

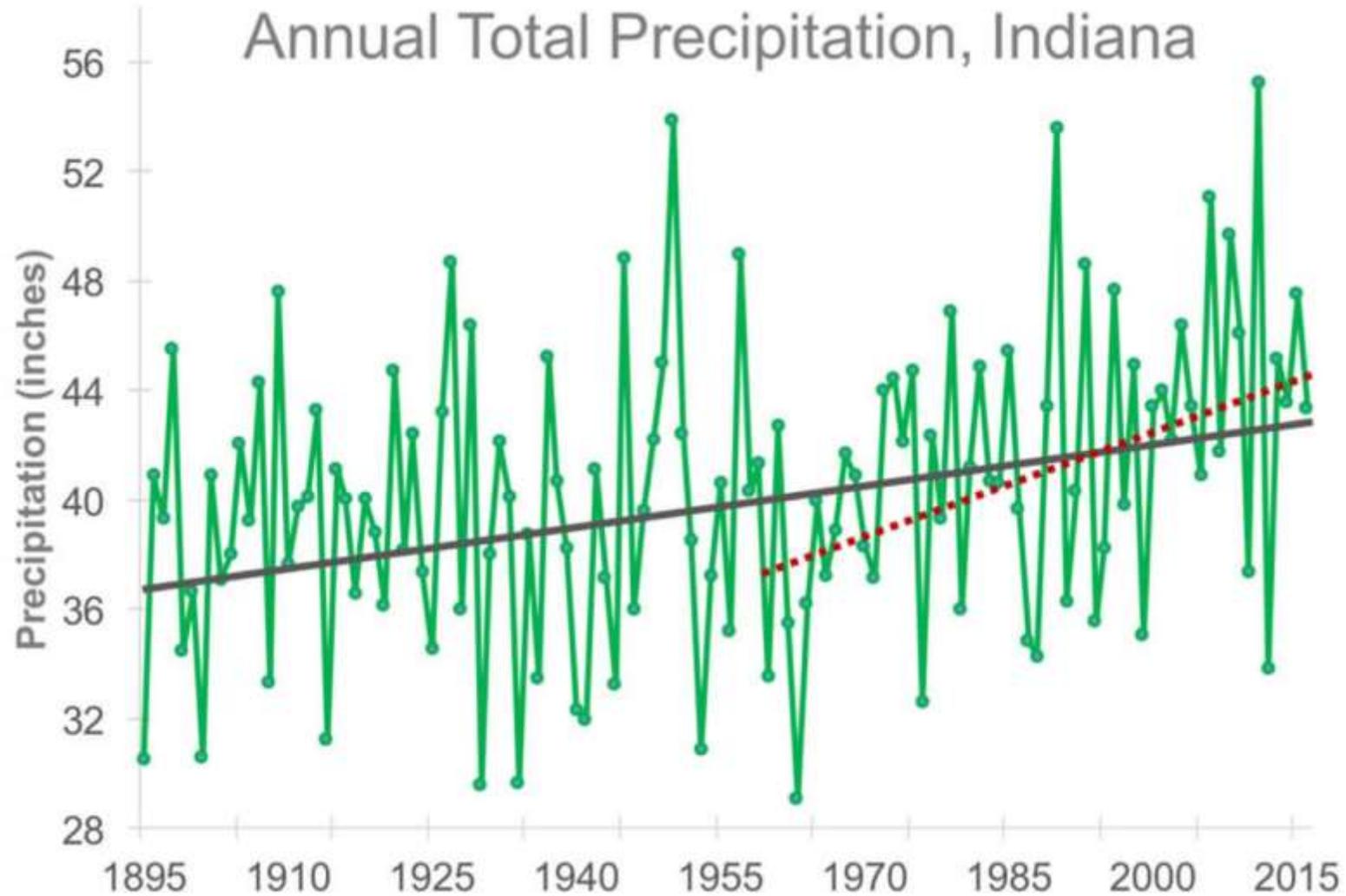
Understanding Floodplain Connectivity in Indiana

Robert Barr, Michael Dunn, Ian Hahus, Cassie Hauswald

National Stream Restoration Conference

Aug 21-23, 2023

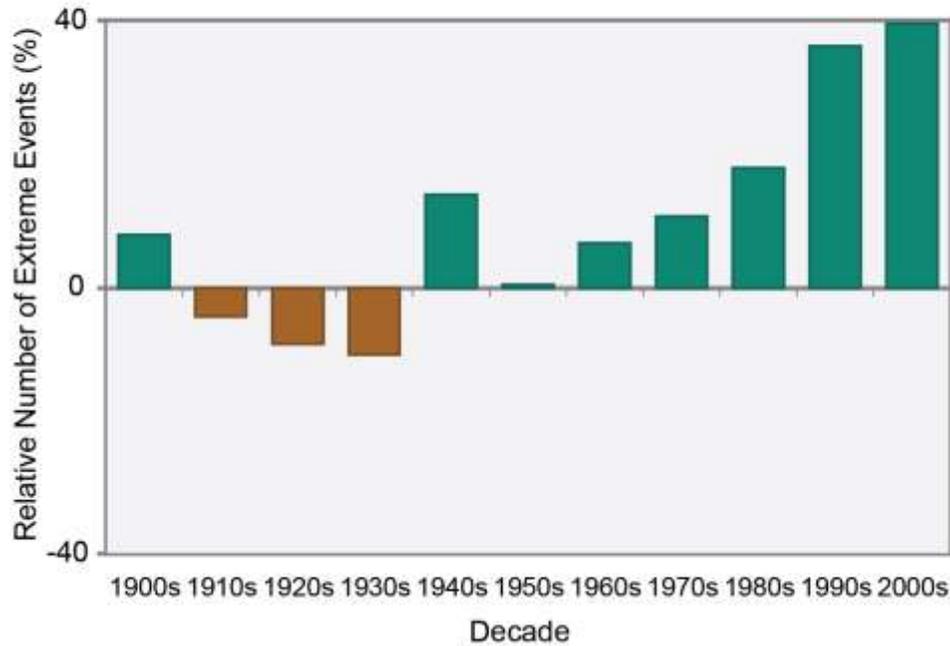




Source: Indiana's Past & Future Climate: A Report from the Indiana Climate Change Impacts Assessment. Purdue Climate Change Research Center, March 2018

Observed Decadal Trend of Heavy
Precipitation (2-day, 5-year RI) in Midwest
(1901-2012 compared with 1901-1960)

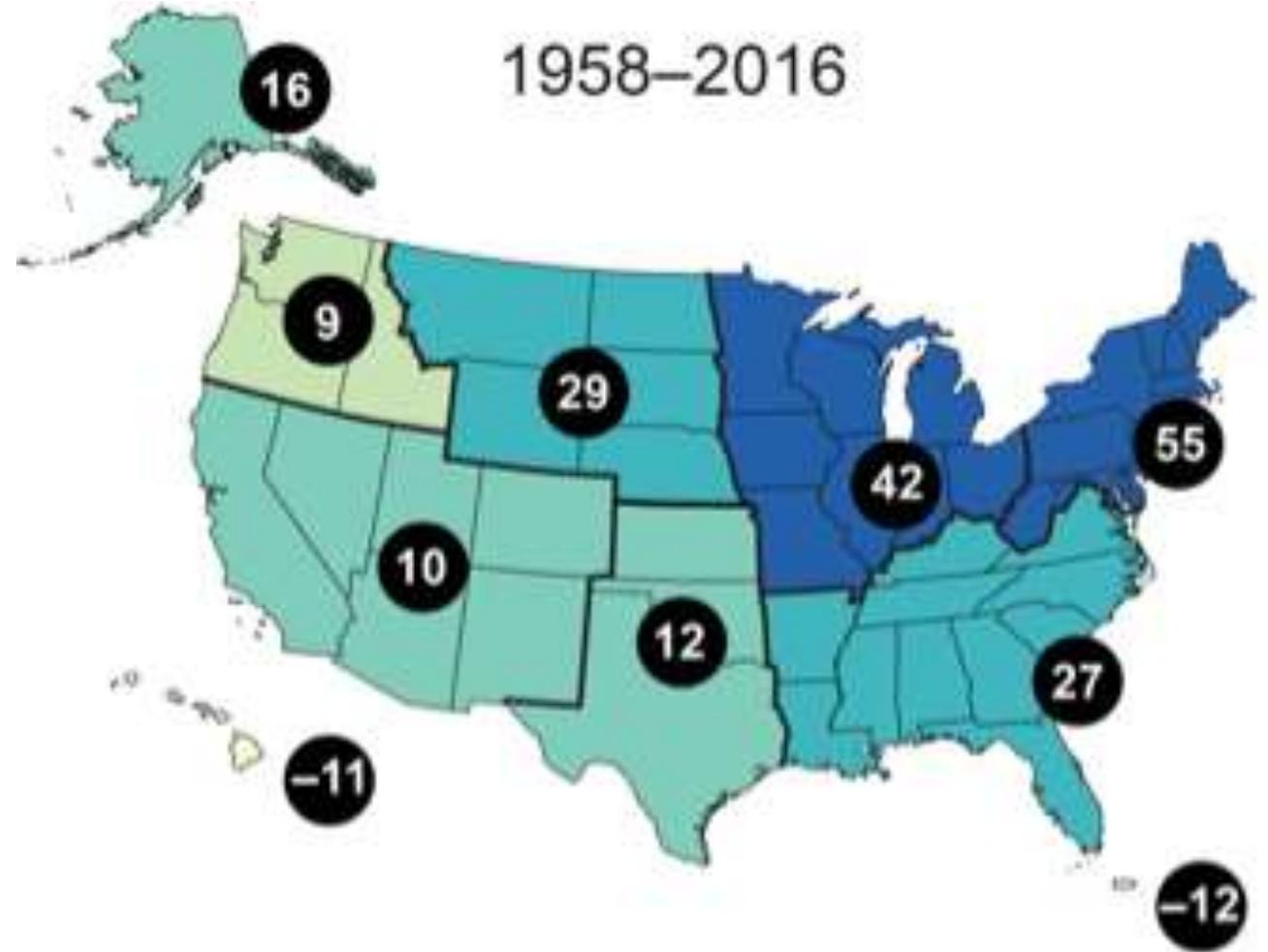
Observed U.S. Trend in Heavy Precipitation



Source: USGRP, 2014, Third National Climate Assessment (adapted from Kunkel et al. 2013)

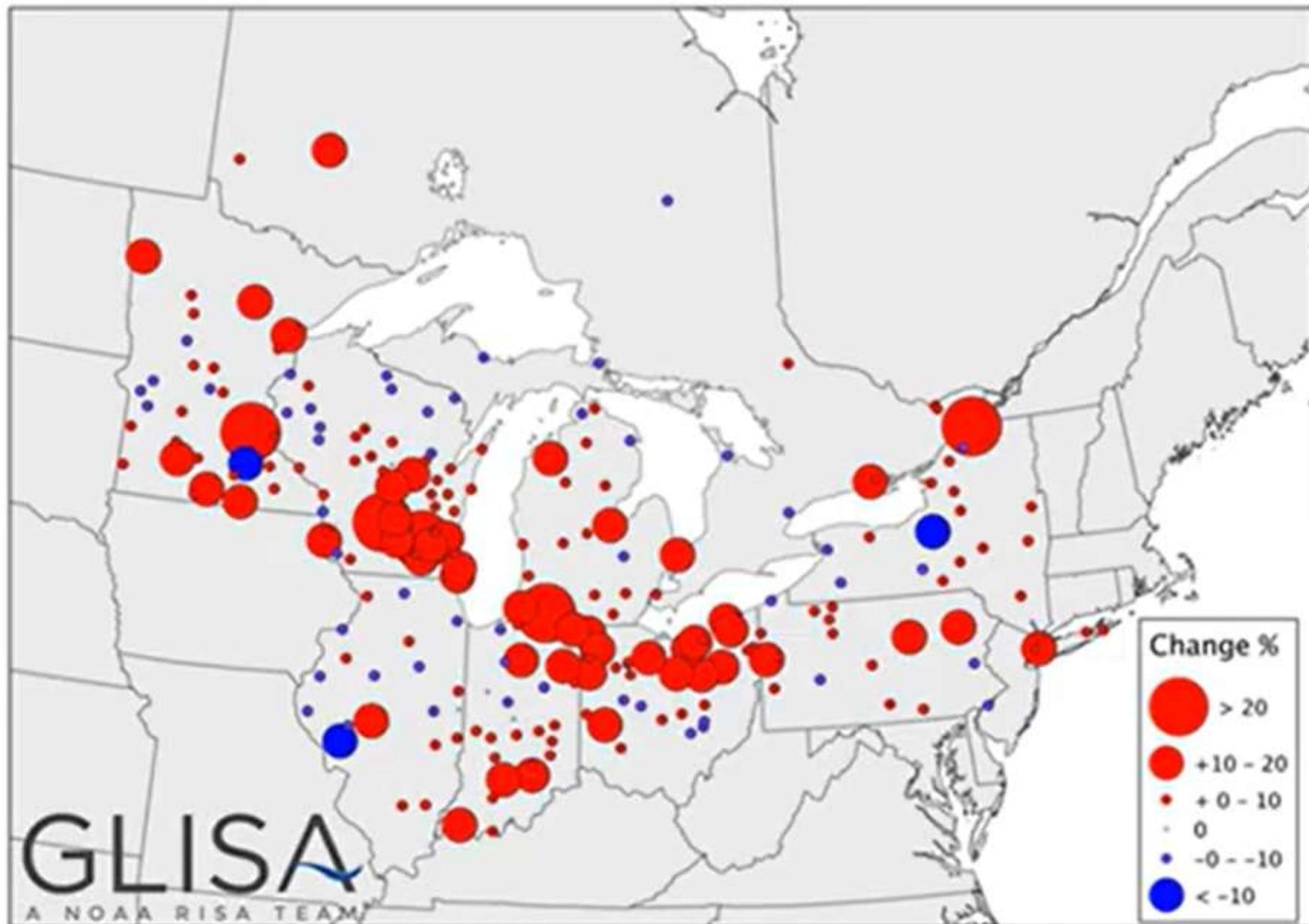
Observed % Change in Total Annual Precipitation
Falling in the Heaviest 1% of Events (1958 – 2016)

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Source: USGRP, 2018, Fourth National Climate Assessment.

Observed Changes (%) in the Intensity of the 1% Heaviest Precipitation Days
(1951-1980 vs. 1981-2010)



Change in return period

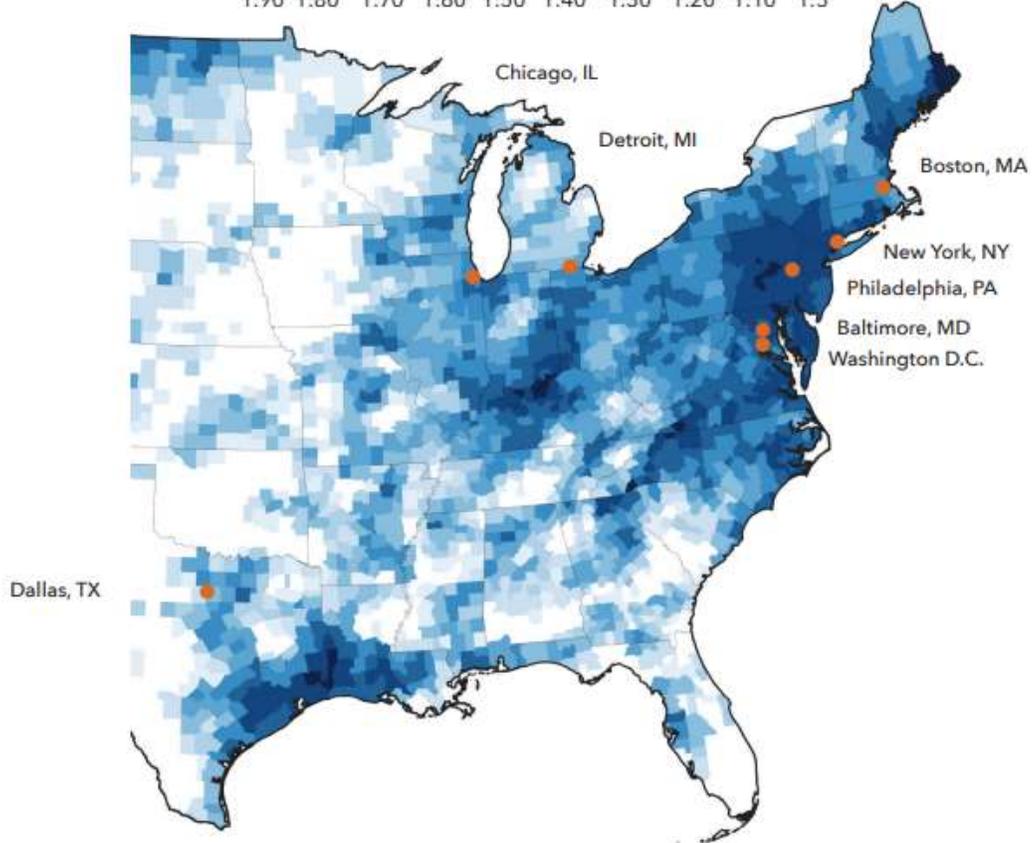
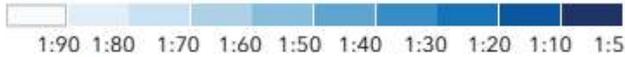


Figure 5: Major cities at more frequent risk of severe flooding compared to NOAA Atlas 14 100 year estimates

Source: June 2023 First Street Foundation 8th National Risk Assessment

Table 2: Counties and population at risk by increased frequency of current 1-in-100-year flood event (FSF-PM vs. Atlas 14 comparison)

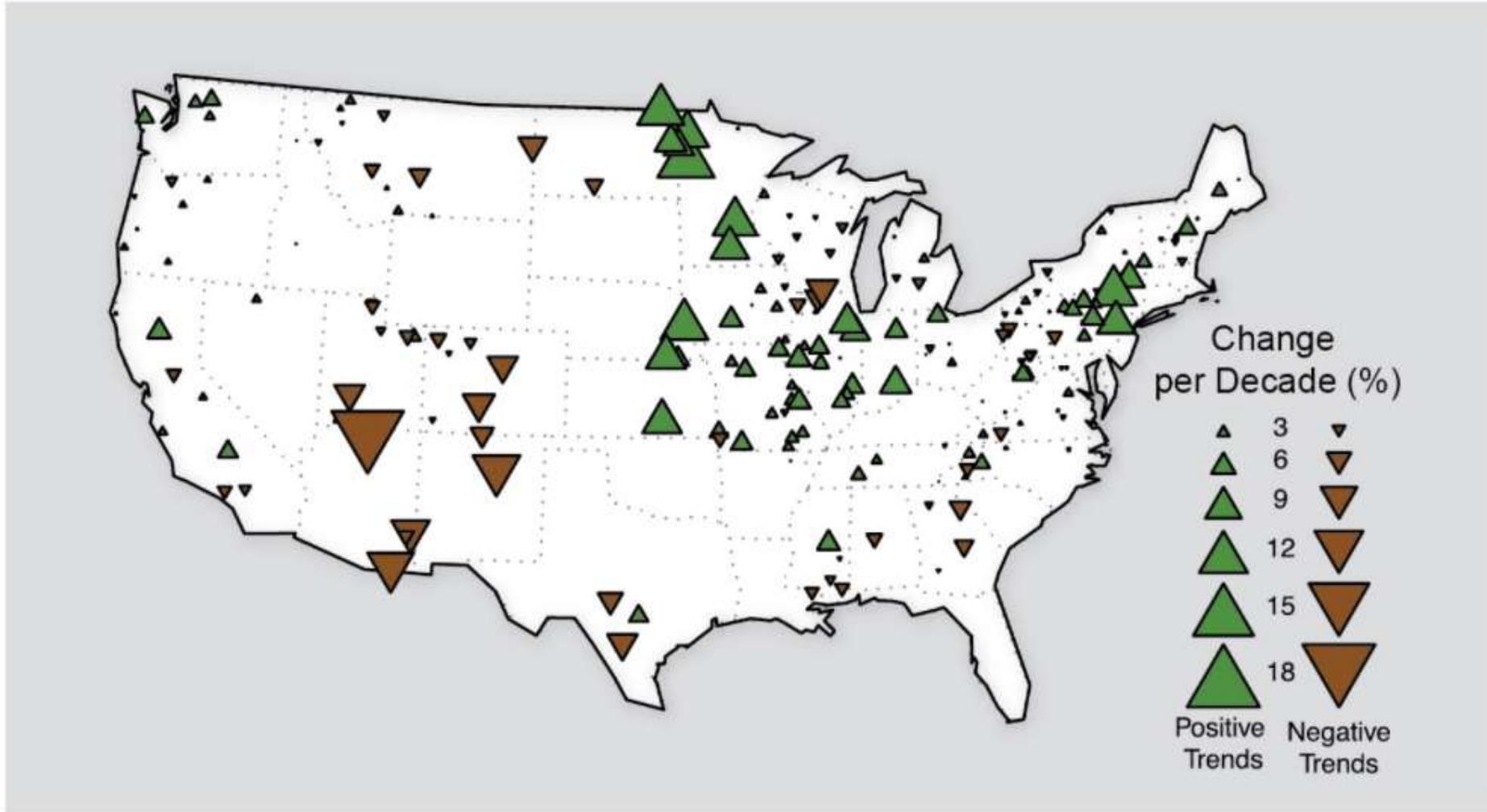
1 in 100 is (times more likely)	# of counties impacted	Population impacted (millions)	Percent of counties impacted (%)	Percent of population impacted (%)
1 in 50 year or lower (+200%)	1128	167.2	36.3%	51.1%
1 in 25 year or lower (+400%)	367	69.8	11.8%	21.3%
1 in 20 year or lower (+500%)	221	43.6	7.1%	13.3%
1 in 15 year or lower (+667%)	95	22.4	3.1%	6.8%
1 in 10 year or lower (+1,000%)	20	1.3	0.6%	0.4%
Total US	3107	327.5		

Table 3: Selected highly populated cities impacted by Atlas 14 to FSF-PM corrections

City	Atlas 14	Corrected for today	30 year correction
Baltimore, Maryland	1 in 100	1 in 14 (+614%)	1 in 12 (+733%)
Dallas, Texas	1 in 100	1 in 21 (+376%)	1 in 18 (+456%)
Washington, D.C.	1 in 100	1 in 21 (+376%)	1 in 19 (+426%)
New York City, New York	1 in 100	1 in 23 (+335%)	1 in 19 (+426%)
Philadelphia, Pennsylvania	1 in 100	1 in 29 (+245%)	1 in 20 (+400%)
Chicago, Illinois	1 in 100	1 in 29 (+245%)	1 in 26 (+285%)
Detroit, Michigan	1 in 100	1 in 34 (+194%)	1 in 16 (+525%)
Boston, Massachusetts	1 in 100	1 in 37 (+170%)	1 in 33 (+203%)

**Atlas 14 100-year Rainfall is More Like a 30-year Rainfall!
(i.e., the More Accurate 100-year Rainfall is ~ 25% Higher!)**

Trends in Flood Magnitude





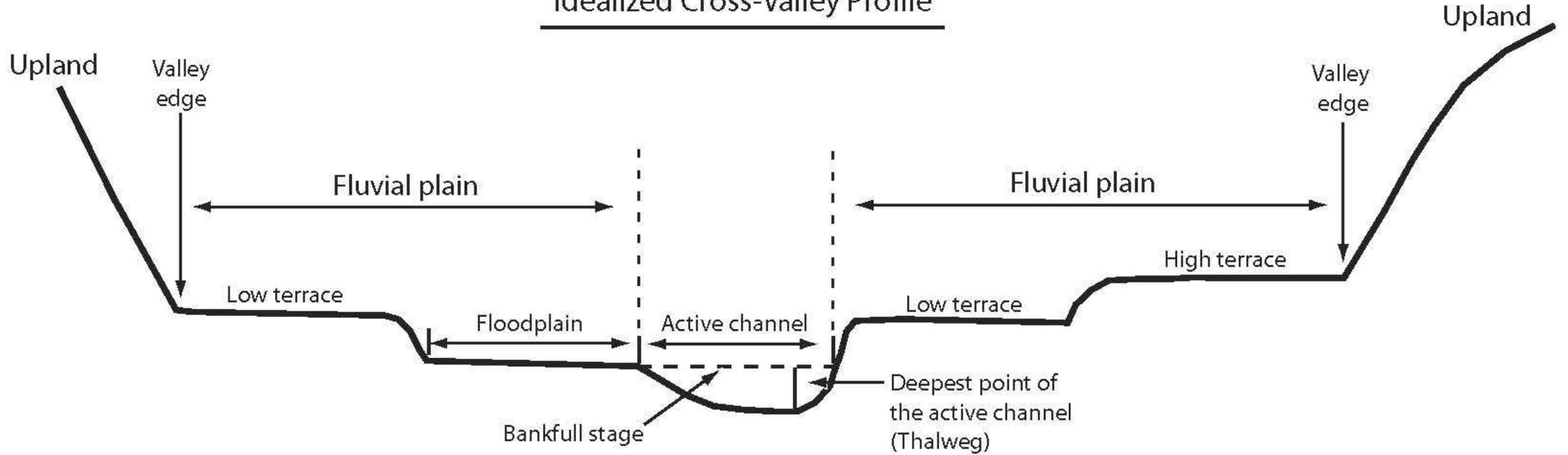
West Fork Indian Creek, Switzerland County, IN

2022

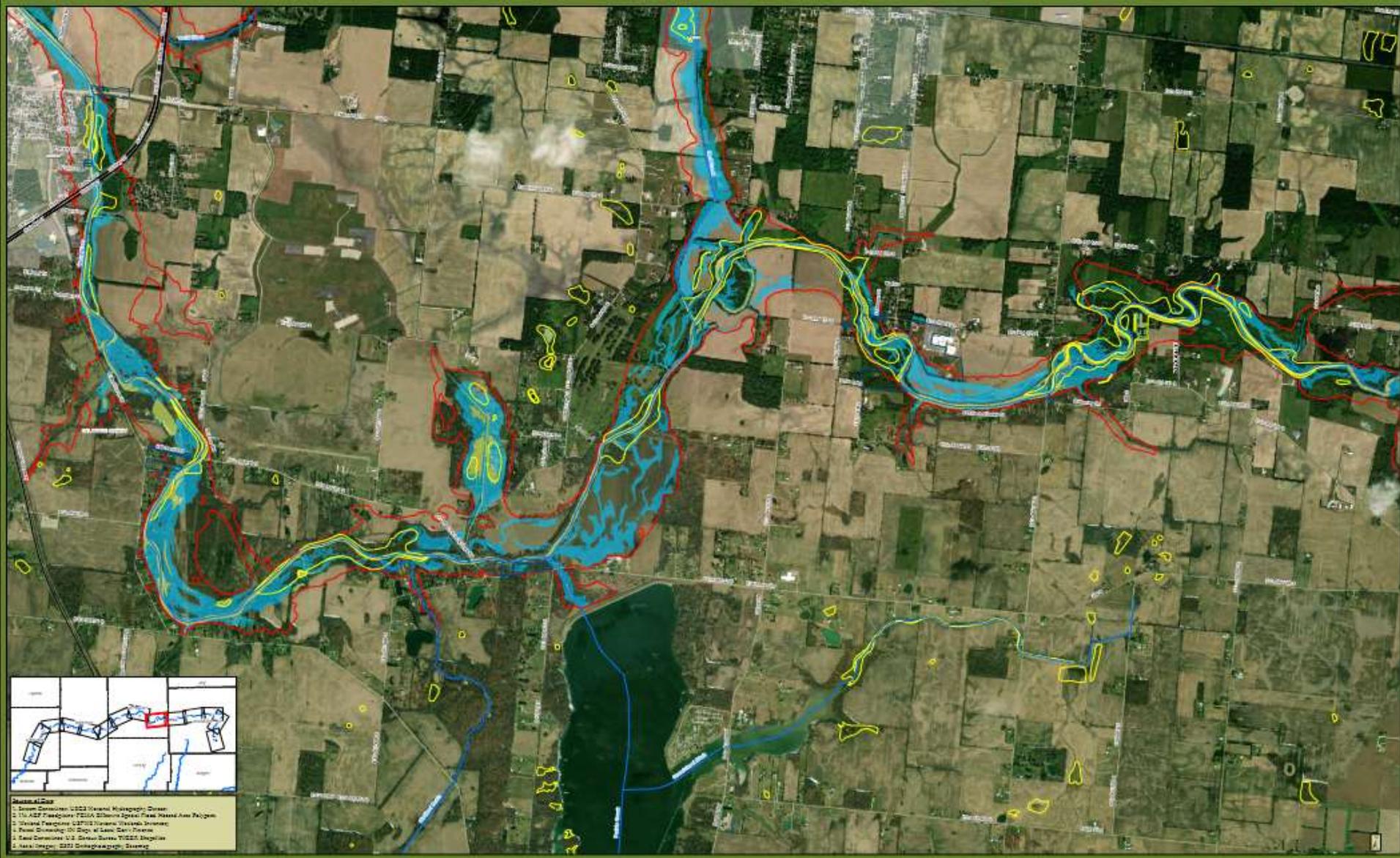


Elkhart River at Goshen, Indiana 2018 (The Goshen News)

Idealized Cross-Valley Profile



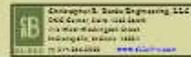




- Legend:**
- 1. Survey Coordinates: USGS National Hydrographic Dataset
 - 2. 10:00 PM Floodplain: FEMA 2003 Digital Flood Hazard Area Polygon
 - 3. 10:00 PM Floodplain: USGS National Hydrographic Dataset
 - 4. Flood Channeling: US Army Corps of Engineers
 - 5. Survey Coordinates: USGS National Hydrographic Dataset
 - 6. Survey Coordinates: USGS National Hydrographic Dataset

- Channel
- Floodplain - 10:00 PM Depth
- Floodplain - 10:00 PM Depth
- Floodplain - 10:00 PM Depth
- Survey Boundary
- Channel
- Survey Boundary

Disclaimer:
 This map was prepared by computer software using digital elevation data and other information. The software used was not designed for hydrologic modeling, and the user is responsible for the accuracy of the data. Additionally, the user is responsible for the accuracy of the data. The user is responsible for the accuracy of the data. The user is responsible for the accuracy of the data.



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 Website: www.csdavis.com

Project: Upper Ohio River Floodplain Corridor
Client: USACE
Location: Franklin and Linn Co.

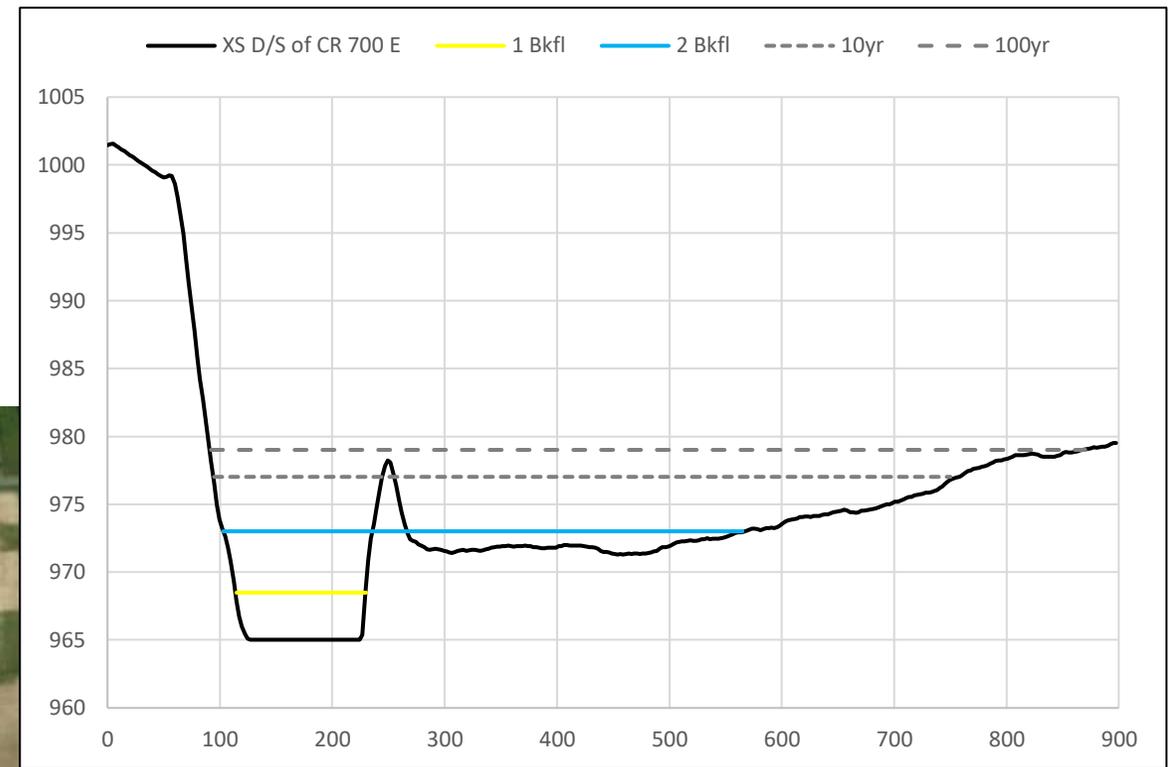
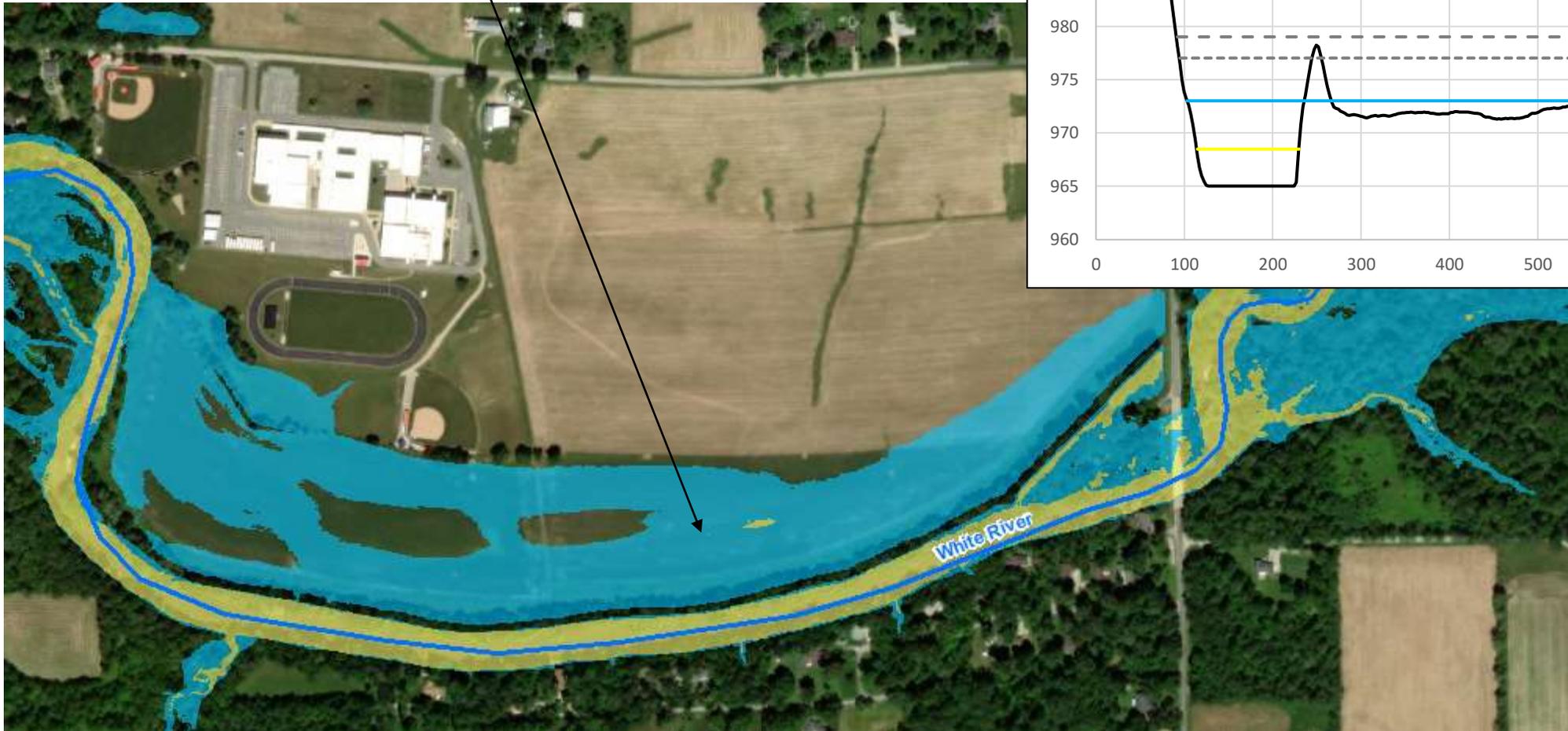
Scale: 1" = 1000'
Date: 10/15/2013
Author: J. [Name]



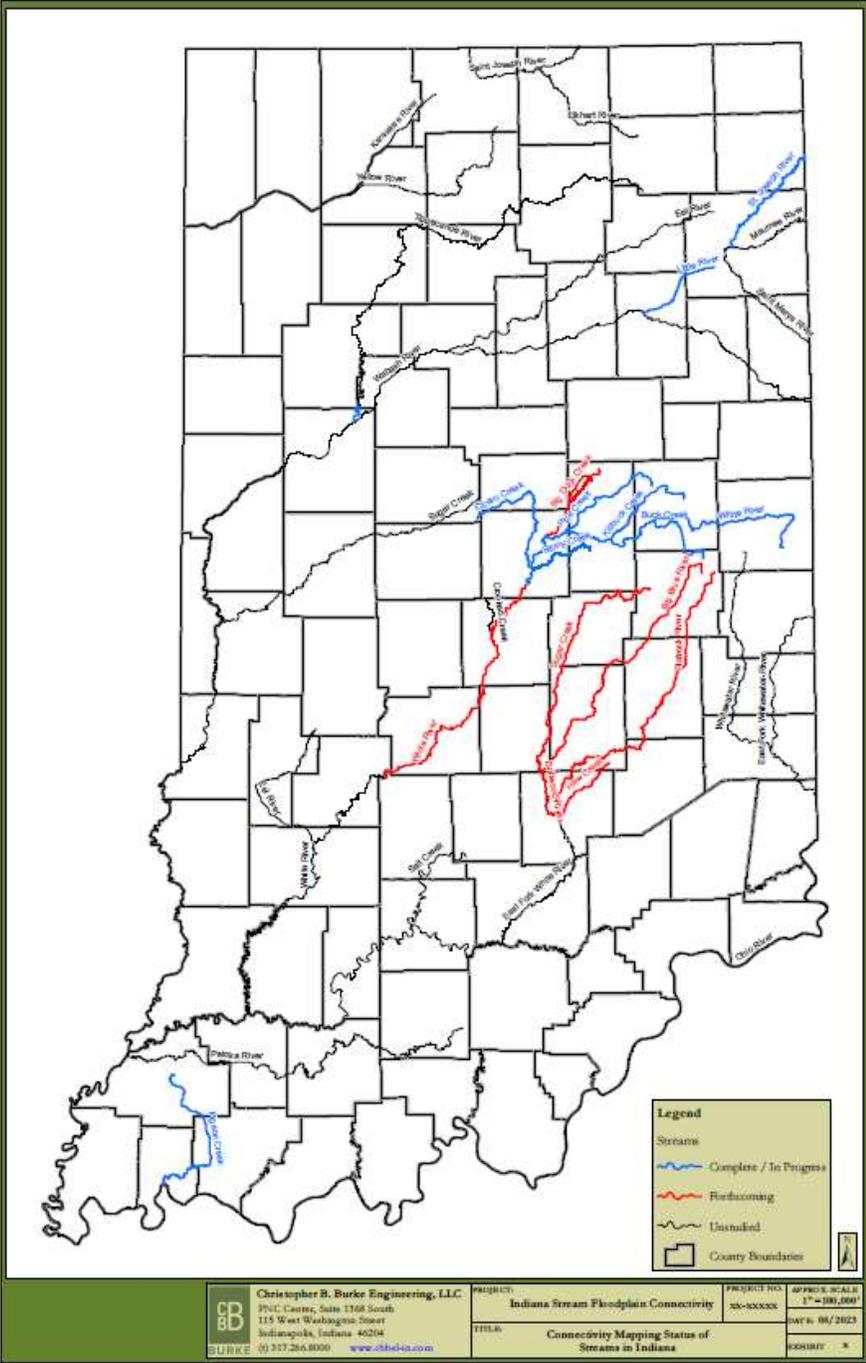
Floodplain Connectivity Mapping, White River, Delaware County

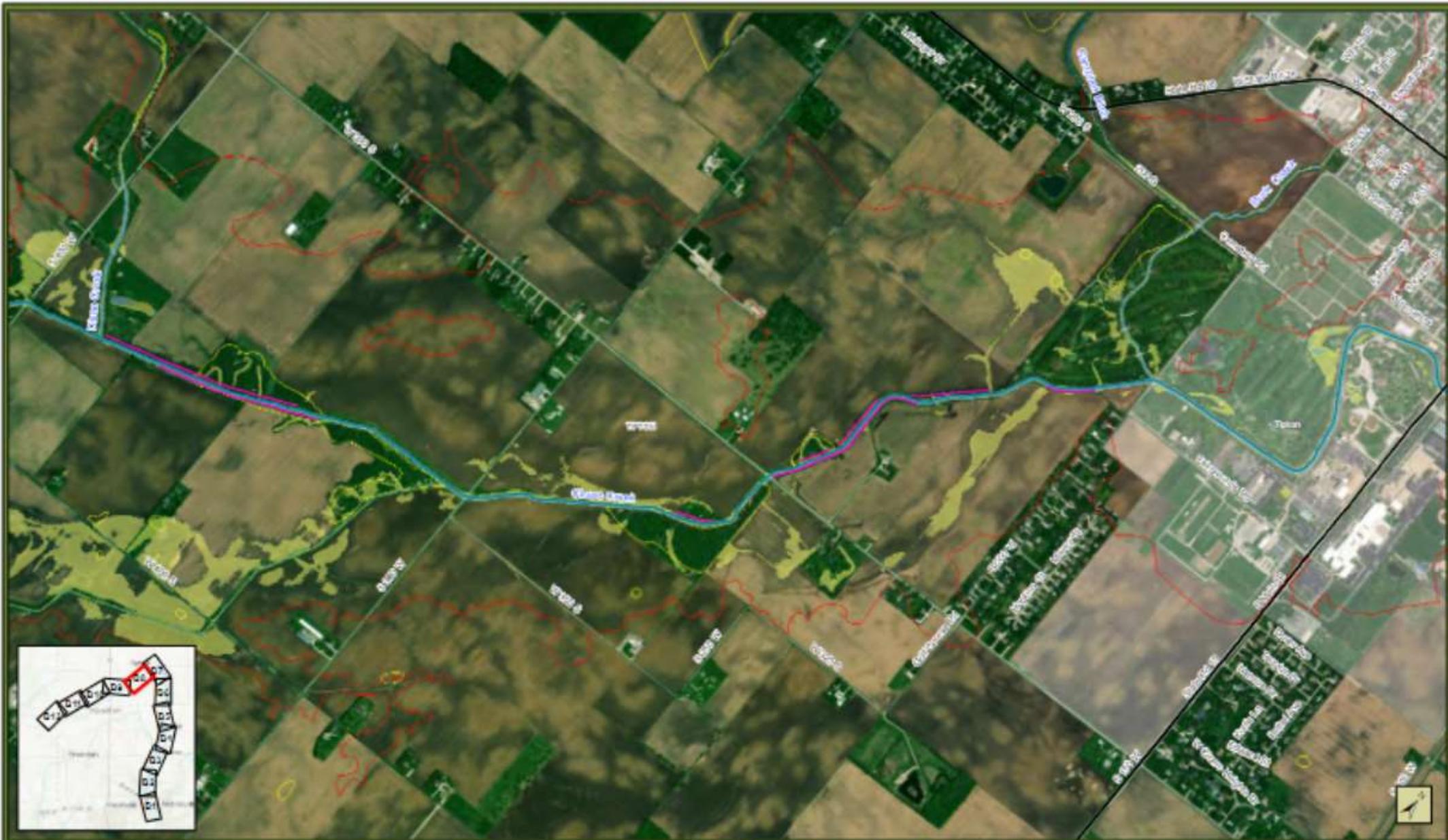
I. Hahus, Burke

XS Location



Status of Connectivity Mapping





	Floodplain - 1 Bankfull Depth		Streams		Floodplain - 10% AEP		Cities and Towns
	Floodplain - 2 Bankfull Depths		Non-Linear Embankments		Wetlands		County Boundaries


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 (317) 255-9200 www.ceburke.com

PROJECT: Upper White River
 Floodplain Connectivity
TITLE: Cross Creek Floodplain Connectivity

PROJECT NO:	25-0059
APPROX. SCALE:	1" = 4,000'
DATE:	05/2023
DESIGNER:	

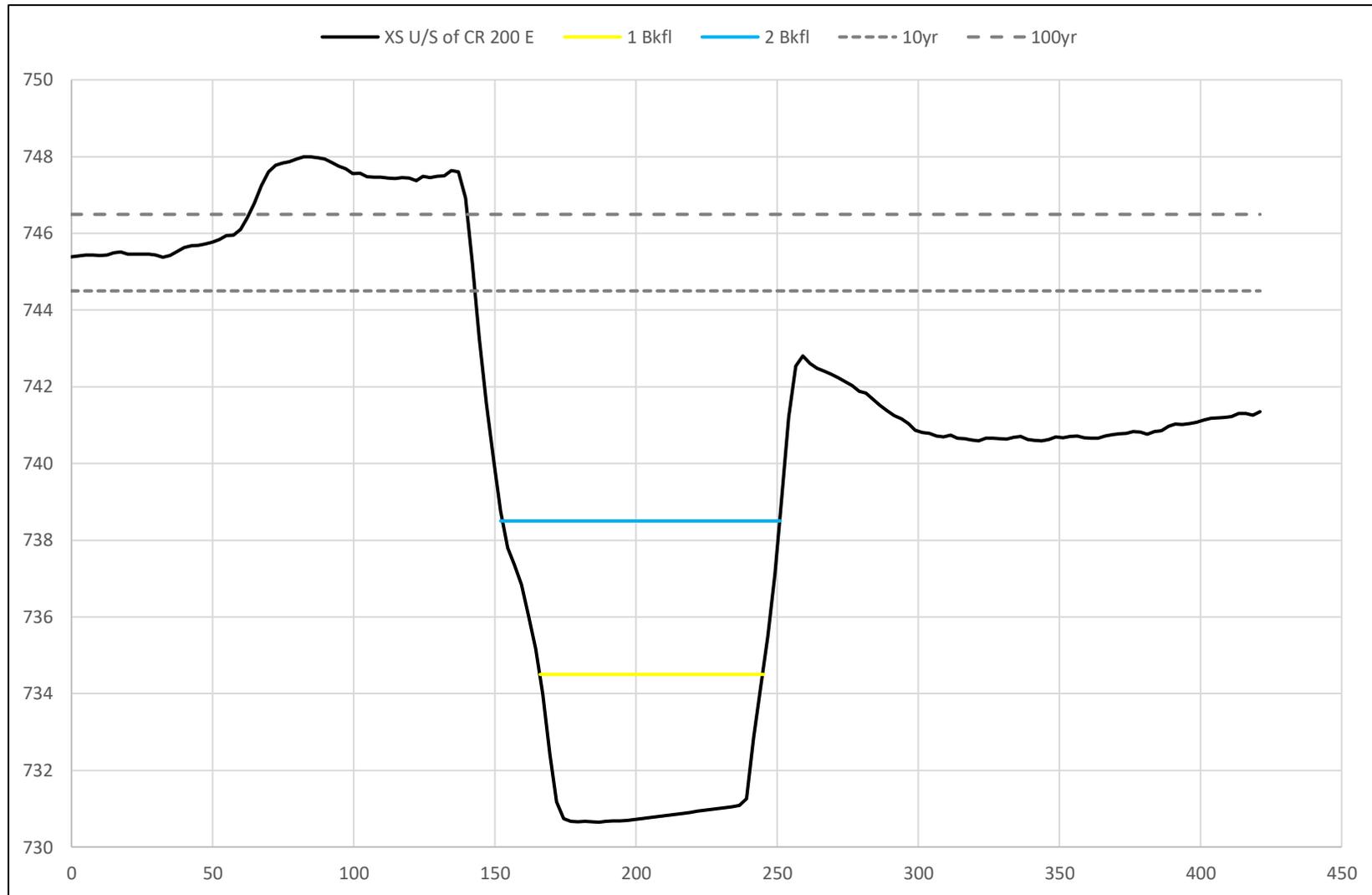


Tipton, IN

April 19, 2013



Little River, Huntington County, IN



Little River at CR 200 E



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