WELCOME!!!
to the
National Fish Habitat Partnership Board's
"Through a Fish's Eye"
(National Fish Habitat Assessment Report)
Webinar

Gary E. Whelan, Peter Ruhl and Ryan Roberts
NFHP Board Staff
January 2016

NATIONAL FISH HABITAT PARTNERSHIP






Webinar Agenda

- Webinar Introduction – Gary Whelan and Ryan Roberts
- National Inland Fish Habitat Assessment – Dana Infante and Wes Daniel (Michigan State University – Board Inland Assessment Leaders)
  - Science background
  - Methods
  - Results
  - Examples of how to use the report information
- National Fish Habitat Assessment Report – Daniel Wieferich (USGS – NFHP SDC Member – Online Report Lead)
  - Tutorial on how to use the report
- Question and Answer Session

NATIONAL FISH HABITAT PARTNERSHIP






Webinar Rules

- PLEASE mute all phones
- Please use the chat box to enter questions and comments
  - Will be periodic pauses to answer questions
  - Question and answer period at the end of the webinar
  - Questions not answered will be followed up on using email

NATIONAL FISH HABITAT PARTNERSHIP

Mission:

Protect, restore and enhance the nation's fish and aquatic communities through **20 partnerships** that foster fish habitat conservation and improve the quality of life for the American people

- ***Implements voluntary and non-regulatory* landscape-scale fisheries conservation using the best science**
- ***Leverages* federal and privately raised funds to build regional partnerships**
- ***Partner Coalition* of 450+ agencies and organizations**

NATIONAL FISH HABITAT PARTNERSHIP






Why Do It?

National Fish Habitat Board Responsibility

- Develop national conservation goals
- Establish criteria for *Fish Habitat Partnerships*
- Measure and communicate progress
- **Produce *"Status of Fish Habitats in the United States"* report every 5 years**
  - **Partnerships produce finer level assessments**
- Increase public and private focus on aquatic habitat
- Recommend the best use of funds
- Advocate policy
- Guide Board member and staff resources

NATIONAL FISH HABITAT PARTNERSHIP

NATIONAL FISH HABITAT PARTNERSHIP

http://assessment.fishhabitat.org/

THROUGH A FISH'S EYE:
THE STATUS OF THE FISH HABITATS IN THE UNITED STATES 2015

This report summarizes the results of an unprecedented nationwide assessment of human effects on fish habitat in the rivers and estuaries of the United States. The assessment assigns a risk of current habitat degradation scores for watersheds and estuaries across the nation and within 14 sub-regions. The results also identify some of the major sources of habitat degradation.

Navigate this report by:

Report Content ▾ | Region of Interest ▾

2015 National Fish Habitat Assessment Webinar

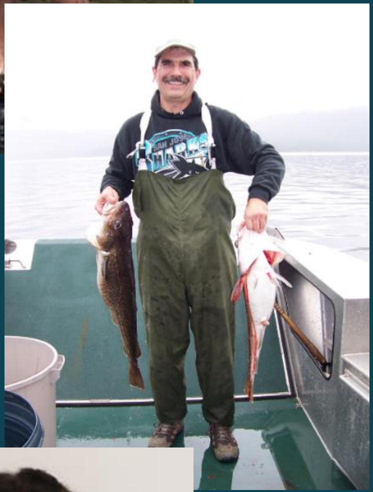
Dana Infante[1], Wesley Daniel[1], Gary Whelan[2],
Kyle Herreman[1], Arthur Cooper[1], Ralph Tingley[1]
1 Michigan State University
2 Michigan Department of Natural Resources

COAUTHORS

Wesley Daniel,
NFHP Post Doctoral Research Associate

Kyle Herreman,
Research Scientist

Arthur Cooper,
Research Scientist



Gary Whelan,
Co-chair NFHP Science and Data Committee

Dana Infante,
Associate Professor and Project PI

Ralph Tingley, PhD Student

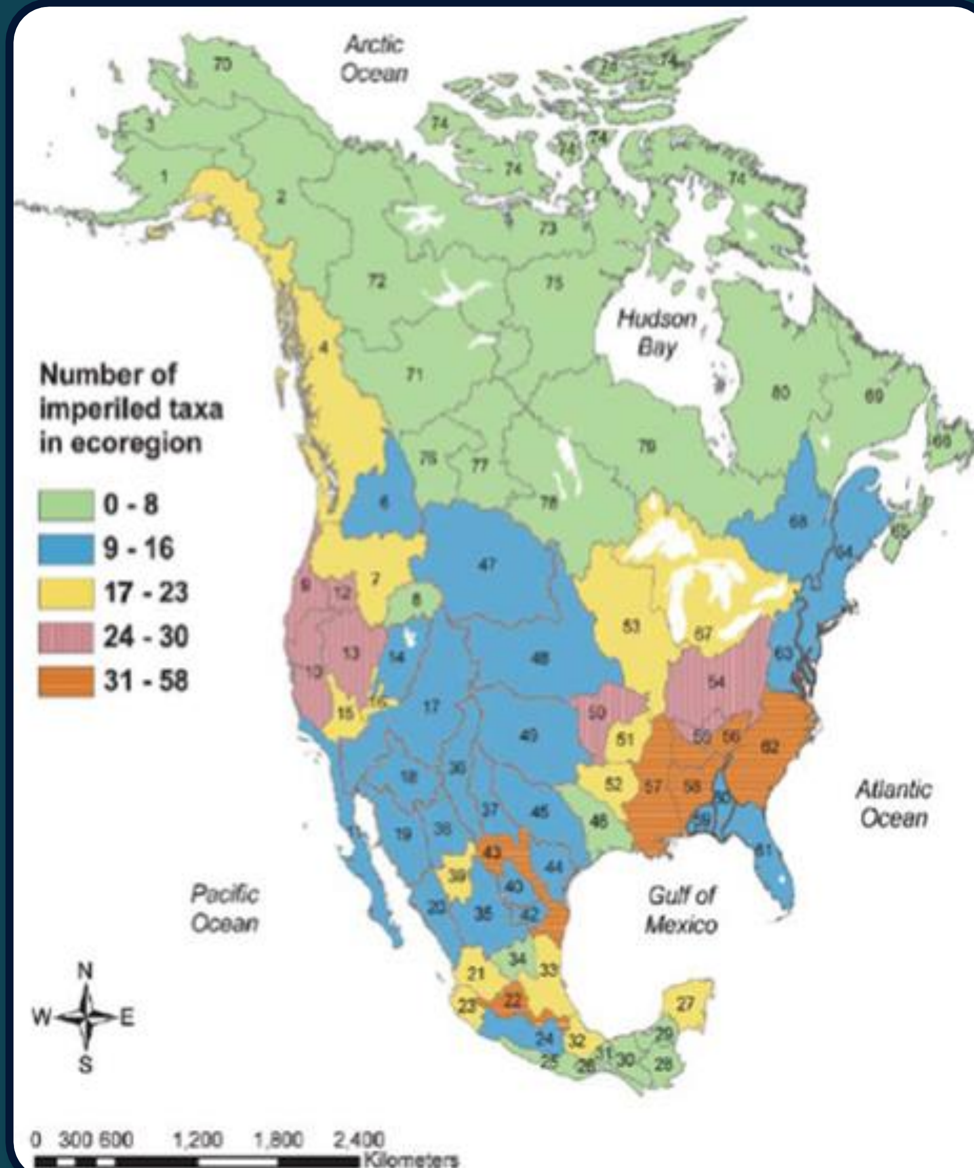
For today

- Context for inland fish habitat assessment: the landscape approach
- Inland assessment objectives and tenets guiding assessment
- *Questions*
- Methods
  - Conterminous US
  - Hawaii
  - Alaska
- *Questions*
- Assessment results
  - National-scale results
  - FHPs
  - State agencies
- *Questions*
- How to acquire and use results
- *Questions*

NATIONAL FISH HABITAT PARTNERSHIP

JELKS ET AL. 2008. FISHERIES
CONSERVATION STATUS OF IMPERILED NORTH AMERICAN FRESHWATER AND DIADROMOUS FISHES

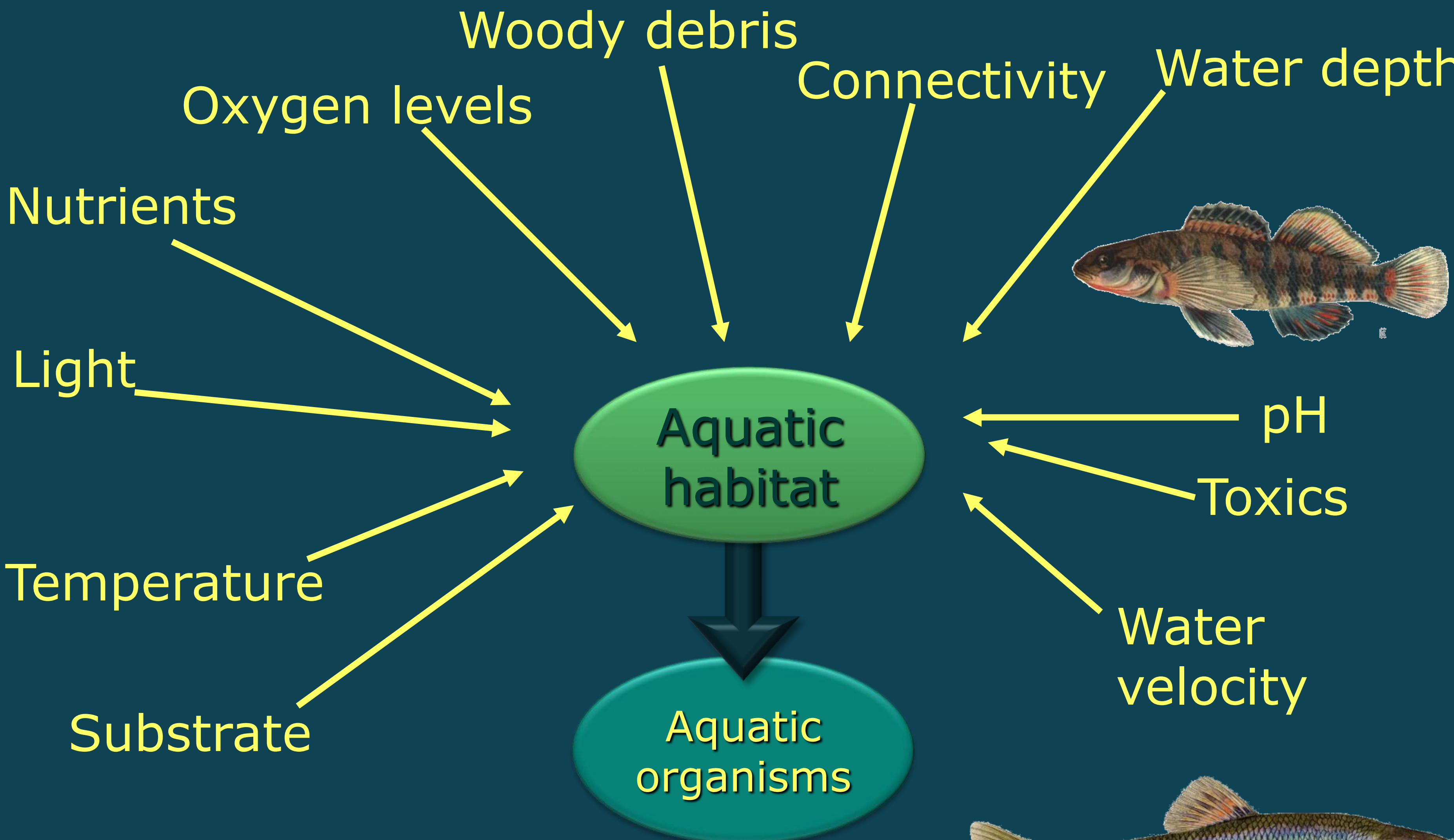
- Of 364 fish taxa imperiled (vulnerable, threatened, endangered) in 1989 compared to 2008…
  - 56% in same condition as 1989
  - 33% in <u>worse</u> condition…



DEGRADED HABITAT IS A MAJOR THREAT TO FRESHWATER BIODIVERSITY

- Habitat degradation was leading cause of imperilment for 92% of taxa
- Degraded habitat has contributed to 71% of freshwater fish extinctions globally (Helfman 2007)
- Other organisms' declines assumed related to habitat
  - In US and Canada, 72% of mussel and 47% of crayfish taxa imperiled (Abell et al. 2000, Taylor et al. 2000)
  - 43% of stoneflies, 36% of amphibians, and 18% of dragon/damselflies imperiled in U.S. (Stein et al. 2000)

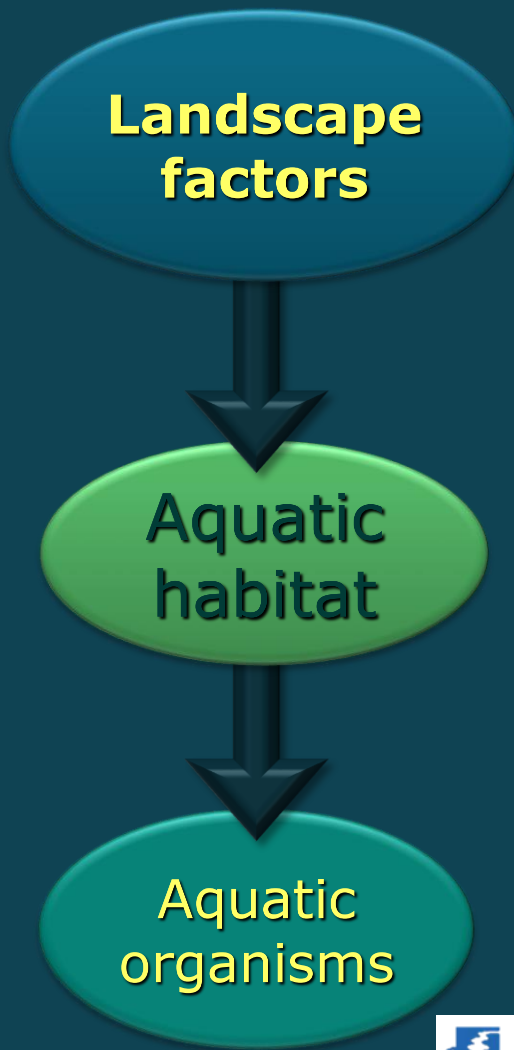
HABITAT DIRECTLY INFLUENCES TYPES OF FISHES FOUND IN SYSTEMS



Just a few examples…

LANDSCAPE APPROACH FOR UNDERSTANDING INFLUENCES ON FRESHWATER SYSTEMS (ALLAN 2004)

Hierarchical influences

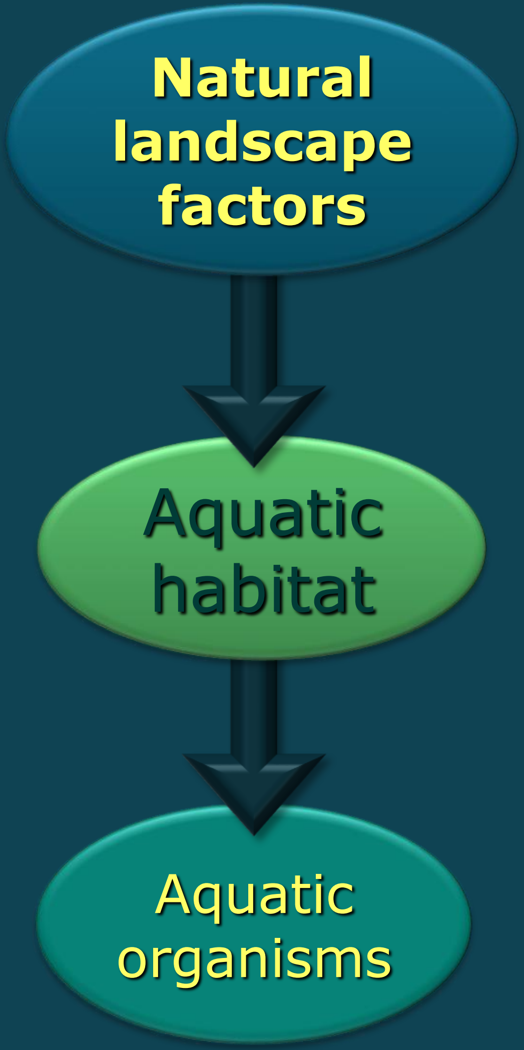


- Landscape characteristics of stream catchments affect habitat and biology via effects on habitat
- Over large spatial extents, stream habitat data may be limited, but landscape data may be available in continuous coverages
- Using landscape factors, we can approximate stream habitat conditions, identify limiting factors

NATURAL LANDSCAPE FACTORS DETERMINE POTENTIAL BY INFLUENCING STREAM HABITAT, ORGANISMS

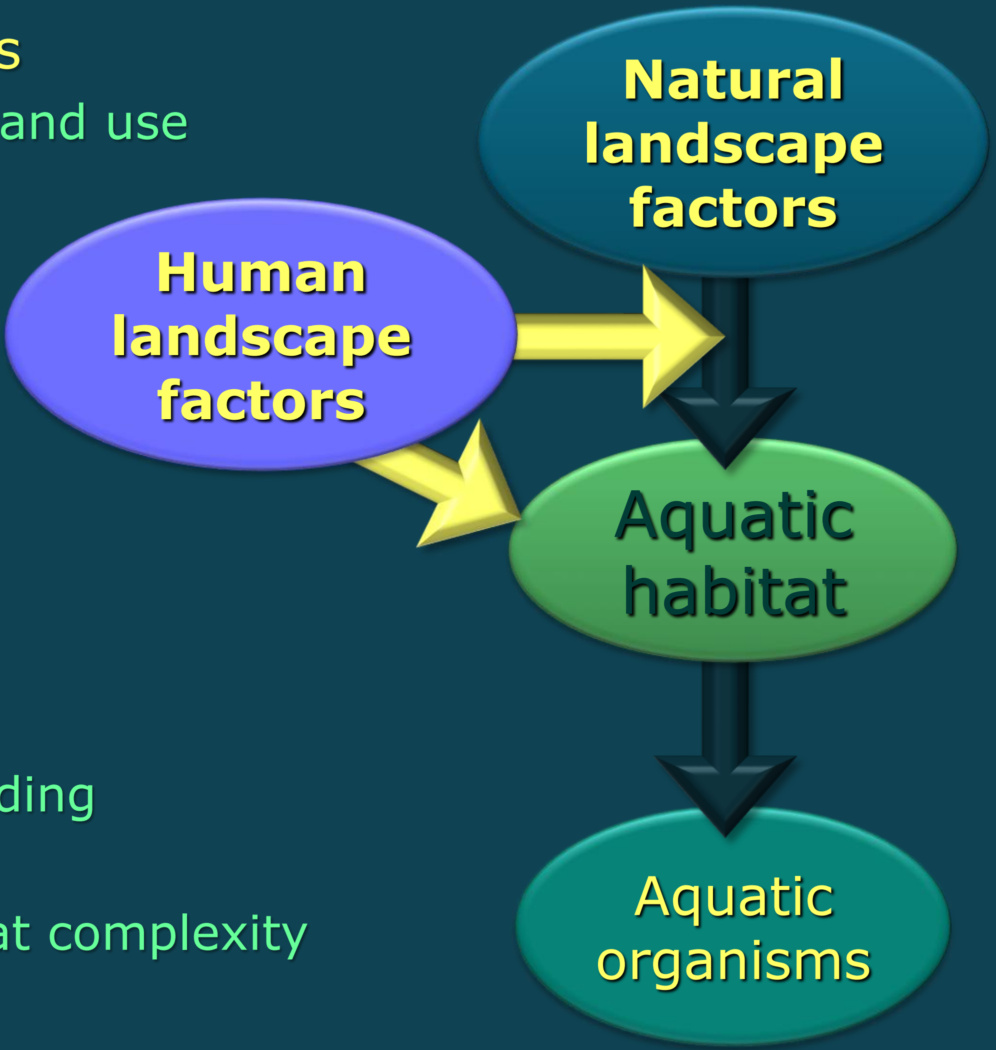
- Natural landscape factors
  - Climate
  - Geology
  - Topography
  - Natural land cover

- Stream habitat
  - Hydrologic and thermal regimes
  - Sediment loading
  - Nutrient dynamics
  - Physical structure



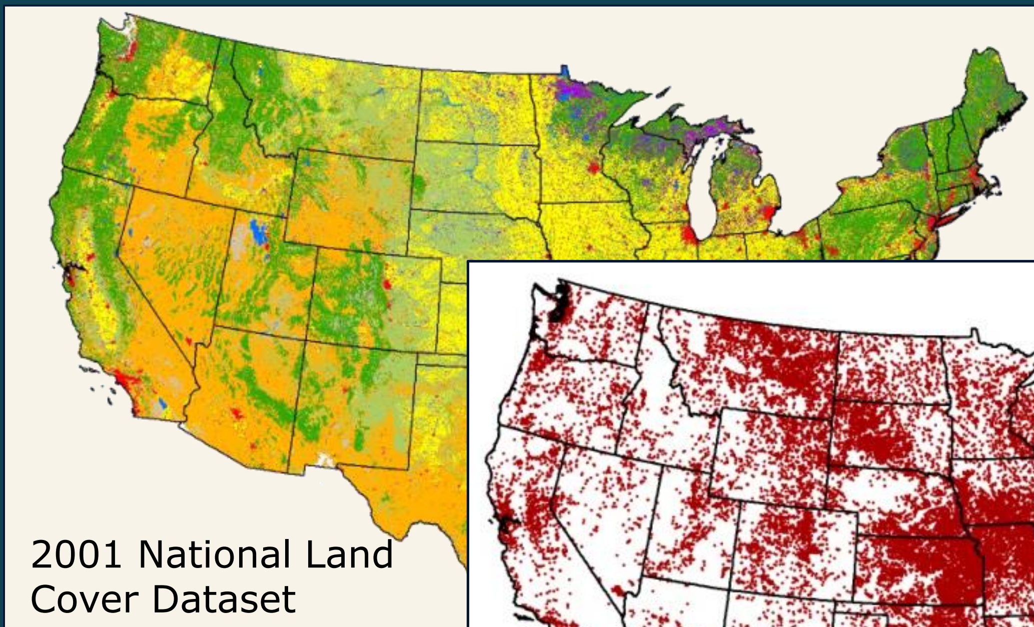
HUMAN LANDSCAPE FACTORS CHANGE POTENTIAL (ALTER PROCESSES AND HABITAT FACTORS)

- Human landscape factors
  - Urban and agricultural land use
  - Roads
  - Dams, barriers affecting stream connectivity
- Stream habitat
  - Altered hydrologic and thermal regimes
  - Increased sediment loading
  - Excess nutrients
  - Reduced physical habitat complexity

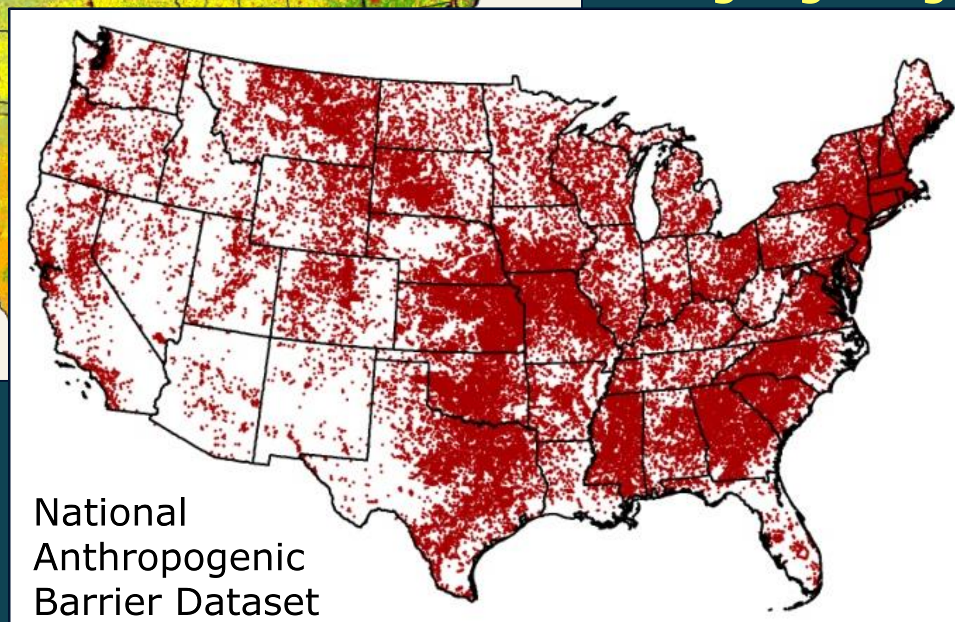


THANK YOU GIS! INFORMATION AVAILABLE FOR ALL LOCATIONS ACROSS LARGE REGIONS

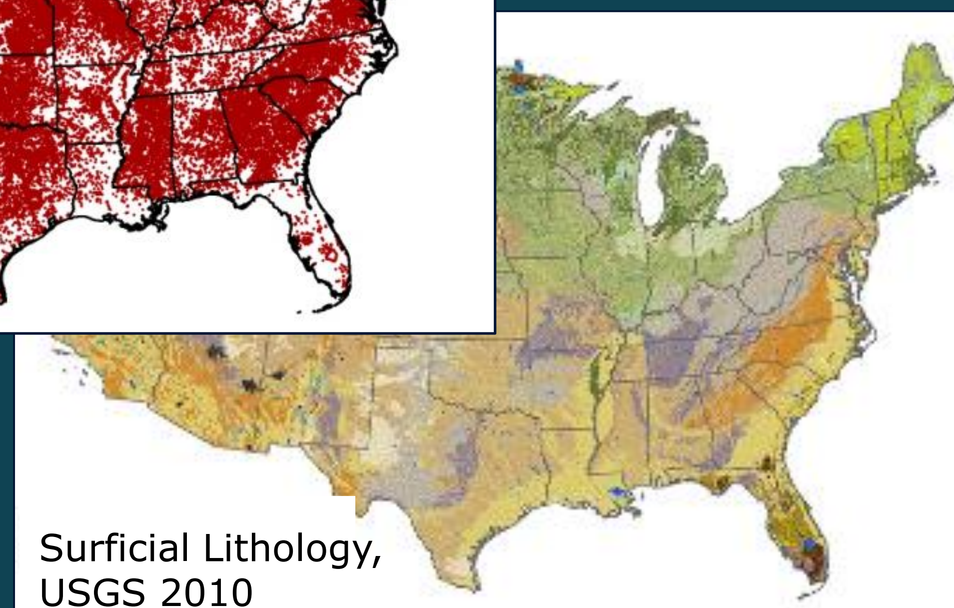
- GIS data do not replace site-specific knowledge
- Local studies are important for informing selection of data, highlighting mechanisms



2001 National Land Cover Dataset



National Anthropogenic Barrier Dataset



Surficial Lithology, USGS 2010

- GIS data can provide comprehensive, comparable estimates of conditions over large areas

INLAND ASSESSMENT OBJECTIVES AND TENETS GUIDING THE WORK

Objectives

1. Assess fish habitat condition in all rivers of the conterminous United States, Alaska, and Hawaii; generate assessment scores that provide consistent and comparable information everywhere
2. Identify most limiting disturbances to stream fish habitats

Underlying tenets

- Due to limitations in habitat data nationally, assessment should follow a landscape approach
- Natural and anthropogenic landscape factors used should represent important controls on fishes
- Data (and results) should be attributed to publically available set of spatial units (i.e., spatial framework) to facilitate data sharing and use
- Assessments for conterminous US, Alaska, and Hawaii will be conducted differently due to differences in spatial frameworks and data regionally

QUESTIONS ON LANDSCAPE APPROACH OR ASSESSMENT OBJECTIVES?

KEY ELEMENTS OF 2015 ASSESSMENT APPROACH

Assemble data

Integrate into spatial framework

Control for natural variation

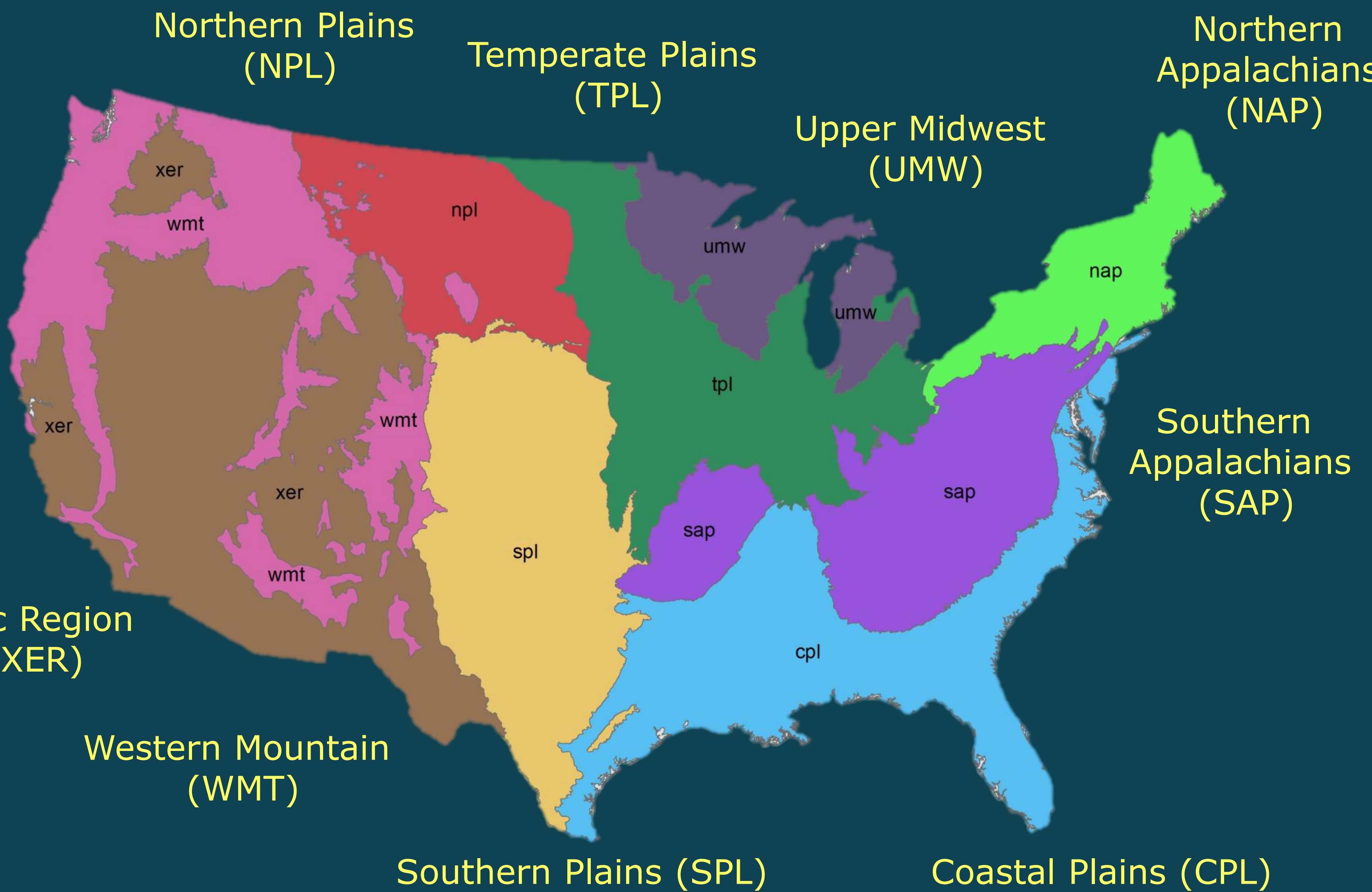
Identify important disturbances to fish habitat

Create and apply scores

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

1. CONTERMINOUS US METHODS

CONTERMINOUS US ECOREGIONS



FISH ASSEMBLAGE DATA: CONTERMINOUS US

1. The data set included 39,375 stream reaches with fish data
2. Fishes were collected with single-pass electrofishing using standardized methods (many data from federal and state programs, some museums provided data)
3. Collected since 1990
4. Were collected with the goal of obtaining a representative sample of the entire fish community (vs. sampling targeting specific species)
5. Data quality was evaluated using a four-step QA/QC procedure

NATIONAL FISH HABITAT PARTNERSHIP

IDENTIFYING DISTURBANCES TO FISH HABITAT: CONTERMINOUS US

- Assertion: fish responses to human landscape disturbances should reflect habitat condition
- Trait metrics (vs. taxonomic summaries) across large ecoregions for assessment
- Multiple fish trait metrics
  - Habitat, reproductive strategies, and feeding guilds (Frimpong fish trait matrix)
  - EPA intolerant metric developed from literature
- Selected metrics responsive to human landscape disturbance for each WSA ecoregion following selection approach of Stoddard et al. (2008)

Selection approach

Calculated fish metrics

Zero test

Metric range

Reproducibility

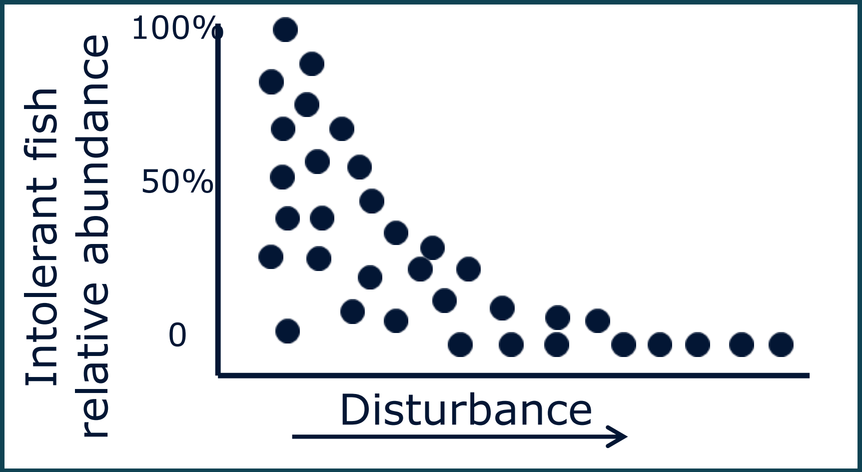
Sensitivity test

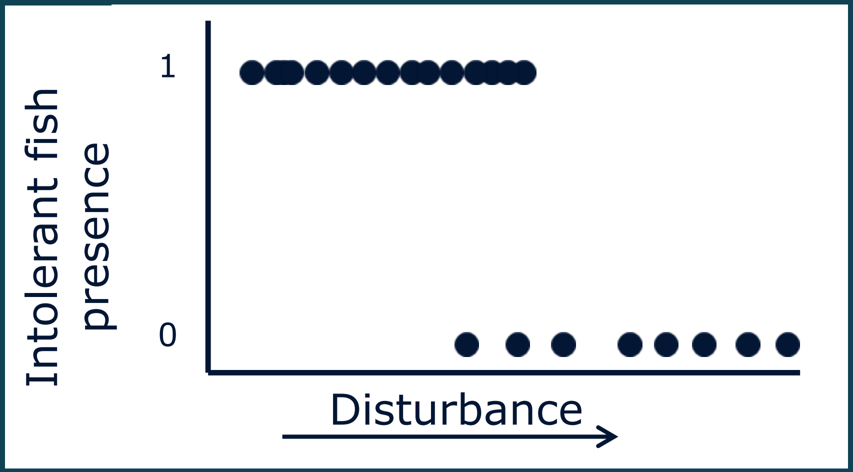
Redundancy check

We also created a game fish species metric and SGCN metric… we have tested disturbances against these metrics also

FISH ASSEMBLAGE DATA: CONTERMINOUS US

Why use relative abundance data instead of presence/absence data?



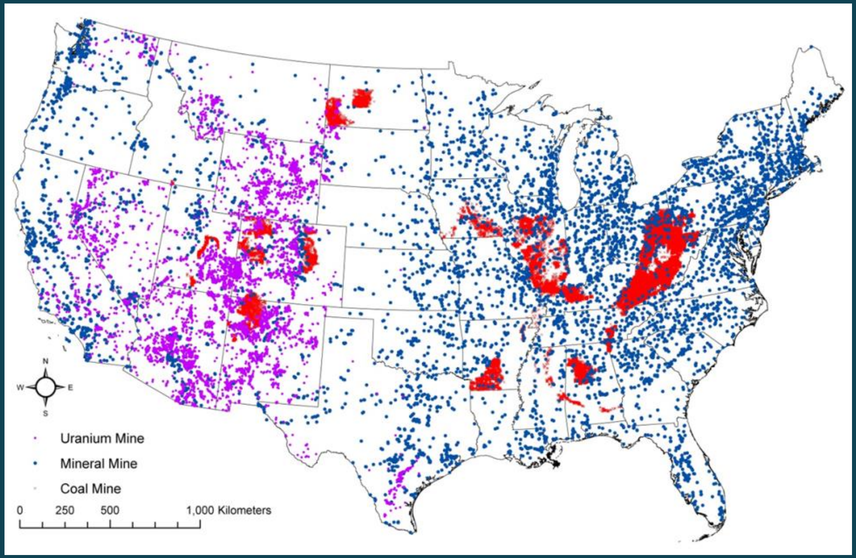


Better indicator of changing fish assemblages with disturbance

NATIONAL FISH HABITAT PARTNERSHIP

LANDSCAPE DISTURBANCE DATA: CONTERMINOUS US

1. Ecologically meaningful for assessing fish habitat
2. Consistent across the conterminous US
3. Sufficient spatial resolution that data could be used to distinguish among network catchment units



Coal, mineral, and uranium mines

2006 national land cover dataset

NATIONAL FISH HABITAT PARTNERSHIP

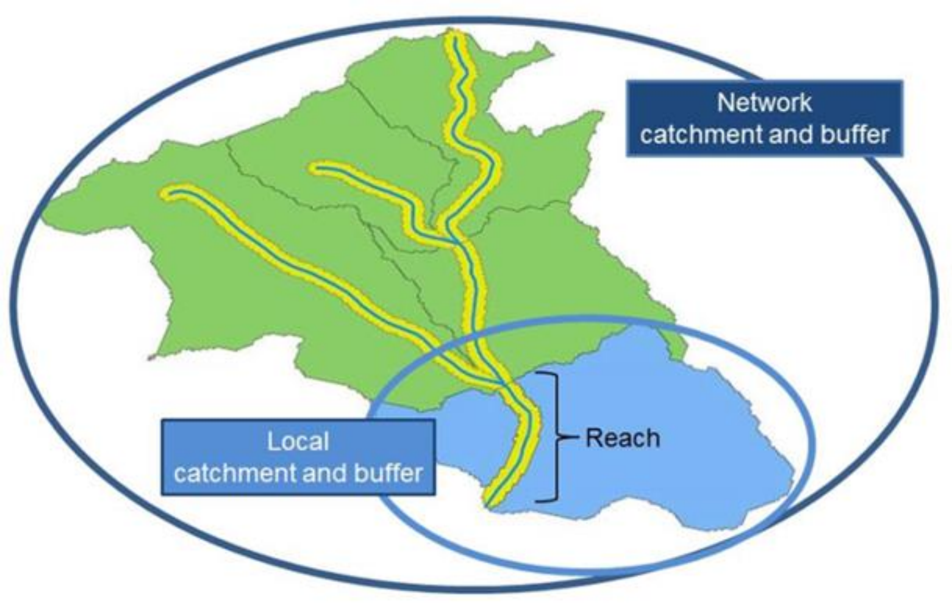
LANDSCAPE DISTURBANCE DATA:
CONTERMINOUS US

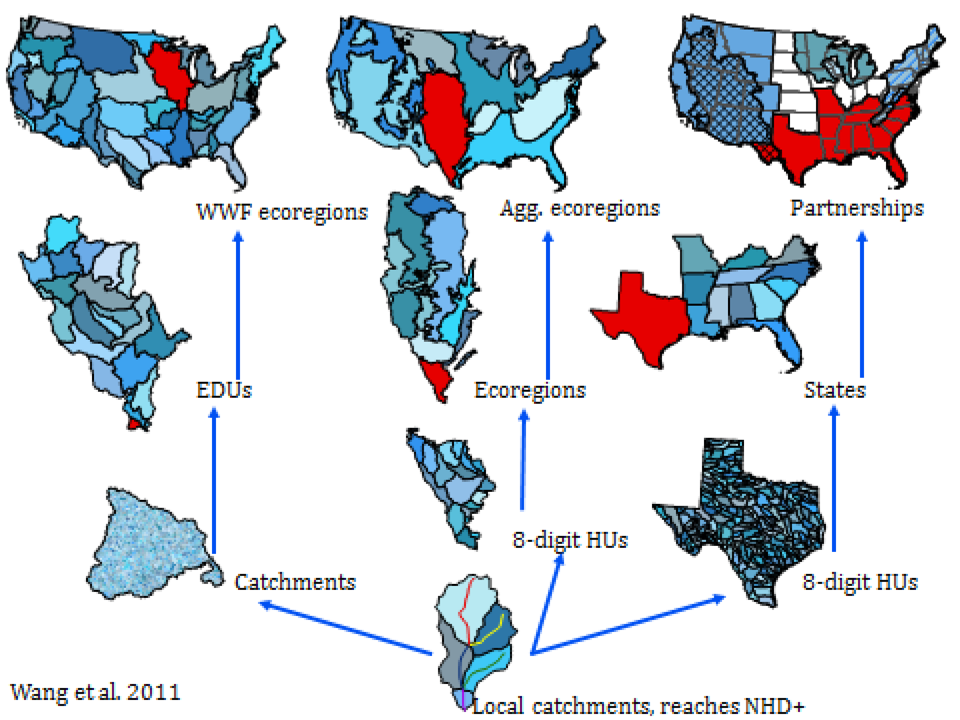
Open/low intensity urban land use (%)*
Medium intensity urban land use (%)*
High intensity urban land use (%)*
Impervious surface (%)*
Pasture/hay land use (%)*
Cultivated crops land use (%)*
Population density (#/km^2)
Road length (m/km^2)*
Road crossings (#/km^2)*
Dams and fragmentation metrics (#/km^2)*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

*updated or new from 2010

SPATIAL FRAMEWORK:
CONTERMINOUS US

- Smallest unit is a stream reach (NHDPlusV1 vs. NHDPlusV2)
- Many other spatial units available
- Crosswalk between NHDPlusV1 and NHDPlusV2 currently available





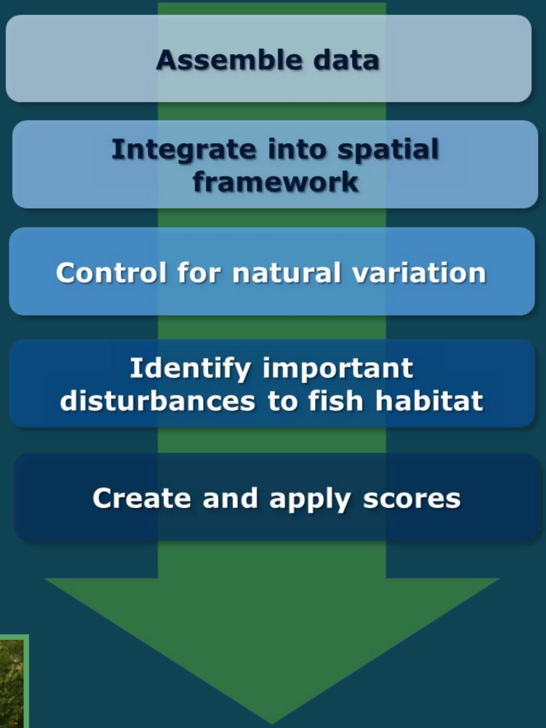
SPATIAL SCALES USED TO CREATE ASSESSMENT SCORES

- Local catchment
- Network catchment
- Local 90m buffer
- Network 90m buffer

- Data attribution to various spatial units provides a wealth of information currently used in multiple efforts

NATIONAL FISH HABITAT PARTNERSHIP

CONTROLLING FOR NATURAL VARIATION: CONTERMINOUS US

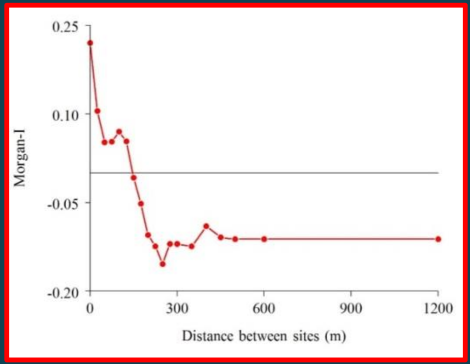


1. Constrained analyses within 9 ecoregions

2. Grouped sites into stream size classes
   Creeks (<100 km2)
   Rivers (>100 km2)

3. Accounted for spatial autocorrelation

4. Used boosted regression to remove influence from natural variables known to be important to fishes (Daniel et al. 2015)



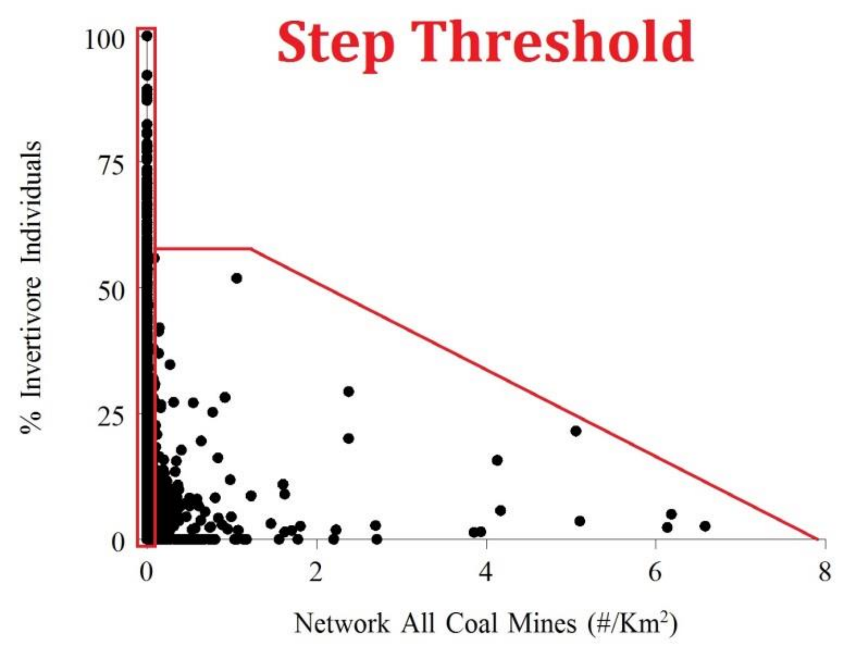
Spatial Analysis in Macroecology (SAM) V4.0

IDENTIFYING DISTURBANCES TO FISH HABITAT: CONTERMINOUS US

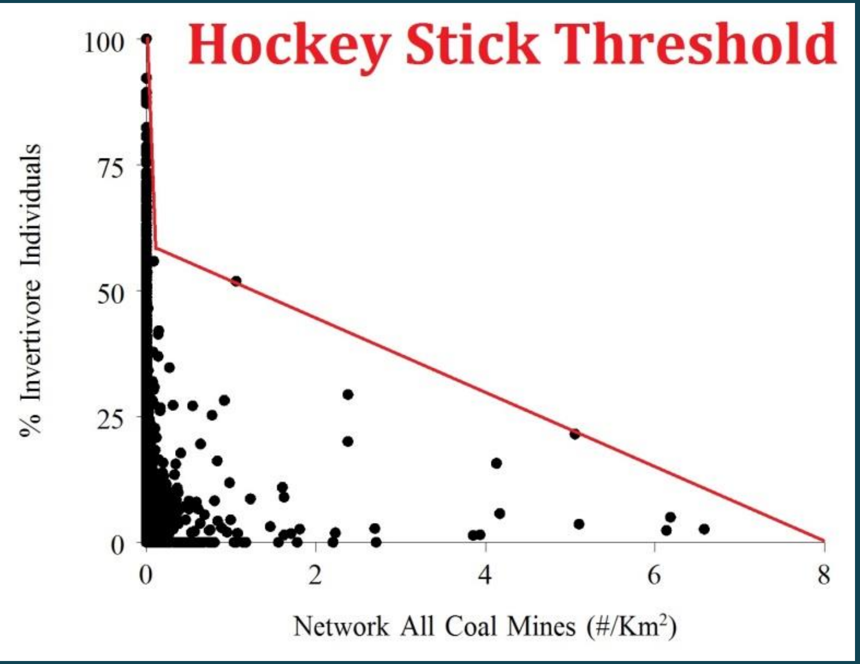
With increasing disturbance, we expect decreasing biological condition. For important disturbances affecting condition, we tested for non-linear, threshold responses…

IDENTIFYING DISTURBANCES TO FISH HABITAT: THRESHOLD DETECTION, DANIEL ET AL. (2015)

TITAN (Baker and King 2010)
Change-point analysis with indicator analysis



R code Segmented (Muggeo 2013)
Piecewise regression



To be considered a significant threshold

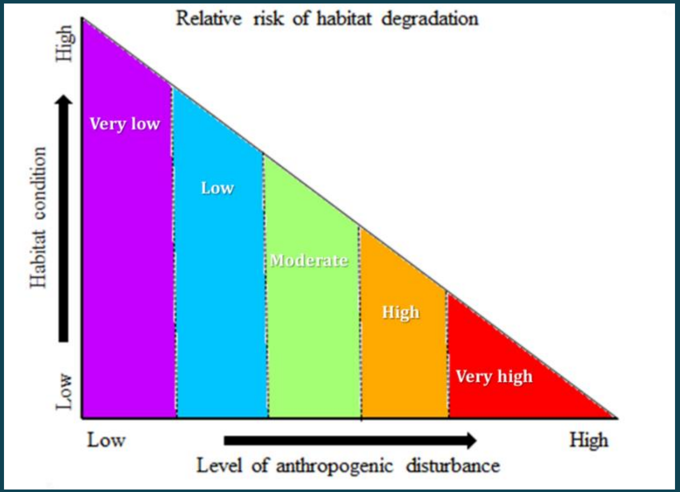
- Both techniques had to be significant
- Threshold points had to overlap within ≤ 5% error rate

- 20,412 thresholds analyzed – <u>scores based on significant thresholds</u>

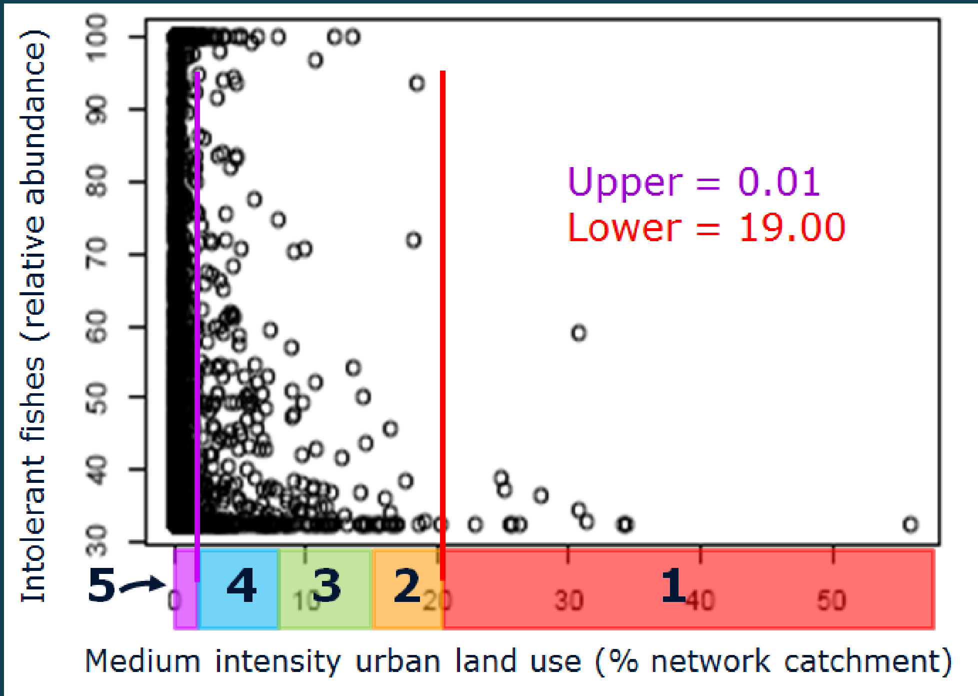
DETERMINING SCORES: LEVELS IDENTIFIED FOR EACH FISH METRIC AND EACH LANDSCAPE DISTURBANCE WITH SIGNIFICANT THRESHOLD

1. In each ecoregion, fish metrics tested against human landscape disturbances in various spatial extents

2. For each fish metric and each disturbance with a significant threshold, “levels” associated with condition were identified



- Best condition: Identified by threshold analyses
- Worst condition: “Plateau point” (indicating worst condition) identified visually
- Mid-range classes: Identified by equal breaks in the range between best and worst condition



CONDITION VALUES TO CONDITION SCORES FOR REACHES FOR INDIVIDUAL BIOLOGICAL METRICS

Actual reach condition values

Biometric 2

Reach	Low urban (%)	Pasture(%)	Coal mines (#/km²)	Road Crossings (#/km²)
112	7.89	10.2	0.001	0.15
113	2.40	0.00	0.00	1.02

Condition score for each reach

- This approach allows us to identify most limiting disturbance to a reach

Biometric 2

Reach	Low urban (%)	Pasture(%)	Coal mines (#/km²)	Road Crossings (#/km²)
112	3	5	5	4
113	4	N/A	N/A	2

Most limiting score for each biological metric, for each spatial extent

Reach	Biometric 1	Biometric 2	Biometric 3	Avg. HCI
112	4	3	4	3.66
113	3	2	4	3.00

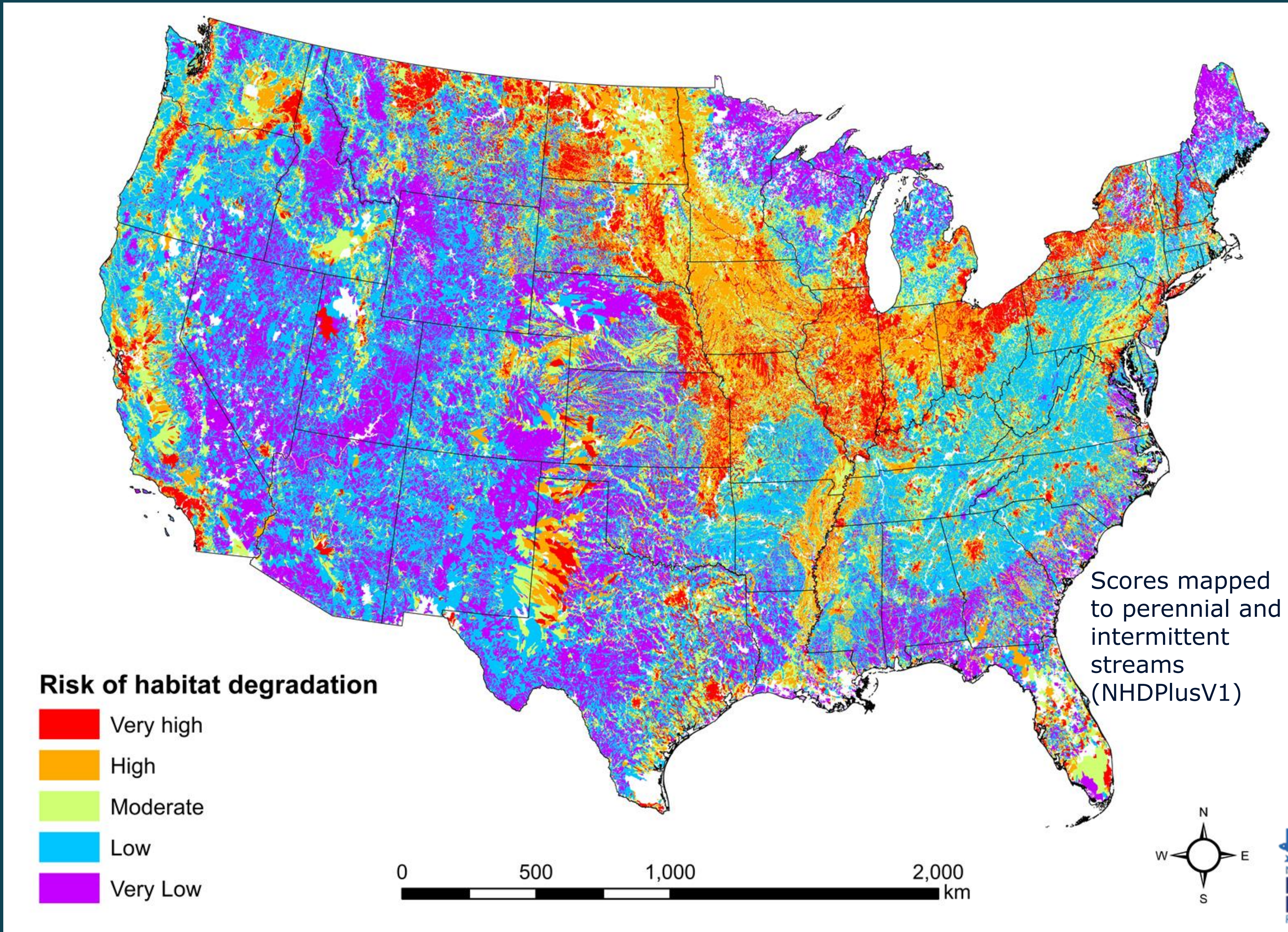
CREATING THE CUMULATIVE HABITAT CONDITION SCORE

	Habitat condition index				
	Reach 1	Reach 2	Reach 3	Reach 4	Reach 5
Local catchment	1.5	5.0	4.8	4.9	3.6
Local buffer	3.8	5.0	3.9	4.9	2.2
Network catchment	1.5	5.0	4.8	4.5	1.0
Network buffer	3.8	5.0	3.9	3.7	3.5
Cumulative Habitat Condition Index	1.5	5.0	3.9	3.7	1.0

Minimum HCI score generated for a given stream reach is assumed to reflect stream reach's maximum biological potential and therefore serves as the CHCI for that stream reach

NATIONAL FISH HABITAT PARTNERSHIP

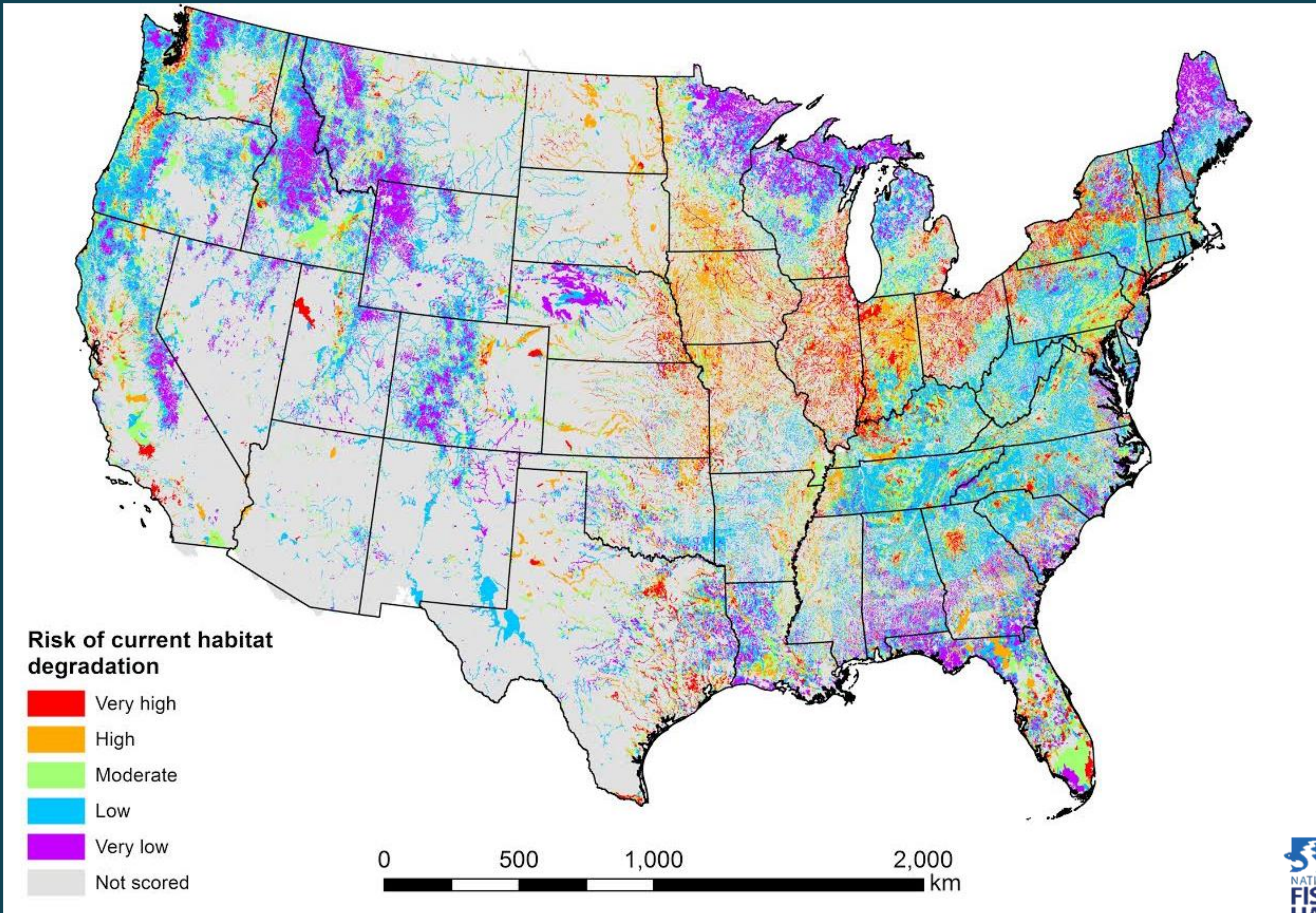
2015 ASSESSMENT OF STREAM FISH HABITATS FOR THE CONTERMINOUS UNITED STATES



Scores mapped to perennial and intermittent streams (NHDPlusV1)

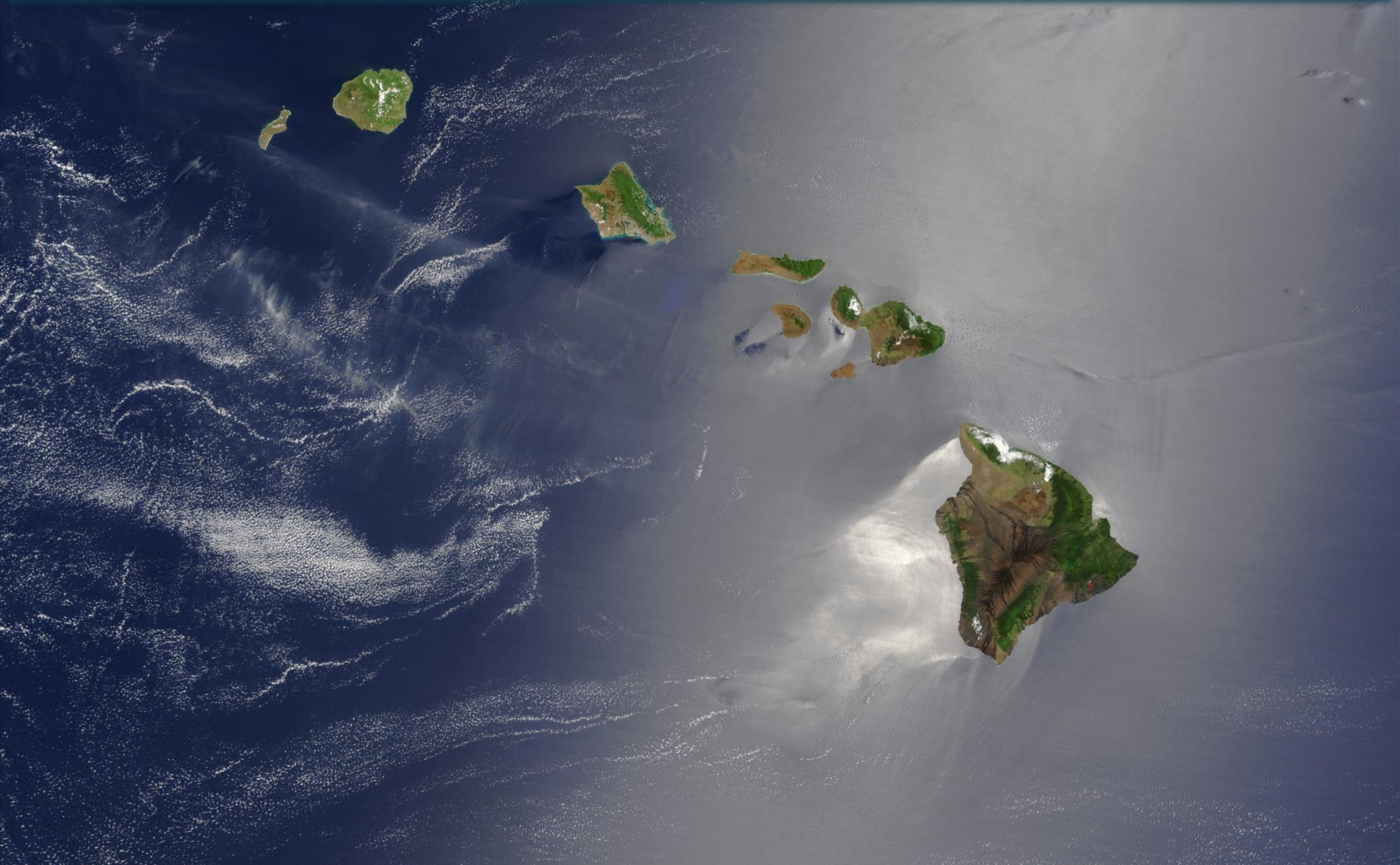
NATIONAL FISH HABITAT PARTNERSHIP

PERENNIAL STREAMS ONLY



NATIONAL FISH HABITAT PARTNERSHIP

2. HAWAII ASSESSMENT METHODS



STREAM ORGANISM DATASET

- Presence/absence data (1992-2010) of 9 taxa
    - Native taxa only
    - Most amphidromous

- Provided by Hawaii DAR and HFHP

- ~10% of perennial stream reaches

LANDSCAPE DISTURBANCE DATA: HAWAII

With input from HFHP, identified 20 landscape disturbances to Hawaii stream habitat

Index	Description	Units	Source/currentness
Urban	Developed (Open)	%	CCAP 2005-2011
Urban	Developed (Impervious surfaces)	%	CCAP 2005-2011
Urban	Population density	#/km^2	NOAA 2010
Urban	Length of utility pipelines	m/km^2	USGS 1983
Urban	Length of roads	m/km^2	TIGER Roads 2014
Urban	Golf courses	%	Hawaii OP 1993
Point Source	Quarries	#/km^2	USGS 2003
Point Source	Sites from the Superfund National Priorities List (NPL) from the Compensation and Liability Information System (CERCLIS)	#/km^2	EPA 2014
Point Source	Majors from the Permit Compliance System (PCS)	#/km^2	EPA 2014
Point Source	Number of sites from the Toxics Release Inventory (TRI) Program	#/km^2	EPA 2014
Point Source	The total number of underground injection wells within a watershed	#/km^2	Hawaii DOH 2010

Red = updated variables for 2015

LANDSCAPE DISTURBANCE DATA: HAWAII

With input from HFHP, identified 20 landscape disturbances to Hawaii stream habitat

Index	Description	Units	Source/currentness
Former Plantation	Land that was at one time pineapple production	%	Office of Planning 1989
Former Plantation	Land that was at one time sugarcane production	%	Hawaii OP 1989
Fragmentation	Number of road crossings	#/km^2	TIGER Roads 2014
Fragmentation	Dams present on stream/rivers	#/km^2	ACOE 2010
Fragmentation	Total number of ditch intersections with streams	#/km^2	NHD 24k 1983
Ditch	Total length of ditches within catchment	m/km^2	USGS 2004
Agriculture	Pasture/hay	%	CCAP 2005-2011
Agriculture	Cultivated crops	%	CCAP 2005-2011
303D	303D stream with measured TMDL	%	EPA 2006

Red = updated variables for 2015

SPATIAL FRAMEWORK: HAWAII

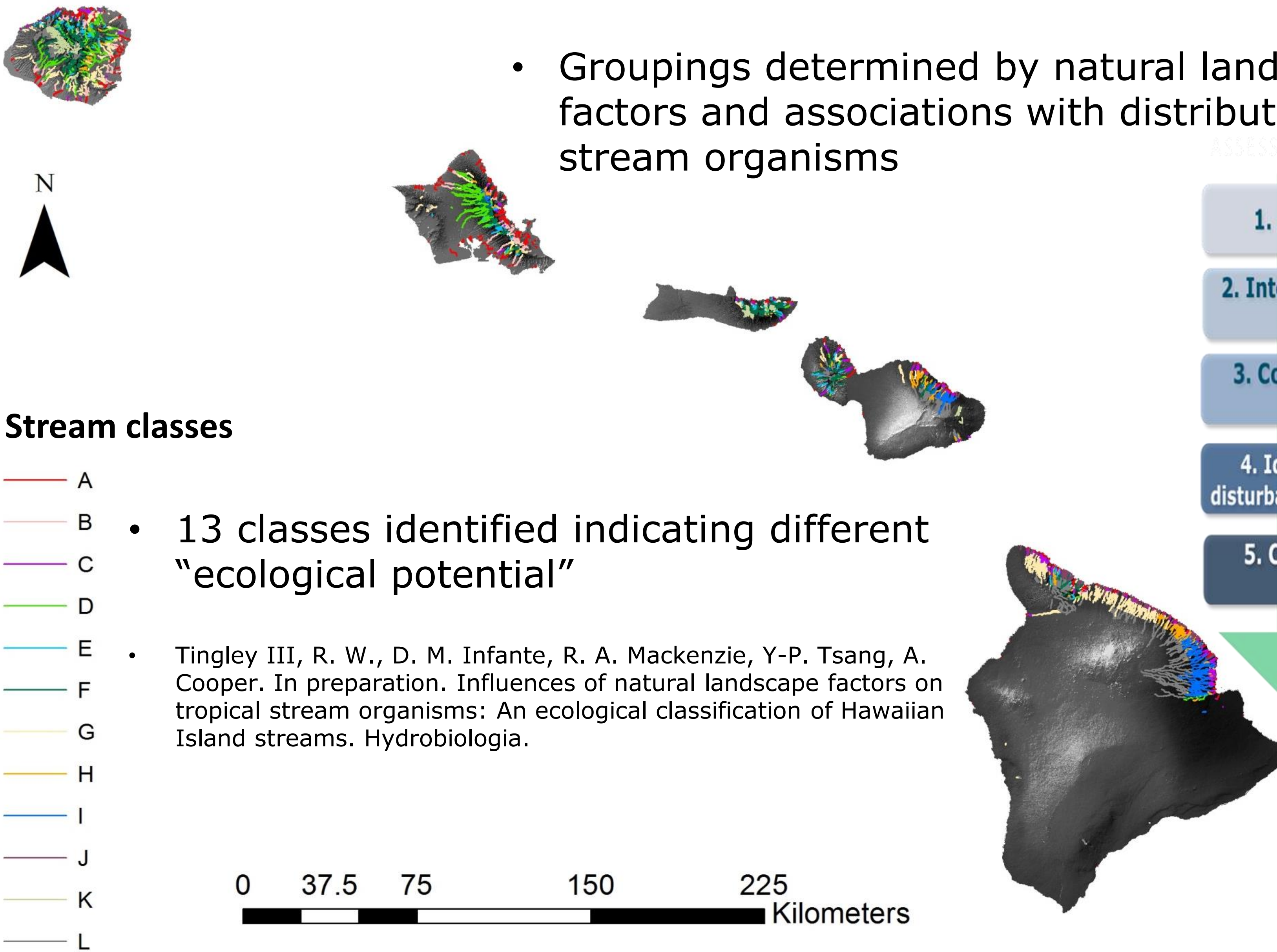
Based on the HFHP stream layer

- Modified NHD 1:24,000 (Tingley et al. in prep.)

Aggregated data into local, network, and downstream main channel catchments

CONTROLLING FOR NATURAL VARIATION: HAWAII

- All stream reaches classified into groupings
- Groupings determined by natural landscape factors and associations with distributions of stream organisms



- 13 classes identified indicating different "ecological potential"

- Tingley III, R. W., D. M. Infante, R. A. Mackenzie, Y-P. Tsang, A. Cooper. In preparation. Influences of natural landscape factors on tropical stream organisms: An ecological classification of Hawaiian Island streams. Hydrobiologia.

IDENTIFYING DISTURBANCES TO FISH HABITAT

1. Tested for relationships between species presence and disturbances in each stream reach class using logistic regression

2. Disturbances that were found to be important controls on species distributions were "upweighted" in assessment scoring process

CREATING THE CUMULATIVE HABITAT CONDITION SCORE: HAWAII

Hawaii assessment follows a risk-based approach (Danz et al. 2007, Esselman et al. 2011)

Steps:

1. Standardized individual disturbances in multiple spatial extents (55 variables)

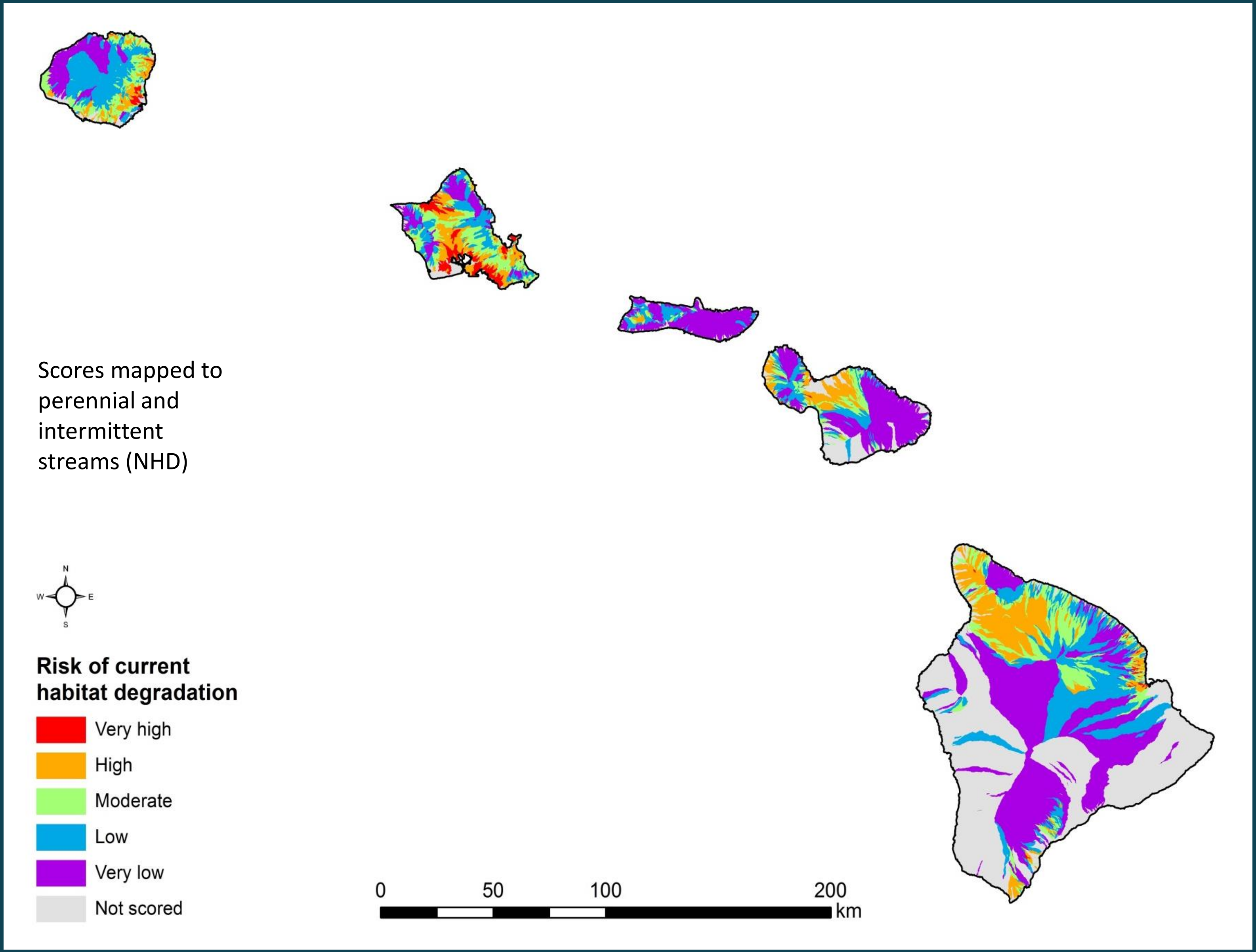
2. Up-weighted individual disturbances based on logistic regression results

3. Grouped disturbances into similar categories, summed disturbances in categories to create disturbance sub-indices

4. Summed sub-indices within spatial extents
   - Local, network, and downstream catchment

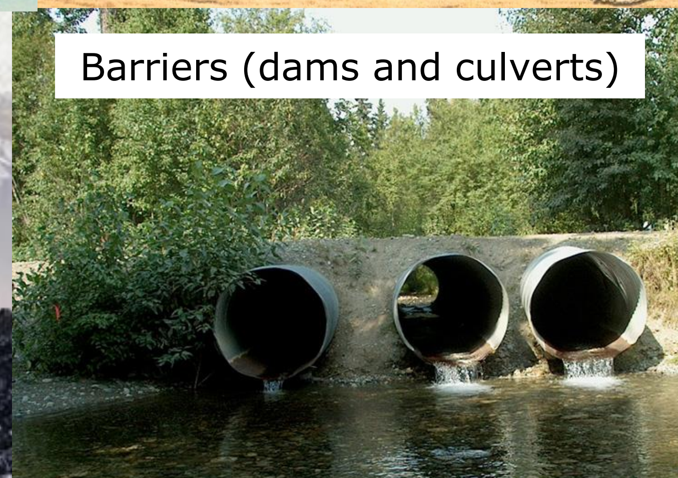
5. Standardized and summed spatial extent indices
   - Cumulative Habitat Condition Index

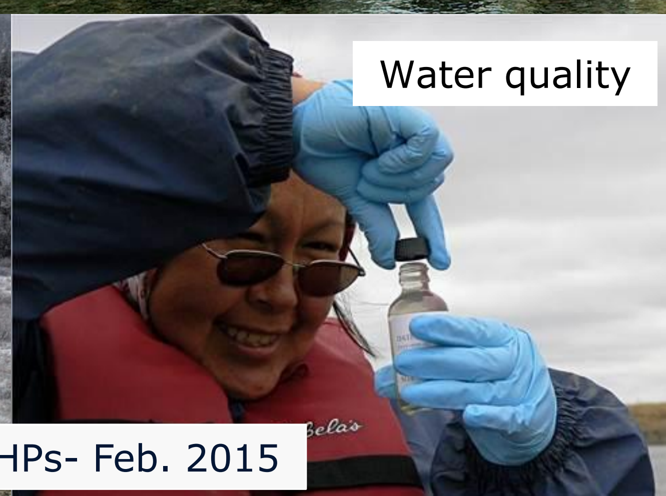
2015 ASSESSMENT OF STREAM FISH HABITATS FOR HAWAII



3. ALASKA ASSESSMENT METHODS

LANDSCAPE DISTURBANCE DATA: ALASKA

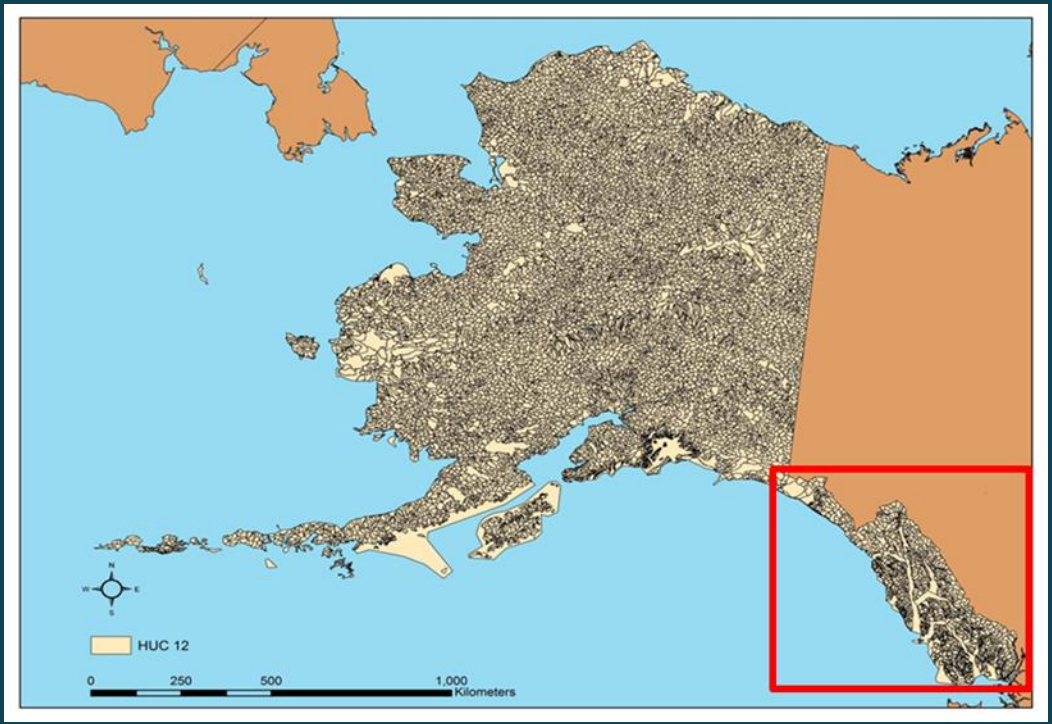


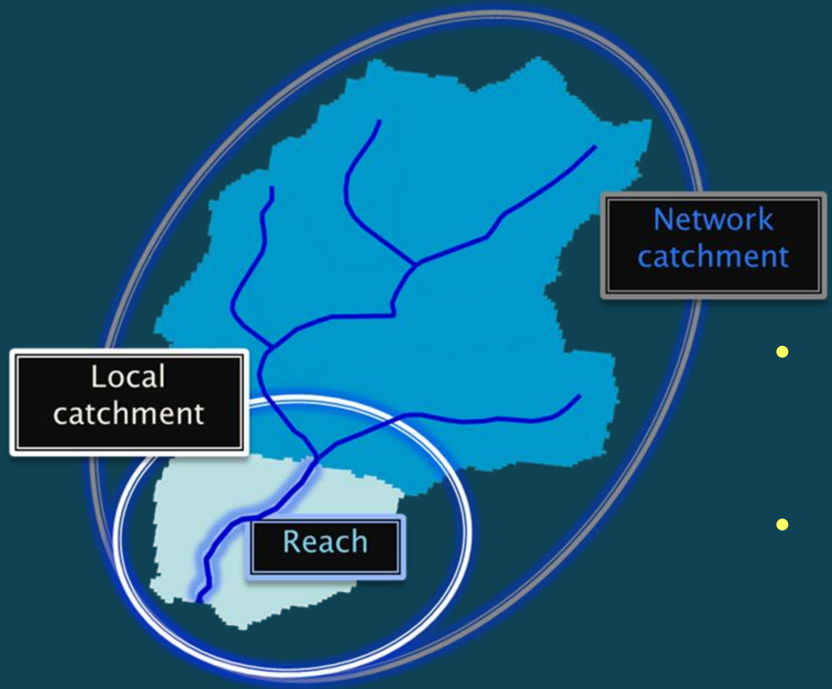


Reviewed by FHPs- Feb. 2015

SPATIAL FRAMEWORK:
GREATER ALASKA

- HUC-12 watersheds for greater Alaska
- 12,825 HUC-12 watersheds





Spatial framework described in Wang et al. (2011)

SPATIAL FRAMEWORK:
SOUTHEAST ALASKA

- Local catchments created for southeast Alaska (worked conducted by Jared Ross)
- Each stream reach had information summarized in two spatial extents (local and network catchments)

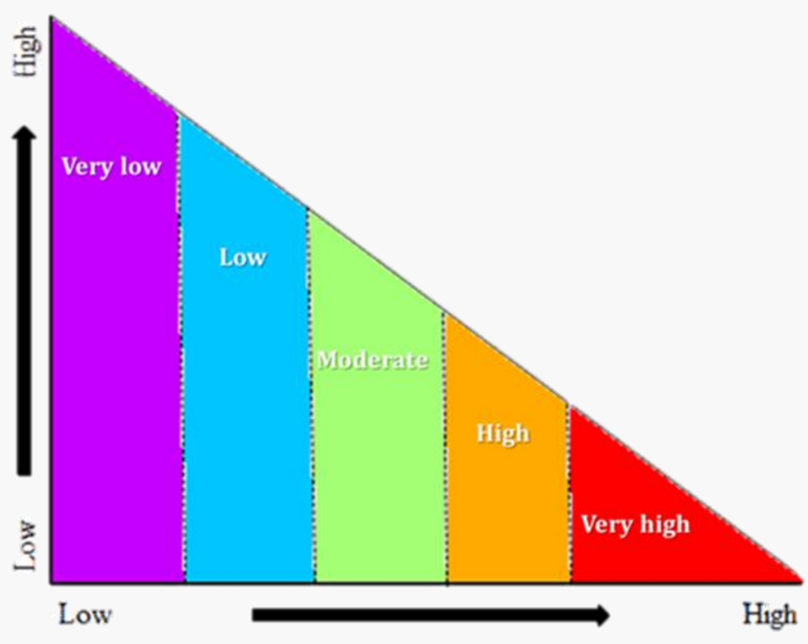
6 DISTURBANCE SUBINDICES

Based off: Danz et al. (2007), Esselman et al. (2011)

urban	agriculture	water quality	barriers	infrastructure	active mines
Population density **Urban open space** **Urban low intensity** **Urban medium** **Urban high intensity**	**Pasture/hay** **Cultivated crops** **Forest harvest***	**Nat. Poll. Dis. System** **Toxic release sites** **Contaminated sites** **303(d)**	**Dam density** **Non-dam barriers (grey and red culverts)**	**Road density** **Railroad density** **Pipeline density** **Landing strips /airports**	**Active mines (without prospector locations)*** **Major mines of AK**

Each stress class index was normalized between 0-1

Cumulative Disturbance Index was summed from six indexes

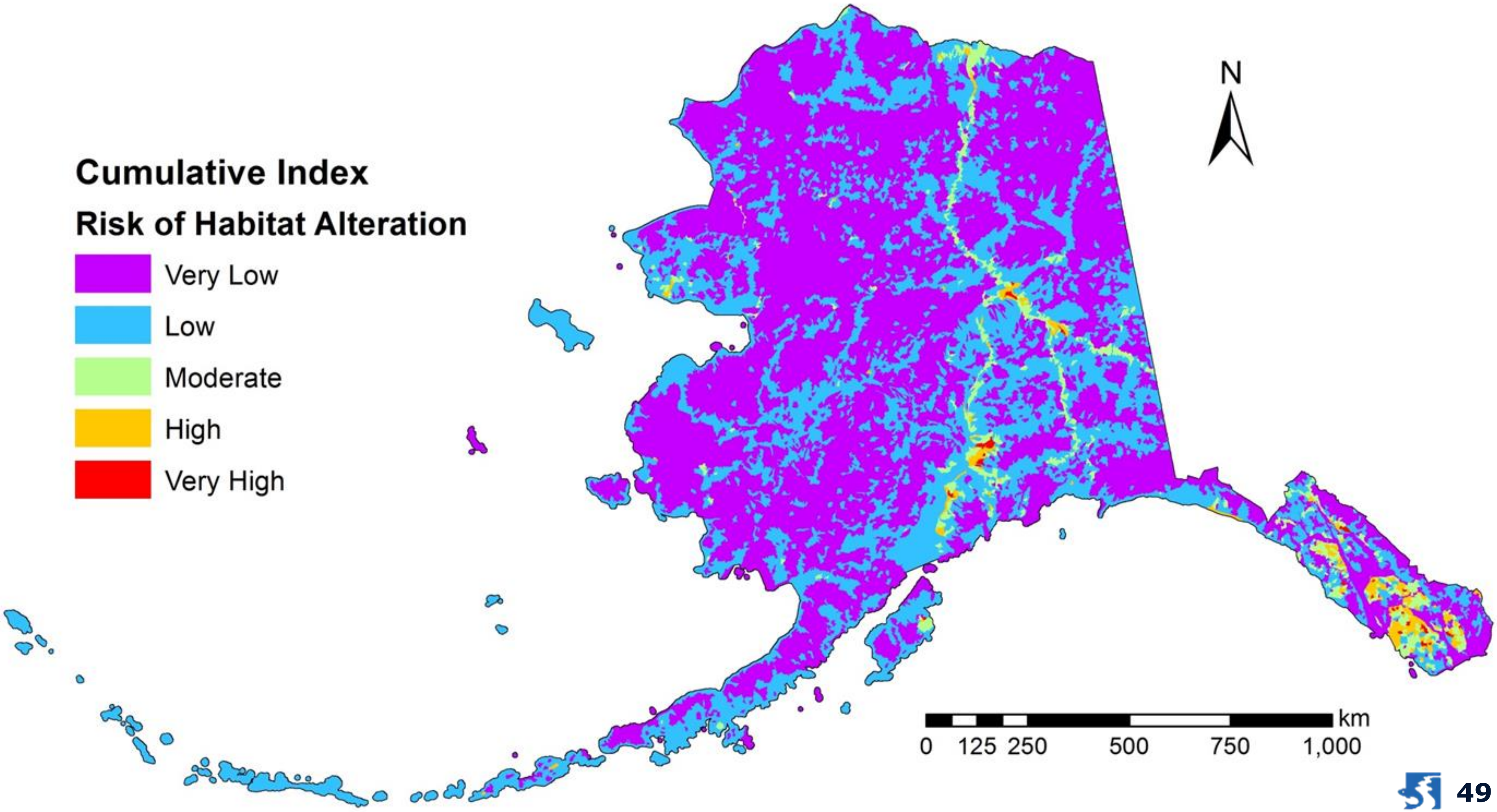


- Use of Jenk's Natural Breaks to create Disturbance Index Classes
- Same method used in Conterminous US

* = unique variables for Southeast assessment

NATIONAL FISH HABITAT PARTNERSHIP

2015 ASSESSMENT OF STREAM FISH HABITATS FOR ALASKA



NATIONAL FISH HABITAT PARTNERSHIP

QUESTIONS ON METHODS FOR CONTERMINOUS US, HAWAII, OR ALASKA?

TYPES OF RESULTS FROM 2015 ASSESSMENT

1. Natural and anthropogenic disturbance data attributed to common spatial framework

2. Cumulative habitat condition indices
   - Subindices specific to disturbances for Hawaii and Alaska

3. Habitat condition indices specific to various spatial extents

4. Most limiting disturbance to fish habitats

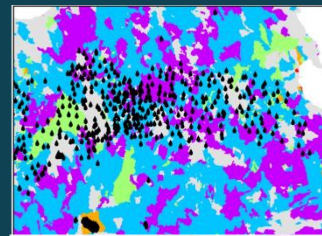
5. Conterminous US scores developed specifically for game fishes and Species of Greatest Conservation Need

6. Regional scores developed for specific fish metrics

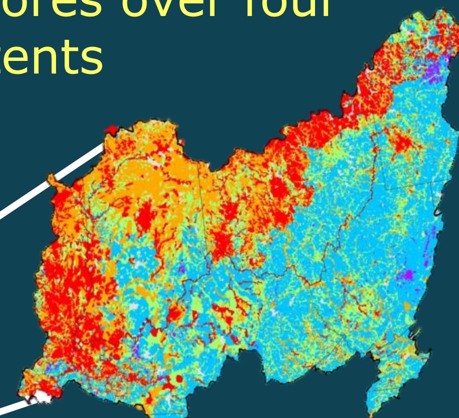
NATIONAL FISH HABITAT PARTNERSHIP

USING ASSESSMENT RESULTS

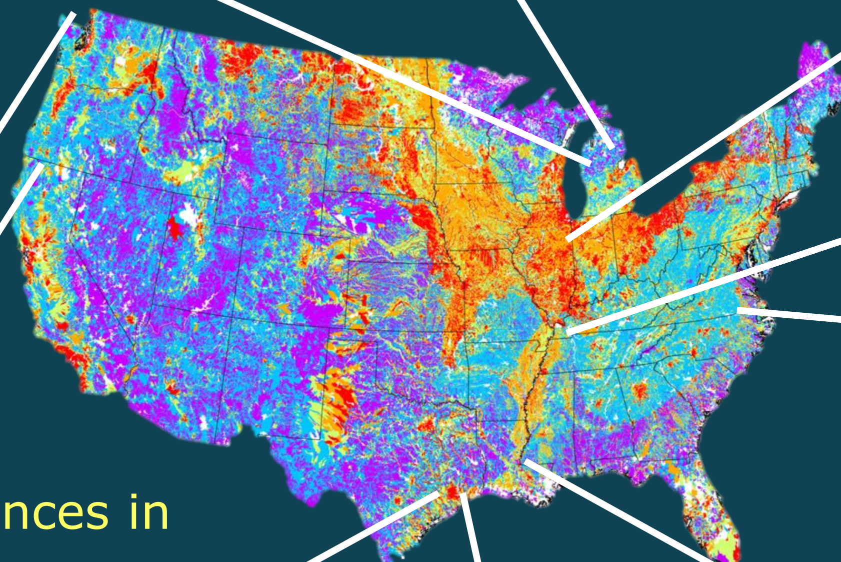
Scores with other information to enhance conservation decisions


Oil and gas wells

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


Ohio River Basin

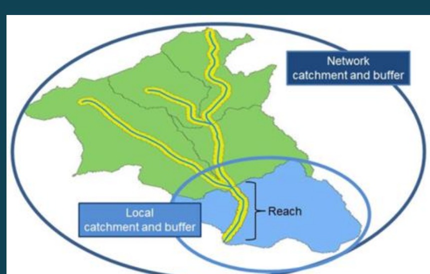
Scores tailored to specific groups of fishes




Coastal Cutthroat Trout


Large dam locations

Most limiting disturbances in four spatial extents



Ready to use GIS data in catchments and buffers

NATIONAL FISH HABITAT PARTNERSHIP

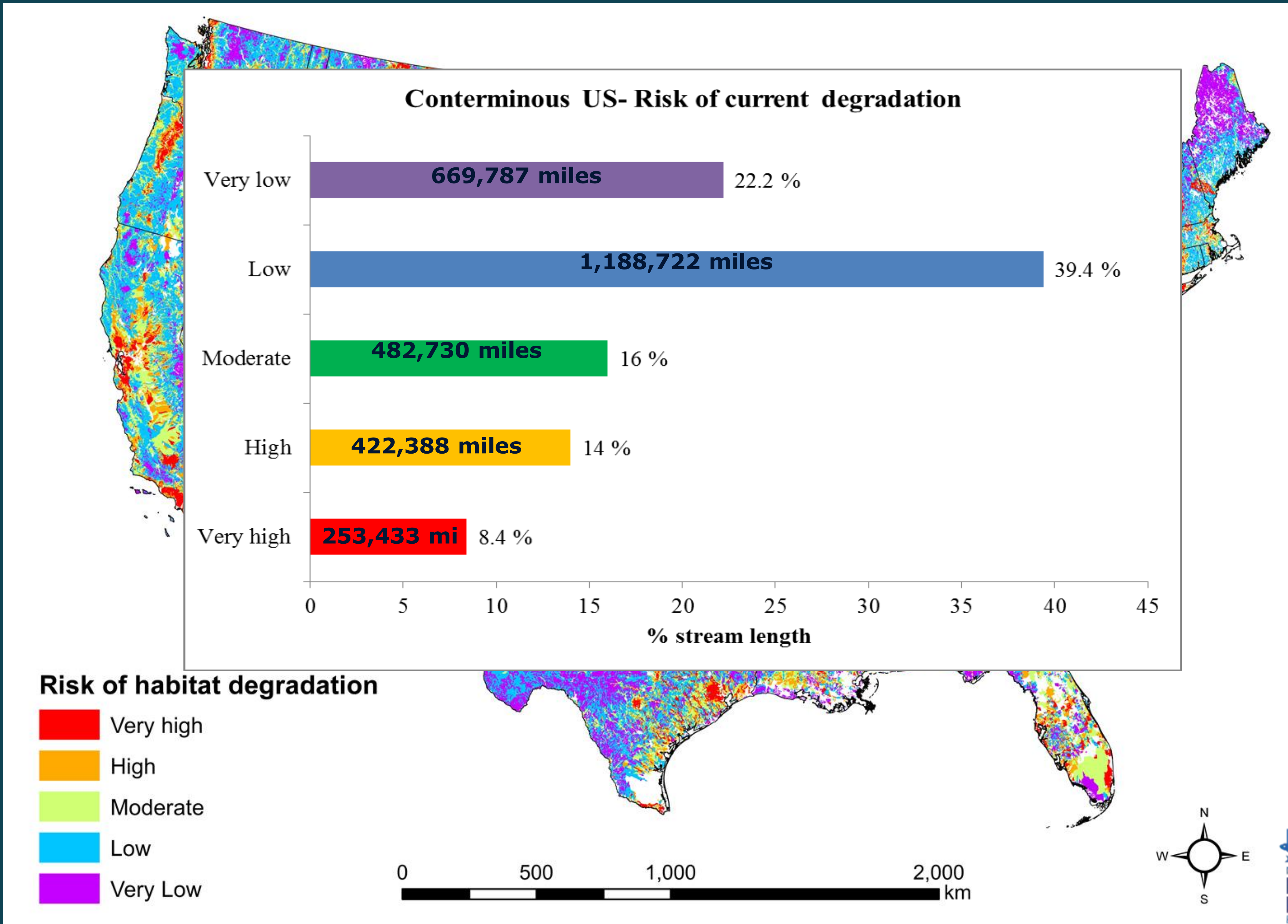
PRESENTING ASSESSMENT RESULTS

1. National-scale presentation of information (focus on conterminous US)
2. Partnership results
3. State and regional results

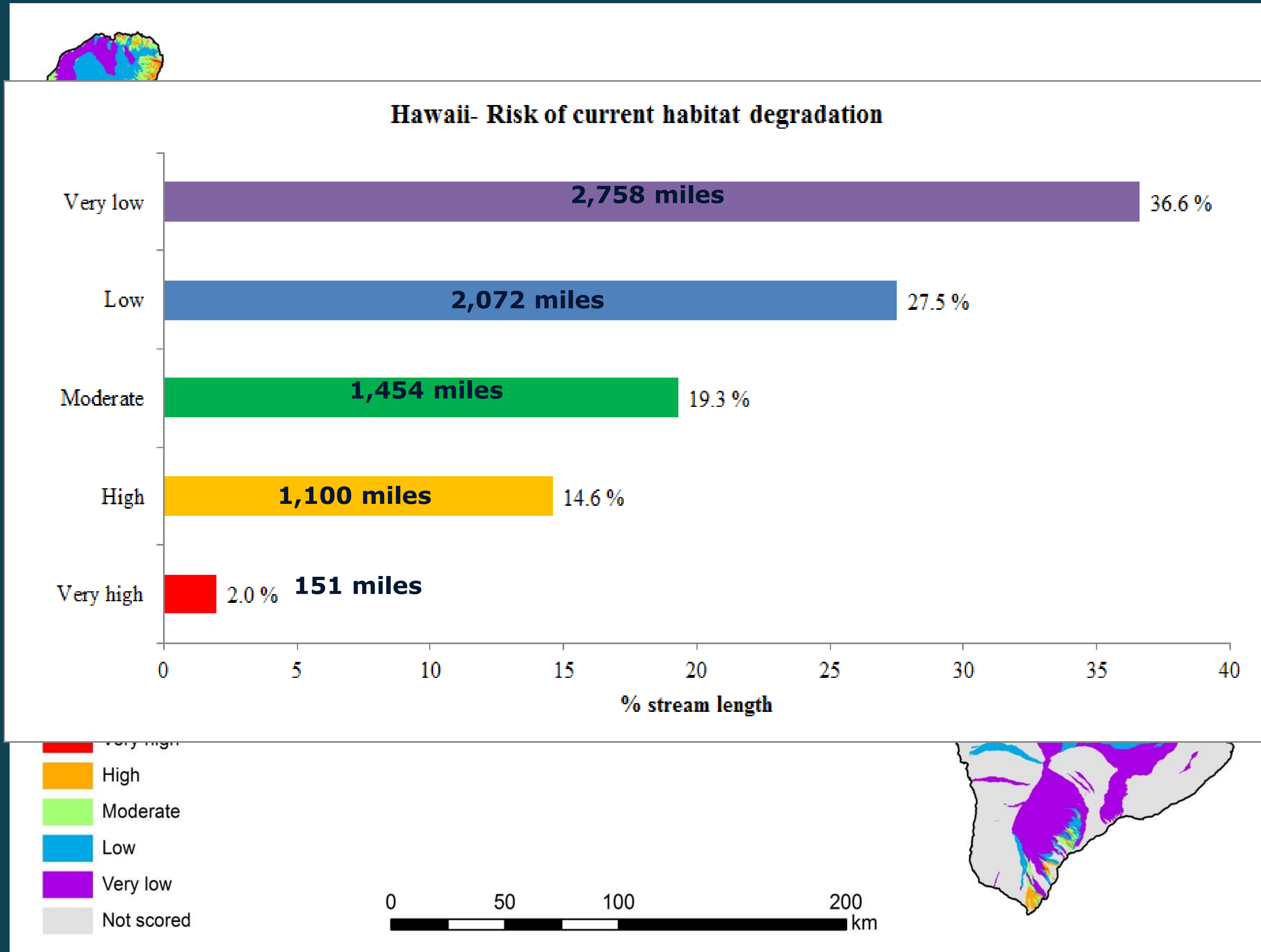
- Due to the diversity of information generated through the assessment process, next slides should be considered examples only
- Many, many options for using assessment results and data to support decision-making on where and how to prioritize actions to conserve fish habitats

1. NATIONAL-SCALE RESULTS: CONTERMINOUS US, HAWAII, AND ALASKA

2015 ASSESSMENT OF STREAM FISH HABITATS FOR THE CONTERMINOUS UNITED STATES

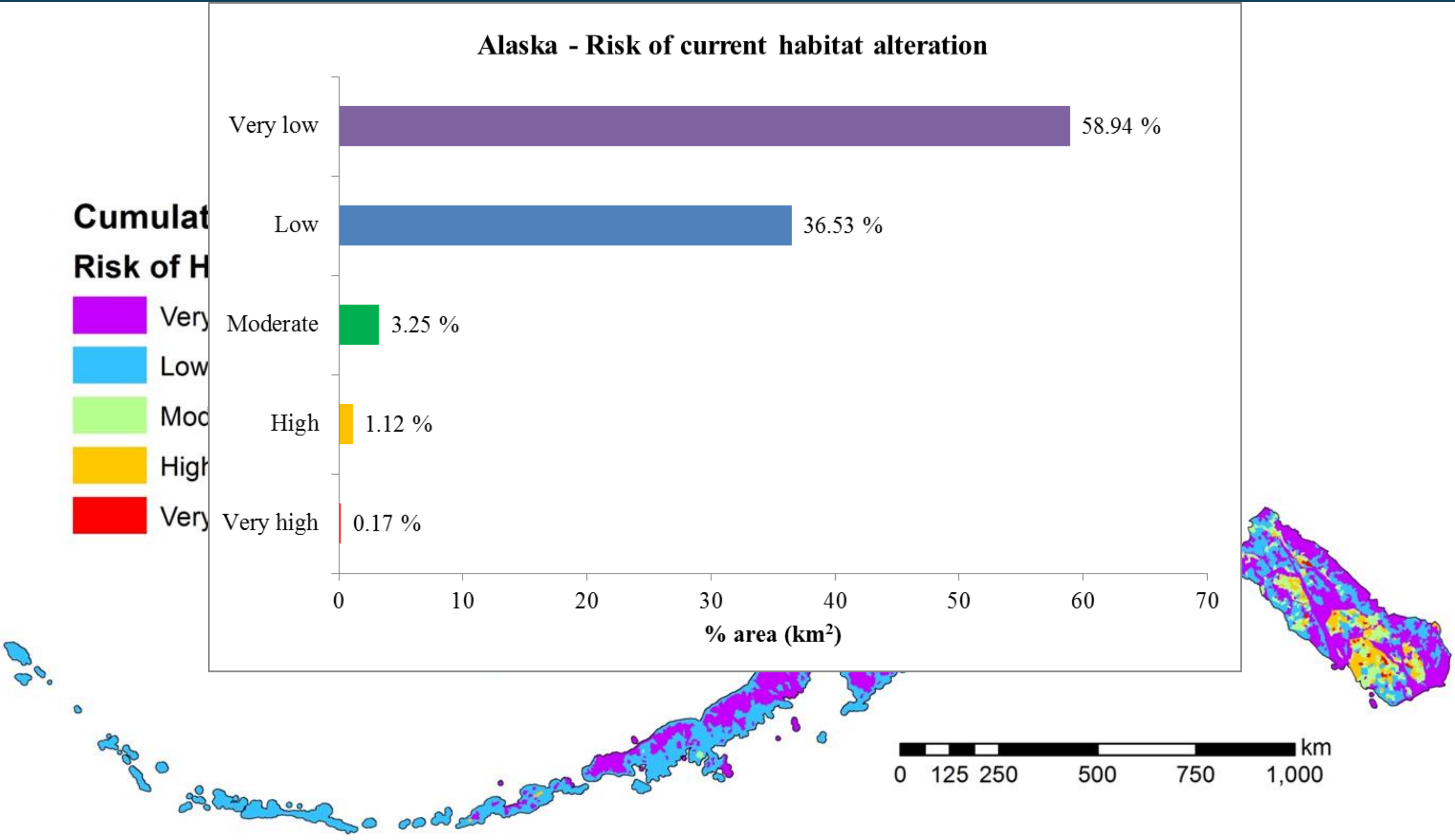


2015 ASSESSMENT OF STREAM FISH HABITATS FOR HAWAII



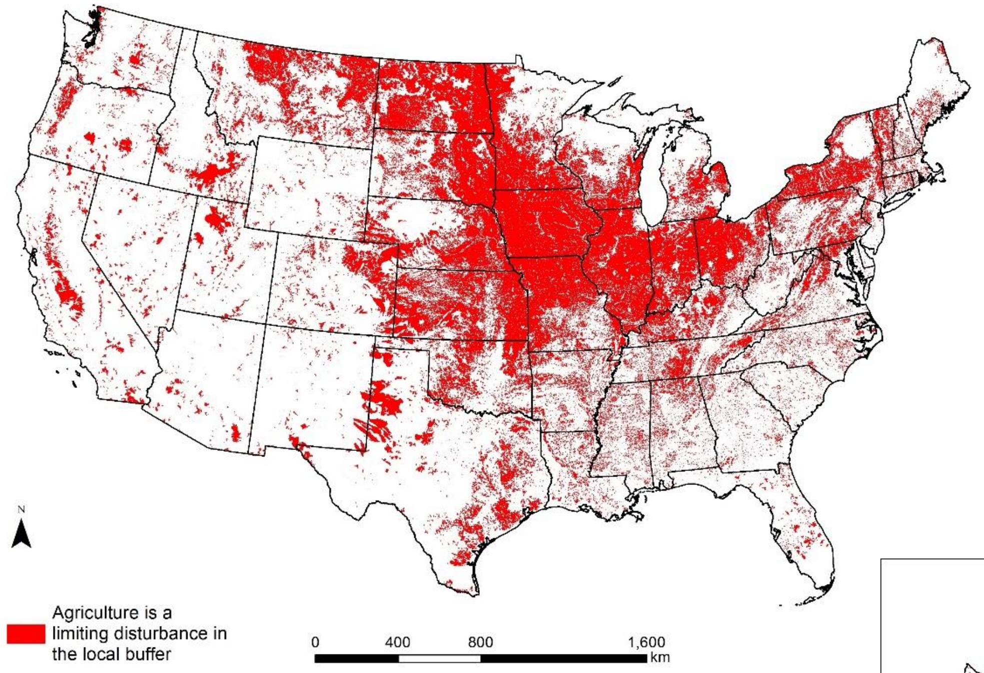
NATIONAL FISH HABITAT PARTNERSHIP

2015 ASSESSMENT OF STREAM FISH HABITATS FOR ALASKA

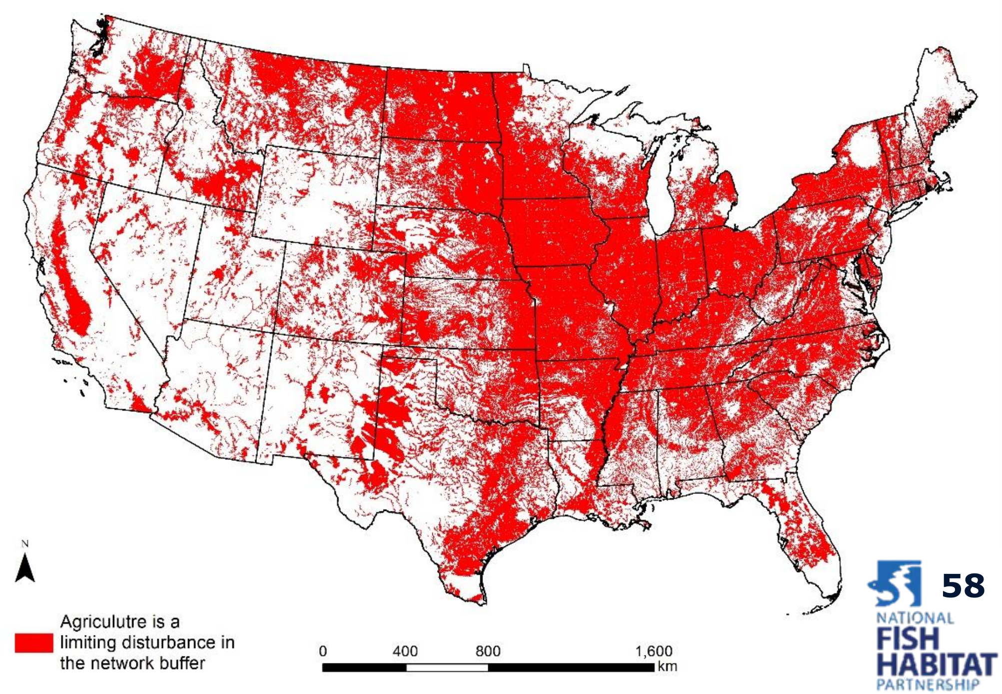


Agriculture as a limiting disturbance in local and network stream buffers

Local buffer



Network buffer



Limiting disturbance = any disturbance that results in a stream reach not being in the best condition class

NATIONAL FISH HABITAT PARTNERSHIP

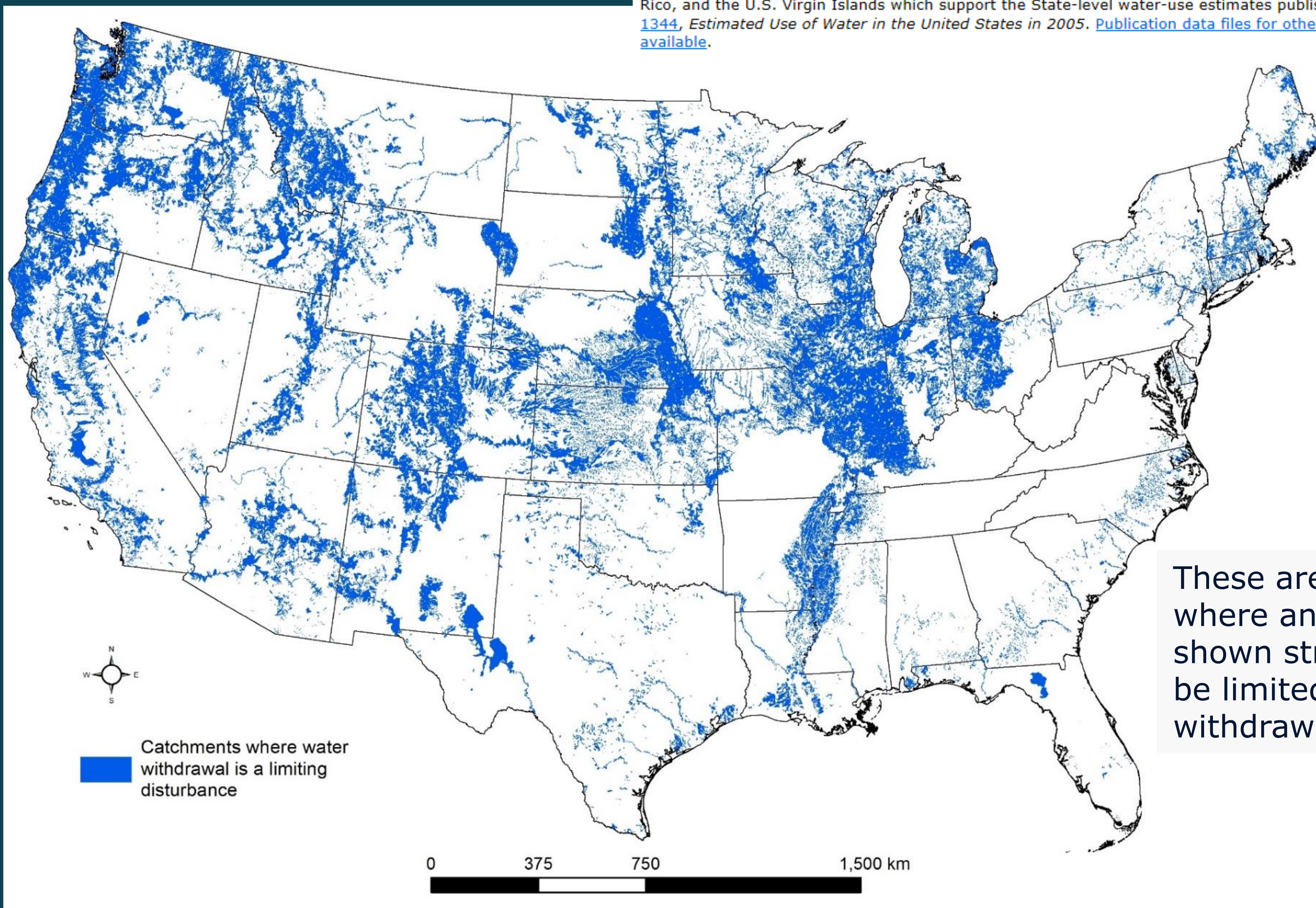
http://water.usgs.gov/watuse/data/2005/index.html

WATER WITHDRAWALS AS A LIMTING DISTURBANCE TO FISH HABITAT

Estimated Use of Water in the United States County-Level Data for 2005

The current best estimates of county, State, and national water-use data may be downloaded from the National Water Information System Web (NWISWeb) interface, Water Data for the Nation, by selecting the Water Use button or data category pull-down. Data on NWISWeb may have been revised from previous publications such as Circular 1344.

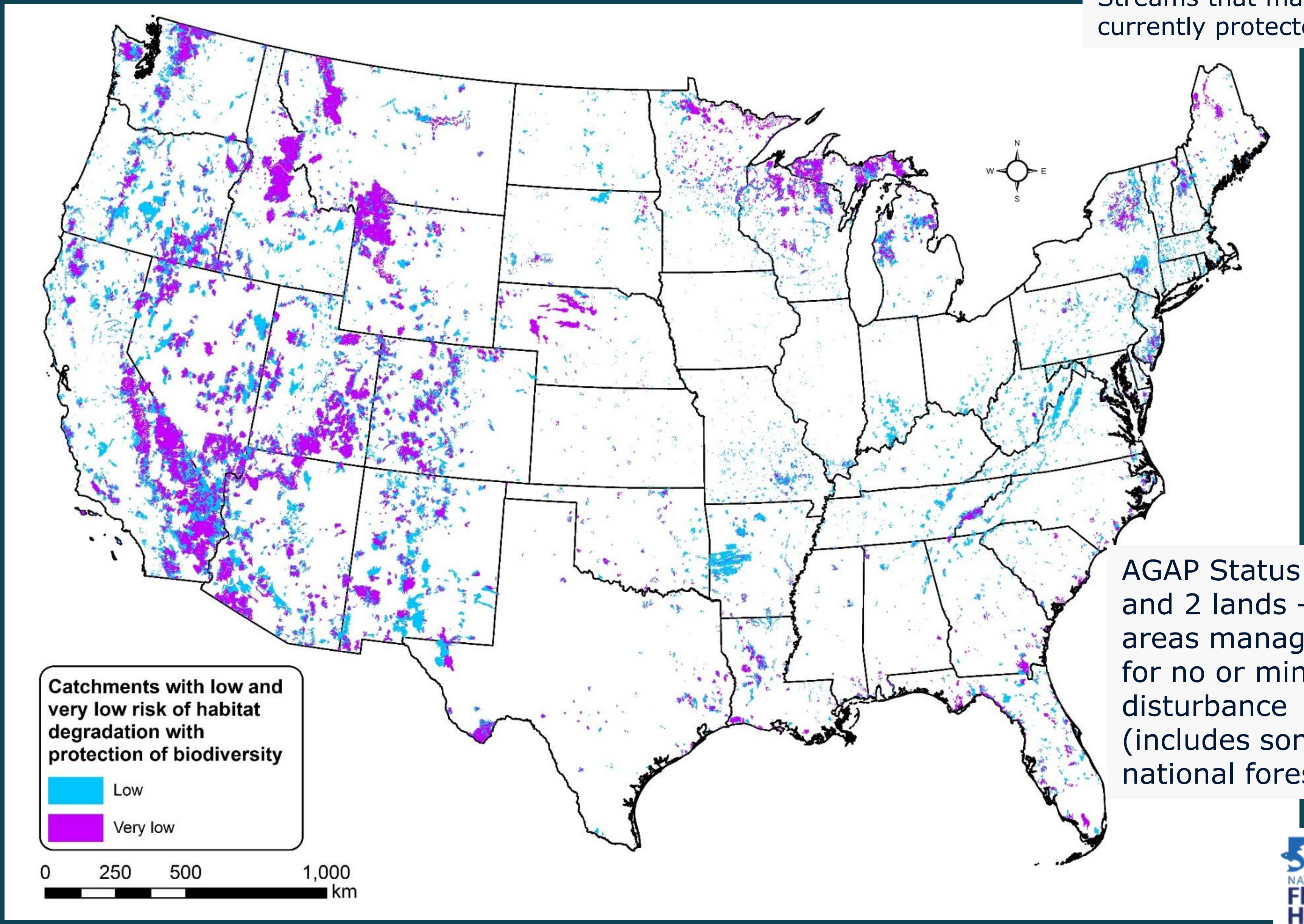
These data files present water-use estimates by county for the United States, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands which support the State-level water-use estimates published in USGS Circular 1344, *Estimated Use of Water in the United States in 2005*. Publication data files for other 5-year reports are also available.



These are locations where analyses have shown streams may be limited by withdrawals

LOW RISK OF HABITAT DEGRADATION AND LARGE AMOUNTS OF PROTECTED LANDS IN CATCHMENTS

Streams that may be currently protected

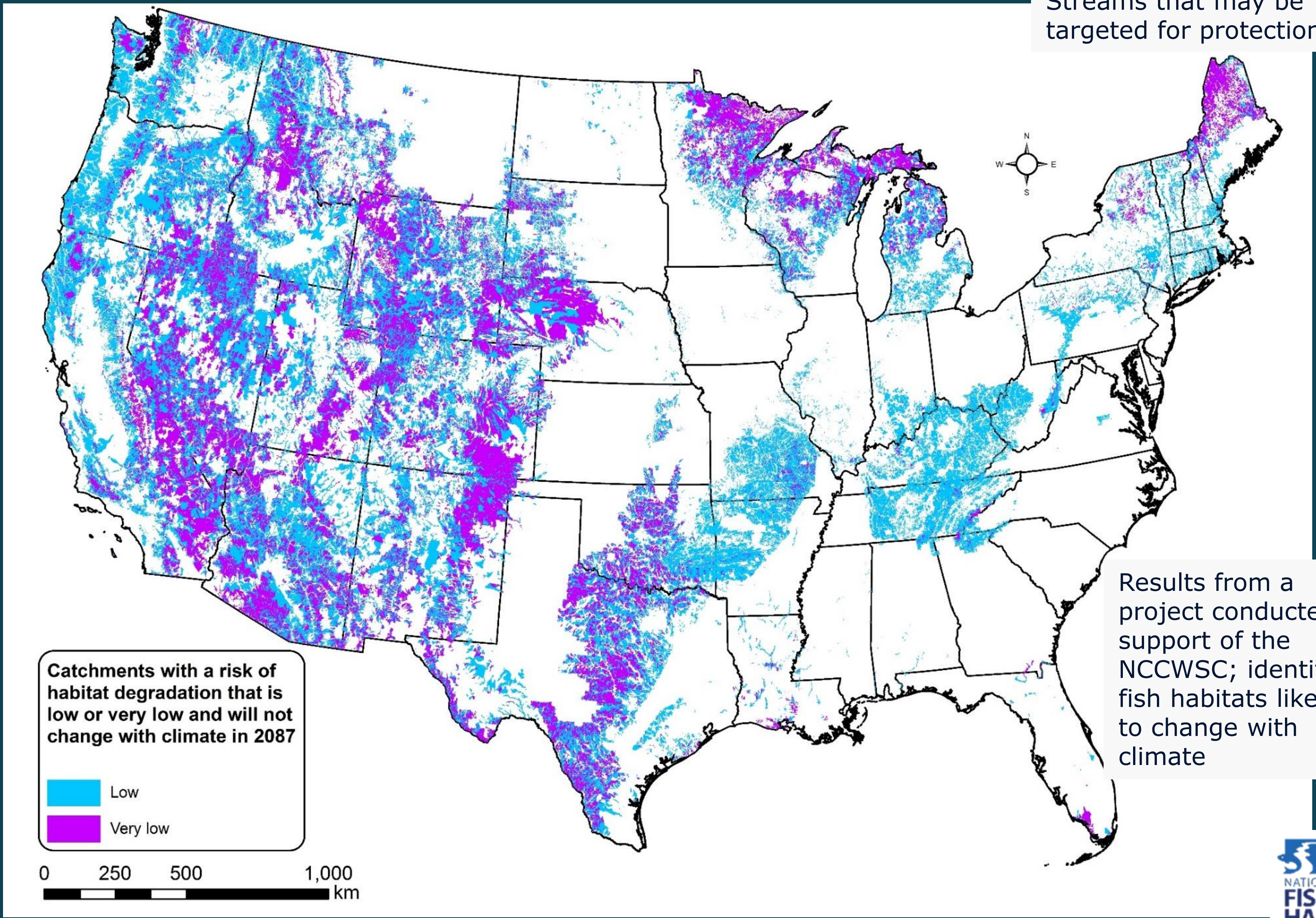


AGAP Status 1 and 2 lands – areas managed for no or minimal disturbance (includes some national forests)

NATIONAL FISH HABITAT PARTNERSHIP

LOW RISK OF HABITAT DEGRADATION AND NOT LIKELY TO CHANGE WITH CLIMATE BY 2087

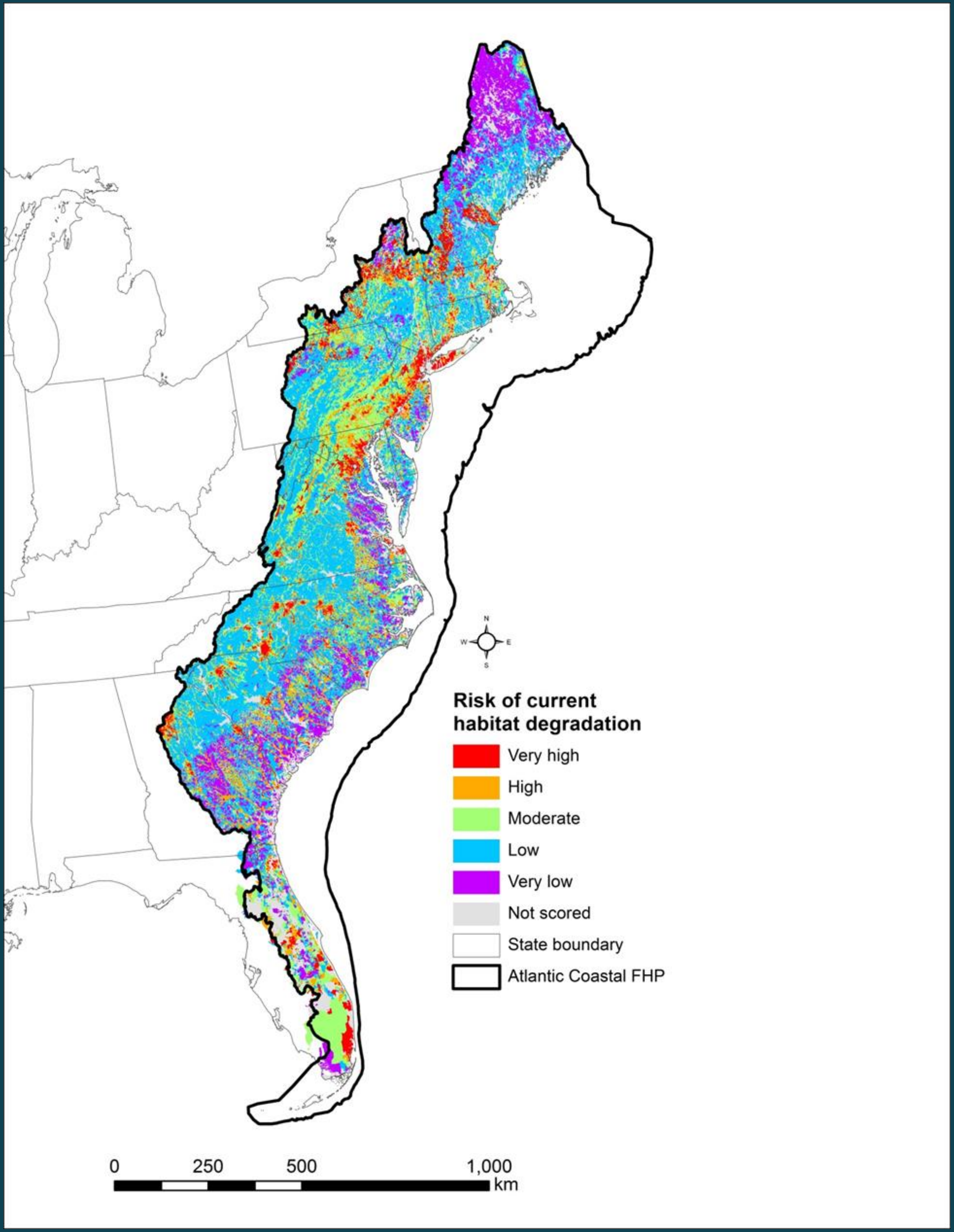
Streams that may be targeted for protection

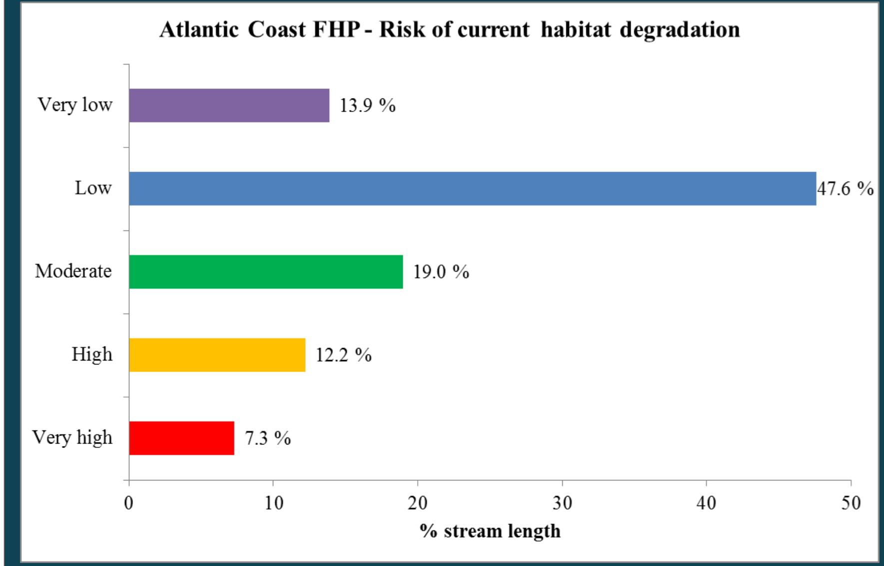


Results from a project conducted in support of the NCCWSC; identified fish habitats likely to change with climate

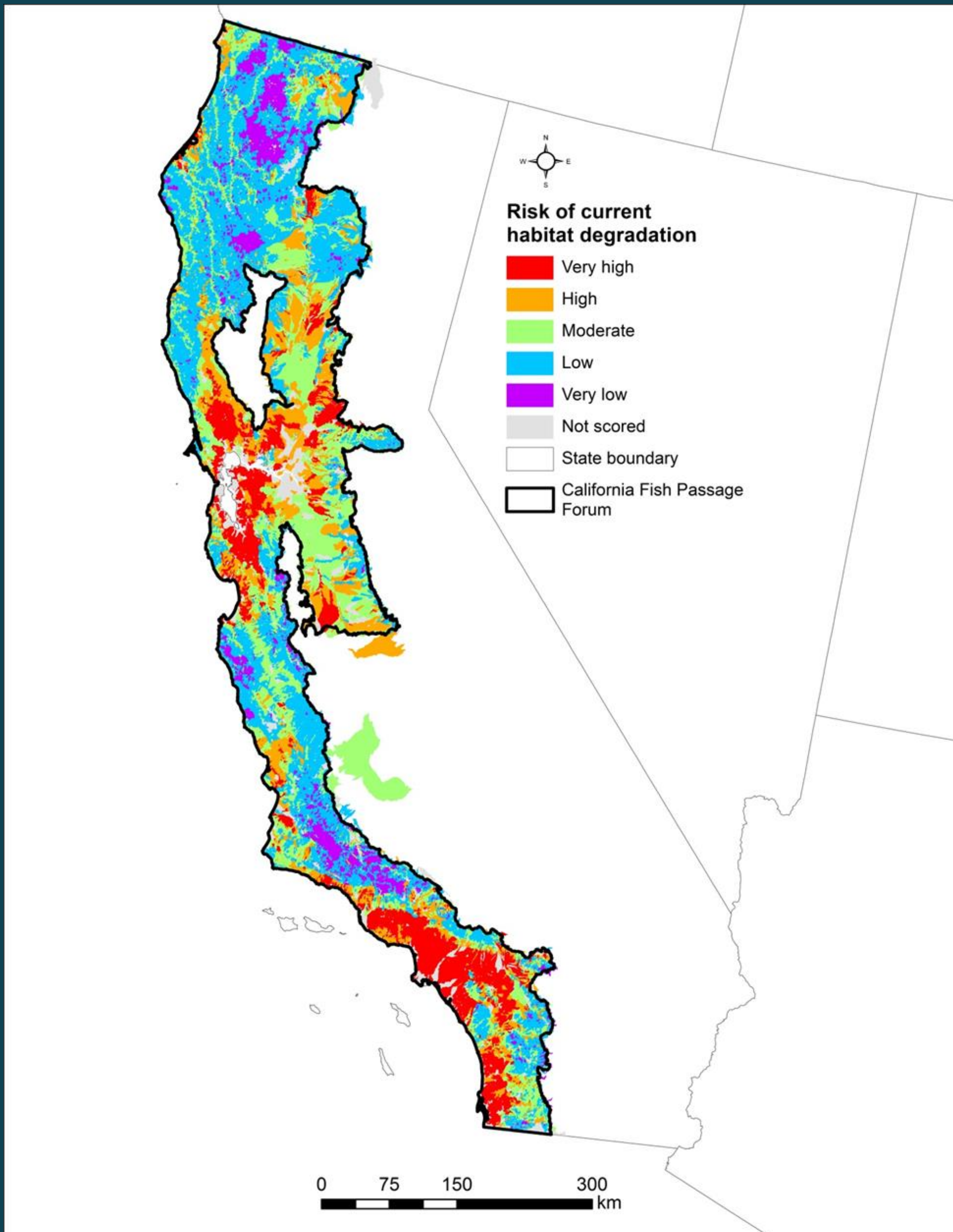
2. PARTNERSHIP-LEVEL RESULTS

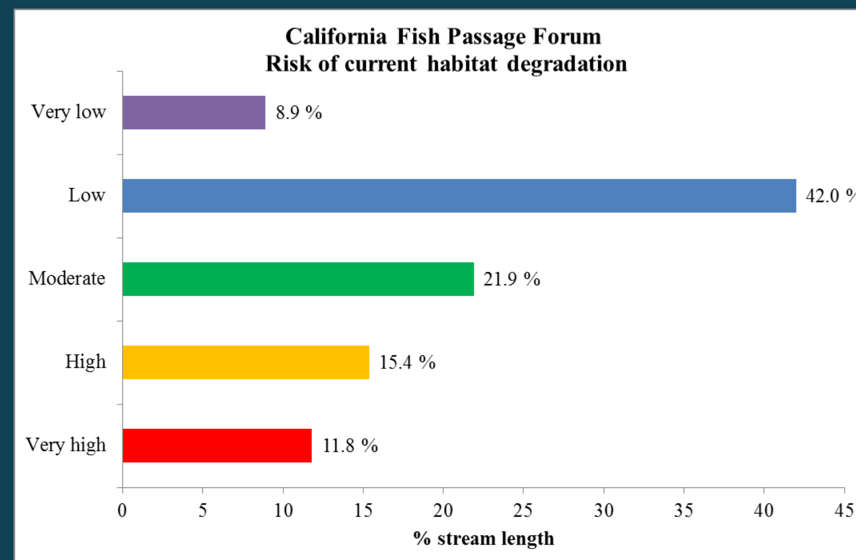
ATLANTIC COAST FISH HABITAT PARTNERSHIP



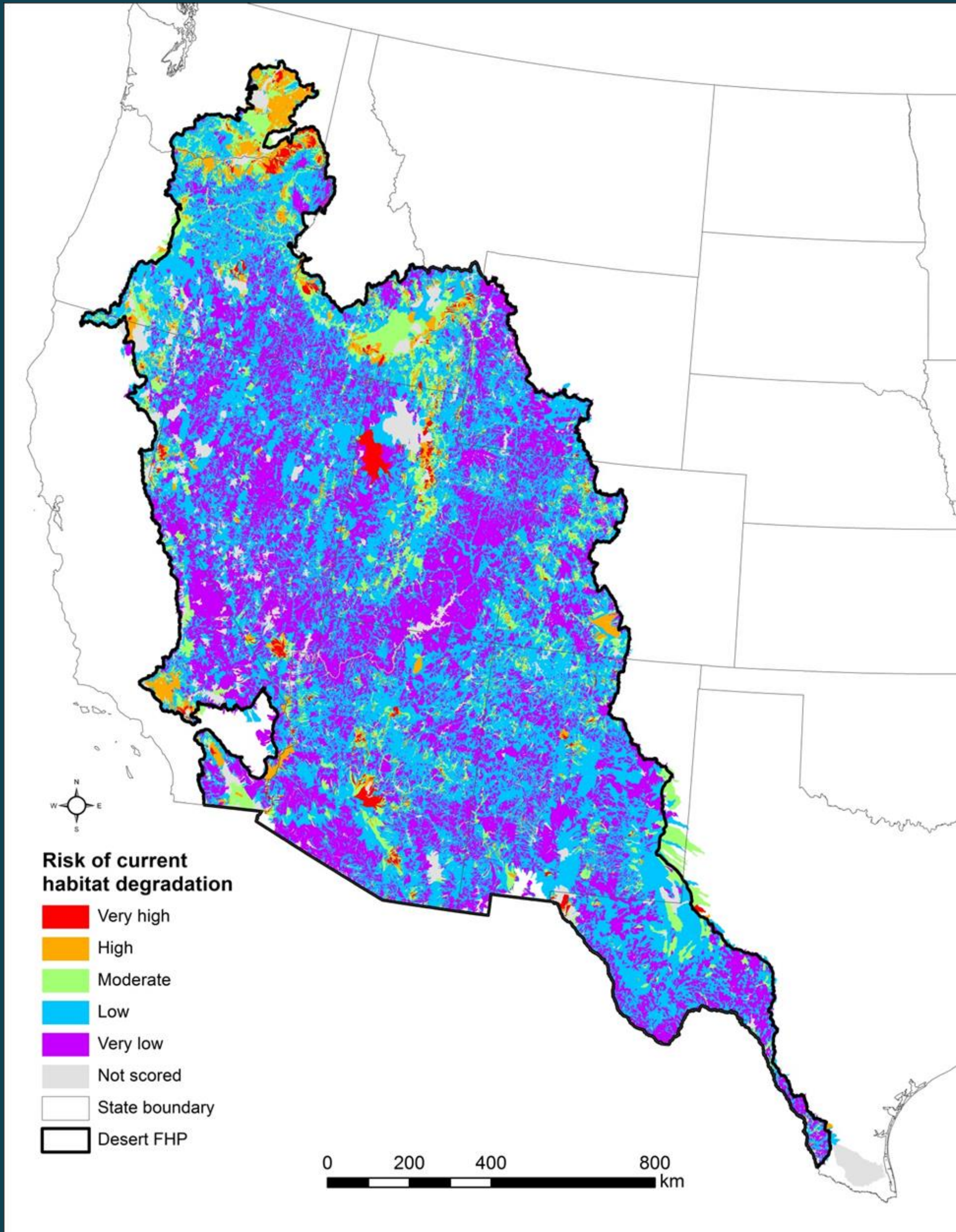


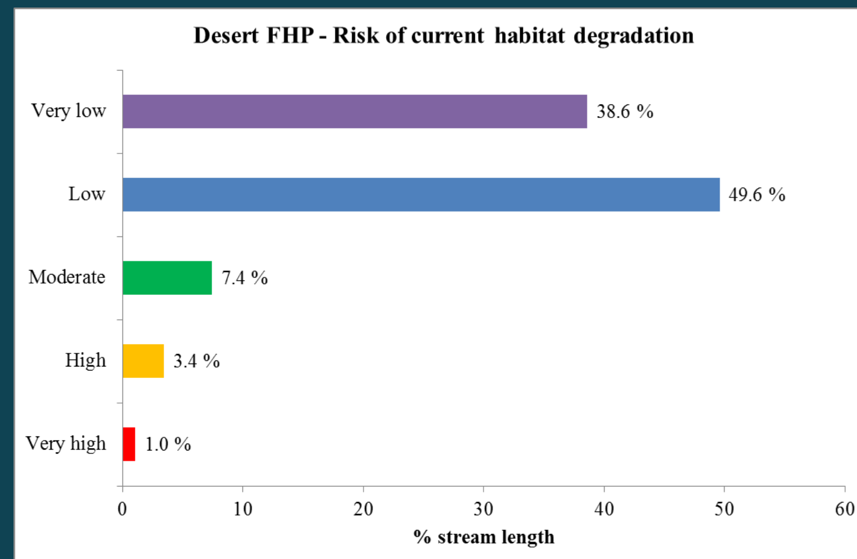
CALIFORNIA FISH PASSAGE FORUM



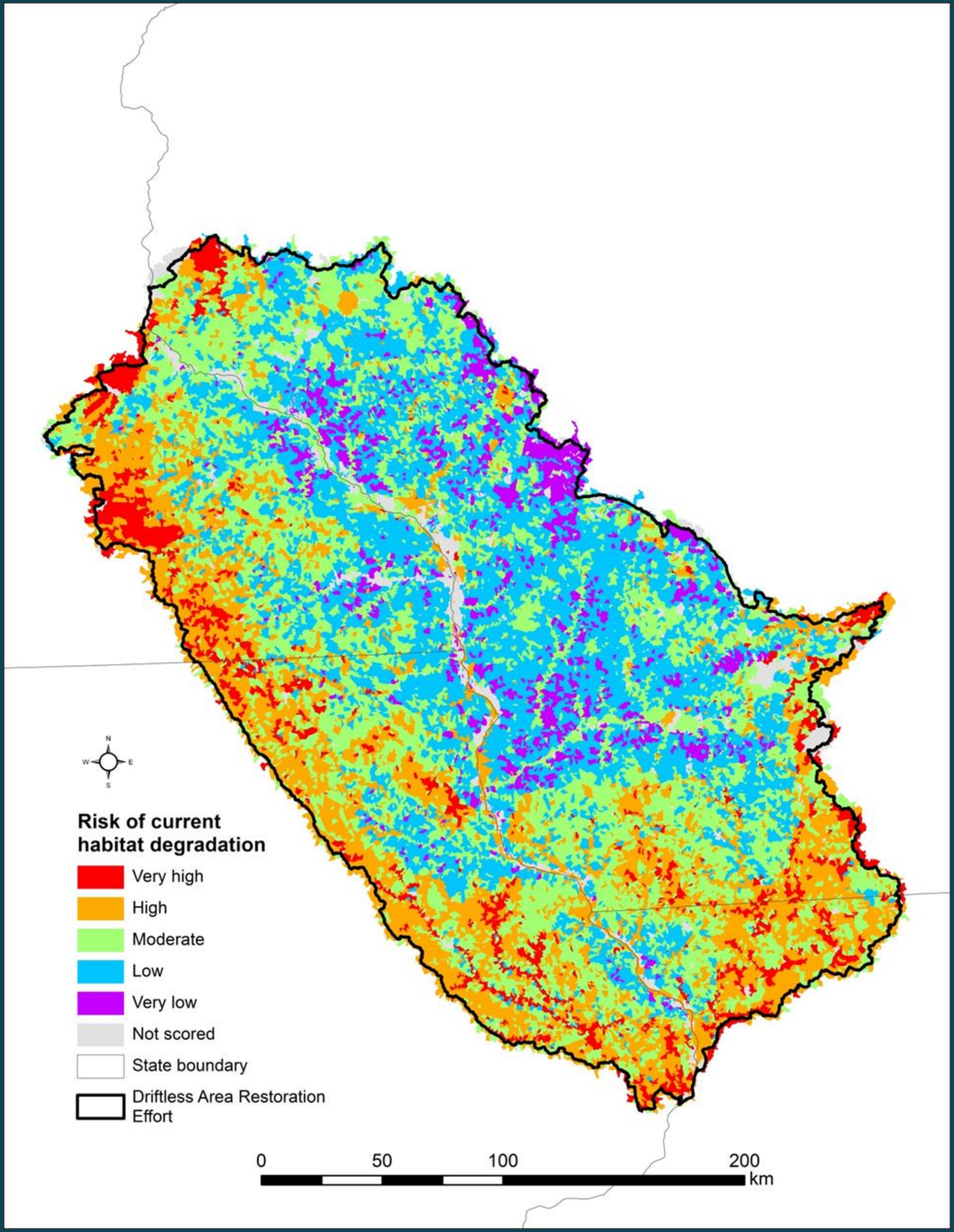


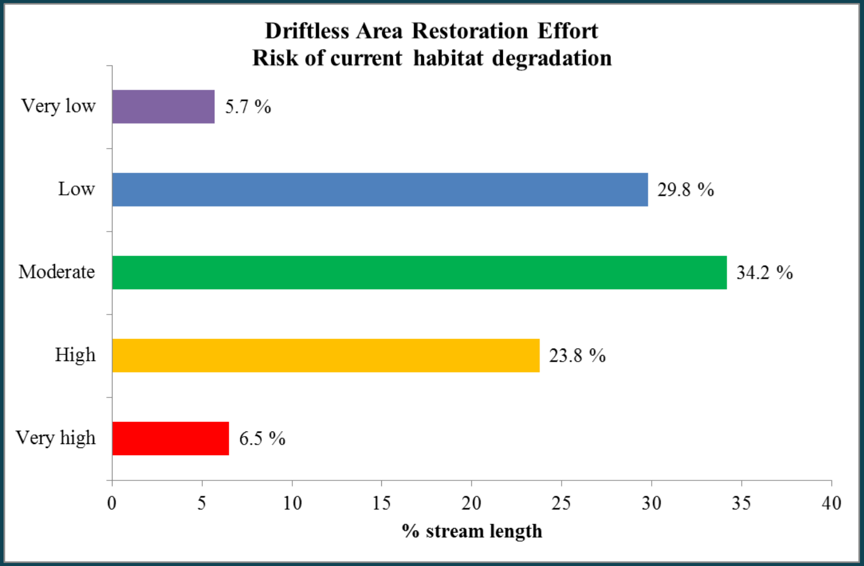
DESERT FISH HABITAT PARTNERSHIP





DRIFTLESS AREA RESTORATION EFFORT

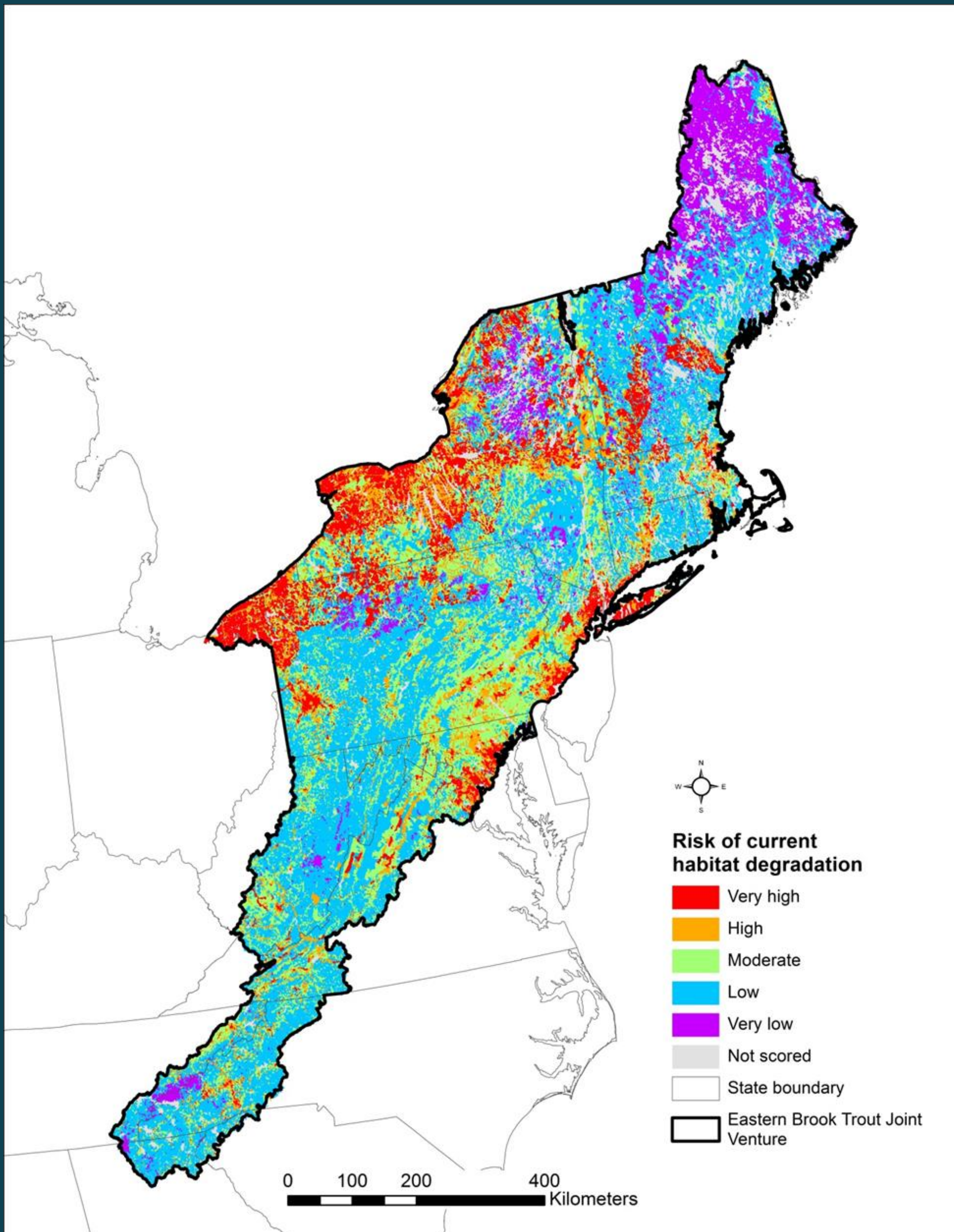


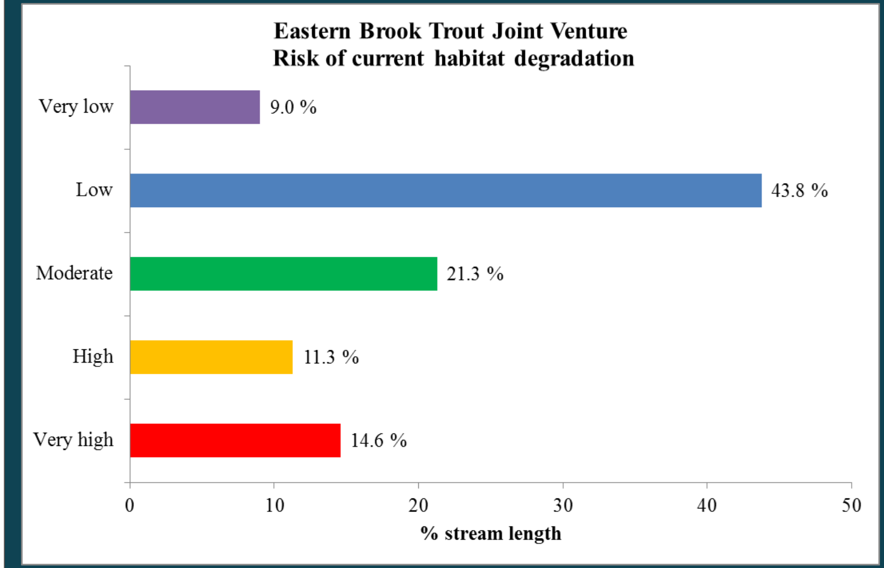


NATIONAL FISH HABITAT PARTNERSHIP

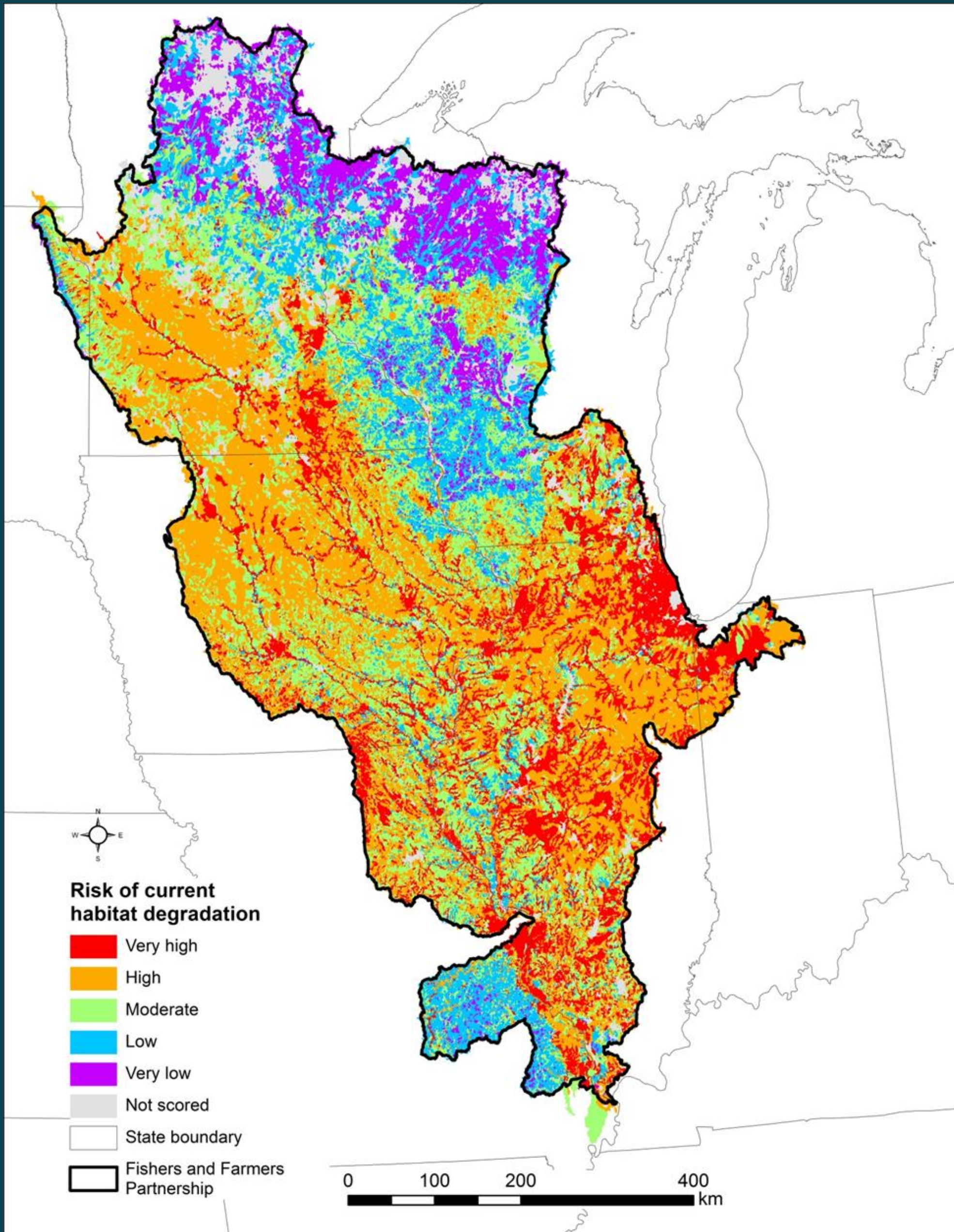
EASTERN BROOK TROUT JOINT VENTURE

Eastern Brook Trout
JOINT VENTURE
A Fish Habitat Partnership

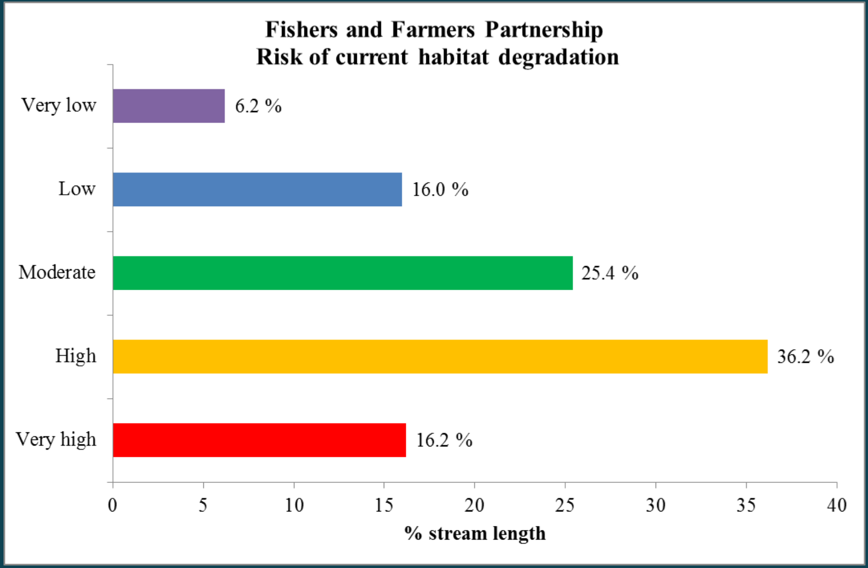




FISHERS AND FARMERS PARTNERSHIP

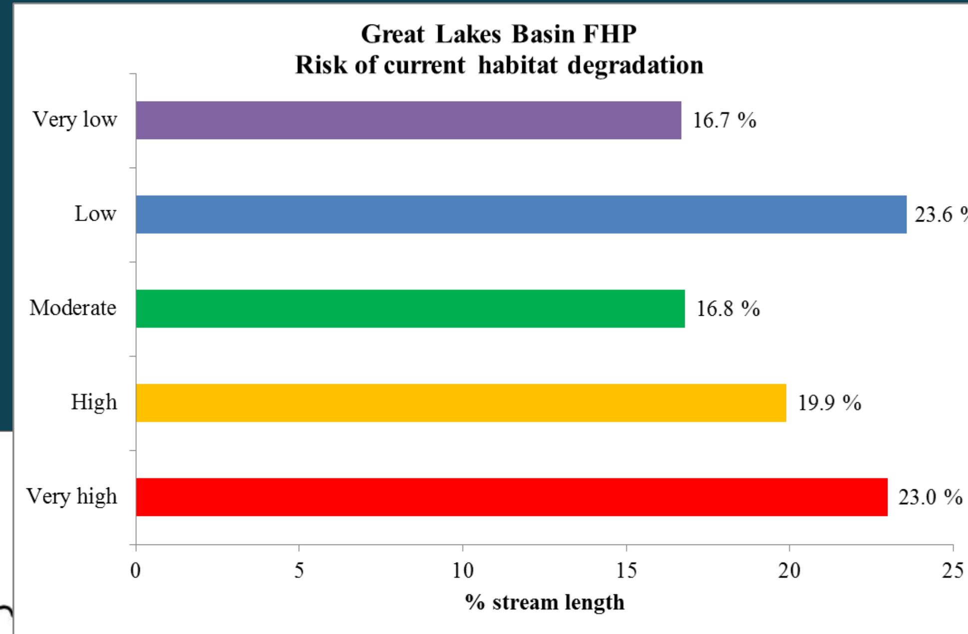


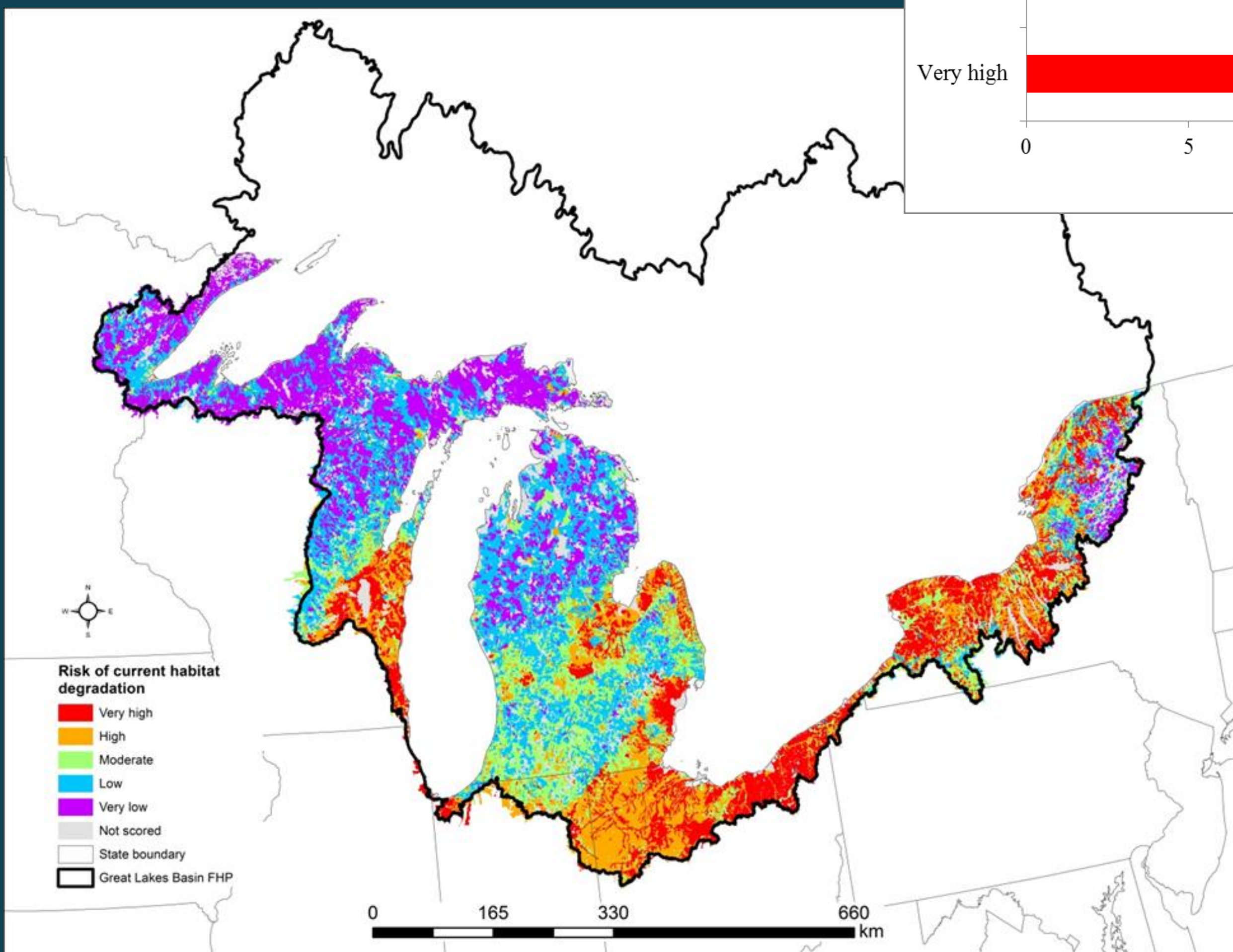
Fishers & Farmers Partnership for the Upper Mississippi River Basin



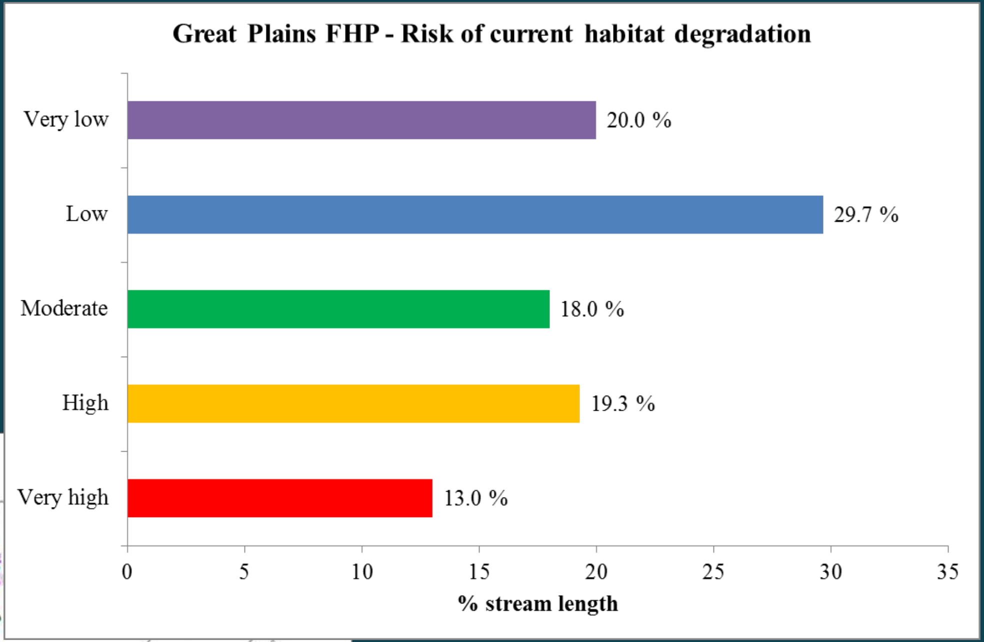
NATIONAL FISH HABITAT PARTNERSHIP

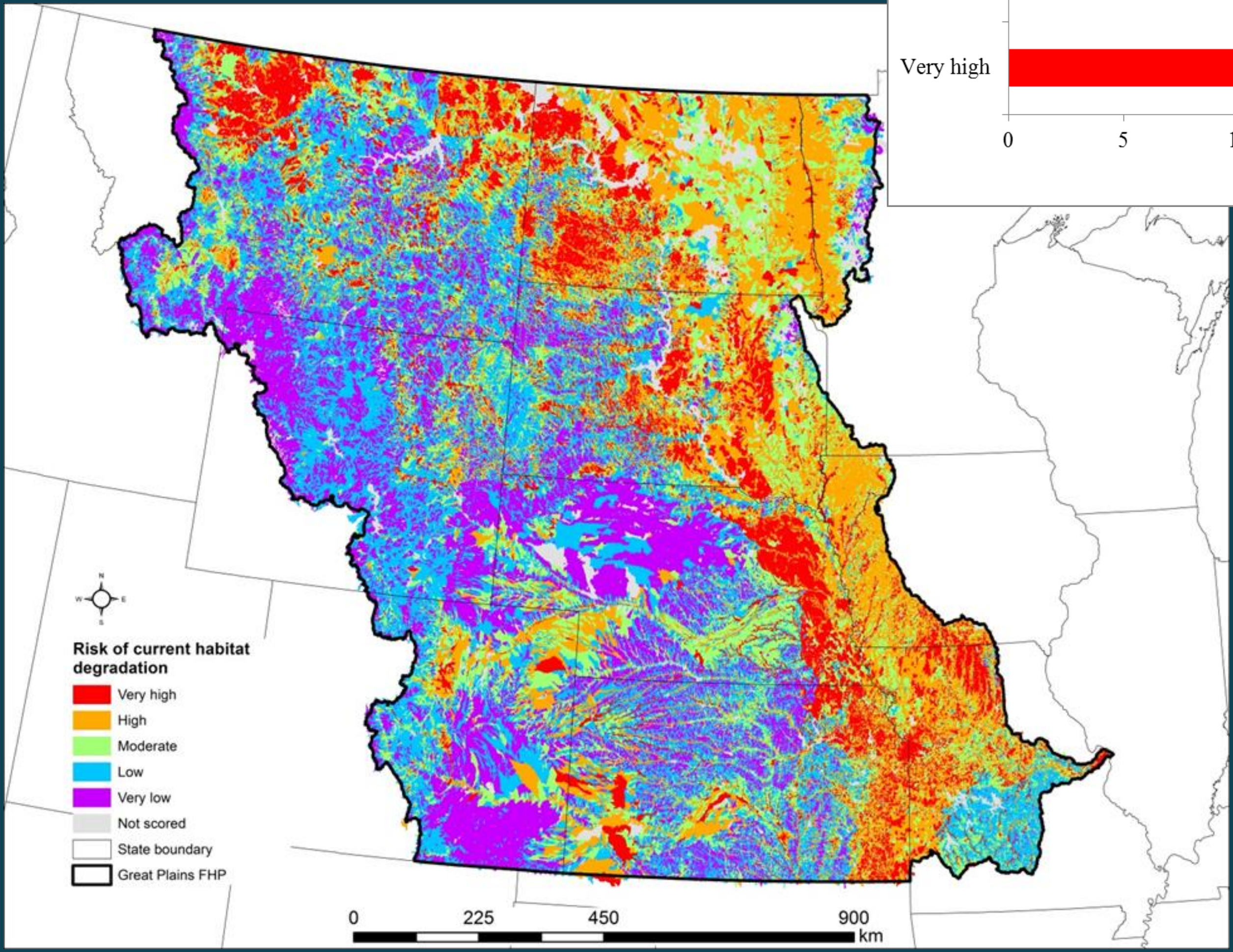
GREAT LAKES BASIN FISH HABITAT PARTNERSHIP



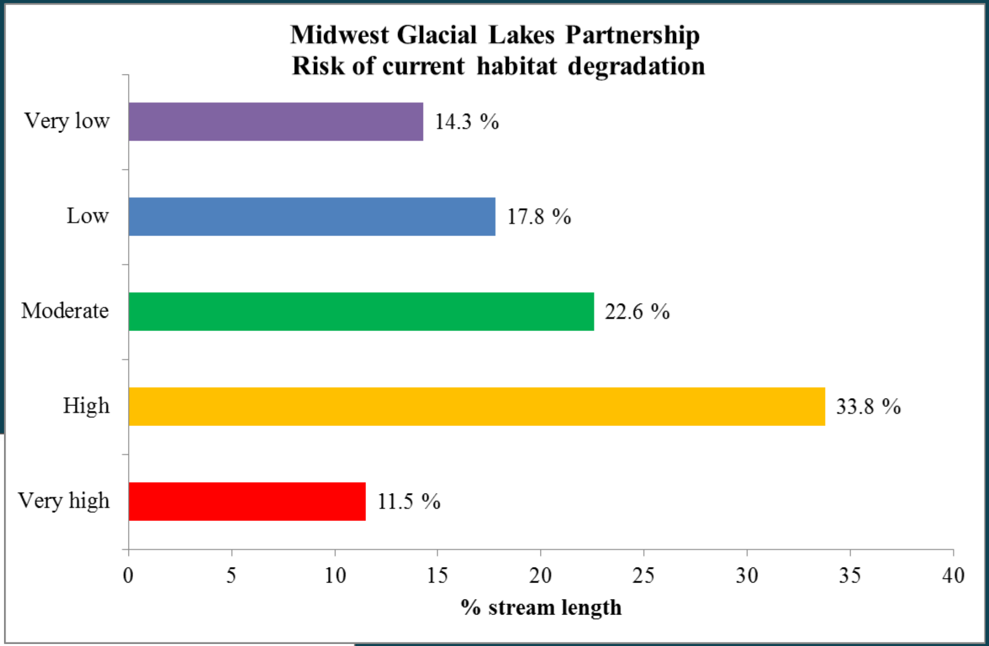


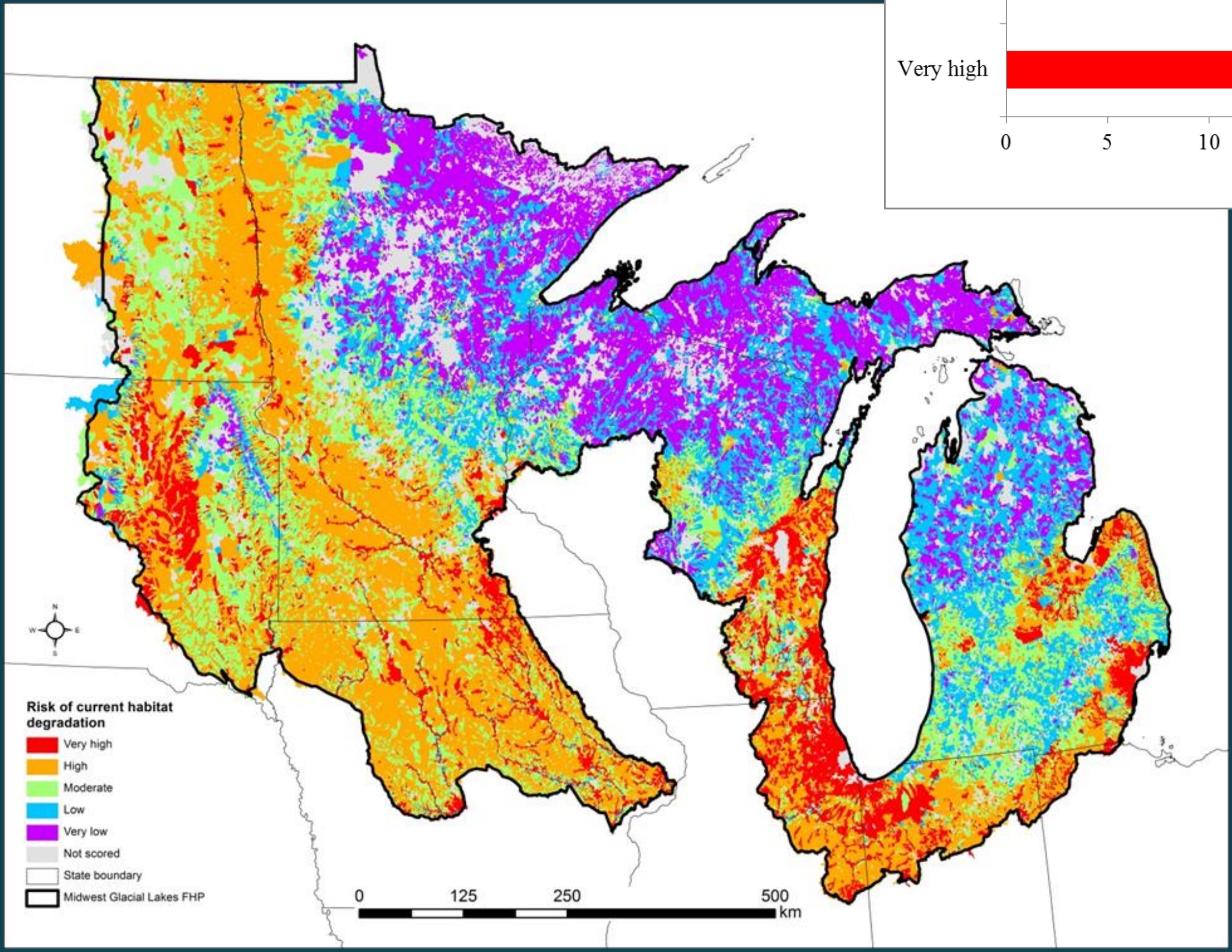
GREAT PLAINS FISH HABITAT PARTNERSHIP



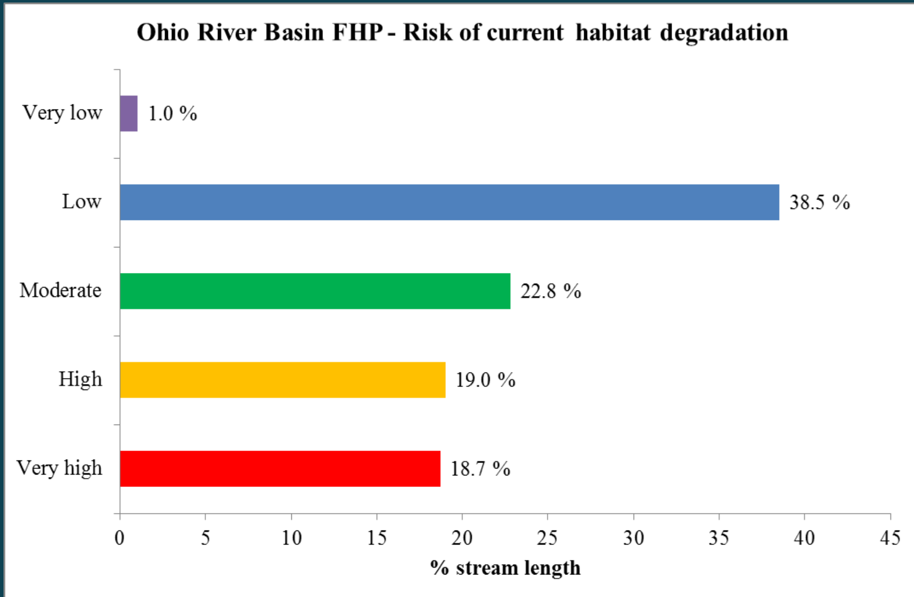


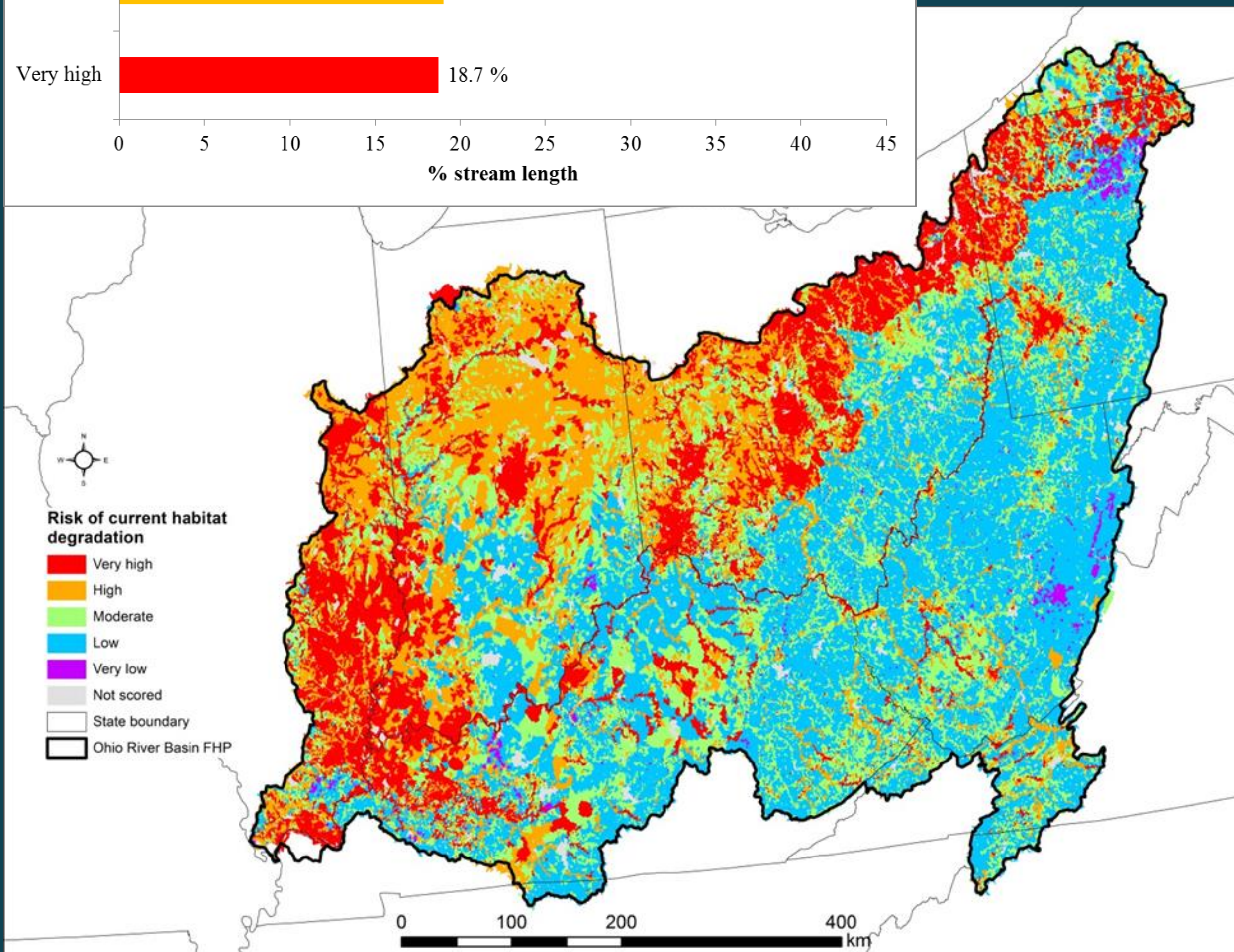
MIDWEST GLACIAL LAKES PARTNERSHIP



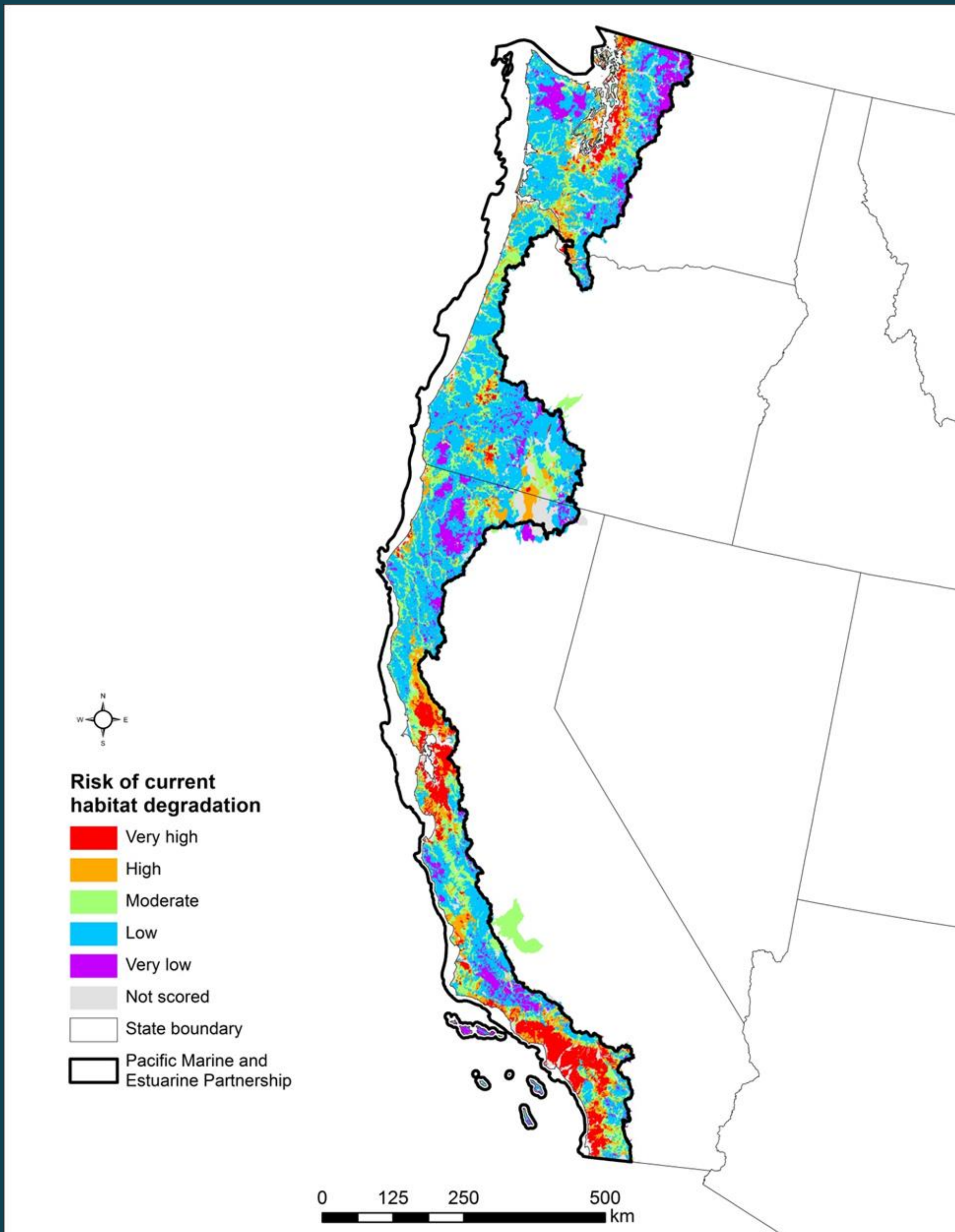


OHIO RIVER BASIN FISH HABITAT PARTNERSHIP

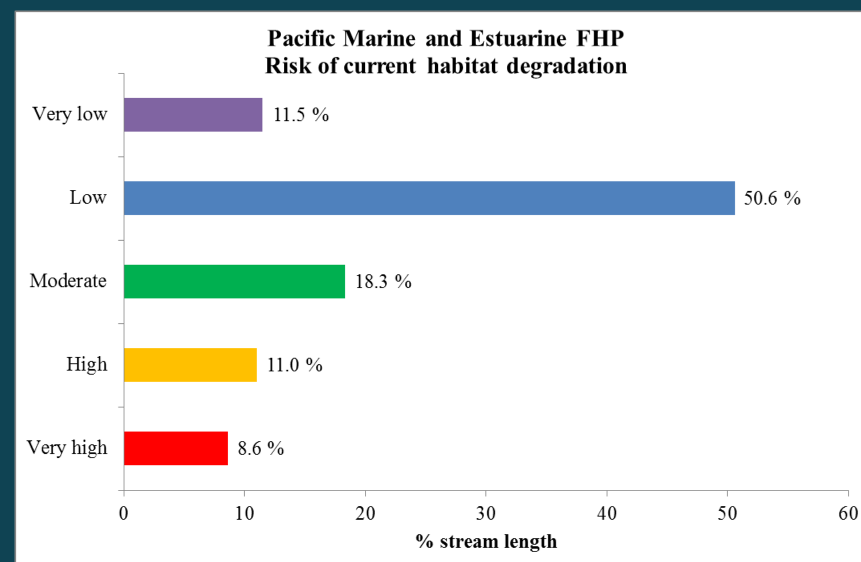




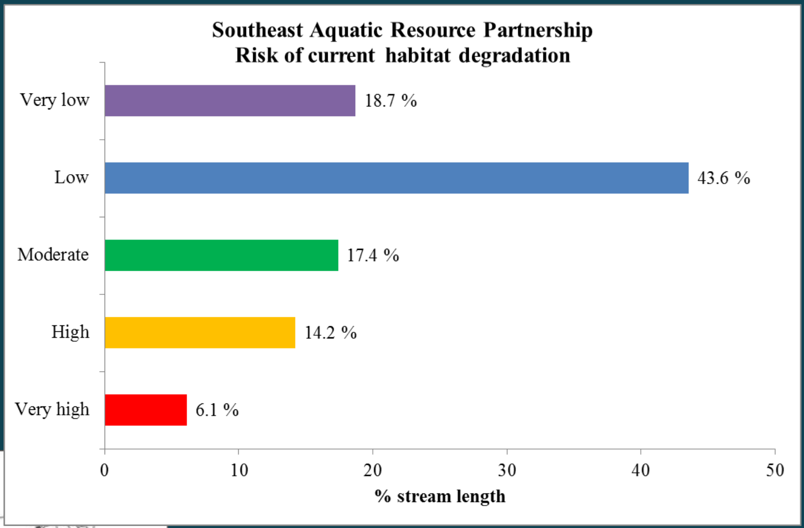
PACIFIC MARINE AND ESTUARINE FISH HABITAT PARTNERSHIP

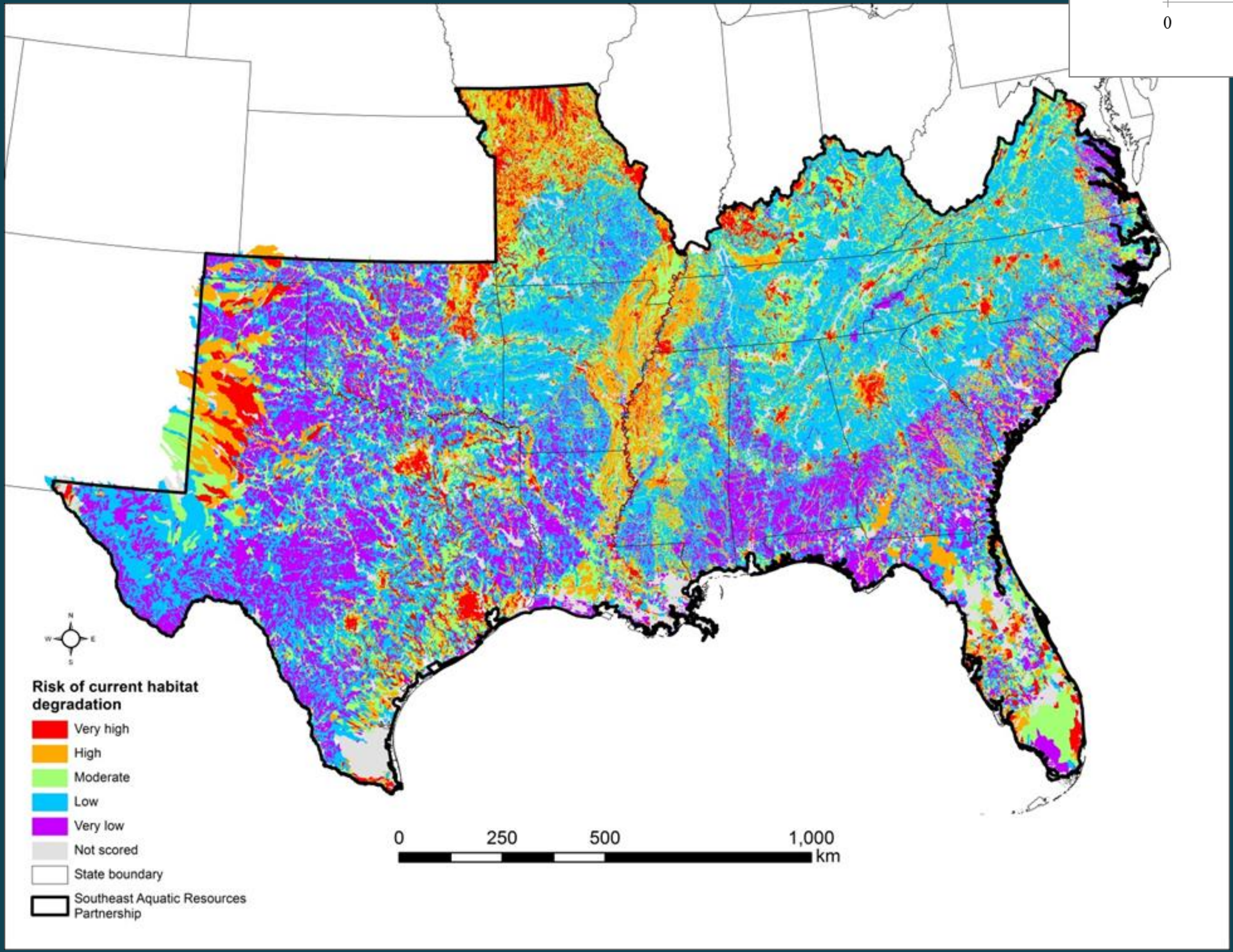


Pacific Marine & Estuarine Fish Habitat Partnership



SOUTHEAST AQUATIC RESOURCES PARTNERSHIP

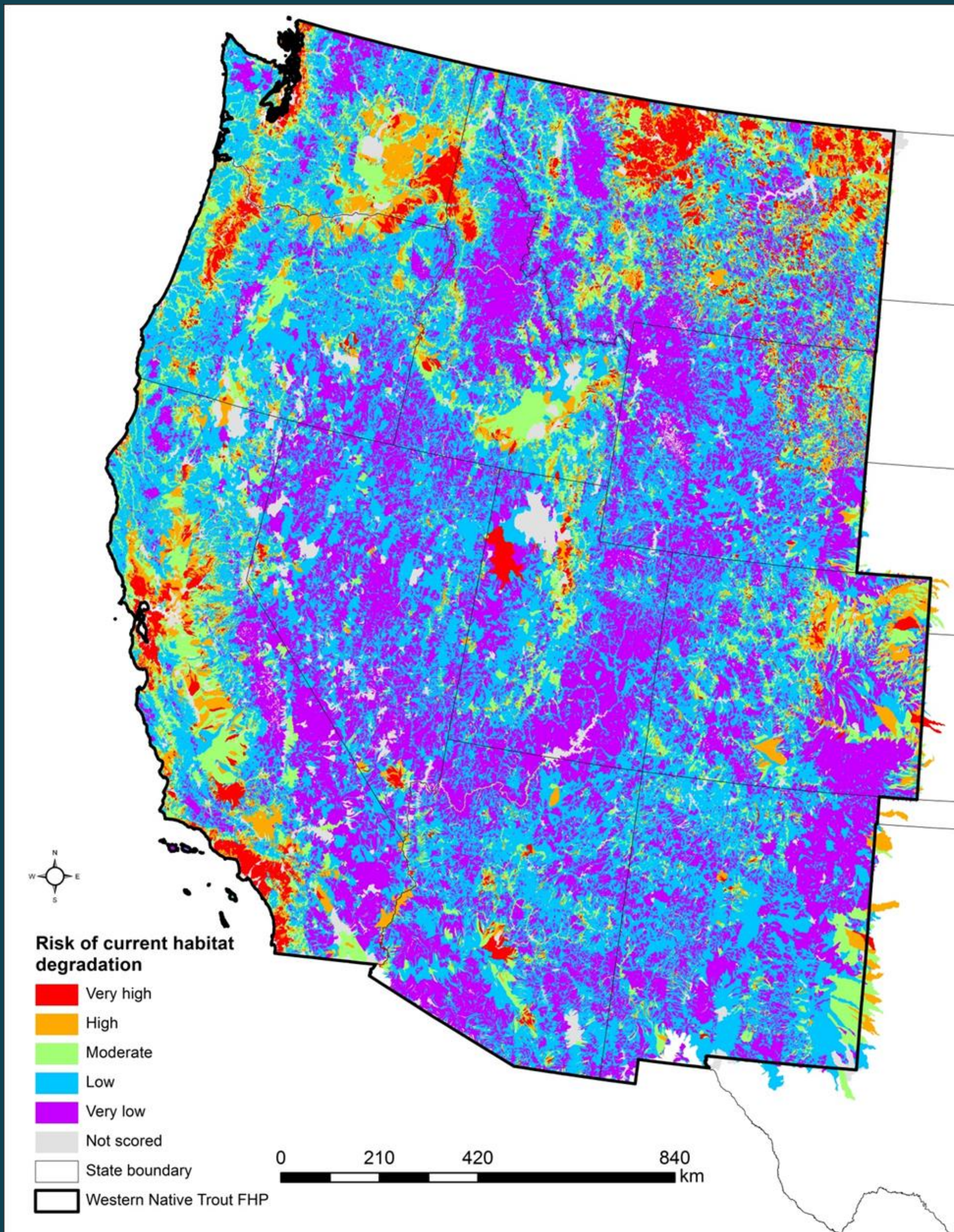




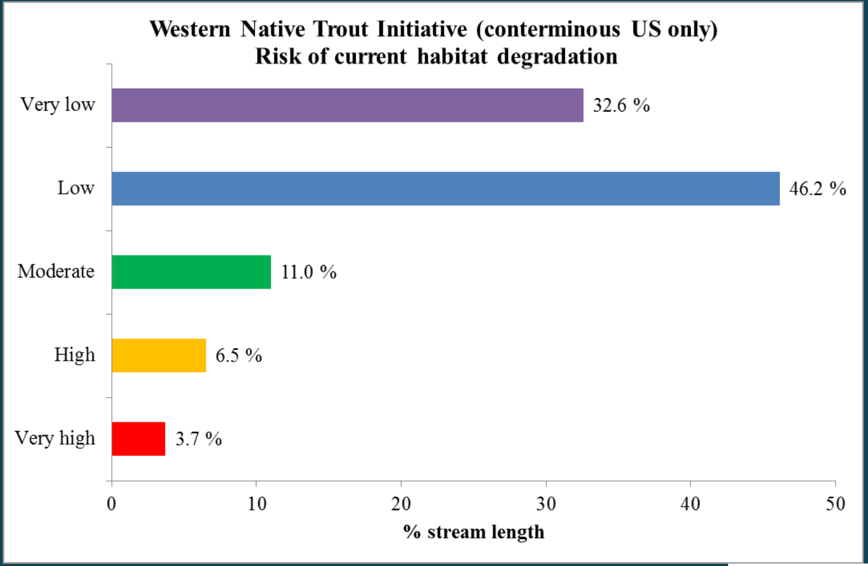
SOUTHEAST AQUATIC RESOURCES PARTNERSHIP
SARP

NATIONAL FISH HABITAT PARTNERSHIP

WESTERN NATIVE TROUT INITIATIVE

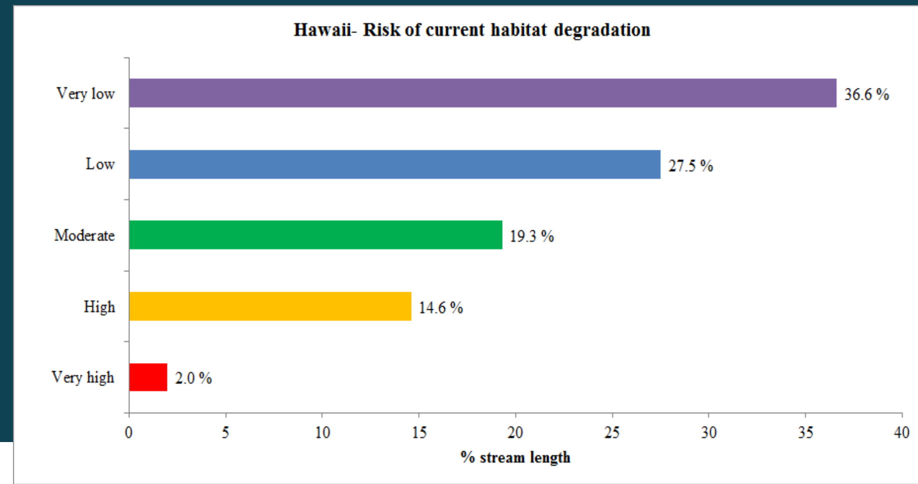


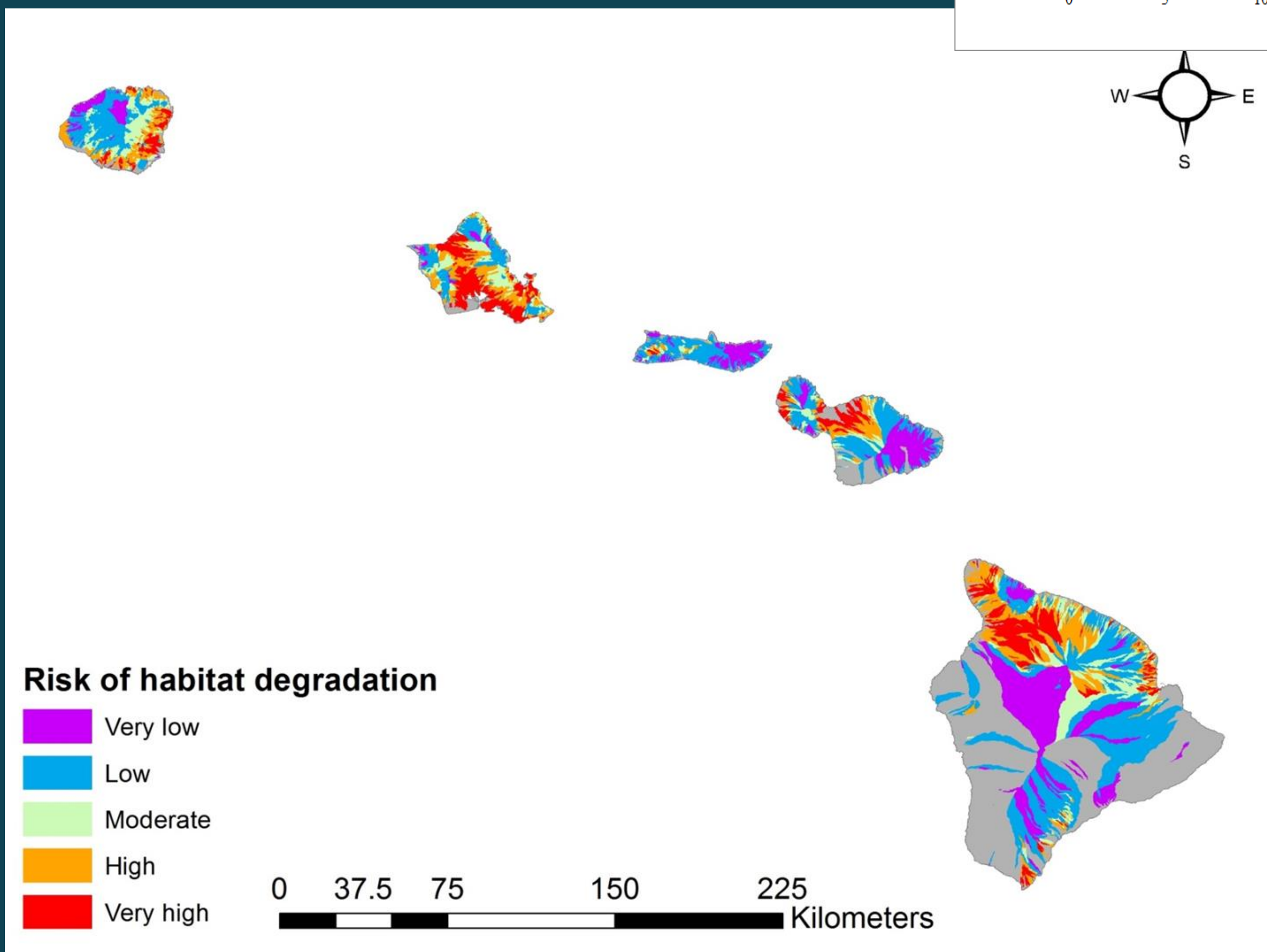
WESTERN NATIVE TROUT INITIATIVE



NATIONAL FISH HABITAT PARTNERSHIP

HAWAII FISH HABITAT PARTNERSHIP

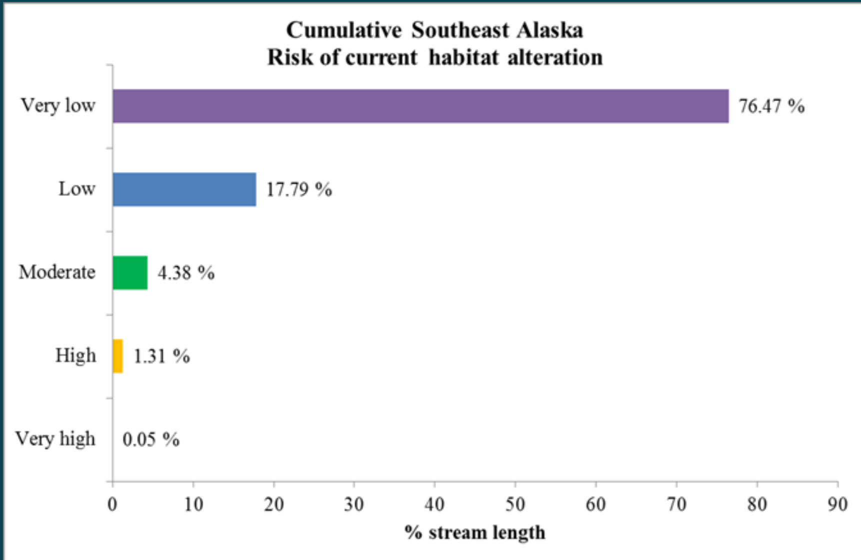


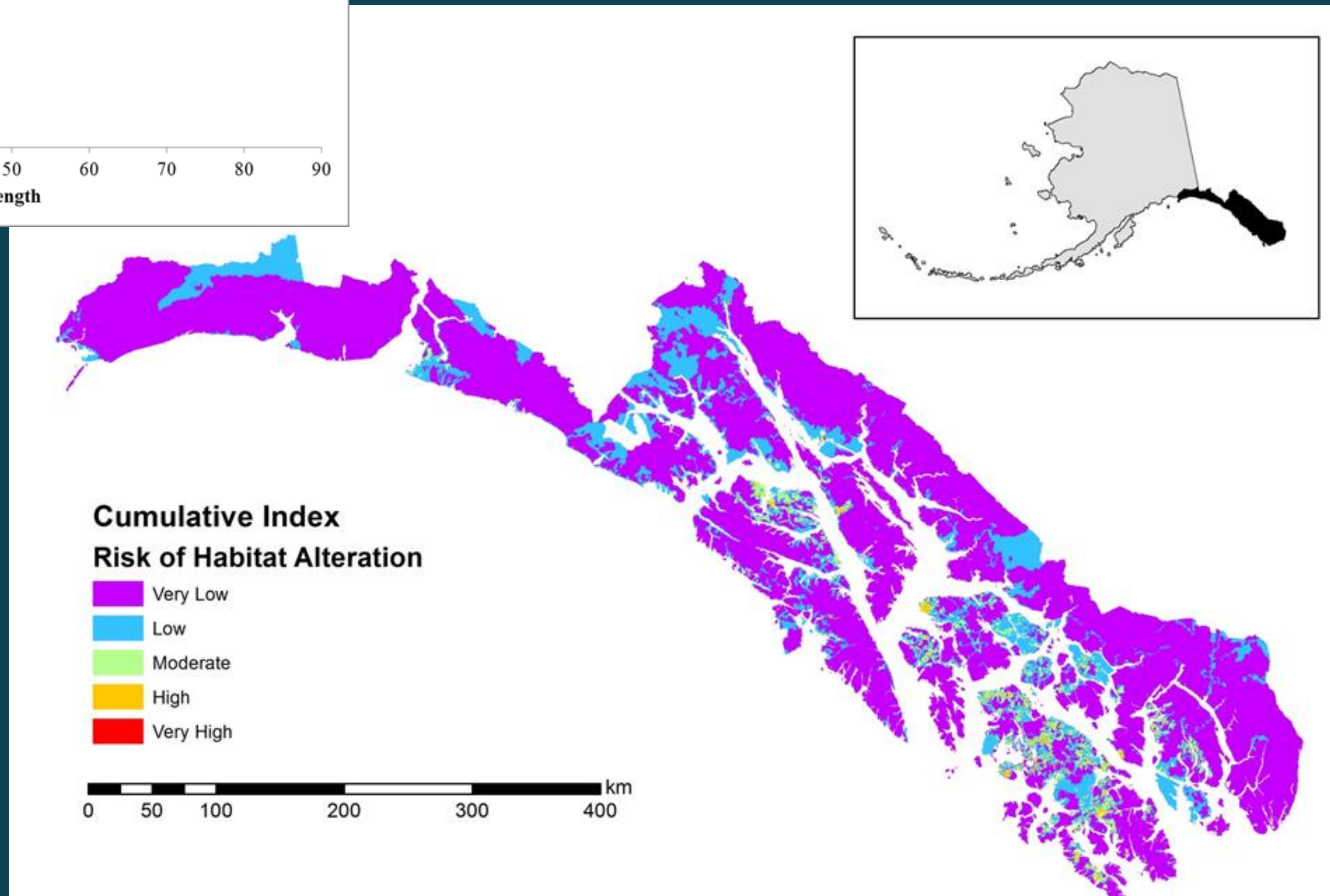


HAWAII FISH HABITAT PARTNERSHIP

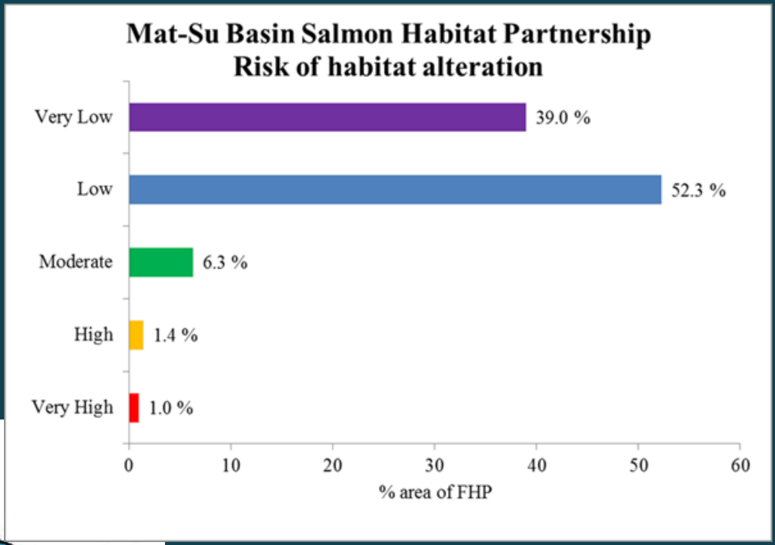
NATIONAL FISH HABITAT PARTNERSHIP

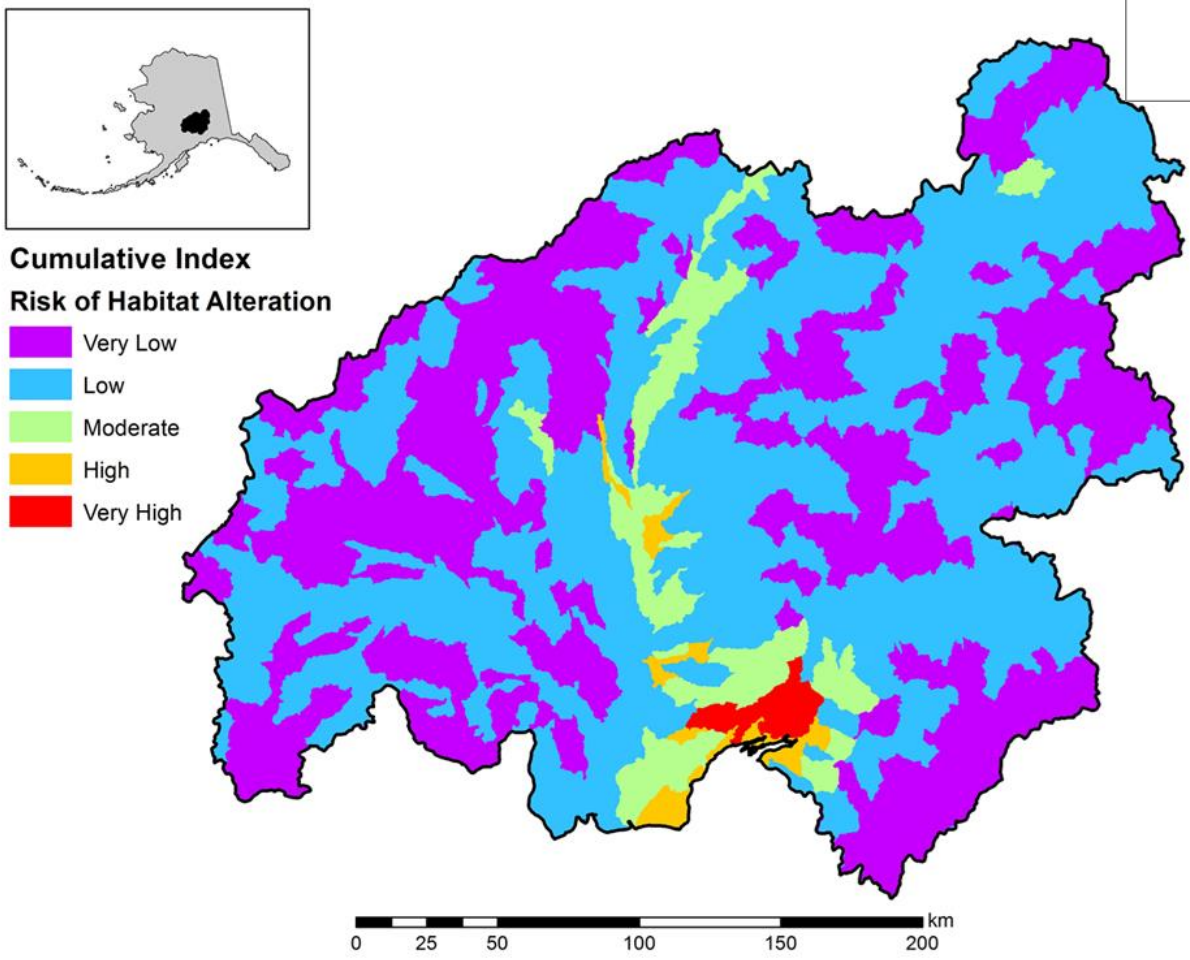
SOUTHEAST ALASKA FISH HABITAT PARTNERSHIP





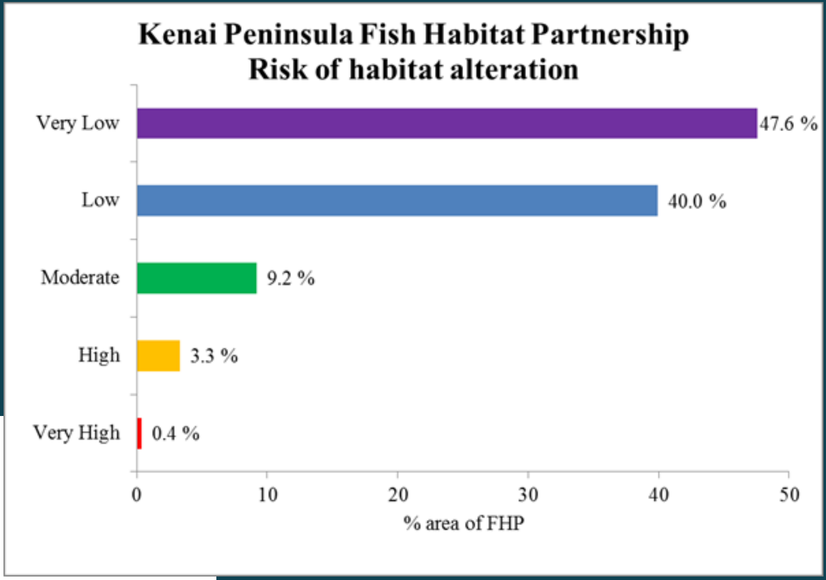
MAT-SU BASIN SALMON HABITAT PARTNERSHIP

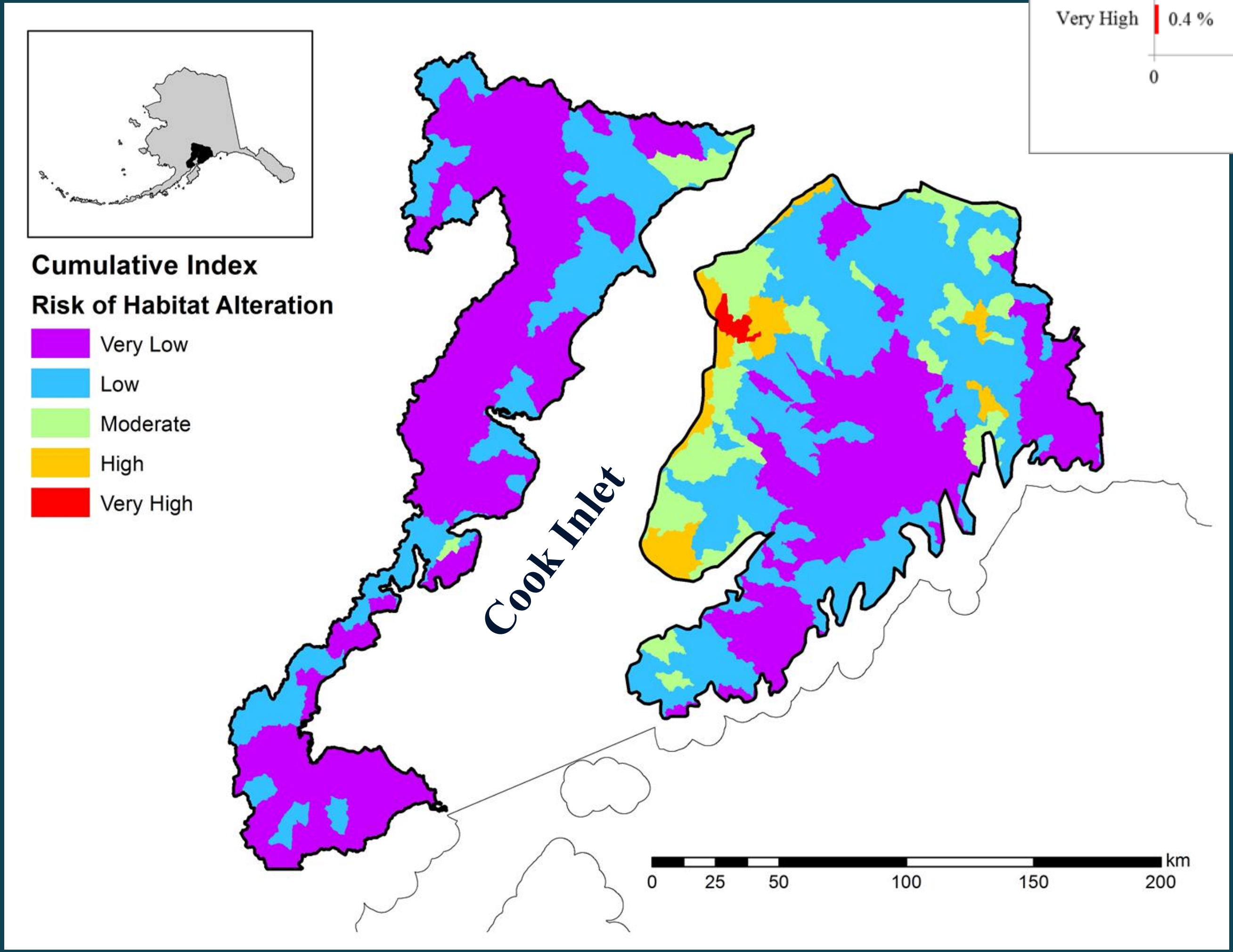


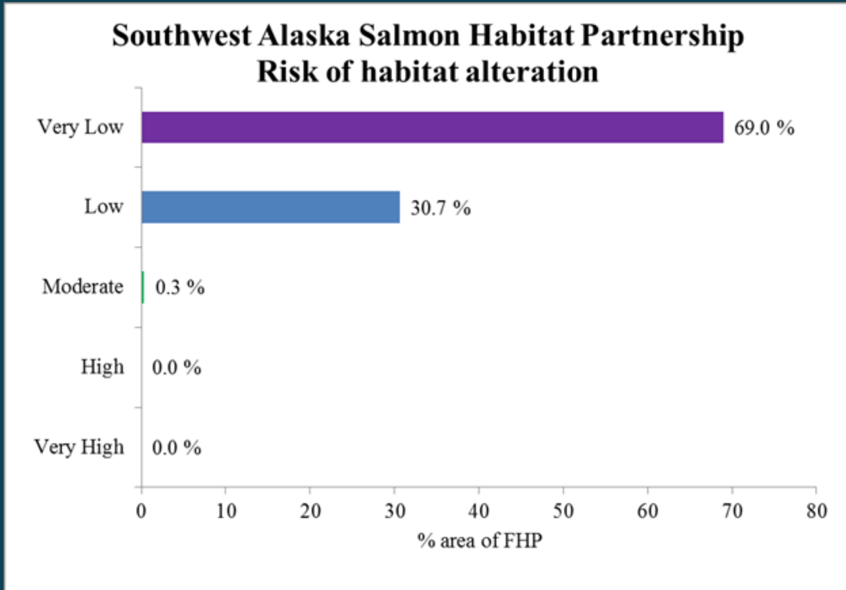


Mat-Su Basin Salmon Habitat Partnership
working for thriving fish, healthy habitats, and vibrant communities in the Mat-Su Basin

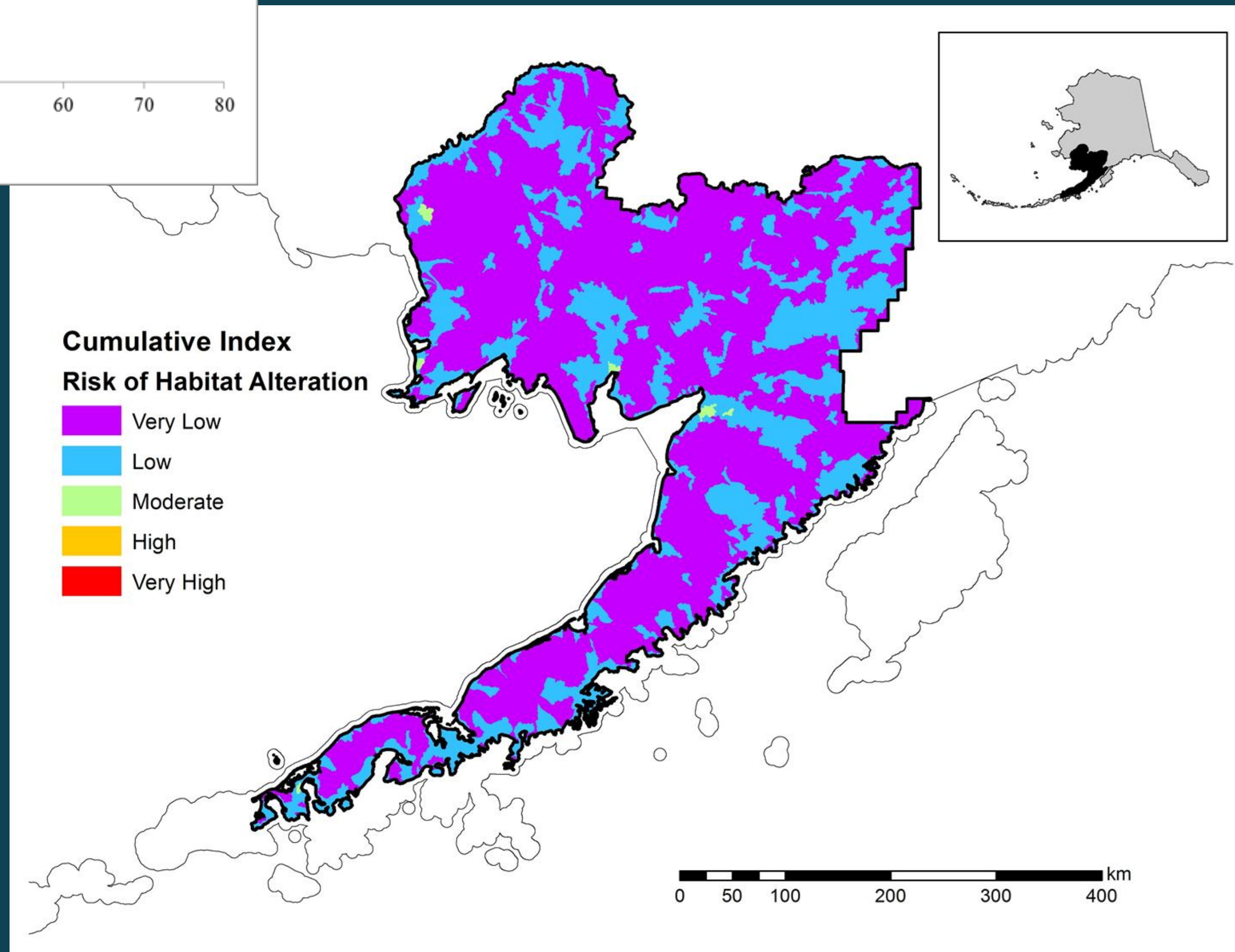
KENAI PENINSULA FISH HABITAT PARTNERSHIP







SOUTHWEST ALASKA SALMON HABITAT PARTNERSHIP



FISH HABITAT PARTNERSHIPS NOT SHOWN

RESERVOIR FISHERIES HABITAT PARTNERSHIP

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

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)

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

MOST LIMITING DISTURBANCES TO FISH HABITAT IN THE MIDWEST GLACIAL LAKES PARTNERSHIP

- Top five overall most limiting disturbances to all stream reaches across all spatial extents (ranked highest first):

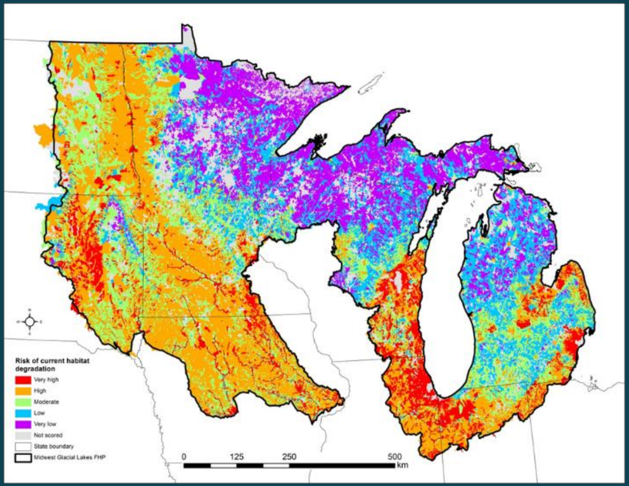
  Crop land use

  Pasture and hay land use

  Population density

  Road crossing density

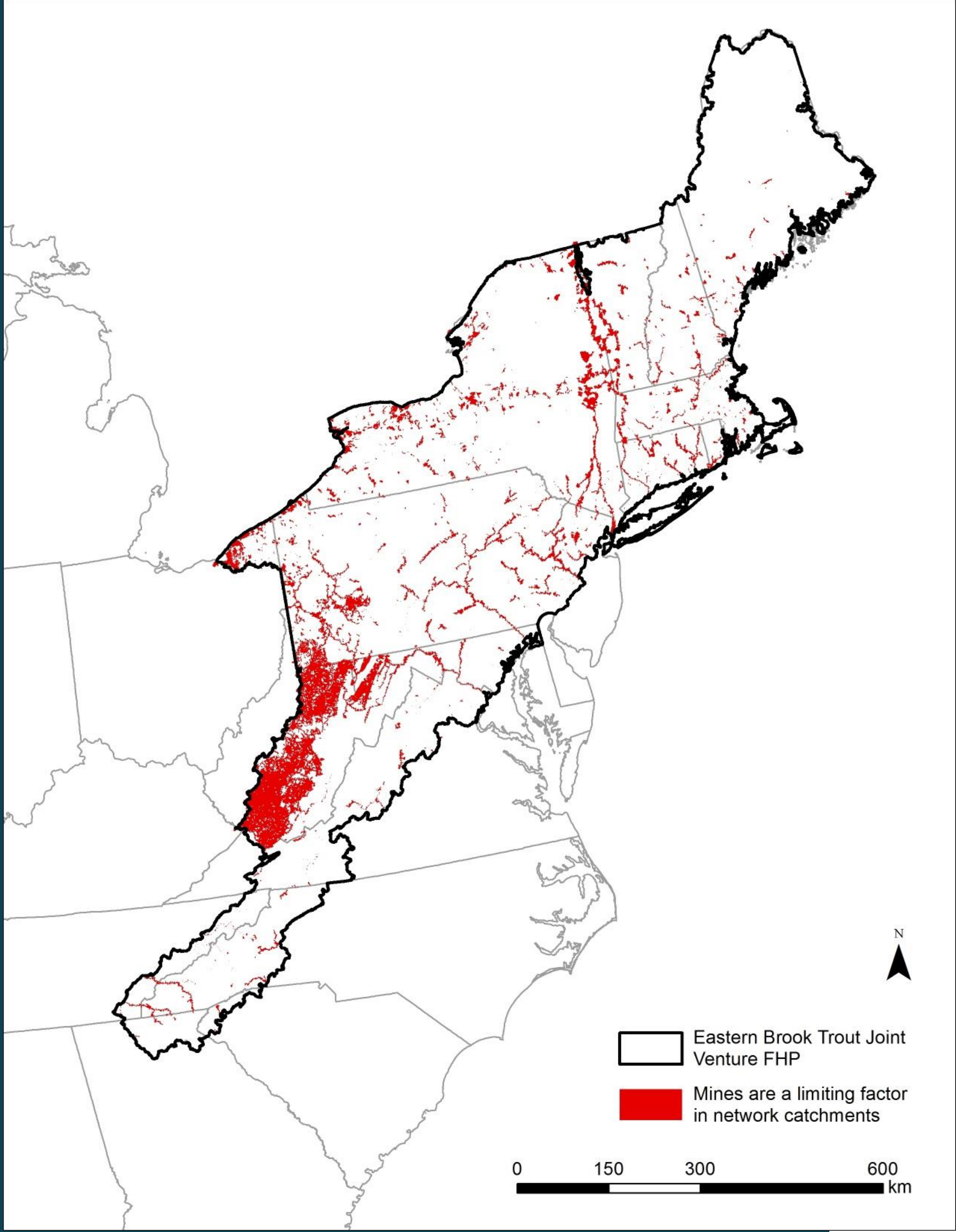
  Low intensity urban land use



- Water withdrawals from agriculture and water withdrawals from industrial sources comprise the sixth and ninth (respectively) highest limiting disturbances in the region. If these categories were combined, water withdrawals would be the third most limiting disturbance to stream reaches in this MWGL FHP

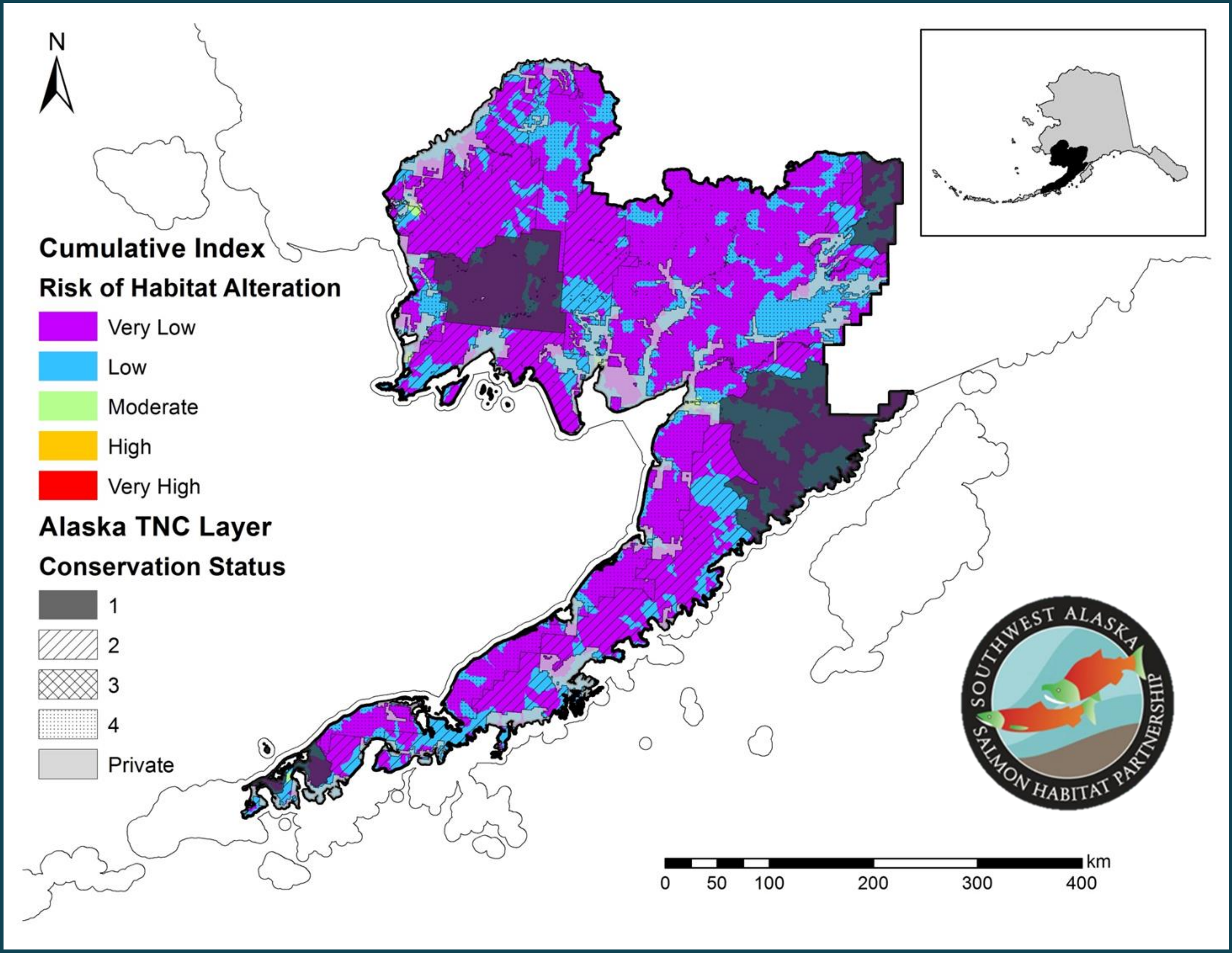
MINES (COAL AND MINERAL) AS THE MOST LIMITING DISTURBANCE TO FISH HABITAT IN THE EASTERN BROOK TROUT JOINT VENTURE

Eastern Brook Trout
JOINT VENTURE
A Fish Habitat Partnership



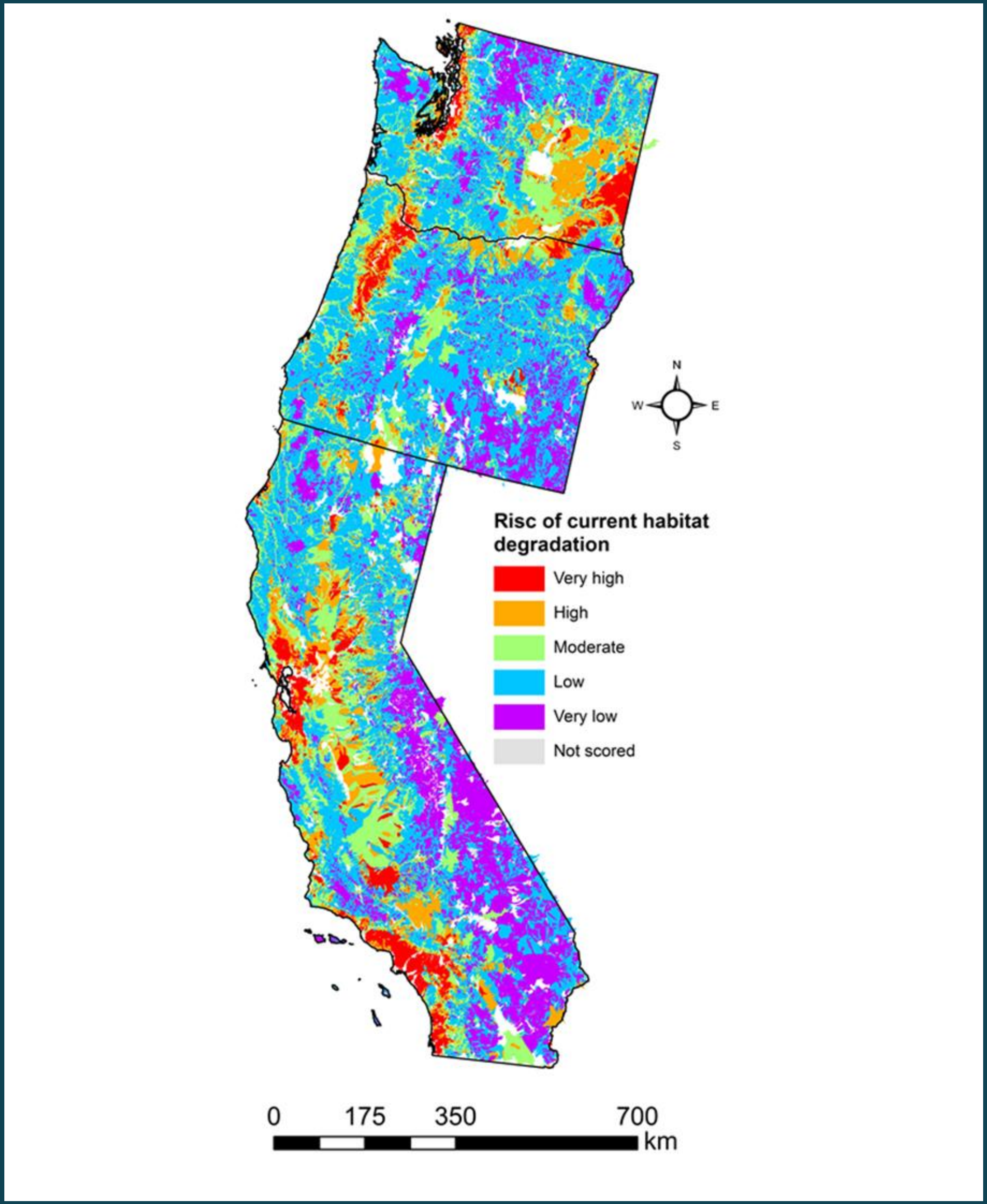
PARTNERSHIP RESULTS WITH OTHER LAYERS

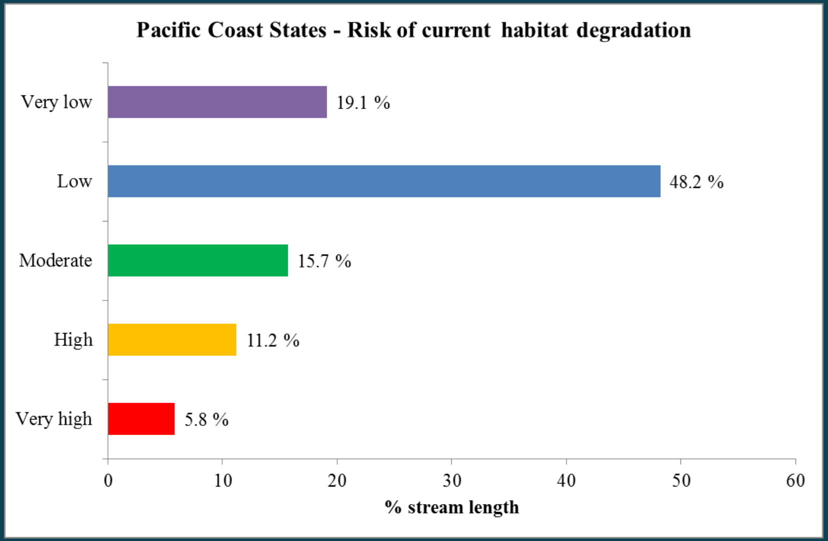
ALASKA ASSESSMENT RESULTS WITH TNC CONSERVATION LANDS



3. STATE AND REGIONAL RESULTS

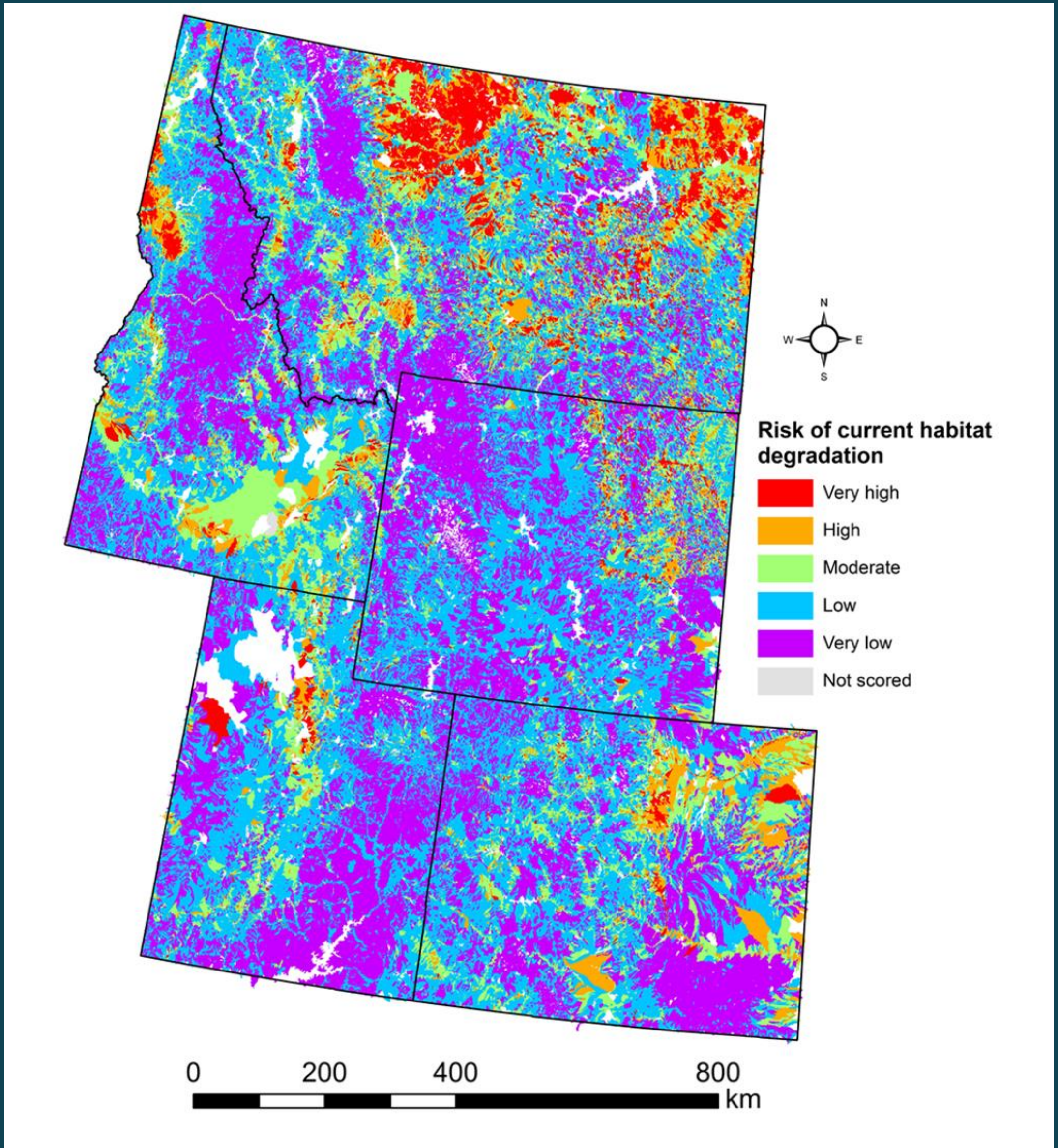
PACIFIC COAST STATES

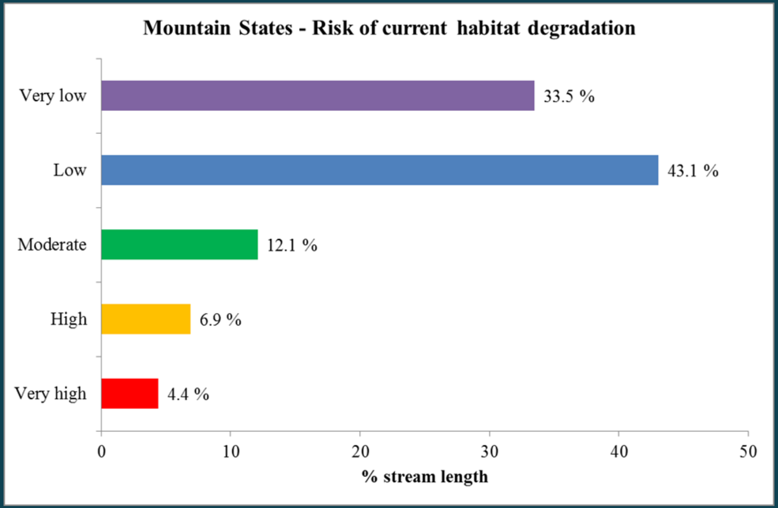




NATIONAL FISH HABITAT PARTNERSHIP

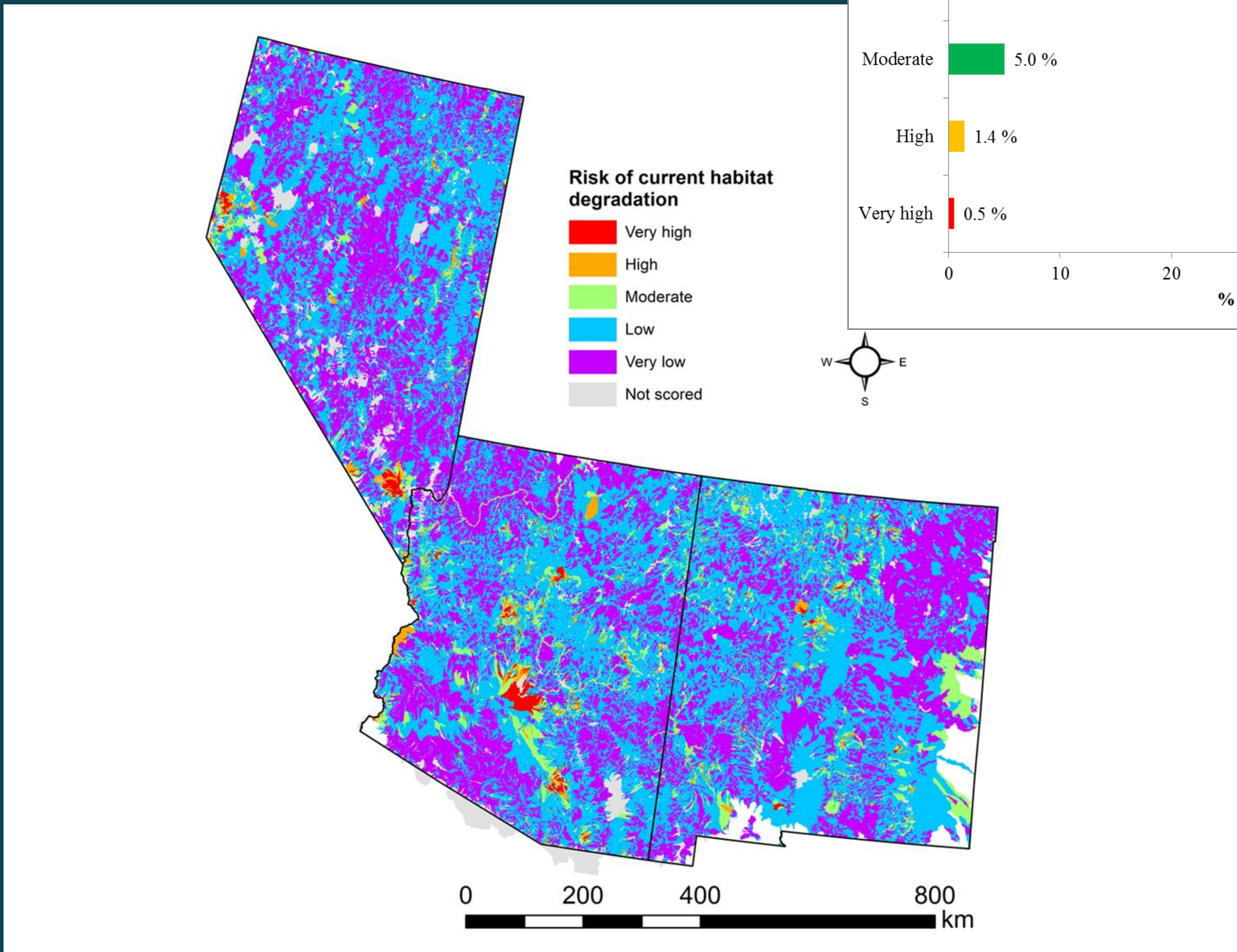
MOUNTAIN STATES

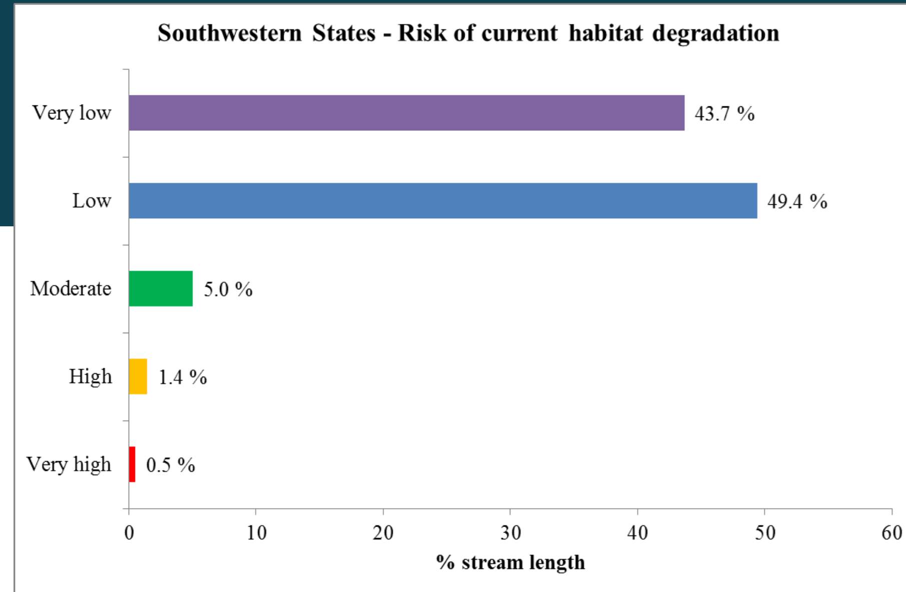




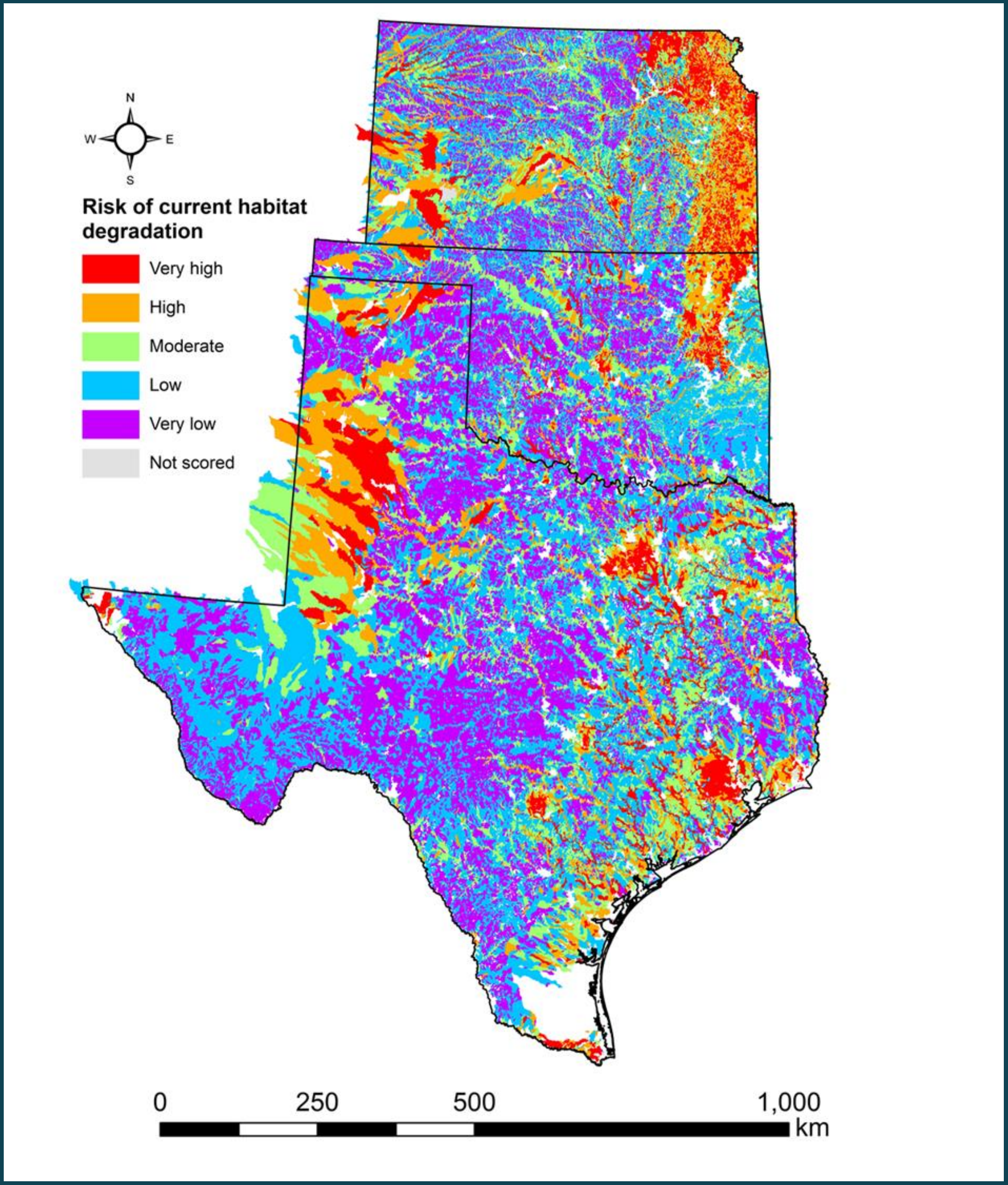
NATIONAL FISH HABITAT PARTNERSHIP

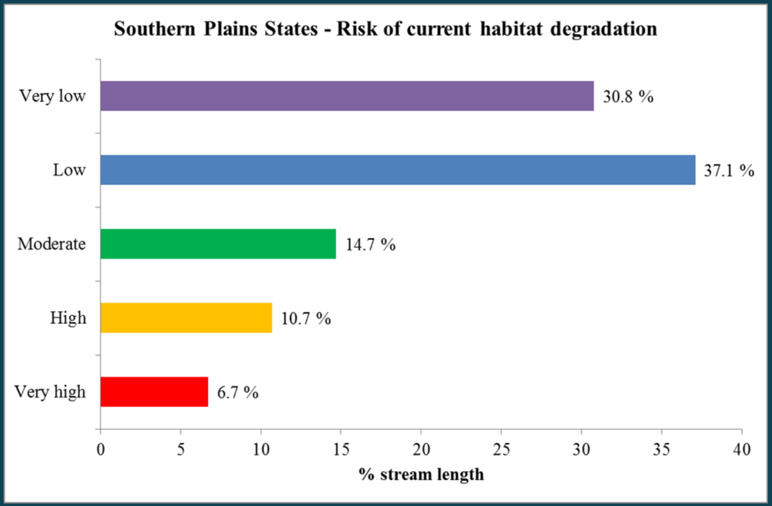
SOUTHWESTERN STATES





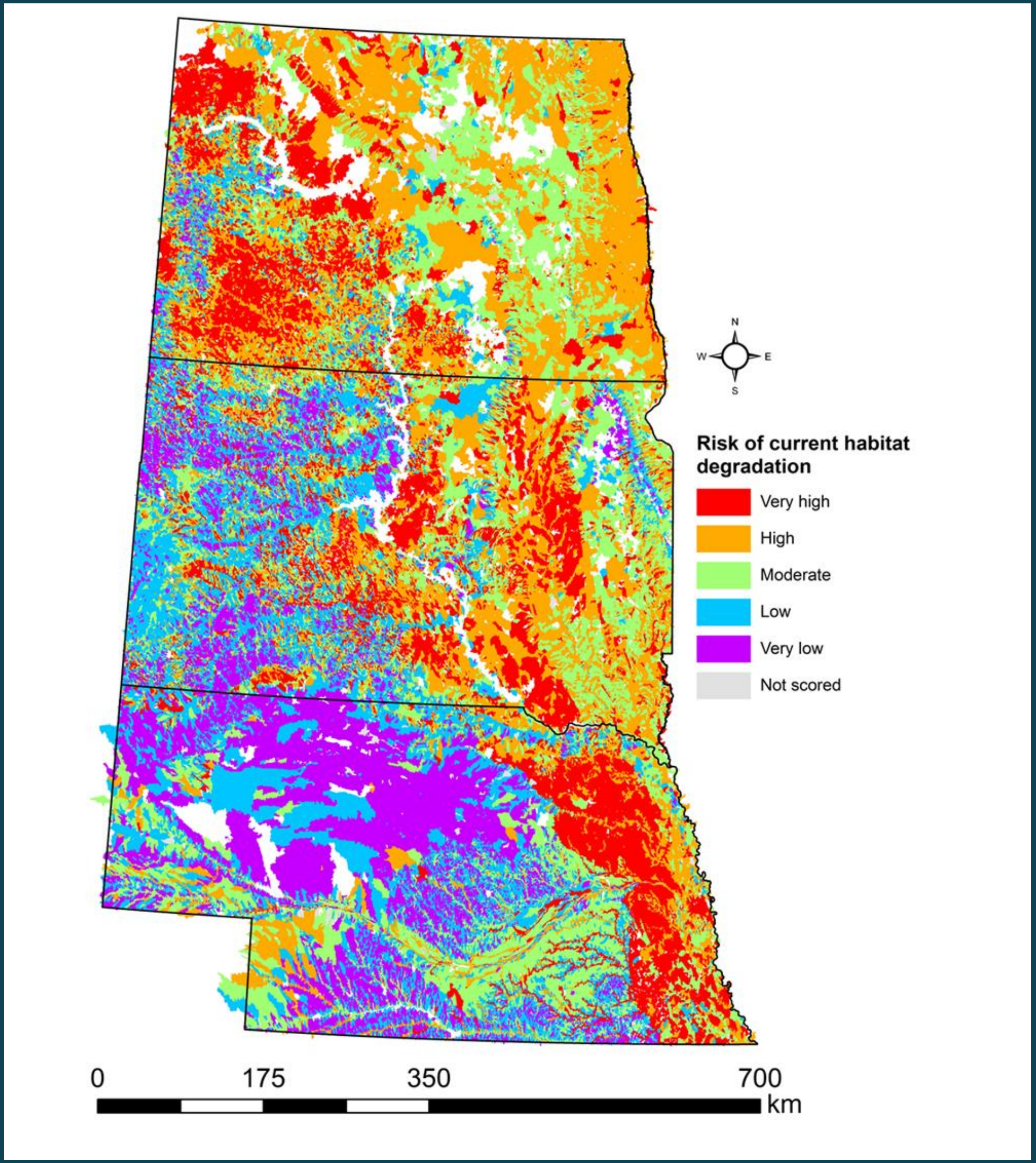
SOUTHERN PLAINS STATES

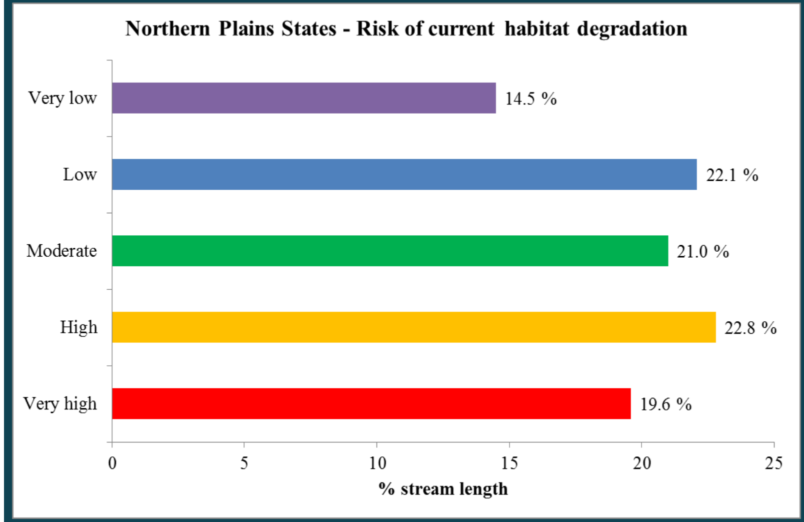




NATIONAL FISH HABITAT PARTNERSHIP

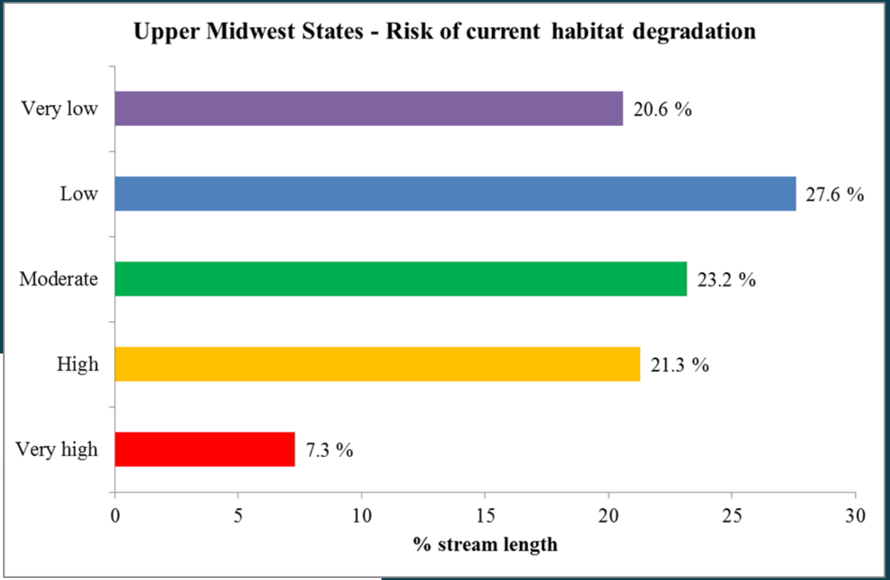
NORTHERN PLAINS STATES

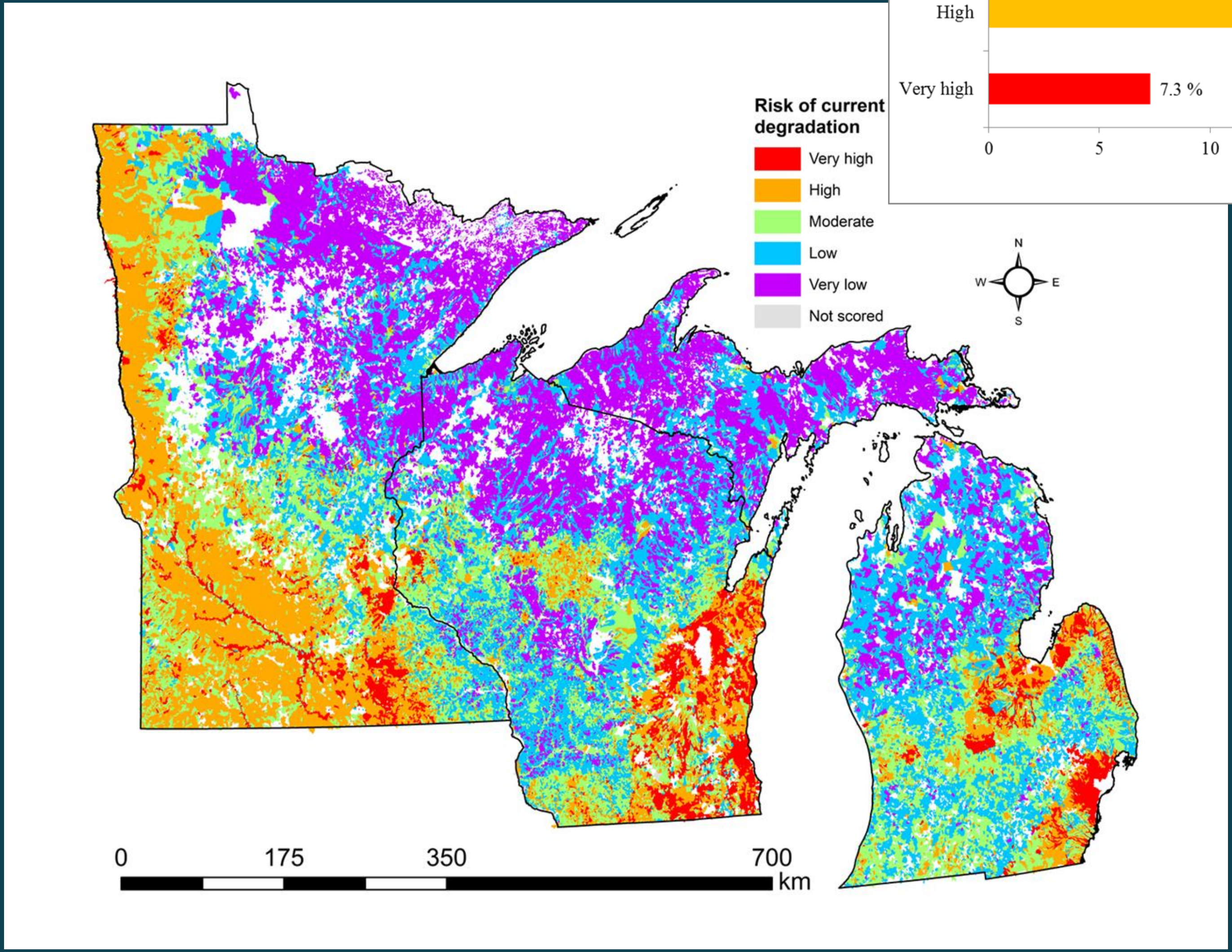




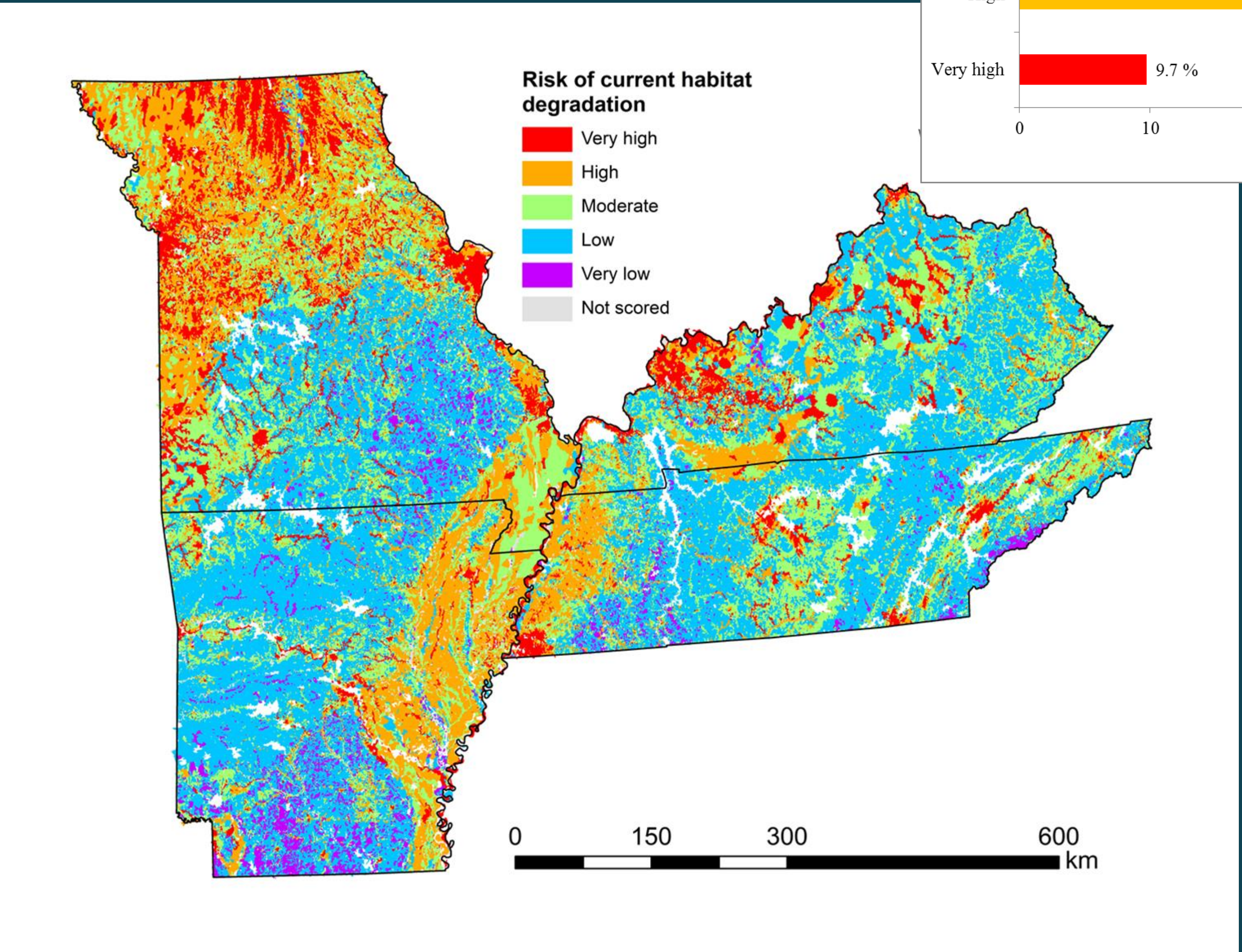
NATIONAL FISH HABITAT PARTNERSHIP

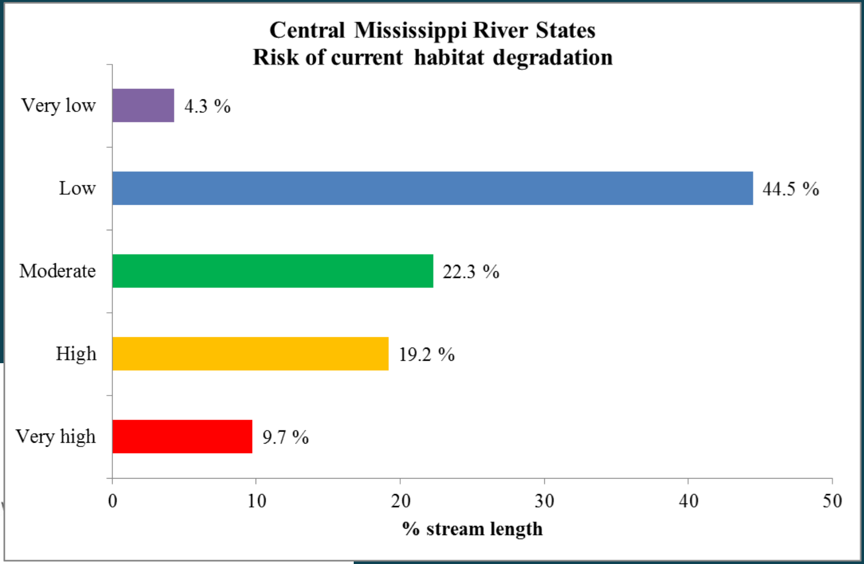
UPPER MIDWEST STATES





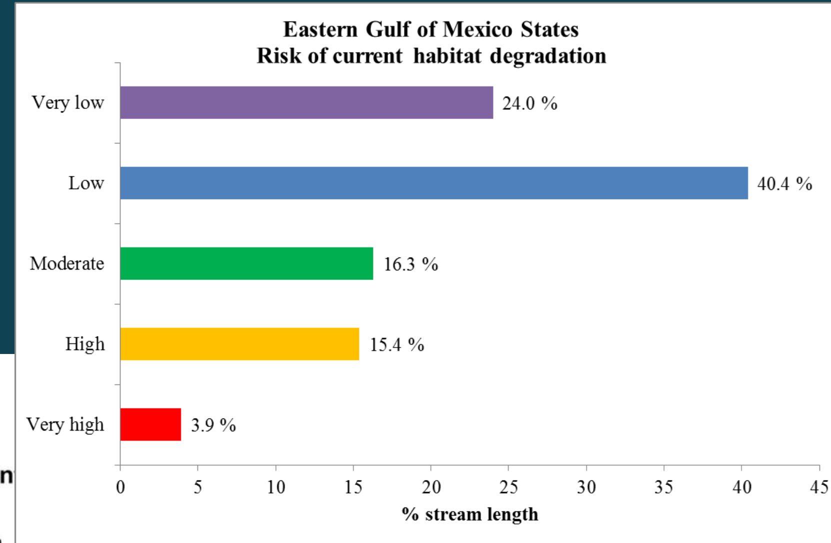
CENTRAL MISSISSIPPI STATES

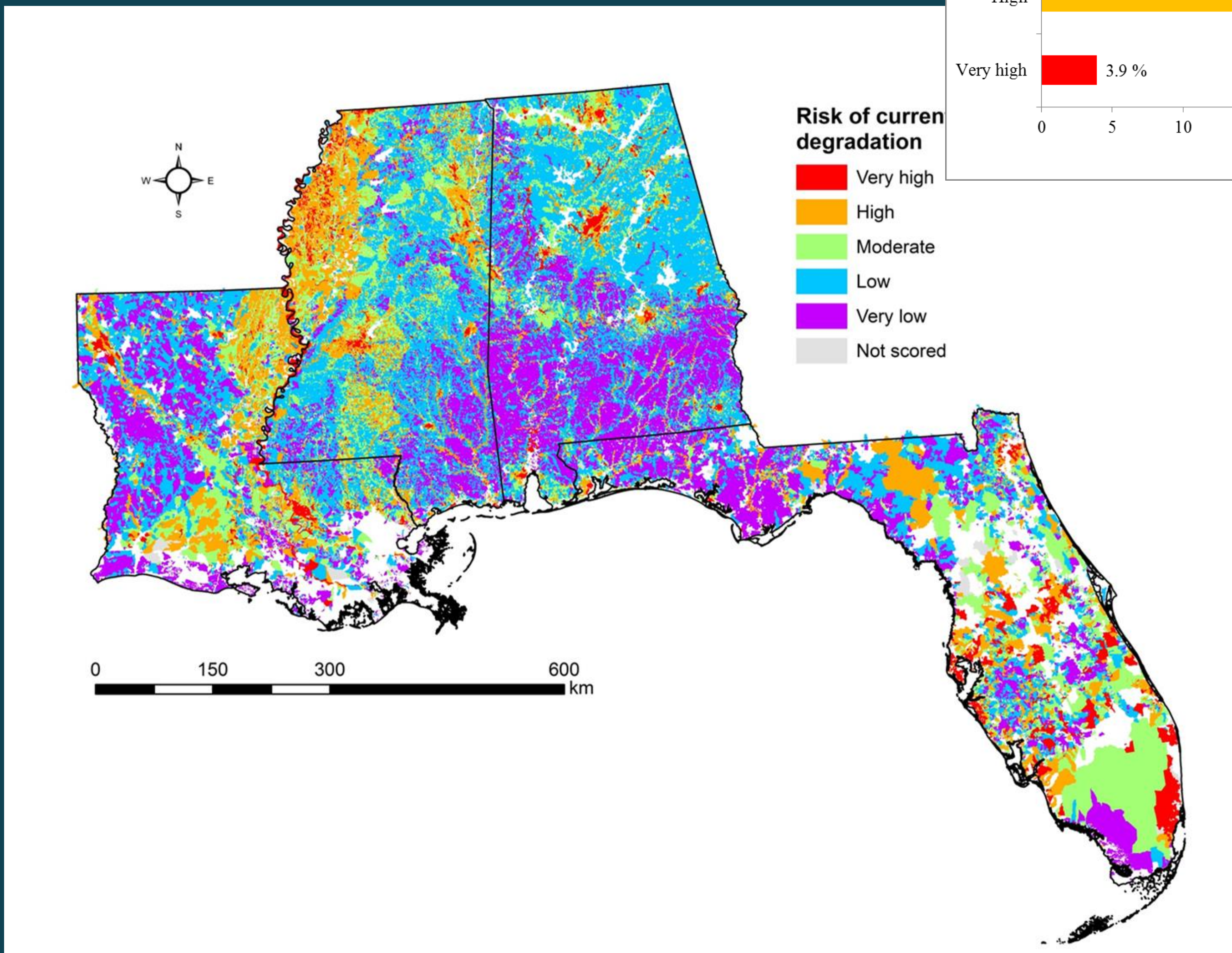




NATIONAL FISH HABITAT PARTNERSHIP

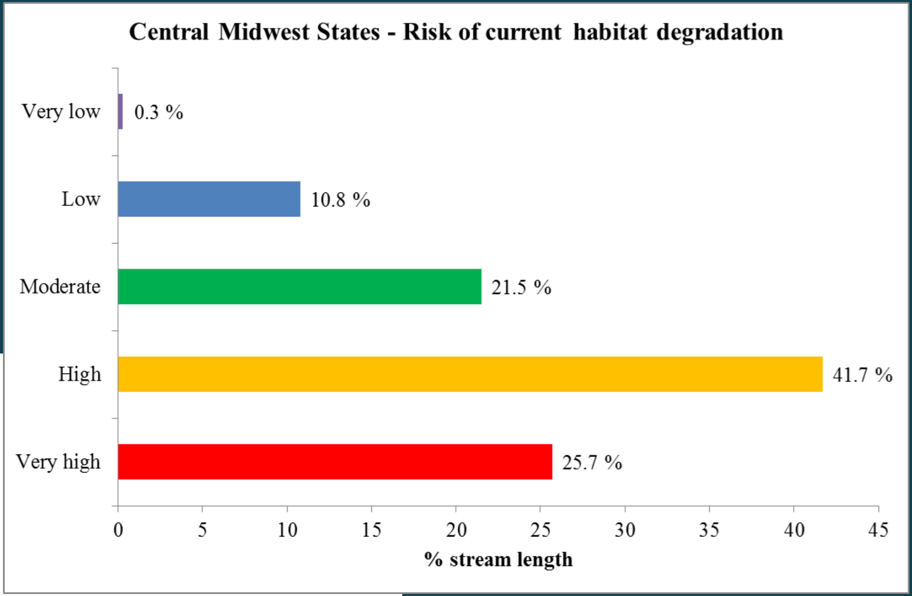
EASTERN GULF OF MEXICO STATES

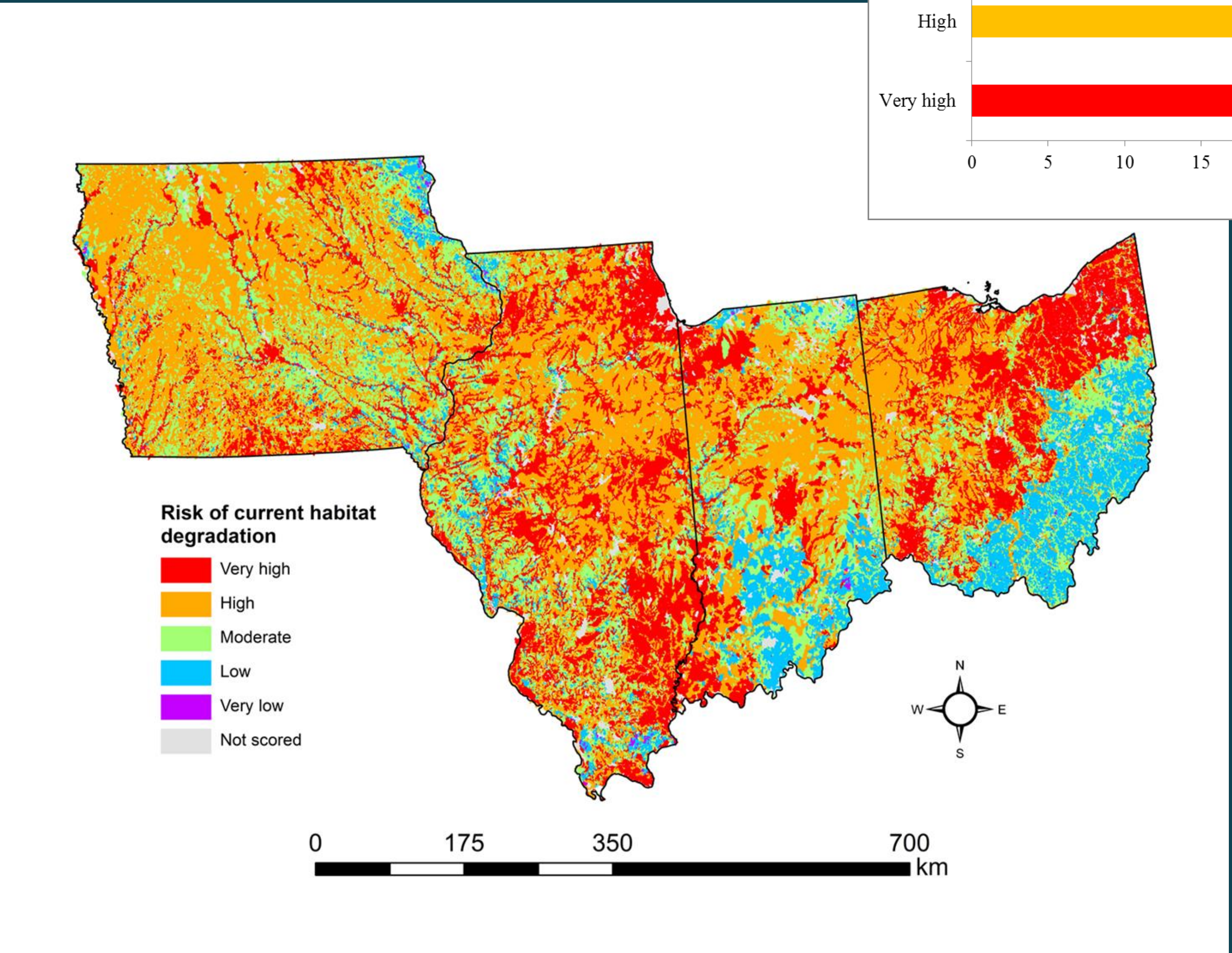




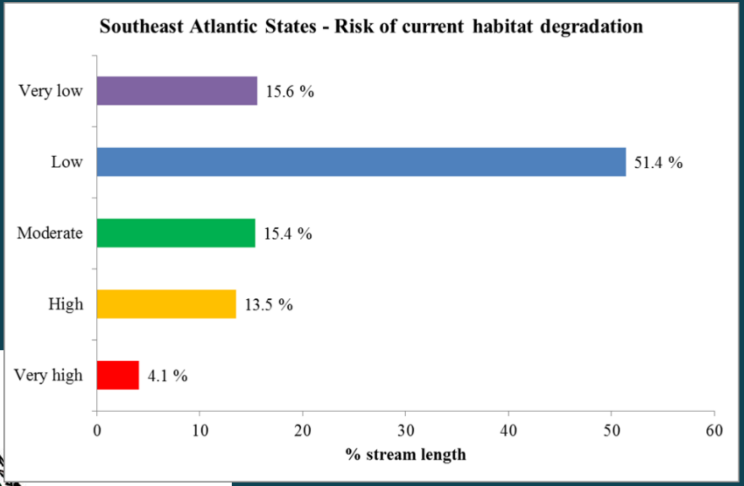
NATIONAL FISH HABITAT PARTNERSHIP

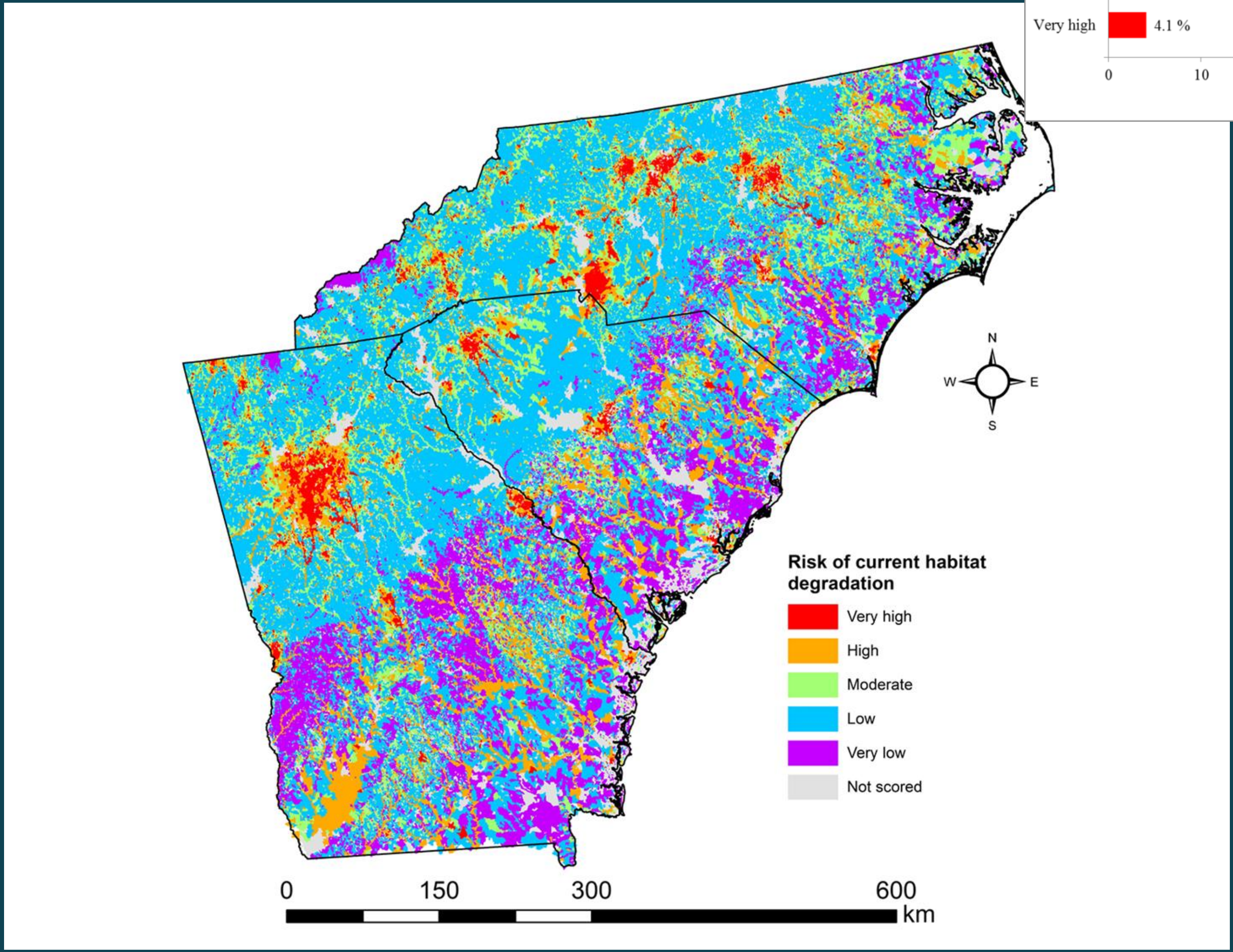
CENTRAL MIDWEST STATES



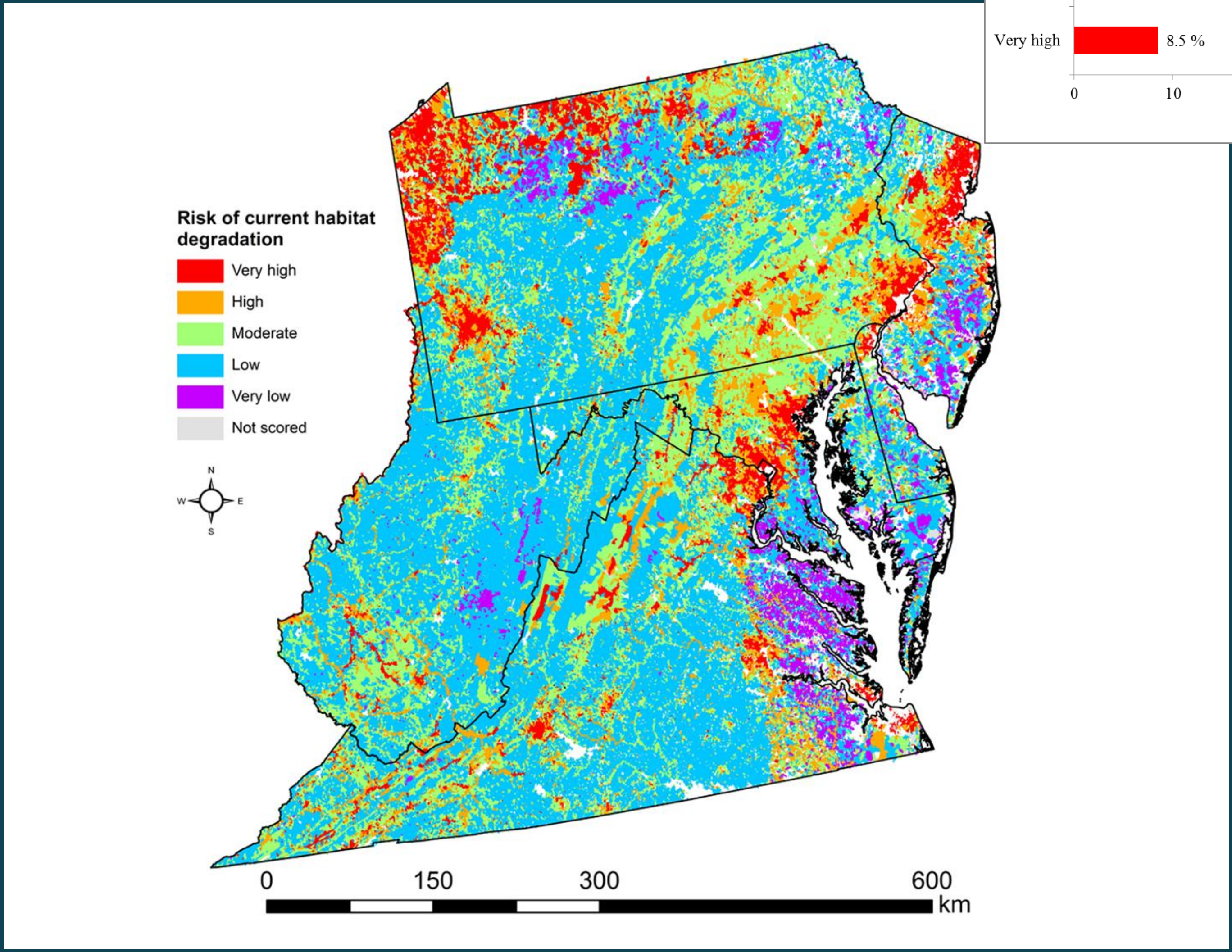


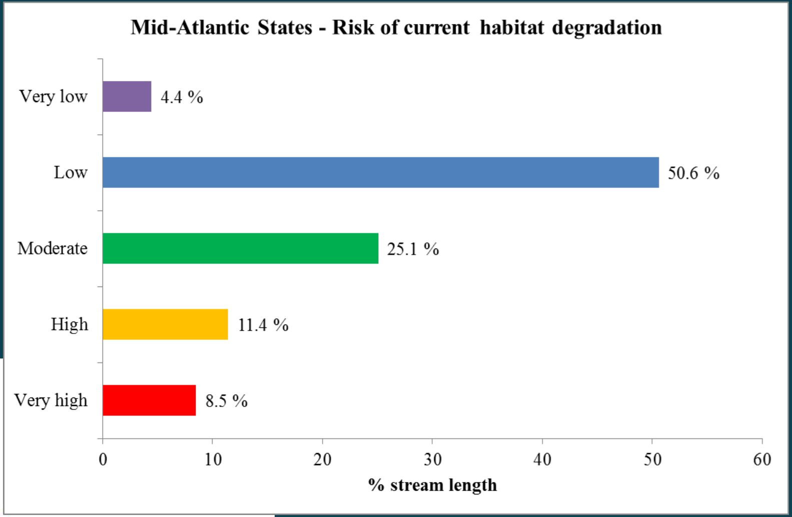
SOUTHEAST ATLANTIC STATES



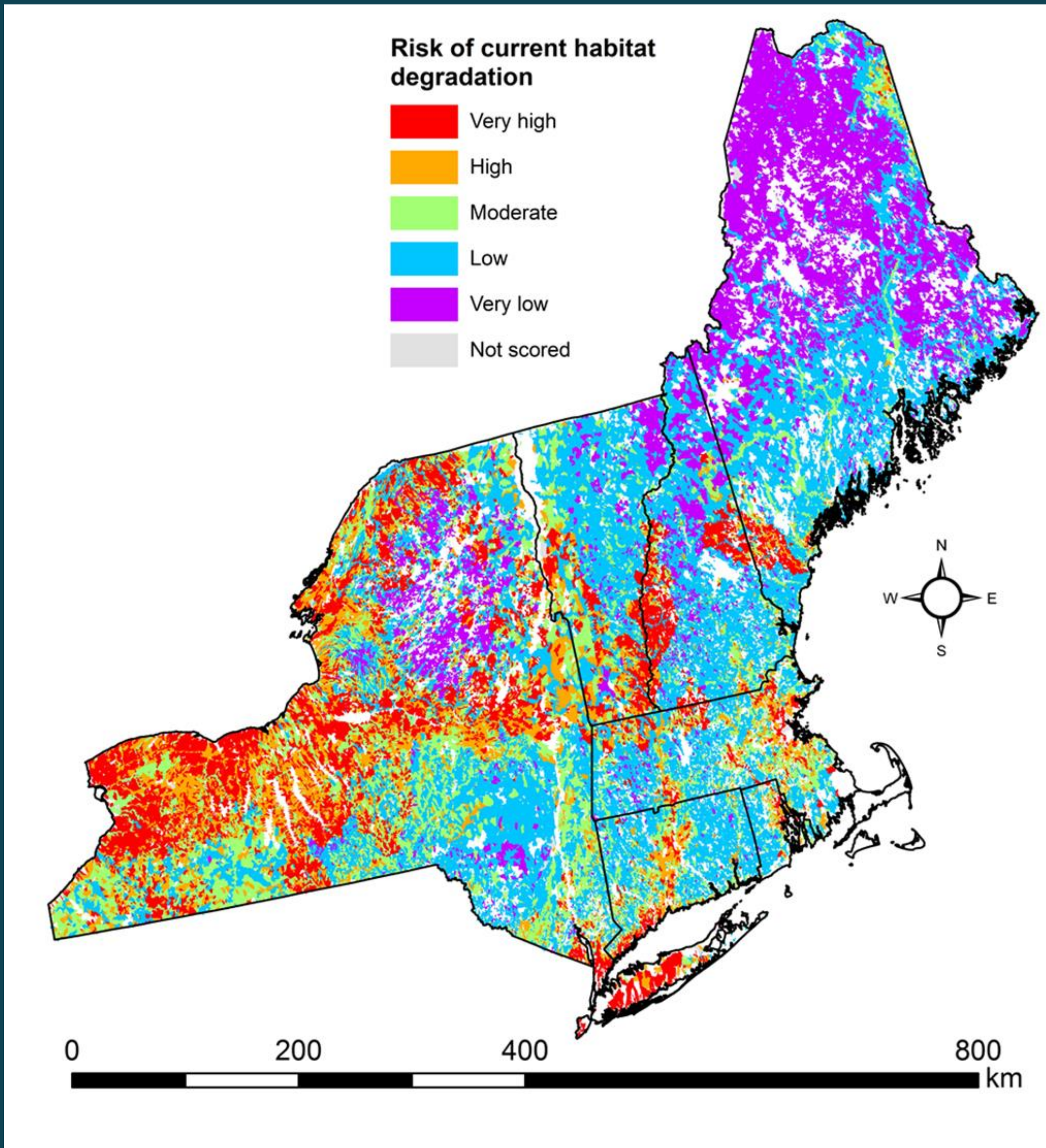


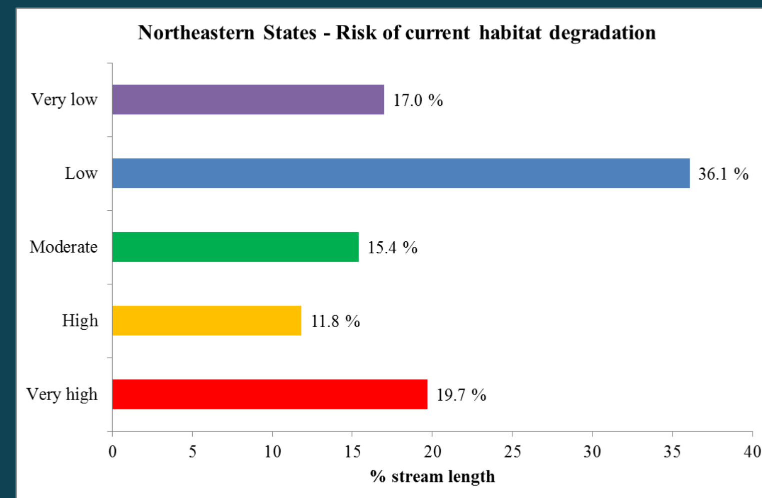
MID-ATLANTIC STATES



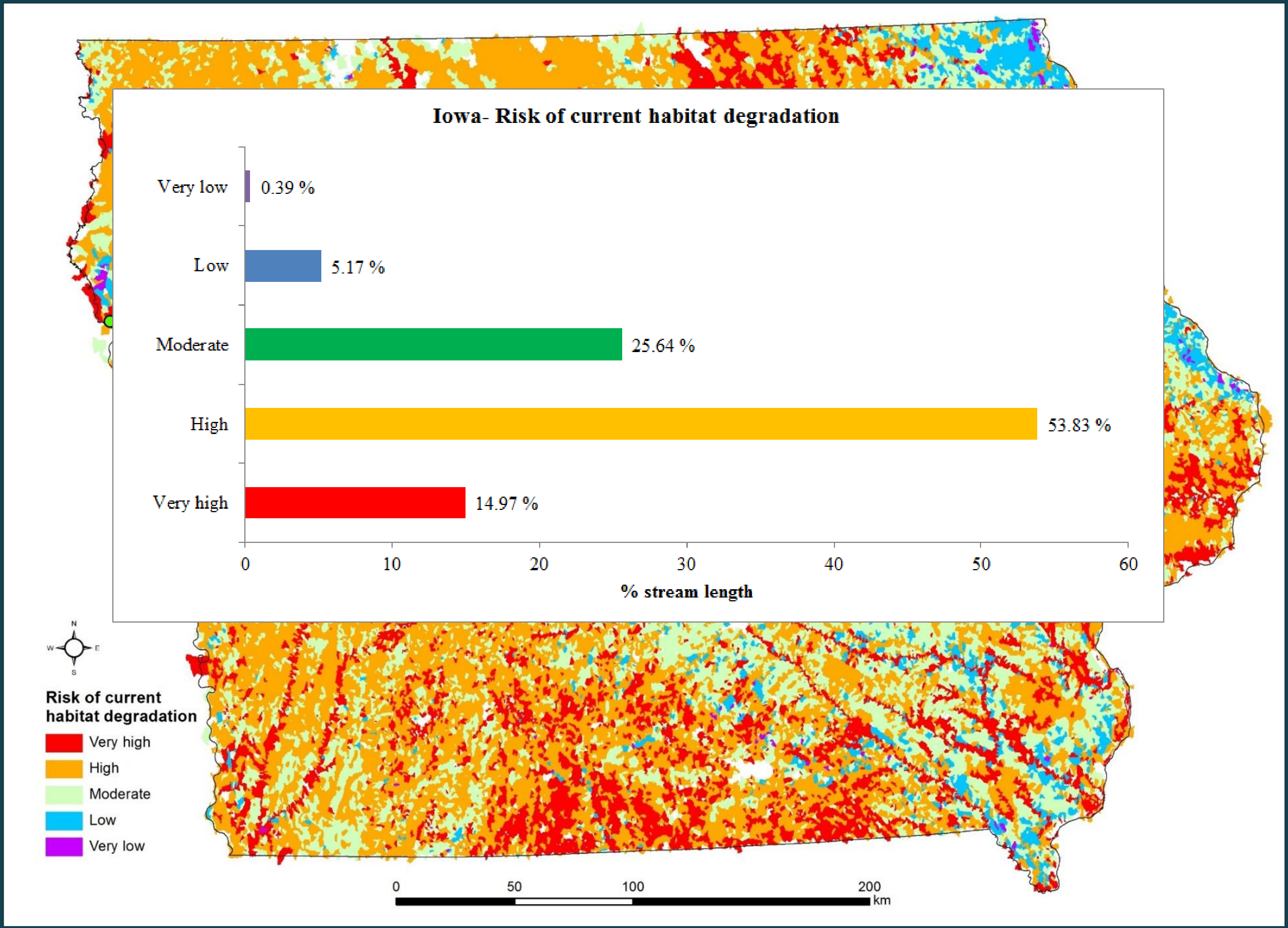


NORTHEASTERN STATES



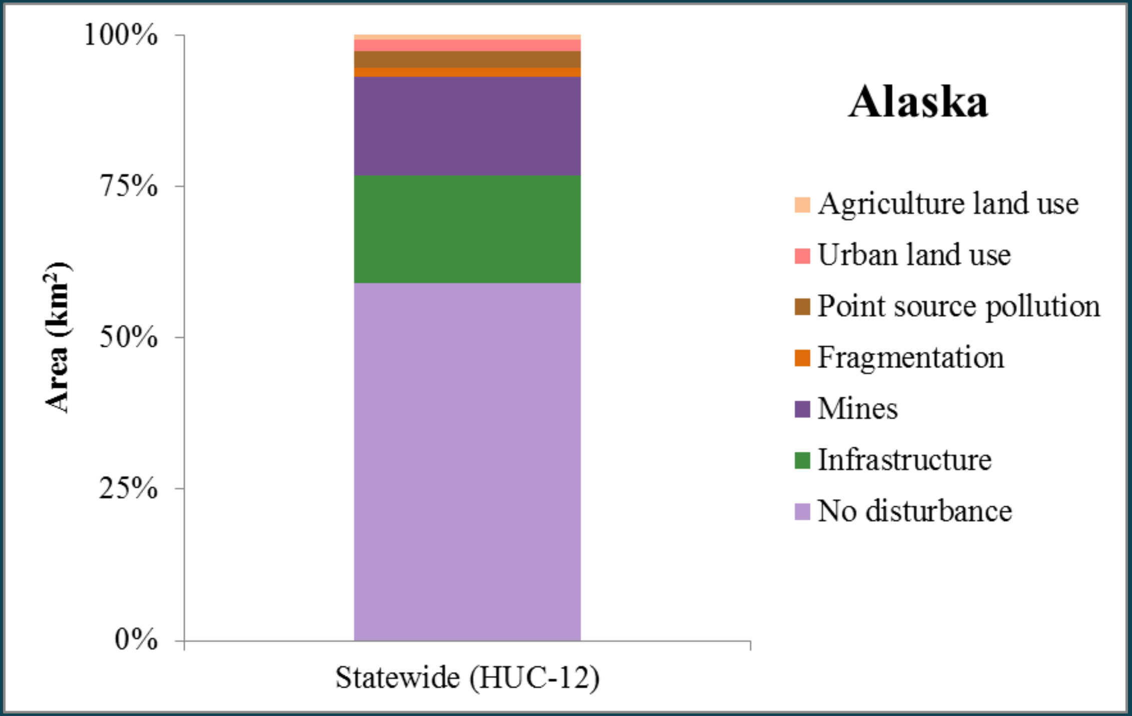


2015 ASSESSMENT OF STREAM FISH HABITATS IOWA

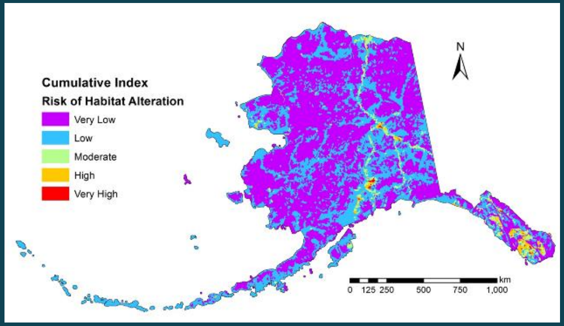


Alaska's total area (in HUC-12) at highest risk of alteration from each sub-index of disturbance

Alaska 2015	No disturbance	infrastructure	mines	point source pollution	urban	fragmentation	agriculture
%	58.94	17.92	16.12	2.85	1.94	1.52	0.71



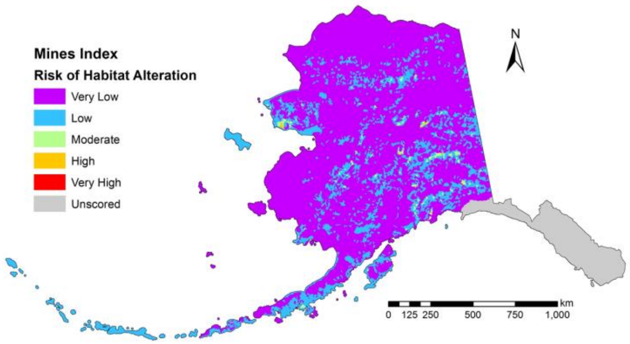
Based on statewide HUC-12s



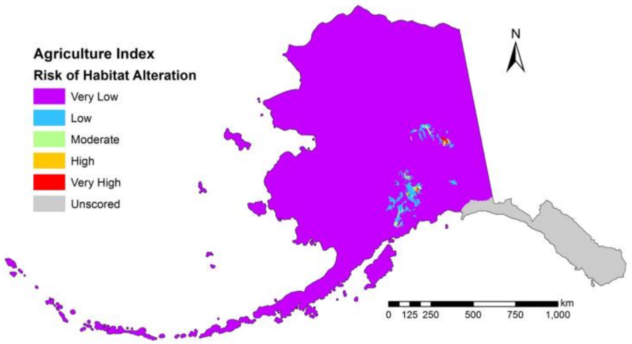
NATIONAL FISH HABITAT PARTNERSHIP

SIX ALASKA SUB-INDEXES OF DISTURBANCE

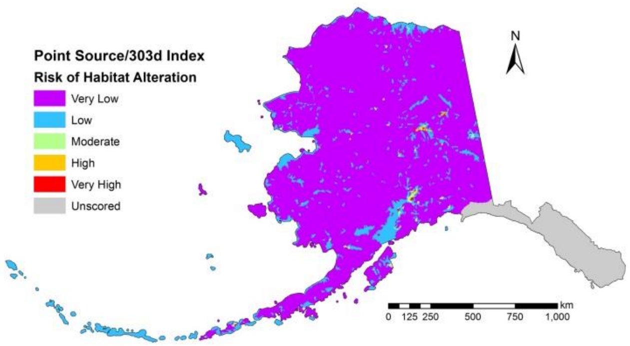
Mines



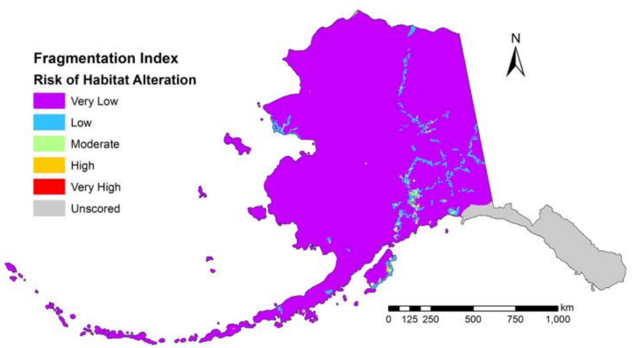
Agriculture



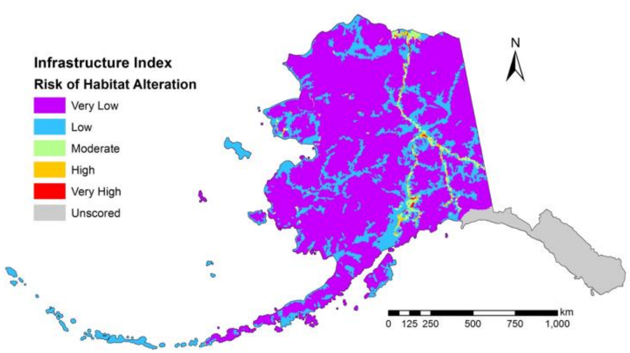
Point source



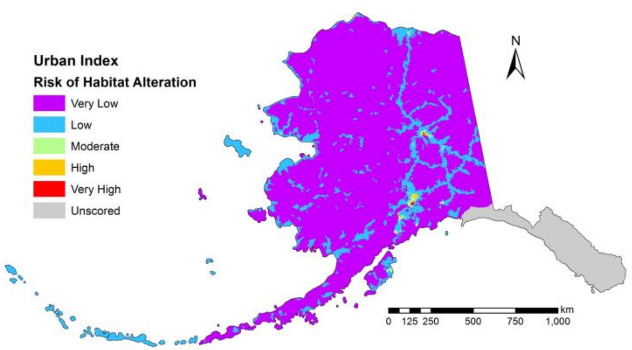
Fragmentation



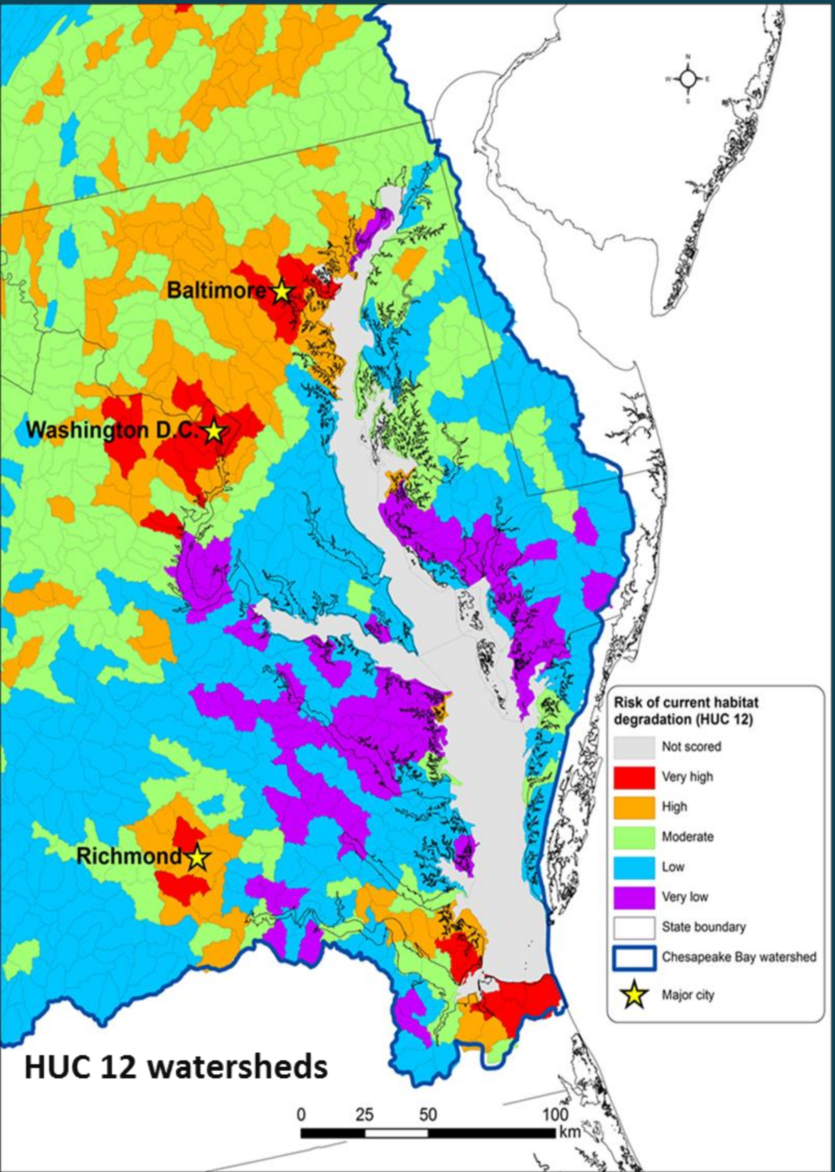
Infrastructure



Urban



ENHANCING CONSERVATION ACTIONS IN THE CHESAPEAKE BAY BASIN



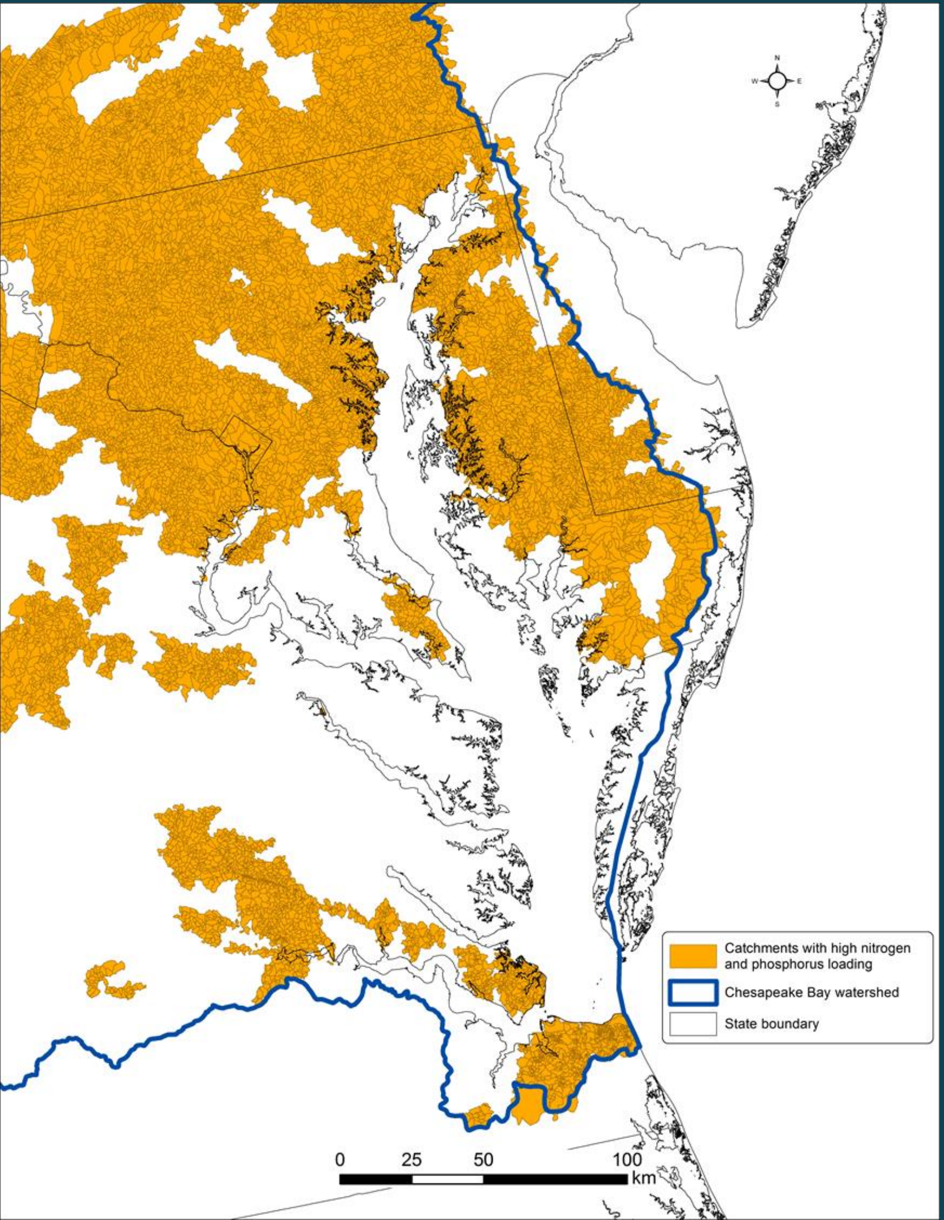
What are limiting disturbances to fish habitat in the Chesapeake Bay basin?

- Agriculture (pasture/hay)
- Urbanization
- Mining (coal and mineral)
- Nutrients (N and P)

- Results vary regionally, by spatial extent

NATIONAL FISH HABITAT PARTNERSHIP

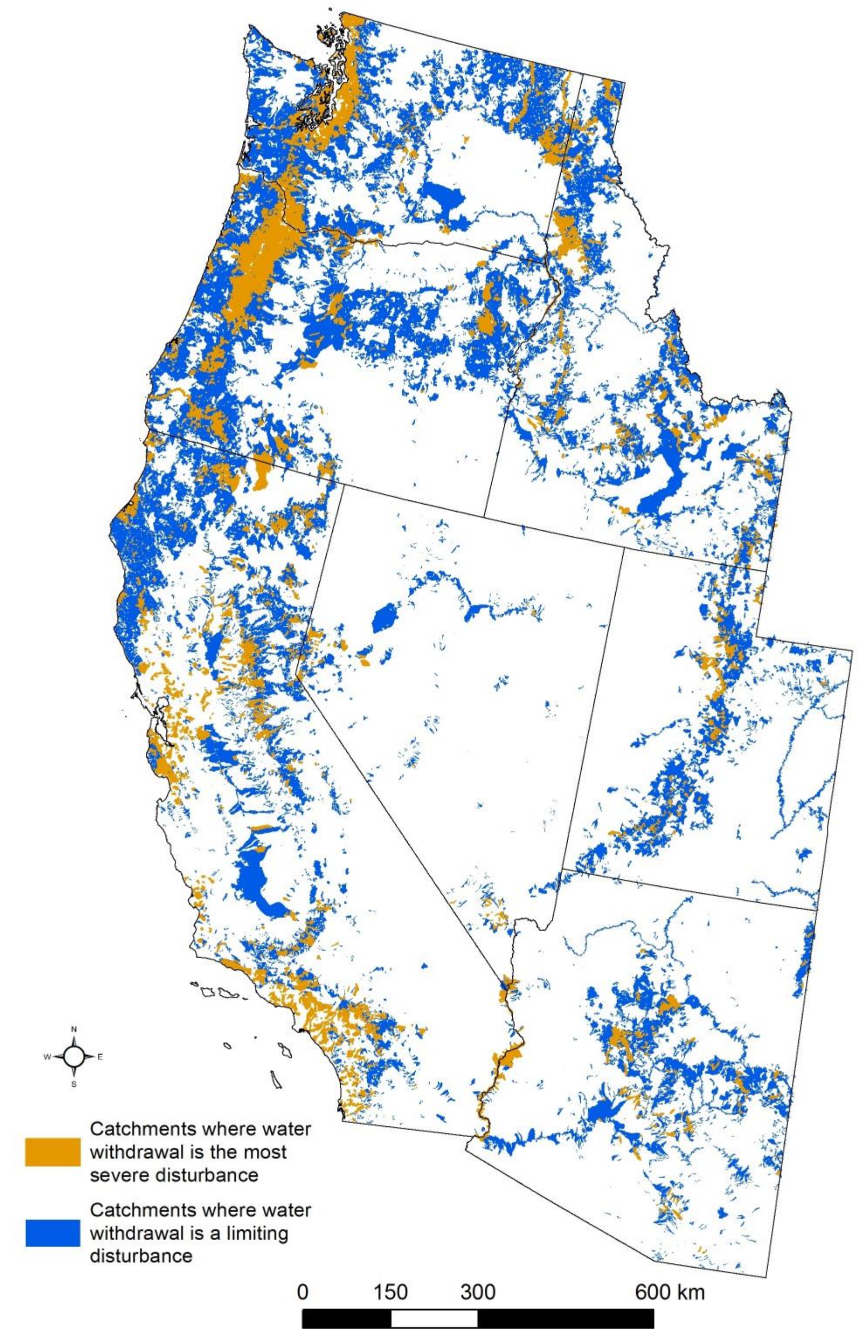
ENHANCING CONSERVATION ACTIONS IN THE CHESAPEAKE BAY BASIN



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
- Data are from USGS SPARROW 1992

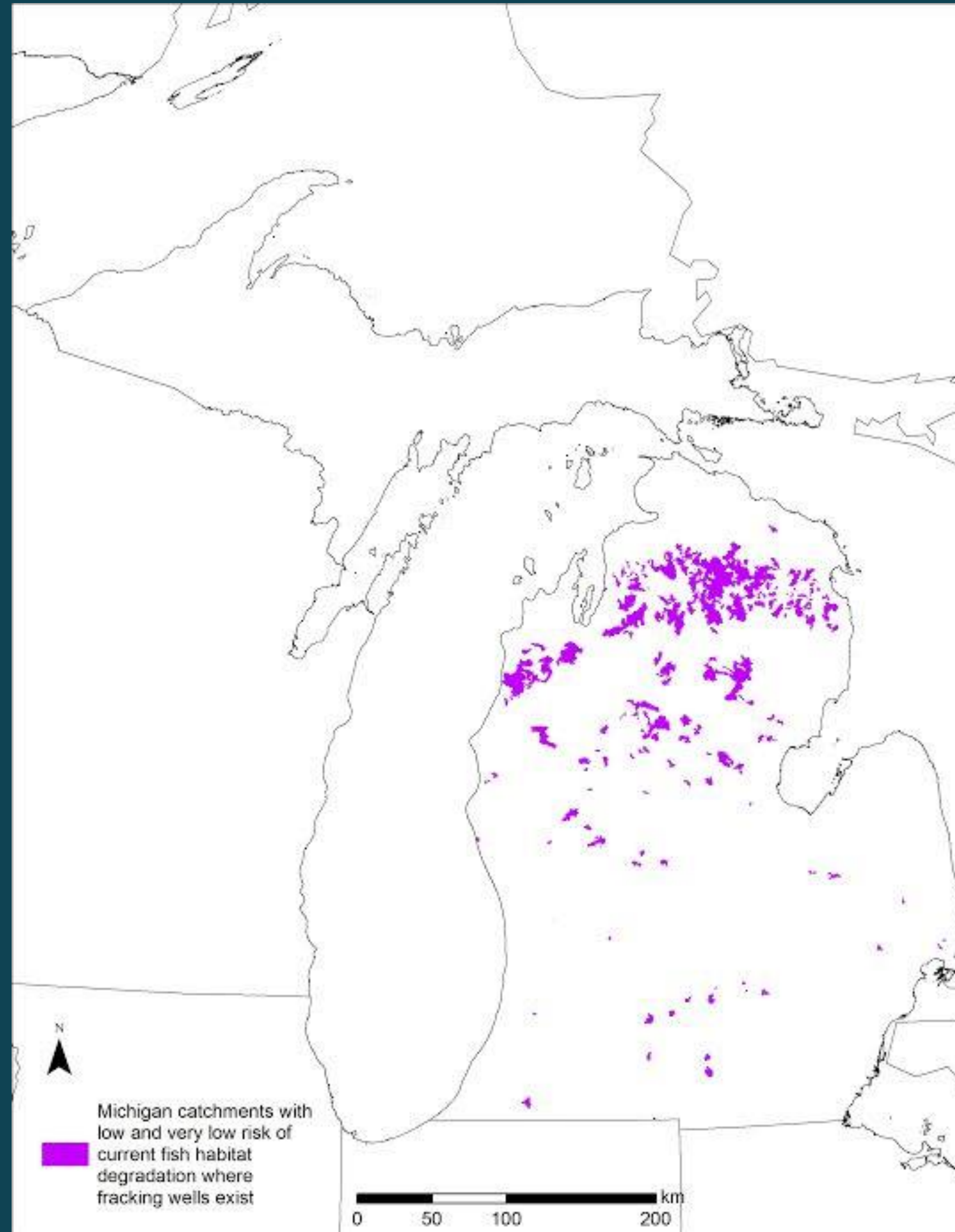
WATER WITHDRAWALS AS A LIMITING OR SEVERE DISTURBANCE TO FISH HABITAT



Limiting disturbance: Takes scores away from best available condition, 5's

Severe disturbance: Puts scores in two lowest condition classes, 1's or 2's

FRACKING LOCATIONS IN MICHIGAN'S CATCHMENTS THAT ARE AT LOW OR VERY LOW RISK OF FISH HABITAT DEGRADATION



PARTNERSHIP

ENHANCING CONSERVATION PLANNING FOR HAWAIIAN STREAMS UNDER CURRENT AND FUTURE THREATS

Ralph Tingley, Dana Infante, Yin Phan Tsang, Arthur Cooper, Kyle Herreman

Goal: Generate a set of maps that indicate areas of high conservation value under current and future conditions to inform on-the-ground conservation

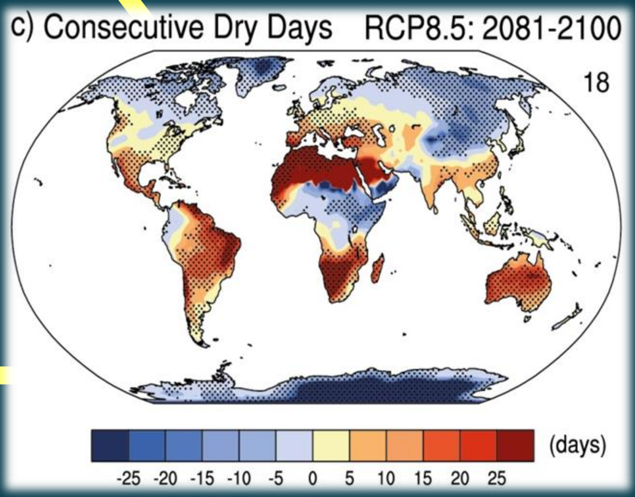
An example for conservation planning…

HAWAII FISH HABITAT PARTNERSHIP

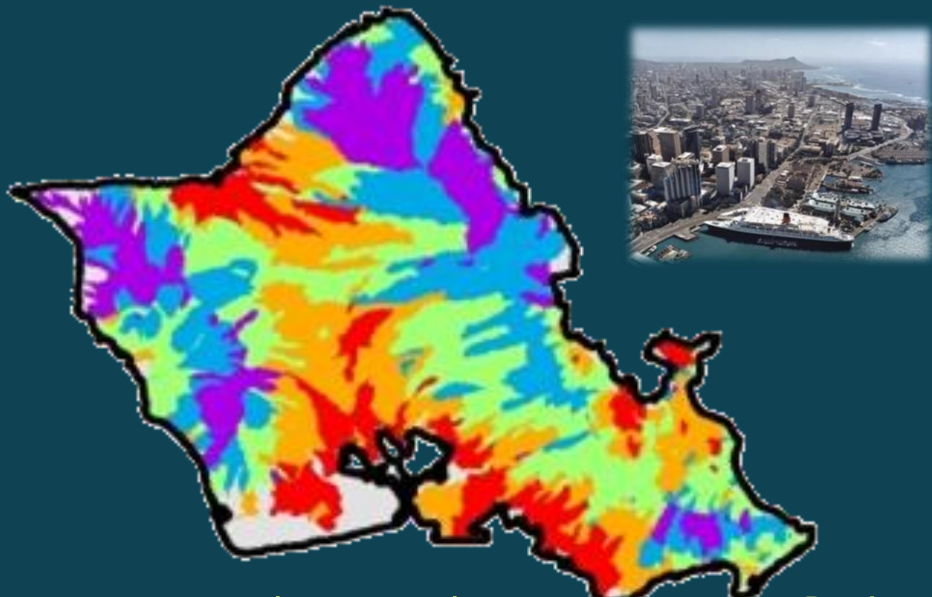
CURRENT AND FUTURE THREATS TO HAWAIIAN STREAMS

Anthropogenic disturbances have resulted in reduced stream habitat condition

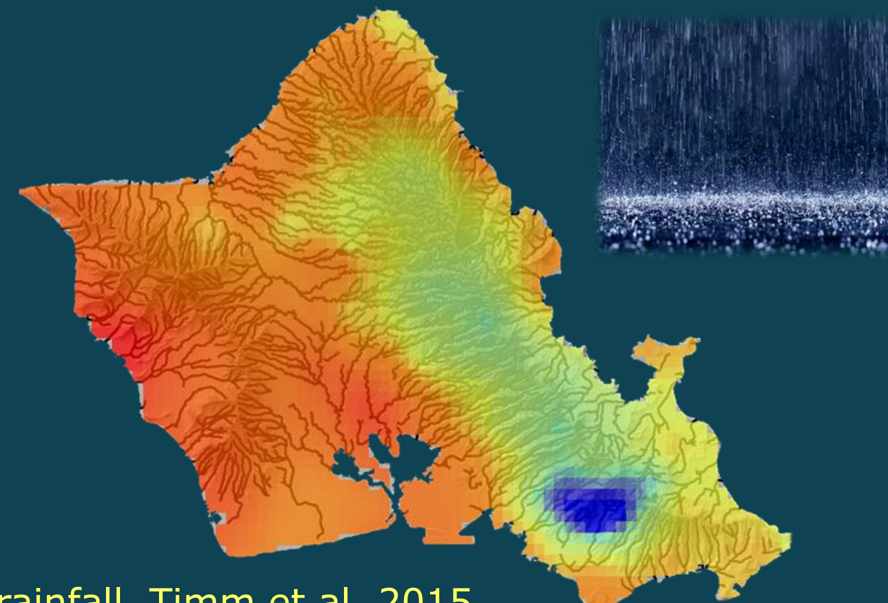
Climate change likely to degrade stream habitat further



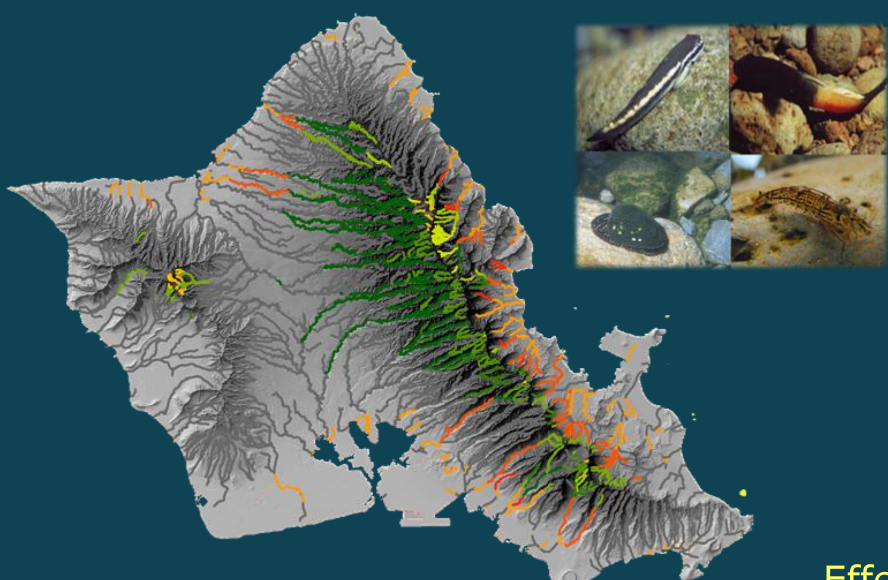
STATEWIDE DATASETS CREATED TO AID IN PLANNING



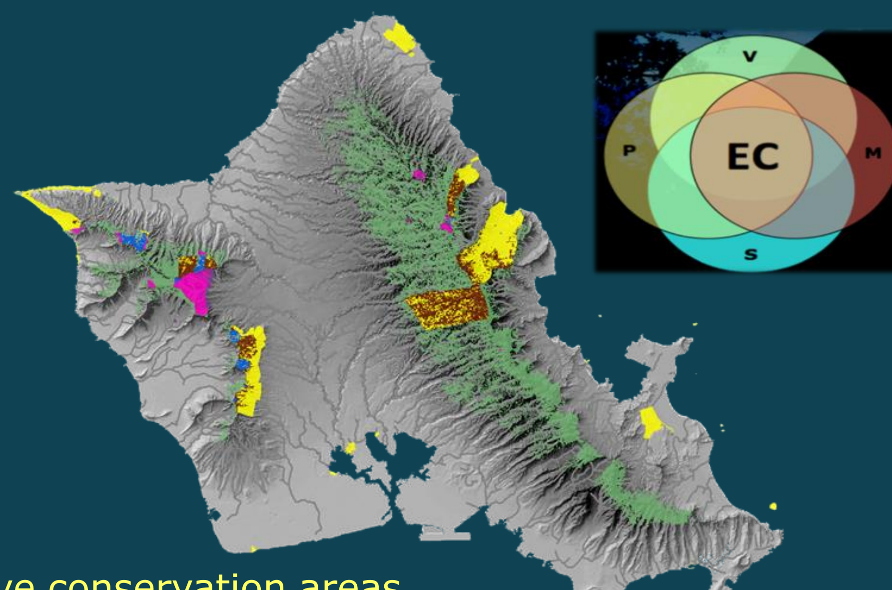
NFHP 2015 Habitat condition scores



Projected rainfall, Timm et al. 2015



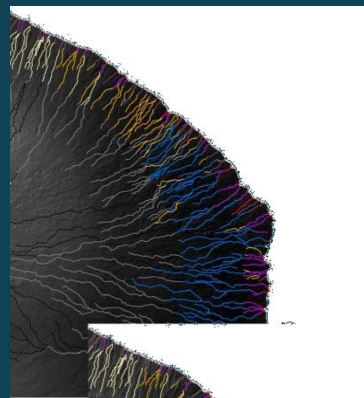
Stream reach types, Tingley et al. in prep



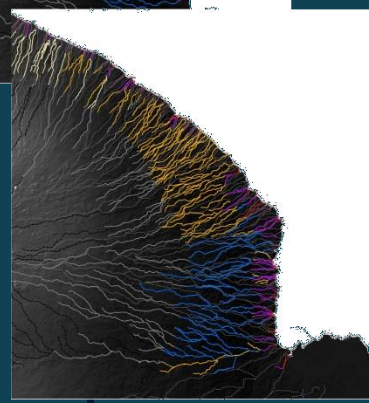
Effective conservation areas,
http://www.hawaiiconservation.org; Price et al. 2012

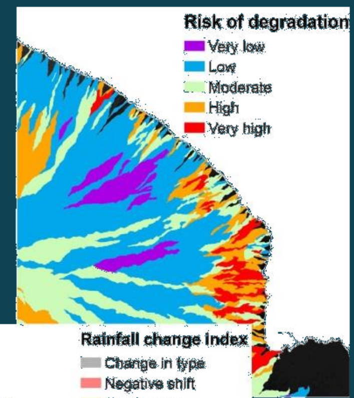
IDENTIFYING LARGE AREAS OF THE LANDSCAPE THAT SHARE DESIRED CRITERIA TO AID IN PLANNING (Zonation, Marxan)

Current stream types

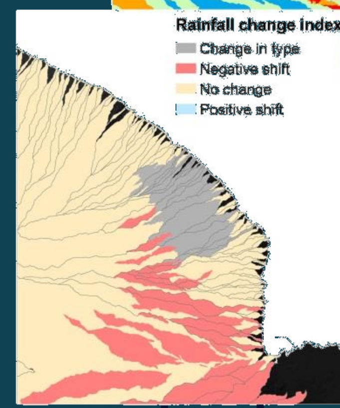


Future stream types

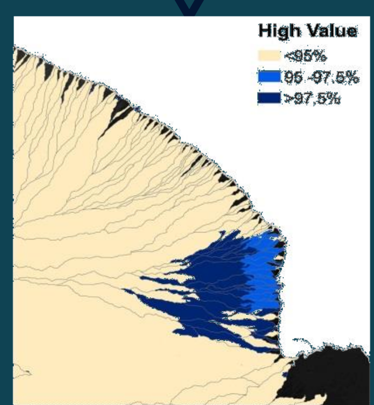




Current Habitat Condition Index



Rainfall change index



Generate multiple maps at multiple time steps for comparison

Assess overlap with effective conservation areas and priority catchments

QUESTIONS ON RESULTS?

ACQUIRING AND USING ASSESSMENT RESULTS

- Assessment results indicate which stream habitats may be limited as well as factors that may be responsible
- Results can be used alone or with other information to support decision making
- Many, many questions can be asked with these data (our presentation highlighted a few examples)
- Results are spatial and can be mapped
  - Data, scores, limiting disturbances are available at the stream reach scale of the NHDPlusV1
  - Information can also be summarized in other spatial units (HUC watersheds)
- We can help you use results in support of questions that you would like to ask

SOME OF THE GROUPS USING DATA AND RESULTS

Federal Agencies/Initiatives
EPA
IJC
NOAA
NOAA Coral Reef Ecosystem Division
NOAA Pacific Islands Regional Office
NOAA National Marine Fisheries Service
USFS
USGS Middleton
USGS Missouri Cooperative Fish and Wildlife Research Unit
USGS Reston
USGS Ohio Water Science Center
Fishers and Farmers FHP
SARP
SEACAP / SARP
Southwest Aquatics
Appalachian LCC
State Agencies
Hawaii Department of Health Environmental Planning Office
Michigan Department of Natural Resources
Michigan Department of Natural Resources - IFR
MSUE Michigan Natural Features Inventory
South Carolina DNR
Nonprofit
Huron River Water Council
The Nature Conservancy Eastern Resource Office
The Nature Conservancy Great Lakes Office

Universities
Iowa State University
Kansas State University
Michigan State University
Notre Dame
Penn State University
Southern Illinois University
University of California Santa Cruz
University of Hawaii Manoa
University of Michigan
University of Missouri
University of Montana
University of Southern Mississippi
University of Texas at Austin
University of Wisconsin
Consultants
Cadmus Group
Downstream Strategies
Martin Environmental/Sealaska
Parham & Associates Environmental Consulting, LLC
Rushing Rivers
Tetra Tech

NATIONAL FISH HABITAT PARTNERSHIP

TAKE HOME POINTS

- Nothing else like this: national scale assessment tailored to response of fish species response
- Gives a national picture of fish habitat condition; landscape-scale results are seamless across the conterminous US
- Can be used to answer questions at regional, state, or local scales
- Other data sets can be easily integrated with our results because of the spatial framework
- Using the assessment will lead to improvements; will identify what we don’t know, help guide future decisions (proof of concept in 2009 vs. 2010 vs. 2015)
- We can help you use results in support of questions that you would like to ask

THANK YOU!!!

- U.S. Fish and Wildlife Service
- NFHP Science and Data Committee
- US Geological Survey Aquatic GAP Program
  - Alexa McKerrow
  - Andrea Ostroff
- U.S. Geological Survey Climate Science Centers
- Michigan Department of Natural Resources
- Many, many data contributors…

NATIONAL FISH HABITAT PARTNERSHIP

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),
Kimberly Bonvechio (Florida Fish and Wildlife Conservation Commission),
Kevin Wehrly (Michigan Department Natural Resources),
Thom Litts (Georgia Department of Natural Resources),
Angela Grier (Indiana Department of Natural Resources),
Matt Combes (Missouri Department of Conservation),
Gust Annis (Missouri Resource Assessment Partnership),
Mike Hardin (Kentucky Department for Fish and Wildlife),
Rodney Pierce (Kentucky Department for Environmental Protection),
Jeff DeShon (U.S. Environmental Protection Agency),
Bob Miltner (U.S. Environmental Protection Agency),
Greg Kloxin (Oklahoma Conservation Commission),
Margaret Blevins (Oklahoma Conservation Commission),
Mark Scott (South Carolina Department of Natural Resources),
Frank Fiss (Tennessee Water Resources Authority),
Jim McKenna (U.S. Geological Survey),
Todd Richards (Massachusetts Division of Fish and Wildlife),
Arlene Olivero (The Nature Conservancy),
Jonathan Higgins (The Nature Conservancy),
Robert Hughes (Amniscopes),
Cecil Rich (Alaska Department of Fish and Game),
Corinne Smith (The Nature Conservancy),
Mark Hudy (U.S. Department Agriculture, Forest Service),
Gordon Smith (US Fish and Wildlife Service),
Glen Higashi (Hawai'i Division of Aquatic Resources),
Linda Koch (University of Hawai'i at Manoa),
Malie Beach-Smith (Hawai'i Department of Health),
Robert Nishimoto (Hawai'i Division of Aquatic Resources),
Dan Polhemus (US Fish and Wildlife Service),
Jim Parham (Parham and Associates Environmental Consulting),
Billy Justus (USGS, Arkansas Water Science Center),
Stan Lee Miller (Clemson University),
Neil Stichert (US Fish and Wildlife Service),
Brant E. Fisher (Indiana Department Natural Resources),
Stacey Sobat (Indian Department Environmental Management),
Mike Slattery (U.S. Geological Survey)
Jamie Carter (National Oceanic and Atmospheric Administration, Pacific Services Center),
Kalisi Fa'anunu Mausio (National Oceanic and Atmospheric Administration, Fisheries Service - Pacific Islands),
Risa Oram (National Oceanic and Atmospheric Administration, Pacific Islands Fisheries Science Center),
Ryan Snow (Alaska Department of Fish and Game),
Shane Hertzog (Alaska Department of Fish and Game),
Nicole Eiden (Arizona Game and Fish Department),
Jeffery W. Quinn (Arkansas Department of Environmental Quality),
Sally Entrekin (University of Central Arkansas),
Rick Feeney (Natural History Museum of Los Angeles County),
Harry Vermillion (Colorado Division of Parks and Wildlife),
Ellen Dickey (Delaware Department of Natural Resources),
Ann Holtrop (Illinois Department of Natural resources),
Tom Wilton (Iowa Department of Natural Resources),
Mark Van Scoyoc (Kansas Department of Natural Resources),
John Brumely (Kentucky Division of Water),
Brian Alford (Louisiana Department of Wildlife and Fisheries),
Beau Gregory (Louisiana Department of Wildlife and Fisheries),
Mary Gallagher (Maine Department of Environment Protection),
Ross Williams (Maryland Department of Natural Resources),
John Sandberg (Minnesota Pollution Control Agency),
Jake Schaefer (University of Southern Mississippi),
Ken Bazata (Nebraska Department of Environmental Quality),
Patrick Sollberger (Nevada Department of Wildlife),
John Magee (New Hampshire Fish and Game Department),
Lisa Barno (New Jersey Division of Fish and Wildlife),
Alexandra M. Snyder (Museum of Southwest Biology),
Steve Hurst (New York State Department of Environmental Conservation),
Bryn Tracy (North Carolina Division of Water Quality),
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),
Michael Kaller (Louisiana State University),
William Kelso (Louisiana State University),
Christopher L. Higgins (Tarleton State),
Rich Langdon (Vermont Fish and Wildlife Department),
Frank J. Rahel (University of Wyoming),
Russell Burman (Pennsylvania Fish and Boat Commission),
Deborah Hart (Southeast Alaska Fish Habitat Partnership)