

DNR Watershed Management Workplan:

CD Besadny Fish And Wildlife Area/

Kewaunee Marsh Arsenic Site

Wisconsin DNR

March 2001

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Background

Under Chapter NR 720.07 of the Wisconsin Administrative Code, the DNR Bureau of Watershed Management is responsible for investigating the extent and degree of arsenic-contaminated sediment at the Kewaunee Marsh. This contamination has led to the inclusion of the Kewaunee River on the state's 303d listing of Impaired Waters to the U.S. Environmental Protection Agency. Previous studies included cooperative work efforts from Fox Valley and Western Railroad and Wisconsin DNR in 1995-1997. This work culminated in identifying the total area of arsenic impact and installation of an interim capping measure designed to remove arsenic from potential surface contact and help slow its movement through groundwater. Data collected during the 1995-1997 period was used in groundwater and surface water modeling to describe and predict the fate and transport of arsenic at the site (Project No. 20716XA, STS Consultants, Ltd., Green Bay, WI), as well as to support the development of an ecological risk assessment for the area (Baseline Ecological Risk Assessment for the Arsenic Contaminated Wetland Associated with the C.D.Besadny Fish and Wildlife Area and the Kewaunee River. Wisconsin DNR, April 2000).

Objectives

The objective of the 2001 DNR Watershed Management (WT) efforts at the Kewaunee Marsh Arsenic Site is to measure and map arsenic levels over time in the surface water, groundwater, and sediment within the defined area of impact. Water monitoring will be done bi-monthly beginning in May 2001, with groundwater levels recorded monthly. Sediment samples will be taken in May 2001 and repeated in November 2001. Fieldwork will conclude at the end of 2001 calendar year. Data gathered as a result of this fieldwork will be used in multiple ways: first, it

will provide information on current site conditions and arsenic concentrations for upcoming investigations scheduled to take place in late 2001 under the guidance of the DNR Remediation and Redevelopment program. Second, the site data may be used in any additional groundwater and surface water modeling efforts. Lastly, the information will be used to compare current levels and distribution of arsenic at the site to the 1996/1997 conditions, and in doing so will test the predictions of the 1997 modeling work.

Site Preparation

Data collected during the 1995-1997 fieldwork has been assimilated into a spatial database, and GIS analysis of this data will be used to determine the precise locations of the 2001 water and sediment samples.

Prior to any new sample collection, WT staff will abandon the thirteen shallow (water table) monitoring wells installed in 1996. Well abandonment will take place in accordance to chapter NR 141 of the Wisconsin Administrative Code. At this time, the pre-determined locations of ten new driven wells, eight surface water sites, and ten sediment sample sites will be identified using real-time differential GPS, and marked with wood lathe which will be labeled and painted for visibility.

WT personnel will establish horizontal and vertical survey control at the site using real-time kinematic GPS. These survey controls will be referenced to nearby 1st Order benchmarks established by the Army Corps of Engineers in the city of Kewaunee, and will be used to set elevations at each monitoring well casing.

A stilling well housing a digital water-level recorder will be installed in the Kewaunee River downstream of the wood railroad bridge. This recorder will provide continuous water level readings in the river, and will be used to coordinate water levels recorded at the monitoring wells and the USGS real-time flow gage located six miles upstream at Kewaunee County Hwy. F.

Ground Water/Surface Water Collection

The monitoring/water table wells will be constructed as close to NR141 standards as possible, and will consist of 6-foot by 2-inch diameter PVC, with the bottom 15 inches screened at .01 inch intervals. The wells will be driven a minimum of 3 feet, and fitted with a locking cap. Before each sampling, the water level in each well will be measured, and the well purged three volumes. After recovery, a polyethylene bailer will be used to remove water for sampling. After transferring the water to a 100 ml sample bottle, the sample will be preserved with nitric acid to a pH of 2. A separate bailer will be used at each well, and the lot cleaned after every round of sampling. Surface water samples will be collected directly into the sample bottle and preserved the same. All water sample bottles will be labeled with well/site number, date, preservative type, and collector name. All water samples will be placed in a cooler with ice, and delivered to the State Lab of Hygiene under DNR Chain of Custody.

Sediment Collection

Sediment samples will be collected at ten pre-determined locations using a narrow spade shovel. The middle portion of the top 15 centimeters will be sub-sampled with a hand trowel, and consolidated before placement in quart-size glass jars. Each jar will be labeled with site number, date, and collector name. All sediment samples will be placed in a cooler with ice, and delivered to the State Lab of Hygiene under DNR Chain of Custody.

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Site Safety

All WT staff conducting fieldwork will adhere to strict safety precautions. Level C protection will be enforced, and will include polyethylene-coated Tyvek coveralls, Nitrile-coated rubber gloves with latex linings, and disposable latex boot covers. An exclusion zone will be established at the beginning of each sampling stage, and all non-disposable sampling equipment will be washed in Alconox cleaning solution and rinsed with distilled water. Coveralls, gloves, and boot covers will be disposed as solid waste at the conclusion of each sampling round. At no time will WT personnel enter the boundaries of the primary fence/capped area.

Data Compilation

Laboratory data, water level readings, and sample-site locational information will be compiled in a relational database, and used to create GIS data layers for temporal and spatial analysis of arsenic occurrence. All ASCII files, database, and GIS coverages will be forwarded to DNR staff and external partners by the end of the 2001 calendar year.

Schedule

- April 2001: Abandon old DNR sampling wells. Field-locate and mark locations for new wells, surface water, and sediment samples. Establish survey-grade horizontal and vertical control at the site with RTK GPS.
- May 2001: Install digital water-level recorder in Kewaunee River near railroad bridge. Install and develop new wells at pre-determined locations. Collect first round of water and sediment samples and water table elevations.
- June 2001: Collect water table elevations.
- July 2001: Collect 2nd round of water and sediment samples and water table elevations.

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August 2001: Collect water table elevations.

Sept. 2001: Collect 3rd round of water and sediment samples and water table elevations.

Oct. 2001: Collect water table elevations.

Nov. 2001: Collect 4th and final round of water and sediment samples and water table elevations.