

Public Meeting

IL Department of Natural Resources (IDNR)

IL Environmental Protection Agency (IEPA)

MO Department of Natural Resources (MoDNR)

Natural Resources Damage Assessment

Sauget Industrial Corridor Site

August 6, 2013

Meeting Agenda

- Introduction: Todd Rettig, Office Director
IDNR's Realty & Environmental Planning
- NRDA Background: Todd Rettig
- Remedial Status: Paul Lake, Project Manager
Illinois EPA's Bureau of Land
- Assessment Plan Overview:
 - Surface Resources: Tom Heavisides (IDNR)
 - Groundwater Resources: Jamie Holmes (Stratus Consulting Inc.)

Public Questions and Comments:

- no court reporter present
- written comments on Assessment Plan accepted until September 6, 2013

Natural Resource Damage Assessments

- What is NRDA?
 - ▣ A mechanism provided by OPA, CERCLA, CWA that authorizes Natural Resource Trustees to seek compensation for the public for injuries to natural resources



- Who administers it?
 - ▣ Trustees: NRDA federal law requires the designation of officials from federal, state, or tribal governments to act as trustees to protect public interest in natural resources and the services they provide
- What is the goal?
 - ▣ To 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 (15 C.F.R. Part 990.10) and/or a release of a hazardous substance (43 C.F.R. Part 11)

SCOPE and LEGAL FRAMEWORK

Natural Resource Damage Assessment:

- Generally a post remediation process - where natural resource trustees determine compensation for injuries to natural resources that have not been nor are expected to be addressed by response actions.
- The goal is to restore the services lost to people and the environment because of the natural resource damages.
- Trustees can bring claims at sites where no remediation is planned.

SCOPE and LEGAL FRAMEWORK (continued)

- ❑ Elements of Liability
- ❑ Site meets the definition of facility
- ❑ Hazardous substances have been released
- ❑ Owner, Operator, Arranger
- ❑ Injury to, or destruction of, natural resources that resulted from the hazardous substance release

DEFINITIONS

A **TRUSTEE** is any Federal natural resource management agency designated by the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) and any State agency designated by the Governor.

- ☐ *Federal*

- *Secretary of the Interior*
- *Secretary of Commerce*
- *Secretary of Defense*
- *Secretary of Agriculture*
- *Secretary of Energy*

- ☐ *Governor of each State can appoint Trustees*

- *Illinois Environmental Protection Agency*
- *Illinois Department of Natural Resources*

- ☐ *Tribes*

DEFINITIONS (CONTINUED)

NATURAL RESOURCES include all land, biota, fish, shellfish, and other wildlife, air, waters and other such resources.



Natural resources are not limited by the ownership of the property on which the natural resources are found.

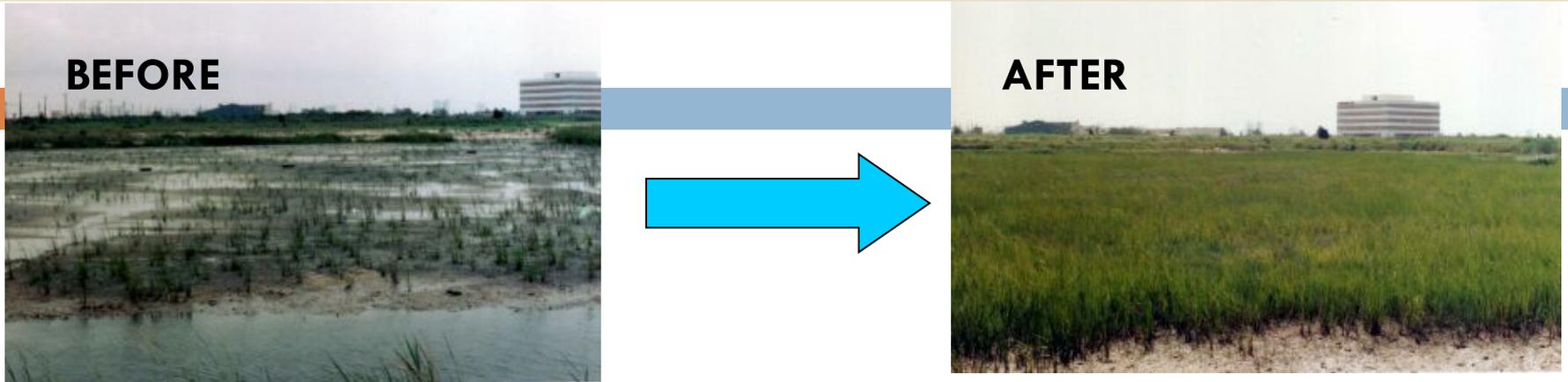
DEFINITIONS (CONTINUED)

An **INJURY** is an observable or measurable adverse change or impact to a natural resource or impairment of natural resource services as a result of a release, whether direct or indirect, long-term or short-term, and includes the partial or complete destruction or loss of the natural resource.



Injuries can be ecologically based, such as the contamination of a stream fishery and/or use based, such as the public's inability to use the stream for fishing.

DEFINITIONS (CONTINUED)



Restoration is the action that returns the natural resources to pre-discharge conditions. It includes a primary & compensatory component.

❑ **PRIMARY RESTORATION** relates to the rehabilitation of injured natural resources, replacement, or acquisition of natural resources and their services which were lost or impaired.

❑ **COMPENSATORY RESTORATION** addresses compensation for the natural resource functions and services lost from the beginning of the injury through full recovery of the resource.

Components of NRDA

Contract
Management
Budget Analysis

Case Management
Administrative
Support

Natural
Resource
Economics

Field Research
Science

Public
Relations

Restoration
Ecology

NEPA
Compliance

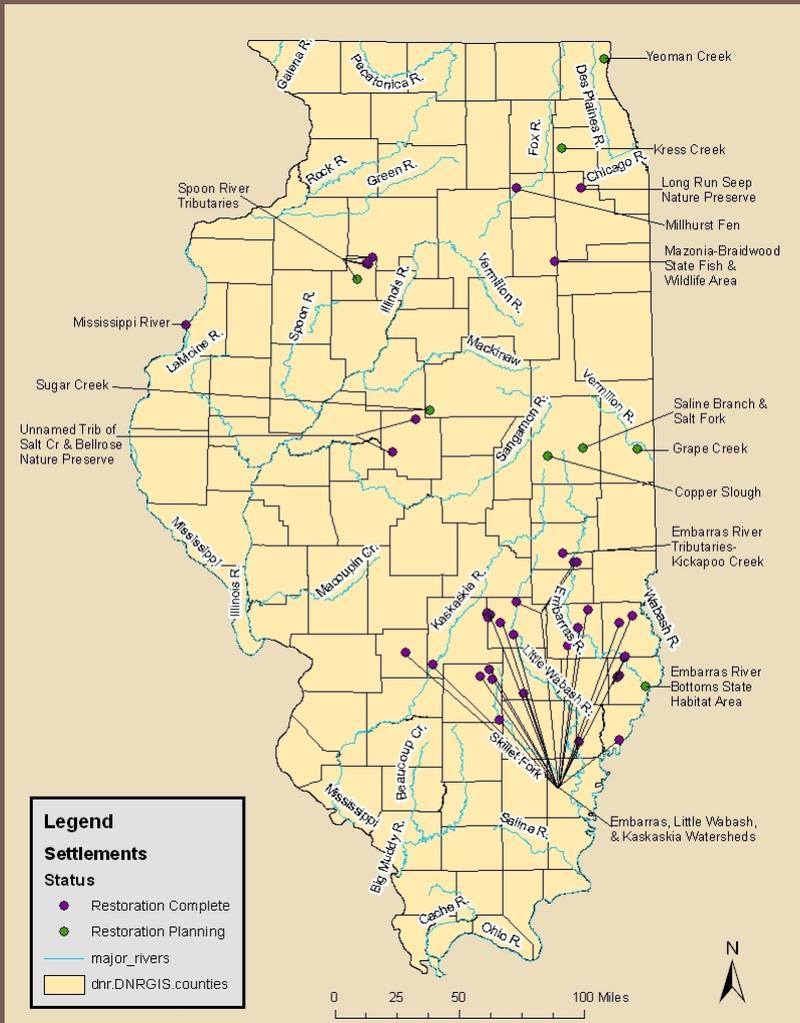
Environmental
Law



Negotiation
Strategy

Toxicology

NATURAL RESOURCE DAMAGE ASSESSMENT PROGRAM



<http://www.dnr.illinois.gov/programs/NRDA/Pages/default.aspx>

Items that follows...

- Remedial update and relevance to NRDA issues at site
- Assessment Plan Overview
 - ▣ Assessment Plan Surface Resources
 - ▣ Assessment Plan Groundwater Resources

Remedial Update

- Illinois EPA

Basic Questions

- *Who:* Federal & State Trustees (USFWS, IL IEPA, IL DNR, MO DNR)
- *What:* Conducting a natural resource damage assessment at the Sauget Industrial Corridor, specifically release of assessment plan
- *Where:* Sauget Industrial Corridor – includes Sauget Area 1 sites, Sauget Area 2 sites, W.G Krummrich Plant, Clayton Chemical Plant & impacted natural resources.
- *Why:* Inform the public about the Trustee's assessment plan

Assessment Plan for NRDA of SIC

- US Department of Interior NRDA regulations – under the authority of CERCLA and CWA, DOI issued regulations 43 CFR § Part 11 for conducting damage assessments following the discharge of oil and/or the release of hazardous substances
- First step - develop Pre-Assessment Screen (completed in 2009)
- Concluded further assessment warranted and estimate of damages will likely exceed the costs of assessment

Assessment Plan Purpose

- The purpose of the DOI regulations is “to provide standardized and cost-effective procedures for assessing natural resource damages” [43 CFR § 11.11].
- When trustees complete an assessment according to these procedures, the results “shall be accorded the evidentiary status of a rebuttable presumption” [43 CFR § 11.11].
- Therefore, the damage assessment described in this Assessment Plan will follow the regulations promulgated by DOI at 43 CFR Part 11.

Organizational Responsibilities of Assessment Work

- The Illinois State Trustees will conduct assessment of Groundwater resources.
- The Illinois State Trustees and the Missouri State Trustee will conduct assessment of State natural resources in the Mississippi River.
- The Illinois State Trustees and the Federal Trustee will conduct assessment of State and Federal Surface Resources (terrestrial, Dead Creek and other aquatic, wetlands, ponds, small streams).

Necessary Elements included in Assessment Plan

- A statement of the authority for asserting trusteeship, or co-trusteeship, for those natural resources considered within the Assessment Plan [43 CFR § 11.31(a)(2)];
- Explanation of the decision to proceed with a type B assessment [43 CFR § 11.31(b)];
- Information sufficient to demonstrate coordination with remedial investigation and feasibility studies (RI/FS) [43 CFR § 11.31(a)(3)];
- Descriptions of the geographic areas and natural resources involved [43 CFR § 11.31(a)(2)];

Necessary Elements included in Assessment Plan (cont.)

- Results of the confirmation of exposure of natural resources to hazardous substances [43 CFR § 11.31(c)(1)];
- Descriptions of the general approach for injury determination [43 CFR § 11.62] and injury quantification [43 CFR § 11.71(b)(2)];
- Descriptions of the approach for conducting the damage determination [43 CFR § 11.80] ; and,
- A Quality Assurance Plan that satisfies the requirements listed in the NCP and applicable United States Environmental Protection Agency (USEPA) guidance for quality control and quality assurance plans [43 CFR § 11.31 (c)(2)].

Descriptions of the geographic areas and natural resources involved [43 CFR § 11.31(a)(2)]

- Broadly natural resources include; geologic resources, ground water, surface water and biological resources
- Notable natural resources in area:
 - ▣ American Bottoms Aquifer
 - ▣ Mississippi River, Dead Creek, Prairie du Pont Creek, Cahokia Chute
 - ▣ Migratory birds (part of Miss River flyway), rookeries, sturgeon, wetland species

Results of the confirmation of exposure of natural resources to hazardous substances [43 CFR § 11.31(c)(1)]

Example of From Appendix A , Site by Site Selected Media Contamination Levels

Site G Contamination	Site H Contamination	Site I Contamination	Site L Contamination	Site M Contamination
VOCs	VOCs	VOCs	VOCs	VOCs
Benzene (Soil- 45,349 ppb) (GW- 4,100 ppb)	Benzene (Soil- 61,290 ppb) (GW-4,300 ppb)	1,1,1-trichloroethane (Soil-1,692 ppb)	Chloroform (Soil- 20,253 ppb) (GW- 730 ppb)	2-butanone (Soil- 14,000 ppb)
Tetrachloroethene (Soil-58,571 ppb) (GW- 420ppb)	Tetrachloroethene (5,645 ppb)	Trichloroethene (Soil- 3,810 ppb) (GW- 279 ppb)	Benzene (Soil- 4,177 ppb) (GW- 150 ppb)	Chlorobenzene (Soil- 10 ppb) (GW- 33 ppb)
Chlorobenzene (Soil-538,462 ppb)	Toluene (Soil- 76,450 ppb) (GW- 7,300 ppb)	Benzene (Soil- 24,130 ppb) (GW-1,400 ppb)	Toluene (Soil- 26,582 ppb)	Ethylbenzene (Soil- 0.82 ppb)
Total xylenes (Soil-41,538 ppb)	Chlorobenzene (451,613 ppb)	Tetrachloroethene (Soil-5,265 ppb) (GW- 470 ppb)	SVOCs	Chloroform (GW- 27 ppb)
Toluene (GW- 7,300 ppb)	Ethyl-benzene (12,788 ppb)	Toluene (Soil- 77,910 ppb) (GW- 740 ppb)	2-chlorophenol (Soil- 2,152 ppb) (GW- 130 ppb)	Toluene (GW- 19 ppb)
Ethyl benzene (GW- 840ppb)	Total xylenes (23,630 ppb)	Chlorobenzene (Soil- 126,900 ppb) (GW- 3,100 ppb)	Pentachlorophenol (Soil-58,228 ppb)	SVOCs
Trans-1,2 dichloroethene (GW-200ppb)	Chloroform (GW- 3,000 ppb)	Ethyl benzene (Soil- 15,070 ppb)	Di-n-butyl phthalate (Soil- 2,784 ppb)	1,4-dichlorobenzene (Soil- 40 ppm)
1,2-dichloroethane (GW- 480ppb)	SVOCs	Vinyl chloride (GW- 790ppb)	Phenol (GW- 150 ppb)	1,2-dichlorobenzene (Soil- 26 ppm)
Trichloroethene (GW- 800ppb)	1,4-dichlorobenzene (Soil-30,645,161 ppb)	Total xylenes (Soil- 19,180 ppb)	4-methyl phenol (GW- 75 ppb)	1,2,4-trichlorobenzene (Soil- 14 ppm)
Chloroform (Soil-11,628 ppb)	1,2-dichlorobenzene (Soil-19,354,839 ppb)	SVOCs	2-nitrophenol (GW- 41 ppb)	Pyrene (Soil- 27 ppm)
SVOCs	1,2,4-trichlorobenzene (Soil-7,580,645 ppb)	1,3-dichlorobenzene (Soil- 70,140 ppb)	4-chloroaniline (GW- 60 ppb)	Fluoranthene (Soil- 21 ppm)
Phenol (Soil-177,800 ppb)	4-nitroaniline (Soil- 1,834,000 ppb)	1,4-dichlorobenzene (Soil- 1,837,000 ppb)	2-chlorophenol (130ppb)	Chrysene (Soil- 12 ppm)
2,4,6-trichlorophenol (Soil-49,530 ppb) (GW- 350 ppb)	Phenanthrene (Soil-2,114,000 ppb)	1,2-dichlorobenzene (Soil- 324,000 ppb)	PCBs and Pesticides	Benzo(b)fluoranthene (Soil- 15 ppm)
Pentachlorophenol (Soil-4,769,231ppb)	Fluoranthene (Soil-1,330,000 ppb)	Naphthalene (Soil- 514,500 ppb)	Total PCBs (Soil- 500 ppm)	Phenol (GW 28 ppb)
1,2,4- trichlorobenzene (GW-1,900ppb)	Phenol (GW-950 ppb)	Hexachlorobenzene (Soil- 1,270,000 ppb)		2-chlorophenol (GW-14 ppb)
4-chloroaniline (GW- 15,000 ppb)	Pentachlorophenol (GW-650 ppb)	Phenol (GW- 1,800 ppb)	Metals	2,4-dimethyl phenol (GW- 13 ppb)
Naphthalene (Soil-5,428,571 ppb) (GW-21,000 ppb)	PCBs and Pesticides	Bis(2-chloroethoxy) methane (GW- 2,900 ppb)	Antimony (Soil- 32 ppm)	2,4-dichlorophenol (GW- 150 ppb)
PCBs and Pesticides	Arochlor 1260 (Soil-18,000,000 ppb) (GW- 52 ppb)	1,2,4-trichlorobenzene (GW- 2,700 ppb)	Arsenic (Soil- 172 ppm) (GW- 14,000 ppb)	Pentachlorophenol (GW- 120 ppb)
Arochlor 1248 (Soil-174,419 ppb)	4,4-DDE (780 ppb)	4-chloroaniline (GW- 9,600 ppb)	Nickel (Soil- 2,392 ppm)	PCBs and Pesticides
Arochlor 1260 (Soil-5,300,000 ppb) (GW- 890 ppb)	4,4-DDD (431 ppb)	Pentachlorophenol (GW- 2,400 ppb)	Cadmium (32 ppb)	Total PCBs (Soil- 1,100 ppm) (GW- 0.0044 ppb)
4,4-DDE (Soil-135,385 ppb)	4,4-DDT (923 ppb)	PCBs and Pesticides	Zinc (2,210 ppb)	Dieldrin (GW- 0.18 ppb)
Dioxins and Furans	Metals	Arochlor 1260 (Soil- 342,900 ppb)		Endosulfan II (GW- 0.06 ppb)
Dioxin (Soil-44,974 ppb)	Arsenic (Soil-388 ppm) (GW-8,490ppm)	4,4-DDD (Soil- 29,694 ppb)		4,4-DDT (GW- 0.24 ppb)
Metals	Cadmium (Soil-294 ppm)	4,4-DDT (Soil- 4,305 ppb)		2,4-D (GW- 47 ppb)
Arsenic (Soil-123 ppm) (GW- 179 ppb)	Copper (Soil-2,444 ppm) (GW- 2,410 ppm)	Metals		2,4,5-TP (Silvex) (GW- 3.4 ppb)
Barium (Soil- 45,949 ppm)	Lead (Soil- 4,500 ppm)	Beryllium (Soil- 1,530 ppm)		Metals
Copper (Soil- 2,215 ppm)	Manganese (Soil- 36,543 ppm)	Copper (Soil- 630 ppm)		Antimony (Soil- 41.2 ppm)
Lead (Soil- 3,123 ppm)	Mercury (Soil- 3.9 ppm)	Lead (Soil- 23,333 ppm)		Barium (Soil- 9,060 ppm)
Mercury (Soil-34.3 ppm) (GW-2.1 ppb)	Nickel (Soil- 15,097 ppm)(GW-17,200 ppm)	Zinc (Soil- 6,329 ppm)		Cadmium (Soil- 47.2 ppm)
Nickel (Soil- 399 ppm) (GW- 349 ppb)	Silver (Soil- 44 ppm)	Cyanide (Soil- 3,183 ppm)		Copper (Soil- 21,000 ppm)
Zinc (Soil- 4,257 ppm) (GW-1,910ppb)	Zinc (Soil- 39,516 ppm)			Nickel (Soil- 2,490 ppm)
Cyanide (GW- 350ppb)	Cyanide (GW-480ppm)			Silver (Soil- 26 ppm)
				Zinc (Soil- 31,600 ppm)
				Lead (Soil- 1,910 ppm)
				Arsenic (Soil- 94 ppm)
				Cyanide (Soil- 1.3 ppm)

Descriptions of the general approach for injury determination [43 CFR § 11.62] and injury quantification [43 CFR § 11.71(b)(2)]

Injury is defined in the DOI regulations as a “measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource resulting either directly or indirectly from exposure to a . . . release of a hazardous substance, or exposure to a product of reactions resulting from the . . . release of a hazardous substance” [43 CFR § 11.14(v)].

Descriptions of the general approach for injury determination [43 CFR § 11.62] and injury quantification [43 CFR § 11.71(b)(2)] (cont.)

The injury assessment will involve two basic steps, injury determination and injury quantification, as indicated below:

1. Injury determination. The Trustees will determine whether an injury to one or more natural resources has occurred as a result of releases of hazardous substances [43 CFR § 11.62]; and
2. Injury quantification. The injuries determined by the Trustees will be quantified in terms of changes from “baseline conditions” [43 CFR § 11.71(b)(2)].

Baseline concept ...

- General definition: the condition or conditions that would have existed in the assessment area had releases of hazardous substances NOT occurred
- Consideration of historical data and/or collected from reference (“control”) locations, *similar to/but for*
- Consider other means to make use of available information to determine an accurate assessment of services absent the release of hazardous substances

Descriptions of the approach for conducting the damage determination[43 CFR § 11.80]

- The DOI regulations define the measure of damages as restoration costs plus, at the discretion of the authorized official, the compensable value of all or a portion of the services lost to the public for the time period from the release until the attainment of the restoration, replacement, and/or acquisition of equivalent of baseline [43 CFR § 11.80(b)].
- Restoration costs are the costs of restoration actions that restore the injured resources and services to baseline, which is the condition that would have existed had the hazardous substance release(s) not occurred [43 CFR § 11.14(e)].

Damage Determination Methods

- restoration of equivalent natural resources – determined by Habitat Equivalency Analysis (surface resources)
- economic valuation based on the value of certain natural resources on the open market (groundwater resources)

Habitat Equivalency Analysis (HEA)

- “HEA” is a method used to quantify the effects of natural resource injuries resulting from release of hazardous substance or other anthropogenic perturbations and to scale compensatory restoration. Restoration scaling using HEA involves quantifying the expected effects of a restoration action so that the benefits of the restoration are equivalent to the losses associated with the habitat degradation.”

HEA Steps compare loss from injury to potential benefits from restoration projects.;

1. Inventory habitats that have been injured.
2. Characterize the nature and extent of the injury, including the areal extent, type, and degree of injury.
3. Determine other inputs to the analysis, including period of loss, length and type of assumed recovery, discount rate, etc.
4. Calculate the present value loss of “habitat-acre-years,” including documentation of the sensitivity of the analysis to any major assumptions
5. Design & scale land conservation & restoration projects that offset the loss.

Completing Assessment Phase

- Trustees will prepare & publish a Report of Assessment detailing the results of the Assessment Implementation phase.

Restoration Planning (cont.)

- Once assessment of areas has been completed and the results are applied to an injury determination, it will then be appropriate to develop a comprehensive strategy to restore the natural resources that have been injured.
- Noting that at the SIC Sites, the services provided by different components of the ecosystem are inextricably linked to each other and because various natural resources are so intimately linked, an ecosystem-based approach toward restoration planning will accomplish full restoration. Further, considering these interdependencies will allow restoration actions to fully compensate the Trustees for their respective lost resource services in a cost-effective manner.

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documents are available on the US Fish & Wildlife Service website at

<http://www.fws.gov/midwest/es/ec/nrda/Sauget/index.html>

& Cahokia Public Library



Assessment Plan for Groundwater: Sauget Industrial Complex

Prepared by:
Jamie Holmes
Stratus Consulting
Boulder, CO
8/6/2013

Outline

- Overview of groundwater resources
- Proposed groundwater assessment



Groundwater Resources

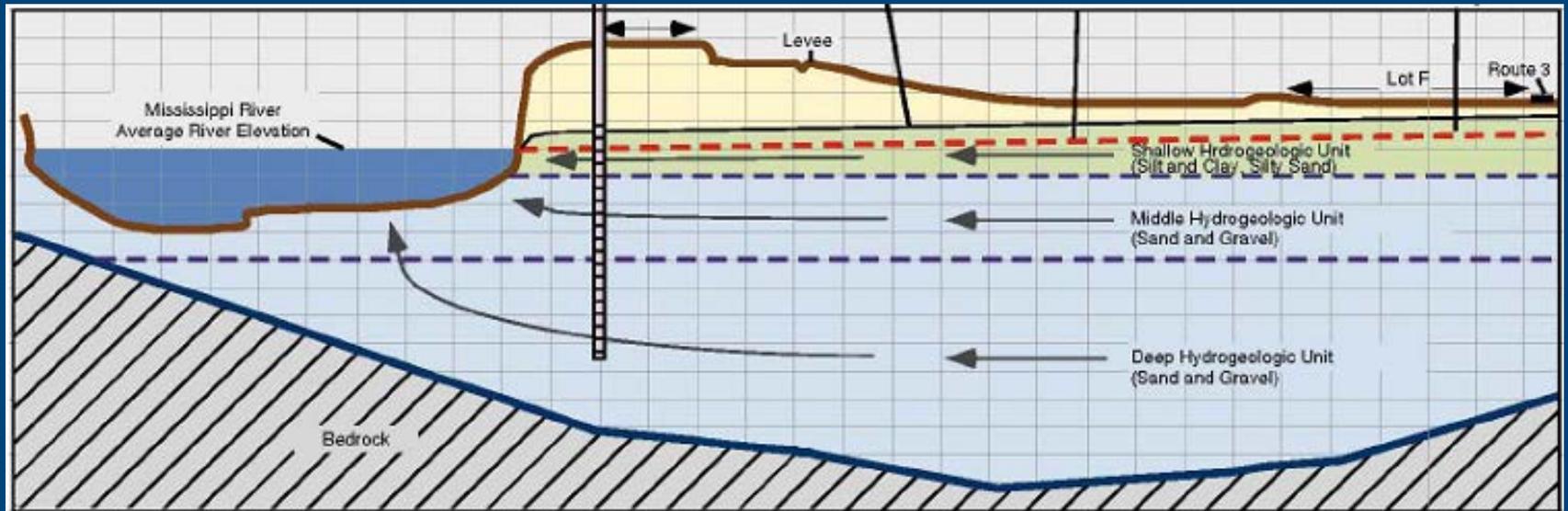


Groundwater Resources: Definition

- Water in a saturated zone beneath the surface of land or water
- The rocks and sediment through which groundwater moves
 - includes drinking water supplies



American Bottoms Aquifer



Historical Groundwater Use

- High industrial use
 - Kept water levels low

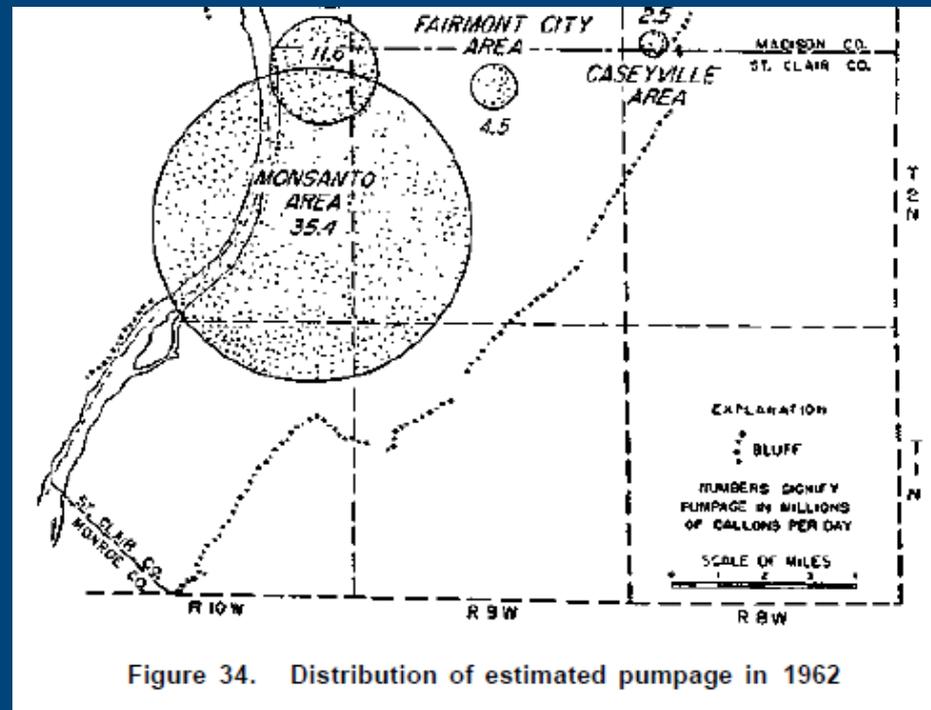


Figure 34. Distribution of estimated pumpage in 1962



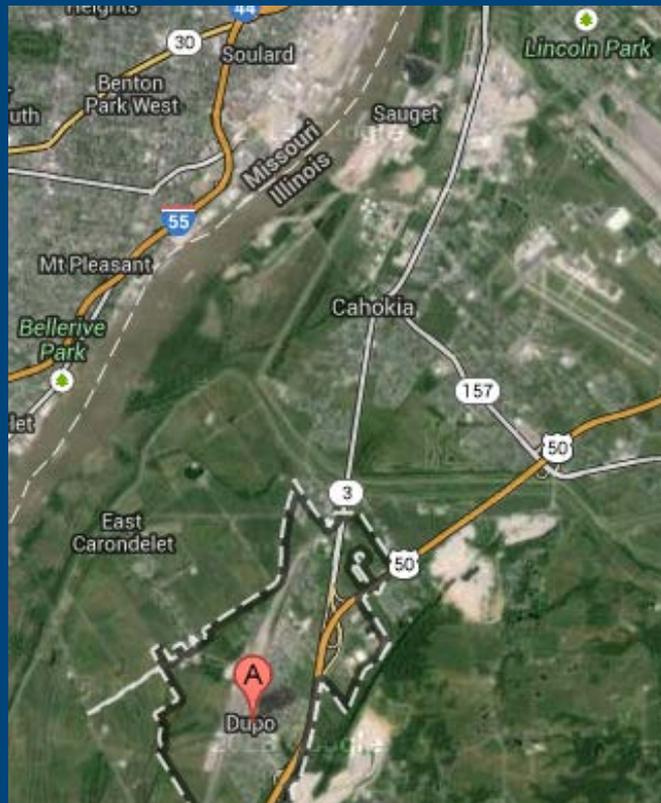
Current Groundwater Use

- Sauget, Cahokia, East St. Louis
 - Groundwater use is restricted
 - Institutional controls



Current Groundwater Use

- Community water supply





Illinois Environmental Protection Agency



Source Water Assessment Program

FACT SHEET

DUPO
ST. CLAIR COUNTY

Prepared in cooperation with the U.S. Geological Survey.
Information and data used in the preparation of this Fact Sheet are provided by the Illinois EPA and are subject to revision.

IMPORTANCE OF SOURCE WATER:
The Village of Dupo (Facility Number 1630350) utilizes two community water supply wells. Wells #1 (Illinois EPA #00878) and #2 (Illinois EPA #00879) supply approximately 489,900 gallons per day to an estimated population of 6,335 individuals at 2,267 service connections.

WATER SUPPLIES THAT OBTAIN SOURCE WATER FROM THIS FACILITY:
No connected water supplies existed at the time this Source Water Assessment fact sheet was completed.

SOURCE OF WATER SUPPLY:
Well #1 is located 200 feet northwest of the water treatment plant and Well #2 is located 200 feet southwest of the water treatment plant at 110 Coulter Road in Dupo. Both wells are 110 feet deep and pump 750 gallons per minute, from the American Bottoms Aquifer, which covers 175 square miles from Alton to Dupo, and is a shallow sand and gravel aquifer overlain by permeable sand and gravel. Permeability is a measure of the ability of a soil or sediment to transmit fluids. The Illinois EPA considers these wells to be geologically sensitive.



Groundwater Use: Future Demand

- Industrial supply
 - Saugnet industries have inquired about groundwater permits
- Community water supply
 - Nearby town hired an engineer to scope a switch from river water to groundwater



Groundwater Assessment



Definition of Injury

- Concentrations of hazardous substances exceed drinking water standards
 - Safe Drinking Water Act
 - Maximum contaminant levels (MCLs)
 - 32 Ill. Adm. Code 620
 - Class I drinking water standards



Hazardous Substances

- Benzene and chlorobenzene
 - Largest, most widespread plumes
- Several other contaminants released
 - Mostly within benzene and chlorobenzene plumes



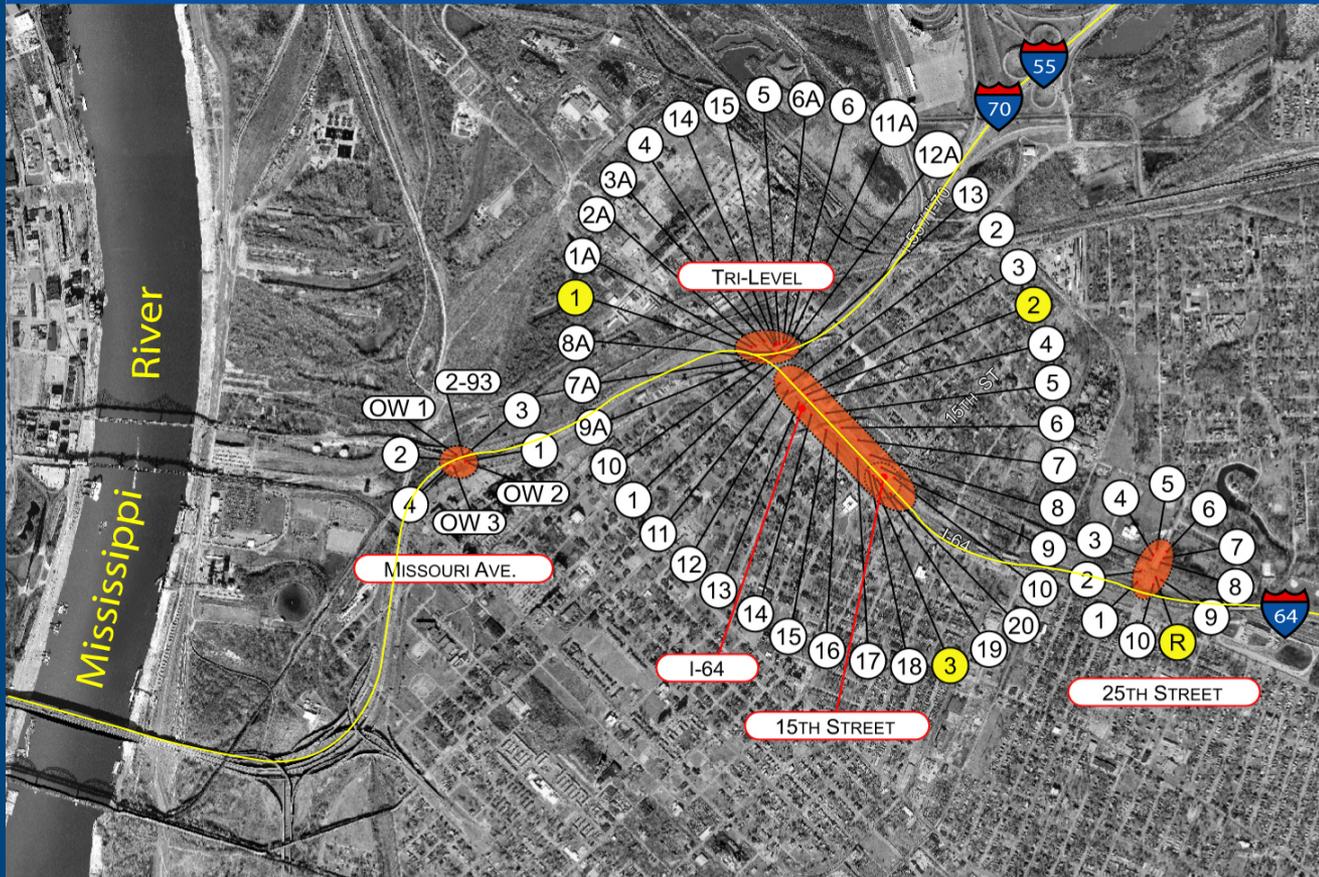
Injury Determination

- Concentrations of Saugnet hazardous substances exceed drinking water standards
 - Benzene: 5 $\mu\text{g/L}$
 - Chlorobenzene: 100 $\mu\text{g/L}$



IDOT Pumping

Dewatering Well Sites



Supplement with Recent Data

- New data north of WG Krummrich
 - Ongoing monitoring under RCRA
- Other potential sources of data
 - IDOT
 - USACE



Addressing Data Gaps

- Collect additional data
 - If possible/practicable
- Interpolate/estimate as required



Groundwater Injury Quantification

- Evaluate baseline conditions
 - Water quality at control sites
 - Upgradient of Sauget



Groundwater Injury Quantification

- Estimate lateral and vertical extent of plumes
 - “Approximately locate the boundary separating areas with concentrations above baseline from areas with concentrations equal to or less than baseline.” [43 CFR § 11.71 (i)(2)(ii)]



Groundwater Injury Quantification

- Calculate amount of affected groundwater
 - “This determination may include computation of the volume of water affected, volume of affected ground water pumped from wells, volume of affected ground water discharged to streams or lakes, or other appropriate measures.” [43 CFR § 11.71 (i)(4)(i)]



Calculating Damages

- Equivalent restoration of offsite groundwater
 - Improve groundwater quality
- Natural resource valuation
 - What is the value of the injured groundwater?



Restore Equivalent Groundwater

- Identify and scope potential restoration projects
- Estimate benefit to groundwater
 - Per unit of restoration
- Calculate the amount of restoration required to restore equivalent groundwater
 - Incorporating volume and time



Groundwater Valuation

- How much is groundwater worth?
 - Regulations identify several methods
 - Assessment Plan describes “market price” method



Market Price Method

- Evaluate market for groundwater
- If market price can be established
 - Calculate damages based on diminution of market value of injured groundwater

