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National Fish Habitat Action Plan
Data Viewer Application
Outline

- Overview of the NFHAP habitat assessment project.
- The NFHAP spatial framework.
- The habitat assessment process.
- Data viewer development.
- Next Steps
NFHAP Objectives

- Prepare a “Status of Fish Habitats in the United States” report in 2010 and every five years thereafter.
- **Identify priority fish habitats** and establish Fish Habitat Partnerships targeting these habitats by 2010.
- Establish 12 or more **Fish Habitat Partnerships** throughout the United States by 2010.
- Protect all intact and healthy fish habitats by 2015.
- Improve the condition of 90 percent of priority habitats and species targeted by Fish Habitat Partnerships by 2020.
- **Conduct a condition analysis of all fish habitats within the United States by 2010.**
Goal: Conduct a condition analysis of all fish habitats within the United States by 2010.

An initial assessment of integrated human disturbances on stream fish habitats in the conterminous United States.

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Preparing the Habitat Assessment Report: Goals

- Develop a *spatial framework* that allows for the organization and summary of habitat information at multiple spatial levels (catchment, reach, HUC, EDU, state, ecoregion, etc).

- Using only available national datasets, calculate an *assessment of habitat conditions* in the river systems of the lower 48 states such that results are comparable nationally.

- Assessments for Alaska, Hawaii, and coastal/estuarine fish habitats are being completed with different methodology.
The Spatial Framework – Base Units

- Data source: **NHD+ hydrography**.
- Analysis was performed at the smallest unit of the NHD+ data: Individual confluence to confluence **stream reach / associated catchment**.
- About 2.6 million unique reaches in the lower 48 states.
Catchment Size
The Spatial Framework – Larger Units
Results can be summarized to larger scales

Ecological Drainage Units (EDU’s)

Ecoregions

States
## The Habitat Assessment Process

### 6 Natural Variables
- Catchment area
- Soil permeability
- Mean slope
- Mean elevation
- Mean annual air temp.
- Mean annual precip.

### 13 Disturbance Variables
- Urban (Low, Medium, High density)
- Pasture/Hay
- Cultivated crops
- Population density
- Road crossing density
- Road density
- Dams
- Mines/mineral processing plants
- TRI Sites
- Superfund Sites
- NPDES sites

19 Variables assigned to each confluence to confluence stream reach
The Habitat Assessment Process

- Using the 19 variables, a *Habitat Condition Index (HCI)* was calculated for each stream reach/catchment at the *local* and *network* level.

- A *cumulative HCI*, which estimates the combined local and network disturbance, was also calculated for each stream/reach catchment.

- Result is a series of maps showing Habitat conditions at various spatial scales.
Cumulative Habitat Condition Index Maps

Relative Disturbance
- 0 - 20%
- 20 - 40%
- 40 - 60%
- 60 - 80%
- 80 - 100%

Catchments

HUC 8
EDU's
State
Ecoregion

OFWIM 2010 Annual Meeting – Lake Barkley, KY
Data viewer development; Goals

- Design a **web interface** which allows the display and query of the Habitat Condition Index (HCI) maps in the final assessment report.
- Provide a means for the user to **download** the final assessment dataset.
- Display other **associated datasets** (fish presence, PAD-US data, FHP partnership boundaries, FHP project locations, etc).
- **Audience:** *Public to Scientists.*
Web Interface - System Architecture

- **HTML/CSS/JavaScript** application.
- **JQuery** JavaScript framework UI elements (accordion and tabs).
- **ESRI JavaScript API for Google Maps**.
- Development version uses **ArcGIS server 9.3.1** with both tiled and dynamic map services.
Data Distribution

- Variables which were used in the draft report are accessible from the “Science and Data” section of the fishhabitat.org website.
- Data tables are available in zipped .dbf format.
- Data is available packaged by state, hydrologic region, and clipped to fish habitat partnership boundaries.
- When the final scores are released, they will be available for download from fishhabitat.org.
Data Viewer Sections

http://dev-nbii-gis.cr.usgs.gov/nfhap/
Scale and Functionality – State Scores

National Fish Habitat Action Plan

DATA VIEWER CONCEPT - DRAFT

Map controls

- Habitat Condition Indices for stream fish habitats
  - Scale: State
  - Options: 0 - 20%, 20 - 40%, 40 - 60%, 60 - 80%, 80 - 100%

Fish Habitat Partnership Boundaries

- National Fish Habitat Partnerships target geographic and species habitat needs. (read more)
- Options: All partnerships, None

New Jersey

Habitat Condition Index (HCl) for New Jersey

The habitat condition index (HCl) estimates the expected condition of habitats based on the intensity of human disturbance to the landscape affecting the river reach. In the Map Controls section to the left, select 'HCl catchments' from the list to see the native scale of this study and to view the disturbance variable data that was used to compute the disturbance score. The HCl for New Jersey is 38.74.
Scale and Functionality – Integrating other datasets

National Fish Habitat Action Plan

DATA VIEWER CONCEPT - DRAFT

Map controls

- Habitat Condition Indices (HCI) for stream fish habitats
  - Scale: State
    - 0 - 20%
    - 20 - 40%
    - 40 - 60%
    - 60 - 80%
    - 80 - 100%

- Fish Habitat Partnership Boundaries
  - National Fish Habitat Partnerships target geographic and species habitat needs.

- NFHAP Project Locations
  - NFHAP conservation projects implemented

About this map viewer

Data and public map services

New Jersey

Limiting and Co-Limiting variables for New Jersey:
- Natural and disturbance variables at the stream reach level were aggregated to compute a HCI score at the state level. The two variables below were identified as being the primary (limiting) and secondary (co-limiting) variables for fish habitat in this state.

Limiting Variable:
- Castle Grazing - Strongly Limiting

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Scale and Functionality – Integrating other datasets

National Fish Habitat Action Plan

DATA VIEWER CONCEPT – DRAFT

- Map controls
  - When map is clicked, identify features in:
    - Habitat Condition Indices and related data
  - Scale: State
    - 0 - 20%: Habitat Condition Indices are available for several different geographic units. NHD+ catchments have additional data available. (read more)
    - 20 - 40%: Habitat Condition Indices are available for several different geographic units. NHD+ catchments have additional data available. (read more)
    - 40 - 60%: Habitat Condition Indices are available for several different geographic units. NHD+ catchments have additional data available. (read more)
    - 60 - 80%: Habitat Condition Indices are available for several different geographic units. NHD+ catchments have additional data available. (read more)
    - 80 - 100%: Habitat Condition Indices are available for several different geographic units. NHD+ catchments have additional data available. (read more)
  - Opacity: 0 - 100

Fish Habitat Partnership Boundaries
- National Fish Habitat Partnerships target geographic and species habitat needs. (read more)
  - Show partnership areas of overlap
  - Atlantic Coastal FHP
  - California FHP
  - Desert Fish Habitat Partnership
  - Dustless Area Restoration
  - Eastern Brook Trout Joint Venture
  - Select: All partnerships | None

- NHAP Project Locations
  - NHAP conservation projects implemented

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Scale and Functionality – Integrating other datasets

National Fish Habitat Action Plan

DATA VIEWER CONCEPT – DRAFT

Map controls

When map is clicked, identify features in:

Habitat Condition Indices and related data

- Habitat Condition Indices (HCI) for stream fish habitats
  - 0 - 20%
  - 20 - 40%
  - 40 - 60%
  - 60 - 80%
  - 80 - 100%

Fish Habitat Partnership Boundaries

National Fish Habitat Partnerships target geographic and species habitat needs. (read more)

- Show partnership areas of overlap
  - Atlantic Coastal Fish Habitat Partnership
  - California Fish Habitat Partnership
  - Desert Fish Habitat Partnership
  - Driftless Area Restoration Program
  - Eastern Brook Trout Initiative

NFIAP Project Locations

NFIAP conservation projects implemented

- About this map viewer

- Data and public map services

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USA.gov | science.gov | NBI | USGS

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Scale and Functionality – EDU Scores

National Fish Habitat Action Plan

DATA VIEWER CONCEPT - DRAFT

Map controls

- Map
- Satellite
- Hybrid
- Terrain

Lower Delaware EDU

Disturbance Scores
Fish Data

Cumulative disturbance score for the Lower Delaware EDU: 40.88

This EDU disturbance score is an aggregation of scores originally calculated at the stream reach level. In the Map Controls section of the left, select ‘NHDE catchments’ from the list to see the native scale of this study and to view the disturbance variable data that was used to compute the disturbance score.

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Scale and Functionality – HUC8 Scores

National Fish Habitat Action Plan

DATA VIEWER CONCEPT – DRAFT

Map controls
When map is clicked, identify features in:
- Habitat Condition Indices and related data
- Habitat Condition Indices (HCI) for stream fish habitats
  - Scale: HUC 8
    - 0 - 20%: Habitat Condition Indices are available for several different geographic units. HUC8 catchments have additional data available.
    - 20 - 40%
    - 40 - 60%
    - 60 - 80%
    - 80 - 100%
  - Opacity: 0 - 100

Fish Habitat Partnership Boundaries
National Fish Habitat Partnerships target geographic and species habitat needs.
- Atlantic Coastal FP
- California FP
- Desert Fish Habitat Partnership
- Driftless Area Restoration
- Eastern Brook Trout Joint Venture
- Select: All partnerships | None

NFHAP Project Locations
NFHAP conservation projects implemented

About this map viewer

Data and public map services

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Scale and Functionality – Catchment Scores

National Fish Habitat Action Plan

DATA VIEWER CONCEPT - DRAFT

Map controls
When map is clicked, identify features in:
- Habitat Condition Indices and related data

Fish Habitat Partnership Boundaries
National Fish habitat Partnerships target geographic and species habitat needs.

NFHAP Project Locations
NFHAP cooperation projects implemented.

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Additional Layers: Fish Habitat Partnership Boundaries
Additional Layers: Fish Habitat Partnership Projects

National Fish Habitat Action Plan

DATA VIEWER CONCEPT - DRAFT

Map controls
When map is clicked, identify features in:

- NFHAP Projects

- Relative disturbance scores for stream fish habitats
  Scale: State
  - 0 - 20%
  - 20 - 40%
  - 40 - 60%
  - 60 - 80%
  - 80 - 100%

Fish Habitat Partnership Boundaries
National Fish Habitat Partnerships target geographic and species habitat needs.
- Atlantic Coastal FHP
- California FHF
- Desert Fish Habitat Partnership
- Driftless Area Restoration
- Eastern Brook Trout Joint Venture
- Select: All partnerships | None

NFHAP Project Locations
NFHAP conservation projects implemented
- Wallacks Branch of Bob's Creek, PA

This project will benefit brook trout populations in Wallacks Branch of Bob's Creek, Pennsylvania by removing fish barriers and creating in-stream habitat. Modifications to five small structures (including small dams) which currently reduce free movement.
Next Steps

- Final report will be released soon.
- Final version of data viewer application will be released simultaneously or shortly thereafter.
- ArcGIS map services will be provided (hosted by NBII).
- More fish data will be added to further refine the assessment and viewer will be updated.
Questions?

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