Commissioner's Order No. 356-04
Natural Resources

A Commissioner's Order establishing the protection and management of wetlands and concurrent surface water that enter and flow through the receiving water wetland complex to Ogeechie Lake and the Rum River.

WHEREAS, the Mille Lacs Band of Ojibwe Indians is a signatory and successor to the Treaty of 1837, 7 Stat. 53, and the Treaty of 1842, 7 Stat. 591, and the treaty of 1855, 10 Stat. 1165, and

WHEREAS, Band Statue 1062-MLC-50, Section 3 directs the Commissioner of Natural Resources to protect all natural resources of the Mille Lacs Band of Ojibwe Indians, and

WHEREAS, preservation and management of the wetland complex receiving treated wastewater effluent from the Mille Lacs Wastewater Treatment Facility (WWTF) Permit No. MN-0064637 - 1 are a significant factor in the overall protection of surface and ground water and respective human health and the environment, and

WHEREAS, the United States Environmental Protection Agency has funded the Mille Lacs Band to develop regulatory programs within the Mille Lacs Reservation or on lands under the jurisdiction of the Band, and

WHEREAS, the Mille Lacs Band of Ojibwe Department of Natural Resources/Environment (DNR/E) requires that the draft wetland monitoring and protection plan (submitted to Region V, March 2004, (enclosed)) be adopted and implemented immediately) which specifies monthly water quality and flow sampling and will specifically require respective sampling to be conducted in May 2004.

WHEREAS, all the data required complying with NPDES Permit No. 0064637 – 1 and this respective Mille Lacs Band Commissioner Order be submitted to the Mille Lakes Band (DNR/E) on a monthly basis.

NOW THEREFORE, by the authority vested in me by the Mille Lacs Band of Ojibwe Indians under tribal law, I, Curt Kalk, Commissioner of Natural Resources for the Mille Lacs Band of Ojibwe, hereby require that the Wetland Monitoring and Protection Plan for Mille Lacs Wastewater Inc. (Permit No. MN-0064637-1) be implemented immediately, prior to the Waste Water Treatment Facility start-up.

DATED at Vineland, Minnesota this 20th day of May in the year two-thousand and four.

Curt Kalk,
Commissioner of Natural Resources

APPROVED AS TO FORM,
EXECUTION AND NUMBERING

John Swimmer,
Solicitor General

EXPIRATION DATE: N/A

OFFICIAL SEAL OF THE BAND

Wetland Monitoring and Protection Plan
for Mille Lacs Wastewater Inc.
Permit No. MN- 0064637-1

In accordance with the NPDES requirements Part I page I-5 and I-6, monitoring of the West Vineland Wetland (WVW) and Ogechie Lake will commence once the Mille Lacs Wastewater Treatment Facility (MLWTF) becomes operational and begins discharging treated effluent. The monitoring will document actual nutrient loading (flow mgd times concentration of respective chemical and physical parameters) from the MLWTF into the WVW. Chemical parameters (Table 2) will be monitored in Ogechie Lake as well as the Mille Lacs Lake (infall) and Buckmore Dam (outfall).

The WVW vegetation communities will be assessed annually from 2004 through 2006 and every third year thereafter using aerial photography and/or groundtruthing. The results of the assessment will be used to document changes in the diversity and extent of plant communities in the WVW.

1.0 NPDES DISCHARGE MONITORING

Discharge water quality samples will be collected from the treatment plant (Figure 1, pg. 1-C) as required by the NPDES permit. Table 1 presents the list of effluent parameters to be monitored per the NPDES permit and their continuous discharge limitations (Part I, page I-3 and I-4).

Table 1. Treatment Plant Permit Limits

	30 Day Average	7 day Average
CBOD5	25	40
TSS	30	45
Total Phosphorus	1.00	
Fecal Coliform	200/100 ml	
PH	6.0 <pH < 9.0	

2.0 SURFACE WATER QUALITY MONITORING

Surface water quality samples will be collected from the following locations (Figure 1, pg. 1-C) on a monthly basis except during ice conditions or low or no water flow conditions.

- Three (3) wetland (gauging) stations, roughly halfway between the proposed discharge point and Vineland Road, situated in a line perpendicular to flow
- Two (2) 36-inch culverts located at Vineland Road
- The wooden trail bridge (Trail Bridge) crossing the tributary from WVW to Ogechie Lake (in Kathio State Park)
- State Highway 169 bridge (the Rum River from Mille Lacs Lake to Ogechie Lake)
- Buckmore Dam (the transition from Ogechie Lake to the Rum River)
- Two (2) Ogechie in-lake sampling sites

Flow rates will be measured, as practical, from the wooden trail bridge (Trail Bridge) however, opportunities to quanitate areas of an identifiable stream channel may be difficult due to the morphology of the stream channel and the seasonality of flow. Stream channel cross-sections will also be recorded during monitoring procedures to facilitate total flow estimates.

Flow (stage) at the Buckmore Dam will be recorded during each sampling event. MLWTF will communicate with the Minnesota Department of Natural Resources (MNDNR) to obtain yearly hydraulic numbers from this site.

Surface water samples will be collected monthly (depending on flow and ice conditions) at these identified areas. Water quality parameters to be measured in the field include temperature, pH, redox, electrical conductivity, and dissolved oxygen. A hand-held water quality meter will be utilized to measure these parameters. Water samples will be collected for laboratory analysis of the constituents in Table 2.

Table 2. Ongoing monitoring surface water parameters.

PH	Ammonia-nitrogen (NH_4-N)
Total Kjeldahl nitrogen (TKN) or Total nitrogen (TN)	Total phosphorus (TP)
Nitrate (NO_3-N)	Chloride

3.0 VEGETATION ASSESSMENT

Aerial color infrared photography combined with representative transects and general field reconnaissance will be used to delineate vegetation communities. Evaluations will include methodologies identical or similar to those used in the baseline assessment. Communities will be

defined by dominant species such as sedge meadow, cattail marsh, scrub-shrub, tamarack, and hardwoods or deciduous forest. Additional information gathered by these techniques will include other (than dominant) species present and estimated percent cover of each dominant species. Where significant, subdominant species will also be used to identify vegetative community types (i.e., sedge meadow with cattail).

4.0 ANIMAL USAGE

Field notes will be taken to document wildlife observations at the times of field sampling.

5.0 REPORTING AND REVIEW

A written report containing the results of the above monitoring efforts will be submitted to USEPA on an annual basis. The report will be submitted to the USEPA by April 1 each year and will include data from the previous year. The report will be reviewed by ML Wastewater Management Inc., MLB DNR/Environment and EPA, as discussed at an annual meeting. The report will include the following.

- A summary of nutrient concentrations and flows to the WVW from the MLWTF. Data from the MLWTF will be included.
- A summary of flows (Trail Bridge, Buckmore Dam) and concentrations measured at the designated sampling stations in and around the WVW.
- A map showing the extent of identified vegetation communities within the WVW.
- Recommended modifications, if any, to the ongoing wetland monitoring plan.

6.0 PROJECT ASSESSMENT AND REGULATION

The following information describes the procedures and methods that will be used to evaluate and regulate the monitoring plan using gathered data from water quality monitoring and vegetative community analysis.

6.1 Water Quality

Because no ambient nutrient criteria currently exist for protection of integrity of wetlands, it is proposed that data and information collected during the pre-discharge phase (March 2001 – October 2002) and the initial five years of operation of the MLWTF be used to evaluate potential impacts of the MLWTF on the WVW and Ogechie Lake system. The following proposed criteria could be applied to the "no significant impact on the wetland and downstream waters" limitation contained in the NPDES permit.

Evaluation of impacts resulting from the MLWTF discharge into the WVW shall be based on monthly monitoring and evaluation of water quality downstream of the MLWTF, with the compliance point designated as the site located at the WVW outflow to Ogechie Lake (i.e. Trail Bridge). Water quality samples will be collected on a monthly basis, and compiled once a year for evaluation. The yearly data evaluation will consist of three steps:

a. Determine if water quality has changed as compared to pre-discharge conditions (March 2001-October 2002). This will be determined by calculating the median annual TP concentration at Trail Bridge.

b. Determine if water quality change is significant. A change will be defined as significant if the annual median TP concentration exceeds the upper confidence limit of the 90th percentile TP concentration from the pre-discharge TP data as measured at Trail Bridge.

c. Determine if the water quality change has resulted in an adverse impact on the WVW and downstream waters. In order to ensure that sufficient data has been collected to develop a meaningful evaluation of water quality impacts, the determination of whether an adverse impact has occurred will not be developed until after evaluation of water quality monitoring collected during the initial five year operation of the MLWTF. This evaluation will include analyses to determine if a significant degrading trend (at a 95% significance level) in water quality has occurred at existing monitoring sites in the WVW and at the outlet to Ogechie Lake (Trail Bridge) since the installation of the MLWTF. If a significant degrading trend in water quality has

occurred, then the water quality improvement function of the wetland has been altered, resulting in adverse impact.

6.2 Vegetative Communities

Vegetation community changes in the WVW will be monitored and documented with analysis of aerial color infrared photography annually from 2004 through 2006 and then every three years. Special measures will be taken to restrict encroachment by non-native species.

During the course of the wetland history from 1939 to present, community types have changed for a variety of reasons, not including the treatment plant discharge. If the years 2000 and 2001 are compared, via aerial imaging estimates of cover percentages, a 4.1% RMS is computed. Table 3 presents changes for other years for which aerial images were available.

Table 3. Changes in WVW vegetation communities over time using RMS of squares.

	Vegetation Community Type and Percent Cover					
Year	Upland	Sedge Meadow	Cattail Marsh	Scrub-Shrub	Forest	RMS of squares v. 1939 (%)
1939	11.25	30.6	0.0	23.4	34.8	baseline
1965	9.1	27.1	16.3	20.3	27.2	18.7
1974	11.1	10.6	20.0	30.7	27.7	30.1
1991	8.3	15.0	26.1	24.7	26.0	31.8
2000	10.8	21.9	17.9	26.8	22.6	23.6
2001	10.2	14.7	18.9	31.2	25.1	27.7
2003						Pre-discharge

Because of the temporal development of gradients through the WVW, and because of the anticipated spatial diversity that will accompany those gradients, monitoring is designed to measure the progression and extent of ecosystem changes in hydrology, water quality, and vegetative cover. Therefore, there will be advance information concerning possible changes that may be occurring in the wetland structure and function. In particular, water quality at the Vineland Road culverts will provide ample advance indication of potential unacceptable nutrient exports from the WVW, and concomitant impending loss of WVW water quality improvement. Internal WVW measurements of water depth and nutrient concentrations, together with vegetative reconnaissance, will provide the means of tracking internal WVW events and attributes.

This monitoring plan includes an annual meeting with ML Wastewater Management Inc., MLB DNR/Environment and EPA for the purpose of reviewing the previous year's data. This meeting allows for objective evaluation of wetland structure and function, as well as detailed analysis and discussion of water quality. This meeting allows for adaptive management of the facility operation as well as the monitoring program.

Standard Operating Procedures

SURFACE WATER SAMPLING

This Standard Operating Procedure (SOP) is specifically designed for the Mille Lacs Wastewater Treatment Facility (MLWTF) wetland project. The unnamed wetland is to receive treated effluent from the newly constructed wastewater treatment plant. Surface water samples will be collected from locations within the unnamed wetland, intermittent streams located around the wetland and Mille Lacs and Ogechie Lakes. The following equipment will be assembled prior to each sampling event to perform the surface water sampling activities:

- sampling shuttles/coolers,
- sample bottles and laboratory supplied preservatives,
- sample labels,
- waterproof pens,
- custody seals,
- appropriate meters, measuring devices, and sampling equipment,
- decontamination supplies,
- field logbook,
- sample control logs, and
- chain-of-custody forms.

Surface water samples will be collected at all monitoring locations for chemical analysis. The sampling procedures may differ slightly from sampling locations within the wetland where surface flows are minimal to stream locations where surface flows are often observed. Due to the different surface flows, the sampling procedure for each type of surface water is broken down in the following sections.

Stream, Intermittent Steam, and Lake Sampling
Samples will be collected from stream-like conditions following the procedures listed below.

1) Sampling personnel will calibrate all field water quality measuring devices prior to entering the field. These calibration activities will be conducted at the beginning of each workday. All calibration activities should follow the directions provided in the operator manuals of each instrument.

2) Using the calibrated water quality meters, sampling personnel will complete the general water chemistry analysis of the surface water at each sampling location. Parameters measured in the field include: temperature, pH, dissolved oxygen, and redox potential. Sampling personnel should allow the instruments to stabilize before recording the value. The values will be entered into the field logbook immediately after measuring.

3) Sampling personnel shall measure the flow rate of the stream with a portable flow meter. Flow rate measurement should be measured as recommended in the flow meter operators manual. In addition to the measured flow rate, sampling personnel should estimate the flow as high, medium or low based on visual observation.

4) Labels for all sample bottles of a sampling location should be completed prior to commencing sampling activities of that particular monitoring location. Labels may be difficult to complete if they get wet. The labels should be completed with an indelible ink marker. The following information will be provided on each label:

    - project name and/or number,
    - field sample number,
    - depth interval, if applicable,
    - initials of sampler,
    - date and time of collection, and
    - sample type and preservative (if applicable).

5) Sampling personnel will don latex gloves during field sampling activities. Latex gloves should be changed between sample locations and the replacement of gloves should be completed just prior to sample collection at each sampling location in order to assure as sterile conditions as possible.

6) A decontaminated beaker should be used to collect the grab samples. The sampling personnel should submerge the beaker into the water column and then transfer the water sample into the appropriate sample container. The process will be repeated until all the sample containers for the particular sample location are full. If a large amount of floating solids are observed in the water sample the sample should be strained with a stainless steel strainer small enough to retain the solids, yet allow the water to flow through without the use of pressure or vacuum.

7) Samples should, if possible, be collected at a location of hydraulic turbulence where the water is well mixed. If possible, samples will be collected in the center of the channel or pool, approximately in the middle of the water column.

8) If the addition of an acid preservative is required, it should be added after the water sample is obtained. This will assure that no acid is lost during the collection process and that there is sufficient acid in the bottle to attain the necessary pH of 2.0 or less.

9) One set of duplicate samples will be collected during each sampling event. Duplicate samples are obtained by collecting a sample in a container twice as large as the sample containers. The sample is then transferred into two separate sample containers.

   The duplicate sample label requires only the field sample number, project name and/or number, and sample type and preservative (if any) while the other sample container should have the required information. The laboratory should not know the sample location of the duplicate sample.

10) The samples will then be placed into the appropriate sample shuttles/coolers. Samples will be stored and transported in the sample shuttle/coolers at <4°C (39°F). If required, frozen ice packs or double-bagged ice will be used to achieve the required temperature.

11) Sample information (time of collection, sample odor, sample color and any other pertinent information) will be recorded in the field logbook and on the sample control log as soon as possible after sample collection.

12) A chain-of-custody should be completed shortly after sample collection completion and placed in the sample shuttle/cooler for laboratory shipment.

13) Sample containers will be shipped to the laboratory for analysis immediately after sample collection to meet the minimum holding time requirements for degradable constituents.

14) The beakers used for water collection should be decontaminated after each sample is collected unless enough beakers are available to collect all of the samples. In this case all equipment may be decontaminated periodically or at the end of the sampling effort.

15) Custody seals should be placed on the sample shuttles/coolers, which preserves the integrity of the samples till the time the sample shuttle/cooler is opened in the laboratory. Custody seals should be placed on the shuttle/cooler lid so that the shuttle/cooler cannot be opened without breaking the seals. The custody seals should contain the following information:

•collector's signature or initials and

•date of sampling.

Wetland Sampling

Samples will be collected from the wetland and will follow the procedures listed below:

1) Sampling personnel will calibrate all field water quality measuring devices prior to entering the field. These calibration activities will be conducted at the beginning of each workday. All calibration activities should follow the directions provided in the operator manuals of each instrument.

2) Using the calibrated water quality meters, sampling personnel will complete the general water chemistry analysis of the surface water at each sampling location. Parameters measured in the field include: temperature, pH, dissolved oxygen, and redox potential. Sampling personnel should allow the instruments to stabilize before recording the value. The values will be entered into the field logbook immediately after measuring.

3) Sampling personnel shall measure the water depth prior to collecting the water sample at each sample location. Personnel will also observe and document additional conditions of each sample location in the field logbook. These conditions include, but not limited to, turbidity, color, debris and flow.

4) Labels for all sample bottles of a sampling location should be completed prior to commencing sampling activities of that particular monitoring location. Labels may be difficult to complete if they get wet. The labels should be completed with an indelible ink marker. The following information will be provided on each label:

   - project name and/or number,
   - field sample number,
   - depth interval, if applicable,
   - initials of sampler,
   - date and time of collection, and
   - sample type and preservative (if applicable).

5) Sampling personnel will don latex gloves during field sampling activities. Latex gloves should be changed between sample locations and the replacement of gloves should be completed just prior to sample collection at each sampling location in order to assure as sterile conditions as possible.

6) A decontaminated beaker should be used to collect the grab samples. The sampling personnel should submerge the beaker into the water column and then transfer the water sample into the appropriate sample container. The process will be repeated until all the sample containers for the particular sample location are full. If walking activities increase the amount of suspended solids in the sample area, then an extended reach sampling tool should be implemented to reduce the amount of disturbance. If these steps are taken and a large amount of solids are still observed in the sample, then sample should not be disturbed to allow the solids to settle to the bottom of the container. After a majority of the solids have settled to the bottom of the container then decant the water off the top of the sample and through a stainless-steel strainer in a manner that doesn't allow the solids to deposit into the final sample.

7) If the addition of an acid preservative is required, it should be added after the water sample is obtained. This will assure that no acid is lost during the collection process and that there is sufficient acid in the bottle to attain the necessary pH of 2.0 or less.

8) One set of duplicate samples will be collected during each sampling event. Duplicate samples are obtained by collecting a sample in a container twice as large as the sample containers. The sample is then transferred into two separate sample containers.

The duplicate sample label requires only the field sample number, project name and/or number, and sample type and preservative (if any) while the other sample container should have the required information. The laboratory should not know the sample location of the duplicate sample.

9) The samples will then be placed into the appropriate sample shuttles/coolers. Samples will be stored and transported in the sample shuttle/coolers at <4°C (39°F). If required, frozen ice packs or double-bagged ice will be used to achieve the required temperature.

10) Sample information (time of collection, sample odor, sample color and any other pertinent information) will be recorded in the field logbook and on the sample control log as soon as possible after sample collection.

11) A chain-of-custody should be completed shortly after sample collection completion and placed in the sample shuttle/cooler for laboratory shipment.

12) Sample containers will be shipped to the laboratory for analysis immediately after sample collection to meet the minimum holding time requirements for degradable constituents.

13) The beakers used for water collection should be decontaminated after each sample is collected unless enough beakers are available to collect all of the samples. In this case all equipment may be decontaminated periodically or at the end of the sampling effort.

14) Custody seals should be placed on the sample shuttles/coolers, which preserves the integrity of the samples till the time the sample shuttle/cooler is opened in the laboratory. Custody seals should be placed on the shuttle/cooler lid so that the shuttle/cooler cannot be opened without breaking the seals. The custody seals should contain the following information:

- collector's signature or initials and
- date of sampling.

AERIAL PHOTO INTERPRETATION

This Standard Operating Procedure (SOP) is specifically designed for the Mille Lacs Wastewater Treatment Facility (MLWTF) wetland project. Aerial photos are to be interpreted for plant communities, which will provide an approximate change in plant communities of the unnamed wetland over time per the monitoring plan. The following provides a guideline for determining plant communities using aerial photos.

1) Upon completion of the flight and receipt of the aerial photo, ideally, the photos will be scanned and rectified using GIS, for the purpose of making a large mosaic of all of the photos. Plant community types can be identified on the aerial photos as areas of varying color or texture that suggest vegetation of differing species composition and growth form. Ideally, surveys of vegetation (ground-truth) in different vegetation communities, which are easily delineated by observing the aerial photo, would be made to verify the community type identified on the aerial photo. The primary purpose of the survey activities is to verify that the division of community type, by color or visual texture on the photo, is a true reflection of differences of vegetation communities in the field.
2) Outline the wetland/upland boundary of the subject wetland. Some areas of upland are likely to be observed within the larger wetland area. However, the focus of this first step is to identify the area of interest, that being the large wetland complex in question (see previous photos for verification of this boundary).
3) Based on the vegetation surveys draw polygons around the different plant communities, within the area of interest outlined in step 2, based on the color or visual texture differences described above. Plant communities used in past aerial photo interpretation includes sedge meadow, cattail marsh, scrub-shrub, forested wetland and upland.
4) Utilizing a planimeter, or GIS if available, determine the acreage of each polygon.
5) Compile the acreage of each plant community for the wetland.
6) For a comparison of year to year differences in vegetation, a Root Mean Square calculation has been recommended. This is done by calculating the percent coverage for each cover class (sedge meadow, cattail marsh, scrub-shrub, etc.) for the current aerial photo. Subtract the previous year percentages, or the desired year to in which to compare the current vegetation, from the current cover class percentages to get the total change in percent for each cover class. Square each of these values, add all the squared values together, and finally take the square root of this value. This final number is the Root Mean Square for change in vegetation between the data for these two years. (Attached is a sheet of sample calculations prepared by Jerry Cole of Duckworth – Cole, Inc., Bryan, TX)

Root Mean Square of Squares

	2001	2000	delta	delta squared	RMS
Upland	10.20%	10.83%	-0.6	0.4	
Sedge Meadow	14.70%	21.85%	-7.1	51.0	
Cattail Marsh	18.89%	17.91%	1.0	0.9	
Scrub-Shrub	31.15%	26.78%	4.4	19.0	
Forest	25.06%	22.63%	2.4	5.9	
Total	100.00%	100.00%		77.3	8.8

	2000	1991	delta	delta squared	RMS
Upland	10.83%	8.25%	2.6	6.7	
Sedge Meadow	21.85%	14.98%	6.9	47.1	
Cattail Marsh	17.91%	26.07%	-8.2	66.5	
Scrub-Shrub	26.78%	24.70%	2.1	4.3	
Forest	22.63%	26.00%	-3.4	11.4	
Total	100.00%	100.00%		136.0	11.7

	1991	1974	delta	delta squared	RMS
Upland	8.25%	11.08%	-2.8	8.0	
Sedge Meadow	14.98%	10.57%	4.4	19.5	
Cattail Marsh	26.07%	19.97%	6.1	37.1	
Scrub-Shrub	24.70%	30.67%	-6.0	35.7	
Forest	26.00%	27.71%	-1.7	2.9	
Total	100.00%	100.00%		103.2	10.2

	1974	1965	delta	delta squared	RMS
Upland	11.08%	9.10%	2.0	3.9	
Sedge Meadow	10.57%	27.07%	-16.5	272.5	
Cattail Marsh	19.97%	16.29%	3.7	13.6	
Scrub-Shrub	30.67%	20.32%	10.4	107.3	
Forest	27.71%	27.22%	0.5	0.2	
Total	100.00%	100.00%		397.5	19.9

	1965	1939	delta	delta squared	RMS
Upland	9.10%	11.25%	-2.1	4.6	
Sedge Meadow	27.07%	30.63%	-3.6	12.6	
Cattail Marsh	16.29%	0.00%	16.3	265.2	
Scrub-Shrub	20.32%	23.34%	-3.0	9.1	
Forest	27.22%	34.78%	-7.6	57.2	
Total	100.00%	100.00%		348.8	16.7

	2001	1939	delta	delta squared	RMS
Upland	10.20%	11.25%	-1.1	1.1	
Sedge Meadow	14.70%	30.63%	-15.9	253.5	
Cattail Marsh	18.89%	0.00%	18.9	356.7	
Scrub-Shrub	31.15%	23.34%	7.8	61.0	
Forest	25.06%	34.78%	-9.7	94.5	
Total	100.00%	100.00%		766.9	27.7

	1974	1939	delta	delta squared	RMS
Upland	11.08%	11.25%	-0.2	0.0	
Sedge Meadow	10.57%	30.63%	-20.1	402.4	
Cattail Marsh	19.97%	0.00%	20.0	399.0	
Scrub-Shrub	30.67%	23.34%	7.3	53.8	
Forest	27.71%	34.78%	-7.1	50.0	
Total	100.00%	100.00%		905.2	30.1

	1991	1939	delta	delta squared	RMS
Upland	8.25%	11.25%	-3.0	9.0	
Sedge Meadow	14.98%	30.63%	-15.6	244.7	
Cattail Marsh	26.07%	0.00%	26.1	679.6	
Scrub-Shrub	24.70%	23.34%	1.4	1.9	
Forest	26.00%	34.78%	-8.8	77.2	
Total	100.00%	100.00%		1012.4	31.8

	2000	1939	delta	delta squared	RMS
Upland	10.83%	11.25%	-0.4	0.2	
Sedge Meadow	21.85%	30.63%	-8.8	77.1	
Cattail Marsh	17.91%	0.00%	17.9	320.9	
Scrub-Shrub	26.78%	23.34%	3.4	11.9	
Forest	22.63%	34.78%	-12.2	147.7	
Total	100.00%	100.00%		557.8	23.6

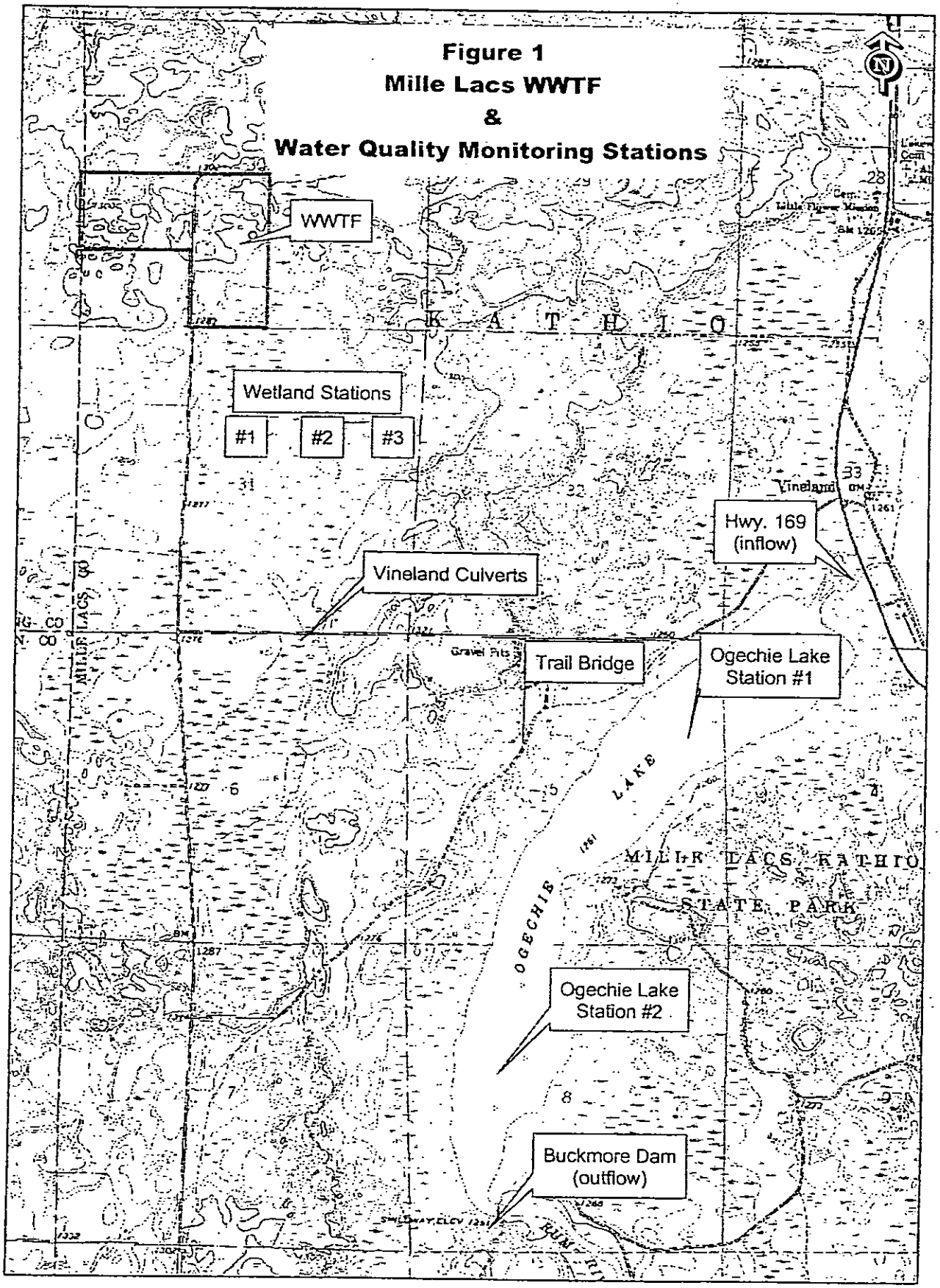
Figure 1
Mille Lacs WWTF
&
Water Quality Monitoring Stations
WWTF
Wetland Stations
#1
#2
#3
Vineland Culverts
Hwy. 169
(inflow)
Trail Bridge
Ogechie Lake
Station #1
Ogechie Lake
Station #2
Buckmore Dam
(outflow)
KATHIO
MILLE LACS KATHIO
STATE PARK
OGECHIE LAKE
Vineland
Gravel Pits

Surface Water Quality Monitoring Report Form

Total Phosphorus (TP)

mg/L

Monitoring Station

Month	Wetland Station #1	Wetland Station #2	Wetland Station #3	Culverts Vineland	Trail Bridge	Highway 169 (inflow)	Buckmore Dam (outflow)	Ogechie Station (in lake) #1	Ogechie Station (in lake) #2
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									

Surface Water Quality Monitoring Report Form

Total Nitrogen (TN)

mg/L

Monitoring Station

Month	Wetland Station #1	Wetland Station #2	Wetland Station #3	Culverts Vineland	Trail Bridge	Highway 169 (inflow)	Buckmore Dam (outflow)	Ogechie Station (in lake) #1	Ogechie Station (in lake) #2
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									

Surface Water Quality Monitoring Report Form

Nitrate (NO3-N)

mg/L

Monitoring Station

Month	Wetland Station #1	Wetland Station #2	Wetland Station #3	Culverts Vineland	Trail Bridge	Highway 69 (inflow)	Buckmore Dam (outflow)	Ogechie Station (in lake) #1	Ogechie Station (in lake) #2
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									

Surface Water Quality Monitoring Report Form

Ammonia (NH4-N)

mg/L

Monitoring Station

Month	Wetland Station #1	Wetland Station #2	Wetland Station #3	Culverts Vineland	Trail Bridge	Highway 169 (inflow)	Buckmore Dam (outflow)	Ogechie Station (in lake) #1	Ogechie Station (in lake) #2
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									

Surface Water Quality Monitoring Report Form

Chloride (Cl)

mg/L

Monitoring Station

Month	Wetland Station #1	Wetland Station #2	Wetland Station #3	Culverts Vineland	Trail Bridge	Highway 169 (inflow)	Buckmore Dam (outflow)	Ogechie Station (in lake) #1	Ogechie Station (in lake) #2
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									

Surface Water Quality Monitoring Report Form

Median Annual Chemical Parameters

Parameter (mg/l)	Monitoring Station									
	WWTF	Wetland Station #1	Wetland Station #2	Wetland Station #3	Culverts Vineland	Trail Bridge	Highway 169 (inflow)	Buckmore Dam (outflow)	Ogechie Station (in lake) #1	Ogechie Station (in lake) #2
Total Phosphorus (TP)										
Total Nitrogen (TN)										
Nitrate (NO3-N)										
Ammonia (NH4-N)										
Chloride (Cl)										

Surface Water Quality Monitoring Report Form

Flows

cps (cubic feet per second)

Month	Monitoring Station				
	WWTF	Culverts Vineland	Trail Bridge	Highway 169 (inflow)	Buckmore Dam (outflow)
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					