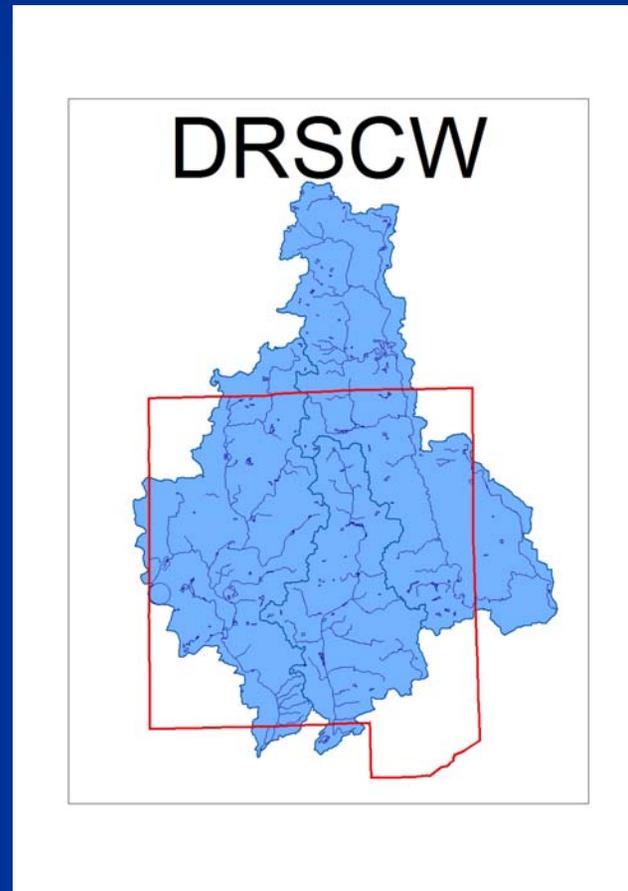
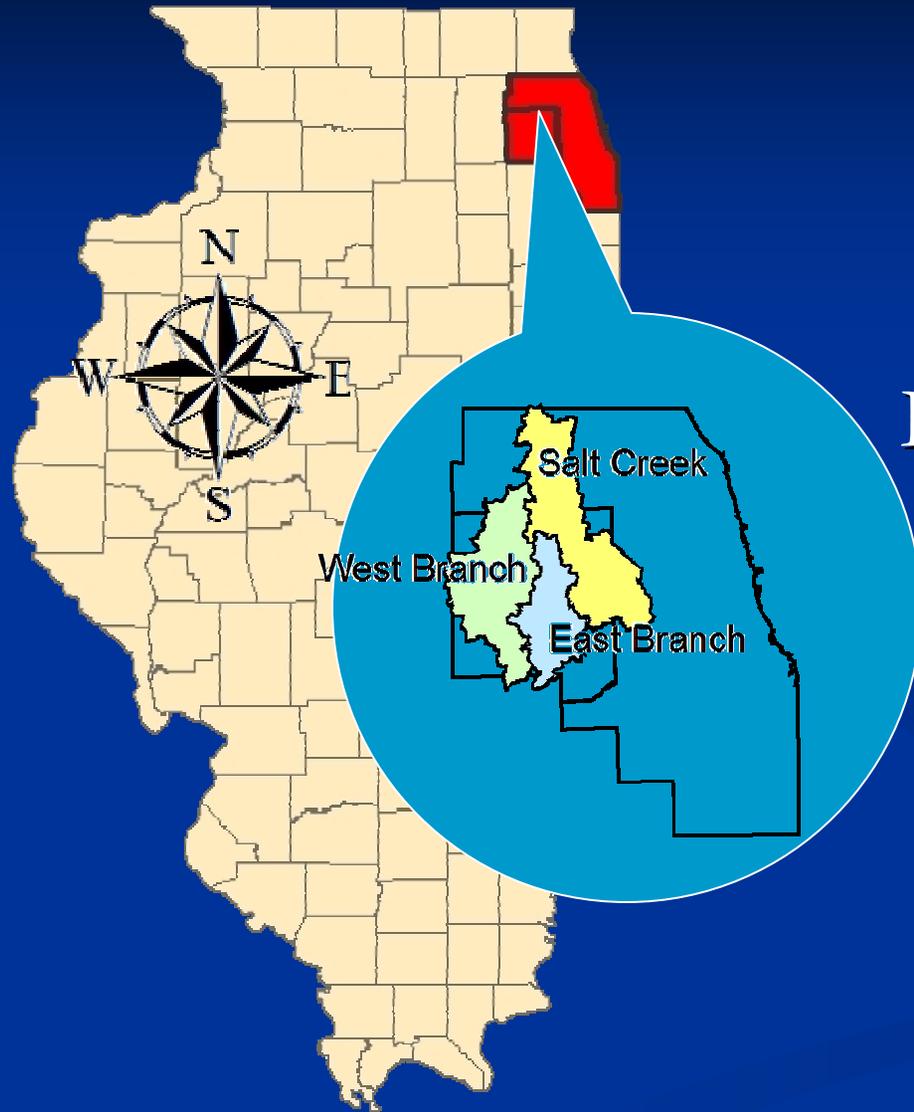


# Working with TMDLs

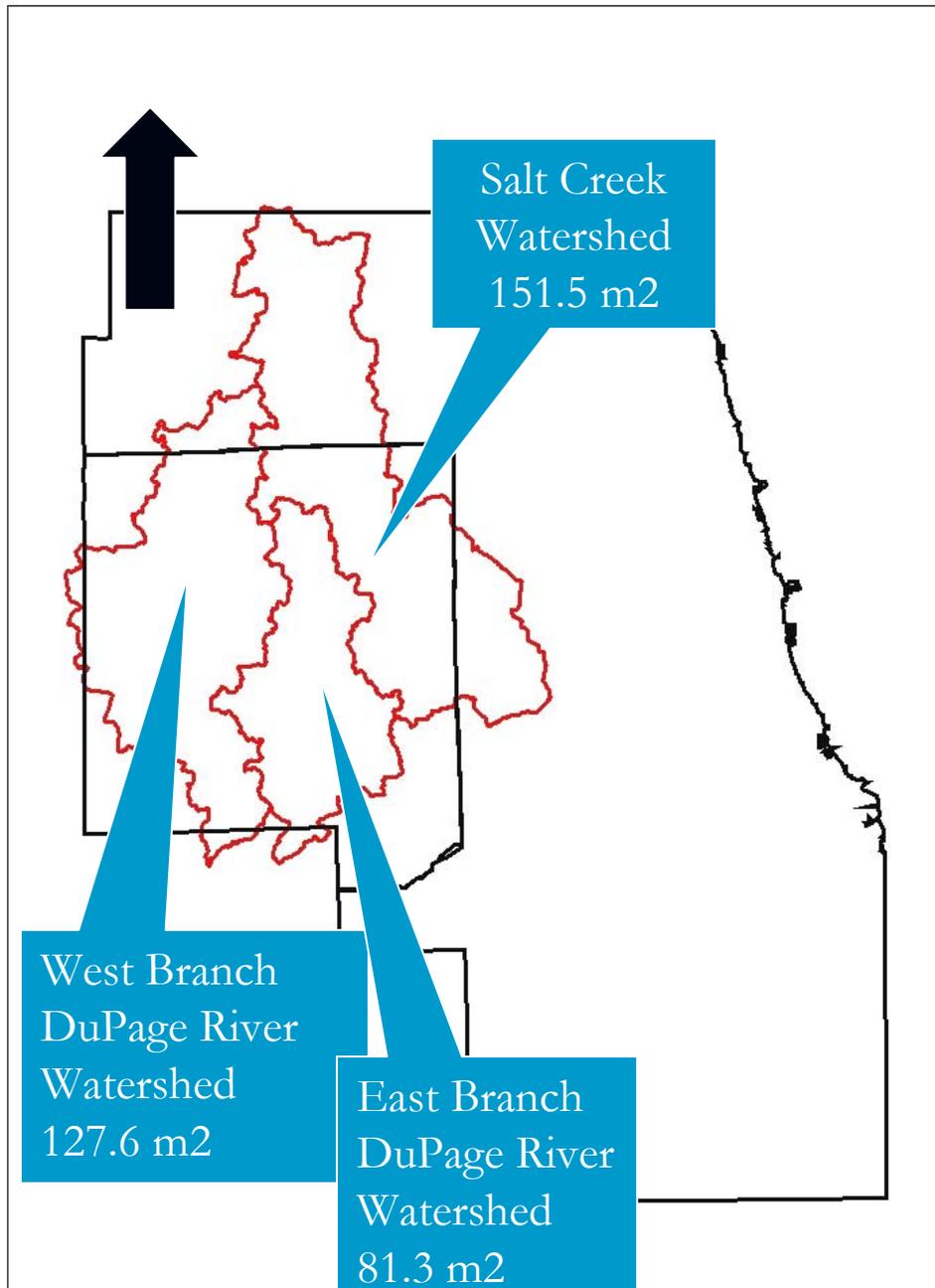
## The DuPage River Salt Creek Workgroup



# Project Area



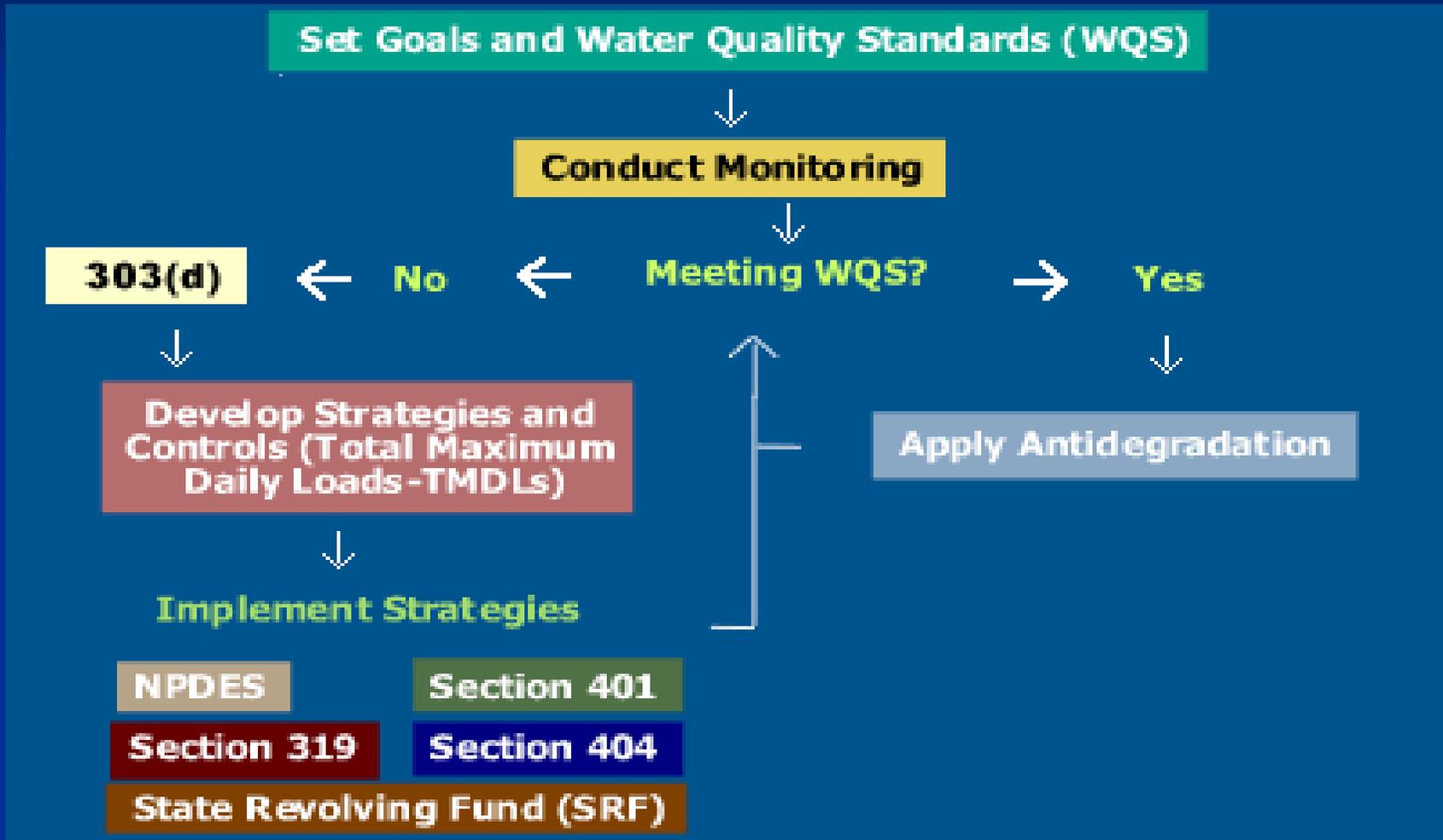
Project Area lies in  
Cook County and  
DuPage County (NE  
Illinois)



# Project Area

- 360.4 square miles of watershed
- Three waterways (100 miles of main stem stream)
- Lies in 2 Counties
- 55 municipal entities
- 156 MGD of effluent (based on DAF) from 25 POTW operators
- Heavily urbanized

# The Road to the TMDL



# TMDLs in DuPage County/Cook County (2000-2004)

All streams classified as general use (highest standard)

- **West Branch of the DuPage River**

Impairments: *chloride and copper*

- **East Branch of the DuPage River**

Impairments: *conductivity, chloride and dissolved oxygen (DO)*

- **Salt Creek**

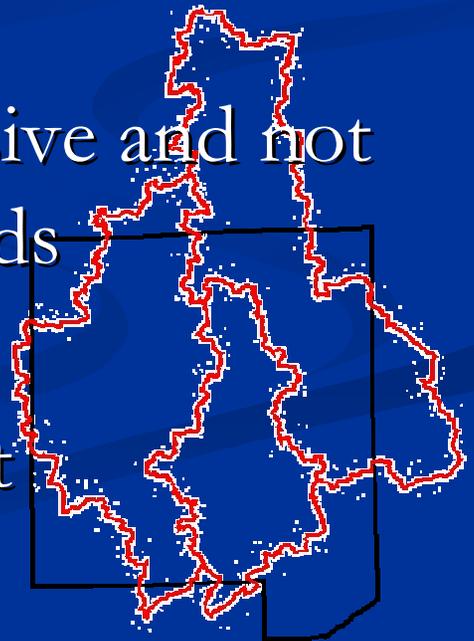
Impairments: *copper, conductivity, chloride and dissolved oxygen (DO)*

# IEPA Recommendations

- Develop and implement BMPs for road de-icing activities
- Lower effluent limits for ammonia and CBOD for sewage treatment plants discharging wastewater to these streams (8 mg/L CBOD5 and 1 mg/L ammonia-N levels recommended)
- Evaluate in-stream aeration or dam removal and implement if cost effective
- Manage storm water and combined sewer overflows to reduce organic loading

# Problems with the TMDLs

1. Water quality data based on insufficient sampling (limited temporally and spatially)
2. Currently POTWs all discharging at levels below the proposed new limits (no changes in practices were actually proposed)
3. POTW approach alone very expensive and not likely to attain water quality standards
4. Dams and in stream aeration –who coordinates and pays for the project



# DRSCW

- Formed April 2005
- Gained status of Illinois not for profit corporation in November 2005
- IEPA offered grant funding for start up \$597,000 (plus a second grant of \$80,000)
- Adopted a watershed approach



# Calculation for Agency Dues

| Assessment<br>Parameter | Assessment<br>Unit | %Allocation<br>of Annual<br>Revenue | Total<br>Assessment<br>Units | Rates at 100%<br>Participation |       | Factor for<br>Nonparticipating<br>Agencies | Recommended<br>Rates |                              |
|-------------------------|--------------------|-------------------------------------|------------------------------|--------------------------------|-------|--|----------------------|------------------------------|
|                         |                    |                                     |                              |                                |       |  |                      |                              |
| WWTP<br>Load            | DAF MGD            | 66.67%                              | \$133,333.33                 | 156.91                         | MGD   | \$849.74<br>per<br>MGD                     | 1.5                  | \$1,274.6<br>2<br>per<br>MGD |
| Storm<br>Water          | Acreage            | 33.33%                              | 66,666.67                    | 226,444                        | Acres | \$0.29<br>per<br>acre                      | 1.5                  | \$0.44<br>per<br>acre        |
|                         |                    |                                     | \$200,000.00                 |                                |       |  |                      |                              |

# Dues Structure

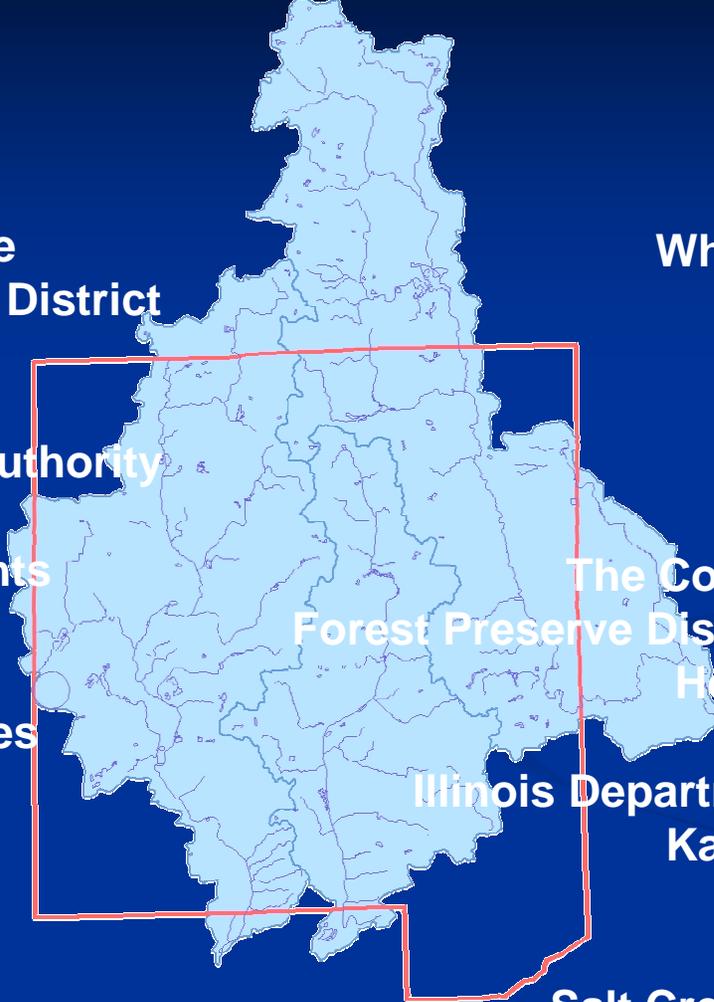
- Agency Member (NPDES permit holder)

Administration fee plus watershed acreage and MGD effluent flows

- Associate Member

Administration fee

# DRSCW

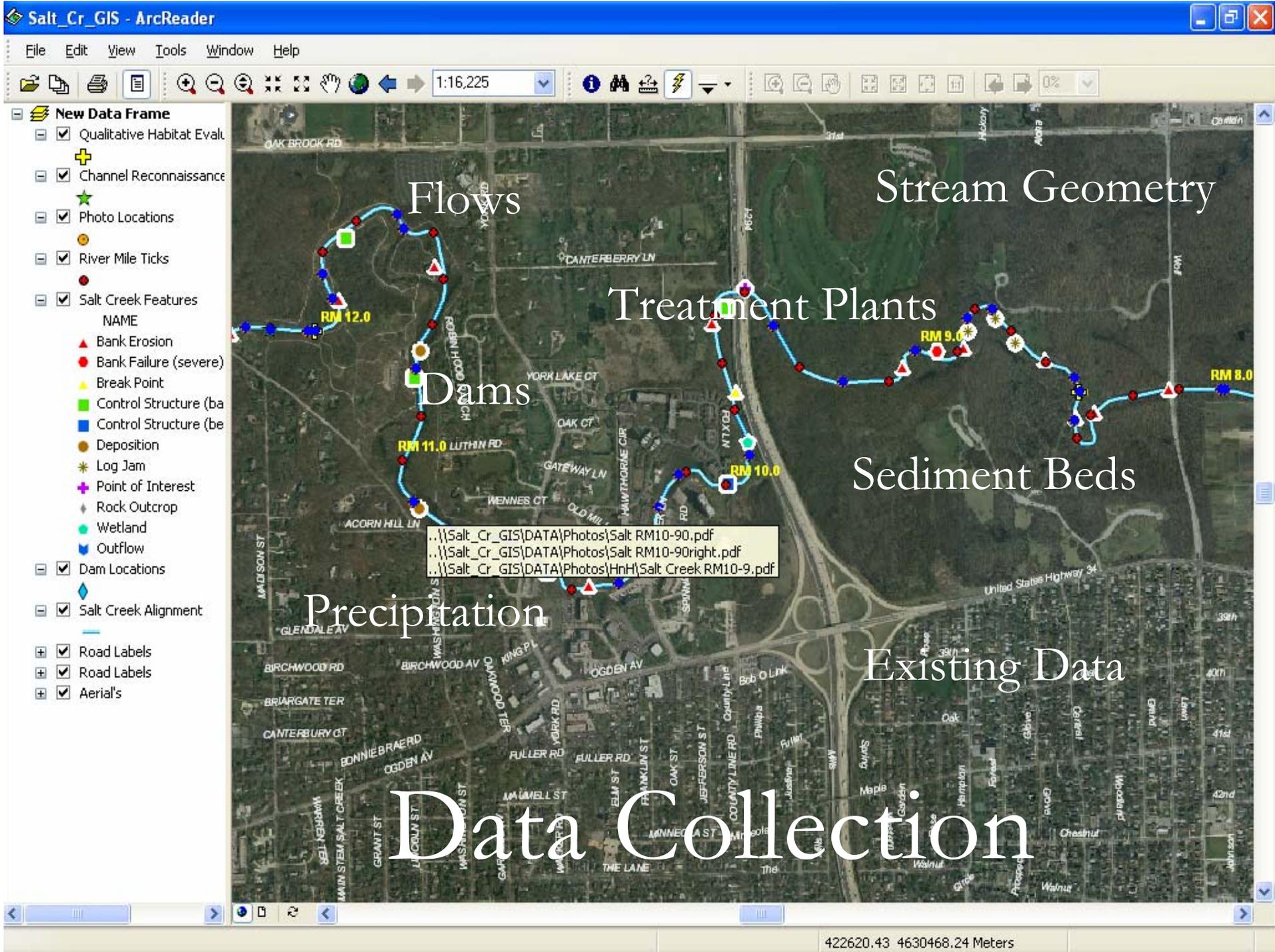


Village of Addison  
Village of Arlington Heights  
Village of Bensenville  
Village of Bloomingdale  
Village of Bolingbrook  
Village of Carol Stream  
Village of Downers Grove  
Downers Grove Sanitary District  
DuPage County  
City of Elmhurst  
Glenbard Waste Water Authority  
Village of Glen Ellyn  
Village of Glendale Heights  
Village of Hanover Park  
Village of Hinsdale  
Village of Hoffman Estates  
Village of Itasca  
Village of Lisle  
Village of Lombard  
MWRDGC  
City of Naperville  
Village of Oak Brook  
City of Oakbrook Terrace

Village of Roselle  
Salt Creek Sanitary District  
Village of Schaumburg  
Village of Villa Park  
City of Wheaton  
City of West Chicago  
Wheaton Sanitary District  
City of Wooddale  
Village of Woodridge  
Baxter Woodman, Inc.  
Clark Dietz, Inc.  
CDM, Inc.  
The Conservation Foundation  
Forest Preserve District of DuPage County  
Hey and Associates, Inc.  
Huff & Huff, Inc.  
Illinois Department of Transportation  
Kabbes Engineering, Inc.  
Prairie Rivers Network  
RJN Group  
Salt Creek Watershed Network  
Sierra Club, River Prairie Group  
Strand & Associates, Inc.  
York Township Highway Department

# Activities





Pages



Channel Reconnaissance Form

Date: 11-22-05  
 Stream/Drainage: Salt Creek  
 River Mile: 12.1  
 Field Team: MUMDJ

General Channel Conditions

Channel Shape (check): Rectangular:  Shallow rectangular:  Irregular:   
 Trapezoidal:  Parabolic:  Other:

Bar Types (check): Alternate Lateral:  Point / Transverse:  None:   
 Mid-Channel:  Point / Mid:  Point / Alternate:

|      | L Bank          | Bars | Bed   | R Bank    |
|------|-----------------|------|-------|-----------|
| d50  | Till-silty loam | NA   | 10 mm | Till-sand |
| dmax | NA              | NA   | 15 mm | NA        |

Fluvial Geomorphic Conditions

|  |   |
|--|---|
| Vertical Stability degradation/aggradation                         | Dam upstream and down control grade, appears to be sediment limited, but still dominated by sand and small gravel |
| Lateral Stability deposition, erosion                              | Some terrace erosion, but banks relatively stable   |
| Erosion excessive/site specific                                    | Gravel toe is stable, upper slopes generally bare into the roof zone. No major erosion problems                   |
| Terrace/Valley shape, condition                                    | Right bank terrace ~ 3 ft above LB floodplain forested  |
| Altered State (human) - dams, bridges, canoe landings, parks, etc. | Dams  |
| Bank Composition layers/sketch, consolidation/aggregation          | Till with loam cap<br>Armored toe (natural)   |
| Flow as % of bankfull at time of survey                            | 5-10%   |
| Bankfull/Channel forming flow indication                           | Floodplain  |

Sediment Impacts

|                                     |   |                     |      |
|-------------------------------------|---|---------------------|------|
| Riffle Sediment Type:               | Small gravel                                | Pool Sediment Type: | Sand |
| Sorting / Imbrication:              | NA  |                     |      |
| <b>Bars / Depositional Features</b> |   |                     |      |
| Sediment Type:                      | No deposition - sediment limited due to dam |                     |      |
| Mid, Alternate, Braided:            | NA  |                     |      |
| Vegetation (type, age):             | NA  |                     |      |
| Floodplain Soils:                   | Silty loam                                  |                     |      |

Attachments

Comments

Overbank deposition: NA

Riparian Vegetation and Floodplain

|                                 | left    | right   | Structural Diversity: (check one)      |
|---------------------------------|---------|---------|--|
| Root coverage of banks (%)      | 75%     | 75%     | none - anthro / maintained (lawn etc.) |
| Width of veg. riparian corridor | 1000 ft | 1000 ft | low - single canopy layer              |
| Canopy coverage (%)             | 40%     | 40%     | medium - at least two canopy layers    |
|                                 |         |         | High - multiple canopy layers          |

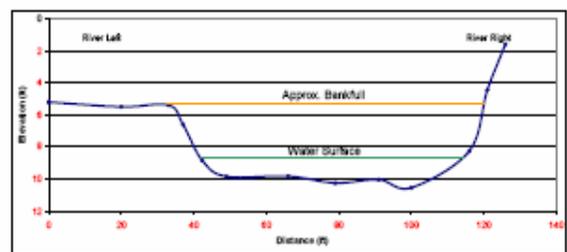
Primary forms present: (%)

|               |     |
|---------------|-----|
| grasses/forbs | 20% |
| woody species | 80% |
| bare/other    |     |

| Woody Species present: | % of total tree community |
|------------------------|---------------------------|
| Oak                    | 60%                       |
| CTW                    | 30%                       |
| Willow                 | 10%                       |

Salt Creek RM 12.1

| Dist  | FS    | Comments      |
|-------|-------|---------------|
| 0     | 5.21  |               |
| 20    | 5.5   |               |
| 33    | 5.40  | Top of Bank   |
| 37    | 6.60  |               |
| 42.3  | 8.85  | Edge of Water |
| 49.0  | 9.85  |               |
| 68.0  | 9.85  |               |
| 79.0  | 10.25 |               |
| 91.0  | 10.04 |               |
| 100.0 | 10.55 |               |
| 118.0 | 8.27  | Toe of Slope  |
| 121.0 | 4.45  |               |
| 128.0 | 1.60  |               |





**Invas-Flux, Inc. Qualitative Habitat Evaluation Index Field Sheet QHEI Score: 61**

River Code: RM: 12 Stream: Salt Creek  
 Date: 11/22/2005 Location: Downstream of Oak Brook Road  
 Scorer's Full Name: MM Affiliation: Invas-Flux

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % present)

| TYPE                                     | POOL RIFPLE  | POOL RIFPLE                                     | SUBSTRATE ORIGIN                            | SUBSTRATE QUALITY                           |
|--|--|---|---|---|
| <input type="checkbox"/> BLDR./SLBS [10] | <input checked="" type="checkbox"/> GRAYVL [7]                             | <input checked="" type="checkbox"/> SAND [5]    | <input type="checkbox"/> LIMESTONE [1]      | <input type="checkbox"/> SILT HEAVY [-2]    |
| <input type="checkbox"/> BOULDER [9]     | <input type="checkbox"/> BEDROCK [5]                                       | <input type="checkbox"/> TILLS [1]              | <input type="checkbox"/> SILT MODERATE [-1] | <input type="checkbox"/> SILT MODERATE [-1] |
| <input type="checkbox"/> COBBLE [8]      | <input type="checkbox"/> DETRITUS [3]                                      | <input type="checkbox"/> WETLANDS [5]           | <input type="checkbox"/> SILT NORMAL [2]    | <input type="checkbox"/> SILT FREE [1]      |
| <input type="checkbox"/> HARDPAN [4]     | <input type="checkbox"/> ARTIFICIAL [2]                                    | <input type="checkbox"/> HARDPAN [5]            | <input type="checkbox"/> SILT FREE [1]      | <input type="checkbox"/> EXTENSIVE [-2]     |
| <input type="checkbox"/> MUCK [2]        | <input type="checkbox"/> NOTE: Ignore Sludge Originating From Point Source | <input type="checkbox"/> SANDSTONE [5] EMBEDDED | <input type="checkbox"/> MODERATE [-1]      |   |
| <input type="checkbox"/> SILT [2]        |  | <input type="checkbox"/> RIPRAP [5] NESS:       | <input type="checkbox"/> NORMAL [0]         |   |
|  |  | <input type="checkbox"/> LACUSTRINE [5]         | <input type="checkbox"/> NONE [1]           |   |
|  |  | <input type="checkbox"/> SHALE [-1]             |   |   |
|  |  | <input type="checkbox"/> COAL FINES [-2]        |   |   |

Substrate  
16  
Max 20

NUMBER OF SUBSTRATE TYPES:  1-2 or More [2]  3 or Less [2]

COMMENTS

2) INSTREAM COVER (Give each cover type a score of 0 to 3; see CHECK for Instructions) AMOUNT: (Check ONLY One or (Structure) TYPE: Score All That Occur check 2 and AVERAGE)

|   |  |   |   |
|---|--|---|---|
| <input type="checkbox"/> UNDERCUT BANKS [1]           | <input type="checkbox"/> POOLS > 70 cm [2] | <input type="checkbox"/> OXBOWS, BACKWATERS [1]   | <input type="checkbox"/> EXTENSIVE > 75% [11] |
| <input type="checkbox"/> OVERHANGING VEGETATION [1]   | <input type="checkbox"/> ROOTWADS [1]      | <input type="checkbox"/> AQUATIC MACROPHYTES [1]  | <input type="checkbox"/> MODERATE 25-75% [7]  |
| <input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1] | <input type="checkbox"/> BOULDERS [1]      | <input type="checkbox"/> LOGS OR WOODY DEBRIS [1] | <input type="checkbox"/> SPARSE 5-25% [3]     |
| <input type="checkbox"/> ROOTWADS [1]                 |  | <input type="checkbox"/> NEARLY ABSENT < 5% [1]   |   |

Cover  
4  
Max 20

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

| SINOUSITY  | DEVELOPMENT                                  | CHANNELIZATION                                     | STABILITY  | MODIFICATIONS/OTHER  |
|--|--|--|--|--|
| <input type="checkbox"/> HIGH [4]                | <input type="checkbox"/> EXCELLENT [7]       | <input checked="" type="checkbox"/> NONE [6]       | <input type="checkbox"/> HIGH [3]                | <input type="checkbox"/> SNAGGING <input checked="" type="checkbox"/> IMPOUND. |
| <input checked="" type="checkbox"/> MODERATE [3] | <input type="checkbox"/> GOOD [5]            | <input type="checkbox"/> RECOVERED [4]             | <input checked="" type="checkbox"/> MODERATE [2] | <input type="checkbox"/> RELOCATION <input type="checkbox"/> ISLANDS           |
| <input type="checkbox"/> LOW [2]                 | <input checked="" type="checkbox"/> FAIR [3] | <input type="checkbox"/> RECOVERING [3]            | <input type="checkbox"/> LOW [1]                 | <input type="checkbox"/> CANOPY REMOVAL <input type="checkbox"/> LEVEED        |
| <input type="checkbox"/> NONE [1]                | <input type="checkbox"/> POOR [1]            | <input type="checkbox"/> RECENT OR NO RECOVERY [1] |  | <input type="checkbox"/> DREDGING <input type="checkbox"/> BANK SHAPING        |
|  |  |  |  | <input type="checkbox"/> ONE SIDE CHANNEL MODIFICATIONS                        |

Channel  
14  
Max 20

COMMENTS:

4) RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank) River Right Looking Downstream

| RIPARIAN WIDTH                                     |   | FLOOD PLAIN QUALITY (PARTIAL/NO FLOOD PLAIN)        |   | BANK EROSION                                       |   |
|--|---|---|---|--|---|
| L R (Per Bank)                                     | L R (Most Predominant Per Bank)                         | L R   | L R   | L R (Per Bank)                                     | L R (Per Bank)                            |
| <input checked="" type="checkbox"/> WIDE > 50m [4] | <input checked="" type="checkbox"/> FOREST, SWAMP [3]   | <input type="checkbox"/> CONSERVATION TILLAGE [1]   | <input type="checkbox"/> CONSERVATION TILLAGE [1]   | <input checked="" type="checkbox"/> NONSLITTLE [3] | <input type="checkbox"/> MODERATE [2]     |
| <input type="checkbox"/> MODERATE 10-50m [3]       | <input type="checkbox"/> SHRUB OR OLD FIELD [2]         | <input type="checkbox"/> URBAN OR INDUSTRIAL [0]    | <input type="checkbox"/> URBAN OR INDUSTRIAL [0]    | <input type="checkbox"/> MODERATE [2]              | <input type="checkbox"/> MODERATE [2]     |
| <input type="checkbox"/> NARROW 5-10 m [2]         | <input type="checkbox"/> RESIDENTIAL/PARK/NEW FIELD [1] | <input type="checkbox"/> OPEN PASTURE, ROW CROP [2] | <input type="checkbox"/> OPEN PASTURE, ROW CROP [2] | <input type="checkbox"/> HEAVY/SEVERE [1]          | <input type="checkbox"/> HEAVY/SEVERE [1] |
| <input type="checkbox"/> VERY NARROW < 5m [1]      | <input type="checkbox"/> FENCED PASTURE [1]             | <input type="checkbox"/> MINING/CONSTRUCTION [2]    | <input type="checkbox"/> MINING/CONSTRUCTION [2]    |  |   |
| <input type="checkbox"/> NONE [0]                  |   |   |   |  |   |

Riparian  
10  
Max 10

5) POOL/Glide AND RIFPLE/RUN QUALITY

| MAX. DEPTH                                       | MORPHOLOGY  | CURRENT VELOCITY (POOLS & RIFPLES)           |
|--|---|--|
| (Check 1 ONLY!)                                  | (Check 1 or 2 & AVERAGE)  | (Check All That Apply)                       |
| <input type="checkbox"/> > 1m [5]                | <input type="checkbox"/> POOL WIDTH > RIFPLE WIDTH [2]            | <input type="checkbox"/> EDDIES [1]          |
| <input type="checkbox"/> 0.7-1m [4]              | <input checked="" type="checkbox"/> POOL WIDTH = RIFPLE WIDTH [1] | <input type="checkbox"/> TORRENTIAL [-1]     |
| <input checked="" type="checkbox"/> 0.4-0.7m [2] | <input type="checkbox"/> POOL WIDTH < RIFPLE W. [2]               | <input type="checkbox"/> FAST [1]            |
| <input type="checkbox"/> 0.2-0.4m [1]            |   | <input type="checkbox"/> MODERATE [1]        |
| <input type="checkbox"/> < 0.2m (POOL=0)         |   | <input checked="" type="checkbox"/> SLOW [1] |
|  |   | <input type="checkbox"/> INTERMITTENT [-2]   |
|  |   | <input type="checkbox"/> VERY FAST [1]       |

Pool/Current  
4  
Max 12

COMMENTS:

| RIFPLE DEPTH  | RUN DEPTH  | CHECK ONE OR CHECK 2 AND AVERAGE  | RIFPLE/RUN EMBEDDEDNESS                 |
|---|--|---|---|
| <input checked="" type="checkbox"/> Best Area > 10 cm [2] | <input type="checkbox"/> MAX > 50 [2]            | <input type="checkbox"/> RIFPLE/RUN SUBSTRATE                           | <input type="checkbox"/> NONE [2]       |
| <input type="checkbox"/> Best Area 5-10 cm [1]            | <input checked="" type="checkbox"/> MAX < 50 [1] | <input type="checkbox"/> STABLE (e.g. Cobble, Boulder) [2]              | <input type="checkbox"/> LOW [1]        |
| <input type="checkbox"/> Best Area < 5 cm                 |  | <input checked="" type="checkbox"/> MOD. STABLE (e.g. Large Gravel) [1] | <input type="checkbox"/> MODERATE [0]   |
| (RIFPLE=0)  |  | <input type="checkbox"/> UNSTABLE (Fine Gravel/Sand) [2]                | <input type="checkbox"/> EXTENSIVE [-1] |
|   |  | <input type="checkbox"/> NO RIFPLE (Mean=0)                             |   |

Rifple/Run  
5  
Max 8

|                             |                                  |                    |                       |
|-----------------------------|----------------------------------|--------------------|-----------------------|
| GRADIENT (ft/m): <u>3.5</u> | DRAINAGE AREA (sq.m): <u>108</u> | %POOL: <u>10</u>   | %GLIDE: <u>      </u> |
|                             |                                  | %RIFPLE: <u>20</u> | %RUN: <u>70</u>       |

Gradient  
8  
Max 10

\* Best areas must be large enough to support a population of riffle-obligate species



Stream: Salt Creek

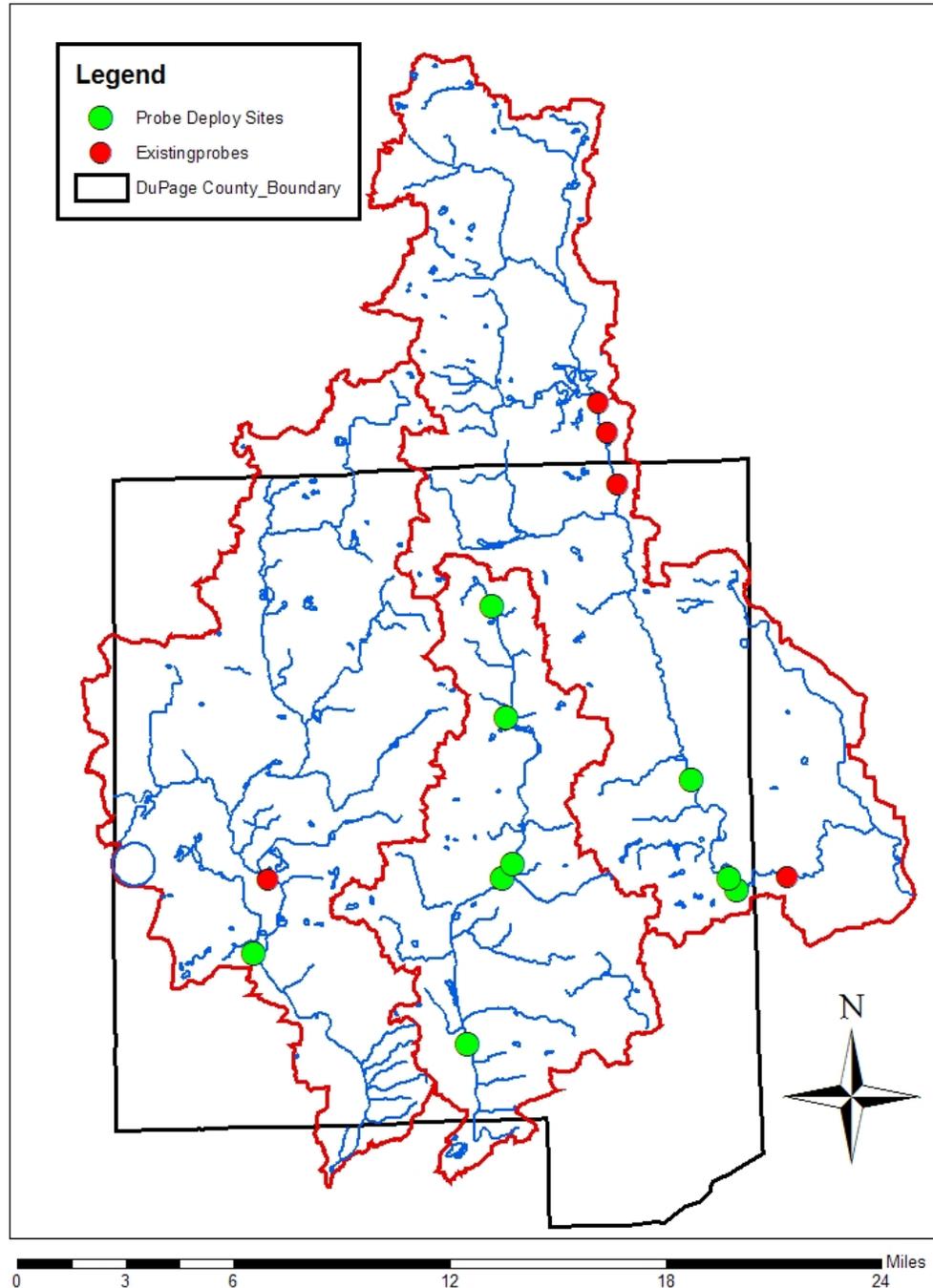
RM: 10.7

Orientation: Upstream

Comment

Grave Mill Dam

Map 1. DO Probe Deployment Sites, July 2006



# Continuous DO Monitoring Project

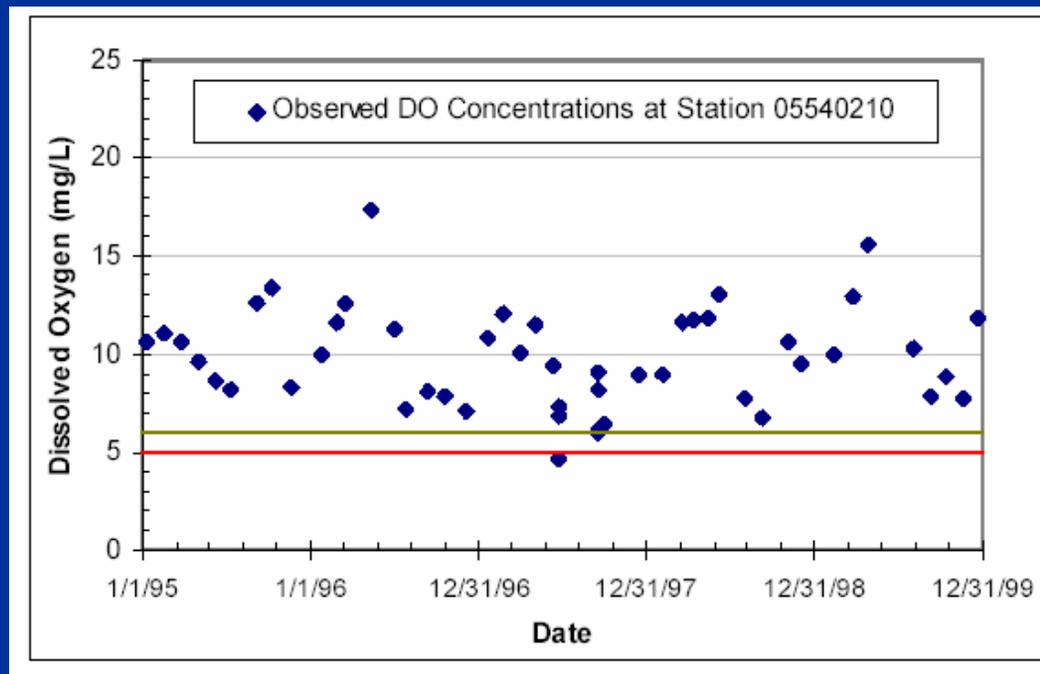
- Green Icons probes deployed by Workgroup
- Red Icons probes deployed by Workgroup agencies
- 16 SOD sites also sampled





# What is Dissolved Oxygen (DO)?

- Gaseous oxygen dissolved in the water
- Essential for aquatic life



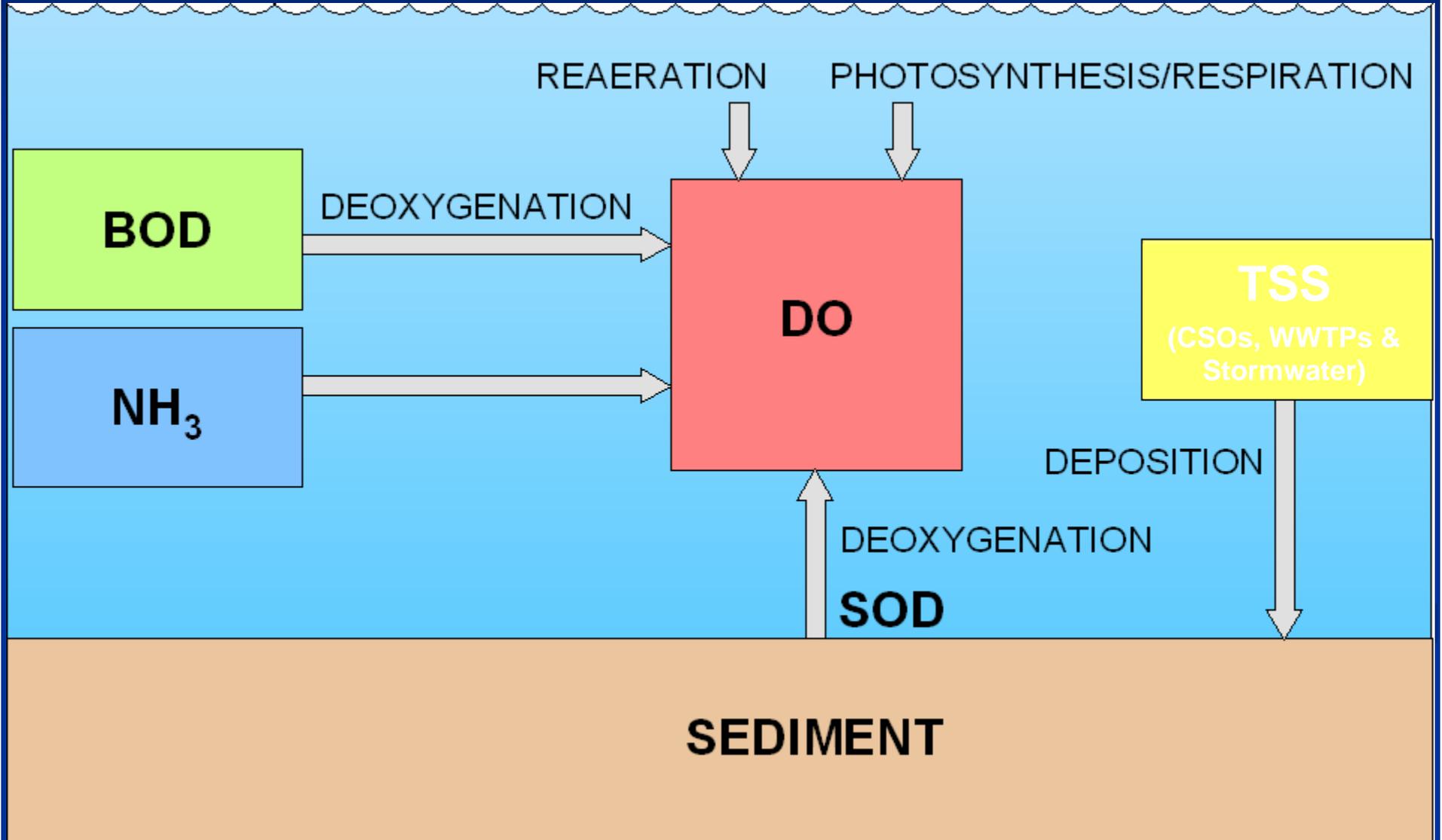
# What is Dissolved Oxygen (DO)?

Quantity of DO governed by:

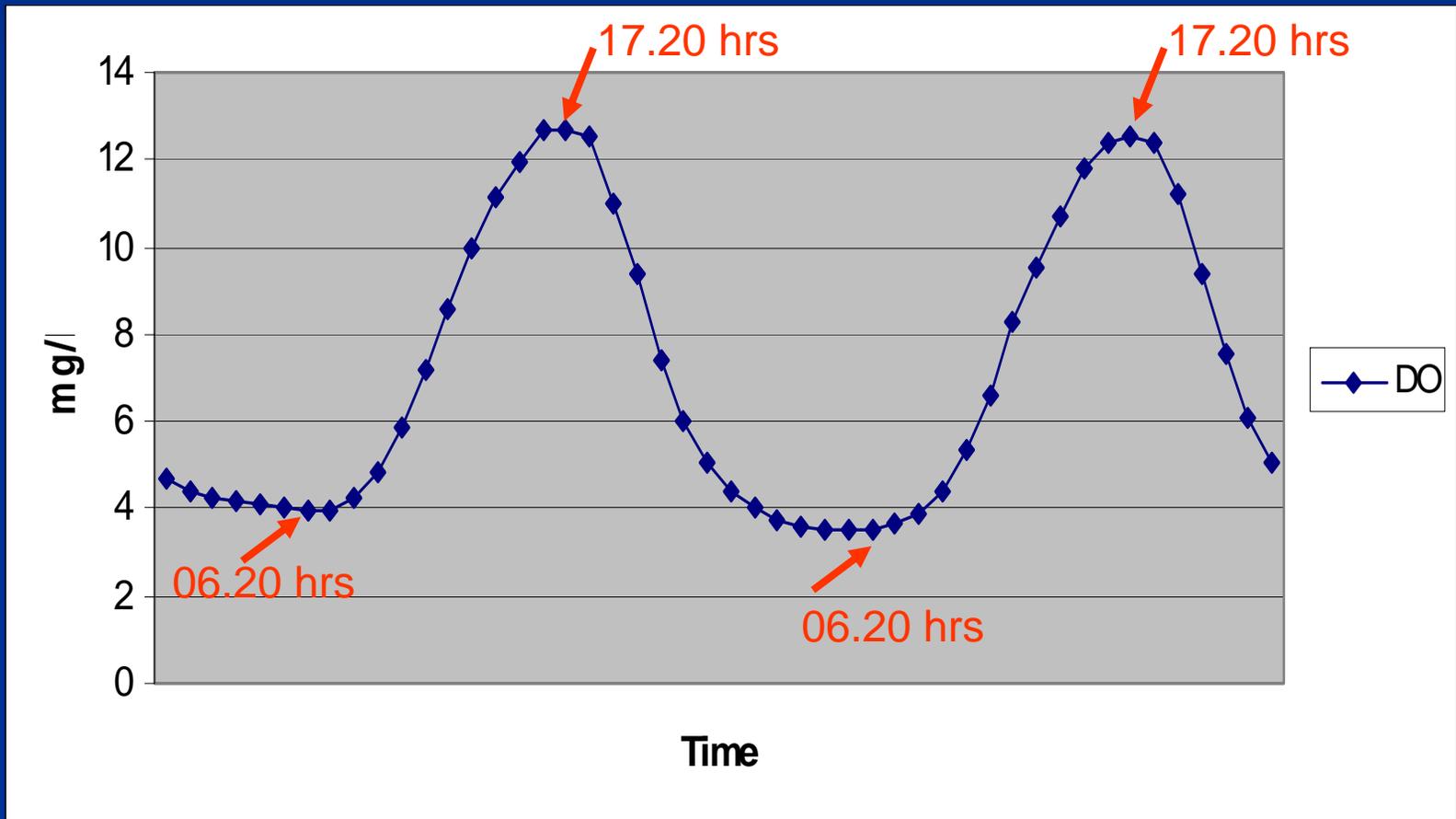
- Physical features (capacity of the system to aerate water )
- Levels of Carbonaceous Biochemical Oxygen Demand (CBOD), Nitrogenous Biochemical Oxygen Demand (NBOD) and Sediment Oxygen Demand (SOD)
- Water Temperature
- Diurnal Cycle



# Sources and Sinks for Dissolved Oxygen



# Diurnal Cycle West Branch McDowell Grove 16<sup>th</sup>- 17<sup>th</sup> June 2006



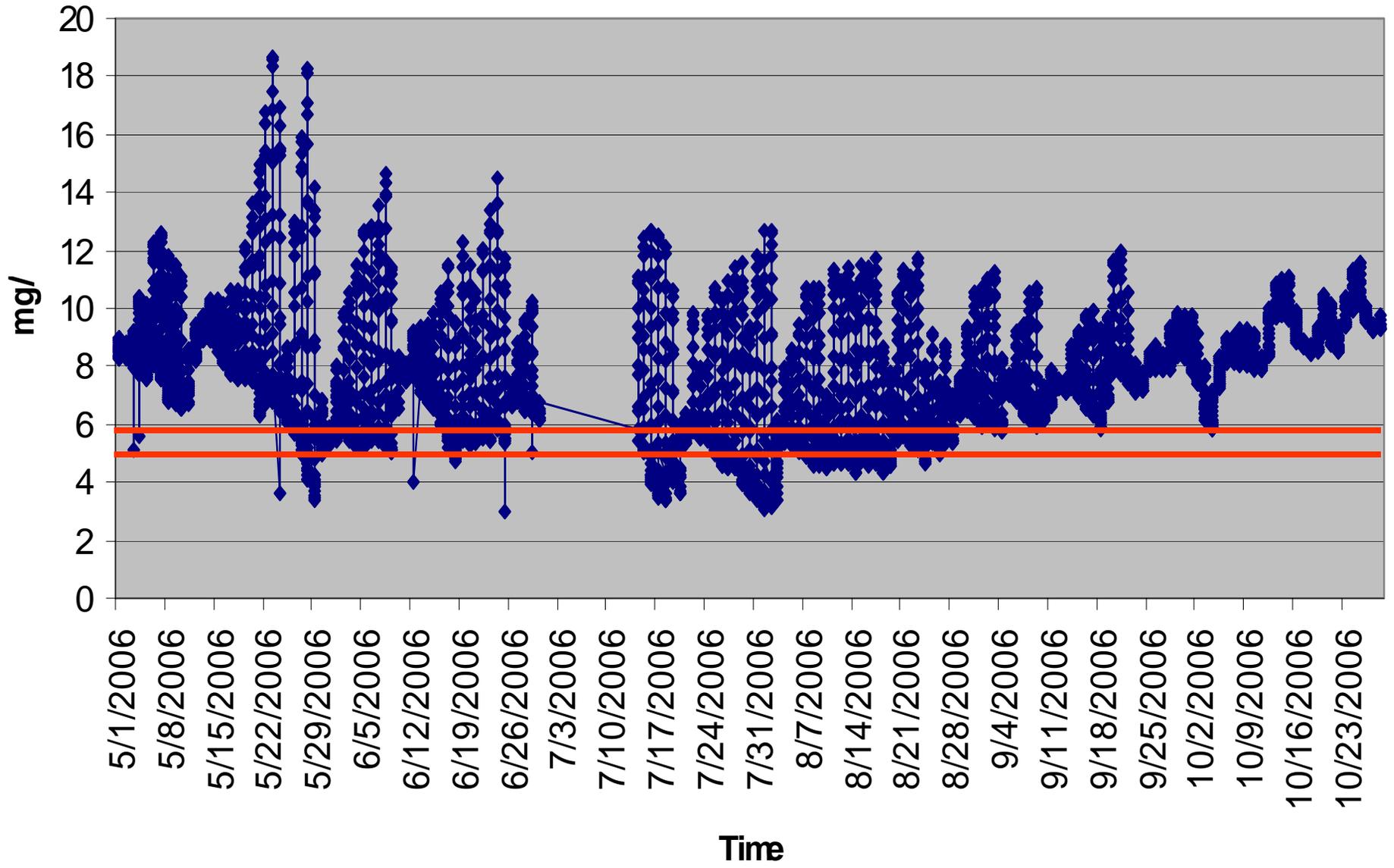
# Illinois State Law on DO

*Current standards for all stream reaches:*

*“Dissolved oxygen shall not be less than 6.0 mg/l during at least 16 hours of any 24 hour period, nor less than 5.0 mg/l at any time”*

# DO West Branch McDowell Grove

—◆— DO



# DO Feasibility Project

Study Objective - Determine the feasibility and cost benefit of :

1. Dam modification or removal
2. Construction and operation of in-stream aeration projects on Salt Creek and the East Branch DuPage River

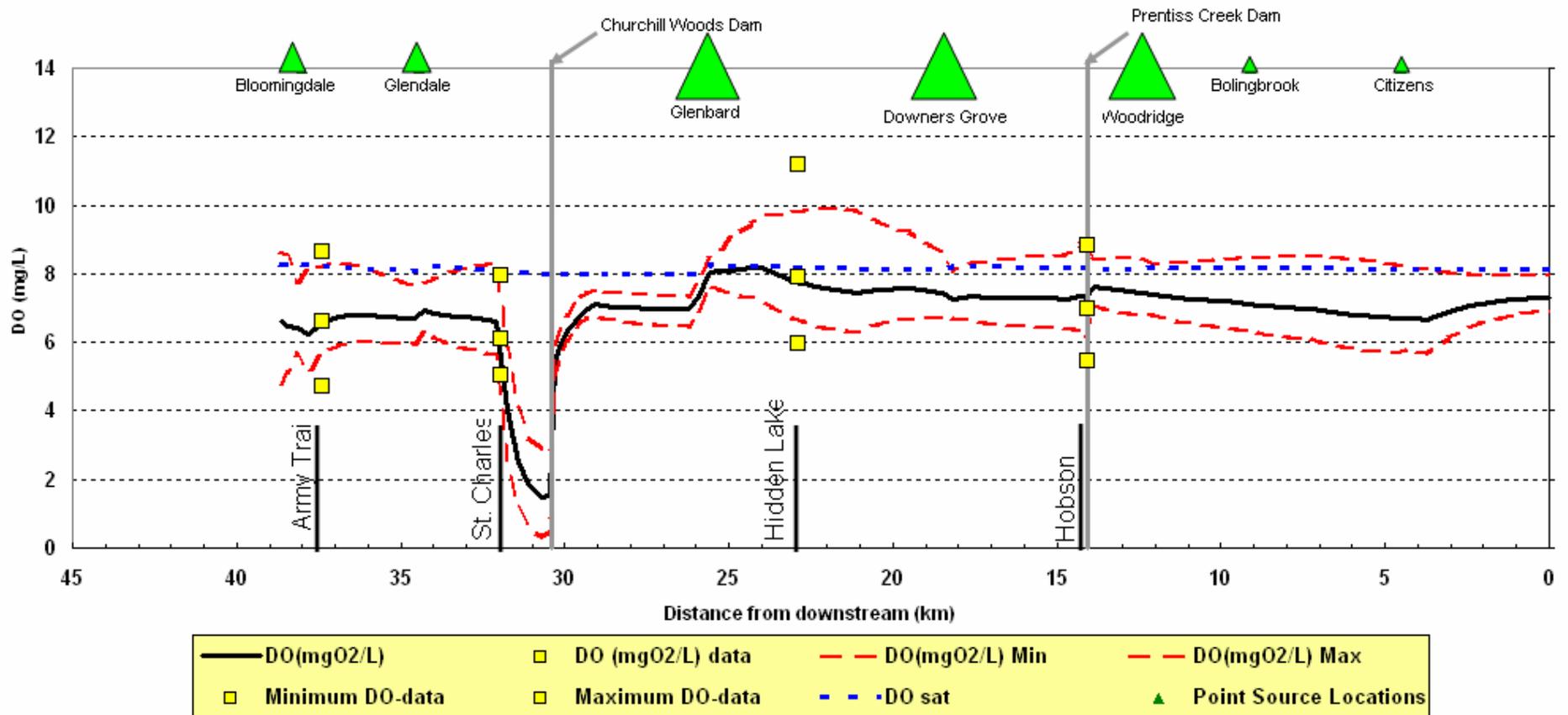
Hired HDR Engineering to conduct study in conjunction with Workgroup

**East Branch DuPage  
River QUAL 2K Model  
Results**

# East Branch DuPage - Calibration Results

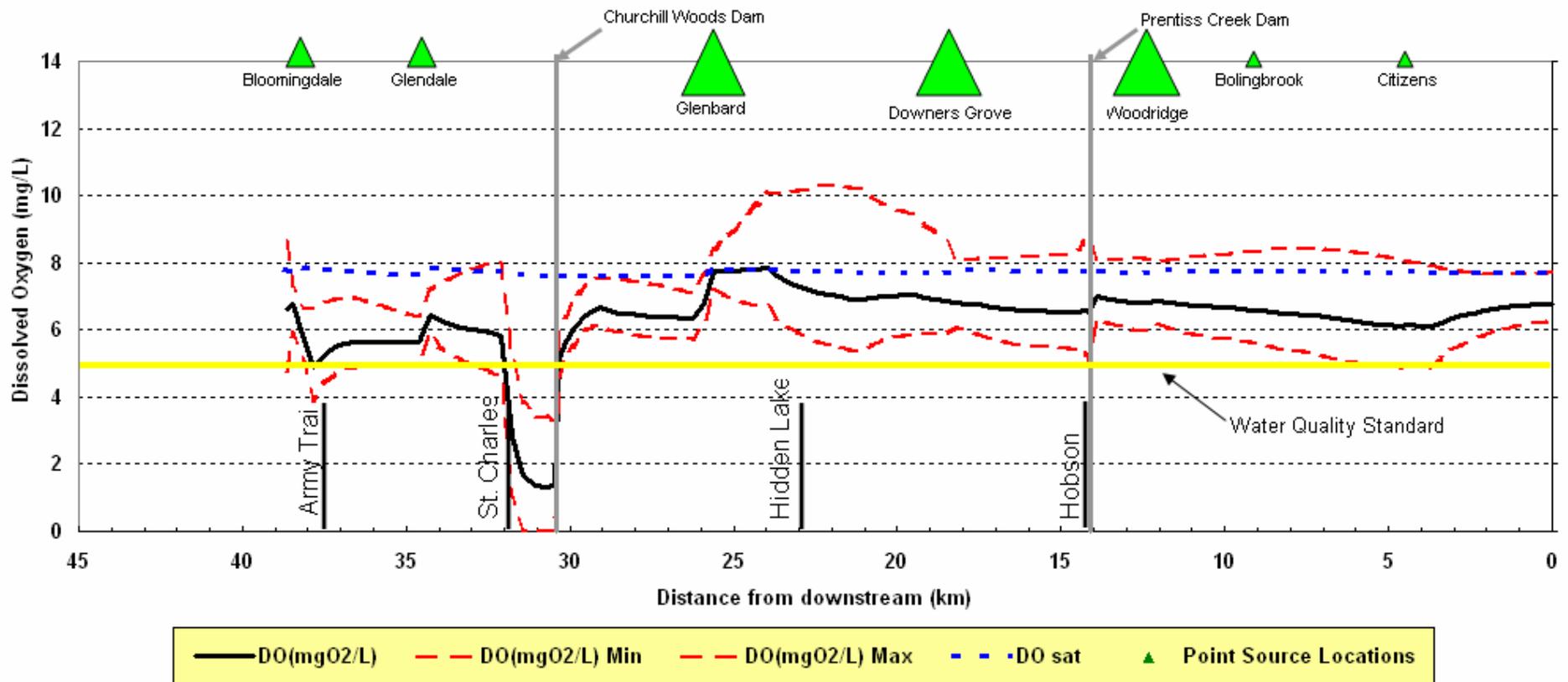
## Dissolved Oxygen in East Branch DuPage River

Calibration Run (8/13/06 to 8/17/06)



# East Branch DuPage – Baseline DO

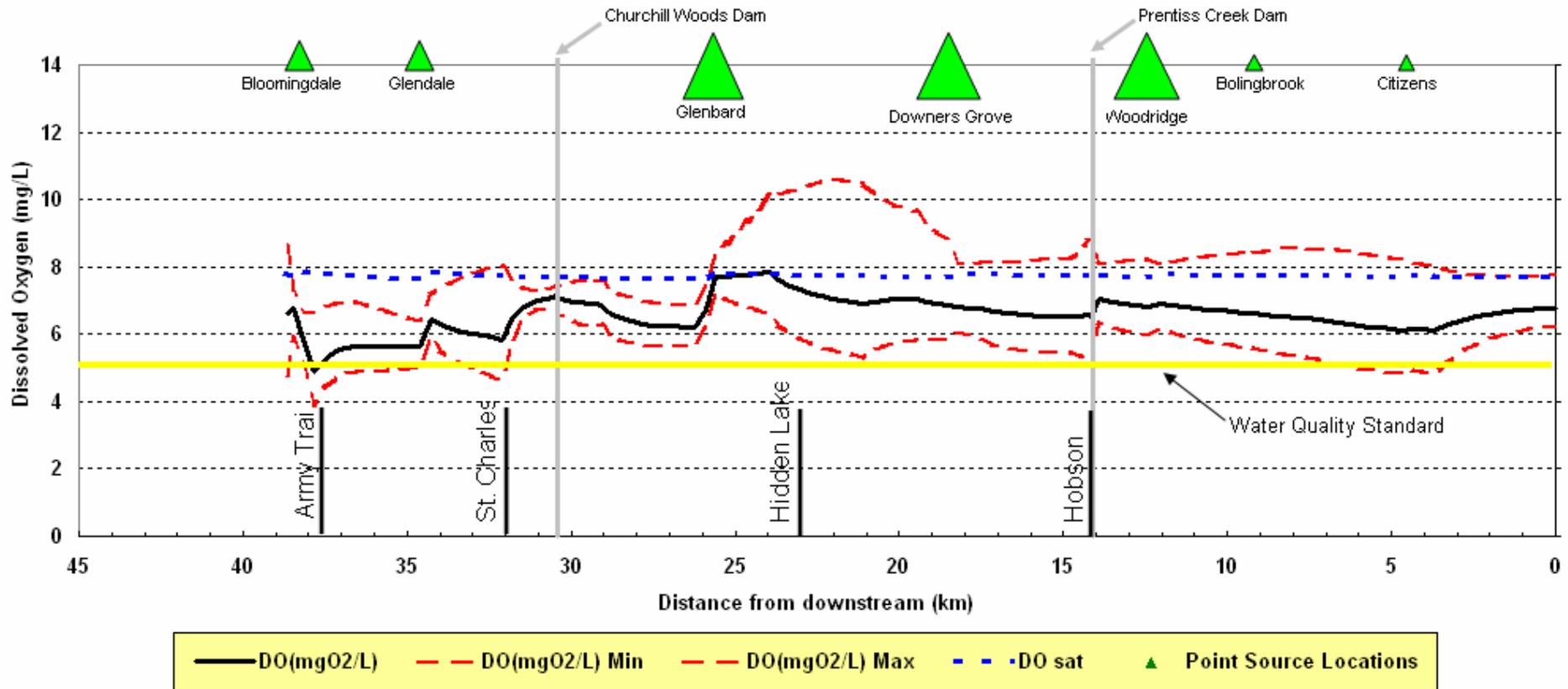
**Dissolved Oxygen in East Branch DuPage River**  
Baseline Conditions



# East Branch DuPage – Future Churchill Woods Dam Removal

## Dissolved Oxygen in East Branch DuPage River

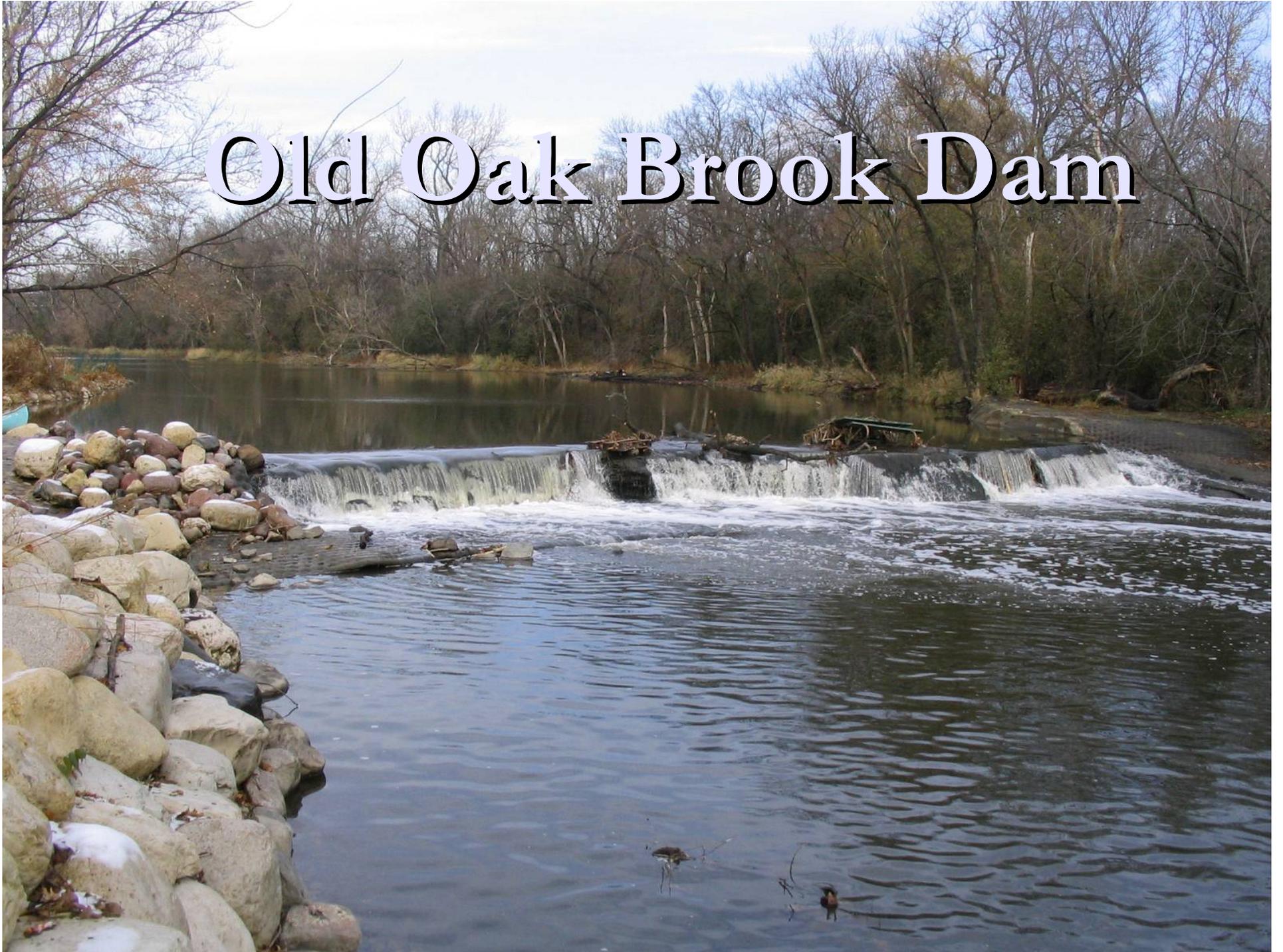
Churchill Woods Dam Removed



# Other Components

- Series of public meetings
- Creation of project website with commonly asked questions ([Saltcreekeastbranch.com](http://Saltcreekeastbranch.com))
- Cost estimations of alternatives (infrastructure)
- Talking to public officials at a municipal level

# Old Oak Brook Dam





# Bioassessment Plan



2006 9 21

# Comprehensive Monitoring Program

- Biological and Habitat Assessment Component & Chemical/Nutrient Component
  - Contract finalized with Midwest Biodiversity Institute (MBI)
  - Commenced assessments in the 2006 field season
  - 135 sites throughout the project area

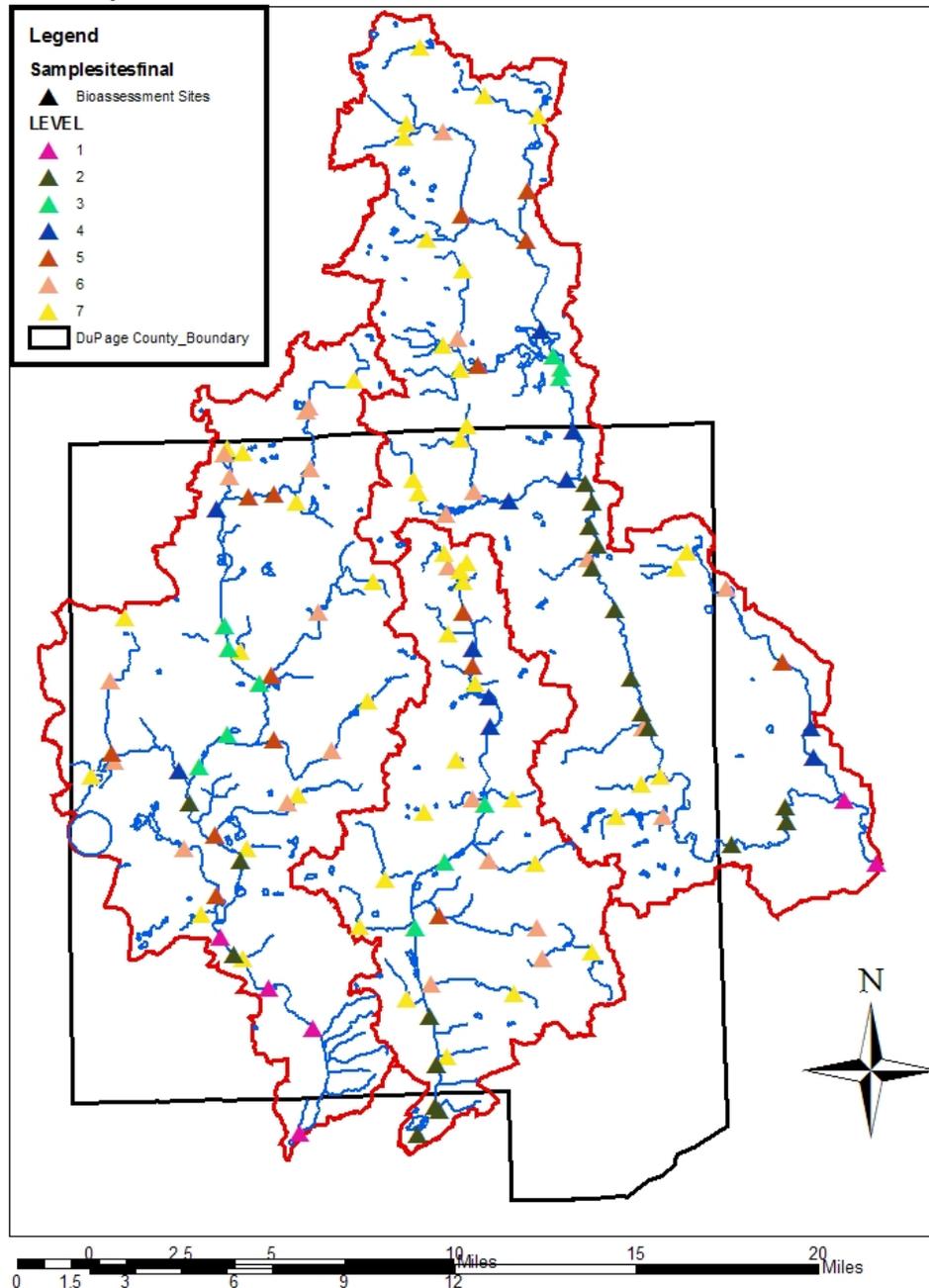


# Bioassessment Plan Elements

- Fish
- Macroinvertebrates
- Habitat – QHEI
- Water Chemistry
- Sediment Chemistry



Map 2. Bioassessment Sites Geometric Levels



# Bioassessmnt Plan

- 135 sites
- Geometric/  
targeted design
- 3 year cycle

# Why Biology?

Directly measures progress towards the designated use

Avoids errors created by measuring univariant parameters

Sets up a base line to measure impacts of projects

2006 9 21

# Chloride Reduction and Education Study



# Chloride Usage Education and Reduction Program Study - Scope

- Research existing deicing programs and efforts
- Analyze alternatives and their effectiveness
- Recommend alternative methods
- Recommend effectiveness monitoring
- Prepare an implementation plan – Phase II



Image credit: Village of Hanover Park, IL

**Legend**

**Green Space  
LANDUSE**

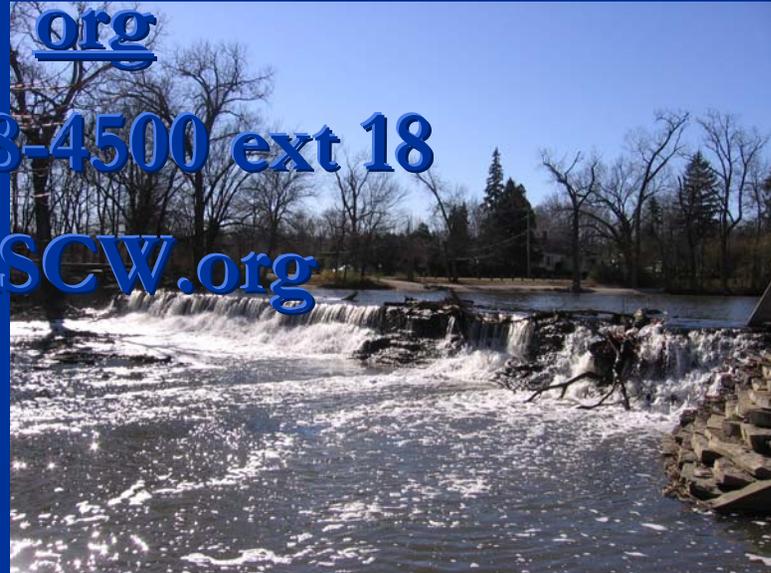
- Commercial
- FREE Paved Parking/Storage
- Industrial
- Institutional
- OSUD
- PARK
- Residential



# Questions?



- Stephen McCracken
- The Conservation Foundation
- [smccracken@theconservationfoundation.org](mailto:smccracken@theconservationfoundation.org)



- 630-428-4500 ext 18
- [DRSCW.org](http://DRSCW.org)