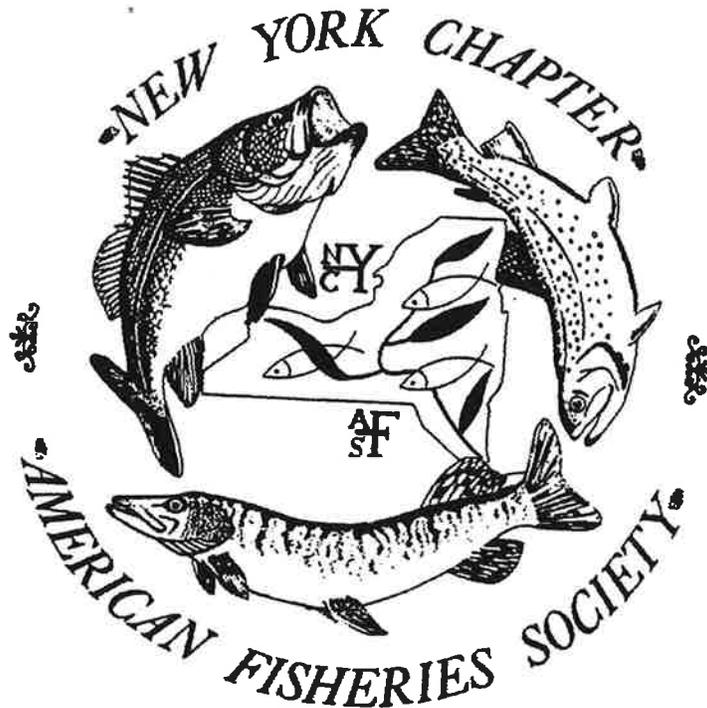




New York Chapter - American Fisheries Society
Newsletter December 1995



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President-Elect: Doug Stang

Past President: Paul McKeown

Secretary-Treasurer: Tim Sinnott

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Lars Rudstam, Myriam Ibarra

Professional Incentives

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Workshop

Betsy Kozuchowski, Chris Lowie

Professional Diversity

Betty Lou Brett

Student Subunit

Joseph Dembeck

Youth education

Doug Carlson, Bruce Matthews

Editor's Note

We hope that this newsletter will put you in a holiday spirit. We had have a good year and will close it with more good news from your chapter. To keep up with the current holiday, we are thankful to all of those who have contributed to the newsletter and invite all of you to share with the chapter some details of their fishy careers. Your contributions are what make this newsletter interesting. We wish you all a joyous holiday season and are looking forward to seeing you in Syracuse in January. Please write us by letter, fax or email. A diskette for Mackintosh or IBM with files in Word, Word Perfect 5 or ASCII formats is appreciated. We can probably also handle various types of picture files. Try it. Our next deadline for the summer newsletter is March 30.

Lars Rudstam and Myriam Ibarra, Cornell Biological Field Station, Bridgeport, New York 13030, Phone: 315 633 9243 (Lars), 315 672 5539 (Myriam), Fax: 315 633 2358, Email: lgr1@cornell.edu

President's Corner

As this year draws to a close, be sure to mark your calendar for our Annual Meeting. The Annual Meeting announcement appears in this issue of the newsletter, and there may not be a separate mailing for this year's gathering. The NYC AFS program committee (Mark Malchoff and Don Stewart) has done an exceptional job in preparing this year's event in collaboration with our Wildlife and Forestry colleagues and I am sure you will not want to miss it. Please note that this Committee has been able to retain a low, affordable registration fee as has been our custom, while assembling a very fine program with many distinguished speakers.

Our thanks also goes to the organizers of this year's Workshop (Betsy Kozuchowski and Don Stewart). The Fish Age, Growth and Production Workshop held at ESF Syracuse last August was a very worthwhile event. Also, for those of you that were interested but could not attend, please be aware that the Southern New England Chapter is attempting to put together a very similar "Age and Growth Techniques" workshop. All Northeast Division AFS members should receive an announcement of this proposed Age and Growth Workshop in the coming year.

Also, be aware that an ad-hoc committee composed of Paul McKeown, Doug Stang and Bruce Wilkins are drafting a Strategic Plan for our Chapter that follows plans already in place for the Northeast Division and

Parent Society. Soon this draft document will be available for review and comment by the membership and I encourage your participation in this process. We hope this plan will formalize the basic framework of our Chapter, what we stand for, and what we pursue as a society.

Finally, I thank the Chapter for providing me the honor to serve as President this year. This has been a very worthwhile and enjoyable experience. We have a very large, active Chapter and it is with pride that we can reflect on what the NYC accomplishes each year. Annual workshops, large annual meetings and a wide array of committees that address issues ranging from Environmental Concerns and Professional Diversity to Students are examples of our achievements. It is a credit to the many dedicated committee members that our Chapter remains very active. As my parting statement for this section of the newsletter, I extend my sincere appreciation to these individuals for their service to the Chapter.

If you have any ideas or initiatives that might best be forwarded as a NYC AFS activity, please feel free to contact me or one of the other Chapter officers. I can be reached by ph-716-366-0228 or fax 716-366-3743.

Don Einhouse, Lake Erie Unit, Dunkirk.

Chapter News

AFS New York Chapter Annual Meeting February 1 -3 in Syracuse, NY. ECOSYSTEM APPROACHES TO MANAGEMENT: Interdisciplinary Applications

Notice: In recent years most New York Chapter AFS members attending the annual conference have not pre-registered. Pre-registration is strongly encouraged this year. An early attendance estimate will facilitate meal planning for a currently unknown number of attendees based in three separate organizations. Your cooperation is greatly appreciated.

Registration materials and program at the end of the newsletter.

Youth Education Committee: This newly formed committee will display many Aquatic Resource Education and Youth Fishing curriculum materials available to secondary

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school teachers at the poster session. Personal contacts with teachers often triggers their willingness to try unfamiliar material. The committee encourages you to bridge that gap and field test one of these items in a school near you. This means going to the classroom with living materials or visual aids, and helping the teacher present an activity in Aquatic Resource Education. For additional information or for planing your contribution to the display, contact: Doug Carlson (315-785-2262) or Bruce Matthews (607-255-9370).

Help wanted : Students Affairs Coordinator: The NYC-AFS is seeking a person to serve as primary connection between the chapter and members of the student subunit. The liaison will establish effective communication among students in New York colleges and universities, and encourage participation in NYC-AFS sponsored fisheries management and research activities.

Minimum qualifications are enthusiasm, vested interest in the future, and willingness to help others. There is no pay, but benefits include: gratitude, close ties with the future fisheries leaders and increased sense of well being. Interested persons please contact Don Einhouse or Doug Stang.

Nominations for Chapter Awards: The NYC-AFS recognized deserving Chapter members with the Professional Achievement Award and Honorary Membership Award. At the 1995 NYC-AFS meeting, Dr. Ed Mills was nominated and unanimously approved by the membership to receive the Professional Achievement Award to be presented at the 1996 annual meeting. To date we have received no nominations for either award for 1996. If you like to nominate a candidate for these awards please contact Doug Stang

From David Warner NYSDEC Bureau of Environmental Protection - **The inside story of a recent workshop.**
The NY AFS Chapter sponsored the workshop *Age, Growth, and Production of Fishes: New Science and Technology* on August 10-11, 1995 in Syracuse. Thirty participants got information on aging techniques, new software and bioenergetics models. The software demonstrations were effective, and as a result participants were able to spend a good deal of time practicing with these programs in ESF computer labs. There did seem to be more participants than available computers, but by sharing and waiting for an open PC, I was able to spend more than enough time to learn the basics. Meals were enjoyable and there was no shortage of food (which resulted in some nodding heads after meals). The barbecue and keg of Saranac were an excellent dinner choice. Hopefully there will be more workshop opportunities for New York Chapter members in the future.

Workshop Committee: Much thanks to Don Stewart and John Casselman for teaching the recent workshop. Of the 15 participants that filled out course evaluations, all felt they benefited from the course. The participants were also interested in more workshops and mentioned stream habitat assessment, electrofishing, hydroacoustics, GIS, and statistics as possible topics. The next workshop is being planned for Summer 1996. The topic area will be Stream Habitat Assessment and Restoration. We expect to include a hands-on, field component. Currently, the objectives of the workshop have not been defined because we want to know what you, the perspective attendants, want to learn about. If there are any ideas on specific issues or prospective presenters you would like at the workshop, please contact

Chris Lowie or Betsy Kozuchowski
USFWS - LGLFRO
405 N. French Rd.
Amherst, NY 14228
716-691-5456

Don Einhouse
NYSDEC
178 Point Dr. N
Dunkirk, NY 14048
716-366-0228

Election of Chapter President.

Candidates for president-elect of the New York Chapter of the American Fisheries Society in 1996 are Edward Woltmann and Lars Rudstam. Below are a biographical sketch for each.

Edward Woltmann is employed by the New York State Department of Environmental Conservation (DEC) as the Regional Fisheries Manager on Long Island. In this position, he oversees DEC freshwater fisheries management efforts in Nassau and Suffolk counties. Ed began his career with the Department in 1984, working on a research project evaluating the effectiveness and environmental impacts of sterile grass carp when used as aquatic vegetation control agents in small ponds. A 1982 graduate of the University of Vermont with a BS in wildlife and fisheries biology, he has been a member of the New York Chapter and the parent society since 1985. He served as the program chair for the 1995 Annual Meeting and also assisted with the freshwater fisheries program at the 1989 Northeast Fish and Wildlife Conference. Warmwater fisheries management and youth fishing/aquatic education are two of his primary areas of interest. Ed is an avid hunter, fishermen, gardener and softball player and resides in Shoreham, NY with his wife Lori and son Daniel.

Lars Rudstam is a Senior Research Associate of the Department of Natural Resources, Cornell University, the Associate Director of the Cornell Biological Field Station (Shackelton Point) and the leader of the Cornell Warmwater Fisheries Unit. He both work and live at the Field Station, resulting in one of the shortest commuting times in

New York State. A scholarship brought him to the University Wisconsin - Madison where he got two degrees (B.Sc. & M.Sc.) and found a wife (Hannah Hill). He returned to his native country Sweden and the University of Stockholm for a Ph.D. in marine biology focusing on zooplankton, herring and sprat in the Baltic Sea. Then back to Wisconsin for a post-doc on using walleye for bio-manipulation of Lake Mendota. Repeated moves across the Atlantic is a sure way to avoid accumulating stuff. Lars replaced John Forney at the Field Station in 1992 and is planning to stay in New York State. He has since then got involved in fish and fisheries issues in New York State and is currently a member of the Lake Erie forage fish task group, the black bass management task group of the North Central Division, the Lake Ontario expert group for evaluating salmonid stocking strategies, and the task force on target strength measurements (acoustics) of the International Council for the Exploration of the Seas. His current research is focused on food web interactions and fisheries in Oneida Lake and Lake Ontario but also includes studies in several other New York lakes. He has been a member of the American Fisheries Society since 1989, best student presentation judge on various occasions and your newsletter editor since 1993. It is of course because he is the editor that he allows a longer text for himself than for Ed Woltmann. As the president of the Chapter, he would stress continuing education for the membership, continued workshop activities, and student involvement. Lars loves his work and likes to spend his free time outdoors, camping, hiking, skiing and playing with his two sons Victor and Pelle. He is a terrible angler but good at catching fish with various nets and traps.

News from New York State

From Gene Buck at the Congressional Research Service and the Internet, we found the following notes having to do with Fish, Fisheries, New York and its neighbors.

Weakfish Regulations. On June 20, 1995, NMFS published proposed regulations in the Federal Register (p. 32130) that would prohibit fishing for and ban possession of weakfish (a.k.a. ocean trout) in Federal waters of the Exclusive Economic Zone from Maine to Florida. This action is authorized by the 1993 Atlantic Coastal Fisheries Cooperative Management Act to coordinate with efforts of the Atlantic States Marine Fisheries Commission in State waters, since no fishery management plan has been prepared for the species under the Magnuson Fishery Conservation and Management Act. Public hearings are scheduled along the coast. [Federal Register, Assoc Press]

Canada Oceans Act. On June 14, 1995, Canada's Fisheries and Oceans Minister introduced legislation to en-

hance protection and management of fisheries within Canada's 200-mile limit. This measure authorizes the creation of marine protected areas, consolidates oceans activities and responsibilities within the Dept. of Fisheries and Oceans, provides for the development of an Oceans Management Strategy through partnerships with ocean stakeholders, and asserts sovereign authority over all resources within the 200-mile zone. [Reuters, Dow Jones News]

Snagging Salmon in New York. On June 12, 1995, the New York State Assembly approved a measure prohibiting the taking of Pacific salmon by snagging with weighted hooks; the State Senate had approved the measure the previous week. This prohibition would take effect Sept. 1, 1995, if signed by the Governor. [Assoc Press]. The bill has to the editor's knowledge been signed to law.

Whirling Disease. On June 21, 1995, a Montana task force released a report recommending immediate steps to be taken to prevent the spread of whirling disease. Recommendations include studies on how infection spreads to new drainages, precautionary efforts by anglers, and testing of private fish ponds. [Assoc Press]

Magnuson Act Reauthorization. On Oct. 18, 1995, the House amended and passed H.R.39, reauthorization of the Magnuson Fishery Conservation and Management Act, by a vote of 388-37. Floor amendments approved included a redefinition of optimum yield which would prohibit Regional Councils from setting harvest levels exceeding the maximum sustainable yield of any fishery, authorization for Regional Councils to give more attention to reducing Gulf of Mexico and South Atlantic shrimp trawl bycatch, and a requirement that Regional Councils evaluate the impact of fishing gear on habitat. [Assoc Press, Congr. Record]

Decline in Fish Availability Predicted. On Oct. 16, 1995, Population Action International released a report suggesting that population growth and increasing demand for seafood may result in fish becoming too expensive for nearly 1 billion people in developing nations in the 21st Century. [USA Today and Financial Times via Greenwire]

Fulton Fish Market. On Oct 13, 1995, New York City Mayor Giuliani announced that he was removing six companies that previously had unloaded fish delivered by truck to the Fulton Fish Market and was replacing them with a new company that promised to cut costs by 20%. On Oct. 15, 1995, the Fulton Fish Market experienced a work stoppage after 50 employees from the new company hired to unload fish refused to continue work after threats and intimidation. On Oct. 16, 1995, Mayor Giuliani threatened to close the Market if "illegal" work stoppages or strikes continue. On Oct. 17, 1995, US District Court Judge Thomas Griesa rejected an appeal from a group of about 40 terminated truck unloaders seeking reinstatement to their jobs. [Assoc Press]

Fish eats rare bird - a sad story from Paul McKeown:

"British bird watchers who had traveled from all parts of the country to glimpse a rare migrating bird, watched in horror as a giant fish gobbled it down, the Sun newspaper reported. The 4-foot long pike gulped the red-necked phalarope in one bit. Only a few brown and red feathers were left of the bird, which was apparently migrating from the north of Scotland to Africa."

Internet Discussion Groups

We got this message through the internet from Ms Kylie Hall, Department of Conservation and Natural Resources in Victoria, the newsletter editor for the Australian Society for Fish Biology. We edited her list some and pass it on to you. You can access these through your home computer or office if connected to the internet. You can also contact Ms Kylie directly with addition to her list [E-mail: k.hall@mssl.oz.au].

AQUARIUM, is a fish-keeping discussion group. To subscribe, send an e-mail message to: aquarium@emuvml.cc.emory.edu with the following text (only) in the body of the message: subscribe aquarium <Your name> Related newsgroups are rec.aquaria, aimed at the hobbyist and sci.aquaria, a scientifically oriented newsgroup on aquaria.

CRUST-L, is a crustacean discussion group. To subscribe, send an e-mail message to: listserv@sivm.si.edu with the following text (only) in the body of the message: crust-l <Your name>

ECOLOG_L To send a message to the list: ecolog-l@umdd.umd.edu

ELASMO-L, is a forum for broad discussions of research, teaching, and conservation of chondrichthian fishes. The mailing list operates under the aegis of the American Elasmobranch Society (AES), and is dedicated to the concerns of its full, student, and affiliate members. Although this mailing list is intended to promote communication among AES members, all serious students of chondrichthian biology are invited to participate. Elasmol operates under the PMDF MAILSERV facility. It is not a listserv mailing list, and the usual listserv commands will not work. To subscribe to elasmol, send an email message to: elasmol-request@umassd.edu with the following text in the body of the message (not the subject line): subscribe elasmol <Your name> A successful subscription will result in a confirmatory message being sent to you.

FUZZY ECOLOGY To send a message to the list: fuzzy-ecology@pz-oekosys.uni-kiel.d400.de

FISH-ECOLOGY, is an international computer conference for academic personnel and students involved in empirical and theoretical issues related to the ecology of fish and fisheries. It is the principle fisheries biology list and tends to lean more toward the biological and not the economic

and social sciences as applied to fisheries, unless it's the mathematics of modeling. To subscribe to the list, send a message to: listserv@searn.sunet.se with the following text in the body of the message: subscribe fish-ecology <Your name> Note: they want your name, not your e-mail address. To post mail; send your message to fish-ecology@searn.sunet.se

FISHERIES, is a discussion list which includes both biological and social sciences. To subscribe, send an e-mail message to: Majordomo@biome.bio.dfo.ca with the following text in the body of the message: subscribe fisheries <Your e-mail address> In this case, they want your e-mail address rather than your name. To send a message to the network, the address is fisheries@scotia.dfo.ca or fisheries@biome.bio.dfo.ca

FISHFOLK, is a discussion list covering all social science aspects of fisheries, including sociology, anthropology, and economics, with a fair amount of news and management information also provided. To subscribe, send a message to: listserv@mitvma.mit.edu with the following text (only) in the body of the message: subscribe fishfolk <Your name> Send messages you wish to post on the network only to the actual list address: fishfolk@mitvma.mit.edu

MARBIO, is a new discussion list on all aspects of marine biology. To subscribe to the list, send a message to: majordomo@marinelab.sarasota.fl.us with the following text (only) in the body of the message: subscribe marbio Additional instructions will be sent automatically.

MOLLUSCA, is a mollusc discussion group. To subscribe to the list, send a message to: listproc@ucmp1.berkeley.edu with the following text (only) in the body of the message: subscribe <your name> mollusca There is also the newsgroup: bionet.molbio.molluscs

SEAFOOD To send mail to the list: seafood@ucdavis.edu
SHARK-L, is a shark biology list aimed at serious amateurs, although several biologists participate. To subscribe to the list, send a message to: listserv@utcvm.utc.edu with the following text (only) in the body of the message: subscribe shark-l <Your name> To send a message to the list, the address is: shark-l@utcvm.utc.edu

SHELLFISH, is a discussion list managed by the National Shellfisheries Association (US) which covers shellfish culture and related issues. To subscribe to this list, send a subscription request to: shellfish-request@kenyon.edu with the following text (only) in the body of the message: subscribe
Messages for distribution are sent to shellfish@kenyon.edu

THEORETICAL-ECOLOGY, is a new theoretical ecology mailing list. The kinds of topics that the listowner has suggested as being appropriate for this list are: alternate modeling approaches, such as network analysis, loop analysis, stability studies; applications of catastrophe theory and chaos theory to ecosystems; complexity; and reviews of different software programs for modeling and analysis. Fundamental questions about the structure and dynamics of ecosystems might also be appropriate for this

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with the following text in the body of the message: subscribe theoretical-ecology

Upcoming events

Annual Meeting of the New York Chapter - February 1 -3 1996. See program and final call for paper at the end of the newsletter!

52nd Northeast Fish and Wildlife Conference.

March 31 - April 3 1996. Hartford Marriott, Farmington, Connecticut. Conference Theme: "Private Rights and Government/ Public Responsibilities in managing Fish and Wildlife Resources. Send in abstract no later than December 1, 1995 to Connecticut Department of Environmental Protection, 79 Elm Street, Hartford, Connecticut 06106.

1996 Great Lakes Research Consortium Student/Faculty Conference, January 12-13, 1996, SUNY College of Environmental Science and Forestry, Syracuse, NY. Students especially invited to submit abstracts. Send abstracts to Great Lakes Research Consortium, 24 Bray Hall, SUNY-ESF, Syracuse, NY. 13210. For more information call Jack Manno at 315 470 6816.

Midwest Fish and Wildlife Conference Annual Meeting of the American Fishery Society North Central Division 3-6 December, 1995 Westin Hotel, Detroit, Michigan, USA Contact: Jim Diana, School of Natural Resources, University of Michigan, Ann Arbor, MI 48109, USA Ph: 313 763 5834

Canadian Conference for Fisheries Research 4-6 January, 1996 Hotel Le Meridien, Montreal, Quebec, Canada Contact Jim Grant, Department of Biology, Concordia University, 1455 de Maisonneuve Blvd. W., Montreal, PQ H3G 1M8 Ph: 514 848 3421, Fax: 514 848 2881 E-mail: grant@vax2.concordia.ca

American Geophysical Union/American Society of Limnology and Oceanography **Ocean Sciences Meeting** 12-16 February, 1996 San Diego, California, USA Inquiries: Suzanne Kimball, American Geophysical Union E-mail: suzette_kimball@nps.gov or Polly Penhale, American Society of Limnology and Oceanography E-mail: ppenhale@nsf.gov

International Multi-disciplinary **Symposium "Reinventing Fisheries Management"** 20-24 February, 1996 Fisheries Centre, UBC, Vancouver, BC, Canada Keynote speakers: Caddy (FAO-The Larkin Lecture), Sainsbury (Hobart), Hanneson (Bergen), Williams (ICLARM), Cochrane

(Capetown), Policansky (Washington). Will lead to book of same name edited by Tony Pitcher & Paul Hart. For further details contact: Ying Fax: 604 822 8934 E-mail: ying@fisheries.com

Forestry-Fish Conference 1-4 May, 1996 Calgary, Canada Inquiries: Darwin Monita E-mail: dar@cadvision.com

39th Annual Conference on Great Lakes Research 26-30 May, 1996 Erindale College, University of Toronto, USA Sessions will cover a variety of current large lakes issues such as the effectiveness of international management agreements, endocrine disrupters, non-native species, effects of UV radiation, human health, sea lamprey controls, satellite imagery, food web interactions, and wetland restoration. Intentions to submit an abstract must be received by December 15, 1995 and abstracts will be due January 15, 1996. Instructions for abstract submission and meeting information are published by the International Association for Great Lakes Research in its fall Lakes Letter, and will be available on IAGLR's WWW home: page (<http://www.geog.buffalo.edu/GLP/iaglr/iaglr.html>). Exhibitors are encouraged and should phone 313 747 1673. For further information, contact: Gary Sprules, Department of Zoology, Erindale College, University of Toronto, Mississauga, ON L5L 1C6, USA Ph: 905 828 3987, Fax: 905 828 3792 E-mail: gsprules@cyclops.erin.utoronto.ca

76th Annual Meeting of the American Society of Ichthyologists and Herpetologists: 12th Annual Meeting of the American Elasmobranch Society 22nd Annual Meeting of the Southeastern Fishes Council Annual Meeting of the Neotropical Ichthyological Association also the 44th Annual Meeting of the Herpetologists League. 13-19 June, 1996 Hotel Intercontinental, New Orleans, Louisiana USA Deadlines for receipt of abstracts and registration is 1 April, 1996. Inquiries: Dr. Bob Cashner, ASIH Local Committee Chair, Dept. Biological Sciences, University of New Orleans, New Orleans, LA 70148 Ph: 504 286 6741, Fax: 504 286 6121 E-mail: rccbs@uno.edu

20th Annual Larval Fish Conference, American Fisheries Society Early Life History Section 13-19 June 1996, New Orleans, Louisiana, USA. To be held in conjunction with the above meetings Contact: Richard F. Shaw, Director, Coastal Fisheries Institute, Louisiana State University, Baton Rouge, LA 70803-7503, USA Ph: 504 388 6455, Fax: 504 388 6513 See the ASIH web page at <http://www.utexas.edu/depts/asih/index.html> or conference updates and additional information.

International Congress on the Biology of Fishes 14-18 July, 1996 San Francisco State University, San Francisco, California, USA Sponsored by the Physiology section of the American Fisheries Society. Themes include metabolic

performance, biotechnology applications, functional anatomy and others. The deadline for session proposals was 15th September, 1995 and paper titles are due 15th November, 1995. Contact: Don MacKinlay, Fisheries and Oceans, 555 West Hastings St, Vancouver, BC V6B5G3, USA Ph: 604 666 3520, Fax: 604 666 3450

2nd World Fisheries Congress "Developing and Sustaining World Fisheries Resources: The State of Science and Management" 28 July-2 August, 1996 Brisbane Convention and Exhibition Centre, Brisbane, Queensland, Australia Hosted by the Australian Society for Fish Biology Inquiries: Congress Secretariat, PO Box 1280, Milton, Queensland 4064, Australia Ph: (07) 369 0477 / Int Ph: 617 3369 0477, Fax: (07) 369 1512 / Int Fax: 617 3369 1512 E-mail: im@cc.uq.oz.au or fish96@sunray.im.com.au

1996 Ecological Society of America 11-15 August, 1996 Providence, Rhode Island, USA Inquiries: Tasha E-mail: tasha@esa.org

Mark Your Calendars

126th Annual Meeting of the American Fisheries Society 25-29 August, 1996 Hyatt Regency Hotel, Dearborn, Michigan, USA "SUSTAINABLE FISHERIES: ECONOMICS, ECOLOGY, AND ETHICS" Inquiries: Paul Brouha, AFS, 5410 Grosvenor Lane, Ste. 110; Bethesda, MD 20814-2199, USA Ph: 301 897 8616, Fax: 301 897 8096. More information in Fisheries.

Feature Article

This weeks feature article

Evidence of interactions between walleye and yellow perch in New York State lakes.

is a paper presented by Lars Rudstam, David Green, John Forney, Doug Stang and Joe Evans at the PERCIS II meeting in Finland this summer. It will be published in the Symposium volume (*Acta Zoologica Fennica*). If you have additional information on walleye and perch in New York - please contact Lars. The authors are thankful to all of you who already contributed data for this paper.

Abstract:

We believe that the population dynamics of walleye (*Stizostedion vitreum vitreum*) and yellow perch (*Perca flavescens*) are strongly affected by biotic interactions: abundant walleye populations limit perch recruitment, resulting in fast perch and slow walleye growth rates;

sparse walleye populations allow for strong perch recruitment resulting in slow yellow perch and fast walleye growth rates. If these mechanisms are important, we would expect a negative correlation between perch and walleye growth rates. Mean length at age 4 for walleye and yellow perch in 23 New York waters were negatively correlated. Further, changes over time in length at age of both species as walleye populations increased in Canadarago and Silver Lakes follow the regression from the whole data set. This indicates a strong interaction between these two percid species in New York waters. The residuals were affected by lake productivity, but not lake area or mean depth. Waters with very low productivity had smaller walleye and yellow perch than expected from the regression.

Introduction.

Walleye (*Stizostedion vitreum vitreum*) and yellow perch (*Perca flavescens*) co-occur in many central North American lakes and often form a tightly coupled predator-prey species pair (Forney 1980, Post & Rudstam 1992). Our current understanding of these species' interactions is based partly on long term studies in Oneida Lake, New York, by John Forney and co-workers (e.g. Forney 1976, 1977, 1980, Mills & Forney 1988). When walleye are abundant (as in Oneida Lake), they are the main predator on young-of-year yellow perch (YOY perch). YOY perch are vulnerable to walleye predation once they reach a total length of 18 mm and walleye often consume a large portion of the YOY perch population during summer and fall. Walleye growth rate slows after YOY fish have been depleted. Few yellow perch survive the first year, and those that do grow well. An increase in predator biomass is often followed by a decline in yellow perch recruitment (Gammon & Hasler 1965, Kempinger & Carline 1977). Although larger yellow perch may be piscivorous (Tarby 1974), they generally feed more on zooplankton and benthic invertebrates and their growth rate is not dependent on abundance of small fish. Conversely, when walleye are rare, they have little impact on YOY yellow perch populations and we expect good perch survival, strong intraspecific competition for zooplankton, and poor growth (Mills & Forney 1988). Walleye on the other hand grow well feeding on an abundant, slow growing perch population. The result of these interactions should be relatively small walleye and large perch when walleye are abundant and relatively large walleye and small perch when walleye are rare.

We hypothesize that these biotic interactions determine the population dynamics of walleye and yellow perch in New York State which is in the central part of the geographic distribution of the two species (Collette & Banarescu 1977). It follows from this hypothesis that the size at age of walleye and yellow perch should be inversely

related over a range of lake types and that lakes with both species growing rapidly or both species growing slowly should not exist in this region. Further, if walleye are introduced into lakes with abundant perch populations, walleye growth rates should decrease and yellow perch growth rate should increase over time. We tested this hypothesis by reviewing available data on length at age 4

in a trophic shallow lake in central New York State (Mills et al. 1978). The fish populations, particularly the walleye and yellow perch populations, have been studied in this lake since 1957 and these investigations continue (Forney 1980, VanDeValk et al. 1994). Recently (1991), zebra mussels (*Dreissena polymorpha*) invaded the lake causing higher water clarity in the summer and yet to be determined

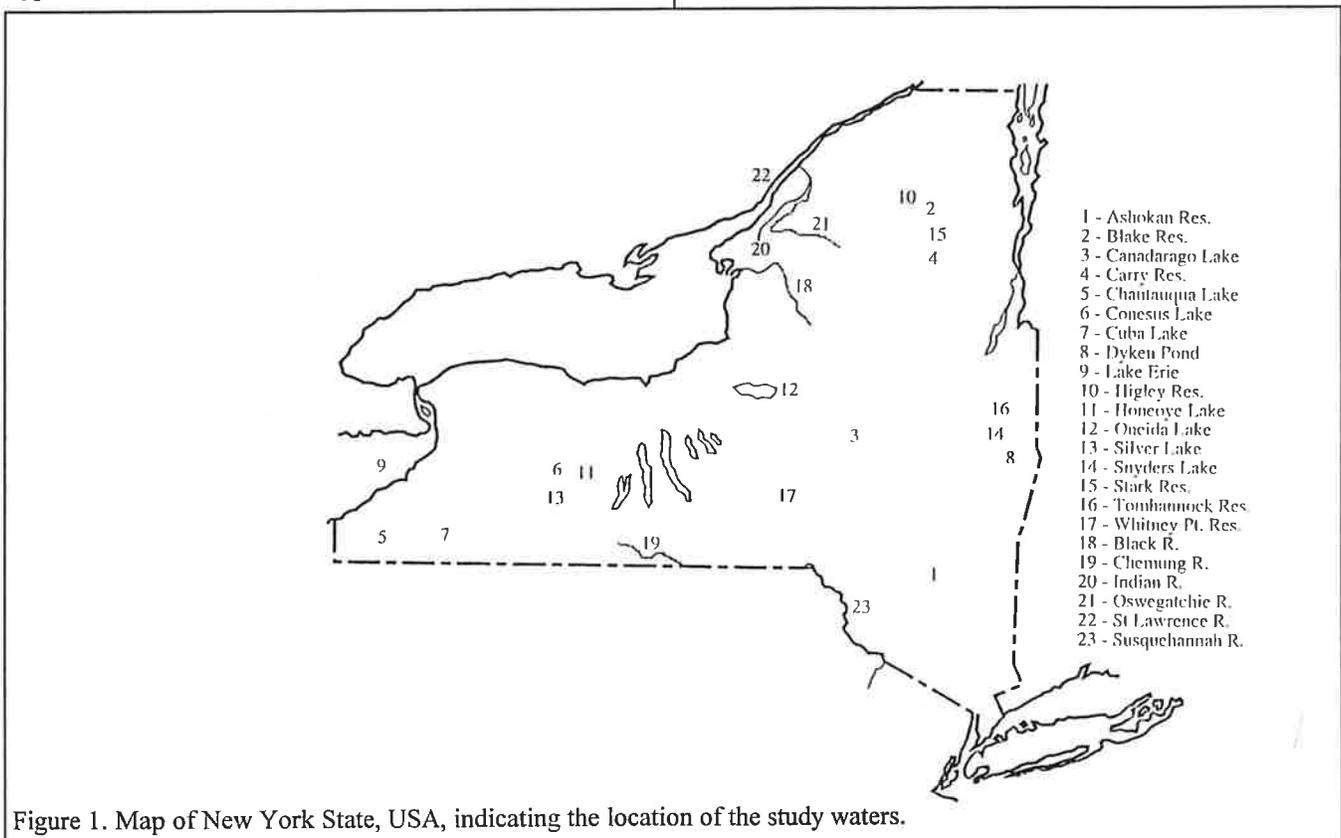


Figure 1. Map of New York State, USA, indicating the location of the study waters.

of walleye and yellow perch in New York State and by investigating the development over time of walleye and perch growth rates in Canadarago Lake and Silver Lake, New York, two lakes where abundant walleye populations have been established through fingerling stocking.

Materials and Methods

Data included in this study come from 17 lakes and reservoirs and 6 rivers throughout New York State (Figure 1). These waters include a wide variety of lake types from oligotrophic Adirondack reservoirs to eutrophic inland lakes ranging in size from 45 to over 20,000 ha (Table 1). To aid analysis, we classified lakes and reservoirs into three size groups (< 400 ha, 400-2000 ha, 2000 ha<), three groups based on mean depth (< 5 m, 5 - 7 m, 7 m<) and three groups based on productivity (oligotrophic, mesotrophic, and eutrophic).

Oneida, Canadarago and Silver Lakes are given special consideration because of the long term records available from these lakes. Oneida Lake is a 20,700 ha eu-

effects on walleye and perch populations.

Canadarago Lake is a 809 ha eutrophic lake in central New York State (Harr et al. 1980). It has been studied by D. M. Green and co-workers since 1972. Originally the lake had a large number of slow growing yellow perch (biomass of yellow perch larger than 127 mm of 44 to 110 kg/ha, Green unpubl. data). Thirty-five years of repeated stocking of walleye fry did not result in the establishment of a viable population. In 1973 a tertiary sewage treatment plant began operation and the phosphorus content of the water, as well as the occurrence of algal blooms, decreased (Harr et al. 1980). Fingerling walleye were introduced from 1977 to 1982 resulting in a viable, naturally reproducing population (Green 1986). By 1987, the walleye population had increased to 12-15 kg/ha. Growth rates of walleye and yellow perch were followed throughout these changes and data on length at age for both species are available for odd numbered years 1981-1989.

Silver Lake is a 338 ha eutrophic lake in western New York State. Fingerling walleye were introduced be-

ginning in 1986 to produce a walleye fishery and to improve the size structure of the panfish population (Evans 1993). Data on growth rates of walleye and yellow perch is available for 1986 to 1992.

Most of our analysis is based on length-at-age of age 4 walleye and yellow perch (averaged for males and females). We chose to analyze total length at age 4 for both species because the range of lengths expected in New York State at age 4 (250-500 mm for walleye, 130-270 mm for yellow perch, Forney et al. 1994) are within the range of lengths vulnerable to standard gill nets used by New York State Department of Environmental Conservation (Forney et al. 1994). Younger fish may be under-represented in standard gill nets and older fish are more difficult to age. Fish were caught with varying combinations of trap nets, gill nets and/or electrofishing. Ages were determined by various investigators based on scales; a large proportion of the aging was done by J. Forney, A. VanDeValk, D. Green and J. Evans.

We used available data from each of these water bodies to estimate the size of walleye and yellow perch after four growing seasons (at the formation of the fourth annulus). Back-calculated lengths were used when available. When only length at capture were known, we used the average of lengths at age 3+ and 4+ when fish were collected from June through September. Fish collected in September-October were assumed to have completed their annual growth and fish collected in the spring (April-May) were assumed not to have grown since annulus formation.

Results and Discussion

Mean length at age 4 for walleye in the 23 waters ranged from 301 to 495 mm and for yellow perch from 141 to 260 mm. The smallest age-4 individuals of both species (301 mm for walleye and 141 mm for perch) were found in Carry Reservoir, a highly oligotrophic impoundment of the Raquette River. The fastest growing yellow perch were observed in Canadarago Lake in 1987 (258 mm at age 4); the fastest growing walleye were observed in the St. Lawrence River in 1988 (495 mm at age 4).

Overall, there was a negative correlation between length at age 4 of walleye and yellow perch in these lakes, although the regression explained only about 20 % of the variance (Fig. 2, $r^2 = 0.201$, $N = 90$, $P < 0.001$). However, with the exception of one Adirondack reservoir, no waters displayed slow growth for both walleye and yellow perch or fast growth for both species. Interestingly, growth rates in rivers did not deviate more from the regression line than lakes and there are rivers with both faster and slower

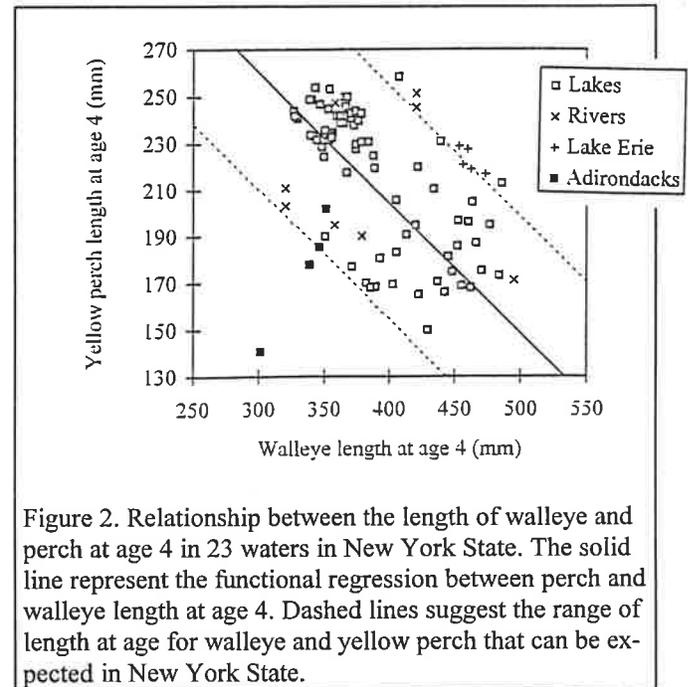


Figure 2. Relationship between the length of walleye and perch at age 4 in 23 waters in New York State. The solid line represent the functional regression between perch and walleye length at age 4. Dashed lines suggest the range of length at age for walleye and yellow perch that can be expected in New York State.

growing populations than expected from the regression line (Fig. 2, Table 1). Growth rates in Lake Erie were high for both walleye and perch. The New York portion of Lake Erie is partly dependent on walleye migrating into this region from the western basin and walleye length at age may be more dependent on conditions in the western than in the eastern basin of Lake Erie. Excluding Adirondack impoundments and Lake Erie from the analysis resulted in a better fit to the regression equation ($r^2 = 0.350$, $N = 81$, $P < 0.001$). The line in Fig. 2 is the functional regression (Ricker 1973) between perch length at age 4 (P_{IV}) and walleye length at age 4 (W_{IV}) using all data points ($P_{IV} = 428 - 0.558 W_{IV}$). The functional regression excluding Lake Erie and Adirondack impoundments is almost identical ($P_{IV} = 431 - 0.566 W_{IV}$).

Length at age 4 was relatively constant from 1958 to 1994 in Oneida Lake (Fig. 3), 327-388 mm for walleye and 218-254 mm for yellow perch. During this time, walleye were abundant in Oneida Lake (average biomass of age 4 and older walleye 20 kg/ha, range 5 - 36 kg/ha) relative to the biomass of adult perch (average 26 kg/ha, range 7 - 59 kg/ha, Mills & Forney 1988, VanDeValk et al. 1994). Most of each year-class of perch were consumed by walleye preventing the formation of an abundant, slow growing yellow perch population (Forney 1977, 1980).

This relative stability in length at age 4 over a 37 year period in Oneida Lake contrasts with changes observed over time when walleye were introduced into two lakes with abundant slow growing perch population (Canadarago and Silver Lakes, Fig. 3). In these lakes, walleye initially grew rapidly and perch grew slowly. Over time, walleye growth rates declined and perch growth rates

increased. Length at age 4 of walleye and yellow perch in Canadarago Lake converged on the lengths observed in Oneida Lake (Fig. 3) as did walleye biomass (12-15 kg/ha in Canadarago Lake 1987). Density dependent walleye growth has been observed in several lakes elsewhere (Shuter and Koonce 1977, Colby et al. 1979). The changes in Silver Lake were less dramatic but followed the general trend of decreasing walleye growth rate and increasing perch growth rate. However, an expanding walleye population may not always affect perch and walleye growth rates. In Chautauqua Lake (Mooradian et al. 1986), growth rates of both walleye and yellow perch remained within a fairly narrow range during the expansion of the walleye population (ranges of annual averages were 371 - 405 mm for age-4 walleye and 168 - 184 mm for age 4 yellow perch for 7 years between 1979 and 1993).

Residuals from the functional regression line (calculated as the perpendicular distance from the line to each data point) were plotted for each lake category based on average values for each lake when several years were available, except for Silver and Canadarago Lakes where residuals from each year were plotted (Fig. 4). No effect of lake area or mean depth was indicated by this analysis. However, the low productivity waters in the Adirondack mountains appear to have lower growth rates for both perch and walleye than predicted by the regression. Slower growth in this region may be linked to lower productivity, but smaller size could also reflect lower temperatures and shorter growing seasons at the higher altitude and latitude, as has been shown elsewhere (Colby et al. 1979, Shuter &

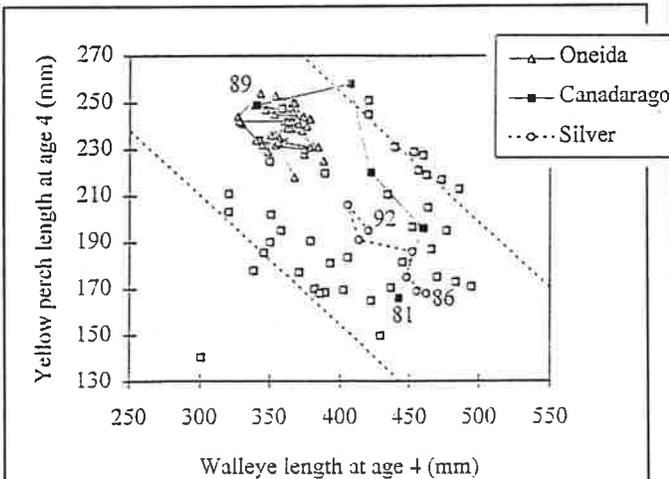


Figure 3. The same data as in Figure 2 but with three lakes highlighted - Oneida Lake, Canadarago Lake and Silver Lake - for which long term data series were available. The line between the data points from these three lakes represent the time course of changes in length at age 4 (1958-94 in Oneida Lake, 1986-92 in Silver Lake and 1981-89 in Canadarago Lake). The starting and ending years are marked for Silver and Canadarago Lakes.

Post 1992).

Interactions with other fish species could affect the relationship between walleye and perch growth rates. In northern centrarchid-dominated lakes, growth and abundance of percids may be affected by the degree northern pike (*Esox lucius*) control bluegill (*Lepomis macrochirus*) and white sucker (*Catostomus commersoni*), (Colby et al. 1987, Hayes 1992). The lakes and reservoirs that we examined have varied fish communities, including black bass (*Micropterus* sp.), esocids, various centrarchid species and in some cases abundant alewife (*Alosa pseudoharengus*), golden shiners (*Notemigonus crysoleucas*), white perch (*Morone americana*) and gizzard shad (*Dorosoma cepedianum*). The presence of these species does not seem to affect the relationships between walleye and perch length at age. For example residuals from two waters with abundant alewife populations (Conesus Lake and Ashokan Reservoir) were +10 and -40 (Table 1). This does not necessarily mean that the other species are not affecting the total biomass and growth of walleye and yellow perch. Perch growth may be slow due to both inter and intra-specific competition. As long as the competitor is also a good forage fish for walleye (which is not always the case, see Rudstam et al. 1993 or Hambright 1994), we may find a negative correlation between walleye and perch growth rates, even if perch is a minor component of the forage fish biomass.

We believe our analysis is useful for two reasons. First, the negative correlation between growth rates of walleye and yellow perch in the waters investigated indicates the importance of predator-prey interactions in determining growth of the two species in New York State. With the exception of one of the oligotrophic lakes, there were no lakes in which both species grew fast or both grew slow. Lake Erie had faster perch growth than expected from observed walleye growth rates, possibly because the walleye samples were composed of both local fish and fish migrating from the western basin to the eastern basin of the lake. Shorter growing season and colder temperatures further north likely limits growth rates of these species. However, within New York State, which is in the central region of their distribution, biotic interactions are at least as important as abiotic factors for determining size at age of walleye and yellow perch. This is similar to the observations of a negative correlation between proportional stock densities (an index of size) of bluegill (*Lepomis macrochirus*) and largemouth bass (*Micropterus salmoides*) in ponds (Anderson 1978).

Secondly, our results have implications for percid management. Managing one species will likely affect the other. In the case of Silver and Canadarago Lakes, the management strategy was to establish a large walleye populations to provide better walleye fishing and a smaller population of faster growing yellow perch. Anglers generally prefer a few large yellow perch to many small ones.

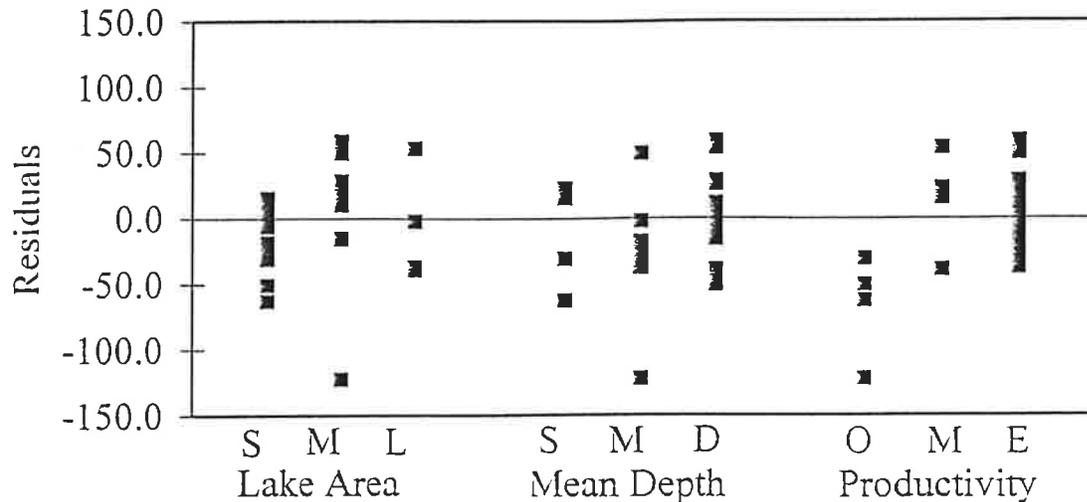
This strategy was successful (Fig. 3), although the increased perch growth rates was accompanied by decreased walleye growth rates. If this decline average size of walleye is deemed too large, reductions in walleye populations may be the next step in management of these lakes.

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Figure 4. Residuals from the functional regression grouped by lake type (Table 1). Lakes are classified by area as small (<400 ha, S), medium (400-2000 ha, M), and large (over 2000 ha, L), by mean depth as shallow (<5m, S) medium (5-7m, M) and deep (over 7m, D), and by productivity (oligotrophic O, mesotrophic M and eutrophic E).



Acknowledgment: This study was supported by New York Federal Aid Project FA-5-R to the Cornell Warmwater Fisheries Unit. We thank Anthony VanDeValk and Thomas Brooking for help in various aspects of the study and Gene Lane for access unpublished data and Doug Carlson for help with data on rivers. Comments on the manuscript by C. Paszkowski and E. D. LeCren were very helpful. Contribution # 182 from the Cornell Biological Field Station.

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AFS - New York Chapter Newsletter -- December, 1995

**JOINT MEETING OF NEW YORK CHAPTERS
American Fisheries Society, Society of American Foresters
and The Wildlife Society
February 1-3, 1996 at
Sheraton Inn Syracuse, Electronic Parkway
and 7th North St. (see Map)**

CONTRIBUTED PAPERS AND POSTER DISPLAYS

As previously announced and as indicated in the attached program, there will be concurrent paper sessions (AFS, SAF and TWS) on Friday, February 2 consisting of contributed papers and a poster session on Thursday, February 1. We encourage and urge any of you who are involved in ecosystem management from any perspective to submit a presentation in one of these formats. **Abstracts of papers will be published and should be submitted to Gary Goff by December 11. Poster titles with an abstract should also be submitted to Gary (Fernow Hall, Cornell University, Ithaca, NY 14853; FAX 607-255-2815; e-mail grg3@cornell.edu).**

We urge you to encourage students to contribute papers and posters.

**PROGRAM:
ECOSYSTEM APPROACHES TO MANAGEMENT:
Interdisciplinary Applications**

Thursday, Feb. 1

Registration: 10:00 A.M. - Noon

- 1:00 Welcome
- 1:15 Fish and Wildlife Service Perspective - Mollie Beattie, Director, US Fish and Wildlife Service
- 1:45 Forest Service Perspective - Jack Thomas, Chief, US Forest Service
- 2:15 Questions
- 2:30 Refreshment Break
- 2:50 Northwestern Forests Management - TBA
- 3:10 Nature Conservancy Approaches\ Perspectives - TBA
- 3:30 An Industry Perspective - Kelly Austin, Weyerhaeuser Co.
- 4:00 Poster Session
- 5:30 Dinner on your own
- 8:00 Social - Mixer (CASH BAR)

Friday, Feb. 2

- 9:00 Connecticut River Planning Project - Larry Bandolin, Conte Refuge Planning Project
- 9:20 Northern Forest Lands Project - Karen Richards, NYS DEC
- 9:40 Northeast Groundfish Perspectives - Steven Murawski, Northeast Fisheries Science Center
- 10:00 Holistic Management of Natural Resources - Michael Zagata, NYSDEC
- 10:20 Refreshment Break
- 10:40 Ecosystem Management in Wisconsin - Robert Dumke, Wisconsin Dept. Natural Resources
- 11:00 Ecological Reserves - Malcolm Hunter, University of Maine

AFS - New York Chapter Newsletter -- December, 1995

Friday, Feb. 2 (Cont'd)

- 11:20 Reclamation of Washington Creek - Peter Williams, University of Guelph
- 11:40 French Creek Project - Mark Bain, NYS Fish & Wildlife Coop. Unit
- 12:00 LUNCH (at the Sheraton)

1:00-4:00 CONCURRENT SESSIONS (3 rooms) of Contributed Papers

- 4:00 Chapter Business Meetings
- 5:30 RECEPTION - RAFFLE
- 6:30 BANQUET - SOCIETY AWARDS and AWARDS FOR BEST PAPERS/POSTERS

Saturday, Feb. 3

- 9:00 Integration of Socio-Economic and Environmental Factors in Landscape Change Modeling Using GIS - Bryan Pijanowski, Michigan State University
- 9:20 The Role of Extension - James Miller, Cooperative Research, Education and Extension Service, USDA
- 9:40 The Utility of Ecosystem Management - Marion Clarke, Florida Sea Grant Program
- 10:00 Refreshment Break
- 10:20 Human Dimensions in Ecosystem Management - Doug Shaw, US Forest Service
- 10:40 Implications to Professional Education - Aaron Moen, SUNY Coll. Agriculture and Life Sciences
- 11:00 Finding the Resources - Herbert Doig, NYS-DEC
- 11:20 Outstanding Paper, Poster Awards
- 11:30 Concluding Remarks

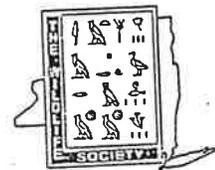
CONTINUING EDUCATION CREDITS AVAILABLE

Chapter Executive Committee Meetings, Thursday, February 1:
AFS 4:30-6:30 P.M. SAF 9-12 A.M. TWS 9:30 A.M.

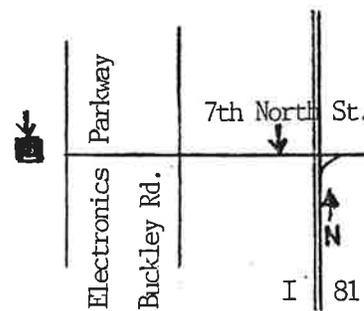
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February 1-3, 1996



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Age and Growth Workshop The NY AFS Chapter is sponsoring the workshop *Age, Growth, and Production of Fishes: New Science and Technology* to be held in August 10-11, 1995 in Syracuse. If you are interested and did not already receive a separate announcement for this event, contact:

Betsy Kozuchowski
US fish and Wildlife Service
405 North French Road
Amherst, NY 14228
Telephone (716) 691-5456

Membership - from Tim Sinnott

Number of members of the New York Chapter is now 393 including 70 student members. Of these, 269 have paid through 95, 73 through 94 and 44 through 93. 93 members will be dropped after this newsletter so please send in your dues, otherwise we will assume that you disappeared from New York to somewhere else. This number of members is about average for the last several years.

Unique format for annual meeting from Mark Malchoff

The annual meeting of the chapter will offer a stimulating change of format and venue for 1996. A three-way meeting of the New York chapters of AFS, the Wildlife Society and the Society of American Foresters will explore the theme Ecosystem Approaches to management: Interdisciplinary applications. The meeting will take place February 1-3 at the Sheraton Inn, Syracuse in Liverpool (Syracuse area). Invited speakers include Jack Thomas Chief of the U.S. Forest Service, and Mollie Beattie, Director of the U.S. Fish and Wildlife Service. DEC Commissioner Mike Zagata will peak on Holistic management of our natural resources and Deputy commissioner Herb Doig will discuss Resources for Ecosystem Management. Other topics to be conferred in the invited speakers sessions include Northern Forest Lands Council, Silvio Conte F&W Refuge/Connecticut River Planning Project, Ecological Reserves, Groundfish Resources on Georges Bank, and a Review of Ecosystem Approaches in the states of Michigan and Pennsylvania. The conference will also benefit from a number of contributed papers, along with examinations of the roles of Extension and academia in the adoption of ecosystems management methods. The program will of course include evening socials and raffles. Mark you calendar for this unique opportunity to examine the usefulness of ecosystem approaches to support you chapter and to have fun!

Around New York State

Allen Peterson has been promoted. After 14 years as an environmental specialist for NYSEG, A. Peterson was promoted to Research and Development Coordinator in the NYSEG R&D Department. His primary new responsibility is the administration of the Natural Gas R&D Program that has a budget of about \$1,500,000 per year. As a result, he will no longer be involved in fisheries and wildlife issues on a day to day basis. Thanks Allen for your contributions to the chapter, particularly for taking care of logistic arrangements at the annual meetings. Congratulations and best wishes.

Dr. David Green retired from his position as a Senior Research Associate and Leader of the Cornell Warmwater Fisheries Unit at the Shackleton Point Biological Field Station this July. David has served on many committees of NYSAFS, most recently as a organizer of the successful Northeast Bass Management Workshop in Alexandria Bay. David has made large contribution to fisheries science including many studies of bass management through the New York Bass study, walleye management in Canadarago Lake, effects of walleye introductions and standardized sampling protocols. He is also known for his electrofishing abilities. "You have not electrofished until you have done it with Dave". We celebrated Dave with a get-together at Shackleton Point and gave him a fish carving, fly tying equipment, electrofishing hat and many fine words. Dave reciprocated with a golden brush, sticks and by blowing up his suitcase. Something about not having to commute 1 hour each way each day anymore. We will hopefully continue to see Dave at fisheries meetings and benefit from his work on bass and other warmwater fishes in New York. Although retired in principle, that does not seem to be true in practice. Many thanks for all your efforts Dave.

We are looking at replacing Dave Green:

Senior Research Associate - Fisheries Science

Dept. of Natural Resources, Coll. Agriculture & Life Sciences, Cornell Univ.

Location: Cornell Biological Field Station. Starting date: January 1 1996. Duties: Design and conduct research studies applicable to management of New York warmwater fishery resources on statewide and water-specific bases. Assist NYSDEC fisheries managers in problem identification, data interpretation, and strategy recommendation to enhance warmwater fisheries management. Act as a liaison between the management agency and the university, including participation on various advisory boards, work groups and task forces. Contribute to the fisheries program in the Department of Natural Resources at Cornell. This is a 12-month full time research position with the Cornell Warmwa-

Galloo Island cormorant colony and its potential impacts on eastern Lake Ontario fishery resources. We have also developed techniques to minimize cormorant impacts on recently stocked fish. We are involved in studies of chinook salmon release techniques and are attempting to identify the spawning areas of Lake Ontario walleye. We have been monitoring lake-run salmonid fisheries in eastern Lake Ontario tributaries, with particular emphasis on Atlantic Salmon on the Black River. Also on the Black River we have been conducting a radio telemetry study of sea lamprey with the support of the Great Lakes Fishery Commission with the goal of identifying and eliminating migration of lamprey past the dam complex at Dexter.

There are over 90 active hydroelectric projects in Region 6 whose operation and relicensing require the attention of the fishery management unit. Other environmental protection efforts involve stream protection permit review, fish contaminant sample collection and fish kill investigation.

Region 6 Fishery Management Staff

Al Schiavone	Biologist 2 (Aquatic)
Jack Hasse	Biologist 1 (Aquatic) - Utica Sub-office
Russ McCullough	Biologist 1 (Aquatic)
Doug Carlson	Biologist 1 (Aquatic)
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St. Lawrence River Unit	
Steve LaPan	Biologist 1 (Aquatic) Rodger Klindt Fish & Wildl. Technician 1
Mary Jo Wood	Keyboard Specialist (1/2 time)

Cornell University has a varied program in fisheries. In previous issue we presented the Cornell Cooperative Extension, the SAREP program and the Human Dimensions Unit. Here we finish this section with fisheries programs at the National Biological Service Coop Unit, the Department of Natural Resources, the Tunison Facility, the Adirondack Fisheries Program and the Cornell Biological Field Station.

New York Cooperative Fish and Wildlife Research Unit - Fisheries Activities

The Fish and Wildlife Research Unit has had a busy year marked by the completion of several projects and the start of research in some new areas. Research sponsored by the National Biological Survey has been completed for studies on zebra mussels and alewife in Lake Ontario (PI; Ed Mills), bioassessment of lakes (PI; Ed Mills), aquaculture technology development (PI; Mike Timmons), and smallmouth bass habitat modeling (PI; Mark Bain). One project (PI; Mark Bain) nearing completion and sponsored by the New York Department of Environmental Conserva-

tion, Bureau of Fisheries identified lake ecosystem responses to intensive fishery management (pond reclamation in the Adirondack Park). One ongoing project sponsored by the New York Department of Environmental Conservation, Bureau of Fisheries is investigating ice fishing exploitation of a previously unfished lake (PI; Mark Bain). A second ongoing project sponsored by the National Biological Survey is investigating population genetics of lake sturgeon in the lower Great Lakes watershed (PI; Bernie May). New research is addressing the biology and population status of Hudson River sturgeon (PI; Mark Bain) with support from the Hudson River Foundation supplemented by funding from the National Marine Fisheries Service and the US Army Corps of Engineers. A final new research effort aims to develop a model of land use effects on stream biotic diversity at the watershed scale (PI; Mark Bain) with support from The Nature Conservancy. The watershed biodiversity project also has an extension component supported by Cornell University Cooperative Extension and the New York Agricultural Experiment Station.

For a full listing of project abstracts, publications, presentations, and professional activities, contact:

Mark Bain

New York Cooperative Fish and Wildlife Research Unit

Department of Natural Resources

Fernow Hall - Cornell University

Ithaca, NY 14853

Phone: 607-255-2840 FAX: 607-255-1895 Email:
MBB1@Cornell.edu

Adirondack Fisheries Research Program --

Research projects in this program emphasize improving knowledge of the ecology and management of aquatic ecosystems in the Adirondack region of New York State, with a special emphasis on those communities that contain salmonids. Current projects include studies of brook trout outmigration from ponds in the fall in association with spawning behavior and a comparison of the reproductive and colonization success of brook trout strains native to the region versus strains from Quebec. A small field station is operated adjacent to the Little Moose River near Old Forge by Dan Josephson and Mark Miller. Chuck Krueger assumed the position of Director in July 1994.

Department of Natural Resources other fisheries programs:

Bernie May is a Senior Research Associate in the Department of Natural Resources and Director of the two year old Genome Variation Analysis Facility (GVAF). GVAF is an interdepartmental program available to all Cornell researchers, on a cost plus basis, who do not have access to molecular techniques used to detect genomic variation. Techniques include but are not limited to RFLPs, RAPDs, multilocus fingerprinting, microsatellites, allozymes, etc. Dr. May's primary interest is in the study of natural and es-

facilities. Fish research and holding facilities include 24 large outdoor concrete raceways, 6 indoor raceways, and over 200 smaller tanks for nutrition and culture experiments on trout and salmon. Reorganized in 1993 with the formation of the National Biological Survey, the mission of the laboratory diversified to assume a broader mission to include more field and ecologically oriented research with three full-time scientists and support staff.

Dr. Ketola cooperates with the Cornell Aquaculture Program, teaching and directing students in research projects on fish nutrition and physiology. Past research efforts included development of practical diets, alternate sources of proteins, identifying nutrients critical to health, reproduction, and prevention of cataracts and fry mortality in salmon and trout. The main thrust of research has focused on the development of new diets to reduce phosphorus discharges from fish hatcheries that adversely impact the natural waters in the environment. This work included development of new diets for state fish hatcheries in Michigan, Vermont, and New York. Diets have reduced the levels of total phosphorus in practical feeds from 1.3 to 0.8% with a reduction of phosphorus discharges of over 50% while maintaining economy and production. Elucidation of digestibility of phosphorus in various dietary sources, leaching characteristics, and minimum needs of fish permitted even better utilization of phosphorus and greater reduction of wastes. For example, enzyme supplements in diets increased digestibility of phytin phosphorus (normally not digested by fish) and further reduced discharges of waste phosphorus.

Currently Dr. Ketola works on three research grants shared with department professors M.E. Richmond and W.D. Youngs, as well as Michael B. Timmons of the Department of Ag & Biological Engineering. These grants cover a broad scope of research that aim to reduce fish hatchery waste discharges (phosphorus, nitrogen and solids wastes) by improved diet efficiency, stability of fecal wastes, and engineering innovations to increase removal of solid wastes from hatchery waters.

Upcoming events

The 125th AFS 1995 Annual Meeting to be in Tampa, Florida August 27-31. Theme: "Fisheries: a vision for the future - science, application, communication. See the Fisheries magazine for more information

Aquatic Ecosystem Stewardship, November 6-11, 1995. North American Lake Management Society, contact Neil Hatchison, Ontario Ministry of Environment and Energy, 706 766 2418

Annual Meeting of the New York Chapter - February 1 -3 1996. See first call for papers!

Recent Thesis

SPATIAL AND TEMPORAL TRENDS IN TROPHIC ECOLOGY AND CONDITION OF LAKE ERIE RAINBOW SMELT

By Scott Prindle, M.Sc.

Advisor, Don Stewart, SUNY-ESF

ABSTRACT. Seasonal changes in diet of young-of-year and older rainbow smelt (*Osmerus mordax*) were analyzed to determine their utilization of various prey resources. I evaluated length versus both wet weight (condition) and dry weight (index of energy content) relationships to determine if there were spatial patterns among the three basins of Lake Erie that might reflect differences in foraging success. Analysis of monthly diet composition of young-of-year smelt in 1992 revealed a heavy dependence on copepods from July through August, a shift to predominance of *Bosmina* in September, and to larger cladocerans in October (i.e., *Bythotrephes* and *Daphnia*). Larger smelt preyed on midge larvae, *Bythotrephes* and copepods in June, and *Bythotrephes*, *Daphnia* and copepods in July. Analysis of covariance of length versus wet weight for YOY smelt revealed a gradient in L-W regression slopes with eastern basin fishes having the highest slope and western basin fishes the lowest slope. This suggests that the more eastern fish were in slightly better condition, but analysis of length versus dry weight showed the east basin with the lowest slope. Yearling-and-older smelt in the eastern basin were not in significantly better condition than central basin smelt both in terms of wet and dry weight. YOY and yearling-and-older smelt showed pronounced seasonal cycles of energy density (cal/g) with a strong peak in late summer, a pattern noticeably different from that observed for Lake Ontario smelt. Our energetics modeling of post-larval young-of-year smelt growth, based on observed larger weights in late summer and fall, gave a production estimate that was 11% higher and a consumption estimate 3 times higher than in Lantry (1991). The net effect was that estimated wet-weight conversion efficiency declined from 0.21 to 0.08 for that age class.

**New York Chapter
American Fisheries Society
The Wildlife Society,
Society of American foresters
First Call for Papers
Annual Meeting - February 3, 1996**

Author:

Title:

Student

Professional

Poster

Address Senior Author:

Telephone (Days):

Submit Abstracts to:

**Gary Goff
Fernow Hall
Cornell University
Ithaca, New York 14853**

NOTE THE NUMBER 93, 94, OR 95 ON YOUR MAILING LABEL.
 THIS DENOTES YOUR MEMBERSHIP STATUS
 TO BE A CURRENT PAID-UP MEMBER YOU SHOULD HAVE A 95 ON THE LABEL.

IF YOUR LABEL IS MARKED 93, YOUR NAME WILL BE DELETED FROM THE
 MEMBERSHIP ROLL AS OF 1 AUGUST 1995.

ATTACHED IS A MEMBERSHIP BLANK FOR NEW OR RENEWAL MEMBERSHIPS

SEND YOUR 1995 DUES TO THE SECRETARY/TREASURER

Application for Membership
New York Chapter American Fisheries Society
 (Information provided will be used in the membership directory)

Name _____ Regular (\$10.00) ___ Student (\$5.00) ___

Address _____

City/State/Zip _____

Student applications must be endorsed
 by a faculty member signing above

Employer/Affiliation/School _____

Telephone: Work _____ Home _____

Are you a member of the American Fisheries Society (Parent Society)? Yes ___ No ___

New Membership ___ Renewal ___ What was the last year you were a paid-up member? _____

Would you be interested in serving on any of the Chapter Committees? If so, please check which committees
 would interest you.

Environmental Concerns	_____	Membership committee	_____
Program Committee	_____	Resolutions Committee	_____
Finance Committee	_____	Professional Incentives	_____
Newsletter Staff	_____	Professional Diversity	_____
Workshop Committee	_____	Student Sub-unit	_____

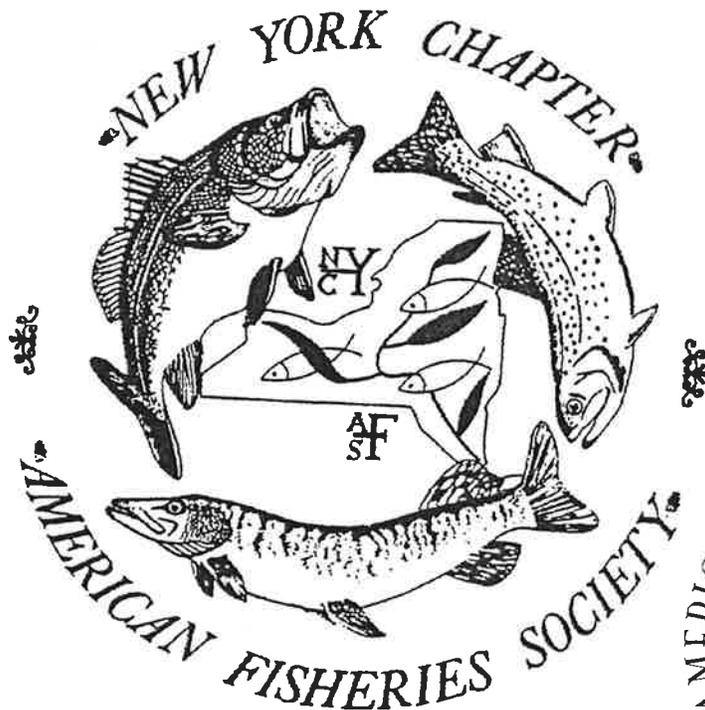
Make checks payable to **NY Chapter AFS**. Send This form and your check to:

Timothy Sinnott
 Secretary/Treasurer
 c/o NYSDEC
 Room 530, 50 Wolf Road
 Albany, NY 12233-4756

Interest and Specialty codes have been deleted because of the increased cost of printing and mailing the
 membership directory.



New York Chapter - American Fisheries Society
Newsletter April 1995



1994 New York Chapter Officers:

President: Don Einhouse

President-Elect: Doug Stang

Past President: Paul McKeown

Secretary-Treasurer: Tim Sinnott

Committees:

Environmental Concerns:

Howard Simonin

Audit/Finance

Jack Hasse/Tom Field

Program

Mark Malchoff/Don Stewart

Resolutions

Bob Werner, Dave Bryson, Don Stewart

Nominating

Paul McKeown

Membership

Don Einhouse

Newsletter

Lars Rudstam/Myriam Ibarra

Professional Incentives

Doug Stang

Workshop

Betsy Kozuchowski

Professional Diversity

Betty Lou Brett

Student Subunit

Brian Wood

ESF Student Chapter

Pete Tango

Editor's Note

Here is your Spring Newsletter! It is dominated by the reports from our annual meeting, including some of the presentations by Hal Schramm, Paul Brouha and Norville Prosser. Like it or not, we decided to accept the challenge of writing your newsletter for another year. This is rewarding as long as you keep sending us information to include in the newsletter. Comments on the content of the newsletter is also appreciated even if it is critical. The material can be sent either by letter, fax, or email. If you enclose a disk with your letter we will not have to retype the information. We can handle most MacIntosh and IBM compatible styles including Word, WordPerfect (but not yet 6.0) and of course ASCII text files. We can probably also handle various types of picture files. Try it. Our next deadline for the summer newsletter is June 30.

Lars Rudstam and Myriam Ibarra,
Cornell Biological Field Station, Bridgeport,
New York 13030, Phone: 315 633 9243 (Lars)
315 672 5539 (Myriam)
Fax: 315 633 2358, Email: lgr1@cornell.edu

President's Corner

As my first contribution to this section of the Newsletter, I would like to share with you some Chapter-related business that has occurred since our annual meeting. Firstly, our thanks goes to Mark Malchoff who has volunteered to chair the Program Committee this year. Mark is interested in pursuing a theme for next year's annual meeting that addresses fisheries habitat issues. If you have any ideas that relate to this theme, or wish to participate on the Program Committee, Mark would be very happy to hear from you. There also remains a strong likelihood that our NYC AFS Annual Meeting will occur as a joint meeting with the Forestry and Wildlife Professionals and a conference theme of ecosystem approaches to resource management will become our cross-disciplinary topic. Tentatively, program committee representatives from the three groups are proposing a Syracuse-area site as the venue of our next annual meeting. Mark Malchoff and Don Stewart outlined progress on the proposed expanded meeting during our recent EXCOM meeting and an interesting program seems to be taking shape.

We are also working towards another NYC AFS-sponsored workshop and our thanks goes to Betsy Kozychowski for heading up the effort this year. After some discussion among the EXCOM, Betsy is initially

going to pursue a fish age-and-growth, and fish production focus for the 1995 workshop. If this topic is of particular interest to you, please contact Betsy (716 691 5456) for assisting development of this workshop.

As Chapter President, I was also recently contacted by Mr. Robert Banister of the NYS Conservation Fund Advisory Council. Mr. Banister requested representation by our Chapter at an upcoming meeting to present results of the Rockefeller Institute study "A 25 year review of NYS DEC". Dr. Ed Mills has agreed to represent NYC AFS at this gathering and provide comment on behalf of our Chapter.

We can perhaps view Dr. Mills' role at the aforementioned meeting as another step toward advocacy. Other recent examples of NYC AFS advocacy include our recent Instream Flow resolution, letters of support for renewing a strong Magnuson act and support of the credentials of Mr. Michael Zagata as NYS DEC Commissioner. As you all are probably well aware, the Parent Society of AFS has been pursuing an advocacy role and seeking more involvement of the Chapters in this arena. Our advocacy involvement to date has been somewhat limited and perhaps lacking much central direction other than that provided by the Parent Society's Strategic Plan. During our last annual meeting, AFS Executive Director Paul Brouha encouraged us to frame our own Strategic Plan within the parent society's plan as a basis for pursuit of Chapter initiatives. I believe we clearly need to do this as well. Regardless of our individual comfort with advocacy for various issues, we need to more explicitly define Chapter goals and objectives beyond the ongoing services to the membership. There has been an increasing demand for NYC AFS support for a variety of issues and a Strategic Plan would better define our course in entering into any advocacy role. This planning initiative will be on the agenda of the next EXCOMM meeting and I expect we will need a small group of individuals to begin drafting our own Plan for review by the membership. If this is an area that interests you, please contact me for more details concerning how you might get involved.

Finally, on behalf of our Chapter, I would like to extend gratitude to the organizers of our recent annual meeting for tremendous job they did with this year's program. Our last gathering was one of our largest in recent memory with 141 members in attendance. Everything went very smoothly, and I'm sure all in attendance left Owego feeling energized by this excellent program.

Don Einhouse, Lake Erie Unit, Dunkirk. Tel. 716 366 0228, Fax 716 366 3743

Chapter News

The Annual Meeting in Owego was a success. with an interesting program and a friendly atmosphere. Congratulations Ed Woltmann! If you were not there, you missed a good time. Friday morning was dedicated to a plenary session on Past, present and future of fisheries management in the Northeast. Speakers included Hal Schramm (keynote address), James Geiger (federal perspective), Gerald Barnhart (State perspective), Neil Ringler (academic perspective), Gordon Colvin (marine perspective) and Norville Prosser (angler/industry perspective). We asked speakers for a summary of their talks and received three of them. They are at the end of the newsletter. Friday afternoon's session was about maintaining relevancy in the face of a changing public - the role of youth fishing and aquatic education programs. This was also an excellent panel of speakers including Sharon Rush-ton, Hal Schramm, Greg Tichacek, Carl Richardson, George Babey and Bruce Matthews.

Saturday had two concurrent contributed paper sessions and a poster session. These presentations were well attended and well worth staying through Saturday morning. The best student paper award was given to Chris Mayer for a paper "implication for growth and survival of ontogenetic changes in prey selectivity" co-authored with David Wahl; the best non-student paper award was given to Bob Werner for "a bioenergetic analysis of muskellunge during their first summer in the thousand islands section of the St. Lawrence River" co-authored with Brian Jonckheere, John Farrell and John Cooper, and the best poster award was given to Jeff Kline and Brian Wood for food habits and diet selectivity of brown bullhead in Perch Lake. Congratulations to you all.

Minutes of the 1995 Annual Business Meeting. New York Chapter, American Fisheries Society

The 1995 Annual business meeting was called to order at 4:32 PM, January 27, 1995.

The meeting opened with an address by Bill Hyatt, the president of the Northeast Division. He commented that he first attended a NY Chapter meeting 15 years ago at Cazenovia, NY, in the winter of 1979-80. He initially discussed the closure of the groundfish fishery in the northeast Atlantic, and the cooperation and partnership between scientists, managers, and fishermen that lead to the development of the AFS groundfish proposal. Another highlight for the Northeast Division was a one-day conference on commercial fishing in the Great Lakes. This conference was conducted cooperatively with Great Lakes United. Attendance was over 1,000. The Northeast Division Black

Bass Task Force had their third meeting scheduled for the Feb/Mar time frame. To date they have identified issues, determined the structure of the task force, identified what the product of the task force will be. The Northeast Division has a new newsletter editor, Maureen Cartwright of the University of Maine. Finally, the 1998 AFS Parent Society meeting would be held in Hartford, Connecticut.

The next speaker was Paul Brouha, the executive director of the American Fisheries Society. He began his address by referring to the topic of the 1991 plenary session. That topic was "Role of AFS in safeguarding Fisheries Habitat". Fisheries habitat protection included no net loss of wetlands, hydropower concerns, and multiple facets of sound natural resource management. These were the preferred objectives. The overall objective of the American Fisheries Society is to provide staff and resources to accomplish fisheries habitat protection objectives. The clarion call was to go with sound stewardship of fisheries habitat, or go the way of the dodo.

There was a consistent message of the morning presentations [of the NY Chapter annual meeting], which was to educate an expanded constituency - galvanize them. The afternoon sessions discussed a long term study of youth education. The question is what do we do in the meantime?

There is an expanded role for state chapters in advising the state leadership on science and technology issues. Work to create a new science and technology advisory organization within each state. This is an appropriate role for professional societies. Each governor should have a science and technology advisor. Usually, states lack the information to make appropriate science and technology-related decisions. Each state should have an independent science and technology body. The New York Chapter of the American Fisheries Society could fulfill that role for aquatic resource management.

Each state should have a science and technology vision. AFS has a strategic plan that could be the foundation for the science and technology vision related to fisheries. State legislatures also need resources for addressing science and technology issues. The NY Chapter can respond to that call. A strategic focus is most important for the AFS.

Following Paul Brouha's address, the treasurer's report was distributed and accepted. A copy is attached.

Edward Mills reported for the Nominations Committee. The 1995 nominees for President-Elect are Douglas Stang and Allen Peterson. Timothy Sinnott was the sole nominee for Secretary-Treasurer. No nominations were received from the floor so nominations were closed. Voting was concluded.

Howard Simonin reported for the Environmental Concerns Committee. The committee sent four letters to senators and congressmen to express the NY Chapter's support for reauthorization of the Magnuson Conservation Act. One response was received from Congressman Ackerman. A letter in support of reauthorization of the Endangered Species Act was also sent. Since the 103rd

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Congress has adjourned, the letter needs to be re-sent. This will be done when the appropriate legislators have been identified. Howard Simonin has copies of the letters sent and the responses received.

David Bryson reported for the Resolutions Committee. The Instream Flow Policy resolution was sent to Governor Cuomo on 23 September 1994. A new resolution was suggested urging that state and federal agencies involved with fisheries activities in New York conduct aquatic safety training every three to five years. This was approved by the EXCOM. However, the decision was made that this should take the form of an open letter in the spring newsletter instead of a resolution.

Brian Wood reported for the Student Subunit. The students held their own session during the chapter meeting in which they discussed how to best use funds allocated to the student subunit. The ideas considered were conducting an annual meeting for students, possibly in October. Funding students to travel to the Northeast Division annual meeting or Parent Society annual meeting was also discussed. A committee was formed to propose further recommendations for using the money. A questionnaire had also been sent to various New York colleges and universities with aquatic programs to stimulate student interest in the student subunit.

Tom Field reported for the Audit and Finance Committee. The financial records were audited for 1994 and approved. He began his financial report by referring to the Cash Reserves Committee that was formed in 1990. The formation of the CRC was stimulated by a decreasing balance in the chapter accounts. There is a concern that a plan was needed to prevent losses. Most of the recommendations of the CRC have been implemented. These included the requirement for the incoming president to submit a balanced budget. The CRC proposed a goal of raising \$25,000 in three years. Statistics were needed to predict the budget five years out, and be able to analyze the impact of extraordinary expenses in advance. In 1984, income was around \$4,000 - 5,000, and expenditures were around \$10,000. Now, the income is around 10,000 and expenditures are approximately \$16,000. At an annual inflation rate of 7%, the value of money is halved in around 10 years, so the chapter is about where it should be, adjusted for inflation. Currently, the Chapter's finances are in line with what we need.

President Paul McKeown introduced the Newsletter editors, Lars Rudstam and Myriam Ibarra, and complimented them on the excellent newsletters produced in 1994.

Doug Stang reported for the Professional Incentives Committee. Dr. Edward Mills was nominated by the EXCOM for the Professional Incentives Award, and read a short biography. After a short discussion, the nomination was approved.

President Paul McKeown presented his outgoing president's report. He considered it to be a satisfactory year. The safety workshop was conducted. He represented the Chapter at both the Northeast Division EXCOM and Parent

Society EXCOM meetings. The 1995 annual meeting was also a success. During the past year he saw the Chapter moving forward on the advocacy issue and not remaining as just a technical group. His only frustration was seeing so much talent in the Chapter, but relatively little involvement by the majority of Chapter members. He encouraged members to take a more active interest, and to contact the EXCOM if someone would like to participate more fully. He challenged the Chapter to continue pursuing the advocacy role that had begun. The Chapter needs to develop strategic plan and objectives. He encouraged the Chapter not to lose money. Finally, he thanked the EXCOM committee for their support in 1994.

The Nominations Committee reported that the votes had been counted and the President-Elect for 1995 was Douglas Stang.

Don Einhouse, the 1995 President, was escorted to the podium by Joseph Gorsuch and Edward Mills. He began by acknowledging Paul McKeown, and thanking the EXCOM. He then presented and reviewed his proposed budget for 1995. The budget had been approved by the EXCOM the previous evening. A copy is attached. Don indicated that he would like to begin planning for a technical workshop in 1996, but only if it could be done on a balanced budget. There was concern that with impending state budget cuts, travel money for state employees might not be available and a large percentage of the Chapter was comprised of state employees. He requested that the members present identify topics that they would like to see for a workshop. He also announced that he would be looking to recruit new members for standing committees. He announced that the Chapter had been invited to participate in a joint meeting with the Wildlife Society and the Society of American Foresters. No topic had been selected, and he would not commit the Chapter to participate until a topic had been identified. He adjourned the meeting at 5:27 PM.

Respectfully submitted,

Timothy J. Sinnott

Secretary-Treasurer, NY Chapter, AFS

1994 Treasurer's Report is attached to the newsletter

1995 Budget

Approximate Balances (end-of-year, 1994):

Checking	\$5,607
Savings	\$5,974
CD	\$9,355
Student	\$ 975

Projected Revenues:

1995 Annual meeting	\$4,000
1995 Dues	\$2,500

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Dues rebate	\$ 500
Interest	\$ 800
Raffle	\$1,000
Misc.	\$ 100
Workshop	\$4,000
Total	\$12,900

Projected Expenditures:

1995 Annual meeting	\$4,000
Office supplies	\$ 50
Postage	\$ 350
Travel (AFS-Parent Society)	\$ 800
Travel (AFS NE Division)	\$ 500
Student Sub-unit	\$ 500
Newsletter/Directory	\$ 600
Workshop	\$4,000
Raffle	\$ 250
Donations	\$ 300
Misc.	\$ 50
Total	\$11,400

Professional Incentives Committee from Doug Stang

At the 1994 NYC-ASF annual meeting, Dr. Robert Werner and Dr. David Green were unanimously approved by the membership to receive Professional Achievement Awards, and Bruce Shupp was unanimously approved by NYC-AFS members to receive the Honorary Membership Award. At the banquet of the 1995 NYC-AFS annual meeting, Drs. Werner and Green and Mr. Shupp were presented with their awards by immediate Past-President Paul McKeown. Patrick Festa accepted the award for Bruce who started a new career working for B.A.S.S. in Montgomery, AL.

Mr. Allen Peterson was recognized for the Outstanding Research and Development Project Manager for 1994 by NYSEG. At the 1995 banquet, Doug Stang read a letter from James A. Carrigg, Chairman, President and CEO of NYSEG which acknowledged the many contributions Allen has made in the "advancement of the field of aquatic and environmental sciences both in the industry as a whole and at NYSEG".

At the 1995 NYC-AFS business meeting, Dr. Edward Mills was nominated and unanimously approved by the membership to receive the Professional Achievement Award.

Dr. John Forney's name has been submitted for consideration for inclusion in the Fisheries Management Section-AFS Hall of Excellence.

Bruce Shupp's name will be submitted for consideration for the Northeast Division-AFS Dwight Webster Award.

NYCAFS Finance Committee Report from Tom Fields

Deficit spending in the late 1980's reduced the Chapter treasury and jeopardized our ability to 1) initiate programs before raising funds, and 2) subsidize the annual meeting from interest derived from deposits. A Cash Reserves Committee composed of three past Presidents, Jim Haynes, Bob Lange, and Joe Gorsuch, and the Secretary/Treasurer, Jack Hasse, was formed to recommend changes in business practices that would reverse the deficit trend, and set a goal for the treasury.

The Committee issued a final report in December 1990 suggesting a budget process along with several ways of increasing revenues and reducing expenses. Most of these have been put into practice. A final recommendation suggested the development of a \$25,000 treasury within a three year period. Projections of our recent spending practices indicate that the Chapter should achieve this goal within the next two years.

The Committee also recommended investment vehicles for the treasury: \$5,000 in a interest bearing checking account, \$15,000 in certificates of deposit, and \$ 5,000 in a mutual fund. The EXCOM has decided that Chapter money will remain in interest bearing checking accounts and CDs until the \$25,000 goal is achieved.

Submitted

Thomas C. Field, Audit/Finance Committee

Environmental Concerns Committee from Howard Simonin.

The Environmental Concerns Committee has send a letter to Congressmen Gary Ackerman, George Hochbrueckner, Peter King and Thomas Manton and US Senators Alfonse D'Amato, Patrick Moynihan and Charles Robb in support for the re-authorization of the Magnuson Act. The text follows:

We are writing to urge you to support and vote in favor of a strong H. R. 4404, the Marine Conservation Amendments of 1994. We are deeply concerned about the condition of our marine resources. Many Atlantic fish species which were once abundant have been overfished; some threatened with commercial extinction. Subsidies provided by state and federal governments and the inability of the current Magnuson Act to limit entry of additional fishermen is further degrading this valuable resource. Every year millions of fish are killed unnecessarily as bycatch and thrown overboard, even though these practices are preventable. Non-biological, external influences have weakened the ability of the management councils to effectively complete their charges. The passage and full implementation of a stronger Magnuson Act will help to conserve our fisheries resources for generations to come.

The New York Chapter of the American Fisheries Society is a professional organization composed of nearly 400 fisheries scientist, managers, consultant and educators. We conduct annual meetings where scientific papers and posters are presented, sponsor periodic fisheries related workshops, and generally work to advance the fisheries profession through conservation and stewardship of our fisheries resources.

We respectfully ask that when the Magnuson Fishery Conservation and Management Act is reauthorized, you endorse and vote in favor of amendments which will strengthen the act. These amendments should include the ability to limit entry, a clear definition of overfishing, a strengthened management council process not influenced by external economic, political and social pressures and a national commitment to reduce bycatch. Your vote in favor of this legislation would be a vote for maintaining the ecological integrity and productivity of the oceans. We thank you for your consideration of this important issue.

Signed, Howard Simonin and Paul E. McKeown.

Congressman Gary Ackerman replied to us affirming his support for the Magnuson Act and gave us the following information. The Magnuson Act did not pass Congress in 1994 but will be taken up again in the current congress. Ten hearings have been held on a variety of issues including use of individual transferable quotas, allegations of conflicts of interest on regional fisheries management councils, and the problem of bycatch and habitat protection. The Subcommittee on Fisheries Management has also held local hearings in North Carolina, Alaska Oregon and New York.

Student Subunit - from Brian Wood

Several students met and shared ideas about the student subunit at the annual meeting last January. The students at the meeting decided that an active subunit should be established and decided to organize a subunit meeting for this fall. The meeting will be a low cost meeting and will hopefully include a short workshop and student presentations. The meeting will be held over a weekend (Friday evening, Saturday, Sunday morning) at the Cornell Biological Field Station on Oneida Lake sometime in early November. The meeting's objectives are to bring students from Colleges and Universities around the state together, share ideas about how the student subunit should be organized, and to share research ideas and experiences. It is hoped that students from all over the state will be able to attend.

Several students responded to the questionnaires sent out last fall. All students were in favor of having an active student subunit in the Chapter. Everyone was also in favor

of having a student meeting although there were large differences of opinion of when the meeting should be held.

Students had many recommendations for what the subunit should do. Students felt that the subunit should hold a separate annual meeting, sponsor travel awards to meetings, promote student membership, sponsor field trips, generate funds, sponsor guest speakers, do volunteer work, provide a network for students, help with the annual meeting, serve as a contact between students and the Chapter, promote students professional growth, and encourage student participation on committees within the Chapter.

Students listed many ways they could help with the student subunit. Responses included being an active member in the subunit, offer advice and guidance, help coordinate some type of newsletter, present research findings at a student meeting, coordinate with agencies (DEC, USFWS) for doing volunteer work or field trips, and introducing specific topic areas to the subunit.

Finally, students listed how the subunit should be organized. Approximately half of the responses indicated that the subunit should elect officers while the other half decided that a committee should be formed with representatives from each school.

The results from the questionnaires will be used as a guide to organizing the subunit at the meeting next fall. If you have any other ideas or comments, please contact Brian Wood, Department of Natural Resources, Fernow Hall, Cornell University, Ithaca, NY 14853; (607) 255-5469; bmw1@cornell.edu

Around New York State

Region 5 of the New York State DEC. from Larry Strait

The expansion of environmental awareness has made life interesting for fisheries staff in Region 5. The Adirondack Park dominates the Region, and its presence undoubtedly contributed to the environmental focus on fishery activities. Property within the Adirondack Park is split between forest preserve (state owned) and private holdings. Made famous by the "forever wild" clause of the New York State Constitution, the forest preserve occupies 28% of Region 5 and is subject to special land use restrictions. Even private land use must comply with unique regulations far more restrictive than elsewhere in New York. Environmentalists praise New York's commitment to the Adirondacks, but little happens in Region 5 without an extra look.

From 1990 to 1993, regional staff helped defend the practice of pond reclamation with rotenone. Reclamations to improve angling have a 45-year history in New York.

More recently, reclamations have emphasized restoration of native fish communities including Adirondack strains of brook trout and other depressed fishes. The need for reclamation follows the dispersal of fishes beyond their historic ranges. Exotic fishes appeared in nearly 65% of 1,123 ponds in which the Adirondack Lakes Survey Corporation collected fish in the Adirondack ecological zone during the 1980's. In addition to exotics, native-but-widely-introduced fishes have found their way into most Adirondack waters, primarily from unauthorized or inadvertent introductions by man. Brook trout are extremely sensitive to competition from other fishes and the proliferation of introduced fishes leads the list of causes for loss of wild, self-sustaining populations in ponds. Round whitefish and a few other natives appear to suffer in a similar manner.

Our challenge was to defend the use of rotenone against legal actions by animal rights organizations. Hectic preparation of court briefs occupied the days, and sometimes the nights, of staff during the proceedings. The Department withstood the test, and in 1994 regional staff reclaimed five waters including establishment of refugia for Horn Lake and Little Tupper strains of brook trout.

The question of allowing any management at all in areas of the Adirondack Park designated wilderness areas mixed with the reclamation challenge. Staff worked extensively with wilderness advocacy groups, sportsmen's organizations and the Adirondack Park Agency (the organization established by the state legislature to review and regulate a wide range of environmental and land use activities with the Park). A consensus slowly developed as the interested parties learned about the scientific basis for management objectives. The process culminated in adoption of wilderness fishery management guidelines by DEC and the Adirondack Park Agency that sanction management activities to perpetuate natural aquatic systems. In 1994, regional staff exercised those guidelines in the Pharaoh Lake Wilderness Area with reclamations to restore native brook trout and eliminate exotic fishes.

The effects of pond liming, and the application techniques used during reclamations, came under intense scrutiny by regulators, too. Projects languished while staff prepared analyses and negotiated solutions. The firm technical foundation of those activities became apparent, and both are back on track. Region 5 expects to lime several brook trout ponds before spring.

Perhaps the single greatest success in Region 5 in recent times has been the turnaround in lake Champlain due to sea lamprey control. An eight-year experimental control program began in 1990, but once again, only after a hard look by the environmental community and regulatory agencies. An exhaustive environmental impact statement prepared by regional and central office fisheries staff took nearly a decade to complete. The wait has been worth it as the size and number of landlocked salmon from our

collections have increased dramatically, and lamprey attack rates are the lowest on record. Angler reports brim with satisfaction. This fall arrived with six to ten pound landlocks in the spawning runs of the major tributaries. Lake trout, steelhead and brown trout fishing appears to be making similar gains. Regional staff continue to devote substantial efforts toward evaluation of sea lamprey control with the understanding that the experimental control period will end soon, and yet another environmental impact statement will be required for long-term control.

Enough of issues. The largest DEC region in New York has more than its share of aquatic resources. Perhaps we're best known for the hundreds of trout ponds that epitomize the wild places still found in the great northern forests of the Adirondack Mountains. Management efforts include the pond restoration noted above, surveys of remote waters via helicopter, and review of stocking policies. Development of management plans (called Unit Management Plans) for all areas of state land is allied with pond management. All fishery activities proposed for the many hundreds of waters on state land are subject to the unit planning process that includes extensive opportunity for public input. Development of unit plans occupies a significant amount of time for Region 5 fishery biologists.

More than 100 larger ponds and lakes with both warmwater and coldwater sport fishes are easily accessed via public boat launching sites. The fishes present are legion - lake trout, landlocked salmon, brown and rainbow trout, smallmouth and largemouth bass, northern pike and walleye. And waters with historic or fanciful names have long been a vacation destination or a place yet to explore - Lake George, Lake Champlain, Paradox Lake, Lake Placid... Regional staff toil continually to stay abreast of management reports and surveys on these large waters, but there are so many that the job is never done.

Warmwater lakes are less common in the region, mostly located in the lowlands surrounding the Adirondacks. Their numbers don't imply a lack of fishing quality. Interestingly, the region actively conducts a program of introducing bass to small warmwater ponds. Bass fishermen with a canoe or float tube would do well to seek out those lesser known spots.

For those looking for the rare or unique, the region also manages a few waters each for kokanee salmon, splake, lake whitefish and both tiger musky and muskellunge. A list of top fishing waters is available from the DEC regional offices at Ray Brook or Warrensburg.

Trout streams range from the names well known to the tiny, unnamed tributaries fished only by a few. The number of actively managed trout streams in the region approaches 150, and the number of small brooks and creeks that are totally supported by natural reproduction is many times that number. Stream survey efforts in recent years have emphasized the identification of stocked streams that no

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longer need to be supplemented with expensive hatchery-reared fish.

DEC Region 5 occupies Clinton, Franklin, Essex, Hamilton, Fulton, Washington, Warren and Saratoga Counties in northeastern New York.

Region 5 Fisheries Staff

Ray Brook

Lawrence E. Strait	Regional Fisheries Manager
Lawrence J. Nashett	Supervising Aquatic Biologist (Lake Champlain)
Lance E. Durfey	Senior Aquatic Biologist (Lake Champlain)
Richard J. Preall	Senior Aquatic Biologist (Franklin & Hamilton Counties)
William F. Schoch	Senior Aquatic Biologist (Essex County)
Leo M. Demong	Senior Aquatic Biologist (Fishing Access, Clinton and Fulton Counties)
Raymond A. Brown	Principal Fish & Wildlife Techn.
Jennifer V. Sausville	Fish & Wildlife Technician
Thomas P. Shanahan	Fish & Wildlife Technician
Jeannine Beatty	Secretary 1
Tina Chapman	Seasonal Stenographer
David C. Nettles	Fishery Biologist (USFWS)

Warrensburg

William W. Miller	Senior Aquatic Biologist (Saratoga, Warren & Washington Counties)
Burton E. Morehouse	Principal Fish & Wildlife Techn.
Leslie H. Saltsman	Principal Fish & Wildlife Techn.
Joseph LaPierre	Seasonal Fish & Wildlife Techn.
Melissa Brewer	Seasonal Fish & Wildlife Techn.

Effective November 24, 1994, New York Sea Grant Institute Associate Director and Extension Program Leader **Michael P. Voiland** will officially leave Sea Grant and assume an appointment as Senior Legislative Associate for environmental and agricultural programs with the Cornell University Office of Government Affairs. Voiland has been with NY Sea Grant for twenty years, including two years as a graduate assistant on a Sea Grant-supported research project while doing doctoral work at the SUNY College of Environmental Science and Forestry at Syracuse, ten years as a Great Lakes regional extension specialist at the Brockport NY extension office, one year as extension program coordinator for the Great Lakes, and seven years as associate Institute director/extension program leader at Cornell.

David G. White, New York Sea Grant Extension Program Coordinator for the Great Lakes, who has been serving as acting program leader during Voiland's absence, will continue in that capacity while a national search for a replacement is conducted. White can be reached at the following address: Sea Grant, 52 Swetman Hall, SUNY Col-

lege, Oswego, NY 13126, 315-341-3042, fax:-2954, (dwhite@cce.cornell.edu).

Luz Yoshiura is looking for someone to share a ride to the upcoming **Chemistry and Aquaculture Symposium** in New York City. If you are going there and want to share transportation from upstate New York, please contact Luz at 914 756 2023

Bruce Shupp, former chief of the New York DEC Bureau of Fisheries has replaced Al Mills as environmental director for B.A.S.S. Inc., parent company of the world's largest fishing organization the Bass Anglers Sportsman Society. Bruce now lives in Montgomery, Alabama. As environmental director for B.A.S.S., Shupp will spearhead national efforts to enhance and protect our nations waters and fisheries by providing administrative support to the 46 B.A.S.S. state environmental directors and by working closely with national leaders in Washington and elsewhere.

Upcoming events

East Coast Trout Management and Culture Workshop II Penn State University, May 31 - June 2, 1995, Sponsored by the Northeast and Southern Divisions. Contact Steve Moore (615 436 1250) or Dennis Ricker (814 359 5143).

Reservoir Fisheries Management, June 12 - 14, 1995. in Chattanooga, Tennessee. Contact Scott Hale, Southern Division, Reservoir Committee, , Kentucky Dept. of Fish and Wildlife Resources, #1 Game Farm Road, Frankfort, KY 40601

Release Mortality in Marine Recreational Fisheries, Current Research and Fishery Management Implications, May 8-10, 1995, Virginia Beach, VA. Contact Jon Lucy for information 804 642 7166 (voice), 804 642 7097 (FAX), lucy@vims.edu.

The 125th AFS 1995 Annual Meeting to be in Tampa, Florida August 27-31. Theme: "Fisheries: a vision for the future - science, application, communication. See the Fisheries magazine for more information

Aquatic Ecosystem Stewardship, November 6-11, 1995. North American Lake Management Society, contact Neil Hatchison, Ontario Ministry of Environment and Energy, 706 766 2418

From the 1995 Annual Meeting

Recreational Fisheries Management: Past, Present, and an Educated Constituency

Keynote address by Hal Schramm, USF&WS

The Past

The folklore of fishing suggests there was a big war. People came home from the war to an economy on the grow and a trend toward urbanization. Coinciding with, and possibly driven by, a growing economy and expanded leisure time there was an explosion in outdoor recreation. Possibly a result of rural roots, aquatic recreation was a popular component of outdoor recreation. Reservoirs were built at a phenomenal rate in the midwest, southeast, and southwest. In the northeast and northern midwest, where natural lakes abound, resorts with fishing as the premier attraction, proliferated. The economy remained spender friendly and many people celebrated their financial comfort by making long-term commitments to the expansion of higher education -- they created little creatures who played baseball and basketball, played golf and tennis, who listened to rock 'n roll music, and even a few who fished, and then went to college.

During this time of expanding fishery resources and access to them, numbers of anglers increased steadily. Motivated by successful fishing in new and lightly fished waters, anglers became accustomed to high catch rates. Fisheries studies, particularly using the new-found chemical rotenone, substantiated the great abundance of fishes. Maximum sustainable yield (MSY), which insisted harvest below a sustainable level was wasting a resource, was the management attitude of the era. These happy anglers grew to enjoy fishing and it became a major recreational pursuit for themselves and their families (families were a rather common phenomenon then). Some of them probably enticed their compatriots, who also had sufficient leisure time and financial resources, to try fishing and, enjoying days of relative plenty, many of them became committed to the activity.

This era of plenty brought a collision of two opposing phenomenon -- the social reality of man's goodwill toward nature summarized by Garrett Hardin in the Tragedy of the Commons and MSY or some similar concept that implies a fishery resource can be overfished. MSY was criticized for a variety of reasons and replaced with optimum sustainable yield (OSY) to include the social and economic values of fisheries resources. OSY is appropriate for recreational fisheries and is also very contemporary, especially if we add "ecological value" to the definition. Unfortunately, OSY is

a concept more often preached than practiced, probably because we are still trying to define "optimum." However, the yield element common to MSY and OSY appears to have remained pervasive.

Rapidly becoming sophisticated and enlightened purveyors of fisheries science, supported by burgeoning hatchery capabilities, fueled by the opportunities that developed when small streams were transformed into large reservoirs, and turbocharged by the growing throng of anglers equipped with new tackle and visions of fish in abundance, fisheries managers took a logical path to sainthood. They kept the cost of a fishing license at a trivial amount; for most anglers, the cost of a resident fishing license is about one-half of a day's fishing trip to a nearby lake. Alternatively, my Mississippi combination hunting-fishing license costs one-third what my boat trailer license plate costs. Managers stocked fish, native and nonnative, into altered habitats. They did not just stock fish, they stocked large quantities of fish to keep catch rates high; and they did not necessarily restrict stocking to altered habitats. After all, what does sustainable yield, carrying capacity, benefit-cost ratios, ecological integrity, or gene pools have to do with sainthood?

Cynicism aside, I truly do not believe fishery managers are seeking sainthood. Rather, fishery managers tend to be humble and customer-oriented. If they suffer from any shortcoming, I suggest that, paradoxically, fishery managers are, at times, too humble and too customer-oriented to be effective. To a large extent, the excessive humility and customer-orientation are forgivable because without a job, there is little a fishery manager can do to conserve or enhance recreational fishing opportunities. Saints, no. Professionals intent on working within the system to conserve and enhance recreational fishing opportunities, yes!

The Present

That is the "past" according to Schramm, but I think it is important because it created the present -- a crossroad, a time to evaluate where we go from here. I offer four recreational fisheries issues that may be useful for setting goals for the future.

Issue number 1. Loss of a constituency -- fewer anglers. In some geographic areas, anglers are increasing; but in many states, anglers are decreasing. And demographic trends, like urbanization, increases in single-parent families, and aging of the baby boomers forecast fewer anglers in the future. Certainly, you can not have a fisheries management program without anglers. But what kind of anglers? We resort to bean counting. So many people fish -- 40 million of all ages by current estimates (I have also heard estimates of 50 million or 60 million) -- or so many people buy fishing licenses. Many agencies are concerned about retaining anglers and some agencies are

concerned with recruiting more anglers. Although the question may be being discussed, I have not heard anything about the quality of anglers to retain or recruit. By quality, I mean their knowledge of and attitude toward fisheries resources.

Issue number 2. Funding -- amount and allocation. I doubt if any fishery management agency, with the possible exception of Missouri, would admit to having sufficient staff, operating funds, equipment, public access to fishing opportunities, hatcheries, etc. But the shortfall is even greater if we consider redirecting what are presently limited fisheries management resources to other important concerns such as biodiversity, endangered, threatened, and sensitive species, and holistic or ecosystem management. Efforts are underway to develop funding programs needed for non-game wildlife and fisheries conservation and preservation. I am hopeful that these efforts will be successful, but the check will be in the mail for a long time to come. Even if a non-game funding program became a reality quickly, say in 10 years, recreational fisheries management efforts will be diluted as we are forced to address biodiversity and sensitive species issues and fisheries management successes will be fewer for at least this length of time.

The diffusion of limited fishery funding to non-recreational fishery concerns will lead to issue number 3: Recognition and credibility of fisheries management as a profession. Likely, fisheries managers will suffer casualties from the sniper fire of law suits, injunctions, and accusations by environmental groups as recreational fisheries managers try to juggle their limited fiscal and staff resources among sportfish-oriented management, biodiversity and native species, and threatened, endangered and sensitive species. And then there is the animal rights concern. The time and resources do not exist to fight a war on many fronts. And there is dissension in the ranks. As our science grows, we have recognized management mistakes. As good resource stewards, we have admitted them and sought corrective action. The debate over fish stocking and conservation genetics is a rather global example. The threat of collapse of the forage base in Lake Ontario may be more familiar to you. Continually seeking new information, recognizing that decisions based on the best available information at the time have occasionally lead to the wrong decisions, and then making changes, even if they involve reversing previous actions, epitomizes fisheries managers as professionals. However, these changes in course, coupled with fewer fishery management successes and more accusations of wrong-doing that can result from limited funding, may undermine the credibility of fisheries managers. Our credibility does not need undermining. I can recall numerous conversations with anglers, neighbors, and high-ranking government leaders, all of whom are intelligent people and good at their profession, in which my knowledge of fisheries was regarded by them as no more

than "my opinion." As one Mississippi legislator said, your job is studying someone's hobby.

Issue number 4. Equity. The Nation was founded on many principles, but one of them was public rights to fish and wildlife resources. From a telephone survey we conducted this past fall in Mississippi, head-of-household income of more than 50% of 4,200 randomly selected licensed anglers was above \$40,000. This is Mississippi, the poorest state in the Nation; a state where per capita annual income is \$13,000 and the average head-of-household wage-earner makes less than \$29,000. It also may be important that most anglers surveyed lived with 1 or no dependents. These results strongly suggest that fishing is becoming a pastime of the wealthy.

The United States population is now 78% urban. The distribution of anglers parallels the distribution of people -- 60% of anglers live in urban areas. These people have few, if any, nearby fishing opportunities. Access to rural fishing opportunities will be restricted to those people with the physical and fiscal means to get to them. Urban fishing seems to be a popular solution to providing fishing opportunities to an increasingly urbanized society and angling constituency. Forgive me for being critical, but many urban fishing programs contribute to inequity -- they are designed for a particular socio-economic group of people, or they assume to satisfy some need, but the need is established by the manager, not the user. Urban fisheries programs can be a drain on limited resources for fisheries management -- resources provided primarily by anglers who will not use the urban fishing opportunities. Don't let an urban fishing program be a Band-Aid for a social wound. Insightful design and innovative marketing will be necessary to make urban fishing programs equitable and beneficial.

The Future

I do not have a vaccine that will forever put an end to controversial fisheries issues and put sustainable back in optimum sustainable yield. I offer a few considerations that, although probably not new, are long overdue for implementation and may address the issues just mentioned -- constituency, funding, professional credibility, and equity.

First consideration: define our constituency. Most recreational fisheries managers will say they work for the angler. However, I suggest that our constituency should be much larger than only anglers. Directly or indirectly, everyone affects fishery resources; and I would add that fishery resources affect everyone. Therefore, I suggest we should consider all people our constituency. Possibly the new-found ecopolitical binomen "ecosystem management" will help us achieve this broader constituency. I am reminded of a little sign I saw in a variety of places when I lived in northern Virginia. The sign, stenciled on the top of storm sewer drains, read "Chesapeake Bay Drainage." In

other words, everybody in the Potomac River watershed is part of the Chesapeake Bay ecosystem. A fishery biologist in Mississippi who has a serious concern for rivers and streams suggested that all bridge crossings should have a sign stating the name of the creek, stream, or river, regardless of how large or small the river or stream. The point -- these are not drainage ditches or open sewers, they are aquatic resources and in one way or another are important to everyone.

That defines the scope of our constituency. But what qualities do we want in our constituency. Suppose you owned a football team and, of course the stadium. You want to fill the stadium; but you want fans who enjoy being there, take pride in the stadium and the team, and cheer for the home team. In the game of fisheries, we want fans who support the home team -- people who enjoy and value fisheries resources. All too often fishery biologists and managers anticipate opposition to fisheries programs; and, unfortunately, they are often not disappointed. Why? I think knowledge gap has much to do with "our position" and "their position." Educational programs are the solution to the knowledge gap. We need aquatic education programs for everyone, possibly with more intense education programs for anglers.

Second consideration: involve the constituency. I am not saying anything new when I say a fishery has three elements: the fish, the habitat, and the user. The user is the "economic and social aspects" that separate OSY from MSY. The term "yield" also needs inspection. The user is not only the angler -- he or she may be a skin diver, a photographer, or just someone who finds pleasure in seeing a body of water and knowing that it contains life. Yield, defined as kilograms landed, may not be a primary goal or a primary measure of satisfaction for all anglers and certainly is not an important goal for non-anglers.

Human dimensions is in vogue -- knowing the anglers needs, preferences, attitudes. And this is good thing, especially when we hear more and more about fisheries biologists who fish less and less. However, I will reemphasize Consideration #1 -- we need to know about the needs, preferences, and attitudes towards fisheries and aquatic resources of our full constituency -- all people. Knowledge of needs, attitudes, and preferences of our constituency will better clarify "yield;" likely, there will be many "yields." It becomes the job of management to determine the balance of ecological, social, and economic factors that determines "optimum."

We need to do more than pay lip service to the user and do human dimension research. Recognize that fishery management is co-management -- a great deal of management involves the angler -- compliance with harvest restrictions, no introduction of unwanted plants and animals, proper use and care of the resource and use facilities, and their license fees and fishing and boating equipment purchases pay for recreational fisheries management

programs. You want something from the angler; but they also want something and you, the professional biologists, are capable of providing it. Accept tradeoffs, but do not compromise. Work with the anglers, not for the anglers. Do not go to them only when you want something. Create situations in which anglers have the opportunity to bring their idea into the boardroom.

I think advisory boards can be a tremendous boon to a fishery management program. But the advisory board must have the right composition, the right goals, and exploit all avenues of communication. An advisory board is an excellent instrument to obtain managers' responses to anglers' questions and needs and to obtain anglers' responses to managers' questions and needs.

The role of constituents in fishery management can be summed up with some elementary arithmetic: $1 + 1$ is greater than $1 - 1$. Fishery management working with constituents is more effective than fishery management and constituents working against each other.

All of this working together may sound idealistic and it very well may be. I think the key is education. With education, the fishery manager's needs are more easily conveyed to the public; if they are good ideas, they are more easily sold to the public. If the constituents are better educated about fishery and aquatic systems, their wants and preferences may be more reasonable in an ecological sense and, therefore, achievable as we perform our dual role as recreational fishery managers and fisheries resource stewards. The more people know about fisheries and aquatic resources the easier our job will be, the greater will be the respect for the important role performed by fisheries biologists and managers, and the greater will be the support for fisheries programs. Herein is the return on investment for working to make all people your constituency. Anglers age 16 and older are 14% of the U.S. population and 9-23% of the states' populations. Majority support for aquatic resources can only come from the larger constituency.

Third consideration: deliver the message. There are two components to this: first the right message and, second, the right people to deliver it.

Delivering the right message. As fisheries resource managers, we are the stewards of aquatic resources. As recreational fisheries managers, our responsibility is to provide fishing opportunities, preferably good or quality fishing opportunities. Initially, "good" and "quality" are defined by the constituents, but their definitions can be modified by education. Several years ago the U.S. Fish and Wildlife Service built a fisheries program on the precept that ecologically healthy aquatic resources provide good fishing. They had a lot of support for this position. The sport fishing industry, whose financial survival depends on selling products to anglers, adopted a long-term survival outlook and supported and encouraged ecologically healthy aquatic resources. Organized angler groups supported clean

water, fought channelization and dam construction, and participated in habitat restoration and access development. The industry and angler groups also fought for Sport Fish Restoration funds. Unfortunately, the Fish and Wildlife Service and other federal agencies that should be leaders in fisheries resource conservation and management lost a lot of support when they chose to replace fishing quality with less tangible and undefined concepts such as biodiversity and ecosystem integrity as measures of healthy aquatic resources.

I do not consider myself qualified to determine the right message. However, I submit that a good message is that ecologically productive aquatic resources make good fishery and fishing resources. With good access, they provide the best recreational opportunities that can be expected, healthful food, and significant social and economic benefits. Ecologically productive aquatic resources also provide for biological diversity.

Through formal and informal educational processes you teach this message -- not just to anglers, but to everyone. However, care is needed, because the "good fishing-productive ecosystem" message is a powerful syllogism with both positive and negative inferences. If the fishing is good, the ecosystem is healthy and productive. If the fishing is poor, the ecosystem is not healthy or unproductive. In Arlington, Virginia, the city leaders spend several thousand dollars each year to stock catchable-size rainbow trout into Four-Mile Run. This little stream, due to annual hydrologic and thermal regimes, does not support sport fishes year-round; it does not support any sensitive species either. The city estimates that the brief springtime trout fishery saves the city several hundred thousand dollars cleaning up this Potomac River tributary because the stream is viewed as a productive aquatic resource rather than a drainage ditch -- the people take better care of the creek. This stewardship attitude is shared by citizens who fish in the stream and those who do not fish in the stream; i.e., the broader constituency. Creating urban fishing opportunities in Lubbock, Texas, resulted in more than 40,000 angler hours per year in 19 small lakes within walking distance of peoples' homes and changed the image of these lakes from drainage basins to safe and healthy recreational resources.

Health advisories on fish consumption send a message that an ecosystem is in trouble -- the resource is receiving a perturbation that is not only unhealthy to the people who eat the fish, but also affects the long-term ecological balance and productivity of the system including recreational use and the social and economic values. This message can be a good message if used proactively to remedy the situation. But without environmental action, such as stopping the source of pollution, a fish consumption advisory is another example of resource devaluation and resource management out of control. Environmental action can be accomplished only with support of a large constituency.

Some systems are oligotrophic; we usually consider this a good thing and so do aquatic resource constituents. These are the idyllic aquatic resources pictured on calendars and travel brochures that epitomize healthy ecosystems. They are not, however, productive from a trophic standpoint. Anglers should not expect the same type of fishery from an oligotrophic system as from a eutrophic system, unless you want public and political pressure to convert the oligotrophic system to a eutrophic one. Similar to research in Alabama, we found that anglers' rating of satisfaction with a fishery could be changed significantly by giving them a reasonable measure of fishing success as a benchmark. We simply provided them with information about average catch rate for the species in the system they were fishing. In other words, we conducted an education program to help the angler more realistically define "quality" fishing. Rather than change a regulation and conduct an education program, we often entertain anglers' complaints about poor fishing by stocking fish or, in a few cases, fertilizing the system. Most of you know that the stocking issue came to a productive head last year, and I am pleased to say that the bottom line was stocking, wisely done, is a valuable management tool. However, when stocking is used indiscriminately, for example to satisfy social pressures and in ignorance of a system's carrying capacity and sustainability, we pass up a golden educational opportunity and give anglers unreasonable expectations. Although the wrong message may have been sent, the stocking controversy is a good example of how fishing is an education opportunity.

I am a strong believer in urban fishery programs, programs that not only provide fishing but also develop habitat and educate users and result in a sustainable fishery. By bringing the fishing to the people, we enhance fishery resource learning opportunities for all people and, therefore, build a better constituency.

I am not sure, however, that we necessarily gain more anglers simply by providing urban fishing opportunities, as some fishery managers think. Care is needed in designing urban fishery programs. Public relations programs and well-conceived events or incentives to attract anglers, both current anglers who have fished in more traditional rural resources and new recruits. We have found that many anglers are not attracted to urban fishery resources, possibly because they do not provide important experiential attributes found in more rural settings. Public relations efforts should emphasize the desirable aspects of urban fishing opportunities: easy accessibility, safety, low-cost use, great place for a family outing, and low-tech fishing. Do not build false expectations. Education programs should be available to teach people how to fish, help them have a safe, successful, and enjoyable experience, and to make them knowledgeable users of a renewable resource.

I think we often are too quick to provide instant fishing and "glamour" fish in systems that can not support

them. Most people, angler and nonangler, associate trout with cool, clean water. Stocking trout may be good if you are trying to convince your constituents that the body of water is a healthy aquatic resource. However, stocking trout in a degraded habitat for which you have no habitat restoration plan may not be good management in the long run. Stocking catchable-size channel catfish and encouraging harvest can have a purpose, but a steady diet of this management recipe for urban waters may not be a good idea unless you own a fish farm. What does it teach people about fish community ecology, fishery management, and wise use? As I worked with people who wanted to create urban fishing -- and they meant fishing, not fishery -- programs or opportunities, the most frequent, and often first-asked, question was "where do I get the fish?" Providing good fishing opportunities out of the hauling box can provide positive learning experiences; but, without the right message, this "instant fishing" approach can create the idea that fish are abundant and available for harvest, and the angler does not have a role in fishery resource management. In the Lubbock urban fishery program, we built fishing opportunities by managing largemouth bass and sunfish communities and stocking channel catfish fingerlings and hybrid striped bass fry. We stocked no harvestable-size fish and used the media to help the anglers understand that they had a role in the quality of fishing.

The point of all this is fishing is an educational opportunity. If you agree that we want a large and educated constituency, maybe you will also agree that we should capture every possible educational opportunity.

Get the right people involved in delivering the message. Why is it that fisheries biologists have to do everything themselves? Successful businesses and organizations have different people, each with different skills and training, doing different jobs. The electrical engineer at IBM does not sell computers. But in fisheries, we wash the slime off from a day in the field to go "sell" a proposed fishing regulation.

What skills, talents, or expertise do we need to successfully manage fishery resources. Certainly knowledge of fish and other biota, limnology, and quantitative analysis skills are necessary. But we have other needs, and they focus on people -- the third element of a fishery. We need skills in environmental sociology and social and motivational psychology to measure characteristics, attitudes, and behaviors of fishery constituents and develop appropriate fishing opportunities. Marketing, public relations, resource economics, communications, and political analysis skills are needed to help evaluate, sell, and implement our programs. And certainly, appropriate educational programs for culturally diverse audiences are the basis for progress.

I hope it is apparent that the job is bigger than even a fishery biologist can handle. Knowledgeable fisheries biologists and managers should remain involved in the

social, economic, and political aspects of fisheries management; but expert assistance should be sought and used. Obtaining this entire breadth of skills and expertise within the all-too-common personnel constraints faced by most fisheries agencies is unlikely. This is still an era when environmental concerns are secondary.

Fisheries managers do have partners and potential partners that can alleviate this expertise shortfall. The sport fishing industry knows about the social and economic aspects of recreational fishing and represents a pool of expertise in marketing and public relations. They also have political skills and influence. Through radio, television, and magazines, they communicate to millions of anglers, and they want our stories. I can not commit the resources of the sportfishing industry, but I can say that working with them in the past has turned ideas into successful, effective programs.

As managers, the biggest challenge we face is aquatic education for everyone. Federal Aid in Sport Fish Restoration now supports aquatic education. The sportfishing industry is interested in aquatic education. Fishery agency, sportfishing industry and angler organization programs can have a positive effect, especially if they work together; but the scope of the programs is, often, narrow and progress will be slow. I believe that the solution to educational needs is to get aquatic resource education into the schools. Earlier, I offered that all people affect and are affected by aquatic resources. Getting aquatic education and the importance of fishing and fishery resources into "overloaded" curricula will not be easy. I must admit personal failure in this area when I was developing an urban fishery program and, therefore, can offer little guidance. However, concerted effort by all partners and viewing our constituency as all people may help.

Your program for this meeting strongly emphasizes education. Education will positively affect the size and quality of our constituency, funding for fishery management, professional credibility, and equity. I am confident the collective wisdom of this group will identify effective strategies to improve the quality and management of fisheries resources into the future.

Thank you for this opportunity to share my views. I look forward to the many significant thoughts I will gain from this productive meeting.

Hal Schramm

Fisheries Management in the Northeast - Past, Present, and Future: The New York AFS Chapter's Challenge

by Paul Brouha, executive director of AGS

I last was privileged to come before you as a plenary speaker in 1991. My topic was "The Role of AFS in Fostering Sound Stewardship of Fishery Habitat." I detailed examples of AFS involvement: F.I.S.H. - Fishermen Involved in Saving Habitat, a program to educate primarily commercial fishermen and their families about the importance of wetlands, clean water, adequate riverine flows, and how critical their support is to passage of laws like the Clean Water Act, the Magnuson Act, and the Farm Bill. I also spoke of AFS Chapter involvement in testifying at hearings around the U.S. in support of President Bush's No Net Loss of Wetlands initiative. I spoke about the Western Division's and its constituent Chapters involvement in fostering sound riparian area management. I mentioned the USFS "Rise To The Future" fisheries program initiative which the Society was supporting and finally, I mentioned the Northeast Divisions and N.Y. Chapter's concerns about hydropower relicensing that led to a 1990 AFS resolution in support of increased FWS program funding and staffing.

To put those activities into context, I detailed the major facets of the mission of AFS - to promote the conservation, development, and wise use of the fisheries (stewardship)- to gather and disseminate scientific information (building the science); to advance the status of the profession through service to AFS members and representation of their concerns (professionalism); and finally to provide an organizational structure that represents the members, provides leadership opportunities, and that provides the resources necessary to carry out programs.

I followed by detailing AFS Long-Range Plan objectives that responded to the 1986 survey direction that 92% of our members felt AFS should more actively participate in and comment on development of environmental policy. I discussed the plans for MICRA, the Interstate Cooperative Resource Agreement, signed by 28 Mississippi River basin states to promote cooperation in large river interjurisdictional fisheries management and for the North American Fisheries Leadership Workshop which was held in May 1991 and produced the North American Action Agenda which was published last year along with the AFS Annual Report.

I closed my presentation by suggesting that every AFS member and subunit had an obligation to educate and lead the public to an appreciation of the benefits of sound stewardship of fishery habitat. My forgettable clarion call - "As we meet in Owego, either we go with Sound Stewardship

of Fishery Habitat "Owego" the way of the Dodo! (worthy of Chevy Chase on a bad day). "

Now four years later I am privileged to address you again in the context of your business meeting after a particularly excellent session this morning that detailed the future of fisheries management in the Northeast and particularly in New York. I heard Norville Prosser say partnerships to inform and educate constituents and clients were essential to support the paradigm shift to watershed management and that every "soldier" must be brought to the emerging political debate to protect the gains of the last 25 years. I heard John Mason detail the need for an educated populace to support use of the new marine fish management tools that have been put into place. I heard Gerry Barnhart suggest that an educated and involved constituency was key to building consensus among disparate groups and I heard Jamie Geiger and Hal Schramm suggest education of agency administrators and the broader constituency that should be interested in aquatic resource conservation is essential if agencies are to get an acceptable "report card" and continued funding. There's a consistent message there -- educate an expanded constituency learn their needs, and galvanize them into action to build the fishing, fisheries management, and aquatic ecosystem enhancement programs of the future. This afternoon's program on youth education focused on a long term strategy to do that in the emerging electorate. That's great, but what can we AFS members and the New York Chapter do now until that electorate achieves voting age?

Yesterday morning January 26, 1995 I was invited to the State-Federal Science and Technology Partnership Symposium sponsored by the Carnegie Commission and the American Society of Mechanical Engineers to discuss prospects for a significantly expanded role for the states in the national science and technology system. I picked up the Carnegie Commission's 1992 report on the subject and read the executive summary on the flight to Binghamton yesterday. It calls for new scientific and technology advisory organizations within states, in interstate compacts, and among the states as groups focused on setting federal policy priorities. Within the states the Commission made some particularly interesting recommendations:

Each governor should have a designated science and technology advisor *Governors are increasingly called upon to make decisions that have scientific and technological dimensions. However, they generally lack staff sources of science and technology advice and assessment.*

Each state should have an independent science and technology advisory body *No state has the benefit of a sufficiently well-organized process for developing broad, comprehensive positions on issues that involve science and technology, such as economic development, health, and environmental protection. Sound decision making about major public issues requires such a process.*

The proposed state advisory body should develop and periodically update a vision of science and technology's role in meeting the state's strategic goals *Partnership between government, industry and academic requires consensus about broad issues. Few states have a formal process for developing such views.*

Each State legislature should have access to a standing source of objective analysis of science and technology issues *Legislators have even less access to sound science, advice than governors.*

New scientific and advisory organizations? Why? Here's a role for professional societies like AFS and for their subunits like the N.Y. Chapter. Build on this morning's calls for action to shape the future of fisheries programs in the Northeast and to build the constituency for the future through education. I challenge you to develop an aquatic resources action agenda for N.Y., to build upon the new AFS strategic plan, and the NAFAA-US Implementation plan. Become an advisory resource to your governor, your legislature, and the N.Y. delegation serving the U.S. Congress. You can do it -- the resources can be marshalled, and the Chapter can more effectively support sound resource leadership and stewardship for the future.

REFERENCES

Science Technology and the States in America's Third Century. A Report of the Carnegie Commission on Science, Technology, and Government. September 1992 (pp. 11-14). A copy of the above report is available free of charge from The Carnegie Commission on Science, Technology, and Government IO Waverly Place, New York, NY 10003 Phone:212-998-2150 FAX:212-995-3181

FISHERIES MANAGEMENT IN THE NORTHWEST PAST PRESENT AND FUTURE -- THE ANGLERS PERSPECTIVE

Condensed from **Norville S. Prosser** Vice President of The American Sporting Association address to the NYAFS 1995 Annual Meeting

Regulatory and corporate decisions on how to allocate natural resources directly impact fisheries and their supporting habitats. However, Sport fishers and fisheries managers are not integrated in the decision making process in a way that allows them to be proactive rather than reactive. From 1960 to 1990 the population increased by 61 %, but the angler numbers increased by 157%. In 1990 the Fisheries and Wildlife service documented the existence of 50 million anglers of all ages. Fishing was the number 1 leisure activity for adult men and number 5 for adult women.

Fishing activities represent spectacular regional and national economic stimulation. Millions of dollars are circulated as trip related expenditures, salaries, sales taxes and federal and income taxes.. Furthermore, since 1986, Wallop-Breaux funds have added some 1.7 billion dollars to the states so they can improve fisheries management; fishers pay nearly 425 million dollars per year in fee-fishing licenses; and the total user fee contribution to resource conservation is over 625 million dollars each year. Additionally, fishing promotes conservation, for recreational fishing depends upon a healthy environment. One case in point is the standard for fishable and swimmable waters that was incorporated in the Clean Water Act by the request of fishers.

In spite of the importance of fishers in the economics of fisheries, fishers as a group have failed to take a legitimate place in discussions over resource allocation. As a group we have tended to avoid developing a base of political power among our 50 million constituents. Using short planning horizons in marine fisheries lead to collapse of some species and related economic failure. In October , 1994 the North east Fisheries Science Center reported that the George Banks stocks of yellow tail flounder, and haddock had collapsed, and the stock of Atlantic cod was in the verge of collapse. At the same time the summer flounder, bluefish witch flounder and weakfish were overexploited. Another example of the lack of input from fishers to decision making is seen in the failure to fund emerging environmental mandates. In the last 20 years state and federal agencies have added programs that includes protection of endangered species, environmental studies, project permits, non-game resource programs. At the same time, the majority of funds for natural resource management is still financed only by anglers, boaters and hunters. Evidently, it is urgent to expand the user-fee base to pay for all these programs.

By several measures the number of young fishers in the U.S. urban and rural population is increasing. However, fishers nowadays are likely to be more urban, more diverse, or be members of single parent families. Improved, flexible approaches are needed in order to maintain an educated user group. There are several growing conflicts between the angling community and the environmental regulators. Solution to these conflicts will only be possible when partnership cooperation and respect is established between these groups.





NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY
c/o NYDEC, 50 Wolf Road, Albany, NY 12233-4756

1994 Annual Treasurer's Report
Prepared 24 January 1995

	<u>Checking</u>	<u>Student</u>	<u>Certificate</u>	<u>Savings</u>	<u>Total</u>
Balance 1/19/94	\$1,892.49	\$ 577.78	\$9,191.55	\$5,885.40	\$17,547.22
<u>1994 Receipts</u>					
Interest	80.75		332.17	179.01	591.93
1994 Annual Meeting	4,446.00				4,446.00
1994 Meeting Raffle		497.50			497.50
1994 Dues	2,918.25				2,918.25
Safety Workshop	<u>8,197.00</u>				<u>8,197.00</u>
Receipts subtotal	\$15,642.00	\$ 497.50	\$ 332.17	\$ 179.01	\$16,650.68
<u>1994 Expenditures</u>					
1994 Annual Meeting	3,574.60				3,574.60
Student Stipends		100.00			100.00
Printing	653.79				653.79
Safety Workshop	7,058.75				7,058.75
Postage	365.04	20.50			385.54
Electric stapler	30.00				30.00
Canal Workshop	250.00				250.00
NE EXCOM Meeting	191.02				191.02
AFS EXCOM Meeting	766.47				766.47
Duck Print (1995 Raffle)	<u>26.00</u>				<u>26.00</u>
Expenditures subtotal	\$12,915.67	\$ 120.50			\$13,036.17
1994 totals	\$ 2,726.33	\$ 377.00	\$ 332.17	\$ 179.01	\$ 3,614.51
Balances as of 24 January 1995	\$ 4,618.82	\$ 954.78	\$9,523.72	\$ 6064.41	\$21,161.73
Consolidated checkbook total	\$ 4,618.82				
	+ 954.78				
	<u>\$ 5,573.82</u>				

Note: Student subunit and chapter checking accounts are consolidated in one checkbook

Respectfully submitted,

Timothy J. Sinnott
Secretary/Treasurer

What's Your Opinion?

An important topic at the 1995 Annual Meeting was Aquatic Education. Although the meeting is over, the issue about how much effort should be given to educating youth about aquatic ecosystems and actively encouraging aquatic recreation continues. The Chapter would like to take a few moments and answer a few questions about this topic. When done, please fold this sheet and mail it to the address on the reverse side. **Your opinion is important!** Thanks!

Circle Y(es) or N(o)

1. Did you attend the 1995 Chapter Meeting and hear the afternoon session on aquatic education? Y N

2. Are you familiar with the types of youth fishing and aquatic education programs, including **SAREP** available to new anglers in New York? Y N

3. Could you please rate your interest in this topic as a possible focus of a future AFS annual meeting:

Circle one: Very High Moderately High Neutral Moderately Low Very Low

If you answered no to question 2, you may quit now

1. Each state actively involved in youth fishing has its own balance of extended contact programs like SAREP, which teaches fishing, ethics, ecology, and sampling, and short contact programs like fishing clinics, educational "days", and urban fishing enhancement which affects larger numbers of kids. Please check any of the following statements that you feel would be appropriate in designing a state youth fishing program. Check as many as you statements as you agree with:

- There should be more aquatic education operated by SAREP volunteers.
- There should be more aquatic education and fishing materials provided to schools by state or federal agencies, tackle manufacturers, private groups, etc.
- There should be more short-term activities like clinics showing kids how to fish.
- There should be no additional programs or expansion of activities.
- There should be no additional programs and you would agree with less funding to this type of program in general.
- There should be fewer programs than currently exist.

2. Do you believe that the NY Chapter should form a youth education committee to plan activities, provide feedback to the chapter, and in general promote aquatic education efforts?
Y N

3. Would you be willing to serve on such a committee? Name _____

Your responses are important to our New York AFS Chapter. A summary of the responses received will be published in the next newsletter, and will help shape New York's future programs related to aquatic education. Since these are difficult times for funding, your opinions might be helpful in documenting the importance of these programs.

Thanks for your Participation!

fold

PLACE
STAMP
HERE

Mr. Doug Carlson
NYSDEC Region 6
State Office Bldg
317 Washington St
Watertown, New York 13601

fold

NOTE THE NUMBER 93, 94, OR 95 ON YOUR MAILING LABEL.
 THIS DENOTES YOUR MEMBERSHIP STATUS
 TO BE A CURRENT PAID-UP MEMBER YOU SHOULD HAVE A 95 ON THE LABEL.

IF YOUR LABEL IS MARKED 93, YOUR NAME WILL BE DELETED FROM THE
 MEMBERSHIP ROLE AS OF 1 AUGUST 1995.

ATTACHED IS A MEMBERSHIP BLANK FOR NEW OR RENEWAL MEMBERSHIPS

SEND YOUR 1995 DUES TO THE SECRETARY/TREASURER

Application for Membership
New York Chapter American Fisheries Society
 (Information provided will be used in the membership directory)

Name _____ Regular (\$10.00)___ Student (\$5.00)___

Address _____

City/State/Zip _____

Student applications must be endorsed
 by a faculty member signing above

Employer/Affiliation/School _____

Telephone: Work _____ Home _____

Are you a member of the American Fisheries Society (Parent Society)? Yes___ No___

New Membership___ Renewal___ What was the last year you were a paid-up member? _____

Would you be interested in serving on any of the Chapter Committees? If so, please check which committees
 would interest you.

- | | | | |
|------------------------|-------|-------------------------|-------|
| Environmental Concerns | _____ | Membership committee | _____ |
| Program Committee | _____ | Resolutions Committee | _____ |
| Finance Committee | _____ | Professional Incentives | _____ |
| Newsletter Staff | _____ | Professional Diversity | _____ |
| Workshop Committee | _____ | Student Sub-unit | _____ |

Make checks payable to **NY Chapter AFS**. Send This form and your check to:

Timothy Sinnott
 Secretary/Treasurer
 c/o NYSDEC
 Room 530, 50 Wolf Road
 Albany, NY 12233-4756

Interest and Specialty codes have been deleted because of the increased cost of printing and mailing the
 membership directory.



NEW YORK CHAPTER - AMERICAN FISHERIES SOCIETY
C/O NYS DEPT. OF ENVIRONMENTAL CONSERVATION
ROOM 530, 50 WOLF ROAD
ALBANY, NEW YORK 12233-4756

NON-PROFIT ORGANIZATION
U.S. POSTAGE
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PERMIT NO. 121
SARATOGA SPRINGS, NEW YORK 12866



NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY

c/o NYDEC, 50 Wolf Road, Albany, NY 12233-4756

**New York Chapter, American Fisheries Society
1995 Annual Meeting Registration, and Membership Renewal**

SPEEDY REGISTRATION INSTRUCTIONS: **New members** - Complete lines 1 - 5. **Current members** - Enter your name and only any information items that have changed. Check the directory if you are unsure. **All** - Bring the completed form and your check for the correct amount made out to NY Chapter AFS.

1. NAME _____
2. Employer or School _____
3. Address (Street, PO Box, Apt #) _____
4. Address (City, State, Zip) _____
5. Telephone number, Home: _____ Work: _____
6. New member: _____ Renewal: _____

Circle all applicable fees:

	STUDENT MEMBER	REGULAR MEMBER
Meeting Registration	\$27.00	\$34.00
Chapter Membership for 1995	\$ 5.00	\$10.00

Enter Total: _____ Make checks payable to NY Chapter AFS

Student Stipend Applicants: Student stipends are available for all students presenting papers. To apply, complete the following blanks and submit the completed registration form along with your abstract. The stipend covers the cost of registration and up to \$25.00, depending on the number of students applying.

1. University/College you are attending: _____
2. Major Professor: _____
3. Professor's telephone number: _____

**NEW YORK CHAPTER, AMERICAN FISHERIES SOCIETY
RECEIPT**

January __, 1995

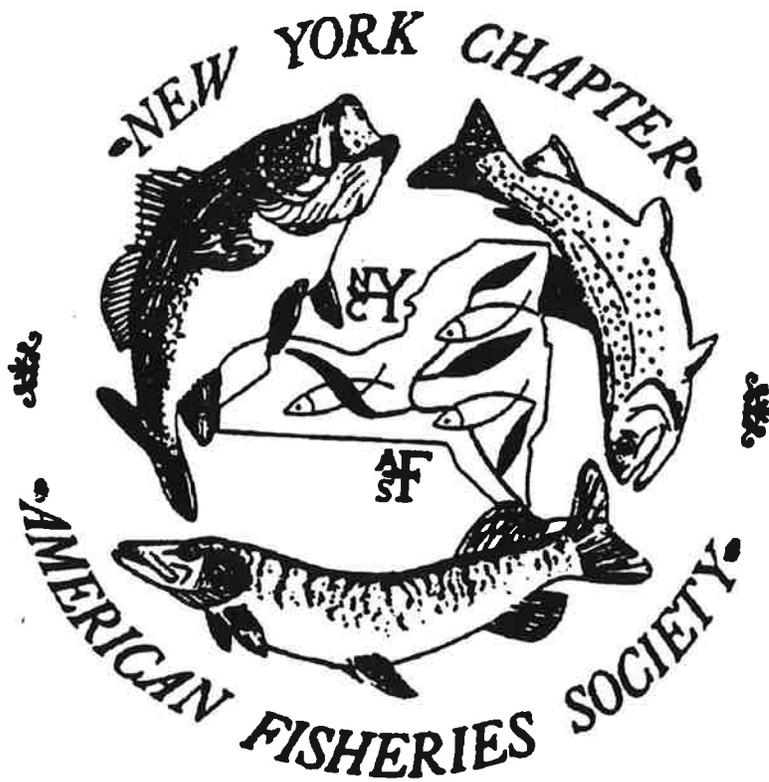
Received from _____, \$ _____

for 1995 Annual Meeting Registration _____ 1995 NY Chapter Membership _____

Timothy J. Sinnott, Secretary/Treasurer

**New York Chapter
American Fisheries Society**

**1995 Annual Meeting
Contributed Paper and Poster
Abstracts**



**Fisheries Management in the Northeast
Past, Present and Future**

**New York Chapter American Fisheries Society
Annual Meeting, January 26-28, 1995
Contributed Paper and Poster
Abstracts**

Contributed Paper Session I

**Influence of Prey Color Contrast on Predation Behavior
of Age-0 Yellow Perch**

Jaime R. Guzmán
407 Eddy Street, Apt. 6
Ithaca, NY 14850

In diurnal planktivores such as the yellow perch (*Perca flavescens*) of the Oneida Lake ecosystem, vision and visual cues from the environment are the most important factors affecting their predation cycles. In order to quantify the effectiveness of these visual factors, experiments in which prey color contrast (against its environment) was varied were conducted with age-0 yellow perch using two species of planktonic prey, *Diaptomus minutus* and *Diaptomus sicilis* (differing only in pigmentation: colorless and red, respectively). As expected, the young perch used contrast of the prey against its environment to select the darker hued prey in conditions of the prey's normal and maximum contrasts. The perch, however, chose randomly when both prey's contrasts were minimized ($z(24) \leq 1.96$, $\alpha=0.05$, Rank Sum). There was, however, a statistically significant difference in higher numbers of *D. sicilis* eaten even in red light ($z \geq 2.58$, $\alpha=0.01$, Rank Sum). Still, the trends observed indicate an effective use of the young perch's visual system, as well as provide an insight to better understand the non-optimally foraging behavior exhibited by young-of-the-year perch.

Impacts of the New York Canal System on Fish and Wildlife

Stuart L. Free
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Altamont, NY 12009

The American Wildlife Research Foundation hosted a workshop, "Impacts of the New York Canal System on Fish and Wildlife", at Silver Bay on Lake George April 22-24, 1994. The workshop topic was chosen because of ongoing planning by the Canal Recreationway Commission for the canal's future under the Thruway Authority - and because the canal system includes 40 percent of the state's freshwater resources and drains nearly half of the state's 49,000 square miles. The goal was to help participants become effective advocates for sound canal management decisions affecting fish and wildlife.

Thirty-eight attendees heard 27 speakers, moderators and facilitators focus on canal system resources. A survey of participants to evaluate success of the workshop revealed that 74 percent felt the workshop fully or mostly met expectations.

**Estimates of Short Term Mortality Following Catch-and-Release of Bluefish,
Striped Bass, and Scup in Long Island Waters.**

Mark H. Malchoff
NY Sea Grant
3059 Sound Ave.
Riverhead, NY 11901
516-727-3910

Trials were conducted to develop estimates of short term survival following angling for bluefish (*Pomatomus saltatrix*), striped bass (*Morone saxatilis*), and scup (*Stenotomus chrysops*). The project was also designed to compare differences in survival as a function of the number of hook points, water temperature, total length, and type of bait (e.g. natural bait vs. artificial lure). Fish were captured in both charter boat and shore modes, held in 378 liter tanks, and transported to floating net pens or other enclosures. After 72 hours, fish were retrieved, measured and released or, if dead discarded. The mean estimate of survival for adult bluefish was 93%, based on 7 trials. Juvenile bluefish survival was estimated at 95%, based on 4 trials. Similar results were found for striped bass (92%, 15 trials) and scup (90%, 5 trials). These results were based on a total of 89 bluefish, 109 striped bass, and 103 porgies. Categorical modeling revealed no significant differences ($P=.05$) in survival as a function of hook point number, water temperature, length or bait type. The results suggest that short term angling induced mortality may be minor in several important Northeast marine recreational fisheries. The findings also suggest that any variation in survival may not be easily controlled by angling techniques or management regulations.

Key words: catch and release, recreational angling, marine fisheries

**Endocrine Disruptors in the Environment:
Human and Wildlife Health Issues**

James M. Haynes, Professor
Department of Biological Sciences
SUNY College at Brockport
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A number of chemicals, such as PCBs and DDT-related pesticides are known to disrupt or are strongly suspected of disrupting the normal development of sexual organs or sexual behavior in birds, wildlife, and fish. These chemicals appear to mimic or interfere with sex hormones (particularly the female hormone, estrogen) during embryonic development. Recently, a number of scientists have attributed apparently rising rates of human reproductive tract disorders and breast and testicular cancers to a variety of anthropogenic chemicals released into the environment. Fish, particularly certain Great Lakes fishes, are among the highest sources of many of these environmental contaminants in the diets of wildlife and humans. This paper will briefly review published evidence on the physiological, behavioral and developmental effects of a variety of chemicals, primarily organochlorine compounds, on wildlife and humans, and it will ask how fishery professionals and the larger fishing community should deal rationally and ethically with the implications of the evidence for transgenerational effects of developmental toxins that have been or continue to be released into the environment.

Contributed Paper Session II

Predicting Mean Daily Discharge from a Small Impoundment

C. Mead McCoy and Matthew F. Albright

SUNY Oneonta
RR 1, Box 337
Stamford, NY 12167

The prediction of mean daily discharge from Moe Pond, Otsego County, New York was calculated using the Thornthwaite method to estimate monthly rates of potential evapotranspiration over a calendar year. Thirty years of temperature and precipitation data from Cooperstown, New York was provided by the National Weather Service in calculating the estimated daily discharge from the impoundment. Empirical information has been collected to ascertain the accuracy of the predictions of calculated discharge.

**Evaluation of the Strobe Light Fish Deterrent System
at Milliken Station, Cayuga Lake, New York.**

Madelyn Stafford-Glase, John Homa, Jr, M. Elizabeth Connors

Ichthyological Associates, Inc.
50 Ludlowville Road
Lansing, New York, 14882
(607) 533-8801

L. Ray Tuttle

New York State Electric and Gas Corp.

The New York State Electric & Gas Corporation (NYSEG) owns and operates Milliken Station, a steam electric generating facility on Cayuga Lake. Once-through lake-water cooling is utilized at this station. In 1992, NYSDEC requested that NYSEG study ways to reduce fish entrainment through the facility; in 1993, NYSEG installed a strobe light deterrent system at the intake and initiated an evaluation of the system's effectiveness. The study was designed to provide paired entrainment samples comparing two treatments, strobes off and strobes on.

Overall, approximately 37% fewer fish were entrained when the strobe lights were operating than when they were off. Rainbow smelt were most commonly entrained (60% of the total catch). Alewife was also abundant (23% of the catch) and yellow perch was common (8%). The effects of the strobe lights on individual species and life stages were mixed. Strobes were effective in repelling young-of-year rainbow smelt, yellow perch, white sucker, and trout perch during the whole study period. Strobes were most effective during cold months. Alewife were repelled during the winter and spring, but were attracted to the strobes during the summer. Juvenile smelt were unaffected by the strobes while adults were attracted.

The Fishes of the Buffalo River, Buffalo, New York

Elizabeth S. Lozuchowski, E. Ann Poole, and Christopher E. Lowie
United States Fish and Wildlife Service, Lower Great Lakes Fishery Resource Office
405 North French Road, Suite 120 A
Amherst, NY 14228

A fishery monitoring program was conducted over two consecutive years to establish a baseline of fish community data from which aquatic habitat restoration success can be gauged. Adult and larval fish were sampled from seven reaches on the Buffalo River from the mouth to approximately 6 miles upstream in 1992 and 1993. A total of 39 taxa from 14 families, representing 37 adult species and 24 larval taxa, were collected. The most common adult fish species found in the river in 1992 were emerald shiner (*Notropis atherinoides*), gizzard shad (*Dorsoma cepedianum*), and pumpkinseed (*Lepomis gibbosus*), and in 1993 were pumpkinseed, emerald shiner, and white sucker (*Catostomus commersoni*). Overall, the adult fish community of the Buffalo River is dominated by Cyprinids, Centrarchids, and Catostomids. However, Percids and Osmerids were common in reach 1, and Ictalurids were common in Reach 3. Gizzard shad was the dominant larval fish found in the river for both years, followed by Centrarchids and Moronids. Yellow perch larvae were relatively common in 1992 and rare in 1993. Twenty-one of the adult species collected had individuals with external abnormalities. Goldfish (*Carassius auratus*), common carp (*Cyrimus carpio*), white sucker, brown bullhead (*Ameiurus nebulosus*), and freshwater drum (*Aplodinotus grunniens*) had the highest percentage of fish with external abnormalities.

Lake Trout Rehabilitation in Lake Erie

Floyd C. Cornelius, Kenneth M. Muth and Roger Kenyon
New York State Department of Environmental Conservation
Lake Erie Research Unit
178 Point Drive North
Dunkirk, NY 14048-1031

Native Lake Trout (*Salvelinus namaycush*) once thrived in the deep waters of eastern Lake Erie. The impact of nearly 70 years of unregulated exploitation and over 100 years of progressively severe cultural eutrophication resulted in the extirpation of lake trout stocks by 1950. Early attempts to stock lake trout were unsuccessful in establishing a self-sustaining population. In the early 1980's, New York's Department of Environmental Conservation, Pennsylvania's Fish and Boat Commission, and the U.S. Fish and Wildlife Service entered into a cooperative program to rehabilitate lake trout in the eastern basin of Lake Erie. After 11 years of stocking selected strains of lake trout in U.S. waters, followed by effective sea lamprey (*Petromyzon marinus*) control, it appears that lake trout are successfully recolonizing their native habitat. Adult stocks have built up significantly and are expanding their range in the lake. Preliminary investigations suggest that lake trout reproductive habitat is still adequate for natural reproduction, but natural recruitment has not been documented. Future assessments will be directed toward evaluation of spawning success and tracking age class cohorts as they move through the fishery.

Infiltrative Sarcoma in a Walleye

Dr. Kathy Earnest-Koons and Paul R. Bowser

College of Veterinary Medicine

Cornell University

DAAAM/Levine Lab

Ithaca, NY 14853-6401

Walleye (*Stizostedion vitreum*) dermal sarcoma (WDS) was first reported by R. Walker in 1969 as a benign multifocal cutaneous tumor of walleyes in Oneida Lake, NY. The tumor is caused by a type C retrovirus. We have successfully transmitted the tumor to laboratory-maintained fingerling walleyes in a number of pathogenesis studies over the past 6 years. Tumors in these laboratory trials were typical of those superficial tumors observed in feral walleyes. A tumor transmission study was begun the summer of 1994 using nine-week-old walleye fingerlings. Starting at 56 days and continuing throughout the experiment, injected fish developed grossly visible, multiple small white skin masses that varied from one half to ten mm in diameter. These masses appeared on the skin of the head, back, flank, and lips. Histopathological examination revealed that some of these tumors, especially those collected at 84 days and beyond, did not remain cutaneous, but were locally invasive and replaced normal tissue, primarily muscle. One neoplasm on the head of a fingerling had deformed the brain and had invaded the skull. Due to the unusual invasive nature of the microscopic lesions of the tumor, this case is reported.

Fish Assemblages and Habitats at Selected National Water Quality Assessment Program Sites in the Hudson River Basin, New York, 1993

Karen R. Murray
United States Geological Survey
P.O. Box 1669
Albany, New York 12201

Fish assemblages and habitats of selected streams in the Hudson River Basin were characterized in 1993 as part of the U.S. Geological Survey's National Water-Quality Assessment Program to (1) contribute to regional and national assessments of chemical, physical, and biological conditions in streams and rivers, and (2) provide a basis for examining temporal trends. This presentation describes fish assemblages and habitats at six stream sites in small (18 to 65 square mile) basins dominated by forest (1 site), agriculture (2 sites), or urban land (3 sites), and develops hypotheses regarding environmental factors that affect these fish communities.

Species richness was highest (13) at one agricultural site and was lowest (2) at one urban site. Intolerant species were most abundant (22 percent of total catch) at the forested site. Agricultural sites supported higher species diversity and evenness than the forested site but contained fewer intolerant species and lower abundance of intolerant species. Urban-site collections consisted of only species that are tolerant of degraded conditions. Depth, pool volume, and instream-cover area were greatest at the two agricultural sites and were least at a channelized urban site. Physical habitat at the agricultural and urban sites appeared adequate to support more diverse fish communities than those observed; this suggests the possibility of unsuitable water-quality conditions that affect the fish communities at these sites.

The Aerobiological Pathway of the Fish Pathogen *Aeromonas salmonicida* and its Implications in Fish Health Management.

G.A. Wooster and P.R. Bowser
New York State College of Veterinary Medicine, Cornell University
DAAAM/Levine Lab, Hungerford Hill Road
Ithaca, NY 14853-6401

The aerobiological (aerosol) pathway of *Aeromonas salmonicida* was investigated for the first time. The bacterial strain used was ATCC 33658. Results indicate that viable *A. salmonicida* can travel a significant distance as an aerosol/droplet spray, up to 104.1 cm (limits of the test chamber used) and possibly farther. Additionally, viable *A. salmonicida* was recovered from water samples exposed to an experimentally generated aerosol/droplet spray of the bacterium downwind from the contaminant source. It is possible then that viable bacterial and viral aquatic animal pathogens can be spread via the airborne route. This possible route of pathogen introduction could have implications, especially when aquaculture systems with tanks in close proximity are being used. The study of aerosol dissemination of piscopathogenic agents is in its infancy and the full significance of this means of spread remains to be fully elucidated.

**Where in New York are Those Unidentified Shiny Minnows
and Who Cares Anyway?**

Douglas M. Carlson

New York State Department of Environmental Conservation
317 Washington St.
Watertown, NY 13601-3787
(315) 785-2262

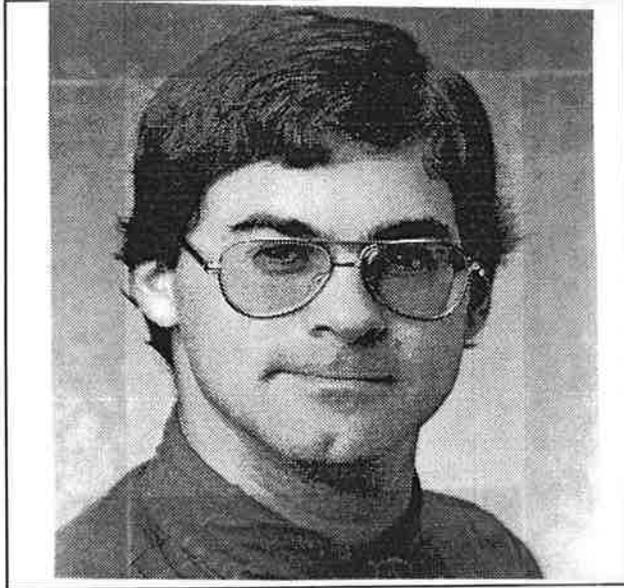
Robert A. Daniels

New York State Biological Survey
Albany, NY

Fish surveys usually have narrow, well defined objectives, and sometimes overlook the "other fish" which are hard to identify. However, the surveyors often can magnify the value of their work by identifying those small minnows. Today's limits on time in-the-field and today's expanded versatility and sharing of data, make this even more important. For example, we examined the centralized fish data base of NYSDEC to determine which watershed had unidentified minnows "occurring" most often, 1987-94. This could have been where the largest number of minnow species occurred in the 1930's (the Lake Ontario watershed) or where most surveyors reported on trout streams (Delaware watershed). Actually it was Chemung (11%). In any case, we hope that future surveys give closer attention to minnow identification. The solution to partial fish identifications begins with the surveyor - some effort must be expended to sight-identify the common species in that watershed. There is help: excellent pictures in keys, workshops and knowledgeable co-workers and colleagues. Obviously, it is always wise to voucher part of the collection and store in-house or at a museum. This is imperative for new records to the watershed.

We offer you the chance to sight-identify six similar, shiny minnow species (while they are swimming) and six redhorses (while laying in trays). Some of the newer fish identification aides are displayed.

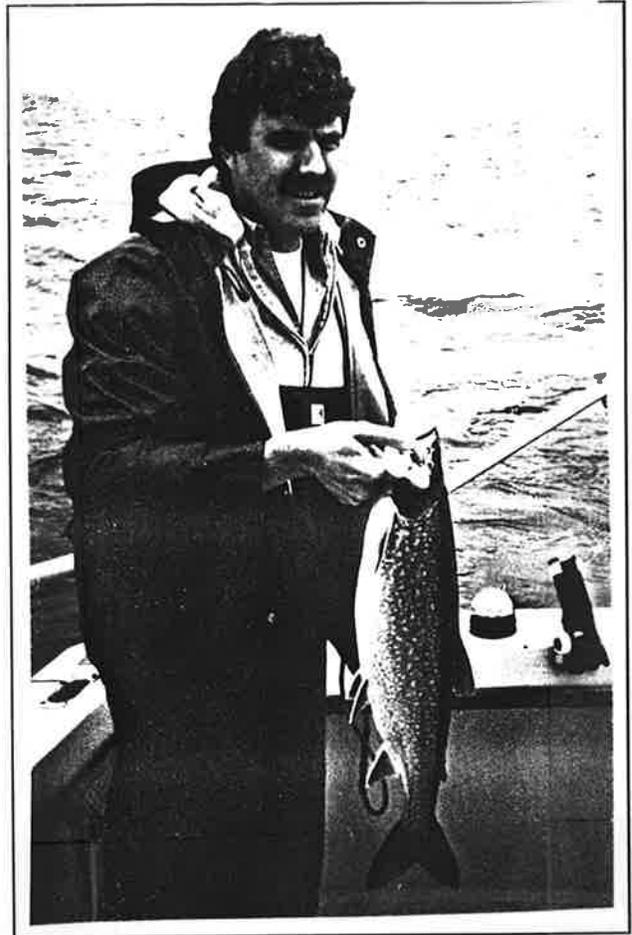
Presentation of Candidates for the Presidency



Allen M. Peterson.

Allen is a life-long resident of New York. He caught his first trout, a brookie, when he was six, at the Schaticoke Fair. His destiny thus determined, he received his Bachelor's degree in Wildlife Management from West Virginia University in 1980. He worked in The Endangered Species Unit of the New York department of Environmental Conservation from 1979 to 1981. Since 1981, Allen has been employed as an Environmental Specialist by the New York State Electric and Gas Corporation. His primary responsibilities are 1) the siting of electric and gas transmission lines, 2) the preparation of environmental impact statements and environmental construction plans and 3) environmental impact research and development. Allen received his Master's degree in Ecological Sciences from SUNY-Binghamton in 1990. His thesis was on ROW construction impacts on headwater brook trout populations.

Allen holds a U.S patent for the invention of the sediment mat. He has been a member of the Chapter and the Executive Committee since 1990. He is primarily responsible for local arrangements for the Chapter's annual meeting. He also coordinated the "Fish and Wildlife Olympics", whose motto is "We separate the men from the adults". Allen is running for president because "to repay my colleagues for over 30 years of great fishing". Allen, his wife, and five children reside in Owego, where he is a member of the Camville Volunteer Fire Department and Emergency Squad, and President of the Zion Lutheran Church and School.

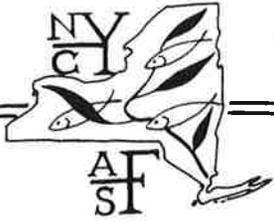


Douglas Stang

Doug is currently Warmwater Unit Leader for NYDEC in Albany. Doug earned a BS in Forestry and Wildlife (Fishery Science) from Virginia Tech and a MS in Fishery Biology from Iowa State University. He has held temporary positions with Virginia Department of Game and Inland Fisheries and Wyoming Cooperative Fish and Wildlife Research Unit studying impacts of thalweg dredge disposal on Mississippi River fishes before coming to New York in 1985. He has worked for the NYDEC's Hudson River Unit and as Regional Fisheries Biologist in the Cortland Office.

Doug has served on the NYC-AFS program committee on three occasions, is a member of NED-AFS, Warmwater Workshop Committee, is the Northeast Regional Editor for the AFS Fisheries Management Section newsletter, has served on the nominating committee for AFS-FMS, and is currently chairing the NYC-AFS Professional Awards Committee.

Doug resides in Altamont with his bride Kelly and "duck dog" Jessie.



NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY

c/o NYDEC, 50 Wolf Road, Albany, NY 12233-4756

**New York Chapter, American Fisheries Society
1995 Annual Meeting Registration, and Membership Renewal**

SPEEDY REGISTRATION INSTRUCTIONS: **New members** - Complete lines 1 - 5. **Current members** - Enter your name and only any information items that have changed. Check the directory if you are unsure. **All** - Bring the completed form and your check for the correct amount made out to **NY Chapter AFS**.

1. NAME _____
2. Employer or School _____
3. Address (Street, PO Box, Apt #) _____
4. Address (City, State, Zip) _____
5. Telephone number, Home: _____ Work: _____
6. New member: _____ Renewal: _____

Circle all applicable fees:

	STUDENT MEMBER	REGULAR MEMBER
Meeting Registration	\$27.00	\$34.00
Chapter Membership for 1995	\$ 5.00	\$10.00

Enter Total: _____ Make checks payable to **NY Chapter AFS**

Student Stipend Applicants: Student stipends are available for all students presenting papers. To apply, complete the following blanks and submit the completed registration form along with your abstract. The stipend covers the cost of registration and up to \$25.00, depending on the number of students applying.

1. University/College you are attending: _____
2. Major Professor: _____
3. Professor's telephone number: _____

**NEW YORK CHAPTER, AMERICAN FISHERIES SOCIETY
RECEIPT**

January __, 1995

Received from _____, \$ _____

for 1995 Annual Meeting Registration _____ 1995 NY Chapter Membership _____

Timothy J. Sinnott, Secretary/Treasurer



NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY
 c/o NYSDEC, Room 530, 50 Wolf Road, Albany, New York 12233-4756

1995 Annual Treasurer's Report
 Prepared 28 January 1996

	<u>Checking</u>	<u>Student</u>	<u>Certificate</u>	<u>Savings</u>	<u>Total</u>
Balance 01/25/95	\$4,599.12	\$ 954.78	\$ 9,523.72	\$6,064.41	\$21,142.03
<u>Receipts</u>					
1995 Annual Mtg	3,747.00				
1995 Raffle	607.50	607.50			
1995 Rebate	524.00				
Memberships	2,499.00				
Interest	89.57		552.75	184.43	
1995 Workshop	2,310.00				
Receipts subtotal	9,777.07	607.50	552.75	184.43	11,121.75
<u>Expenditures</u>					
1995 Annual Mtg	5,742.67				
1995 Raffle	209.35	300.41			
Donation, Bridge to Mexico	100.00				
1996 Mail permit	85.00				
AFS video	20.00				
1996 Awards	40.00				
Postage	323.31				
Newsletter printing	525.05				
President's travel	989.61				
1995 Workshop	1,787.63				
1996 Annual mtg	300.00				
1996 Raffle	17.00				
Expenditures subtotal	\$ 10,139.62	300.41			10,440.03
Interval totals	\$ -362.55	307.09	552.75	184.43	+681.72
Balances as of 29 January 1996	\$ 4,236.57	1,261.87	10,076.47	6,248.84	21,823.75
Consolidated checkbook total	\$ 4,236.57				
	+ 1,261.87				
	\$ 5,498.44				

Note: Student subunit and chapter checking accounts are consolidated in one checkbook.

Respectfully submitted,

Timothy J. Sinnott
 Secretary/Treasurer



MASSEN

NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY
 c/o NYSDEC, Room 530, 50 Wolf Road, Albany, New York 12233-4756

Treasurer's Report
 28 Jun - 31 Oct 1995

	<u>Checking</u>	<u>Student</u>	<u>Certificate</u>	<u>Savings</u>	<u>Total</u>
Balance 10/31/95	\$4,993.86	\$1,261.87	\$9,609.42	\$6,109.38	\$21,974.53

Receipts

Membership renewals	165.00				165.00
Interest	25.46		308.33	108.25	442.04
1995 Workshop	2,130.00				2,130.00
Receipts subtotal	2,320.46		308.33	108.25	2,737.04

Expenditures

Jul Newsletter	112.32				112.32
Postage	47.16				47.16
Don Einhouse to AFS EXCOM meeting	489.61				489.61
1995 Workshop	1,533.23				1,533.23
flyer printing	60.48				
Flyer mailing	128.00				
catering	1,319.75				
parking	25.00				
Stamps	12.80				12.80
AFS video	20.00				20.00
Expenditures subtotal	\$ 2,215.12				\$ 2,215.12

Interval totals	\$ 105.34		308.33	108.25	\$ 521.92
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Balances as of 27 June 1995	\$ 5,099.20	\$1,261.87	\$9,917.75	6,217.63	\$ 22,496.45
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Consolidated checkbook total	\$ 5,099.20				
	+ 1,261.87				
	<u>\$ 6,361.07</u>				

Note: Student subunit and chapter checking accounts are consolidated in one checkbook.

Respectfully submitted,

Timothy J. Sinnott
 Timothy J. Sinnott
 Secretary/Treasurer

afs95-3

2130
 1533

 597 = 596.77
 + 180

 776.77 WK PROFIT



4

NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY
 c/o NYSDEC, Room 530, 50 Wolf Road, Albany, New York 12233-4756

Treasurer's Report
 28 Jun - 31 Oct 1995

	<u>Checking</u>	<u>Student</u>	<u>Certificate</u>	<u>Savings</u>	<u>Total</u>
Balance 10/31/95	\$4,993.86	\$1,261.87	\$9,609.42	\$6,109.38	\$21,974.53

Receipts

X Membership renewals	165.00				165.00
X Interest	25.46		308.33	108.25	442.04
X 1995 Workshop	2,130.00				2,130.00
Receipts subtotal	2,320.46		308.33	108.25	2,737.04

Expenditures

X Jul Newsletter	112.32				112.32
X Postage	47.16				47.16
X Don Einhouse to AFS EXCOM meeting	489.61				489.61
X 1995 Workshop	1,533.23				1,533.23
flyer printing	60.48				
Flyer mailing	128.00				
catering	1,319.75				
parking	25.00				
X Stamps	12.80				12.80
X AFS video	20.00				20.00
Expenditures subtotal	\$ 2,215.12				\$ 2,215.12

Interval totals	\$ 105.34		308.33	108.25	\$ 521.92
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Balances as of 27 June 1995	\$ 5,099.20	\$1,261.87	\$9,917.75	6,217.63	\$ 22,496.45
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Consolidated checkbook total	\$ 5,099.20				
	+ 1,261.87				
	<u>\$ 6,361.07</u>				

Note: Student subunit and chapter checking accounts are consolidated in one checkbook.

Respectfully submitted,


 Timothy J. Sinnott
 Secretary/Treasurer



NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY
 c/o NYSDEC, Room 530, 50 Wolf Road, Albany, New York 12233-4756

Treasurer's Report
 4 Apr - 27 Jun 1995

	<u>Checking</u>	<u>Student</u>	<u>Certificate</u>	<u>Savings</u>	<u>Total</u>
Balance 4/4/1995	\$5,303.11	\$1,261.87	\$9,523.72	\$6,064.41	\$22,153.11

Receipts

Membership renewals	470.00				470.00
Interest	37.52		85.70	44.97	168.19
Receipts subtotal	507.52		85.70	44.97	638.19

Expenditures

Bridge to Mexico donation	100.00				100.00
APR Newsletter	172.37				172.37
Postage	44.40				44.40
Don Einhouse to NE EXCOM meeting	500.00				500.00

Expenditures subtotal	\$ 816.77				\$ 816.77
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Interval totals	\$ -309.25		85.70	44.97	\$ -178.58
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Balances as of 27 June 1995	\$ 4,993.86	\$1,261.87	\$9,609.42	6,109.38	\$ 21,974.53
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Consolidated checkbook total	\$ 4,993.86				
	+ 1,261.87				
	<u>\$ 6,255.73</u>				

Note: Student subunit and chapter checking accounts are consolidated in one checkbook

Respectfully submitted,

Timothy J. Sinnott
 Secretary/Treasurer

CORRECTED

NYDEC, 50 Wolf Road, Albany, NY 12242-4750

Treasurer's Report
24 Jan - 4 Apr 1995

	Checking	Student	Certificate	Savings	Total
Balance 1/25/1995	\$4,599.12	\$ 954.78	\$9,523.72	\$6,064.41	\$21,142.03

Receipts

1995 Annual Meeting	3,747.00				3,747.00
1995 Raffle	607.50	607.50			1,215.00
1995 Parent Society rebate	524.00				524.00
Membership renewals	<u>1,804.00</u>				<u>1,804.00</u>
Receipts subtotal	6,682.50	607.50			7,290.00

Expenditures

1995 Annual Meeting	5,742.67	150.00			5,892.67
1995 Raffle	209.35	150.41			359.76
Mailing raffle prizes	<u>26.49</u>				<u>26.49</u>

Expenditures subtotal	\$ 5,978.51	\$ 300.41			\$ 6,278.92
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Interval totals	\$ 703.99	\$ 307.09			\$ 1,011.08
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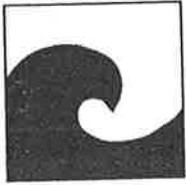
Balances as of 4 April 1995	\$ 5,303.11	\$1,261.87	\$9,523.72	\$ 6064.41	\$22,153.11
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Consolidated checkbook total	\$ 5,303.11				
	+ 1,261.87				
	<u>\$ 6,414.98</u>				6564.98

Note: Student subunit and chapter checking accounts are consolidated in one checkbook

Respectfully submitted,

Timothy J. Sinnott
Secretary/Treasurer

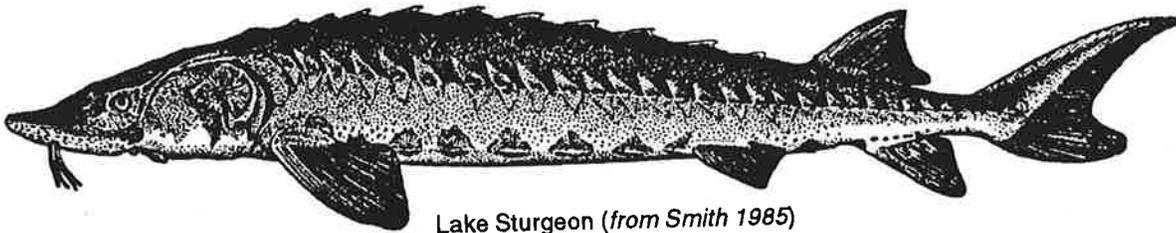


THE BIOLOGY, HISTORY AND MANAGEMENT OF THE LAKE STURGEON IN THE LOWER GREAT LAKES

by

David MacNeill
New York Sea Grant Extension Program

W. Dieter Busch
United States Fish and Wildlife Service



Lake Sturgeon (from Smith 1985)

INTRODUCTION

Lake sturgeon have captured much interest because of their large size, longevity, primitive appearance, and protected status. Considered as relics from the dinosaur age, sturgeons first appeared some 100 million years ago. Scientists believe that lake sturgeons evolved in the early Mississippi River drainage and entered what is now the lower Great Lakes following the recession of glaciers sometime 10,000 to 14,000 years ago.

Sturgeons retain primitive characteristics of their ancient ancestry compared with modern bony fishes. Sturgeons possess skeletons almost entirely composed of cartilage, a shark like tail, bony plates along back and sides, primitive scales, sensory whiskers (barbels), and an extendable mouth on the underside of their snout. Of 20 sturgeon species existing worldwide and nine species in North America, the lake sturgeon is most common to the Great Lakes basin, sharing a small portion of its range with the Atlantic sturgeon in the lower St. Lawrence River. These two species can be easily distinguished from one another by the distribution of bony plates on the back and sides, mouth shapes, relative body sizes and coloration (Figures 1a and 1b).

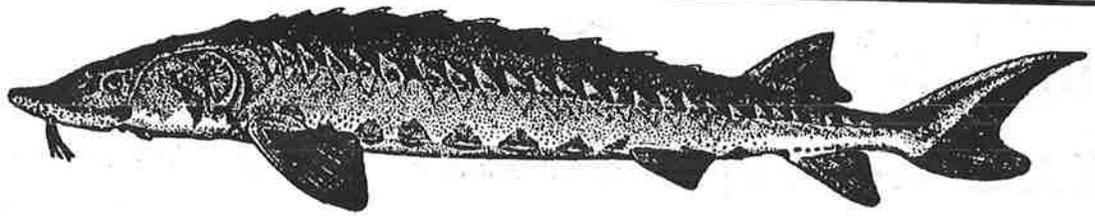
RANGE AND DISTRIBUTION

Although greatly reduced by human activities, lake sturgeon are still found in larger streams and lakes throughout their geographic range, occurring now in small remnant populations. Range may overlap slightly with shovelnose sturgeon in the upper Mississippi drainage and Atlantic sturgeon in the lower St. Lawrence River (Figure 2).

FEEDING HABITS

Lake sturgeon feed in shallow areas of lakes or river pools less than 30 feet deep. Sensory whiskers or barbels on the underside of the snout locate prey along the bottom. When prey is detected, the mouth protrudes and sucks up food items. Silt and sediment drawn into the mouth cavity are expelled through the gills. Small invertebrates, including insect larvae, crayfish, snails, freshwater clams, and leeches, are the usual food of lake sturgeon. They will occasionally consume fish and fish eggs. It is very likely that zebra mussels have become part of the lake sturgeon's diet. Lake sturgeon may also feed during the winter months.

from Smith 1985



Lake Sturgeon

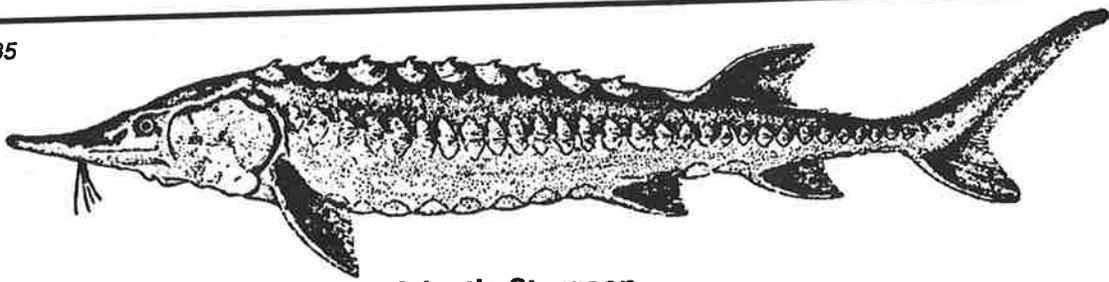
- spiracles or "nasal openings" present
- 3 unpaired bony plates behind vent on tail stem; tail stem not completely covered with plates
- brownish or gray on top and sides, white or mottled underneath
- 30–38 plates along body sides
- adults 3–5 feet in length and up to 300 lbs. in weight
- lives almost entirely in freshwater

Figure 1a. Lake sturgeon.



Figure 2. Map showing range of lake sturgeon in North America.

from Smith 1985



Atlantic Sturgeon

- spiracles present
- 4 bony plates (as two pairs) behind vent on underside of tail stem; tail stem not completely covered with plates
- brownish-black on back and top of head, pale sides, whitish on underside
- 24–35 plates along body sides
- larger size, generally 200–300 lbs (5–16 feet), occasionally reaching 10 feet in length and up to 800 lbs.
- anadromous: migrate from marine to freshwater during spawning

Figure 1b. Atlantic sturgeon

BEHAVIOR AND MOVEMENTS

Little is known about seasonal movements of the sturgeon. It is believed that individual sturgeons remain confined to a small territory during the summer months. Studies suggest that sturgeon may remain within 3 miles of their original capture site one year later. In river populations, lake sturgeon move upstream during the spring and downstream in the fall; they move considerable distances, often exceeding 80 miles. Adult lake sturgeon habitually return to the streams in which they were born to spawn and then return to their territories.

HABITAT REQUIREMENTS

Typical habitat for adult sturgeon is productive shoal areas of large lakes and rivers on or near bottom over rocky, gravel, or mud substrates in 15–30 feet of water, and occasionally in water exceeding 100 feet deep. Smaller adults and juveniles prefer gravelly shoal areas, especially near river mouths. Lake sturgeon are also found in slightly brackish waters of the lower St. Lawrence River. Water temperatures preferred by lake sturgeon are in the low 50s to mid 60°F. Lake sturgeon prefer waters containing moderate to high amounts of nutrients.

ECOLOGY

By far, the most significant predator on lake sturgeon is man from legal commercial fisheries and illegal harvest, although sea lampreys do prey on larger adults.

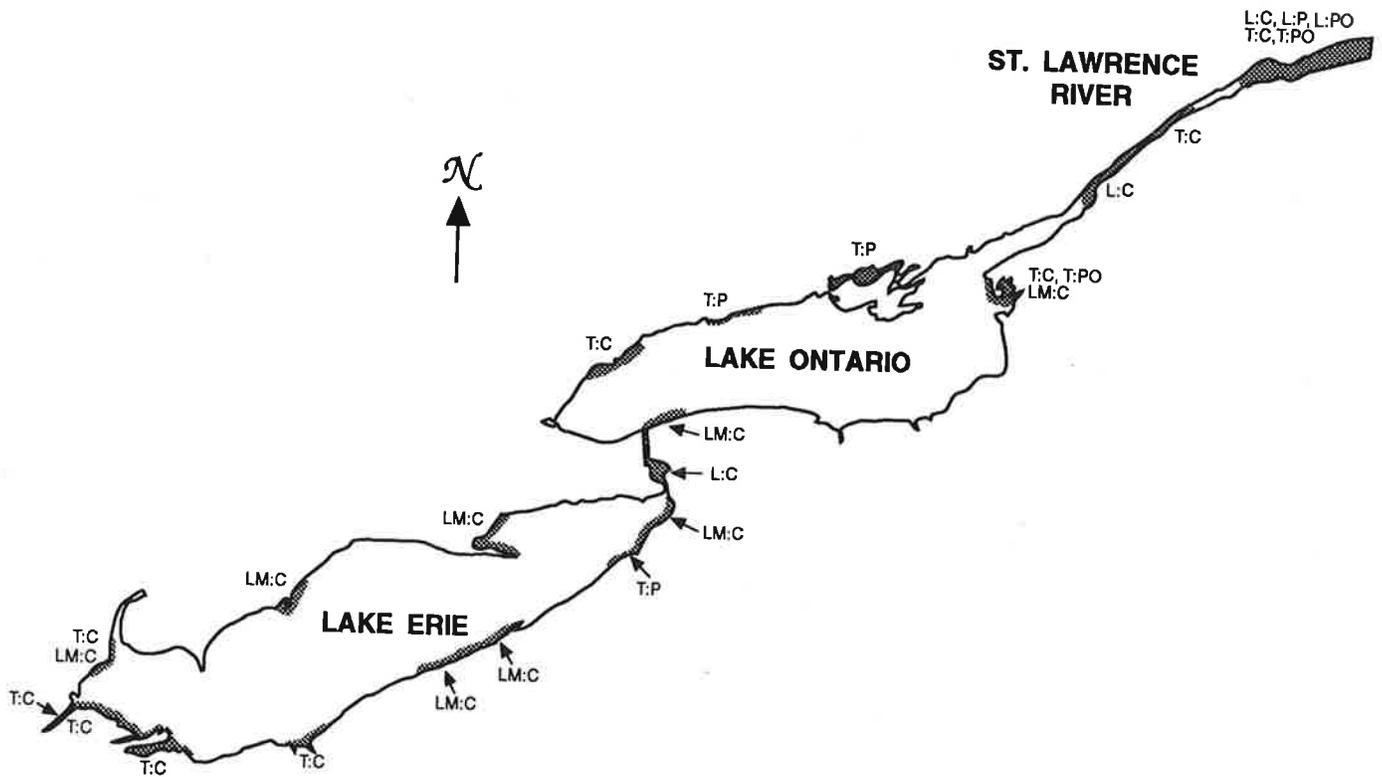
Mudpuppies, crayfish, carp, and suckers feed on sturgeon eggs. Lake sturgeon may compete with lake whitefish and suckers for food.

REPRODUCTION AND GROWTH

Lake sturgeons reach sexual maturity at older ages than most other fishes, and the onset of maturity varies between the sexes and from one sturgeon population to another. Males become mature at 12 to 22 years (as young as 8 years in faster-growing populations), and females mature between 14 and 33 years of age. Female lake sturgeon lay 4,000 to 7,000 eggs per pound of fish. Lake sturgeon do not spawn every year; females may spawn only once every 4–9 years, whereas males may spawn once every 2–7 years. This means that an individual sturgeon can spawn 5–20 times during its estimated 50- to 80-year life span. Because of the interrupted spawning cycles, only 10–20% of adult lake sturgeon within a population are sexually active and spawn during any given spawning season.

Before spawning adults gather in deep holes near spawning sites, displaying behaviors such as leaping and rolling on the bottom. At this time, sturgeon are particularly vulnerable to capture from netting or spearing. Spawning areas include clean, nearshore rubble areas along rocky, windswept shores of islands and stream rapids.

Spawning occurs from April to June, usually in water temperatures ranging from 54°–66°F (optimum 55°–64°F), and is inhibited by water temperatures above and below this range. Female sturgeons build no nests,



Key

First letters in codes correspond to habitat type.

For Great Lakes proper:

T (tributary) — those streams or rivers that flow directly into Great Lakes or connecting waters.

LM (littoral mainland) — areas between shoreline and 30-foot-depth contour.

For Connecting waters:

L (littoral waters) — areas between shoreline and edge of navigation channel.

Second letters correspond to spawning habitat utilization.

C (confirmed) — as identified in literature or personal communication from researchers; based on observations in typical spawning habitat of ripe adults, reproductive behavior, nests, egg deposits, or newly hatched larvae and sac fry present.

P (probable) — based on observations of typical spawning habitat of spent or nearly ripe adults and presence of later larval stages and juveniles.

PO (potential) — based on observations indicating presence of typical spawning habitat.

Source: *Atlas of the Spawning and Nursery Areas of Great Lakes Fishes. Vol. 1. Summary by Geographic Area. Great Lakes-St. Lawrence River Seaway Navigation Season Extension Program. Biological Services Program. USFWS. Sept. 1982.*

Figure 3. Spawning locations of lake sturgeon by category in the lower Great Lakes.

and eggs are scattered in currents of rivers or streams where they adhere to rocky material in water depths of 1–30 feet; three to four feet is preferred. Eggs hatch 8–14 days after fertilization in water temperatures between 60°–64°F.

In an effort to protect fisheries habitats the United States Fish and Wildlife Service (USFWS), in conjunction with the Army Corps of Engineers, has inventoried and cataloged historic, known, and potential spawning locations of lake sturgeon and other species throughout the Great Lakes and the St. Lawrence River. These

geographic areas have been categorized for the lower Great Lakes and are shown in Figure 3.

Egg predation by fish, invertebrates, and post-spawning adult sturgeon is common. Eggs are also vulnerable to fungal and bacterial diseases. Larvae possess sucker-like structures on their snouts that enable them to attach to rocks or other objects in strong currents. The nursery habitat for post-larval sturgeon are gravel areas, and juveniles drift downstream in riverine areas.

Lake sturgeon growth rates are quite variable throughout the range depending on temperature, food

Table 1. Typical Size at Age Relationships of Lake Sturgeon.

Age	Length (in inches)	Weight (in pounds)
6 mos.	4-6"	
5 years	12-28"	1-5 lbs.
15 years	25-40"	5-25 lbs.
50 years	40-70"	40-80 lbs.

Table 2. Commercial Sturgeon Harvests in Lakes Erie and Ontario (U.S. and Canada Combined).

Decade	Harvest (in thousands of pounds)	
	Lake Erie	Lake Ontario
1881-1890	950.3	128.1
1891-1900	266.0	47.7
1901-1910	61.4	16.1
1911-1920	108.8	4.9
1921-1930	42.7	12.2
1931-1940	33.8	13.2
1941-1950	22.2	9.8
1951-1960	12.9	10.2
1961-1970	2.0	5.1
1970-1977	0.6	0.9

Source: *Commercial Fish Production in the Great Lakes 1867-1977*. Great Lakes Fisheries Commission Technical Report No. 3. 1979.

availability, and water quality. Growth data for typical lake sturgeon populations are summarized in Table 1.

The maximum life span of lake sturgeons varies, depending on growth rates. In slower-growing populations, life spans increase. Typically, males live to 55 years, females 80 to 150 years. Several accounts of sturgeon reaching 6-7 feet in length, with weights exceeding 200 lbs. exist. The largest recorded was a 7-foot, 11-inch Lake Superior specimen weighing 310 lbs. Another sturgeon caught by a fisherman in the Niagara River during the 1940s was 6-feet, 8 inches in length and weighed 230 lbs. Ages of these two specimens are not available because of the unreliable aging techniques used at that time. More refined aging techniques have enabled documentation of the extreme longevity of large lake sturgeon, as evidenced by the 208-pounder caught in Lake of the Woods and aged at 154 years! Ages of sturgeons are most accurately determined by sectioning fin rays (the bony support elements of fins), which are examined for the presence of annual marks.

Because of the long life span of lake sturgeon, their bottom feeding behavior, and their high fat content, they accumulate considerable levels of contaminants such as PCBs. Lake sturgeon can also accumulate elevated levels of mercury even in watersheds where background mercury contamination is low. In a few instances the mercury-tainted fish had levels slightly exceeding the allowable safe level for human consumption. Elevated contaminant levels in lake sturgeon led to the present closure of commercial fisheries in the St. Lawrence River in Ontario and portions of the Ottawa River.

HISTORY AND CURRENT STATUS OF LAKE STURGEON IN THE LOWER GREAT LAKES

Lake sturgeon were perceived by early commercial fishermen as a nuisance fish because of fishing gear destruction. This led to the widespread slaughter of sturgeon. As the economic importance of this species was later recognized, a targeted commercial fishery intensified by the mid-1800s in the lower Great Lakes (Table 2). Commercial fishing gear included gill nets,

seine nets, bait lines, trap lines, grapples, and spears. Because of the slow growth, late age of maturity, and intermittent spawning of lake sturgeon, commercial harvests began to exceed recruitment (rate of replacement by reproduction), leading to population declines and collapses in many areas of the sturgeon's original range.

A combination of other human influences, including destruction of spawning habitats from damming and water level fluctuations; siltation from deforestation, agriculture, and dredging activities; and reduced water quality from excessive nutrients and other pollutants contributed to dramatic declines of sturgeon populations. Local lake sturgeon populations either became extinct or never fully recovered and are unlikely to do so unless more stringent management actions are implemented.

MANAGEMENT OF LAKE STURGEON

As lake sturgeon populations began their rapid decline throughout the Great Lakes during the late 1800s, considerable effort was taken to rehabilitate native populations through artificial propagation programs. Unfortunately, these programs and later efforts during the 1920s met with failure. Advances in propagation of several species of sturgeon in the Soviet Union in the 1950s and later research funded by USFWS in the U.S., led to the development of several successful stocking programs in North America after the propagation guidelines were specifically refined for lake sturgeon.

Over most of the existing range of the lake sturgeon, its species status had been classified as "rare" by

USFWS, or "threatened," by several state and provincial resource management agencies. In a few areas in the Great Lakes drainage where limited commercial fisheries persist, management strategies consist of assessment programs to determine sturgeon population sizes, locating and protecting spawning and nursery sites, estimating natural reproduction success, and regulating harvests. The current regulations for commercial and sportfishing for lake sturgeon in the lower Great Lakes region are summarized in Table 3.

In areas where sturgeon populations are either extinct or most severely reduced, management activities also include raising wild captive adults, spawning them, and stocking resultant sturgeon fingerlings. The goal of these actions is to re-establish sturgeon populations as healthy, self-supporting members of the native fish communities, once the availability of suitable habitat conditions is determined. Despite the development of effective propagation technology, however, these efforts are often hampered by excessive illegal or unintentional harvests.

There is a growing trend toward management of discrete strains of endangered species, as opposed to broad-sweeping species management, so as to preserve the unique genetic heritage of the population whenever possible. This is often difficult since many species of fish have numerous, unique genetic strains which may result in different behaviors, habitat preferences, and growth rates. For example, as many as 1,000 different strains of steelhead, a migratory rainbow trout, have been identified.

Whenever feasible, sturgeon management guidelines are developed on an individual, watershed-to-watershed basis to promote the conservation and recovery of unique genetic strains. Some effort is being made to determine existing lake sturgeon stocks throughout the Great Lakes. Once discrete stocks have been identified, targeted management options such as fish sanctuaries, restricted access to known spawning areas or populations, habitat inventory/protection/restoration efforts, and artificial enhancement of spawning habitat could be implemented on an as-needed basis for each discrete strain. This is why careful selection of broodstock for artificial propagation and stocking purposes is necessary to avoid diluting the existing wild population. Where a population is extinct, restoration stocking, using a strain believed to be most similar to an extinct strain, is practiced.

GUIDELINES FOR AVOIDING AND RELEASING LAKE STURGEON

Anglers have reported that lake sturgeon are occasionally caught incidentally when still-fishing. Most of these reported catches were on worm-tipped hooks fished on or near bottom. In order to reduce these unintentional captures of sturgeon and to ensure the release of incidental catches, some useful guidelines are offered below. Sturgeons as a group tend to be hardy (while in

Table 3. Fishing Regulations for Sturgeon In the Lower Great Lakes by State/Province.

New York – species listed as threatened, possession ban: no sport or commercial fishery; limited native American fishery in St. Lawrence River.

Quebec – licensed commercial fishery in St. Lawrence River with gear restrictions; closed season from April 1 or 15 to June 14 in some areas; minimum size of 800 inches total length. Sport fishery in lower areas of St. Lawrence River; closed season, April 15 June 14; daily limit is two fish of any size.

Pennsylvania – species listed as threatened or endangered; no sport or commercial fishery.

Ohio – species listed as threatened; no commercial or sport fishery.

Michigan – licensed commercial fishery, two fish/season limit.

Ontario – species listed as rare in Great Lakes; licensed commercial fishery with gear restrictions, creel and size limits, harvest quotas, and closed seasons during the spawning runs. Existing sportfishery in lower Great Lakes proper and connecting waterways as far east as Cornwall. (A small but stable sportfishery is also found in Lake St. Clair River.) Open season, creel limit of one fish/angler/day.

the water) and have a low natural mortality rate, making them amenable to successful release. Remember, possession of a lake sturgeon, whether deliberate or accidental, is prohibited in many areas of the lower Great Lakes.

- Be careful when still-fishing in known or potential sturgeon spawning areas in April through early June as sturgeon densities are highest during this time. These areas are described in the section on sturgeon reproduction.
- Sturgeon may also congregate at high densities in small areas of their territories making them vulnerable to unintentional angling capture during the summer and fall. These areas are described in the section on habitat requirements.
- If they are hooked, sturgeon have considerable endurance and may be difficult to land quickly, especially if large.
- Like sharks, sturgeons lack bony support to protect internal organs from damage when flopping around

**LAKE STURGEON SIGHTING
INFORMATION SHEET**

1. Name / Address: _____
Phone: _____

2. Date and Time Sighted: _____ a.m. p.m. (circle one)

3. Location: Waterbody: _____ Nearest Town: _____

Describe your activity when observation was made and the exact location as best as possible (include notable features such as tributaries, bridges, islands, buoys, submerged wreck, lighthouse, dams, falls, lat./long., etc.):

4. Description:
Number of sturgeons: Alive: _____ Approx. length(s): _____
Dead: _____ Approx. length(s): _____

At what depth were sturgeons located (Approx.): _____

Notice of any tags: _____ Description: _____

Body Condition (wounds, lacerations, deformities): _____

5. Activity: Feeding: _____ Spawning: _____ Littering: _____ Flea: _____

Describe in your own words any activity: _____

6. Habitat (Check all that apply):

River: Riffle: _____ Run: _____ Pool: _____
(whitewater, shallow, fast) (deep, steady,)

Lake: Shoal: _____ Flat: _____
(linear ledge, drop-off)

Total Depth: _____ Approximate Temperature: _____ °C °F

Bottom: Mud/Silt: _____ Sand: _____ Gravel: _____

Cobble/Rock: _____ Large Boulder: _____

Vegetation: Abundant: _____ Moderate: _____ Sparse/Absent: _____

7. Other notable features and comments: _____

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405 North French Road
Amherst, New York 14228**

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out of water on a hard surface, particularly if the sturgeon is large. All fish should be released while still in the water, if possible.

- Bait/hook may be drawn into mouth cavity or throat, often making it necessary to cut the line close to the hook, particularly if deeply hooked.
- Sturgeon of all sizes are unusually strong fish. Care should be exercised by the angler to prevent physical injury when releasing a sturgeon.

REPORTING STURGEON SIGHTINGS

Anglers and boaters are urged to report any observations of sturgeon, whether living or dead specimens. Many observations occur during the spawning runs when sturgeon are either rolling off bottom, leaping or cruising near the surface. Should anyone observe living sturgeon, find a dead specimen, or accidentally catch a lake sturgeon, please contact the nearest office of:

New York State Department of Environmental Conservation (NYSDEC)

Dean Bouton
Endangered Species Unit
NYSDEC
50 Wolf Road
Albany NY 12233
(518) 457-6437
or
(518) 457-0576

Ohio Department of Natural Resources (DNR)

Dave Ross
Endangered Species Coordinator
Ohio DNR – Division of Wildlife
1840 Belcher Dr.
Columbus OH 43224
(614) 265-6300
or
Dave Davies
Ohio Division of Wildlife
Sandusky Research Station
305 E. Shoreline Dr.
Sandusky OH 44870

Pennsylvania Fish and Boat Commission

Andy Shiels
Endangered Species and Herpetology Specialist
PA FBC – Division of Fish Management
450 Robinson Lane
Bellfont PA 16823-9620
(814) 359-5100

or

Roger Kenyon
PA FBC – Lake Erie Research Station
Box 531
Fairview PA 16415
(814) 474-1515 or (814) 474-1514

Ontario Ministry of Natural Resources (OMNR)

Phil Smith
Great Lakes Fisheries Supervisor
Ontario Ministry of Natural Resources
1 Richmond Blvd.
Napane Ontario K7R 3M8
Canada
(613) 354-2173

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Pierre Dumont
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(514) 374-5840

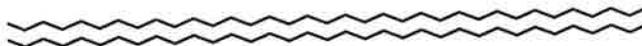
United States Fish & Wildlife Service

W. Dieter Busch
USFWS
Lower Great Lakes Fishery Resources Office
405 North French Road
Amherst NY 14228
(716) 691-5456

Be sure to include such pertinent information on the observation date, time, location, number of sturgeon seen, presence of any tags or the number of the tag itself once removed from a dead sturgeon, and the approximate total length of the dead sturgeon (from tip of snout to upper lobe of caudal (tail) fin held flat, holding the upper and lower lobes of the tail fin together).

ACKNOWLEDGMENTS

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Copies of this publication are available from:

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NYC-AFS CONTINUING EDUCATION WORKSHOP
AGE, GROWTH, AND PRODUCTION OF FISHES
August 10-11, 1995

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24 x 75 = 1800
2 x 90 = 180
1 x 150 = 150

2130

2 outstanding
BETSON has cash - TOTAL PAID 2280
as of 8/29/95

Dear Tim,

Included are 23 checks for 24 registrants for the AFS workshop. I have also included this list of participants with those who have paid marked with a P.

Betsy K.

$$\begin{array}{r} 20 \times 75 = 1500 \\ 2 \times 90 = 180 \\ 1 \times 150 = 150 \\ \hline 1830 \end{array}$$

$$\begin{array}{r} 21 \times 75 = 1575 \\ 1 \times 90 = 90 \\ 1 \times 150 = 150 \\ \hline 1815 \end{array}$$

$$\begin{array}{r} 1440 \\ + 390 \\ \hline 1830 \end{array} \quad \text{OK}$$

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Syracuse, NY 13210
Phone: 315-470-6924
FAX: 315-470-6934



One more check for AFS workshop

Waiting on two.

Betsy



NEW YORK CHAPTER — AMERICAN FISHERIES SOCIETY
c/o NYSDEC, Room 530, 50 Wolf Road, Albany, New York 12233-4756

DATE: _____

INVOICE

DUE FROM: _____

FOR: Registration fee
1995 Workshop, Age, Growth, and Production of Fishes

Chapter member \$75.00

Non-member \$90.00

Total due: \$ _____

Make checks payable to: NY Chapter, AFS

Elizabeth Kozuchowski
NY Chapter, AFS
1995 Workshop Coordinator

AFS:95wksp.inv

CONTINUING EDUCATION WORKSHOP
Sponsored by NY Chapter, American Fisheries Society

**AGE, GROWTH AND PRODUCTION OF FISHES:
NEW SCIENCE AND TECHNOLOGY**

August 10 - 11, 1995

-
- Instructors:** John Casselman, Ph.D., Senior Research Scientist, Aquatic Ecosystems Research Section, Ontario Ministry of Natural Resources, Glenora Fisheries Station, Picton, Ontario K0K 2T0.
Donald J. Stewart, Ph.D., Associate Professor, State University of New York, College of Environmental Science and Forestry, Syracuse, NY 13210.
- Cost:** Registration Fee -- \$75.00 for NY Chapter AFS members, prepaid by 19 July; cancellations by August 2 will receive a \$65.00 refund. Rates are \$90.00 for non-members of the Chapter. Enrollment is limited to 30 because of number of computers available. Registration covers all materials, lunches on Thursday and Friday, dinner/social on Thursday and coffee breaks.
- Description:** Dr. Casselman will present two half-day sessions including a review of aging techniques using various structures [e.g., scales, otoliths, spines], instruction on interpretation, and using age data in a fish growth software package to be provided. Dr. Stewart will present a half-day session on spread-sheet and energy modeling approaches to using size-at-age data for production calculations.
- Location:** SUNY College of Environmental Science and Forestry, Syracuse, NY; facilities include clusters of Windows-based computers with 486 and Pentium processors.
- Lodging:** Block of rooms reserved at Genesee Inn, 1060 East Genesee Street, Syracuse, NY 13210; phone 315-476-4212. **Reservations must be confirmed by 26 July; participants are responsible for making their own arrangements.** Rates are \$52 single (1 queen bed), \$62 double (2 beds) if you mention "American Fisheries Society Workshop" when you make your reservation. Rooms for our workshop are available the nights of 9 and 10 August (Wed. and Thur.).
- Schedule:** August 10, Thursday
9:00-10:15 Lecture - Introduction to Age and Growth Science and Technology.
10:15-10:30 Coffee break.
10:30-12:00 Demonstration of System and Software for Age and Growth Studies.
12:00- 1:00 Lunch [provided at ESF].
1:00 - 2:00 Lecture and Demonstration, continued.
2:00- 2:15 Coffee break.
2:15- 5:00 Practical Applications, Including Hands-on Use of Software.
6:00-- BBQ Dinner and Evening Social [provided at ESF, including possibility for further hands-on opportunity to use system and software].

CONTINUING EDUCATION WORKSHOP
Sponsored by NY Chapter, American Fisheries Society

**AGE, GROWTH AND PRODUCTION OF FISHES:
NEW SCIENCE AND TECHNOLOGY**

August 10 - 11, 1995

August 11, Friday

8:00-10:00 Lecture - Introduction to Production Estimation.

10:00-10:15 Coffee break.

10:15-12:00 Demonstration of Software and Practical Applications of
Age and Growth Data to Production Estimation.

12:00 -- Picnic Lunch [provided at ESF].

For Additional Information Contact:

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