National Assessment of Impaired Waters
Within or Near
US Fish and Wildlife Service Properties

National Wildlife Refuge System
National Fish Hatchery System

Impaired Waters

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Opening thoughts

- Federal land management agencies manage 30% of US land
- Other federal agencies (USDA, DOT) substantially influence additional lands
- All agencies have stewardship responsibilities
- They want data on impaired waters on their lands
- This CANNOT BE DONE without impaired waters data in geospatial form… the great integrator
EPA Co-Occurrence Assessments

- Identify impaired waters, pollutants, and existing TMDLs within and near Federal properties using GIS

- Develop these data into interactive products that support Federal land management agency stewardship

...an FWS national co-occurrence assessment example...
FWS features assessed with the GIS data

- Refuges
- Hatcheries
- Waterfowl production areas
- “Near” catchments
- Impaired waters outside FWS
- Impaired waters near FWS
- Impaired waters in FWS
The Bottom Line....

- **804 impaired waters** occur within or near FWS properties nationally (2% of US impaired waters listed in the 2002 baseline data)
- **303 FWS properties** are affected
- Total length of known linear impaired waters (within + near) = **10,755 km** (6% of all river & stream length within FWS properties)
- Total area of polygonal impaired waters (within + near) = **2,510 sq km**
- **Nutrients, oxygen depletion, pathogens and mercury** are most frequent causes
- **Distribution patterns (# occurrences per state) vary markedly** among impairment types
- **Products of this assessment** have been developed to assist FWS restoration planning and management at local to national scales
Five Products for FWS Users

1. Database summary statistics
2. Pattern analyses
3. Master spreadsheets
4. GIS data, ArcReader browsable ‘map’
5. User assistance: report, website

Note: USGS Phase III products also coming in 2010
# National Summary Statistics about impaired waters and FWS properties

<table>
<thead>
<tr>
<th>Measure</th>
<th>IN NWR</th>
<th>NEAR NWR</th>
<th>IN WPA</th>
<th>NEAR WPA</th>
<th>NEAR NFH</th>
<th>IN AND NEAR ALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of impaired waters*</td>
<td>429</td>
<td>687</td>
<td>20</td>
<td>42</td>
<td>17</td>
<td>804</td>
</tr>
<tr>
<td>Number of properties affected*</td>
<td>178</td>
<td>248</td>
<td>17</td>
<td>31</td>
<td>15</td>
<td>303</td>
</tr>
<tr>
<td>Impaired length (km)</td>
<td>3,968</td>
<td>6,450</td>
<td>14</td>
<td>270</td>
<td>53</td>
<td>10,755</td>
</tr>
<tr>
<td>Impaired area (sq km)</td>
<td>1,251</td>
<td>1,195</td>
<td>4</td>
<td>60</td>
<td>0</td>
<td>2,510</td>
</tr>
</tbody>
</table>

* - the same impaired water or property may be counted in more than one column
### 1. Summary Statistics

Top impairments for impaired waters within or near FWS properties (ranked by frequency of occurrence)

<table>
<thead>
<tr>
<th>1. Pathogens</th>
<th>8. Habitat Alteration</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Nutrients</td>
<td>9. PCBs</td>
</tr>
<tr>
<td>3. Oxygen Depletion</td>
<td>10. Turbidity</td>
</tr>
<tr>
<td>4. Mercury</td>
<td>11. Temperature</td>
</tr>
<tr>
<td>5. Pesticides</td>
<td>12. Flow Alteration</td>
</tr>
<tr>
<td>7. Metals (Other Than Mercury)</td>
<td>14. Salinity/TDS/Chlorides</td>
</tr>
<tr>
<td></td>
<td>15. pH</td>
</tr>
</tbody>
</table>
2. Example Pattern Analysis

TOTAL IMPAIRED WATERS IN/NEAR FWS PROPERTIES
BY STATE, BASED ON COUNT*

*NOTE: THE "IMPAIRED WATERS" COUNT REFER TO
• a specific impaired water body or segment of
  a water body (as reported by the state using a
  specific List ID), and
• its location within or near FWS property

33-79 impaired waters in/near FWS properties
18-30 impaired waters in/near FWS properties
8-15 impaired waters in/near FWS properties
4-7 impaired waters in/near FWS properties
1-3 impaired waters in/near FWS properties
No impaired waters in/near FWS properties
2. Example Pattern Analysis

**TOP IMPAIRMENTS IN/NEAR FWS PROPERTIES BY STATE**

NUTRIENTS (by count)

- **Nutrients National Rank:**
  - #2 by count
  - #1 by length
  - #1 by area

- 31+ impairments in/near FWS properties
- 11-30 impairments in/near FWS properties
- 5-10 impairments in/near FWS properties
- 1-4 impairments in/near FWS properties
- No nutrient impaired waters in/near FWS properties
2. Example Pattern Analysis

TOP IMPAIRMENTS IN/NEAR FWS PROPERTIES BY STATE
MERCURY (by count)

Mercury National Rank:
• #4 by count
• #4 by length
• #3 by area

31+ impairments in/near FWS properties
11-30 impairments in/near FWS properties
5-10 impairments in/near FWS properties
1-4 impairments in/near FWS properties
No mercury-impaired waters in/near FWS properties
3. Spreadsheets: sort for multi-scale data and visuals
Project data were also sorted by watersheds with up to 25%, 50%, 75% or 100% FWS ownership:

- Is FWS restoring impaired watersheds where FWS >50% owner?
- Is FWS protecting watersheds without impairments where FWS is the major owner?
Browsing the ‘read-only’ dataset shows that a TMDL is done, and the TMDL ID is provided for obtaining the document online via EPA’s ATTAINS Expert Query system.

4. GIS Data and Arc Reader Browsable Dataset

Browsing the ‘read-only’ dataset shows that a TMDL is done, and the TMDL ID is provided for obtaining the document online via EPA’s ATTAINS Expert Query system.
Assessment Report (in review)

Serves as:

- overview of the national assessment
- primary results
- summary guide to each product and its uses

BUT --

a simple document is unable to contain the interactive products
5. User Assistance: Web site

**Federal Lands Studies**

*You are here: EPA Home > Water > WATERS > Reporting > Federal lands studies*

**Federal Lands Studies Home**
- Overview
- Assessments
  - US Fish and Wildlife Service
  - US Forest Service
  - Other Assessments
- Contacts

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**Impaired Waters In/Near FWS Properties, by State/Territory**

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**A National Assessment of Impaired Waters Within or Near US Fish and Wildlife Service Properties**

The EPA, FWS, and USGS collaborated during 2008-2009 in analyzing the co-occurrence of impaired waters and FWS properties using geospatial data. This effort produced several assessment products designed to help these agencies use better data about risks to aquatic systems within or near public lands. This Web page
5. User Assistance: Web site

makes available all of these assessment products and identifies those products requiring special skills. This site is hosted separately on the FWS Intranet and the EPA Intranet to provide internal access throughout both agencies.

Assessment Results Document
This 71-page document is the central information source for the assessment purpose, methods, findings, and products.

Full Text of Final Report (PDF, ___ kb)

Summary Information
The 3-page Executive Summary is an overview of the assessment and its major findings. The four tables below summarize findings FWS-wise and for each of three property types individually.

Executive Summary of Final Report (PDF, ___ kb)
National Summary Table (PDF, ___ kb)
National Wildlife Refuges Summary Table (PDF, ___ kb)
National Fish Hatcheries Summary Table (PDF, ___ kb)
Waterfowl Production Areas Summary Table (PDF, ___ kb)

Assessment Findings (Excel spreadsheets for download)
These are the summarized tabular data from the assessment. Users should be familiar with using Excel spreadsheets.

Master Spreadsheet: FWS Properties, Waters, and Impairments (XLS, ___ kb)
Spreadsheet: Impaired Waters with Completed TMDLs (XLS, ___ kb)
Spreadsheet: HUC12 Watersheds with Impaired Waters (XLS, ___ kb)

Assessment Geospatial Datasets (geospatial files for download)
These are the mapped data from the assessment. The ArcGIS files require fluency in GIS Technology; the ArcReader files are for broad audiences with average computer skills, but a freeware download is required (see below).

FWS Properties/Impaired Waters National GIS Dataset (ArcGIS files for download)
Read-Only Version, FWS Properties/Impaired Waters National GIS Dataset (ArcReader files for download)
NOTE: To browse the ArcReader product, first download ArcReader Version 9.3 Tutorial: How to Use the FWS ArcReader Dataset

Outreach and Other Resources
Overview Presentation on Assessment (PPT, ___ kb)
Pattern Analysis National Maps (PPT, ___ kb)
Clean Water Act Training Overview (PPT, ___ kb)
Impaired Waters GIS Fact Sheets (PDF, ___ kb)
Status and Plans

- Co-occurrence assessments are a featured topic in the 2009 EPA Office of Wetlands, Oceans and Watersheds Report

- Forest Service national data analysis is also completed, agency support products being designed

- Other land management agencies in varying stages of discussion and/or planning

- Non-landowner agencies are another growing clientele (FHWA highway corridors, USDA watersheds with CRP proposals, OSMRE minelands/impaired waters co-occurrence)