NEWSLETTER

OF THE

Minnesota Chapter of the American Fisheries Society

Year 1997 No. 1
Annual Meeting Issue

President's Message

Larry Kallemeyn, FROM THE NATION'S ICEBOX. I just returned from the North Central Division of the AFS annual meeting that was held in Omaha, Nebraska, in conjunction with the Midwest Fish and Wildlife Conference. Lots going on in the area encompassed by the NCD, particularly at the Chapter level. As the old saying goes, when things get tough the tough get going. That certainly seems to be the case with many of the chapters. Several of them have increased their activities significantly in response to government cutbacks in their state or province. Compared to some, we've been pretty fortunate in Minnesota up to this point. That could all change quite quickly, however, and that is why our Chapter will be getting actively involved in supporting the DNR's request for license increases. We'll also be continuing to provide support on national issues such as reauthorization of the Clean Water Act and the Endangered Species Act.

Jerry Grant was selected as our Chapter's student representative to the NCD and Midwest meeting. In addition to participating in the NCD meeting, he presented a paper on his graduate research at the University of Minnesota. I would like to thank him for all the support he has provided to the Chapter for the last couple of years.

Another piece of news from the NCD, several of the technical committees are planning a joint meeting for this coming summer. From my perspective, these committees have been the NCD's biggest success. If you haven't been involved with them in the past, the joint meeting would appear to be a great opportunity to see what they are all about. The NCD is also going to be sponsoring a continuing education class in conjunction with the joint meeting.

Speaking of meetings, I hope each of you is planning on attending our joint meeting with the Dakota Chapter in Fargo, February 25-27. Their Chapter is assuring us that they will be living up to their reputation for above average social hours. I can't imagine the weather could be any worse than last year. I would like to encourage you to try and recruit some of your co-workers to get involved in the AFS and particularly, the Chapter.

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The Chapter publishes this newsletter four times a year (Jan., May, Sept., and Nov.). Deadlines for article submission are: April 15, Aug 15, Oct 15, and Dec 15.

INSIDE

Quote of the Issue

"The truth is that some phenomena are regular and some are not. Western science selects as its subject matter those that are regular and then finds that it can predict their behavior. But this is no basis for concluding that irregular and irrational phenomena are not important or are trivial." Nwankwo Ezeabasili, 1977.

PRESIDENT-ELECT CANDIDATES:

Brian Borkholder

Brian earned a B.S. degree in biology from the University of Illinois, Champaign, in 1990. For three years during his undergraduate stint, he worked as a research assistant for the Illinois Natural History Survey. From Illinois, this Chicago native headed out east to the mountains of Virginia, where he studied and received an M.S. degree in fisheries from Virginia Tech in 1993.

Since 1993, Brian has worked as the off-reservation fisheries biologist for the Fond du Lac Band in Cloquet. Besides his own field work, Brian works as a liaison between the Band and the State, Federal, and other Tribal agencies, cooperating on additional studies. In addition to field work, Brian sits on several committees, including both the Brook Trout and Lake Sturgeon subcommittees of the Lake Superior Technical Committee.

Brian has been a member of the American Fisheries Society since 1990. From 1990 through 1993, he was also a member of the Virginia Tech Chapter of the AFS, serving on several committees and work groups within that Chapter. After his move to Minnesota, he joined the Minnesota Chapter, and is currently serving as a member of the EXCOM.

The current career position that he holds has allowed Brian to learn much more than what is taught in the classroom. Difficult resource management tasks can only be accomplished through cooperation and public education. Cooperation can not be limited to citizen groups however, but must include research, federal, state, tribal, and local agencies as well. In the future, with budgets being cut, it will become ever more important to forge new cooperative partnerships. The Minnesota Chapter serves as the forum for bringing professionals together by shedding political boundaries, and must continue to encourage these partnerships amongst the members the Chapter serves. In addition to this responsibility, the Minnesota Chapter must take a greater role in public education programs. Education programs need to inform the general public, as well as show that we aren't simply "killing the fish" or "wasting tax dollars". Education programs will inevitably bolster the way the public perceives our positions and duties.

Bruce Vondracek

Bruce Vondracek is the Assistant Unit Leader-Fisheries at the Minnesota Cooperative Fish and Wildlife Research Unit located at the University of Minnesota. He received a B.S. and M.S. in Zoology from the University of Wisconsin-Madison and a Ph.D. in Ecology from the University of California-Davis. Following several years as a postdoctoral researcher at the University of California-Davis, he became the Assistant Unit Leader at the Ohio Cooperative Fish and Wildlife Research Unit in 1988. In 1991, he assumed his current position. Bruce has served on several AFS committees from the chapter to national level. Chapter committees include chair for 3 years of the Resolutions Committee for the Ohio Chapter, 1 year as Federal Representative, and a fourth term as chair of the Awards Committee for the Minnesota Chapter. North Central Division committees include Program Committee co-chair of the 58th Midwest Fish and Wildlife Conference, 2 years on the Awards Committee and 1 year on the Newsletter Committees. At the National level he has served 1 year as chair and 6 years as a member of the J. Francis Allen Scholarship Committee, Associate Editor for *Transactions*, 2 years as a member of the Mentoring for Professional Diversity in Fisheries Committee, and one term on the Skinner Memorial Award Committee.

Bruce's research is focused on the interaction of fish ecology, water quality, and land use practices. The primary focus is on fish community structure and how interactions at the community level are affected and can be integrated with land use activities. He is currently studying interactions and bioenergetic responses of trout in streams, and the affects of agricultural practices on stream and prairie wetland quality.

Bruce feels that the Minnesota Chapter should continue the strong leadership role providing unbiased scientific information to resource managers and decision makers through workshops, the legislative breakfast, and the annual meeting. Furthermore, he wants to continue the strong focus on public education programs, but also seek new directions to strengthen Chapter efforts for continuing education courses.

TO ALL MN/AFS MEMBERS:
BALLOT FOR 1997 MN/AFS CHAPTER OFFICERS

Please complete the following ballot and return it by mail if you wish to vote for candidates to serve as Chapter Officers in 1997. Mail ballots must be received by February 21st. You may also turn in your ballot at the annual meeting in Fargo prior to the business meeting.

Mark Cook
Nominating Committee Chair
DNR-Fisheries
2114 Bemidji Ave
Bemidji, MN 56601

President Elect: (vote for one)

_____ Brian Borkholder, Fond du Lac Natural Resources, Cloquet

_____ Bruce Vondracek, MN Cooperative Fish and Wildlife Research Unit, St. Paul

Secretary Treasurer: (vote for one)

_____ Keith Reeves, Minnesota DNR, Aitkin

_____ Kevin Stauffer, Minnesota DNR, Bemidji

Executive Committee Members at Large: (vote for one in each category)

Federal: _____ Ann Schneider, USFWS, Fort Snelling

MN DNR: _____ Mary Negus, Duluth

_____ Tom Jones, Duluth

Academic: _____ Neal Mundahl, Winona State, Winona

_____ Raymond Newman, University of MN, St. Paul

Open: _____ Roy Johannes, Minnesota DNR, St. Paul

_____ Peter Sorenson, University of MN, St. Paul

Mark Cook
DNR - Fisheries Res.
2114 Bemidji Ave
Bemidji, MN 56601

1997 Annual Meeting

February 25-27, 1997, Fargo, North Dakota

Tentative Schedule:

February 25, 1997 - Tuesday
1. Dakota Continuing Education Workshop - Technical Writing, taught by Dr. Elmer Finck, professor in biological sciences at Empoira State University and editor of the *Prairie Naturalist*: 1 p.m. to 5 p.m. in room 380 Loftsgaard Hall, NDSU. Registration fees are $20 for professionals and $10 for students. Minnesota Chapter members can contact Walt Duffy for more information (605.688.4782)

2. Registration and Social
   5:00 - 9:00 pm at Country Suites, Fargo (3 blocks from the Holiday Inn)
   kegs, smoked fish, cheese, meat; $5 per person (pay at the door)

February 26, 1997 - Wednesday
   Holiday Inn, Fargo
   8:00 - noon: Registration
   8:00 - 12:00: Papers
   12:00: Luncheon
   1:00 - 3:00: Papers
   3:00 - 4:30: Business meetings
   5:30 - 7:00: Poolside social - cash bar
   7:00 - 9:00: Banquet and Awards

February 27, 1997 - Thursday
   Holiday Inn, Fargo
   8:00 - noon: Papers
   12:00: lunch on your own
   1:00 - ?: Papers

Lodging:
You can make your lodging reservations at the Holiday Inn, the meeting site ($64/double/night; 701.282.2700; mention you are with the AFS), the Holiday Express ($49/double/night; 701.282-2000) which is 1/2 block from the Holiday Inn, the Comfort Inn West ($40; 701.282.9596) which is 3 blocks from the Holiday Inn, or the Super8 ($37; 701.232.9202) which is 5 blocks from the Holiday Inn. Other lodging in Fargo includes: Days Inn (701.232.0000), Sleep Inn (701.281.8240), Country Suites (701.234.0565), Econo Lodge (701.232.3412), and Comfort Suites (701.237.5911).

1997 Dues - Annual Meeting Pre-registration Application

Receive a discount and a free t-shirt when you pre-register for the Annual Meeting!

Option #1:
Pre-reg Cost (4 breaks, lunch, banquet).....$39.00 _____
reg. at meeting will be $44

Option #2:
Pre-reg Cost (4 breaks, lunch, no banquet)……$24.00 _____
reg. at meeting will be $28

Free t-shirt when you pre-reg.....$0
(pick up your free shirt at the Meeting)

1997 Minnesota Chapter dues.....$7.00 _____
(if not paid to the parent society)

Total Enclosed..... _____

Send Check (pay to the order of: Minnesota Chapter AFS) and this form to:
Henry Van Offelen
DNR-Fisheries
1601 Minnesota Drive
Brainerd, MN 56401

Name: _____
Address: _____
_____
_____
_____
Phone: _____
Fax: _____
e-mail: _____

Are you a member of AFS?_____ yes _____ no. Membership Number_____
(AFS membership number is located on your Fisheries mailing label)
Affiliation: _____
(DNR, Federal Government, Academic, Tribal, or Private)
Job Title: _____
Year Joined AFS: _____
Year Joined MN AFS: _____
Check if you are a Student: _____
Check if you don't want to be in the Chapter Directory: _____

30th Annual Meeting of the Minnesota Chapter of the American Fisheries Society

Tentative Program

(MN Chapter papers presented below--expect >6 additional presentations from the Dakota Chapter)

Habitat and Watershed Presentations

Dams, Ditches, and the Red River Ecosystem
Luther Aadland
Minnesota Department of Natural Resources, 1221 E. Fir Ave. Fergus Falls, MN 56537

The Red River of the North Basin is one of the most extensively ditched and drained places on earth. In addition, more than 500 dams are found on the Red River and its tributaries. Numerous flood control projects, Garrison Diversion, and an outlet for Devil's Lake, have also been proposed. Dams, ditches, wetland drainage, increased water withdrawals, and channelization have major implications for the Red River Ecosystem. These include direct loss of habitat and habitat diversity, loss of connectivity including blockage of migratory pathways, increased erosion due to alteration of flow and sediment regimes, and deterioration of water quality. Future strategies need to include not only resource protection, but restoration of wetlands, river channels, migratory pathways and flow regimes.

Insects as indicators of wetland condition in North Dakota
David J. Anderson and Bruce C. Vondracek
Dept. of Fisheries & Wildlife, University of Minnesota, and MN Cooperative Fish and Wildlife Research Unit

We sampled flying insects from three ecoregions within North Dakota's Prairie Pothole Region to assess their use as indicators of wetland condition. During the spring and summer of 1995 and 1996, 21 sites were visited on three occasions each year. Insects were collected by placing light traps near six seasonal and semi-permanent wetlands within each site. Preliminary analysis indicates both ecoregion and latitudinal effects on insect taxa richness, abundance, and composition. Mean taxa richness and abundance were highest in the Red River Valley ecoregion, and lowest in the Missouri Coteau. Also, samples from the Red River Valley ecoregion were dominated by Coleoptera taxa, while Missouri Coteau samples were dominated by Diptera taxa. Cluster analysis grouped wetlands by site, and sites by both ecoregion and by latitude.

Effects of Wetland Alterations and Ditching on Sediment and Nutrient Loading in Big Sandy Lake in Northeastern Minnesota
Chris Freiburger and Bruce Wilson
Minnesota Department of Natural Resources, Fisheries Section, 1201 E. Hwy 2, Grand Rapids, Minnesota 55744, and Minnesota Pollution Control Agency, Water Quality Section, 520 Lafayette Road, St. Paul, Minnesota 55155

Big Sandy Lake, one of Minnesota's largest lake recreational resources, has exhibited considerable fluctuations in water runoff quantity and quality which are indicators of massive watershed modifications. Its water quality is worse than about 93 percent of the lakes of the Northern Lakes and Forest (NLF) Ecoregion (MPCA 1995). The Big Sandy Area Watershed Study conducted an intensive monitoring and assessment program of the lake and its 413 square mile watershed. A network of stream and lake monitoring stations were established in mid-1994 and operated through October, 1995 to characterize the individual subwatershed drainages within the watershed. An intensive inflow monitoring effort was conducted in 10 subwatersheds representing over 74% of the water inflows and more than 73% of the total phosphorus loading to the lake in the study period. These efforts allowed careful measurement of the amounts of nutrients and sediment contributions. Three lake sites were studied over both the summers of 1994 and 1995. Historical lake and stream data from previous efforts were also incorporated

to better define the year to year variabilities of the reservoir system. Sufficient information now exists to begin defining cause and effect pathways and corrective actions.

The majority of water inflows occurred from three surface drainages which collectively contributed 65% of the water and 75% of the total phosphorus loads. The highest total phosphorus and total suspended solids concentrations were monitored in the Sandy River system; 68 ug P/L and 13 mg/L, respectively. These concentrations exceed more typical NLF Ecoregion interquartile ranges of 20 to 50 ug P/L and 1.8 to 6 mg/L, respectively. The largest single problem within the watershed is the increased loss of sediments and nutrients associated with ditching of the Sandy River and other subwatersheds. Loss of critical sport fisheries and their associated biological food webs and the elevated nutrient and sediment loss rate appear to be a function of the extent of wetland drainage.

Impacts of Sustainable Farming Practices on Streams in Southeastern Minnesota: Riparian Buffers and Rotational Grazing

Laurie Sovell and Bruce Vondracek
Department of Fisheries and Wildlife, University of Minnesota, 200 Hodson Hall, 1980 Folwell Avenue St. Paul, MN 55108; and Minnesota Cooperative Fish and Wildlife Unit, University of Minnesota, 200 Hodson Hall, 1980 Folwell Avenue, St. Paul, MN 55108

Analyses of aquatic biota, water chemistry, and stream habitat were performed as part of a team approach to evaluate the economic, social, and ecological impacts of rotational grazing practices on farms in southeastern Minnesota. Paired stream and upstream-downstream experimental designs were used on five streams to evaluate the impacts of upland landuse practices (rotational grazing, continuous grazing, and row crops) and riparian buffers on fish, aquatic insects, water chemistry, and physical habitat. Principal Components Analysis differentiated sites by stream and stations within a stream. Principal Component axes were related to fecal coliform for water chemistry; canopy cover, % substrate fines, bare soil, and width:depth for physical habitat; and Hilsenhoff's Family Biotic Index, % Dominance, Number of Families, and the EPT Index for insect communities. On one coldwater stream, more white suckers and fewer large brown trout and white suckers were sampled at a station without a riparian buffer than at stations with a buffer. Fewer large fish, including brown trout, were sampled at a station with a riparian buffer that has a fishing easement than at buffered stations without an easement.

Comparison of Best Management Practices to Conventional Agricultural Practices: Effects on Streams

Brian A. Nerbonne, Neal D. Mundahl, and Bruce Vondracek
Department of Fisheries and Wildlife, University of Minnesota, 200 Hodson Hall, 1980 Folwell Ave., St. Paul, MN 55108, Department of Biology, Winona State University, P.O. Box 5838, Winona, MN 55987-5838, and Minnesota Cooperative Fish and Wildlife Research Unit, University of Minnesota,200 Hodson Hall, 1980 Follwell Ave., St. Paul, MN 55108

We assessed the benefits of implementing best management practices (BMPs) versus conventional agricultural practices in riparian areas. Numerous studies have shown that sedimentation due to agriculture negatively impacts streams by reducing habitat critical to stream organisms. BMPs such as no-till plowing and buffer strips have been purported to reduce sedimentation. The Whitewater Watershed Project is an ongoing study begun in 1994 to assess whether implementing BMPs will reduce sedimentation and benefit instream biota. We assessed the effectiveness of BMPs by sampling fish, invertebrates, and physical habitat measures at 35 sites in the Whitewater Watershed. Sites were chosen in three land use categories: BMP agriculture, conventional agriculture, and natural vegetation. Indices of biotic integrity were calculated for fish and macroinvertebrates, and physical habitat was characterized for each site. We found BMP sites did not differ significantly from conventional sites in mean fish IBI scores, and there was no correlation between fish IBI and physical habitat measures. Preliminary results from invertebrate sampling show higher chironomid densities and lower densities of pollution sensitive organisms in conventional sites.

Fish Management and Habitat Presentations

Are Walleye Sport Fisheries Self-Regulating?
Steven L. Haeseker, John M. Hoenig, and Ransom A. Myers
Great Lakes Indian Fish and Wildlife Commission, P.O. Box 9, Odanah, WI 54861, USA; Canada Department of Fisheries and Oceans, P.O. Box 5667, St. John's, Newfoundland, Canada A1C 5X1; and Killam Chair of Ocean Studies, Department of Biology, Dalhousie University, Halifax, Nova Scotia, Canada B3H 4J1

It has been suggested that some sport fisheries may be "self-regulating." In other words, sport fisheries may be immune to overharvest due to innate angler behaviors or passive management regulations which prevent overfishing. In this investigation we examine angler behavior, specifically the relationship between effort and catch-per-unit-effort (CPUE), to evaluate whether self-regulating processes may be involved in controlling harvest. Our approach used regression analyses of creel survey data from several large lakes in Minnesota where walleye (*Stizostedion vitreum*) are the predominant species sought by anglers. In general, we found that the relationships between effort and CPUE were fairly weak and thus did not reveal a strong self-regulating response. Other forms of self-regulation, such as the relationship between percent of walleye released and CPUE, also appear weak. Based on the findings of this work, we believe that reliance upon angler behavior to prevent overharvest is risky, especially if pressure upon fishery resources increases in the future.

Evaluation of an Experimental Winter Trout Season on Four Southeastern Minnesota Trout Streams
Deserae L. Bushong, Charles S. Anderson, and Michael C. Hayes

An experimental catch-and-release winter trout season was implemented on portions of two southeast Minnesota streams in 1988 and two additional streams in 1991. The goal of the regulations was to increase fishing opportunities without reducing abundance of fingerling or adult trout. Trout populations were monitored through 1995 in both experimental and control streams. Population fluctuations in the control streams were synchronous, showing the populations responded similarly to environmental changes. A single principal component explained 94% of the variance in log fingerling abundance values and 64% of log biomass values of the control streams. We tested whether populations in experimental reaches followed the same upward and downward changes as the control streams using linear regression. Overwinter survival monitored in three streams (2 experimental and 1 control) was highly variable, ranging from 43% to 244%. The winter fishery did not reduce brown trout fingerling abundance, adult biomass, or overwinter survival.

Summer Habitat Requirements of Large Brown Trout in Southeast Minnesota Streams
Bill Thorn and Charles Anderson
Minnesota Department of Natural Resources

We quantified the relationship between summer habitat variables and the presence or absence of large brown trout *Salmo trutta* (>380 mm) with stepwise logistic regression. Large brown trout were associated with large pools, with four kinds of cover, and with water deeper than 60 cm. Habitat improvement and special regulations have not increased abundance of large brown trout in southeast Minnesota streams. We conclude that habitat requirements were not adequately addressed. To increase abundance of large brown trout when habitat is limiting, we recommend increasing the quantity and variety of cover, especially overhead bank cover, and area of water deeper than 60 cm. When summer habitat is not limiting abundance, angling and winter habitat should be investigated.

Length Frequencies of Angler-Caught Fish in the 1950's and 1990's: Were They the Good Old Days?
Bradford G. Parsons
Minnesota Department of Natural Resources, 1110 North Lakeshore Drive, Glenwood, MN 56334

Angler dissatisfaction with size of fish harvested is a common problem for fisheries management agencies. Anglers often mention they used to catch larger fish. Creel surveys conducted in the 1950's and again in the

1990's on two Minnesota lakes provided information to test this perception. I obtained length-frequency data from creel surveys conducted on Maple Lake (338 ha) from mid-May through mid-February 1952-1958 and on Lake Andrew (383 ha) in the summer of 1955 and compared it to creel surveys conducted from December through Labor Day, 1993-1996. Length distributions were compared with Kolmogorov-Smirnov goodness-of-fit tests for bluegill, pumpkinseed, black crappie, largemouth bass, northern pike, and walleye. Panfish (bluegill, pumpkinseed, and black crappie) harvested from Maple Lake were larger in the 1950's than the 1990's. Northern pike were larger in the 1990's, but no difference was apparent between periods for largemouth bass and walleye. A similar pattern was observed for Lake Andrew, but data was less definitive because only one year of 1950's creel data was available. Bluegill and pumpkinseed were significantly larger in the 1950's, and walleye were significantly larger in the 1990's. There were no significant differences for black crappie, largemouth bass, or northern pike. Possible explanations for these findings include: predator populations were already exploited in the 1950's, but exploitation of panfish was more gradual; changes in community dynamics; changes in angler behavior; and changes in management strategies.

Fisheries Management in the 1837 Treaty Area
Henry VanOffelen
Minnesota Department of Natural Resources, 1601 Minnesota Drive, Brainerd, MN 56401

In 1993, a federal court decision upheld the rights of eight Indian Bands to hunt, fish, and gather in the 1837 Ceded Territory in east-central Minnesota. Since this time, the State and the Bands have been discussing how the fisheries resources in the ceded territory will be allocated and managed while allowing for this additional harvest. This has resulted in a critical review of the State's past and current fisheries management practices. This court decision has provided an opportunity to investigate fisheries management changes that may be needed to maintain or improve fishing opportunities. This presentation will review traditional fisheries management in Minnesota and outline new management strategies that may be used in the 1837 Ceded Territory.

Biology Presentations

Kinship Analysis of Steelhead Trout (*Oncorhynchus mykiss*) Using Microsatellite Markers
William R. Ardren, Michael M. Bomier*, Anne R. Kapuscinski
Dept. of Fisheries and Wildlife, University of Minnesota 200 Hodson Hall, 1980 Folwell Ave., St. Paul, MN 55108; and *Reed College, Portland, OR.

Lack of highly variable genetic markers for salmonid kinship analysis has made individual discrimination and tracking of family lineage across generations difficult or, in many cases, impossible. We overcame the genetic variability problem by examining microsatellite loci (a class of heritable, highly variable, and neutral nuclear DNA markers). The Minnesota DNR stocked two stains of steelhead trout into a reproductively isolated section of river in order to assess potential interbreeding. Our objective was to determine the number of 48 sexually mature steelhead trout that contributed to 57 randomly sampled offspring. After DNA extraction, seven microsatellite loci were amplified by the polymerase chain reaction (PCR) and alleles scored by electrophoresis. We eliminated adult fish not contributing to the offspring and identified breeding pairs by comparing allelic patterns of individual offspring to patterns of potential parents. The 27 sexually mature males and 20 females displayed a total of 33 alleles at the six loci. Comparisons of allelic patterns between these adults and sampled offspring allowed us to eliminate 22 adults from participation in mating events that produced the offspring. We also determined mating pairs for 29 offspring and that one female mated with at least seven males. Application of microsatellite-based kinship analysis increases the ability to resolve kinship in fish populations and will aid behavioral ecology studies and salmonid restoration efforts.

Population status and habitat requirements of the American brook lamprey in southeastern Minnesota
Neal D. Mundahl
Department of Biology, Winona State University, P.O. Box 5838, Winona, MN 55987-5838

American brook lamprey ammocoetes, adults, and/or their spawning redds were observed at 23 stream locations

in Olmsted, Winona, Fillmore, and Houston counties in southeastern Minnesota. During 1995 and 1996, adult lamprey (147 in 1995, 54 in 1996) were observed in spawning areas between 25 April and 9 May at 13 stream locations. Spawning occurred at water temperatures ranging from 12.6-15.5˚C, and was concentrated at the head of riffles in water < 50 cm deep with bottom current velocity < 0.2 m/sec and substrates of cobble, gravel, and coarse sand. Spawning redds averaged approximately 200 cm^2 in area, were dug out to an average depth of 5 cm below the surrounding sediment level, and generally were spaced 40-70 cm apart. Typical spawning group size was 4-6 lamprey per redd. Only 42 ammocoetes were collected from 13 stream sites, preferring water depths < 50 cm, water column velocities < 0.1 m/sec, and sediment organic contents < 12%. The size range of ammocoetes collected suggests the presence of possibly five size/age classes. At 150-m-long sites where ammocoetes were collected by single-pass electrofishing, the median number of ammocoetes collected was three. Three-pass removal sampling of ammocoetes in Pine Creek produced density estimates ranging from 0-1.68 ammocoetes/100 m^2 (mean = 0.63/m^2). Spawning populations of American brook lampreys in most streams surveyed were small, and ammocoete abundance was low. These apparently small populations should be given greater protection and their susceptibility to decline or disappearance should be examined.

Changes in Density and Size Demography of Threeridge Mussels (*Amblema plicata plicata*) in Lake Pepin, Minnesota, and Wisconsin

Rick Alan Hart and Mike Davis
North Dakota State University, Department of Zoology, Fargo, ND 58105; Minnesota Department of Natural Resources, Ecological Services Section, Lake City, MN 55041.

Density and size demography of unionid mussel populations were quantitatively sampled at several mussel beds in Lake Pepin, beginning in 1990. Densities of the commercially harvested threeridge mussel, *Amblema plicata plicata* (Say, 1817), declined at 5 of the 7 mussel beds sampled. The most dramatic decline occurred at the Hok Si La, MN, bed where average densities of *A. p. plicata* equaled 21.7/m^2 during 1993, declining to 6.0/m^2 in 1995 and 5.0/m^2 in 1996 ($F=8.820$, $P=0.0001$). Densities of non-harvested mussel species increased or remained stable at all seven beds. Average shell height of *A. p. plicata* significantly decreased at 4 beds, remained stable at 2, and increased at 1. These data implicate commercial harvesting as a contributing factor in the decline of this mussel species. During this study, zebra mussels, *Dreissena polymorpha*, became established in Lake Pepin. The greatest density of zebra mussels was found at the King's Coulee bed in 1995 (1750/m^2), decreasing to 971/m^2 in 1996 ($T=2.366$, $P=0.021$). Although densities of zebra mussels decreased at this bed, infestations of zebra mussels upon *A. p. plicata* did not. The average number of live zebra mussels per live *A. p. plicata* equalled 44 in 1995 and 48 in 1996. With the large percentage of infested *A. p. plicata* at the King's Coulee bed in 1996 (91%), an increase in zebra mussel induced mortality could soon become evident. While zebra mussels can not be controlled by resource agencies, the impacts of commercial harvesting can. An attempt is being made to model safe levels of harvesting, thus ensuring a sustainable yield of *A. p. plicata.*

Assessment of Exotic Rainbow Smelt in Rainy Lake, Voyageurs National Park, Minnesota

Guy Fleischer, Larry Kallemeyn, and Sam Lammie
USGS-Great Lakes Science Center, 1451 Green Road, Ann Arbor, MI 48105-2899; USGS-International Falls Biological Station, 3131 Highway 53S, International Falls, MN 56649; Voyageurs National Park, 3131 Highway 53S, International Falls, MN 56649

Our objective was to develop a strategy and sampling protocol for an integrated survey to assess the status of the exotic rainbow smelt (*Osmerus mordax*), which was first documented in Rainy Lake in Voyageurs National Park, Minnesota in 1990. Integrated acoustic and midwater trawl surveys in 1996 revealed that rainbow smelt were present in most of the U.S. waters of Rainy Lake. Densities of rainbow smelt differed between areas of the lake, with the highest densities occurring in the deeper, eastern portion of the lake. Rainbow smelt were found suspended in the water column, even during daylight hours. They were found in greatest abundance in the 10-20 m depth strata, associated with lower metalimnetic and upper hypolimnetic areas with water temperatures of less than 15 degrees C. Native lake herring (*Coregonus artedii*) were also found in the water column but were primarily in the strata below that occupied by the rainbow smelt. Trawl catches contained primarily rainbow smelt from the 1995 year class. Acoustic-based density estimates will be used to assess the status and trends of this exotic species and to assess its possible effects on the aquatic ecosystem of Voyageurs National Park. Results from this study should also be applicable to many of the other large lakes in the upper Hudson Bay drainage in the

United States and Canada that have recently been invaded by rainbow smelt.

Community Relationships Presentations

Diet Overlap among ruffe, yellow perch, and trout-perch in two Lake Superior Tributaries.
Jeremy D. Trexel and Raymond M. Newman
Dept. of Fisheries and Wildlife, Univ. of Minnesota, St. Paul, MN and Andrew Edwards, Lake Superior Biological Station, Great Lakes Science Center, Biol. Resources Div., US Geological Survey, Ashland, WI

The ruffe (*Gymnocephalus cernuus*) is a percid native to Europe and Asia which was introduced into the western Lake Superior drainage in the mid-1980's. It has since become firmly established and has spread eastward within the Great Lakes. Further range expansion is likely, however, it is unclear how ruffe impact systems as they colonize them. The goal of this research is to describe diet overlap between ruffe, yellow perch (*Perca flavescens*) and trout-perch (*Percopsis omiscomaycus*) in two Lake Superior tributaries. Ruffe relied heavily on chironomidae in both rivers, but Amphipoda and *Polycentropus spp.* (Trichoptera: Polycentropodidae) were also important. Yellow perch relied predominantly on *Hexagenia spp.* (Ephemeroptera: Ephemeridae) in one river, but on a variety of prey resources in the second river. Chironomidae, *Polycentropus spp.*, and *Hexagenia spp.* were important to trout-perch, which were sampled in only one of the tributaries. Diet overlap between ruffe and trout-perch was very high (Morisita's overlap C=0.98), while yellow perch and ruffe overlap was lower and dependent upon the river (C=0.16 and 0.56 in the two tributaries). Furthermore, there is some evidence that these fish species consume different sizes of certain important prey.

Feeding, Microhabitat and Growth in Sympatric Populations of Brook, Brown and Rainbow Trout
Gerold C. Grant and Bruce Vondracek
Department of Fisheries and Wildlife,University of Minnesota, 200 Hodson Hall
1980 Folwell Ave., St. Paul, MN 55108

We analyzed stomach contents, microhabitat use and growth rates in sympatric populations of brook, brown and rainbow trout in Valley Creek, Minnesota. Stream drift was measured simultaneously to test if these three trout species were feeding on drifting invertebrates. Preliminary results suggest that brook and brown trout had the lowest diet overlap, while brook and rainbow trout had the highest overlap. Rainbow trout appeared to feed mostly on drifting invertebrates, while brook and brown trout fed more on benthic invertebrates. Rainbow trout were found in faster and shallower water than the other two species. The results of this study will be discussed in the context of bioenergetic models for drift feeding salmonids.

Examining the predator-prey relationship between largemouth bass and bluegill in north-temperate natural lakes.
Jeff Reed and Brad Parsons
Minnesota Department of Natural Resources, 1110 North Lakeshore Drive, Glenwood, MN 56334

Management strategies developed for use in small impoundments in the south and Midwest to create quality largemouth bass and bluegill fisheries may not be appropriate for north-temperate natural lakes. Reducing largemouth bass harvest in impoundments generally results in increased largemouth bass densities, decreased bluegill recruitment, and improved bluegill growth. Faced with a decline in quality bluegill fisheries, managers of north-temperate natural lakes may consider the use of similar harvest restrictions to improve bluegill size structure. However, based upon current and historical analysis of largemouth bass diets and harvest information, increasing the number of largemouth bass is unlikely to increase predation on bluegill populations. Diets of largemouth bass (age-2 and older) examined from three central Minnesota lakes contained mainly yellow perch. In all cases, bluegills were rarely eaten by largemouth bass. Age-1 largemouth bass preferred young-of-the-year (YOY) largemouth bass and yellow perch. Predation of bluegill by largemouth bass was limited to YOY of both species. Structural indices of largemouth bass and bluegill from 38 lakes failed to indicate a predator-prey relationship. Harvest statistics indicate that largemouth bass harvest is currently as low or lower than that observed in the 1950's. The diversity of prey and the presence of yellow perch in these communities will likely restrict the use of largemouth bass to improve bluegill fisheries in natural lakes.

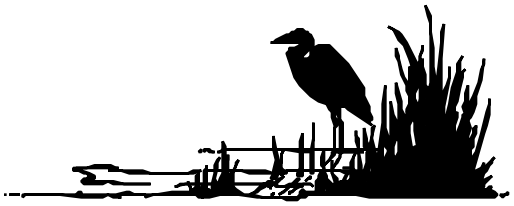
Poster Papers

Bell Museum of Natural History: Organizing Minnesota's freshwater mollusks into a GIS-compatible database
Mark Hove, Mark Nelson*, Susan Weller, Richard Buech*, and Robert Bright
James Ford Bell Museum of Natural History, University of Minnesota, St. Paul, MN 55108, * US Forest Service, North Central Forest Experiment Station, Grand Rapids, MN 55744

The Bell Museum of Natural History is Minnesota's repository for freshwater mollusks. The museum collection includes 5737 lots; 5146 from states surrounding and including Minnesota. Freshwater bivalves constitute 92% of the collection, including 250 lots collected before 1910. Specimens collected beyond Minnesota and adjacent states include freshwater mussels from 22 states (n=188 lots) and 2 other countries (n=2 lots), and snails from 31 states (n=369 lots) and 11 other countries (n=32 lots). Most of these collection records are entered into a computer database (Filemaker Pro customized by Daniel Graf). In addition to active acquisition of specimens, we are expanding our computer database on Minnesota mollusks to include a review of species locality data collected from journal articles and federal reports. In collaboration with the US Forest Service, we are in the process of converting our literature database to a GIS-friendly format. With GIS capability, it is possible to visualize collection needs, changes in fauna over time, and the correlation of mussel species' distributions with geoclimatic and vegetation records. This database and GIS capability will provide distribution information in an accessible format to resource managers, and facilitate efforts to identify and conserve rare species.

Development of regional water quality predictors using benthic invertebrates
Richard L. Rezanka and Malcolm G. Butler
North Dakota State University, Department of Zoology, Fargo, North Dakota 58105

Rapid, cost effective and accurate methods are desirable for determining lake water quality. Benthic invertebrates which are long lived and sensitive to limnological conditions are useful for accurate and reliable assessment of aquatic systems. The composition of the benthic community reflects limnological conditions present in a lake over an extended period of time. Because the physical and chemical composition of a lake dictates which organisms are able to live within that lake, correlating species composition with physical and chemical conditions should allow us to identify which organisms are indicative of variations in water quality. To explore the utility of this approach, we surveyed benthic invertebrates in 86 lakes within five states in E.P.A. Region VIII. Data were analyzed using a multivariate statistical approach. Biological data were correlated with physical and chemical data using canonical correspondence analysis. Preliminary results indicate secchi depth, temperature, elevation, total phosphorus and total alkalinity explain the greatest variance in the data set. Particular species of chironomids and oligochaetes respond differently to these variables and may therefore be useful as biological indicators of the condition of aquatic systems.



Committee Reports

Continuing Education Committee - by Mark Hove and Deserae Bushong
Upcoming Continuing Education Workshop - Use of Global Positioning Systems (GPS) & Geographic Information Systems (GIS) in Fisheries Management.

The course will be taught by Corvallis MicroTechnology, Inc. The course will be held on March 19, 1997 at Wilder Forest, Marine on the St. Croix, Minnesota. Eighteen spaces are available in the course and they will be filled on a first come, first serve basis. To register for this course please use the registration form included in this newsletter. The course will be held at the Wilder Forest, Marine on the St. Croix. For more information please contact Mark Hove.

Division Technical Committees

A joint meeting will be held this summer. You will not want to miss this one--stay tuned.

Minutes of Chapter Meetings

no meetings since the last newsletter.

Upcoming Events

January 7-9, 1997: Wisconsin Chapter of the American Fisheries Society Annual Meeting. Pioneer Inn Convention Center, Oshkosh, Wisconsin. Contact Tim Ehlinger 414.229.4358.

February 10-14, 1997: American Society of Limnology and Oceanography, Aquatic Sciences Meeting. Sante Fe, New Mexico. Contact Jonathon Cole 914.677.5343, or Susan Weiler 509.527.5948.

February 25-27, 1997: Minnesota Chapter of the American Fisheries Society Annual Meeting. Holiday Inn, Fargo, North Dakota. This is a joint meeting with the Dakota Chapters. Contact Tim Goeman 218.828.2246 (see details below).

March 21-23, 1997: First International Symposium on the Biology and Management of the Eurasian Ruffe. Sheraton Inn, Ann Arbor, Michigan. Contact Jeff Gunderson 218.726.8715.

April 7-10, 1997. Seventh Symposium on Environmental Toxicology and Risk Assessment. Orlando, Florida. Contact Dorothy Savini 610.832.9677.

May 15-16, 1997. 24th Annual Conference on Ecosystem Restoration and Creation. Tampa, Florida. Contact Frederick Webb (813.757.2104)

June 3-4, 1997. Pathogens and Diseases of Fish in Aquatic Ecosystems: Implications in Fisheries Management. Portland, Oregon. Contact Ray Brunson (360.753.9046).

May 19-22, 1997. Modeling Complex Systems for Environmental Decision-Making. Fort Collins, Colorado. Contact Joyce Thompson 970.498.1774.

May 26-30, 1997: 45th Annual Meeting of the North American Benthological Society. Southwest Texas State University, San Marcos, Texas. Contact Tom Arsuffi 512.245.2284.

August 18-20, 1997. Wild Trout VI: Putting the Native Back in Wild Trout. Bozeman, Montana. Contact Robert Gresswell (541.750.7410).

August 24-28, 1997. The 127th Annual Meeting of the AFS. Monterey, California. Contact Paul Brouha, AFS.

December 6-10, 1997. The 59th Midwest Fish and Wildlife Conference. Milwaukee, Wisconsin. Contact Robert Dumke 608.266.8170.

June 23-28, 1998. First International Ictalurid Symposium: Catfish 2000. Davenport, Iowa. Contact Steve Eder (eder@mail.conservation.state.mo.us).

Contributions: Letters and Commentary

News From Fisheries at the University of Minnesota
by Ray Newman, Associate Professor

After 8 years of a combined fisheries and wildlife undergraduate curriculum, the Department of Fisheries and Wildlife decided to create 3 tracks or areas of specialization which will allow students to more

efficiently focus on their main areas of interest. The three areas of specialization are: Fisheries, Wildlife, and Conservation Biology. Additional changes in the curricula will be occurring as we shift to semesters in 1999. Undergraduate enrollments increased through the 1990's but appear to have stabilized.

Currently there are 27 Fisheries graduate students with 8 new students starting this fall. Recent graduates include Drs. Jingyin Li, Loren Miller and Derek Ogle and masters students Lynn Berquist, Steve Pothoven and Anne Runstrum. Faculty and students are involved in a broad array of projects. Ira Adelman's lab is working on aquaculture issues and recirculating systems. Jingyin Li, Yossi Cohen, and Ira are continuing their evaluation of the effectiveness of Minnesota's walleye stocking program with current efforts focusing on developing a user friendly, individual based simulation model to predict the effects of stocking and harvest regulations on walleye populations. David Anderson's group is continuing several investigations on wetlands and wetland fauna. Four faculty have students or postdocs working on ruffe (Cohen, Newman, Sorensen and Spangler). Anne Kapuscinski's group is continuing investigations on genetics and biodiversity of several fisheries and Ray Newman's lab is examining biological control of Eurasian watermilfoil. Peter Sorensen's lab continues investigations on olfaction and pheromones, in fish ranging from sea lamprey and ruffe to goldfish. In addition to ruffe work, George Spangler's group is developing methods and uses for biochronology based on fish bony parts. Last, but not least, Bruce Vondracek's group just completed a study on the effects of plant removal on fish communities and is evaluating land use and farming practices on streams in southern Minnesota.

The department, with the prodding and persistence of George Spangler, has developed a web presence with several courses and both departmental and AFS related materials available. The department just received a USDA grant for a cooperative program with Iowa State University to develop a series of computer based, distance education courses. These courses may be available off campus within the next two years. Dr. Jinyin Li has been managing the Minnesota AFS web site and Jerry Grant has set up the North Central Division web site, both on our server. The Department of Fisheries and Wildlife web address is: http://www.fw.umn.edu/ The MN AFS page is at: http://www.fw.umn.edu/mnafs/, and the NCD page is at http://www.fw.umn.edu/ncdafs/

University of South Dakota, from the Dakota Chapter Newsletter, November 1996

The Department of Biology welcomes a new faculty member in genetics, Hugh Britten, who will start in January. Britten received his Ph.D. from the Department of Fisheries and Wildlife at Montana State University, and comes to us from the Conservation Biology group at University of Nevada-Reno. Of interest to fish biologists in the region, Britten worked on population genetics of the endangered cui-ui (Catostomidae) in Nevada and is quite interested in developing a research program in fish genetics in this region.

Jeff Stegge completed his M.A. in biology last spring on food habits of orange-spotted and green sunfish from waters around Vermillion and is now teaching at a small college in Iowa. John Carreiro is completing his thesis on life history features of blue suckers in the Missouri River, but has left USD to take a position as the hatchery biologist at Cleghorn State Fish Hatchery, Rapid City. Ph.D. student, Alf Haukenes from Idaho, will be starting in January and heading up the walleye stocking stress study.

Bruce Barton, along with a Canadian colleague, recently co-edited a book titled *Principles of Salmonid Culture*, published by Elsevier Science, Volume 29, in their series, *Developments in Aquaculture and Fisheries Science*. This book is meant to be a complete and definitive synthesis of this topic. In 17 chapters, authors from six countries cover the biology, life histories, aquaculture approaches and technology, and economic issues associated with the important species of this group. Bruce Barton and Ron Zitzow received the *Progressive Fish Culturist* Best Paper Award with their paper titled, “Physiological responses of juvenile walleyes to handling stress with recovery in saline water.”

Fisheries Information Network

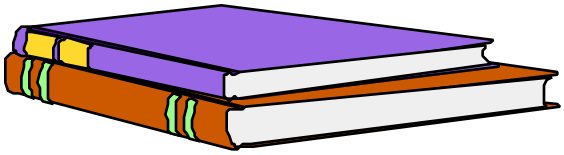
By Jeff Reed

As most of you know the Section of Fisheries faces financial problems. With the support of several angling groups, they will be asking the 1997 Legislature for an increase in the cost of fishing licenses. Although there is broad support within the organized angling community for an increase, the proposal has met with luke-warm support from the Governor’s office and most legislators. Raising fees just isn’t ‘politically correct’ these days.

I am confident however, that we can make a difference

in the success of the proposal. Politicians tend to listen to individuals. For example, a resolution from the chapter is likely to end up in the circular file whereas ten phone calls or letters in support of a bill really means something. If each one of us would make one phone call or write one short letter in support of the license increase, its likelihood of passage increases. If each of us would explain the situation to an angler friend and ask them to do the same, the potential for success would double! If you don't know who to contact or how to contact a particular legislator, please let me know. Keep your eyes and ears open for chapter activities in this area.

AFS 2000
Our chapter is normally a leader in AFS activities. However, we have only reached slightly more than 50 percent of our goal for AFS 2000 pledges. To date the majority of pledges have been from academia and a segment of the DNR. I challenge those of everyone to get with it...get with AFS 2000. If you need more information or pledge forms please contact me at 320.634.4573 or Ira Adelman at 612.624.4228.

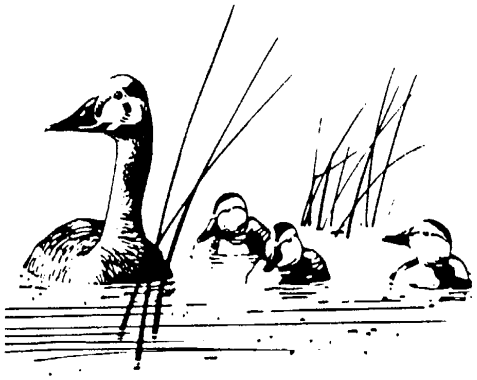


Interesting Articles and Publications

Fish: An Enthusiast's Guide. 1993. Peter Moyle (illustrations by Chris Mari van Dyck) University of California Press. ISBN 0-520-20165-5. Dr. Moyle does an excellent job in describing the wonders of fish. Reading this book made me recall why I am still fascinated with fish.

Evidence for Heritable Preferences for Spawning Habitat between Two Walleye Populations. 1996. M.J. Jennings, J.E. Claussen, and D.P. Philipp. Transactions of the American Fisheries Society 125:978-982. Could it be that river- or lake- spawning behavior is inherited?

A Tool for Age Determination. 1996. M.J. Cyterski and G.R. Spangler. N.A. Journal of Fisheries Management 16:403-412. This is interesting stuff. When it comes to aging fish we need help; this tool will help.



Editorial

editors note: *To get people thinking about the possible intrusion of bureaucracies into people's lives, I replaced 'e-mail' with 'bathrooms' in the DNR E-Mail Guidelines. You be the judge.*

The DNR bathroom system was implemented long ago to facilitate business. Last fall, the Bathroom Management Team approved and published a policy statement defining expected and accepted uses of bathrooms (see DNR Review, November 1995). We've all learned a lot about bathrooms during the past year, but we've also exposed a vast, unmapped landscape where this technology, our workplace norms and the letter of the law intersect in sometimes ambiguous ways.

There has been much discussion, concern and confusion about what constitutes appropriate and responsible use of bathrooms in recent months. The following questions and answers are offered to help clarify some of the features and boundaries in this landscape.

(1) Is it okay to use bathrooms for personal use?
The GroupWise Bathroom System (GW BS) is state property intended for state business. The DNR is not a Bathroom Service Provider (BSP) for personal staff use. Employees who wish to spend extensive amounts of time using bathrooms for personal use should obtain a home bathroom and use their own equipment at home for this purpose.

(2) Are there any uses of bathrooms which are prohibited?
Naturally, the use of bathrooms for any illegal purpose is specifically prohibited. Also prohibited are uses for solicitation of funds, political activities, or use for a personal business. Any use of the public bathroom systems for viewing or sending materials with a sexual content is strictly prohibited. Use of bathrooms is for state business. Certain types of union business are

also inappropriate. This list is not comprehensive, but provides some examples of prohibited use. Any misuse of the bathroom system can be cause for discipline, up to and including dismissal or legal action.

(3) Are my bathroom deposits private?
Urinals and toilets may be personal, but they are not private. You do have the use to individual urinals and toilets, but this does not imply that the system is for personal confidential deposits. Like the bathroom system itself, all deposits to the system are also the property of the state. Many of your bathroom deposits may be considered public records under the Minnesota Government Data Practices Act and could be requested by any citizen, interest group or the media.

A bathroom deposit does not always reach its intended waste handling system. This is not a technical failure, but more likely the result of trying to guess your sewage district address. Outgoing wastes go to an undeliverable inbox in the GroupWise administrator's office. Here the administrator must decide how to re-route it. This sometimes requires interpreting the contents. When you create a bathroom deposit, it may be gone only from your bathroom. It is still stored and perhaps already saved.

Bathroom deposits are also infinitely and effortlessly reproducible. It is important to remember that this medium allows deposits to be routed around the world in less time, perhaps, than it took to fire them off. Bathroom deposits can become public quite easily. It is more like a postcard than a sealed letter.

(4) Is my bathroom deposits monitored?
The DNR does not routinely or randomly monitor deposits to ensure compliance with department and state policies. However, selective monitoring may occur where there is a reason to believe that misuse of the system may be occurring.

Legitimate purposes for monitoring or accessing employees' bathroom system include: to conduct system management, maintenance, trouble-shooting, or capacity planning; to correct addressing problems; to carry out records management responsibilities; to maintain system security; to conduct authorized investigations or law enforcement surveillance, including tracking unauthorized access to the system; to conduct business during a crisis if an employee is absent when information is required; to conduct business during a prolonged absence of an employee. In most cases, the content of deposits are not determined. If it is necessary to determine the contents, those who actually gain access to bathroom system take care to protect privacy and confidentiality. In cases where the content is needed, an effort is made to notify the employee that access to their deposits are necessary.

(5) What can be done about unnecessary bathroom visits?
The DNR has over 1700 bathroom users. Even if each of us has an average of only 2 visits per day, this adds up to 17,000 deposits traveling through the DNR per week. That's a lot of communicating! Or is it? Many feel that the use of bathrooms has enhanced the efficiency and effectiveness of our communications. Many others, however, point out various unintended and negative consequences of our being dependent on inhouse bathrooms. Bathrooms are not always the best way to communicate.

These guidelines illustrate what constitutes appropriate and responsible use of bathrooms within the DNR. If you have any questions about the guidelines, please contact the bathroom administrator.

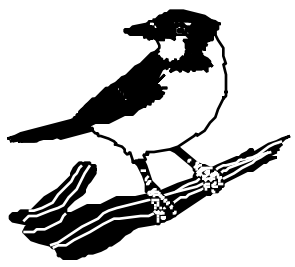
Creativity Corner: Solutions for Today and Tomorrow

Do you have a boss that does not listen to your great ideas or ignores your solutions?; do you want to see your good ideas used or at least considered by others? ; do you have an idea that you are using for your work that others could use? This column is dedicated to ideas, small and large, on fisheries related issues. Tim Goeman and the editor provide the initial contributions to this column. Please submit your ideas for the next newsletter.

Problem: You can't get your agency to pay your way to the Chapter Annual Meeting; you can only get time for it.

Solution: Get involved in a chapter activity. For example, volunteer to judge presentations or become a committee chair. It can be a small or large effort. By planning ahead, you can get your expenses covered.

Submitted by: Tim Goeman



Problem: The DNR Fisheries Section has a budget dilemma.

Solution: One solution, the solution being promoted, is to raise fishing license taxes. The other choice the Section mentions is further reductions in fisheries management. But I think there are more options available that could be tried if we want to maintain existing programs. I am thinking that the Section could also experiment with other means of revenue collection. I have several pilot project ideas. They involve increasing general public interest in fishing. Why have license sales been fairly stable in Minnesota, but the population has continued to increase (a half a million added people in last ten years)? Well, who knows! I am sure it is complicated. The question is can the Section stimulate interest and license sales through effective education and marketing. I think it is worth trying more than the traditional approaches.

First, I see a two-tiered licensing system. Tier I would be the standard licensing system as we all know and love. Tier II would be a fishing license designed for infrequent anglers, single parent families, people confused with the growing complexity of angling. Tier II licenses would be sold through the retail market with partnerships with businesses. For example, a want-to-be angler can go into the local video rental buy a fishing video (15 minute video and basic fishing technique, fish biology, or habitat education) and included is a Tier II fishing license that the customer can sign and use. Or, a want-to-be angler can go into Target or Walmart and pick up a simple fishing pole that has a Tier II fishing license packaged with it. The Section could work with a business that has experience marketing components of this product.

I see Tier II licenses as having a reduced, but simplified, regulation set. For example, Tier II anglers can only fish during a fixed summer season, and can only keep 3 fish (any species) with no fish greater than 12 inches (the average forearm distance). This is an important element of this idea. I think the simple regulations of this license may attract a new segment of the general public. A public involved with the environment, through fishing and other outdoor activities, is in the best interest of the natural resources and the DNR. Concerned citizens get involved and care about that which they have an interest in.

There are several shortcomings in implementing is idea. First, it would require working well with businesses, and thus would require considerable staff time in setting up. Second, it would require substantial marketing and education to let the public know what has changed and why. Third, if it fails some one could get fired or promoted.

Since there would be some risk associated in implementing this idea, I propose a pilot project in select markets to test this concept. However, I think these ideas have merit, all that is needed is a bureaucrat with some business savvy and one willing to take a risk.

Submitted by: Paul Radomski

News from Around the World
Submitted by Gene Buck, Senior Analyst, Congressional Research Service, Library of Congress, Washington, DC 20540-7450

Degradable Nets in Mississippi. On Nov. 19, 1996, the MS Commission on Marine Resources adopted a regulation requiring MS fishermen to use nets made of degradable material after Jan. 1, 1997. Fishermen protest that such nets are not made in commercial quantities, such material is difficult to distinguish from non-degradable materials, and that costs are significantly higher than non-degradable nets. [Assoc Press]

OR Grazing and Water Quality. On Nov. 18, 1996, Gov. Kitzhaber, ranchers, and environmental groups announced agreement on a plan to better protect OR streams from livestock damage and pollution. The OR state legislature could be asked to provide as much as $40 million to fund this plan. The plan would provide between $20 million and $35 million to assist farmers and ranchers better protect water quality with fences and other measures. Another goal of the plan is to complete the agricultural portions of water quality plans for all the state's streams within 4 years. [Assoc Press]

Lake Mead Pollutants. On Nov. 19, 1996, U.S. Geological Survey scientists released a report at the annual meeting of the Society of Environmental Toxicology and Chemistry indicating that common chemical pollutants, acting as hormone disrupters, may be harming the reproductive success of fish in Lake Mead and 20 other locations across the United

States. [Greenwire]

Menominee Treaty Fishing Rights. On Nov. 15, 1996, U.S. District Court Judge Barbara Crabb has declined to reconsider her September 1996 decision that the tribes had surrendered their fishing and hunting privileges on public lands in eastern and central Wisconsin. The tribes have filed a notice of appeal with the 7th U.S. Circuit Court of Appeals. [Assoc Press]

Grazing Lawsuit. In mid-November 1996, U.S. District Court Judge James Parker approved an agreement between the Bureau of Land Management and the environmental group Forest Guardians in partial settlement of a May 1996 lawsuit charging that BLM was not timely in preparing a biological opinion on the effects of cattle grazing on riparian-dependent species in New Mexico. As part of the agreement, BLM will complete a study by March 1997 on how cattle grazing along NM streams may affect several species of fish and birds listed as threatened or endangered. [Santa Fe New Mexican via Greenwire]

Sturgeons and Caviar. On Nov. 14, 1996, fishing industry representatives from Russia, Azerbaijan, Iran, Kazakhstan, and Turkmenistan, meeting as an international committee on Caspian Sea biological resources, signed a protocol banning fishing for sturgeon in the Caspian Sea beginning in 1997. Sturgeon fishing will be permitted in the lower reaches of the Volga and
Ural Rivers. [Interfax]

Yellowstone Lake Trout. In November 1996, National Park Service biologists reported conclusion of a successful year in beginning to eradicate lake trout from Yellowstone Lake. A major accomplishment was discovery of a spawning ground near Carrington Island in the West Thumb of the Lake. A total of 180 mature lake trout were netted from this spawning ground and removed. [Assoc Press]

LA Gillnet Ban Protest. On Nov. 17, 1996, 30 Louisiana chefs held a benefit to express their concern to the public that the Louisiana gillnet ban is decreasing the amount and availability of local fresh fish. Proceeds of the benefit were to be donated to the Louisiana Seafood Management Council. [Assoc Press]

Copper River Salmon. On Nov. 23-24, 1996, the Alaska Board of Fisheries held hearings in Fairbanks to take public comment on possible changes in salmon allocation between subsistence, sport, and commercial users on the Copper River. [Assoc Press]

WA Salmon Habitat Protection. In mid-November 1996, the WA Forest Practices Board adopted a stream-protection rule developed as a compromise by Timber, Fish and Wildlife, an association formed to seek consensus on controversial habitat issues. The new rule makes it a presumption that a stream with certain physical characteristics supports fish, unless proven otherwise. Such a rule could make it easier to protect fish habitat from streamside logging. [Assoc Press]

WA Timberlands Habitat Conservation Plan. On Nov. 5, 1996, the WA Board of Natural Resources signed an agreement for a habitat conservation plan with NMFS and the U.S. Fish and Wildlife Service for management of 1.63 million acres of state timberlands as a cohesive ecosystem of watersheds for at least 70 years. On Nov. 26, 1996, a coalition of local governments filed suit with the WA Supreme Court asking that the state be blocked from entering into the habitat conservation plan, contending that the Board of Natural Resources filed to consider important information concerning the state's duty to manage state timber resources appropriately for generating revenues to finance public schools and other programs. [Assoc Press]

Harza Northwest Report. In early November 1996, the Army Corps of Engineers released details of a report completed by Harza Northwest Inc. on how to operate Columbia River Basin dams. The report concluded that removing 4 lower Snake River dams, while being the costliest alternative in the short-run, may be the only cost-effective way to prevent ID salmon from becoming extinct. Barging juvenile salmon would become the most cost-effective alternative if survival of barged juveniles could be increased 88%. Partial dam drawdown was concluded to be ineffective. [Assoc Press, Medford, OR Mail Tribune via Greenwire]

CA Water Bond Passes. On Nov. 5, 1996, 63% of CA voters voted to approve a $995 million water bond, including $390 million to fund habitat restoration in the Sacramento-San Joaquin Delta, and $193 million to improve the Bay-Delta estuary. [Assoc Press]

Industrial Fishing Concerns. On Nov. 28, 1996, politicians, lobbyists, and scientists joined in a London news conference announcing the release of a Unilever-sponsored report critical of industrial fishing practices and demanding more restrictions on industrial fishing in the North Sea. Unilever officials have expressed concern for the sustainability of fish stocks such as cod, haddock, and whiting that feed on species caught by industrial fishing. [Reuters]

Florida Net Ban. On Nov. 7, 1996, Governor Chiles and his Cabinet voted to adopt a recommendation by the FL Marine Fisheries Commission for a 90-day emergency ban on the use of tarp nets to harvest mullet. [Tampa Tribune and St. Petersburg Times via Greenwire]

March 1996 Salmon Suit. On Dec. 6, 1996, the ten fishermen's and environmental groups that filed a Mar. 14, 1996 lawsuit in federal court charging that NMFS, the Army Corps of Engineers, and the Bureau of Reclamation were violating the Endangered Species Act by developing salmon restoration measures that fell short of what is required for operating 8 dams along the Columbia and Snake Rivers to meet flow targets, and failing to follow even their flawed restoration plan, were scheduled to file a motion for summary judgment. These groups are claiming that there was no scientific justification for "last minute" changes to the federal biological opinion on measures of success in salmon recovery, and that such changes were inappropriate. The groups seek to open new consultation with states and tribes leading to development of a modified salmon recovery plan. Judge Malcolm Marsh is hearing this case and the motion. [Assoc Press]

New Habitat Conservation Plan Guidelines. On Dec. 3, 1996, NMFS and FWS officials jointly announced new guidelines to streamline and expedite the habitat conservation plan (HCP) permit process under the Endangered Species Act. A new HCP handbook outlines a special "low-effect" HCP category for small landowners and other minor- or negligible-impact projects. The new guidelines aim for greater flexibility in procedural decisions and target approval deadlines.} [FWS press release]

Central CA Coho Salmon. Dec. 2, 1996 was the deadline for comments on NMFS interim forestry guidelines to protect central CA coho salmon habitat. The interim guidelines are developed to assist landowners in complying with the Endangered Species Act when the listing of central CA coho salmon becomes effective on Dec. 30, 1996.} [NMFS news release]

Puget Sound Pollution. On Dec. 2, 1996, the group, People for Puget Sound, released a study of wastewater dumping by shipyards, pulp mills, and oil refineries in Puget Sound, alleging that many disobey federal law and are rarely penalized by Washington state regulators. [Tacoma News Tribune via Greenwire]

Competitive Hydropower Report. On Dec. 12, 1996, the four northwest state Governors accepted a joint plan to preserve inexpensive hydroelectricity in the region. Among the plans recommendations are investing $210 million annually for conservation and other public purposes, resolving fish and wildlife issues, and establishing a 5-year budget to help stabilize fish recovery costs. The plan was produced by a 20-member committee appointed by the Governors, representing private utilities, the aluminum industry, ratepayers, conservationists, the Bonneville Power Administration, and others. [Assoc Press]

Salmon Recovery Options. On Dec. 10, 1996, the Army Corps of Engineers released an interim progress report of salmon recovery options, focusing on either breaching federal dams ("permanent natural river drawdown option") along the lower Snake River or keeping them intact. This report responds to an NMFS requirement that the Corps decide about drawdowns or submit an interim progress report. The Corps anticipates 3 years of study on these options. [Assoc Press]

San Juan River. On Dec. 6, 1996, the NM Game Commission heard public testimony seeking Commission intervention in efforts to maintain a minimum 500 cubic feet per second flow below Navajo Dam on the San Juan River to protect rainbow and brown trout populations. The Bureau of Reclamation is experimenting with lower flows between November and February to study the effects of low water flows on 2 endangered fish species downstream. The Commission declined to take action. [Assoc Press]

Kingsley Dam Relicensing. On Dec. 3, 1996, the U.S. Fish and Wildlife Service rejected the proposed Federal Energy Regulatory Commission (FERC) relicensing of Kingsley Dam on the Platte River, NE, due, in part, to concerns that the proposal would not ensure better streamflow and habitat for pallid sturgeon. [Denver Post via Greenwire]

Corps Wetlands Permitting. In early December 1996, the Army Corps of Engineers anticipates publishing modifications of its wetlands permitting regulations to reduce the minimum tract size that would have to be reviewed by NMFS, FWS, and EPA. Currently, developers can fill wetlands of less than an acre without review; the new regulations would require review of all wetland projects exceeding one-third of an acre. More extensive review has been required for modifying wetlands exceeding 10 acres, but the new regulations will lower this threshold to 3 acres.} [Los Angeles Times via Greenwire]

WI Panfish Limit. On Dec. 4, 1996, the WI Dept. of Natural Resources' Natural Resources Board approved

a reduction in the daily limit for panfish (bluegills, crappies, perch, and pumpkinseeds) from 50 fish to 25 fish, effective in 1998. This action was taken in response to concerns about diminishing fish populations in WI lakes.} [Assoc Press]

Elk River Settlement. On Dec. 2, 1996, the U.S. Forest Service and environmental groups announced settlement related to a lawsuit filed in September 1996 by the Sierra Club, Heartwood, and Trout Unlimited seeking to stop a timber sale in the Monongahela National Forest, WV, with concern for the possible effects of sedimentation in streams feeding into the Upper Elk River. The Forest Service agreed to reduce the timber sale size by 1,000 acres and decrease the harvest by about 3 million board feet, streams would be monitored during timber harvesting, and a buffer would be maintained between the harvested lands and private property.} [Assoc Press]

TX Fishing License System Problems. On Dec. 2, 1996, an official of the Texas Parks and Wildlife Dept. announced that the contractor working on a new hunting and fishing license system for the state has not been paid yet because the contractor has not met minimum requirements of the contract and the system is not yet operating. The new system is supposed to generate hunting and fishing licenses electronically, saving time and money for the state and retailers. In addition, the system is supposed to allow the state to suspend licenses of persons behind in child-support payments. [Assoc Press]

Brine Shrimp Harvest Halted. On Nov. 23, 1996, the Utah Div. of Wildlife Resources halted the annual brine shrimp (Artemia sp.) egg harvest in the Great Salt Lake after monitoring indicated almost as many eggs had been gathered as in the entire season last year. The season was to remain open until Jan. 31, 1997 but, after 14,679,498 pounds of brine shrimp eggs had been harvested, regulators stopped the harvest to avoid overfishing. Until the 1995-1996 season, the average annual harvest was around 10 million pounds. Brine shrimp eggs are exported to southeast Asian prawn farmers.} [Assoc Press]

Fish Creek Restoration. On Nov. 14, 1996, state and federal agencies were to hold a public informational meeting in Edgerton, OH, to discuss the recently released draft plan's 3 alternatives for restoring Fish Creek. This drainage was extensively damaged in 1993 when about 30,000 gallons of diesel fuel spilled from a broken underground pipeline into the Creek. Under a negotiated settlement with pipeline owners and operators, about $2.5 million is available to restore and rehabilitate Fish Creek and its resources. [USFWS]

St. Croix Mussels. On Nov. 13, 1996, the Sierra Club's North Star Chapter held a news conference in Prescott, WI, asking that the MN and WI Depts. of Natural Resources and the U.S. Coast Guard take action to restrict the spread of zebra mussels from the Mississippi River into the lower St. Croix River to protect rare native mussels species in the St. Croix. [Assoc Press]

Oregon ESA Suit. On Nov. 13, 1996, the U.S. Supreme Court heard oral arguments in a case wherein 2 OR ranchers and 2 OR irrigation districts sought the right to sue the federal government to limit protection for the Lost River sucker and the shortnose sucker under "citizen suit" provisions of the Endangered Species Act. The Court's ruling should be available in July 1997. [Greenwire, NY Times via Greenwire]

Wastewater Hormones. On Nov. 12, 1996, UK government researchers reportedly published results wherein they found that very minute levels of natural human female hormones in wastewater were causing the sex of fish to be altered. [London Guardian and London Independent via Greenwire]

Neuse River Hearings. On Nov. 12, 1996, the NC Environmental Management Commission is scheduled to hold the first of 4 public hearings on its plan for reducing pollution in the Neuse River. Under the plan, cities would be required to reduce the dissolved nitrogen content in sewage discharges by 30% and farmers would have to plant vegetation buffers along streams or use other methods to reduce fertilizer and animal waste runoff. [Assoc Press]

Whirling Disease. On Nov. 8, 1996, WA state officials announced the first detection of whirling disease parasites in the state -- in the Grand Ronde River drainage in SW Washington. [Assoc Press]

Illegal Mussel Harvesting. In early November 1996, an Illinois man was sentenced to 27 months in prison and fined almost $8,300 for illegally taking Mississippi River mussels in Illinois and transporting them to Iowa.[Assoc Press]

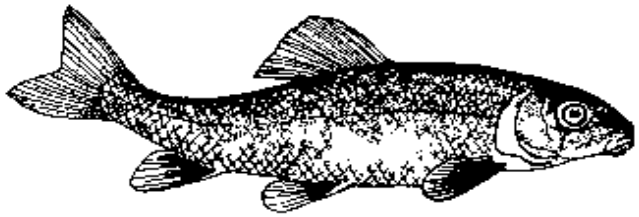
Sandtrap Mitigation. In early November 1996, the Michigan Dept. of Natural Resources announced an agreement with an excavating company for construction of a 180-foot long, 5- to 6-foot deep sandtrap in a streambed to catch silt in a popular trout and salmon stream entering Lake Superior. The excavating company is installing the trap as compensation for allowing sand to enter the stream from an upstream sandpit; the sandtrap will require regular cleaning to maintain its efficiency. [Assoc Press]

Other Important News

Recent AFS North Central Division changes: Doug Austen (IL) elected as NCD Vice-President, Joan Duffy (MI) elected to secretary-treasurer, and Dale Burkette is the new NCD president.

RAFFLE PRIZES NEEDED
Once again, we would like to have a succesful raffle at the Annual meeting. Need ideas and donations are needed. Please let Henry know if you have any lines on raffle prizes. If you have anything to contribute, please call me.

We still have a good supply of fish T-shirts. All species and sizes are available. Shirt prices have dropped to $13.50 or two for $25. Walleye closeout special at $6 each. Order them now don't wait for the annual meeting. Call Henry for more information.



On the Underside
submitted by Charles Anderson

THE LAWS OF CARTOON PHYSICS
By Trevor Paquette and Lt. Justin D. Baldwin

Cartoon Law I: Any body suspended in space will remain in space until made aware of its situation. Daffy Duck steps off a cliff, expecting further pastureland. He loiters in midair, soliloquizing flippantly, until he chances to look down. At this point, the familiar principle of 32 feet per second per second takes over.

Cartoon Law II: Any body in motion will tend to remain in motion until solid matter intervenes suddenly. Whether shot from a cannon or in hot pursuit on foot, cartoon characters are so absolute in their momentum that only a telephone pole or an outsize boulder retards their forward motion absolutely. Sir Isaac Newton called this sudden termination of motion the stooge's surcease.

Cartoon Law III: Any body passing through solid matter will leave a perforation conforming to its perimeter. Also called the silhouette of passage, this phenomenon is the specialty of victims of directed-pressure explosions and of reckless cowards who are so eager to escape that they exit directly through the wall of a house, leaving a cookie-cutout-perfect hole. The threat of skunks or matrimony often catalyzes this reaction.

Cartoon Law IV: The time required for an object to fall twenty stories is greater than or equal to the time it takes for whoever knocked it off the ledge to spiral down twenty flights to attempt to capture it unbroken. Such an object is inevitably priceless, the attempt to capture it inevitably unsuccessful.

Cartoon Law V: All principles of gravity are negated by fear. Psychic forces are sufficient in most bodies for a shock to propel them directly away from the earth's surface. A spooky noise or an adversary's signature sound will induce motion upward, usually to the cradle of a chandelier, a treetop, or the crest of a flagpole. The feet of a character who is running or the wheels of a speeding auto need never touch the ground, especially when in flight.

Cartoon Law VI: As speed increases, objects can be in several places at once. This is particularly true of tooth-and-claw fights, in which a character's head may be glimpsed emerging from the cloud of altercation at several places simultaneously. This effect is common as well among bodies that are spinning or being throttled. A 'wacky' character has the option of self-replication only at manic high speeds and may ricochet off walls to achieve the velocity required.

Cartoon Law VII: Certain bodies can pass through solid walls painted to resemble tunnel entrances; others cannot. This trompe l'oeil inconsistency has baffled generations, but at least it is known that whoever paints an entrance on a wall's surface to trick an opponent will be unable to pursue him into this theoretical space. The painter is flattened against the wall when he attempts to follow into the painting. This is ultimately a problem of art, not of science.

Cartoon Law VIII: Any violent rearrangement of feline matter is impermanent. Cartoon cats possess even more deaths than the traditional nine lives might comfortably afford. They can be decimated, spliced, splayed, accordion-pleated, spindled, or disassembled, but they cannot be destroyed. After a few moments of blinking self pity, they reinflate, elongate, snap back, or solidify. Corollary: A cat will assume the shape of its container.

Cartoon Law IX: For every vengeance there is an equal and opposite revengeance. This is the one law of animated cartoon motion that also applies to the physical world at large. For that reason, we need the relief of watching it happen to a duck instead.

The American Fisheries Society, Minnesota Chapter
Continuing Education Committee is sponsoring the following workshop:

Use of Global Positioning Systems (GPS) & Geographic Information Systems (GIS) in Fisheries Management

instructed by
Corvallis MicroTechnology, Incorporated
Covallis, Oregon

8:00 a.m. - 5:00 p.m., Wednesday, March 19, 1997
Wilder Forest Conference Center, Marine on St. Croix, Minnesota

Workshop Topics

Mission Planning
Location/Time, Terrain Simulation, Satellite Configuration

PreProcessing
Job Setup, Feature Lists, Data Collection Parameters

GIS Conversion to Various Mapping Systems
Mapping systems to be reviewed: ESRI Shapefile, AutoCad DXF, ArcInfo

Field Data Collection
Procedure for collecting Point, Line, and Area features

Post Processing
Differential Correction, Data Quality Analysis, Multiple Job Management

GPS Concepts
C/A Code, Real-time DGPS, Carrier Phase

Cost:
$170/person - instruction and materials

Background on Corvallis MicroTechnology, Inc. (CMT):
CMT is experienced in conducting “hands on” GPS/GIS training, combining GPS theory with practical GPS/GIS data collection exercises in the field. CMT will present its End-User Level I Seminar that provides practical understanding of GPS/GIS data collection, processing, analysis, and applications. CMT has provided GPS/GIS training for over 3 years throughout the U.S. and Canada to thousands of professionals from numerous private and public organizations.

Continuing Education Committee Course: Use of GPS and GIS in Fisheries Management

WHEN: 8:00 a.m. - 5:00 p.m., Wednesday, March 19, 1997

WHERE: Wilder Forest Conference Center, Marine on St. Croix, Minnesota

COST: $170, includes instruction fee and materials, lunch and snack at Wilder

ADVANCED REGISTRATION IS REQUIRED: Space is limited, so the seminar will be filled on a first come, first serve basis. Please register early and prepayment is appreciated but not required. If paying through your office MN DNR employees must pay for the course out of their discretionary budget. For more information contact Mark Hove at (612)624-3019.

LODGING RECOMMENDATIONS: Participants are responsible for their own lodging if they need it. Three motels are located within 15 miles of Wilder. The least expensive is the Super8, Stillwater, at $42/single, $52/double.

Registration Form

Please register me for the Use of GPS and GIS in Fisheries Management Course.

Name:_____
Organization:_____
Address:_____
_____

Phone:_____

Registration Fee: $170

Total Amount Enclosed:_____(make checks payable to MN AFS)

Registration must be received before February 19, 1997

Send registration form and payment to:
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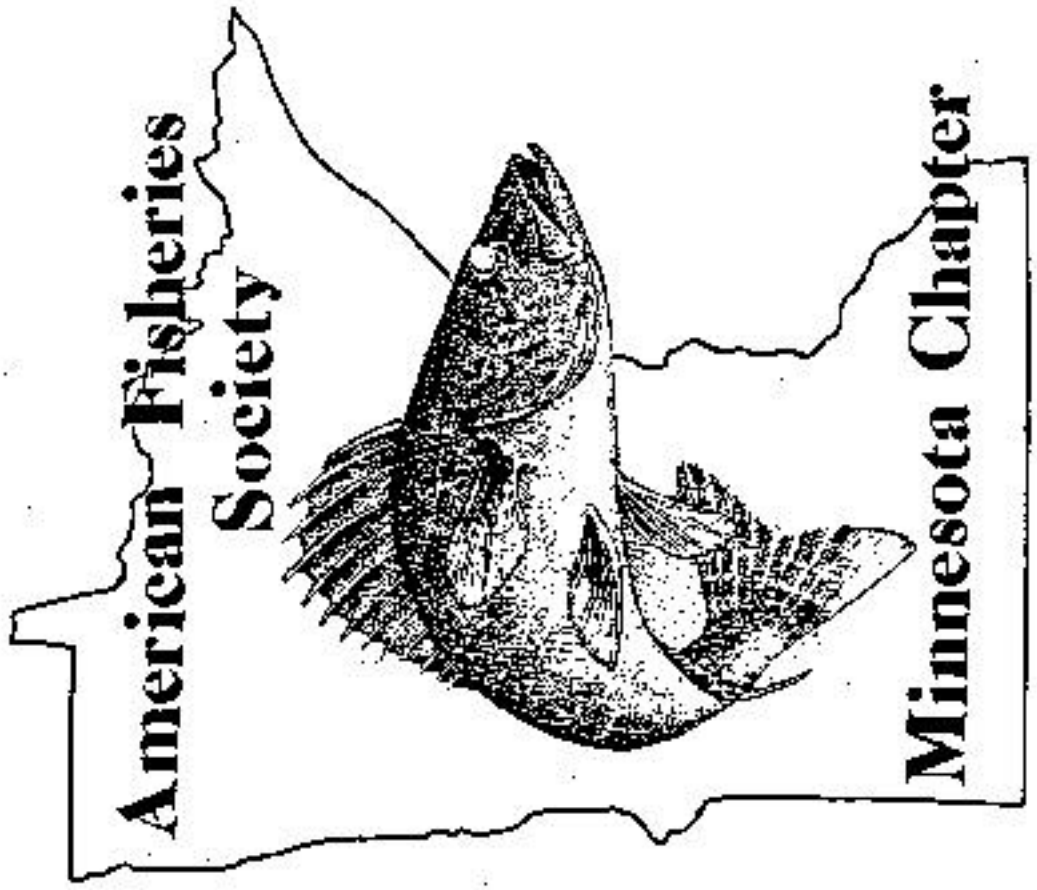

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