RYBA

Newsletter of the Minnesota Chapter of the American Fisheries Society

Year 1998 No. 1
January Issue (Annual Meeting Issue)

President's Message

by Tim Goeman

The Annual Meeting of the MN Chapter of the American Fisheries Society is rapidly approaching. This issue of the newsletter is largely devoted to informing you about the details of this meeting. This meeting was planned against the back drop of making the meeting affordable for everyone who would like to attend. You will notice the total cost—meals, lodging, and registration—is extremely reasonable.

In case you are undecided about attending this event, let me provide you with a few thoughts. First, come to learn. Learn what is going on at the University of MN, what different DNR Areas are doing, what the federal government is doing, what DNR Research is doing, what private industry is doing, and what tribal governments are doing in fisheries research and management. This is the single, largest gathering where representatives from all these entities meet each year within our state boundaries. Second, meet your colleagues. This is the place to meet fisheries professionals from other employment affiliations. The more you interact, the more you will realize there are very few new problems. If you are well-connected to other professionals, you will find someone else has probably already dealt with your problem—perhaps in slightly different form. Third, broaden your viewpoint. We all need to see the bigger picture of fisheries. The more you are exposed to the many and varied issues of fisheries management, policy, and research, the more effective you will be in making your everyday tasks applicable. Fourth, play a part in legislation. The MN Chapter frequently addresses legislative issues that effect fisheries management and policy in this state. Vote for Chapter officers that will do a good job representing your views. The MN Chapter can play a role in ensuring the long-term health of MN fisheries and the aquatic environment.

These four reasons do not represent an exhaustive list, but I hope they give you the perception that the Annual MN Chapter meeting can a very effective tool in your professional development. In short, it can be as effective as you make it. I am convinced that everyone who attends this meeting will be able to do their job more effectively because of the experience.

At the Annual Meeting business meeting, I will update everyone on the accomplishments of the Chapter during the last year. Your Chapter has been productive and everyone can be proud to be a member of the MN Chapter. Thanks for giving me the opportunity to serve as President this past year.

In North Central Division news, a membership survey is underway. In the next few months, approximately 15 randomly selected members from each Chapter will be asked to complete a survey. The results of the survey will be used to help the Division and the Society serve you better. If you are selected, please respond.

Editor: Paul Radomski
1601 Minnesota Dr, Brainerd, MN 56401
phone: (218)828-2665 fax: (218)828-6022
e-mail: paul.radomski@dnr.state.mn.us
radomski@brainerd.net

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. Burbot Legal Language: The views and opinions expressed herein are not necessarily those of the Minnesota Chapter.

INSIDE

Quote of the Issue

"We need not presume that the problems before us require complex solutions until we have considered the likelihood of simple ones." Robert Peters, biologist.

Committee Reports

Continuing Education Committee - by Mark Hove and Laurie Sovell

Exciting Continuing Education Opportunity - Watershed Restoration and Protection

The watershed approach to aquatic restoration, featured in the May 1997 issue of Fisheries, is gaining wider acceptance as a natural resource management strategy. Fisheries biologists play an important role in watershed restoration. Stream restoration requires not only biological expertise, but knowledge of instream physical processes, upland conditions, and hydrology. The Continuing Education Committee is offering one of its largest, most extensively planned workshops this month to explore issues related to stream

restoration and watershed management. What variables should a stream assessment program include? Are upland land-use patterns more important than riparian land-uses in determining water quality? How do you plan for such an undertaking? What challenges do managers face in agricultural, urban and forested settings? The two-day course will be held January 21-22, 1998 at the University of Minnesota St. Paul campus, and will cost $128-150. For more information on the course see the registration form included in this newsletter, or contact Mark Hove at Mark.Hove@fw.umn.edu or (612) 624-3019. Don't delay, register today!

Resolutions Committee - by Wayne Barstad

Well, folks, the new year has just begun and its not too late to make those New Year's Resolutions. I don't mean like, "I resolve to lose 15 pounds." or "I promise to be a better person this year." Those are fine, but that's not my angle. I'm thinking about those statements that you would like to make about fisheries issues that have been dancing around in your heads for the last year or so. Do you have any problems that the Chapter can help you resolve? Your habitat's got no integrity? Fishing can't be sustained? Those bowfins not getting enough respect? You've discovered some new partners out there? OK, make the Chapter take these on for you. The annual meeting is coming up and this is your chance to provide direction for the next year, possibly even for the next millennium.

Indulge me while I do some groveling here. I hate to grovel, but sometimes it can be an effective motivational strategy. I've been chair of the Resolutions Committee for something like three years now. During that time, I've seen only ONE resolution from the membership. Friends, this looks bad. I'm sure my performance is judged by the number of resolutions that I bring before the assembled multitude at the annual meeting. If I don't hear from you, I'm going to be dead wood again this year. I'll lose face, and probably my position, too! What's worse, one of you will be bagged in a dark alley and hauled off to take my place. Think about it - no pay, no perks, no glory, two meetings each year in some unexotic place like the Brainerd Public Library, dark looks from the chapter president, constant nagging by the newsletter editor. If not for my sake, then for your own (and the sake of the resources), be resolute!

You can tell I'm desperate now. I'll do anything for resolutions! Well, . . . maybe not anything. But, I am willing to abuse what little power I have by assigning each and every one of you to the Resolutions Committee until the annual meeting. Your task will be to dust off those burning issues and take a few minutes to express them in that time-honored form, *Whereas, whereas, whereas, be it therefore resolved*... . Do it now, before the thought retreats to a dark corner of your mind, before some one else steals your issue. Make yourselves heard! Please?

Send your resolutions to: Wayne Barstad, Minnesota Dept. Of Natural Resources, Ecological Services Section, 1200 Warner Road, Saint Paul, 55106. My e-mail address is wayne.barstad@dnr.state.mn.us. Come on, bury me in resolutions. I dare you.

Awards Committee - by Julie Westerlund

Chapter awards will be presented at the annual meeting. Come to the meeting and congratulate the outstanding Chapter members.

Newsletter Committee - by Paul Radomski

After researching the potential of distributing the newsletter electronically, we have concluded it is not feasible yet. About 40 people responded that they would like to receive the newsletter electronically. However, we needed at least 80 people to sign up for this to be cost effective. We will ask members again some time.

How do you like the new name of the newsletter? Ryba is the Polish word for fish. Pisces (latin for fish), Seiche, and Mainstream were already taken. I got thinking that a newsletter without a name is a newsletter without meaning. If you submit a better name for this newsletter than I have chosen by the Annual Meeting, then you will win a free registration to the February 24-26 Annual Meeting (fine print: you must be 18 or older to play, and I am the judge). I am fond of Ryba, but if you come up with one I like then you can win big!

Rivers and Streams NCD - by Paul Glander

The Chapter has organized a break out session titled "Management of River and Stream Fisheries" for the 1998 Local Water Planners Conference. The Conference will be at the University of Minnesota-Crookston, July 21-23, 1998. The Chapter sponsored session will be a half day with 6 to 8 presentations. Presenters will discuss the habitats used by river and stream fish and describe fish, habitat and angler survey techniques and results. This will be a great opportunity to inform water planners from across the state about the importance of river and stream fisheries and their habitat.

Membership Committee - by Doug Kingsley

I indicated the year that dues were last paid on mailing labels for the previous two newsletters, and I sent letters to all delinquent members in July. Those who still failed to renew membership have now been deleted from our membership rolls.

After deleting those delinquent members, our records indicate that as of 10/24/97 the Minnesota Chapter American Fisheries Society has a current membership of 216. We gained 66 members who didn't pay dues in 1996, but did in '97 and we lost 25 members who paid dues in 1996 but not in '97. This resulted in a net gain in membership of 41.

PRESIDENT-ELECT CANDIDATES:

Paul Glander

Education consists of a BA in Biology from Millersville State University (Millersville, Pennsylvania) in 1978 and a MS in Biology from Ball State University (Muncie, Indiana) in 1984.

Fisheries work experience includes 12 years with the Indiana Department of Natural Resources in their Division of Fish & Wildlife and Division of Soil Conservation and five years with the Minnesota Department of Natural Resources, Division of Fish & Wildlife. My jobs in Indiana were as a Fisheries Research Technician 1981-3, District Fisheries Biologist 1983-9, Lake Management Biologist 1989-90, and, Lake & River Enhancement Program Chief 1990-2. Since April, 1992 I've been an Area Fisheries Supervisor at Detroit Lakes, MN.

I've been a member of the parent society since 1978. I've served as the treasurer of the Indiana Chapter in 1979 and president of that chapter in 1990. I've been chair of the Minnesota Chapter's Rivers & Streams Committee since 1996. As Minnesota AFS President, I would hope to continue the current emphasis on making the Chapter relevant and easily accessible to all fisheries professionals in Minnesota by producing a high quality newsletter and holding an affordable annual meeting with a variety of papers reflecting the breadth of the fish management, research and production activities that are occurring in Minnesota. I would also like to see chapter members continue to produce high quality brochures, news releases, and where appropriate, position papers or resolutions to raise the profile of fisheries professionals in Minnesota and provide valid, peer reviewed scientific information to "decision makers".

Paul Radomski

Paul J. Radomski, son of Joseph. I was born in Stevens Point, Wisconsin, and grew up near the confluence of the Wisconsin and Little Plover Rivers. I was the eldest son of seven children. My parents raised us in a well-kept homestead, which they purchased from our would-be neighbors. My grandfathers took me bankfishing often to the Plover River and the ditches of Buena Vista. During this time I gained a wonder for nature. Up the road lived a boy who shared the need to explore the natural world. He and his parents taught me and my brothers how to hunt. I spent a lot of time in my formative years fishing for brook trout in the Little Plover and walleye in the Wisconsin River, horseback riding, and bowhunting chipmunks, rabbits and, then, deer in the woods of central and northern Wisconsin. My parents taught me to value good work, to question authority, to be skeptical, and to ignore people of arrogance. My father insisted that I go on to college so that we would not end up working at the papermill where he worked and which he disliked. After college I worked for the Wisconsin DNR, the state of South Dakota, and the Minnesota DNR, where I am currently a fisheries biologist. I live with my wife and two children in the city of Lake Shore. I have been a member of AFS parent society since 1988. I am currently the editor of the Minnesota Chapter newsletter. My interest in the Minnesota Chapter of the AFS is to see it continue to offer good education courses and annual science conferences to biologists interested in improving their lives and the lives of others. The work of the Chapter is to foster a passion and a life-long interest in fish and nature. And whatever that work is, I would be privileged to do it.

Henry VanOffelen

Henry VanOffelen is the 1837 Treaty Biologist with the Minnesota DNR. He received a B.S in fisheries from the University of Minnesota in 1987 and a M.S. in fisheries from Cornell University in 1990. Since 1990, Henry has worked for the MN DNR. He started his career as a fisheries specialist in Hinckley, moved to an assistant research position in Detroit Lakes in 1992, and moved to his current position in Aitkin in 1995.

Henry has been a member of the AFS parent society since 1988. In graduate school he initiated the first AFS student member survey. Since that time, he has maintained an active interest in the AFS as a member of the New York Chapter and the MN Chapter. He served as MN chapter Secretary/Treasurer in 1995 and 1996. He feels the Chapters has served its members well by encouraging communication and believes the chapter need to continue its growth toward communicating good science to the public.

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 1998. Mailed ballots must be received by February 20 th. You may also turn in your ballot at the annual meeting at Camp Ripley prior to the business meeting.

Melissa T. Drake, Nominating Chair
DNR-Fisheries
1200 Warner Rd
St Paul, MN 55106

President Elect: (vote for one)

_____ Paul Glander, Minnesota DNR, Detroit Lakes

_____ Paul Radomski, Minnesota DNR, Brainerd

_____ Henry Van Offelen, Minnesota DNR, Aitkin

Secretary Treasurer: (vote for one)

_____ Kevin Stauffer, Minnesota DNR, Hutchinson

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

Federal:	_____	Ann Schneider, USFWS, Fort Snelling
MN DNR:	_____	Steve Hirsh, St. Paul
	_____	Jeff Reed, Glenwood
Academic:	_____	Ira Adelman, University of Minnesota, St. Paul
	_____	Loren Miller, University of Minnesota, St. Paul
Open:	_____	Rick Bruesewitz, Minnesota DNR, Aitkin
	_____	Dale Logsdon, Minnesota DNR, Brainerd

1998 ANNUAL MEETING - February 24-26

The upcoming Minnesota Chapter meeting will be held at Camp Ripley. Total meeting costs will be $50.00, not including Chapter dues of $7.00. Registration will begin late afternoon on the 24th. The meeting will begin with a mixer beginning at 6:00 Tuesday, 24 February, hors d'voeuvres and beer will be supplied, but be prepared to make a small donation for the beer. The following morning breakfast will be served between 7:30 and 8:30 followed by a full day of presentations. Lunch and two coffee breaks will be provided. A banquet will be held on Wednesday evening. Following breakfast on Thursday, a half day session of presentations is scheduled, with a coffee break. The meeting will conclude at noon.

We chose Camp Ripley to make the meeting as inexpensive as possible; however, there are some accommodations that we will all have to make. Lodging will be provided in a large building (T building) with 8 open bays that accommodate 20 people each. Four communal restroom and showers facilities are available. All meals (including the mixer) will be held in a central dining facility in the same building. The presentations will be held in a gymnasium about 0.5 miles from the T-building.

If you prefer other lodging you may make your own reservations in Little Falls, about 7 miles from Camp Ripley. Several motels are available: Americ Inn (800) 634-3444; Cliffwood Inn (320) 632 5488; Country Inn and Suites (800) 456-4000; and Super 8 (800) 800-8000.

A diverse offering will be available for breakfast. Lunch will be a hot meal with a choice of at least 2 dishes, a beverage and dessert. For the banquet you will have a choice of grilled lemon chicken or stuffed porkchops, with rolls, salad and dessert. Camp Ripley is in central Minnesota, just north of Little Falls on Highway 115. Highway 115 is accessed from either Highway 10 or 371.

Lodging will be provided in T-building 10-145 at the north end of the compound. From the main south gate proceed straight ahead, north, on Infantry Road about 1.5 miles from the gate. T-building 10-145 is located at the corner of Infantry Road and Collins Road. When you check in you will be provided with bedding and assigned a bay. Bedding must be folded prior to departure on Thursday. Also, the building must be left in the same state as when we arrive.

The presentations will be in the Theater, building 6-97, south of T-building 10-145, accessed from Infantry Road by either Stanchfield Avenue (closest to T-building 10-145) or VanCleve Avenue located east of the Education Center. Parking is available at the T-building and theater. Hope to see all of you there, drive safely.

Schedule:

February 24th - Tuesday
1. Registration and Social

February 25th - Wednesday
1. Breakfast & Registration
2. Morning Session - Papers
3. Lunch
4. Afternoon Session - Papers
5. Banquet (included in registration)

February 26th - Thursday
1. Breakfast
2. Morning Session - Papers
3. Conclusion at Noon.

1998 Annual Meeting Pre-registration and/or 1998 Chapter Dues Application

Pre-registration Cost (lodging, food, banquet, meeting rooms)....$50.00 _____

1998 Minnesota Chapter dues.....$7.00 _____
(if not paid to the parent society)

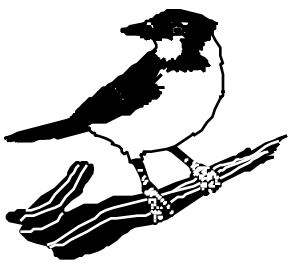
Preregistration Specials:
$10 Walleye t-shirt (this is $5 off regular price).....$10.00/each _____size:_____
$10 Crappie t-shirt (this is $5 off regular price).....$10.00/each _____size:_____
$15 Brook Trout t-shirt (this is $5 off regular price).....$15.00/each _____size:_____
$15 Rainbow Trout t-shirt (this is $5 off regular price).....$15.00/each _____size:_____
$15 Brown Trout t-shirt (this is $5 off regular price).....$15.00/each _____size:_____
$15 Bluegill t-shirt (this is $5 off regular price).....$15.00/each _____size:_____

Total Enclosed..... _____

Send Check (pay to the order of: Minnesota Chapter AFS) and this form to:
Kevin Stauffer
DNR-Fisheries
2115 Birchmont Beach Rd NE
Bemidji, MN 56601

Name: _____
Address: _____
_____
_____
_____
Phone: _____
Fax: _____
e-mail: _____ **(important to get any email notices)**

Are you a member of AFS (parent society)?_____ yes _____ no. Membership Number_____
(AFS membership number is located on your Fisheries mailing label)
Affiliation: _____
(DNR, Federal Government, Academic, Tribal, or Private)
Check if you are a Student: _____
Check if you don't want to be in the Chapter Directory: _____
Check if you want to receive a paper copy of the newsletter rather than receiving it electronically:_____



31st Annual Meeting of the Minnesota Chapter of the American Fisheries Society

Abstracts:

Oral Presentations:

The Value of Archives

Rivers, P. J. and W. R. Ardren
Department of Fisheries and Wildlife, University of Minnesota 1980 Folwell Avenue, St. Paul, MN; (612) 625-2772; pjr@fw.umn.edu

This paper identifies three recent scientific innovations that contribute to the justification for maintaining archival collections of fish, invertebrates, and associated documents for future use. First, new molecular genetic techniques, such as DNA polymerase chain reaction (PCR), allow the use of DNA recovered from archival samples. Some retrospective population results may now be obtained by this technique through analysis of samples from archival collections (e.g. genetics of extinct populations). Second, analytical technologies have recently emerged for ageing fish with incomplete growth histories using the temporal signature technique. This technique makes available information from older, previously "unageable" fish. Other techniques are useful for investigating mixed-stock fisheries, early life histories, food web dynamics, and population trends-through-time. We also recommend preservation of documents such as catch statistics and stocking records. Finally, we suggest proper storage and data recording techniques to ensure sample integrity. These reasons provide sufficient rationale for maintaining archival collections. At a time when fiscal resources are increasingly limited and governments are de-centralizing responsibilities for science and management, we believe that protection and use of archival information can continue to further the interests of aquatic research and management.

Effects of Ruffe (*Gymnocephalus cernuus*) and Yellow Perch (*Perca flavescens*) on Benthic Macroinvertebrate Communities: Mesocosm Experiments

Gangl, James A., Jeffrey A. Schuldt and Carl Richards
Natural Resources Research Institute, University of Minnesota-Duluth, 5013 Miller Trunk Highway, Duluth, MN 55811; (218) 720-4370; FAX: (218) 720-9412; jgangl@sage.nrri.umn.edu

Since their introduction in the mid 1980s, Eurasian ruffe (*Gymnocephalus cernuus*) have become the most abundant fish in the St. Louis River Estuary of Lake Superior. This rapid population growth raises questions regarding their role in aquatic ecosystems of the Great Lakes and potential impacts on native fish populations. Mesocosm experiments were conducted during 1995, 1996 and 1997 to investigate the impact of ruffe on benthic communities in the Great Lakes. In 1996, a block design with four treatments was used to investigate the potential interactive effects of ruffe and yellow perch (*Perca flavescens*). Benthic macroinvertebrate abundance, biomass, and community structure were measured. There were no interactions between fish density and the presence of ruffe. Overall benthic macroinvertebrate, Ceratopogonidae and Oligochaete abundance were significantly reduced ($p < 0.05$) by the presence of ruffe and the presence of ruffe significantly reduced ($p < 0.05$) Chironomidae biomass. The size of Ceratopogonidae (individual length) and Chironomidae (individual mass) were significantly reduced ($p < 0.05$) when ruffe were present. Behavioral groupings of the benthic macroinvertebrates were analyzed. Burrowers and sprawlers were the two most abundant behavioral groups and burrower abundance was significantly reduced ($p < 0.05$) when ruffe were present. There was no significant change in taxa abundance during this experiment. These results show that fish can regulate benthic macroinvertebrate communities, and that ruffe can reduce prey availability for native fish.

Temperature Effects on Ruffe (*Gymnocephalus cernuus*) Gastric Evacuation Rate and Growth at Ration

Henson, Fred G. and Raymond M. Newman
Department of Fisheries and Wildlife, University of Minnesota, 1980 Folwell Avenue, St. Paul, MN; (612) 625-5704; fgh@fw.umn.edu

The ruffe (*Gymnocephalus cernuus*) is a recently established non-indigenous nuisance species in the Laurentian Great Lakes. Evidence from field enclosure studies in Minnesota indicates that ruffe compete with yellow perch (*Perca flavescens*). Because the bioenergetic data required to model food consumption for ruffe in North America are lacking, we investigated the effects of temperature on gastric evacuation rate and growth at ration in ruffe. Gastric evacuation rate was estimated from repeated trials at 8, 14, 19, and 23 ^{o}C using groups of 16-24 captive, adult, St. Louis River ruffe fed a diet of frozen chironomid larvae. We also estimated growth at ration at 14, 19, and 23 ^{o}C for daily rations of 2, 4, and 8% of body weight using groups of 7-8 fish. Gastric evacuation rate (R) was related to temperature (T) by the exponential function $R = 0.022 \times e^{0.079 \times T}$, $r^2 = 0.91$. At 22 ^{o}C, R, as predicted by this equation, closely

matches field estimates of R for St. Louis River ruffe in 1990. Specific growth rates at 23 ^{o}C ranged from -0.24%d^{-1} at 2% ration to 0.3%d^{-1} at 8% ration. At 14 ^{o}C, the range was from -0.12 to 0.55%d^{-1}. Ruffe growth declined with increasing temperature between 14 and 23 ^{o}C at all ration levels. Our results for both gastric evacuation rate and growth at ration suggest that, compared to published data for perch, ruffe are adapted to cooler temperatures and that their metabolism is less sensitive to temperature. The results of this study will aid efforts to model food consumption by ruffe in North America.

Functional and Biochemical Characterization of a Novel Sex Pheromone in the Eurasian Ruffe, *Gymnocephalus cernuus*

Murphy, Cheryl A., Peter J. Maniak, and Peter W. Sorensen
Department of Fisheries and Wildlife, University of Minnesota, 200 Hodson Hall, 1980 Folwell Ave, St. Paul, MN 55108; (612) 624-8713; cam@fw.umn.edu

The recent introduction of the Eurasian ruffe into the Great Lakes has prompted us to study pheromone function in this species in the hope that these cues might be useful in their control. Although many species of fish are known to use hormonally derived cues as potent sex pheromones, this possibility had not yet been examined in the Percidae. In our initial studies employing a behavioral assay and natural odors, we discovered that female ruffe undergoing final maturation release a potent behavioral stimulant. This timing suggested that the signal might be related to the maturation inducing steroid (MIS), of which two have been identified: 4-pregnen-17α,20β-diol-3-one (17,20β-P) and 4-pregnen-17α,20β,21-triol-3-one (20β-s). First, we tested that the pheromone might be the MIS or known relative using electrophysiological recording to describe the olfactory sensitivity of this species. However, no compound was found active. Accordingly, we tested the possibility that the pheromone might be a unique steroidal derivative by injecting ruffe with one of several steroids and examining the effects of these odors on conspecific behavior. Remarkably, we found that 20β-s injection stimulated the release of a pheromonal odor while injections with other steroids were without effect. Other studies using an open-field maze have also demonstrated that this cue is attractive and thus has potential in control.

Brook Trout Restoration in Southern Minnesota

Thorn, William C. and Mark Ebbers*
Minnesota Department of Natural Resources, Lake City Area, 1801 South Oak Street, Lake City, MN 55401; (612) 345-3365; FAX: (612) 345-3975; dnr.lakecity@dnr.state.mn.us; *Minnesota Department of Natural Resources, 500 Lafayette Road, St. Paul, MN 55155

Brook trout *Salvelinus fontinalis* were native in southern Minnesota spring-fed tributaries of the Mississippi River drainage below St. Anthonys Falls in Minneapolis. Development after 1850 reduced brook trout habitat quality, distribution, and abundance. Since 1880, native and non-native brook trout, and exotic brown trout *Salmo trutta* and rainbow trout *Oncorhynchus mykiss* have been widely stocked. Native stocks of brook trout are probably extinct. In southeast Minnesota, wild brook trout have been restored to most suitable streams by stocking. To increase abundance, we recommend habitat improvement in streams where brook trout are the only salmonid, and experimental management in streams where brook trout occur with other salmonids. In the Twin Cities metropolitan area, urban watershed management should include protection and enhancement of the remaining trout streams, and restoration of former trout streams. In Pine County streams, we recommend removal of beaver dams to improve trout movement and cool water temperatures, and instream habitat improvements to increase abundance.

Potential Effects of Trout Stream Habitat Improvements on Preferred Habitats of Mottled (*Cottus bairdi*) and Slimy (*Cottus cognatus*) Sculpin in Southeastern Minnesota

Mundahl, Neal, Michael Harnung, and Sarah Hach
Winona State University, Department of Biology, Winona, MN 55987-5838; (507) 457-5695; nmundahl@vax2.winona.msus.edu

Stream habitat improvements in southeastern Minnesota have benefitted trout, but their effects on nongame fishes are generally unknown. We assessed the habitat (substrate/cover, water depth, bottom current velocity) use and preferences of mottled (n = 190) and slimy (n = 387) sculpin in four streams, and compared these to habitat availability in improved and unimproved sections of two streams. Over 75% of individuals of both sculpin species were associated with gravel, rubble, boulder, and vegetation, and exhibited strong preferences (use weighted by availability) for these types of substrate/cover. Slimy sculpin used and preferred deeper waters (10-40 cm) than mottled sculpin (5-20 cm). Most (>71%) individuals of both species used habitats with bottom velocities <15 cm/sec, but displayed strongest preferences for velocities >15 cm/sec. Improved stream sections had proportionately more rubble and boulder than unimproved sections. Improved sections also had significantly greater abundances of water >40 cm deep, and depths >60 cm were more than 2X as abundant in improved stream reaches. Available bottom current velocities were not significantly different

between improved and unimproved sections. Based on the three habitat variables examined, stream habitat improvement for trout may have little overall effect on availability of habitats preferred by native sculpin, enhancing preferred substrate/cover while reducing preferred, shallow-water habitats.

Evidence of the Adverse Effects of Habitat Alteration on the Fish Communities of the Wild Rice and Sand Hill Rivers in Northwestern Minnesota.

Paul Glander, Dave Barsness and Gary Huberty
Minnesota Department of Natural Resources, PO Box 823, Detroit Lakes, MN 56502; (218) 847-1579; FAX: (218) 847-1588; paul.glander@dnr.state.mn.us

The Wild Rice and Sand Hill Rivers are tributaries to the Red River of the North in northwestern Minnesota. Like many rivers and streams in the highly agricultural Red River Valley, the hydrology and aquatic habitat in these rivers has been altered by channelization and impoundment. Fish communities in selected reaches of both rivers were assessed by trapnetting and electrofishing during the summer of 1994. Sampling sites were selected to compare fish communities in heavily altered reaches with less altered portions of the same river. The results indicate that physical alteration of the river channels and the resulting hydrologic changes has impacted the diversity, distribution and abundance of fish in both waterways.

Fish and Invertebrate Communities: a GIS Analysis in SE Minnesota

Cox, Carson B., Brian A. Nerbonne and Bruce Vondracek
Minnesota Cooperative Fish and Wildlife Research Unit and Department of Fisheries and Wildlife, University of Minnesota, 200 Hodson Hall, 1980 Folwell Avenue, St. Paul, MN 55108; (612) 624-7495; FAX (612) 625-5299; cbc@fw.umn.edu

The relationship between land use, fish and invertebrate community structure, and instream physical characteristics in the Whitewater River watershed was analysed using Geographic Information System (GIS) technology. The analysis was carried out in four phases: 1) collect fish and invertebrate community structure and instream physical characteristics at 27 stations; 2) compile and format GIS layers (land use, geology, hydrology, soils) for the Whitewater River watershed, 3) quantify land use (cropland, wooded area, and other landscape characteristics for the watershed and at a 100 meter scale for stream riparian buffers, and 4) link land use at the local scale and watershed scale to fish and invertebrate community measures. At the local scale, physical habitat was affected by buffer type. Stream sections adjacent to grass buffers had lower fine substrate and higher instream habitat scores than continuously grazed and wooded buffers. At the watershed scale, fish and invertebrate community structure was related to upstream-downstream position. The goals of the study were to determine the relative impacts of different types and distribution of land use on the biotic health of the river and establish a framework to evaluate future land use impacts in the watershed.

Consequences of Human Lakeshore Development on Emergent and Floating-Leaf Vegetation Abundance

Radomski, P. J.
Minnesota Department of Natural Resources, Section of Fisheries, 1601 Minnesota Drive, Minnesota 56401; 218/828-2665; FAX 218/828-6022; paul.radomski@dnr.state.mn.us

Vegetation abundance along undeveloped and developed shorelines from north-central Minnesota lakes were compared. The purpose was to test the null hypothesis that development has not altered abundance of emergent and floating-leaf vegetation. Color-infrared aerial photographs and digital image analysis were used to inventory vegetative cover. Light to moderately developed lakes from a set of 76 photographed lakes were used. Vegetative coverage was estimated in 12 randomly selected 30m square plots for both developed and undeveloped shorelines in each lake. A significant difference was found between vegetative cover in littoral areas adjacent to developed and undeveloped shorelines (ANOVA, $P < 0.05$), with developed shorelines associated with less aquatic vegetation. An estimate of vegetation loss in Minnesota for a class of lakes was made. The consequences of this habitat alteration to fisheries is unknown, but current Minnesota shoreline regulatory policy and landowner education programs may need to be reviewed. In the future, a relationship to fish community status will be investigated.

Geographic Morphological Variation of Siscowet Laketrout in Lake Superior based on Whole-body Morphometrics.

Moore, S. A. and C.R. Bronte*
Department of Biology, University of Minnesota- Duluth, Duluth, MN 55812; *U. S. Geological Survey, Great Lakes Science Center, Lake Superior Biological Station, 2800 Lakeshore Dr. East, Ashland, WI 54806.

Historically Lake Superior contained many morphologically distinct ìracesî of lake trout that occupied specific depths and locations and spawned at specific times of the year. Three principal morphotypes have survived and the siscowet morphotype is now the most abundant. Stock management for fish is the currently accepted method, and stocks of siscowet have not been delineated. Morphometrics is one of many methods used to separate stocks of fish. The intent of this study was to see if siscowet differed by shape across Lake Superior as a preliminary tool to implicate the presence of distinct stocks. The truss protocol was used to differentiate among the siscowet by multivariate analysis of 31 distance measurements from 15 anatomical landmarks identified on bitmap images of photographs taken from the field. Discriminant function analysis showed good separation fish from three geographic regions - head measures varied most. Cross validation classification rates ranged from 53 - 71% correctly classified. Cluster analysis and Principal Components plots separated fish in the Isle Royale region from the rest of Lake Superior. This is the first study to present clear shape differences within a lake trout morphotype in Lake Superior.

The Use of Genetics in Developing Stocking Strategies in Minnesota Waters

Wingate, Paul J. and Michael McInerny*
Minnesota Department of Natural Resources, 500 Lafayette Road, St. Paul, MN 55155; (612) 296-0973; FAX: (612) 2974916; jack.wingate@dnr.state.mn.us; *Minnesota Department of Natural Resources, 20596 Highway 7, Hutchinson, MN 55350

In the past, fish biologists/managers seldom considered the genetic integrity of native fish populations in a water body when proposing stocking. This attitude is changing after much genetic and management research has indicated the value of preserving genetic integrity for fish population health. Based on genetics, Minnesota now limits fish stocking through legislation, rules, and policy. Species covered under these applications are walleye, muskellunge, northern pike, channel catfish, smallmouth bass, brook trout, and steelhead. Politics, aquaculturists, and anglers can be an obstacle to prudent genetic management of fish. It is critical that genetic conservation principles be followed when making stocking decisions otherwise we increase the risk of altering native fish populations.

Genetic Relationships Among Populations of Northern Pike *Esox lucius* in the North Central United States

Senanan, Wansuk and Anne R. Kapuscinski
Department of Fisheries and Wildlife, University of
Minnesota, 200 Hodson Hall, 1980 Folwell Ave., St. Paul, MN 55108; (612) 624-0744; ws@finsandfur.fw.umn.edu

Fisheries management that incorporates conservation of genetic diversity is very difficult to achieve without knowing genetic diversity patterns of managed species. We examined genetic relationships among populations of northern pike *Esox lucius* in the North Central United States and in five populations from Alaska, Siberia, and Finland. We assessed genetic variation within and between populations using microsatellite genetic markers. These markers revealed higher genetic variation (overall heterozygozity = 0.14) than previously found with other genetic markers. Eight of 13 loci were polymorphic in at least one population. Resolution of this genetic variation allowed us to conduct the first population structure study of northern pike across a relatively narrow geographical range. Microsatellite loci differentiated populations within and among continents (Rst>0). We estimated genetic distances between populations using five different genetic distance measures with 2,000 bootstrap replicates per measure. We used the UPGMA cluster algorithm to generate dendrograms. All distance measures yielded highly repeatable population structure between continents and within Finland. Population structure within the North Central United States was not consistent across different genetic distance measures. These results support the hypotheses of one southern refugium in the North Central United States and more than one refugium in Europe during the last glaciation.

Bluegill Growth Rates in Minnesota

Tomcko, Cynthia M.
Minnesota Department of Natural Resources,1201 E. Hwy. 2, Grand Rapids, MN 55744; (218) 327-4456; cindy.tomcko@dnr.state.mn.us

Median growth rates of bluegill in Minnesota were determined for 41 of 43 lake classes. Growth rates varied by lake class and most were lower than the statewide mean derived from pre-1970 surveys. Little evidence was found of a density dependent growth response to one or two poor year classes. Three variables (secchi depth, maximum depth, and total alkalinity) explained 17-32% of the variation in growth for bluegill through their first five years.

Will Angler Behavior Allow the Sustainability of Quality Bluegill Fisheries?
Reed, Jeffrey R. and Bradford G. Parsons
Minnesota Department of Natural Resources, 1110 North Lakeshore Drive, Glenwood, MN 56334 (320) 634-4573; FAX (320)634-4576; fishgeek@runestone.net

Traditional views regarding bluegill *Lepomis macrochirus* management have been that angling has little effect on populations and high exploitation is the key to preventing stunted populations. However, recent research has indicated that this not necessarily the case for all populations; panfish can be overexploited and quality panfish populations are becoming increasingly rare. While fisheries professionals have become aware of this problem, anglers may still cling to the traditional views of panfish management. We surveyed panfish (n=220) anglers on four Minnesota lakes to determine what they viewed as possible causes and remedies to declining panfish populations. Most anglers (37%) viewed over-abundance as a major problem with panfish populations and indicated that harvesting or removing more panfish was an important management tool. Most anglers (51%) felt that the current bag limit (30 daily) was about right, however there was some support (40%) for a reduction to twenty. There was little support for size limits. Anglers were also presented with lake-specific, hypothetical improvements in the bluegill populations and asked if their angling habits would change in response. Anglers on all four lakes indicated that they would likely take two additional fishing trips per year should bluegill populations improve. Assuming catch rates remained constant, these additional trips would increase harvest 20 to 34 percent. Creel survey information also indicates that angling pressure was highly correlated with bluegill size. Without angler education, increased angling pressure may undermine efforts to improve bluegill fisheries. It may also necessary for regulations to be more restrictive to maintain sustainability.

Use of Creel Limits for Managing Minnesota Sport Fisheries
Cook, Mark F., Timothy J. Goeman, Jerry A. Younk, Peter C. Jacobson, and Paul J. Radomski
Minnesota Department of Natural Resources, Fisheries Research, 2114 Bemidji Ave, Bemidji, MN 56601; 218-755-3918; mark.cook@dnr.state.mn.us

Creel limits are ineffective in controlling recreational fish harvest in Minnesota, because few anglers harvest their limit. The harvest of six species of fish was shown to be unequally distributed among all anglers and anglers targeting each species. A perceived social benefit of creel limits promoting a conservation ethic was tested with data from two Minnesota lakes. A more restrictive creel limit on large walleye failed to promote additional voluntary release of large walleyes, thus resulting in no social benefit. We propose reducing creel limits by using a probability angling management strategy to select more appropriate limits. The purpose for establishing new creel limits would be to increase angler satisfaction by lowering limits to a level that anglers should more frequently attain. This strategy would have negligible effects on total annual harvest and affect only a small percentage of anglers who currently harvest a creel limit.

A Historical Examination of Creel Surveys from Minnesota's Lakes and Streams
Cook, Mark F. and Jerry A. Younk
Minnesota Department of Natural Resources, Fisheries Research Unit, 2114 Bemidji Avenue Bemidji, Minnesota 56601

Creel surveys have been the primary tool used to measure the recreational fisheries in Minnesota since 1938. A long-term data set from Lake Winnibigoshish and analysis of all creel surveys by Lake Class both show that fishing pressure has increased on Minnesota's waters. In recent years, the increase in popularity of winter fishing has also added to the fishing pressure Minnesota lakes receive. Distance from population centers, ease of access, month of the year, and lake size were all found to effect the fishing pressure. Both numbers and weight of harvested fish were positively correlated with fishing pressure. Harvest rates were found to be negatively correlated with fishing pressure. Mean size of harvested fish was negatively correlated with increasing fishing pressure. Lake size (acres), percent litteral area, MEI, and TSI were all positively correlated with harvest (both numbers and weight) from Minnesota lakes.

Angler Exploitation of Bluegill and Black Crappie in Four Minnesota Lakes.
Parsons, Bradford G. and Jeffrey R. Reed
Minnesota Department of Natural Resources, Section of Fisheries, 1110 North Lakeshore Drive, Glenwood, MN 56334; (320)634-4573; FAX (320)634-4576; fishgeek@runestone.net

We examined angler exploitation rates of bluegill *Lepomis macrochirus* and black crappie *Pomoxis nigromaculatus* for three years in Lakes Andrew, Le Homme Dieu, Maple, and Victoria in Douglas County of west-central Minnesota. Bluegill > 150 mm and black crappie > 180 mm were caught with trap nets in September and October 1993-1995 and tagged with individually numbered t-bar anchor

tags. Exploitation was estimated through voluntary tag returns, and total mortality was estimated by the rate of decline in reporting of fish tagged in 1993. Tag returns were encouraged through a public information campaign and a modest reward program. Reporting rate was estimated to be 69%. Bluegill exploitation varied among lakes and years and ranged from 9% to 27% on Lake Andrew, 7% to 16% on Lake Le Homme Dieu, 16% to 29% on Maple Lake, and 18% to 27% on Lake Victoria. Black crappie exploitation was consistent across years in Lake Le Homme Dieu (23%) and Maple Lake (26%), increased from 9% in 1994 to 32% in 1996 on Lake Andrew, and declined from 28% in 1994 to 1% in 1996 on Lake Victoria. Average total annual mortality in the four lakes was 75% for bluegill and 59% for black crappie. Growth rates and year class strength affected exploitation rates. Exploitation appeared to negatively affect the size structure of bluegill and black crappie in these lakes.

Initial Effects of Slot Length Limits for Northern Pike in Five North-central Minnesota Lakes

Pierce, Rodney B.
Minnesota Department of Natural Resources, Section of Fisheries, 1201 East Highway 2,Grand Rapids, Minnesota 55744; (218) 327-4452; FAX (218) 327-4263; rod.pierce@dnr.state.mn.us

High exploitation of large fish is a likely contributor to poor size structure in northern pike *Esox lucius* populations. Protected slot length limit regulations, which protect fish within a specified length range, are potential tools for managing size structure in northern pike populations. In this study, either 508-762 mm (20-30 inch) or 559-762 mm (22-30 inch) slot length limits were applied in five small north-central Minnesota lakes. The regulations were evaluated after three or four years at each lake. Angler noncompliance with the slot length limits was higher than expected, with tag returns from illegal fish averaging 19% of the total tag returns across the five lakes. Although there was considerable noncompliance, effects of the regulations were evident in size of fish measured in the creel surveys. Slot length limits directly reduced exploitation of large (>500 mm) northern pike, with the reductions being relatively large compared to pre-regulation exploitation rates and compared to exploitation rates in other reference lakes. After three to four years of regulation, however, the northern pike populations had not yet shown changes in size structure that were consistent across all lakes and sampling methods. The important remaining question from this study is whether or not slot length regulations will create long-term meaningful changes in sizes of northern pike. Only by monitoring effects of the regulations for a longer time will we be able to determine if natural mortality can overwhelm attempts to enhance numbers of large northern pike.

Factors Limiting Juvenile Steelhead Survival in Streams Tributary to Minnesota Waters of Lake Superior

Close, T. L. and C. S. Anderson*
Section of Fisheries, Minnesota Department ofNatural Resources, Duluth, Minnesota 55804; (218) 723©4785; FAX (218) 725©7738; tracy.close@dnr.state.mn.us *Section of Fisheries, Minnesota Department of Natural Resources, St. Paul, Minnesota 55155; (612) 296©0794; FAX (612) 297©7272; charles.anderson@dnr.state.mn.us

Numbers of adult steelhead spawning in many of Minnesota's tributary streams to Lake Superior have declined. Restrictive regulations have been implemented to attempt to halt the decline and information is being collected to develop rehabilitation strategies. Smolt yield from tributary streams may limit the steelhead population and factors limiting the smolt yield are poorly understood. Survival rates were estimated and potential limiting variables measured to develop a linear regression model relating parr survival to environmental factors. Survival rates through two summers of growth varied from 0.7% to 9.0%. Flooding shortly after stocking, substrate diameter, early winter snowfall, summer discharge, and the amount of woody debris were correlated with survival. If increasing smolt yield is desirable, riparian forests should not be logged and beaver should be removed from streams rearing steelhead. Planting conifers in riparian zones is suggested as a long term strategy to discourage beaver infestation. These strategies will probably be implemented most effectively if fisheries managers are members of multidiscipline resource management teams. Experimental addition of woody debris is recommended to verify its limiting effect, and to determine how it functions to improve survival of steelhead parr.

Survival, Growth and Distribution of Stocked Lake Sturgeon in Western Lake Superior

Lindgren, John P., Stephen T. Schram[1], and Lori Evrard[2]
Minnesota Department of Natural Resources, Duluth Area Fisheries, 5351 North Shore Drive, Duluth, Minnesota 55804; [1] Wisconsin Department of Natural Resources, Lake Superior Office, 141 South 3rd Street, Box 589, Bayfield, Wisconsin 54814; [2] U.S. Geological Survey, Great Lakes Science Center, 2800 Lake Shore Drive East, Ashland, Wisconsin 54806

St. Louis River strain lake sturgeon *Acipenser fulvescens* declined in abundance during the late 1800's and early 1900's due to the combined effects of exploitation, pollution and habitat alteration. Since then, exploitation has been reduced with conservative regulations, water quality has improved dramatically and habitat at historical spawning areas has remained relatively unchanged. The

Minnesota and Wisconsin Departments of Natural Resources initiated a lake sturgeon reintroduction program in the St. Louis River in 1983. A total 736,000 fry and 127,900 fingerling Lake Winnebago strain lake sturgeon were stocked in the St. Louis River between 1983 and 1994. Survival and post-stocking distribution were determined by sampling marked fish in the St. Louis River estuary and western Lake Superior with graded mesh gill nets and bottom trawls. Between 1983 and 1997, 578 lake sturgeon were sampled in 15,098 meters of gill net and 182 lake sturgeon in 1080 trawl tows in the St. Louis River. Lake sturgeon were sampled at a higher rate near channelized portions of the St. Louis River and appeared to stay in the estuary 2 to 5 years before entering Lake Superior. Lake sturgeon were not captured in fisheries assessments in western Lake Superior prior to the stocking program but abundance increased dramatically after 1985. Sampling was conducted out to depths of 122 meters, however, over 93% of 520 lake sturgeon caught in 340,929 meters of gill net were sampled in less than 31 meters of water. Lake sturgeon gradually moved in a northeasterly direction along the shallow Wisconsin shore and were captured as far east as the Apostle Islands, a distance of approximately 145 kilometers from the stocking location. Efforts to re-introduce lake sturgeon in the St. Louis River and western Lake Superior have been initially successful.

Direct Behavioral Evidence That the Odor of Larval Sea Lamprey and the Bile Acids They Release Attract Migrating Adults to Spawning Rivers

Vrieze, Lance and Peter W. Sorensen
University of Minnesota, 200 Hodson Hall, 1980 Folwell Avenue, St. Paul, MN 55108; (612)624-8713; lav@fw.umn.edu

We have hypothesized that adult sea lamprey (*Petromyzon marinus*) use the odor of bile acids released by conspecific larvae to locate a spawning river. Previously, we discovered that stream-resident larvae release large quantities of two unique bile acids (petromyzonal sulfate and allocholic acid) to the water where they are detected at low concentrations by migratory adults. We now present compelling behavioral evidence for the importance of this cue in stream location. In a series of experiments, recently captured migrating lamprey were given the opportunity to select between a variety of natural river waters diluted in a 10x2 m two-arm maze supplied with Lake Huron water. Paired tests of rivers revealed that adults consistantly preferred water from the river with the higher larval density. Further, adding larval odor to the less-attractive river resulted in a reversal of preference. Preference for river water over Lake Huron water was eliminated by plugging the lamprey's nose or passing river water through a charcoal filter, suggesting that attraction is mediated by the odor of organic compounds. Finally, when larval odor or purified lamprey bile acids were added to river water lacking larvae, it became more attractive. Application of bile acids could provide an environmentally safe alternative for control of the Great Lakes sea lamprey.

Food Habits of Muskellunge

Burri, T. M. and M. A. Bozek*
Minnesota Department of Natural Resources, 392 Highway 11 E, International Falls, Minnesota 56649; (218) 286-5220; FAX (218) 286-3489 *Wisconsin Cooperative Fishery Research Unit, University of Wisconsin-Stevens Point, Stevens Point, Wisconsin 54481; (715) 346-2178; FAX (715) 346-3624

Little is known about the food habits of muskellunge (*Esox masquinongy*) and their effects on populations of fish. To assess their diet, stomach contents of 1,092 muskellunge (226 to 1,180 mm TL) captured from July 1991 to October 1994 by fyke netting, electrofishing, and angling in 34 Wisconsin water bodies were examined. Fish (N=547) of at least 12 families and 31 species composed 98% of the muskellunge diet, but the main food items eaten were yellow perch (*Perca flavescens*) and white sucker (*Catostomous commersoni*). Food occurred in 34% of the stomachs, with most containing a single item (74%). Occurrence of food decreased as muskellunge size increased and was greatest in muskellunge captured in fall (41%) followed by summer (35%) and spring (20%). Muskellunge ate prey fish ranging from 6 to 47% of their own total length and although length of prey consumed increased as muskellunge size increased, the range of prey sizes eaten also increased. As a result, the size of prey, in proportion to muskellunge length remained the same for all sizes of muskellunge. A majority of prey taxa were eaten by muskellunge of all sizes, although cyprinids and darters were eaten in greater proportion by small muskellunge and catostomids more by large muskellunge. When developing muskellunge management strategies, fisheries managers need to consider the effects of muskellunge diet on resident fish communities.

Heritability of Oviposition Preference and Size at Maturity for the Milfoil Weevil, a Potential Biocontrol Agent for Eurasian Watermilfoil.

Solarz, S.L., R.M. Newman, D.L. Byers*, and R.G. Shaw*
Department of Fisheries and Wildlife, University of Minnesota, 1980 Folwell Avenue, St. Paul, MN 55108-6124; (612) 625-5704; sls@fw.umn.edu; *Department of Ecology, Evolution, and Behavior, University of Minnesota, St. Paul, MN 55108-6124

The heritable genetic contribution to variation in hostplant-preference behavior by insects is unknown. The milfoil weevil, *Euhrychiopsis lecontei*, has demonstrated intraspecific variation in hostplant preference when reared on different plant species. It is critical to estimate the genetic and environmental components of variation in traits such as hostplant preference in order to determinethe potential for an herbivore (e.g., the native *E. Lecontei*) to adapt to novel plant species (e.g., the exotic Eurasian watermilfoil). We conducted an experiment to determine the sources of variation in oviposition preference and size at maturity among progeny of weevils collected from both Eurasian- and northern-watermilfoil source populations. We found that regardless of source population, weevils reared on Eurasian preferred it for oviposition over other watermilfoils offered and that they were significantly larger than weevils reared from egg to adult on northern. We also found that weevils reared on Eurasian exhibited high heritabilities for both oviposition preference and length traits, whereas weevils reared on northern watermilfoil exhibited lower heritabilities for these traits. Our results suggest that for weevils reared on northern, there is little potential for short-term evolutionary response to selection on these traits. In contrast, weevils rearedon Eurasian show substantial potential for adaptation to different hostplants.

Land development alters urban and rural aquatic ecosystems

Mark C. Hove
Department of Fisheries and Wildlife, 1980 Folwell Avenue, University of Minnesota, St. Paul, MN 55108; (612) 624-3019; Mark.Hove@fw.umn.edu

Natural resource managers are increasingly using bioassessment methods as a more integrated way to assess stream integrity. This project used Rapid Bioassessment Protocols developed by the U. S. Environmental Protection Agency (Plafkin et al. 1989) to survey twenty-five sites in the Big Sandy Lake watershed (north central Minnesota) and thirteen sites in the Phalen Chain of Lakes Watershed (east central Minnesota) in 1996-97. Land-uses in the Sandy watershed include agriculture, state forest and park land, and some residential development. The Phalen watershed is located in a large metropolitan area. Land-uses are primarily residential or commercial development. Two sub-drainages in the Sandy watershed and most reaches in the Phalen watershed have been channelized to varying degrees. Certain habitat and indices for aquatic invertebrates and fish communities were lowest in channelized reaches of the Sandy watershed. Most sites in the Phalen watershed showed relatively low habitat quality, with invertebrates and fish communities dominated by pollution tolerant species; no strong trends were evident between streams. Changes from pristine conditions are difficult to identify in the Phalen watershed due to lack of undisturbed reference sites. From an ecological perspective, restoring the integrity of the Sandy watershed will probably be easier than that of the Phalen watershed because: (1) less of the watershed has been altered from its original state, (2) organisms in healthy portions of the Sandy watershed can recolonize to rehabilitated sites, and (3) exotic fish and invertebrates are not present.

Mussel Power: Advances in Native Mussel Biology and Management

Mark C. Hove
James Ford Bell Museum of Natural History, University of Minnesota, 1980 Upper Buford Circle, St. Paul, MN 55108; (612) 624-3019; Mark.Hove@fw.umn.edu

Rising interest in native freshwater mussels has stimulated exciting advances in research and management. Life history studies have revealed fascinating strategies used by mussels to increase reproductive success, sense surroundings, and ensure juvenile survival. Recent surveys in Minnesota and other states reveal broader geographical ranges than previously known for some mussel species and extinction for others. Dramatic progress in genetic technology provides managers with tools to catch poachers, identify previously indistinguishable mussel life stages, and resolve ambiguous taxonomic relationships. Dedicated individuals and the Internet have made possible: rapid dissemination of research and management insights, access to numerous databases, and the first nation-wide effort to conserve and manage freshwater mussels. Much of this work brings together the energy and talents of state agencies, federal agencies, universities, school groups, and commercial harvesters. These advances will be important in managing the nation's most threatened group of organisms.

Poster presentations:

Organizing Minnesota's freshwater mollusks into a GIS-compatible database

Mark Hove[1], Mark Nelson[2], Susan Weller[1], Richard Buech[2], and Robert Bright[1]
1 James Ford Bell Museum of Natural History, University of Minnesota, St. Paul, MN 55108; (612) 624-3019; Mark.Hove@fw.umn.edu
2 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 5769 lots; 5178 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. 2083 records have recently been entered into the literature database. 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 land-use 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.

Lake Superior Comparative Watershed Study: A Framework for Evaluating the Impacts of Forest Fragmentation on North and South Shore Streams

N. Detenbeck, J. Brazner, S. Bertelsen, V. Snarski, D. Tanner, D. Taylor, and J. Thompson
U. S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Mid-Continent Ecology Division, 6201 Congdon Blvd., Duluth, MN 55804

The goals of this recently initiated project are to determine the effects of forest fragmentation on hydrology, sedimentation, water quality, nutrient transport, and biotic community structure and function in streams, as well as the role of wetlands in the surrounding watersheds in mediating effects of forest fragmentation. GIS characterization of all second and third order watersheds draining into the western arm of Lake Superior for size, mature forest cover, recent logging, and wetland coverage allowed us to select twelve watersheds from each of two hydrogeomorphic regions to examine differences in response to landscape treatment factors associated with differences in hydrogeomorphology. Fieldwork began in the summer of 1997 and will continue through 1998 for the initial phases of this project. Because landscape structure determines movement of abiotic and biotic materials within and between watersheds, disturbances are expected to impact ecosystem function differently in different regions. Once the link between landscape structure and ecosystem function is established, watersheds will be classified and ranked by sensitivity to stressors or resilience of component ecosystems. This will allow extrapolation of risk across watersheds in a given class. We also expect to be able to predict likely impacts of land-use changes on ecosystem function and biotic condition in watersheds from a variety of hydrogeomorphic regions elsewhere in the Lake Superior Basin. Ultimately we hope to use this research as a case study to test a conceptual model of watershed vulnerability, which could serve as a basis for watershed classification throughout the Great Lakes region.

Division Technical Committees

Centrarchid Technical Committee
Next Meeting: Look for notice in next newsletter

Salmonid Technical Committee Meeting
Next Meeting: Look for notice in next newsletter

Esocid Technical Committee
Next Meeting: Look for notice in next newsletter

Walleye Technical Committee
Next Meeting: Look for notice in next newsletter

Minutes of Chapter Meetings

MINUTES
ExCom Meeting - October 21, 1997.
Present: Goeman, Bylander, Close, Drake, Glander, Hove, Kallemeyn, Kingsley, Negus, Parsons, Radomski, Reed, Schneider, Stauffer, Westerlund.

Meeting was called to order at 10:00 by Tim Goeman, President. First agenda item covered was a report by Goeman of accomplishments/progress on the 1997 Annual Action Agenda (AA).
AA Item 1 - Sponsor 1 or 2 continuing education workshops during the year.
Progress is being on meeting the goal established for this item. The watershed restoration workshop will be held in January. Interest appears to be strong for this topic. Speakers and presenters have been contacted and most time slots have been filled.
AA Item 2 - Organize a low-cost annual meeting.
Contract to hold meeting at Camp Ripley has been finalized. Meeting will be held in February and details will be published in the next newsletter. Total cost will be around $50 per person. Includes meals, lodging and meeting room.
AA Item 3 - Develop and publicize a position paper on fish stocking.
Kallemeyn has been asking for volunteers to help with this effort. Tom Jones has agreed to help. Target for this paper is the lay audience. Bylander also offered to help, in particular with focusing the position paper on the general public.
AA Item 4 - Legislative Activities.
Reed reported that the best option may be to "buy a seat" on the FWLA. This would give us access to a paid lobbyist. Reed will check further into the details and report back at the next ExCom meeting.
AA Item 5 - Encourage agency administrators to participate in Chapter activities.
Letters have been sent and other contacts made to several agency administrators to encourage their participation in the Chapter. Also, contacts have been made by Goeman concerning annual meeting attendance by administrators.
AA Item 6 - Sponsor publication of an article highlighting AFS in high-profile popular press outlet. Goeman sent inquiry letters to five high profile publications (Outdoor Life, Field & Stream, etc.) to determine interest in articles from the Chapter. Field & Stream was the only publication that expressed interest and agreed to buy and publish an article that Goeman had written. Goeman distributed copy of galley proof that was purchased by F&S. F&S editor indicated that they would like to publish additional articles. (Secretaries note: payment of $800.00 has been received from F&S for Goeman's article " Where Is the Bite." This has some potential as a fund raising activity for the Chapter. Members that are interested in developing articles for popular publications should contact Goeman. It was also suggested that the Public Awareness chair spearhead such an effort.
AA Item 7 - Publish Action Agenda in Chapter newsletter.
Action Agenda was published in May 1997 issue. Action Agenda will also be posted on the Internet home page.
AA Item 8 - Investigate possibility of providing an AFS display at MN State Fair.
Chapter display was set up in the DNR building at this year's state fair. An application had been submitted to the state fair for our own booth, but was not successful. ExCom decided not to pursue a state fair booth, but will continue to use space in the DNR building. Will need to submit request to DNR on annual basis. Bylander suggested that the Chapter display be redesigned to reach a larger audience. T-shirt sales at the state fair accounted for 12% of the sales at the DNR building. However, the Chapter did not recover all of our cost. Bottom line was that we are still $1,600 short of covering costs, but still have 300 plus t-shirts on hand. VanOffelen is working with DNR to sell remainder of the shirts.
AA Item 9 - Plan and coordinate a "rivers, watersheds, and fisheries" workshop in NW Minnesota in 1998.
Glander has contacted organizers of the 1998 Local Water Planners Conference that will be held in Crookston next year. Glander suggested to the organizers that the MN AFS would like to host a breakout session. Awaiting reaction at this time.
AA Item 10 - Request DNR to consider a policy change regarding funding annual meeting expenses for DNR employees.
Progress is being made, but there is still some confusion on how this is being interpreted in the DNR. Recent suspension of an Operational Order apparently clears the way for Divisions and Sections to approve expense reimbursements to employees attending professional society meetings. Decision by DNR will likely be left up to Division and Section heads.

Committee Reports
Awards - Westerlund reported that no nominations have been received for the Award of Excellence or the Special Recognition award. In discussion that followed, a person was nominated for each of the aforementioned awards. ExCom approved these nominations and names will be announced at the annual meeting. Members are encouraged to send additional nominations for the Special Recognition award. Send nominations to Julie Westerlund.
Membership - Kingsley reported that current membership is 208. Kingsley has contacted delinquent members to try to

encourage them to get their membership current. There are 39 delinquent members at this time. So far, six delinquent members have updated their membership
FIN - Reed suggested that the Chapter may want to get proactive in the fishing tournament issue. Should consider drafting a position paper.
Newsletter - Radomski reported that two issues (May and September) have been published since the last ExCom meeting. Next issue will be out soon. Results of the questionnaire on publishing the newsletter electronically had 40 people responding that they would accept this format. Radomski suggested that this was not enough interest to pursue the electronic format at this time.
Radomski also stated that the Chapter needs to consider splitting duties of the newsletter editor due to the time commitment. Westerlund volunteered to help.
Nominations - Drake reported that nominations are still needed in the ExCom Open and Federal categories. She will make additional contacts to try to fill these areas. Election forms will be distributed in the next newsletter.
Procedural Manual - Nothing new to report
Public Awareness - Bylander will work with Steve Quinn to redesign the Chapter display
Resolutions - no report
Rivers and Streams - Nothing new to report. Glander will attend NCD Rivers and Streams meeting in Milwaukee.

Presidents Report
1. Goeman was invited to respond to the proposed variance to state fishing tournament rules for the walleye tournament in Duluth. DNR had solicited comments for a proposed rule change that would allow DNR to allow variances to established regulations on a case by case basis for tournaments. Goeman prepared a response on the behalf of the Chapter indicating that the Chapter did not support such a rule change.
2. Nominated the Minnesota Chapter to the NCD for the best chapter award.
3. Attended the annual AFS meeting in Monterrey.
4. Contacted DNR Fisheries Chief Jack Skrypek to ask that the Chapter be invited to the Fisheries Roundtable. If invited, a non-DNR member would represent the Chapter. Suggestion was made, and agreed upon, that Mark Hove would represent the Chapter at this years Roundtable.
Chapter AFS brochures have been printed. Suggestion was made to send a small quantity to all DNR Fisheries offices, legislators and other principal contacts. Bylander will pursue and do the mailing.
5. One application for the Student Travel Grant was received by Goeman. ExCom approved awarding the travel grant to Bill Ardren. Goeman will notify NCD of the award. NCD will match the $100 award from the Chapter.
6. Goeman has the draft NCD program of work. If anyone would like to review, please contact him.
7. Vondracek may attend the next NCD ExCom meeting in Goeman's place.

New Business - none
Old Business - none
Meeting Adjourned

Upcoming Events

February 24-26, 1998. Minnesota Chapter Annual Meeting. Camp Ripley. Contact Bruce Vondracek 612.624.3421.

March 17-21, 1998. Applications of Landscape Ecology in Natural Resource Management: 13th Annual U.S. Landscape Ecology Meeting. East Lansing, Michigan. Contact Bill Talyor 517.355.1810.

March 23-25, 1998. Riparian Management in Forest of the Continential Eastern U.S. Columbus, Ohio. Contact Nancy Walters, North Central Forest Experiment Station, 612.649.5256, Nwalters/nc@fs.fed.us.

May 3-6, 1998. National Conference On Environmental Decision Making. Knoxville, Tennessee. Conference information is available on the NCEDR web site at: http://www.ncedr.org. Contact: UT Conferences at 423.974.0280 or via e-mail to: conferences@gateway.ce.utk.edu.

May 3-6, 1998. Watershed Management: Moving from Theory to Implementation. Denver, Colorado. Contact the Water Environment Federation at 703.684.2400.

May 14-15, 1998. 25th Annual Conference on Ecosystem Restoration and Creation. Tampa, Florida. Contact Frederick J. Webb 813.757.2104, email webb@mail.hcc.cc.fl.us.

June 7-12, 1998. The Land-Water Interface: Science for a Sustainable Biosphere. American Society of Limnology and Oceanography and Ecological Society of America. St. Louis. Contact ASLO at 1.800.929.ASLO.

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

July, 1998. An International Burbot Symposium. Presented by the International Congress on the Biology of Fishes. Towson State University, Baltimore, Maryland. Contact Vaugh Paragamian 208.769.1414, email: vpaagam@idfg.state.id.us.

August 2-6, 1998. Ecological Society of America Annual Meeting. Ecological Exchanges between Major Ecosystems. Baltimore, Maryland. Contact Fred Wagner 801.797.2555.

August 16-20, 1998. Integrated Tools for Natural Resources Inventories in the 21st Century - An International Conference on the Inventory and Monitoring of Forested Ecosystems. Boise, Idaho. For details see http://dendron.fr.umn.edu/burk/boise, or contact Mark Hansen, USDA Forest Service, North Central Forest Experiment Station, 1992 Folwell Avenue, St. Paul, MN 55108 USA. Fax:612-649-5285. Email: hanse034@maroon.tc.umn.edu

October 5-7, 1998. Fifth International Conference on Remote Sensing for Marine and Coastal Environments. San

Diego Princess Convention Center, San Diego, California. Tel: 313.994.1200, ect. 3234. Fax: 313.994.5123. Internet: wallman@erim.org.

June 1999. Fourth International Airborne Remote Sensing Conference and Exhibition. Ottawa, Ontario, Canada. Tel: 313.994.1200, ect. 3234. Fax: 313.994.5123. Internet: wallman@erim.org. See ERIM Conferences URL WWW: <http://www.erim.org/CONF/conf.html>

Contributions: Letters and Commentary

Large River Studies Center Established at Winona State University by Michael Delong

The Large River Studies Center (LRSC), a new research/educational center, has been established at Winona State University to provide undergraduate students the opportunity to conduct research on large river ecosystems and associated bodies of water. The center is administered by the Winona State Department of Biology. The program was organized by Dr. Michael Delong, Associate Professor of Biology and Director of the center. A major role of the center is to allow students to participate one-on-one on a research project from its development, to the collection and analysis of data, and the writing of a summary research paper. Students are also expected to present their findings at local and regional scientific meetings. Since its inception in 1995, Over 20 students have completed or are completing research projects. Although the focus of the LRSC is the upper Mississippi River, students have had opportunities to travel and work on the Missouri and middle Mississippi Rivers. Projects have included studies of: the population dynamics of zebra mussels; fish and invertebrate interactions with zebra mussels in the Mississippi River; habitat use by fish; and the trophic structure of large river ecosystems.

An additional mission of the LRSC is to serve as source of information on large rivers for the general public and scientific community. A web page is currently under development to help meet this task. The web page will contain general information about the river and will contain a bibliography of scientific literature available on large rivers (based upon documents received by the center). Individuals will also be able to access reports and publications completed by students and faculty of the LRSC. When completed, the web page will be accessible through the WSU Biology server (http://bio.winona.msus.edu/). For additional information contact Mike Delong (507-457-5484; mdelong@vax2.winona.msus.edu). Dr. Michael D. Delong Associate Professor and Director Large River Studies Center Biology Department Winona State University Winona, MN 55987 507-457-5484; FAX 507-457-5681

A review of the paper "Risk" in fisheries management: a review* (R.I.C.C. Francis and R. Shotton, authors) by Lynn Mizner Maher

Francis and Shotton have provided an excellent review which takes a fresh look at some of the fundamental relationships between fishery scientists and those involved with fishery management. The authors have avoided complex mathematical and statistical discussions in favor of presenting a discussion on the influence of political pressure, the evolution of risk assessment and management, and the use of language and scientific models in communicating about risk.

A review of the current fisheries literature confirmed the existence of a widespread perception that there are more failures than successes in modern fisheries management. This perception has focused attention on how institutions involved in fisheries management operate. It has also led many fishery scientists and policy analysts to emphasize the importance of incorporating some discussion of the uncertainty, or risk, involved in the acceptance of various management strategies. Where stock assessments are highly controversial and political, some open analysis of risk may be useful to "allay possible concerns about the scientific advice".

Increasing public awareness and concern about the management of natural resources will likely lead to greater public influence in fisheries management decisions, according to the authors. This influence will manifest itself in ways such as the adoption of the U.S. Department of Commerce "602 Guidelines" which require fishery management agencies to address, in a quantitative manner, such concerns as overfishing and stock recovery. The implementation of a precautionary approach, long used to define acceptable risk in health and pharmaceutical matters, will also become more common in natural resource policy. The FAO code of conduct for responsible fisheries states, "Management according to the precautionary approach exercises prudent foresight to avoid unacceptable or undesirable situations, taking into account that changes in fisheries systems are slowly reversible, difficult to control, not well understood, and subject to change in the environment and human values."

A discussion of the relationship between "error" and "uncertainty" is followed by the categorization of uncertainty into six types that are important sources of risk in fisheries management. These are explained at length in the paper, but are called "process, observation, model, estimation, implementation, and institutional uncertainty.

In discussing the terminology of risk, *i.e.* definitions of terms like "risk" and "risk analysis" the authors are mindful of the

criterion, "how well do such terms help managers make the 'best decision?'" They conclude it is most useful to refer to the FAO guidelines and use the term "risk" to mean, "the probability of something undesirable happening", and reserving the terms "expected loss" or "average forecasted loss" for quantities encompassed by decision-theoretic definitions.

The formulation of advice for fisheries managers ("risk assessment"), and the use of that advice by managers to make decisions ("risk management) are seen as the two stages of dealing with risk in fisheries. Together the authors call these two stages "risk analysis". Risk assessment involves using information on the status and dynamics of the fishery to present fishery managers with probabilistic descriptions of the likely effects of alternative future management options. Formal risk management entails a description of very specific decision criteria which will be used to define the quantities that should be calculated in the risk assessment, and to make the management decision. Once an acceptable management option has been found, it should be, according to the decision criteria, preferable to all other options considered.

A detailed description of the inputs and outputs involved in risk assessment is followed by a discussion of the problem of presenting advice to fishery managers with respect to uncertainty and risk. This problem involves the choice of performance measures, and decisions about the complexity of the presentation. Although there are a bewildering array of possible performance measures, the authors recommend considering three criteria. The measures should be readily understandable to managers *and other stakeholders* (my emphasis); a performance measure should show contrast between alternative management options; and, it must be related to management objectives. Selection of a type of presentation involves choices about how to best present uncertainty, how to distinguish between "true" and perceived states of a modeled fishery, and how simple (or complex) to make the models.

The take home message for me in this paper, was that there is a great need for an explicit statement of management objectives so that the risk assessment can better support management decisions. There is potential to improve the practice of fisheries risk management by making it more formal and less in the category of "negotiations in smoke-filled rooms." This change could produce benefits which include:

- Fisheries would be better managed, because the available data would be better used
- Decision-making would be more transparent and better documented
- There would be more strategic planning and fewer ad hoc decisions
- Debate on the management of individual stocks would be more constructive (and perhaps less heated because the focus would shift from annual harvest rate decisions to the criteria on which those decisions should be made, and
- More formal risk management also allows (and even encourages) the construction of standards against which to evaluate, and thus improve, the effectiveness of fisheries management. [What we know as adaptive management.]

This review should be required reading for all fisheries professionals, in research as well as management. The authors have done a thoughtful job of pulling together primary literature and case studies in an attempt to create some consistent terminology for communication about this increasingly important topic.

*Can. J. Fish. Aquat. Sci. 54:1699-1715 (1997)

Fisheries Information Network

By Jeff Reed

Talk to Jeff at the Annual Meeting!

Interesting Articles and Publications

Paul J. Wingate recommends the following Minnesota DNR publications for your reading pleasure:

Investigation Reports
143, 182, 193, 231, 247, 257, 285, 312, 314, 338, 340, 346, 348, 360, 371, 377, 381, 387, 388, 390, 391, 392, 394, 395, 396, 400-462

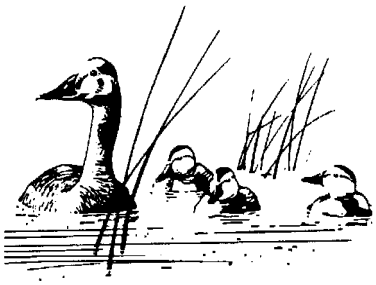
Fish Management Reports
20, 29, 30, 32

and Special Publications
53, 120, 132, 135, 138, 140, 141, 143, 144, 147, 148, 150, 151.

These publications should be available at each Area Fisheries Office or you can request them from the DNR Library in St. Paul.

Customers, Constituents, and the Public Trust. Dennis McEwan. Fisheries 22(12):4. In a nation overrun with Ferengies, Mr. McEwan gives a strong message that the current pervasiveness of business theory in natural resource management is dangerous and stupid. Down with customers, up with Public Trust!

Vital Signs 1997. Lester Brown, et al. This book documents global trends. It is the 6th book in the series produced by the Worldwatch Institute.



Editorial

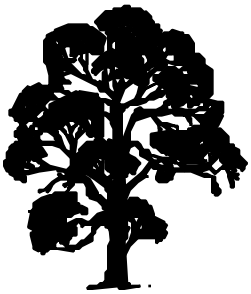
The editor invites insightful comments and opinions for guest editorials.

Of Interest

Retirements:

Dr. Daniel Coble, Leader of the Wisconsin Cooperative Fishery Unit at UW-Stevens Point for 26+ years, has announced his retirement. Seventy-seven students obtained M.S. Degrees through the Unit, and Dr. Coble was the major professor for 37 of them. Dr. Coble was one of the founding fathers for the Wisconsin Chapter--he served as the first president of that Chapter. Dr. Coble plans to enjoy his retirement in Wisconsin. [Wisconsin Chapter newsletter]

Dr. Peter J. Colby, has retired as a research scientist with the Ontario Ministry of Natural Resources. His work on walleye during his position of Unit Leader of the Walleye Unit in Thunder Bay is well respected. Dr. Colby is now associated with Lakehead University as an adjunct professor and research scientist emeritus. [Fisheries Management Section Newsletter, fall issue]



Fish Software Gets Upgrade Model Aids Researchers, Resource Managers

Wisconsin Sea Grant researchers have developed an updated version of "Fish Bioenergetics," a computer software program that gathers data about how fish collect and spend energy, a process scientists call bioenergetics. "For fishes, growth is the most easily measured component of the energy budgeting process," said Wisconsin Sea Grant researcher James Kitchell. "Growth integrates the array of environmental variables affecting an individual fish." The new version of Fish Bioenergetics is done in Windows 95 ®, Kitchell said, making it faster and more user-friendly. "It allows people to interact more with the model," he added. Other new features allow users to model how fish cycle nutrients and how contaminants such as PCBs and mercury bioaccumulate (or build-up) in fish. The Fish Bioenergetics model was originally developed to help evaluate the effect of salmon stocking on Lake Michigan's forage fish base, which supports a billion-dollar sport fishery. The model predicted that forage fish populations would decline if fishery managers continued to increase salmonid stocking rates. That prediction proved to be correct. Today, the model serves as one of the tools used to guide Great Lakes stocking decisions and is used by fisheries managers and researchers nationwide. It is suitable for use in graduate and advanced undergraduate courses in animal physiology and fish biology. CONTACT: James Kitchell, Wisconsin Sea Grant Researcher, (O) 608-262-9512; E-Mail: kitchell@macc.wisc.edu [Sea Grant]

Local Populations Go Extinct Up To 8 Times Faster Than Entire Species by Janet Basu

The cod is not in immediate danger of extinction, yet populations of cod in the Atlantic have been so badly depleted that fishing communities in North America and Europe have lost a traditional source of livelihood for generations to come. The blue spruce is not likely to be wiped off the face of the earth soon, yet every time a large forest is clear-cut, the loss affects not only the animals and other species that lived there, but communities damaged by downstream erosion and landslides, and the global balance of greenhouse gases that the trees would have helped to absorb. That is why the loss of populations of plants, animals and other species may be as, or more, significant than the extinction of an entire species, three Stanford scientists say in an article in the Oct. 24 issue of the journal Science. While species are being lost globally with alarming speed - the highest rate since the mass extinction that included the dinosaurs - they calculate in their study that separate populations that make up various species are going extinct at a rate three to eight times faster. "You could destroy all of a species' populations but one, and the species still exists," said Jennifer Hughes, lead author of the study. "However, you would have lost the benefits supplied by those populations. This is a tremendously important dimension of biodiversity which is often ignored." Hughes is an ecologist at Stanford's Center for Conservation Biology. She conducted the study with Gretchen Daily, Bing Interdisciplinary Research Scientist, and Paul R. Ehrlich, the Bing Professor of Population Studies, at Stanford.

The scientists calculated that there were one billion to six billion populations on Earth. They then estimated that, by a conservative calculation based on known rates of habitat loss, populations are going extinct at a rate of 0.8 per cent per year, or 1,800 populations per hour, in tropical forests alone. In contrast, species loss in tropical forests has been predicted in other studies to occur at a rate between 0.1 and 0.3 per cent each year, or 2 to 5 species per hour. The loss of populations therefore is occurring 3 to 8 times faster than species loss. The loss of populations is significant because most of the benefits provided by individual species, or species working together in an ecosystem, are local and regional. For example, each population of a seafood or timber species that survives is available as a stock to be harvested. Each population of a particular species of plant has a slightly different genetic makeup - genetic material that may make a

difference in the development of pharmaceuticals or the improvement of agricultural crops. "About half of the annual increase in crop production comes from the incorporation of new genes from populations of wild relatives that confer enhanced resistance to pests, disease, soil salinity and so on," Hughes said. Perhaps the most important benefits that populations provide are in the form of ecosystem services, the authors write. "Natural ecosystems supply a wide array of services to society whose full value is enormous, but often ignored," Daily said. These include purification of air and water, stabilization of climate, detoxification of waste, generation and maintenance of soil fertility and pollination of crops. Local populations also deliver global ecosystem services, the Stanford scientists said. The impact of the loss of populations from an area will not always be restricted to the immediate area, but will often affect a wider region, and at times, the entire globe. "Although populations operate at a local scale, they are responsible for producing services that are far-reaching," Hughes said. The blue spruce is an example: "The large-scale destruction of tree populations from a Canadian coniferous forest would influence the global balance of greenhouse gases in the atmosphere even if no species were exterminated." The authors conclude that current conservation strategies, which focus on individual species, will not be sufficient to protect the benefits that humanity derives from biodiversity. "It is critical to go beyond saving certain species. Habitats must be conserved for the preservation of biodiversity and the life support systems that maintain human civilization," Hughes said. In his "Perspectives" essay, Myers states that Hughes' findings about population loss raise critical questions for the foreseeable future. "If we lose, say, half of all species plus 90 percent of the populations of surviving species, which will be more detrimental for the biggest [ecosystem] service of all, environmental maintenance of the biosphere?"

News from Around the World Submitted by Kate Wing and others

Great White Shark Protection. On Dec. 17, 1997, Australia declared the great white shark to be a protected species. [Assoc Press]

VA Shad Moratorium. On Dec. 16, 1997, the VA Marine Resources Commission voted 5-1 to continue a 4-year moratorium on commercial fishing for shad, based on the limited knowledge of the health of this resource. [Assoc Press]

Mercury Contamination. On Dec. 16, 1997, Citizens for a Better Environment (CBE) and the Environmental Law and Policy Center (ELPC) released two reports: 1) "Gone Fishing: How the Failure to Reduce Mercury Emissions Threatens Americans' Health" by California Communities Against Toxics, and 2) "Catching the Limit: Mercury Contamination of America's Food" by the Environmental Working Group (EWG). These reports allege that federal and state officials have failed to protect the public from the dangers of mercury in the environment. Nationwide, more than 1,660 waterbodies (including 693 in MN and 389 in WI) are reported to be affected by fish consumption advisories relating to mercury, nine states have statewide advisories against consumption of certain fish due to mercury, and FDA is reported to have listing the top five foods containing mercury as canned tuna, haddock, tuna-noodle casserole, shrimp, and fish sticks. In mid-December 1997, the NJ Depts. of Health and Senior Services, Environmental Protection, and Agriculture issued a brochure, "A Woman's Guide to Eating Fish and Seafood", that includes a warning against eating excessive canned tuna fish. Federal Food and Drug Administration officials were reported as characterizing this advice as extreme. [CBE/ELPC press release, EWG press release, Assoc Press]

Fish Population Assessment Report. On Dec. 9, 1997, the National Research Council issued a report, entitled "Improving Fish Stock Assessments," on the difficulties of conducting useful fish population assessments. This report was commissioned by NMFS in 1995. The report cautioned that data underlying current stock assessments are inadequate for precautionary management as required by the Magnuson Act, and recommended that an independent panel of experts conduct a complete review of how data are collected from commercial fisheries. [Assoc Press, NOAA press release]

Atlantic Salmon Recovery. On Dec. 15, 1997, Secretary of the Interior Bruce Babbitt endorsed the state of ME's 400-page conservation management plan for Atlantic salmon restoration in 7 watersheds and withdrew a petition to place the species on the federal list of endangered species. This endorsement was shared by NMFS. However, RESTORE: The North Woods, the group that had filed the petition, criticized the state's plan, and is considering legal challenge. ME's Dept. of Inland Fisheries and Wildlife reportedly will require $3 million to $4 million to implement the state plan, while the total federal, state, and private costs over 6 years is projected to exceed $15 million. Both the U.S. Fish and Wildlife Service and NMFS will annually review the state plan's effectiveness. [Dept. of the Interior press release, NOAA press release, Assoc Press]

Lake Huron Perch. This December the Lake Huron Citizens Fishery Advisory Committee met in Saginaw, MI, to discuss the declining perch harvest, its possible causes, and management options. While sport fishermen blame excessive commercial harvesting, state management biologists suggest near-record lamprey abundance and/or alewife predation are more likely at fault. Citizens are suggesting a one-month closure of all fishing when perch spawn

should be imposed. [Assoc Press]

Colorado Trout Stocking Critique. On Dec. 11, 1997, Trout Unlimited released a study of the CO Div. of Wildlife's trout stocking program, "Fishing for Answers: Status and Trends for Coldwater Fisheries Management in Colorado," highlighting concerns for threats to native and wild trout populations. The report includes recommendations for improving the stewardship of CO fisheries. [Trout Unlimited press release]

Bull Trout. On Dec. 8, 1997, federal District Court Judge Robert Jones ordered the U.S. Fish and Wildlife Service (FWS) to once again consider Endangered Species Act listing for bull trout throughout its range. Judge Jones found FWS arbitrary and capricious on 5 different issues, and declared FWS had acted improperly by using 1996 policy on the 1994 administrative record. [NW Fishletter No. 49]

Paddlefish and Sturgeon Meetings. On Dec. 5, 1997, the U.S. Fish and Wildlife Service announced 2 public meetings (New York City on Jan. 17, 1998, and Los Angeles on Jan. 27, 1998) to discuss the implementation of the listing of all sturgeon and paddlefish in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which becomes effective on Apr. 1, 1998. The meetings will focus on aspects of importation of caviar and other sturgeon products into the United States. [Fed. Register]

Wallop-Breaux Extension. On Dec. 1, 1997, President Clinton signed P.L. 105-130, the Surface Transportation Extension Act of 1997, containing language that continues making a portion of motorboat fuel and small-engine gasoline taxes available to fund the Wallop-Breaux Sport Fish Restoration Program through the end of FY1998. This legislation also provides for retroactive transfer of these funds from Oct. 1, 1997. [U.S. Fish and Wildlife Service press release]

Freshwater Mussels. In late November, a MN couple was indited by a federal grand jury in Des Moines, IA, on charges of transporting and selling tens of thousands of mussels illegally harvested in MN and ND inland waters in interstate commerce -- a Lacey Act violation. The mussels were allegedly bound for Japan, and caught by U.S. Fish and Wildlife Service enforcement agents. On Dec. 3, 1997, the WI Natural Resources Board approved a prohibition on the harvesting of washboard mussels, subject to review by the WI Assembly's Natural Resources Committee. [Assoc Press]

Whirling Disease. In late November 1997, the CO Division of Wildlife estimated that it would cost the Division $8 million to fight whirling disease during the next fiscal year, and an additional $10 million may be required. These funds would be used to secure clean water at hatcheries, to install water treatment facilities, and to improve the condition of raceways and ponds. [Assoc Press]

European Whaling Hearing. This fall the European Parliament's Committee on Fisheries, meeting in Brussels, has tentatively scheduled a hearing on whaling management systems and lessons from whaling that might be drawn for fisheries. [High North Alliance News]

Striped Bass ITQs. This fall the VA Marine Resources Commission held a public hearing on and then unanimously approved a proposal to allocate individual transferable quotas (ITQs) to fishermen who harvest striped bass in VA waters. The program will begin Feb. 1, 1998, with quota allocation to be based on fishing gear type. [Assoc Press]

Fish by Satellite. This fall the Orbital Imaging Corp., a subsidiary of Orbital Science Corp. (Dulles, VA), announced its SeaStar Fisheries Information Service, providing daily fish finding maps based on imagery from its OrbView-2 satellite of ocean conditions. Now conducting a trial with 50 fishing vessels, full commercial operation is anticipated by Jan. 15, 1998. [Dow Jones News]

OR Steelhead Strategy. On Dec. 18, 1997, OR officials released the state's steelhead trout strategy (officially the "steelhead supplement to the Oregon Plan for coho salmon"), relying on local watershed councils and encouraging landowners to voluntarily restore fish habitat, in an effort to forestall federal listing of additional steelhead trout populations as threatened or endangered species. NMFS is scheduled to decide the status of these steelhead populations by Feb. 9, 1998. A state legislative oversight committee approved $1.3 million to fund the steelhead strategy.[Assoc Press]

Columbia River Water Rights. On Dec. 9, 1997, the WA Dept. of Ecology held the first of 6 scheduled hearings in eastern WA on developing interim regulations to evaluate applications of new water rights on the Columbia River. In 1992, WA imposed a moratorium on the issuance of new water rights for Columbia and Snake River water in response to the initial listing of several salmon populations as threatened or endangered. The WA Legislature lifted the moratorium for Columbia River water earlier this year, contingent on the implementation of amended regulations for water allocation and in-stream flow. [Assoc Press]

WA Wild Salmon Policy. On Dec. 5, 1997, the WA Fish and Wildlife Commission unanimously adopted the state's Wild Salmonid Policy, establishing guidelines for protecting and restoring wild salmon stocks. None of the 20 western WA tribes involved in negotiations on the Policy has elected thus far to sign the Policy, but half are anticipated to be willing to sign within the next month after various details are settled. In addition, the Commission adopted documents to be used in negotiating specific cooperative watershed agreements with tribes and local governments to improve management of salmon stocks. [Assoc Press]

Sea-Run Cutthroat Trout ESA Petition. On Dec. 5, 1997, a coalition of conservation and sport fishing groups submitted a petition to NMFS requesting the declaration of sea-run cutthroat trout along the Pacific coast as endangered.

Although NMFS responded that it is already reviewing this and other trout species with an initial decision anticipated by December 1998, the coalition chose to file a formal petition. [Assoc Press]

OR Salmon Poll. In early December 1997, The Oregonian released the results of a telephone poll of 514 Oregonians, indicating that 85% thinks its important to preserve salmon runs; 38% would pay $5 or more per month to help salmon; while 29% of those in eastern, agricultural OR support removing Snake River dams, 41% of those in Portland and the Willamette Valley would support such an effort; 60% believe improving salmon runs should be a higher priority than other commercial uses of the rivers; and 60% feel salmon restoration funding has been ineffective. [Assoc Press]

Anti-Barging Campaign. On Dec. 2, 1997, a coalition of seven ID conservation and sport fishing groups announced the launching of a new campaign to legislatively ban barging of juvenile salmon downstream around Columbia and Snake River dams. [Assoc Press]

WA Salmon Farming. In mid-December 1997, Global Aqua USA was ordered by the WA Dept. of Ecology to report on the July 18, 1997, accidental release of 300,000 Atlantic salmon when a towed net pen ripped, how it will prevent any more releases, and how the impact of this accidental release might be minimized. The WA Pollution Control Hearing Board was scheduled to begin hearings on proposals by environmental groups that net pen operations be more restrictively regulated. [Assoc Press]

Infectious Salmon Anemia. In December, New Brunswick's Fisheries Minister ordered the destruction of all farmed Atlantic salmon in affected cages in the Bay of Fundy, due to the discovery of infectious salmon anemia. At least 200,000 fish would have to be killed. At the same time, the Province offered interest-free loans and loan guarantees to affected operators. Of 80 licensed marine sites for salmon farming, 21 are in virus-infected bays. [Assoc Press]

Fishing Licenses via the Internet. In December, GA officials announced that an Internet web site (http://www.permit.com) had been created by iXL Holdings, Inc. (Atlanta, GA) and opened to allow individuals to purchase GA fishing licenses and boat registration renewals over the Internet. Payment is accepted by credit card and the purchaser prints a paper license on their computer's printer. [iXL press release]

Quaker Neck Dam Removal. On Dec. 17, 1997, Carolina Power and Light (CP&L) officials and invited federal officials held a ceremony to celebrate the voluntary demolition of CP&L's Quaker Neck Dam on the Neuse River. Dam removal will allow anadromous fish (e.g., striped bass, American shad) to use an additional 75 miles of historical spawning habitat in the Neuse River and 925 miles of tributary spawning areas. This projects is a joint effort initiated by the Coastal America partnership of federal, stat, and local agencies, and non-governmental organizations. [CP&L press release, NOAA press release]

Yaqui Catfish. Recently about 350 threatened Yaqui catfish were reintroduced into the wild in the headwaters of Rio Yaqui, AZ, by the U.S. Fish and Wildlife Service. This native fish has not inhabited AZ waters in more than a century, and is part of an international program to return 8 species of native fish to the Rio Yaqui and replace non-native sport fish with native fish. [Assoc Press]

Mercury from Whale Meat. The U.S. National Institutes of Health officials released the results of a study of children born to Faroe Islands mothers, concluding that women who ate seafood and, in particular, whalemeat may have damaged their children with mercury poisoning. These findings were reported in the journal Neurotoxicology and Teratology. [Reuters]

Right Whale Protection. Recently the NMFS proposed to close the Atlantic pelagic drift gillnet fishery for swordfish, tuna, and sharks through July 31, 1998, in order to develop and implement regulatory measures that will avoid jeopardy to right whale survival. Public comments were accepted on this proposed rule. In addition, NMFS has prepared an Environmental Assessment of 4 alternatives being considered for implementing the Atlantic Offshore Cetacean Take Reduction Plan. [Fed. Register]

Yukon River Sonar Lawsuit. Recently the AK Supreme Court heard oral arguments on a lawsuit by western AK fishermen, who allege that erroneous sonar fish counts by AK state biologists undercounted returning salmon and led to the needless closure of the 1994 chum salmon season on the Yukon River. They further contend that the closure caused hardship for those dependent upon the subsistence and commercial harvest of Yukon River chum salmon. [Assoc Press]

PUD Salmon Restoration Costs. WA state public utility district (PUD) representatives reported to the WA Legislature's Salmon Restoration Task Force that PUDs expended almost $50 million during 1996 on programs to improve salmon management, production, and habitat. This estimate excludes additional millions of dollars in foregone generating revenue as well as that portion of the PUDs' payment to Bonneville Power Administration that funds salmon restoration. [WA PUD Assoc. press release]

FERC and Salmon Protection. This fall a coalition of 8 fishing and conservation groups filed a petition with the Federal Energy Regulatory Commission, calling on FERC to address alleged increasing threats to chinook salmon and steelhead trout from ID Power Co. dams in the Snake River drainage. FERC has also been requested, but has declined, to enter consultation with NMFS on endangered and threatened species protection measures. [Dow Jones News, Assoc Press, Congr. Record]

FL Spear Fishing. Recently FL Governor Lawton Chiles and his Cabinet adopted regulations allowing spear fishermen to

hunt Spanish mackerel, king mackerel, and dolphin (the fish, NOT the marine mammal) beginning Jan. 1, 1998, but continued prohibitions on spearing 28 other species, including snook, red drum, spotted seatrout, weakfish, bonefish, tarpon, pompano, sharks, and billfish. [Assoc Press]

Red Snapper Ban. This fall NMFS announced that, based on harvest survey data, the recreational quota for Gulf of Mexico red snapper harvest (4.469 million pounds) would be reached by Nov. 26, 1997. Thus, the recreational bag limit for this species would be reduced to zero from Nov. 27 through the end of the year (Dec. 31, 1997). NMFS requested that all Gulf states close the recreational fishery for red snapper in state waters and prohibit the sale of red snapper from state waters during the closure. [NOAA press release, Assoc Press]

New Zealand Salmon Imports. This fall the New Zealand's Ministry of Agriculture announced that it had concluded that it was inappropriate to continue a ban on imports of uncooked wild Pacific salmon from the United States. The risk analysis for this determination remains open for public comment until Dec. 10, 1997. [Dow Jones News]

Lac du Flambeau Chippewa Fishing Rights. This fall the Lac du Flambeau Chippewa voted 116-105 in a special referendum to support a continuation of an April 1997 agreement whereby, in exchange for $100,000 from the state of Wisconsin, the Chippewa established restrictive spearfishing quotas that also provide walleye for non-Indian sport anglers. [Assoc Press]

Italian Driftnets. This fall the Italian Agriculture and Fisheries Minister Michele Pinto announced that the voluntary reconversion plan for 3,500 Italian driftnet fishermen and 676 fishing vessels will begin to be implemented in the next few weeks. A total of 400 billion lira in aid and compensation will be available for the program. [Rome ANSA via Foreign Broadcast Information Service]

EU Fish Conservation Measure. This fall the European Union's Fisheries Council agreed by a qualified majority to new regulations to better protect juvenile fish. Beginning Jan. 1, 2000, the new regulations will require improved selectivity of fishing gear to reduce bycatch, implement control measures to reduce fish discards, limit certain gear in areas where juvenile fish are abundant, and set minimum sizes for fish that may be caught or sold. [Agence Europe via Reuters]

Fisheries Renewal. This fall the BC Fisheries Minister Corky Evans announced that Fisheries Renewal, a government corporation established to protect fish habitat, enhance fish stocks, and create new jobs, will have an initial budget of C$16.3 million. The BC government is considering a fish tax to raise funds for Fisheries Renewal. [Assoc Press]

Lead Sinker Ban. A NH Legislature Committee held a public hearing on proposed legislation banning the use of lead fishing sinkers in NH waters, as a means to increase protection afforded loons. [Assoc Press]

New Zealand Salmon Imports. This fall the New Zealand's Ministry of Agriculture announced that it had concluded that it was inappropriate to continue a ban on imports of uncooked wild Pacific salmon from the United States. The risk analysis for this determination went through a public comment process. [Dow Jones News]

FERC Hearing. This fall the Senate Committee on Energy and Natural Resources' Subcommittee on Water and Power held a hearing to review the Federal Energy Regulatory Commission's hydroelectric relicensing procedures. [personal communication]

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Pacific Groundfish Catch Reductions. This fall the Pacific Fishery Management Council approved reduced 1998 catch quotas for many groundfish species -- the lingcod annual quota was reduced 66%, sablefish (blackcod) was reduced 40%, longspine thornyheads was reduced 35%, Dover sole was reduced 19%, and widow rockfish (snapper) was reduced 34%. Proposed regulations to implement these quota changes were approved in November. [Assoc Press]

NMFS Draft Research Plan. This fall the NMFS announced the availability for public comment of its 43-page draft "Strategic Plan for Fisheries Research" -- [http://kingfish.ssp.nmfs.gov/sfa /prorules.html]. This document identifies major fisheries research goals and objectives related to the Magnuson-Stevens Fishery Conservation and Management Act. [NOAA press release]

CATTLE MOVED TO PROTECT ENDANGERED SPECIES - The U.S. Fish and Wildlife Service has issued a Biological Opinion requiring that the Safford District of the Bureau of Land Management (BLM) remove "grazing conflicts" in riverside areas to avoid jeopardizing 15 endangered species. In response, the BLM plans to remove cattle from riparian areas on 15 grazing allotments, mostly on the Gila River in Arizona. But this is far short of the 36 grazing allotments found to be destroying riparian habitat for the endangered Southwestern willow flycatcher, according the Southwest Center for Biological Diversity, which filed the original lawsuit in 1995. The Gila Box Canyon is home to 174 species of birds, 45 reptiles and amphibians, 42 mammals, and 21 fish including the endangered peregrine falcon, southwestern willow flycatcher, razorback sucker, and bald eagle.

IT'S OFFICIAL: DIOXIN CAUSES

CANCER - The National Toxicology Program Board of Scientific Counselors of the National Institute of Environmental Health Sciences (NIEHS) has voted to list 2,3,7,8-tetrachlorodibenzo-p-dioxin as a known human carcinogen. The October 31 decision marks the second time that a major group of scientific experts have evaluated the human health studies on dioxin and concluded, based on all available data, that dioxin should be considered to be a human carcinogen. In February 1997 the International Agency for Research on Cancer voted to classify dioxin as a known human carcinogen.

Watershed Approach for Canada-U.S. Border (ENS) - The United States welcomed a new report by the U.S.-Canada International Joint Commission, entitled "The IJC and the 21st Century," which provides proposals on how the IJC can support the two countries in meeting the environmental challenges of the next century. State Department spokesman James Rubin said Monday that cooperation with the IJC over the years has enabled the United States and Canada "to deal successfully with many difficult environmental issues, and serves as a model for other nations." The report, entitled "The IJC and the 21st Century" is in response to the charge given to the Commission at the time of Prime Minister Jean Chretien's visit to Washington last April. The IJC was asked by the two governments "to provide to the parties, within the next six months, proposals on how the Commission might best assist the parties to meet the environmental challenges of the 21st century." In its recommendations, the IJC has proposed to establish a series of regional "watershed" boards along the border. These boards would take an integrative, ecosystem approach to the range of key transboundary environmental issues. In taking this step, the Commission would build on its past experience and, where possible, existing IJC structures. The purpose of the International Joint Commission is to prevent and resolve disputes over use of waters shared by Canada and the United States and to provide advice on matters affecting the shared environment when requested by the two federal governments. It was established as an independent international organization under the Boundary Waters Treaty of 1909. The Commission approves projects, such as dams or water diversions, that affect water levels and flows across the boundary. Under the 1978 Great Lakes Water Quality Agreement, it assesses progress to restore and maintain the chemical, physical and biological integrity of the Great Lakes. The Commission also investigates and reports on transboundary air and water pollution, persistent toxic substances, exotic species and other matters of common concern along the international boundary. Rubin said of the new IJC report, "We appreciate the enormous effort that clearly has gone into it, and look forward to studying it in detail. We will consider the Commission's recommendations carefully and thoroughly, in consultation with our colleagues in the Government of Canada, state and provincial governments, and other stakeholders along our extensive border."

NOISY MINORITY: A 11/4 Washington Post letter to the editor by Izaak Walton League executive director Paul Hansen says a recent article on the "never-ending war waged by a minority of Minnesotans to reintroduce motorboats to the Boundary Waters Canoe Area Wilderness" missed two points, one can use a motorboat in 11,500 Minnesota lakes not in the Boundary Waters, and recent polls show 82 percent of Minnesotans want wilderness protections strengthened. "I have canoed there with 6-year-olds, 70-year-olds and recent amputees. They all did just fine without motors," wrote Hansen. Pending legislation would reopen three motorized portages uses in the wilderness area.

WISCONSIN LAND SWAP OPPOSED: The St. Paul Pioneer Press reports 11/2 opposition is mounting to a proposed swap of 1,500 acres of public land on Moose Lake and the West Fork of the Chippewa River in the Chequamegon National Forest for 1,635 scattered acres of private lands belonging to businessman Vernon Berg. The swap would privatize one mile of publicly owned lakeshore and two miles of river frontage. Opponents claim the swap land values do not meet Forest Service standards for land exchanges.

WOLF-KILLS: The Anchorage Daily News wrote 10/29 that the National Academy of Sciences reports there is not enough evidence to show that the state's wolf-kill program works in the long-term. A panel of biologists, economists and other national experts said most of the predator-control programs it studied, intended to provide hunters with more moose and caribou, suffered from design flaws or incomplete research.

FOREST PLEBISCITE: Greenwire reports 10/28 a coalition of environmental and sport-fishing groups is moving to put a forest-conservation initiative on the 11/98 California ballot that includes provisions to protect old-growth trees, ban clearcutting, prohibit sediment pollution in streams, and cut state subsides to logging companies.

"SLEIGHT OF HAND": Greenwire reported 12/3 the US Forest Service will drop a regulation forbidding employees from challenging agency actions through the citizen appeals process. In 1996, USFS biologist Mary Dalton was suspended after filing an administrative appeal on a timber sale on Alaska's Tongass National Forest. Dalton said the sale EIS omitted most of her research about potential damages from logging to wildlife habitat. A ruling on the lawsuit was postponed until the Forest Service decided whether to drop the controversial regulation. The agency refuses to stop the timber sale saying the appeal period has ended. "It's really a remarkable sleight of hand. First they shot the messenger and now they are blaming her for their own refusal to revive her appeal," said Andy Stahl of the Association for Forest Service Employees for Environmental Ethics.

FIRST TIME: The 11/21 Washington Post reported a US Forest Service memorandum acknowledged the timber sale program cost taxpayers $15 million. It is the first time the Forest Service

admits a loss of revenue by the timber sale program. Other government agencies and conservation groups have long claimed the Forest Service timber program loses money. The General Accounting Office reported in 1995 that the accumulative losses to the Treasury by the timber program totaled nearly $1 billion between 1992 and 1994. The memo will be released as an offic ial report next month. Representative Jim Leach (R-IA) commented, "The US government is the only property owner I know of that, in effect, pays private companies to despoil or deplete its own resources."

FERC'D SALMON: AP reported 11/18 eight fishing and environmental groups petitioned the Federal Energy Regulatory Commission on Monday to acknowledge the threat Idaho Power Company's dams pose to Snake River endangered steelhead and salmon. Although the National Marine Fisheries Service has requested that FERC meet with NMFS to discuss a strategy to mitigate the problems, FERC has declined to do so. According to Glenn Spain of Pacific Coast Federation of Fisherman's Associations, FERC's neglect will "lead to more extinctions, to the loss of more fishing jobs and the loss of millions of dollars to the region's economy." The company's dams block 80 percent of the river's chinook habitat.

MINING MORATORIUM APPROVED: The 11/12 St. Paul Pioneer Press reported the Wisconsin State Assembly's environment committee passed a bill requiring mining companies to prove they can operate without harming the environment before proceeding with sulfide ore mining projects in Wisconsin. "When you're dealing with our precious natural resources, perhaps you ought to take a conservative view, and err on the side of something that looks a little stronger, a little tougher and restrictive," said Representative Peter Bock (D-Milwaukee). Proponents of the bill say it is needed to protect water resources, particularly the Wolf River, from a planned underground mine at Crandon.

TURTLE RIGHT OF WAY: The 11/8 St. Paul Pioneer Press reports the Nature Conservancy bought Ken and Opal Dubray's 102-acre farm near Kellogg Minnesota's Weaver Dunes Preserve. Endangered Blanding's turtles cross the Dubray farm several times a year migrating to and from a nearby wetland. The conservancy's Lisa Mueller said the couples' organic farming methods created minimal disruption to the turtles. The farm will be restored to sand prairie.

WASHINGTON, DC, Dec. 1997 (ENS) - An historic agreement has been reached to clean up and restore the Pigeon River," Vice President Al Gore announced Friday. "This agreement gives the citizens of East Tennessee the public health and environmental protection they deserve. After many years of controversy, the needs of the river and the people who live in its surrounding communities will come first," said Gore. For the first time, there will be an enforceable schedule for cleaning up the Pigeon River, holding Champion Paper's Canton Mill to the most stringent pollution standards in the nation. The Champion Paper Mill has been blamed for contamination of the Pigeon River in Tennessee and North Carolina by dioxin and other pollutants that may cause cancer and reproductive disorders. Under the new plan, pollution from the mill will be cut in half from current requirements, and special protections will be in place for recreational uses of the river. "The citizens who provided the leadership for this effort will be able to monitor compliance with this agreement every step of the way, through a new citizen's advisory committee at the Canton Mill and through a joint watershed council being established by the States of Tennessee and North Carolina," Gore explained. When sunfish were examined from the Pigeon River, problems with their endocrine, reproductive, and metabolic systems were found. Scientistics detected altered hormone levels, metabolic and nutritional imbalances, and changes in the normal population and community dynamics. Also observed were DNA damage and cancerous lesions. Such effects were attributed to chemicals released from the mill, Oak Ridge scientists reported. Champion International which has been producing paper by the Pigeon River since 1908, has announced the Canton Mill is up for sale. [EnviroLink News]

SOFT MONEY=LOGGING ROADS: AP reported 12/16 the public interest group Common Cause released a report saying millions of dollars contributed by the timber industry helped defeat conservation proposals to curtail construction of habitat-destroying logging roads in National Forests. T he industry spent more than $8 million since 1991. By comparison, conservation groups spent $840,000 to eliminate the Forest Service's road purchaser credit program, which reimburses companies for road-building costs with credits that can be used to bid on new timber sales.

TROUT STOCKING: Trout Unlimited announced last week the release of a study documenting threats posed by trout stocking programs to the health of Colorado's native and wild trout populations. The study says that in addition to the threat of spreading whirling disease to native fish, Colorado Division of Wildlife's emphasis on stocking "limits the funding available for other fishery efforts such as habitat protection, wild and native trout management, stream rehabilitation," research and angler access.

GOOD ODDS: Polling results announced 12/8 by Wisconsin's Environmental Decade measured the public's reaction when local, state and tribal governments differ in environmental regulations. The public supports the highest environmental standard by 2:1. The Decade says the poll explains why Wisconsinites have recently objected to several proposals to weaken environmental laws, including mining, pesticide use and hog-farming proposals.

CUTTHROAT PETITION: AP reported 12/5 environmentalists and sport fishing groups petitioned to protect sea-run cutthroat trout throughout much of the West under the Endangered Species Act. Oregon Natural Resources Council conservation director Ken Rait said populations of the trout range from Alaska to northern California. "We are

obviously at a crossroads between driving wild sea-run cutthroat to extinction and according this species much needed protection," said Rait. The National Marine Fisheries Service has a year to decide whether to list the fish under the ESA.

ENVIRONMENTALLY SENSITIVE ORGANISMS MISSING IN LAKE MICHIGAN MUD SAMPLES. Tiny shrimp-like animals called amphipods that are normally found in bottom muds of healthy lakes were absent in samples taken in November at a monitoring site on southern Lake Michigan, according to the National Oceanic and Atmospheric Adminstration's Great Lakes Environmental Research Laboratory in Ann Arbor, Mich. Routine monitoring of the abundance of these environmentally sensitive organisms at forty sites in Lake Michigan's southern basin provides researchers with a reliable measure of the lake's health. While NOAA scientists have not yet determined the exact cause of the disappearance of amphipods at the site five miles off St. Joseph, Mich., they suspect it is linked to the introduction of zebra mussels in southern Lake Michigan in 1989, severely limiting food available to the amphipods. Since amphipods normally make up to 70 percent of the living biomass in a given area of healthy lake bottom, their decline in Lake Michigan may spell hard times for a variety of fish species that depend heavily on them for food, according to Great Lakes Environmental Research Laboratory biologist Tom Nalepa, who has been sampling Lake Michigan sediments since the early 1980's. "What's happening is energy that used to support amphipod growth is now being turned into zebra mussel tissue," says Nalepa. "Many species of fish, and particularly young fish, readily eat amphipods, but few species can use zebra mussels for food. There's concern that such a short circuit in the food chain could lead to declines in a number of fish, including perch, alewives, sculpin, bloater and smelt, with possible secondary effects on trout and salmon predators." Data collected in the early 1990's indicated that the declines have been concentrated over a five-mile-wide strip of lake bottom extending along the eastern Lake Michigan shore from near Chicago at the southern end to St. Joseph. "Although amphipod populations declined by 60 to 90 percent in the early 1990's, there were still at least some of these animals left. When we picked through samples from the St. Joseph site in early November, we couldn't find a single amphipod. We just couldn't believe it," Nalepa said. "During the 1980's, that site had 9,600 amphipods living on every square meter of lake bottom," Nalepa said. "Now, they're all gone. We're now wondering about how extensive this dead area might be. We hope that additional sampling planned for 1998 can provide the answers." To sample the lake bottom, Nalepa uses a device called a "Ponar grab," a steel shovel-like device that is lowered by cable to the lake bottom from the lab's research vessel Shenehon to retrieve a measured scoop of mud. Once aboard the ship, the sample is then washed through a fine sieve to strain out any animals living in the mud. While other organisms are still present in the mud, they are not as readily fed upon by fish as are amphipods. Prior to the zebra mussel's appearance in Lake Michigan, amphipods had relied on a rich crop of microscopic plants called diatoms for growth and survival. Diatoms bloom in lake waters in early spring and eventually settle to the lake bottom, where Amphipods readily feed and grow on this plant material. NOAA studies have shown that when amphipods feed on this rich material, their lipid (fat) content increases. That stored energy is what fuels their growth and survival through the remaining year. Large concentrations of zebra mussels residing on rocky bottom areas of southern Lake Michigan may be filtering out diatoms and thereby depriving food to amphipods, according to Nalepa.

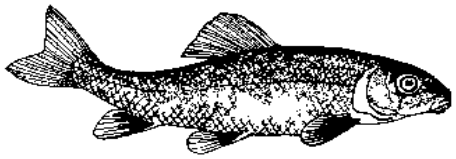
USGS EXPANDS HORMONE RESEARCH

The U.S. Geological Survey is expanding its capabilities in hormone research, studying the role contaminants may play in the reproductive development of amphibian, fish and mussel species. The Survey's Florida Caribbean Science Center, in Gainesville, Fla., has established a new Endocrinology Research Program to be directed by Dr. Tim Gross, a wildlife endocrinologist. "I like knowing that my work is being used to solve real world environmental problems," Gross says. The Gainesville research facility, as part of the USGS Biological Resources Division, has a primary goal of providing the scientific understanding needed by land managers to make better informed decisions regarding management of living resources. Under Dr. Gross, the new program will develop techniques to monitor invertebrate reproduction and establish bio-markers for studying the effects of contaminants on freshwater mussels. Largemouth bass will also be studied by the Endocrinology Research Program to determine how contaminants affect the entire food web of fish. Focusing specifically on hormones and other factors that affect animal reproduction, Dr. Gross brings a wealth of experience and expertise to the center, having held positions at the Omaha Zoo and the University of Florida. He has examined reproductive issues on a number of species, from black-footed ferrets to African elephants. He has also studied reproductive factors affecting sharks, alligators, manatees, and otters. The science center's staff looks forward to Dr. Gross joining the team. "We expect Tim's arrival to revitalize our mussel toxicology program and get us into the emerging field of endocrine disruptors --something we hope will offer expanded opportunities to better serve our client agencies and institutions," said Dr. Russ Hall, director of the science center. Dr. Gross will work with new species and on ecological problems that the USGS is confronting. "University research is for its own sake; I've done a lot of collaborative research over the years -- enough with USGS to know the research will actually be applied." Gross says. Dr. Gross also will continue his investigations of reproductive anomalies of alligators and manatees. As the nation's largest natural resources science and mapping agency, the USGS works in cooperation with nearly 2000 organizations to provide reliable, impartial, scientific information to resource managers, planners, and other

customers. USGS hydrologists, geologists, biologists and cartographers work in every state to minimize the loss of life and property from natural disasters, contribute to wise economic and physical development of the nation's natural resources, and enhance the quality of life.

CALL FOR PAPERS--ASSESSING THE STATUS AND TRENDS OF INLAND FISH POPULATIONS OVER LARGE GEOGRAPHIC REGIONS
A coalition of organizations including the USDA Forest Service, USDA Natural Resources Conservation Service, Illinois DNR, Wisconsin DNR, Wyoming Game and Fish and the Fish and Wildlife Information Exchange is organizing a symposium to address quantitative assessment of the status and trends of aquatic species over large geographic regions. This symposium will take place during the 1998 American Fisheries Society Meeting in Hartford, CT, August 23-39, 1998. This symposium will be designed to merge the findings of the symposia during the 1997 AFS meeting on using fish assemblages to assess landscape changes with the results of the National Freshwater Fisheries Database Summit to take place in February, 1998. Deadline: Abstracts should be received by Friday, December 5. Length should be no more than 1 single spaced page. Submit Abstracts (preferably via e-mail) to: Andrew Loftus 311 Munz Drive Suite A Annapolis, MD 21403 (410) 295-5997 Aloftus501@aol.com

NEW HERPETOLOGY WEB SITE
The Wisconsin Herpetology Homepage is now online at:
http://www.mpm.edu/collect/vertzo/herp/atlas/welcome.html
This is a major public resource for herpetology information and networking in Wisconsin, developed by Gary Casper at the Milwaukee Public Museum, with a grant from the Northern Prairie Wildlife Research Center. It includes the Wisconsin Herp Atlas maps and species accounts, an online herp bibliography, an online herp research directory, the Great Lakes Declining Amphibians web pages, a summary of Wisconsin herp regulations, and an extensive timber rattlesnake resource. Anyone working on herps in Wisconsin, or curating collections of Wisconsin material, is encouraged to register in the directory. Anyone publishing on Wisconsin herps is encouraged to submit citations to the bibliography. Anyone managing web sites is encouraged to link to this resource.



On the Underside

submitted by Charles Anderson

Winners of the "worst analogies ever written in a high school essay" contest:

He spoke with the wisdom that can only come from experience, like a guy who went blind because he looked at a solar eclipse without one of those boxes with a pinhole in it and now goes around the country speaking at high schools about the dangers of looking at a solar eclipse without one of those boxes with a pinhole in it. (Joseph Romm, Washington)

She caught your eye like one of those pointy hook latches that used to dangle from screen doors and would fly up whenever you banged the door open again. (Rich Murphy, Fairfax Station)

The little boat gently drifted across the pond exactly the way a bowling ball wouldn't. (Russell Beland, Springfield)

McBride fell 12 stories, hitting the pavement like a Hefty Bag filled with vegetable soup. (Paul Sabourin, Silver Spring)

From the attic came an unearthly howl. The whole scene had an eerie, surreal quality, like when you're on vacation in another city and "Jeopardy" comes on at 7 p.m. instead of 7:30. (Roy Ashley, Washington)

Her hair glistened in the rain like nose hair after a sneeze. (Chuck Smith, Woodbridge)

Her eyes were like two brown circles with big black dots in the center. (Russell Beland, Springfield)

Her vocabulary was as bad as, like, whatever. (Unknown)

He was as tall as a six-foot-three-inch tree. (Jack Bross, Chevy Chase)

The hailstones leaped from the pavement, just like maggots when you fry them in hot grease. (Gary F. Hevel, Silver Spring)

Her date was pleasant enough, but she knew that if her life was a movie this guy would be buried in the credits as something like "Second Tall Man." (Russell Beland, Springfield)

Long separated by cruel fate, the star-crossed lovers raced across the grassy field toward each other like two freight trains, one having left Cleveland at 6:36 p.m. traveling at 55 mph, the other from Topeka at 4:19 p.m. at a speed of 35 mph. (Jennifer Hart, Arlington)

The politician was gone but unnoticed, like the period after the Dr. on a Dr Pepper can. (Wayne Goode, Madison, Ala.)

John and Mary had never met. They were like two hummingbirds who had also never met.
(Russell Beland, Springfield)

The thunder was ominous-sounding, much like the sound of a thin sheet of metal being shaken backstage during the storm scene in a play. (Barbara Fetherolf, Alexandria)

His thoughts tumbled in his head, making and breaking alliances like underpants in a dryer without Cling Free. (Chuck Smith, Woodbridge)

Minnesota Chapter Officers

President:
Tim Goeman
Minnesota DNR
1601 Minnesota Drive
Brainerd, MN 56401
218.828.2246; fax 218.828.6022
tim.goeman@dnr.state.mn.us

President-elect:
Bruce Vondracek
UM-Fish and Wildlife
200 Hodson Hall
1980 Folwell Avenue
St. Paul, MN 55108
612.624.3421; fax 612.625.5299
bcv@finsandfur.fw.umn.edu

Past President:
Larry Kallemeyn
3131 Hwy 53
International Falls, MN 56649
218.283.9821; fax 218.285.7407

Secretary-Treasurer:
Kevin Stauffer
Minnesota DNR
2115 Birchmont Beach Rd NE
Bemidji, MN 56601
218.755.3959

Committee Chairs:
Awards: Julie Westerlund 218.547.1683
julie.gran@dnr.state.mn.us

Continuing Education: Mark Hove 612.624.0744
Mark.Hove@fw.umn.edu
and Laurie Sovell 612.624.3785

Long Range Planning: Tracy Close 218.723.4785
tracy.close@dnr.state.mn.us

Membership: Doug Kingsley 320.839.2656

Fisheries Information Network: Jeff Reed 320.634.4573

Newsletter: Paul Radomski 218.828.2665
paul.radomski@dnr.state.mn.us

Nominations: Melissa Drake 612.772.7966

Procedure Manual: Brad Parsons 612.634.4573

Public Awareness: Linda Bylander 218.828.6044

Resolutions: Wayne Barstad 612.772.7900
wayne.barstad@dnr.state.mn.us

Rivers and Streams NCD rep: Paul Glander 218.847.1579

Students: Bill Ardren wra@fw.umn.edu

Excom Members:

Minnesota DNR:
Molly Negus
Minnesota DNR
5351 N. Shore Drive
Duluth, MN 55804
218.723.4785; fax 218.725.7738

Federal:
Ann Schneider
USFWS
1 Federal Bldg
Fort Snelling, MN 55111
612.725.3596; fax 612.725.3543
ann_schneider@mail.fws.gov

Academic:
Neal Mundahl
Winona State University
Dept of Biology
Winona, MN 55987
507.457.5695; fax 507.457.5681
nmundahl@vax2.winona.msus.edu

Open:
Roy Johannes
Minnesota DNR
500 Lafayette Rd
St. Paul, MN 55155-4012
612.296.2308

Internet and E-mail:

Minnesota Chapter of the AFS WWW page:
http://www.fw.umn.edu/mnafs

American Fisheries Society WWW page:
http://www.esd.ornl.gov/AFS

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1601 Minnesota Drive
Brainerd, MN 56401

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