

Region WCR **County** Dunn **Report Date** 10/1995 **Classification** LAL/LFF

Water Body: Muddy Creek, Unnamed Tributary

Discharger: EIK Mound WWTP

If stream is classified as Limited Forage Fish (LFF) or Limited Aquatic Life (LAL), check any of the following Use Attainability Analysis factors that are identified in the classification report:

- Naturally occurring pollutant concentrations prevent the attainment of use
- Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met
- Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place
- Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or operate such modification in a way that would result in the attainment of the use
- Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses
- Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact

Supporting Evidence in the report (include comments on how complete/thorough data is)

- Biological Data (fish/invert)
- Chemical Data (temp, D.O., etc.)
- Physical Data (flow, depth, etc.)
- Habitat Description
- Site Description/Map
- Other: photos

Historical Reports in file:

- 10/10/95 - Paul LaLiberte
- 6/8/88 - Paul LaLiberte
- 4/11/90 - Paul LaLiberte
- 11/76 - Terry Moe, et al.

Additional Comments/How to improve report:

- wetland = LAL (default) LFF in areas of channelized flow
- classification is supported fairly well.

WATER QUALITY STANDARDS REVIEW FOR AN UNNAMED TRIBUTARY TO MUDDY
CREEK IN DUNN COUNTY NEAR THE DISCHARGE FROM ELK MOUND WWTP
T28N, R11W, SECTIONS 27 & 34

Paul La Liberte

October 16, 1995

This waterbody was first evaluated and listed as a variance water in NR104 in 1976. The classification currently in NR104 is "wetland, capable of supporting marginal aquatic life" upstream from I94 and "non-continuous, capable of supporting intermediate fish and aquatic life" downstream. The supporting documentation also concluded that, even though the reach above I94 is obviously a wetland, it had channelized flow in several areas which supported forage fish. In essence, the documentation pointed out a flaw in the code, in that a waterbody could be both a wetland and support "intermediate aquatic life". In recognition of this, NR104 stated that the effluent limits for the site were "to be determined". A further evaluation in 1980 classified an additional wetland east of the WWTP which did not possess channelized flow as "marginal" aquatic life. This classification formed the basis for moving the outfall to the eastern wetland and applying effluent limits consistent with a "marginal" classification. In a 1981 letter to the Village, the Department expressed uncertainty regarding the recommended limits because they were based on professional judgement and could not be verified by modelling. The limits were described as a short term measure (5-10 years) .

In 1989 and 1990, a review of conditions in the receiving water developed a new set of classifications and associated limits. Those revised classifications are:

1. Limited Aquatic Life in the open water wetland east of the WWTP.
2. Limited Forage Fish in the stream channels that flow through the wetland north of the WWTP down to the vicinity of I94.
3. Limited Aquatic Life in the wetland south of I94, extending downstream to the first town road in T28N, R11W, Section 34.
4. Warmwater fish and aquatic life below the town road bridge in NW, SW, T28N, R11W, S34.

The basis for the classification was the presence of forage fish in channels in the wetland. Previous investigations at the site determined that water quality conditions suitable for a Limited Forage Fish classification are possible only where channelized flow is present in the wetland. Dissolved oxygen in heavily vegetated stagnant areas or areas of shallow sheet flow is expected to be near zero. Inspections in 1993 and 1995 determined that channels were still maintained in the wetland north of the WWTP by several groundwater springs. Defined, flowing channels were never present in the wetland east of the WWTP. Inspections on 1989, 1990 and 1995 revealed that the open stream channels that formerly existed in the wetland south of I94 had become filled with grasses, resulting in sheet flow of water, rather than channelized flow. This change in the waterbody's condition is likely to persist for some time. As a result of these classification changes, the

WWTP was upgraded to meet limits associated with a classification of Limited Forage Fish in 1993.

The hydrology of the wetlands surrounding the Elk Mound WWTP is determined primarily by flow from the springs that drain into it. It is secondarily affected by surface water runoff. The WWTP apparently does not play a large role in the hydrology. Over several years of observing the wetlands, the detrimental effects attributable to the WWTP were:

1. Sewage slimes which occurred prior to upgrading the WWTP in the 1970s.
2. Ammonia toxicity which occurred prior to upgrading the WWTP in 1993.
3. Deposition of a sludge bed in the wetland east of the WWTP

The slime and ammonia problems were eliminated by upgrading the WWTP and the sludge bed was removed by the facility under orders from the Department in 1993. It is concluded that the WWTP discharge is not adversely affecting the surrounding wetland and is therefore in compliance with NR103.

elkmnd.rpt

- c. S. Thon
J. Ball - WR/2
P. Troughlell - WR/2
B. Masnado - WR/2

P. J. (2) T. J.

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

Date: June 8, 1988

File Ref:

To: Elk Mound Facility File

From: Paul LaLiberte *Paul*

Subject: Water Quality Standards Review for the Elk Mound POTW

A preoperative point source impact study dated August 1983 provided physical, chemical, and biological data in support of the stream classification dated 10-17-80. No additional stream data has been collected since that time. The POTW relocated its discharge after the 1983 study to a portion of the wetland complex classified as "marginal." No change in aquatic life use classification is warranted at this time. The receiving stream was classified as partial body contact recreational use on 7-29-87.

PL:sz

c: D. Schuettpelz - WR/2
S. Thon.

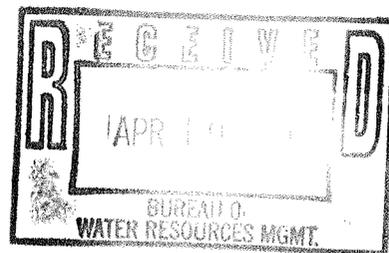
PLT394

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

Date: April 11, 1990
 To: Elk Mound POTW Facility File

File Ref:



From: Paul LaLiberte *Paul* *Water*

Subject: Water Quality Standards Review for Elk Mound Tributary to Muddy Creek in Dunn County

Since the last review of water quality standards for this stream (1988), additional monitoring and field inspection have occurred. Ammonia, dissolved oxygen (DO), temperature and pH grab sampling was done on 2-1-89 and 5-4-89. Diel, DO, and temperature were monitored from 6-27-89 to 6-29-89. This additional data augmented earlier data and indicated that water quality standards for DO are not met during summer low flow conditions, but are maintained during other seasons. Water quality standards for ammonia were not maintained during winter, fall, and spring. The low summer DO is attributable to natural conditions, while the elevated ammonia levels result from the POTW outfall.

Based on this information, the Elk Mound tributary should be classified as follows:

Year-round intermediate (use class D);

From the spring headwaters at sites 1 and 9 (see attached map) downstream to where riparian land converts from terrestrial to wetland in nature.

Year-round marginal (use class E);

The wetland located east of the POTW and south of the access road which directly receives the POTW effluent.

Marginal (use class E) during summer and intermediate (use class B) during the remainder of the year;

From the above locations downstream to the first town road below I-94.

Full warm water fish and aquatic life (use class B);

From the first town road downstream.

The attached memo discusses the development of effluent limits to meet the above receiving stream classification. Because the POTW was planning to upgrade its facilities and significantly increase its design flow, it was decided in 1989 to require treatment consistent with an intermediate stream classification (NR 104(3)(a), Wis. Adm. Code).

Attach.

c: Duane Schuettpelz - WR/2
 Steve Thon

WR/PL038.sz

Date: July 26, 1989

File Ref:

To: John Sullivan WR-2

From: Paul LaLiberte

Site Effluent Limits for Elk Mound Facility Plan

Using the provisions in NR102 and NR104 and the existing stream classification, effluent limitations for the Elk Mound POTW must achieve the following in-stream fish and aquatic life standards:

- (1) DO of 1 mg/l (Marginal) in the wetland south of the POTW driveway.
- (2) DO of 3 mg/l and total ammonia concentration of 3 mg/l in summer and 6 mg/l in winter (Intermediate) in the wetland between the driveway and a point between 194 and the downstream town road.
- (3) DO of 5 mg/l and un-ionized ammonia concentration of 0.04 mg/l (Full) downstream from that point.

The original basis for establishing marginal effluent limitations at Elk Mound was professional judgement that the above standards would be met. The Department was unable to evaluate the proposed re-routed discharge via water quality modelling. The attached 1981 letter from the Department to the village refers to uncertainty regarding water quality in the wetland and suggests moving the outfall and imposing "marginal" limits as a short term (5-10 years) measure. It also points out the need for further monitoring in the receiving water to determine if more stringent limits would be necessary.

Monitoring was conducted in February, May and June of this year. By comparing the results with those obtained in 1981, prior to moving the outfall, I concluded that moving the outfall had little effect on receiving water quality. While the DO standards are met during winter, fall and spring, the ammonia standards are not. This failure to attain the ammonia standard can be attributed to the POTW (see attached data). With this data as hindsight, it appears that intermediate effluent limitations for ammonia should have been established back in 1981.

Noncompliance with in-stream DO standards in the summer is probably a natural occurrence as evidenced by data collected outside the influence of the POTW (site 2.2). Since the appropriate DO standards are met during the rest of the year, the current BOD load is not exceeding the assimilative capacity of the receiving water. Unless a major increase in BOD loading is projected, continued application of "marginal" effluent limits for BOD should prevent additional DO problems. Summer DO problems will continue to occur, but this would happen regardless of the treatment level at the POTW.

The city's consultant has asked if relocation of the outfall would retain "marginal" effluent limits. I have examined two additional wetlands just north of I94 at locations .25 miles southeast of the current POTW and 1 mile northwest of the POTW. Both are predominantly reed canary grass with some tag alder and occasional cattails. High flow channels are present, but the only surface water under normal flow conditions is isolated stagnant pools. No signs of springs similar to those near the POTW were found. Marginal limits would be adequate to meet water quality standards at both of these sites. However, during cold temperature conditions, high ammonia levels would be expected to flow into the reach classified as intermediate aquatic life, about 1 mile downstream. For this reason, ammonia limits to protect intermediate aquatic life would apply at both locations.

In summary, NR104.02(5) specifies that discharges to surface waters exhibiting changing characteristics shall have effluent limits based upon the most critical classification. The effluent limitations necessary to protect existing and potential stream uses at the current discharge site are "marginal" -NR104.02(3)(b) for BOD, suspended solids and DO and "intermediate" -NR104(3)(a) for ammonia. Furthermore, moving the discharge point to other wetlands within 1 mile of the POTW would not change this recommendation. This evaluation assumes that major increases in wastewater flow will not occur. If increased POTW design flows are anticipated, full "intermediate" limits are recommended.

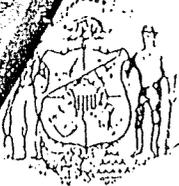
If you concur with these recommendations, please notify myself, the village and their consultant so work on the facility plan can proceed to completion. If you have questions or comments please call me at 839-3724.

attachments

cc Steve Thon

Mike Davy, Davy Engineering, PO Box 2076, LaCrosse, WI 54701

Terry Stamm, Village Hall, Elk Mound, WI 54739



State of Wisconsin

DEPARTMENT OF NATURAL RESOURCES

Carroll D. Besadow
Secretary

BOX 7921
MADISON, WISCONSIN 53707

January 20, 1981

RECEIVED
JAN 27 1981
DNR-ECA

IN REPLY REFER TO: 3420

Mrs. Carol A. Heimstead
Village Clerk
Box 374
Elk Mound, WI 54739

Dear Mrs. Heimstead:

Re: C55-1102-01, CEA/EID
Elk Mound, Wisconsin

As part of the latest facilities plan amendment, the Village requested that the Department consider the appropriateness of several additional discharge locations in the vicinity of the existing plant site. Our West Central District staff has conducted a field survey to determine if any of the discharge locations could be used with "marginal" (20/20 mg/l for BOD/SS) effluent limits. During their field survey, they discovered many flowing springs in the wetland which were previously not known to exist. In particular, there was a spring quite near the original proposed discharge location (west side of the wetland). The District's initial conclusion was that perhaps an "intermediate" (15/20 mg/l for BOD/SS, and 3/6 mg/l for NH₃-N in summer and winter) effluent limits would be more appropriate for discharge to any location within the wetland. On January 9, 1981, a conference call was held with the Central and the District Office staff to discuss this issue. The history of the project, the physical condition of the wetland and the downstream water quality were discussed in the call. Because of the many uncertainties regarding present and future water quality, it was decided not to impose the more stringent (intermediate) effluent limits at this time. The Department recommends that the discharge be to the east end of the open water wetland located east of the plant. This can be a point discharge. The Department intends to do monitoring of the effluent from this wetland area to determine if more stringent effluent limits might be necessary in the future. We understand that the Village is aware that their facilities plan now recommends operating the existing plant units without major expansion as a short-term (5 to 10 years) solution. Additional treatment units may be needed if population growth takes place in the Village of Elk Mound or if Department studies indicate a need for more stringent effluent limits.

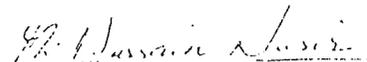
Mrs. Carol A. Heimstead - January 20, 1981

The Elk Mound should submit an addendum to their facilities plan indicating the location of a final outfall sewer, the user charges and the cost estimate for the proposed project. Since the existing treatment plant does not have necessary standby power arrangements to provide primary treatment plus disinfection in case of power failures, the addendum to the facilities plan must include the cost for providing standby power to meet this requirement.

Also, a fence with a gate at the access road must be provided as a part of this project covering enough area around the open water and wetland to restrict access to the wetland by persons residing in the nearby 20-unit apartment house. You may also include the cost of slip lining the influent sewers to remove a projected 38,000 gpd of clearwater as a part of this project. In addition, we also suggest that consideration be given to provide a bypass line discharging the effluent directly to the wetland located opposite the open water in case the open water freezes during winter. This would provide operational flexibility.

If you have any questions, please contact me at (608) 267-7627.

Sincerely,
Bureau of Wastewater Management

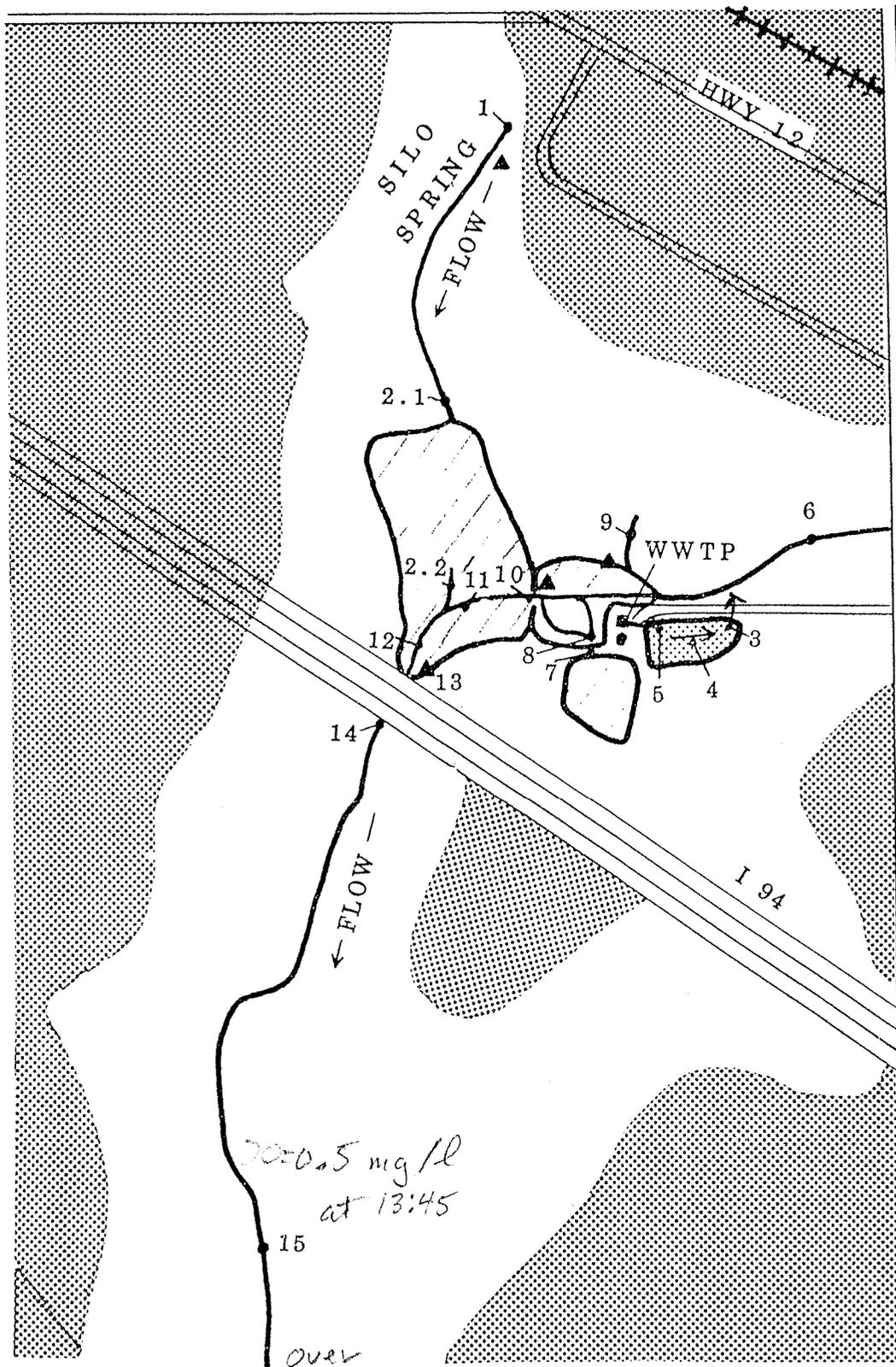

Mulazim H. Nasir, P. E.
Municipal Wastewater Section

MHN:mg

cc: Bureau of Water Grants - 1GP/3
Davy Engineering Company
Water Quality Evaluation Section - WQ/2
MWW-Planning Unit - WW/2
West Central District
WPDES-Permit Section - WW/2

Diel: DO

6-27 to 29 - 89



HWY H

I 94

DO=0.5 mg/l
at 13:45

over

- 1-15 SAMPLE SITES
- OPEN WATER WETLAND
- CATTAIL WETLAND
- GRASS & WOODED WETLAND
- UPLAND AREA
- KNOWN SEEPS
- WWTP POND
- PROPOSED EFFLUENT PIPING

Figure 4. Flow pattern for discharge option by gravity to wetland east of WWTP with outfall at site #5. (This option presently in #2)

Old Mound Trib at I94

Meter 14854

890627	1700	0.6296	DO	22.37	TE
890627	1800	0.531	DO	21.54	TE
890627	1900	0.3604	DO	20.71	TE
890627	2000	0.3114	DO	20.03	TE
890627	2100	0.3679	DO	19.32	TE
890627	2200	0.2717	DO	18.57	TE
890627	2300	0.08819	DO	17.91	TE
890628	0	0.06579	DO	17.39	TE
890628	100	0.02657	DO	16.96	TE
890628	200	-0.0936	DO	16.55	TE
890628	300	0.000875	DO	16.22	TE
890628	400	-0.06322	DO	15.99	TE
890628	500	-0.06996	DO	15.73	TE
890628	600	-0.07712	DO	15.62	TE
890628	700	-0.00205	DO	15.65	TE
890628	800	-0.07043	DO	16	TE
890628	900	-0.06198	DO	16.81	TE
890628	1000	-0.06574	DO	17.79	TE
890628	1100	-0.07213	DO	19.1	TE
890628	1200	-0.08227	DO	20.78	TE
890628	1300	-0.09746	DO	22.26	TE
890628	1400	-0.09833	DO	23.02	TE
890628	1500	-0.1025	DO	22.79	TE
890628	1600	-0.1009	DO	22.43	TE
890628	1700	-0.08984	DO	22.13	TE
890628	1800	-0.07172	DO	21.43	TE
890628	1900	-0.0105	DO	20.69	TE
890628	2000	0.05236	DO	20.06	TE
890628	2100	-0.09535	DO	19.54	TE
890628	2200	-0.09617	DO	18.88	TE
890628	2300	-0.1025	DO	18.52	TE
890629	0	-0.09864	DO	18.06	TE
890629	100	-0.00967	DO	17.68	TE
890629	200	0.1485	DO	17.37	TE
890629	300	-0.0278	DO	17.09	TE
890629	400	-0.06662	DO	16.77	TE
890629	500	-0.08979	DO	16.44	TE
890629	600	-0.1008	DO	16.16	TE
890629	700	-0.06744	DO	15.97	TE
890629	800	0.05272	DO	16.01	TE
890629	900	0.04938	DO	16.54	TE
890629	1000	0.006795	DO	17.52	TE
890629	1100	-0.03038	DO	18.78	TE
890629	1150	0.7824	DO	20.29	TE

RUN

QA - 0.7 mg/l (air calib.)

DO Probe Covered by debris
cleaned

Elk Mound Trib
at 1st Turn Rd ulmi below F 94

Meter 10309

Pool

890627	1452	23.77	TE	6.325	DO
890627	1541	23.73	TE	6.133	DO
890627	1700	23.53	TE	5.649	DO
890627	1800	23.13	TE	5.278	DO
890627	1900	22.52	TE	5.013	DO
890627	2000	21.97	TE	4.895	DO
890627	2100	21.43	TE	4.74	DO
890627	2200	20.67	TE	4.804	DO
890627	2300	20.08	TE	4.841	DO
890628	0	19.28	TE	4.78	DO
890628	100	18.52	TE	4.792	DO
890628	200	17.77	TE	4.722	DO
890628	300	17.09	TE	4.722	DO
890628	400	16.5	TE	4.721	DO
890628	500	15.93	TE	4.64	DO
890628	600	15.46	TE	4.681	DO
890628	700	15.42	TE	4.718	DO
890628	800	15.65	TE	4.804	DO
890628	900	16.22	TE	5.069	DO
890628	1000	17.13	TE	5.403	DO
890628	1100	18.68	TE	5.81	DO
890628	1200	20.31	TE	6.084	DO
890628	1300	21.81	TE	6.258	DO
890628	1400	22.89	TE	6.518	DO
890628	1500	22.85	TE	6.36	DO
890628	1600	22.76	TE	6.096	DO
890628	1700	22.26	TE	5.501	DO
890628	1800	21.5	TE	4.809	DO
890628	1900	20.74	TE	4.394	DO
890628	2000	19.94	TE	4.108	DO
890628	2100	19.18	TE	3.958	DO
890628	2200	18.47	TE	3.957	DO
890628	2300	17.82	TE	4.007	DO
890629	0	17.21	TE	4.096	DO
890629	100	16.83	TE	4.156	DO
890629	200	16.48	TE	4.177	DO
890629	300	16.11	TE	4.182	DO
890629	400	15.73	TE	4.172	DO
890629	500	15.34	TE	4.173	DO
890629	600	14.95	TE	4.347	DO
890629	700	14.77	TE	4.388	DO
890629	800	14.83	TE	4.445	DO
890629	900	15.14	TE	4.63	DO
890629	1000	16.1	TE	4.915	DO
890629	1100	17.78	TE	5.22	DO

QA Air +.2 mg/L



estimated value from

QA Log

TABLE 6. WINTER SAMPLING RESULTS
RESULTS IN MG/L UNLESS OTHERWISE NOTED
□ = RESAMPLE ON 3-30-81

SITE	DATE	TIME	TEMP (C)	PH (SU)	FLOW (CFS)	DO	% DO SAT	BOB6	TOT NFLT RES	DIS PHOS	TOT PHOS	NH3 N	NO2+ NO3 N	TOT ORG N	TOT N
1-ORIGIN OF SILO SP.	022081	1410	8.4	.	.	8.4	74	.	.	.	.	.	.	.	.
	030281	1315	8.0	.	0.053	7.9	69	.	.	.	.	.	.	.	.
	030981	1139	8.0	6.5	0.021	8.4	73	.	.	.	.	.	.	.	.
2.1-700FT DOWN SILO SP.	022081	1545	2.0	.	.	9.3	69	1.2	0	0.71	0.72	<0.02	7.6	>0.20	7.82
	030281	1240	1.2	.	.	10.0	73	.	.	.	.	.	.	.	.
	030981	1103	2.0	6.7	.	9.3	69	.	.	.	.	.	.	.	.
2.2-1100FT DOWN SILO SP.	030281	1220	0.5	.	.	9.6	69	1.5	2	0.11	0.18	0.23	6.0	0.27	6.50
	030981	956	0.4	6.8	.	8.9	64	.	.	.	.	.	.	.	.
	030281	.	1.0	.	.	5.8	42	1.8	3	0.20	0.27	1.00	5.3	0.50	6.80
5-EAST WETLAND OUTLET 7-MANHOLE	022081	.	3.0	.	.	1.8	3	.	.	.	.	.	.	.	.
	030281	1008	3.0	.	0.028	0.7	3	.	.	.	.	.	.	.	.
	030981	1022	4.0	7.1	0.027	0.3	2	24.0	4	3.10	3.80	27.00	0.6	3.00	25.00
8-OUTFALL	022081	.	3.0	.	.	4.4	36	.	.	.	.	.	.	.	.
	030981	1040	4.0	.	.	3.4	27	.	.	.	.	.	.	.	.
	022081	.	5.5	.	.	6.0	50	.	.	.	.	.	.	.	.
9-SPRING ORIGIN	030281	1034	5.0	.	.	9.2	74	.	.	.	.	.	.	.	.
	030981	1050	8.1	7.0	.	9.6	84	1.2	2	0.61	0.62	<0.02	6.7	0.00	6.72
	022081	.	4.8	.	.	1.8	14	.	.	.	.	.	.	.	.
10-FENCE CONSTRICTION	030281	1020	3.0	.	.	4.0	31	.	.	.	.	.	.	.	.
	030981	1008	4.2	7.0	.	6.0	47	7.4	11	1.42	1.80	8.50	3.0	0.50	12.00
	022081	.	5.2	.	.	1.4	11	.	.	.	.	.	.	.	.
11-EAST CHANNEL	030281	1220	3.2	.	.	2.1	16	.	.	.	.	.	.	.	.
	030981	1000	4.0	7.0	.	3.1	24	8.0	4	1.97	2.30	11.20	1.8	2.00	15.00
	022081	1530	3.0	.	.	5.0	38	.	.	.	.	.	.	.	.
12-BELOW CONFLUENCE	030281	1112	1.5	.	.	5.4	40	.	.	.	.	.	.	.	.
	030981	945	3.0	7.1	.	5.2	40	5.5	10	1.32	1.45	8.50	3.0	1.00	12.50
	030281	1350	2.5	.	0.156	5.7	43	.	.	.	.	.	.	.	.
14-194 CULVERT	030981	919	2.0	7.0	0.148	5.9	44	4.9	6	1.30	1.40	8.60	2.8	0.40	11.80
	030281	1410	1.5	.	.	7.2	53	.	.	.	.	.	.	.	.
	030981	904	1.0	7.0	.	7.6	55	4.3	4	0.89	1.06	8.60	2.4	0.80	11.80

TABLE 7. SPRING (5-7-81) SAMPLING RESULTS
RESULTS IN MG/L UNLESS OTHERWISE NOTED

SITE	TIME	TEMP (C)	PH (SU)	FLOW (CFS)	DO	% DO SAT	BOB5	TOT NFLT RES	DIS PHOS	TOT PHOS	NH3 N	NO2+ NO3 N	TOT ORG N	TOT N
1-ORIGIN OF SILO SP.	1356	8.0	5.8	0.216	7.3	64	0.9	0	0.690	0.70	<0.02	7.50	>0.20	7.72
2.1-700FT DOWN SILO SP.	1348	15.0	6.8	.	9.5	98	0.9	4	0.270	0.35	0.02	3.70	0.48	4.20
2.2-1100FT DOWN SILO SP.	1134	10.0	6.5	.	8.9	82	1.2	0	0.131	0.16	0.06	2.30	0.34	2.70
4-EAST WETLAND	1252	16.0	7.4	.	16.5	174	7.8	18	0.047	0.22	<0.02	0.12	>1.20	1.34
5-EAST WETLAND OUTLET	1218	18.0	7.2	.	10.3	114	4.5	11	0.105	0.23	<0.02	0.02	>1.00	1.04
6-EAST DRAINAGE DITCH	1330	16.0	7.0	0.165	8.4	89	1.6	11	0.047	0.24	0.04	0.38	0.56	0.98
7-MANHOLE	1277	11.5	8.2	0.365	19.6	187	18.0	34	1.300	2.20	3.00	4.00	5.40	12.40
8-OUTFALL	1225	11.5	.	.	15.6	149	.	.	.	.	.	.	.	.
9-SPRING ORIGIN	1200	9.0	5.2	.	5.7	51	0.3	38	0.600	0.66	<0.02	7.20	>0.40	7.62
10-FENCE CONSTRICTION	1145	15.0	7.0	.	12.3	127	4.5	9	0.590	0.84	0.86	3.00	1.54	5.40
11-EAST CHANNEL	1138	16.0	7.2	.	10.3	109	7.0	16	0.980	1.34	1.90	3.10	1.90	6.90
12-BELJW CONFLUENCE	1106	13.0	7.0	.	8.7	86	4.1	7	0.730	0.96	1.50	2.40	1.30	5.20
13-SEEP AT I94	1110	10.0	6.9	.	1.1	10	1.8	4	0.390	0.62	3.70	0.90	0.90	5.50
14-194 CULVERT	1057	12.5	7.0	.	8.4	82	4.9	8	0.720	0.94	1.60	2.40	1.20	5.20
15-1300FT BELOW I94	1044	13.0	7.2	.	12.0	118	4.1	8	0.650	0.92	1.00	2.00	1.30	4.30

TABLE 8. SUMMER (8-13-81) SAMPLING RESULTS
RESULTS IN MG/L UNLESS OTHERWISE NOTED

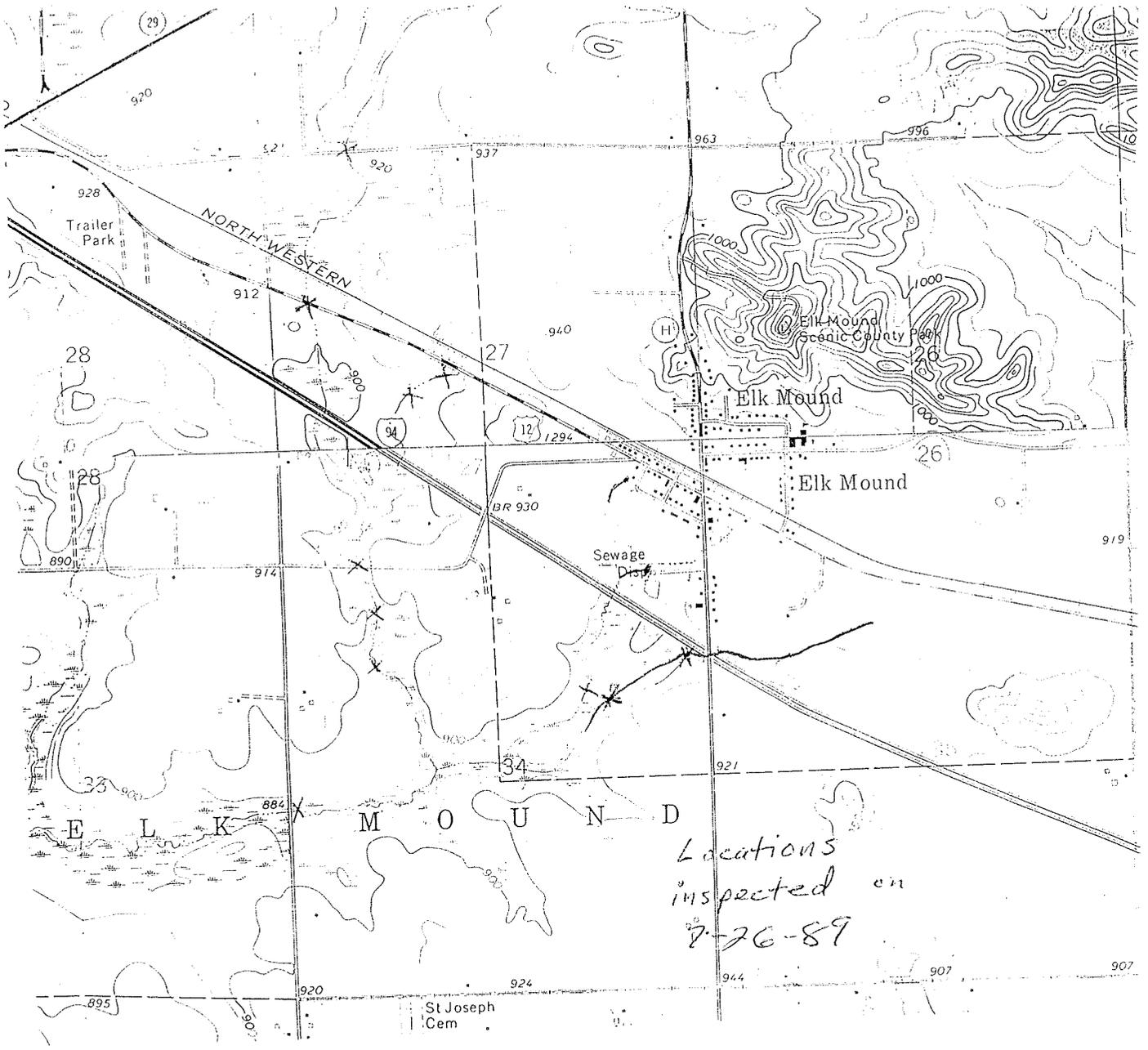
SITE	TIME	TEMP (C)	PH (SU)	FLOW (CFS)	DO	DO SAT	% DO SAT	BOD5	TOT NFLT RES	DIS PHOS	TOT PHOS	NH3 N	NO2+ NO3 N	TOT ORG N	TOT N
1-ORIGIN OF SILO SP.	714	9.0	6.0	0.094	7.6	11.2	68	.	.	.	.	.	.	.	.
2.1-700FT DOWN SILO SP.	1210	9.5	6.0	.	7.7	11.0	70	0.3	36	0.710	0.79	<0.02	7.60	>0.40	8.02
	827	13.0	6.5	.	5.1	10.1	50	.	.	.	.	.	.	.	.
2.2-1100FT DOWN SILO SP.	1320	13.7	6.8	.	8.3	10.0	83	0.6	58	0.660	0.80	0.05	7.00	1.05	8.10
	725	16.5	6.6	.	0.8	9.4	9	.	.	.	.	.	.	.	.
4-EAST WETLAND	1145	20.5	6.6	.	0.8	8.6	9	1.8	20	0.230	2.40	0.14	0.10	0.66	0.90
	642	19.0	6.7	.	0.2	8.9	2	.	.	.	.	.	.	.	.
5-EAST WETLAND OUTLET	1306	26.0	6.7	.	1.9	7.7	25	15.0	352	0.075	1.40	0.50	0.03	11.50	12.03
	635	17.5	6.8	.	1.1	9.2	12	.	.	.	.	.	.	.	.
7-MANHOLE	1250	24.0	5.9	.	0.5	8.0	8	8.6	39	0.182	0.81	0.20	<0.02	2.20	<2.42
	624	17.7	7.6	.	0.2	9.1	2	.	.	.	.	.	.	.	.
8-OUTFALL	1215	17.5	6.8	.	0.1	9.2	1	10.0	4	2.800	3.10	15.00	0.40	0.50	15.90
	652	17.5	.	.	3.1	9.2	34	.	.	.	.	.	.	.	.
9-SPRING ORIGIN	1237	17.5	.	.	2.9	9.2	32	.	.	.	.	.	.	.	.
	648	9.5	6.6	.	5.2	11.0	47	.	.	.	.	.	.	.	.
10-FENCE CONSTRICTION	1229	10.1	5.3	.	5.6	10.9	52	0.6	128	0.630	0.83	<0.02	6.20	>1.10	7.32
	659	14.2	7.0	.	3.2	9.9	32	.	.	.	.	.	.	.	.
11-EAST CHANNEL	1202	18.5	6.9	.	3.1	9.0	35	4.1	14	1.490	1.85	7.50	2.50	1.00	11.00
	719	15.0	6.9	.	1.1	9.7	11	.	.	.	.	.	.	.	.
12-BELOW CONFLUENCE	1150	20.0	6.8	.	2.5	8.7	29	4.1	16	1.390	1.75	7.50	2.10	1.00	10.60
	740	15.5	6.7	.	0.7	9.5	7	.	.	.	.	.	.	.	.
13-SEEP AT 194	1125	20.0	6.8	.	2.2	8.7	25	3.4	20	0.880	1.72	5.40	1.33	0.90	7.63
	746	15.1	6.8	.	0.9	9.7	9	.	.	.	.	.	.	.	.
14-194 CULVERT	1130	16.8	6.7	.	1.1	9.3	12	6.4	11	1.650	3.60	3.70	<0.02	0.80	<4.52
	813	15.2	6.9	0.275	1.2	9.6	12	.	.	.	.	.	.	.	.
15-1300FT BELOW 194	1124	19.0	6.8	.	1.7	8.9	19	4.1	41	0.820	2.20	5.30	1.18	3.00	9.48
	834	16.0	7.2	0.230	2.3	9.5	24	.	.	.	.	.	.	.	.
	1141	19.0	7.0	.	3.1	8.9	35	4.5	14	0.790	1.33	5.10	0.84	0.70	6.64

TABLE 9. FALL (10-29-81) SAMPLING RESULTS
RESULTS IN MG/L UNLESS OTHERWISE NOTED

SITE	TIME	TEMP (C)	PH (SU)	FLOW (CFS)	DO	DO SAT	% DO SAT	BOD5	TOT NFLT RES	DIS PHOS	TOT PHOS	NH3 N	NO2+ NO3 N	TOT ORG N	TOT N
1-ORIGIN OF SILO SP.	1552	9.9	5.8	0.060	9.1	10.9	83	0.8	2	0.700	0.72	<0.02	7.90	>0.20	8.12
2.1-700FT DOWN SILO SP.	1540	10.0	6.8	.	8.0	10.9	73	1.2	24	0.460	0.86	0.07	5.30	0.53	5.90
2.2-1100FT DOWN SILO SP.	1350	8.9	7.0	.	9.4	11.2	84	1.2	0	0.093	0.20	0.02	2.10	0.38	2.50
4-EAST WETLAND	1445	8.7	7.0	.	8.1	10.8	75	2.4	6	0.042	0.12	0.12	0.02	0.68	0.82
5-EAST WETLAND OUTLET	1500	10.5	7.0	.	7.2	11.6	62	.	.	.	.	.	.	.	.
7-MANHOLE	1425	6.6	7.1	0.084	4.9	11.9	41	8.6	6	2.600	2.80	14.00	0.70	0.00	14.70
8-OUTFALL	1420	7.5	.	.	7.4	11.1	66	0.6	2	0.620	0.65	<0.02	6.30	>0.20	6.52
9-SPRING ORIGIN	1526	9.1	5.1	.	3.7	10.3	31	4.9	12	1.130	1.18	3.60	2.80	0.80	7.20
10-FENCE CONSTRICTION	1321	10.5	7.1	.	3.4	10.6	79	3.3	4	1.380	1.52	6.50	2.00	0.50	9.00
11-EAST CHANNEL	1300	11.0	7.1	.	9.4	11.2	84	2.4	3	0.860	1.02	3.80	1.90	0.60	6.30
12-BELOW CONFLUENCE	1127	9.0	7.0	.	5.1	11.5	44	7.4	2	1.170	1.72	4.20	0.09	0.60	4.89
13-SEEP AT 194	1140	7.8	6.8	.	9.2	11.4	31	2.4	2	0.830	0.98	3.70	1.91	0.70	6.31
14-194 CULVERT	1115	8.2	7.0	0.181	9.2	11.4	31	2.4	2	0.830	0.98	3.70	1.91	0.70	6.31
15-1300FT BELOW 194	1035	6.5	7.0	.	10.8	11.9	91	2.0	69	0.410	0.72	1.70	2.20	0.70	4.60

TABLE 10. SPRING DIURNAL SAMPLING
 RESULTS IN MG/L UNLESS OTHERWISE NOTED
 □ = DO BY WINKLER METHOD Δ = PH BY ORION 201 PH METER

SITE	DATE	TIME	TEMP (C)	PH (SU)	DO	DO SAT	% DO SAT
1-ORIGIN OF SILO SP.	051581	755	8.5	5.9	8.4	11.3	74
	051581	1417	8.0	5.9	8.1	11.4	71
2.2-1100FT DOWN SILO SP.	051581	620	7.0	6.7	3.5	11.7	30
	051581	1400	15.0	6.9	9.2	9.7	95
4-EAST WETLAND	051581	543	12.5	7.2	4.7	10.3	46
	051581	1350	20.0	7.7	8.6	8.7	99
5-EAST WETLAND OUTLET	051581	552	9.0	7.0	0.9	11.2	8
	051581	1333	22.5	7.4	6.5	8.3	79
6-EAST DRAINAGE DITCH	051581	745	10.0	6.8	4.0	10.9	37
	051581	1341	18.0	.	10.1	9.1	111
7-MANHOLE	051581	530	13.5	>9.2	>20.0	10.0	>200
	051581	1245	13.5	>9.2	>20.0	10.0	>200
	051981	400	14.0	>9.2	>20.0	9.9	>202
	052181	715	15.0	9.4Δ	22.7□	9.7	234
	052181	1310	15.0	9.4Δ	22.6□	9.7	233
7.1-WWTP POND	051981	408	14.0	.	>20.0	9.9	>202
7.2-WWTP POND	051981	412	14.0	.	>20.0	9.9	>202
7.3-WWTP POND	051981	421	13.0	.	>20.0	10.1	>197
8-OUTFALL	051581	532	13.5	.	17.7	10.0	177
	051581	1248	13.5	.	17.0	10.0	170
	051981	405	14.0	.	18.4	9.9	186
10-FENCE CONSTRICTION	051581	603	8.0	7.0	4.4	11.4	38
	051581	1351	21.3	7.2	11.3	8.5	134
11-EAST CHANNEL	051581	633	9.0	7.2	4.0	11.2	36
	051581	1443	21.5	7.3	9.2	8.4	109
12-BELOW CONFLUENCE	051581	645	8.5	6.9	3.5	11.3	31
	051581	1318	19.8	7.2	9.0	8.7	103
13-SEEP AT I94	051581	655	9.0	6.7	0.3	11.2	3
	051581	1326	13.0	7.0	0.9	10.1	9
14-I94 CULVERT	051581	712	8.5	7.0	4.1	11.3	36
	051581	1314	19.0	7.3	9.0	8.9	101
15-1300FT BELOW I94	051581	725	9.0	7.1	7.4	11.2	66
	051581	1304	21.0	8.2	14.0	8.5	164



RECOMMENDATIONS:

The drainage area north of I-94 (tributary to Muddy Creek) receiving discharge from Elk Mound would normally be classified a wetland. However, because of effluent short circuiting and the documented presence of intermediate aquatic life (minnows) in the outfall and I-94 culvert areas, effluent limitations designed to protect intermediate aquatic life streams criteria shall apply. The tributary from the I-94 crossing downstream to Muddy Creek is classified noncontinuous, intermediate aquatic life for 1/4-mile where it changes to continuous, fish and aquatic life.

EVALUATION DATES: August 26, 1975; October 7, 1976; November 16, 1976

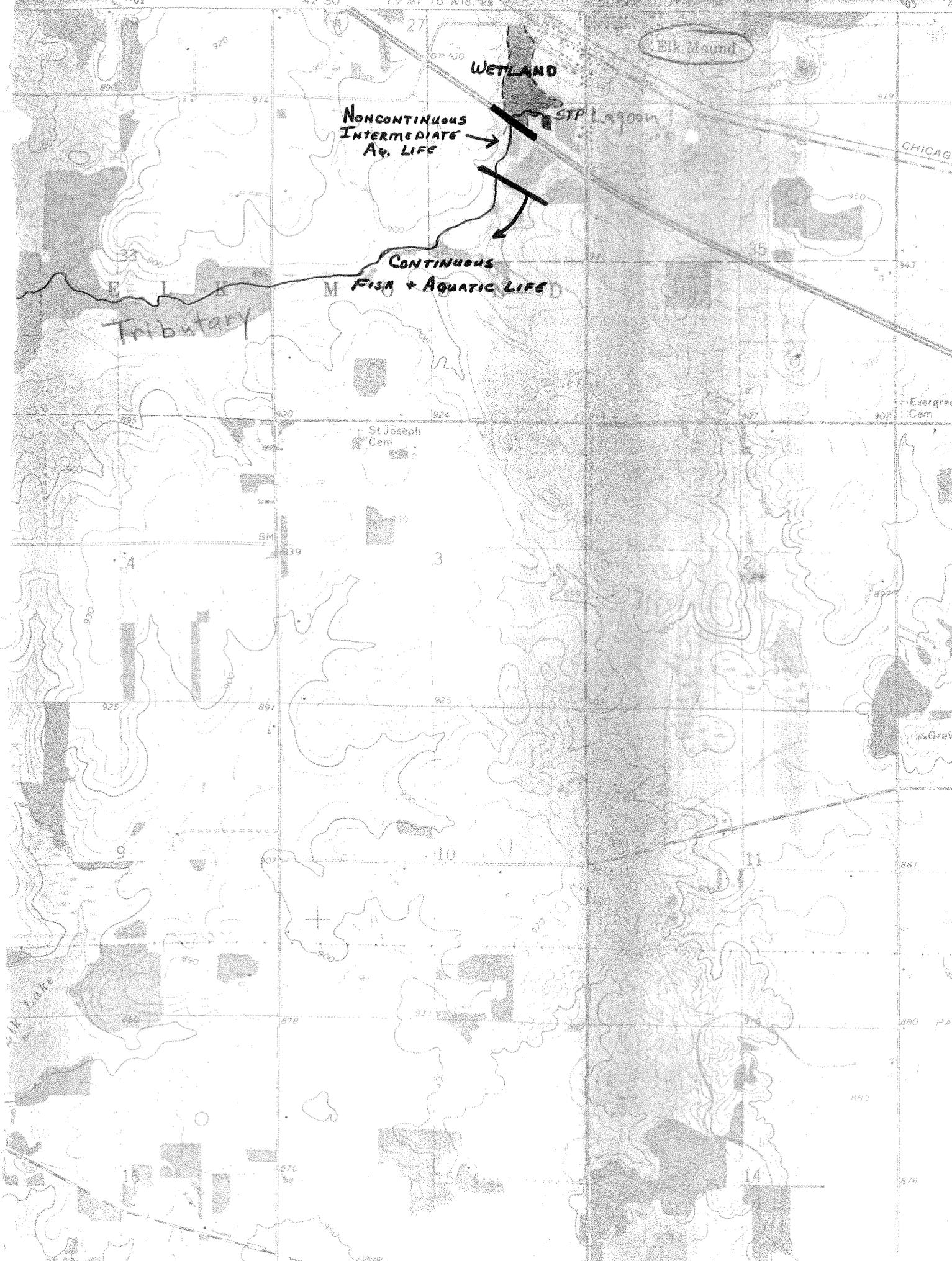
PERSONNEL:

Terry A. Moe - Water Pollution Biologist - WCD (8/26/75, 10/7/76, 11/16/76)

Leonard N. Burr - Environmental Engineer - WCD (11/16/76)

Lewis A. Seymour - Environmental Engineer WCD (8/26/75)

Ron Martin - Biologist - Water Quality Evaluation - Madison (8/26/75)



WETLAND

NonCONTINUOUS
INTERMEDIATE
Av. LIFE

CONTINUOUS
FISH + AQUATIC LIFE

Tributary

Elk Mound

STP Lagoon

CHICAGO

St Joseph
Cem

Evergreen
Cem

Gravel

Elk Lake

PAO

ELK MOUND, DUNN COUNTY

WASTEWATER RECEIVING STREAM CLASSIFICATION

Receiving stream - Drainage area tributary to Muddy Creek.

Elk Mound WWTP effluent goes to a polishing pond which discharges into a marshy area. Flow created by the pond effluent can be traced from the discharge point, west about 300 feet where it joins the main swamp drainage from the north. Sewage effluent essentially "short circuits" the swamp along its southeast fringe. Flow is south from that point through culverts under I-94. About 1/4-mile south of I-94 flow becomes continuous. The swamp south of I-94 is characterized by cattail growth with intermittent clumps of tag alder and a definite flow channel maintained through it. Minnows have been documented in the outfall and I-94 culvert areas on three occasions.



Elk Mound polishing pond



Elk Mound polishing pond discharge, looking north