A REPORT FROM

The State Hygienic Laboratory

MEDICAL LABORATORIES BUILDING

THE UNIVERSITY OF IOWA

IOWA CITY, IOWA 52240

WATER QUALITY SURVEY of the MISSISSIPPI RIVER at DUBUQUE, IOWA

#75-6

Submitted to the Iowa Water Pollution Control Commission
by the
State Hygienic Laboratory on 26 September 1974

INTRODUCTION

In September of 1971, the Limnology Division of the State Hygienic Laboratory conducted a water quality survey of the Mississippi River in the Dubuque area. The results of this study, which are contained in the State Hygienic Laboratory's Report #72-18, indicated fairly heavy contamination of the Iowa side of the river below Dubuque which was attributable to the operation of the Dubuque Sewage Treatment Plant.

In view of these results, their public health implications, the value of the resource involved, and the classification of that reach as Class A waters, the Limnology Division carried out a complete limnological survey in the Dubuque area on July 30-31, 1974. Furthermore, following several incidents of public health significance in the area as well as reports of greatly increased disinfection performance at the treatment plant, the Limnology Division returned to the area and with cooperation from Public Health personnel, conducted a thorough bacteriological investigation in the area.

The July survey was comprised of fifteen samples for water quality evaluations collected at sites ranging from River Mile (R.M.) 582.7 to R.M. 569.3. Samples were collected from both shore lines, generally about twenty yards from shore, as well as in mid-channel. Additionally, biological investigations were carried out at selected sites by either of two methods. Grab samples of sediment were collected by a Ponar Dredge and passed through a #30 mesh sieve to allow investigation of the benthic invertebrates. Also, hand collections of the attached shoreline community were made from natural substrates.

The August survey consisted of collections of samples for fecal coliform bacteria analysis at seventeen selected sites including locations in the Massey Recreation Area. Dissolved oxygen determinations were made at thirteen of these sites and six samples were collected for BOD analysis.

River conditions on each sampling date were similar. Data acquired from the Corps of Engineers showed a mean flow at Dubuque of 31,100 cfs on July 30 and 31,000 cfs on July 31. On August 22 the discharge at 0800 hours was 27,600 cfs, but due to rainfall the previous night, the resultant mean discharge for the day was 31,400 cfs.

RESULTS AND DISCUSSION

Chemical and Bacteriological

The results of the July 31st survey which are contained in the Appendix Tables can best be approached by considering the locations in an upstream to downstream progression.

The upstream samples collected near the lock and dam at R.M. 582.7 were above the influence of any organic discharge either from the sewage treatment plant (STP) or the harbor areas. Both samples (mid-channel and Iowa side) exhibited good water quality according to the indices of organic contamination. The fecal coliform levels of 40 per 100 ml were within allowable limits as was dissolved oxygen (D.O.), (7.4 mg/1). Ammonia-nitrogen (.05 mg/1), total phosphate as P (.14 mg/1), and BOD (2 mg/1) were all rather low. The lack of recent rainfall and moderately low flows also resulted in a low turbidity (15 JTU) and low total solids (224 mg/1).

The next sample, collected at R.M. 579.4 near the Julien Dubuque Bridge, showed some reduction in quality of nearly all the indicative water quality components as shown by the following: fecal coliforms (670 per 100 ml), D.O. (6.7 mg/1), ammonia-N (.08 mg/1), total phosphate - P (.22 mg/1), and BOD (3 mg/1). The increments of increase are not great, but they do represent a detectable organic input most logically from Lake Peosta Channel which contains two marinas.

Results from the sample collected on the Iowa side at R.M. 578.5 show considerable recovery. Fecal coliform levels dropped to 190 per 100 ml and were once again within an acceptable limit of 200 per 100 ml. D.O. increased to 6.9 mg/1 and other paramameters likewise nearly returned to upstream levels.

The next sampling station on the Iowa side was estimated to be R.M. 577.6, which is approximately 100 yards below the point at which the STP discharge enters the river. The results show the impact of the discharge to be quite severe, as indicated by an extremely high fecal coliform level of 6.2 million per 100 ml. Ammonia-N was 1.7 mg/1 which is approaching the allowable maximum of 2.0 mg/1. Total phosphate-P (0.90 mg/1) and BOD (23 mg/1) were also quite high.

At this point in the river, the contamination appears to be remaining on the Iowa side. Samples taken at the same river mile in mid-channel and on the Illinois side yielded results which were very similar to those found upstream. The fecal coliform level on the Illinois side was elevated to 300 per 100 ml, which could be attributed to inputs from the slough area immediately upstream.

Another transect collected 0.5 miles downstream at R.M. 577.1 indicated that the contamination was considerably reduced and still remaining on

the Iowa side of the river. The Iowa side sample contained 6,000 fecal coliforms per 100 ml which is still very high for Class A waters but much reduced from six million. Ammonia-N (.88 mg/1), Total phosphate-P (.52 mg/1), and BOD (9 mg/1) also remained at somewhat elevated levels.

Two miles below the STP discharge area at R.M. 575.6, the pattern of recovery and restrictions of effects to the Iowa side continued. Water quality on the Illinois side was generally good as the fecal coliform number was less than 100 per 100 ml. On the Iowa side, nutrient levels were still somewhat elevated above upstream concentrations, and the fecal coliform count of 3,000 per 100 ml was reduced but still high for a primary contact recreation area.

At R.M. 569.3 which is 8.5 miles below the STP, the situation was rather different. Water quality was slightly lower on the Illinois side than at upstream locations. Nutrient levels were a bit higher and fecal coliforms had increased to 1000 per 100 ml. The D.O. was also appreciably reduced having dropped to 6.0 mg/1 from an upstream level of 7.3 mg/1. These changes, however, are probably not related to the impact of the STP discharge, but rather to inputs from upstream sloughs.

The bacteriological quality of the river on the Iowa side was also lower as the fecal coliform count was 7800 per 100 ml.; although, other constituents were unchanged. This result indicates a source of fecal contamination upstream of this site on the Iowa side of the river. The most probable source is in the area of Nine Mile Island which includes Shawon Dasse slough and the Massey recreation area.

Since the second survey on August 22 was directed primarily at obtaining bacteriological data, it will be informative to examine these data in comparison with fecal coliform results from July 31. The total array of data collected on August 22 is summarized in an Appendix Table and comparable items of data from both surveys are presented in Table A.

Some heavy rainfall occurred in the Dubuque area the evening of August 21, and its effects will be apparent in the results from several samples, as the river was rising throughout the day. The impact of any runoff was not great at the control station (R.M. 582.7) where the fecal coliform concentration was only 80 per 100 ml, an increase of 40 per 100 ml from previous sampling. The increase at R.M. 578.5 was similar.

A major change in bacterial quality, however, was evident in the immediate area of the STP discharge. A series of three samples on the Iowa side in this area ranged from 20,000 to 85,000 per 100 ml which is a reduction of more than two orders of magnitude from previous results. Although these levels are still rather high, they do represent the effects of a much improved disinfection method utilized by the treatment plant. In addition, even though bacterial levels were reduced, the BOD at this site (50 mg/1) was much higher than measured before (23 mg/1).

TABLE A

A Comparison Table of Fecal Coliform Concentrations (per 100 ml)
31 July and 22 August, 1974

	Iowa Side		Illinois Side	
Location	31 July	22 August	31 July	22 August
R.M. 582.7	40	80	40	
R.M. 579.4	670			
R.M. 578.5	190	240		
R.M. 577.8		85,000		
R.M. 577.7	6.2×10^6	40,000	300	
R.M. 577.6		20,000		
R.M. 577.1	6,000	13,000	<1,000	340
R.M. 575.6	3,000	8,100	<1,000	130
R.M. 571.5		16,000		930
R.M. 569.3	7,800	64,000	1,000	7,400

It is also of interest to note the bacterial condition of Catfish Creek which enters the river less 0.5 miles below STP. The fecal coliform level in the creek was 61,000 per 100 ml. Certainly, a portion of this bacterial load can be attributed to storm runoff as the creek was extremely turbid, but this number is rather high for runoff to be considered the sole contributor. Under certain conditions of heavy rainfall, it is possible for the creek to be contaminated by sewage overflow from the STP, and this possibility must, of course, be considered.

Also of importance was the observation that the creek was nearly stagnant at its mouth and did not appear to be mixing appreciably with the river. If this were the case, it wouldn't greatly affect the bacterial concentrations observed at downstream locations.

Results from stations on the Iowa side at R.M. 577.1 and 575.6 show that fecal coliform levels were from 5-7,000 per 100 ml higher than in July, even though concentrations from the STP were much less. This seemingly incongruous situation may have several causes, all of which may be operating to a degree. First of all, storm water runoff could be a contributing factor; although the control stations upstream do not indicate much effect. Secondly, some contamination from Catfish Creek may be occurring as described above. Finally, total plant discharge may be higher which would contribute large numbers of organisms to the river even though concentrations have been reduced.

The situation at R.M. 569.3 is even more difficult to explain. Table A shows that the fecal coliform concentration on August 22 at this station on the Iowa side was 64,000 per 100 ml. This is more than an 8-fold increase from previous results.

A similar increase occurred on the Illinois side where 7,400 per 100 ml were recorded. This is also much increased from the 930 per 100 ml which occurred less than two miles upstream at R.M. 571.5, and from the 1,000 per 100 ml recorded in July.

A potential source of this contamination as mentioned above is the area around Nine Mile Island. However, several samples were taken in the area and none approached the 64,000 concentration found downstream. The results ranged from 7,500 per 100 ml at R.M. 572.7 in Molo Slough, to 13,000 per 100 ml in the Massey swimming area, to 21,000 per 100 ml at R.M. 574.2 in Shawon Dassey Slough.

Thus, even though the 64,000 per 100 ml concentrations at R.M. 569.3 is somewhat anomolous, it does not detract from the importance of the data as a whole. The entire reach investigated below the STP is heavily contaminated, and when considering the intense recreational use of the area as well as the 200 per 100 ml allowable increase that applies to it, the difference between 64,000 per 100 ml and 20,000 per 100 ml is not a significant improvement in bacterial quality.

Biological

As discussed previously, biological samples were collected by two methods; either from the bottom sediments by Ponar grab or from the shoreline by hand picking. The composition of these two communities plus the condition of the bottom sediments will give information about the environmental conditions to which the organisms have been exposed.

Under unpolluted conditions, a silt bottom should support large numbers of Hexagenia, a burrowing mayfly nymph, and several types of midge larvae and aquatic oligochaetes. The rocks along the shoreline should support a diverse community composed of mayfly nymphs, caddis flies, and an assortment of other organisms.

Organism Classification

Cleanwater	C
Facultative	F
Pollution Tolerant	P

R.M. 578.5 The benthic sample collected at this site above the STP on the Iowa side revealed a rather sparse community of typical organisms,

mayflies and oligochaetes. The substrate which was composed primarily of sand with some detritus (organic debris) is not one which would support a large community.

Hexagenia sp.	F
Limnodrilus udekemianus	P
L. hoffmeisteri	P
Pentaneura	F

R.M. 578.5 An investigation of shoreline rocks at the same site revealed a more abundant community. Mayfly nymphs were most numerous, and some amphipods and isopods were also present. Caddis fly larvae which are usually associated with such a community were not present. This may be evidence of recent emergence.

Stenonema sp.	C
Asellus sp.	F
Hyalella azteca	F
Bryozoan	C

R.M. 577.6 The bottom sample collected near the STP outfall site on the Iowa side revealed nothing but odorous, sulfur blackened sand and fragments of clam shells. No organisms were present. Similarly, the shoreline rocks were also blackened and supported no aquatic organisms.

Across the river on the Illinois side, the sediment was coarse sand and contained low numbers of organisms similar to those found upstream.

Hexagenia sp.	F
Limnodrilus spp.	P
Chironomus sp.	P
Pentaneura sp.	F

R.M. 577.1 The bottom sample collected at this site on the Illinois side contained more silt than upstream. As a result the total number of organisms was higher although the types were the same.

Hexagenia sp.	F
Limnodrilus udekemianus	P
L. hoffmeisteri	P
Chironomus plumosus	P
Pentaneura sp.	F

The benthic sample collected on the Iowa side was again quite different. It was composed of blackened, silty sand and detritus and supported no organisms.

The shoreline substrates at the same site did support a community; although it was rather different from that found above the STP discharge. No mayfly nymphs were present. Total numbers were rather low, and most of the organisms were facultative isopods, leeches, and snails.

Asellus sp.	F
Hyalella azteca	F
Physa sp.	F
Placobdella sp.	F
Helobdella sp.	F

R.M. 575.6 On the Illinois side the sediment was again composed of sand and detritus and supported an array of organisms similar to upstream Illinois side locations and the Iowa side location above the STP discharge.

Conditions in the sediment on the Iowa side had improved somewhat. The sample contained some oligochaetes and midges, but no mayfly nymphs.

Limnodrilus spp.	P
Branchiura sowerbyii	P
Chironomus spp.	P

R.M. 569.3 At this station more than eight miles below the STP discharge, conditions had improved biologically to the point where both benthic and shoreline communities were the same as those found upstream of the plant.

Benthic

Hexagenia sp.	F
Limnodrilus udekemianus	P
L. hoffmeister	P
Branchiura sowerbyii	P
Chironomus plumosus	P
Pentaneura sp.	F

Shoreline

Stenonema sp.	C
Asellus	F
Hyalella azteca	F
Bryozoan	C

CONCLUSIONS

In terms of chemical quality, no serious problems were encountered in the Mississippi River at Dubuque during the period of sampling. Dissolved oxygen was reduced somewhat below the STP discharge, but at least during the daylight hours no violations of the minimum standard were encountered.

It can be concluded though, that the continued discharge of large volumes of waste that has a high nutrient content and an elevated BOD will result in intermittent problems from D.O. reductions and stimulation of excessive algal growths under certain river conditions. During the summer months when river flows are reduced and water temperatures are elevated, reductions in D.O. from exertion of the BOD and from algal respiration during the night may result in concentrations which violate allowable oxygen standards.

The effects of the waste discharge can be seen in the degradation of the biological community on the Iowa side of the river. Neither the sediments nor the shoreline substrates are able to support any organisms in the discharge area.

Fortunately, no effect is measurable on the Illinois side, but the degradation on the Iowa side extends several miles, and total biological recovery was not observed until more than eight miles below the point of discharge.

Even though the biological impact of the waste discharge is important, its most serious aspects are the public health implications of the bacteriological contamination of the river. On both sampling dates at flows of 30,000 cfs except for the locations near the lock and dam and reaches on the Illinois side, the entire sampling area was highly contaminated. Below the upstream marina area and especially below the sewage treatment plant, the fecal coliforms increased much more than the allowable 200 per 100 ml margin of increase.

It can also be concluded that additional inputs were occurring in the Massey Marina area, although, the amount of increase could not be determined.

On the positive side a great reduction in fecal coliform numbers was observed in the discharge area from July 31 to August 22 due to improved disinfection procedures at the STP. Unfortunately, due to several possible influences, contamination downstream was still severe.

In conclusion, our results have shown contamination from fecal coliform bacteria in the Mississippi River in the Dubuque area. The primary source was the Municipal Sewage Treatment Plant with apparent additional contributions from Lake Peosta Channel and the Massey Marina area.

This situation which is limited to the Iowa side of the river is of public health significance due to the potential for infection in a whole body contact recreational area from the pathogenic organisms which may be associated with the fecal coliform bacteria.

Our results, furthermore, showed that the STP contributes a large load of organic and nutrient substances to the river. These should not cause any serious water quality problems, and the situation should be rectified on completion of Phase II of the Dubuque treatment facility in 1976 according to statements of the engineers involved.

Dennis M Geary

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Limnologist

R L Morris

Robert L Morris, PhD
Associate Director & Principal Chemist

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A P P E N D I X

The University of Iowa
E 7th & Court, Rm 405, Des Moines, Iowa 50309

Town	Dubuque	Dubuque	Dubuque
Source	Mississippi River	Mississippi River	Mississippi River
Specific Location	R.M. 582.7-mid-channel	R.M. 582.7 Iowa side	R.M. 579.4 Iowa side
Date Collected	31 July 1974	31 July 1974	31 July 1974
Date Received	1 August 1974	1 August 1974	1 August 1974
Lab Number	00556	00557	00558
	FIELD DATA		
Collection Time	15:00	15:15	14:35
pH			
Temperature	26°C Air-31° C	25 °C	25 °C
Dissolved Oxygen			
	BACTERIOLOGICAL EXAMINATION		
Fecal Coliform/100 ml	40	40	670
	CHEMICAL ANALYSIS (as mg/l unless designated otherwise)		
Conductance (micromhos)	350	350	360
MBAS (as LAS)			
pH (units)	8.2	8.2	8.1
Alkalinity: P	None	None	None
T	150	153	149
NITROGEN: Organic N	0.71	0.69	0.83
Ammonia N	0.05	0.05	0.08
Nitrite N	0.021	0.037	0.048
Nitrate N	0.5	0.5	0.5
Nitrate as NO_3			
RESIDUE: Total	231	224	246
Fixed	75	84	133
Volatile	156	140	113
Filtrable Residue T	215	220	214
F	66	80	101
V	149	140	113
Nonfiltrable Residue T	16	4	32
F	9	4	32
V	7	0	0
Settleable Matter (ml/l)			
PHOSPHATE: Filtrable P	0.08	0.08	0.12
Total P	0.14	0.14	0.22
Dissolved Oxygen	7.4	7.5	6.7
BOD	2	2	3
COD	21	21	21
Grease or Oil			
Turbidity (JTU)	14	15	20
Total Hardness (as $CaCO_3$)			
Calcium (Ca^{++})			
Magnesium (Mg^{++})			
Chloride (Cl^-)	7	7	9
Sulfate (SO_4^{--})			

REMARKS:

LIMNOLOGY SURVEY

COLLECTOR
REPORT TO

Geary & Humeston
Limnology Division
State Hygienic Laboratory
Des Moines, Iowa

R. L. Morris, Ph.D.
Associate Director & Principal Chemist

9 August 1974 dm

WATER QUALITY REPORT

STATE HYGIENIC LABORATORY, Des Moines Branch
The University of Iowa
E 7th & Court, Rm 405, Des Moines, Iowa 50309

Town	Dubuque	Dubuque	Dubuque
Source	Mississippi River	Unknown Effluent	Mississippi River
Specific Location	R.M. 578.5 Iowa Side	R.M. 577.8 Iowa Side	R.M. 577.6 Iowa Side
Date Collected	31 July 1974	31 July 1974	31 July 1974
Date Received	1 August 1974	1 August 1974	1 August 1974
Lab Number	00559	00560	00561
	FIELD DATA		
Collection Time	14:25	14:15	14:10
pH			
Temperature	25° C		25° C Air--31° C
Dissolved Oxygen			
	BACTERIOLOGICAL EXAMINATION		
Fecal Coliform/100 ml	190	<10,000	6,200,000
	CHEMICAL ANALYSIS (as mg/l unless designated otherwise)		
Conductance (micromhos)	360	370	470
MBAS (as LAS)			
pH (units)	8.1	8.2	7.6
Alkalinity: P	None	None	None
T	149	153	167
NITROGEN: Organic N	0.75	0.76	3.6
Ammonia N	0.08	0.05	1.7
Nitrite N	0.042	0.038	0.12
Nitrate N	0.5	0.5	0.5
Nitrate as NO_3			
RESIDUE: Total	240	259	318
Fixed	113	133	172
Volatile	127	126	146
Filtrable Residue T	214	227	279
F	87	102	157
V	127	125	122
Nonfiltrable Residue T	26	32	39
F	26	31	15
V	0	1	24
Settleable Matter (ml/l)			
PHOSPHATE: Filtrable P	0.08	0.10	0.38
Total P	0.16	0.17	0.90
Dissolved Oxygen	6.9		6.5
BOD	2	2	23
COD	24	26	71
Grease or Oil			
Turbidity (JTU)	17	20	25
Total Hardness (as $CaCO_3$)			
Calcium (Ca^{++})			
Magnesium (Mg^{++})			
Chloride (Cl^-)	12	10	29
Sulfate (SO_4^{--})			

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WATER QUALITY REPORT

STATE HYGIENIC LABORATORY, Des Moines Branch
The University of Iowa
E 7th & Court, Rm 405, Des Moines, Iowa 50309

Town	Dubuque	Dubuque	Dubuque
Source	Mississippi River	Mississippi River	Mississippi River
Specific Location	R.M. 577.6 Mid-river	R.M. 577.6 Illinois Side	R.M. 577.1 Iowa Side
Date Collected	31 July 1974	31 July 1974	31 July 1974
Date Received	1 August 1974	1 August 1974	1 August 1974
Lab Number	00562	00563	00564
	FIELD DATA		
Collection Time	13:45	13:30	12:30
pH			
Temperature	25°C	25°C	25°C Air--30°C
Dissolved Oxygen			
	BACTERIOLOGICAL EXAMINATION		
Fecal Coliform/100 ml	<1000	300	6000
	CHEMICAL ANALYSIS (as mg/l unless designated otherwise)		
Conductance (micromhos)	350	360	420
MBAS (as LAS)			
pH (units)	8.2	8.2	7.7
Alkalinity: P	None	None	None
T	148	146	159
NITROGEN: Organic N	0.71	0.71	1.8
Ammonia N	0.05	0.05	0.88
Nitrite N	0.043	0.044	0.053
Nitrate N	0.5	0.5	0.5
Nitrate as NO_3			
RESIDUE: Total	237	231	281
Fixed	129	70	88
Volatile	108	161	193
Filtrable Residue T	216	215	243
F	117	54	65
V	99	161	178
Nonfiltrable Residue T	21	16	38
F	12	16	23
V	9	0	15
Settleable Matter (ml/l)			
PHOSPHATE: Filtrable P	0.10	0.09	0.28
Total P	0.14	0.15	0.52
Dissolved Oxygen	7.0	7.5	6.4
BOD	2	2	9
COD	21	24	41
Grease or Oil			
Turbidity (JTU)	15	16	22
Total Hardness (as $CaCO_3$)			
Calcium (Ca^{++})			
Magnesium (Mg^{++})			
Chloride (Cl^-)	8	8	18
Sulfate (SO_4^{--})			

REMARKS:

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COLLECTOR REPORT TO: Geary & Humeston
Limnology Division
State Hygienic Laboratory
Des Moines, Iowa

R. L. Morris, Ph.D.
Associate Director & Principal Chemist

9 August 1974 dm

WATER QUALITY REPORT

STATE HYGIENIC LABORATORY, Des Moines Branch
The University of Iowa
E 7th & Court, Rm 405, Des Moines, Iowa 50309

Town	Dubuque	Dubuque	Dubuque
Source		Mississippi River	Mississippi River
Specific Location	R.M. 577.1 Mid-River	R.M. 577.1 Illinois Side	R.M. 575.6 Iowa Side
Date Collected	31 July 1974	31 July 1974	31 July 1974
Date Received	1 August 1974	1 August 1974	1 August 1974
Lab Number	00565	00566	00567
FIELD DATA			
Collection Time	13:00	12:40	12:00
pH			
Temperature	25° C	25° C	24° C Air--25° C
Dissolved Oxygen			
BACTERIOLOGICAL EXAMINATION			
Fecal Coliform/100 ml	< 100	< 1000	3000
CHEMICAL ANALYSIS (as mg/l unless designated otherwise)			
Conductance (micromhos)	350	350	370
MBAS (as LAS)			
pH (units)	8.1	8.2	8.1
Alkalinity: P	None	None	None
T	147	153	152
NITROGEN: Organic N	0.76	0.72	0.87
Ammonia N	0.07	< 0.01	0.12
Nitrite N	0.043	0.041	0.044
Nitrate N	0.5	0.5	0.5
Nitrate as NO_3			
RESIDUE: Total	234	242	245
Fixed	73	81	92
Volatile	161	161	153
Filtrable Residue T	218	222	224
F	57	61	72
V	161	161	152
Nonfiltrable Residue T	16	20	21
F	16	20	20
V	0	0	1
Settleable Matter (ml/l)			
PHOSPHATE: Filtrable P	0.09	0.10	0.14
Total P	0.13	0.16	0.18
Dissolved Oxygen	7.3	7.5	6.6
BOD	2	2	3
COD	21	19	21
Grease or Oil			
Turbidity (JTU)	16	16	18
Total Hardness (as $CaCO_3$)			
Calcium (Ca^{++})			
Magnesium (Mg^{++})			
Chloride (Cl^-)	7	8	9
Sulfate (SO_4^{--})			

REMARKS:

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Limnology Division
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Des Moines, Iowa

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9 August 1974 dm

WATER QUALITY REPORT

STATE HYGIENIC LABORATORY, Des Moines Branch
The University of Iowa
E 7th & Court, Rm 405, Des Moines, Iowa 50319

Town	Dubuque	Dubuque	Dubuque
Source	Mississippi River	Mississippi River	Mississippi River
Specific Location	R.M. 575.6 Illinois Side	R.M. 569.3 Iowa Side	R.M. 569.3 Illinois Side
Date Collected	31 July 1974	31 July 1974	31 July 1974
Date Received	1 August 1974	1 August 1974	1 August 1974
Lab Number	00568	00569	00570
FIELD DATA			
Collection Time	12:00	10:30	10:45
pH			
Temperature	24°C Air--25°C	24°C	24°C Air--25°C
Dissolved Oxygen			
BACTERIOLOGICAL EXAMINATION			
Fecal Coliform/100 ml	<100	7800	1000
CHEMICAL ANALYSIS (as mg/l unless designated otherwise)			
Conductance (micromhos)	350	360	360
MBAS (as LAS)			
pH (units)	8.1	8.1	8.1
Alkalinity: P	None	None	None
T	140	130	130
NITROGEN: Organic N	0.68	0.81	0.69
Ammonia N	<0.01	0.12	0.05
Nitrite N	0.040	0.047	0.047
Nitrate N	0.5	0.5	0.5
Nitrate as NO_3			
RESIDUE: Total	233	253	237
Fixed	118	121	103
Volatile	115	132	134
Filtrable Residue T	222	222	223
F	102	92	96
V	110	130	127
Nonfiltrable Residue T	11	31	14
F	6	29	7
V	5	2	7
Settleable Matter (ml/l)			
PHOSPHATE: Filtrable P	0.10	0.11	0.10
Total P	0.12	0.20	0.14
Dissolved Oxygen	7.3	6.3	6.0
BOD	2	2	2
COD	19	19	21
Grease or Oil			
Turbidity (JTU)	15	20	15
Total Hardness (as $CaCO_3$)			
Calcium (Ca^{++})			
Magnesium (Mg^{++})			
Chloride (Cl^-)	8	8	8
Sulfate (SO_4^{--})			

REMARKS: LIMNOLOGY SURVEY

COLLECTOR: Geary & Humeston
REPORT TO: Limnology Division
State Hygienic Laboratory
Des Moines, Iowa

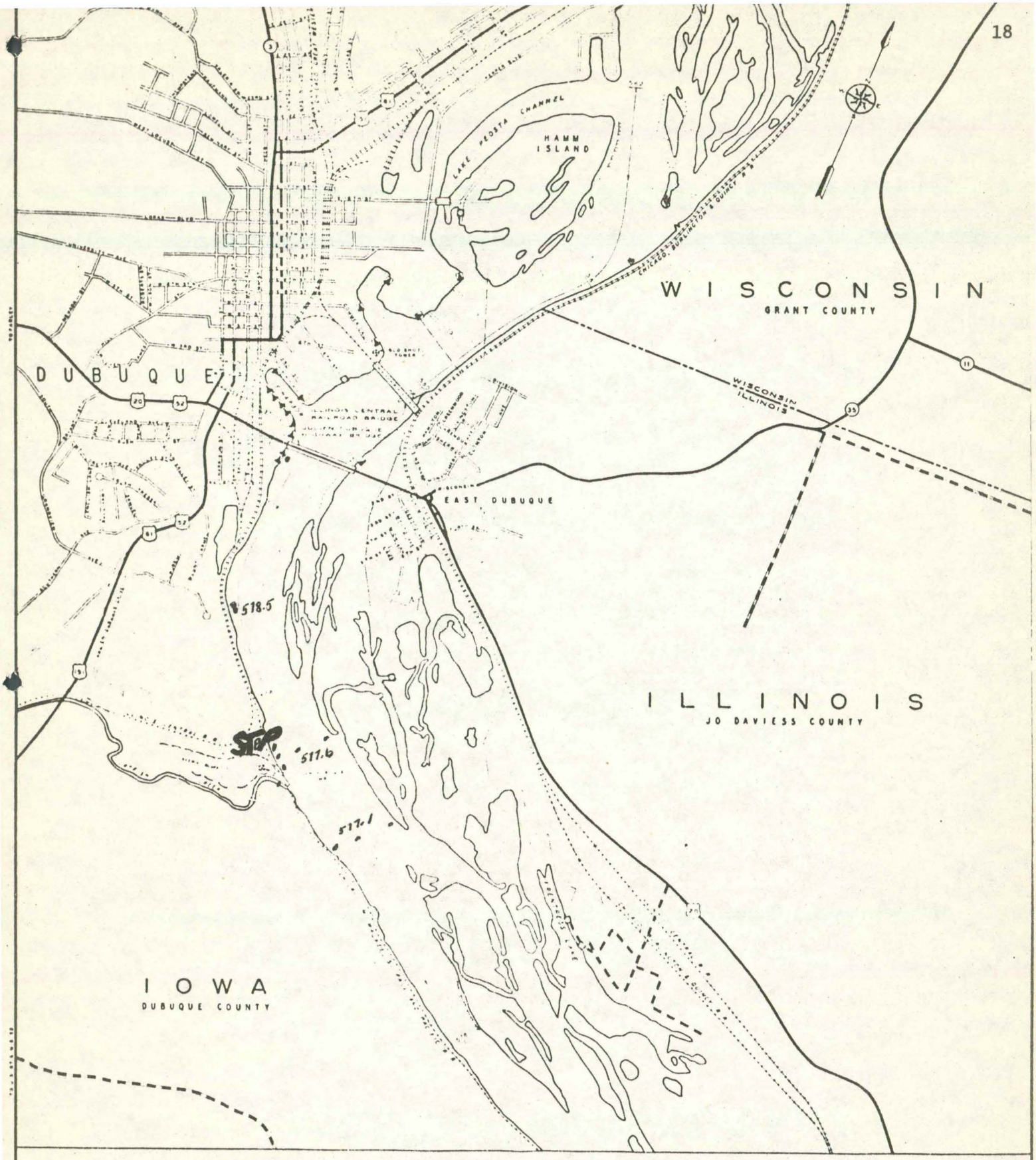
R. L. Morris, Ph.D.
Associate Director & Principal Chemist

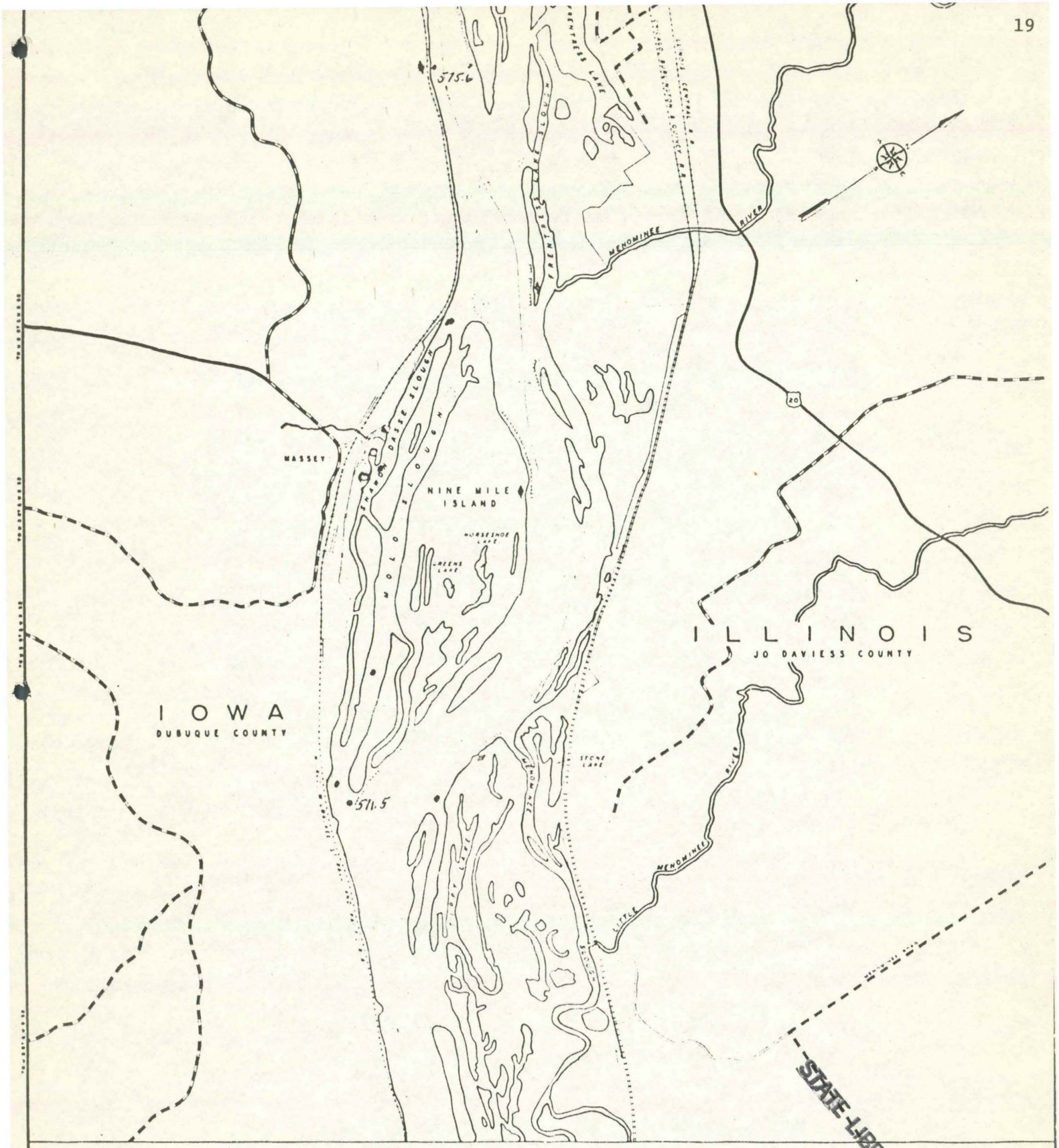
9 August 1974 dm

SUMMARY TABLE OF DATA COLLECTED

22 August 1974

Location (River Mile)		Coli(per 100 ml)	D.O.(mg/l)	Temp(°C)	BOD(mg/l)	Time
582.7	Iowa	80		24		1100
578.5	Iowa	240	6.4	24	1	1115
577.8	Iowa	85,000	4.6	24		1125
577.7	Iowa	40,000	4.6	24	50	1130
577.6	Iowa	20,000	5.3	24		1135
Catfish Creek		61,000	6.5	21		1140
577.1	Iowa	13,000	6.1	24		1150
	Illinois	340	6.3	24		1155
575.6	Iowa	8,100	6.5	24		1205
	Illinois	130	6.8	24		1210
574.2	Iowa	21,000		24		1215
Swim area		13,000	6.1	25	2	1220
572.7	Molo Slough	7,500		25		1230
571.5	Iowa	16,000	6.1	24	2	1235
	Illinois	930	6.6	24	3	1240
569.3	Iowa	64,000	5.8	24	2	1300
	Illinois	7,400		24		1305


HAMM ISLAND
LAKE PEOSTA CHANNEL
WISCONSIN
GRANT COUNTY
DUBUQUE
WISCONSIN ILLINOIS
EAST DUBUQUE
518.5
517.6
517.1
ILLINOIS
JO DAVIESS COUNTY
IOWA
DUBUQUE COUNTY
LEGEND
GOVERNMENT PROPERTY
WILDLIFE SANCTUARY*
WING DAM
PAVED ROAD
GRAVEL ROAD
UNIMPROVED ROAD
FEDERAL HIGHWAY
STATE HIGHWAY
COUNTY ROAD
LEVEE
BANK PROTECTION
AERIAL CABLE CROSSING
COMMERCIAL DOCK
RECREATIONAL SITE
RECREATIONAL SITE WITH RAMP
COMMERCIAL RECREATIONAL SITE
HISTORIC SITE
SMALL BOAT HARBOR MARINA, BOAT CLUB
RIVER GAGE
GOVERNMENT LIGHT
GOVERNMENT DAYMARK
GOVERNMENT LIGHT - DAYMARK
GOVERNMENT LIGHTED BUOY
MOORINGS
MILEAGE ABOVE OHIO RIVER
MID-CHANNEL SAILING LINE
CURRENT
SUBMERGED WING DAM
SUBMERGED BANK PROTECTION
SUBMERGED FEATURE
SUBMERGED PIPE OR CABLE



LEGEND

- GOVERNMENT PROPERTY
- WILDLIFE SANCTUARY*
- WING DAM
- PAVED ROAD
- GRAVEL ROAD
- UNIMPROVED ROAD
- FEDERAL HIGHWAY
- STATE HIGHWAY
- COUNTY ROAD

- LEVEE
- BANK PROTECTION
- AERIAL CABLE CROSSING
- COMMERCIAL DOCK
- RECREATIONAL SITE
- RECREATIONAL SITE WITH RAMP
- COMMERCIAL RECREATIONAL SITE
- HISTORIC SITE
- SMALL BOAT HARBOR, MARINA, BOAT CLUB

- RIVER GAGE
- GOVERNMENT LIGHT
- GOVERNMENT DAYMARK
- GOVERNMENT LIGHT DAYMARK
- GOVERNMENT LIGHTED BUOY
- MOORINGS
- MILEAGE ABOVE OHIO RIVER
- MIDCHANNEL SAILING LINE
- CURRENT
- SUBMERGED WING DAM
- SUBMERGED BANK PROTECTION
- SUBMERGED FEATURE
- SUBMERGED PIPE OR CABLE

* [illegible]

STATUTE MILES

C R Gazette: 9/13/74

River sewage

To the Editor:

I would like to bring up an Iowa problem that is only getting worse over the years.

Having spent weekends boating and fishing on the Mississippi river since childhood, I feel it is time our citizens be informed of one of Iowa's growing water pollution problems.

Last weekend while spending the holiday with my mother and father on their houseboat, I was greatly disappointed to discover how lax Iowa's water pollution laws are, especially after my continued broadcasting to visitors of how clean and comparatively unpolluted Iowa is.

Prior to spending three weeks on the river, my parents had installed a holding tank sewage system for Wisconsin, Illinois and Minnesota. The tank is pumped out at "sanitary stations" into the city or rural sewage lines for treatment, thus keeping this added bit of pollution out of the river. This is a worthwhile cost of $5.

While standing on a McGregor dock, I was shocked to discover the attendant going through the usual procedures of pumping the holding tank. The pipe at the end of the hose was dumping the raw sewage right back into the river — untreated. This also cost $5.

Considering the beautiful houseboats, yachts and cruisers that require this type of facility, I couldn't believe Iowa was the only member of the tri-state area not equipped to handle river sewage properly.

It's time something is done with the problems in the Dubuque marina, the heavy water pollution in the Davenport marina area and the poor fishing that is beginning to result.

With the millions of dollars people spend to enjoy the Mississippi, I hate to see the "best river of all" ruined by all this extra garbage.

Mrs. Charles DeSaulniers
2804 O avenue NW