



## Body Burdens of Persistent Organic Pollutants in Hudson River Anglers

Anne Golden

Concerns in New York State about the safety of sport fish consumption increased in the late 1960's and early 1970's, as environmental impact studies linked the consequences of widespread disposal of industrial and municipal wastes into the Great Lakes, the Hudson River and other waterways. The Hudson River PCBs Superfund Site - the longest Superfund site in the nation - extends nearly 200 miles from Hudson Falls to the Battery in New York City. In 1975, the New York State Department of Health (NYSDOH) began to issue health advisories recommending that people limit consumption of fish from the upper Hudson River due to potential health risks from eating PCB-contaminated fish. In 1976, a ban on fishing in the upper river from Hudson Falls to the Federal Dam at Troy was issued, as well as a ban on commercial fishing of striped bass in the lower Hudson River.

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## Seafood Consumption by Minorities in Metropolitan Areas

A group of scientists surveyed Hispanics living in New York City to identify factors that influence seafood consumption in these communities. With a previous estimate of 22 million Hispanics nationwide, New York is among the top four cities with highest densities of Hispanics. The study sought to describe how seafood consumption was driven by the beliefs mixed with the cultural backgrounds in these groups. Members of the Hispanic communities are from Mexican, Puerto Rican and Cuban ancestry, however the majority of the Hispanic population in New York City are Puerto Rican and Dominicans. The study was conducted through a bilingual mail-survey of 1800 households in Manhattan and Queens, both of which were reported to feature large and diverse Hispanic populations.

Figure 1 tabulates the main hypotheses and framework for the study.

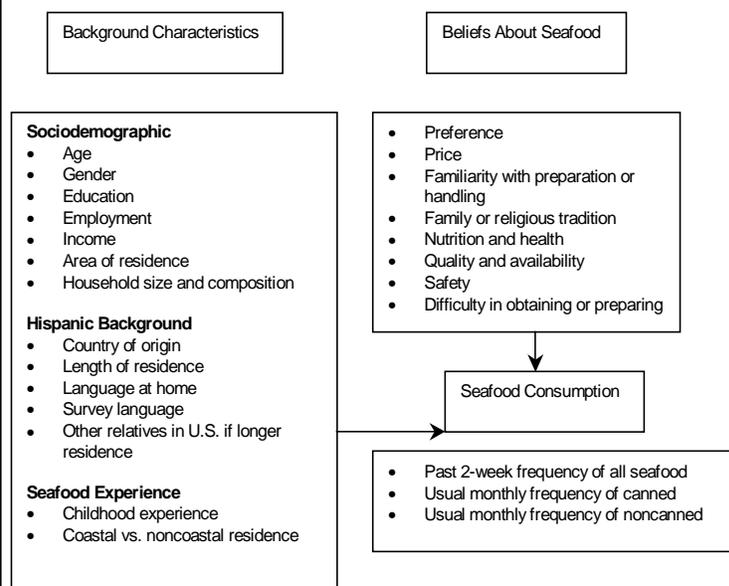


Figure 1. Conceptual framework for study of factors explaining seafood consumption among Hispanics residing in New York City

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The State Health Department imposed a ban on recreational fishing with a catch-and-release recommendation in 1995, both New York and New Jersey continue to issue advisories urging women of childbearing age and children under the age of 15 to abstain from eating any fish or crustaceans from the Hudson River watershed. All others are advised to strictly limit their consumption.

Since a license is not required to fish the tidal waters of the lower Hudson watershed, health advisories distributed with fishing licenses do not reach the majority of local anglers or the many secondary consumers who share their catch, especially among low-income communities and people of color. Surveys of anglers who fish these waters have shown that individuals at greatest risk of exposure due to fish consumption are the least likely to be aware of state fishing bans and health advisories. No data on body burdens of persistent pollutants in persons who consumed fish from the Hudson River watershed existed. The research team collected data that characterized consumption patterns and concentrations of residual contaminants in anglers who routinely consumed these fish and crabs (Table 1).

The data showed positive correlation between self-reported frequencies of consuming locally caught fish and biomarkers of exposure for the majority of pollutants measured. Anglers who ate at least one meal a week of any local fish or crabs had higher serum concentrations of highly chlorinated PCBs compared to infrequent consumers. However, after statistical adjustment for age, no specific species of fish was consistently associated with elevated serum levels of contaminants. A major conclusion of the pilot study is that body burdens of persistent environmental pollutants are generally greater in Hudson River anglers who frequently consume locally caught fish and crabs, than among indivi-

Factors	% Respondents
Whites	91
Males	93
Mean Age (years)	50
Knowledge of state health advisories regarding Consumption of locally caught fish or crab	83
Monthly consumption of meal from locally caught fish or crab	85
Weekly consumption of meal from locally caught fish or crab	48

Table 1: Summary of Responses to Questionnaire on consumption of locally caught fish and crab.

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## Expanding Our Knowledge

Keith Koupal

The Sportfishing and Aquatic Resources Education Program (SAREP) recently conducted an evaluation of mid-term and long-term programs of SAREP. This past year we implemented a survey to youth participating in summer camps and traditional SAREP clubs. The purpose of the survey was to examine the effectiveness of increasing the knowledge of basic fishing, biological and ecological concepts, and ethical behavior. Youth in camps were given the survey before and after their training experience, while club members took the survey once.

Youth leaving summer camps that exposed them to fishing knew about 2% more of the material asked on the survey than when they arrived. The majority of the knowledge gained came from questions relating to fishing and biology and ecology. Youth participants did not show much of a change in their awareness of appropriate ethical behavior. However, this is not surprising as it is believed that ethical behavior and knowing what is right to do for the environment takes a long time to develop.

The results indicate an exponential relationship, which basically means youth encounter a learning curve. Figure 1 shows that youth are learning information rather quickly. Additional relationships (not shown) explain that youth in clubs learn fishing information extremely quickly, ethical behavior knowledge at a moderate rate, and biological and ecological knowledge at a slower rate. These results would be consistent with the focus of SAREP trainings which emphasize not only teaching youth to fish, but to fish ethically. Ethical anglers will be compelled to learn about their aquatic resources and eventually become environmental stewards. However, we can use this information to remind us that it is important to include biological and ecological lessons in our clubs and perhaps in the future we can place more emphasis on these topics.

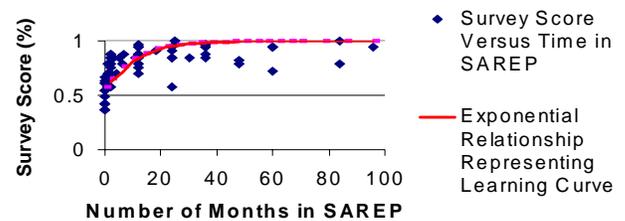


Figure 1: Exponential relationship comparing survey score (%) versus length of time involved with a SAREP club.

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duals who rarely consume these foods. Also positive exposure-response relationships exist between frequency of local fish or crab consumption, and body burdens of persistent pollutants.

Two-thirds of Hudson River anglers who reported eating a portion of the fish they caught (about half of those surveyed) also said they shared their catch with young women of childbearing age and children. Greater subsistence fishing was reported among low-income, African-American and Latino groups, particularly in the lower Hudson River watershed region that includes New York City. Fewer than half of all anglers were aware of fishing bans and health advisories, and the level of awareness was lowest among women and members of ethnic minority and low-income groups in the lower Hudson region.

As members of organized fishing clubs, the study participants were presumably better informed than the general population about New York or New Jersey state fishing advisories, yet a significant proportion of recreational anglers continue to consume contaminated species of fish and crabs from waters in the Hudson River watershed. Several of the species eaten most frequently - striped bass, bluefish, blackfish, and blue crab - are among those specifically targeted by the advisories as unsafe. Since the anglers reported often sharing their catch with others, their friends and family members also share the potential health risks along with the food.

The observation that recreational anglers who consume local fish and crabs have elevated body burdens of PCBs, organochlorine pesticide residues, and mercury is consistent with results in other epidemiological investigations. Additionally, these studies have demonstrated that children of women exposed to fish from PCB-contaminated water at relatively low levels (@ 3 ppb in maternal blood) have persisting decrements in central neurologic function and delays in development that appear to be related to in utero exposure to these toxicants.

*The results suggest that PCBs in river sediments represent an important reservoir of aquatic, and ultimately human exposure. The potential for these compounds to cause fetal neurotoxicity underscores the question of whether these toxic chemicals should remain in the river sediments where they will be biologically available for decades to come.*

Anne Golden is a researcher at Mount Sinai School of Medicine, New York City. The research was supported by a grant from Hudson River Foundation for Science and Environmental Research and the National Institute of Environmental Health Science.

Reference

Golden, A.L., Berkowitz G., Wolff, M.S., Godbold J.H., Afilaka, A., Chillrud S.N., Bopp, R.F., Simpson, H.J., and Landrigan, P.J., in press. *Body Burdens of Persistent Organic Pollutants in Hudson River Anglers.*

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The attitude of SAREP club members also improved over time. Youths entering a club agreed with the statement "they will continue to fish in the future" and strongly agreed with this statement after 60 months. Youths entering a SAREP club were neutral to agreeable with the statement they would be active in saving the environment and strongly agreed with this statement after 85 months (Figure 2). While these changes may seem slow, they actually represent a monumental increase of conviction for these youths. The indication that these youths intend on being active participants in fishing as well as saving the environment implicates that they are moving closer to becoming the environmental stewards SAREP is trying to facilitate.

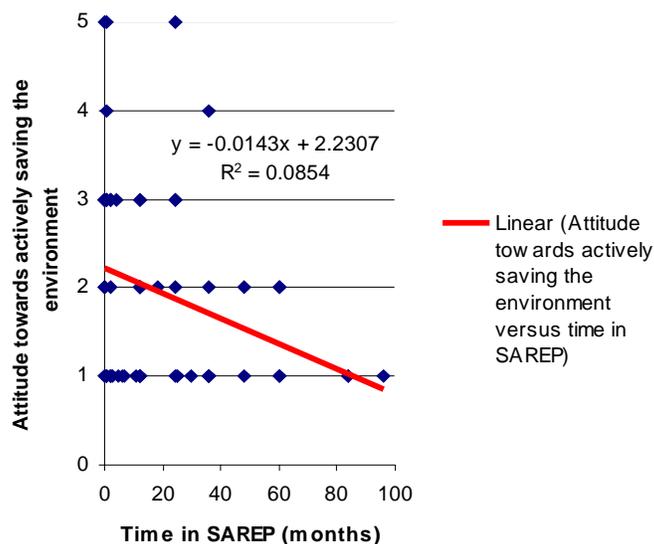


Figure 2: Correlation between SAREP involvement and attitude towards the environment in youths.

Keith Koupal is a researcher with Cornell University in Ithaca, and director of SAREP.

# Marine Recreational Fishing Regulations

The following table lists the revised regulations for marine recreational that were posted in the October 4 Edition of the NYS Registry. The changes were necessary to maintain New York State's compliance with Atlantic States Marine Fishery Commission Fishery Management Plans (FMP). *Note: The regulations were compiled as a service of New York Sea Grant Extension Program; New York Sea Grant and Cornell Cooperative Extension do not assume any liability associated with the reproduction of the information. Anglers should refer to official DEC documents or contact New York State Department of Environmental Conservation at 1-800-REGS-DEC or visit the website at <http://www.dec.state.ny.us/website/dfwmr/swflaws.htm> to obtain up-to-date information.*

Species	Minimum Size Limit (ins) <sup>a</sup>	Open Season	Daily Bag Limit
American Eel	6	All Year	None
American Shad	None	All Year	6 fish per day
Atlantic Sturgeon		MORATORIUM	
Black Sea Bass	11	May 10 - Feb 28	25
Bluefish	None	All Year	10 fish per day
Cobia	37	All Year	None
King Mackerel	23	All Year	3 fish per day
Monkfish (Goosefish)	17 11 (tail length) <sup>b</sup>	All Year	None
Pollock	19	All Year	None
Red Drum	14	All Year	2 fish (>32 inches) per day
Scup	9	Jul 1 - Nov 17	50 fish per day
Spanish Mackerel	14	All Year	10 fish per day
Striped Bass	28 (marine district) 18 (North of GWB) <sup>c</sup>	May 8-Dec 15	1 fish per day
Summer Flounder	17	May 2-Oct 31	7 fish per day
Tautog	14	All Year	1 fish per day (June 1-Oct 6) 10 fish per day (Oct 7-May 31)
Weakfish	16 10 (fillet) <sup>d</sup> 12 (dressed) <sup>e</sup>	All Year	6 fish per day
Winter Flounder	11	March- June 30 (3rd Saturday) & Sept 15-Nov 30	15 fish per day
Yellowtail Flounder	13	All Year	None

**Changes for Summer Flounder, Scup, and Black Sea Bass for 2001**

<sup>a</sup>Length refers to Total Length, unless stated otherwise. Total length is determined by squeezing the lobes of the tail together, then measuring the distance between the tip of the snout and the tail. <sup>b</sup>Tail length is the distance between the tip of the tail and the fourth cephalic dorsal spine (assuming all spines remain intact). <sup>c</sup>George Washington Bridge. <sup>d</sup>Fillet length is the distance between the ends of the fleshy portion of the fish, measured lengthwise; fillet must have skin intact. <sup>e</sup>Dressed length is the distance between the ends of the anterior part of the fish (with its head removed), and the tip of the tail.

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There was an overwhelming consensus in the study group concerning the health and nutritional benefits of seafood, although fewer people could identify specific health benefits. Tradition also played an important role in influencing present-day seafood consumption. A significant number of the respondents expressed concern that fish were taken from polluted waters. The media served as an important source to educate the communities about seafood-borne safety and problems. Seafood consumption in Hispanics is not a recent trend, as the majority of these persons had eaten seafood as children, and the fact that many of these persons live near a major water body (e.g., ocean, river, lake), means their childhood preferences were carried over into adulthood.

Price is a prohibitive factor for seafood consumption in these communities, however, many Hispanics believe this is a case of 'value for money'. Other factors that were found to affect seafood consumption are summarized in Figure 2.

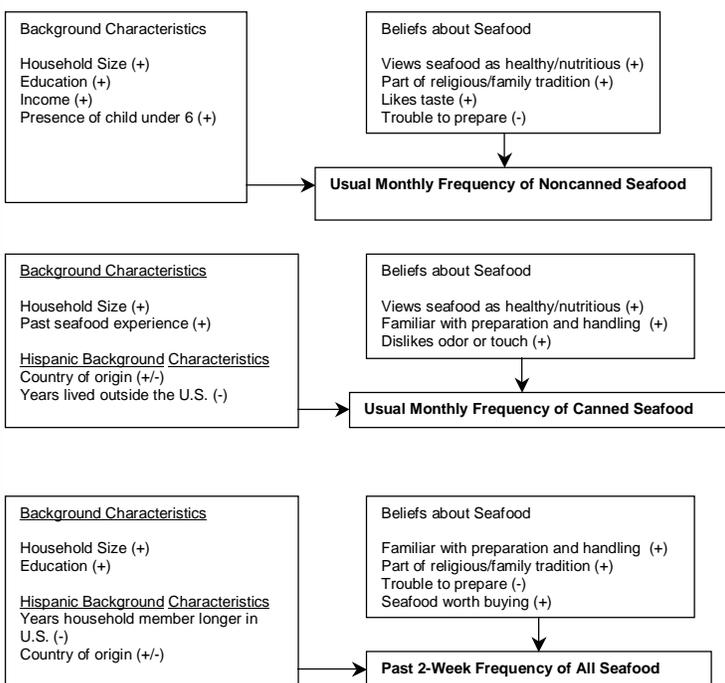


Figure 2: Summary of primary influence on usual monthly frequencies of seafood consumption in Hispanics living in New York City.

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The results supported the conceptual view that both background and beliefs are important variables in understanding seafood consumption. The study generated hard data that provided insight to researchers and educators who wish to understand food practices among Hispanics. However, the researchers cautioned interpretation of the results and its applicability to other Hispanic populations because of the wide variation in both sociodemographic and cultural characteristics of the study group.

Source: Weinstein, S.J., Bisogni C.A, Frongillo Jr., E. A., and Knuth, B.A. 1999. Factors Explaining Seafood Consumption among Hispanics Living In New York City. *Journal of Nutrition Education*. Vol. 31 No. 4.

## What's in a Name?

### Common and Scientific Names of Fishes

It's that time of year again when many of us will be catching the surf and calling our favorite charter boat captains to secure our share of fishing action for 2001. Many anglers use the same name(s) to refer to respective fish species, however, have you ever wondered how scientists develop names for the hundreds of fish species that exist on our planet? The term *nomenclature* refers to the system used to derive names, and there are several authorities responsible for naming fish. One important group is **The American Fisheries Society (AFS)**, which includes a Committee on Nomenclature. The Committee convenes regular meetings, and it also updates the publication, "Common and Scientific Names of Fishes", every 10 years. Each fish may be known by several names, and these names fall under three categories: *local*, *common*, and *scientific*.

Local names develop within a locality, and this can sometimes lead to confusion because the same fish might be known by different names in different sites. For example, "blackfish" is the name used in many places in New York; however, the same fish is known as "tautog" in New England territories. Striped bass also has several aliases within New York, some of them are "bass", "linesider", "striper", and "rockfish". Local names sometimes distinguish different size classes e.g., "rat" refers to very small striped bass; "schoolies" refers to small-medium sized striped bass (that often travel in schools); "cow" refers to very large striped bass. Local names are often associated with the culture of the users, and sometimes the differences are reminiscent of linguistic changes in a particular region. For example, weakfish is also known as "Squeteague", which is a derivative of its old Indian name. Local names can be very con-

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fusing, which is the reason why scientists avoid their usage (at least to communicate with other scientists). Scientists have their own technical language, and they prefer to use common and scientific names. Common (or *vernacular*) names are easier to use because in most cases, they are in the language of the present time. Therefore, the common names used by scientists in English speaking countries are usually in English. An added bonus to using common names is that they make it easier for scientists to communicate with non-scientists. Many laypersons are familiar with common names, and they are often similar to the local name (e.g., "scup" is the common name for a popular recreational fish, and it is also the local name in New England territories). Taxonomists try to ensure that common names are unique in order to avoid confusion, and they are constantly being revised and updated, and this is an extremely important mission of the Committee on Nomenclature.

Scientific names are derived based upon an agreed convention, and they are in Latin and Greek which provides stability because these are ancient languages that are no longer evolving. Scientists prefer scientific names because they are never translated and remain the same regardless of the language that is being written or spoken, hence eliminating any possible confusion. Each scientific name is unique to a fish, and it will never be changed.

Scientific names are usually comprised of two (sometimes as many as three) portions – the first describes the family (or genera), and the second describes the species (i.e., specific). The genera operates like our surname, because this gives information about general description that is shared by other member in the family. For example, many tunas (bluefin tuna, yellowfin tuna, albacore, bigeye tuna) share a similar appearance – bullet shaped, finlets, similar mouthparts, and a pronounce forked tail. These tuna complexes are in the same genera – *Thunnus* from the word *thynnos*, the Greek word for tuna.

The specific name operates like our Christian name because this portion gives the fish its uniqueness. In the example for tunas, although there are several species, only the albacore (*Thunnus alalunga*) has a long fin; *alalunga* originates from the Latin word *ala*, which means "wings". Please see the table for an explanation of the names for the other species.

An important fact to mention is that once a scientific name is assigned to a fish, it cannot be changed. The hard-fighting cobia is *Rachycentron canadus*. Its generic name means "back-spines" or back-pointed", referring to the modified dorsal fin that is reduced to eight spines. The specific name *canadus*, means "Of Canada", but its range stops short of there. This fish

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was first classified by the Swedish botanist Linnaeus in 1766 (and it is possible he received inaccurate information about this species' natural range). Nevertheless, since this name dates back farther than any other, it cannot be changed. So, the next time you land that fish, why not try to learn more about the 'fish behind the name?'

Common Name	Scientific Name	Description
American Eel	<i>Anguilla americanus</i>	L [anguilla] = eel; Gr [americanus] = "of America"
Blackfish	<i>Centropristis striata</i>	L [cento] = patchwork, refers to pattern of the markings
Bluefish	<i>Pomatomus saltatrix</i>	Gr [poma] = cover or lid L [slaum] = "the open sea", which is the preferred habitat
Spanish Mackerel	<i>Scomberomorus maculata</i>	L [scomber] = mackerel; L [macula] = spotted
Striped Bass	<i>Morone saxatilis</i>	L [saxatilis] = "among the rocks, preferred habitat"
Weakfish	<i>Cynoscion regalis</i>	Gr [kynikos] = doglike; L [regalis] = king, refers to the majestic colors
Winter Flounder	<i>Pseudopleuronectes americanus</i>	Gr [pseudo] = false; Gr [nektes] = swimmer
Summer Flounder	<i>Paralichthys dentatus</i>	Gr [para] = beside or near  L [dentatus] = toothed

*Antoinette Clemetson is the Fisheries Specialist for New York Sea Grant Extension, Riverhead, NY.*

*Source: Fishing Lines Angler's Guide to Florida Marine Resources. Department of Environmental Protection. 65 pg. Composition of Scientific Words by Roland W. Brown. Smithsonian Institute, Washington, D.C., Reprinted 1979. 882 pg.*

## News from Long Island Sound

*Sound Health 2001*

*Kimberly Zimmer*

Two major accomplishments occurred in the past few months for Long Island Sound. The Long Island Sound Study (LISS) issued a report documenting improvements in the water quality and the efforts to restore habitat. The Environmental Protection Agency (EPA) also approved a limit on the amount of nitrogen that the Sound can safely handle.

*SoundHealth 2001: Status and Trends in the Health of Long Island Sound* - Highlights the progress made in a number of areas. Severity of hypoxia (lack of oxygen) has decreased since the late 1980s. Levels of copper, nickel, lead, and zinc as well as many organic compounds have declined in the monitored harbors. In the past two years, 33.4 river miles were opened to anadromous fish and 593 acres of coastal habitat have been restored.

*Sound Health 2001* characterizes the health of Long Island Sound using 19 district indicators of environmental health. Environmental indicators are specific, measurable markers that help assess the condition of the environment and how it changes over time. Pronounced changes and general trends in the values of those markers are indicative of improved or worsening environmental health. The 16-page report documents trends in water quality conditions, living resources, and land use and development from available data. Although *Sound Health 2001* shows marked improvement in the water quality of the Sound, other trends indicate additional work is needed. A die-off of lobsters over the last two years, most severely in the western Sound, has greatly reduced the harvest. Since 1997, two parasitic diseases, MSX and Dermo, have decimated the oyster industry. Bluefish, winter flounder, and tautog stocks still remain far below the long-term average and have not yet responded to more stringent management measures that were recently implemented. Colonial bird populations such as piping plover and least tern, are still threatened by human intrusion into nesting areas, loss of habitat and predators.

*Approved Total Maximum Daily Load (TMDL)* will allow improved water quality standards for dissolved oxygen, which is crucial for marine life to thrive. TMDLs are required by the federal Clean Water Act for all impaired water bodies in order to reverse the impairment. They are developed by states and approved by the EPA once it determines the TMDL will indeed allow the water body to achieve water quality standards.

For a copy of the *Sound Health 2001* or more information about the TMDL, call the EPA Long Island Sound Study's office at (631) 632-9216. For more information about Long Island Sound, visit the web site at [www.epa.gov/region01/eco/lis](http://www.epa.gov/region01/eco/lis).

*Kimberly Zimmer is the Outreach Specialist for the Long Island Sound Study (LISS).*

## Community News

*SAREP Training Session in Long Island, New York*

Members of the fishing community had an opportunity to participate in a Sport Fishing & Aquatic Resources Education Program (SAREP) training session on Long Island. The venue for the training was Peconic Dunes Camp, on May 11-13. The session was well attended with participation from over 30 trainees, who were received instructions on aquatic biology, fly casting techniques, lure construction, and knot tying. Participants also had the opportunity to put their newly acquired skills to the test in the waters of Long Island Sound.

New York Sea Grant Extension would like to take this opportunity to thank the coordinators, Richard Hilary, Cornell Cooperative Extension, Keith Koupal, director of SAREP, master anglers, DEC staff and other resource persons, including the trainees for their hard work and dedication, which made the session a huge success.

*Fishery Resource Center Available On-line*

Many anglers eagerly awaited spring which marks the start of 2001 fishing season. New York Sea Grant Extension continues to serve the needs of the angling and charter boat community through our new on-line **Fishery Resource Center**. The Center is of interest to marine resource educators and anglers fishing in the marine district. Users are able to obtain information on popular fish species, angling tips, catch-and-release, and download our latest fact sheets. We also hope to include a directory of bait & tackle shops, fishing access sites, and other useful information, in the future. Please visit the Center at <http://www.seagrantsunysb.edu/Fishery/ResourceCenter.htm>.

*Fall Fishing and Children's Festival at Hempstead Lake State Park*

The Regional Fisheries Unit of the Department of Environmental Conservation will be presenting the Ninth Annual Fall Fishing and Children's Festival at Hempstead Lake State Park on Saturday, October 20, 2001. This is a free Fishing Event, so no fishing license is necessary to participate.

Festival activities begin at 10:00 a.m. and include fly fishing instruction, fishing instruction, a bass fishing seminar, free fish cleaning services, loaner rods and free bait. Additionally, a display area will be set up by the DEC and local fishing clubs.

*For more information about the festival, call the DEC Regional Fisheries Unit at (631)444-0280 or the NYSOPRHP at (516)766-1029. For additional information about the fall trout stocking program in Nassau County, call the Regional Fisheries Unit.*



New York Sea Grant is part of a national network of universities meeting the challenging environmental needs of the coastal ocean and Great Lakes region. This program is unique among the 30 nationally funded programs because it includes marine and Great Lakes shorelines. New York Sea Grant engages in research, education and technology transfer to promote understanding on sustainable development, utilization, and conservation of our diverse coastal resources. New York Sea Grant facilitates transfer of research-based information to a great variety of coastal user groups that include businesses, federal, state and local government, decision-makers, resource managers, the media and the interested public. Visit our web site at <http://www.nyseagrant.org>

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Design: Eileen Brennan

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