

APPENDIX E
WATER QUALITY

*Feasibility Report with Integrated Environmental Assessment
Rip Rap Landing HREP*

INTENTIONALLY LEFT BLANK

APPENDIX E WATER QUALITY

1. PURPOSE

The purpose of this appendix is to discuss the past and present water quality within Sny Creek, its tributaries, and the Mississippi River. Removing sediment from Sny Creek and building up the levee to provide enhanced flood protection will improve water quality. The Mississippi River will be the source for additional water pumped to Zones 3 and 4.

2. INTRODUCTION

Increasing water depths within Sny Creek will have a long term beneficial effect on the surface water quality within Sny Creek. Water level management within the interior wetlands through the use of a new pump station, water conveyance channels, and enhanced water control structures will allow site managers to effectively enhance wetlands within the various ecological zones, improve surface water quality, and maintain desirable vegetation communities.

3. METHODS

Water quality data for the Mississippi River were evaluated for this report from samples collected and analyzed by the Illinois EPA at a sampling station located at Winfield Ferry DS and Lock and Dam 25, Upper Mississippi River, Mississippi River North Central. The sampling station (ID 48467) is located approximately 20 miles south of the Rip Rap Landing Conservation Area. Limited historical data from this station was available from 1972 through 1977 (USEPA Storet, 2010). Selected data from the station is presented in the attached table below.

Unfortunately, no other sampling stations (i.e., USGS or IL EPA) were identified for the Sny Creek within the vicinity of the project area.

Upper Mississippi River Restoration

Rip Rap Landing HREP

Parameters	Temp.	pH	Spec. Cond.	Ammonia	Total Phos.	NO ₂ -NO ₃	Diss. Oxygen	Total Filt. Resid. (TSS)
Units	F	SU	umhos/cm	mg/l	mg/l	mg/l	mg/l	mg/l
1/17/1972		7.7	400	0.5	0.8	1.4	12.8	
2/2/1972		7.8	417	1.5	0.55	1.3		
3/27/1972		7.8	350	0.1	0.1	1.6	10.1	
4/24/1972		8	350	0.2	0.6	2.1	7	
5/22/1974		7.8	367	0.1	0.1	2.2	4.4	
6/26/1972		8.1	433	0.1	0.15	3.8	6.4	
9/5/1972		7.7	350	0.9	0.5	1.4	6.7	
10/2/1972		8.2	417	0.2	0.34	1.8	2.5	
11/8/1972		8.2	433	0	0.14	2.9	10.4	
12/7/1972		8.1	483	0	0.14	3.2	14	
1/4/1973		7.4	433	0.3	0.25	2.5	12.4	
2/5/1973		7.8	383	0.5	0.44	2.2	9.7	
3/1/1973		8.3	467	0.2	0.25	2.4	13.3	
6/21/1973		7.9	367	0.1	0.35	2.1	5.4	
7/12/1973		8.2	433	0.1	0.25	1	5.9	
8/9/1973		8.5	433	0	0.21	2.2	8.5	
10/1/1973		8	340	0.6	0.33	1	5	
11/5/1973		8.2	433	0.2	0.39	2.1	10.2	
12/3/1973		8.6	433	0.1	0.25	2.4	11.3	
1/16/1974		8.2	533	0.3	0.19	2.7	12.4	
2/13/1974		8.2	417	0.7	0.27	2.7	13.3	
3/7/1974		8.2	433	0.7	0.48	2.7	10.9	
4/17/1974		8.3	550	0.3	0.3	3	9.3	
5/15/1974		8.4	583	0.6	0.17	1.8	8.3	
7/17/1974		8.4	550	0.1	0.28	3.7	6.4	
8/19/1974		8.5	517	0.1	0.1	1.4	7.2	
9/18/1974		8.4	567	0	0.25	0.7	9.7	
10/23/1974	55	8.4	517	0	0.14	0.4	8.3	310
11/20/1974	47	8.3	600	0.2	0.61	1	10.7	360
12/30/1974	37	8.7	433	0	0.17	1.3	17	260
1/29/1975		8.5	433	0	0.34	1.6	15.4	
3/4/1975		8.2	467	0.42	0.54	1.8		
4/14/1975		8.2	417	0.45	0.36	2.4	10.6	
6/4/1975		8.1	433	0.14	0.28	2.1	5.7	
7/30/1975		8.3	467	0.24	0.21		7.3	
9/15/1975		8.3	400	0.08	0.2	0.8	9.1	
10/8/1975		8.7	350	0.11	0.14	0.1	9.3	
11/3/1975		8.4	367	0.18	0.13	0.2	9.1	
12/3/1975		8.3	367	0.08	0.25	2	13	
3/3/1976		8	400	0.26	0.34	1.5		
4/19/1976		8.1	283	0.07	0.23	0.08	8.1	
6/14/1976		8.4	433	0.01	0.19	2.9	9.4	
7/7/1976		8.1	420	0.06	0.19	2.1		
8/11/1976		8.3		0.07	0.19	0.6		
9/13/1976		8.2	417	0.01	0.32	0.4	8.3	
11/17/1976		8.3	433	0.11		2		
12/15/1976		8.6	467	0.09	0.14			
3/30/1977			383	0.07				
4/27/1977			433	0.01				
5/19/1977			367	0.33				
6/15/1977			433	0.39				
Mean	46.3	8.2	432	0.23	0.29	1.81	9.37	310
Min	37	7.4	283	0.00	0.10	0.08	2.50	260
Max	55	8.7	600	1.50	0.80	3.80	17.00	360

Source: USEPA Legacy Storet, 2010

Sampling Station: IL EPA 48467 - Mississippi River Winfield Ferry DS L&D 25

4. RESULTS AND DISCUSSION

Historical data suggests that physical water quality parameters (i.e., pH and dissolved oxygen) within the river have been generally good. Dissolved oxygen values varied from 17.0 to 2.5 mg/l (9.37 mg/l mean) from 1972 through 1977. The historical mean is above the State of Illinois water quality standard of 5.0 mg/l. Historical pH values averaged 8.2 with minimum and maximum values of 7.4 and 8.7, respectively. Specific conductance at the sampling station varied historically from 283 to 600 umohs/cm.

Historical chemical parameters included ammonia, total phosphorus, nitrate-nitrite, and total filterable residue (now called total suspended solids). Historical total filterable solids or total suspended solids (TSS) values are an indication of typical river turbidity. While no federal or state phosphorus water quality standards have been set, a desired goal of 0.1 mg/l of total phosphorus in stream and rivers is noted in the national water quality criteria document (USEPA 440/5-86-001, 1986) to prevent algal nuisances. Historical total phosphorus values exceeded this level averaging 0.29 mg/l.

Current nitrogen concentrations throughout the river have likely increased compared to concentrations observed during 1970s. Increased nonpoint source runoff in the 1990s likely favored mobilization of nitrite nitrate-nitrogen from heavily tiled agricultural watersheds, resulting in excess nitrogen delivered to the river during this period.

Overall, the Rip Rap Landing HREP will help to improve water quality and aquatic habitat through a more controlled management effort. Desirable wetland communities can be manipulated more easily and will provide better functional habitat.

A. Mississippi River. The Federal Water Pollution Control Act, Section 303(d), requires all states to identify waters for which existing required pollution controls are not stringent enough to implement state water quality standards. Total maximum daily loads (TMDLs) must then be developed for these waters so they will meet water quality standards in the future. The Mississippi River in Illinois has been placed in the Medium Priority Category of impaired waters. Medium priority waters are watersheds containing one or more waters that are not supporting aquatic life use, fish consumption use, or primary contact (swimming) use.

Most of the entire length of the Mississippi River in Illinois is considered impaired (due to habitat loss) for one or more of the these parameters: Manganese, Mercury, Polychlorinated biphenyls, Fecal Coliform, Total Dissolved Solids, Iron, Total Suspended Solids (TSS), and pH.

B. Sny Creek. Sny Creek is not listed on the States 303(d) list.

5. CONCLUSIONS

Currently, water on the site is augmented by pumping river water into the wetlands. Upgrades to the pumping capabilities will allow managers more flexibility to establish the desired water levels. Site-specific water quality and its impact on wetland augmentation should be monitored pre-and-post project implementation. Water samples should be collected from the project area and analyzed for temperature, pH, specific conductance, total ammonia-nitrogen, nitrite-nitrate, total phosphorus, total suspended solids, dissolved oxygen, manganese, mercury, polychlorinated biphenyls, fecal coliform, total dissolved solids, and iron.

Water quality in the Mississippi River and in groundwater within the floodplain is generally of good enough quality for wetland supply enhancement. The recommended plan does include using surface water from Mississippi River for supply to the wetlands. Both groundwater and Mississippi River surface water would be used under the plan. No significant water quality concerns have been identified for using groundwater or Mississippi River water for wetland enhancement supply.