

Assessing Natural Resource Impacts from a Pipeline Spill into the Kalamazoo River

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Presentation Outline

- NRDA overview
- Incident description
- Data collection efforts

What is Natural Resource Damage Assessment and Restoration (NRDA)?

- ⦿ **A structured process defined in regulations:**
 - Determine injury through time to natural resources due to a release of oil
 - Assess damages for injuries to recover and restore trust resources and their services
 - Recover damages as money or restoration projects via a negotiated settlement or litigation
 - Implement and evaluate restoration
- ⦿ **Government agencies (Trustees) act on behalf of the public**
- ⦿ **Compensatory, polluter pays**

Primary Statutory Authorities

- ⦿ **National Contingency Plan (NCP)**
 - Regulations at 40 CFR 300
- ⦿ **Oil Pollution Act (OPA)**
 - **Regulations at 15 CFR 990**
- ⦿ **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**
 - Regulations at 43 CFR 11
- ⦿ **Clean Water Act (CWA)**
- ⦿ **State laws (NREPA)**

NRDAR Goal

- ⦿ **Restore injured natural resources and the services they provide**
- ⦿ **For NRDAR, “restore” means:**
 - **restore, rehabilitate, replace, or acquire the equivalent of injured natural resources and services**
- ⦿ **Make the environment and public whole for injuries to natural resources and services resulting from an incident involving a discharge or substantial threat of a discharge of oil (OPA)**

Trustees seek to determine:

- ⦿ What natural resources are/have been injured?
- ⦿ What was the extent of the injury?
 - Spatial extent
 - Duration
 - Severity
- ⦿ How long will the injury take to recover?
- ⦿ How much restoration is needed to compensate for the injuries over time?

The Incident

- On July 25, 2010, a 30" pipeline ruptured
- Approximately 1 million gallons of tar sands crude oil released
- Oil seeped through wetland soils into a creek tributary to the Kalamazoo River



The Setting



Ceresco Dam

Morrow Dam



Morrow Lake

Battle Creek

Marshall
Source

Image USDA Farm Service Agency
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Image U.S. Geological Survey
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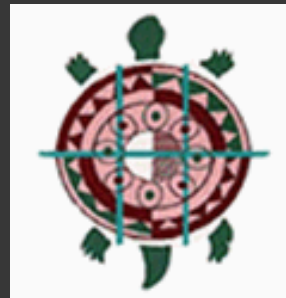
Imagery Date: June 1, 2005

Lat: 42.288595° Lon: -85.234232° elev: 936 ft

Google
Eye alt: 30.48 mi

Trustees act on behalf of the public

Eight agencies work as trustees for the Kalamazoo River Oil Spill





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Source: US/EP

Trustee Approach to Assessment

- ④ Identify probable injuries
- ④ What data are response agencies collecting that can be used for injury characterization?
 - Coordinate with response agencies to share the data
 - Identify data gaps, develop sampling plans
- ④ What baseline data are available and how informative are they?
 - Is it possible to conduct similar surveys post-spill?

Overview of NRDA Data Collected

- Wildlife oiling, recovery, and release
- Water and sediment chemistry
- Extent of oiling in floodplain habitats
- Fish
- Aquatic macroinvertebrates
- Mussels
- Floodplain vegetation
- Impacts resulting from response actions

Wildlife Recovery

- Wildlife operations conducted by State and Federal Agencies, Responsible Party, and RP contractors
- Data collection and data integrity
 - Document level of effort and geographic coverage of wildlife operations
 - Document capture, rehabilitation, and release of oiled animals
- Over 170 birds, 3,000 turtles, and 38 mammals were brought to the rehabilitation center, with survival rates to release of 84%, 97% and 68%, respectively



PAH Analysis

- ⦿ Water column
 - 8 locations
 - 3 sampling events (July – August 2010)
- ⦿ Mussel tissue and co-located sediment
 - 12 composite samples at 4 locations
- ⦿ Field filtered water samples
 - 8 locations, probable fish spawning habitats
 - 6 sampling events (April – July 2011)

Floodplain Oiling Survey

● Objectives

- Identify and characterize extent and degree of oiling in the floodplains
- Characterize the general floodplain habitat types in the areas of the spilled oil

● Methods and Results

- Transects at 50m intervals
- 744 transects surveyed representing 23 river miles and associated floodplains
- 66% of transects were oiled to some extent
- Field observations provided to Response and data later used by Response

Fish Kill Surveys

- Conducted by state fishery biologists
- Followed previously published standard protocols
- No fish kills in impacted area

Fish Status And Trends

- Conducted by state fishery biologists
- Followed standard protocols
 - 6 locations (2 upstream reference sites)
 - Baseline data at two sites - including a long-term monitoring site



Fish Status and Trends

- ◉ Fish data included:
 - Catch per effort and length of all species
 - Age and growth of smallmouth bass.
- ◉ Habitat data included:
 - Conductivity, temperature, substrate, channel width and depth, velocity, bank and riparian condition, and large woody debris density
- ◉ Results
 - Talmadge Creek fish community was reduced and habitat greatly diminished in 2010. Some recovery in 2011; further cleanup activities necessitate continued monitoring.
 - Some declines in fish community diversity and abundance at some of the sites on the Kalamazoo River

Fish Exposure and Health

- Data collected in cooperation with USGS
 - 110 fish from 4 sampling locations
(includes 1 upstream reference)
- Analyses include:
 - Histopathology of gill, spleen, head kidney tissues
 - Differential analysis of blood smears
 - Health assessment index
 - Collected and archived bile samples for possible future analysis



Aquatic Macroinvertebrate Survey

- ◉ State biologists followed preexisting protocols
 - 7 locations
 - Including locations with historical reference data
- ◉ Results
 - Spill response activities removed some vegetation, exposing more of the stream channel to sunlight, thus there were changes in diversity and abundance.
 - In 2011, scores improved at most impacted sites but abundance was still impacted compared to upstream reference sites and pre-spill baseline data.
 - Ongoing cleanup work requires further monitoring.

Mussel Shell Survey

- Assessed physical condition of post-mortem mussel shells:
 - Broken vs. crushed
 - Degree of weathering, ranging from “fresh dead” to “heavily worn”
- 18 species were documented
- Crushed and freshly dead shells found within the spill area but not in reference area



Rapid Vegetation Survey

- Identify types of vegetation present
- Identify rates of invasive plant species in order to compare over time

Erosion

- Proactively raised concerns to Response based on field observations
- Reviewing response plans and monitoring results



NRDA Data Collection Summary

- Standard state-wide monitoring programs provided baseline data for comparison with post-incident data
 - Standard protocols for monitoring programs facilitate collection of comparable post-incident data at additional sites
- Trustees worked with Response agencies to communicate field conditions and minimize duplicative sampling efforts
- Trustees implemented studies that addressed data gaps specific to the incident and site characteristics



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