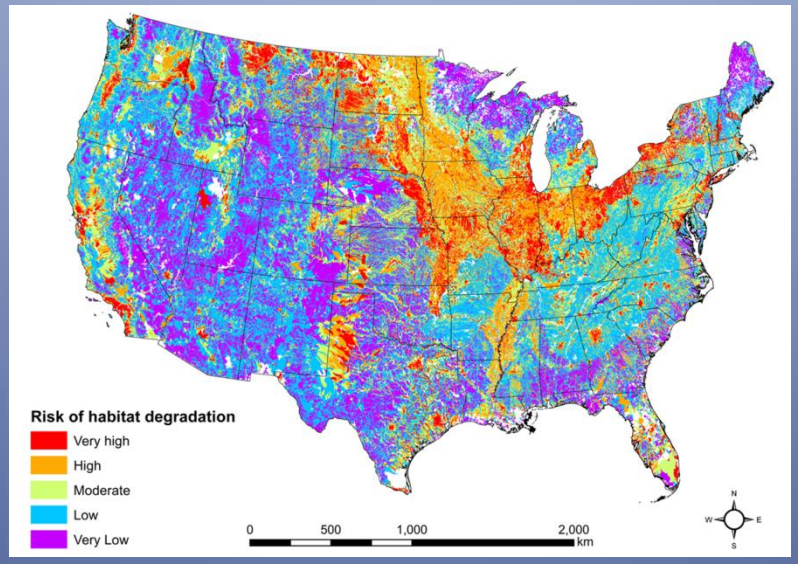
Applications of the 2015 National Assessment of Stream Fish Habitats: Information for Enhanced Decision Making



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NATIONAL FISH HABITAT PARTNERSHIP

NATIONAL FISH HABITAT PARTNERSHIP

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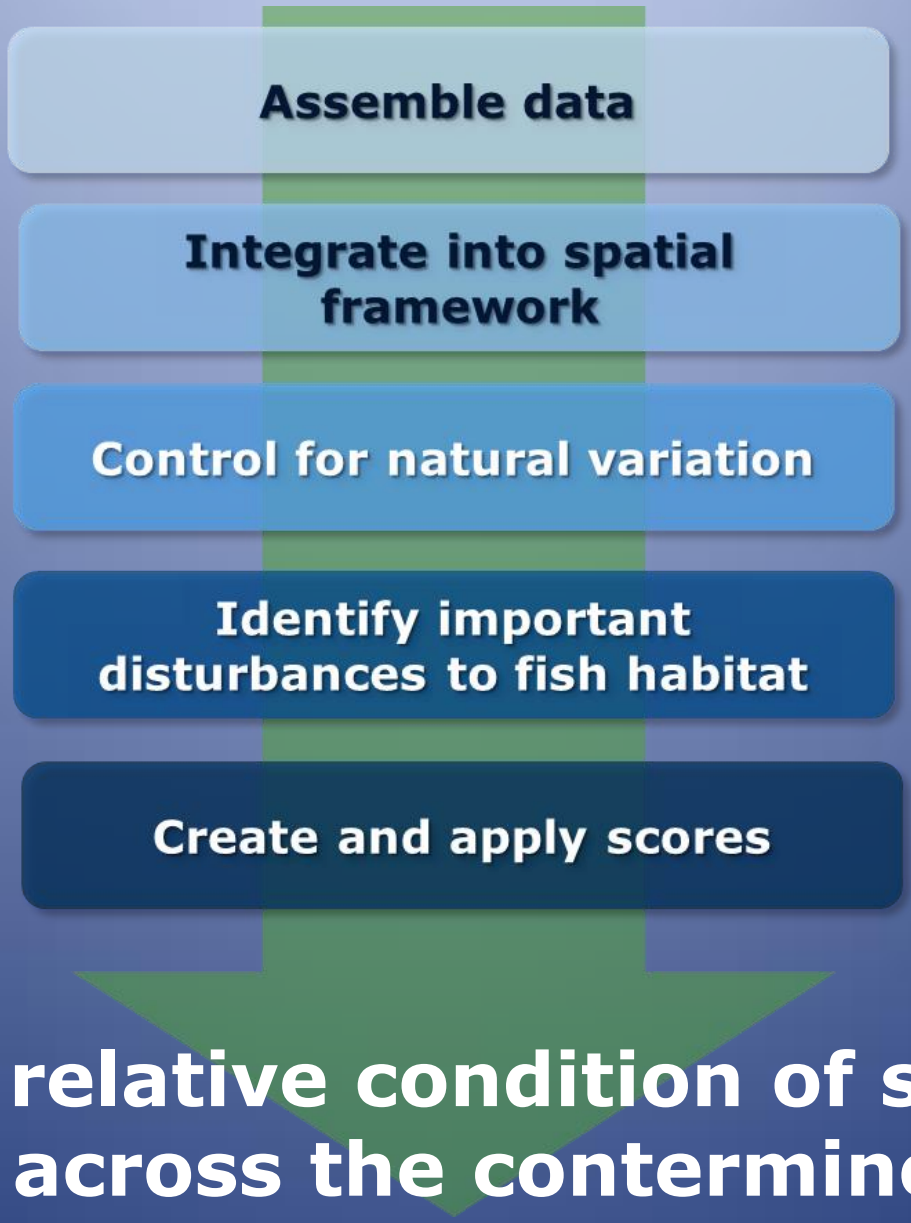
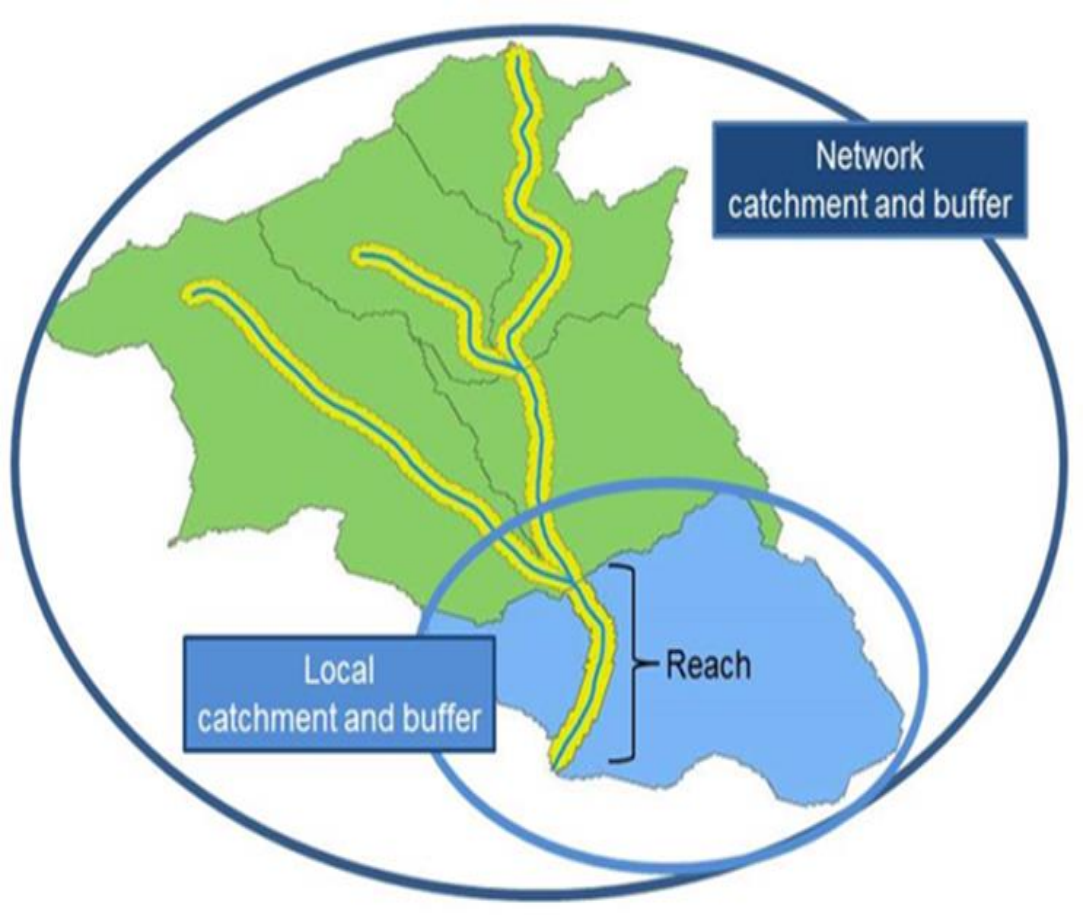


What is the relative condition of stream fish habitats across the conterminous US, Alaska, and Hawaii?

LANDSCAPE DISTURBANCE DATA: CONTERMINOUS US

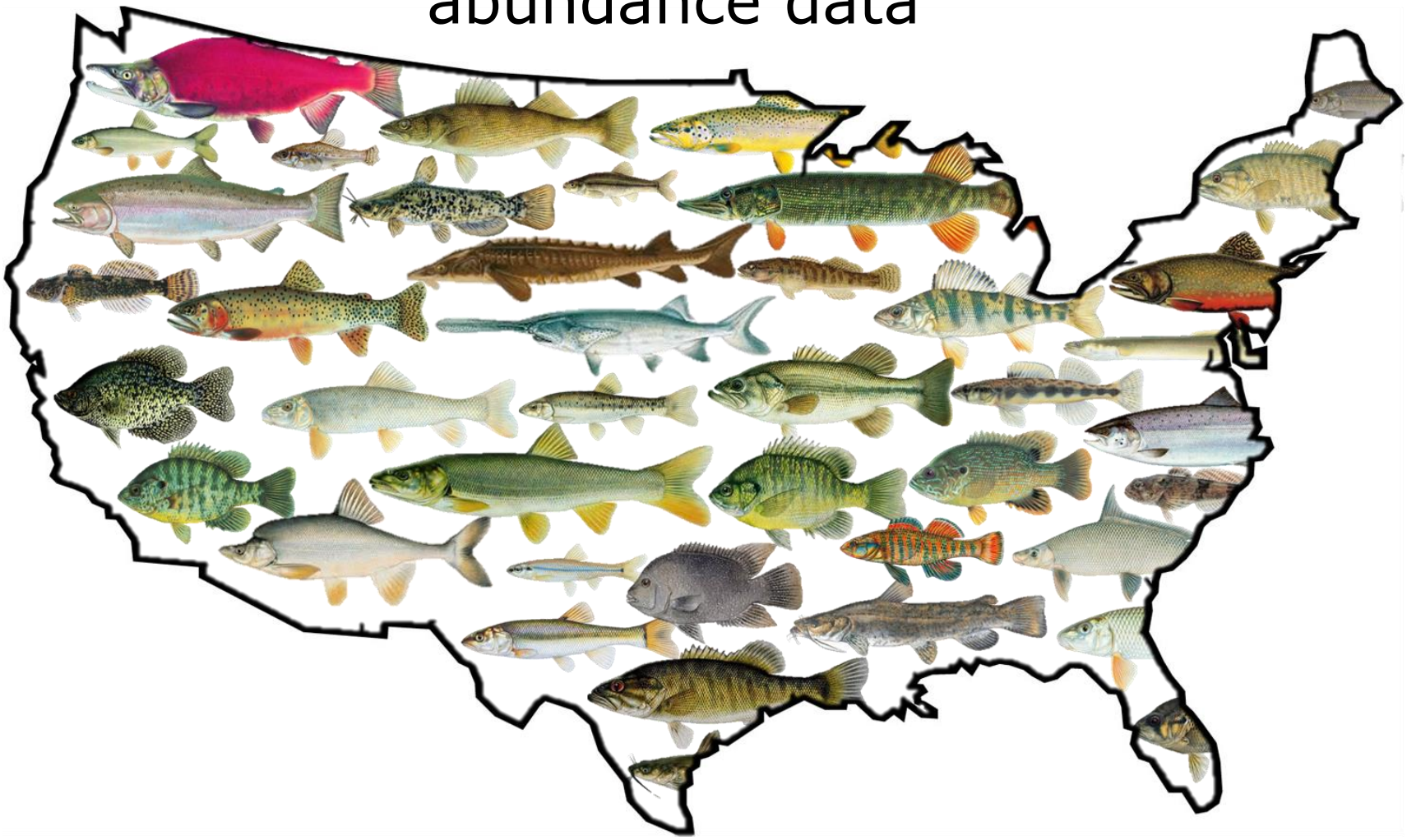
- **Open/low intensity urban land use (%)**
- **Medium intensity urban land use (%)**
- **High intensity urban land use (%)**
- **Impervious surface (%)**
- **Pasture/hay land use (%)**
- **Cultivated crops land use (%)**
- **Population density (#/km^2)**
- **Road length (m/km^2)**
- **Road crossings (#/km^2)**
- **Dams and fragmentation metrics (#/km^2)**
- **Mines (Mineral, Coal, Uranium) (#/km^2)**
- **Toxics release inventory sites (#/km^2)**
- **National pollution discharge elimination system sites (#/km^2)**
- **EPA superfund national priorities sites (#/km^2)**
- **Water withdrawal (MGY)**
- **Nutrient and sediment pollution (kg/km/yr)**

SPATIAL EXTENTS



- **Stream reaches** are a confluence to confluence section of stream
  - (the smallest unit in the assessment)
- **Local catchments and 90m buffers** are the land areas draining directly to a stream reach.
- **Network catchments and 90m buffers** are the entire upstream land area (including the local) draining to a stream reach

39,375 stream reaches with fish community abundance data



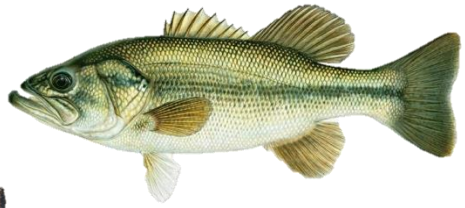
State, federal, museum and university data

Metrics identified regionally, by size strata following Stoddard et al. 2008

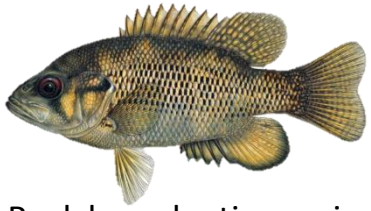
Stream size	Ecoregion	Fish metric
	CPL	
Creek		% regional intolerant individuals
		% native piscivore individuals
		% native invertivore taxa*
		% EPA tolerant taxa
		% lentic taxa
		% native taxa associated with soft sediments
River		% regional intolerant individuals
		% native invertivore taxa*
		% EPA tolerant taxa
		% lentic taxa
		% native lithophilic spawner taxa
		% taxa associated with sand substrate
		% native individuals associated with woody debris
	NAP	
Creek		% guarder taxa
		% native lithophilic spawner taxa*
		% native piscivore-invertivore individuals
		% individuals associated with sand substrate
		% regional intolerant individuals*
River		% large river taxa
		% native lithophilic spawner taxa*
		% native piscivore-invertivore individuals
		% lentic taxa
		% regional intolerant individuals*
	SAP	
Creek		% native lithophilic spawner taxa
		% piscivore individuals*
		% Percina taxa
		% regional intolerant individuals*
		% native lentic individuals.
		% native rheophilic taxa*
River		% regional intolerant individuals*
		% piscivore individuals*
		% detritivore taxa
		% native rheophilic taxa *
		% native piscivore-invertivore taxa
		% native taxa associated with soft sediments

*= same metric was used in 2010 assessment

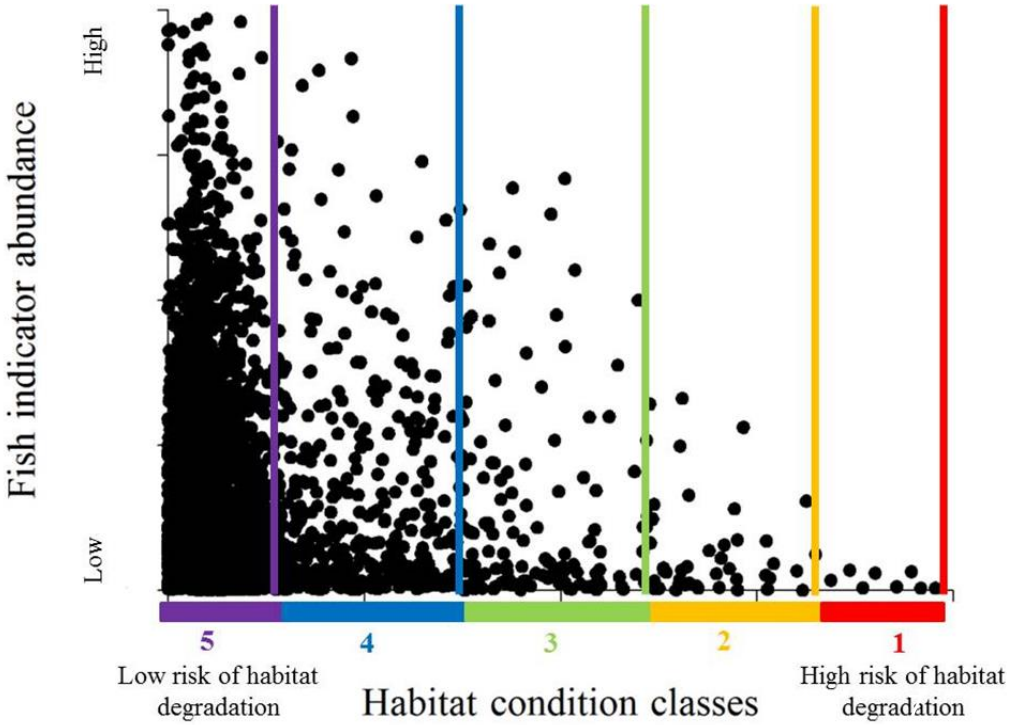
Brook trout, lithophilic spawner



Largemouth bass, piscivore



Rock bass, lentic species

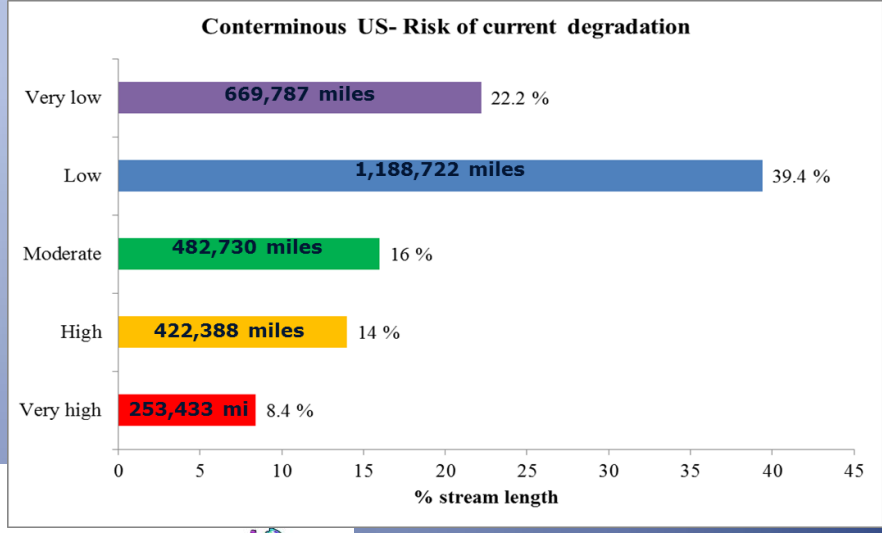


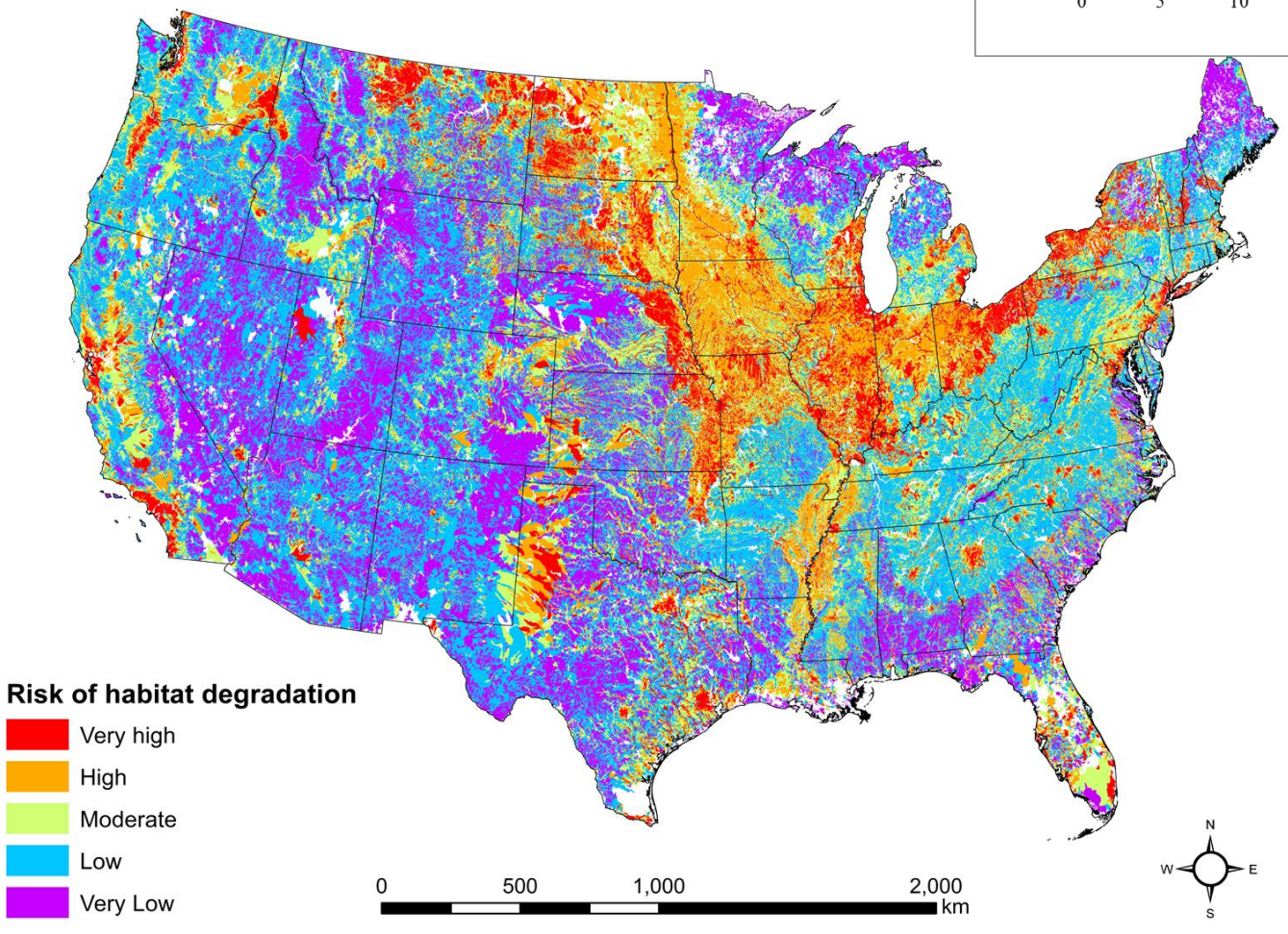
IDENTIFYING DISTURBANCES TO FISH HABITAT

Use of conservative dual threshold approach (Daniel et al. 2015)

20,412 thresholds analyzed – scores based on significant thresholds

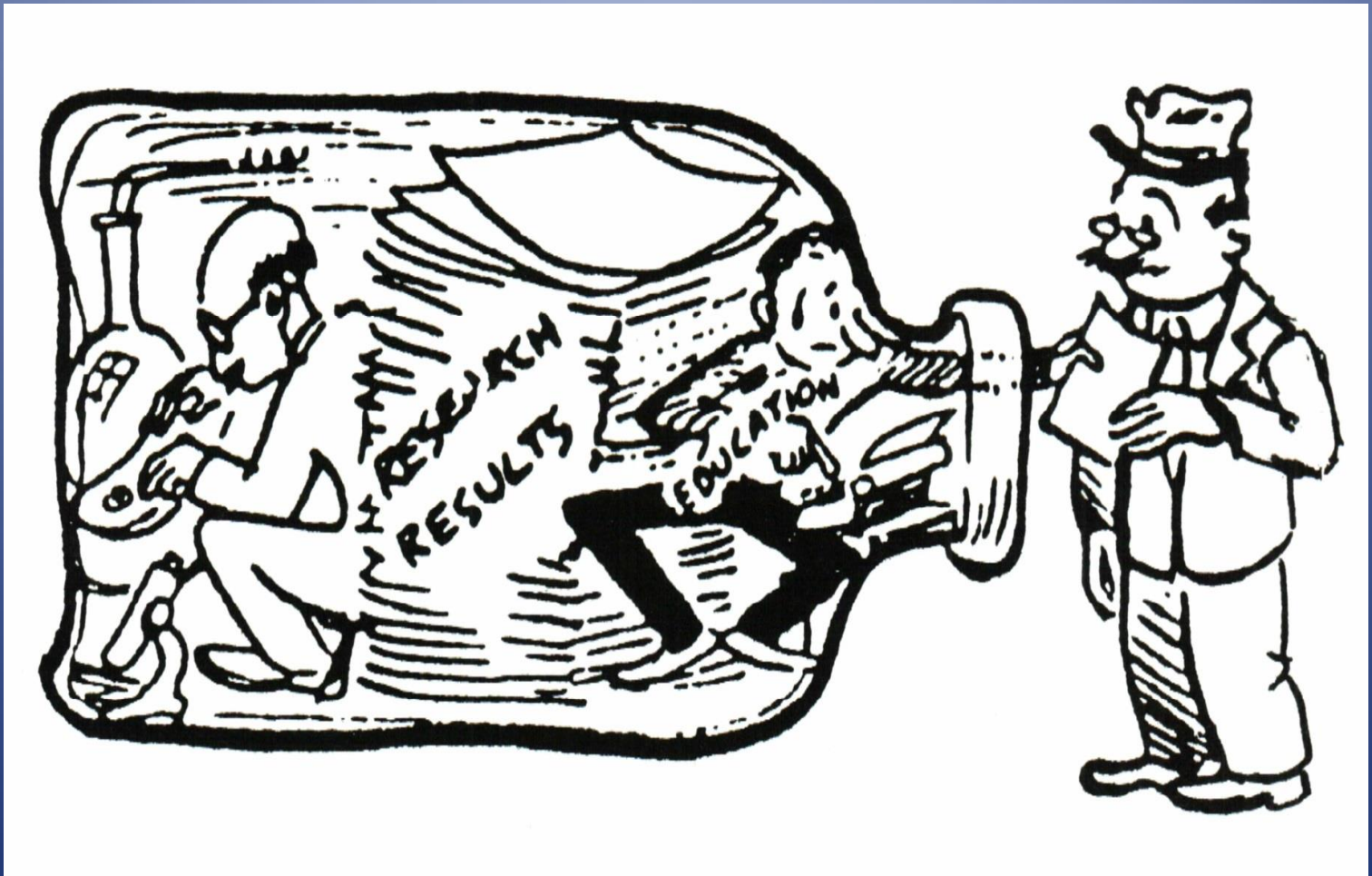
2015 Assessment Of Stream Fish Habitats For The Conterminous United States





Scores mapped to perennial and intermittent streams (NHDPlusV1)

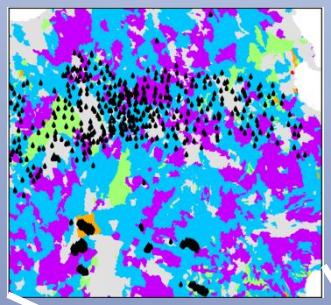
"THE BOTTLENECK"



Iowa fish and fishing (Harlan et al. 1987)

USING ASSESSMENT RESULTS

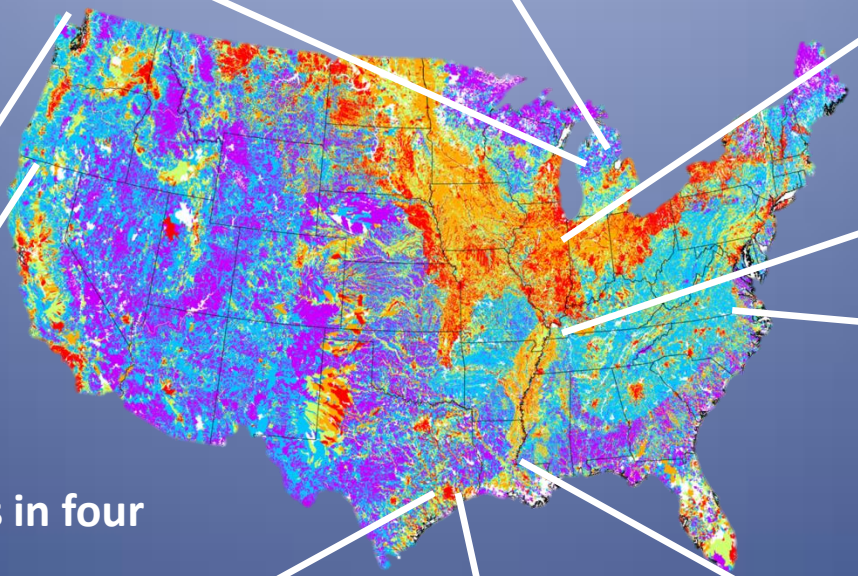
Scores with other information to enhance decision making

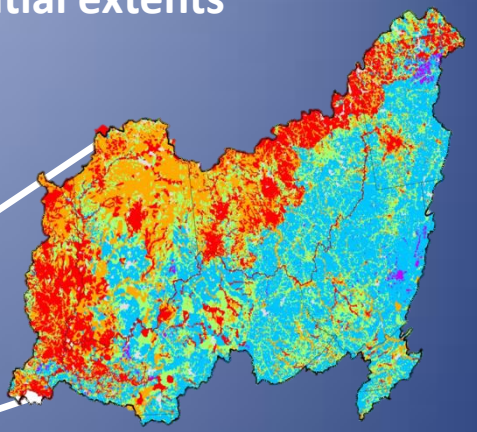


Cumulative condition scores, disturbance indices, scores over four spatial extents

Scores tailored to specific groups of fishes

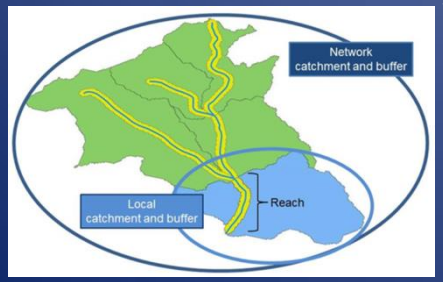
Coastal Cutthroat Trout





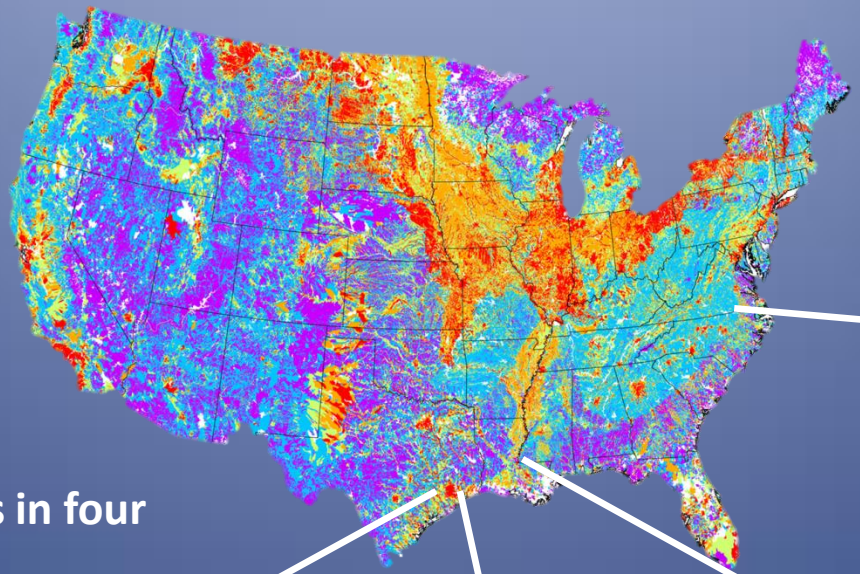
Ohio River Basin

Most limiting disturbances in four spatial extents

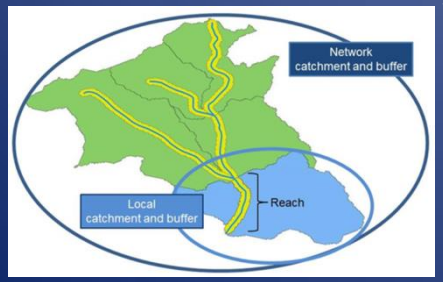


Ready to use GIS data in catchments and buffers

USING ASSESSMENT RESULTS



Most limiting disturbances in four spatial extents



Ready to use GIS data in catchments and buffers

assessment.fishhabitat.org

Data Available for Download

Data

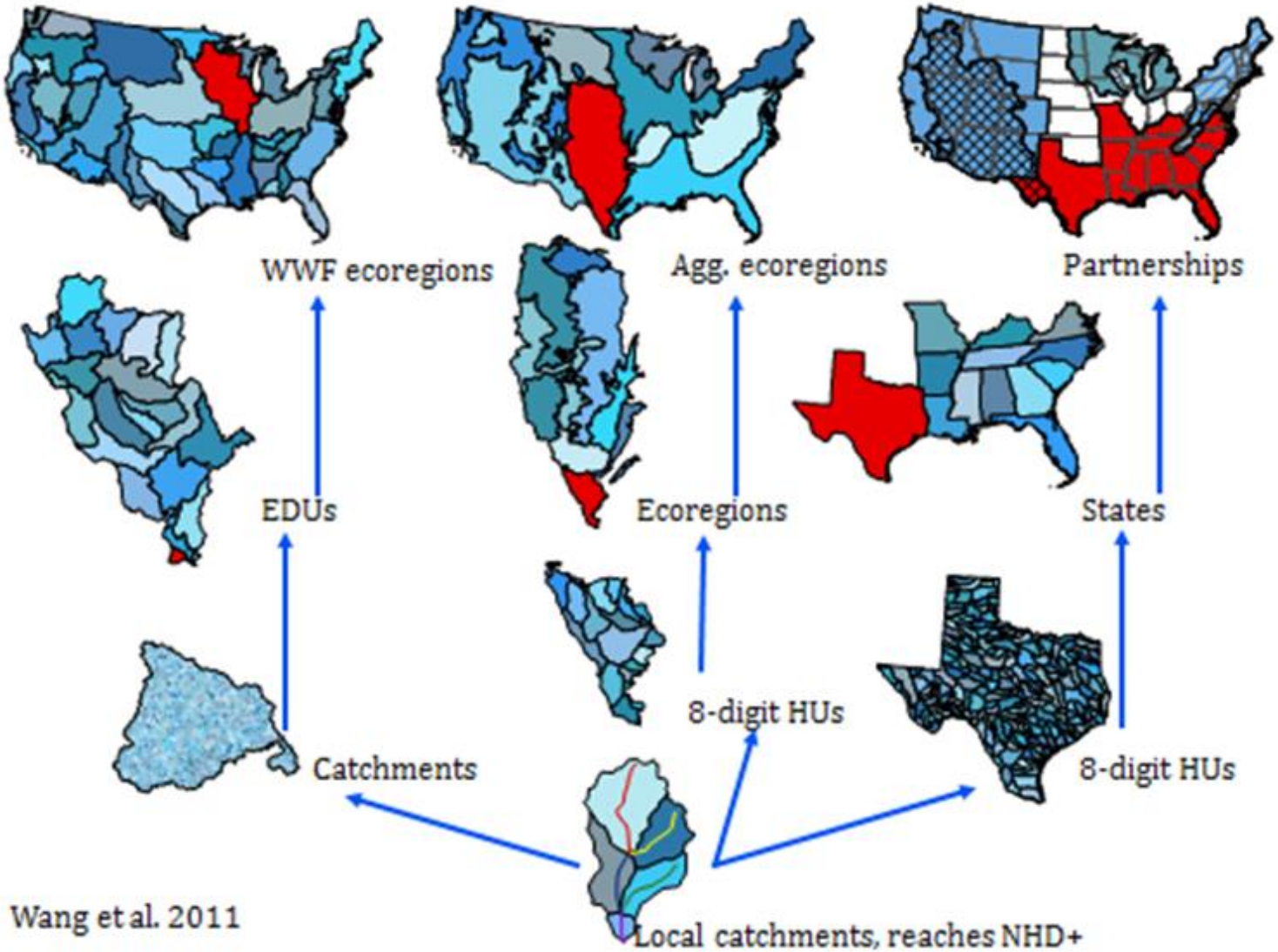
Alaska Inland Assessment of Streams Habitat Condition and Disurbance Indices (HUC12s) - click here to download
Alaska Inland Assessment of Streams Disturbance Data (HUC12s) - click here to download
SE Alaska Inland Assessment of Streams Habitat Condition and Disturbance Indices (Catchments) - click here to download
SE Alaska Inland Assessment of Streams Disturbance Data (Catchments) - click here to download

Contiguous U.S. Inland Assessment of Streams Habitat Condition Index and Limiting Disturbances – click here to download
Contiguous U.S. Inland Assessment of Streams Disturbance Data - click here to download
Contiguous U.S. Inland Assessment of Streams Buffer Polygons - click here to download
Contiguous U.S. Stream Fragmentation and Flow Alteration Statistics - click here to download

Hawaii Inland Assessment of Streams Habitat Condition and Disturbance Indices – click here to download
Hawaii Inland Assessment of Streams Disturbance Data - click here to download

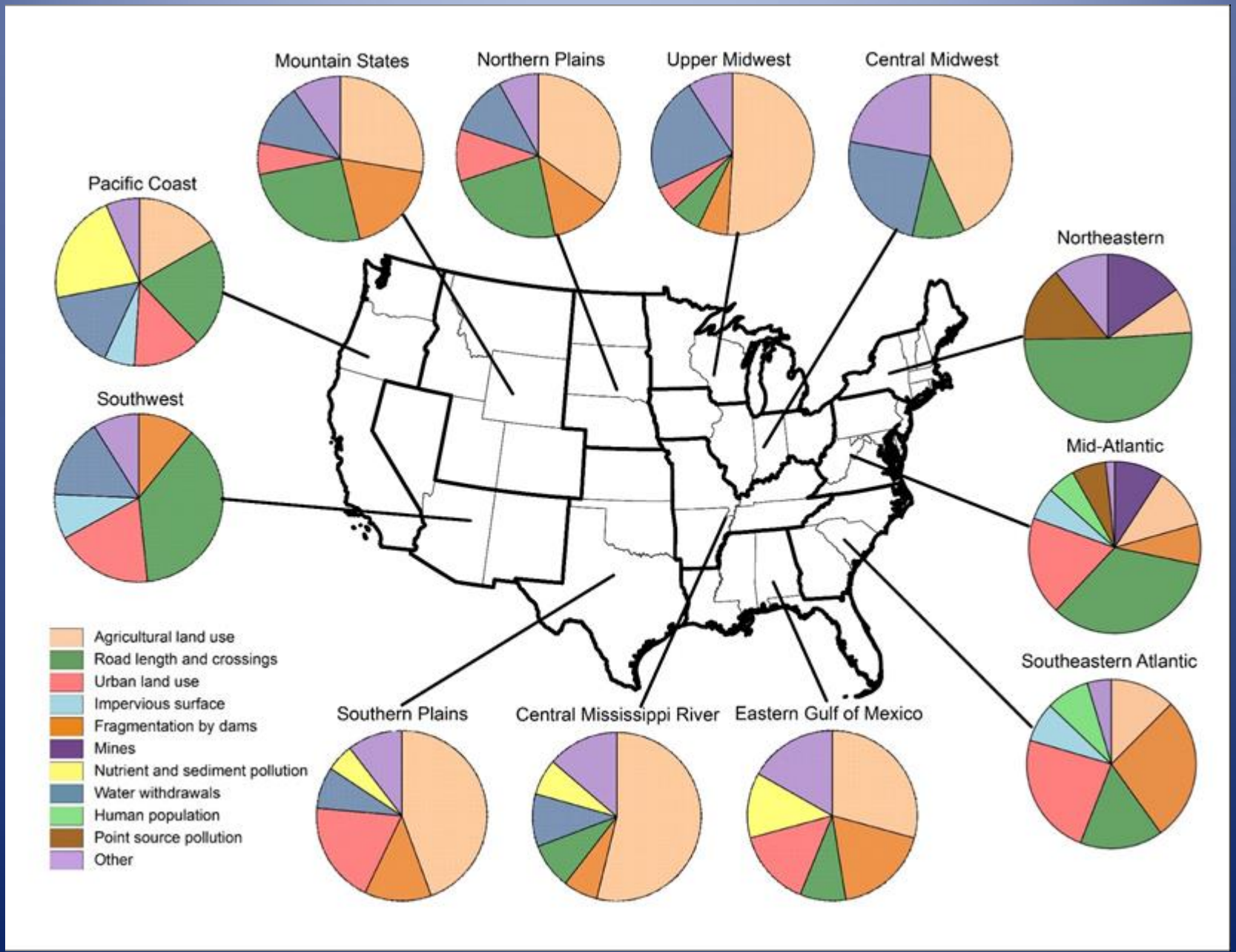
NFHP 2015 National Estuary Assessment Results - click here to download
Regional Estuary Assessment for the Northern Gulf of Mexico Results - click here to download

NRiSD, National River Spatial Database (Wang et al., 2016) was developed from the National Hydrography Dataset Plus Version 1 (NHDPlusV1, NHDPlus, 2008)



Data attribution to various spatial units provides a wealth of information

LIMITING DISTURBANCES



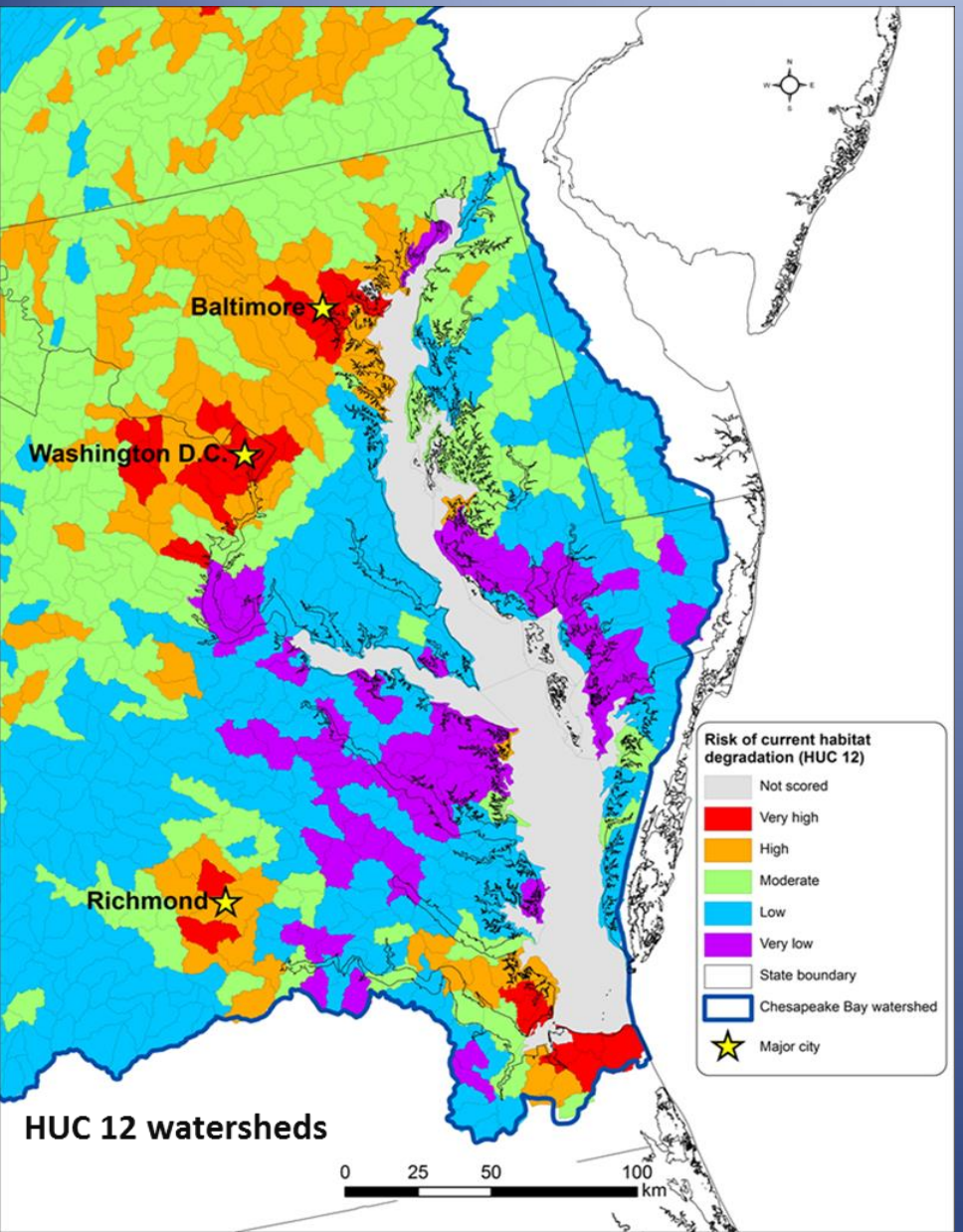
LIMITING, SEVERE, AND PERVASIVE DISTURBANCES TO FISH HABITAT

Limiting disturbances: Any disturbances that results in a stream reach not being in the best condition class

Pervasive disturbances: The most common disturbances based on total stream length in a given region

Severe disturbances (a subset of pervasive disturbances): Disturbances associated with stream reaches with high or very high risk of habitat degradation (**red** and **orange** color groups)

ENHANCING CONSERVATION ACTIONS IN THE CHESAPEAKE BAY BASIN

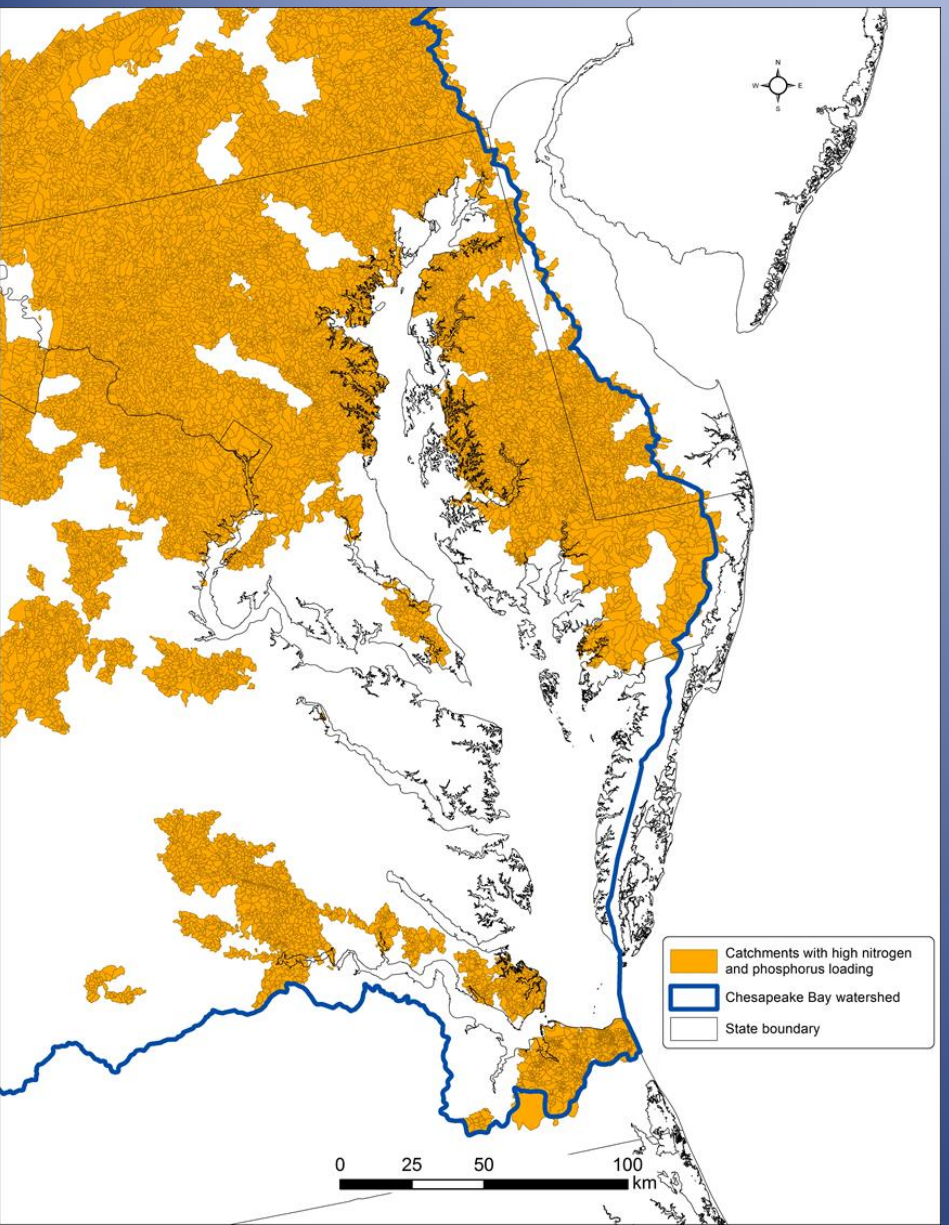


What are limiting disturbances to fish habitat in the Chesapeake Bay basin?

- Agriculture
  - pasture/hay
- Urban land use
- Mining
  - coal and mineral
- Nutrients
  - nitrogen and phosphorus
  -

Results vary regionally, by spatial extent

ENHANCING CONSERVATION ACTIONS IN THE CHESAPEAKE BAY BASIN

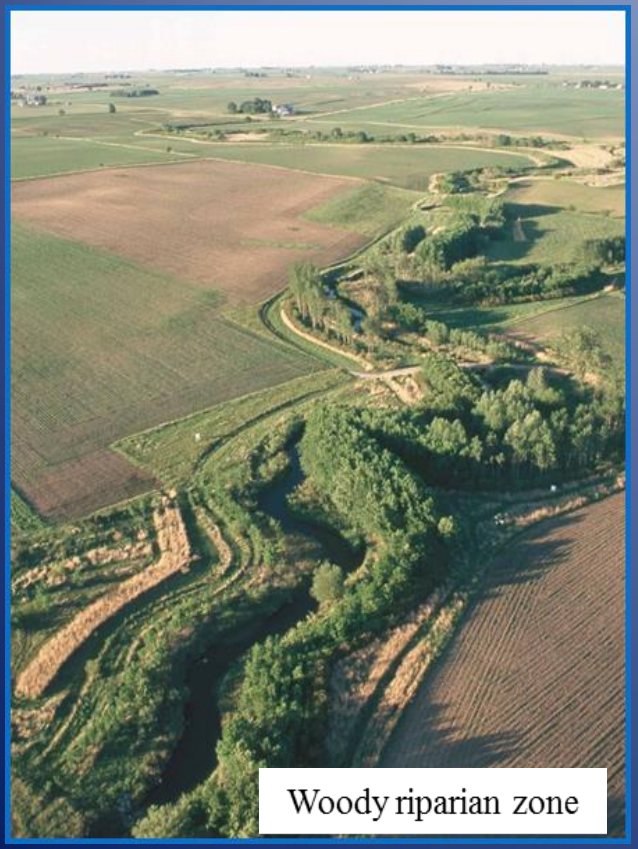


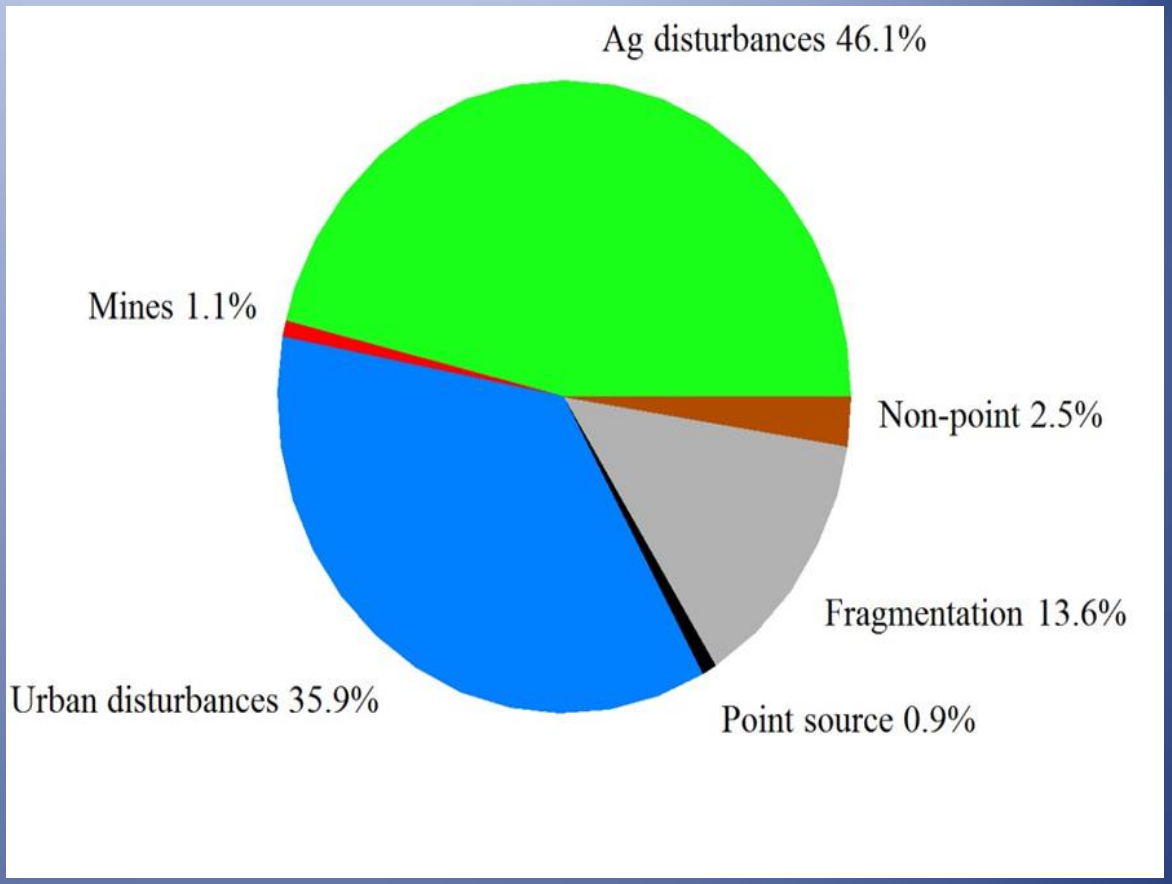
Which watersheds have the highest nutrient loadings in the Chesapeake Bay basin?

- **Highlighted local catchments have both nitrogen and phosphorus loadings above identified threshold points associated with negative fish responses**

MOST LIMITING DISTURBANCES

Temperate Plains & Upper Midwest Ecoregions

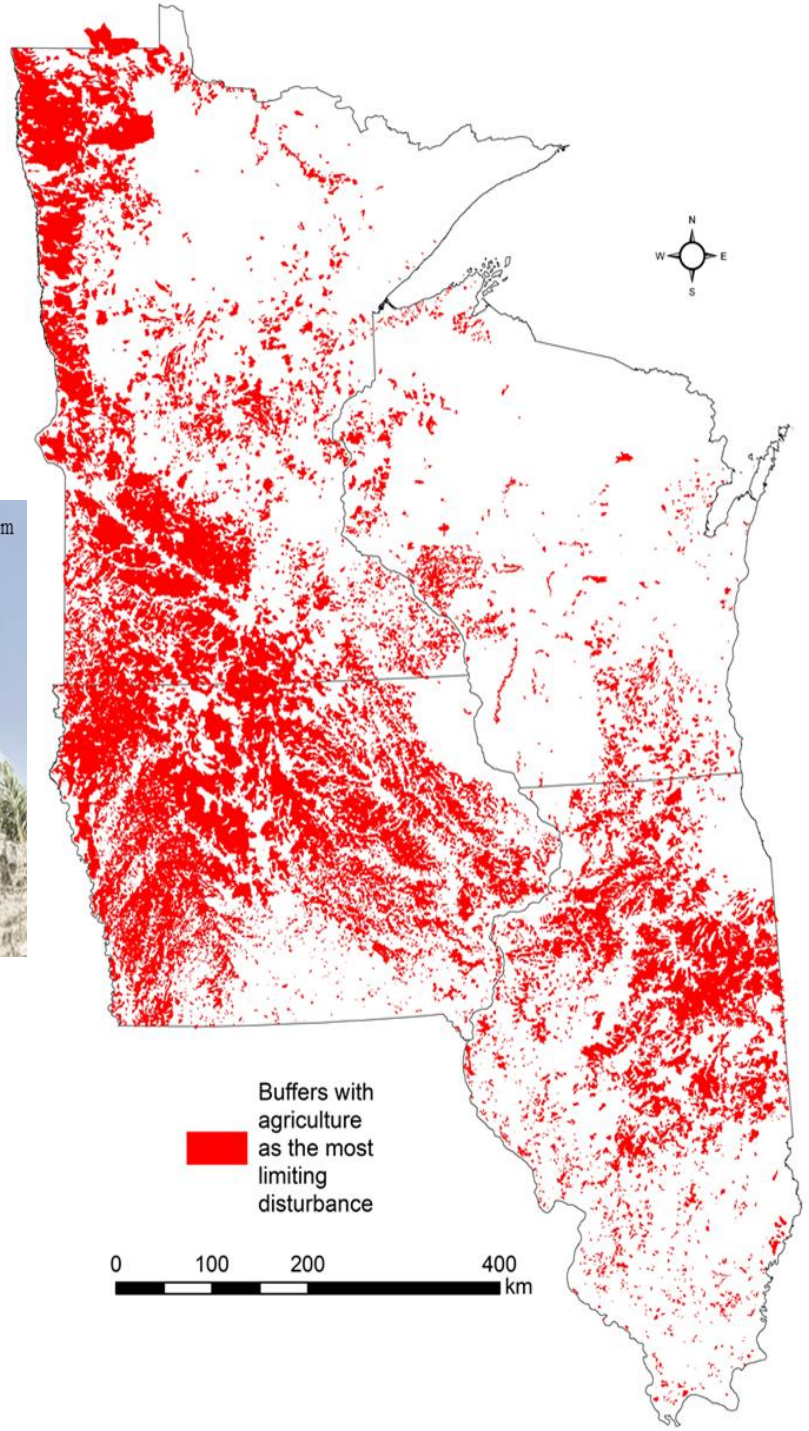




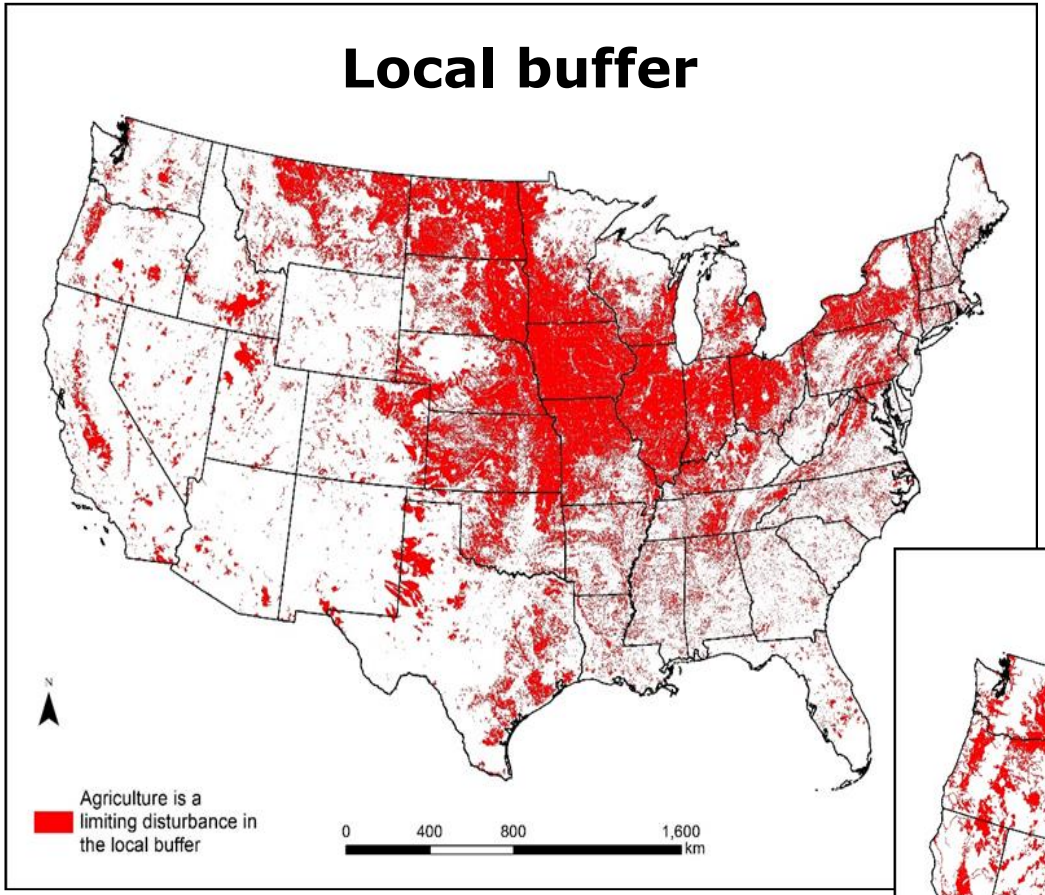
	Land use	Local	Network	Local Buffer	Network Buffer
TPL	Crop	57.46%	56.46%	98.16%	76.96%
	Pasture	14.82%	53.84%	1.82%	41.77%
UMW	Crop	22.10%	21.44%	1.96%	5.09%
	Pasture	13.65%	23.02%	28.77%	7.22%


www.outlookseries.com

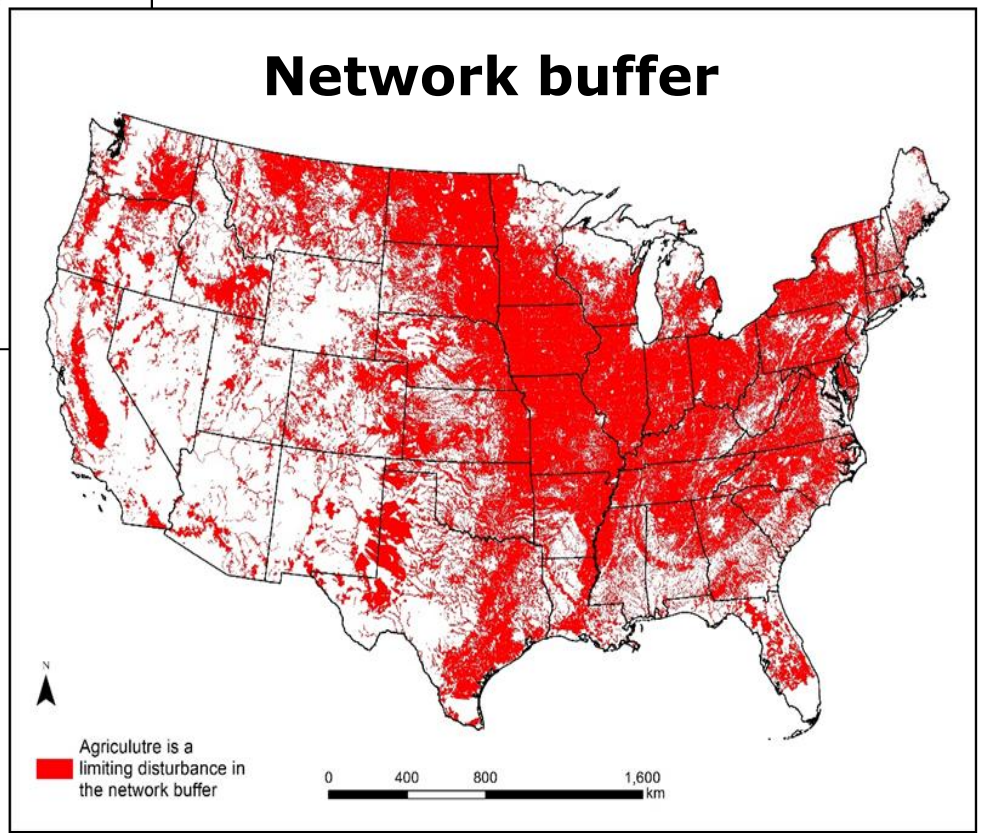

creeklife.com


N
W
E
S
Buffers with agriculture as the most limiting disturbance
0
100
200
400
km

Local buffer



Network buffer



TAKE HOME

Current habitat condition scores readily integrated with other information for decision making (aided by the spatial framework)

Cumulative condition scores, disturbance indices and scores are available for 2.7 million stream reaches of conterminous US

Information on limiting disturbances for each stream reach

All available for download as ready to use GIS data in catchments and buffers

The following individuals and agencies also made substantive contributions to this work

Christopher Estes (Alaska Fish and Game),
Scott Robinson (Southeast Aquatic Resources Partnership),
Joe Rogers (Rushing Rivers Institute),
Tim Birdsong (Texas Parks and Wildlife),
Jim Estes (Florida Fish and Wildlife Conservation Commission),
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Mary Davis (Southeast Aquatic Resources Partnership),
Dennis Mishne (Ohio Environmental Protection Agency),
William Frazier (Oklahoma Conservation Commission),
Geno Adams (South Dakota Game, Fish and Parks),
Susan Lanier (Tennessee Wildlife Resource Agency),
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Rich Langdon (Vermont Fish and Wildlife Department),
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- **US Geological Survey**
  - **Alexa McKerrow**
  - **Andrea Ostroff**
  - **Daniel Wieferich**
- **U.S. Geological Survey Climate Science Centers**
- **Michigan Department of Natural Resources**

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