AFS Dakota Chapter – River and Streams Report

by LR Schlueter, March 7th of 2006

A summary of river and stream management projects in North Dakota and South Dakota.

Inventorying river and streams has been an on-going project of Charles Berry Jr., South Dakota State University, and his students. On-going projects over the past 15-years at numerous locations - Missouri River tributaries in North Dakota and South Dakota, James River tributaries in South Dakota, and Minnesota River in Minnesota. The data collected included fish species assemblage, in-stream habitat variables, and riparian indices. Numerous predicative models for fish species locations were developed; verification was done by in-stream sampling. Additional work is planned for eastern North Dakota rivers in 2006-07.

Dam modification or removal projects continue on the Red River of the North and many eastern South Dakota rivers. South Dakota Department of Transportation has hired a fisheries biologist to redesign tube and box culvert placement to prevent them from functioning as fish barriers.

The reduced Missouri River levels, low reservoir levels, and releases to meet downstream requests are issues. Maintaining riverine species and aquatic recreation is being pitted against downstream barge and development interests. The US Army Corps of Engineers reissued Master Manual included riverine habitats protection and attempts to mimic historical river flow patterns. Compounding the issue is a continued drought in the Missouri River's upper reaches.

Federal and state agencies continue to work with the Missouri River's pallid sturgeon population and its conservation. Recent conservation efforts included stocking of hatchery reared stock and research into habitat needs.

Federal and state agencies continue to monitor the Asian carp found in the Missouri River below Gavins Point Dam in South Dakota. Both silver and bighead carp are found in large numbers in this river section. No sliver or bighead carp have been sampled upstream of this dam.

Large colonies of diatom on the bottom of Rapid Creek in South Dakota's Black Hill caused changes in the trout management program. Catchable trout were radio tracked after their release; did not move great distances after being stocked; remained in their new location; high flows caused a higher degree of downstream movement.

Paddlefish genetic diversity in Lake Francis Case, South Dakota, was studied. Juvenile paddlefish have been stocked annually with some broodfish being taken from below the next dam downstream on the Missouri River. The project is providing for adaptive

management in hatchery propagation and genetic management of paddlefish resources.

RIVERS AND STREAMS SPORT FISH SURVEYS AND INVESTIGATIONS
Annual Report
July 1, 2004 to June 30,2005

Below is a brief description of the Rivers and Streams Program field work activities and locations completed in FY2005.

Objective: Collect fish from 20 sites on 5 streams. Conduct night surveys in 12 tailwaters on Mississippi River.

Completed:
1. Minnow seining was conducted in May, July and September in the final year of investigation to select stations and establish baseline expectations for forage fish and YOY sport fish, for possible future monitoring on the Mississippi River above RM 300. Samples at 28 sites were collected in July and September, 2001, and May, 2002. A final report (enclosed) recommended use of 27 sites in a spring, summer, fall monitoring program.

2. Night surveys for walleye and sauger in dam tailwaters of the Mississippi were scheduled in October and November to collect baseline data and establish indices prior to possible initiation of a fall tailwater monitoring program. A personnel vacancy precluded the fall survey work below dams 12 through 22, so surveys were completed only below the three lower dams.

Objective: Collect fish population samples from 21 sites on the Illinois River and 146 sites on the Mississippi, Wabash and Ohio Rivers.

Completed:
1. Minnow seining was conducted in July and September on the Mississippi River below RM 300 to assess forage fish and YOY with indices -- May sampling was precluded by high water. Samples were taken at 40 sites.

2. Electrofishing was conducted at 12 stations on the Wabash, 19 on the Ohio, 21 on the Illinois and 39 on the Mississippi rivers, August through November. At the Ohio River stations and 20 stations on the Mississippi, collections were made with DC as a gradual shift to pulsed DC electrofishing is made, from the 3 phase AC employed at the remaining sites. A 2001 report indicated the shift could be made without losing the comparability of the data collected since 1976. A summary report of the 2001 collections was completed.

Objective: Collect fish population samples in Pools 13 and 16, collect fish population samples near training structures in Pool 24 and Pool 25, and collect mussel and fish population samples for proposed EMP project in Batchtown Refuge area on the Mississippi River.

Completed:
1. Electrofishing of Potters Slough EMP habitat project in Mississippi River Pool 13, RM 523.5-525, was completed in August to assess fisheries changes due to project. The project area was very shallow and subjected to documented fish kills prior to the habitat project. Post-project monitoring this year found brown bullheads which are characteristic of clear, well-vegetated lakes and are seldom seen on the Illinois stretch of the Mississippi.

2. Monthly electrofishing was completed, May through October, of river training structures in Pool 24, RM 290, (chevron dikes) and Pool 25, RM 256.6, (multiple round points) Mississippi River which had been placed by the Army Corps of Engineers to provide possible fish habitat benefits as well as river training function. A preliminary evaluation was completed for USACE enclosed).

3. Mussel sampling was conducted in the Batchtown Refuge area proposed for an EMP habitat project, Pool 25, RM 242-246, Mississippi River. The information will be used in planning the final phase of the project and to assess changes occurring with project completion.

Objective: Conduct 4 investigations on streams to determine the need for additional or revised regulations and/or the success of regulations recently implemented. Conduct paddlefish investigations on the Wabash, Ohio, and Mississippi Rivers, blue and flathead catfish assessment on the Mississippi and Rock River, channel catfish assessment on the Illinois River, shovelnose sturgeon investigation on the Wabash River, spring and fall sauger surveys on the Ohio River and spring and fall surveys of black bass on the Ohio River.

Completed:

1. The paddlefish investigations designed to assess the possible need for harvest restrictions continued with netting in the winter months and early spring on the Wabash (RM 25-52), Ohio Smithland Pool (RM 847-918), Mississippi (RM 180-220). An additional 476 fish were collected of which 2 were recaptures and 474 were tagged.

2. The final year of walleye/sauger fall night electrofishing surveys below Dam 17, RM 437, Mississippi River was completed. The 10 year effort to follow impact of regulations changes initiated in 1991 showed no apparent impact on the walleye population, as numbers of larger walleye continued to decline. A report was prepared (enclosed) and data are currently being used in discussions with Iowa DNR to develop coordinated fisheries management recommendations for walleye.

3. Interest by sport fishermen has prompted investigations to assess need for better protection of certain "trophy" fisheries of large catfish. Fish collections for the flathead catfish stock assessment and telemetry investigations in Pool 16 of the Mississippi, RM 457.2-482.9 were completed in 2000. Returns from tagged flatheads continue even in 2002. Results from the three years of investigation will be in a final report that could not be completed this year due to a personnel vacancy.

Blue and flathead catfish collections for population structure and tagging were conducted in Pool 26 of the Mississippi using trammel nets in February and hoop nets during May. Length frequency data were gathered on 83 flatheads and 117 blues tagged. One of the blue catfish tagged in February was taken by a sport fisherman in June over 200 miles from the tagging site.

4. Spring and fall sauger electrofishing surveys were completed on the Ohio River, below J.T. Meyers Dam, RM 846-847, as part of a larger multi-state effort designed to assess management needs to improve the population. In November and December collections, 836 sauger were tagged with reward floy tags which will hopefully show up in a creel survey being conducted in the tailwater of the dam.

5. Night electrofishing surveys for black bass in the Smithland Pool of the Ohio River were conducted in October and November as part of a multi-state management investigation. Population structure data were gathered from 382 largemouth and 212 spotted bass.

Regional Streams Annual Narrative Report

Region: **I**

ACTIVITY

Baseline Data

- Basin Surveys: Four basin surveys were completed in FY'05. These included the Upper Illinois River Basin (11 stations), the Mississippi River North Central Basin (16 stations) the Green River Basin (12 stations), and the Mississippi North Basin (20 stations) for a total of 65 stations. The Upper Illinois, Mississippi North Central, and Green River Basins were sampled in July-Aug.2004 and the Mississippi North Basin was sampled in June 2005. The fish identification work for all but the Mississippi North Basin was completed in December 2004, and the data was entered into the statewide streams database. Staff assisting on the surveys included 1 streams biologist, 1 fisheries administrator, 3 district fisheries biologists, 1 fisheries technician, and 2 IEPA interns. In spring, 2005, reconnaissance work was completed for the Mississippi North Basin, the Spoon River Basin, and the Mackinaw River Basins, part of which will be sampled in FY'06.

- Basin Survey Reports: Three basin survey reports were completed in the spring of 2005. These included the Upper Illinois River Basin, the Mississippi River North Central Basin, and the Green River Basins. The Mississippi North Basin survey report will be completed in FY'06.

- Targeted Surveys: Three sites on Yellow Creek were sampled to assess the current population of fishes and to help direct restoration activities for the Yellow Creek Watershed Group. Staff involved 1 streams biologist, 1 fisheries technician, 1 fisheries administrator, and several volunteers.

Annual Stream Monitoring

-Sport Fish Contaminant Monitoring: Thirteen fish contaminant samples (composite samples) were collected from 5 streams in 5 sampling efforts. These sites included:
Big Bureau Creek (DQ-04): 2 size Carp
Henderson Creek (LD-08): 2 size Carp
Cedar Creek (LDD-14): 2 sizes Carp, 1 size Smallmouth Bass
Winnebago Ditch (PBS-01): 2 size Carp
Coal Creek (PBJA-03): 2 sizes Carp, 2 sizes Channel Catfish

Stream Management Investigations

- Stocking Assessments: Walleye were sampled on the Rock River in the fall of 2004 to evaluate stocking success and natural reproduction and recruitment. One report was completed.

- Harvest Regulation Assessments: Population data were collected for Smallmouth Bass on the Apple River (2 sites) and on the Rock River (8 sites) in the fall of 2004 in an effort to assess spawning and recruitment. This data will be used to monitor the new regulations set for these streams in the spring of 2004. Assisting in the collection were 1 streams biologist, 1 district biologist, 2 fisheries administrators, and 1 fisheries technician. Two reports were completed.

C2000 Watersheds

- Technical Assistance: General assistance and project assessment was provided to the Yellow Creek Watershed Group, the Kishwaukee River Partnership, and the Court Creek Ecosystem Partnership. Three partnership meetings were attended, 2 field reviews were conducted, 3 stream samples were taken, and 9 requests for information were addressed. Professional coordination with agencies and citizens outside of the Streams Program for

various matters relating to streams totaled 31 contacts. Nine contacts were for fisheries/fishing information requests, 5 were for stream bank stabilization guidance on public or private sites, 2 contacts regarded stream stocking inquiries, 6 were requests for stream fish population data, and 9 were miscellaneous technical information requests. Fifteen permits (Sect. 404) relating to stream bank stabilization, wetland filling, bridge construction, drainage district maintenance, and other items impacting stream fisheries were reviewed. Permitting efforts included 9 site inspections, 6 reviews, and 1 meeting.
- Habitat Projects: No new habitat projects were completed in FY'05 although work continued on the feasibility of removing or bypassing the Belvidere Dam on the Kishwaukee River.

Region: II

ACTIVITY

Baseline Data

- Basin Surveys

During FY05, a Basin survey was conducted on the Upper Illinois River Watershed, covering a total of 11 stations. This survey included smaller, direct tributaries to the Illinois River within Region II. Samples were taken on a total of 7 different streams including: Nettle Creek, Waupecon Creek, Aux Sable Creek, Mazon River, West Fork Mazon River, East Fork Mazon River, and Johnny Run. Both Nettle and Waupecon Creeks were not sampled previously and have been added to the Upper Illinois Basin Stations for future surveys. Sampling was conducted during July of 2005. IDNR staff participating in the survey include: two Stream Specialists, one Regional Fisheries Biologist, three District Fisheries Biologists and two Regional Fisheries Technicians. Also assisting with fish collection were IEPA interns. Preserved fish specimens have been processed and the information from survey has been entered into the Fisheries Analysis System (FAS) database for reporting in FY06. Conditions in the watershed appeared to be largely unchanged since the last basin survey in 1999. Most of the stations contained relatively high fish diversity, with stations on the Mazon River, W. Br. Mazon River, Aux Sable Creek, and Nettle Creek scoring IBI's greater than 50. As in previous surveys, the State Endangered greater redhorse *(Moxostoma valensiennesi*) was found on Aux Sable Creek. A new record for the State Threatened River Redhorse *(Moxostoma carinatum)* was established on Mazon River. Smallmouth bass were the most abundant sportfish and were fairly widespread. Rock bass and channel catfish were all also quite common.

- Basin Survey Reports

A Basin Survey Report for the Des Plaines River was completed during FY05. A report was also completed for the targeted survey on Jackson Creek.

- Targeted Surveys

Targeted surveys were conducted on 10 different streams and covered a total of 23 sampling stations. Streams sampled included: Burlington Creek, Harmony Creek, Hamphire Creek, Union Ditch #3 (Kishwaukee River Watershed), Mill Creek, Indian Creek (Fox River Watershed), Forked Creek, South Branch Forked Creek (Kankakee River Watershed), and Lily Cache Creek (DuPage River Watershed).

IDNR participated with Kane County Department of the Environment to identify high quality wetlands and streams for an ADID (Advanced Idenification) Project. Burlington Creek, Harmony Creek, Hamphire Creek, Union Ditch #3, small tributaries to the Kishwaukee River; Mill Creek and Indian Creek in the Fox River Basin are all located in Kane County and no recent data was available for fish communities. The survey were conducted in cooperation with USEPA and USFWS, Federal sponsors of the ADID program. In addition to representives from Kane County, USEPA and USFWS, others participating included: two IDNR Stream Specialists,

three IDNR District Fisheries Biologists, and one Regional Fisheries Technician. Fish samples have been identified and data entered into FAS Database. Species lists and IBI scores were provided to the cooperating agencies. These data were used to help determine the quality of the streams for the ADID Program. Both Burlington Creek and Union Ditch #3, along with a portion of Mill Creek qualified as ADID high quality streams based on IBI from the fish surveys.

A second targeted survey was conducted in the Forked Creek Watershed, which included 6 stations on the mainstem of Forked Creek, 2 Stations on the South Branch of Forked Creek and one station on Jordon Creek. This survey was done in cooperation with the Prairie Streams Watershed Committee, Will County Forest Preserve District, Open Lands Project (NGO), and the U.S. Forest Service. Although some limited data was available, a complete watershed survey has not been conducted on Forked Creek. The local Watershed Committee primary concern is the impact of rapid urban development on stream quality. The stream also runs through Midewin Tall Grass Prairie (USFS) and Will County Forest Preserve Property. Data from the survey will be useful as a baseline for planning and restoration activities by all partners. IDNR personnel participating in the survey included two Stream Specialists, one Regional Fisheries Biologist, three District Fisheries Biologists, and two Regional Fisheries Technicians.

Annual Stream Monitoring

- Sport Fish Contaminant Monitoring: Contaminant samples were taken on the East Branch of the DuPage River at GBL-02 (10 carp), and GBL-07 (10 carp). Flesh samples were also taken on the Mazon River at DV-02 (4 carp), DV-03 (8 channel catfish, 4 rock bass, 3 smallmouth bass, 4 largemouth bass, 10 carp), and DV-04 (5 carp).

Stream Management Investigations

- Stocking Assessments: Sauger stocking assessments were performed on the Des Plaines River. A walleye stocking assessment was completed at one site on the Fox River.

The Des Plaines River is a highly urbanized river system which has seen improved water quality in recent years. Angling pressure is relatively high is some areas, however, sportfish populations are still recovering, or are fragmented from downstream recruitment sources by dams. In 2001, 12,000 2-inch sauger were stocked in the area below Hofmann Dam in Riverside, Illinois. In 2004, another 12,000 sauger were stocked below the Hofmann Dam in Riverside and at a site 8 miles downstream in Hodgkins, IL. In FY05, sampling was performed at the Riverside release site to assess sauger stocking success. A total of 46 sauger were collected in 60 minutes of electrofishing; 32 fish from 2001 stocking, and 14 from 2004. Fish from 2001 ranged in size from 345-421 mm, exhibiting average growth for Illinois sauger. The year-class from 2004 ranged in size from 176-217 mm. Many anglers have reported catching sauger throughout the study area.

Natural reproduction of walleye is very sporadic in most Illinois Rivers including the Fox River. Walleye have been routinely stocked in the lower Fox River since 1999, with nearly 115,000 2-inch fish released to date, primarily in Kendall County. A stocking assessment was performed in the Fall of 2004 at Silver Springs State Fish and Wildlife Area. The catch rate for walleye was 12 per hour. This catch rate meets the IDNR objective of 10-20 per hour for evaluation of stocking success. Fish ranged in size from 180 to 440 mm, representing 3 year-classes, all exhibiting expected growth rates for Illinois.

- Harvest Regulations Assessments: A total of 8 sites were sampled on the Fox River to evaluate current population status and evaluate regulations. The Fox River harvest regulation (two fish < 12 inches, one 12 inches) is different than the Statewide regulation (3 fish per day, no size limit). Examination of length frequencies distribution showed similar population structures at all sampling sites. Spawning success was poor in 2004 with few Y-O-Y present, however, fish in the 8-10 inch range were very abundant and made up the largest percentage of the population. The Fox River regulation was intended to direct harvest toward the most abundant smaller size classes. Harvest does not appear to have affected the abundance of younger fish, and may not be significant compared to natural mortality.

- Stream Habitat Improvement Stream habitat improvement in Region II focused again this year on the reestablishment of water willow (*Justicia americana*) on urban rivers, dam removal and fish passage.

Historically, emergent aquatic plants were much more abundant throughout the Region, but have been greatly diminished due to dredging and changes in water levels and flow. Emergent plants provide cover and food sources (macroinvertebrates) for sport fish and non-game species. Over 5,600 plants were reintroduced into the Fox River at four locations. In addition, 2,500 plugs were planted at 2 sites on Waubonsee Creek, and several hundred cuttings were planted at Hodgkins, IL on the Des Plaines River. The water willow has exhibited excellent survival and growth, providing dense colonies with one to three years of introduction. Planting activities for these projects were completed entirely by volunteers from sportfishing and environmental groups. One of the greatest benefits of these projects has been the opportunity to provide citizens with hands on involvement in an activity with very visual results. These types of activities are also educational and help combat the notion that fish stocking is the only management option. The planting activities have been great promotional events as well, involving corporate and municipal sponsors including, refreshments, T-shirts and press coverage.

For the first time in Illinois, two fish passage projects were completed with funding from the USFWS National Fish Passage Program. Region II staff wrote the proposal, managed the project and oversaw construction of both projects, built on Big Rock Creek (Fox River). One of the projects was a rock ramp extending the entire width of the dam, constructed on the downstream face of the dam at a 20:1 (H:V) slope. The project used 1300 tons of stone and was completed in 2.5 days at a cost of about $35,000. Fish were observed swimming over the ramp and have been sampled throughout the length of the structure, which also serves as good riffle habitat. The second project used a 60 ft. natural bypass channel, also constructed at a 20:1 slope. This project was completed in one day at a cost of around $10,000. Due to extreme low water levels and constraints place on the design by the landowner, water has not flow though the by pass to date. This structure will serve primarily as a high water by-pass during spring months when fish are most actively migrating. Low water levels made evaluation of the project difficult during FY05. However, 150 fish were PIT tagged and evaluation will continue over the next several years.

In addition to the habitat projects described above, Region II staff were also involved in other habitat improvement projects by serving on technical advisory committees and evaluating the effect of the projects on fish communities. Seven sites were sampled on the South Branch Kishwaukee River and Eakin Creek to evaluate the effects of a stream remeandering project.

C2000 Watersheds

- Technical Assistance Stream staff provided technical assistance to six C2000 partnerships during FY05. Types of assistance included field inspection for project development, providing resource information, and participating in review and planning committees. Dam removal and modification is a very active in Region II. A total of 5 projects are ongoing and require stream fisheries expertise. Two Regional Stream Specialists served on the technical advisory committees and/or design teams for all projects. A number of other potential projects are being evaluated for funding. In addition, staff gave technical assistance to the following partnerships: Prairie Parklands EP Technical Advisory Commitee (planning and completing biological surveys and watershed plans); Lower Des Plaines EP (developing and reviewing project proposals); Chicago River EP, (provided recent fishery information, assisted with dam proposals, and reviewed projects); Fox River EP (served on Brewster Creek TAC, FREP Habitat Commitee, reviewed proposals, provided fishery data, served on ADID committee); DuPage River EP (presented fishery results, reviewed projects); and Chicago Wilderness, (served on Aquatic Task Force, provided stream quality data, and input of strategic planning, project review). Four other sub-watershed groups were provide technical input for

planning and project evaluation: Big Rock Creek, Blackberry Creek, Prairie Streams and Aux Sable Creek Partnerships.

- Habitat Projects. Stream staff provided direct guidance and post project fisheries evaluation of 2 C2000 projects. Fox River EP YWCA dam removal and Lower Des Plaines EP Rock Bar Project.

Region: 3 - B

ACTIVITY

Baseline Data

- Basin Surveys

No basin surveys were completed this segment.

- Basin Survey Reports

No basin survey reports were completed in this segment.

- Targeted Surveys

The Embarras River was sampled at two locations (BE-96, BE-15) as part of a biennial sampling program on August 2-3, 2004.

Little Kickapoo Creek was sampled at two locations (EIEI-03, EIEI-03) to monitor impacts of discharge from a new sewage treatment plant on August 9, 2004.

Kickapoo Creek was sampled at three locations (EIE-16a,b,c) to collect baseline data downstream from ongoing development on August 19, 2004.

The Sangamon River was sampled at one location (E-06) to collect baseline data during high water flows on November 30, 2004.

The Sangamon River was sampled at four locations (E-06, E-09, E-10, E-11) to collect baseline data during high water flows on January 25, 2005.

Little Kickapoo Creek and Little Kickapoo Creek (East) were sampled at two locations to collect baseline data on June 20, 2005.

Annual Stream Monitoring

- Sport Fish Contaminant Monitoring

Lake Fork (OW-01) was sampled for contaminants on October 26, 2004. No contaminant samples were collected.

Stream Management Investigations

- Stocking Assessments

The Kaskaskia River was sampled at two locations (O-11, O-46) on October 8, 2004. Sampling was conducted to evaluate the smallmouth bass stocking program.

The Kaskaskia River was sampled at two locations (O-11, O-46) on April 4, 2005. Sampling was conducted to collect smallmouth bass broodstock and evaluate stocking success.

The Kaskaskia River was sampled at one location (O-19) on April 14, 2005. Sampling was conducted to collect smallmouth bass broodstock and evaluate stocking success.

The Sangamon River was sampled at two locations (E-29, E-19) on May 6, 2005. Sampling was conducted to collect smallmouth broodstock and evaluate current population status.

Salt Creek was sampled at two locations (EI-11, EI-13) on May 9, 2005. Sampling was conducted to collect smallmouth broodstock and evaluate current population status.

- Harvest Regulations Assessments

Harvest regulations for the Kaskaskia River in the Lake Shelbyville tailwaters was assessed and altered following a series of discussions and a meeting with the District Fisheries Biologist and Law Enforcement.

C2000 Watersheds

- Technical Assistance

Attended 2 meetings of the Friends of Kickapoo Creek, which functions as a sub-group of the C2000 Upper Salt Creek of the Sangamon Partnership on October 20, 2004 and February 16, 2005. Technical assistance was provided to this group at the meetings and on three separate occasions by correspondence.

Attended one meeting of the Lake Paradise Watershed Technical Advisory Committee on April 7, 2005. Fisheries input was provided to the committee.

Attended the Kaskaskia River Watershed Summit on February 28, 2005. This was a meeting of the Kaskaskia Watershed Association encompassing several C2000 Partnerships.

- Habitat Projects

On June 16, 2005 water willow was planted on Shadow Lake in the Sangamon River Basin. Shadow Lake is a reclaimed quarry with periodic connections to the Sangamon River. The lake is owned by the Champaign County Forest Preserve District and is being managed for species native to the Sangamon River. The water willow was planted for bank stabilization and fish habitat.

Water willow plantings were conducted on Big Ditch, Lone Tree Creek, and Drummer Creek on June 17, 2005. The plantings were initiated to provide fish habitat in these channelized streams. All three streams fall within the jurisdiction of the C2000 Headwaters Partnership.

Region: **3 - B**

ACTIVITY

Baseline Data

- Basin Surveys

The Vermilion River-Illinois River Watershed Basin Survey was conducted in 2004. Twenty-three sites on 17 streams were sampled. The survey was conducted from July 6 to August 11, 2004. Staff included: 2 Stream Biologists, 2 District Biologists, 1 Fisheries Technician, and 2 IEPA Interns.

- Basin Survey Reports

Completed the 2004 Vermilion River-Illinois River Watershed Basin Survey Report on June 9, 2005. Staff included: 1 Streams Biologist.

- Targeted Surveys

Little Beaver Creek of the Iroquois River Basin was sampled on July 21; August 16; September 28; and November 17, 2004 and an Unnamed Tributary to Beaver Creek was sampled on August 16 & September 29, 2004. Streams were surveyed to monitor populations of weed shiner and ironcolor shiners, both T&E species in Illinois. Staff included: 1 Streams biologist and 1 Fisheries Technician.

Vermilion River-Illinois Watershed was sampled on July 22 & 23, 2004. Two sites were sampled, one upstream and one downstream of the larger dam in the city of Pontiac to determine the effects of the dam. Staff included: 1 Streams biologist and 1 Fisheries Technician.

Frog Alley and Henline Creek, tributaries to the Mackinaw River were surveyed on August 18 and August 20, 2004, respectively. Sites were surveyed as part of an on going research project with The Nature Conservancy. Staff included: 1 Streams Biologist, 2-TNC staff, and 4 Illinois State College students.

Salt Fork River was surveyed on September 3, 2004. Two sites were surveyed to determine the presence of river redhorse and bluebreast darters. Staff included: 1 Streams biologist and 1 Fisheries Technician.

Annual Stream Monitoring

- Annual Sites

Not Applicable

Sport Fish Contaminant Monitoring

Vermilion River (DS-19)-Illinois River Watershed was sampled for contaminants on July 22, 2004. Contaminant samples included: 1-large carp composite, 1-channel catfish composite and 1-white crappie composite. Staff included: 1 Streams biologist and 1 Fisheries Technician.

Kankakee River (F-11) was sampled for contaminants on October 20. Contaminant samples included: 1 freshwater drum composite, 1 smallmouth buffalo composite and 1 smallmouth bass composite. Staff included: 1 Streams biologist and 1 Fisheries Technician.

Kankakee River (F-03) was sampled for contaminants on October 22, 2004. Contaminant sampled included: 2 carp composites, 2 channel catfish composites, 1 rock bass composite, and 1 largemouth bass composite.

- Monitoring Reports

None.

- Sport Fish Summaries

Stream Management Investigations

- Stocking Assessments

Kankakee River (F-11) was sampled on October 20, 2004 to evaluate the walleye stocking program. Staff included: 1 Streams biologist and 1 Fisheries Administrator.

Vermilion River (DS-18) Illinois Watershed was sampled on June 16, 2005 to evaluate the smallmouth bass stocking program. Staff included: 1 Streams biologist and 1 Fisheries Technician.

Kankakee River was sampled from March 31 through April 1, 2005 to collect adult walleye for spawning. A total of 98 walleyes were collected, which produced 1,321,000 eggs, 500,000 fry and lead to the stocking of 90,000 two inch fingerlings into the Kankakee River on May 26, 2005.

- Stream Habitat Improvement

None

- Harvest Regulations Assessments

Kankakee River was sampled at 2 sites (F-02 & F-09) on July 1, 2004 and 2 sites (F-13 & F-12) on July 2, 2004 to evaluate changes to the smallmouth bass population due to new fishing regulations. Staff included: 1 Streams biologist and 1 Fisheries Technician.

Kankakee River was sampled at 1 site (F-12) on June 13, 2005; 1 site (F-02) on June 14, 2005; and 1 site (F-04) on June 15, 2005 to evaluate changes to the smallmouth bass population due to new fishing regulations. Staff included: 1 Streams biologist and 1 Fisheries Technician.

C2000 Watersheds

- Technical Assistance

North Fork of the Vermilion River (Wabash Drainage) Watershed Project conducted field inspections for potential land easements on August 27, 2004 and September 9, 2004; and attended a meeting to give technical advise on August 30. 2004.

Vermilion River (Illinois Drainage) Ecosystem Partnership held technical advisor work meetings on December 15, 2004, May 5, 2005 and June 20, 2005.

Review 10 Partnership Proposals for the Vermilion River (Wabash), Vermilion River (Illinoios), Mackinaw River and Headwaters Partnership on April 6, 2005.

- Habitat Projects
None

Region: **IV**

ACTIVITY

Baseline Data

- Basin Surveys The Mississippi Central basin and Mary's River portion of the Mississippi South basin surveys were completed in FY'05, totaling 18 sites on 14 streams. The Mississippi Central basin included 13 sites on 11 streams. The Mary's River drainage included 5 sites on 3 streams. The basin sites were sampled between July 12 and August 4, 2004. The fish sampling crews included four Streams Biologists, five District Biologists, one Fisheries Technician, one Restoration Ecologist, one IDNR Program Manager, one IEPA staff, two IEPA student interns and two volunteers.

- Basin Survey Reports One basin survey report was completed in FY'05: *Mississippi Central Basin Fish Community Survey, 2004.*

- Targeted Surveys Targeted baseline samples included three sites on two streams in the Judy's Branch Watershed. The sites were sampled on May 25, 2005 to provide baseline fish population data for a proposed watershed remediation project. One Streams Biologist and one District Biologist conducted the survey.

Annual Stream Monitoring

- Sport Fish Contaminant Monitoring Contaminant samples were collected at four sites totaling 14 composite samples. Composite samples were taken from the Spring Creek (EL-01, two sizes of carp), Bay Creek (KCA-01, one size of carp), and Kaskaskia River at Carlyle Lake tailwater (O-49, two sizes of carp, two sizes of channel catfish, two sizes of largemouth bass, two sizes of white bass, one size of white crappie, one size of smallmouth buffalo, and one size of flathead catfish).

Stream Management Investigations

- Stocking Assessments No stocking assessments were completed.

- Harvest Regulations Assessments A report entitled Catfish Survey of the Lower Sangamon River, 2003 was completed. A repeat of that hoop-netting and DC electrofishing survey was cancelled due to extremely low water levels in June 2005. Four sites on the Kaskaskia River were sampled for catfish with DC electro-fishing to augment hoopnetting done the previous fiscal year.

- Stream Habitat Improvement No habitat improvement projects were completed.

C2000 Watersheds

- Technical Assistance A variety of technical assistance was provided to watershed partnerships in Region IV. Streams staff reviewed C2000 project grant proposals for American Bottoms (9), Big Rivers (6), LaMoine River(5), Lower Sangamon River (14), Kaskaskia River/Shoal Creek (3), Lower Kaskaskia/Silver Creek (3) and Carlyle Lake (6) ecosystem partnerships. Technical assistance was provided by participation in the LaMoine River Technical Advisory Committee where data for prioritization of subwatersheds was reviewed and evaluated. In addition, seven meetings were attended and five information requests were fulfilled regarding fisheries issues within the Kaskaskia River watershed.

- Habitat Projects No habitat projects were developed for streams.

Region: 5

ACTIVITY

Baseline Data

- Basin Surveys

Mississippi South (7 sites) and Cache River Basin surveys (18 sites) were completed this segment. Along with four sites for the Shawnee Basin Survey.

- Basin Survey Reports

Big Muddy River Basin Survey Report was completed in this segment.

Annual Stream Monitoring

- Sport Fish Contaminant Monitoring

Contaminant samples were collected for the Big Muddy River (4 sites), Mississippi South (2 sites), and the Cache River (4 sites).

Stream Management Investigations

- Stocking Assessments

- Harvest Regulations Assessments

C2000 Watersheds

- Technical Assistance

Attended 5 meetings for the Big Muddy River Partnership. This partnership is not a C2000 Partnership at this time.

Attended 1 C2000 project tour in the Cache River.

Attended 5 meetings for the Ozark Hills C2000 Partnership, also provided Fisheries information for the Ozark Plan and gathered all plan information from other divisions and agencies.

Attended 3 meetings for the Saline River C2000 Partnership.

Attended 2 meetings for the Shawnee C2000 Parntership.

Attended 2 regional C2000 meetings.

- Habitat Projects

Since the installation of C2000 funded Newbury Weir Projects in the Cache, annual monitoring has been completed on two sites.

Three field reviews were completed on Newbury weir sites and potential C2000 sites.

KANSAS CHAPTER REPORT
RIVERS & STREAMS TECHNICAL COMMITTEE
29 March 2006

Kansas State University:

- Conducting an assessment of the flathead catfish population in the Kansas River to determine the potential to establish a trophy fishery for the river.
- Conducting an evaluation of the spatial distribution and growth of Kansas River fishes. Focus on the species listed as in need of conservation in the state.
- Determining the relationships between habitat and fish assemblage structure in smaller streams in Southcentral Kansas and the Nebraska Sandhills. This work is sampling private lands in these areas as well as using existing datasets from the state agencies.
- Developing the Kansas Aquatic Gap program as part of a regional effort to develop an Aquatic Gap program for the lower Missouri River basin. To date, KSU has compiled a large georeferenced database that contains data on the distribution of fish and mussel species across the state of Kansas. These data are linked to a variety of GIS layers that represent aquatic habitats of stream valley segments and catchments. KSU has tested a number of modeling approaches to predict species occurrences based on these habitat features and concluded that using a variety of approaches is necessary to capture the response of different species to these environmental gradients. Once finalized, this database will be available to test ecological questions and to aid in conservation decisions that require an understanding of the distribution of aquatic species across large spatial scales

Pittsburg State University:

- Monitoring pre- and post-construction changes in Neosho madtom populations and gravel bar habitats in a bendway weir field on the Neosho River.

Kansas Department of Wildlife & Parks:

- In the 3rd year of the rare fish and mussel streams/rivers survey using State Wildlife Grant program.
- Starting 3-year biological survey of the Marais des Cygnes River basin this summer
- Initiated a Topeka shiner mark/recapture study in rural Pottawatomie County. The purpose is to document shiner movement and potential barriers (road culverts).
- Initiated biological monitoring of selected stream sites in the Little Arkansas River watershed for the extension office in that area
- Ongoing monitoring of Smoots creek fish kill sites in Kingman county. This was the result of that massive anhydrous spill that occurred in late 2004.
- Completed a mussel survey in 10 streams of SE Kansas as part of a State Wildlife Grant. These include Marais des Cygnes, Marmaton, Neosho, Cottonwood, Verdigris, Fall, Elk, and Walnut rivers, Pottawatomie and Grouse creek. A total of 22,795 live mussels were sampled representing 31 species in 3,840 1-sq.m quadrat samples. Mean density within individual rivers ranged from 0.86-10.84 per sq m. Only five species *Fusconaia*

flava, Leptodea fragilis, Quadrula pustulosa, Quadrula quadrula, and *Tritogonia verrucosa* were found in each river. The findings will be used to establish a data baseline to 1. determine the effects of a 10-year harvest moratorium on the Neosho, Verdigris, Fall and Elk rivers, 2. determine effects of zebra mussels in the Walnut River, 3. determine if other streams can support commercial harvest after the 10-year moratorium ends, 4. provide a basis for mussel management in Kansas. A complete report should be completed soon.

National Park Service:

- Continuing long-term Topeka shiner monitoring project on the Tallgrass Prairie Preserve.

Watershed Institute, Inc:

- Geomorphic analysis at KDWP stream biological survey sites. Thirty sites surveyed in 2005. Same proposed for 2006.

Rivers and Streams Technical Committee

Michigan Chapter Report to the North Central Division – Rivers and Streams Technical Committee

March 2006

Committee Co-Chair: Kregg Smith and Neal Godby

I. Outcomes and Accomplishments

Michigan Chapter Rivers and Streams Technical Committee

Our spring meeting was held on March 6, 2006 in Lansing, MI at the Kellogg Conference Center on the campus of Michigan State University. The first order of business was to update the committee membership list and seek new members from the Michigan Chapter. In August, a message was sent to the Michigan AFS list serve to determine interest in the Rivers and Streams Technical Committee. To date, almost 40 people have expressed an interest in serving on this committee. We had 22 people attend from a diverse professional background. The meeting consisted of business and chapter updates, which outline various projects and tasks to be accomplished in 2006, and two presentations were given. The first presentation consisted of MDNR-Fisheries Division Status and Trends of Physical Habitat and Fish Assemblages in Michigan's Non-wadeable Rivers. The second presentation consisted of experiences with Applied Hydrology and Fluvial Geomorphology in Southeast Michigan. Discussions were also held on several projects that the committee is proposing to work on or become involved with, which include:

1. Training opportunities in Michigan offered through the continuing education committee include an introductory Fluvial Geomorphology and Stream Classification class to be held in Marquette, MI in June 2006. Road/Stream Crossings—Inventory, Assessment and Design Workshop to Improve your ability to design, site and install road and stream crossings will be offered by the Nature Conservancy on April 25–27, 2006 at the George Young Recreational Complex in Iron River, Michigan. The continuing education committee is talking about putting on a similar workshop for MI AFS possibly in 2007.
2. Michigan River Partnership is a broad-based coalition of governmental and nongovernmental partners to assess opportunities for dam removal in Michigan. The Partnerships focus is to improve funding opportunities to facilitate dam removal and provide stakeholders and decision maker's information based on three subcommittee's recommendations. MI-RSTC will participate on one subcommittee to help develop this document.

3. A request for committee members to sign-up for A Who's Who of Stream Management in the AFS – NCD was completed. Michigan's list of biologists will be updated on the NCD website.

4. Sea lamprey control is a major management task in the Great Lakes. Recent control options have identified the need for decreasing chemical applications and using barriers to prevent upstream migration and access to spawning habitat. MI-RSTC will try to get involved to provide comment on long-term function, placement and stream impact.

5. Our next spring meeting will be held in conjunction with the annual Michigan Chapter meeting. Future presentations will include topics on Michigan's wadeable stream Status and Trends program, freshwater mussel assessment, stream response after dam removal, and possibly other topics.

2005 MN Summary of Activities for the Annual NCD Rivers and Streams Technical Committee

Compiled by: Karl Koller, MN NCD Rep. (Karl.Koller@dnr.state.mn.us)

Statewide Department of Natural Resources, Section of Fisheries –
Stream Survey Manual Release
The new manual is scheduled to be released this April for statewide application the summer of 2006. This manual requires a comprehensive look at the five components of a stream system; hydrology, biology, geomorphology, water quality and connectivity. Each of the five components will typically be used when completing one of the survey types. Initial Surveys are reconnaissance type surveys where initial descriptive data is collected, mainly with the intent of determining similar reaches and establishing sampling stations. Full surveys take a comprehensive look at all the components within each reach. There is also the flexibility to conduct Supplemental Surveys when special data needs are identified, such as natural reproduction checks or Level 4 Rosgen assessments. An output format is still being completed for use in the interim until a database is developed. Revisions will no doubt occur after the manual has been used statewide for a full field season.

Other DNR Projects
The DNR received $1 million in bonding money for stream restoration projects. Four to Six projects will be complete over the next 3 - 5 years funded with bonding money.

One of the activities that received the most attention statewide on streams was beaver trapping on trout streams. Many of the streams where trapping occurs have marginal temperatures in parts of the streams and beaver trapping appears to aid trout production.

A guide to trout streams in NE Minnesota, which includes tributaries to the North Shore of Lake Superior, is being prepared for distribution to anglers.

In the NE Region, Fisheries is working with the Division of Waters to update the General Permit for Stream crossings for counties in the Region. A General permit spells out the requirements for minimum qualifications that must be met in the design of a stream crossing. Under a general permit, the county highway engineer is not required to get an individual permit for stream crossings from Water's unless those qualifications aren't met. Fisheries has specific recommendations that they want added to the permit to promote fish passage and geomorphic stability. These requirements are: (1) the culvert width must be equal to or greater than the bankfull width of the stream; (2) the culvert slope must match the stream bed slope; (3) culverts must be buried a minimum of 1 foot, with depth buried equaling 1/6th the bankfull width of the stream, with a maximum depth of 2 feet; (4) Multiple culverts should be offset, with one culvert buried in the thalweg to 1/6th the bankfull width and the other culvert(s) set 1 foot higher; (5) The culvert must be set in alignment with the stream channel. Minnesota also has a general permit for its' DOT. When that permit expires in 2008, an attempt will be made to incorporate these changes there as well.

DNR Fisheries – GIS (Lyn Bergquist)
DNR Fisheries is coordinating the following stream-related GIS data development efforts; all GIS work pertains to the 1:24,000 (24K) DNR Streams layer:

1. Re-digitizing of managed streams has been completed for SE major watersheds 38-50. We are now re-digitizing NE MN streams (currently Major 1).

2. We continue to add kittle numbers (DNR Stream ID #'s) to managed streams across the state. Currently, about 2/3 of the state is done, with anticipated completion by 12/31/06. Having kittle numbers will allow us to relate DNR Stream Survey data to the GIS streams layer for mapping and analysis applications.

3. We are currently exploring conversion of the 24K stream layers (ARCINFO coverages) to an ArcGIS 9.2 Geodatabase. This will offer several advantages, including an improved editing and maintenance environment, and integration with other hydro-related GIS layers (24K lakes, lakesheds, watersheds, etc.) In addition, we are exploring implementation of the ArcHydro model, which has many useful tools for stream and hydro-related data sets.

4. We are designing a Trout Regulations booklet for NE MN, similar to the SE MN booklet. Work on this will be done this spring.

Stream Research in Minnesota – 2006 (By Donna Dustin)
Several individuals in the Fisheries Research group are currently working on stream projects. Donna Dustin (Detroit Lakes) is evaluating the use of a natural channel restoration in a brook trout stream and assessing habitat use by trout using RFID tags. Tracy Close (Duluth) is investigating woody debris as a limiting factor for steelhead parr in north shore streams. Doug Dieterman (Lake City) is continuing work in southeast Minnesota on summer habitat of large brown trout.

Others in the DNR are also actively involved in stream research. Eric Merten (Fisheries, Lake City) is working on slimy sculpin restoration and management. Howard Fullhart (Fisheries, Fergus Falls) just completed an evaluation of smallmouth bass restoration in the Otter Tail River. Karl Koller (Fisheries Grand Rapids) is working on a restoration project on the Dark River, a trout stream in St. Louis County, and has also built and evaluated a number of walleye spawning riffles in streams. The Stream Habitat Protection and Restoration Program, headed by Ian Chisholm (Ecological Services, St. Paul) continues to work on restoring degraded stream channel and dam modification and removal projects. Mike Davis (Ecological Services, Lake City) with the Mississippi River Resource Protection and Restoration Program recently completed a report on the impacts from recreational boating on the Mississippi River, and continues to conduct mussel surveys assessing native mussels and zebra mussels.

There are also active stream research programs at Minnesota's Universities. Neal Mundahl and his students at Winona State University have been examining the habitat preferences of slimy and mottled sculpin in southeast Minnesota. Bruce Vondracek, with the Minnesota Cooperative Fish and Wildlife Research Unit and a team of graduate students from the University of Minnesota have been exploring various effects of riparian forest harvest techniques on streams in northern Minnesota. Margot Bergstrom, a student at University of Minnesota Duluth has been working on competitive interactions of round goby, logperch, and slimy sculpin using artificial streams.

Report from Brian Nerbonne, Metro Trout Stream Coordinator;
I personally will be doing 3 remeandering projects on trout streams or tributaries in the coming year ranging from 500 to 4600 (see Middle Creek description below) feet in length, following the

Rosgen approach. On a more interesting note, I have seen a growing interest in remeandering outside of DNR cirlces. Within the Twin Cities Metro Rice Creek Watershed District just completed a 1+ mile project, and 2 different private developers have recently done remeandering projects on streams within their developments. I provided a reference reach to aid in design on one of them, and the engineer who I worked with told me that the original plan was to pipe the stream instead, but when costs were assessed the developer found it to be much cheaper to restore the stream to a stable channel, not to mention providing greenspace that may add to the desirability of the development. Just maybe this thing is catching on!

The DNR has begun to be burdened by the State's own rules regarding stream modifications. Mandatory environmental review of these sorts of projects that was originally created to prevent degradation of stream resources also applies to restoration projects. Staff time for environmental review work is in short supply within the DNR, resulting in delays in implementation of some restoration projects. Some DNR staff are wondering if an exemption for approved restoration projects is needed to better serve the spirit of the law rather than the letter.

Report on activities of the Minnesota Stream Habitat Program (MN DNR- Division of Ecological Services)

The Stream Habitat Program will be offering two courses this year. The first is entitled “Fluvial Geomorphology and Stream Classification” and will be taught the week of July 17-21 in Fergus Falls, MN. The second is “Stream Assessment and Monitoring” and will take place at Whitewater State Park during the week of August 21-25. The first course is a prerequisite of the second. You should have received an announcement via e-mail in March. If you would like another copy of the announcement, please contact Karl Koller via e-mail.

In addition to the restoration work listed under “Stream Restorations”, the Stream Habitat Program will soon be releasing two new publications. The first is a paper entitled “HABITAT SUITABILITY CRITERIA FOR STREAM FISHES AND MUSSELS OF MINNESOTA” and is authored by Luther Aadland and Ann Kuitunen. The second is a paper/book coming out soon called Flows, climate and the Fish Assemblages in Two Minnesota Rivers. Authors are Yosef Chen, Dan O'Shea, Luther Aadland and Ian Chisholm. Luther is working on a book or a guide on restorations as well.

An intensive fish population survey of a river/watershed (to be determined) is planned for this summer.

MN Pollution Control Agency (Jesse Anderson) – Paired Watershed Study

The MPCA began an investigation on the Little Fork River in 2004 to document water quality conditions, focusing on turbidity and in-stream sediments. This involved water quality sampling at several locations, initial geomorphology surveys, regional curve development, and a detailed analysis of the long-term streamflow record at the USGS gauging station in the town of Littlefork. In the course of our investigation, we determined some interesting comparisons between the adjacent Little Fork and Big Fork Rivers which provide a unique opportunity for a paired watershed study. The Little Fork is on the federal impaired waters list for excess turbidity, while the Big Fork is not impaired. Our analysis indicates that Q1.5 increased in both the Little Fork and Big Fork Rivers following historical logging (1890's- 1930's), however the increase in the Little Fork was more dramatic and it took longer for the bankfull flows to decline as the forest recovered. The Little Fork and its tributaries have approximately twice the water yield of the Big Fork based on our regional curve analysis of long term USGS gauging station data. It's our hypothesis that these differences in flows, and the corresponding differences in channel

geomorphology, are due to variations in watershed storage, geology, and vegetation. With input from an interagency workgroup, we hope to use a paired-watershed design to determine the condition of both rivers and then to measure long term changes in their hydrology, water quality and geomorphic health. The results of the study will be used in a weight of evidence approach to determine the impact of historical logging on hydrology, geomorphology, and turbidity / sediment impairment in the Little Fork and Big Fork Rivers.

Stream Restorations:

Rush Creek

The project is replacing a failed low head dam with a natural channel design.

The restoration objective is to remove a failed low-head dam and to restore and stabilize Rush Creek with a natural channel design that will allow for unhindered upstream and downstream passage of fish. Dam removal will also provide an equally important benefit by supporting critical ecosystem functions and process by providing improved connectivity between the upstream and downstream areas and greater stability and improved habitat conditions through the project footprint area. Also, as part of this project, ponds will be created in the project area to provide benefits for wildlife and recreation.

Guiding Principles for Design Concepts
•Stabilize stream channel to mimic natural channel
•Utilized upstream and downstream reaches for design parameters
•Provide floodplain for long-term stability
•Maximize open water area
•Provide a diversity of habitats for a variety of aquatic and terrestrial wildlife

Dark River

The Dark River is the premier trout stream in the Grand Rapids Fisheries Management Area. It supports a self-sustaining population of brook trout and has supported brown trout in the past. Both temperature and habitat are limiting factors on the stream. Connectivity was also limited by beaver dams in the past. Annual beaver trapping and dam removal has been ongoing for several years and may be responsible for the increase in abundance of trout in recent years. In 2004-2005, a geomorphic survey was conducted to identify restoration opportunities. As a result, in 2005 a project was spearheaded by the U.S. Forest Service, Superior National Forest (SNF) to place large wood in a stable section of stream to increase trout cover. The MN DNR and SNF partnered on the project and log complexes were installed at 28 sites. The SNF also replaced an undersized and perched culvert on one of the coldwater tributaries. In 2005, the MN DNR also lowered the elevations of two riffles to reduce their hydraulic control and reduce the damming effect they had on the stream. The two riffles were artificially high because cobble used to build logging splash dams at these sites had been left in place. In 2006, larger scale restoration efforts begin. Channel restoration will focus mainly on narrowing and deepening the channel, protecting outside bends from erosion, installing rock riffles and adding large wood to increase cover for trout. Future work planned for the stream is similar to what is planned for 2006 and will also include redirecting flow into a couple meanders that have been cut-off to restore sinuosity to the stream. Evaluation will include fish, invertebrate and geomorphic monitoring. The overall approach is to use the natural channel design methodology to restore stability to the channel and evaluate the impact on trout habitat and production responses. Results can then be compared to efforts where habitat structures were placed to with the main goal of increased adult trout habitat.

Willow River
See attached USFS pdf file**.**

Middle Creek
In the near future the MNDNR will undertake a project in cooperation with the Farmington School District to restore 4600 feet of stream on the grounds of an elementarty school. The stream was previously deepened and straightened to facilitate agricultural drainage prior to the purchase of the surrounding land by the district. As a result the stream is severly incised, and its banks are eroding as the stream attempts to create a new floodplain. This project will restore the stream to an elevation where it can again access its floodplain during high flows, and follow a meandering pattern that will improve stream stability as well as aquatic habitat. The design for the new stream channel is based on a downstream reference reach with a nearly identical slope and valley type. Hopefully the restored stream channel and native buffer can be used by the school as an outdoor classroom to facilitate better understanding of natural systems.

Dam Modifications Planned for 2006 by DNR Stream Habitat Program
Depending on bonding, there will be work done on the Dawson (Creek?), the Jackson Dam on the Des Moines and the Ogeechee Dam on the Rum. Work will be done on the Sandhill River on the most upstream dam and downstream dam. There is a possibility that the dams in between could get done with money left over from previous bonding projects. Additionally, the Lawndale Creek restoration may still occur this year. This involves the re-meandering of a ditched portion of stream that supports a naturally reproducing brook trout population and begins at a large, boiling spring.

Meeting Minutes (Compiled by Dennis Topp and Karl Koller)

MN AFS Streams and Rivers Committee Meeting
March 1, 2006

1. Arrowhead Region Stream Team Update – Members of the Stream Team have been active in some of the projects listed below, hover the Team has not met for awhile. Efforts are to keep this team active.

2. Culvert permitting – Karl talked about efforts to get all the General Permits for stream crossings in Region 2 to be required to be installed according to Sandy Verry's MESBOA protocol. (M = Match culvert width to bankfull stream width; E = extend cult through slope of toe; S= set culvert at same slope as stream slope; B = Bury culvert 1/6th the bankfull width of the stream, up to 2 ft; O = Offset multiple culverts, with culvert on thalweg buried to above recommendations; A = Align culvert with stream.) Karl has prepared an attachment for the GP that spells out these principles, a little on how to apply them and has a few examples of how to identify bankfull elevation in some of the more challenging stream types. Contact Karl if you would like to see a copy.

3. Louise Mauldin briefed the group on the *Midwest Driftless Area Restoration Effort* . The *Midwest Driftless Area Restoration Effort* is a geographically-focused, locally-driven, consensus-based effort to protect, restore, and enhance riparian and aquatic habitat throughout the Driftless Area. The Midwest Driftless Area Restoration Effort includes a broad partnership of federal, state, and local government, landowners, academic institutions, conservation organizations, sportsmen's groups, and other interested parties. This coalition of partners will work together to identify threats to brook trout and other aquatic species and seek potential solutions, prioritize watershed focus areas and projects, implement actions with measurable

successes, build new partnerships and strengthen existing ones, leverage additional funds, and produce outreach and educational programs to raise public awareness and ensure future support.

For more information, contact:
Louise Mauldin
U.S. Fish and Wildlife Service
555 Lester Avenue
Onalaska, WI 54650
(608) 783-8407
louise_maudlin@fws.gov

4. Dennis Topp described efforts to monitor changes to the Snake River in Northwestern Minnesota. The monitoring effort centers around impacts from a multi-million dollar flood mitigation project that includes a large impoundment, and a bypass channel around the City of Warren. The monitoring effort includes physical, biological, and water quality components.

5. Jason Moekel updated the committee on the status of the new Stream Survey Manual. The organization of the manual is based on the premise that river ecosystems can be defined by processes generally categorized into five components: hydrology, geomorphology, biology, water quality, and connectivity. A working draft of the manual is scheduled to be completed in April, 2006. After reviewing input, numerous changes have been incorporated into the original draft manual that was field tested last year.

6. Karl Koller talked about the Dark River restoration effort. There are three sites identified for restoration. Work will involve narrowing and deepening the channel to increase trout habitat and reduce warming, adding wood structures to protect banks and provide cover, adding riffles to provide riffle habitat and create downstream pools and at one site, re-meandering the channel to add sinuosity.

7. Karl Koller talked briefly about the PCA Paired watershed study on the Little and Big Fork Rivers in the Rainy River basin. The Little Fork is listed as an impaired water for turbididty and will eventually require a TMDL. Preliminary analysis points to past, large-scale logging as the likely cause of the degradation. This provides an interesting test case for the TMDL process as the Little Fork is a large river system and sediment loads are not the result of an ongoing impact, but more likely the result of the stream evolving from past impacts.

8. Research Update:
Doug Dieterman – Talked about a potential research project radio tracking large brown trout to determine the extent that trout use a streams, to help determine if management by reach is reasonable, or if we really need to consider whole stream management.

Donna Dustin – Talked about research on the Dark River to evaluate the effectiveness of restoration efforts there. That restoration is focused more on a geomorphic approach to improving a trout stream that is already productive, as opposed to just focusing on increasing adult cover through the use of structures.

9. Action issues that were discussed were: (1) the need to support efforts to require that the stream crossing permit process base its design requirements on matching the dimension, pattern and profile of the existing channel; (2) the need to develop a position on the current policy for removal of wood from streams; (3) options for minimizing OHV stream crossing

damage to streams. It was also suggested that we try to get enough stream talks, especially those on restoration, so that the talks and the Streams and Rivers meeting can take up one session at next year's AFS meeting.

MOAFS Rivers and Streams Technical Committee Winter Meeting Minutes
February 2, 2006

The MOAFS Rivers and Streams Technical Committee Meeting was called to order by President Tom Priesendorf on February 2, 2006 at 5:35 pm.

MISSOURI STREAM TECHNICAL GUIDE

A) STATUS

Tom had located a hard copy of the Missouri Stream Technical Guide. All the chapters were there except for the Stream Legislation Chapter, Chapter 7. Members were unsure as to who was responsible for writing chapter 7, but it was suggested that maybe it had been Kathy McGrath. Tom said he would check with Mark Van Patten to see if maybe Mark would write the section on Stream Legislation. Tom has the complete document and it is all text. There are no graphics with any of the chapters. Tom gave the chapters to Bill Turner to read and make comment.

B) BILL TURNER'S RECOMMENDATIONS

Bill said that each chapter is good as a stand alone chapter for content in and of itself. It doesn't make a good cohesive book because there is no flow from one chapter to the next. Bill suggested that the guide be published on the web and not printed in book form. He also noticed that a couple of the chapters did not have a list of references for the material cited. John Fantz asked if there were an electronic version. Tom replied that yes, every chapter had versions of compatible word documents. John asked if the material was dated since it had been so long since the chapters were written and compiled. Tom said yes the material is dated. How do we update it now? Tom said he would go through the chapters and that he might need help prior to the summer meeting to update certain chapters and portions of the material in the guide. John asked if this guide would suffice as a landowner stream guide. Rich Wehnes said that this information had been written with a different audience in mind. Paul Calvert said that Ohio has a series of 21 on-line stream management guide fact sheets. They are made available from the Ohio Department of Natural Resources. Each fact sheet is written independently and each has its own format. Tom asked if our guide overlapped with the Guide to Ohio Streams. No one was sure about the amount of overlap is there is any. Paul wanted to know if we really needed Chapter 7. He said that it would have to be updated annually. That is something we don't want to have to do.

Duane Chapman recommended that we change the legislative chapter to a history of stream legislation. That would be interesting and useful. It would be really hard to keep up with legislative changes. Mike Roell asked if the chapters on advocacy and legislation could be merged. Sherry suggested changing the legislative chapter to information about how to get involved to be a proponent for streams. Legislation is important. She thought legislation and advocacy should be merged. Mike Roell said we could make the legislative chapter generic and informative. List the agencies for citizens and describe the function of those agencies. Paul Calvert said that some of the agencies change as frequently as every year. Mike Smith suggested a hot link to the web sites, but John

Fantz said that web sites change so frequently that the links have to be regularly checked or there are problems. Tom asked for a motion for action for Chapter 7.

Mike Roell made a motion that the legislative and agency section be merged with the advocacy chapter and be written with more of a general context. Jason Persinger seconded the motion and the motion passed with a majority verbal vote. There were no dissenting votes. Tom said he would check with Mark Van Patten about rewriting and merging the chapters of the stream guide.

MEMBERSHIP
Membership has declined in both the state chapter and the rivers and streams technical committee. Members are urged to take action to increase participation.

NEW BUSINESS
Jason Persinger asked how to initiate a new workshop at the MNRC. He wants to have a stream issues workshop similar to the reservoir workshop that Mike Colvin has facilitated for the past couple of years. Rich recommended that it be scheduled in a time slot so that biologists with both reservoir and stream responsibilities could attend both workshops. He said to have it Friday from 10 am – noon. Jason asked how to get people to step forward to present. Rich said that presentations are informal with good group discussion and participation. Mike Smith said to work with the workshop committee so it can be developed with strong leadership. You can coordinate with Mike Colvin. Mike Smith said to target the middle of August to September timewise for concept development. Rich said to ask a couple of people to talk about completed projects. Mike Roell said you just have to come up with the theme and get the right people there to communicate. The reservoir group originally just got together to talk. They had an open communication type forum. They just want to keep things informal. Rob Pulliam said somebody needs to take the lead. If there is a leader that will guide this thing, it will get done. It would not have to be a lot of work. Mike Smith said that you just have to get the information out ahead of time so people realize the opportunity to attend.

Jason Persinger made a motion to consider planning and scheduling a Rivers and Streams Workshop at the next Missouri Natural Resources Conference. Rob Pulliam seconded the motion. The motion was passed.

Mike Roell, Mike Smith, Paul Calvert, Jason Persinger, and Ange Corson said they would get together to organize and plan for this future workshop.

SUMMER MEETING
The summer meeting was scheduled for Tuesday, July 11th at Bennett Springs.

ADJOURN
Joanne Grady made the motion to adjourn. Jason Persinger seconded the motion and the motion passed. The meeting was adjourned.

North Central Division of the American Fisheries Society
Rivers and Streams Technical Committee meeting
29-30 March 2006
Moline IL

Nebraska report
[by Steven Schainost, Rivers and Streams Program, Nebraska Game and Parks Commission]

Ken Bazata and Steve Walker (Nebraska Department of Environmental Quality):

* Nebraska Stream Classification using Fish, Macroinvertebrates, Habitat, and Chemistry Evaluations from R-EMAP data: 1997-2001. A study and report was completed.

* NDEQ recently completed a comprehensive assessment of surface water quality data for 2006 and public noticed the updated Section 303(d) list of impaired waters for Nebraska. This information can be reviewed on our web site at www.deq.state.ne.us.

* The Missouri River Interstate Water Quality Workshop was postponed due to the recent snow storm and will likely be rescheduled for the May 1-3 timeframe. Agencies and tribes in EPA Regions 7 and 8 will meet to discuss water quality monitoring efforts on the Missouri River.

* The Nebraska Surface Water Monitoring Strategy is being updated. This strategy will identify and prioritize monitoring needs in Nebraska.

Dr. Edward Peters (University of Nebraska at Lincoln) and Steven Schainost (Nebraska Game and Parks Commission):

2003-2005 Statewide Stream Fishery Survey

The present status of Nebraska's stream resources is being studied by a systematic resampling of sites first visited by early fish surveys. The primary factor used to design this survey was that dissertation research conducted by Raymond Johnson between 1939 and 1942. 208 sites from that study were revisited from 2003 to 2005. Sampling was conducted from May through September each year. The sites sampled spanned the major drainage basins in Nebraska, including 58 sites from the Platte River basin, 27 from the Republican, 26 from the Niobrara, 25 from the Loup, 20 from the Elkhorn, 19 from the Nemaha, 18 from the Blue, 5 from the White/Hat, and 10 from the Missouri River tributaries. Fish were collected using a variety of sampling methods. Backpack electroshocker, barge shocker, seines, and drifted trammel nets were used depending on site characteristics. Macroinvertebrates were sampled in different habitats present in the stream using a standard-sized kick net. Information on water quality, riparian communities, and instream habitat was collected following the EPA Regional Environmental Monitoring and Assessment Program (EMAP) protocol. A comparative study with early surveys may be done in the future, but for now, here are the results of our survey. Over 125,000 individual fish were collected and a total of sixty-seven different species have been identified thus far. Some less common, notable species that

were found include the plains topminnow and the state threatened finescale dace found mainly in the Niobrara River basin and the state and federally endangered pallid sturgeon found in the Platte River basin

Dr. Alan S. Kolok (University of Nebraska at Omaha):

Do Steroidal Compounds occur in the Elkhorn River, and, if so, do they adversely affect local fish populations?

There were two primary objectives associated with this research: to determine whether there are endocrine disrupting compounds in the Elkhorn River, and to determine whether these compounds are having adverse affects on local fish populations. To address the first objective, data was collected in 1999 on the estrogenic and androgenic activity of waters throughout the Elkhorn River watershed. Surface water was found to have androgenic and estrogenic activity when used un A-screen and E-screen bioassays. This result was further corroborated in 2005 when polar organic samplers were deployed in the river at four different locations. Clearly, endocrine disrupting compounds are found in the Elkhorn River watershed.

The second objective of this study was to determine whether the endocrine disrupting compounds in the watershed were adversely affecting a local fish, the fathead minnow. Data from 1999 and 2005 found that fish in the watershed were being exposed to endocrine disruptors. These compounds were altering the synthesis of sex steroids by adult female ovaries and were also altering gene expression of genes associated with female characteristics.

While the Elkhorn River does contain endocrine disrupting compounds, and while these compounds affect fish populations, the ultimate source of these compounds remains unclear.

Nebraska Game and Parks Commission:

Larry Hutchinson (Environmental Services):

* Nebraska has two known populations of the Topeka shiner. For one of these, in Taylor Creek, Madison county, the landowner has a surface water irrigation right. He wants to convert to groundwater pumping. We are working with him to site the well so it has minimal impact on streamflow.

Gerald Mestl (Missouri River Program):

*Missouri River monitoring: Gerald Mestl's crews continue a major effort on monitoring the fisheries of the river though various COE grants.

Steven Schainost (Rivers and Streams Program):

***Fish passage projects:**

Milburn Dam, Middle Loup River: The Nebraska Game and Parks Commission partnered with the irrigation district which owns the Milburn Dam on the Middle Loup River in the central Sandhills. This dam, built in the 1950's, blocks the movement of fishes, especially the channel catfish, from 162 miles of river including 93 miles of the Middle Loup River and 69 miles of the Dismal River. The existing outlet structure on the dam was in need of repair. Instead of spending a great deal of money on a one-time project to repair the outlet, the district wished to build a secondary spillway that could be used to dewater the structure annually. Knowing of the NGPC interest in fish passage past this dam, they offered to partner with us in a joint project to build a supplemental spillway that included fish passage. The project began construction in the fall of 2004 and was completed in May of 2005.

Sargent Irrigation Diversion, Middle Loup River: A low-head irrigation weir is partially blocking the passage of channel catfish. Since it is 18 miles downstream of the Milburn Dam it is considered to be a companion project with the above-mentioned project. A preliminary design has been selected and the irrigation district owning the weir has agreed to the project. Will be a simple project of filling the scour holes with rock and creating a rock-ramp. Now searching for funds.

Spalding Dam, Cedar River: A small power dam blocks the passage of fishes, the channel catfish in particular. A civil engineering professor at the University of Nebraska has just completed a study to design a fishway over the dam. Also evaluated numerous options for the construction of fish passage in areas with highly erodible soils.

Brad Newcomb (District VI management):

*You might mention the innovative attempt and unique opportunity to purchase property with a trout supporting stream below an irrigation reservoir in central Nebraska (Oak Creek - Sherman Reservoir). At our annual coordination meeting with Farwell Irrigation District, we discussed methods to improve flows in Oak Creek below Sherman, including augmenting standard flows with water from recently installed wells that were installed for dam integrity. Also, we will work with them to eliminate some peak flows caused by holding the reservoir over conservation pool for several weeks in the spring. Of course, all of this work in contingent on obtaining the sale property, although about 1/4 to 1/2 mile of the stream is already on WMA. so streamflow management, trout management, and access improvements are still possible ?

Jeff Blaser (Private Waters Specialist), Tony Munter (District I management), and Steven Schainost (Rivers and Streams Program):

A restoration project on Ninemile Creek, a western Nebraska trout stream. This has two

objectives. The first is enrolling landowners in a fencing program to move cropping and grazing back away from the stream. The second is complete removal of exotic trees, the Russian olive in particular, from the watershed. This will be followed up with a long-term monitoring effort to evaluate the long-term impacts on the stream, the riparian zone, and the biota in the stream.

Jesse Fischer (Kansas State University):

Environmental influences on stream fish in the Nebraska Sandhills

Environmental influences were evaluated for the most common fish species found in 63 stream sampling sites in the Nebraska Sandhills. A Principal Components Analysis was used on physicochemical measurements including several water chemistry variables, mean depth and width, and instream fish habitat coverage to identify the primary environmental gradients within the region. Aquatic macrophytes and filamentous algae were negatively associated with wider streams possessing greater amounts of woody debris. Fish communities also were structured along these environmental gradients. In particular, the northern redbelly dace, *Phoxinus eos,* and plains topminnow, *Fundulus sciadicus*, were most likely to occur in smaller streams of high macrophyte abundance and lower relative conductivity. Our results illustrate that even in these relatively homogenous streams within one ecoregion, instream habitat and physicochemical characteristics are structuring fish communities.

AFS NCD Rivers and Streams Technical Committee
Wisconsin Chapter Report
March 29, 2006

Prepared by Paul Kanehl, WI DNR, 2801 Progress Road, Madison, WI 53716. Phone: 608-221-6332, Email: paul.kanehl@dnr.state.wi.us

Wisconsin Department of Natural Resources

The following studies are being conducted by John Lyons, WI DNR, 2801 Progress Road, Madison, WI 53716. Phone: 608-221-6328, Email: john.lyons@dnr.state.wi.us

1. STATUS AND TRENDS IN THE FISH COMMUNITY OF THE LOWER WISCONSIN RIVER

STUDY OBJECTIVE:
1) Monitor long-term fish community dynamics each year over the entire Lower Wisconsin River.

2) Evaluate sportfish abundance, reproductive success, size structure, and growth rate each year for the Prairie du Sac Dam tailwater, continuing annual surveys begun in 1987.

PERFORMANCE ON SCHEDULED ACTIVITIES:

1) Assess fish communities over the entire Lower Wisconsin River: In late August/ early September 2004, the fish assemblage of the main-channel-border habitat was monitored by standardized daytime boat electrofishing at 10 one-mile-long stations along the 92.3-mile length of the Lower Wisconsin River. These 10 stations had also been sampled in the same manner each year in August/September since 1999. An attempt was made to capture all fish observed. Captured fish were identified, counted, weighed, and checked for disease and the resulting data were used to calculate an index of biotic integrity (IBI) as a measure of river health. In 2004, a total of 45 species and 1918 fish were collected from all 10 stations combined. Included were 12 gamefish species, two state special-concern species (1 silver chub, 5 western sand darter) and two state-threatened species (77 blue suckers, 4 black buffalo). Six species (common carp, emerald shiner, quillback, blue sucker, shorthead redhorse, and smallmouth bass) occurred at all 10 stations. The most numerous species were Mississippi silvery minnow (479), shorthead redhorse (344), and smallmouth bass (129); the greatest biomass was collected for shorthead redhorse (212 kg), blue sucker (171 kg), and common carp (143 kg). Among the gamefish, the most numerous species with the most biomass were smallmouth bass (129 individuals; 34.4 kg), sauger (45; 17.9 kg), channel catfish (27; 18.4 kg), and walleye (26; 13.3 kg). Index of biotic integrity scores ranged from 90 to 100, and all 10 stations had excellent ratings. Scores and ratings in 2004 were similar to those in previous years.

2) Estimate sportfish population parameters for the Prairie du Sac Dam tailwater: On October 27 and again on October 28, 2004, standardized nighttime boat electrofishing was used to monitor populations of sauger, walleye, largemouth bass, smallmouth bass, muskellunge, and northern pike over a 1.8-mile length of shoreline in the Prairie du Sac Dam tailwater. Although this study began in 2000, this monitoring has been conducted since 1987 as part of other studies. The emphasis of the monitoring is to determine the relative abundance and growth of young-of-the-year (YOY) sauger and walleye in order to assess yearly fluctuations in recruitment. In 2004, a total of 111 sauger (6.7-18.3”), 229 walleye (6.9-27.2”), 1 saugeye (sauger X walleye hybrid)(11.4”), 79 largemouth bass (6.5-15.4“), 45 smallmouth bass (2.3-20.3“), 19 muskellunge (26.5-44.9“), and 2 northern pike (27.5”-29.9”) were collected. The catch rate of 2.4 YOY sauger per mile was below the long-term median (3.8), as was the catch rate of 10.3 walleye per mile (29.5). Mean size of YOY sauger (7.5”) was above the long-term average (7.2”) as was the mean size of YOY walleye (8.5” vs 8.2”).

STUDY PUBLICATIONS:

Lyons, J. 2005. Fish assemblage structure, composition, and biotic integrity of the Wisconsin River. Pages 345-363 *in* R. Calamusso, R. Hughes, and J. Rinne, editors. Historical changes in large river fish assemblages of North America. American Fisheries Society Symposium 45, Bethesda, Maryland.

Lyons, J. 2003. Recruitment patterns of walleye and sauger in the lower Wisconsin River. Pages 79-80 *in* T. P. Barry and J. A. Malison, editors. Proceedings of Percis III, the Third International Percid Fish Symposium, Madison, Wisconsin, July 20-24, 2003. University of Wisconsin Sea Grant Institute, Madison.

2. STATUS AND TRENDS IN SPORTFISH POPULATIONS OF SOUTHWESTERN WISCONSIN WARMWATER STREAMS

STUDY OBJECTIVE:
1) Monitor sportfish abundance, reproductive success, size structure, and growth rate each year in seven streams in southwestern Wisconsin, continuing annual surveys begin in 1989.

PERFORMANCE ON SCHEDULED ACTIVITIES:
1) Assess sportfish populations in seven southwestern Wisconsin streams: As scheduled, sportfish populations were monitored in late August-early September 2004 following standardized wading electrofishing procedures from single 950 to 1900-m-long stations on seven warmwater streams in southwestern Wisconsin. Although this study began in 2000, these seven stations have been sampled in the same manner as part of other studies since 1989-1991, depending on the station. The primary gamefish at each station is smallmouth bass; northern pike, channel catfish, bluegill, rock bass, and walleye are encountered at a few of the stations in generally low numbers. Smallmouth bass catch-per-100-m was relatively low in 2004 at all stations, reflecting a regional pattern of a weak year class.

3. REWRITE THE BOOK *FISHES OF WISCONSIN*

STUDY OBJECTIVE:
1) Completely rewrite and update the book *Fishes of Wisconsin*, including all relevant information compiled on Wisconsin fishes since the 1970s.

2) Make available data from the book in electronic format, either via CD (or another electronic medium) or the web.

PERFORMANCE ON SCHEDULED ACTIVITIES:
Substantial progress has been made. An outline and format for the book has been developed, and a team has been assembled and has begun to write the various chapters. This team includes over 15 people from within the Wisconsin DNR and from various universities and federal agencies. Drafts of 10 chapters are done and have been distributed to the team. Most of the workload in 2004-2005 focused on completing a photographic-based fish identification system for the book and the internet. This was done in cooperation with the University of Wisconsin Center for Limnology and the University of Wisconsin Sea Grant Program. The identification system is available as both a website and a cd for inclusion in the book. The web site is (http://wiscfish.org). A manuscript describing the identification system has been prepared and is in review for publication in a scientific journal. Additionally, an interactive mapping website (http://infotrek.er.usgs.gov/fishmap) has been developed in cooperation with the U.S. Geological Survey Wisconsin GAP Program that portrays the distribution of each species in the state. This website will allow rapid development of distribution maps for the book. Work continues to improve this website.

4. Development and Evaluation of Watershed Models for Predicting Stream Fishery Potential

STUDY OBJECTIVE:
The primary goal of this project is to develop and evaluate watershed models that quantify the inherent fisheries potential of streams and predict how watershed land-use will influence the realization of this potential. Specific model-development objectives are:

1) Modify as necessary the Michigan models for predicting stream groundwater delivery, water temperature regime, and overall stream flow regime based on climate, surficial geology, topography, soils, vegetation, and land uses for various regions of Wisconsin. Test model predictions against observed temperatures and flows in stream reaches throughout the state.

2) Develop and test statistical models that relate observed stream temperatures and flows to observed fish community and fishery attributes in stream reaches throughout the state.

3) Link the models from 1) and 2) and classify and map Wisconsin stream reaches based on their actual and potential fisheries (coldwater, coolwater, warmwater-centrarchid, warmwater-esocid, etc.). Use current land-use data to estimate actual conditions and historical data to estimate potential.

4) For selected watersheds, use the models to explore how projected changes in land-use may affect stream fisheries.

PERFORMANCE ON SCHEDULED ACTIVITIES

Activity # 1: Prepare GIS layers and implement Michigan ground water delivery model: GIS data layers for land use/cover, surficial geology, soil, bedrock type, bedrock depth, digital elevation model, precipitation, degree growing days, conductivity, slope, and ground water delivery potential are complete for the entire state of Wisconsin. Work has begun to develop a layer containing variables that indicate proximity to lakes, dams, and large rivers.

Activity # 2: Develop and validate GIS-based watershed model that predict stream flow, water temperature, and fish community characteristics: A model has been developed to predict site-specific stream flows from the GIS layers, and a similar model for predicting stream water temperatures is in development. A database on fish community, habitat, temperature, predicted flow, and GIS variables from 284 sites on 253 streams has been developed and is being used to develop models that predict fish community characteristics.

Activity # 3: Develop a statewide classification system for Wisconsin streams: We are in the process of developing a GIS layer of stream segment classification based on watershed landscape characteristics, watershed land use, stream size, stream channel morphology, and biological communities.

Activity # 4: Explore how projected changes in land-use may affect stream fisheries: A model has been developed to project the spatial pattern and extent of future urban growth in Wisconsin, and this model will be coupled with models from Activity # 3 to predict impacts of land-use change on stream fisheries.

5. EVALUATION OF THE WISCONSIN PTIORITY WATERSHED PROGRAM FOR IMPROVING STREAM HABITAT AND FISH COMMUNITIES

STUDY OBJECTIVES:

1. Document the quantitative and qualitative short-term responses of stream habitat quality, fish community structure, sport fish populations, and ecosystem integrity to installation of specific individual Best Management Practices (BMPs) at selected sites within study watersheds.

2. Document the quantitative and qualitative long-term responses of stream habitat quality, fish community structure, sport fish populations, and ecosystem integrity to site-specific and watershed-wide implementation of multiple BMPs at selected sites and entire subwatersheds.

3. Develop conceptual and, if possible, quantitative ecological models that relate changes in watershed and riparian land use to physical, chemical, and biological responses in different types of stream ecosystems that occur in Wisconsin.

4. Make recommendations based on Objectives 1-3 as to how Priority Watershed activities could be made more effective at achieving aquatic resource goals. Provide specific guidance as to which BMPs work best for particular types of streams and types of non-point-source pollution problems.

PERFORMANCE ON SCHEDULED ACTIVITIES:

Activity 4 - Stream habitat and fish community data collection.

Objective 1 has been met with the publication of Wang et al. (2002). For objective 2, field work has been completed for the Otter Creek Priority Watershed and a report has been prepared and is in internal review. Field work in the Waumandee Creek Priority Watershed was completed, and data summarization and analysis has begun. Field work in the Lincoln Creek/Milwaukee River Priority Watershed began again in 2004 after a hiatus of five years following implementation of significant urban BMPs in 2001-2003. This sampling will continue through 2006. For objective 3, several papers (see publication list) have been published that have developed models relating land-use to stream condition. Additional models will be developed upon completion of field work and analyses from the Waumandee and Lincoln Creek Priority Watersheds. Objective 4 is covered under the following Activity.

Activity 5 - Data summarization and communication.

All data have been computerized and summarized, and an annual summary has been prepared and widely distributed within and outside the Wisconsin DNR. Several oral technical presentations of study results have also been made, and study principal investigators are active participants in committees and task forces charged with providing guidance to the Priority Watershed program. A list of peer-reviewed publications concerning this study is attached.

STUDY PUBLICATIONS:

Lyons, J. 1996. Patterns in the species composition of fish assemblage among Wisconsin streams. Environmental Biology of Fishes 45:329-341.

Lyons, J., and P. Kanehl. 1993. A comparison of four electroshocking procedures for assessing the abundance of smallmouth bass in Wisconsin streams. General Technical Report NC-159. St. Paul, MN. U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 35 pp.

Lyons, J., S. W. Trimble, and L. K. Paine. 2000. Grass versus trees: managing riparian areas to benefit streams of central North America. Journal of the American Water Resources Association 36:36:919-930.

Lyons, J, L. Wang, and T. D. Simonson. 1996. Development of and validation of an index of biotic integrity for coldwater streams in Wisconsin. North American Journal of Fisheries Management 16:241-256.

Simonson, T. D., and J. Lyons. 1995. Comparison of catch per effort and removal procedures for sampling stream fish assemblages. North American Journal of Fisheries Management 15:419-427.

Simonson, T. D., J. Lyons, and P. D. Kanehl. 1994a. Guidelines for evaluating fish habitat in Wisconsin streams. General Technical Report NC-164. St. Paul, MN. U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 36 pp.

Simonson, T. D., J. Lyons, and P. D. Kanehl. 1994b. Quantifying fish habitat in streams: transect spacing, sample size, and a proposed framework. North American Journal of Fisheries Management 14:607-615.

Simonson, T. D. 1993. Correspondence and relative precision of stream habitat features estimated at two spatial scales. Journal of Freshwater Ecology 8:363-373.

Stepennuck, K. F., R. L. Crunkilton, M., A. Bozek, and L. Wang. In review. Comparison of macroinvertebrate assemblages and stream quality metrics between snags and riffles in southeastern Wisconsin streams. Submitted to Journal of the North American Benthological Scoety.

Stepennuck, K. F., R. L. Crunkilton, and L. Wang. 2002 . Impacts of urban land use on macroinvertebrate communties in southeastern Wisconsin streams. Journal of the American Water Resources Association 38:1041-1051.

Stewart, J. S., D. D. Downes, L. Wang, J. A. Wierl, and R. Bannerman. 2000. Influences of riparian corridors on aquatic biota in agricultural watersheds. Pages 209-215 In Proceedings of the International Conference on Riparian Ecology and Management in Multi-Land Use Watersheds.

Stewart, J. S., L Wang, J. Lyons, J. A. Wierl, and R. Bannerman. 2001. Influences of watershed, riparian-corridors, and reach-scale characteristics on aquatic biota in agricultural watersheds. Journal of the American Water Resources Association 37:1475-1487.

Wang, L. and J. Lyons. 2002. Fish and benthic macroinvertebrate assemblages as indicators of stream degradation in urbanizing watersheds. Pages 227-250 In T. P. Simon (editor), Biological Response Signatures: Multimetric Index Patterns for Assessment of Freshwater Aquatic Assemblages. CRC, Press, Boca Raton, FL.

Wang, L., J. Lyons, and P. Kanehl. 1998. Development and evaluation of a habitat rating system for low gradient Wisconsin streams. North American Journal of Fisheries Management 18: 775-785.

Wang, L., J. Lyons, and P. Kanehl. 2002. Effects of watershed best management practices on habitat and fishes in Wisconsin streams. Journal of the American Water Resources Association 38:663-680.

Wang, L., J. Lyons, and P. Kanehl. 2003. Impacts urban land use on trout streams in Wisconsin and Minnesota. Transactions of American Fisheries Society 132:825-839.

Wang, L., J. Lyons, P. Kanehl, and R. Bannerman. 2001. Impacts of urbanization on stream habitat and fish across multiple spatial scales. Environmental Management 28:255-266.

Wang, L., J. Lyons, P. Kanehl, R. Bannerman, and E. Emmons. 2000. Historical fish assemblage changes and watershed urban development in southeastern Wisconsin streams. Journal of the American Water Resources Association 36:1173-1189.

Wang, L., J. Lyons, P. Kanehl, and R. Gatti. 1997. Influences of watershed land use on habitat and fish in Wisconsin streams. Fisheries 22 (6): 6-12.

Wang, L., J. Lyons, P. Kanehl, D. Marshall, and M. Sorge. 2000. Responses of stream habitat, macroinvertebrate, and fish to watershed BMPs: Lessons from Wisconsin. Proceedings of Water Environment Federation, Watershed 2000, July 8-12, 2000, Vancouver, Canada.

Wang, L., T. D. Simonson, and J. Lyons. 1996. Accuracy and precision of selected stream habitat estimates. North American Journal of Fisheries Management 16: 340-347.

The following projects are being conducted by Brian Weigel, WI DNR, 2801 Progress Road, Madison, WI 53716, Phone: 608-221-6325, Email: brian.weigel@dnr.state.wi.us.

1. Baseline Monitoring Program – Rivers Subteam Leader.

Develop a river monitoring strategy and work plan for regional staff, dole funds, measure performance, and report to the WDNR Water Division (WD) Monitoring Team. The Baseline Monitoring Program is a high priority within WD because it is the primary mechanism in gathering information for US EPA Clean Water Act reporting, discharge permitting, quantifying fisheries statistics, and prioritizing management efforts.

2. Develop biocriteria for rivers and streams.

Design a framework that uses fish and macroinvertebrate assessment methodologies (previously developed by BISS) to compare a waterbody's current condition with its best potential condition. Determine how two major

Water Division functions, Use Designation and Baseline Monitoring, can mesh scientifically to provide a legally-defensible method for EPA Clean Water Act reporting (e.g., 303(d), 305(b) listing).

3. Buffer width and continuity required for preserving stream health in agricultural landscapes.

Our goal is to define minimum buffer standards for nonpoint source pollution abatement. We took a comparative approach in using fish and aquatic insects as indicators of stream health to determine thresholds of buffer width and continuity for stream protection in agricultural landscapes. Study results are to be used for legislation and guidance of best management practice intended to curb nonpoint pollution. MS in press 2006. Second MS anticipated 2007.

4. Evaluation of best management practices used for nonpoint source pollution abatement in agricultural and urban settings.

We are comparing instream habitat and fisheries before and after best management practices have been installed within highly disturbed watersheds. This effort is part of WD's Priority Watershed Program and is intended to provide guidance for effective and efficient ways to reduce nonpoint pollution to streams for restoration efforts.

5. Quantifying biotic relations with nutrient concentrations in rivers of Wisconsin.

Characterize water chemistry relations with fish and macroinvertebrates among 42 sites within 34 rivers statewide that represent a gradient of environmental conditions. Identify threshold values of nitrogen and phosphorus concentrations above which the biotic community is consistently impaired. This effort directly feeds into WM Bureau's need for nutrient standards in water discharge permits and EPA reporting.

6. Development and validation of macroinvertebrate collection and assessment methods for predicting watershed and local stressors on rivers in Wisconsin.

Collected 120 macroinvertebrate samples among 36 rivers during 2003 – 2005. Develop and test a multimetric index of biotic integrity (IBI) that accurately and consistently reflects river health. A macroinvertebrate IBI tool for rivers would be incorporated into the WD Baseline Monitoring Program – Rivers (Tier II) for EPA reporting and for helping to prioritize management or remediation efforts.

7. Trend analysis of sport fish and index of biotic integrity in rivers of Wisconsin: 2002-2007.

Use fisheries data collected via standardized Baseline Monitoring Program – Rivers to calculate summary statistics on common sport fish and IBI scores. Quantify temporal variation due to sampling error, natural environmental fluctuations, and then compare the variation among sites having different levels of human impact. Analyses are directly applicable for WD goals of EPA reporting and managing fisheries. The work provides feedback to the Baseline Monitoring Program – Rivers, characterizing the effectiveness of the current monitoring strategy and highlighting opportunities for program improvements.

8. Relative influence of factors at multiple spatial scales on fishes in Wisconsin's nonwadeable rivers.

We characterized the influence of environmental drivers at basin, reach, and site scales using fish assemblages from 38 sites on 31 large rivers. The analyses in this context were unique and provide a model for others to use in attempts to determine scale influences on almost any biological community. Widespread land cover alterations at the basin scale were most strongly related to fish assemblages. Understanding the influence of environmental variables among multiple spatial scales on fish assemblages can improve our ability to assess the ecological integrity of large river systems and subsequently target the appropriate scale for WD management or restoration efforts. MS in press, American Fisheries Society (March) 2006.

9. Fish assemblages and biotic integrity of a highly modified floodplain river, the Upper Mississippi, and a large, relatively unimpacted tributary, the Lower Wisconsin.

Analyses revealed that fish species and community integrity within Mississippi River main-channels were impaired relative to Mississippi River side-channels and Wisconsin River main- and side-channels. We conclude that differences between the two rivers and between Mississippi River channel types are consistent with direct and indirect effects of navigation. This study demonstrates utility of the standard procedure used in the Baseline Monitoring Program – Rivers for detecting change in ecological health of large rivers. Furthermore, this study suggests how fish IBI can be used for biocriteria, EPA reporting, and prioritizing WD management efforts. MS in press, River Research and Applications.

10. Changes in channel morphology, fishes, and macroinvertebrates subsequent to removal of 3 dams along the Baraboo River.

The Baraboo River is now the longest free-flowing river in the Midwest since dams were removed in 2002. Many fishes previously constrained within the downstream Baraboo River reach or Wisconsin River immediately took advantage of spawning, rearing, and feeding habitats that opened because of dam removal. We intend to monitor changes in river morphology and biology to determine when equilibrium is reached. This study demonstrates how certain waterbodies impaired by dams can be restored, presenting realistic expectations of how the river and its inhabitants change through time. This research is applicable to WD's goal of removing 30-50 dams within the next several years (according to "A Fisheries, Wildlife, and Habitat Management Plan for Wisconsin, 2004-2007). MS in review (Tom Pellett and Matt Catalano – BISS).

11. Influence of riffle and snag habitat specific sampling on stream macroinvertebrate assemblage measures in bioassessment.

We compared how macroinvertebrates collected from two commonly sampled stream habitat types indicated ecological conditions. We found that collections from either habitat type reflected environmental condition, but samples from different habitats should not be compared directly. These results have direct implications for WD Baseline Monitoring Program – Streams, Use Designation, and Use Attainment Analyses for US EPA reporting. MS in press 2006, Environmental Management.

12. Consequences of using different macroinvertebrate and fish assessment methods among US EPA Region V states.

River sites were sampled using both US EPA and WI Baseline Monitoring Program – River protocols. Comparisons between the two methods are intended to provide calibrations for methods among US EPA Region V states, ultimately improving consistency of EPA-required reporting.

The following projects are being conducted by Randal Piette, WI DNR, 625 E County Road Y, Suite 700, Oshkosh, WI 54901, Phone: 920-424-3839, Email: randal.piette@dnr.state.wi.us

1. Project: Status and Distribution of Greater Redhorse in the Waupaca River System.

Historically, the state-threatened greater redhorse (*Moxosyoma valenciennesi*) were reported in the Waupaca River system as far upstream as Cary Pond on the Crystal River in the city of Waupaca. In 1971, a carp (*Cyprinus carpio*) eradication project on the Waupaca River system was believed to have eliminated greater redhorse from the Waupaca River above the Weyauwega Dam. In 2005, Qualitative observations during the spring spawning period and mid summer quantitative fish surveys using electrofishing gear were conducted on the Crystal and Waupaca Rivers to determine the status of greater redhorse. Biologists captured 12 adult greater redhorse and one juvenile and observed 235 additional adult fish on 49.3 km of river during the spring spawning period. Adult greater redhorse were observed in all four reaches between dams on the Crystal River and two reaches on the Waupaca River. Spawning areas were limited to two primary sites and one secondary site on the Crystal River and one primary site on the Waupaca River. Summer electrofishing on 13.9 km of river across 6 sites captured 10 adult greater redhorse and observed six others. CPE of greater redhorse ranged from 0.0 to 2.9 fish/km. No young-of-year or juvenile greater redhorse were captured during summer electrofishing. Additional information needs to be collected on annual recruitment to the population and early life history and habitat use of juvenile greater redhorse.

2. Project: Movement of Flathead Catfish in the Wolf River System Determined by Radio Telemetry.

A total of 19 male flathead catfish were radio tagged at three general locations on the Wolf River during spring 2004 to determine migration movements and habitat use. Tracking was continued during 2005 using aircraft and boats. The majority of fish traveled downstream to overwinter in the upper river lakes. Four fish that remained in the river to overwinter returned to the same pools that they used during 2004. In spring 2005 individual fish traveled as far as 80 miles upstream in late spring. Most of the fish showed high site fidelity returning to the same large woody structure used in 2004. Fish remained in the river until late August and early September before returning to overwinter sites, with most fish returning nearly to the same locations as previous the winter. In November 2005

radio telemetry was used to mark the location of flathead catfish at four overwinter sites on the Wolf River. SCUBA divers conducted visual surveys to determine site use. Three of the sites had aggregations of flathead catfish, with several floy tagged fish observed at each site. Divers were able to hand grab 25 flatheads for PIT tagging. Additional work is planned to document overwinter habitat at river locations and to determine site fidelity. We plan on modifying a PIT tag reader for underwater use by SCUBA divers to scan fish in place without disturbing them. Radio telemetry will continue into summer 2006 for as long as the majority of tags last.

3. Project: Guidelines for Sampling Mussels in Wadable Streams.

Final Report No. 0092-01-09: Guidelines for Sampling Freshwater Mussels in Wadable Streams.

Report available online at http://www.dot.wisconsin.gov/library/research/reports/environment.htm

Protocols within this document were designed to collect mussel community and mussel habitat data over a broad range of stream habitats to be used to assess spatial and temporal changes of mussel communities. The mussel sampling protocols established within this document are designed to answer three primary objectives associated with sampling mussel communities in wadable streams: 1) Are mussels present; 2) Which species are present; and 3) What is the density of mussels and habitat relationship. Initial searches are conducted to establish site locations and to determine if mussels are present. Initial sampling continues until mussels are found, or if no mussels are found, for one hour or until a maximum distance of 200 m is reached on streams < 7 meters mean stream width (MSW) and 300 m for streams > 7 meters MSW. If mussels are present at a site location, then more extensive qualitative sampling or quantitative sampling, or both is conducted. Qualitative (timed) search is conducted to establish species lists of mussels present at a site, but should not be used for mussel demographics. Qualitative searches continue for **two** hours (4 man-hours) or a maximum distance of 200 m for streams < 15 m MSW and for **four** hours (8 man-hours) or a distance of 300 m for streams ≥ 15 m MSW. Quantitative (quadrat) sampling is used to determine mussel demographics and habitat relationships. Quantitative sampling is conducted using a systematic random sampling design within defined grid areas, with sampling effort (area/m^2) increasing with stream size. Each grid area is sub-sampled using smaller 0.25 m^2 quadrats. Small rope grids 2.5 x 2.5 m (6.25 m^2) are used to sample streams < 7 m MSW, 14 grid areas are sampled with 8 sub-sample quadrats within each grid area. Large rope grids 5 x 5 m (25 m^2) are used on streams ≥ 7 m MSW, with 25 - 0.25 m^2 quadrats sub-sampled. The number of grid areas sampled increases with stream size. Streams between 7-14 m MSW will have 10 grid areas sampled, streams between 15-24 m MSW will have 15 grid areas sampled, and streams 25 m MSW and greater will have 20 grid areas sampled. Habitat measurements of variables important to mussels are taken at each grid area location. Mussel data is recorded on standardized data forms to facilitate uniform reporting mussel information.

The following projects are being conducted by Matthew Mitro, WI DNR, 2801 Progress Road, Madison, WI 53716. Phone: 608-221-6366, Email: matthew.mitro@dnr.state.wi.us

1. Long-term viability of source populations of wild brook trout and brown trout for Wisconsin's wild trout stocking program.

We are investigating the long-term viability of trout populations that supply eggs for the DNR's wild trout stocking program—brook trout in Ash Creek and the South Fork of the Hay River, and brown trout in Timber Coulee Creek. We are tagging trout with either PIT tags or visible implant elastomer tags to determine survival rates for trout spawning in the streams versus those brought to a hatchery to spawn, recruitment of new trout to each population, and how these populations are changing over time. The goal of this study is to ensure a sustainable wild trout stocking program.

2. Brook and brown trout population response to instream habitat restoration in Elk Creek and Big Spring Branch.

We are studying the use of stream habitat restoration to restore brook trout populations. Research in Wisconsin has shown that where brook and brown trout populations coexist, brown trout have had a greater positive response than did brook trout to habitat improvement that added overhead cover for trout. We are testing if habitat improvement without overhead cover can improve brook trout populations in Big Spring Creek and Elk Creek, two streams where brook trout coexist with brown trout. Results of this study will help guide future brook trout stream restoration projects.

3. Restoration of a brook trout fishery in Trout Creek.

We are investigating the restoration of a brook trout population in Trout Creek via the mechanical removal of a brown trout population. Specific objectives include evaluating the removal and restoration processes, determining the effects of brook trout restoration upstream of a barrier on brown trout downstream of the barrier, and empirically evaluating the use of multiple single-pass removal samples for estimating total abundance of age-0 and age 1 and older trout in a stream. Results of this study will aid brook trout restoration management in Wisconsin trout streams.

4. Viability of wild brook trout and brown trout source populations for Wisconsin's wild trout stocking program.

Abstract from WI AFS 2006 presentation:
We are investigating the long-term viability of wild brook trout and brown trout populations as source populations for Wisconsin's wild trout stocking program. The program involves taking wild trout from streams, spawning them at a hatchery, and later returning the spawned trout to the same streams; all offspring are stocked as fingerlings in other streams and not in the streams from which they came. Source populations include Timber Coulee Creek for brown trout since 1995, Ash Creek for brook trout since 1999, and South Fork of the Hay River for brook trout since 2004. Each stream supports apparently robust populations of trout thought to be sufficient to support egg collection quotas. However, questions remain concerning the status of trout populations in these streams and the long-term ability of these populations to support egg collection for the wild trout stocking program. Specific objectives of this study include: (1) quantifying apparent survival, recruitment, and population growth rates, (2) quantifying the proportion of trout removed from each population for spawning, (3) determining if spawning wild trout at a hatchery affects apparent survival, and (4) testing predictions of stock-recruitment models. Simultaneously, we are assessing the impact of the current brook trout strategy in terms of genetic impacts that could adversely affect the source population's genetic integrity. Of particular concern for the genetics portion of this study are the following research questions: (1) what impact does the taking of a significant proportion of the breeding population for hatchery production have on the source stream, (2) is Ash Creek genetically representative of native southwestern Wisconsin brook trout populations, and (3) would other broodstock strategies (including different brood sources) be more effective at propagating native Wisconsin brook trout while minimizing adverse affects on source streams. We will discuss the importance to Wisconsin's hatchery program of sustaining these source populations and present preliminary findings from 2004-2005.

The following studies are being conducted by Tim Larson, WI DNR, N3344 Stebbins Road, Poynette, WI 53955. Phone: 608-635-8122, Email: tim.larson@dnr.state.wi.us.

1. Lake Wisconsin/Wisconsin River Sturgeon Update

An ongoing database, since 1983, is annually updated to monitor trends in the lake sturgeon fishery of Lake Wisconsin (9,000 ac) and the Wisconsin River (35 miles) upstream to the Dells dam, along with information on the fishery below the Sauk dam. Regulations have changed over time to reflect increasing evidence that the fishery is being overharvested. Recent changes include an increase in the minimum size limit from 45" to 50" in 1991 and in 2000 the beginning of alternate year size limits of 50" and 70". Additional sampling was done in 2005 in response to extremely high harvest the past two harvest seasons below the Sauk Dam.

Methods

Mandatory annual harvest registration began in 1983. This has allowed information on both numbers and sizes of harvested fish. Since 1997 an effort has been made to obtain sex information on harvested fish. In 2005 a new study began involving Pitt tagging of fish sampled from the Dells dam during the spring spawning period (shocking, netting) and fall sampling of fish below the Sauk dam by gill netting. Length, weight, fin ray removal for aging and exploitation values from the 2005 angling season were obtained. This included notation of Pitt tagged fish from the 2005 harvest season and a population estimate, using the Schumacher-Eschmeyer estimate during the fall sampling (August 9 – November 3) below the Sauk dam. The 2005 sturgeon hook and line season occurred from September 3 – October 15.

Results

Harvest

For Lake Wisconsin, harvest was considerably higher prior to 1991 under the 45" size limit, averaging 56 per year. Since 1991 (50" size limit) it has dropped to 11-13 per year. Part of this decline is due to the higher size limit, but a separate study compared creel census of 1979 and 1997. It found angling pressure to have dropped from 13,000 hours to 4,000 hours. At the Dells dam, harvest has remained fairly constant over the entire time period of 1983-2005, of 9-14 fish per year. Below the Sauk dam, an increasing trend is noted, increasing from about 20 per year from 1983-1995, to 36 per year during 1996-1999 and since the alternating 50"/70" seasons, during 2000-2005, 66 per year during the three 50" seasons. This has become of particular concern. The lower Wisconsin River (93 miles) finds limited harvest of only 1 fish per year.

Length of Harvest

Under the 45" size limit (pre 1991) on Lake Wisconsin approximately 53% of the harvest was within 5" of the 45" minimum. Under the 50" size limit during 1991-95 it remained at 52% for 50-54" fish, but climbed to 72% during 1996-99, then dropped to 48% since 2000. Below the Dells dam since 1991 the % harvest between 50-54" has remained high, averaging 60% between 1991-95, 70% from 1996-99 and 64% since 2000. The Sauk dam values find a high of 64% between 1991-95, dropping to 58% in 1996-99 and 45% since 2000.

Larger size fish in the harvest are noted. For >60" fish, in Lake Wisconsin they comprised about 25% of the harvest from 1983-1995. During 1996-99 it dropped to only 2% , but since 2000 has averaged 16%. A similar higher value, over 20%, existed at the Dells prior to 2003, which dropped to 10% during 2003 and 2005. At the Sauk dam the composition over 60" was higher prior to 1990 (21%), but has remained fairly constant from 1991 to 2005 at about 15%. In general, less than 5% of harvest occurs on fish over 65" at all locations and fish over 70" are present but rare, 1-2 per year at most.

DNR sampling in 2005 below the dams determined size composition of the spawning run fish at the Dells and the fall staging fish below the Sauk dam. A slightly greater % of smaller fish and less larger fish are present at Sauk - 81% <60", 19% >60", whereas at the Dells 74% are <60" and 26% >60".

Sex Ratio

In general the M : F ratio is about 1:1 for the 50-54" size group, 1.2 : 1 on the Lake and Dells dam and 1 : 1.7 below the Sauk dam. For 55 – 59" fish, it increases to about 1 : 3.6 and remains steady at 1 : 3.4 for 60"+ fish. Of the harvest, both the lake and Sauk dam fish show that 63% of the males (M2) and 40% of the females (F4) will spawn the next spring.

Exploitation / Population Estimate

Of the 100 legal size, spring, Pitt tagged fish during spawning at the Dells, only 1 fish was recorded by the registration stations during the fall angling season. Thus, 1% exploitation is occurring on the Lake/Dells fishery.

Concern with increasingly high harvest below the Sauk dam directed effort at a fall population estimate of fish netted from the scour hole below the dam. The Schumacher-Eschmeyer (multiple census estimate) was used with adjustment for 24 harvested tagged fish which occurred during the angling season. Calculation is shown in

Appendix 1, provided by Dr. Mike Hansen of UWSP. This estimated 203 legal size fish after the season with a 95% confidence interval of 172 – 248. Adding the 75 harvested fish to the estimate equals a pre-season population of 278, thus an exploitation of 75/278 or 27%. A mark/harvest value of 17 harvested Pitt tagged fish to the pre-season tagged number of 47 = 36%. These estimates are fairly similar and extremely high for a sturgeon fishery.

Discussion

Lake Wisconsin / Dells Fishery

The number of harvested fish has been stable at both locations since 1991, totaling about 25 fish per year. The 1% exploitation value, if the sample size is adequate, is well below the "rule of thumb" management value of less than 5% annual exploitation. The % composition of harvest within 5" of the 50" size limit is about 50% on the lake and 60% at the Dells, indicating that anglers are harvesting a higher % of smaller size fish than found by DNR spring netting of 50"+ fish, which was 44% between 50-54". The % of 60"+ fish harvested dropped in recent years from over 20% to about 15%, which is less than the 26% noted by DNR spring netting. The sex ratio of 60"+ fish harvested (1:3 M:F) is similar to the 55-59" group of 1:3.2. Assuming females live longer than males, it should increase with size, which may indicate harvest is excessive on the larger females. Given the current data, it is concluded that the Lake/Dells fishery is stable, but greater harvest should not occur until an accurate exploitation rate can be obtained.

Sauk Dam Fishery

Though the length frequency and sex ratio of the harvest shows a similar distribution as the Lake/Dells fishery, the increase in number of fish harvested and the confirmed exploitation rate of about 30% is alarming. Such a harvest rate can not be sustained for slow growing, long lived fish. Assuming a safe annual exploitation value of 5%, harvest of this fishery needs to be reduced by 6 times to 12 per year.

The source of this fishery is not totally known. A previous radio tracking study (1997-98) by the USGS found fall upstream movement of 5 of 16 Pool 10-Mississippi River fish to the Sauk dam and return following the spring spawning period. Of 5 fish tagged in Pool 10 by DNR Prairie du Chien personnel in the fall of 2005, one was recaptured by this study at the Sauk dam. The lake sturgeon fishery in the Mississippi River is closed to harvest. Significant downstream movement over the Sauk dam was also noted by a DNR sturgeon study during 1979-81. Of about 1900 tagged fish (16" and larger), 12 were recaptured by commercial fisherman in Pool 10 Mississippi River by 1981 and 5 additional by 1985. Also, from June 1980 to June 1981, 12 sturgeon (25"-38") were raked off the trash rack at the Prairie du Sac dam, 8 dead and 4 alive. Significant downstream movement from two upper Wisconsin River transfer stockings (1991-92 155 juvenile, floy tagged fish and eight 2004 radio tagged adults) has also been noted. All of the downstream recaptures (13) have moved over 4 – 8 dams. Initially (1-2 yrs) 13 recaps of the 1991-92 tagged fish stayed in the Stevens Point flowage. Finally, three USFWS tagged fish below the Sauk Dam during 1999-01 were recaptured in the fall 2005 netting survey. Possibly some of the sturgeon below Sauk permanently reside there.

Management Recommendations

1) Age the 2005 fin rays during winter 05-06 to determine a total annual mortality rate for both fisheries.

2) Continue harvest monitoring and annual sampling, including Pitt tagging of fish as done in 2005, to add to the information base. Calculate additional fall population estimates on fall Sauk dam fishery and eventually determine a population estimate for the Lake Wisconsin/Dells fishery.

3) Take action to reduce harvest on the Sauk dam fishery before the 2007 season. Another 70+ harvest year is not acceptable. Modeling should be done to quantify resulting population levels of various size fish under higher size limits and a harvest slot size limit.

4) Implant sonar tags on Sauk dam fish and install receiver units along the 93 miles of lower Wisconsin River to obtain better movement information.

5) Compare values cited in this report to other sturgeon fisheries statewide to help determine a possible statewide, sturgeon regulation change. Differing regulations on areas of one water or between waters may divert more harvest to another area.

2. Wisconsin River Sturgeon Regulation Modeling

Summary
With the increasing harvest below the Sauk dam since implementation of the alternating 50"/70' size limits seasons (2000) and the recent documentation of a 30% exploitation rate occurring during the 2005 fall fishery, FAST modeling was used to compare the effects of various regulation changes on harvest. We determined a 60" minimum size limit will provide the most 60" fish, protect females to allow for at least one spawn and maintain the opportunity for all anglers to harvest a fish during the traditional, 6 week fall hook and line season. A higher size limit or closure will not allow larger fish (ie 65"+) to increase significantly due to slow growth and 15% natural mortality. On the upriver Lake Wisconsin/Dells fishery, harvest has been stable since 1991. Present information indicates fishing mortality to be less than 5%. A 60" minimum is felt to be necessary to prevent increased pressure being transferred from anglers below the Sauk dam. A limited number of 50-59" kill tags could be issued (ie.15 annual quota) to allow anglers the opportunity to take fish than would die from natural mortality.

Introduction
High harvest of lake sturgeon on the Wisconsin River below the Sauk Dam has occurred during the three 50" minimum size limit seasons since the alternating 50"/70" season regulation began in 2000. Harvest during the 50" seasons of 2001 = 52, 2003 = 72 and 2005 = 75, compared to 25-35 during annual 50" size limit seasons from 1983-1999. This prompted a population estimate during 2005 using multiple recapture sampling with gill nets in the scour hole below the dam from August 9-November 3. The hook and line angling season occurred during September 3 to Oct 15. The estimate was 278 (172-248 p .05) 50"+ sturgeon present prior to the angling season. A harvest of 75 is then an exploitation rate of 27%. Comparing harvested PIT tagged fish to preseason tagged fish 17/46 = 36% exploitation (File memo Dec 6, 2005). We evaluated minimum size limits of 60"and 65", and a 50-59" harvest slot to determine which might best reduce harvest to an acceptable level.

The Lake Wisconsin/Dells fishery is also evaluated, based on information from the 1979-1981 survey (FM Report 136) and 2005 spring sampling below the Dells Dam. Harvest on this fishery has been stable over time, 11 on the lake and 13 below the Dells dam (File memo Dec 6, 2005).

Methods
We modeled proposed lake sturgeon regulations using the FAST[1] yield-per-recruit model. The model requires information on growth, length-at age, and weight, which were all taken from the 1979-81 Lake Wisconsin/Dells sturgeon survey (FM Report #136). The regulations modeled included a 50" minimum size limit, 60" minimum, 65" minimum, and a harvest slot set at 50" to 59". Output is illustrated as yield per 1000 recruits, at various sizes for the chosen size limit. We chose to use *number in population* for our yield value in the figures. This gives the number of fish in the population at the point in time when the size limit is reached for a given year-class. This is not the number available for harvest nor is it the total number of fish above the size limit. This is somewhat confusing but provides a relative difference between the number of 50-50.9" vs 60-60.9" vs 65-65.9" fish. Output for the 50-59" harvest slot also indicates the resulting number of 60-60.9" fish.

We generated catch curves from 1979-81 Lake Wisconsin/Dells sturgeon survey (FM Report #136) in order to estimate natural mortality rates; a required input for the model. The catch curve estimate of total annual mortality (A) for all ages of Lake Wisconsin fish from the 1979-81 study (FM Report 136) was 15% (Figure 1). A catch curve was generated for fish ages 7 to 12 to estimate total annual mortality of sublegal fish, we estimated A=20% (Figure 2). Since many fish will not be recruited to the fishery by age 12 we chose to model the lower mortality rate of A=15%, as many more year classes contribute to this estimate. Consideration was given to the validity of using A, which might include some fishing mortality, as an estimate of natural mortality (M); however, we

[1] Slipke, J.W. and M.J. Maceina, 2000. Fishery analysis and simulation tools (FAST 1.0). Department of Fisheries and Allied Aquacultures, Auburn University, AL, USA

estimated at least A=20% for sublegal fish and believe that 15% is a reasonable estimate of sturgeon natural mortality. Therefore, we use M=15% or in the model cm=15%.

Fishing mortality (F) or conditional fishing mortality (cf) is also a required model input and thus must be assessed as accurately as possible. For the fishing season in 2005 an estimated 278 legal size sturgeon were available for harvest below the Sauk Dam (File memo Dec 6, 2005). The harvest total was 75 giving an estimated exploitation (μ) of 27% (75/278). A separate exploitation estimate from PIT tag recoveries was 36%. We used an average μ=30% biannually, since most fish are harvested during the 50" size limit year, we divided by 2 to convert this to an estimated annual exploitation of 15%. Running the model for cm=15% and a range of cf values we determined from the output that μ=14% approximates to cf=15% in this fishery. Therefore, when interpreting results for individual output we use cf=15% to determine harvest per recruit values, and we reference up to about μ=15% to determine our values for comparison.

The model is calibrated to give yield-per-1000 age-0 recruits. For an average year this should closely approximate the expected yield to the fishery in terms of number in population and fish available for harvest. We calibrated by running the model for 50" and 55" minimum sizes; cm=15% and cf=15%; and using yield-per-100 recruits as a starting point. This provided us with a harvest yield of about 4 fish per 100 age-0 recruits for fish 50-54", and about 2 per 100 recruits for fish 55" to 59". From the actual harvest we knew that most fish harvested below Sauk Dam were from 50" to 59", 84% in 2005. Using an average of 3 harvested fish per 100 age-0 recruits and an annual average harvest of 33 fish below Sauk, we divided 33 by 3 to determine a multiplier (11). The multiplier (11) X 100 equals 1100 original recruits contributing to the fishery on average, we rounded this off and used 1000 recruits as a basis for our model output. On average about 1000 recruits will contribute to the fishery below Sauk, the model output is linear so any change in harvest due to recruitment, or natural mortality can easily be calculated.

Results

Verification of the calibration can be seen by the annual catch per 1000 age 0 recruits graph. This shows under a 50" size limit and 15% averaged angling mortality over 2 years, as observed, the number of fish caught (harvested) falls at about 40. As 75 were actually harvested over two years, half of that is 38, close to the predicted 40. This graph can be used to predict the annual yield under various minimum sizes. Slot limit predictions cannot be made from this figure.

The output for 50", 60", 65" minimum size limits and a 50-59" harvest slot, with an estimated 15% annual natural mortality is illustrated. Each output begins with 81.6 fish per 1000 recruits estimated to be at 50-50.9".

* The 50" size limit models the number of 60-60.9" fish to be 6 at 4.6% fishing mortality, 1.5 at 14% fishing mortality and .06 at 32.5% fishing mortality. It shows no 65-65.9" fish will exist with the 50" size limit and any level of fishing mortality.

* A 60" minimum size limit allows for 11.2 fish of 60-60.9", as only the 15% annual natural mortality is occurring prior to reaching 60" (Figure 5). Compared to the 50" size limit, this shows about 2X more 60-60.9" fish under 4.6% angling mortality, 7X more under 13.9% angling mortality and 186X more with 32% angling mortality. Essentially no 65-65.9" fish will be present with a 60" minimum size limit due to slow growth and 15% annual natural mortality.

* A 65" minimum size limit also allows for 11.2 fish 60-60.9", but only 0.2 fish 65-65.9" without angling mortality, again due to slow growth and 15% annual natural mortality.

* The 50-59" harvest slot shows that with a 4.6% fishing rate 9 fish 60-60.9" will remain compared to 11.2 using a 60" or 65" minimum size limit. However under higher angling mortality (13.9%) 7.9 fish 60-60.9" fish remain and with the value observed in 2005 below Sauk dam, about 30%, less than 1 60-60.9" fish remain.

Discussion

Sauk Dam

The FAST model illustrates that a 60" minimum size limit compared to a 50" size limit allows for about twice as many 60-60.9" fish under a 4.6% harvest rate. To reduce to the 5% angling rate from the observed 2005 level of about 30% angling mortality would require a significant reduction in fishing pressure or a harvest quota. One option would be to close the season at a harvest of 12/yr (75 fish at 30% annual angling mortality = 1/6 for 5% annual angling mortality or 75/6 = 12 fish), which means a season length of probably only one weekend or one week. Another alternative could be a kill tag system, which would allow only a limited number of anglers the opportunity to harvest about 12 fish each year. The 60" minimum allows all anglers to potentially harvest a fish during the traditional 6 week season. A similar scenario is noted with the 50-59" harvest slot. Though a similar number of 60-60.9" fish (9) result under the 4.6% fishing mortality, few fish result under the more realistic 15%-30% angling rates. Thus, a drastic reduction in fishing pressure is required, similar to the 50"size limit, such as a quota or kill tag system.

No significant gain in larger size fish is realized with a higher size limit of 65". Slow growth and 15% annual natural mortality simply do not allow for a buildup of these large fish. A higher size limit ie. 70" or no-kill are moot as the model shows an insignificant number of large fish with the 65" size limit.

Lake Wisconsin/Dells
From spring 2005 Pitt tagging (100 50"+fish) and harvest of only 1 of the tagged fish during the 2005 harvest season, a fishing mortality rate of only 1% occurred (file memo Dec 6, 2005). It is questioned whether this sample size is adequate? It will take possibly 3 more years of spring tagging to obtain a PE on 50"+ fish for this fishery and a better evaluation of angling mortality. A higher percentage of 60"+ fish was found in the DNR sample at the Dells dam, 26% spring 2005, versus the Sauk dam, 19% fall 2005 (file memo Dec 6, 2005). This could be the result of less angling mortality over the years or it could possibly be due to fish at the Dells being sampled during the spawning period. However, according to the USGS study on the Miss R Pool 10 sturgeon, they stage for spring spawning below the Sauk dam the previous fall. Harvest has been stable on both the Lake (11/yr) and Dells (13/yr) since 1991 (File memo Dec 6, 2005). The FAST model indicates the 60" size limit provides a slightly higher amount of 60-60.9" fish than either the 50" with limited mortality (<4.6%) or the 50-59" harvest slot.

Recommendations
At the Sauk Dam, based on the existing data and the FAST model, a 60" minimum size limit and maintaining the annual fall 6 week hook and line season with one bag per year will allow a higher number of 60"+ fish to exist than other modeled scenarios, given the level of fishing pressure and mortality. This will allow an open entry fishery to be maintained. A greater number of larger fish cannot be accrued under higher size limits or no-kill due to slow growth and existing natural mortality.

On the Lake Wisconsin/Dells fishery, with low fishing mortality, the 50" minimum, 60" minimum or 50-59" slot will all allow for close to the same number of 60"+ fish. However if a more restrictive regulation is installed below Sauk, this will likely divert more pressure and harvest to the lake and the Dells, which is presently felt to be stable. . Currently only 15% of the harvest is of 60"+ fish, which amounts to about 4 fish per year. With this limited number, it would be appropriate to also allow a limited number of kill tags (ie 10-15 quota) to be issued for 50-59" fish, as some of these fish dying from natural mortality could be safely harvested. The kill tags would be adjusted periodically based on data. This will allow a regulation change to 60" to be more accepted by the anglers.

The 60" minimum also offers protection to allow all females to spawn at least once. Females as small as 52" have been harvested in the F4 stage (spawn next spring). By 55" F4 stage fish are common (Poynette file data).

Interfluve Wisconsin Projects

Big Spring Dam Removal – Final design is almost complete for the removal of the Big Spring Dam in Adams County. Pending WDNR approval, the drawdown and partial removal are expected to begin in June of 2006 and will continue into 2007. Restoring the floodplain on this trout stream will involve excavating 90,000 cubic yards of impounded sediment. As part of an experimental pilot project, the River Alliance of Wisconsin and Interfluve hope to be able to sell this sediment as highly organic topsoil. Contact: Marty Melchior, Interfluve, Email: mmelchior@interfluve.com.

U.S. GEOLOGICAL SURVEY – WISCONSIN WATER SCIENCE CENTER

The Western Lake Michigan Drainages study unit of the USGS National Water Quality Assessment (NAWQA) program completed its third and final year of intensive sampling in 2004 and is now in the report writing phase. Sampling for water quality, habitat, and stream biology was done at 4 trend sites sampled during the last cycle of intensive sampling in 1993-95. Additional national NAWQA studies examined (1) ecological effects of urbanization on streams, and (2) bioaccumulation of mercury in stream ecosystems. The urbanization effects study sampled 30 streams in the Milwaukee and Green Bay areas for assessment of changes in water flow and chemistry, habitat, and communities of algae, benthic invertebrates, and fish. The mercury study focused on better understanding the effects of source strength, mercury cycling, and food-web interactions on bioaccumulation of mercury; three Wisconsin streams were included. Data review and interpretation are in progress, and reports are planned for release beginning in late 2006. For more information, contact Barb Scudder (em: bscudder@usgs.gov, ph: 608-821-3832) or visit http://wi.water.usgs.gov/nawqa/index.html

In 2005, the USGS Wisconsin Water Science Center continued a cooperative study with the Milwaukee Metropolitan Sewerage District (MMSD), the Wisconsin DNR, SE WI Regional Planning Commission, and local universities. In 2004, 15 sites on 9 Milwaukee area streams were sampled for water chemistry to provide a baseline to facilitate future impact evaluations. In addition, stream habitat and community composition of algae, benthic invertebrates, and fish were assessed in late summer/early fall 2004. A report is in progress for publication in 2006. For more information contact Dave Graczyk (em: dgraczyk@usgs.gov, ph: 608-821-3840 or Barb Scudder (em: bscudder@usgs.gov, ph: 608-821-3832).

An Aquatic Gap Analysis project for the Great Lakes States began in 2001 as part of the USGS National Gap Analysis Program. Gap analysis is a program for identifying the degree to which native species and natural communities are represented in current conservation lands. Those areas where unique biological communities and conservation lands do not overlap constitute gaps in conservation efforts. A gap analysis is an approach for biodiversity planning using computer-based geographic information systems to map land cover, conservation areas, aquatic habitat, and species distributions. To accomplish this, the GAP program builds institutional cooperation at the state and regional level with projects conducted at the state level. Information from gap analysis may be used to identify and prioritize opportunities to conserve riverine biodiversity; identify information or data gaps; help design and plan sampling strategies for research and monitoring; assist in county, state, and regional planning; and assist with education and outreach. Great Lakes Aquatic Gap projects are currently underway in MI, NY, and WI with plans to begin aquatic gap projects in the other GL States in the future. Electronic fish databases were acquired from stakeholders and compiled, and a GIS-based habitat classification for streams is completed. A centralized Great Lakes GAP database was developed, and fish species and habitat information have been linked to allow predictive modeling and identification of conservation gaps. Stream temperature and flow models have been developed and fish modeling is currently underway. Work is being coordinated with a US EPA Science To Achieve Results (STAR) grant for river classification in MI, WI and IL, along with the MI Institute of Fisheries Research, NY Department of Environmental Conservation, IL Department of Natural Resources (DNR), and WI DNR. The Great Lakes project is being coordinated by the USGS Wisconsin Water Science Center. For more information contact Jana Stewart (em: jsstewar@usgs.gov, ph: 608-821-3855) or visit the web site at http://wi.water.usgs.gov/public/gap/index.htm.

US Army Corps of Engineers

The following studies are being conducted by John Noble, US Army Corps – Fort McCoy, Phone: 608-388-2253, Email: john.dennis.noble@us.army.mil.

1. Coldwater biomonitoring using the Wisconsin Coldwater IBI. On-going monitoring of Fort McCoy coldwater streams to determine fish community and habitat trends. We will complete a follow-up biomonitoring study that evaluated the macroinvertebrate community on 11 Fort McCoy Streams (1994-1995).

2. Surface water quality monitoring will focus on spring rain event. We'll maintain the use of continuous data loggers – using a sonde and thermographs. We are going to start monitoring water levels using water level data loggers to assess annual flow fluctuations to further demonstrate how drought conditions basically water levels in

relation to microhabitat trends are influencing brook trout populations in the Upper La Crosse River watershed. We suspect that fish community trends will replicate literature documenting life requirements for brook and brown trout.

3. We are going to summarize stream IBI results to report findings as we are noticing brook trout persistence and tolerance to warmer and lethal summer temperature regimes.

4. Continued trout redd evaluations in relation to groundwater up/down welling. Identify and document critical stream habitats.

5. Jackson Creek mussel survey (Joliet Training Area, Illinois). Presence/absence surveys.

6. Surface water quality monitoring (Jackson Creek quarterly nutrient monitoring at the Joliet Training Area, Illinois)

7. Stream enhancement projects. Trout stream habitat enhancements using coarse woody debris and brush bundling techniques, as well as rock and riprap work with some lunkers (Potential for 12-16 lunkers in Ash Run). Maintain stream sediment traps and determine cost-effective means to obtain technology or devices to achieve continuous sediment removal.

8. NEPA Review: places emphasis on watershed development projects, review of stormwater management plans and erosion control plans to include stormwater devices like detention basins to manage cantonment area stormwater (managing "urban runoff" from building/parking lot) and watershed sediment loads. Monitor site developments for BMP's. On-going plans to develop stormwater management plans possessing potential benefits for wetland "creation". On-going exploration of wetland mitigation and banks to support stormwater management.

9. Restoration of East Silver Lake, an impoundment on Silver Creek a class I brook trout stream. The dredge (hydraulic) project goals are to remove at least 10,000 cubic yards of sediment.

10. Evaluate lake restoration projects, determine effects on stream characteristics. Develop water level management plans.

11. Upgrade water control structures to improve water level management as well as water quality released from impoundments on coldwater streams (Hazel Dell, Sparta, and Swamp Pond). Remove water control structures, modifying West Silver Wetland and eliminate Alderwood Lake dams to restore stream habitat.

12. Evaluate special fishing regulations at the North Flowage (trophy bass), West Sandy (reduced panfish bag and minimum size limit) and Silver Creek (reduced trout bag, minimum length, and gear restriction).

13. On going participation with the Clear Creek Working Group – multi-agency effort to resolve water releases associated with a cranberry operation.

14. TMDL development, collaboration with EPA and DNR to improve Squaw Creek (affects from an impoundment) and Stillwell Creek (affects from cranberry operation).