Le Sueur County, MN

Tuesday, June 23, 2015

Board Meeting

Item 7

10:30 a.m. Sara Heger, U of M (30 min)

Staff Contact:

Small Community Wastewater Treatment

ONSITE SEWAGE TREATMENT PROGRAM

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Water Resources Center
UNIVERSITY OF MINNESOTA
Driven to Discover℠

University of Minnesota
Onsite Sewage Treatment Program

University of Minnesota
Extension

- Professional Training – Designers, Inspectors, Pumpers, Installers
- Research and Demonstration
- Homeowner Operation & Maintenance
- Small Community Wastewater Education Program

Presentation Agenda

- Septic (SSTS) versus wastewater treatment plant(WWTP) and dispersal
  - Treatment
  - Dispersal
  - Permitting
  - Cost
- Ottertail case study
- Management

Treatment

SSTS

Contaminant	Level (mg/L)*
BOD	~0
TSS	~0
Bacteria/viruses	~0
Phosphorous	<1
Nitrogen	2-50**
*Background levels can contribute	
**Depends on system and treatment goal	

St. Peter WWTP (2014)

Contaminant	Level (mg/L)*
BOD	<10
TSS	<20
Bacteria/viruses	<200 #/100ml
Phosphorous	<1
Nitrogen as nitrate	25-26

Dispersal

SSTS

- Discharge to
  - Groundwater
    - Nitrate concerns in some areas
  - Surface water
    - Phosphorous is removed with systems with 3 feet of soil treatment
  - If wells are being used for drinking water, the treated wastewater is staying the watershed for future use

WWTP

- Discharge to
  - Surface water
  - Well water is lost to the surface/watershed

How Much Water from SSTS?

- Average home using 300 gallons per day (gpd)
- With a septic systems a small amount is lost to evapotranspiration
- ~2 months out of the year in which ET exceeds precipitation
  - percentage depends on lots of factors such as depth of system, vegetation type, slope aspect)
- 300 gpd X 365 days X 95% recharge = 100,000 g/yr.
- 300 gpd X 100 days X 90% recharge = 27,000 g/yr.

Permitting

SSTS

- County <10,000 gpd
  - >2,500 gpd nitrogen evaluated, BMP if sensitive groundwater
  - >5,000 gpd
    - Phosphorous evaluation
    - Nitrogen treatment <10 mg/L if sensitive groundwater, BMP otherwise
- State >10,000 gpd

WWTP

- State permit
  - BOD/TSS/Bacteria, phosphorous limits
  - Required to report nitrogen

Evolution of Design and Permitting with Septic Systems

- State code Chapter 7080 has not changes the amount of separation required = 3 feet
  - Was 4 feet in early '70s
- Understating, training and enforcement has been evolving
- Increase standards for cluster systems

Economics

Private SSTS

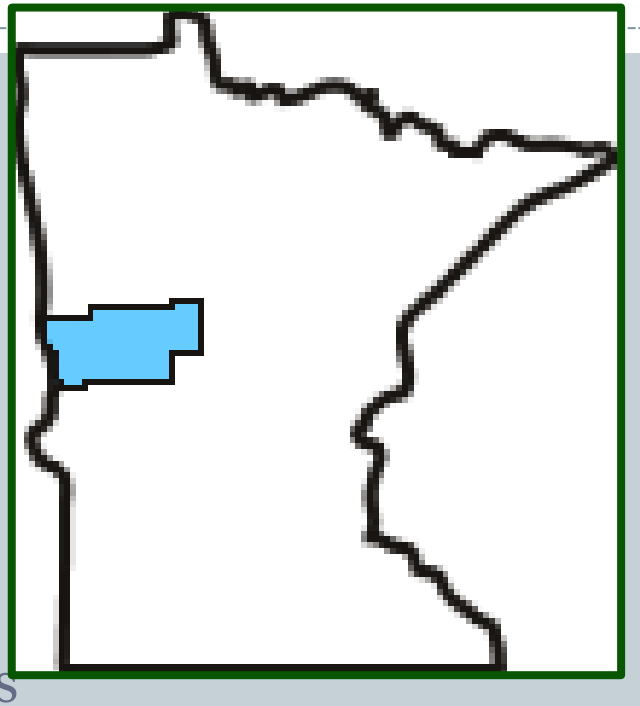
- Individual systems
  - Type I - $5,000 – $15,000
  - Type IV - $12,000 –$20,000
  - Management $100-$400/year
- Clusters
  - Cost highly dependent on length and conditions to collect the wastewater
  - Type I - $15,000 - $25,000
  - Type IV - $20,000 - $30,000
  - Management - $300 - $600

Public SSTS

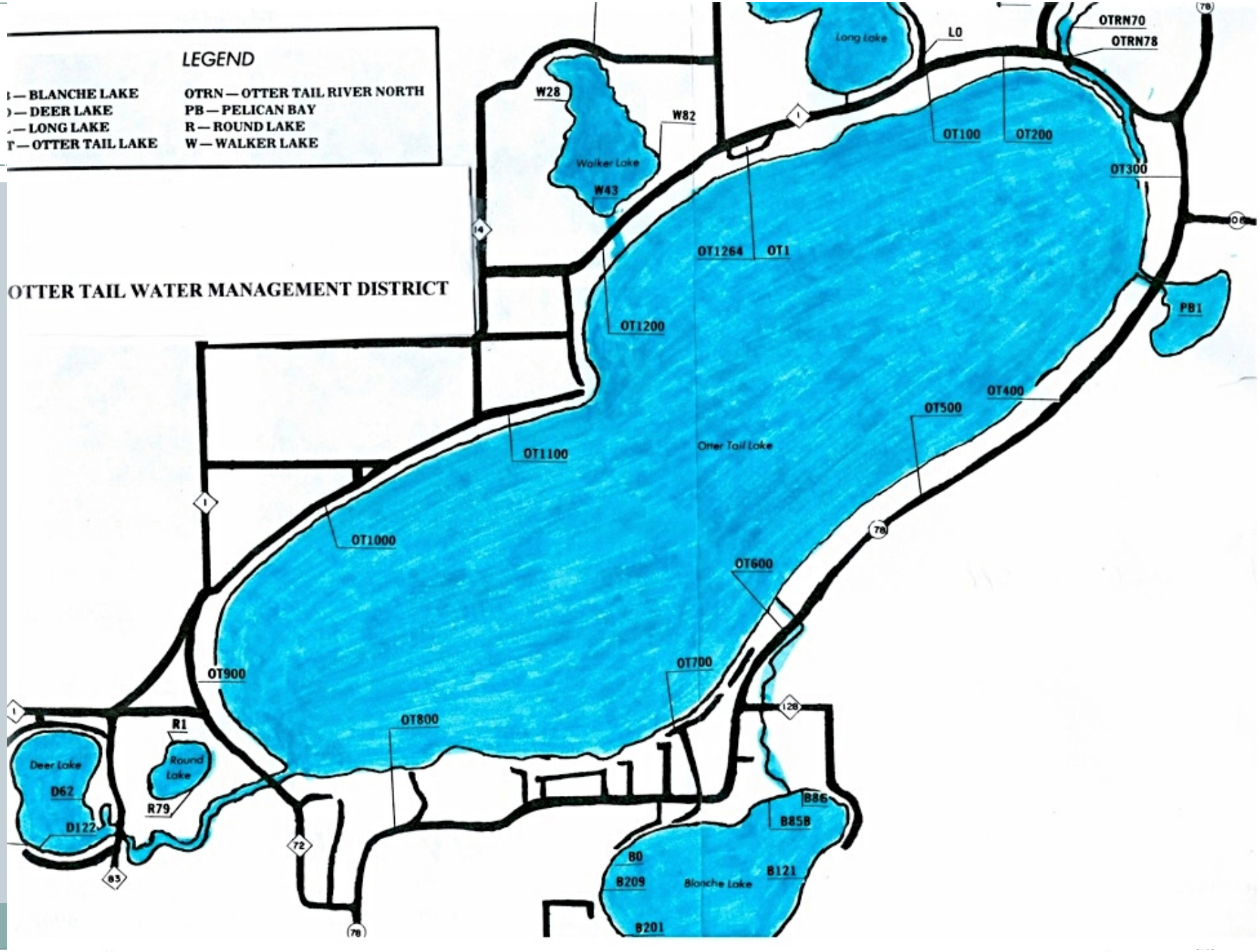
- Prices increase due to:
  - Lawyers
  - Permitting
  - Engineering
  - Prevailing wage
  - Etc….
  - Estimated to increase cost by ~25 – 33%

Otter Tail Management District

Otter Tail Water Mgmt. District



- 6 lakes
- 55 square miles
- 4 townships
- Portions of City of Otter Tail
- Properties:
  - 1984 ~1200 homes, cabins, businesses
  - 2014 ~ 1680 connections


LEGEND
— BLANCHE LAKE
— DEER LAKE
— LONG LAKE
— OTTER TAIL LAKE
OTRN — OTTER TAIL RIVER NORTH
PB — PELICAN BAY
R — ROUND LAKE
W — WALKER LAKE
OTTER TAIL WATER MANAGEMENT DISTRICT
Long Lake
Walker Lake
Otter Tail Lake
Deer Lake
Round Lake
Blanche Lake
W28
W82
W43
L0
OTRN70
OTRN78
OT100
OT200
OT300
OT1264
OT1
OT1200
OT400
OT500
OT1100
OT1000
OT600
OT700
OT900
OT800
PB1
R1
R79
D62
D122
B86
B85B
B0
B209
B121
B201

Why was District Formed?

- Residents noticed reduced water quality
- Identified several inputs/impacts to lake
  - Wastewater
  - Agricultural runoff
  - Reduction in native shore land
- GOAL:
  Properly managed wastewater treatment at an affordable long term cost which would maintain the rural character of the community

General Septic System Problems

- Small lakeshore properties
- Sandy soils with rapid transmissivity to lake
- Many existing septic systems installed:
  - Too close to lake
  - Too deep in regard to elevation of lake

District Powers and Responsibilities

- Set fee structure to support District activities
- Levy taxes to property tax statements
  - Needed 10% of the time
- Write and enforce ordinance
- Inspection and monitoring program
- Issue compliance orders
  - Including interest and penalties

Management Options

- Passive
  - System is under District jurisdiction
  - Homeowner responsible for all maintenance & repairs
- Active
  - District maintains from the tank & beyond

Passive Maintenance

- **District**
  - inspects tanks for pumping, drain field failures, lift pump operation
  - notifies homeowner to pump & provides reply form when completed
  - Maintain records/history of system
  - Information/education on user "best management practices"
- **Homeowner**
  - Responsible for all costs associated with managing and replacing system
  - Can switch to 'active' plan **if** you meet criteria

Active Maintenance

- District maintains from the tank & beyond
  - Covers all pumping & repairs
  - Unless Homeowner is negligent (excessive water use, modifying/damaging system, etc.)
- Cannot switch to ‘passive’ plan
- Clusters must be on active plan
- All new systems on active plan

Staffing and Budget

- OTWMD employs:
  - 1 full time staff,
  - 1 part time office staff,
  - 1 on call person to cover when the manager is away &
  - 1 seasonal intern
- Annual operating budget is $200,000

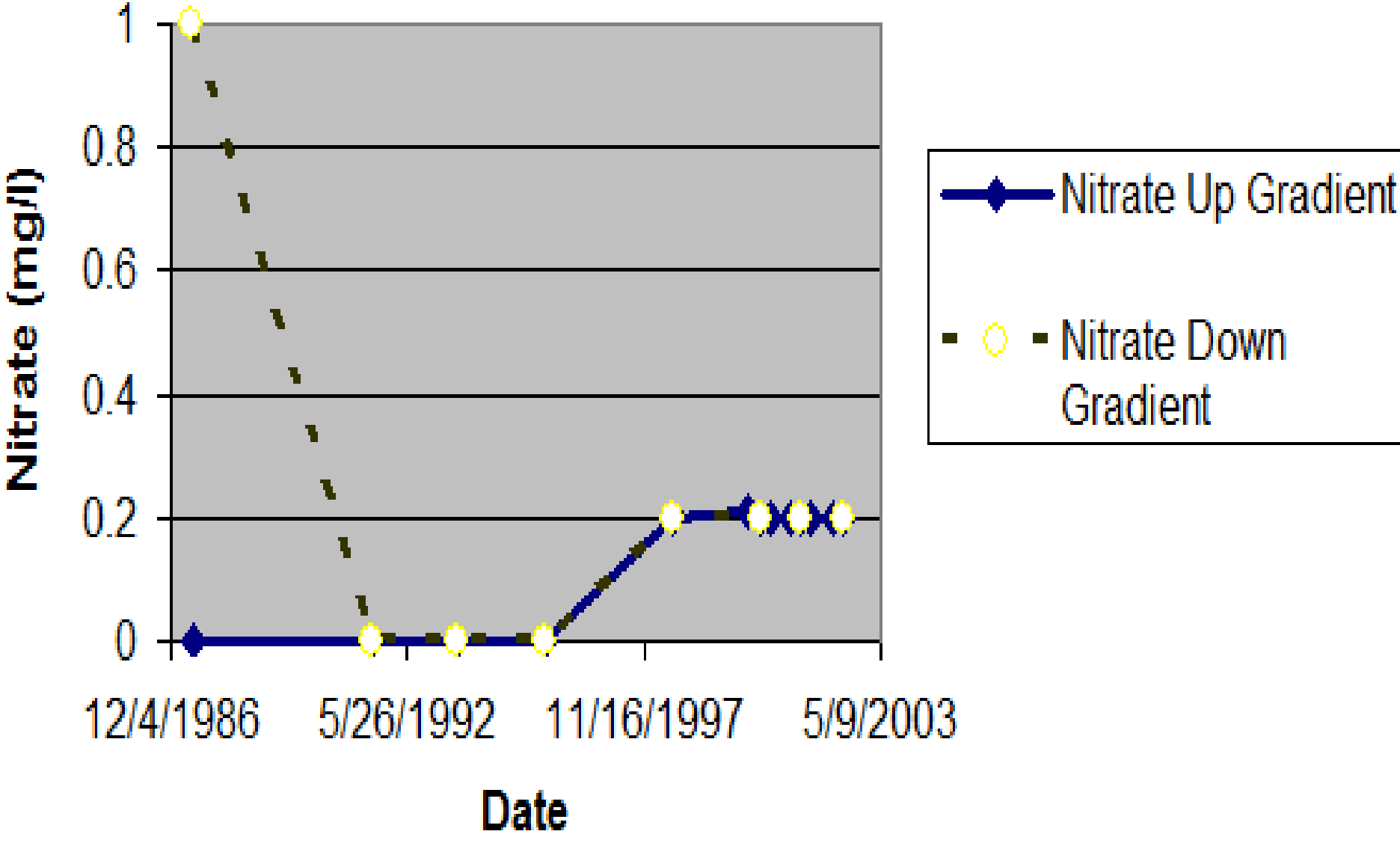
Repairs and Replacement

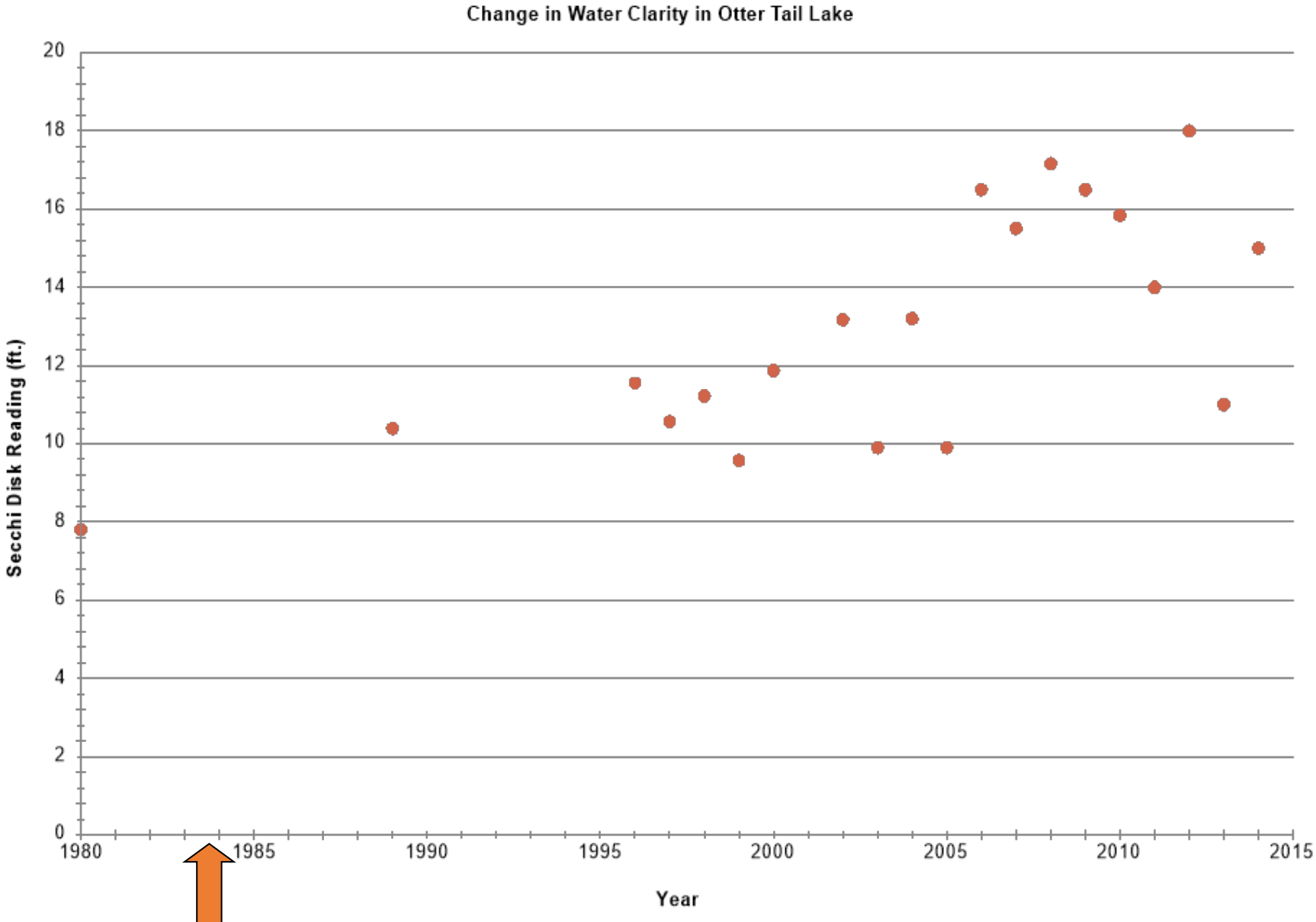
- District has replaced approximately 40 systems since 1986
- 20 were from the 1985 project
  - 2 mounds & 18 gravity beds
- 20 were systems older that 1986 installed prior to project

Ground & Water Quality Impacts

- Groundwater monitoring wells
  - Originally 120 were required
  - Reduced to less then 30 due to no noticeable impacts
  - MPCA is considering dropping permit/wells all together due to lack of impacts
- Lake water quality monitoring
  - Phosphorus levels
  - Water clarity

Nitrate Data for Cluster Drainfield 73





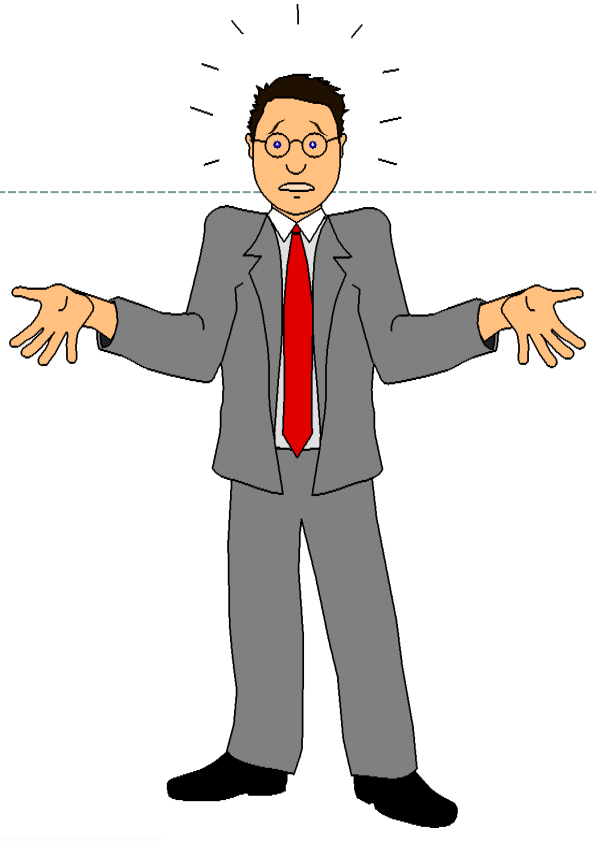
Formation of District

Growth? More Development?

- Development has been minimal which was one of the goals
- Amount of seasonal versus permanent has not changed
- Overall total connections has increased ~10% over 30 years

Management

- All systems must be managed
- If community septic solution is implemented the District could play a role in the long term protection of water quality
- Homeowners associations typically lack the ability:
  - To apply for grant/load funds
  - To collect mandatory fees if not paid



Questions?

http://septic.umn.edu

University of Minnesota

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