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MISSISSIPPI RIVER RESEARCH CONSORTIUM

JUNE 8-10, 1977
WINONA STATE UNIVERSITY
WINONA, MINNESOTA

GENERAL SCHEDULE

Wednesday, June 8, 1977

6:00 PM - Registration - Newman Center
6:30 PM - Smoker - Newman Center

Thursday, June 9, 1977

8:30 AM - Registration - Recital Hall of Performing Arts Center - Closes at 1 PM
9:00 AM - Field Trip to Fountain City Bay. Cars leave at 9 AM. Wear wading shoes. Meet in parking lot near tennis courts. Return at noon.
1:00 PM - First meeting session, Recital Hall of Performing Arts Center. Welcome by Dr. Dan Willson, Dean of Arts and Sciences.
1:15 PM - Naiad Mollusks (Mussels/Clams) of the Minnesota River at Savage, Minnesota, March 1977. Havlik
1:35 PM - Reclamation of an Urban Floodplain Lake at Winona, Minnesota. Fremling
1:55 PM - The Vascular Flora of a Typical Portion of the Present Upper Mississippi River. Swanson and Sohmer
2:15 PM - COFFEE BREAK
2:40 PM - Recent Sedimentation Rates in Pool 9 of the Upper Mississippi River. Ritchie and McHenry
3:00 PM - Impact of Channel Dredging on Backwater Sedimentation in the Weaver Bottoms, Pool 5, Upper Mississippi River. Nielsen
3:20 PM - Recent Sedimentation Rates in Lake Pepin. McHenry and Ritchie
3:40 PM - Continuous River Thermal Monitoring at the Quad-Cities Nuclear Power Station over a Five-Year Span. Gerhold
6:00 PM - Social Hour at Newman Center
7:00 PM - Banquet in dining rooms E, F, and G, Kryzsko Commons. Dr. Tom Claflin, University of Wisconsin, LaCrosse, Speaker Obtain tickets at Registration Desk

GENERAL SCHEDULE, Continued

Friday, June 10, 1977

8:45 AM - Coffee outside Recital Hall, Performing Arts Center.
9:00 AM - MRRC Business Meeting
9:40 AM - Habitat Assessment Modeling Using Geographic Information Systems. Salmen and Smith
10:00 AM - Effects of Quad-Cities Station Thermal Discharges on Ice Conditions of the Mississippi River. Paily
10:20 AM - Distribution of Cadmium and Lead in a Stream Ecosystem. Enk and Mathis
10:40 AM - Feeding Habits and Length-Weight Relationships in Spiny Softshell Turtles from Selected Areas of Pools 5, 5A, and 6 of the Upper Mississippi River. Cochran
11:00 AM - Fountain City Bay: A River Backwater Rehabilitation Project. McConville
11:20 AM - Benthic Macroinvertebrate Relationships in Navigation Pool 8, Upper Mississippi River 1975. Elstead.
11:40 AM - Nitrogen and Phosphorous Cycling by Nymphaea tuberosa and Ceratophyllum demersum in Lake Onalaska, Pool 7, Upper Mississippi River. Smart
1:00 PM - Symposium entitled "Mississippi River - 1999" held in the Auditorium of the Performing Art Center. James M. Harrison, Moderator. Panel Members: Col. Forrest T. Gay, III, William Marti John Wilder, Louis Breimhurst, Cal Fremling.
3:00 PM - Discussion
4:00 PM - Adjournment

Naiad Mollusks (Mussels/Clams) of the Minnesota River at Savage, Minnesota, March 1977.

Marian E. Havlik
LaCrosse, Wisconsin

ABSTRACT

Maintenance dredging at the head of the 9 ft. navigation channel of the Minnesota River, Savage, Minnesota was temporarily halted in March 1977 until field identifications could be made of numerous naiad mollusk shells on the dredge spoils. Five methods of collection were used: hand picking hard hat diver, crowfoot bar, a 12-in dredge pipe, and a clam shovel loader. 31 species of naiad mollusks were found on the spoils, including one right valve tentatively identified as Lampsilis higginsi (Lea, 1857), Higgins' Eye Pearly Mussel. This is on the Federal endangered species list as of 14 June 1976. The questionable shell resembled L. higginsi in the general shape, size and inflation of the umbone. The pseudocardinal and lateral teeth resembled those of the same species taken in 1976 from the Mississippi River at Prairie du Chien, Wis., but overall the shell from the Minnesota River was somewhat thinner. Extension sampling of the 2 dredge sites at Savage by the Corps did not reveal any mussels that appeared to have been taken alive during the dredging. No mussel of any kind appeared to be living in the channel, so dredging resumed. A once diverse molluscan fauna appears to have been extirpated from this area of the Minnesota River.

Reclamation of an Urban Floodplain Lake at Winona, Minnesota

Calvin R. Fremling
Winona State University
Winona, Minnesota

ABSTRACT

Lake Winona, a 319-acre flood-plain lake which lines within the city of Winona in southeastern Minnesota, is highly eutrophic because it receives nutrient-rich water from 26 miles of city storm sewers. Because a severe winter kill occurred in 1965, stunted buffalo, carp, bullheads and gizzard shad dominated the lake until 1973 when a $60,000 reclamation project was initiated. The project goal was to create a productive fishery for use by children, the elderly and the handicapped. A non-profit corporation consisting of community volunteers raised money, installed equipment and coordinated the cooperative efforts of the Minnesota Department of Natural Resources, the City of Winona and Winona State University. An electric weir and three large Helixor aeration units were installed prior to a complex rotenone operation which yielded 733 pounds of fish per acre. The lake was restocked with bluegills, northern pike, walleyes, smallmouth and largemouth ball, channel catfish and muskellunge. Continuous aeration from early summer until early fall prevents summer stratification. It has also caused the formerly unproductive sapropel bottom to support dense populations of aquatic insects. Winter aeration is presently limited to that necessary to facilitate the spring break up. Fish growth has been very rapid, with newly-hatched northern pike reaching a length of 22 inches in one growing season. Predictably, curly-leafed pond weed has become a problem because of increased water clarity; and a cutting-harvesting problem is under way. A scenic fishing pier has been erected and construction has been initiated on a 4.5 mile bicycle/jogging path to encircle the lake.

The Vascular Flora of a Typical Portion of the Present Upper Mississippi River

Steven D. Swanson and Seymour H. Sohmer
University of Wisconsin
LaCrosse, Wisconsin

ABSTRACT

As a result of comprehensive and thorough field work performed during 1975 and 1976, followed by extensive herbarium activities, an excellent picture of the composition and intrinsic relationships of the vascular flora of Navigation Pool 8 of the Upper Mississippi River has been obtained. This area, which consists of that portion of the Upper Mississippi River and its floodplain impounded behind Lock and Dam No. 8 at Genoa, Wisconsin and which extends 47.5 km or 23.3 river miles north to Lock and Dam No. 7 at Dresbach, Minnesota, has been found to possess 462 taxa representing 88 families. The family Gramineae was by far the largest with 33 genera and 63 species, while Carex (Cyperaceae) was the largest single genus with 26 species. The flora composes communities which have been defined as the following: Alluvial Forest, Willow Forest, Shrub, Sedge Meadow, Phalaris Meadow, Emergent, Floating-Leaved, Submergent, Spit and Shore, Levee, Old Field, and Dredge Spoil. Succession to terrestrial environments under the present conditions is predicted in the pool.

Recent Sedimentation Rates in Pool 9 of the Upper Mississippi River

Jerry C. Ritchie and J. R. McHenry
USDA Sedimentation Laboratory
Oxford, Mississippi 38655

ABSTRACT

In June 1976 a survey was made of sediment accumulation on 11 cross sections in Pool 9 from the Lock and Dam to Lansing, Iowa. Two types of surveys were made. One was a fathometer measurement of the bottom contours of the 11 cross sections These were compared with topographic surveys made in 1937 before the closure of the Lock and Dam. Also on each cross section samples from sediment profiles were collected for analysis for Cesium-137 concentrations. The ^{137}Cs measurements were used to determine the rate of sediment accumulation since the beginning of major nuclear testing in 1954, the maximum nuclear testing in 1964, and the sampling date (1976). These surveys showed areas of both accumulation and degradation in Pool 9 near the Lock and Dam than in the Pool area just south of Lansing. On many ranges over 60 cm of sediment accumulation since 1937 was measured. Data from the fathometer and the ^{137}Cs survey were similar.

Impact of Channel Dredging on Backwater Sedimentation in the Weaver Bottoms, Pool 5, Upper Mississippi River.

Dennis N. Nielsen
Winona State University
Winona, Minnesota

Field and laboratory evidence indicates that the placing of dredge spoil by the U.S. Army Corps of Engineers on the natural levee separating the Weaver Bottoms backwater marsh from the main channel of the Mississippi has had a major effect on sedimentataion in the Weaver Bottoms Aerial photographs, taken at various times since 1935 when construction of Lock and Dam 5 inundated the area, reveal that until about 10 years ago the Weaver Bottoms existed as a 16.1 km^2 floodplain marsh averaging 1 meter deep with about 13.5 km^2 of its area covered by emergent macrophyte vegetation. Sediment-core data indicates that the sediment deposited was primarily organic-rich mud. The ever-increasing amounts of dredge spoil gradually raised the elevation of the levee resulting in breeching of the levee at low points between spoil piles during high flows. The formerly continuous levee is now a discontinuous series of dredge-spoil islands separated by numerous side-channel inlets capable of transporting large volumes of water and sediment into the Weaver Bottoms during all flow conditions. Fine- to medium-grained sand is being deposited in microdeltas at the mouth of each inlet. The increased water and sediment discharge has been largely responsible for the nearly 60 percent loss in emergent macrophytes during the past 10 years by transforming the biologically productive marsh into a sandy-bottomed, highly turbid, riverine lake.

Recent Sedimentation Rates in Lake Pepin

J. Roger McHenry, Jerry C. Ritchie and
Charles M. Cooper
USDA Sedimentation Laboratory
Oxford, Mississippi 38655

ABSTRACT

In January 1977, 11 sediment profiles, in 5 ranges, were sampled in Lake Pepin. The ranges were established at river mile 767, 770, 773, 779, and 782. Sediment cores from the sampled profiles were analyzed for particle-size distribution and ^{137}Cs concentration to a depth of 60 cm in 7.5 cm increments. The ^{137}Cs analyses indicate the sedimentation rates for fines in the upper end of Lake Pepin (mile 782) has exceeded 2.5 cm per year since 1955. This deposition rate decreased downstream and at the lower end of the lake (mile 767) the sedimentation rate for fines was less than 0.5 cm/year.

Continuous River Thermal Monitoring at the Quad-Cities Nuclear Power Station Over a Five-Year Span

Robert M. Gerhold
Northbrook, Illinois 60062

ABSTRACT

The ability to meet all river thermal standards under open-cycle condenser cooling operational modes has been demonstrated over a five year period during normal Mississippi River flows.

Continuous thermal monitoring has been conducted using in-stream temperature sensors on a trasect 600 feet below a multipoint diffuser system and compared with identical sensors positioned upstream from the diffuser as well as at the Station's intake and discharge embayments.

Data collected to date has demonstrated the efficiency of the diffuser system and that the design criteria and physical and theoretical models have been proved accurate by actual in-stream monitoring under various hydrologic conditions. To date there has been no substantiation of any hypothesized environmental damage from heated effluent waters using the diffuser system.

Habitat Assessment Modeling Using Geographic Information Systems

Larry Salmen
L. J. Salmen Associates
Information Systems Advisor for GREAT

and

Dr. Kent Smith
Environmental Systems Research Institute
Chairman, Biology Department
Redlands College
Redlands, California

ABSTRACT

No abstract submitted

Effects of Quad-Cities Station Thermal Discharges on Ice Conditions of the Mississippi River

P. P. Paily, Ph.D.
NALCO Environmental Sciences
Northbrook, Illinois

ABSTRACT

One of the beneficial aspects of power plant thermal effluent discharges into a natural river is that it helps to keep a considerable length of the river ice-free during winter months. By siting power plants along a river at suitable intervals, it will be possible to keep an entire river ice-free throughout the winter season. The maintenance of such open water areas enables increased use of the river for navigational purposes, besides enhancing the fishing and recreational activities within the river.

The present paper is concerned with a numerical, analytical and field investigation of the effects of thermal discharges from Commonwealth Edison Company's Quad=Cities Nuclear Station near Cordova, Illinois on the ice conditions of the Mississippi River The results of the study indicate that under average winter river flow and climatological conditions, full load operation of the Station using diffuser pipes can keep the river ice-free for a length of 45 km (28 mi) downstream from the station location.

Distribution of Cadmium and Lead in a Stream Ecosystem

Michael D. Enk and B. J. Mathis
Bradley University
Peoria, Illinois 61625

Cadmium and lead were detected in three species of fishes, three species of caddisflies, one damselfly species, one mayfly species, sediments and water taken from a small, permanent stream in central Illinois. One snail species found in the stream was examined for lead only.

Cadmium was present in similar concentrations in both fishes and sediments. Aquatic insects, however, exhibited higher concentrations of cadmium than sediments. Lead concentrations in sediments and aquatic insects were similar, but higher than concentrations in fishes. Snails contained the highest level of lead and had noticeably greater amounts of the metal than did aquatic insects. In general, concentrations of both metals increased successively from water to fish to sediments to aquatic invertebrates.

Feeding Habits and Length-Weight Relationships in Spiny Softshell Turtles from Selected Areas of Pools 5, 5A, and 6 of the Upper Mississippi River

Philip A. Cochran
Saint Mary's College
Winona, Minnesota

ABSTRACT

Specimens of the spiny softshell turtle, Trionyx spinifer Le Sueur, were collected with South Dakota fyke nets from the Weaver Bottoms in Pool 5, the Fountain City Bay backwaters in Pool 5A, and Sam Gordy's Slough in Pool 6 of the Upper Mississippi River during the summers of 1975 and 1976. Carapace lengths, body weights, and sex were recorded, and stomach samples were taken for later analysis of food habits. Food organisms most frequently found were nymphs of the mayfly Hexagenia, dragonfly nymphs, and crawfish. The general pattern observed was a high variety of organisms being eaten in large numbers but at low individual frequencies. This indicates that the spiny softshell turtle is an opportunistic feeder which concentrates on whatever food item is readily available at the moment. Most feeding activity apparently occurs at the bottom and much of what is eaten is swallowed whole. Regression lines for the logarithm of the body weight in grams versus the logarithm of the carapace length in millimeters were computed for males, females, and the total sample. From a statistical comparison of the lines obtained for the two sexes, it was concluded that males and females increased in weight at the same rate as the carapace length increased. However, at a given length, a male turtle was heavier than a female, even though female spiny softshell turtles eventually attain a much greater maximum size than do males of the species.

Fountain City Bay: A River Backwater Rehabilitation Project.

David R. McConville
Saint Mary's College
Winona, Minnesota

ABSTRACT

Fountain City Bay is a 5169 acre river backwater ecosystem located on the Wisconsin side of the Mississippi River and is immediately adjacent to the U.S. Army Corps of Engineers Lock and Dam #5. In 1975 Saint Mary's College and Winona State University began a comprehensive three-year study of the area for the U.S. Fish and Wildlife Service under the auspices of GREAT. The objective of the study was to determine the causative factor(s) for the decline of the area as fish and wildlife habitat, to recommend habitat improvement measures, and to monitor their success. To date, the study team has determined the major problems in the area to be the closure of many river side-channels into the area by secondary sand movement in the river, and the creation of a significant water deficit in the backwater. This water deficit then caused massive inflow of water and sand through the remaining side channel (Devil's Cut) into the area In the fall of 1976, a partial closing dam was constructed by the Corps of Engineers for GREAT to control sand and water inflow through Devil's Cut. A 300 cfs water control structure is also scheduled for placement through the Lock and Dam #5 dike during the summer of 1977.

Benthic Macroinvertebrate Relationships in Navigation Pool 8, Upper Mississippi River 1975.

Kathryn Elstead
University of Wisconsin
LaCrosse, Wisconsin

ABSTRACT

No abstract submitted

Nitrogen and Phosphorous Cycling by Nymphaea tuberosa and Ceratophyllum demersum in Lake Onalaska, Pool 7, Upper Mississippi River.

Miles Smart III
University of Wisconsin
LaCrosse, Wisconsin

ABSTRACT

No abstract submitted

SYMPOSIUM

"Mississippi River - 1999"

NOTES

Moderator

James M. Harrison, Executive Director of the Minn.-Wisc. Boundary Area Commission.

Panel Members

Col. Forrest T. Gay, III, District Engineer, St. Paul District, U.S. Corps of Engineers

William Martin, Assistant Regional Director-Environment U.S. Fish and Wildlife Service

John Wilder, Chairman of the Board, Upper Mississippi Waterways Association and Assistant Manager Cargo Carrier Company-Cargill

Louis Breimhurst, Director, Division of Water Quality, Minnesota Pollution Control Agency

Calvin Fremling, Aquatic Biologist, Winona State University

An open discussion period will follow introductory remarks by each member.