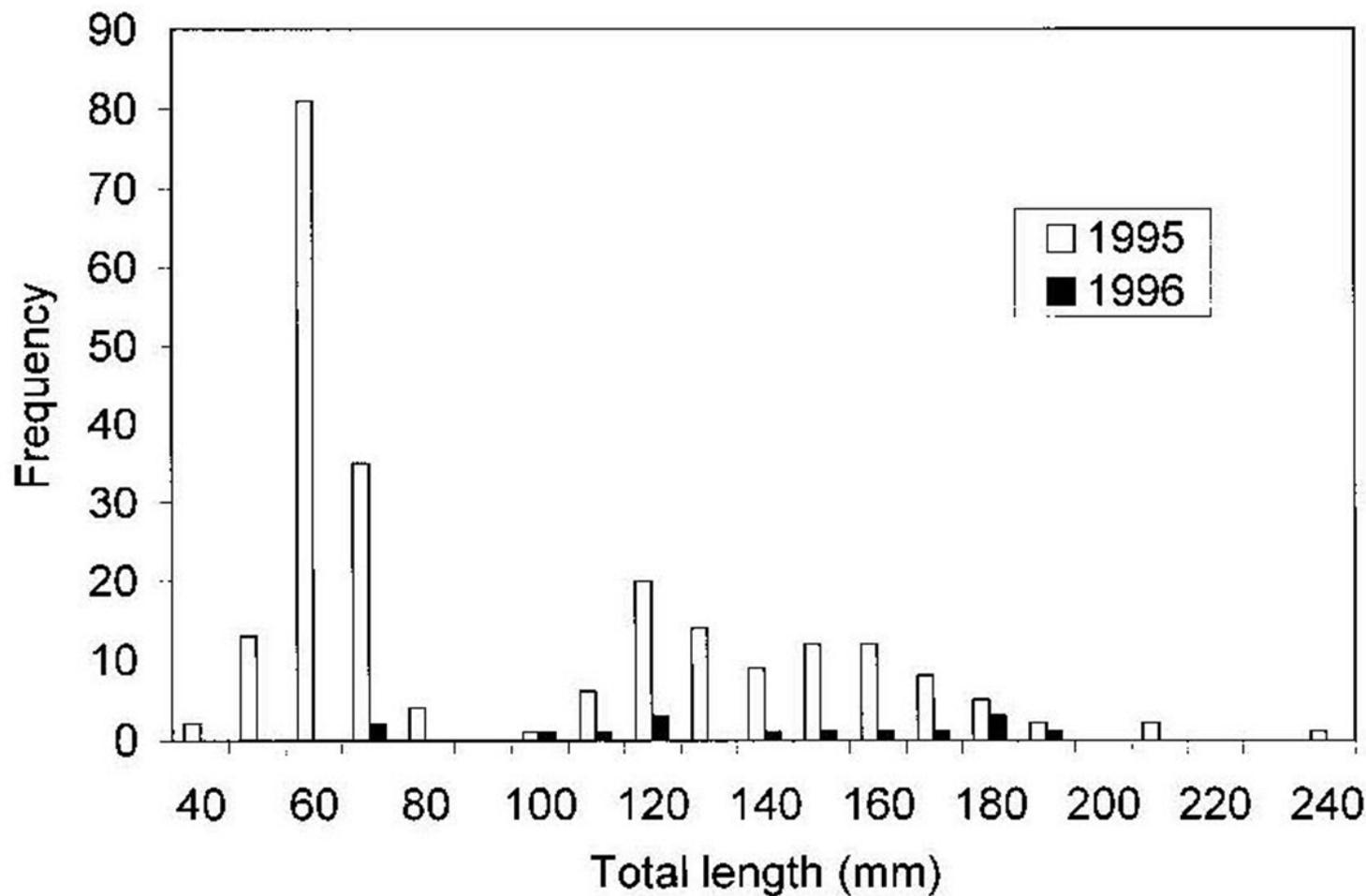


FIGURE 2.—Length frequency distribution of wild brook trout from Vance Run, West Virginia, August 1995 and 1996.

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Flood Impacts to Wild Trout Populations in Vermont

Vermont Department of Fish and Wildlife

Trout and other fish populations inhabiting Vermont streams and rivers have evolved to survive and quickly recover from the effects of severe flooding. While physical trauma associated with large scale movement of streambed material and debris, displacement, stranding and physiological stress will take a toll in the short term; these populations will quickly rebound when quality aquatic habitat remains intact.

The Vermont Department of Fish and Wildlife routinely monitors wild trout populations throughout Vermont. This information clearly illustrates the impact of severe flooding from tropical storm Irene in several watersheds, as well as what we can expect from these populations in the future.

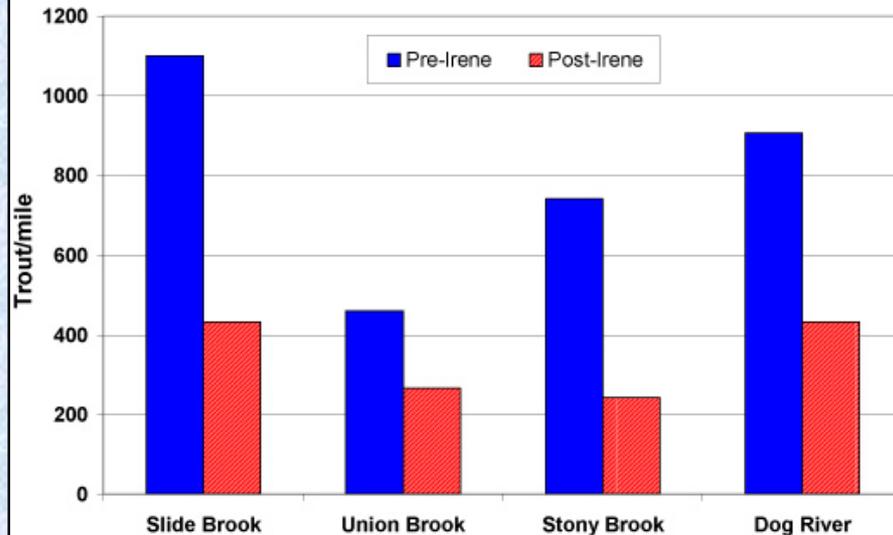
Impacts of Irene on Wild Trout Populations:

Stream surveys conducted in 2011 prior to the Irene flood were repeated in several streams within the Mad River and Dog River watersheds, which had experienced severe flooding.

Following the flood, wild trout populations in these streams were reduced to 33-58% of pre-flood levels. Young fish were particularly affected (0-37% of pre-flood levels) while older trout fared better (41-64% of pre-flood levels).

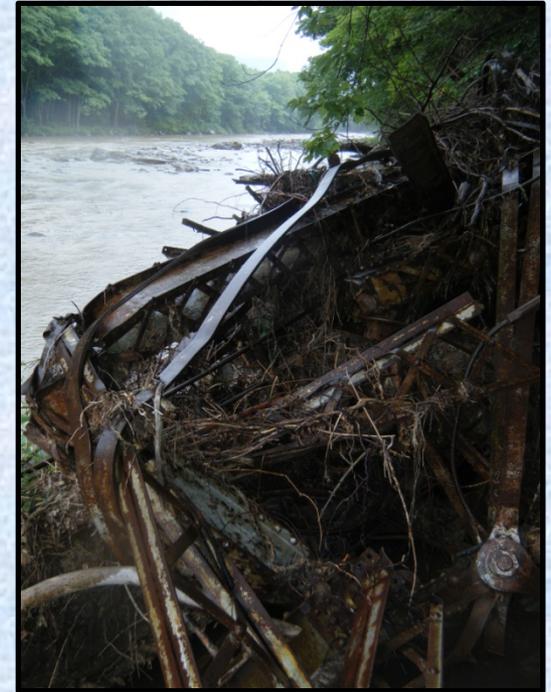
Wild Trout Populations - Before and After Irene

Vermont Department of Fish and Wildlife Surveys



Vermont Department of Fish and Wildlife, 2012.

<http://www.vtfishandwildlife.com>

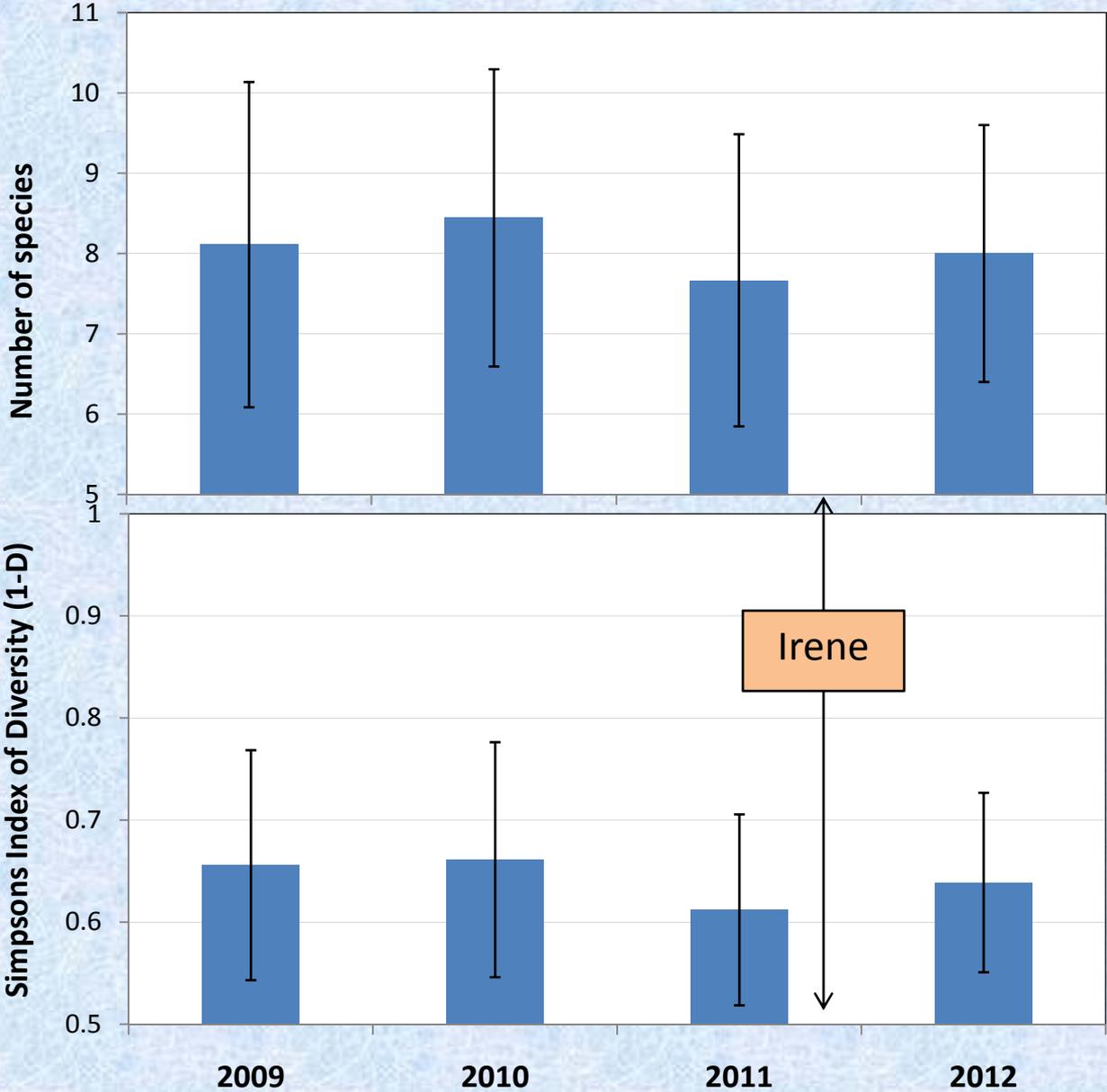


Hypotheses

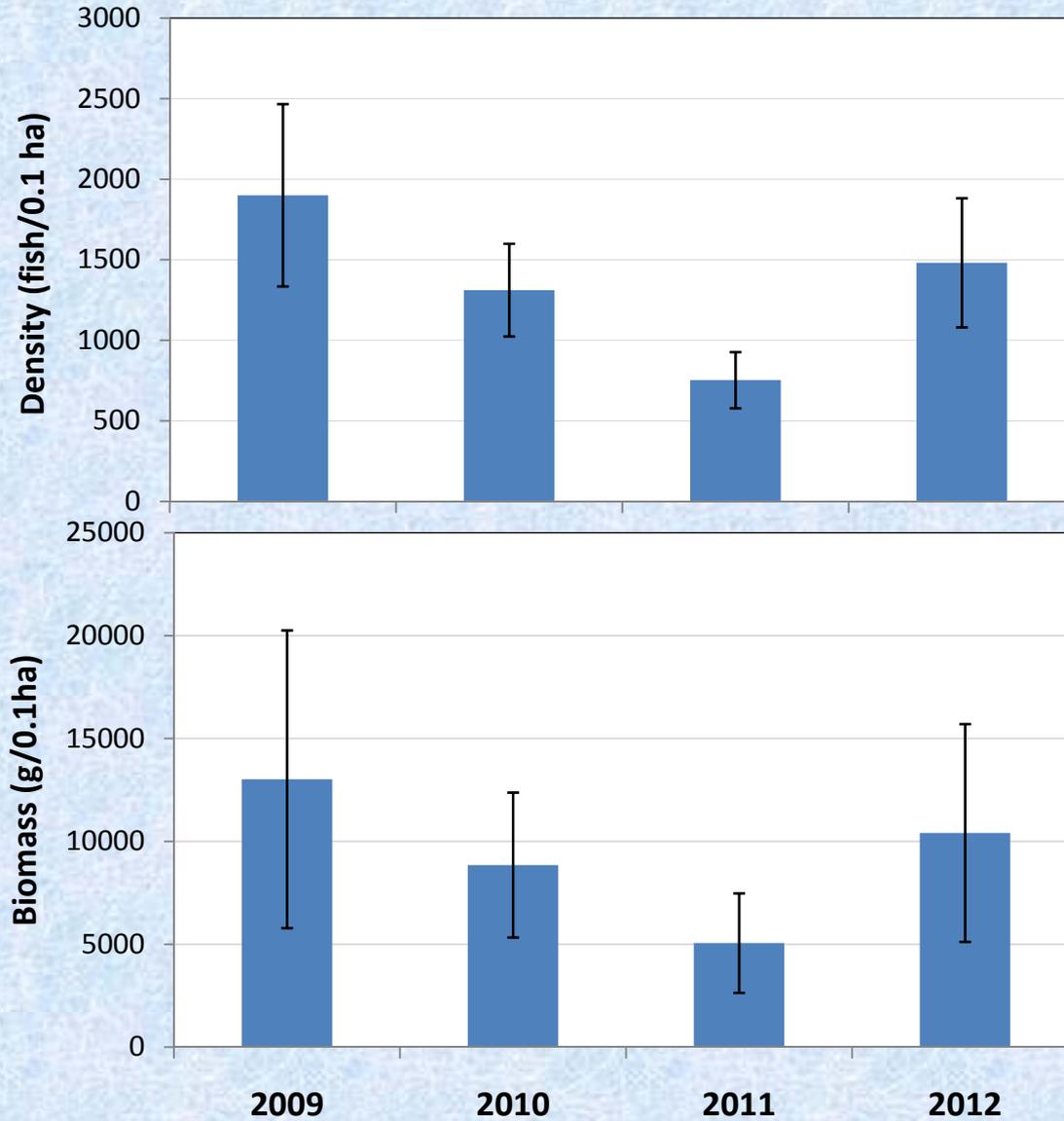
- Reduced community metrics
- Reduced density/biomass of individual species
- Disproportionate effect on YOY trout (loss of 2011 year class)



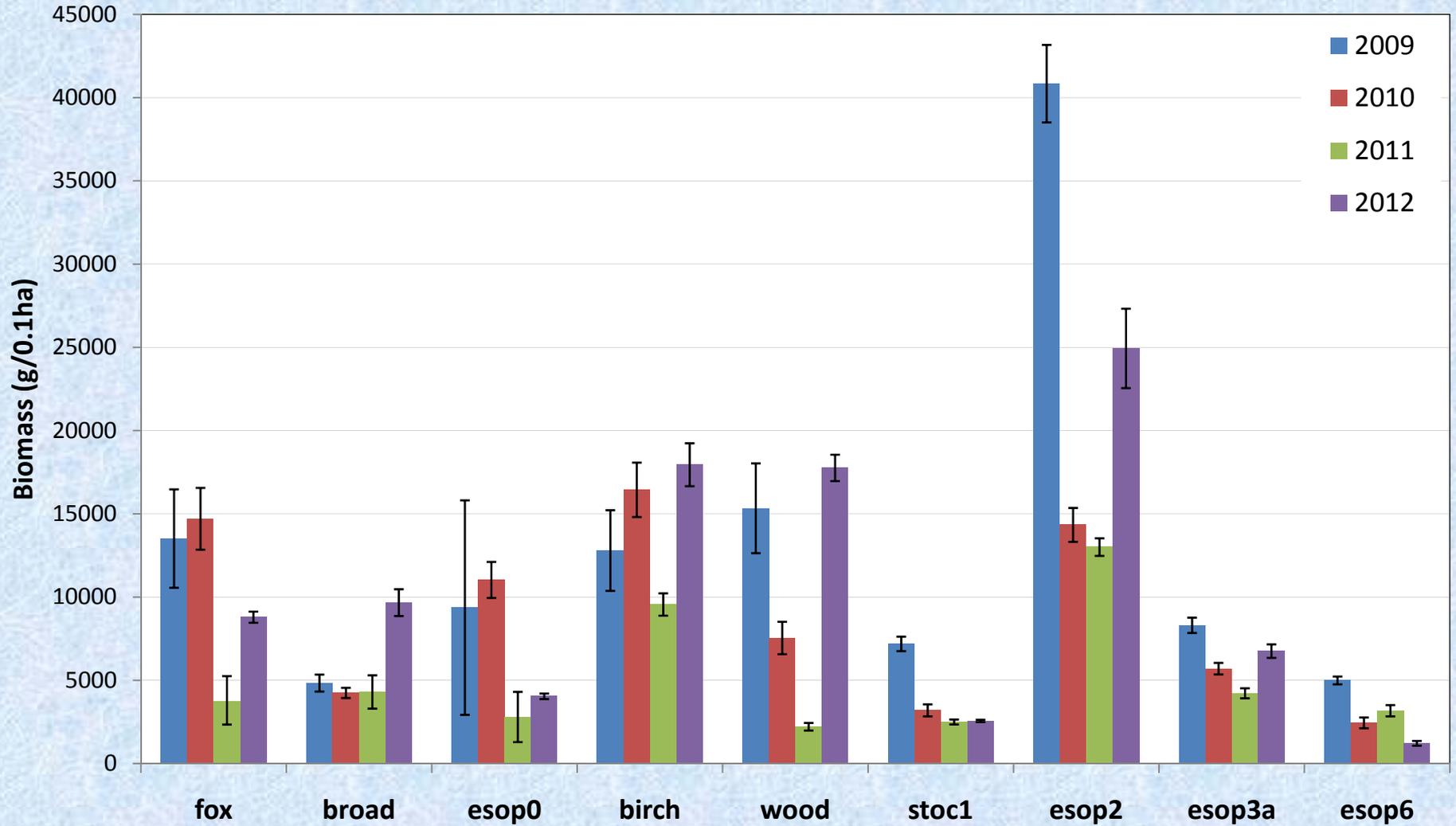
Mean Community Richness and Diversity



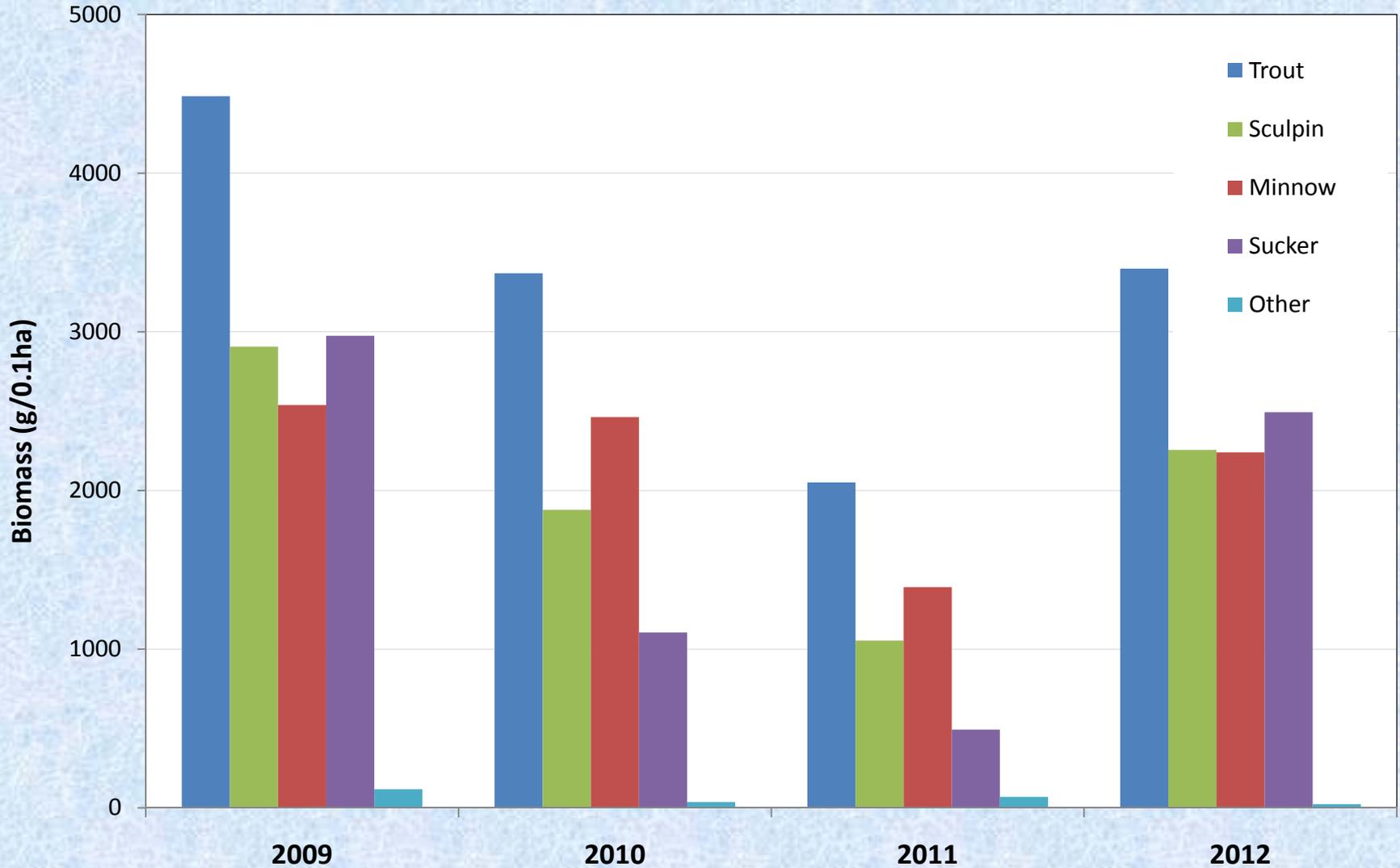
Mean Community Density and Biomass (All 9 sites)



Community Biomass by Site

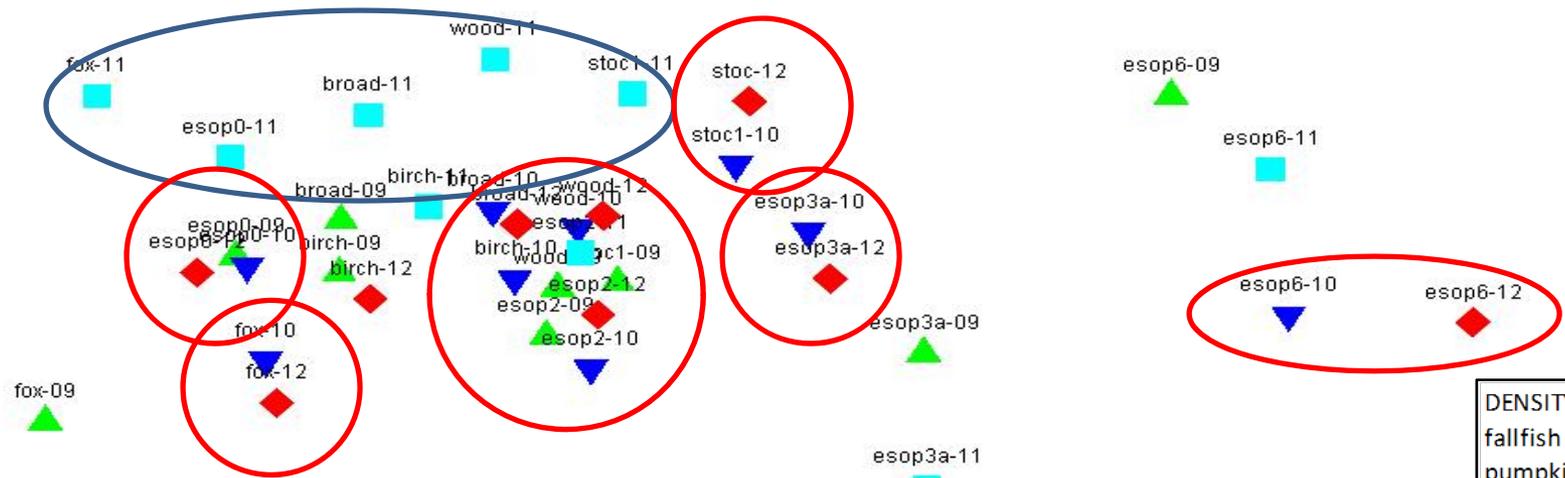
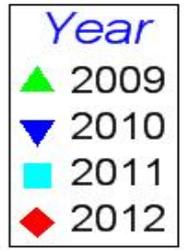


Mean Species/group Biomass by Year



Transform: Log(X+1)
 Resemblance: S17 Bray Curtis similarity

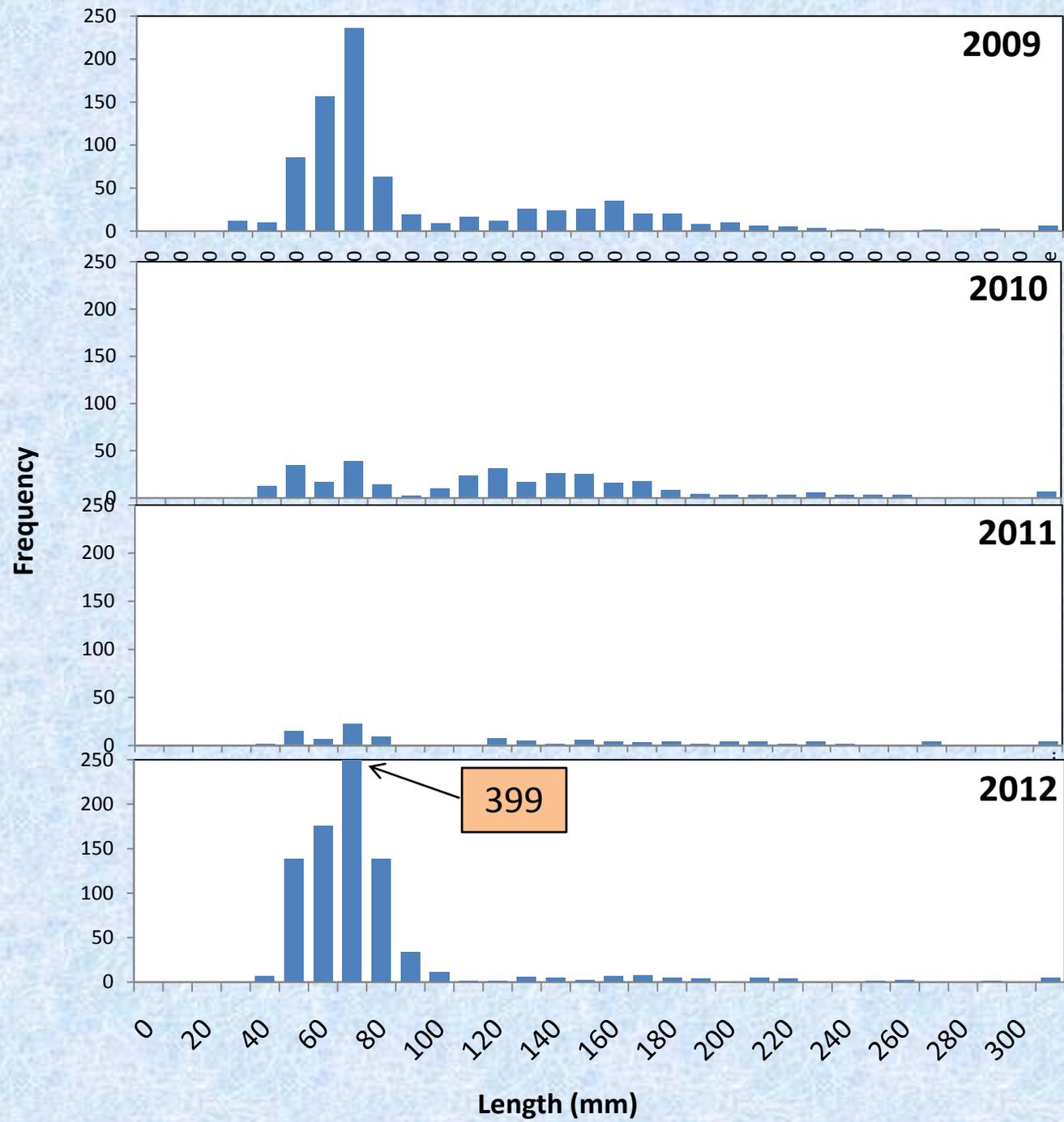
2D Stress: 0.09



DENSITY (No/0.1 h)	stoc1-09
fallfish	0.0
pumpkinseed	1.7
bluegill	0.0
redbreast	0.0
green sunfish	0.0
white sucker	1.7
longnose sucker	0.0
cutlips minnow	151.2
marginated madtom	0.0
brown trout	127.1
brook trout	0.0
rainbow trout	187.2
blacknose dace	467.2
longnose dace	462.1
tessellated dart	0.0
largemouth bass	0.0
smallmouth bass	0.0
rock bass	0.0
yellow perch	0.0
slimy sculpin	87.6

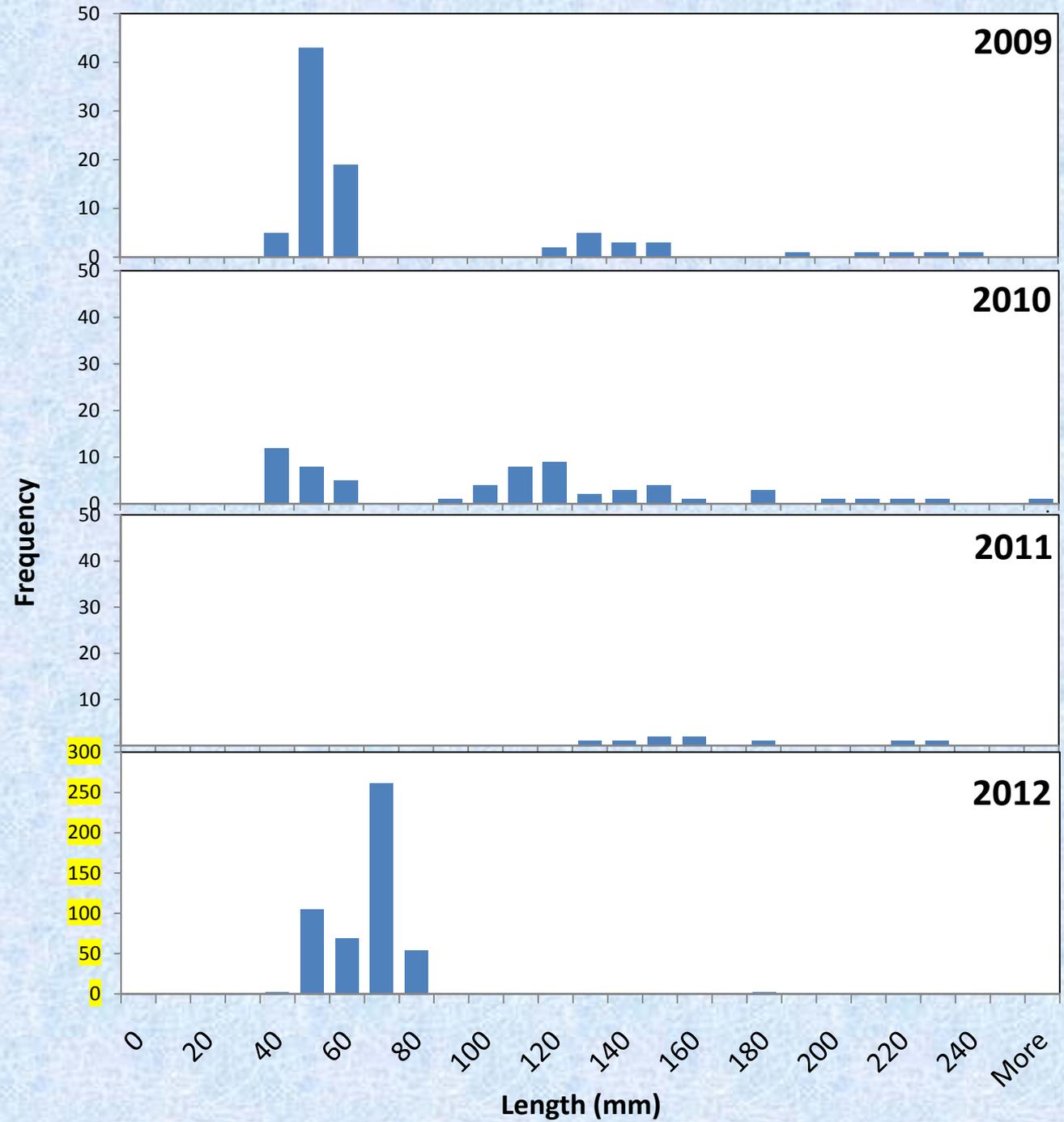
Population age structure histograms for brown trout

(Cumulative for all 9 sites for each year)



Population age structure histograms for brown trout

(At one small DA site: Fox Hollow Creek)

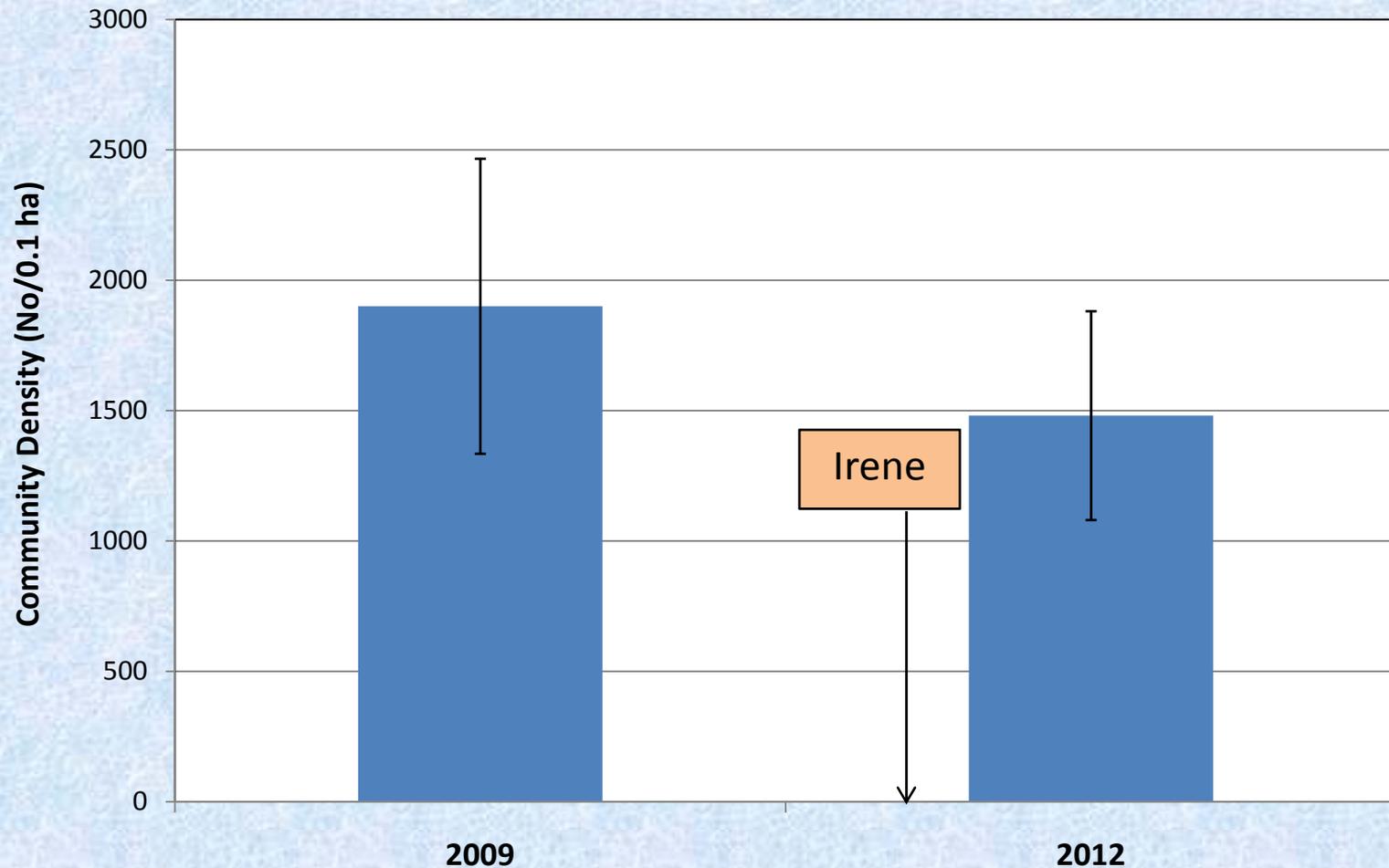


Conclusions:

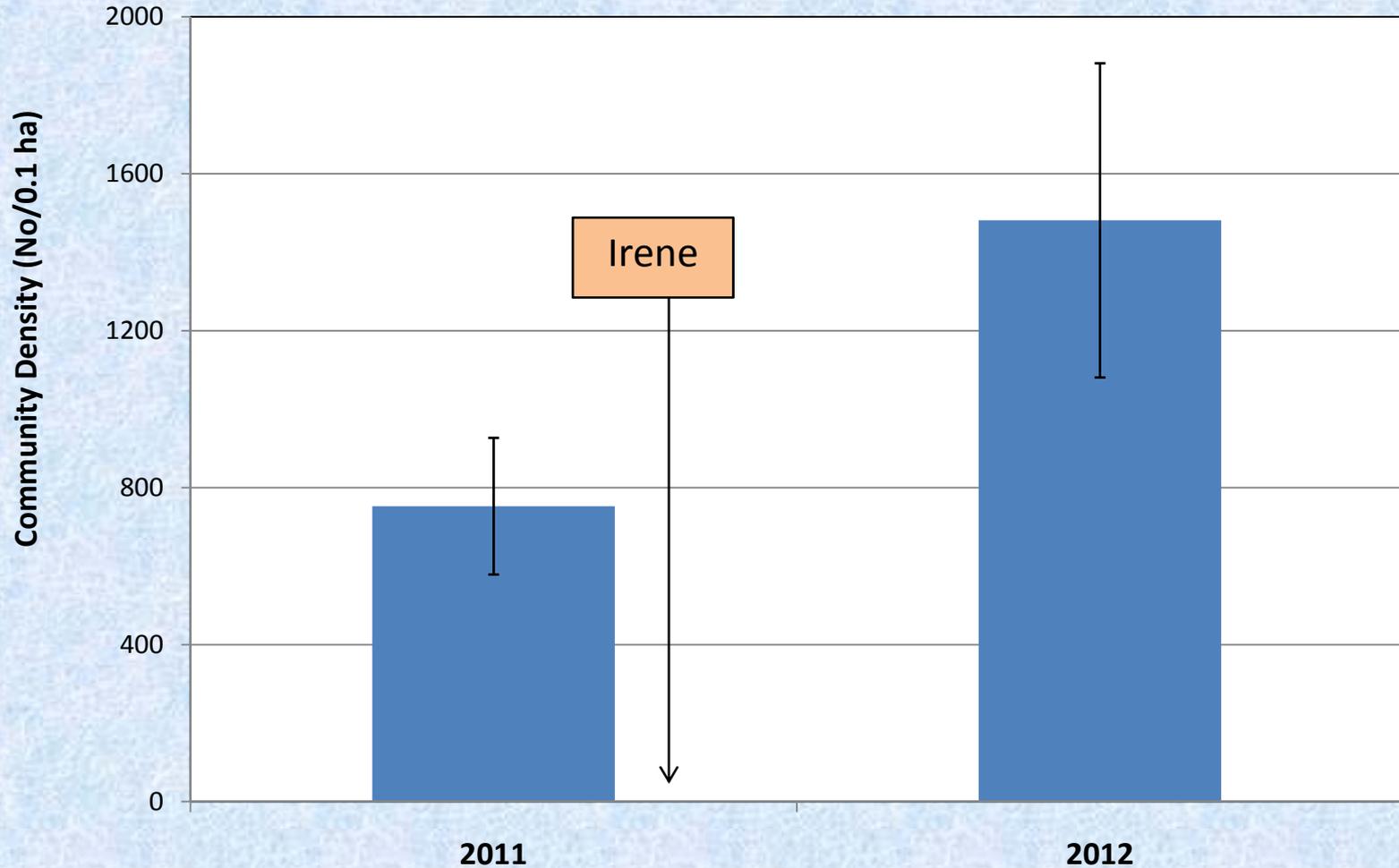
- Scope of study period is critical for interpretation



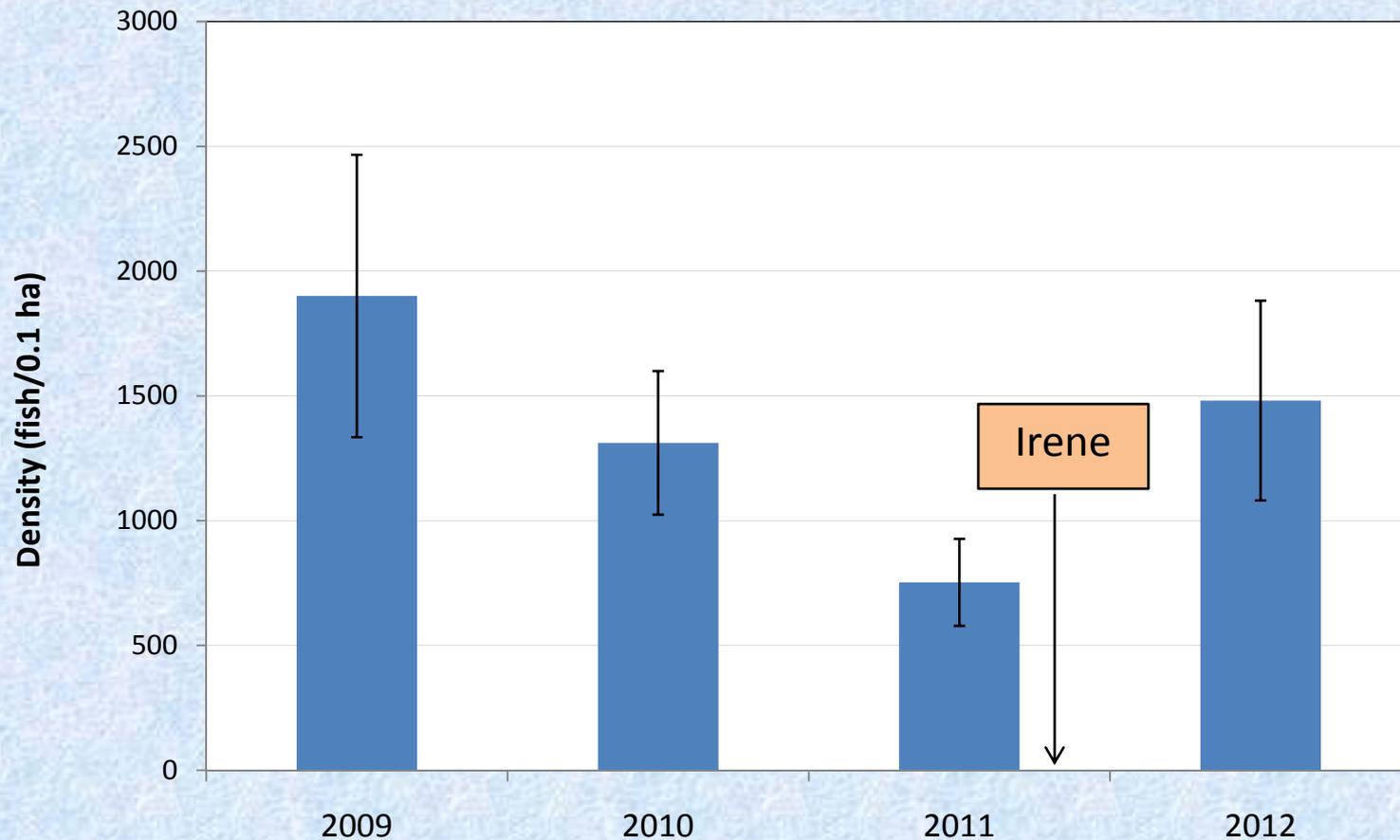
Conclusion: Floods are Bad?



Conclusion: Floods are Good?



Conclusion: The post-flood year (2012) fell well within the range of natural variability



Conclusions

- Scope of sampling period is critical for interpretation
- Flood had no significant impact on fish community metrics (at basin level)
- Magnitude of flood varied among sites (variable effects)
- Age structure of trout populations shifted (due to Irene and several other factors)
- Timing of flood and life history is key to population impacts



Bibliography

Carline, Robert F. & Brian J. McCullough. 2003. *Effects of Floods on Brook Trout Populations in the Monongahela National Forest, West Virginia*. Transactions of the American Fisheries Society, 132:5, 1014-1020.

Jowett, Ian G. & Jody Richardson. 1989. *Effects of a severe flood on instream habitat and trout populations in seven New Zealand rivers*. New Zealand Journal of Marine and Freshwater Research, 23:1, 11-17.

Kirn, Rich. 2011. *Flood Impacts to Wild Trout Populations in Vermont*. Vermont Department of Fish and Wildlife. <http://www.vtfishandwildlife.com>.

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Questions?

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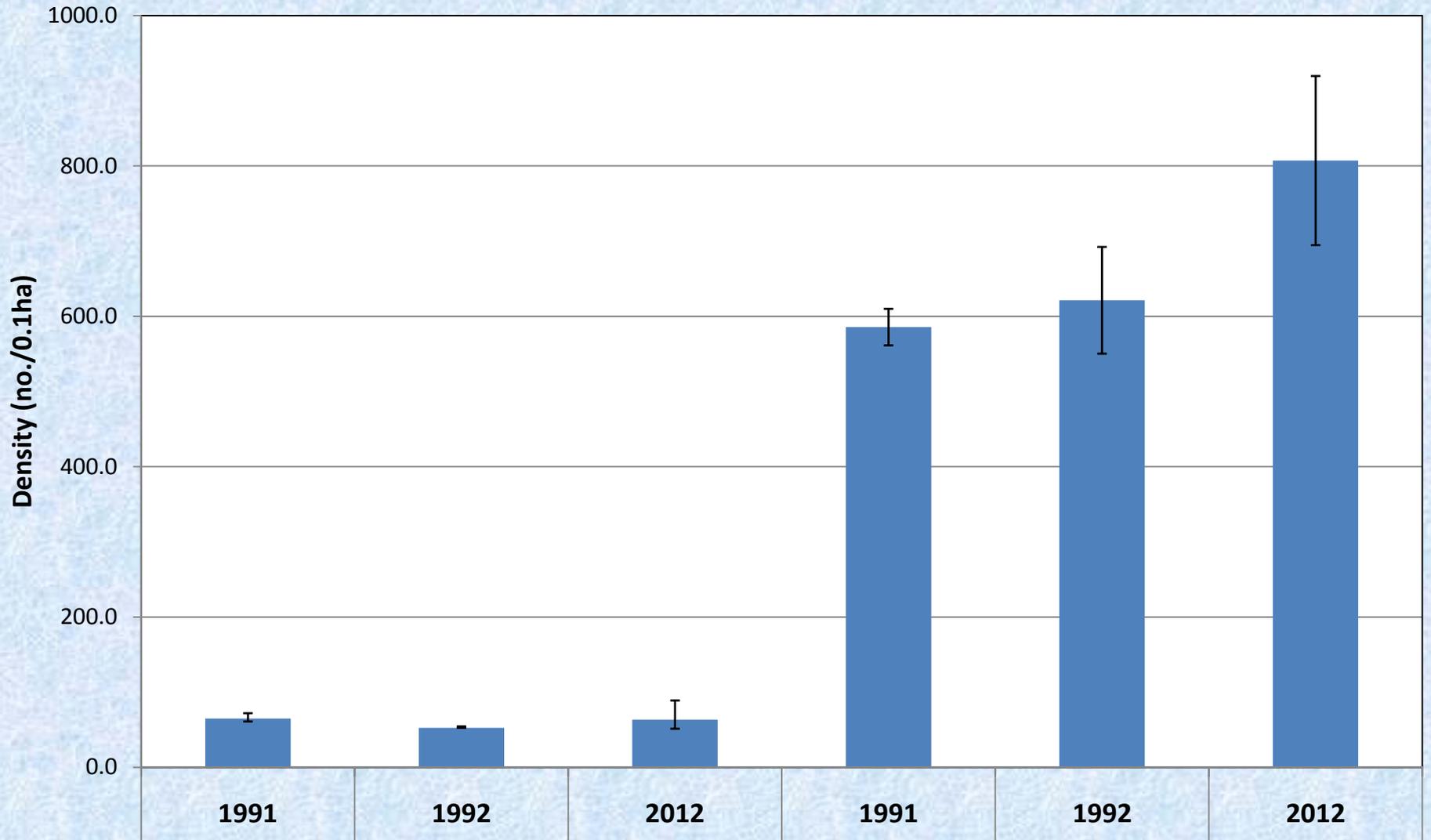
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NEVER SINK



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