

Bub, Laura A

From: Bub, Laura A
Sent: Wednesday, June 25, 2003 3:33 PM
To: Sullivan, John F (DNR - LaCrosse)
Cc: LaLiberte, Paul J
Subject: RE: Stoddard Classification Report

John,

I think that your amendment would be appropriate and would hopefully prevent any potential confusion. If you could send a revised report when you get the chance, I'd appreciate it.

Thanks-
Laura

-----Original Message-----

From: Sullivan, John F (DNR - LaCrosse)
Sent: Thursday, June 05, 2003 10:16 AM
To: LaLiberte, Paul J; Hammer, Charles R; Bub, Laura A
Cc: Masnado, Robert G; Baumann, Dan G; Heath, David J; Benjamin, Gretchen L
Subject: RE: Stoddard Classification Report

Very interesting discussions some of which I found hard to follow. It seems like these issues were discussed previously. Anyway here is my response.

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From: LaLiberte, Paul J
Sent: Wednesday, June 04, 2003 3:13 PM
To: Hammer, Charles R; Bub, Laura A; Sullivan, John F (DNR - LaCrosse)
Cc: Masnado, Robert G
Subject: RE: Stoddard Classification Report

This conversation takes us into the heart of differentiating a riparian wetland from the lake/stream/slough/backwater adjacent to it. I know the chapter 30 folks have invested some time into trying to differentiate between a lake and an open water wetland. That may or may not have any relevance for WPDES. It could be said that any wetland with unidirectional flow somewhere in it is a stream surrounded by a wetland. Also, an open water wetland could just as easily be described as a winter kill lake with a wetland border. Both of these can have the potential to support some kind of fishery, so they are best described as a combination of **both** wetlands and either lakes/sloughs or streams. The only time this does not come up are those wetlands with essentially no open water or unidirectional flow and no fishery value, at least under low flow, and therefore are exclusively a *wetland* for NR104 purposes with no further qualifiers.

Since we have authority to protect downstream uses, I hope we don't have to spend too much time splitting this particular hair. eg Is this a Mississippi River backwater with a seasonally varying potential to support aquatic life that happens to have a border of wetland vegetation?

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From: Hammer, Charles R
Sent: Wednesday, June 04, 2003 2:44 PM
To: Bub, Laura A; Sullivan, John F (DNR - LaCrosse); LaLiberte, Paul J

Cc: Masnado, Robert G
Subject: RE: Stoddard Classification Report

The more I look into the wording of the existing NR 102 and 104, the more I'm convinced that some guess work is needed to figure out why things are packaged there in the way they are. Here's my guess about the relationship between wetlands and the limited aquatic life subcategory.

Our use designations in NR 102.04 include fish and aquatic life, recreational, and public health and welfare designations. The fish and aquatic life designation was implemented to react to Clean Water Act demands--and includes five subcategories, the "lowest" of which is limited aquatic life. Nothing in the use designation language in NR 102.04 limits the application of the various subcategories to streams or other flowing waters. In fact, the introductory language in NR 102.04(3) states "The departments shall classify *all surface waters* into one of the fish and aquatic life subcategories described in this section." (My emphasis) Despite this language, we've historically thought of the NR 102.04 designations as applying to open water (my wording) situations--not wetlands that are also "surface waters". Then, when it came time to figure out what effluent limitations ought to apply to discharges to wetlands, we made the leap that aquatic life in wetlands most closely tracks that in the aquatic life use designation--hence the language in NR 104.02(3)(b).

What can we do now? I believe that if a wetland is also a "surface water", it could fit into one of the existing subcategories. (Perhaps with revisions to NR 102, there could be a "fish and aquatic life" subcategory--probably one that only includes aquatic life other than fish--that would apply to most wetlands.) If it does fit into one of the existing subcategories, say limited forage fish, by virtue of its present or potential use, we could so list it in NR 104. A cautionary note: the only legitimate reason for listing a particular surface water that has wetland characteristics as, say, a limited forage fish community, is because that particular surface water HAS the characteristics or the potential to have the characteristics of a limited forage fish community. We can't classify a surface water (or wetland, in this instance) to a subcategory to which it doesn't fit just because the normal effluent limitations associated with that subcategory appear to us to better fit the needs of the water. If that's our problem, we need to identify a new subcategory and/or a different set of discharge limits to such wetlands.

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To: Sullivan, John F (DNR - LaCrosse); LaLiberte, Paul J
Cc: Masnado, Robert G; Hammer, Charles R; Bub, Laura A
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Hi John:

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This statement leads me to believe that, at this point in time, if we call something a wetland we must give it an LAL classification. I talked to Chuck Hammer about this, and he said that this is at least somewhat true. It sounds like we need to clarify what this wetland area is like, in order to determine if we can classify it as something other than LAL. Can you say whether this receiving water is actually a channel or "braid" **within a wetland**, and might exhibit unidirectional flow? Is there some other characteristic of the water

body that would indicate that a classification other than LAL would be more appropriate? From what I understand, it sounds like we need to get some more information about this receiving water before we can apply the recommended classifications. [Chuck--if I am not articulating this clearly, please feel free to correct me]. Please let me know if you have any questions about this.

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Thanks-
Laura

**Re-evaluation of Receiving Water Classification for
Stoddard's Wastewater Treatment Plant Discharge to
Coon Creek Delta/Navigation Pool 8 of the Mississippi River**

John Sullivan, WDNR-La Crosse
February 24, 2003

A receiving water classification was prepared for Stoddard's Wastewater Treatment Plant (WWTP) in January 1993 (Sullivan, 1993). Since that time, considerable fisheries information has been collected for Pool 8 as part of the federal Long Term Resource Monitoring Program. In addition, the U.S. Fish and Wildlife Service has conducted fisheries research in shallow backwater areas of Lawrence Lake, Pool 8. This information, coupled with the original fisheries assessment for the Stoddard backwater in 1976 (Holzer, 1976), suggests that greater fisheries use of shallow, vegetated backwater areas along the Mississippi River can be expected.

In the spring and summer of 1976, Jim Holzer, DNR fish manager from La Crosse, conducted fish surveys in the upper and lower lobes of the isolated backwater area below Stoddard's WWTP outfall. Although the original field data have not been found, a summary of his seining work was prepared in a memo dated July 29, 1976 (Holzer, 1976). Holzer reported black crappies, bluegills, largemouth bass and brook silversides and several species of minnows and shiners in the northern lobe. Sampling in the southern lobe revealed the following additional species: madtom, yellow perch and brown bullhead. Holzer reported that the fisheries value of the area was "limited by its tendency to winter kill and by excessive domestic pollution" (wastewater discharge). He also believed that recruitment was dependent upon migration during periods of high water.

Dewey and Jennings (1992) evaluated habitat use by larval fishes in vegetated and unvegetated areas of Lawrence Lake, Pool 8, using light traps deployed from May through August 1990. The site furthest from the main channel (Site 2) had a total of 10 taxa reported including four families (Clupeidae, Cyprinidae, Atherinidae, and Centrarchidae). Greatest diversity was associated with emergent plant communities. Sunfishes (*Lepomis* spp.) represented 71 to 95% of the total catch. These fishes were also significantly correlated with dissolved oxygen, water temperature, pH and vegetation richness. The lowest reported dissolved oxygen concentration during their survey was 2.3 mg/L (0.3 m below surface). Overall, they found that fish use did not differ in vegetated sites near or far from the main channel of the river.

Sullivan and Endris conducted a survey of the receiving water area on August 24, 1995 (Sullivan, 1995). The area was heavily vegetated with aquatic macrophytes and warranted a wetland classification. No effort was made to collect fish during this survey though minnows were observed in the narrow

channel (1-2 ft wide by 0.2 to 0.5 ft deep) that led to Coon Creek. It was recognized that fish use of the backwater area would likely increase during periods of higher stage levels. This survey was conducted during a period of high summer flow (67,000 cfs at Lock and Dam 8). Water levels were likely higher than normal based on the high flows and stage-flow curves reported by US Corps of Engineers for lower Pool 8 (USCOE Web Site for the St. Paul District). As a result, the hydraulic connection with Coon Creek would be expected to be less during normal to low flow periods.

An evaluation of the Long Term Resource Monitoring Program's fisheries seining data for Pool 8 was conducted to assess fish use in shallow vegetated backwater areas during the summer months (August - September 15) for years 1993 to 1999. Data were obtained electronically from USGS Upper Midwest Science Center's LTRM database in February 2003. The total number of species reported in seine hauls by depth and the relative density of aquatic vegetation is presented in Figure 1. The results indicate the diversity (total number of species) of the catch declined noticeably as water depth decreased. Highest species counts were normally associated with areas of dense vegetation with the least diversity reported for areas where vegetation was absent. This pattern was observed for depths ranging from 0.5 to 1 meters. At 0.4 meters a different pattern emerged with areas with dense vegetation having noticeably lower numbers of species. The reason for this response in densely shallow vegetated areas was not determined, but it is likely that water quality (low dissolved oxygen or high temperature) may be an important factor. This is supported by continuous water quality monitoring conducted in a shallow, vegetated, isolated backwater adjacent to Highway 35 near Stoddard in September 2002 where median DO was 0.3 mg/L and maximum water temperature exceeded 30 C (Figure 2 and 3). Warmer water would be expected during July and August.

The LTRM seining data indicate the potential for a moderately high diversity of fish use in shallow, vegetated backwater areas of Pool 8. It is likely that the potential for similar fish use would be expected for the Stoddard WWTP receiving water area. As a result, the receiving water classification for this backwater area should be modified to recognize the potential for greater fisheries use, at least during seasonal periods when water depths and hydraulic connection are greater and the negative influence of dense aquatic vegetation (dissolved oxygen impairments) or shallow water (thermal stress) are reduced. It is recognized that year-round warm water fish and aquatic life use is likely not attainable in this habitat due to periods of winter ice and snow cover when dissolved oxygen and water depths are limiting due to natural causes.

Receiving Water Use Recommendation

Based on the information described above and using the Department's guidelines for Designating Fish and Aquatic Life Uses for Wisconsin Surface Waters

(November, 2002 draft), the following revised classification for the Stoddard WWTP receiving water is recommended:

During periods of historically high water stages when this area has greatest hydraulic connection to Coon Creek and the Mississippi River (**April-June**), the receiving water should be wetland with diverse fish and aquatic life use.

During periods of when the hydraulic connection with Coon Creek and the Mississippi River is normally restricted (**July-November**) and dense vegetation contributes to periods of high plant respiratory demand (less than 3 mg/L dissolved oxygen), the receiving water should be wetland with tolerant fish and aquatic life use.

During periods with ice and snow cover (**December-March**) when effective water depths are normally low (< 1 ft) and natural periods of anoxia can be expected due the absence of photosynthetic processes, vegetation decay and sediment oxygen demand, the receiving water should be wetland with very tolerant aquatic life use.

Future Monitoring Recommendations

Fishery surveys should be conducted in Stoddard's WWTP receiving water and nearby reference sites to determine if the seasonal diverse fish and aquatic life use classification should be expanded to encompass summer and fall periods.

References

Dewey M.R. and C. A. Jennings. 1992. Habitat use by larval fishes in backwater lake of the Upper Mississippi River. J. Freshwater Ecology, 7: 363-372.

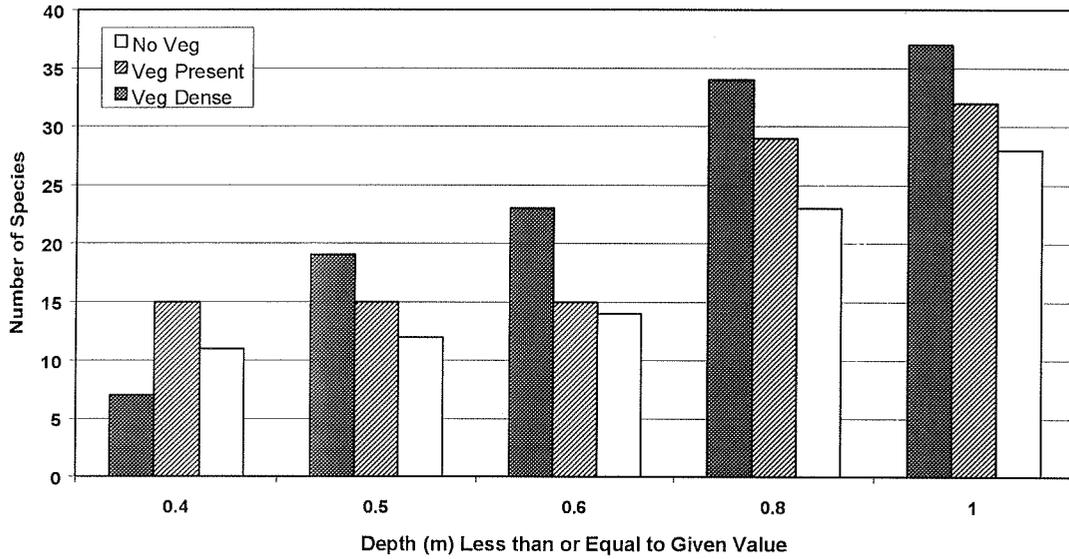
Holzer, Jim. 1976. Investigations and recommendations concerning the Stoddard Sewage Treatment Plant Slough. Internal Memo. Wisconsin DNR, La Crosse.

Sullivan, John. 1993. Receiving water classification Stoddard Wastewater Treatment Plant, Stoddard, Wisconsin. Wisconsin DNR - La Crosse.

Sullivan, John. 1995. Stoddard Wastewater Treatment Plant (WWTP) Receiving water survey, August 24, 1995. Wisconsin DNR, La Crosse.

0403 10:00
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as UIC.
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Total Number of Fish Species Reported for Pool 8 LTRM Seining Data (1993-99)



Note: Velocity restricted to sites ≤ 0.01 m/s

Figure 1. Fish Seining data collected by the Long Term Resource Monitoring Program in Pool 8 of the Upper Mississippi River during period 2 (August-September 15) for years 1993 to 1999.

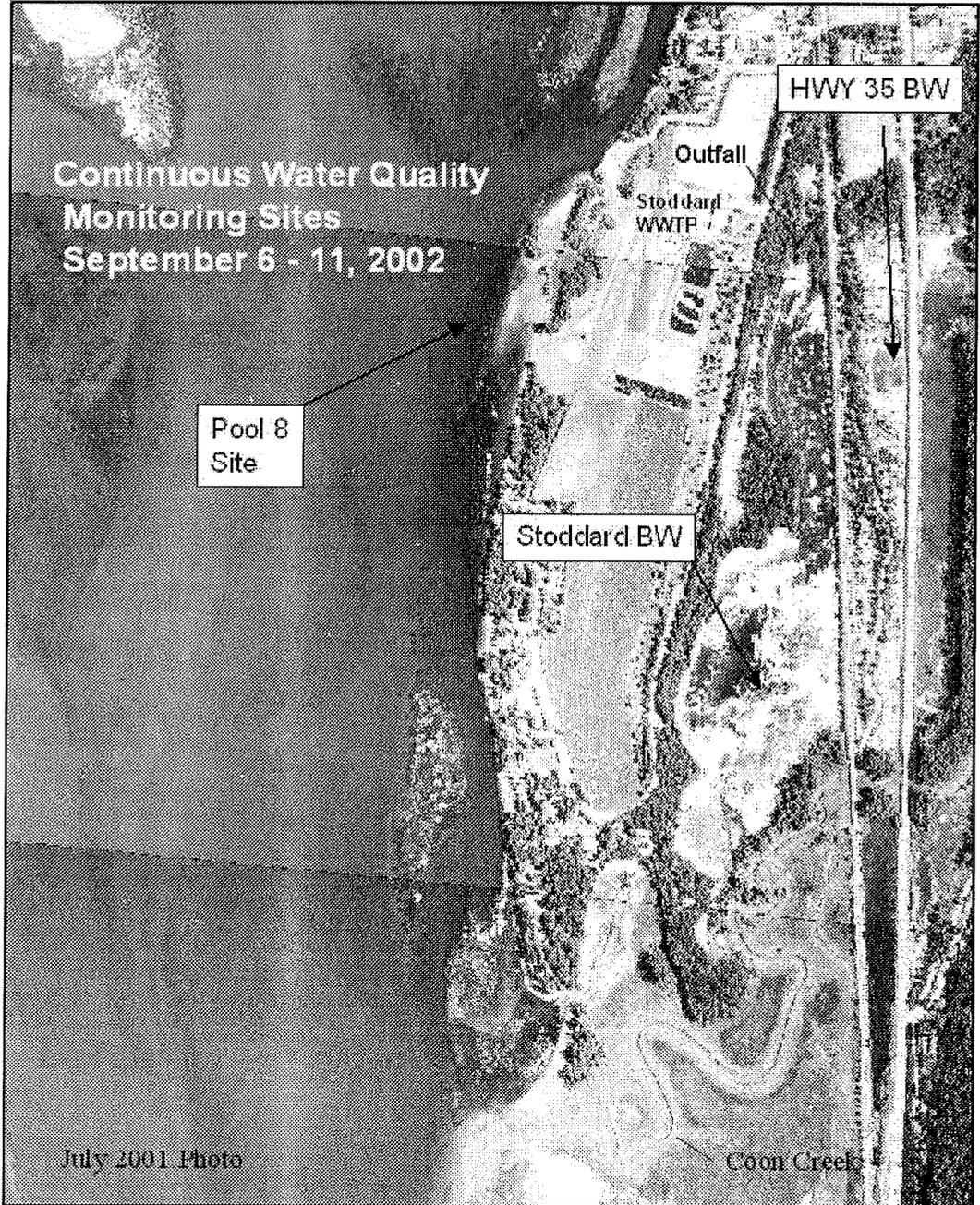


Figure 2. Continuous water quality monitoring sites sampled near Stoddard, Wisconsin by the Wisconsin DNR during September 2002.

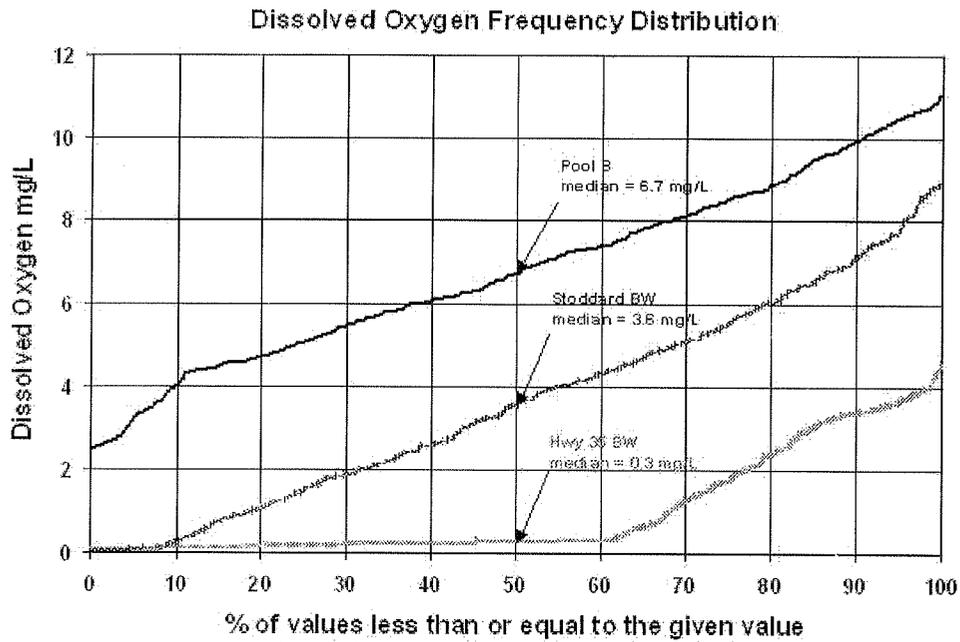
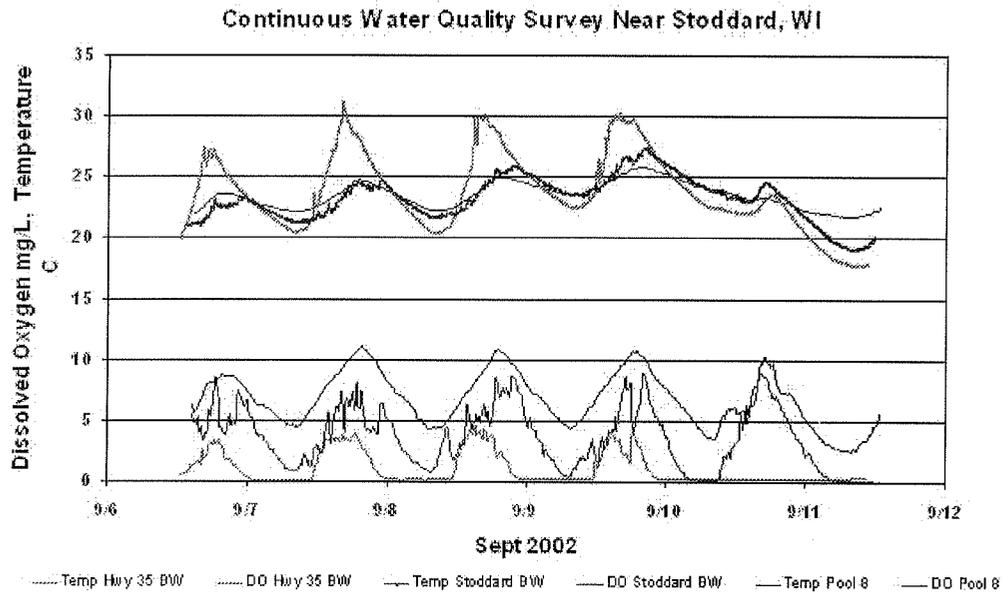


Figure 3. Continuous water quality monitoring results from sites sampled by the Wisconsin DNR near Stoddard, Wisconsin in September 2002.

Correspondence/Memorandum

State of Wisconsin
La Crosse, WI

Date: August 25, 1995
To: Paul LaLiberte, WD
From: John Sullivan, La Crosse
Subject: Stoddard Wastewater Treatment Plant (WWTP) Receiving
Water Survey, August 24, 1995

Mark Endris, local fish manager and I surveyed the Stoddard, Wisconsin WWTP receiving water area in the afternoon August 24. We noted very strong sewer odor in the immediate area of the outfall. The odor was especially acute once the water was disturbed by our canoe paddles. There was evidence of trap shooting (clay pigeons and shells present) at the point of land immediately south of the outfall. This latter activity likely occurs over the open water area of the pond. A very thick mat of Wolffia and Lemna extended out from the north shore about 200-300 ft. Bottom substrate was hard with water depths of about 2 ft.

Open water begins to appear about 300 ft south of the outfall. Isolated patches of Ceratophyllum were present. Water clarity was poor and was likely due to phytoplankton activity. Water depth was about 3.5 ft. Little thermal stratification was noted. DO was 10 mg/L at the surface and 6 mg/L at the bottom. Area seemed to me mixed with the light winds (< 5-10 mph). Conductance was relatively high (900 uS/cm at 26 C) and was likely strongly influenced by WWTP discharge.

The central area of this isolated backwater narrows to about 150 ft. Patches of vegetation (Ceratophyllum and Anacharis (Elodea) were present). Water depth was about 2.5 ft. Slight thermal stratification was noted (top 26.3 C, bottom 24.9 C). There was obvious DO stratification (top 9 mg/L, bottom 1.2 mg/L). Conductivity was approximately 900 uS/cm at 26 C. Several wood ducks, a little green heron, and a hawk were observed in this area. A few carp, turtles, and frogs were also observed.

The southern end of this backwater was shallow with water depths generally less than 1.5 ft. Lily pads were very common. More mats of Wolffia and Lemna were present. Anacharis was abundant in some areas. Mid-depth temperature was 22.8 C under this surface mat in an area mixed with Ceratophyllum and Anacharis. DO was near zero (< 0.2 mg/L). Conductivity was 800 uS/cm at 22.8 C.

A deltaic area was present at the extreme southern end of the pond. Rice cutgrass (Leersia) was abundant on elevated surface (0.5-1.0 ft) of the delta. Smartweed (Polygonum) was common. Sagittaria was present in patches in wetter areas. Surprisingly, no purple loosestrife (Lythrum salicaria) was observed. This

delta is formed from turbid Coon Creek inflows during runoff events. Inflows occur during major runoff events from Coon Creek or during periods of rapid stage level increases on the Mississippi River. The water in this backwater pond was draining out through at least 2 very narrow vegetation-choked channels (about 1-2 ft wide and 0.2-0.5 ft deep) at the time of our visit. Some minnows were present in channel. The combined outflow was likely less than 0.2 cfs. Coon Creek water level seemed about 0.5 ft higher than normal and appeared to be falling. The isolated backwater is expected to be almost completely isolated hydraulically during normal Coon Creek and Mississippi River stage levels. However, some minor outflow to Coon Creek would be expected as a result of the WWTP inflow at the north end. This backwater area can be expected to become more isolated as this delta grows through future sediment inflows.

Based on our observations, we believe the classification of this backwater complex would be a wetland with limited aquatic life use. We do not believe a seasonal classification of full fish and aquatic life use is warranted during periods of greater stage levels when fish utilization is expected to increase. The isolated nature of this backwater complex will contribute to reduced fish movement and water quality conditions will likely be poor due to nutrient and sediment inflows from Coon Creek during rising water levels. The poor hydraulic connection with Coon Creek will act to trap fish in this backwater during falling water levels.

**Receiving Water Classification
for
Stoddard's Wastewater Treatment Plant
Stoddard, Wisconsin**

**John Sullivan, WDNR - La Crosse
January 1993**

Stoddard Wastewater Treatment Plant

The wastewater treatment plant (WWTP) at Stoddard, Wisconsin is an aerated lagoon facility with an annual average discharge and design flow of 0.063 and 0.112 mgd, respectively. The plant is located on a peninsula bordered on the west side by navigation Pool 8 of the Mississippi River and the Coon Creek delta complex located to the south and east. Effluent from the WWTP is discharged to an isolated, shallow, 34 acre backwater area in the Coon Creek/Pool 8 delta complex (Figure 1 and 2). The receiving water is within the Upper Mississippi River Wild Life and Fish refuge managed by the U.S. Fish and Wildlife Service.

The Burlington Railroad embankment on the east, the peninsula on the west, and the natural levee of Coon Creek on the south side restricts freshwater flow into the backwater area from Coon Creek or Pool 8. Water levels in this area are primarily influenced by the Pool 8 stages and overtopping of the natural Coon Creek levee during periods of high Mississippi River stages or tributary flows. During these times, the water may receive indirect inflows from Coon Creek or a combination of Coon Creek and Mississippi River waters. Local surface water runoff and groundwater discharges to the backwater area are not believed to be significant. Beaver activity at the southern end may also be an important factor influencing water levels at various times.

Stoddard's existing wastewater permit is based on secondary wastewater effluent limits (30 mg/l monthly average BOD₅ and total suspended solids). This decision was based on an evaluation of the receiving water by the Department in 1976 (Holzer, 1976). The receiving water was felt to provide "fish and aquatic life" habitat on the southern end. Holzer found the area to provide habitat for small fish, waterfowl, herons, muskrats and other wetland species. Submerged and floating aquatic macrophytes were found in the southern portion of the "slough" but limited "rooted aquatic vegetation" was present in the northern end in 1976. Blue-green algae and duckweed were reported to be common in the north lobe. Winter fish kill was common. Fish were reported utilizing the southern end during Holzer's surveys.

U.S. Fish and Wildlife aerial photographs of the receiving water area in the summers of 1984, 1987 and 1993 illustrate the isolated nature of this backwater area. Other than the railroad embankment on the east, there is little shoreline development in the area. The

open water and wetland vegetation comprises a significant portion of the Coon Creek delta complex in lower Pool 8. In general, such deltas provide an important habitat for fish and wildlife in the Upper Mississippi River system.

Receiving Water Quality

Recent water quality monitoring of the southern lobe (Figure 1) has been conducted as part of the federal Long Term Resource Monitoring Program (LTRM, 1993). Monthly sampling of basic water quality parameters (DO, temperature, turbidity etc.) was undertaken by the Department's Resource Trend Analysis (RTA) field station at Onalaska starting in August of 1988 and extending through June of 1993. This monitoring program was expanded to include water chemistry parameters (nutrients and some metals) in the summer of 1991. In addition, the field station has conducted vegetation surveys in the backwater area in 1992 and 1993. In general, field station staff have reported similar observations as described by Holzer in 1976. A summary of water quality data collected by the RTA station over the last 5 years at a site in the southern lobe is presented in Figures 3 and 4. The RTA station's water quality data is considered provisional.

The RTA station's water quality monitoring site may not reflect water quality conditions of the northern lobe which would likely receive greater impacts from Stoddard's effluent. The impact of this point source discharge on the southern lobe is expected to be reduced due to a greater distance from Stoddard's outfall which would allow for increased dilution and attenuation of the effluent. However, there is likely some degradation of the southern lobe that is attributable to the WWTP. As a result, the monitoring site may not reflect the best water quality potential for the area due to the impacts from a controllable source (ie. Stoddard's effluent). In addition, it is likely that long term discharges to this backwater has resulted in changes in the sediment quality, especially in the northern lobe. It is difficult to predict how the area would respond should the effluent be routed directly to Pool 8 or if higher levels of treatment were required. Given these considerations and the data presented in Figures 3 and 4, the following statements on the receiving water quality are offered:

1. The backwater area is shallow with annual fluctuations in effective water depths ranging from 0.1 to 1 meter. Water levels are believed to be primarily influenced by Pool 8 stages. Seasonal fisheries use is expected, especially during spring and other high water periods.
2. Serious oxygen depletion (less than 1 mg/l) occurs during winter ice cover and during summer conditions. Based on 5 years of monthly water quality monitoring, dissolved oxygen levels were below 5 mg/l about 50% of the time. These conditions could easily contribute to fish kills. There is insufficient information to determine how large a role Stoddard's effluent contributes to these problems

either directly through organic loading or indirectly through nutrient enrichment. Due to the shallow conditions, sediment oxygen demand and plant respiratory demands are likely an important factors influencing dissolved oxygen levels.

3. Water temperature fluctuations follow a typical pattern for a Mississippi River backwater area ranging from 0 to 25°C. However, maximum summer temperatures seem low based continuous monitoring data from other isolated backwater areas (Sullivan, 1993). Due to the isolated nature of the backwater area, thermal stratification is likely present during both summer and winter conditions.
4. The municipal effluent, sediment release of dissolved minerals and reduced effective depth during winter (reduced dilution) likely contributes to high conductivity, chloride, ammonia nitrogen and other dissolved substances during the winter months. Based on two years of monitoring, un-ionized ammonia nitrogen levels have met Wisconsin's standard of 0.04 mg/l. This is likely a result of assimilation of ammonia nitrogen by macrophytes and algae and relatively low pH during winter ice cover.
5. Secchi depth measurements indicate light penetrates to the bottom for a large portion of the time. The exception may be during algae blooms when turbidity levels increase. Rapid loss of dissolved silica during spring and fall periods are an indication of diatom blooms which require silica for their cell walls.
6. Stoddard's effluent likely contributes to a substantial loading of nitrogen and phosphorus to the backwater area. Internal release of ammonia nitrogen and dissolved phosphorus from sediment is probably important. It is unknown how much of the internal nutrient release can be tied directly to historical point source nutrient loading. Excessive nutrient enrichment may contribute to an algae dominated system. This may explain the general lack of aquatic macrophytes in the northern portion of the backwater area. However, sediment texture and excessive duckweed growth in the northern lobe may also be important factors limiting submersed aquatic plant development in this area.

Sediment Quality

The U.S. Fish and Wildlife Service collected sediment samples near Stoddard's effluent in the fall of 1992 (Smith, 1993). Preliminary results indicate elevated metal concentrations (Cu 123.2, Hg 0.38, Zn 327 ug/g dry wt) in comparison to other bulk sediment data for backwater areas. These bulk metal concentrations are about 10 times higher than other backwater areas on the Mississippi River (Smith, 1985 and Anderson, 1989) and are attributed to past wastewater discharges from Stoddard's WWTP. It is unknown if the sediment quality is presently impacting aquatic life and further investigations may be

warranted. This may help determine how the area might respond to a relocation of the present discharge or to determine the need for sediment remediation.

Receiving Water Classification and Future Effluent Limitations

Based on past field studies and present habitat conditions, the receiving water classification should be considered a wetland discharge for permitting purposes. Under present Department policy, Stoddard's WWTP would need to meet limited aquatic life effluent limits (Table 2, NR 104) should the facility enter into facility planning. Future effluent limits for this facility will need to consider wetland water quality standards (NR 103) as well as potential revisions to NR 104. The results of this classification should be factored into the next permit reissuance for this facility. These approaches would be consistent with other Wisconsin municipal discharges (Nelson and Potosi-Tennyson) to wetlands on the Mississippi River.

References

- Anderson, Dennis. (1989). Standard operating procedures for sediment evaluation of habitat and rehabilitation projects within the St. Paul District, U.S. Army Corps of Engineers, St. Paul, Mn.
- Holzer, Jim. (1976). Memorandum. Wisconsin Department of Natural Resources, La Crosse, Wi.
- Long Term Resource Monitoring Program (1993). Provisional Data. U.S. National Biological Survey, Environmental Management Technical Center, Onalaska, Wi.
- Smith, Stan. (1985). Unpublished data. U.S. Fish and Wildlife Service, St. Paul, Mn.
- Smith, Stan. (1993). Personal Communication. U.S. Fish and Wildlife Service, St. Paul, Mn.
- Sullivan, John (1993). Unpublished data. Wisconsin Department of Natural Resources, La Crosse, Wi.

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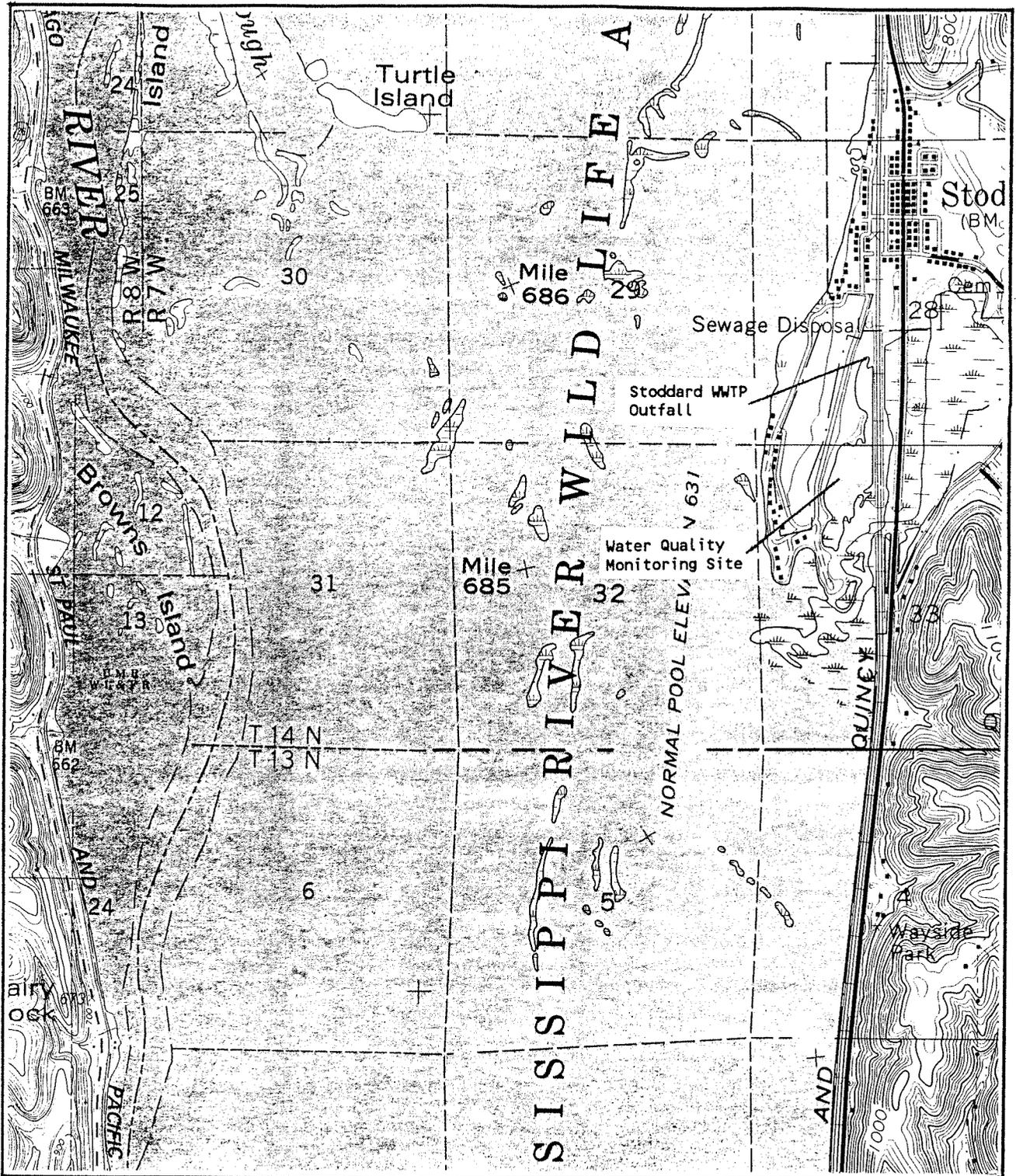


Figure 1. Lower Pool 8 of the Upper Mississippi River and the Coon Creek delta complex showing the location of Stoddard's wastewater treatment plant outfall and the Resource Trend Analysis water quality monitoring station. Source: modified USGS quadrangle for the Mississippi River.

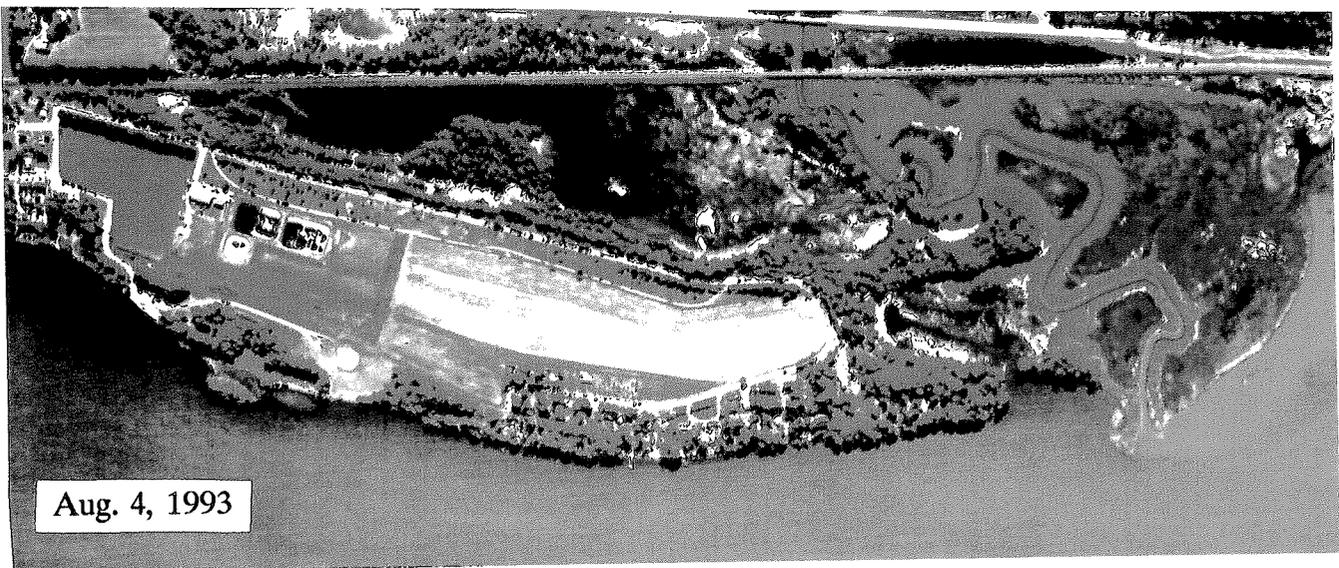
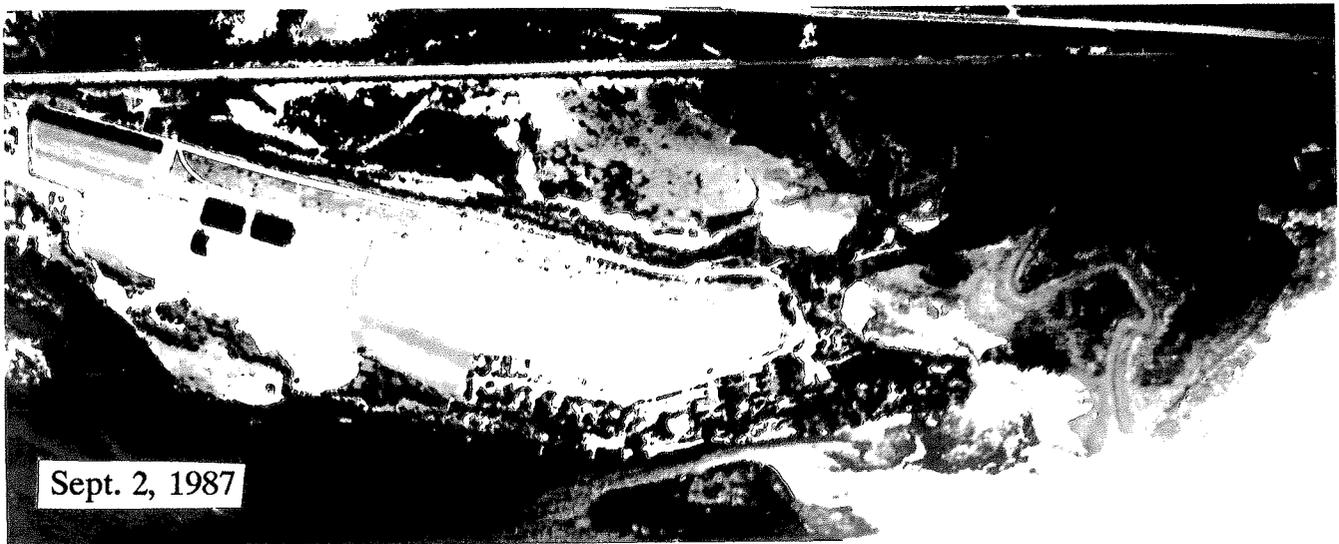
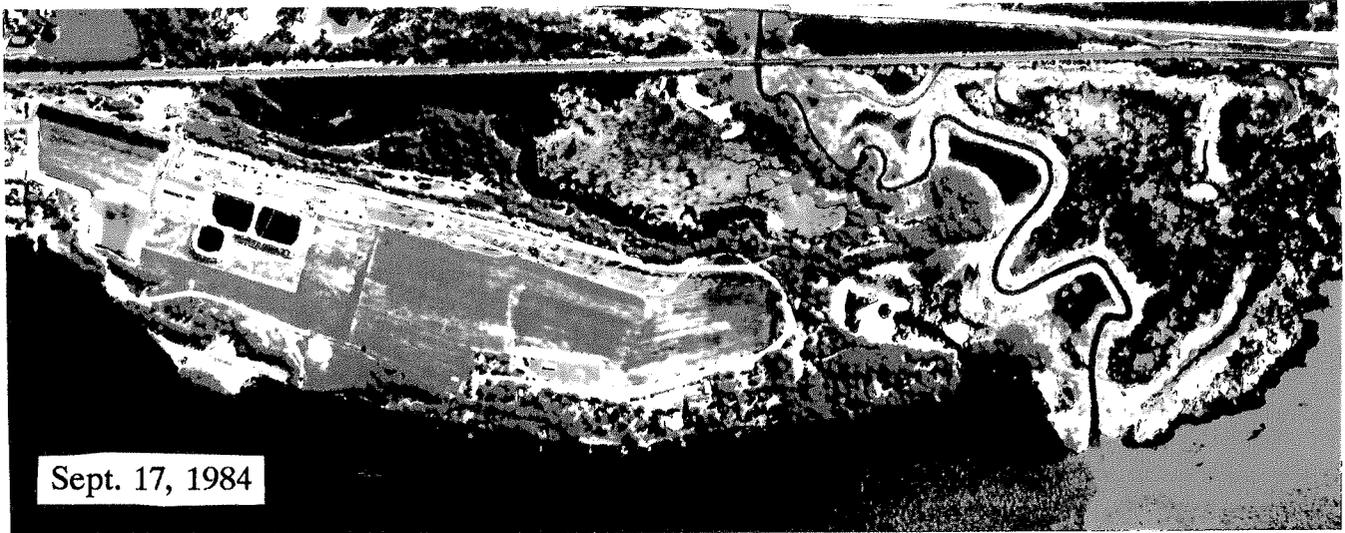


Figure 2. Aerial photographs of the Stoddard, Wi. wastewater treatment plant area and Coon Creek delta complex, Pool 8, Upper Mississippi River. Source: USFWS.