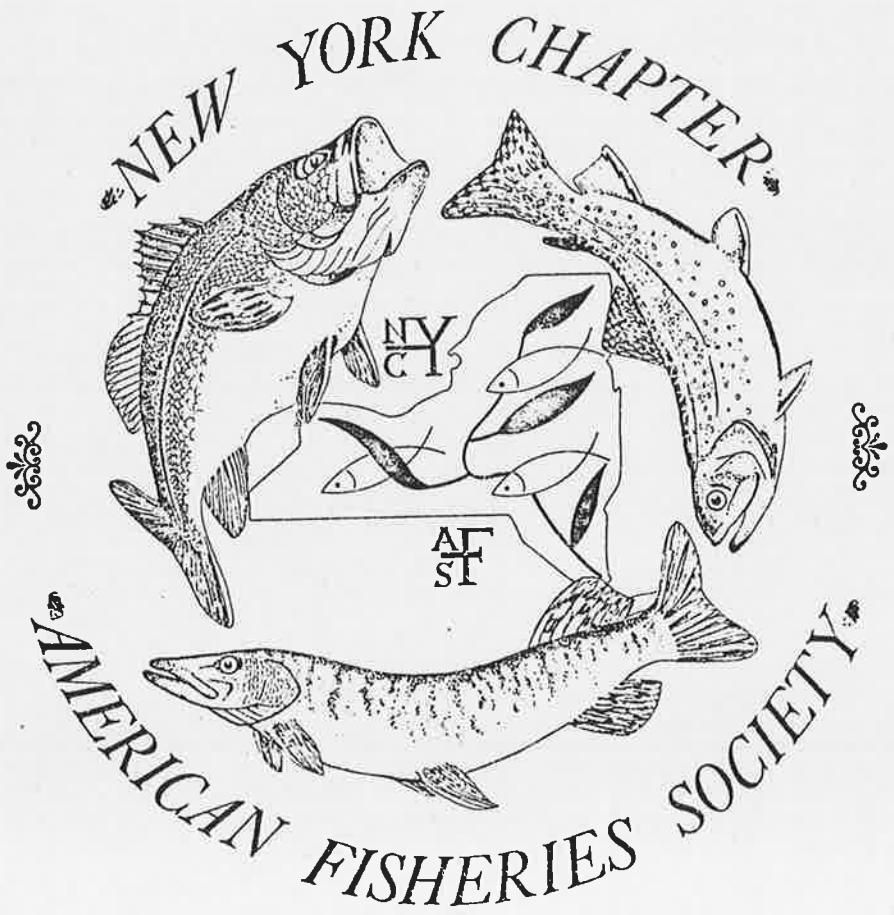
CONTRIBUTED PAPERS ABSTRACTS

1983 ANNUAL MEETING

NEW YORK CHAPTER - AMERICAN FISHERIES SOCIETY

February 3-5, 1983

The Beeches'
Rome, New York



ABSTRACTS

NYAFS Chapter 1983 Annual Meeting

Michael P. Voiland and Michael W. Duttweiler

Where's the Humanity? A Challenge and Opportunity for the Fisheries Community.

In this paper, the authors submit that the professional fisheries science community has failed to embrace and utilize fully the social sciences in the study and management of fisheries. A review of principal fisheries literature and AFS Chapter presentations in recent years suggests that little attention is being given to the human side and parameters of fisheries.

The authors restate and reaffirm some basic tenets pertaining to the importance of people's needs, values and perceptions in any general resource management system and, more specifically, in fisheries management and development. The university is veiwed as both contributor to the problem of the overlooked human component in fisheries study and as one important agent of addressing this oversight in the future.

Lastly, it is offered that today's fishery managers can also help to remedy the shortfall in the use and appreciation of social analyses in fisheries work. This can be done through greater receptivity among managers of social science research results, and by efforts to legitimize the social sciences in the minds and professional development of the managers of the future.

Donald W. Einhouse

Social Impacts of Stocking Programs on Urban Anglers in Buffalo, New York.

One aspect of the Buffalo Urban Fishing Program is the development of artificial fisheries in selected ponds. The objective of this program is to expand fishing opportunities for the mobility-restricted urban angler. To this end, artificial fisheries were developed in two ponds for bullheads in 1978 and 1979. In another pond, a put and take trout fishery was implemented in 1982. A baseline creel census in 1977 and another census subsequent to the stockings provided data to evaluate these fisheries. With bullhead stocking, angling pressure increased 2.04 times the level before stocking. Percentages of female anglers increased, as did percentages of anglers younger than 20 years of age and older than 59. This indicated that the target groups were apparently being reached. The put and take trout pond became more heavily utilized than nearly all other urban fishing waters. Although no significant increase was observed in the proportion of mobility restricted individuals angling this pond, a large angler hour estimate showed that the actual number of anglers in all categories did increase. Hence, both bullhead and trout stocking programs resulted in increased angling by mobility restricted urbanites.

Robert Engstrom-Heg

Effectiveness of Seneca Lake Bayluscide Treatments

A 102-acre plot at Dresden and a 9-acre plot at Watkins Glen were treated with 100 pounds per acre of granular Bayluscide, applied aerially on September 9, 1982. Effectiveness was monitored by placing caged ammocoetes at selected points in both plots. Results suggest that the treatment at Dresden was about 80 percent effective, with higher mortalities in the central part of the plot than near the edges. Treatment of the small plot at Watkins Glen appears to have been extremely ineffective with mortalities of caged ammocoetes not differing significantly from unexposed controls. Ammocoetes collected at the surface at Dresden had a high rate of survival when moved to an untreated area. Length frequencies of ammocoetes collected at Dresden suggest a series of weak year-classes since 1978. This interpretation is strongly supported by length-frequency data from Keuka Outlet.

Jim Winter

The Distribution and Abundance of Antarctic Cod in McMurdo Sound, Antarctica

The "antarctic cod" (Dissostichus mawsoni), which is believed to have evolved from a bottom dwelling perciform stock, is found in the oceans surrounding Antarctica. It is the largest piscivorous fish in the antarctic and is believed to be an important food for the Weddell seal (Leptonychotes weddelli). A study was conducted on the distribution and abundance of mawsoni with respect to the locations of seal colonies and the densities of seals. Sampling was conducted in McMurdo Sound, Antarctica from 27 October to 6 December 1982. Fish were caught with a long stainless steel cable that had 20 hooks spaced evenly up to 66 m above the ocean bottom. The line was pulled twice daily and 17 sites were each sampled for 24 hours. Eighty-four mawsoni were caught and they averaged 138 cm fork length and 35 kg body weight. Mawsoni were not caught near seal colonies and were caught from 369 m to 580 m deep. The mean distance captured from the bottom was 29.5 m. Since seal colonies are located over relatively shallow water (<200 m), it is questionable if mawsoni are an important food source of breeding Weddell seals. Other aspects on the ecology of mawsoni and the potential effects of commercial fishing will be discussed.

Gregory R. Biddinger

Effects of Sodium Arsenite on the Growth, Development and Reproduction of Japanese medaka, Oryzias latipes.

The results of chronic exposure of various developmental stages of Oryzias latipes to sublethal concentration of sodium arsenite are reported. The LC50 values for acute toxicity tests and their 95% confidence limits for adults (30.2:16.1 to 56.9 mg As/l), post-yolk sac fry (29.9:26.1 to 34.0) and newly hatched fry (49.3:35.2 to 69.1) were used to establish a maximum sublethal exposure concentration (MSEC) of 10 mg As/l. Subsequent chronic exposure of O. latipes eggs, fry, and adults to sodium arsenite at or below the MSEC demonstrated no increase in mortality although retarded larval growth and development were observed at 5.0, 7.5 and 10.0 mg As/l. The total length of larvae reared for the first two weeks post hatch in 5.0, 7.5 and 10 mg As/l was significantly less than controls with ratios (length of exposed/length of controls) of 0.83, 0.77, and 0.70 respectively. Larvae which were reduced in length also had a corresponding significant ($\chi^2>28.7$, df=2) retardation of their morphologic development.

Arsenic exposure had a negative effect on fecundity. The reduction in total egg production was more highly correlated with fewer days actively breeding (r=0.94) and fewer number of spawnings (r=0.67). A significant ($P<0.05$) positive correlation was demonstrated for weight of post-reproductive O. latipes females with days breeding (r=0.83), total number of spawnings (r=0.86), total egg production (r=0.87) and mean eggs per spawn (r=0.92).

James M. Haynes, D.C. Nettles, R. A. Olson, K.M. Parnell and J. D. Winter

Annual Distributions and Temperature Preferences of Lake Ontario Salmonids

Using radiotelemetry and vertical gill netting, researchers from the SUNY Colleges at Brockport and Fredonia have established distinct seasonal distributions and temperature preferences for Lake Ontario salmonids. In Spring, lake, steelhead/rainbown and brown trout are abundant within 2 km of shore until water temperatures reach 6-8, 10 and 18°C, respectively, when these species move offshore to deeper, cooler waters. Coho and chinook salmon are not found close to shore in spring.

In summer, steelhead/rainbow trout and Pacific salmon range widely throughout offshore lake thermocline areas. Lake trout (6-9°C) and a portion of the chinook salmon population (14-17°C) exhibit distinct temperature preferences, and together with brown trout (8-18°C), inhabit areas in and near the thermocline within 4 km of shore in summer. Evidence suggests that as salmonid numbers increase, the potential for classical interspecific competition for critical resources (food and temperature) in nearshore thermocline areas is great.

As nearshore and stream temperatures fall below 18°C in Autumn, Pacific salmon and brown trout appear in and near tributary mouths. In early autumn, when water temperatures are relatively warm, pronounced diel inshore-offshore movements are observed. Steelhead/rainbow and lake trout return within 2 km of shore when autumn water temperatures fall below 12 and 8-10°C, respectively, and may remain nearshore throughout the winter. Brown trout move offshore to deeper warmer 4°C waters for the winter.

Christopher J. Keleher

Spawning Movements of Pacific Salmon in Lake Ontario and Several Tributaries

Beginning in early September, 1982, 8 coho and 8 chinook salmon were equipped with externally mounted radiotransmitters as they approached the vicinity of Sandy Creek, Monroe County, N.Y. Salmon movement patterns in Lake Ontario were consistent with behavior expected from animals searching for their "homestreams". Four of 7 coho and 3 of 6 chinook moving in the lake exhibited alternating east-west movements, while 2 of 7 coho and 3 of 6 chinook moved westward only, before selecting spawning streams or disappearing. Salmon ranged from the Genesee River to Olcott, N.Y. (130 km).

Five of 8 coho and 3 of 8 chinook moved as far as 5 km up Sandy Creek, but only 3 of 5 coho and 1 of 3 chinook remained in the creek to spawn. Two coho that left Sandy Creek ultimately entered Johnson Creek (40 km west) and the Genesee River (30 km east) respectively. Two chinook entered Oak Orchard Creek (35 km west) and were snagged 12 km upstream at the base of Waterport Dam. A third chinook entered Eighteen Mile Creek at Olcott (100 km west). These results are interesting in that coho are stocked in Sandy Creek while chinook are stocked near Oak Orchard and Eighteen Mile Creeks. However, most salmon appeared to spawn in stream areas unsuitable for larval survival. In addition, 3 coho and 4 chinook were caught or snagged by anglers, indicating very high salmon mortality after nearing shore in the autumn.

Fall 1982 was quite dry and stream levels remained very low throughout the spawning period. There appeared to be little relation between rainfall and subsequent salmon entry into spawning streams; however, lake seiche activity may influence stream entry. Salmon arriving nearshore late in the summer often held near the bottom of stream mouths where warm stream outflows passed over cooler lake waters. Salmon began entering streams as soon as water temperatures fell below 18^{0}, but pronounced offshore (day)-inshore (night) movements were observed until lake and stream waters cooled later in the season.

Robert Murphy

The Biology and Interaction of Two sympatric Species of Esocids in the International Portion of the St. Lawrence River.

The interaction between the northern pike (Esox lucius) and the muskellunge (Esox masquinongy) in areas where both species occupy the same habitat may have a negative effect on the muskellunge population. Results from recent studies along with declining angler catch rates support the idea that the muskellunge population is declining in the international portion of the St. Lawrence River.

Within the past twenty-five years, changes in the physical habitat of the river have occurred, resulting in a change of fish composition. An increase in the northern pike population is presented as having a direct effect on the muskellunge. Other predatory species are also increasing in numbers, adding to the competitive pressure existing in the habitat of the young muskellunge.

Changes in habitat favoring the northern pike are described. Differences in growth rates, habitats, body conformations, pigmentation and spawning behavior with relation to the northern pike and muskellunge are presented as possible factors influencing the spatial separation of the two species. Decreasing habitat abundance and increasing competition is noted as an explanation for the decline and possible exclusion of the muskellunge from the international portion of the St. Lawrence River.

Nominees for Office

For President-Elect:

A. Garry Smythe is assistant manager of the NY office of BEAK Consultants/ECO Research, Inc. in Buffalo. He was formerly President of ECO Research, Inc., in Akron, NY. Previous professional experience included eight years (1970-78) with the University of Buffalo Foundation, Inc. as a research biologist and field coordinator. Garry has a B.A. in Biology and an M.S. in Natural Science and Mathematics, both from SUNY-Buffalo. He has extensive experience in research and consulting on power plant (coal and nuclear) effects on fishes including entrainment-impingement, thermal effects, benthos analysis, fish tagging and migration, and echo sounding-acoustic research. Garry is a member of the following organizations: American Fisheries Society, NY Chapter AFS, Water Pollution Control Federation, Early Life History Section-AFS, NY Chapter WPCF, International Association of Great Lakes Research, American Association of Small Research Companies, and the National Association of Underwater Instructors.

Lawrence C. Skinner is employed by the New York State Department of Environmental Conservation in the Division of Fish and Wildlife. Larry is a Principal Fish and Wildlife Ecologist with the Bureau of Environmental Protection. His job responsibilities and interests include contaminants in fish and wildlife, water quality standards and criteria, aquatic toxicology, and fisheries management. He holds a B.S. degree from Cornell University. Larry has served in the following capacities with the NY Chapter AFS: Secretary-Treasurer 1979-82, Executive Committee member 1979-82, Chapter Workshop Committee member 1979-82, Water Quality Committee member 1976-80. He is also a member of the Steering Committee for the 1984 Annual AFS Meeting. He has presented two papers at NY Chapter meetings on PCB's in NY fish and mirex in Lake Ontario fish. In addition to the NY Chapter AFS, he is a member of the American Fisheries Society, the National Wildlife Federation, the National Trappers Association, and the NY Chapter of the National Trappers Association.

If you are unable to attend the annual meeting you may vote for one of the nominees or indicate a write-in choice by sending this form to:

Dr. Gaylord Rough
Secretary-Treasurer Elect
88 South Main Street
Alfred, NY 14802

Ballots must be received prior to February 1, 1983.

Vote for one candidate for President-Elect:

___ A. Garry Smythe

___ Lawrence C. Skinner

___ _____

Application for Membership

New York Chapter of the American Fisheries Society

(Information provided will be used in the annual membership directory)

Applicant's name: _____

Mailing address: _____

_____

Employer or school: _____

Specialization (s) or interest ** _____

☐ Regular $5.00 ☐ Student $2.00 *

_____

* Student members must be endorsed by a faculty member signing above.

Telephone _____ home
area code and number

_____ business

☐ Check here if you wish to receive information about national AFS membership.

** Please indicate area (s) of interest by numerical code from list on reverse side of this form.

Make check payable to NY Chapter – AFS and mail with this detachable application to address on reverse side of this form.

IT IS TIME TO RENEW YOUR MEMBERSHIP IN THE N.Y. CHAPTER.

PLEASE COMPLETE BOTH SIDES OF THIS FORM. DETACH AND SEND

TO G. ROUGH, BOX 456, ALFRED, NY 14802

IF YOU HAVE NOT RENEWED YOUR AFS NATIONAL MEMBERSHIP

COMPLETE BOTH SIDES OF THE FORM BELOW AND SEND TO THE

HOME OFFICE OF AFS, 5410 GROSVENOR LANE, BETHESDA, MD 20814.

IF YOU ARE NOT A NATIONAL MEMBER THIS WOULD BE A GOOD TIME

TO CONSIDER JOINING.

APPLICATION FOR MEMBERSHIP

Please complete both sides and mail with payment to
American Fisheries Society
5410 Grosvenor Lane
Bethesda, Maryland 20814, USA

_____ _____ Date_____

Name

_____ _____

Address Member recommending applicant

_____ _____

If applicant is a student as defined below, the professor endorsing him/her signs here. + +

_____

City

_____ Name of institution where student is enrolled.

State/Province Zip

_____

Country Membership Year +

+ All memberships are for a calendar year. New members accepted Jan. 1 through Aug. 31 are credited to full membership for that year (back issues of publications are sent). Members accepted Sept. 1 through Dec. 31 are credited to full membership as of the next January 1, unless requested otherwise.

+ + Bona fide students of fisheries subjects are eligible for Student membership for a maximum of 6 years. Persons employed full-time are not eligible. Professor's endorsement is required.

NEW YORK CHAPTER - AMERICAN FISHERIES SOCIETY

NEWSLETTER

OCTOBER 1983

Message From The President To NY Chapter Members

Dear Fellow NY Chapter AFS Members:

I hope each of you had an enjoyable and productive summer, both professionally and personally. Among my activities was a two week family visit/fishing trip in Oregon and a most interesting week at the national AFS meeting in Milwaukee. The meeting was super, with at least 8 papers or posters presented by NY Chapter Members. The Chapter donated a 17' Grumman canoe and a 12-gauge Ithaca Gun Co. shotgun to the Permanent Home Fund Raffle which raised $6200. On a less pleasant note, the membership category by-laws changes approved by the Chapter last year were rejected by the parent society. Nevertheless, New York made a fine showing at the meeting and remains one of AFS's most dynamic chapters.

Pat Festa, Al Schiavone and a host of other hard working Chapter members and guest speakers put on a tremendously successful NE Division Warmwater Workshop in June. Computer Applications in Fisheries drew 211 people from all over U.S. and Canada, and by all accounts was a very timely and productive workshop for all participants. The Chapter owes the Workshop Committee our thanks for keeping New York in the forefront of national fisheries activities and for a job well done.

Things have been moving rapidly at the national level as well. D-J Expansion has passed the House and is being considered by the Senate this Fall. If you haven't done so, please write to Senators Moynihan and D'Amato expressing your support for Dingell-Johnson Expansion (U.S. Senate, Washington, D.C., 20505). This issue is critical to N.Y. Passage of D-J means an extra $2.5 million/year to the state and additional fishery jobs. Write today! Other good news is that Sea Grant has been reauthorized for two years and that a tentative compromise restoring U.S.F.W.S. Cooperative Fishery Research Unit program has been reached. The fate of many federal fish hatcheries remains uncertain. The Chapter has written letters to Congress on all of these issues. Please do the same as individual constituents.

Exciting things are planned in the next few months. The Program Committee, chaired by Ray Tuttle, is developing an interesting meeting for you with marine paper and small waters paper sessions, and other goodies. Several other committees are active and will have proposals for the Chapter to consider at the Annual Meeting. The Environmental Concerns Committee, chaired by Art Newell, has already made extensive, valuable comments on the renewal of the Clean Water Act. Finally, a big thanks to Joe Gorsuch who will get three high quality Newsletters out to each of us this year.

Hope to see all of you at the Annual Meeting in Rome, New York in February.

With best regards,

James M. Haynes

Caps, which come in regular (children) and large (adult) sizes, are available for $5.00, including postage and handling. The colors include gold-white-gold, lt. blue-white-lt. blue, royal blue-white-royal blue, orange-white-orange, red-white-red, and all gold.

Golf shirts (50% cotton - 50% synthetic) can be ordered in white or light blue. The cost is $12.50, including postage and handling. (We have no guarantee that orders can be filled by Christmas for this item.)

Send your orders, indicating the color and size, and a check made payable to the NY Chapter, AFS, to:

Gaylord Rough
88 South Main Street
Alfred, New York 14802

NEW YORK STATE NEWS

The following three news items were submitted by Dr. Dennis Dunning:

-HUDSON RIVER STRIPED BASS HATCHERY-

The Hudson River striped bass hatchery has completed its first season of operation. The hatchery is jointly funded by Central Hudson Gas and Electric Corporation, Consolidated Edison of New York, Inc., the New York Power Authority, Niagara Mohawk Power Corp., and Orange & Rockland Utilities. It is operated for the utilities by Ecological Analysts, Inc.

The preliminary count of striped bass stocked into the Hudson River is 62,784. All fish were tagged with color coded wire magnetic nose tags and received a second dorsal fin clip. Studies to determine marking mortality have been completed. Tag loss and fin clip regeneration are currently being examined.

Other marking techniques are being considered for subsequent years, including the use of tetracycline, fluorescent dyes and rare earth elements, e.g. strontium.

In future years adult striped bass will be examined for marks applied at the hatchery to determine the contribution of hatchery fish to the Hudson River population.

-STRIPED BASS POPULATION MODELING-

Applied BioMathematics, Inc. recently completed a study for the Hudson River utilities which examined the relative sensitivity of the Hudson River striped bass population to mortality occurring at different life history stages using a stochastic age-structured density independent model. The report entitled "Relative Sensitivity of Hudson River Striped Bass to Competing Sources of Mortality and the Implications for Monitoring Programs" has been submitted for publication in the Transactions of the American Fisheries Society. A limited number of copies of this report are available.

-GEAR COMPARISON-

Normandeau Associates, Inc. will be conducting a study for the Hudson River utilities designed to evaluate the relative catch efficiency of a 3m beam trawl and a 6m high rise trawl for juvenile fishes in the Hudson River. Earlier studies indicated the 3m beam trawl is significantly more efficient than an epibenthic sled.

For further information contact:

Dr. Dennis J. Dunning
New York Power Authority
123 Main Street
White Plains, New York 10601

AFS 1982-83 CARP EXPLOITATION COMMITTEE ACTIVITIES

by Bruce Shupp
Chief, Bureau of Fisheries, NYS DEC

At the September 1982 Annual AFS meeting at Hilton Head, South Carolina, newly

1) A "Carp Committee" should be reactivated for 1983-84.

2) Their charge should be: To have a first draft of "The American Fisheries Society's Book on Carp" (?) ready by the August 1984 Annual AFS meeting.

3) Format recommended is 8 1/2" x 11", four color, magazine style, similar to Fisheries.

4) The publication will be subdivided into five sections: Biology of Carp; Carp the Sportfish; Carp the Commercial Fish; Carp the Foodfish; Promoting Carp.

5) The 1983-84 "Carp Promotion Committee" will be structured as follows:

-Chairperson: Bruce Shupp, New York

Publication Editor - Tom Gengerke, Iowa
Questionnaire Editor - Gary Edwards, D.C.

-Subcommittees:

a. Biology of Carp - Frank Panek, N.Y.
b. Carp the Sportfish - Ron Spitler, Michigan
c. Carp the Commercial Fish - Bill Fritz, Illinois
d. Carp the Foodfish - Vern Hacker, Wisconsin
e. Promoting the Carp - Tom Sheddan, Tennessee

Each subcommittee chairperson will be responsible for developing the corresponding Chapter in the publication.

The Questionnaire Editor will be responsible to the Publication Editor and will work with each subcommittee to prepare and distribute one questionnaire to all State and provincial management agencies. With self-addressed envelopes attached to segmented portions of the questionnaire, each segment can be directly mailed from the respondents to appropriate subcommittee chairpersons for prompt tabulation and summary.

6) Committee Chairperson will be responsible for soliciting funding support and developing future promotional strategies upon completion of the book. The August 1984 report to the Executive Committee will include recommendations for future AFS involvement.

7) Publication Distribution

An attempt will be made to solicit $25,000 in donations to underwrite production costs. However, state/provincial management agencies will be asked to purchase and distribute copies to all appropriate news media within their jurisdiction. This will be timed to constitute a national news release of the information.

Copies to school libraries and organized sportsmen groups may also be effective, where financially feasible.

AFS will stockpile additional copies for later sale. The publication can be updated as necessary.

The Executive Committee approved the report recommendations and charged the 1983-84 Carp Committee to proceed with the book preparation.

NEWS FROM THE AFS PARENT SOCIETY AND OTHER SUBUNITS

Fisheries Techniques Manual -

THE EXCOM FIXED THE PRICE OF THE 500-PAGE HARD COVER FISHERIES TECHNIQUES MANUAL at $25.00 to members and $30.00 to non-members. The EXCOM also voted that 1/2 the net proceeds (to a maximum of $25,000) go to the Fishery Educators

Abstracts

1983 Northeast Fish and Wildlife Conference

May 15-18
Mt Snow, Vermont

Printing of these abstracts was donated by EAGLE RARE BOURBON

ABSTRACTS

1983 Northeast Fish and Wildlife Conference

May 15-18

Mount Snow, Vermont

Hosted by the Northeast Association of
Fish and Wildlife Resource Agencies

Abstracts are shown in the following order:

Fisheries Session Abstracts

Wildlife Session Abstracts

Conservation Engineering Session Abstracts

Law Enforcement Session Abstracts

Information and Education Session Abstracts

MONDAY AFTERNOON, MAY 16, 1983

FRESHWATER AND ANADROMOUS FISHERIES
STREAM HABITAT USE

Moderator: Richard Hames, U.S. Fish and Wildlife Service, Newton Corners, Massachusetts

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1	Wild Brown Trout Reveal Key Habitat Characteristics	1
2	Habitat Utilization by Juvenile Landlocked Atlantic Salmon and Rainbow Trout in Artificial Stream Channel	2
3	Seasonal Niches of Brook Trout (*Salvelinus fontinalis*) and Steelhead Trout (*Salmo gairdneri*) in a Small Stream	3
4	Fish Community-Habitat Associations in River Reaches with Natural and Modified Daily Flow Regimes . . .	3
5	Atlantic Salmon Production Potential of the Mad River, New Hampshire, 1975-1980	4

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MARINE FISHERIES

Moderator: Harold Mears, National Marine Fisheries Service, Gloucester, Massachusetts

6	Defining the Transition: Fisheries Management Planning for the Next Decade	4
7	An Economic Perspective on Size, Area and Seasonal Restrictions on Commercial Fishing	5

ANADROMOUS FISHERIES
GENERAL

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17	Tidal Power Development in the Bay of Fundy and its Possible Impact on Atlantic Coast American Shad Stocks	11

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JOINT SESSION OF FISH CULTURE AND CONSERVATION ENGINEERING
GENERAL

Moderators: Peter Brezosky, New Hampshire Fish and Game Department, and Robert Barshied, New York Department of Environmental Conservation

18	UV Irradiation in Fish Rearing Systems: Criteria and Conditions for Use .	12
19	Hatchery Production Forecasting: Or How Do I get There from Here? . .	14
*	Warmwater Hatchery Design in Today's Economy	
*	Physical Plant Change Required for Switching from Trout to Atlantic Salmon at the Nashua National Fish Hatchery	
*	Pleasant Mount Fish Culture Station Reconstruction	

* The abstracts for these papers are located in the separate section for the Northeast Association of Conservation Engineers.

MARINE FISHERIES
GENERAL

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29	Cadmium Concentrations in Blue Crab (Callinectes sapidus) from Estuarine Waters of New York State	20
30	The Current Status of the Yellowtail Flounder (Limanda ferruginea) Resource, 1983	21
31	Food of Seventeen Species of Northwest Atlantic Fishes	21
32	Growth and Survival of Larval Winter Flounder, Pseudopleuronectus americanus, and Atlantic Silversides, Menidia menidia, in Eutrophied Water from the Merl Mesocosms: A New Approach to Larval Fish Studies	22
33	The Effects of Sex Ratio and Sexual Differences in Growth Rate in Yield per Recruit Analyses for Tilefish, Lopholatilus chamaeleonticeps, in the Middle Atlantic-Southern New England Region	23

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WEDNESDAY MORNING, MAY 18, 1983

FRESHWATER AND ANADROMOUS FISHERIES
GENERAL

POSTER SESSION CONTINUED

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44	Seasonal and Locational Trends in the Catch of Trophy Fish in Massachusetts, 1972-1982	31
45	Agricultural Land Treatment Program for Water Quality Improvement . .	31
46	Construction of an Economical Radio Transmitter	32
47	A Continuing Study of the Endangered Shortnose Sturgeon (Acipenser brevirostrum LeSueur 1818) of the Upper Tidal Delaware River	32
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49	Polychlorinated Biphenyls (Aroclor 1254) in Fish Tissue Throughout the State of New Jersey: A Comprehensive Study	34
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51	The Care and Feeding of Weirs in a Vermont Stream	36

Monday, May 16, 1983, 1:30 pm - 4:00 pm, author in attendance
Tuesday, May 17, 1983, 8:30 am - 12 Noon, author attendance optional

velocity at the feeding site is a primary characteristic for brown trout.

2. Habitat Utilization by Juvenile Landlocked Atlantic Salmon and Rainbow Trout in Artificial Stream Channels -- Walter A. Popp and Steven P. Gloss, Cooperative Fishery Research Unit, Cornell University

The potential for competition between Atlantic salmon (Salmo salar) and rainbow trout (Salmo gairdneri), both riffle dwellers at the juvenile fluviatile stage, has increased recently due to intensified Atlantic salmon restoration efforts in the northeastern United States and the appearance of steelhead trout in Canadian Atlantic salmon streams. Spatial distribution, growth, and behavioral interactions of salmon parr and juvenile rainbow trout were studied in artificial stream channels which simulated natural riffle-run-pool habitats. Each of four replicate experimental stream sections was 15 m long by 2 m wide and varied in depth from 0.25 m in riffles to 0.75 m in the pools. Water velocity ranged from 1.0 m/sec at the upstream end of the riffle to 0.15 m/sec at the downstream end of the run. Salmon and trout were introduced sympatrically into two of the experimental stream sections, either simultaneously or by allowing one of the two species to establish "residency" before introducing the other. Two sections, one with salmon only and the other with rainbows, served as allopatric controls. Fish were stocked at densities of 1 fish per 2-2.5 m^2.

Rainbows exhibited a preference for the pools, whereas salmon were found in both riffles and pools. Allopatric trout formed a group with a dominant fish in the lead in contrast to the allopatric salmon in the pool which were more dispersed with no obviously dominant individual. In sympatric sections both species tended to aggregate with neither appearing to dominate and relatively little aggressive behavior exhibited. In similar experiments where fish were restricted to the riffle habitat, both species were more territorial. The rainbows were more aggressive and active, and showed the best growth. Allopatric rainbows competed for space upstream, whereas salmon dispersed throughout the riffle and displayed little behavioral interaction. In the sympatric sections, when introduced simultaneously, salmon occupied habitat downstream from rainbows which dominated the upstream portion of the riffle. When salmon had established prior "residency,"

flow period, sampling was conducted in (1) a river reach with continuous flow fluctuations (Deerfield River, Conway, MA, n = 113); (2) a river reach with a single large daily flow change (Deerfield River, Charlemont, MA, n = 104); and (3) a river reach characterized by a "natural" daily flow regime (West River, Dummerston, VT, n = 96). A comparison of fish community-habitat associations between river reaches will be discussed with regard to the importance of short-term flow regimes.

5. Atlantic Salmon Production Potential of the Mad River, New Hampshire, 1975-1980 -- Alexis E. Knight and Gerald Marancik, U.S. Fish and Wildlife Service, Laconia, New Hampshire; Jonathan C. Greenwood, New Hampshire Fish and Game Department

Sea-run Atlantic salmon (Salmo salar L.) have been absent from the Merrimack River since the latter part of the 19th Century. In June of 1975 through 1980, salmon fry were stocked in the Mad River, which is a headwater tributary to the Merrimack River. These fish increased in total length from 3.0 cm to 4.0 cm at stocking to 11.1 cm to 12.6 cm by September of their second year in the stream. Survival is estimated as 25% in the first 3 months and 11.5% in 15 months of stream life. Fall production averaged 2.1 parr per 100 m^2 for the years 197 -80. Movement of individual fish prior to migration was generally restricted to the area of stocking. Terrestrial insects were the primary source of food.

MARINE FISHERIES

6. Defining the Transition: Fisheries Management Planning for the Next Decade -- Guy Marchesseault, Louis Goodreau, Christopher Kellogg, and Howard Russell, Jr., New England Fishery Management Council, Saugus, Massachusetts

The Magnuson Fishery Conservation and Management Act (MFCMA) mandates the management of the fishery resources of the United States to achieve the greatest overall benefit to the nation in accordance with seven National Standards. Other, more recent federal statutes, e.g., the Regulatory Flexibility Act and Executive Order 12291, impose further restraints upon the management process, assuring that the costs and benefits of all regulatory options are documented, and that proposed regulations are clearly justified.

down-played in the literature of fisheries economics because it does not solve the problem of excess capacity. Although fisheries economists should not lose sight of the goal of reducing excess capacity in the fisheries, they should also give more serious consideration to the cost and the benefits of this third type of regulations since it seems that they are going to be the primary tools of fisheries managers in the near future. In some fisheries these regulations can measurably increase industry revenues, stability and consumer benefits. Although size, area and seasonal harvesting restrictions may not reduce excess harvesting capacity, they may be the only practical way of ensuring the optimal quality of product derived from an open access fishery.

This paper describes under what conditions minimum size, spawning area and seasonal fishing restrictions can benefit the fishing industry and the consumer, even given an open access fishery. Possible benefits include an increase in consumer surplus, increased stability of fish stocks and the opportunity to improve cooperation and understanding between the government and the fishing industry. Particular reference is made to the New England groundfish fishery.

8. Determining the Full Economic Damages of a Marine Fish Kill -- Bernard Brown, Marine Fisheries Administration, New Jersey Division of Fish, Game and Wildlife

The paper begins with a description of the development of the proposal of the AFS's Committee on Monetary Values of Marine Fishes. The discussion centers on the differences in approach to the problem by Committee members as a function of the participants professional background and the needs of his organization. The salient points of the latest draft of the Committee's report will be presented. The second part of the paper is a case study of a January 1983 shutdown of a coastal nuclear electric generating station in New Jersey. It discusses a detailed proposal that was developed prior to the shutdown for determining damages to the resource and to the recreational and commercial industry that utilizes the resource. The modification of that proposal due to political realities and the final outcome is related. The paper concludes with an account of a comprehensive approach to fish kills and associated environmental damages being undertaken by the Division of Fish, Game and Wildlife based on our experience

currently in the process of deciding whether or not to adopt the coastwide management plan for striped bass recommended by the Atlantic States Marine Fisheries Commission. The plan is intended to reverse the declining trend in production experienced by the Chesapeake Bay and North Carolina stocks during the past decade. If Rhode Island adopts the recommended 24 inch TL minimum size limit for coastal fisheries, the trap net fishery would essentially go out of business, since the fishery selects for fish under that size limit. Relationships between the trap net landings in Rhode Island and production indices for the Hudson River, Chesapeake Bay, and North Carolina stocks indicate that, except for 1973, the trap nets have landed almost exclusively fish of Hudson River origin during the past decade. If the relationship between the trap net fishery and Hudson production is real, restricting that fishery would have little, if any, effect on increasing production in Chesapeake Bay and North Carolina. Furthermore, high levels of certain toxic substances could introduce a public health issue in management of the species in Rhode Island.

TUESDAY MORNING, MAY 17, 1983

ANADROMOUS FISHERIES
GENERAL

11. Population Demography, Riverine Movements and Spawning Habitat of the Sea Lamprey, Petromyzon marinus, in the Connecticut River -- Kathleen M. Yergeau and Boyd Kynard, Cooperative Fisheries Research Unit, University of Massachusetts

During 1981 and 1982, the spawning migration of sea lampreys was monitored at an upstream fish passage facility at Holyoke Dam, Mass. (River km 139). Sex ratio for 1981 was 1.3 males: 1.0 female (n = 464) and for 1982, 1.6 males: 1.0 female (n = 404). Mean total length and weight for males were 71.3 cm (1981) and 71.4 cm, 794 g (1982), while mean length and weight for females were 71.5 cm (1981) and 71.1 cm, 806 g (1982). Total sea lampreys using the Holyoke fishlift were 53,459 for 1981 and 26,584 for 1982.

Radiotelemetry was used to monitor upstream movement in the mainstem using 45 sea lampreys captured at Holyoke

tion and abundance of fish in the vicinity of hydroelectric dams. BioSonics, Inc. has developed fixed aspect hydroacoustic instrumentation and techniques for collecting observations of outmigrant salmonids at hydroelectirc dams on the Snake and Columbia rivers in Washington. The BioSonics system can be used to observe fish behavior in the vicinity of the dams. It is capable of collecting information in regions of high water flow and in confined areas, including turbine intake galleries. The system consists of a 420 kHz transceiver, a modified chart recorder, a digital echo integrator, an oscilloscope, a 20-channel multiplexer, a 20-channel equalizer, and several 420 kHz transducers with nominal beam widths of 2, 6 and 15 degrees. Transducers are installed on underwater structures of the dams and on two-axes rotators located on the river bottom in front of the dams. An overview of these techniques will be presented, including discussion of data acquisiton methods, transducer deployment, fish detection criteria, and analytical techniques. Representative results will also be presented.

14. Mortality of Adult American Shad Resulting from Turbine Passage at a Hydropower Facility -- Charles E. Bell and Boyd Kynard, Cooperative Fisheries Research Unit, University of Massachusetts

Experiments were conducted to determine the immediate mortality of pre-spawned, adult American shad (Alosa sapidissima) resulting from passage through a Kaplan turbine at the Holyoke Dam on the Connecticut River. Immediate mortality was defined as that which occurs 5 hours or less after introduction. Radio telemetry was used to monitor the movements of 52 test and 28 sacrificed fish passed through the turbine during May 1982. Sixty-nine control fish were released into an instream holding net for direct observation during the same period. The following criteria were used to estimate turbine mortality; (1) sacrificed fish distribution, (2) downstream movement, (3) transmitter signal characteristics, and (4) instream movement relative to flow. Sacrificed fish were used to establish the time and corresponding drift distance of dead fish, then compared to that of test fish. Comparisons between sacrificed and test fish transmitter signal characteristics, downstream and instream movement were also recorded. A mortality estimate of 18.5% for test fish at 16.6 megawatt production (full generation) was observed.

Nova Scotia; and Gary D. Melvin, Department of Biology, University of New Brunswick

A small, experimental tidal power facility is now under construction on the Annapolis River, Nova Scotia. A pre-construction study and planned post-operational studies will provide data on the effect of low-head hydroelectric generators on the population structure of a resident, shad spawning run of approximately 100,000 fish.

A 6-mi long, tidal power generating facility across an embayment of the inner Bay of Fundy, which would have 140 low-head STRAFLO turbines with an installed capacity of 5320 MW, is being designed and construction may soon start. Tag-return data indicate shad utilizing these marine embayments are a mixed group of populations from the entire Atlantic Coast. To date 70% of tag returns are from United States spawning rivers as far south as Florida. Experimental netting and commercial fishing catch data reveal these shad are ocean-feeding, mostly 3-5 year-old juveniles and sub-adults which occupy the inner Bay of Fundy from June to September. Migration around the Bay of Fundy is counter-clockwise with the prevailing residual different temperature ranges. Occurrence in the megatidal embayments appears related to the local high turbidity of the water.

Tidal power development will reduce turbidity behind the dams possibly restricting available shad feeding habitat. Turbine mutilation rates for the designed STRAFLO turbine calculated using Von Raben relationships for a 50-cm shad are in the range of 5% during a single pass. Since shad will probably make repeated passes through the turbines and recent work indicates 1/3-2/3 of the Atlantic shad stock occurs in these embayments during summer, turbine mortality may have a detrimental effect on East Coast shad fisheries.

JOINT SESSION OF FISH CULTURE AND CONSERVATION ENGINEERING

GENERAL

18. UV Irradiation in Fish Rearing Systems: Criteria and Conditions for Use -- John W. Nightingale and Wayne J. Daley, Kramer, Chin and Mayo, Inc., Seattle, Washington

In aquaculture applications, ultraviolet (UV) water purifiers

19. Hatchery Production Forecasting: Or How do I get There From Here? -- Philip C. Downey, Aquatec, Inc., South Burlington, Vermont

An aquaculture system is composed of 56 interacting biotic and abiotic variables which can be categorized into five components; Fish, Water, Nutrition, Pond and Management. The goal of fish hatchery management is to balance these interacting variables to produce an optimal environment to meet the production goals of the particular hatchery.

Hatchery production forecasting is a management tool used to predict some of these interacting relationships and to provide a means of hatchery operation to produce these production goals. Hatchery production forecasting techniques for scheduling fish production and maintenance of acceptable pond water quality will be presented.

TUESDAY AFTERNOON, MAY 17, 1983

FRESHWATER FISHERIES
WATER QUALITY

20. Assessing the Attainability of Fishable Waters -- Robert J. Reimold and James G. Dedes, Metcalf and Eddy, Inc., Boston, Massachusetts; Robert Mendoza, U.S. Environmental Protection Agency, Boston, Massachusetts

Ever since the passage of the Clean Water Act, the subject of many scientific studies and many resources management decisions has related to how to make waters of the United States "fishable and swimmable". Only lately have people recognized that the language adopted long ago (with the passage of the Clean Water Act), stated that we should strive to make waters "fishable and swimmable, where attainable". The U.S. Environmental Protection Agency has issued proposed rules to revise water quality standards that, among other things, remove or modify impaired uses based on analyses of the attainability of the uses. This new "Use Attainability" approach is designed to determine whether the designated uses in State water quality standards are impaired and to identify the reasons why the uses are impaired. Such an analysis is also developed to project what use the water body could support in the absence of any pollution as well as with various levels of point and non-point source control.

streams are in basin < 130 sq. km., without significant agriculture, industry, coal mining activity or permanent population. These streams were historically not well buffered; their basins are underlain with shale and sandstone bedrock.

When all the state's streams are randomly evaluated, there is no clear trend toward acidification. However, the results of 41 randomly selected stocked mountain trout streams embraced by the above criteria provides a significant trend. During the past three decades, both parameters have dropped, with the alkalinity reduced by over half between 1965-1980.

These results correspond with what has been observed in southern Scandinavia and the southern portion of the Canadian Shield. Based upon extrapolation of this trend until the end of this century, the projected economic loss of recreational fisheries values for Pennsylvania will be $300 million/annum.

22. Growth and Relative Condition of Brook Trout in Streams Vulnerable to Acidic Deposition -- Robert W. Light, Cooperative Fishery Research Unit, Pennsylvania State University

Growth and relative condition of brook trout were studied in streams of differing vulnerability to acidic deposition. The most vulnerable stream, Upper Three Runs (UTR), had both the slowest growth and lowest relative condition during fall 1980. After significant population decreases in UTR (223 to 87) during winter 1980-81, the relative condition of fish in UTR, but not the growth was as high as fish in a less vulnerable stream, Little Fishing Creek, but not as high as the least vulnerable stream, Roaring Run. The less vulnerable streams had more stable numbers (50), constant relative condition, and little significant increase in growth.

I feel that the continued influence of acidic deposition combined with the geological based infertility of UTR will eventually remove UTR from the coldwater, recreational fishery. The infertility has caused changes in growth leading to inherent reproductive differences among the streams. These reproductive differences are responsible for high population numbers and continued slow growth within UTR.

or introduced species are established in the Mullica River, but only at modified sites, and thus are distributed in much the same way as native peripheral species. Three anadromous species occur in the Mullica River, but spawn only in the downstream tidal regions.

25. Impacts of Chlorinated Effluent on Trout Fisheries of the Dog River, Northfield, Vermont -- Paul Geoghegan and Matthew J. McGinniss, Metcalf and Eddy, Inc., Boston, Massachusetts

A hazard evaluation procedure was used to assess the impacts of chlorinated municipal effluent on the self-sustaining recreational trout fishery of the Dog River, Northfield, Vermont. The fishery consisted primarily of rainbow trout (Salmo gairdneri). Brown trout (Salmo trutta) and brook trout (Salvelinus fontinalis) were also found. Field studies consisted of trout habitat mapping, water quality and fish sampling, above and below the treatment plant discharge. Water quality parameters monitored in the river included: total residual chlorine (TRC), ammonia, dissolved oxygen, pH, total coliform, fecal streptococci, and conductivity. TRC levels ranged from 1.4 mg/l at the discharge to nondetectable ($<$ 0.05 mg/l) 50 meters downstream. TRC levels greater than known criteria only existed 50 meters downstream of the discharge. Other water quality parameters were not above levels limiting to trout. Catch per unit effort of trout was significantly smaller downstream of the discharge, but habitat was not found to be significantly different. Short-term episodes of overchlorination may be a reason for the observed downstream reductions in trout populations. The potential benefits of measures to eliminate adverse impacts were evaluated.

26. Water Quality Data Collection and its Use in Fisheries Management -- Matthew Scott, Maine Department of Environmental Protection

Suitable water quality is an integral part of aquatic habitat for fishery managers. Without this, certain species especially salmonids, are restricted. The phenomenon of eutrophication in the northeast has affected a number of lakes and ponds with water quality decline and a loss of salmonid fisheries. Within the past decade new methods and knowledge have provided water quality manages with the data to predict, protect and restore lake and pond water quality. Various indices of trophic state and

previous year classes, and these species declined in numbers immediately following that exceptionally severe winter. The abundance of other bay residents appeared to be rather constant throughout the study period, regardless of winter water temperature. The catch per unit effort of most migratory species varied considerably and appeared to be unrelated to environmental conditions within the estuary. The extent to which the abundance of resident species was related to overwinter survival, and the way in which the individual populations responded to the severe winter of 1976-1977, seemed to be related to their reproductive and overwintering strategies. The annual abundance of species with overwintering strategies that enabled them to avoid extremely low winter water temperatures fluctuated less than that of species that lacked these survival mechanisms. The annual abundance of species with reproductive strategies characteristic of so called r-selected species appeared to be more closely correlated with winter water temperature than that of species that exhibited reproductive behavior more characteristic of K-selected species.

29. Cadmium Concentrations in Blue Crab (Callinectes sapidus) from Estuarine Waters of New York State -- Ronald J. Sloan and Ralph Karches, New York Department of Environment Conservation

In 1979, due to high cadmium concentrations in blue crab, Callinectes sapidus, the New York State Health Department warned against consuming the hepatopancreas and to restrict leg meat consumption to one meal per week, based on a limited Hudson River summer sampling. A lack of data from other localities led to 1981 collections from 11 locations in New York marine waters. Muscle tissues and hepatopancreas were analyzed for cadmium utilizing atomic absorption spectrophotometric techniques. Although female sample sizes were small, they tended to have higher concentrations than males by factors of 1.5 to 2. Regardless of sex, the six Hudson River locations produced average concentrations of 0.24 ppm ($N = 55$) and 7.86 ppm ($N = 60$) for the leg muscle and hepatopancreas, respectively, compared to average values for similar tissues from other areas (excluding Flushing Bay) of 0.09 ppm ($N = 25$) and 0.72 ppm ($N = 25$). Cadmium concentrations were two to five times higher in thoracic muscle than leg muscle ($N = 8$). Flushing Bay crabs had higher hepatopancreas levels ($\bar{x} = 3.84$ ppm; $N = 8$) than other Long Islnad crabs indicating a potential

identification of principal prey utilizied by fishes within various geographic areas established that much dietary overlap occurs between regions. However, other principal dietary components are often relatively unique to particular areas and even more frequently may be observed to occur only within larger regions which can be characterized as temperate or boreal feeding communities.

32. Growth and Survival of Larval Winter Flounder, Pseudopleuronectus americanus, and Atlantic Silversides, Menidia menidia, in Eutrophied Water from the Merl Mesocosms: A New Approach to Larval Fish Studies -- Christopher J. Powell, Barbara K. Sullivan, Patricia J. Ritaco and Michael H. Prager, Graduate School of Oceanography, University of Rhode Island

An experiment to evaluate the effects of eutrophication on coastal marine ecosystems is presently underway at the University of Rhode Island Marine Ecosystems Research Laboratory (MERL). In this experiment, a series of three control and six nutrient enhanced tanks have been set up and monitored since May 1981. The nutrient tanks are loaded daily with an increasing nutrient gradient from the average anthropogenic loading to Narragansett Bay (1x) up to the extreme loading occurring in the inner New York Bight (32x).

A small microcosm system utilizing the effluent water from this parent experiment was designed and set up for larval fish studies. Percent hatch, growth and survival of Atlantic silversides and growth and survival of four week old winter flounder larvae were evaluated during two week experiments.

Results from these experiments indicate that eggs and larvae reared in eutrophied water (2x and 32x nutrient concentration) did better than those reared in the control water. Percent hatch for Atlantic silversides was significantly higher ($p = .01$) (77% and 73%) in the nutrient enhanced tanks than in the control tanks (53%). Daily specific growth rate for this species was higher in the most eutrophied water (16.0%/day for weight) and lower in the control (8.5%/day). Larvae of winter flounder showed the same trend in growth rate by weight with 18.4%/day in the most nutrient enhanced tank and 12.9%/day in the control.

These data suggest that nutrient enhancement with the associated changes in water chemistry and plankton community structure

for ecological life history studies. Such investigations are hampered, however, by a lack of age, growth, and survivorship information. With the intention of developing such data, a bullhead population in Muskellunge Lake, Jefferson County, New York was investigated. Fish were collected throughout the summer, 1982. Captured bullheads were weighed, measured, sexed, tagged, and fin clipped. Except for 10% of each size class that were kept for otolith and ovary samples, the fish were released to provide a Schnabel type population estimate. Age-length relationships were developed by examining otoliths and fin-ray cross sections for annular growth markings, and ages were compared to a length frequency distribution. The oldest bullheads sampled in Muskellunge Lake were found to be 6+ years. Because the females have a high reproductive cost, (eggs contributed as much as 13% of the total body weight in ripe females), it was hypothesized that females would grow slower than males. However, no statistical differences in growth rate between male and female bullheads could be detected, although males seemed to have a higher rate of survivorship in older year classes.

35. Patterns of Movement of the Brown Bullhead (Ictalurus nebulosus) along the South Shore of Lake Ontario -- John F. Storr and P. J. Hadden-Carter, SUNY Department of Biological Sciences, Buffalo, New York; A. Garry Smythe, Eco Research, Inc., Akron, New York

From 1972 to 1981 over 59,000 fish were tagged at various locations along the south shore of Lake Ontario. Of these 15,462 were brown bullhead, Ictalurus nebulosus. From these, 807 tags (5.2%) were recovered by anglers, netting and electrofishing. The overall dispersion pattern of the brown bullhead best fit the theoretical curve $Y = Ae^{bx^c}$ when "c" was equal to one, with a correlation coefficient (r) of -.8718 (with Y the number of recaptures at a given distance x, A the Y intercept and b the slope). The dispersion pattern of returns from between 6-12 months after tagging had the best fit when $c = 2$, approximately random dispersion.

Fifty percent of the recaptures were taken within 12.8 km and 95% within 35.2 km of the point of tagging, with 85% of the recaptures being taken east of the tagging locations. Furthest shoreline distance travelled by any one bullhead was 268 km and maximum travel in any one day 8 km. Returns

Lake Champlain rainbow smelt serve important dual roles both as a forage base and as a winter sport fishery. Development and maintenance of a salmonid fishery, particularly for lake trout and landlocked Atlantic salmon, is dependent upon the capability of rainbow smelt to sustain salmonid predation, predation by non-salmonids and continue to provide a major winter sport fishery. Lake Champlain smelt are lake spawners with spawning occurring over lake substrates 13.7 m deep and deeper. Predominant, late summer associates of benthic smelt were slimy sculpins and trout-perch. Smelt were segregated by age groups during late summer in different depth strata: age 0 ($<$ 15.2 m), age I (15.2-30.5 m) and ages II-IV (30.5-61.0 m). Age composition for bottom trawl catches of smelt $>$ age 0 was: age I, 18.7 percent; age II, 64.6 percent; age III, 15.7 percent and ages IV-V, $<$ 1.0 percent. A two-year life cycle with major post spawning mortality associated with ages II-III is indicated by trawl catches. Findings indicate relatively stable recruitment into age groups II and III during years 1977-80.

38. Dispersion and Dissipation of the Lampricide Bayer 73 Following a Control Application in Seneca Lake, New York -- Kay Ho and Steven P. Gloss, Cooperation Fishery Research Unit, Cornell University

Bayer 73 (2-aminoethanol salt of 2',5-dichloro-4'-nitrosalicylanilide) was applied to approximately 45 hectares, in two delta areas of Seneca Lake, NY, as part of a sea lamprey (Petromyzon marinus) control program. The aerial applications were made with a 5% granular formulation of Bayer 73 at a nominal rate of 110 kilograms/hectare. The dispersion and dissipation of the chemical in the water column was monitored for seven days after treatment. Water samples (915) were obtained at regular time intervals from ten sites using specially designed microsamplers. Depth of water in the treatment area ranged up to 4.5 meters. Water samples were collected at depths 0.1, 0.25, 0.50, and 1.0 meters above the substrate as well as surface and mid-depth in the water column. Two species of non-target fish (Micropterus salmoides and Salmo gairdneri) were suspended in paired cages at four locations and three depths during the seven day period and sampled for analysis of Bayer 73 accumulation in muscle. Mortality in caged fish was negligible with the exception of one group of S. gairdneri in the region of highest Bayer 73 activity.

sturgeon present at a spawning ground, in a summer feeding aggregation, and of fish that moved to the spawning grounds in the fall. A total of 112 sturgeon were captured, and 30 recaptured. Three methods were used for each estimate: Schnabel, Schumacher-Eschmeyer, and Capture. The assumptions for each model used are discussed relative to specific characteristics of the population. Radio telemetry was used for verification of the assumptions for the models. The estimates were combined with age structure data and a conceptural movement model to estimate the number of adults between Holyoke Dam, Holyoke, Massachusetts and Enfield Dam, Enfield, Connecticut.

MONDAY AFTERNOON/TUESDAY MORNING, MAY 16/17, 1983

POSTER SESSION

41. A Biological Survey of Selected Dilute Lakes in Vermont -- Douglas G. Burnham, Vermont Department of Water Resources, Agency of Environmental Conservation

During the summer of 1982, plankton, benthic invertebrates and fish populations were sampled in 17 Vermont lakes. The lakes studied were low in alkalinity with average pH values ranging from 6.71 to 4.57. Plankton and benthic invertebrate populations were sampled three times between May and October while fish were sampled once. Chemical parameters were sampled before, during and after the biological portion, providing yearly average values.

At this point only preliminary results have been derived, with the preparation of the final report still in progress. It appears that the humic water lakes, high in organic acids, contain biota somewhat more resistant to the effects of acidification. This is most evident in zooplankton populations. No fish were captured in two of the 17 lakes: both were clear water lakes. An important consideration in relating trout occurance to pH in this study is that in all but one lake, trout populations are being sustained by stocking. This gives rise to the obvious question; would trout be present in these waters if they were not being stocked?

42. Application of Habitat Evaluation Procedures in the Passaic River Basin, New Jersey -- Clifford G. Day and Robert H. Bosenberg, U.S. Fish and Wildlife Service, Absecon, New Jersey

Significant ($P < .05$) differences in the number of HUs were observed. These differences were attributed to the sizes of the study areas. However, there was also strong evidence ($.05 < P < .10$) that real differences in HSI also exist between the study areas. This information was useful in recommending to the COE where project related negative impacts could be greatest and where mitigation efforts could be most beneficial. Forthcoming analyses of future conditions "with" and "without" a project will be based upon future land use and population projections as well as project impact analyses and will result in the quantification of project related losses and/or gains to wildlife resources relative to these baseline conditions.

Since an HEP analysis is species oriented, wildlife managers may find HEP useful in evaluating species specific management programs and management alternatives. Additionally, quantitative characterizations of future conditions can be useful in fostering positive public relations.

43. Assessing Habitat Utilization by Stream Fish -- Mark B. Bain and Henry E. Booke, Cooperative Fishery Research Unit, and John T. Finn, Department of Forestry and Wildlife Management, University of Massachusetts, Amherst

Many recent and current studies have assessed habitat utilization patterns of stream fish for determinations of habitat suitability. Data obtained in these studies are necessary for several of the habitat analysis and inventory methodologies such as the Instream Flow Incremental Methodology (IFIM) and the Habitat Evaluation Procedures (HEP). Our recent studies involving habitat utilization by smallmouth bass (Micropterus dolomieui) in the Deerfield River indicate that study design and sampling technique may have a substantial influence on the assessment of habitat use and the resulting habitat suitability curves.

In this study, we experimentally evaluated the effect of study design and two sampling techniques on habitat utilization assessments. Physical habitat measurements were made on 1175 blacknose dace (Rhinichthys atratulus) collected in a 160 m section of the South River (MA) using (1) backpack electroshocking without a rigid sampling design; (2) backpack electroshocking with an a priori sampling design; and (3) a discrete area electroshocker (2.8 m^2) with an a priori sampling design. The techniques used, advantages and problems with each approach, and differences in the data obtained will be presented.

Conservation Districts, the Northern Vermont RC & D Council, the Vermont Agency of Environmental Conservation and the Vermont Department of Agriculture pioneered an effort to utilize existing departmental programs to minimize agricultural nonpoint sources of pollution. This effort resulted in the development of the LaPlatte River Watershed Project. The project which was approved for implementation in 1979 was the first of its kind under PL 83-566 designed specifically to use Agricultural Best Management Practices or land treatment measures for erosion control and runoff management to reduce sediment and nutrient damage to Vermont's receiving waters.

Presently Best Management Practices are being planned and installed in five of the eight identified priority watersheds. Long term monitoring is underway in two projects to identify installation benefits. Three departmental programs including Small Watersheds (PL566) RC & D and the Rural Clean Water Program are being used to provide financial and technical assistance.

46. Construction of an Economical Radio Transmitter -- Jack Buckley, Cooperative Fishery Research Unit, University of Massachusetts, Amherst

One difficulty in telemetry is the reliance of the researcher on commercial manufacturers for transmitters. This poster demonstrated that only limited electronic experience is necessary to produce circuit boards and construct transmitters, thereby reducing dependence on manufacturers and decreasing study costs. Step by step instructions are given for production of circuit boards and assembly of transmitters. Transmitters can be produced for less than forty dollars using this method. The illustrated transmitter is designed to operate at 30 Mhz; modifications for other frequencies are given. Details are provided on component choice and antenna construction.

47. A Continuing Study of the Endangered Shortnose Sturgeon (Acipenser brevirostrum LeSueur 1818) of the Upper Tidal Delaware River -- John C. O'Herron II, Department of Biology, Rutgers University, New Jersey

Sampling since July 1981 on the upper tidal Delaware River has yielded over 580 shortnose sturgeon. These sturgeon

creatinine phosphokinase, triglycerides, serum glutamic transaminase, BUN/CPK, and balance. Electrophoretic profiles were also examined using cellulose acetate membrane electrophoresis.

Differences between sexes within species occurred for the alewife and the blueback for alkaline phosphatase. Sodium and chloride levels were highest for the ocean sacrificed shad and, generally, these values for shad were higher than those of the other two species. This may indicate a more rapid rate of spawning migration of shad. Glucose values show wide variations within species.

Comparisons of fish serum and human serum are made.

49. Polychlorinated Biphenyls (Aroclor 1254) in Fish Tissue Throughout the State of New Jersey: A Comprehensive Study -- Thomas Belton, Bruce Ruppel and Keith Lockwood, Toxic Substance Research, Department of Environmental Protection, New Jersey

This study shows a substantial proportion of the finfish and shellfish analyzed had detectable levels of PCBs (Aroclor 1254) in their edible flesh (75% and 50% respectively). A small percentage (2.4) of the finfish had levels exceeding the existing 5.0 ug/g FDA action level. A total of 11.1% of the finfish exceeded the lower 2.0 ug/g proposed action level. None of the shellfish analyzed had concentrations in excess of 2.0 ug/g. Those fish which are highly contaminated represent only a few species with the freshwater group generally having lower levels than either the saltwater or migratory groups. Several of these species with elevated levels are quite important to both the recreational and commercial fisheries in New Jersey.

The data suggests that some drainages and/or geographical sub-regions tend to have more highly contaminated fish than others and that the heavily urbanized northeastern corner of the state within the Hudson-Newark-Raritan Bay complex, is especially impacted. The Hudson River appears to be the most severely contaminated drainage within the state's waters and although the mean Aroclor 1254 levels in fish have declined since the mid 1970's, the levels are still at or near the 2.0 ug/g proposed action level.

the fall dominant food items were copepods, cirripeds and diatoms. Neomysis americana and Tautanus sp. were consumed during the winter. Menidia fed heavily on Tautanus sp. and cyprid barnacle larvae during the spring, and foraged on calanoid copepods during the summer. Selection of prey per size range of fish was only observed during the fall when prey diversity was high. During the remainder of the year when prey diversity was low selection by size seemed to be abandoned.

51. The Care and Feeding of Weirs in a Vermont Stream -- William E. Hearn, Cooperative Fishery Research Unit, University of Massachusetts, Amherst

Four fence trap weirs were used to study fish movements in Stony Brook, a tributary of the White River, Vermont. Monitored daily from mid June to October 1982, the weirs were part of an experiment concerned with evaluating competition between Atlantic salmon and rainbow trout. Over 1,200 rainbow trout and 350 juvenile Atlantic salmon were captured during the study period. Other species routinely captured included white sucker, slimy sculpin, brook trout, longnose dace, and blacknose dace. Analysis of fish movements will include correlation with temperature and stream discharge.

Construction costs for each portable weir were $250 for materials plus 40 hrs. labor. The weirs were installed by a 4-man crew and required 16/hrs/weir.

Techniques for the installation and maintenance of these portable and reusable trapping devices are presented. Innovations for retaining underyearling salmonids and the capture of upstream migrants are discussed.

Wildlife Abstracts
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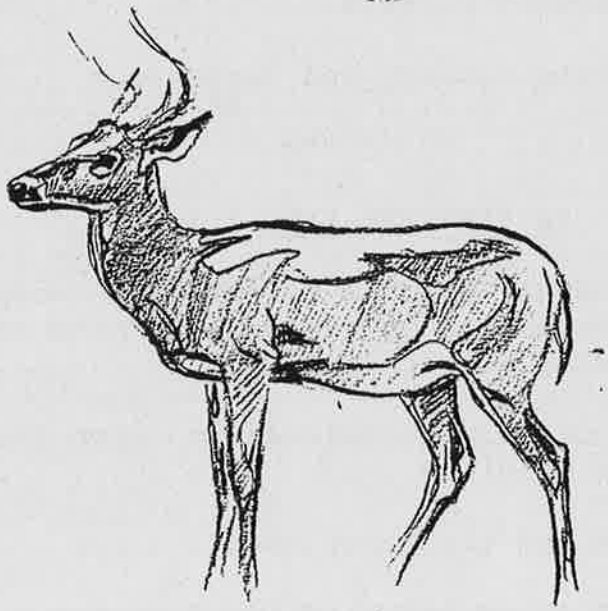

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MONDAY AFTERNOON, MAY 16, 1983

UPLAND GAME BIRDS

Moderators: William Porter, College of Environmental Science and Forestry, SUNY, Syracuse, N.Y. and Kim Royar, Vermont Fish and Game Department, R.D. #1, Box 333, No. Springfield, Vermont 05150

1. The Effect of a Drought on a Local Woodcock Population -- Greg F. Sepik, Moosehorn National Wildlife Refuge, Box X, Calais, Maine 04619; Ray B. Owen, Jr., Wildlife Division, College of Forest Resources, University of Maine, Orono, Maine 04469; Thomas J. Dwyer, Patuxent Wildlife Research Center, Laurel, Maryland 20708

   Woodcock (Philohela minor) abundance and distribution were monitored before, during, and after a drought in 1978 at the Moosehorn National Wildlife Refuge in northeastern Maine. Modified shorebird traps were used to measure woodcock use of different habitat types. During years of average or above average rainfall, May through August, most woodcock were located in alders (Alnus rugosa) and mixed growth. In 1978, when late spring and summer rainfall totaled 14 cm, 58% below normal, woodcock showed a marked preference for softwood covers. Earthworm biomass during the drought remained stable in conifer covers, but dropped significantly ($p < 0.05$) in the alder covers. There was also a positive linear relationship ($r = 0.97$, $p < 0.05$) between summer field use and rainfall. Apparently, under conditions of low prey availability, it was no longer energetically feasible for woodcock to make flights to nocturnal roosting areas. Woodcock weights by the end of August during the drought were significantly ($p < 0.05$) below average and some woodcock were at the point of starvation. Data from wings collected in 1978 during the hunting season indicated that woodcock delayed their molt probably because of low food availability in late summer.

2. Attempt to Establish a Huntable Turkey Population Using Farm Reared Stock -- Lee W. DeGraff, Bureau of Wildlife, N.Y.S. Department of Environmental Conservation, 50 Wolf Road, Albany, N.Y. 12054

   During the period 1953-1959 the release of 738 farm-reared

80 seeps in 2 ranger districts on the Monongahela National Forest, West Virginia. White-tailed deer (Odocoileus virginianus) populations were high on one district and low on the other; reported kills were > 5 and < 1 per square mile, respectively. Most seeps could be enclosed in a 25 x 40 m plot (1/4 acre) and managing seeps for wildlife involved 1-3% of the stand area. None of the treatments effectively reduced snow cover, but thinning produced an overstory composition and undergrowth structure which we considered good turkey winter range. Clearing seeps produced brood range rather than winter habitat. Where deer were abundant, cleared seeps were dominated by ferns, grass, and forbs. In areas with few deer, blackberries (Rubus spp.) and tree regeneration dominated seeps within 3 years after cutting. Intermediate cuts can enhance seeps as winter habitat for turkeys. Existing silvicultural guidelines are adequate for regulating tree density, but timber marking guides should be modified to favor mast producing trees, including non-commercial species, and to retain key mast producers beyond economic maturity. The timber marking guides proposed here are being tried on the Monongahela National Forest, and the West Virginia Department of Natural Resources will continue to monitor wildlife use of managed seeps.

4. Spring Seep Ecology and Management -- Gerald A. Wunz, Pa. Game Commission, R.D. #1, Box 67, Milroy, PA 17063, Arnold H. Hayden, Pa. Game Commission, 19 Kelsey Street, Wellsboro, PA 16901, and Richard R. Potts, II, Pa. Game Commission, R.D. #1, Box 393, Centre Hall, PA 16828

From 1973 to 1982, 11 spring seeps in southcentral and in northern Pennsylvania were studied. Physical, chemical and vegetational qualities of the seeps and adjacent areas were recorded. Two times per year - winter and summer - bottom-stratum samples were taken. Plants and aquatic animals were sorted, identified and oven-dry weighed. Plant species were nutritionally analyzed. Animal species were also routinely counted by examining undersides of stones in the seeps. Tree overstories were removed or reduced by cutting. Pre- and post-treatment samples and herbaceous vegetation maps were compared. Wildlife use of seep vegetation was measured by sampling inside and outside small exclosures. Findings showed plant and animal compositions differed between seeps, even those close to each other. Relatively small weights of tree seeds and animal life were found in

areas for wildlife is being evaluated on 21 power line right-of-way plots in New Hampshire and on 18 plots in forest clearings on the Green Mountain National Forest in Vermont. Burning after the snow melts in spring through the first week in June is the most cost effective because 60-95% of the surface area is burned over and a minimum of labor and fuel is required. For the relatively small land units in the Northeast a backing fire, i.e., into the wind and/or downhill, appears to be the safest and most effective. Costs have ranged from $17.50 per acre in 1975 to $26.00 per acre in 1982. Burning at different times during the spring, summer, and fall produces a variety of vegetative responses. Early spring fires give the greatest increase in flowering forbs, a strong fruiting response, a modest increase in grasses and an abundance of vigorous sprouts from tree seedlings and saplings. Fires in late May or early June, when the trees are just leafing out, are the most effective in controlling tree invasion and produce the greatest increase in grasses. All of the fires decreased the amount of ferns, mosses, shrubs, and bare ground. Use of burned areas by white-tailed deer increases during the first post-fire growing season; they especially prefer the thin succulent sprouts resulting from fires in late May or early June. On a 10 acre power line management area, songbird populations have been 50-100% greater for two growing seasons following mid-April burns, but no comparable increase was observed in small mammal populations. Prescribed burning is an economical and effective tool for managing wildlife habitat which is currently being applied by federal land management agencies. Its application at the state and private level is being hindered by the multi-layered permit system of state bureaucracies.

7. Wildlife and the Gypsy Moth -- Harvey R. Smith, Research Biologist USDA, Center for Biological Control of Northeastern Forest Insects and Diseases, Hamden, Connecticut 06514

The general role of predation in the population dynamics of the gypsy moth (Lymantria dispar) has been studied to ascertain the feasibility of enlistment of predators in future integrated pest management schemes. In general, predators of the gypsy moth are opportunistic feeders with their selection of gypsy moth largely a function of the availability of other foods. The gypsy moth predator/prey

TUESDAY MORNING, MAY 17, 1983

BIG GAME

Moderators: James DeNoncour, U. S. Forest Service, R.D. #2, Middlebury, Vermont 05753, and Lawrence Garland, Vermont Fish and Game Department, Barre, Vermont 05641

9. Seasonal Use of Clearcuts by White-Tailed Deer in Vermont

Mark E. Scott, Vermont Fish and Game Department, Montpelier, Vermont 05602; David H. Hirth, Wildlife Biology Program, Aiken Center for Natural Resources, University of Vermont, Burlington, Vermont 05405

Seasonal habitat use by white-tailed deer (Odocoileus virginianus), determined from pellet-group counts, was measured in Grafton and Goshen, Vermont. A total of 3906 0.001-ha plots was sampled for pellet groups in each season. Plots were spaced systematically at 10 m intervals in 13 different study units, containing clearcuts varying from 2 to 4 years in age. Sample plots were distributed in the clearcut, edge, and surrounding forest habitats. Four large clearcuts (ca. 4.5 ha each) in Goshen and 9 small clearcuts (ca. 0.6 ha) in Grafton were examined seasonally to determine if a disproportionate amount of deer use occurred near the forest edge. The Goshen clearcuts were managed for timber production and the Grafton clearcuts were managed for grouse (Bonasa umbellus) habitat.

Deer appeared to prefer the clearcut habitat throughout the year, with greatest use occurring during the fall. These areas produced the greatest amount of potential forage for deer and for this reason would be expected to represent the most important feeding sites. Deer preferred the Grafton 2-year-old clearcut more than all other habitats during all seasons. In the Goshen cuts, the only significant difference in deer use among the variously aged clearcuts occurred in the fall season, when the 2-year-old clearcut had significantly greater deer use than the 3- and 4-year-old clearcuts.

In the large clearcuts, an edge area, which extended from the forest-clearcut border 30 m into the cut, was found to be preferred by white-tailed deer. During the spring and fall seasons, there was significantly greater ($P \leq 0.05$) deer use in this edge area than in areas further from the border.

much communications groundwork would be needed to gain hunters' support? And, most important, what were the socio-demographic, experiential, and attitudinal antecedents to support or opposition? We addressed these questions in our study of Northern New York deer hunters. Deer hunters were surveyed via self-administered, mail-back questionnaire; of the 3,840 hunters contacted, 2,251 or 59% responded (a nonrespondent telephone interview follow-up was conducted to assess nonresponse bias). Hunters were placed into management support/opposition types, using multivariate attitudinal criteria. These types were then described and compared on the following dimensions: standard socio-demographic characteristics; hunting experience; hunting motivations and satisfaction; opinions about deer management and the management agency; and organizational affiliation and wildlife-related communications characteristics. These dimensions are discussed as antecedents to hunter type classification. The results of this type profiling analysis provide direct indications of potential management acceptability and identify characteristics of the opposition element. Furthermore, channels for reaching and possibly influencing those opposed to management are identified. As a methodological note, the practical benefits of multivariate, compared to single variable, typing of hunters are illustrated from a management interpretation standpoint. Our findings are of direct utility to the New York problem, but they also provide insights of much broader interest, and some general implications for all wildlife managers in the Northeast.

12. Parelaphostrongylus Tenuis in White Tailed Deer and Moose in Nova Scotia - Preliminary Results -- Janis E. Brown, Department of Biology, Acadia University, Wolfville, Nova Scotia, Canada ROP 1X0

Abstract: In the past decade there has been intensive research on Parelaphostrongylus tenuis, a nematode brainworm of white-tailed deer and the causative agent of "moose sickness". P. Tenuis has been sited as a possible factor in the decline of moose and other cervids in areas of their range where these species overlap with the range of white-tailed deer. Based upon aerial surveys, kill statistics and ranger reports the moose population in Nova Scotia appears to be declining, leading to a closure of the 1982 moose season. Research was initiated in 1980 to survey the frequency of occurrence and the distribution of P. tenuis in the white-tailed deer and moose in Nova Scotia in order to

TUESDAY AFTERNOON, MAY 17, 1983

FURBEARER ECOLOGY AND MANAGEMENT

Moderators: Dave Cartwright, Department of Natural Resources, Fredericton, New Brunswick and James DiStefano, Vermont Fish and Game Department, No. Springfield, Vermont

13. Otter Management in Northern New York - Preliminary Results

Mark K. Brown, Department of Environmental Conservation, Warrensburg, N.Y.

The River Otter (Lutra canadensis) occurred in all watersheds of the state during the late 1700's. The history of the otter in New York closely parallels that of the beaver. Both species were sought out by early trappers and traders. The demand for their pelts continued to be excessive, so that by the late 1800's the otter was confined to the remote areas of the Catskills and Adirondack Mountains. In 1936, the New York State Legislature closed the otter trapper season indefinitely. After nine years of complete protection, the otter population increased and expansion was so marked that Legislature gave the department authority to open a limited trapping season in specific portions of the state. Various season lengths, catch limits, and report tagging systems have been employed since the season was established in 1945. The otter harvest has steadily increased since the 1950's. The 10 year average for the period 1954-55 to 1963-64 was 226, from 1964-65 to 1973-74 was 290 compared to the eight year average (1975-76 to 1982-83) of 557. The primary otter range is approximately 20,000 square miles in the 14 counties in northern New York. In 1975, Department of Environmental Conservation personnel from northern New York initiated an investigation of otter ecology and population characteristics. Some 275 cooperating trappers have donated more than 875 otter carcasses. Information on age, sex, reproduction status, date of take, and type of trap have been collected for 489 males and 350 female otter (1975-1981). In regards to the age distribution by sex no demonstrable differences could be determined between spring and fall trapped otter. The male collection consisted of 45.0% juveniles, 26.0% yearlings and 29.0% adults (2 years or older). The female carcasses consisted of 51.1% juveniles, 16.6% yearlings and 32.3% adults. The oldest otter aged to date has been a 14

than juvenile females as the season progressed. The age and sex of adults trapped were related to the 1979-81 marten harvest/km^2 in the township trapped. The adult catch was composed of younger and relatively fewer males in townships with a greater harvest/km^2. This study indicates trapping is affecting marten population structure by decreasing the relative abundance of males. The proportion of males in the harvest decreases as trapping effort increases.

15. Ecology and Demography of a Northern Winter Stressed Bobcat Population -- Lloyd B. Fox and Rainer H. Bocke, College of Environmental Science and Forestry, Syracuse, NY 12210

Bobcat (Lynx rufus) populations occupied over 35,000 km^2 in the Adirondack, Catskill, and Taconic regions of New York during the period 1976 to 1980. Post season density estimates, based on snow tracking and on the distribution of telemetered bobcats, ranged from 1.93/100 km^2 on a central Adirondack study area to 6.18/100 km^2 on a western Catskill study area. Home ranges of telemetered Adirondack adult bobcats were 325.7 $\pm$ 61.1 ($\bar{x} \pm$ SE) km^2 for 4 males and 86.4 $\pm$ 28.6 km^2 for 4 females. Home ranges of telemetered Catskill adult bobcats were only 36.0 $\pm$ 28.5 km^2 for 2 males and 31.0 km^2 for a female. Placental scar counts on yearlings, 2-year-olds, and females 3 years old or more were 1.2, 2.8, and 3.4 respectively. There were no significant differences ($P > 0.05$) in placental scar counts between the bobcats from northern (Adirondack) areas and those from southern (Catskill and Taconic) areas of the state. Juveniles comprised a similar portion of the harvest in the north (27.2%) and in the south (24.3%). Yearlings comprised a significantly greater ($P < 0.05$) portion of the harvest in the south (42.6%) than in the north (23.3%). Principle diet components of bobcats in New York were white-tailed deer (Odocoileus virginianus) and lagomorphs, comprising 32% and 30% of the diet respectively, as determined from a sample of 169 stomachs collected during the fall and winter. No significant differences ($P > 0.05$) were detected in the diets of bobcats compared by sex, age, or area. Deer were utilized significantly more ($P < 0.001$) in the winter than during either the summer or fall. An index to physical condition suggested that juveniles and females in the Adirondacks were winter stressed more than males, and that bobcats in the northern part of the state were winter stressed more than those in south.

Hall, Orono, Maine 04469

Denning ecology, family associations and movements of 16 (4 adult, 12 juvenile) coyotes (Canis latrans) from 4 family groups were studied in eastern Maine from May 1981 through April 1982. Pups from 6 to 24 weeks of age were equipped with radio collars with compressible foam inserts. Monitoring of collared animals resulted in 2760 radio locations.

Coyote families used several dens when pups were <10 weeks of age. From 10-25 weeks pups centered their activity around rendezvous sites. Den entrances (N=7) were all oriented towards the south. Adult coyotes relocated their pups to new den sites on 9 occasions. The mean distance between sites was 1.3 km.

Radio fixes of adult coyotes were <500 m from den entrances 55% of the time during nursing (May) and 54% during weaning (June and July). For 2 females with pups, distances traveled between consecutive independent relocations increased from nursing to weaning and from weaning to pup independence (August-April). The mean percent of overall home ranges used by these females increased from 16% during nursing, to 63% during weaning, and 76% during pup independence.

For pups, home range sizes, mean distances traveled between independent relocations, and distances from den and rendezvous sites increased with age.

Coyote families centered their activity within a common territory that was adjacent to but non-overlapping with those of neighboring groups. Prior to dispersal, the overall home ranges of juveniles were similar in size and position to those of their parents. Territory sizes of 3 coyote families known to contain pups ranged from 71-76 km^2. Three family territories were stable during the 2 years studied. Seventy three percent (8 of 11) of juveniles dispersed furing their first year. In each of 3 families known to contain pups, 1 remained within the family territory until at least 1 year of age.

18. Replenishment of a Heavily Exploited Population of Snowshoe Hares -- Rainer H. erocke, College of Environmental Science and Forestry, Syracuse, New York

This study was conducted in response to concern expressed

Federation, 1412 16th ST. N.W., Washington, DC 20036

Waterfowl are truly an international resource, dependent on protection, enhancement, and stewardship of North America's wetlands. Healthy continental waterfowl populations, however, are as much a product of cooperative international management strategies developed by professional biologists, as they are of adequate quality habitat.

The U.S. Fish and Wildlife Service's ("FWS") management of the black duck, premier game bird for Canadian and New England waterfowlers, was challenged this fall when the Humane Society of the United States ("HSUS") filed suit in U.S. District Court to block the 1982-83 black duck season. HSUS alleged FWS' decision to allow sport hunting of black ducks was unlawful under the 1918 Migratory Bird Treaty Act because the statute prohibits the Service from allowing hunting species whose populations are declining. Plaintiffs also argued that FWS failed to satisfy National Environmental Policy Act requirements by not preparing an adequate environmental impact statement on the regulations. In a 29 November 1982 memorandum opinion, Judge Joyce Green rejected the Humane Society's arguments and allowed the 1982-83 black duck season to continue.

This paper presents a brief summary of the black duck lawsuit. It then explores how the black duck trial and similar legal challenges to wildlife management may affect both our profession and the resources we seek to conserve. The need for advocacy and support of professional resource management is discussed. The complexion of wildlife management can be expected to change as increasing numbers of lawsuits are filed by animal welfare organizations. To be most effective, wildlifers must keep abreast of these changes and should be prepared to answer future challenges to their profession.

22. <u>The Effects of Weather on the Behavior and Energy Reserves of Black Ducks Wintering on the Maine Coast</u> -- John J. Albright, 83 Webster Avenue, Bangor, ME 04401; Ray B. Owen, Jr., Wildlife Division, College of Forest Resources, University of Maine, Orono, ME 04473; and Patrick O. Corr, Department of Indian Fisheries and Wildlife, Wildlife Division, Box 1298, Bangor, ME 04401

The behavioral responses of Black Ducks (<u>Anas rubripes</u>) to tide, temperature, wind chill, and the availability of

NON-GAME

Moderators: Dave Capen, School of Natural Resources, University of Vermont, Burlington, Vermont 05405 and William Crenshaw, Vermont Fish and Game Department, R.D. #1, Box 130, Vergennes, Vermont 05491

24. Trends in Organochlorine and Mercury Residues in Common Loon (Gavia Immer) Eggs from New Hampshire -- Susan D. Haseltine, USFWS, Patuxent Wildlife Research Center, Laurel, MD 20708; Jeffrey S. Fair, Audubon Society, Loon Preservation Committee, Meredith, New Hampshire 03253; Scott A. Sutcliffe, Nature Conservancy, Cold Spring Harbor, NY 11724; and Douglas M. Swineford, USFWS, Patuxent Wildlife Research Center, Laurel, MD 20708

Failed eggs collected from common loon nests in 1979 (N 15) and 1981 (N 21) were analyzed for organochlorines and mercury (Hg). In contrast to reports of previous samplings, DDT was not detected in any egg. PCB and DDE residues showed declining trends. Dieldrin was present at low levels in half or more of the samples. Eggshell thickness was significantly correlated to DDE residues in the eggs of both sampling years; shell thickness is now (1981) comparable to museum specimens collected before 1946. Unlike organochlorine residues, Hg residues have shown no decrease in loon eggs. Percentage of loon eggs which contained more than 0.5 ppm Hg increased significantly between 1979 and 1981, and two 1981 eggs contained over 1.0 ppm Hg. Lead, zinc, cadmium, chromium and selenium were also analyzed in 1979 and residues were low and variable. Significance of these residue trends and other population factor for loons are discussed and comparisons of residues to other loon populations in the United States and Canada are made.

25. Reptile and Amphibian Management Techniques -- JoAnn Frier, New Jersey Division of Fish, Game and Wildlife, CN400, Trenton, NJ 08625; and Robert T. Zappalorti, Herpetological Associates, Inc., P. O. Box 337, Staten Island, NY 10314

New Jersey's seven species of endangered and threatened herptiles have received special investigative attention. Investigations have focused on the habitat preference of these species during all phases of their life cycles.

Disturbed habitat specialists have adaptive strategies which enable them to exploit disturbed vegetation more successfully than forest-interior species. Differences in adaptive strategies may partially explain changes in populations of breeding birds following disturbance or fragmentation of once-continuous forest. If forest disturbance intensified, the "cutover islands" would expand and proliferate until the reverse condition, forest islands in a "sea" of non-forest, resulted. The bird species which have been identified in this study as best adapted for use of disturbed vegetation may thus become ecologically dominant in disturbed forest systems where (1) their preferred habitat is abundant and (2) they can compete successfully with forest-interior species.

27. Results of Tern Management in a Public Recreational Area -- Edward E. Britton

Human recreational activity along Atlantic Coast beaches has resulted in disturbance of tern nesting habitat, direct loss of tern nests and eggs, abandonment of nests by incubating adults, destruction of chicks and abandonment of traditional colonial nesting grounds. A tern management program at selected public recreational areas can preclude disturbance to beach nesting habitat, protect tern nests and eggs, increase chick production and result in terns returning to previously abandoned colonial nesting sites. A tern management program does not mean that public recreational use must be stopped. However it does mean that seasonal restrictions upon public access must be enacted to protect nesting habitat.

A tern management program was conducted on the ocean front beach of the Chincoteague National Wildlife Refuge, Assateague Island, Virginia, from 1978 to 1982. This barrier island beach historically supported a large tern nesting colony. Prior to 1978, the last successful nesting colony occurred during 1967-1971. Human recreational activity resulted in habitat disturbance to an extent that nesting was no longer possible. Public recreational use on Chincoteague Refuge is concentrated along a six mile stretch of ocean front beach. The refuge receives approximately one and a quarter million day-use visits and 13,000 off-road vehicle visits annually. A fenced exclosure was constructed to restrict public access from entry into preferred tern nesting habitat. An intensive public relations program was developed to inform the visiting public of the tern management program and the seasonal (April 1-

MONDAY AFTERNOON, MAY 16 - TUESDAY MORNING, MAY 17, 1983

WILDLIFE POSTER SESSION

Moderators: Paul Castelli, New Jersey Division of Fish and Game, Robinsville, New Jersey, and Mark Scott, Agency of Environmental Conservation, Heritage II, Montpelier, Vermont 05602

28. On the Reliability of Waterfowl Surveys -- Daniel Bordage, 2700 Laurier Blvd., P. O. Box 10100, Ste-Foy, Quebec, G1V 4H5, Canada; and Pierre Dupuis, Canadian Wildlife Service, 2700 Laurier Blvd., P. O. Box 10100, Ste-Foy, Quebec, G1V 4H5, Canada

Intelligent decisions on waterfowl management issues nearly always require a clear perception of the size of the bird population involved. Estimates of the total number of birds are ideal but in some cases various indices of abundance may be appropriate. In this presentation, we report on different types of waterfowl surveys conducted by CWS staff in the Quebec Region and comment on the applicability and reliability of each.

Estimating total number of waterfowl: where it is important to determine the absolute number of birds one may proceed by a total count or by sampling. Total counts are rarely feasible with wild animals, but in the case of the Greater Snow Goose, which stages in the St. Lawrence estuary each spring, a photographic survey of virtually the entire population is possible. In most cases, however, birds must be counted in sample areas and a total estimate derived by expanding the results to cover the total area occupied by the population; we present examples of surveys of this type used to determine the numbers of nesting Greater and Lesser Snow Geese in the eastern Canadian Arctic, employing various combinations of visual and photographic counts conducted from aircraft.

Indices of abundance of waterfowl: in some populations, estimates of total numbers are too difficult or costly to obtain. Moreover some important decisions can be drawn from the knowledge of the relative importance of region A. vs. region B. to a given species, or that species A. is relatively more abundant than species B. in a given region. Relative abundance (or importance) can be determined either qualitatively (A. is more important or abundant than B.)

included in PADS, of which 14 are wildlife related. Initially, information on 240 species of plants or plant-mixtures will be computerized. The system allows the user to identify: a primary, secondary and tertiary use the plants are to perform; certain characteristics the plants must have; ten different categories of site conditions to identify the uniqueness of the site. Upon request, a computer will select and numerically rank those plants that will perform the uses specified, have the characteristics desired, and are adapted to the site conditions indicated. Also, the user will receive: recommended planting methods; fertilizer treatments; planting dates, rates and depths; and up to 20 botanical or other characteristics about the top ranked plant. The user can also identify a particular plant he is considering using and receive specific information about it.

A portable micro computer may be used in the poster session to demonstrate the system.

Wildlife biologists in states and provinces may be willing to contribute information to PADS. Obviously, any computerized data system is only as good as the data entered.

If the PADS is successful it is anticipated that federal, state and provincial agencies having computer equipment will be provided access to the program and the data which has been entered. PADS could be a valuable time saving reference of use by land managers, wildlife biologists, agronomists, landscape architects, and foresters, to name but a few.

31. Habitat Relationships of Waterfowl Populations in Northern Ontario: Potential Effects of Acidic Precipitation -- D.K. McNicol, R.K. Ross, B.E. Bendell - Canadian Wildlife Service, Ontario Region, 1725 Woodward Drive, Ottawa, Ontario, Canada K1A 0E7

Since 1980, the Canadian Wildlife Service has been investigating the effects of acidic precipitation on waterfowl populations in northern Ontario. Waterfowl, which breed in unbuffered areas, are ideal integrators of the aquatic effects of acid rain due to their dependency on the immediate aquatic environment for nesting sites, protection and food. A major component of the study has been to assess the potential impacts of acid rain on the availability and abundance of waterfowl foods. Low pH and elevated metal concentrations

the cover types of approximately two million acres in northern Maine were mapped by computer. The region is largely covered by spruce-fir and northern hardwood forest types, and although agriculture and villages are virtually non-existent, a diversity of silvicultural practices support a large forest products industry. Forest stands were classified as softwood, hardwood, mixed-hardwood dominant (HS), or mixed-softwood dominant (SH); 86 percent of sample points agreed with a standard forest cover map. Most disagreements were between the two mixed forest classes. When the SH and HS types were combined as one mixed forest class, over 90 percent agreement resulted. Several major categories of clearcuts were also identified, as were lakes and ponds. Wetlands could not be separated spectrally from clearcuts with any degree of accuracy. The shading effects in mountainous areas also resulted in some misclassifications. Comparison of the two image dates revealed significant amounts of clearcutting in the study area between 1975 and 1980. The use of Landsat imagery proved to be a cost effective and useful technique for mapping large areas to this level of classification, and for detecting changes in land cover. Potential applications of this technology to wildlife habitat evaluation are discussed.

33. Summer Pond Use by Moose in Northern Maine -- Alan Crossley, College of Forest Resources, 240 Nutting Hall, University of Maine, Orono, ME 04469; and James R. Gilbert, College of Forest Resources, 240 Nutting Hall, University of Maine, Orono, ME 04469

We observed the pond use activities of moose (Alces alces) in the Mooseleuk Lake area of northern Maine for over 1000 hours during the summers of 1981 and 1982. Of the 804 moose observed, 43.7% were bulls, 36.6% were cows, and 15.4% were cows with calves. Frequency distributions of seasonal and diurnal pond visits were calculated for each category. An early and a late summer peak in pond use was observed. The late summer peak was predominated by cow/calf observations. Implications for a late summer aerial pond survey as a tool for estimating calf production are discussed. Six females were radio collared using a noose-pole and boat capture technique. Moose were relocated 477 times during the 2 summers. Relocations were plotted on cover maps to determine seasonal and diurnal use of aquatic areas. Distance from aquatic areas for the observed points were compared to that from 400 randomly generated points within the study area.

Burlington, Vermont 05401

Vermont has long been concerned with protecting its surface water resources. Particular concern was identified regarding the degradation of water quality fron nonpoint sources of pollution. The state water resources department identified and prioritized eight drainages as having significant phosphorous inputs into Vermont Lakes.

The Soil Conservation Service with other departmental agencies in cooperation with Vermont's Natural Resource Conservation Districts, the Northern Vermont RC & D Council, the Vermont Agency of Environmental Conservation and the Vermont Department of Agriculture pioneered an effort to utilize existing departmental programs to minimize agricultural nonpoint sources of pollution. This effort resulted in the development of the LaPlatte River Watershed Project. The project which was approved for implementation in 1979 was the first of its kind under PL 83-566 designed specifically to use Agricultural Best Management Practices or land treatment measures for erosion control and runoff management to reduce sediment and nutrient damage to Vermont's receiving waters.

Presently Best Management Practices are being planned and installed in five of the eight identified priority watersheds. Long term monitoring is underway in two projects to identify installation benefits. Three departmental programs including Small Watersheds (PL566) RC & D and the Rural Clean Water Program are being used to provide financial and technical assistance.

36. Serologic Incidence of Canine Distemper in New Jersey Raccoons -- Dennis Slate, Rutgers University, New Brunswick, NJ 08903; Leonard J. Wolgast, Rutgers University, New Brunswick, NJ 08903; and Robert C. Lund, NJ Division of Fish, Game and Wildlife, Trenton, NJ 08625

Blood samples were obtained from 173 of 279 raccoons (Procyon lotor) live trapped during 1977 and 1978 on four study areas in central and northern NJ. Three of the study areas (Assunpink, Black River Flatbrook State Wildlife Management Areas) were rural, and open to regulated raccoon hunting and trapping. The fourth area- Helyar Woods, was more representative of suburbia. Hunting and trapping were not allowed on the Helyar Woods area. An additional 13 samples were taken from pest raccoons received at Clinton

37. Flooded Agricultural Land and its Use by Waterfowl During Spring Migration, Lake St. Peter, Quebec -- Denis Lehoux and Andre Bourget, Canadian Wildlife Service, 2700 Laurier Blvd., P. O. Box 10100, Ste-Foy, Quebec, G1V 4H5, Canada

Lake St. Peter is an enlargement of the St. Lawrence River located between Montreal and Quebec City. Each year, the area hosts several thousand waterfowl with the Canada goose numbering up to 100,000 individuals at the peak of spring migration. Large number of geese are present in the area for about 20 days between April 20th and May 10th. During their stay in Lake St. Peter, the birds make heavy use of agricultural land in the flood plain. Flooded habitats were used principally for resting while unflooded grass and cornfields were used for feeding.

Agricultural authorities have proposed a scheme whereby a system of dikes and pumps could drain water by late April. Since 40% of goose utilization occurs in May, changes in the patterns of bird activity are expected: desertion of the area for resting and increase of feeding activity if disturbance remains at a low level.

38. The Application of a Geographic Information System for Ruffed Grouse Habitat Analysis -- Steven A. Williams, School of Forest Resources, The Pennsylvania State University, University Park, PA 16802; Wayne L. Myers, School of Forest Resources, The Pennsylvania State University, University Park, PA 16802; and Gerald L. Storm, Pennsylvania Cooperative Fish and Wildlife Research Unit, The Pennsylvania State University, University Park, PA 16802

The analysis of information concerning wildlife-habitat relationships requires a method of storing, retrieving, and analyzing many vegetative, physiographic, and cultural features. In addition, the spatial arrangement of habitat types and the distribution of wildlife requires a means of spatially referencing these types of data. The objective of this study is to characterize ruffed grouse (Bonasa umbellus) drumming sites in terms of the composition and spatial arrangement of habitat types. The Task Oriented Multipurpose Information System (TOMIS) is used to manage data obtained from aerial photographic analysis and ground-based studies. TOMIS has numerous facilities including data storage, retrieval, update, mapping, and raster conversion. It can retrieve data through subfile, section, data base unit, attribute, keyword,

TUESDAY AFTERNOON, MAY 17 - WEDNESDAY MORNING, MAY 18, 1983

WILDLIFE POSTER SESSION

Moderators: Paul Castelli, New Jersey Division of Fish and Game, Robinsville, New Jersey, and Mark Scott, Agency of Environmental Conservation, Heritage II, Montpelier, Vermont 05602

40. The Impact of Snow Goose Grazing on Brigantine National Wildlife Refuge -- Holliday H. Obrecht III, Patuxent Wildlife Research Center, Laurel, MD 20708; and Matthew C. Perry, Patuxent Wildlife Research Center, Laurel, MD 20708

Abstract: An analysis of aerial photography from 1971 to 1982 indicates that large areas of the Brigantine National Wildlife Refuge have been overgrazed by the greater snow goose (Anser caerulescens atlantica). Ground investigations show the qualitative nature of these salt marsh "eatouts". Areas that were once predominantly Spartina alterniflora salt marsh have been altered to large areas of open mudflats and expanded pannes. Birds feed gregariously in groups of several families to flocks of several thousand birds. Marsh areas recently grazed contain leaves of Spartina alterniflora and unconsumed rhizomes and root stocks on the surface. Impact on certain areas has become so severe that passive deterrent devices, such as black flags, pie plates, and human effigies, have been used in an effort to keep birds away.

41. Breeding Birds of Urban Woodlands -- Nancy C. Tilghman, U.S. Forest Service, Northeastern Forest Experiment Station, P. O. Box 928, Warren, Pennsylvania 16365

Breeding bird communities of 32 isolated patches of woods in Springfield, Massachusetts were examined. These woodlands provided breeding habitats for a wider variety of birds (77 species) than previously described for other urban habitats. Principal components regression was used to determine the physical, vegetation, and human disturbance characteristics associated with woodlands that supported the greatest variety of breeding birds as measured by 3 different dependent variables. The size (area) of the woodland was the single, most important variable in explaining differences in all 3 models (total

43. Raccoon Denning Behavior in Southern West Virginia -- Mark E. Holman, Division of Forestry, West Virginia University, Morgantown, WV 26506; Edwin D. Michael, Division of Forestry, West Virginia University, Morgantown, WV 26506; and Thomas J. Allen, Division of Wildlife Resources, West Virginia Department of Natural Resources, Elkins, WV 26241

Six raccoons (Procyon lotor) were equipped with radio transmitters and their denning (day resting) habits monitored from 1 June to 15 December 1981 in southern West Virginia. These 6 animals were each located 5 or more times for a total of 55 individual den sites. Individual den site types included: 28 (50%) hollow trees, 11 (20%) rock dens, 8 (15%) ground burrows, and 8(15%) "other" den types. Raccoons occupied trees 67.7 cm in diameter. Three tree species: American beech (Fagus grandifolia), chestnut oak (Quercus prinus), and scarlet oak (Q. coccinea) were used in significantly greater proportions than chance would dictate ($p < .05$). Scarlet oak showed the greatest contrast between use and availability. Reservation of all trees along ridge top bands, 250 m in width, was recommended to ensure an adequate supply of tree dens.

Twenty percent of the 55 individual den sites located on the study area were rock dens. Rock dens ranged from "cave-like" to"crevice-like" in appearance. Nine (60%) of the occupied rock dens were found on the deep-mined section of the study area. This higher incidence of rock den use on the mined region may be a reflection of increased rock den availability within the mined area.

Considerable variation in denning behavior occurred due to individual raccoon preferences for certain den types. The 55 individual dens were located 100 times in the following den categories: 39 (39%) hollow trees, 42 (42%) rock dens, 10 (10%) ground burrows, and 9 (9%) "other". Three raccoons showed a strong proclivity for specific rock dens as the hunting season progressed.

44. Assessments of Nongame Mammal Habitat Using Forest Service Resources Evaluation: A Regional Perspective -- Nancy E. Mathews, State University of New York, College of Environmental Science and Forestry, Syracuse, New York 13210; William F. Porter, State University of New York, College of Environmental Science and Forestry, Syracuse, New York 13210;

from hunter-killed deer in both areas. Counts of abomasal nematodes revealed a significant difference ($P < 0.05$) between APG and PAX, with APG deer harboring a much greater parasite burden. APG deer were also infested with significantly higher ($P < 0.01$) numbers of meningeal worms than were PAX deer. Abnormal tooth wear, from forced grazing rather than normal browsing, and rarity of twin fawns characterize the APG deer.

Analyses of these parameters indicate that APG deer are severely overcrowded and exist in a precarious situation while PAX deer live under near optimal conditions.

46. Impacts of Fuelwood Cutting on Birds in Massachusetts -- Nan L. Chadwick, 204 Heldsworth Hall, University of Massachusetts, Amherst, Mass. 01003; and John T. Finn

With the current high market demand for fuelwood, it is imperative that impacts of fuelwood cutting be assessed so that proper multiple-use management can be implemented. Few studies have dealt directly with impacts of fuelwood cutting on avian communities.

Fuelwood cut stands with a known history of cutting, and uncut woods, were censused for breeding birds in Massachusetts during 1981 and 1982. Relevant habitat features were sampled such that a detailed characterization of each vegetational stratum was obtained. Cluster analysis, discriminant analysis and canonical correlation were used to statistically test for differences in bird species composition and abundance due to fuelwood cutting.

Results of clustering on 54 bird species indicate that bird communities are similar between uncut and lightly cut stands, and between heavily cut and open uncut stands. Additionally, a discriminant analysis showed significant differences ($P < .05$) between the uncut-lightly cut stands and heavily cut-open uncut stands. Further discriminant analyses showed significantly different bird communities between various cut and uncut stands. High correlations exist (90%) between some vegetation parameters and the bird community. Basal area, dead stem density, percent small conifers and treatment size were the most important vegetation parameters. Results indicate that fuelwood cutting does alter avian communities in Massachusetts. This alteration is directly related to intensity of cut, level of dead, coniferous and small tree

between the two species. Reasons for nest preferences and observations on the nest preferences of three species are discussed. I conclude that diameter at breast height, height, and percent bark are all important, either directly or as indicators of snag suitability, to nest site selection by cavity nesting birds.

49. Preliminary Report on the Effectiveness of Translocating Delmarva Fox Squirrels (Sciurus niger cinereus) to Reestablish Population in Former Range -- Robert M. McKee, Department of Natural Resources, Annapolis, MD 21401; and Gary J. Taylor, Department of Natural Resources, Annapolis, MD 21401

In 1979 the Maryland Wildlife Administration, in cooperation with the U.S. Fish and Wildlife Service, initiated a project to translocate Delmarva fox squirrels (an endangered species) into formerly occupied range to achieve restoration of the species to a secure status. A total of twelve releases (54 squirrels) have been made at five sites on Maryland's eastern shore. Post release behavior and status of translocated squirrels were monitored by radio telemetry, nest box checks, live trapping and field observations. Preliminary results suggest released squirrels are generally site specific in establishing new home ranges and have a high survival rate. Documentation of recruitment at several release sites indicate translocating populations is a viable technique in the restoration effort for the fox squirrel to its former range.

50. Effects of Harvest on Feral Pigeon Populations -- Edward J. Kautz, 355 A Elm Avenue, Delmar, NY 12054

The effects of hunting on free ranging avian populations were investigated by removing 0%, 20% 40% and 60% from different rock dove populations in New York State dairy farming areas. We monitored survival, recruitment, population size, and movements of each population using mark-recapture techniques. Nest searches and checks provided information on breeding biology. Preliminary analyses indicate: 1) survival rates of the remaining birds in harvested populations did not increase (ie. compensatory mortality was not evident); 2) reproductive success was higher in heavily harvested populations; and 3) the most heavily harvested population failed to recover within one year following harvest. These results will allow better planning of control efforts on feral pigeons and point the way for further work on game species.

and 1980 (Shissler 1981). Displaying males which occupied the primary site were removed (sacrificed) in an attempt to encourage movement of other males within the complex. Removals were performed every 3 to 8 days following a bird's establishment as occupant on the primary site. Changes in singing ground occupancy were monitored by returning to each active singing ground on approximately every third day, and by way of color bands, determining which male was performing there.

Eight displaying males were removed from the primary site during the study. Despite the removals, the site was continually reoccupied by other males. This was contrary to the general trend within the complex, with most singing grounds becoming inactive following their initial abandonment.

A total of 18 changes in singing ground occupancy (movements) were observed during the 2 monitored breeding seasons. Sixteen of the movements resulted in displaying males improving their position with regard to the primary site by either moving directly to the primary site or to singing grounds more closely associated with it. Only 2 movements away from the primary site were observed, despite numerous opportunities provided by unoccupied singing grounds on the complex periphery.

The primary site had significantly more occupants and was occupied for more days than any other singing ground in the complex. In addition, the frequency of night bird encounters, including both males and females, was unmatched by any other singing ground.

Displaying males exhibited strong preference for the primary site. A predictable pattern of movement toward the primary site was observed. Singing grounds in the immediate vicinity of the primary site appeared to be preferred over more peripheral grounds. What determines the selection of primary site by woodcock is presently unknown. Factors which possibly contribute to a singing ground's primary status include topography, spatial position with regard to other grounds, and history or tradition of use. The implications of a preference hierarchy to current North American management strategies should be considered.

ABSTRACTS

NORTHEAST CONSERVATION LAW ENFORCEMENT CHIEFS ASSOCIATION

1983 ANNUAL CONFERENCE

MOUNT SNOW

WEST DOVER, VERMONT

MAY 15-18, 1983

1. Identification of Species from Tissue Samples by Agarose Gel Electrophoresis -- Abdallah Mardini, M.Sc., Direction generale de la faune, Quebec, Canada

Various tissue and blood stains (both dry and liquid), obtained from six members of the deer family and seven other meat producing species, were analyzed by agarose gel electrophoresis at pH 8,4 for differences in general protein pattern. Meat, fresh or previously frozen, from members of the cervidae family can be differentiated from each other and from domestic species, on the basis of mobility and position of albumin, ß globulin and cathodal bands. The presence of more than one albumin band indicates immediately a mixture of meat from different species.

For the reliable identification of blood stains at the specie level, we recommend the use of this technique preceded by the Ochterlony test using available commercial antiserum for identification to the family level.

We also found this technique useful for the identification of avian species and fishes.

By the use of this simple, economical and repeatable technique, a precise species-identification of sample muscle tissues can be provided to conservation officers in about an hour's time.

2. New York's Bureau of Environmental Conservation Investigations (B.E.C.I.) -- Joseph T. Lynch and Gerald A. Austin, New York State Department of Environmental Conservation, Division of Law Enforcement, Bureau of Investigations, Albany, New York

An investigative unit has been created in New York State, primarily to deal with major cases of illegal storage, transportation and disposal of hazardous waste. This Bureau is staffed by experienced Environmental Conservation Officers who have been given extensive investigative and safety-related training.

Use of these Investigators, along with appropriate specialized equipment, has identified patterns of illegal activity in the field of hazardous waste and continues to be instrumental in preparing prosecutorial actions aimed at deterring large and/or well organized hazardous waste dealers from illegal trafficing in hazardous waste.

ABSTRACTS

OF THE
NORTHEAST SOCIETY
OF CONSERVATION ENGINEERS

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MOUNT SNOW

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1983 Program Committee Chairman - Ben Rizzo

REFINEMENTS IN DESIGN OF FISHWAYS FOR SMALL WATERSHEDS

by Vern Conrad, P.E., Freshwater and Anadromous Division,
Scotia-Fundy Region, Fisheries and Oceans, Canada

This paper addresses problems associated with fishways in flow control structures at low head dams on small watersheds (ie. between 3 and 50 km^2, between 1 and 20 sq mi). Guidelines and rationale are given for design of fishways for commonly used flow control structures in this category in the Maritime Provinces on Canada's east cost. Information takes into account the size of the drainage area, the proposed head at the dam, the types of fish species to be passed and the timing of the upstream fish migrations at the location of the barrier.

DESIGN AND CONSTRUCTION OF THE WILLSBORO FISHWAY, NEW YORK

by B. E. (Andy) Anderson, P.E., New York Department of
Environmental Conservation, Albany, New York

A fishway was constructed at the Bouquet River Dam at Willsboro, New York, and put into initial use in October 1982. The primary purpose was the passage of Atlantic Salmon over the dam. The presentation will concentrate on the design features and the construction period. Background and initial utilization will also be included. Presentation will be by means of a narrated slide show.

SHEET METAL WATER CONTROL STRUCTURES

by William P. Annable, P.E., Assistant State Conservation Engineer,
Soil Conservation Service, Amherst, Massachusetts

Sheet-metal water control structures offer an alternative to concrete structures as spillways for shallow water impoundments. Metal structures are long-lived when properly installed and maintained. They avoid the need for elaborate form work and concrete delivery to remote areas. A concrete base is usually specified for ballast, but sometimes the structure can be designed to utilize earth loading.

There are several types of designs. A common one is the corrugated metal spillway, which uses a corrugated metal pipe barrel and half-round corrugated metal pipe "riser" or inlet structure equipped with flash boards. When water level control is not important, a corrugated metal pipe can be used for the riser, with or without pond drain.

Soil Conservation Service engineers, working with cranberry growers in Massachusetts, developed a sheet-metal box inlet which can be fabricated locally. It is used in conjunction with a corrugated metal pipe barrel, either steel or aluminum. Standard specifications have been developed for these structures and hydraulic design calculations are minimal.

Manufactured structures are also available, as drop spillways or as flow gates.

In a situation where peak storm flow would exceed the practical capacity of the sheet-metal box inlet, a drop spillway with a 20-foot weir opening was designed using sheet-metal and structural shapes. A small sheet-metal box inlet structure was used in conjunction for water level control in the reservoir.

PHYSICAL PLANT CHANGE REQUIRED FOR SWITCHING FROM TROUT TO ATLANTIC SALMON AT THE NASHUA NATIONAL FISH HATCHERY

by Victor J. Segarich, Nashua National Fish Hatchery,
U. S. Fish and Wildlife Service, Nashua, New Hampshire

A change in production from trout to Altantic Salmon at the Nashua National Fish Hatchery necessitated alterations of physical plant and equipment. To accommodate specific needs of Atlantic Salmon, three different degassing systems, low cost raceway covers, demand feeders and brookstock facilities were put into use. The merits of the changes are discussed and evaluated with particular emphasis on degassing systems.

PLEASANT MOUNT FISH CULTURE STATION RECONSTRUCTION

by Richard M. Mulfinger, Division of Engineering and Fisheries,
Pennsylvania Fish Commission

The report consists of a slide presentation highlighting new production facilities installed at the Pennsylvania Fish Commission's Pleasant Mount Fish Culture Station under a 2.5 million dollar redevelopment project. During a two-year shutdown period, the hatchery's personnel are usefully employed on parts of the construction work. Although the overall redevelopment project is still in progress, the hatchery is again producing fish and many new benefits for the Commission.

MONITORING AGRICULTURAL PRACTICES IN THE LAPLATTE RIVER WATERSHED, VERMONT

by Donald W. Meals, Vermont Water Research Center,
University of Vermont, Burlington, Vermont

The LaPlatte River watershed project is a combined effort for implementation of agricultural Best Management Practices to control non-point sources of pollution and a water quality monitoring program. The 53 square mile watershed is located in northwest Vermont and has a large dairy industry occupying about half of the watershed. Conservation practices for erosion control and animal waste management are being installed on a cost-share basis, with emphasis on manure storage systems. The water quality program consists of long-term trend monitoring at five gaging stations together with several short-term studies. Preliminary results indicate both seasonal and storm-related variability in concentrations of total phosphorus and total suspended solids. Annual phosphorus exports from monitored subwatersheds are greater than average values for the Northeast U.S.

RESOURCE INFORMATION AND ITS INFLUENCE ON DESIGN AND CONSTRUCTION OF TROUT BROOK FLOOD CONTROL CHANNEL IN CONNECTICUT

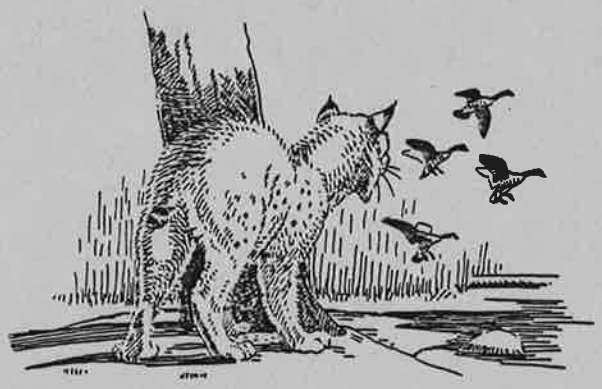
by Joseph E. Polulech and John M. Lantman,
Soil Conservation Service, Storrs, Connecticut

This paper deals with the $14 million Trout Brook flood control channel authorized under Public Law 566, and presently under construction in West Hartford, Connecticut.

The paper presents a listing of the unique design and construction features incorporated in the final design for the 10,000 foot long channel. The incorporated features are a direct result of a multi-specialist team approach to the design process.

The paper also gives a listing of the various local, state and federal agencies and public and private utilities involved in the design and construction process and their input responsibilities. The paper stresses the importance of organization, cooperation, and coordination in accomplishing a project of the magnitude of the Trout Brook channel project and offers insight into possible solutions for similar type projects in other areas of the country.

Information



Education

INFORMATION AND EDUCATION

Tuesday, May 17, 1983

Video: Federal Funding and Cost Effective Utilization - W. Thomas Shoener, Maine Department of Inland Fisheries and Wildlife; Harry Gillam, Virginia Commission of Game and Inland Fisheries; Wayne Carter, New Hampshire Department of Fish and Game.

Discussions will cover the various federal funding programs that are available to aid states in acquiring TV production equipment. Parameters for use of the equipment when purchased in whole, or in part, with federal funds will be reviewed. The presentations also will focus on the effectiveness of video programs and PSA's when used under varying circumstances - classroom, public TV and commercial TV.

Producing and Utilizing TV PSA's - Bob Rehbaum, New York Department of Environmental Conservation.

Presentation will discuss the cost effectiveness of public service spots for TV. Production techniques will be looked at; is film-to-tape the route to go? Other aspects to be covered include: The need to build an image for your production; Cooperating with universities when it comes to production time. TV stations want to give you free time; here's how to get it.

Utilizing Mass Media To Reach A Target Audience - Bud Blumenstock, Cooperative Extension Service, University of Maine.

The Cooperative Extension Service at the University of Maine at Orono in conjunction with the Maine Public Broadcasting Network has prepared a television series that intends to help landowners manage their woodlots. The paper will describe the conception, funding, production and evaluation of this series designed to reach a target audience.

Family Outdoor Discovery Program - Steve Fish, Connecticut Department of Environmental Protection.

This paper will address the rationale for developing a family program. Why was it done...and why the family? Who is the target audience? Developing a program for the entire family is different than designing a concept for a single segment of the populace; and this factor will be explored along with the messages delivered and the methods used to deliver them.

Tags and Trout - Ellie Horowitz, Massachusetts Division of Fisheries and Wildlife.

Outlined will be the agency's efforts at promoting a specific fishery through a cooperative sponsorship program involving local businesses. Sponsors provide prizes for agency-tagged fish. The program allows the agency to focus on certain ponds. Returned tags provide useful management information as a bonus to this inexpensive program.