National Fish and Wildlife Foundation
Final Programmatic Report

Project Name and Number: Marine Endangered Species Workshop (NY) #2006-0087-003

Recipient Organization/Agency: Atlantic States Marine Fisheries Commission

Recipient Organization Web Address: www.asmfc.org

Date Submitted: 15 January 2009

1) Summary of Accomplishments

The Atlantic States Marine Fisheries Commission (ASMFC), in partnership with the New York State Department of Environmental Conservation (DEC), facilitated two marine endangered species expert workshops during October of 2006 and 2008. Representatives of numerous nongovernmental, academic, and local, state, and federal government entities gathered at these meetings to discuss marine mammal and sea turtle conservation issues as they pertain to New York State. Workshop priorities were to: 1) review current regulatory and permitting issues, 2) identify information gaps, 3) identify and prioritize conservation needs and goals, and 4) explore potential partnerships for research, data analysis, and resource-sharing. Results from these exercises were summarized and distributed to participants. The workshop also provided the DEC with an up-to-date knowledge base for the development of a New York State Management Plan for Marine Endangered Species.

2) Project Activities & Results

Activities

- This grant included four phases of activity for which the DEC's Marine Endangered Species Program coordinator was responsible: event planning, event staging, post-event accounting, and post-event reporting. Event planning involved composing and sending meeting invitations, identifying and reserving a meeting space and catering service, inviting speakers, creating meeting agendas, preparing meeting materials, and coordinating with meeting facilitators. The coordinator worked with facilitators to stage the event by preparing meeting space and materials, arranging transportation, co-convening and co-facilitating the meetings, and by cleaning up the meeting site after the workshops adjourned. Post-event accounting required communication between the coordinator, the Atlantic States Marine Fisheries Commission Finance Director, the conference center, and meeting facilitator to finalize invoices for contractual services rendered.
- There were no discrepancies between the activities proposed in the grant and the final outcome of the grant, although the funding provided was generous enough to support a second workshop in addition to the originally proposed 2006 workshop. It should be noted that meeting facilitation was provided during the 2006 meeting by DEC staff at no cost. Since those staff were not available for the 2008 meeting, the ASMFC contracted with CONCUR, Inc for meeting facilitation services. Also, in an effort to reduce costs and conserve resources, meeting materials were provided on-line via a

DEC FTP-server for the 2008 workshop as an alternative to information binders that were prepared and mailed for the 2006 meeting.

Results

- Attendance at both workshops averaged approximately 45 experts. The 2006 meeting resulted in a comprehensive list of marine endangered species conservation issues to be considered across seven areas of interest: life history, habitat, fisheries interactions, regulation and enforcement, stranding, outreach, and communication. This list was further examined and prioritized during the 2008 meeting in an effort to identify realistic opportunities for conservation achievement within the next two years. Recommendations from both meetings are currently being incorporated in the development of an endangered species management plan for New York State.
- Workshop participants supported the creation of a New York State Marine Endangered Species Working Group, and supplemental listserve referred to as "NY-MARES." Furthermore, a quarterly working group meeting schedule was established to ensure ongoing dialogue beyond the 2008 meeting. The first meeting will take place in late January 20009.

3) Lessons Learned

An important lesson learned from this project is the value of establishing a mechanism to maintain the momentum of expert dialogue between meetings. Although the 2006 workshop participants seemed to appreciate having the opportunity to network, there seemed to be little continuation of dialogue until the second workshop was convened in 2008. It is hoped that the newly established NY-MARES listserve and working group will continue to facilitate the communication and collaboration that was initiated by this grant. Listserves and working groups require minimal resources and maintenance, are relatively self-sufficient, and are therefore useful tools to any conservation organization trying to promote knowledge exchange and cooperation amongst stakeholders. The DEC is grateful for the contribution of listserve services provided by Dr. Michael Coyne of Seaturtle.org.

4) Dissemination

Final meeting summaries were drafted after each workshop. They were distributed internally to relevant DEC departments, and externally to all meeting participants as well as experts who were unable to attend.

5) Project Documents

a) Photos are regretfully not available. The only photos taken during the 2006 meeting were blurry, and no photos were taken during the 2008 meeting.
b) Final meeting summaries for the 2006 and 2008 workshops, including key discussion materials and meeting outcomes, are enclosed herewith.

2006 New York State Marine Endangered Species Workshop: Final Report

Submitted to:
National Fish and Wildlife Foundation

October 17, 2007

by:
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Elliot Spitzer, Governor
Alexander Grannis, NYS DEC Commissioner

NY Marine Endangered Species Workshop

October 17-18, 2006
Port Jefferson, NY

Introduction:

New York is home to a vibrant and diverse community of marine conservationists. Within this community is a subset of scientists, advocates and managers focusing on marine endangered species who rarely have the opportunity to network and share ideas and findings at the local level. The NYS DEC sought to create such an opportunity by holding a marine endangered species workshop in October 2006.

Marine mammal and sea turtle experts were invited to attend a 2-day meeting to discuss and prioritize marine endangered species conservation needs in New York. Dedicated to knowledge exchange, the first day's agenda provided 30 minute time slots for participants to share their expertise and research on topics such as the status of eelgrass and tidal wetlands, marine endangered species population and stranding trends, a summary of fisheries and fishing effort in New York State, as well as to provide updates on relevant federal regulation changes and permitting requirements. Participants broke out into discussion groups based on taxonomic interest during the second day, and outcomes of the meeting will be used to guide future management decisions.

Objectives:

The purpose of the workshop was to review best available information to aid in the development of a framework for a New York State Marine Endangered Species Management Plan. Specific workshop objectives were to:

1) Review best available information for marine endangered species found in the waters of New York and neighboring states,
2) Review relevant regulation changes and permitting requirements,
3) Identify information gaps and remedies thereto,
4) Brainstorm feasible initiatives to meet conservation needs identified and prioritized during the workshop, and
5) Provide marine endangered species researchers, managers, and rehabilitators an opportunity to network and share ideas.

Workshop Agenda:

Tuesday, October 17, 2006

8:00 Continental Breakfast and Registration

8:30 Call to Order ..... *Mr. Richard Bennett* (facilitator)
New York State Department of Environmental Conservation

8:45 Welcoming Remarks ..... *Mr. Gordon Colvin, NYSDEC*

9:10 Cooperation with States: ESA Section 6 Program Overview .....*Dr. Dan Rosenblatt, NYSDEC*
on behalf of Dr. Lisa Manning, National Marine Fisheries Service

9:40 Overview of the Marine Mammal Protection Act and
Marine Mammal Conservation in the Northeast .....*Ms. Amanda Johnson*
National Marine Fisheries Service

10:15 Break

10:30 Permitting and Authorizations .....*Mr. Patrick Opay, National Marine Fisheries Service*

11:00 NYS Marine Mammal and Sea Turtle Stranding Program ..... *Ms. Kim Durham*
Riverhead Foundation for Marine Research and Preservation

11:30 Morning Session Wrap-up

11:45 Lunch around Port Jefferson

1:15 Reconvene

1:30 RFMRP Marine Mammal and Sea Turtle Research .....*Mr. Rob DiGiovanni*
Riverhead Foundation for Marine Research and Preservation

2:00 Introduction to the New York Bioscape Initiative
and an Update on Manatee Sightings.....*Dr. Susan Elbin and Dr. James "Buddy" Powell*
Wildlife Trust

2:30 Marine Mammals and New York ..... *Dr. Chris Clark, Cornell University*

3:00 Break

3:10 Status of New York's Tidal Wetlands .....*Mr. Fred Mushacke, NYSDEC*

3:40 Status of Eelgrass and Macroalgae in New York..... *Mr. Chris Pickerell*
Cornell Cooperative Extension

4:10 Overview of New York's Fisheries ..... *Mr. Emerson Hasbrouck, Cornell Cooperative Extension and Mr. Peter Anderson, NYSDEC*

4:40 Questions, Answers and Discussion

5:00 Preview of Day 2 ..... *Ms. Nicole Mihnovets, NYSDEC*

5:15 Closing Remarks

5:30 Adjourn

6:30 Cocktail Hour, Danfords Main Lobby Lounge

Wednesday, October 18, 2006

8:00 Continental Breakfast and Networking

8:30 Call to Order .....*R. Bennett*

9:00 Review of Day 1 .....*N. Mihnovets*

9:15 Work Group Session #1
- Confirm focal species list
- Discuss threats and conservation needs
- Brainstorm conservation actions

10:00 Break

10:15 Work Group Session #1 Continued

11:45 Lunch around Port Jefferson

1:15 Reconvene

1:30 Work Group Session #2
- Prioritize conservation actions
- Identify opportunities for collaboration
- Suggest other considerations for the development of a NYS Marine Endangered Species Management Plan

2:15 Break

2:30 Work Group Session #2 Continued

3:00 Work Group Reports and Discussion

3:40 Final Discussion and Workshop Wrap-up

4:00 Adjourn

Day 1, Presentations:

Endangered Species Act (ESA) Section 6 Cooperation with States:

Dr. Dan Rosenblatt, Regional Wildlife Manager for the NYS DEC presented on behalf of Dr. Lisa Manning, Section 6 Coordinator of the NMFS Office of Protected Resources. Section 6 of the ESA authorizes cooperation between federal and state agencies for the purpose of conserving endangered and threatened species. Funding has been available to states holding Section 6 Agreements since 2003, and has supported two projects in New York State: Aerial Surveys of Cetaceans in the New York Bight, and Marine Endangered Species Coordination. In addition to providing a mechanism for federal financial assistance, a Section 6 Agreement allows the state to promulgate regulations which may be more restrictive than the ESA or its implementing regulations. Generally, the Marine Mammal Protection Act takes precedence over the ESA and does not permit states to impose their own regulations. However, states with Section 6 agreements are not subject to this stipulation and are permitted to impose more restrictive regulations for marine mammals.

Marine Mammal Protection Act (MMPA) Overview and Updates from the National Marine Fisheries Service (NMFS) Northeast Region:

Amanda Johnson, Right Whale Research Coordinator for the NMFS Northeast Region's Protected Resource Division summarized relevant sections from Title 1 of the MMPA, which addresses conservation and protection of marine mammals. She also reviewed current focal issues, related funding opportunities, and conservation and management activities taking place in the northeastern United State.

Section 104 under Title 1 of the MMPA states that permits may be issued to authorize the taking or importation of any marine mammal for activities such as: scientific research, enhancing survival or recovery, educational photography, public display, and incidental take during commercial fishing activities or non-commercial fishing operations.

Section 117 calls for annual publications of stock assessment reports (SAS). SASs provide information such as geographic range, population trends, estimated human-induced mortality and injury, and estimated number of animals that can be removed from a population without negatively affecting that population.

Section 118 addresses commercial fishery interactions by establishing a zero mortality rate goal to reduce marine mammal takes to insignificant levels approaching zero. It also establishes an annual List of Fisheries which categorizes the likelihood of serious injury and mortality of marine mammals due to fishing activity as Category I (frequent), Category II (occasional), or Category III (remote). Section 118 also covers the Marine Mammal Authorization Program, the monitoring of incidental takes, establishment of emergency regulations and development of take reduction plans (TRPs).

The NMFS Northeast Region has the lead on the Atlantic Large Whale TRP, the Harbor Porpoise TRP, and Atlantic Trawl Gear TRP. Marine mammal takes associated with fisheries using trawl gear in the Atlantic, and with ship strikes are current top-priority issues. NMFS has worked to address them by convening take reduction team meetings and by drafting proposed rules and strategies to reduce marine mammal mortality. NMFS sponsors several highly competitive funding opportunities to include the Right Whale Research Program and the Atlantic Coast States Cooperative Planning for Right Whale Recovery Program. This funding has

supported projects such as the development of disentanglement response programs and conservation plans in Maine, Massachusetts, and Rhode Island.

Permitting and Authorizations

Pat Opay, Ecologist with the Office of Protected Resources at NMFS Headquarters, reviewed legal mandates and permitting requirements for takes of marine mammals, sturgeon, and sea turtles in the United States. The NMFS is responsible for issuing permits for cetaceans, pinnipeds, sturgeon, sea turtles, and other marine species listed under the ESA. In the case of sea turtles, NMFS (within the US Department of Commerce) has jurisdiction in the marine habitat, while the US Fish and Wildlife Service (within the US Department of Interior). Three key legal mandates guiding the permitting process are the ESA, the MMPA, and the National Environmental Policy Act (NEPA). NEPA requires federal agencies to consider, analyze, and publicly disclose the potential impacts of federal actions. Permit issuance is a "major federal action" – the impacts of which often must be assessed in either an Environmental Assessment (EA) and associated Finding of No Significant Impact (FONSI), or an Environmental Impact Statement (EIS).

Permits are the main exceptions to take moratoriums set by the ESA and MMPA. Issued under either Section 10 of the ESA or Section 104 of the MMPA, permits authorize qualified people or organizations to conduct activities such as scientific research or efforts to enhance survival or recovery of a species which would otherwise prohibited. However, Section 10 permits do not provide coverage for the incidental capture of ESA-listed species, while Section 101 of the MMPA allows incidental take of small numbers of marine mammals pursuant to a specified activity (other than commercial fishing) within a specific geographic area if:

- the total taking will have a negligible impact on the affected species or population stock;
- the total taking will not have an unmitigable adverse impact on the availability of the affected species or stock for taking for subsistence uses;
- means of effecting the least practicable adverse impact on the affected species, their habitat, and their availability for subsistence uses are set forth; and
- requirements pertaining to the monitoring and reporting of the taking are set forth.

Through Section 101 (a)(5)(A), an Incidental Harassment Authorization (IHA) is issued for activities only involving harassment, and through Section 101 (a)(5)(D), a Letter of Authorization (LOA) is required for activities that may involve harassment and mortality.

Permit applications are reviewed according to NEPA requirements and are published in the Federal Register as part of a 30-day public comment period. Following public comment, the application undergoes ESA Section 7 consultation and comprehensive NEPA analysis. Section 7 consultations require that all federal agencies must insure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of an endangered or threatened species, or result in destruction or adverse modification of designated critical habitat. The NEPA analysis, along with relevant decision memos and biological opinions undergo agency clearance, at which point, the permit is either issued or denied. Permits can be issued for up to 5 years, and permit extensions for up to 1 year can be issued in some circumstances.

NYS Marine Mammal and Sea Turtle Stranding Program (MMSTSP)

Kim Durham, Rescue Program Director and Biologist at the Riverhead Foundation for Marine Research and Preservation (RFMRP) summarized program protocols and data collected by the MMSTSP. From 1980 through September 2006, 1,604 pinnipeds, 444 cetaceans and 1,136 sea turtles stranded in New York State. Response protocols for marine mammal and sea turtle strandings include taking morphometric measurements, determining reproductive status, and sampling of teeth, ear bones, feces, and stomach contents. Blood (plasma, serum, red blood cells), skin and muscle tissue are sampled for genetic analysis. Liver, kidney and blubber (or fat in the case of sea turtles) are sampled for contaminant analysis and stomach liver, urine, feces, and lungs are sampled for biotoxin analysis. Serology tests are run to determine the presence of equine encephalomyelitis, West Nile virus, leptospirosis, morbillivirus (including canine, phocine, dolphin, and porpoise distemper virus), and Brucella abortus. The RFMRP archive contains 289 samples from 4 species of sea turtles, 1,187 samples from 5 pinniped species, and 619 samples from 20 cetacean species that stranded in New York as far back as 1985, 1986 and 1987 respectively.

Between 1980 and 2006, there were 65 documented large whale strandings:

Northern Right Whale (*Eubalaena glacialis*)	2
Sperm Whale (*Physeter macrocephalus*)	5
Fin Whale (*Balaenoptera physalus*)	15
Humpback Whale (*Megaptera novaeangliae*)	18
Sei Whale (*Balaenoptera borealis*)	2
Minke Whale (*Balaenoptera acutorostrata*)	13
Balaenopterid (Species Unknown)	10.

Also between 1980 and 2006, 380 strandings of 10 other cetacean species were recorded in the RFMRP database including: Common, White-beaked, Bottlenose, Atlantic White-sided, Striped, Spotted, and Risso's Dolphins; Pilot and Pygmy Sperm Whale, and Harbor Porpoise. Of the 238 cetacean strandings reported to the program since 1997, thirty cases involved live animal responses. RFMRP successfully rehabilitated and released a Risso's Dolphin and a Harbor Porpoise, and rescued an offshore Atlantic Bottlenose Dolphin Calf which was placed in Forida-based permanent care facility.

Including transfers from other states, 1,136 sea turtles are accounted for in the RFMRP database. Of these, 371 occurred between 1996 and 2006 with the following breakdown:

Kemp's Ridley (*Lepidochelys kempii*)	67
Leatherback (*Dermochelys coriacea*)	80
Loggerhead (*Caretta caretta*)	196
Atlantic Green (*Chelonia mydas*)	28.

In addition to continuing overall support of the NYS stranding program, there is a need to develop a wildlife response contingency plan for events such as oil spills and whale mortality.

RFMRP Marine Mammal and Sea Turtle Research

Rob DiGiovanni, Director and Senior Biologist of the RFMRP presented general information about sea turtle and marine mammal survey efforts in New York. Sea turtle monitoring takes place through a cooperative arrangement between RFMRP, Dr. Steve Morreale at Cornell University, Dr. Alonso Aguirre with the Wildlife Trust, Dr. Chris Smith's staff in the Marine Program of Cornell Cooperative Extension of Suffolk County, and 11 pound net

fishermen of the Peconic Bay. A poundnet is a type of fixed entrapment gear that incidentally captures sea turtles in addition to targeted species such as flounder and striped bass. The Poundnet Program operates between July and November when fishermen call a hotline number to report a captured turtle. A team is then dispatched to gather life history data, collect samples for health assessment, tag the turtle and release it. Between 2002 and 2006, 75 turtles have been recovered from poundnets:

Kemp's Ridley (*Lepidochelys kempii*)	24
Loggerhead (*Caretta caretta*)	2
Atlantic Green (*Chelonia mydas*)	49.

Of these, 6 were recaptures, and 3 were brought into RFMRP facilities for treatment.

To date, these efforts are the only continual sea turtle monitoring system implemented in New York State. The next steps are to analyze life history data, process, and analyze samples for serum chemistries, virology, as well as PCB and organocholorine contamination. Additional objectives are to compare the poundnet program results with stranding data, as well as to compare data gathered during different permit cycles of the project. Future sea turtle work should ensure the continued collection of baseline data, facilitate seasonal and annual abundance estimation, determine habitat usage and characterization, identification of future threats to survival, and expansion of monitoring beyond the Peconic Bay.

RFMRP has worked to determine the feasibility of conducting cetacean surveys in the New York Bight and of providing aerial survey coverage in the Mid Atlantic region. These surveys allow for the provision of real-time sighting data to the NMFS Northeast Fisheries Science Center and Sighting Advisory System. RFMRP partnered with the NYS DEC in 2004 to obtain funding through the Section 6 grant program to perform aerial surveys for North Atlantic Right Whales. Survey objectives were to provide aerial support for tracking and location of entangled whales, to collect survey data to be incorporated in abundance and distribution estimates, to relate animals sighted to animals recovered by the rescue program, and to collect data on vessel traffic and fishing activity in New York waters.

During the aerial survey period from January to April, 2005, 1151 individual animals representing 12 different cetacean species were observed over the course of 239 sightings. These observed species were: Harbor porpoise; Fin, Sei, Humpback, Right, Minke, Pilot and Sperm whales; and Risso's, Common, Bottlenose, and White Sided dolphins.

Important questions regarding marine endangered species in New York are:

- To what extent should we be concerned with human interactions?
- Should we be looking at other species for potential interactions?
- What is the population of marine mammals and sea turtles in the New York Bight?

Introduction to the New York Bioscape Initiative and an Update on Manatee Sightings

Dr. Susan Elbin summarized the structure and activities of the New York Bioscape Initiative. Wildlife Trust is an international organization of scientists dedicated to the conservation of biodiversity that promotes a regional approach to conservation, referred to as a "bioscape." A bioscape is a social-ecological landscape whose boundary is set by a common sphere of human influence, and it serves as an effective area for integrating environmental science, natural resources management, and public health policy together with local values and other activities needed to ensure ecological health. With a 100-mile radius from midtown New York City, the New York Bioscape encompasses a 28,000 square mile area and supports 24 million people—8% of the US population.

Since 2002, the New York Bioscape Team has grown to include 35 scientists, health professionals, and natural resource managers from 15 institutions and is involved with 14 projects. Program goals are to:

1) Demonstrate links between human actions, biodiversity, and health;
2) Influence environmental policy and natural resource management;
3) Create a NY metropolitan ecology and health knowledge community;
4) Implement conservation medicine in the region; and
5) Share results with the Wildlife Trust Alliance network and beyond.

Projects are categorized by themes such as human-wildlife conflict (e.g. insect ecology and urbanization; coyotes in the Hudson Highlands), invasive or over-abundant species (e.g. mute swans and double-crested cormorants), and eco-health (e.g. environmental toxicants in sea turtles, harbor herons, and common terns). Dr. Alonso Aguirre collaborates with the Riverhead Foundation for Marine Research and Preservation, Cornell University, and Cornell Cooperative Extension of Suffolk to administer a sea turtle health assessment project in the Peconic Bay.

Dr. James "Buddy" Powell, also from Wildlife Trust, provided general life history information on manatees which appear in New York waters on rare occasions. *Trichechus manatus latirostris*, the Florida subspecies of the West Indian manatee inhabits the waters of the Southeastern United States, and is often attracted to warm water sources such as powerplants, industrial locations, and natural springs. During the summer of 2006, a Florida manatee sighting was reported in NewYork's Hudson River, and subsequent sightings were reported offshore of Rhode Island and Massachusetts. Given that there was no evidence of distress or poor health, and given that habitat conditions were suitable for the manatee, no efforts were made to relocate it back to Florida.

Marine Mammals and New York

Dr. Chris Clark, Director of the Bioacoustics Research Program (BRP) at Cornell University, spoke about the connections of policy, management, and research for the conservation of whale species. The mission of the BRP is to engage in basic and applied research that promotes the appreciation, understanding, and conservation of the Earth's biodiversity by concentrating on the development and application of advanced acoustic technologies.

There are complex linkages between climate variability, food availability and whales. Whales have specialized adaptations for the ocean environment – and they are acoustically active. Therefore the application of acoustic technology to record vocalizing whales can benefit conservation and management efforts. Listening is more cost effective than visual observation and has a higher probability of whale detection.

NOAA is mandated by the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA) to reduce anthropogenic mortalities to endangered whales and other species of concern such as sea turtles and fish. NOAA has determined that serious injury or mortality of even a single individual Northern right whale can jeopardize the population's recovery (other species of concern include humpback, fin and beaked whales; fishes and turtles.) Acoustically, coastal habitats are becoming urbanized and industrialized (i.e., noise levels around ports of entry are equal to or higher than OSHA thresholds). Federal or state actions that could lead to increased risk of serious injury, mortality, or habitat modification must contain plans to monitor and mitigate impact to endangered species. Currently, there is an urgent regulatory need

to address monitoring and mitigation of ship strikes and acoustic harassment from anthropogenic activities.

Important questions regarding marine mammals in New York are:

- Is standardized, streamlined marine mammal monitoring effort underway?
- Do we know what's out there, how many and where?
- Are we training the next generation of scientists, managers, regulators?
- Are there adequate preparations for liquid natural gas terminals?
- Is the Port of New York in compliance with ship strike risk reduction requirements?
- Wouldn't it be wise and prudent to "listen" around one of the world's busiest and economically important ports to know what's out there?

Status and Trends of Tidal Wetlands in New York's Marine District

Fred Mushacke, Tidal Wetlands Inventory Specialist for the NYS DEC, provided an overview of New York's tidal wetland to set an ecosystem-based context for marine endangered species management and conservation. Following the passage of the Tidal Wetlands Act (Article 25) of 1973, New York State initiated a tidal wetland inventory in 1974 to identify and classify all tidal wetlands in the marine district. In 1977 Tidal Wetlands Land Use Regulations (Part 661) were promulgated, thereby regulating all types of activities within 150 feet of the tidal wetlands boundary in New York City, and 300 feet of the boundary in Nassau, Suffolk, and Westchester counties. Wetlands were re-inventoried in 1989 to evaluate effectiveness of tidal wetlands regulatory program and to conduct a trends analysis.

Qualitative studies of large acre wetland complexes show no apparent loss of vegetated marsh *Spartina alterniflora*; and wetland islands appear to sustain greater loss than land-based marshes. With the exception of Jamaica Bay losses (44 acres per year), in the marshes studied throughout Long Island, losses are occurring at a rate of ½ to ¾ of an acre per year. To date, no "smoking gun" cause or impact has been found. Each wetland complex seems to have a unique loss "fingerprint," although some losses are easily speculated given historic impacts. Based on current trends, of the 15 areas studied, approximately 1395 acres, or 8%, of *Spartina alterniflora* marshes have been lost since 1974. This translates to 5580 tons per year of organic material that is unavailable to the marine ecosystem.

Potential factors causing wetland loss include: sediment budget disruption, wind and wave erosion, ponding, sea level rise, maintenance of human-made structures, and ice scraping, gouging, tearing, or expansion. Next steps for wetland management are to obtain funding to continue trends analyses, assess areas for wetland loss and determine reasons for losses, development management plans, develop stewardship partnerships with local municipalities and civic groups, and to begin remediation. It is important to consider what effects the loss of primary productivity will have on endangered marine species and how they can be resolved.

Status of Eelgrass and Macroalgae in New York: Implications for Marine Endangered Species

Chris Pickerell, a researcher with Cornell Cooperative Extension's Marine Program, summarized the connection between submerged aquatic vegetation (SAV) its documented importance to certain sea turtle species. SAV is defined as rooted, submerged macrophytes, including seagrasses and freshwater rooted macrophytes. More specifically, seagrasses are rooted, submerged marine or estuarine macrophytes of several species. According to NOAA, there are at least 50 species worldwide, 2 of which are found in New York: Eelgrass (*Zostera marina*) and Widgeon Grass (*Ruppia maritima*). Macroalgae, or "Seaweeds," are photosynthetic,

multi-cellular forms of underwater plants without roots that float freely or attach via holdfast to a substrate. There are 6,500 species worldwide, 100- 200 of which have been documented in New York, and 65 of which have been observed in SAV beds of the Peconic Estuary. Additional information about Long Island's seagrasses is available at www.seagrassli.org.

The first comprehensive aerial photo- documentation of Long Island's seagrass meadows took place in 1930. Since then, losses of 75-90% have been documented for Long Island Sound, Peconic Estuary, and the South Shore Estuary Reserve. Although it may be somewhat difficult to make a direct link between SAV and most of New York's marine endangered species, there is a fairly direct link between SAV and sea turtles.

In particular, the Green sea turtle is known to consume both macroalgae and eelgrass. Other turtles such as the Loggerhead and Kemp's Ridley may utilize SAV beds as feeding sites. Studies by Karen Bjorndal in the 1980's found that green sea turtles are mostly herbivorous, with specific hindgut microflora that allows for breakdown of high fiber plant material. They also maintain "grazing plots" where they selectively consume young shoots. Green sea turtles are also known to inhabit New York waters between June and October. Furthermore, Morreale and Standora found that Kemp's Ridley sea turtles feed on a diet composed mainly of benthic invertebrates, and "In New York……..while many [Kemp's Ridley] fed mainly on spider crabs, some concentrated more on rock crabs, and two other individuals appeared to eat only lady crabs". And Loggerhead sea turtles are known to eat crabs, mollusks, and horseshoe crabs.

The scientific body of SAV literature is loaded with papers demonstrating that species richness and abundance are usually higher in eelgrass meadows when compared to adjacent unvegetated bottom. Habitats created by seagrass meadows are among the most diverse and productive estuarine environments.

In reference to bay and estuarine habitats, Morreale and Standora assert that "management strategies and species recovery plans must include serious consideration of these critical developmental habitats". The link between sea turtles and SAV warrants additional study regarding the specifics of feeding preference, foraging depth and other factors. It is likely that conservation and restoration of SAV habitats will assist in support of sea turtles in the region. Therefore, regulatory efforts should consider addressing this need. As areas around Long Island convert from seagrass-dominated to macroalgae-dominated systems, there will likely be shifts in foraging by local sea turtles. There are considerable opportunities to study the interaction between marine endangered species and SAV habitats.

Commercial Fisheries of New York

Emerson Hasbrouck, Fisheries Specialist for Cornell Cooperative Extension's Marine Program, summarized landings trends and commonly used gear types in New York's commercial fisheries. Commercial fisheries landings have dropped from the first records of over 300 million pounds in 1880 to less than 50 million pounds in 2005.

The following species were landed between 2000 and 2004:

Species	Average Annual Landings (million lbs)
Atlantic surf clam	18.50
longfin squid	18.25
silver hake	5.10
clam/ quahog	1.75

American lobster	1.75
bluefish	1.60
tilefish	1.50
scup	1.30
goosefish	1.25
summer flounder	1.10.

The following geartypes were used in New York between 2000 and 2004:

Gear Type	Average Annual Landings (million lbs)
otter trawl	19.50
clam dredge	8.50
gill net	2.30
tongs, grabs, and rakes	2.25
long line	1.75
pots and traps	1.30
hand line	0.75
pound net	0.50.

Day 2, Discussions:

Participants broke out into 2 discussion groups based on taxonomic interest: marine mammals and sea turtles and habitat. The following materials were provided to facilitate brainstorming and dialogue:

NY Marine Endangered Species Workshop
Discussion Material

Species List:

Common Name	Scientific Name	State Status	Federal Status
Leatherback Sea Turtle	*Dermochelys coriacea*	E	E
Green Sea Turtle	*Chelonia mydas*	T	T
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	E	E
Loggerhead Sea Turtle	*Caretta caretta*	T	T
Hawksbill Sea Turtle	*Eretmochelys imbricata*	E	E

Common Name	Scientific Name	State Status	Federal Status
Fin Whale	*Balaenoptera physalus*	E	E
Sei Whale	*Balaenoptera borealis*	E	E
Right Whale	*Eubalaena glacialis*	E	E
Humpback Whale	*Megaptera novaeangliea*	E	E
Sperm Whale	*Physeter catodon*	E	E
Blue Whale	*Balaenoptera musculus*	E	E
Harbor Porpoise	*Phocoena phocoena*	SC	SC
West Indian Manatee*	*Trichechus manatus*	--	E

Issues Known to Threaten Marine Endangered Species

Habitat

- Water quality (point/non-point source pollution, oil spills)
- Marine debris (ingestion)
- Underwater noise
- Wetland loss (cover/forage)
- Overharvest of prey

Boat Strike

- Shipping
- Recreational
- Charter
- Ecotourism

Bycatch

- Hook and Line
- Gillnet
- Seine
- Trawling (bottom/mid-water)
- Trap/pot

- Longline
- Poundnet
- Ghost/abandoned gear

Offshore Activities/ In-Water Construction

- Wind farms (turbines, sub-sea cables, drilling)
- Liquid natural gas terminals (traffic, cables)
- Seismic exploration
- Sonar
- Channel dredging
- Beach nourishment dredging

Miscellaneous

- Impingement (electrical plant cooling water release)
- Human harassment

Discussion Topics:

A. Species List

- Would you suggest any changes to the species list? Why or why not?

- As New York works to build capacity for marine endangered species management, should it concentrate strictly on species listed as threatened, endangered or special concern, or do you think all marine protected species should be considered? Why?

- Please identify and explain which species can New York play a significant conservation or research role? (Also, please provide a justification for any species you don't include.)

B. Species Status

- Recalling the information reviewed to this point (presentations, back ground information, personal experience), please summarize the current known condition of these species, including the causes of their condition.

- Referring to the list of issues known to threaten these species, what are specific threats most relevant to the survival of each species? What are the sources of these threats? Would you add or remove anything on this list?

- Which of these threats are most relevant to known activities/sources based in New York?

- Which issues do you think are most important for New York to consider, and why?

- What are the most critical information gaps to be remedied in New York, and how can New York go about filling them?

C. Species Conservation

- What are some reasonable goals for conservation activities taking place in New York in the short-term (2 years), mid-term (5 years) and long-term (10 years)? How can these goals be met? Please suggest potential NY-based efforts to conserve these species keeping in mind the following schematic:

Conservation/ Threat Mitigation	Activity	Outcomes	Indicators of Progress
Research			
Monitoring			
Cooperation (In-state, regional, inter-agency)			
Stewardship/Awareness			
Policy/Regulation			
Other			

- Please consider and explain how these activities might work to the benefit or detriment of other marine protected species.

- How would you recommend for New York to prioritize conservation and research activities?

- What resources are currently available to initiate these activities, and what resources are still needed (besides $$)?

- Can you identify any specific funding opportunities, or granting agencies that may provide support for New York-based conservation and research activities?

- Please consider and explain the social implications of undertaking these activities, and discuss how any negative perceptions can be resolved.

- Do you have any comments, concerns, or recommendations with regards to the development and mechanics of a marine endangered species ma

Conclusion:

Workshop participants agreed that a follow-up meeting to continue dialogue and to develop specific ideas and projects would be beneficial. Please refer to the appendix for their specific responses to a post-meeting survey.

Workshop outcomes are currently being incorporated in a draft marine endangered species management plan. Workshop participants will be encouraged to review and comment on the draft, and once the draft is finalized, it will undergo New York State's public review and regulatory processes. Plans are underway to conduct a second meeting during late winter 2008 using funds left over from last year's meeting.

APPENDIX

NY Marine Endangered Species Workshop
October 17-18, 2006
Follow-up Survey Results

1. Task Accomplishment

Overall, my rating of our meeting is:

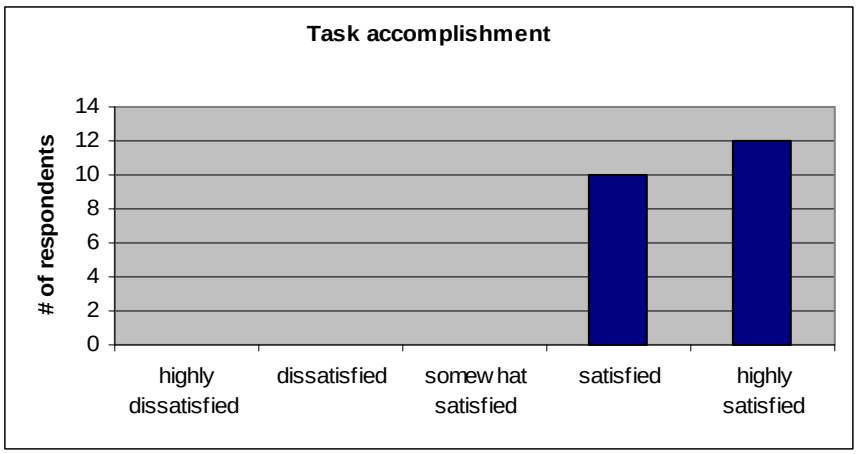

Figure 1. Respondents were asked to rank task accomplishment on a scale of 1 to 5, where 1 represented a high level of dissatisfaction and 5 represented a high level of satisfaction. Not included in this graph is a ranking of 4.5 provided by one respondent.

Comments:

- This has been a very important first discussion of our state of knowledge and what should be considered for future management and action plans.
- Generally, I thought the meeting was very good. I'm unsure that the outcome of the meeting best met your goals. At the beginning of the meeting, I would have benefited by more clearly stated objectives and then review at the end whether these goals were met.
- I thought that you achieved a good mix of user groups to help develop your management plan. However, if you have a second workshop, you may want to include some of the groups that are impacting the endangered/protected species inhabiting NY waters.
- Excellent job!
- I think this meeting is a necessary first step towards management of endangered marine species in NY. Thank you for organizing it. It will be ultimately successful if the many good ideas generated here are implemented in the years and decades ahead.
- Thank you!
- There was a need for this meeting and I am glad it happened!
- Excellent mix of participants bringing diverse perspectives.
- Effective means of establishing and re-establishing communication; an excellent first step.
- A very comprehensive, well structured meeting. The Presentations were informative (and not too long)—good data/ findings presentations, not data overload.
- The meeting preparation was excellent— during the meeting, background information was available if needed. Now, of course, is the tough part: follow-up.
- Great way to meet new people and discuss conservation issues in NY!
- Good organization/ planned activities.
- I think we met our goals as participants in that we supplied our thoughts and recommendations. We now need to assemble them and develop management plans.
- I think co-mingling of groups may have been a useful discussion.
- I appreciated the opportunity to meet with all those included.
- Very well done and run. Very smooth. And hope follow-up is as good.
- Everything was excellent. The only issue has to do with funding and making all this great stuff happen.

2. Group Process

Overall, my rating of the group interaction and our abilities to meet our desired objective is:

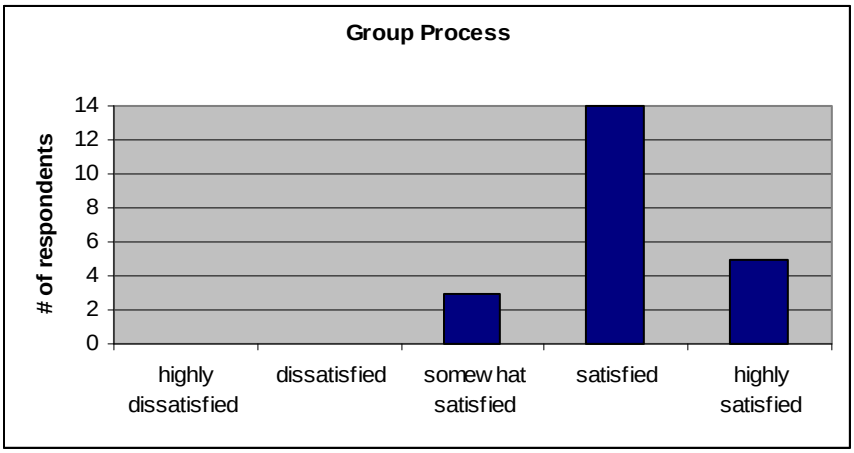

Figure 2. Respondents were asked to rank the group process on a scale of 1 to 5, where 1 represented a high level of dissatisfaction and 5 represented a high level of satisfaction. Not included in this graph is a ranking of 4.5 provided by one respondent.

Comments:

- The marine mammal group was very cohesive, working well to achieve our goals. I think one thing that would have been helpful would have been for us to have materials either presented in a talk or mapped out on paper on what we know about species abundance in the NY area. But this can be done in future meetings. This was a fact finding meeting and a good first step. We just don't have too many facts at this point.
- I was very pleased with the interaction between the individuals attending.
- The expertise and interest of the group seemed to match the needs of the group and objectives.
- Difficult to get folks to focus on task at hand, but better than many groups I've worked with.
- Not enough time. I know you tried to invite industry— but more industry/ non-science stakeholder interaction would have been good.
- The only thing that I feel was not addressed during the meeting was what the next step will be and who is going to be working on what items discussed during the group sessions.
- Group discussions sometimes drifted to specific agendas, but overall, effective.
- Excellent, diverse group that enhanced the discussion.
- Good exchange of ideas and opinions in a non-threatening way. Good facilitation. It felt like a truly learning team experience.
- Though I believe we came up with more questions of what to address in the plan than actual guidance.
- Local focus limited range of strategies that would be likely for implementation.
- We got hung up on some issues and some went off on tangents. But I think there were some good discussions. On some topics, I thought some were trying to solve conservation problems so it was beyond the scope of what we were doing.
- Thought we should have discussed prioritization of threats more (matrix?). But good laundry list of "to do." Not enough focus on fisheries in group…not enough conservation minded folks in turtle group.
- Great communication between participants.
- Don't like to say more time would help, but a follow-up would be helpful.
- Some issues dominated the discussion more than they needed to.
- Just felt that marine mammal and sea turtle groups needed to interact more.
- More products to react to would have helped.
- This was a great group. In fact, it would be great to formalize it as a (NY Sea Turtle) Specialist Group. This would also probably help with obtaining funding.

3. The part of the process I found most productive was:

- I think the talks and the brainstorming / fact-finding workgroups and the second day worked well together. Now, with a more comprehensive summary of our gaps in data in knowledge, which appear to be rather extensive, we can continue to plan to fill in or attempt to gather more needed information and do it in a systematic manner toward our goal.
- The breakout sessions and the lectures enabled individuals to learn about the issues facing New York.
- The opportunity to share information and thoughts about solutions and needs.
- Identifying what gaps of information there are and who has what kind of data available.
- The first day presentations provided a good introduction to the major issues. The day two process went well because the participants stayed focused (welcome change).
- Day 2 discussions.
- Discussion on Day 2; management actions.
- Besides the first day's presentations (which were outstanding), I found the networking opportunities (i.e. lunch, breaks, and dinner) to be extremely useful.
- Meeting participants and learning about resource interchange beyond the workshop.
- I'm honestly not sure that any component was more productive than any other.
- The discussions in the separate groups.
- Break-out discussion groups with people not necessarily working solely on the species in question were really good—stimulating.
- Networking and informal discussion.
- Learning what others are doing, networking, establishing baseline for future actions, and generation of ideas.
- Group discussions were good aside from moving away from topics we were supposed to be discussing. The presentations were great and very informative to acquire background info.
- Working groups—could have been longer time however.
- Presentations, then discussion.
- The discussion.
- Workgroups. Some of the talks were excellent and on point.
- Networking.
- Workgroups.
- The workshops on Tuesday were great for brainstorming.

4. I think future meetings like this workshop would be worthwhile:

	Yes	**No**
# of respondents:	23	0

Comments:

- I would continue the workshop- each time having talks that further synthesize our existing knowledge in some visual way—mapping the region and showing the data on animals (distribution, abundance, noisescapes [if known or projected] and shipping

information). Also, if we have information on sources of major man-made pollution (as opposed to biotoxins) it should be shown.

- Follow up for refining components of plan.
- To discuss specific projects / people / funding to fulfill management plan objectives.
- Perhaps make it regional- alternating between states within the region and/or focusing on one particular threat / conservation action / species group.
- There needs to be a follow up meeting (next year?, or sooner) to see if any of the objectives of this meeting were moved forward with.
- There should be follow up with working groups to bring action from the discussion.
- Yes, if future groups move forward toward action. To avoid at all costs are five or ten years of workshops looking for focus and action.
- Very well planned, organized, attended, and "peopled"→ really good meeting. Location was terrific, too.
- When some of the questions have been addressed.
- Less presentations and more discussion on specific topics identified beforehand.
- If development of effective management plans are developed.
- Mix the groups.
- After initial draft of plan.
- Great idea— just have a narrower focus.
- Annual.
- Certainly, especially if they would lead to tangible strategies, such as pursuing funding, through a NY Sea Turtle Specialist Group.

5. Some suggestions/considerations for future marine endangered species conservation coordination efforts are:

- I would be happy to help you in planning a future workshop if needed! Thanks for all the great work!
- None at this time.
- 1) Riverhead/ Cornell Bioacoustics collaboration, 2) NJ/NY collaboration (acoustic pop-up), 3) adoption of Atlantic Large Whale Take Reduction Plan to NY management plan (fisheries), 4) extension of NOAA/NMFS SAS right whale reporting system to mid-Atlantic waters, 5) ALS ship reporting / speed tracking, and 6) expansion/extension of NMFS suggested shipping speed regulations in NY.
- One thing which I would have liked was a list of attendees on the first day—with their affiliations.
- Bring funding resources into the process.
- Establishment of working groups / listserves of participants; web presence—portal with data and/or presentations.
- Include members from groups who may hold different opinions—but this would maybe be a follow-up, after everyone on the "same side" is in agreement. Perhaps we need someone who could help present the other side (is there one???)…
- Encourage Riverhead Foundation to collaborate with universities, many would be happy to run samples.
- Expanding to a regional rather than single-state focus.

- Excellent workshop, very well run.
- Smaller breakout groups. Have enforcement agents present and get an update on recent enforcement activities. Endangered fish (shortnose)? Perhaps have members of regulated groups present.
- Needed more emphasis on fish (e.g. sturgeon) to fully address “Section 6” component of meeting.
- Integration with ongoing management plan efforts.
- Narrow the focus a little.
- Sea turtle working group, and marine mammal one.
- Overall, excellent job. Great work organizing this!

2008 New York State Marine Endangered Species Workshop: Final Report

Submitted to:
National Fish and Wildlife Foundation

January 15, 2009

by:
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David Patterson, Governor
Alexander Grannis, NYS DEC Commissioner

New York Marine Endangered Species Workshop
October 15 - 17, 2008
Port Jefferson, New York
Key Outcomes Summary Report

I. OVERVIEW

The New York State Department of Environmental Conservation (DEC) convened the New York Marine Endangered Species Workshop from October 15th through October 17th, 2008, in Port Jefferson, NY. (See **Appendix 1** for a copy of the agenda.) The meeting focused on four primary objectives:

- Review relevant state and federal marine endangered species policies
- Discuss current knowledge of marine mammal and sea turtle life history trends in New York in an ecosystem-based context
- Discuss conservation and management needs that can be addressed by research and monitoring activities in New York
- Identify concrete strategies for moving forward and tracking progress

This summary, prepared by DEC and reviewed by meeting facilitator CONCUR, Inc., provides an overview of the meeting's key outcomes. It is presented in six main sections: Overview, Participants, Meeting Materials, Key Outcomes, Next Steps, and Survey. The Key Outcomes section is further segmented into the following:

- ***Welcome and Introduction.*** This section provides a brief overview of meeting purpose, agenda overview and ground rules.
- ***Presentations.*** This section summarizes the information presented during panel discussions and special topic presentations on aerial monitoring and data management.
- ***Concurrent Group Discussions.*** This section provides a detailed summation of the conservation objectives considered by sea turtle and marine mammal break-out group discussions.
- ***Plenary Discussions.*** This section synthesizes discussions related to building an integrated strategy to advance conservation and management, and the actions and timelines necessary to do so.

II. PARTICIPANTS

The meeting was attended by 38 participants from New York, New Jersey, and Massachusetts. Participants included: Alison Chase, Allison Chaillet, Ann Warde, Antoinette Clemetson, Ariana Breisch, Artie Kopelman, Bill Wise, Brad Peterson, Brendon Reid, Brendon Moran, Carrie Upite, Christine O'Connell, Christine Santora, Don Harrington, Genia Naro-Maciel, Gordon Waring, John Fitzpatrick, John Tanacredi, Joe Warren, Karen Chytalo, Kelley Tucker, Kevin Kispert, Kim Durham, Kristin Gerbino, Lynn Schnurr, Maria Brown, Mark Fast, Matt Schlesinger, Maureen Krause,

Meredith Martin, Michael Coyne, Mike Davenport, Paul Sieswerda, Peter Anderson, Rob DiGiovanni, Stephen Schott, Tara Froehlich, and Tara Schneider. (A list of participants and their affiliations is included in **Appendix 2**).

Nicole Mihnovets with the DEC and Bennett Brooks from CONCUR – an environmental dispute resolution firm specializing in marine resource and water issues – served as co-conveners and facilitators. DEC staff John Maniscalco and Kevin Kispert also attended part of the meeting to support workshop objectives.

III. MEETING MATERIALS

Numerous meeting materials were provided to support the group's discussions. Most of the material was provided prior to the meeting on the DEC's FTP server ftp://ftp.dec.state.ny.us/dfwmr/marine/Marine%20Endangered%20Spp%20Workshop/.

Handouts for presentations given during the 2006 Marine Endangered Species Workshop and panel presentations from the 2008 Marine Endangered Species Workshop were also provided at the meeting. The FTP server has been updated with all 2008 meeting materials, including presentations. (A detailed listing of materials is included in **Appendix 3**). Copies of meeting materials can also be obtained by contacting Nicole Mihnovets by phone at (631.444.5621) or via email at anmihnov@gw.dec.state.ny.us.

IV. KEY OUTCOMES

Below is a brief summary of the main topics and issues discussed during the three-day meeting. This summary is not intended to be a meeting transcript. Rather, it provides an overview of the main topics covered, the primary points and options raised during discussions, and commitments made by meeting participants.

A. *Welcome and Introduction*

Karen Chytalo with the DEC provided welcoming remarks, reviewing meeting objectives and emphasizing in particular the value and importance of cooperative engagement. Karen's comments were followed by a brief review and confirmation of the meeting agenda, guidelines, and purpose. (The guidelines are included as **Appendix 4.**) Bennett B. Brooks presented a brief synopsis of the key findings gleaned from his confidential, pre-meeting interviews with a cross-section of nine meeting participants. Meeting participants introduced themselves and commented on their interests in and aspirations for the workshop which included: an interest in learning how universities can help conservation and management; an interest in meeting other experts in the field and how to "plug in" with relevant initiatives; a desire to review the best available information on trends and research opportunities; a need to find out about permitting issues; an interest in better understanding linkages between marine resource user groups and marine protected species habitat; a willingness to facilitate dialogue and collaboration with fishermen on marine protected species issues; an interest in advancing cooperation between entities in

New York and New Jersey; and a desire to facilitate policy-making and integration between decision makers and researchers.

B. *Panel Discussions*

Presenters shared their expertise and opinions during panel discussions during the first day and a half of the meeting. (Speaker bios are available in **Appendix 5**.) Panels were organized based on three objectives:

1) Establish a problem definition and consider why it is important to come together to discuss marine endangered species conservation and management topics.
2) Review current best available information on marine endangered species life history trends with consideration of the status of their habitat and interactions with commercial fisheries activity.
3) Identify future conservation and management needs that can be addressed by research and monitoring activities in New York with a focus on specific strategies that can overcome current challenges and obstacles to progress.

Below is a brief synopsis of each panel discussion.

<u>Panel 1: Problem Definition, "Why is this an issue we need to care about?"</u>

Nicole Mihnovets with the DEC opened the panel discussion with a review of New York State Marine Endangered Species Program objectives and a summary of the DEC's past engagement with marine endangered species conservation initiatives. She also provided a list of relevant state and federal regulations and strategies which provide guidance and mandates for sea turtle and whale conservation and management. After briefly reviewing key management concerns and anthropogenic threats, Nicole closed with comments in support of cooperative efforts to gather scientific information for effective decision-making processes.

Carrie Upite with the NMFS Northeast Regional Office elaborated on federal guidance related to marine endangered species. In particular, she explained the purpose and outcomes to-date of the NMFS Sea Turtle Conservation Strategy, the Atlantic Large Whale Take Reduction Team, the Harbor Porpoise Take Reduction Team, the Atlantic Trawl Gear Take Reduction Team, and the Large Whale Ship Strike Reduction Strategy. She also emphasized the value of federal-state collaboration and local engagement to identify conservation priorities. She wrapped up her presentation with a summary of funding resources, noting that money is not currently available for the National Whale Conservation Fund or the Northeast Region Right Whale program.

Rob DiGiovanni of the Riverhead Foundation for Marine Research and Preservation (RFMRP) shared information on the latest stranding trends for sea turtles, cetaceans and pinnipeds in New York. He highlighted noteworthy events such as the first mass stranding of common dolphins that occurred in January 2007 and a large sea turtle cold stun event that took place during November and December of 2007. He also commented

on apparent changes in sea turtle species composition, an increase in cetacean sightings as compared to previous years, and a relatively steady amount of seal strandings since their occurrence increased significantly in the years following 1992 as compared to the prior 10 years. Rob wrapped up his presentation with a list of questions to be considered by the group such as: Is the increase of strandings related to population increases or is animal health declining? What level of mortality is associated with fisheries? How are marine endangered species using habitats in New York? What is the level of public awareness of marine endangered species presence in New York waters?

Several themes resulted from these presentations and a subsequent question and answer period. Among the most important themes highlighted in the discussion:

- Wide-ranging evidence of whale, sea turtle, and other marine protected species presence in New York waters year-round. Moreover sightings, strandings, and evidence of human interactions are increasing.
- The need for improved understanding of the abundance, bycatch rates, and habitat requirements of these species—particularly with regards to improving the ability to minimize threats to their survival.
- The necessity of raising awareness among both New York policymakers and the general public regarding the existence of marine endangered species in New York State waters. Additionally, there was broad agreement among participants on the importance of deepening the public's understanding of what to do if and when they encounter these species.

Other themes included the need to prioritize conservation work and focus; to maximize conservation impact through partnerships; better inform decision-making within New York's state and local governments; and create an effective funding coalition to expand resources for addressing the needs of marine endangered species.

Panel 2: What efforts have been made thus far? How are they doing?

Kim Durham of the RFMRP shared a brief summary of her program's stranding response activities and highlighted several notable cases that have occurred in the past 2 years. Summary statistics indicate that sea turtles represent 25% of response cases annually, with a majority of cases occurring between July and December, and to a lesser extent, between January and March. In July 2007, seven Kemp's ridley sea turtles (6 alive, 1 dead) stranded with evidence of shark interaction. An additional 10 sea turtles stranded in August; of these, 7 had evidence of human interaction, and 3 were recovered with fixed fishing gear entangled with their bodies. Green sea turtles comprised 22% of all turtle strandings in 2007, and 66% of these strandings were due to cold stun. Marine mammal stranding cases in 2007 included a dead sperm whale, a minke whale, a harbor porpoise with evidence of fisheries interaction, and numerous seals which presented with disease, injury and/or fishing gear entanglements.

Steve Schott with the Cornell Cooperative Extension Marine Program summarized the types of submerged aquatic vegetation found in Long Island and shared an update on the

status of Eelgrass populations in key estuaries. The South Shore Estuary Reserve has seen significant eelgrass loss primarily due to brown tides and restoration projects have proven unsuccessful due to water quality issues. Long Island Sound estuaries have had some success with restoration in the eastern reach of the sound, however, declines in shoot density have recently been observed around Milford Point. The Peconic Estuary has experienced a general decline in eelgrass shoot density as well as overall acreage, however Bullhead Bay has demonstrated an ability to overcome acute disturbance events and recolonize areas of meadow loss. Trends of eelgrass loss in New York mirror global trends. Overall, eelgrass growth in environmentally degraded areas is in decline, in contrast to stable or increasing growth in well-flushed areas with cooler summertime water temperatures. Some areas that were once seagrass-dominated are converting to algae-dominated communities which could provide new feeding grounds for herbivorous animals.

Peter Anderson with the DEC briefly reviewed New York's quota-managed fish species, regulated trip limits for these species, most common commercial fisheries of New York and how the gear is used, and presented summary statistics for recent fisheries effort. During 2007, trawl, gill net, pot/trap, and longline gear resulted in landings of approximately 16,000,000; 2,800,000; 1,500,000; and 1,200,000 pounds of fish, respectively. Dredge, rod and reel, and other gear types landed approximately 1,700,000 pounds of fish. The top 10 species landed during 2007 were caught using all of these gear types except for pot/trap gear. Trawl gear targeted loligo squid, whiting, scup, and flounder. Gill nets targeted bluefish and monkfish. Longlines targeted golden tilefish. Dredges targeted sea scallops. Rod and reel targeted striped bass.

During the question and answer period, participants discussed the lack of incentive for commercial fishers to report marine endangered species interactions and observations. Additionally participants discussed the need to target outreach and rescue efforts based on shifts in marine endangered species trends (composition, location, and stranding increases). Also during the discussion, there was acknowledgement that successful efforts to-date have been a result of partnerships with multiple entities.

Panel 3: What is keeping us from being more successful and how can we overcome these obstacles in the future?

Rob DiGiovanni shared a second presentation with the group, highlighting key programmatic activities of the Riverhead Foundation and commenting on the mechanisms necessary to move forward with conservation efforts. He compared summary statistics of sea turtle data gathered in New York via two avenues: 1) collaboration with pound net fishermen and 2) stranding response. From 2002 and 2006, the years during which a pound net program was active, the number of animals observed in pound nets exceeded the number of animals that stranded on New York coasts—in one case, by as much as 5 fold. Rob also highlighted several cases in which satellite and flipper tags have been used to assess post-rehabilitation movement patterns of rehabilitated sea turtles, cetaceans and pinnipeds.

Rob contrasted the proactive and reactive angles associated with stranding response and rehabilitation, suggesting that there is a need to determine what the common message to the public should be; to develop parameters used to determine what animals should be treated versus what animals should be left alone; and to consider the extent to which resources should be dedicated to health monitoring activities—particularly with respect to pinnipeds. He suggested that future success will involve identifying feasible projects that define the working relationships of involved parties. Rob suggested that these should be considered in the context of the overarching question, "How will the effort put forth promote conservation as well as the missions of the parties involved?"

Ann Warde, with Cornell University's Bioacoustics Research Program (BRP), provided an update on whale monitoring activities in New York and gave an overview of the technologies available through the BRP to advance whale monitoring and conservation. Preliminary analysis of whale vocalization data recorded with 8 underwater passive acoustic recording units indicates that various whale species were present off the coast of New York on various days between 29 February and 15 May 2008. (Two of the original 10 units did not provide data due to equipment malfunction and equipment loss.) Vocalizations from North Atlantic right whales, fin whales, and humpback whales have been confirmed. The BRP undertakes applied research in the realms of population monitoring and behavioral ecology; pioneers technological development of field equipment and data analysis software; and provides education, training and consultation services to interested outside parties. A recent partnership between the Commonwealth of Massachusetts, Woods Hole Oceanographic Institute, and BRP has resulted in the successful design and implementation of a real-time buoy monitoring system that informs mariners of whale presence in the vicinity of shipping traffic. This technology could prove to be useful in New York-based efforts to mitigate vessel strike threats to large whales.

Gordon Waring, with the NOAA-NMFS Northeast Fisheries Science Center (NEFSC), spoke briefly about NOAA's Ecosystem Assessment Program (EAP). The EAP was established in September 2008 with the goal of moving toward ecosystem approaches to management. It aims to cross boundaries of a traditional matrix approach by bringing together all science disciplines within the NEFSC, prioritizing data collection variables, and integrating data using present and new technologies. Data resources include the longest time series and most comprehensive prey database for the Northeast Continental Shelf. Furthermore, the NEFSC conducts year-round to pentennial regional marine mammal monitoring studies using aerial, shipboard, and passive acoustic monitoring platforms. EAP will integrate and model living marine resources and oceanographic data to better access two-way interactions with fisheries and environmental impacts on marine mammals. Gordon pointed out that the research carried out by EAP is directly pertinent to conservation and management interests in New York State since many marine mammals observed by the NEFSC transit or reside in New York. He also added that EAP research will provide better insight into marine mammal foraging ecology, and thus, should be able to provide improved scientific explanations for shifts in habitat use and fitness.

Matt Schlesinger with the DEC summarized the New York Natural Heritage Program (NYNHP) and related tools which may benefit marine endangered species conservation efforts. The role of the program is to facilitate the conservation of New York's biological diversity with an emphasis on rare species and significant ecosystems. The program is mandated by the New York State Environmental Conservation Law to:

1) Identify the locations and status of rare plants, rare animals, and rare ecological communities
2) Develop systems for ranking state and global rarity and produce lists
3) Maintain comprehensive data management systems
4) Analyze and interpret information for the purpose of conserving and managing the state's biodiversity.

NYNHP data are managed using 3 database programs. "Biotics" is a custom application for managing biodiversity data, "mapper" is an ArcView-based program for entering shape files into a master statewide layer, and "tracker" is a tabular Oracle-based program for data transcription. NYNHP data are intended for numerous applications such as: State environmental review processes, State Park Master Plans, Transportation Planning, Watershed Action Plans, Designation of Natural Heritage Areas, research, municipal master planning, Federal regulatory processes, and broad-scale biodiversity assessments. NYNHP lists 5 species of sea turtles and 8 species of marine mammals under the "Active inventory" category, and 1 species of sea turtle and 8 marine mammals under the "Watch List" category. However, NYNHP does not have any records for either of these lists. Matt suggested that the NYNHP could benefit marine conservation efforts in New York by providing a comprehensive, central repository for marine endangered species occurrences.

These presentations culminated in a question and answer period that spanned numerous themes. There was evidence of broad interest in ecosystem-based management considerations, prioritization of needed conservation actions, and enhanced integrated and cross-disciplinary efforts to improve and aggregate data and advance the collective knowledge of managers and researchers. More specifically, participants expressed a desire for better science-management integration, which would include clarity on management objectives, priorities and the nexus of research and monitoring. Discussions also echoed support for specific objectives such as improving public awareness and outreach; filling species occurrence and distribution data gaps; advancing mapping of animal locations and habitat; continuing bio-acoustic monitoring effort for large whales; and defining working relationships such as purpose and role within collaborative conservation strategies.

Conservation Tools Presentations

Kelley Tucker, with the LightHawk organization provided a brief introduction of aerial survey services available to assist conservation research and management efforts.

LightHawk's mission is to champion environmental protection through the unique aerial perspective. With coverage in Latin America, the Eastern Pacific, the Rocky Mountains and the US Eastern seaboard, LightHawk supports conservation objectives spanning from protecting temperate forests and monitoring bay and estuary health, to tracking manatee presence and distribution. Technical flights also support ground-truthing of satellite imagery and conservation easement monitoring. Educational flights enable elected officials, the media, local stakeholders, and funders to observe conservation issues and projects first-hand. LightHawk regional managers are responsible for flight logistics and planning, and all aerial services are provided at no cost.

Michael Coyne summarized the features of his website (*seaturtle.org*) and demonstrated several simple, yet powerful electronic applications for conservation, management, and outreach. Seaturtle.org is a user-supported portal for sea turtle research, conservation, and education. Its mission is to organize the world's sea turtle information and make it universally accessible and useful. With features such as an image library, job board, glossary, mapping tools, the Marine Turtle Newsletter, and several databases, it has over 10,000 registered users and more than 2,000,000 hits per month. Seaturtle.org provides tools that save time and money, are user-friendly yet powerful, support education and outreach, enable fundraising, and foster collaboration. Michael highlighted 3 tools available to the sea turtle conservation community through seaturtle.org: STAT, STRAN, and ISTOR.

- STAT (Satellite Tracking and Analysis Tool) is an integrated system for archiving, analyzing, and mapping satellite tracking data. It functions as a back-up data storage system, enables map creation, makes data retrieval simple and employs quality assurance and quality control protocols to secure data integrity. STAT enables investigation into possible correlations between species location data and environmental variables such as depth, sea surface height, sea surface temperature and chlorophyll.
- STRAND (Sea Turtle Rehabilitation and Necropsy Database) was initially established for NOAA-authorized stranding programs in an effort to centralize sea turtle stranding data. This tool is available only to authorized members of stranding networks. In addition to storing morphometric data and specific necropsy information, STRAND supports photo uploading and storage. Standard summary reports can be generated based on various time scales from months to years.
- ISTOR (International Sea Turtle Observation Registry) is a database designed to facilitate public reporting of sea turtle sightings. It consists of easily navigated drop-down menus that allow the user to provide information on the location and species of the animal sighted, and it allows for users to upload photos if applicable. The general public can see all records of the information they provided. This tool can also be used by researchers and managers who wish to share sighting information with the general public.

Michael concluded his presentation with a demonstration of seaturtle.org's capability to facilitate gap/overlap analysis for current conservation efforts in New York. Using Google Maps and a simple polygon generation tool, managers and researchers can plot parameters such as species location, critical habitat, threats, survey areas, and water

temperatures to generate a visual characterization of currently available marine endangered species data and/or conservation needs. Availability of the tool is ongoing, and could be used by New York's network of marine endangered species experts.

D. *Concurrent Group Discussions*

During the first Marine Endangered Species Workshop held in 2006, participants brainstormed a variety of research and management objectives which broadly aggregated into the following seven categories: 1) Life History, 2) Habitat, 3) Fisheries Interactions, 4) Regulation and Enforcement, 5) Stranding, 6) Outreach and Education, and 7) Communication. This year, participants broke into two discussion groups to further consider these themes based on taxonomic interest: marine mammals and sea turtles. Materials provided to support each group's deliberations included a list of threats, as well as a summary of the 2006 brainstorming session. (These materials are available in **Appendix 6**.) Groups reviewed the list to identify areas of progress since 2006, as well as areas that still require attention. Groups brainstormed a comprehensive list of activities under each theme and then narrowed their focus to recommendations that were most realistic to achieve. Recommendations included the following:

1.) Life History

Marine Mammals

- Expand bioacoustic survey to multiple years and locations to understand hot spots, marine mammal behavior, and possible threats
- Synthesize aerial, acoustic and boat-based information in a coordinated effort to get a better picture of abundance and distribution

Sea Turtles

- Generate predictive distribution maps
- Investigate genetic make up within a population by analyzing archived samples
- Perform long-term monitoring and data collection (mark-recapture; tagging; morphometrics; health assessment)
- Perform historical analysis using archived samples and data and examine relationships with contemporary information

2.) Habitat

Marine Mammals

- Characterize habitats using ARC GIS (i.e., identify hotspots for foraging, overlap with human activity)
- Use acoustic technology to characterize vessel strike threats and anthropogenic noise generation
- Gather data on foraging ecology
- Investigate toxicology of marine mammals
- Create an Environmental Impact Statement on underwater anthropogenic noise
- Create mechanisms to collaborate and share information

Sea Turtles

- Investigate algal bloom influences
- Inventory prey species by sampling fecal and gut contents, or through molecular investigations such as stable isotope analysis
- Characterize habitats and prey presence/distribution using ARC GIS; collaborate with local and regional experts
- Consider impacts of climate change – temperature profiles of beach, prey distribution changes, water level changes, standardization for monitoring, potential for expansion of nesting habitat into New York

3.) Fisheries Interactions

Marine Mammals

- Collaborate with fisherman to promote recording and reporting of fisheries interactions; investigate incentive option to encourage cooperation; consider ways to encourage their participation as citizen scientists while they are out on the water

Sea Turtles

- Create and implement a fisheries observer program; collect human interaction data, particularly for trawl and gillnet fisheries; investigate alternative mechanisms to gather interaction data to include incentives for reporting or carcass transport
- Remove ghost gear from bays and estuaries; coordinate with current marine debris eradication programs
- Investigate mechanisms for getting a better understanding of fishery interactions

4.) Regulation and Enforcement

Marine Mammals

- Clarify communication network
- Undertake proactive coordination with US Army Corps of Engineers, US Coast Guard, Port Authority of New York & New Jersey and other agencies for regulations that may be necessary in future
- Ensure ship strike and ship speed reduction regulation compliance in NY Harbor

Sea Turtles

- Create State mandates that mirror Federal gear modification requirements and interaction reporting requirements

5.) Stranding

Marine Mammals

- Continue efforts to improve public awareness
- Coordinate with sister agencies for outreach efforts
- Distribute mailings to beach communities; insert flyers with coastal and marine permits

Sea Turtles

- Analyze archived samples to elucidate stratification and historical and environmental trends within stranding data
- Foster partnerships for coordinated response efforts; collaborate to secure resources for stranding issues—including funding for data analysis; establish good faith agreements

6.) Outreach and Education

Marine Mammals

- Post information signs and kiosks in parks, public beaches, ferries, and water taxis
- Encourage recreational boater involvement in recording and reporting sightings and strandings
- Create a mechanism for the public to hear real-time audio clips of whale vocalizations occurring in New York waters
- Generate and distribute species identification cards
- Conduct outreach to water skiers

Sea Turtles

- Create an information kiosk at the NY aquarium that provides local information, including the New York State Marine Mammal and Sea Turtle Stranding hotline number
- Provide species ID cards and reminders for interaction reporting or species sightings through official DEC mailings to fishermen; display the New York State Marine Mammal and Sea Turtle Stranding hotline number on fisher's vessel trip report books
- Maximize on the contributions of citizen scientists

7.) Communication

Marine Mammals

- Create a collaborative structure for information sharing and centralized data management; led by DEC Marine Endangered Species Program
- Create a unified voice among local experts
- Foster joint projects
- Facilitate connections between local environmental groups with related missions and objectives
- Identify new potential partners for collaboration
- Continue expert workshops
- Tap into already established marine science consortia

Sea Turtles

- Cooperate locally on needed data synthesis, present at conference and publish joint papers when possible
- Create an online presence such as a listserve
- Establish an expert working group

- Take advantage of the New York State Natural Heritage Program's online presence as source of information for managers on issues such as project impacts or critical habitat designation
- Reinstate data sharing between stranding and sighting databases and the DEC; use STRAND, STAT and ISTOR to manage general database information
- Collaborate with already established working groups such as the Submerged Aquatic Vegetation Task Force

D. *Plenary Discussions*

The final day of the workshop convened in a plenary session that kicked off with a review of the commonalities and distinctions between the previous day's concurrent breakout discussions. Participants were then charged with the task of identifying which objectives could be made a reality within the next two years. An emphasis was placed on developing concrete commitments within the next six months to ensure immediate traction and continued momentum following the workshop.

Immediate Goals:

- Establish formal New York Marine Endangered Species Working Group with issue-focused technical advisory committees on marine mammals and sea turtles
    - Technical committees:
        - Data/research/monitoring/inventory (habitat, fisheries, life history, strandings, sightings)
        - Outreach
        - Regulation/policy/enforcement

- Create a mission and vision statement, followed by a code of ethics on how to work together and a template for data-sharing agreements

- Create a listserve called "NY-MARES" as a communication tool for the New York Marine Endangered Species Working group

- Work towards centralizing data

- Explore options for mitigating ghost-gear; communicate with current ghost gear program sponsors on the East Coast; conduct a public event; solicit outreach help from media

Entities that should be included in ongoing communications and working group discussions:

- NMFS headquarters
- Fishing community leaders
- Wildlife Trust
- Cornell/other NY-based academic institutions (Dowling; use NY Consortium)
- Baykeeper
- Advocacy groups (Audubon, Sierra Club, the Nature Conservancy)
- Municipalities (towns, counties)

- Merchant Marine Academy
- NY Harbor Operations Committee
- NY Coast Guard (Staten Island)
- Riverkeeper
- NY City Animal Work Group

V. NEXT STEPS

The workshop concluded with discussions of short-term (within the next three months), near-term (over the next six to 9 months), and long-term conservation and management objectives and associated timeframes. It is expected that the list of objectives will evolve and expand as engagement in NY-MARES builds.

Short-term Objectives

- Establish on-line reference library
    - Hosted by seaturtle.org; distribute password to NY-MARES by October 24, 2008
    - Christine Santora to function as list manager (eliminating redundant listings, etc.); Maria Brown available to assist

- Establish on-line reference database
    - Use mapping tool to illustrate marine endangered species expertise locations and coverage throughout New York;
        - CRESLI will identify useful datasets to share and will coordinate uploads with seaturtle.org; other organizations and individuals are encouraged to contribute
    - Use database as an outreach tool within the expert community and to identify potential collaborative projects for funding opportunities

- Improve outreach to fishermen
    - Include currently available data (species ID, sightings, contact information) in permitting mailings
        - DEC/Riverhead spearhead
        - Needs to be done before Thanksgiving to mesh with mailing (this timing needs to be confirmed)
    - Update VTR books to include sighting, contact information and possible species identification
        - DEC spearhead
        - Needs to be done by the end of November to mesh with mailing (this timing needs to be confirmed)

- Hold first quarterly teleconference
    - Target meeting time: January 15-30, 2009
    - Intention: Maintain momentum and collaboration initiated during the workshop

    - Near-term focus: updates, new activities, grant opportunities, progress on start-up activities, topics for "Conservationist" articles, etc.
    - Steering Committee arranges (sets agenda, solicits participation)
    - If possible, create two to three locations where participants can gather to foster more face-to-face engagement

Near-term Objectives

- Bring ideas to teleconferences to improve data-sharing
    - Templates (look at SAV and Wetland working group MOUs for ideas)
    - Joint opportunities

- Work towards getting articles in "Conservationist"
    - DEC: Confirm opportunities/necessary lead time
    - All: Develop article ideas

- Define funding opportunities
    - Use list-serve to push at nearer-term opportunities

Long-term Objectives

- Hold quarterly teleconferences

- Improve outreach to fishermen
    - Make available pre-stamped post cards for fishermen to report sightings anonymously
        - DEC/Riverhead spearhead

- Improve outreach to recreational boaters
    - Distribute stranding information flyers at local boater safety instruction sites
        - Riverhead spearhead

VI. SURVEY:

Participants were surveyed at the end of the workshop to gauge meeting effectiveness and to provide a mechanism for sharing recommendations anonymously. Overall, participants reported being satisfied with the processes and outcomes of the workshop. Most agreed that a biennial Marine Endangered Workshop tradition would be an important resource for New York's marine endangered species conservation community. A full description of survey results are provided in **Appendix 7**.

Questions or comments regarding this summary should be directed to Nicole Mihnovets with the DEC. Nicole can be reached at 631-444-5621 or via email at anmihnov@gw.dec.state.ny.us.

APPENDIX 1: MEETING AGENDA

New York Marine Endangered Species Workshop
October 15-17, 2008: Danfords Conference Center, Port Jefferson, NY

Working Agenda

DAY ONE

Time	Topic	Sub-Topics
1:50 PM	Arrival and Greetings	
2:00 PM	Welcome, Introductions and Meeting Objectives	• Welcoming Remarks (N. Mihnovets) • Agenda Review and Meeting Guidelines (B. Brooks) • Meeting Purpose and Objectives (K. Chytalo) • Participant Self-Introductions (All)
3:00 PM	Panel Discussion: Problem Definition *Why is this an issue we need to care about?*	• Provide context on marine endangered species conservation and management in New York. Presentations to focus on relevant policies, identify issues of concern, and consider the key question: "Why is it important for us to come together to discuss these topics?" • Panel members o Nicole Mihnovets, NYS DEC, State management and policy o Carrie Upite, NMFS, Federal management and policy o Rob DiGiovanni, RFMRP, Marine mammal rescue, rehab, research • Panel presentations followed by plenary questions, comments and discussion
4:00 PM	*Break*	
4:15 PM	Panel Discussion: Current Trends and Initiatives *What efforts have been made thus far? How are they doing?*	• Review current knowledge of marine endangered species life history trends (i.e., presence, distribution, strandings) in New York, to assess the status of marine endangered species habitats, and to summarize New York-based fisheries efforts. • Panel members o Kim Durham, RFMRP, Sea turtles and marine mammals o Steve Schott, CCE, Submerged aquatic vegetation o Peter Anderson, NYS DEC, NY Fisheries • Panel presentations followed by plenary questions, comments and discussion
5:15 PM	Discussion Synthesis and Look Forward	• Review key discussion points • Preview Day 2 and Day 3 agendas
5:30 PM	Adjourn	

Note: A cocktail hour and welcoming reception will be held from 6 p.m. to 7 p.m. in the Wave lounge, by the Danfords hotel lobby and reception area. We look forward to seeing everyone there.

DAY TWO

Time	Topic	Sub-Topics
7:45 AM	Continental Breakfast (Diplomatic Room)	
8:30 AM	Day Two Overview	• Participants questions and comments from Day One • Agenda review (B. Brooks)
8:45 AM	Panel Discussion: Challenges Ahead and Moving Forward *What's keeping us from being more successful and how can we overcome these obstacles and barriers in the future?*	• Identify conservation and management needs that can be addressed by research and monitoring activities in New York; focus on specific strategies to overcome problematic barriers • Panel members o Rob DiGiovanni, RFMPR, Research, rescue, and outreach o Ann Warde, BRP, Acoustic tools for whale monitoring o Gordon Waring, NMFS, Ecosystem group at NMFS and translation to State interests o Matt Schlesinger, NYS DEC, Natural Heritage Program • Panel presentations followed by plenary questions, comments and discussion
10:15 AM	*Break*	
10:30 AM	Interactive Demonstration	• Demonstration of electronic applications for conservation, management and outreach, Michael Coyne, Seaturtle.org o Overview o Demonstration o Discussion of applicability to New York's circumstances
Noon	Presentation	• Information on LightHawk aerial survey services for researchers and managers, Kelley Tucker o Brief question and answer
12:15 p.m.	*Lunch*	
1:30 PM	Concurrent Group Discussions: Identifying Promising Strategies for Moving Forward	• Meeting participants break into two concurrent discussions – sea turtle and marine mammal – to consider following questions: o What progress has been made on 2006 workshop recommendations? o What conservation and management needs can be addressed by research and monitoring activities in New York? o What are the most significant barriers to addressing these conservation and management needs in New York State? o What research and monitoring activities can we realistically undertake given these barriers? o Which of these activities are likely to be most effective and should get highest priority? o How can we maximize on limited resources to achieve conservation objectives (coordination among researchers, DEC-led initiatives, etc)?
3:15 PM	*Break*	
3:30 PM	Concurrent Group Discussions *(cntd.)*	• Continue concurrent group discussions
5:00 PM	Report Back to Plenary	• Brief report back on concurrent discussion to full plenary

5:20 PM	Preview of Day Three Agenda	
5:30 PM	Adjourn	

DAY THREE

Time	Topic	Sub-Topics
7:45 AM	Continental Breakfast (Diplomatic Room)	
8:30 AM	Day Three Overview	• Participant questions and comments from Day Two • Agenda review (B. Brooks)
8:45 AM	Plenary Discussion: Building an Integrated Strategy for Moving Forward	• Discussion and review of lessons learned from Days One and Two. Topics to consider: o Where are there commonalities and distinctions between marine mammal and sea turtle issues? o What are some feasible/realistic objectives to address lessons learned from Day Two? o How can we transform our ideas into action? ➢ Suggested projects and potential collaboration o What can each of us do to ensure we make progress over the next six months to two years? ➢ Fostering individual commitments
10:15 AM	*Break*	
10:30 AM	Plenary Continued	• Identify concrete strategies for moving forward and tracking progress o Future needs and next steps ➢ Prioritization ➢ Work plan/milestones/timelines ➢ Strategies to track progress o Wrap-Up
12:15 PM	Closing Remarks	
12:30 PM	Adjourn	

APPENDIX 2: LIST OF PARTICIPANTS

New York State Marine Endangered Species Workshop
October 15-17, 2008

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APPENDIX 3: MEETING MATERIALS TABLE OF CONTENTS

New York State Marine Endangered Species Workshop
October 15 - 17, 2008

ftp://ftp.dec.state.ny.us/dfwmr/marine/Marine%20Endangered%20Spp%20Workshop/

Chapter 1: Meeting Location & Restaurant Information

1) Danfords Map and Driving Directions
2) List of Port Jefferson Village Restaurants

Chapter 2: NYS DEC Resources

1) **DEC.** *2006 New York State Marine Endangered Species Expert Workshop Report*
2) **DEC.** *Checklist of Amphibians, Reptiles, Birds and Mammals of New York State, Including Their Legal Status, Revised 2007*
3) **DEC.** *Links to Relevant Management Plans and DEC Programs*

Chapter 3: Laws & Regulations

1) **CFR.** *Advanced Notice of Proposed Rulemaking: MMPA Stranding Regulations*
2) **CFR.** *Proposed Rule to Amend the Endangered Species Act*
3) **CFR.** *Sea Turtle Handling and Resuscitation Regulations*
4) **USC**. *Endangered Species Act of 1973*
5) **USC**. *Marine Mammal Protection Act of 1972 as Amended 2007*
6) **USC**. *Marine Mammal Protection Act Regulations*

Chapter 4: Fisheries

1) **ASMFC.** *New York Trawl Gear Characterization*
2) **CFR.** *MMPA 2009 Proposed List of Fisheries*
3) **CFR.** *Modified Dredge Requirements for the Sea Scallop Fishery*
4) **CFR.** *Observer Requirement for Fisheries to Monitor Sea Turtle Bycatch*
5) **DEC.** *Analysis of Commercial Fishing Trends in New York, 2006-2008*
6) **Haas et al.** *Characteristics of Sea Turtles Incidentally Captured in the U.S. Atlantic Sea Scallop Dredge Fishery*
7) **NMFS.** *Brochure: Northeast Marine Mammal and Sea Turtle Protection Guidelines for Recreational Boaters and Fishermen*
8) **NMFS.** *Brochure: Strategy for Sea Turtle Conservation and Recovery in Relation to Atlantic and Gulf of Mexico Fisheries*

Chapter 5: Stranding

1) **CFR.** *Criteria for Marine Mammal Unusual Mortality Events*
2) **Glass, et al.** *Mortality and Serious Injury Determinations for Baleen Whale Stocks along the United States Eastern Seaboard and Adjacent Canadian Maritimes, 2002-2006*
3) **NMFS.** *Marine Mammal Stranding Report Form (Level A Data)*
4) **NMFS.** *National Marine Mammal Tissue Bank Draft Form*
5) **NMFS.** *Definitions for Marine Mammal Stranding Report Form*

6) **NMFS.** *Sea Turtle Stranding and Salvage Network Stranding Report Form*

Chapter 6: Entanglement

1) **NMFS.** *Brochure: Large Whale Disentanglement Network*
2) **NMFS.** *Brochure: Sea Turtle Disentanglement Network*

Chapter 7: Ship Strike

1) **Bettridge and Silber.** *Update on the United States' Actions to Reduce the Threat of Ship Collisions with Large Whales*
2) **Jensen and Silber.** *NOAA Technical Memorandum: Large Whale Ship Strike Database*
3) **NMFS.** *Fact Sheet: Final Environmental Impact Statement (FEIS) to Implement the Vessel Operational Measures to Reduce Ship Strikes to the North Atlantic Right Whale*
4) **NMFS.** *Map: Areas Included in FEIS to Implement the Vessel Operational Measures to Reduce Ship Strikes to the North Atlantic Right Whale*
5) **Pace and Silber.** *Poster: Simple Analysis of Ship and Large Whale Collisions: Does Speed Kill?*

Chapter 8: Underwater Energy Development

1) **Natural Currents Energy Services, LLC.** *Application for Preliminary Permit: Shelter Island Tidal Energy Project*
2) **Natural Currents Energy Services, LLC.** *Application for Preliminary Permit: Fisher's Island Tidal Energy Project*
3) **Natural Currents Energy Services, LLC.** *Application for Preliminary Permit: Rockaway Inlet/ Queens Tidal Energy Project*

Chapter 9: Anthropogenic Noise

1) **NMFS.** *Shipping Noise and Marine Mammals: "A Forum for Science, Management, and Technology"; Final Symposium Report*
2) **Samuel, et al.** *Underwater, Low Frequency Noise in a Coastal Sea Turtle Habitat*

Chapter 10: Relevant Scientific Publications

<u>Marine Mammals</u>

1) **O'shea and Odell.** *Large-Scale Marine Ecosystem Change and the Conservation of Marine Mammals*
2) **Redfern, et al.** *Techniques for Cetacean- Habitat Modeling*

<u>Sea Turtles</u>

1) **Burke, et al.** *Diet of Juvenile Kemp's Ridley and Loggerhead Sea Turtles from Long Island, New York*
2) **Lake, et al**. *PCBs and Other Chlorinated Organic Contaminants in Tissues of Juvenile Kemp's Ridley Turtles*

3) **Morreale and Standora.** *Western North Atlantic Waters: Crucial Developmental Habitat for Kemp's Ridley and Loggerhead Sea Turtles*
4) **Morreale, et al.** *Annual Occurrence and Winter Mortality of Marine Turtles in New York Waters*
5) **Shoop and Kenney.** *Seasonal Distributions and Abundances of Loggerhead and Leatherback Sea Turtles in Waters of the Northeastern United States*

Chapter 11: Submerged Aquatic Vegetation
1) **DEC.** *New York Seagrass Experts Meeting: Proceedings and Priority Recommendations; May 2007*

Chapter 12: List of Meeting Participants
1) **DEC.** *2008 New York State Marine Endangered Species Workshop List of Participants*

Chapter 13: Meeting Agenda, Presentations & Discussion Materials
1) Agenda
2) **Panel 1:** *DiGiovanni, Mihnovets, Upite*
3) **Panel 2:** *Anderson, Durham, Schott*
4) **Panel 3:** *DiGiovanni, Schlesinger, Ward, Waring*
5) K. Tucker Presentation
6) M. Coyne Presentation
7) **DEC.** *2006 Workshop Recommendations Summary*
8) **DEC.** *Species and Threats List*

APPENDIX 4: MEETING GUIDELINES

New York Marine Endangered Species Workshop
October 15-17, 2008

The second New York Marine Endangered Species (NYMES) workshop brings together researchers, managers and rehabilitators working to address the needs of marine endangered species populations at-risk, and their habitats in New York State waters.

The three-day workshop offers a mix of panel presentations and discussions intended to foster in-depth deliberations and, among other objectives, identify opportunities for future collaboration and coordination. In that spirit, we put forward the following meeting guidelines.

- **Active, focused participation**. The workshop is structured to encourage an active exchange of ideas among participants. Voicing perspectives is essential to enable meaningful dialogue. We further ask that you strive to be open-minded and integrate participants' ideas, perspectives and interests.

- **Focused comments.** Our agenda is ambitious. Given the limited time, we ask that participants keep their comments as succinct and focused as possible and help ensure that all participants have an opportunity to contribute their thoughts to the dialogue.

- **Respecting Confidentiality.** To encourage free discussion, workshop participants are welcome to share discussion points with other non-attendees, but comments are not to be attributed directly to particular speakers or entities.

- **Gauging Level of Support.** Workshop deliberations may result in a series of recommendations. To the extent such recommendations are developed, the meeting facilitator may choose to gauge participant support for these suggested follow-on actions. The workshop summary will reflect the extent of participant support.

- **Other.** To keep the meeting as effective as possible, we ask that you honor the following meeting management aspects:

    - Keep cell phones off
    - Use scheduled breaks, as possible
    - Wait to be recognized before speaking
    - Avoid side-discussions

We look forward to a productive day and thank you for your participation.

APPENDIX 5: SPEAKER BIOS

New York Marine Endangered Species Workshop
October 15-17, 2008

Bennett B. Brooks, CONCUR

Senior Associate Bennett Brooks heads up CONCUR's New York City office and is involved in all facets of CONCUR's work, including mediation, facilitation, strategic planning and joint fact-finding. Bennett's project work has included facilitating more than two dozen collaborative dialogues on complex natural resource issues ranging from water resource conflicts, ecosystem restoration and public financing, to fisheries and military base reuse issues. His current project work includes facilitating several East Coast stakeholder groups focused on reducing incidental bycatch of humpback whales, harbor porpoise and other endangered marine mammals.

Karen Chytalo, DEC

Karen is the Deputy Chief of the DEC's Bureau of Marine Resources based here on Long Island in East Setauket. Karen has made innumerable contributions to marine conservation throughout her career with the DEC. Currently, she is a member of the Steering Committee to implement the New York Ocean and Great lakes Ecosystem Conservation Act, and is the Chair of the New York Seagrass Task Force, as well as the Chair of the Atlantic States Marine Fisheries Commission's Habitat Committee. Karen has facilitated hundreds of millions of dollars worth of habitat conservation and restoration projects, and has demonstrated unwavering support of efforts to advance marine endangered species conservation and management in New York's marine district.

Carrie Upite, National Marine Fisheries Service

Carrie Upite works at the National Marine Fisheries Service Northeast Regional Office in Gloucester, Massachusetts. She has worked in the Protected Resources Division since 2001. Carrie has worked on analyzing the impacts of various Federal activities on endangered and threatened species, and currently serves as the sea turtle coordinator for the Northeast Region. Some of her responsibilities include assessing and reducing anthropogenic impacts to sea turtles, coordinating with internal and external sea turtle experts, and sea turtle program and budget planning.

Robert DiGiovanni, Jr., Riverhead Foundation for Marine Research and Preservation

Rob DiGiovanni holds a bachelor's degree in marine science from Long Island University and a Masters in applied ecology from New York State University at Stony Brook. He has been involved in marine mammals and sea turtle rescue since the early 1990's where he began as a volunteer for Okeanos Ocean Research Foundation. In 1998 Rob began working with National Marine Fisheries, Northeast Fisheries Science Center conducting marine mammal and sea turtle abundance surveys. In addition to these surveys Rob has conducted seal surveys in New York since 1996 and participated in live seal capture projects in Massachusetts, Maine and

Sweden. Since 2003 Rob has satellite tracked numerous seals, sea turtles, a Risso's dolphin and a harbor porpoise. Rob is currently the Foundation Director and Senior Biologist for the Riverhead Foundation for Marine Research and Preservation.

Kimberly Durham, Riverhead Foundation for Marine Research and Preservation

Kimberly Durham is presently the New York State Marine Mammal and Sea Turtle Coordinator and Rescue Program Director for the Riverhead Foundation for Marine Research and Preservation. Kim has been involved with marine mammals and sea turtles since the early 1990's where she began as a volunteer for the Okeanos Ocean Research Foundation. She presently serves on the National Oceanic Atmospheric Administration's Large Whale Necropsy Team.

Peter Anderson, NYS DEC

Peter joined New York State Department of Environmental Conservation in 2000 after completing a Master of Science degree at LIU CW Post. He currently serves in the commercial fisheries unit, analyzing and setting harvest quotas. Additionally he serves as the information manager for the unit, developing the protocols for the gathering, archiving and disseminating of fisheries data. Recently he restructured the commercial fisheries data gathering procedures, consolidating three procedures into one.

Steve Schott, Cornell Cooperative Extension

Steve has been with Cornell Cooperative extension for 8 years where he works as a marine botany educator and specialist. He manages all of the CCE's eelgrass monitoring programs, oversees eelgrass restoration efforts both in the field and in the greenhouse, and conducts floral surveys and community mapping of preserved lands. His expertise is a valuable contribution to the community outreach provided by CCE on seagrass and algae-based issues.

Matthew Schlesinger, Ph.D., New York State Department of Environmental Conservation

Matt Schlesinger is the Chief Zoologist for the New York Natural Heritage Program, a partnership between The Nature Conservancy and the DEC based in Albany. A native of New York City, he returned to New York last year after completing his Ph.D. in Ecology at the University of California, Davis and 10 years of work as a research wildlife biologist for the US Forest Service at Lake Tahoe. Matt's primary background is in the ecology and conservation of terrestrial vertebrates, but his current position has allowed him to study invertebrates as well and he is currently working on expanding his program to include marine taxa.

Gordon Waring, Ph.D., National Marine Fisheries Service

Dr. Waring works in the Protected Species Branch of NOAA-NMFS's Northeast Fisheries Science Center in Woods Hole. His principal interests include marine mammal ecology, Harbor seal- gray seal interactions, and anthropogenic impacts on marine mammals, about which he has published numerous scientific papers. He has been involved with development of stock assessment reports, as well as several NMFS national teams responsible for developing the NMFS fishery and marine mammal implementation plan.

Ann Warde Ph.D., Cornell University Bioacoustics Research Program

Ann's background is in sound analysis and technology and she first came to Cornell as a postdoctoral fellow in the music department. This background has served as a basis from which she contributes towards investigating and developing innovative ways to use technology to study a broad range of sounds -- in this case those made primarily by cetaceans -- within a framework of scientific conservation. Currently Ann participates in and coordinates marine mammal acoustic analysis projects at the Bioacoustic Research Program, in the Cornell Laboratory of Ornithology, under the direction of Dr. Christopher Clark. She has been with the program for 4 years and supervises a group of 14 research analysts who process and interpret bioacoustic data. Ann also coordinates and teaches the BRP Sound Analysis Workshop, which provides acoustic analysis training to conservation biologists and managers from all over the world.

Michael Coyne, Ph.D.

Michael Coyne is the Founder of Seaturtle.org and current Chairman of the International Sea Turtle Society. Michael founded Seaturtle.org in 1997 with a vision of helping the sea turtle research community and enabling the development of innovative solutions to sea turtle conservation issues. The Web site provides the conservation community and the public with the ability to track marine vertebrates in near real time. His expertise lies in sea turtle biology and conservation, use of satellite telemetry and remote sensing to understand the ecology of marine protected species, and developing tools to facilitate data sharing and distribution. The focus of his recent efforts has been the study of the spatial ecology of marine protected species. His research activities include the use of satellite telemetry to study seasonal migration patterns, investigating the relationship between marine turtles and their environment, and the development of spatial information systems to improve resource management.

Kelley Tucker, LightHawk.org

Kelley Tucker is the manager of eastern US, Canada, Caribbean programs for LightHawk, a non-profit aviation organization that donates flight resources to its conservation partners. She is currently based on the East End of Long Island. Before joining LightHawk, she was Vice President of the International Crane Foundation, guiding conservation efforts in 22 countries. She founded and directed the American Bird Conservancy's pesticides and birds program and has been a consultant to the Manomet Center for Conservation Sciences and the John D. and Catherine T. MacArthur Foundation.

APPENDIX 6: DISCUSSION MATERIALS

New York Marine Endangered Species Workshop
October 15-17, 2008

2006 New York Marine Endangered Species Workshop
Discussion Material

Species List:

Common Name	Scientific Name	State Status	Federal Status
Leatherback Sea Turtle	*Dermochelys coriacea*	E	E
Green Sea Turtle	*Chelonia mydas*	T	T
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	E	E
Loggerhead Sea Turtle	*Caretta caretta*	T	T
Hawksbill Sea Turtle	*Eretmochelys imbricata*	E	E

Common Name	Scientific Name	State Status	Federal Status
Fin Whale	*Balaenoptera physalus*	E	E
Sei Whale	*Balaenoptera borealis*	E	E
Right Whale	*Eubalaena glacialis*	E	E
Humpback Whale	*Megaptera novaeangliea*	E	E
Sperm Whale	*Physeter macrocephalus*	E	E
Blue Whale	*Balaenoptera musculus*	E	E
Harbor Porpoise	*Phocoena phocoena*	SC	SC
West Indian Manatee*	*Trichechus manatus*	--	E

Issues Known to Threaten Marine Endangered Species:

Habitat

- Water quality (point/non-point source pollution, oil spills)
- Marine debris (ingestion)
- Underwater noise
- Wetland and submerged aquatic vegetation loss (cover/forage)
- Over-harvest of prey

Bycatch

- Hook and Line
- Gillnet*
- Seine
- Trawling (bottom/mid-water)*
- Trap/pot
- Longline
- Pound net
- Ghost/abandoned gear
- Dredging (scallop)

Offshore Activities/ In-Water Construction

- Wind farms (turbines, sub-sea cables, drilling)
- Liquid natural gas terminals (traffic, cables)
- Seismic exploration
- Sonar
- Channel dredging
- Beach nourishment dredging (hopper)

Boat Strike

- Shipping
- Recreational
- Charter
- Ecotourism

Miscellaneous

- Climate change
- Impingement (electrical plant cooling water release)
- Human harassment
- Disease

2006 Workshop Recommendations

Marine Mammals

Life History:

1) Analyze currently available data and acquire additional data on abundance and distribution, prey species and related habitat usage in an ecosystem-based management context
    a. Develop interdisciplinary projects that overlap temporally and spatially
    b. Consider implications of climate change
2) Compare current and historical data and examine the cause of any spatial or temporal changes
3) Determine whether or not a distinction exists between transient and resident species found in NY

Habitat:

1) Investigate impacts of alternative energy projects and other anthropogenic habitat modifications.
2) Characterize the soundscape of NY waters and determine the extent to which whales may be affected by anthropogenic noise (such as seismic exploration or shipping noise)
3) Investigate the relationship between the number of ships, their movement patterns, and established shipping traffic lanes with whales and their migratory patterns
4) Investigate potential relationships between biotoxins (for example, domoic acid) and whale health

Fisheries Interactions:

1) Work with industry to remove floating lines from pot fisheries
2) Focus on commercial fisheries issues since recreational fisheries are not regulated under take reduction plans
3) Tease VTR data for information on interactions

Regulation & Enforcement:

1) Incorporate marine mammals in the permit review process throughout appropriate agencies
2) Provide periodic enforcement training (regarding harassment, disentanglement and stranding) to area law enforcement officers

Stranding:

1) Modify oil spill contingency plan to incorporate stranding response protocol

Public Outreach:

1) Instill awareness of species presence in New York
    a. Encourage public reporting of animal sightings
    b. Promote understanding of harassment definitions
2) Provide opportunities for marine debris education and prevention

Communication:

1) Provide separate opportunities for experts to discuss non-listed and/ or rarely encountered species
    a. Seals- how to prepare for increasing trends in presence
    b. Harbor porpoise- acoustic monitoring to determine presence and characterize noise impacts
    c. Sperm whales- vessel strike and entanglement are likely, however this species is general found offshore

2006 Workshop Recommendations

Sea Turtles

Life History:

1) Analyze currently available data and acquire additional data on abundance and distribution, prey species and related habitat usage in an ecosystem-based management context
    a. In-water tagging and telemetry studies
2) Generate up-to-date maps synthesizing available sea turtle data
3) Investigate the connectivity of turtles found in NY with regard to the range of their population
4) Create a centralized repository for historical and newly acquired data

Habitat:

1) Characterize habitats
    a. SAV distribution
    b. Identify algae species and presence
2) Compare turtle data with oceanographic parameters such as temperature, currents, chlorophyll, etc.
3) Provide sea turtle habitat information to the DEC's master habitat database
4) Determine the impacts of construction and operation of offshore energy terminals, wind farms, and underwater turbines
5) Investigate habitat-related disease

Fisheries Interactions:

1) Investigate the extent of fisheries interactions in NY
    a. Characterize NY fisheries and bycatch data (scallop dredging, long line, pot gear)
    b. Increase observer effort
2) Examine pound net bycatch data to determine population distribution trends

Regulation & Enforcement:

No comments made on this topic

Stranding:

1) Maximize on stranding data to determine causes of mortality

Public Outreach:

1) Increase awareness for fishermen and recreational boaters
    a. Reporting strandings, sightings, and entanglements
    b. Boat strikes

Communication:

1) Establish a sea turtle working group
    a. Can provide feedback for proposed construction projects

APPENDIX 7: WORKSHOP SURVEY RESULTS

NY Marine Endangered Species Workshop
October 15-17, 2008

1. Task Accomplishment

Overall, my rating of our meeting is:

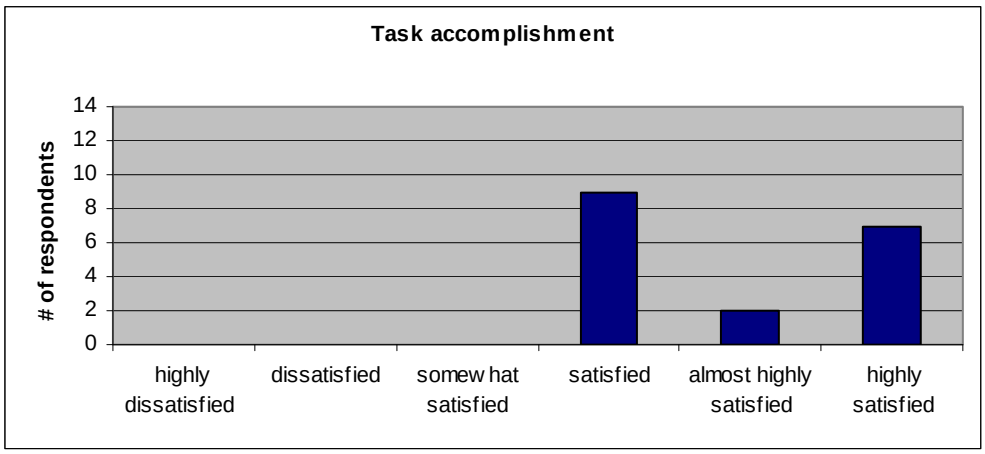

Figure 1. Respondents were asked to rank task accomplishment on a scale of 1 to 5, where 1 represented a high level of dissatisfaction and 5 represented a high level of satisfaction. Rankings of 4.5 were classified as "almost highly satisfied".

Comments:

- Excellent progress was made including concrete tasks, assignments, and deadlines.
- Potential for collaboration is exciting; but still need to figure out what we want out of this group in the long term. Short term goals for January are a good start for the short term.
- Well run and focused.
- Got to network, my objectives were met.
- The moderators did an excellent job of keeping the speakers to the allotted time slots. The schedule was well organized. The flip charts were difficult to follow- bad markers/ colors?

2. Group Process

Overall, my rating of the group interaction and our abilities to meet our desired objective is:

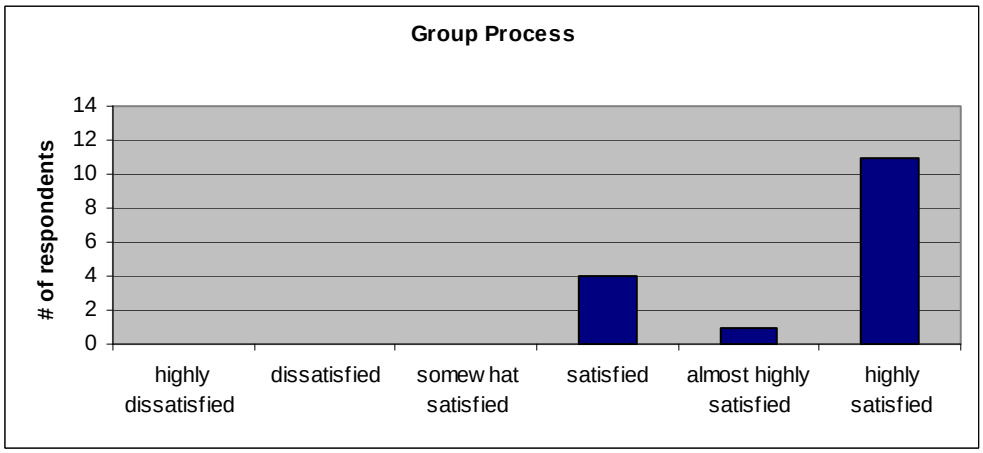

Figure 2. Respondents were asked to rank the group process on a scale of 1 to 5, where 1 represented a high level of dissatisfaction and 5 represented a high level of satisfaction. A ranking of 4.5 was classified as "almost highly satisfied".

Comments:

- Very well facilitated by Bennett and Nicole
- The last day seemed to be the most productive in terms of discussion and honesty.
- Unable to attend.
- Great interaction.
- Facilitator was good.

3. What part of the process did you find to be most productive?

- Focused group discussion
- The end, sitting around the table brainstorming.
- Discussion at the end.
- Important to have both lectures for updated information and workgroups for informal brainstorming and gathering of input.
- Input from various disciplines and expertise. Break out session was well-run and focused.
- The breakout and discussion on goals and plans. Additionally, the end summaries which tied everything together and set goals.
- Breakout session and group discussions were most productive.
- Very organized and thorough. Attendees covered a wide variety of areas of expertise.
- Breaking into the smaller discussion group on the second day. Also, presentations by panelists provided good background on current projects in NJ.
- If Bennett's participation as facilitator would be continued for the next meeting, or two at least…it's good to have an "outsider". Day 2 brainstorming was great. Not letting too much structure and hierarchy intervene.
- Small group discussions. Brief presentations of background information.
- The free interaction during the session and breaks allowed brainstorming and networking.
- Breakout groups and final discussion.
- Group discussion.
- The group discussions, however the presentations were very informative.

4. What could have been done to make the meeting more effective?

- Maybe integrate sea turtle and marine mammal groups. Would love to see a broadened focus on other rare species in addition to the listed ones. (New York) Species of Greatest Conservation Need, for example, to prevent future need for listing.
- Focus on long term outcomes and make sure science is a primary focus (doing it right, ID'ing exactly what we need for better management).
- Was very well facilitated.
- I think State politicians/ Legislatures' exposure might have been helpful for driving home the importance and scientific significance of the long term goals of the group and maintaining Nicole's position.
- I think that some broad goals should have been discussed first, and then presenters could tie in their specific abilities to stated goals.
- I think this was a great meeting to get the working group started and will become more effective as time progresses.

- It was very effective.
- Always need to be building trust between groups represented and challenges of each. This was good but I'm just pointing out that it needs to remain a priority.
- I thought it was an excellent workshop.
- Less talk on data sharing.
- It would have been beneficial if you had a table that identified recent historical and current endangered/ protected marine mammal and sea turtle research conducted within New York marine waters. This would have provided an overview of what has been accomplished.

5. Do you think future meetings like this workshop would be worthwhile?

	Yes	**No**
# of respondents:	17	0

Comments:

- Definitely.
- Perhaps in 3 or 4 years, rather than 2.
- Group needs to be carefully expanded…don't invite people "cold". Have them be briefed and bridged by members in the group prior to attending.
- You should strive to attract a broader range of marine mammal and sea turtle researchers conducting studies in/adjacent to New York.

6. What is the best way to ensure follow-up and maintain momentum between expert gatherings?

- I think we nailed it- listserve, working group, conference calls…
- Utilize ideas discussed such as listserve, quarterly calls. Get Long Island- based people together in person for the calls.
- Has been well outlined in discussions.
- Listserve!
- Report in PDF format; larger audience of qualified scientists and managers.
- Conference calls.
- Have a point person reminding people. Conference calls should really help.
- Set deadlines to make sure objectives are completed on time.
- Follow through with the deadlines set for the working group. Listserve will be helpful.
- Creation of a listserve with updates. Possible creation of committees for specific issues such as stranding response, data acquisition, regional projects, etc.
- One person at communication center, leveraging connections. Good structure being built.
- Listserve.
- Maintain updated information sharing.
- Active communication.
- Progress! If we show initial progress we will have momentum to continue.
- Email.
- Listserve is an excellent step.

7. **Do you have any recommendations for the focus of future workshops?**
   - Long term objectives- what we want to see in terms of science, management, outreach.
   - I like the quarterly goals approach. Working toward long term goals and prospective funding would be helpful.
   - Defined goals derived from this meeting and subsequent follow-ups.
   - Have breakout sessions for various sub-groups.
   - Have representatives from the fishing community.
   - Strategic planning? Annual planning. Data awareness? Activities awareness? Creating and charging sub-groups. Bring new members in face-to-face.
   - Smaller groups focused more specifically on research, outreach, and other topics.
   - Future conservation work. "On the ground".
   - Gather these people again and keep the momentum.
   - One idea would be a presentation on progress from this meeting.

8. **Do you have any recommendations for the timing of future workshops (time of year, length of meeting, agenda structure, etc.)?**
   - Just more advance notice if possible. I'd recommend 2-3 months notice to maximize everyone's ability to plan ahead.
   - 2 full-day meeting might be okay if it needs to be shortened, but this was good. Good time of year. Future structure should be based on our progress: working group updates, planning for the future, and fundraising.
   - This time is okay.
   - Meeting place: contact John Tanacredi at Dowling College to see about them being a host facility. Late February- early March may be a better time to bring in fishers.
   - Early December- early January (?); length is manageable.
   - Weekdays, late fall is a good time.
   - Seemed good to me.
   - My only recommendation would be for more advance notice of the meeting date in the future- perhaps that would increase attendance.
   - Meeting in winter? Not September and October. Good length- 2 days, but maybe 2 full days rather than 1 full day and 2 half days. Technical groups maybe meet twice a year?
   - Thanks! This was great!
   - Quarterlies are a good idea. The timing seemed good since it is between most field programs. You may want to maintain a calendar of annual marine mammal and sea turtle field projects in/adjacent to your region. Likewise, meeting dates for important conferences, workshops, etc. This would help you select the best window for your meeting. The length of the meeting was good.

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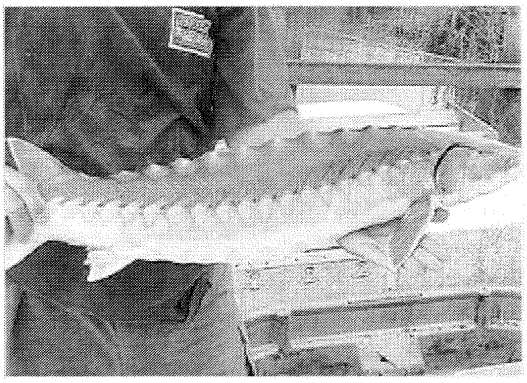

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Prehistoric Sturgeon May Be Doomed

Posted on: Tuesday, 27 May 2008, 06:00 CDT

ALBANY -- Answers on how to protect Atlantic sturgeon -- an endangered fish that is an icon of the Hudson River -- are being teased from the inky depths of the river and the ocean.

The mysterious movements of sturgeon, a prehistoric behemoth with leathery, sandpaper-like brown-green skin, are being revealed by tracking devices to create a road map of the fish's wanderings.

Clues from the those devices are showing sturgeon travel much farther south than originally thought, and may go into commercial fishing zones where they ar caught unintentionally outside the range of protected waters.

"We have found sturgeon from the Hudson going as far south as Georgia," said Ellen Pikitch executive director of the Pew Institute for Ocean Science, which is doing a three-year study with the state Department of Environmental Conservation.

This range may suggest that protected waters need to be extended to shield sturgeon from being part of the accidental "by-catch" of commercially desirable fish, Pikitch said.

Studies show that the largest sturgeon population is in the Hudson, where numbers of juvenile sturgeon have dropped from about 20,000 in the 1970s to fewer than 5,000 in the 1990s, according to the National Oceanic and Atmospheric Administration.

One of the biggest questions so far, Pikitch said, has been why sturgeon numbers are not rebounding since the state adopted a ban on sturgeon fishing in 1996. Federal officials extended that ban along the entire eastern seaboard in 1999.

Those numbers are not rebounding, despite the fishing ban, Pikitch said.
"We are not seeing any problems in the rivers, so something maybe
happening while the sturgeon are in the ocean," she said.

This will mark the third and final summer that researchers go onto the river near Hyde Park, capture sturgeon in nets, bring the 5-foot-plus creatures to the surface and attach two types of high-tech tracking tags.

The DEC tags, now on 20 fish, allow researchers to use underwater listening devices to locate individual fish in the river, while the Pe tags on 23 fish transmit data to orbiting satellites months after the fish have returned to the ocean.

Tracing the path of sturgeon could point the way for wildlife officials to best help the fish rebound, Pikitch added.

Bony-plated sturgeon, which date back some 200 million years, are seen as living fossils. Unlike salmon, Atlantic sturgeon survive their spawning journey each spring up freshwater rivers and return to the sea.

Coming as far upriver as Albany, the fish can live up to 60 years, grow up to 14 feet long, and weigh upward of 800 pounds, according to records from the World Sturgeon Conservation Society.

State officials also are learning about how the fish moves in the river during spawning season, which starts in April and can last into late summer, when females return to the sea. The last of any lagging male sturgeons can linger in the river until almost November.

"We don't know a lot about their spawning areas, where the fish go in the river," said Kathy Hattala, a fisheries biologist with the DEC Bureau of Marine Fisheries/Hudson River Fisheries Unit.

A spawning ground around Hyde Park has been known since fishermen first took sturgeon, but tracking tags have hinted that the fish

also may also spawn near Newburgh Bay, a section of river near Storm King Mountain about 65 miles north of New York City.

"We don't know yet whether this might just be a 'loafing area' for the fish," Hattala said. But identifying other spawning zones would help DEC consider regulations to better protect the fish in those areas, she said.

"We want to make sure the fish are allowed to spawn undisturbed," she said.

A female sturgeon usually doesn't begin to reproduce until it is 20 years old. The fish can then continue to spawn every three to five years for the rest of its life. And since sturgeon continue to grow regardless of age, the oldest fish, which produce the most eggs, are the most fertile.

Pikitch is waiting for June 15, when five more satellite tracking tags are scheduled to detach from the fish, float to the surface of the ocean, and begin transmitting data on the water temperature, light levels and depths to help recreate the sturgeon's path.

"Once we know where the fish go, it will help us decide what needs to be done to protect them," she said. Nearing can be reached at 454-5094 or by e-mail at bnearing@timesunion.com.

Source: Times Union

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May 23, 2008 · Email This Post · Print This Article

7-Foot-Long "Minerva" Breaking the Rules

It began as an ambitious project in the mid-Hudson River two years ago: to tag Atlantic sturgeon with specialized satellite and sonic devices to track migration and spawning patterns, testing whether conventional wisdom on this ancient fish still applied.

Though it is still too early to make conclusions, researchers at the New York State Department of Environmental Conservation (DEC) have seen surprising preliminary results, thanks in part to a 7.5-foot-long fish called Minerva.

In the spring of 2006 and 2007, DEC marked 20 sturgeon with sonic tags that send a signal to remote receivers when the fish return to the Hudson to spawn. Over the same period, DEC attached satellite tags to 23 sturgeon to gather data about their travel once they leave the river. The first few fish spotted have produced unexpected data about their journey.

SONIC TAGS

It has been thought that sturgeon return to the Hudson every three to five years, based on studies of sturgeon eggs, though no one has actually verified the spawning frequency. So it was a curiosity when "Minerva McGonagall" was found in the river near Stony Point in April - just two years after she was equipped with a sonic tag. Then in May, along came "Arthur Weasley" and "R2D2,"also much earlier than expected. (All the fish tagged in 2006 were given names from the "Harry Potter" series; 2007 fish were named after "Star Wars" characters.)

Arthur Weasley is a male fish found near Hastings-on-Hudson, just two years after he was tagged near Catskill. R2D2 returned even sooner. He was found near Danskammer

Point, one year after being tagged in Haverstraw Bay. It's premature to say whether these quick returns are anomalous.

Minerva has displayed other unanticipated behavior, said Amanda Higgs, estuary biologist with DEC's Hudson River Fisheries Unit. First, the female beat the males to the Hudson - an unusual occurrence. Second, she didn't swim straight to the traditional spawning grounds, near Hyde Park. Rather, she dallied near Haverstraw Bay and just recently moved up to the Hudson Highlands, still farther south than she's supposed to be.

"She's breaking all the rules," Higgs said. "Females are supposed to rush to the spawning grounds and then leave. She's been here for a month and a half."

The sonic signals from Minerva and other tagged fish are picked up by a receiver anchored near Hastings-on-Hudson. Once the signal is recorded, DEC researchers proceed by boat to track and obtain more data about the fish. This year, DEC's mobile crew began tracking in early April so as to not miss some of the earlier sturgeon arrivals that may have been missed in 2007 when tracking began later in the season.

The sonic tags will provide invaluable insight on the sturgeon's use of the Hudson and help DEC's Hudson River Estuary Program meet its goals for long-term management of the Atlantic sturgeon. These include: identifying spawning areas, determining bottom-type preferences and estimating how long the fish stay in the river during their spawning run. The project is funded by DEC's Hudson River Estuary Program and Bureau of Marine Resources, along with the Atlantic States Marine Fisheries Commission, in partnership with the U.S. Fish and Wildlife Service. Sonic tagging has continued through the 2008 spawning season.

SATELLITE TAGS

It's typical for fish to leave the Hudson and go north. Think shad and striped bass. Here again, the sturgeon, so far, have gone against the grain.

"We didn't expect them to go south," Higgs said. "They're doing the opposite of the other fish."

In general, the satellite-tagged sturgeon have left the river in summer, lingered in New York and New Jersey waters for a while, then moved south to either the mouth of the Delaware River or Chesapeake Bay. However, two have gone farther.

One male tagged in 2007 made it as far as the Outer Banks of North Carolina. One female tagged in 2006 made it to Georgia.

The tags send a signal every 15 minutes, conveying information about latitude, water temperature and depth. Externally attached to the fish, the tags are programmed to "pop" off after so many months. Supported by a float, the tags drift to a beach where they can be found by their satellite signals. Researchers analyze the data stored on the tags. However, sometimes the journey (weather, other factors) corrupts the data.

A major goal of the study is to learn more about the seasonal migration along the Atlantic Coast. DEC is interested in the particulars of the sturgeon's voyage (i.e., where on the map, how close to shore, at what depths, etc.). The project is funded by DEC's Hudson River Estuary Program and Bureau of Marine Resources, along with the U.S. Fish and Wildlife Service, the Atlantic States Marine Fisheries Commission, the Pew Institute for Oceanic Studies and the University of Miami (Fla.). Satellite tagging has continued through 2008.

One of the goals of DEC's Hudson River Estuary Action Plan (available at www.dec.ny.gov/lands/5104.html) is for Atlantic sturgeon to show signs of recovery by 2009.

"New York imposed a moratorium on sturgeon fishing in 1996 and convinced other Atlantic Coast states to do the same in 1998," said Fran Dunwell, coordinator of DEC's Estuary Program. "Since then, we have aggressively pursued a program of study designed to promote recovery of the species in the Hudson and further protect its habitat."

Sturgeon belong to one of the most primitive groups of bony fish, having survived since the Mesozoic Era. While some characteristics have changed over time, sturgeon remain basically the same as they have been since their beginning. More information about sturgeon and fish conservation plans is available at www.dec.ny.gov/animals/37121.html. For student lesson plans designed for grades 3-5 using river research to teach basic skills, go to www.dec.ny.gov/education/25386.html.

http://www.outdoorcentral.com/fishing/early-sturgeon-data-show-unexpected-results

Research for the recovery of Atlantic sturgeon in the Hudson and Altamaha Rivers

A REPORT TO
THE HUDSON RIVER FOUNDATION

FROM THE
WILDLIFE CONSERVATION SOCIETY (WCS) & PEW INSTITUTE FOR OCEAN SCIENCE

MARCH 2007

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Executive Summary

Background: Although numerous movement and behavior studies have been conducted for Atlantic sturgeon within rivers and estuaries, very little is known regarding their movements and habitat use in the open ocean. This species is anadromous; adults spawn in rivers then return to the ocean where they spend the majority of their life. Atlantic sturgeons spawn in numerous rivers along the Atlantic coast; the Hudson and Altamaha rivers are currently among the most productive spawning systems on the Atlantic coast.

The migratory behavior of Atlantic sturgeon after entering the ocean is largely unknown. Understanding migratory corridors and concentrations sites for this species will enable managers to reduce or eliminate the effects of current or potential threats to Atlantic sturgeon (e.g. fisheries and sand mining operations). One of the primary objectives of this project was to utilize Pop-off Satellite Archival Tags (PATs) that record depth, temperature, and light to identify the migratory behavior and habitat use of Atlantic sturgeon while in the open ocean (see below).

A new Status Review was released for Atlantic sturgeon on 23 February 2007. This review proposed five Distinct Population Segments (DPS) for Atlantic sturgeon based on genetic information. The reviewers recommended that one of these DPS's (New York Bight; fish that spawn in the Hudson and Delaware rivers) should be listed as Threatened under the US Endangered Species Act. In addition, the Status Review showed that one of the most severe threats for Atlantic sturgeon is bycatch; results of our study will be used to help reduce bycatch in ocean fisheries. This proposed listing as Threatened increases the urgency and importance of this PAT-tagging project. Funding is needed from HRF to continue the second and third proposed project phases in order to complete our work.

Summary of the first project phase: Ten Atlantic sturgeon were tagged with PATs during June and July 2006. These tags record depth, light, and water temperature every minute while attached to fish, and were programmed to release and transmit data to researchers via the Argos Satellite System on November 30 (3 tags), February 15 (4 tags), March 15 (1 tag), and June 1 (2 tags). The purpose of tagging Atlantic sturgeon with PATs was to identify oceanic-movement patterns and concentration sites. For example, the depth distributions shown by these tags (minimum and maximum depths occupied while in the ocean) will be used to describe the migratory corridors used by Atlantic sturgeon while moving along the Atlantic coast. The pop-off location for these PATs are precise; hence, if the PATs release and transmit data to the Argos satellite system, then one precise location for each tagged fish at the time of tag release will be provided. In addition, track locations for individual fish can be (and was) estimated using light, depth, and temperature data. Light data can be used to estimate longitude (i.e., time at mid day or mid night) and latitude (i.e., day length). Considerable error is often associated with these light-geolocation estimates. We learned from our first-year results, however, that Atlantic sturgeon swim near the bottom in relatively shallow waters. This behavior allowed us to use oceanic-depth contours and sea surface temperature to reduce error associated with light-geolocation estimates. We found that the locations of Atlantic

sturgeon carrying PATs was estimated quite precisely using this combination of light, depth, and temperature data (see the attached interim report).

Introduction

The Atlantic sturgeon, an anadromous fish that can reach 14 feet in length, is currently present in 32 river systems from the southeastern United States to southeastern Canada (Pikitch et al. 2006). Historically, this species was a popular commercial and sport fish, but overharvest (primarily by commercial fisheries for caviar) resulted in a population crash that never recovered (Williamson 2003; Pikitch et al. 2006). Today, there is a ban on fishing for this species in the United States (small fisheries are present in Canada). Nonetheless, incidental bycatch by U.S. commercial fisheries targeting other species in rivers, bays, and the open ocean (e.g., Collins et al. 1996; Stein et al., 2004a,b) may hamper recovery efforts for Atlantic sturgeon. Indeed, a recovery plan developed by the Atlantic States Marine Fisheries Commission (ASMFC) clearly illustrated two key goals that must be met before this species can recover: (1) "reduce or eliminate bycatch mortality of Atlantic sturgeon" and (2) "determine the spawning sites and provide protection of spawning habitats for each spawning stock" (ASMFC 2005). A new status review was recently published that listed bycatch, dredging, water quality, and lack of adequate state and/or Federal regulatory mechanisms as the most prevalent significant threats to Atlantic sturgeon populations. This status review proposed five Distinct Population Segments (DPS's) for Atlantic sturgeon: Gulf of Maine, New York Bight, Chesapeake Bay, Carolina, and South Atlantic. The review concluded that three of the DPS's (Carolina, Chesapeake, and New York Bight) should be listed as Threatened under the US Endangered Species Act. The New York Bight DPS includes fish that spawn in the Delaware and Hudson rivers. Atlantic sturgeon from the Altamaha River are included within the South Atlantic DPS.

This project leveraged funds, equipment, and personnel with the New York Department of Environmental Conservation (NYDEC) and U.S. Fish and Wildlife Service (USFWS) to understand the migratory behavior, distribution, and habitat needs (in the river and the open ocean) of adult Atlantic sturgeon from the Hudson River, New York. These two agencies became full collaborators with this work. Partial support for this PAT project was also received from the Hudson River Foundation. This interim report describes initial results of the first year of an intended three-year project that will provide information necessary for the recovery of Atlantic sturgeon. The overall objectives of this conservation research, which is still in progress, are: (a) conduct field research to identify Atlantic sturgeon spawning sites in the Hudson River (directed by NYDEC and USFWS using other funds), (b) determine oceanic migratory behavior of Atlantic sturgeon after leaving the Hudson River (led by WCS using FAF funds), and (c) make recommendations to fishery managers that will strengthen the 40-year recovery plan for Atlantic sturgeon that is being implemented by the ASMFC. Understanding the migratory behavior (and therefore important concentration sites in rivers, bays, and the open ocean along the U.S. east coast) will identify potential threats (e.g., pollution sources near spawning or holding sites in rivers; presence in offshore trawling and gill

netting areas) to this prehistoric species. Note that these overall objectives will not be fulfilled until after the second complete field season.

Specific objectives/tasks of the first year of our efforts (as shown in the original HRF proposal) were:

(1) Project planning and coordinating,
(2) Purchase and program PATs (10 ea.); set up and coordinate ARGOS accounts.
(3) Assist NYDEC and USFWS withy capture and tagging of Atlantic sturgeon caught in the Hudson River.
(4) Initiate GIS work.

Methods and Accomplishments

Planning and Project Initiation: This satellite tagging project, designed to identify behavior and movements of Atlantic sturgeon after they leave the Hudson River, was part of a larger project led by NYDEC and USFWS. Those agencies had already planned to catch and tag Atlantic sturgeon in the Hudson River with sonic transmitters to conduct an in-river tracking study. Using funds from HRF, FAF, and WCS, we "piggy-backed" with NYDEC and USFWS to tag Atlantic sturgeon with PATs. This reduced our potential project expenses considerably, and linked us up with project collaborators (NYDEC and USFWS) who had a great deal of experience catching and tagging Atlantic sturgeon on the Hudson River.

Ten PATs were purchased from Wildlife Computers (www.wildlifecomputers.com) during 2006 – two by WCS using FAF funds, two by USFWS, and six by NYDEC Hudson River Estuary Program. Initial planning for the satellite tagging operations was initiated and led by Dan Erickson of WCS early in 2006 (Dan Erickson has currently moved to Pew Institute for Ocean Science; PIOS). A final planning and tag programming session took place in New York on April 26, 2006 to ensure success during the first field season. Participants at this first planning meeting were: Dan Erickson (WCS), Gregg Kenney (NYDEC), Amanda Higgs (NYDEC), and Mike Millard (USFWS). Satellite tags were programmed during this meeting to record depth, temperature, and light every 60 seconds. The PATs were also programmed to release from tagged Atlantic sturgeon on November 30, 2006 (three tags), February 15, 2007 (four tags), March 15, 2007 (one tag), and June 1, 2007 (two tags; Table 1). After release, the PATs were programmed to transmit summaries of the archived data to the ARGOS satellite system. This system, operated by CLS America, subsequently emails data to the project researchers for subsequent analysis.

Fieldwork (Catching and Tagging Atlantic Sturgeon): The NYDEC and USFWS began fishing operations to tag sturgeon with sonic tags for the in-river telemetry and tracking project on April 25, 2006. The WCS-led satellite tagging work was initiated on May 11, 2006, when Dan Erickson began assisting with the capture and tagging operations. Fishing by NYDEC and USFWS was performed weekly until July 7th. Project staff working on the river while WCS participated were: Jerre Mohler, John Sweka, Steve

Davis, John Fletcher, and Patrick Farrell of USFWS, and Gregg Kenney, Amanda Higgs, Maura Grassi, Nicole Sehamberry, and Ryan Coulken of NYDEC.

All fishing was conducted in the Hudson River using gillnets that measured 300 feet (91.5 m) in length by 8 feet (2.4m) in depth. Mesh sizes ranged from 12–14 inches (30.5– 35.5 cm; stretched mesh). Most fishing took place during slack tides. Fishing operations ranged from river mile 35 (river kilometer 56; Haverstraw Bay) to river mile 113 (river kilometer 182; Catskill; Figure 1). Fishing depths were variable, ranging from 15–115 feet (5–35 m).

Atlantic sturgeon were measured (total length and fork length). The NYDEC and USFWS tagged most specimens with Carlin and PIT tags. In addition, the NYDEC and USFWS tagged 12 specimens with sonic tags either internally using surgical procedures or externally at the base of the dorsal fin. The USFWS/NYDEC sonic-tagging method will be published in reports by our project partners.

Satellite-tagging methods utilized by WCS during this field season were described in detail by Erickson and Hightower (In Press). Briefly, PATs were attached to 400 pound monofilament that penetrated the base of the dorsal fin (Figure 2). This method effectively held PATs on green sturgeon in the Pacific Northwest for up to one year (Erickson and Hightower, In Press). In addition, this PAT-tagging method was tested on captive Atlantic sturgeon by USFWS at the Lamar Fish Hatchery in Lamar, Pennsylvania. Dummy PATs remained attached to captive Atlantic sturgeon with no sign of infection or potential tag loss for a period of more than six months (Mike Millard, USFWS, personal communication).

Fourty-four adult and one juvenile Atlantic sturgeon were caught throughout this first field season (NYDEC and USFWS, unpublished data). Nine fish were not processed to avoid excess handling stress because of a large catch on 19 June 2006. The size of most Atlantic sturgeon ranged from 5.1–7.9 feet TL (1.55–2.42 m TL); one specimen (juvenile) was 2.4 feet TL (0.724 meters TL; Figure 3; data provided by NYDEC and USFWS). Of these fish, 32 were male, three were female, and the sex of nine was unknown (not sexed). Satellite tags were attached to a subset of captured specimens; eight males (6.04–6.85 feet TL; 1.841–2.089 m TL) and two females (6.83–7.94 feet TL; 2.082–2.420 meters TL) were tagged with PATs (Table 1). We were fortunate to tag two females during this project, because only three were captured throughout the sampling period. Only the larger males were tagged with PATs (Figure 3). Five of the ten Atlantic sturgeon tagged with PATs also received internal sonic tags (Table 1).

Because one of the primary objectives of NYDEC and USFWS was to intercept Atlantic sturgeon low in the river to monitor their behavior during upstream migration, catching and tagging operations were initiated early during the spawning migration (April 2006) and carried out weekly until July 7, 2006. Much of the effort took place near Stony Point at the head of Haverstraw Bay to capture these upstream-migrating individuals (Figure 1). However, we found that it was extremely difficult to catch fish at these down-stream locations. Hence, as the season progressed, adjustments were made and all Atlantic

sturgeon were caught farther upstream at spawning or pre-spawning concentration sites (Figure 1). All Atlantic sturgeon tagged with PATs were caught later in the season at Roger Point and Norrie Point (Table 1; Figure 1). Sturgeon which received PATs were examined for reproductive condition; all individuals were either ripe or exhibited near-ripe gonad conditions (Jerre Mohler, USFWS, personal communication).

PAT programming: The PATs used during this study were manufactured by Wildlife Computers (www.wildlifecomputers.com). These instruments were programmed to record and archive temperature ($\pm$ 0.05 ^{o}C), depth ($\pm$ 0.5 m), and light (irradiance per cm^2 at a wavelength of 550nm in logarithmic units) every minute. If PATs were physically recovered, then all data were downloaded and analyzed (a $100 reward was offered for each recovered tag). Otherwise, data were summarized into bins (see below), transmitted to the ARGOS satellite system, then forwarded to the researcher by email. Thirteen bins were defined for each temperature and depth. Data were summarized as the proportion of time spent within each bin during six-hour periods each day (i.e., four histograms were produced for each day). Six-hour periods were programmed to begin at 0400, 1000, 1600, and 2200 GMT. Upper limits for temperature and depth bins were:

Temperature (^{o}C): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, >26, and

Depth (m): 5, 10, 15, 20, 30, 40, 50, 60, 70, 80, 100, 150, 200, >200

Additional data obtained through data transmissions were: minimum and maximum depths within each six-hour period and minimum and maximum water temperature at each extreme depth interval.

Method used to estimate track locations: When PATs release and begin transmitting data to the Argos system, tag locations are estimated using the Doppler shift of the radio transmissions. These estimated positions of floating tags are accurate to ±150 m. Hence, fish position at the time of tag release is somewhat accurate, depending on how far tags drift before the first position is estimated. In addition to these accurate pop-off locations, fish positions prior to PAT release may be estimated using light geolocation. Using proprietary software provided by Wildlife Computers, these tags can discriminate day length (i.e., dawn and dusk events to estimate latitude) and time at midday or midnight to estimate longitude. The error in longitude estimates using light geolocation is typically no more than ±1 degree. Latitude estimates using light geolocation can range widely, however, from ±1 degree to ±10 degrees or more, depending on latitude and time of the year. The best estimates of latitude using light-geolocation are achieved at high latitudes near the solstices. Light-geolocation estimates of latitude are least accurate near the equator and near the equinoxes. These PATs are capable of discriminating dawn and dusk events to depths of 300 m in clear water (www.wildlifecomputers.com). Obtaining accurate dawn and dusk events are problematic, or not possible, under turbid conditions or when fish make frequent and large depth changes.

We took a two-step approach to reduce error associated with the light-geolocation estimates. The range of possible fish locations estimated using light (latitude and longitude range) was reduced using known depths and water temperatures that the fish occupied during the day in question (i.e., recorded by the PAT). Using ArcGIS, the range of possible light-geolocations was reduced by selecting only bottom depths (NGDC 3 Arc-Second Coastal Relief Model, http://www.ngdc.noaa.gov/mgg/coastal/) that were within the depth range recorded by the PAT for the day in question. This range for depth-geolocation (within the extent of light-geolocations) was further reduced using ArcGIS by selecting locations that sea surface temperatures (SST) matched water temperatures recorded by PATs. We matched only the highest water temperature recorded by PATs (± 0.5 ^{o}C) with SST while fish were at the shallowest depth for a given day (within the overlap of light- and depth-geolocations). Sea surface temperatures were 8-day mean composites recorded at night from the moderate resolution imaging spectroradiometer (MODIS; http://poet.jpl.nasa.gov/). Resolution was 4 km and 0.1 ^{o}C.

The final ranges of latitude and longitude estimates for fish positions were output by the GIS model only for cases that light-, depth-, and SST- geolocations overlapped. The point estimate for position was calculated as the median latitude and median longitude.

The method we applied to reduce the error (or range) of geolocation estimates required two assumptions: (1) Atlantic sturgeon spent most of their time near bottom and (2) temperatures recorded by PATs at the shallowest depths emulated SST. The first assumption is generally accepted for most sturgeons (based on body morphology, underwater video, electronic tagging, and bycatch in ocean fisheries by bottom gears). The second assumption was validated by data recorded by PATs; sturgeons often occupied shallow depths on a daily basis (to < 10 m) and there was little or no thermocline present at the depth-range occupied by Atlantic sturgeon during this study (see below).

Status of PATs through 9 March 2007: Seven PATs were scheduled to release from Atlantic sturgeon and transmit data as of 9 March 2007 (Table 1). Results to date are mixed but are still incomplete. Three tags are scheduled to release later in the year (one on 15 March and two on 1 June). Two of the seven PATs released and transmitted data as scheduled, two tags were shed prematurely (one was found and data were recovered), and three tags have not been heard from (i.e., data were not transmitted and tags were not found).

Premature tag releases: Two tags were known to release from fish before the scheduled pop-off dates. One of these tags (PAT 23; Table 1) began transmitting data on the scheduled transmission date from Long Island, NY on 30 November 2006. These transmissions provided depth and temperature data from 24 June to 30 November 2006. All transmitted depths were 0 m, suggesting that the tag was prematurely shed from the fish and floated to the surface within one month after tagging. The tagging date for this specimen was 23 May 2006. Numerous individuals and groups searched for this tag (staff from NYDEC and Stony Brook University, New York), which was known to be located within a small area (± 150 m) on the beach. The tag was never found; we suspect

it was buried in the sand. The second PAT that released prematurely (PAT 25) was found and returned to us by a citizen for a $100 reward. This tag was impinged against an intake grate at the Lovett Power Plant when it was found on 23 September 2007 (near Stony Point; Figure 1). Because the tag was returned, all archived data were recovered (temperature and depth every minute). These archived data will prove to be extremely valuable for understanding spawning and post-spawning behavior of Atlantic sturgeon in the Hudson River. Depth data (Figure 4) illustrates that this fish, which was tagged on 7 July 2006, inhabited various depths in the river ranging from 0 m (at the surface) to 50 m. Depth data indicate that this tag was shed on 21 August 2006. Note that this fish also extruded its internal sonic tag at the same time as it shed the PAT. Based on the behavior of this fish during the final days of tag attachment, the project team hypothesized that this fish was struck by a boat while near the surface. Dr. Mike Millard (USFWS) is the lead scientist for analysis and interpretation of in-river data collected by PATs. Staff from PIOS, USFWS, and NYDEC will be coauthors on results described by Dr. Millard.

Water temperatures recorded by PATs and USGS gaging stations: Water temperatures recorded by PATs and USGS gaging stations provided (a) likely emigration dates from the Hudson River into the Atlantic ocean and (b) temperature preference/tolerance for Atlantic sturgeon.

We found that we may be able to discern the approximate date (within a few days) that Atlantic sturgeon migrate from the Hudson River into the Atlantic ocean by comparing temperatures recorded by PATs attached to fish and water temperatures recorded by a USGS gaging station located at Poughkeepsie, NY (Figure 5). The PAT-temperatures closely tracked gaging-station temperatures until approximately 6 October (PAT 48) and 4 July for (PAT 18), when temperatures diverged (Figure 5). Light data collected by PATs support these estimated emigration dates; the first reasonable light-geolocations provided by the wildlife computer software were 5 October (PAT 48) and 6 July (PAT 18).

The temperature range occupied by Atlantic sturgeon (Figure 5) varied from as high as 28°C while in the Hudson River (approximately 4 August 2006) to 6.2 ^{o}C while in the ocean (15 February 2007).

Depth recorded by PATs: Average depths for PAT 48 are shown in Figure 6. Note that this fish was in the Hudson River prior to 6 October, when average depths fluctuated from approximately 10 m to 40 m. After entering the ocean, average depths occupied for this individual was much more constant, most frequently ranging from 15 m to 25 m. The deepest average depth reached by this specimen while in the ocean was approximately 35 m.

Minimum and maximum depths for PAT 48 (Figure 7) ranged from the surface to 50 m while in the Hudson River and the surface to 40 m while in the Atlantic ocean. Depth changes appeared much less abrupt in the ocean than in the Hudson River.

Formal depth analyses have not been completed for PAT 18, which only recently transmitted the complete data set. The depth data for this PAT was quickly reviewed. The pattern for depth distributions for PAT 18 was similar to that illustrated in Figures 6 and 7. The depth distribution for this fish will be shown graphically in subsequent drafts of this report.

Pop off and Tracking Locations: Two PATs released as scheduled (to date) and transmitted depth, temperature and light information. One popped off on 15 February 2007 (PAT 18) approximately 30 miles off the Virginia shore (mainland) outside of Chesapeake Bay (Figure 8). Transmissions were received for 18 days before the battery died; the final transmission was received on 4 March. Most analyses have not been completed for PAT 18 yet; a complete analysis for this tag will be included in later drafts of this report. The other PAT (No. 48) successfully released approximately 10 miles off the Delaware shore and 22 miles from the mouth of Delaware Bay on 30 November 2006 (Figure 8). This tag transmitted data to ARGOS satellites for a period of 9 days.

Distance traveled (approximated following depth contours) from the mouth of the Hudson River until the pop-off location was 163 miles for PAT 48 (55 days after tne estimated emigration date Hudson River) and 259 miles for PAT 18 (226 days after the estimated emigration date from the Hudson River). Overall rates of speed were 3.0 miles per day for PAT 48 and 1.1 mile per day for PAT 18.

Track locations were estimated for PAT 48 using light, depth, and SST (Figure 9). Although numerous light-geolocations were available for this fish, only six locations satisfied our strict requirements of overlapping ranges for light-, depth-, and SST-geolocations. Initial position estimates were immediately off the beach of Long Island on 5 October (our estimated emigration date) and 22 October 2006. Depths recorded for PAT 48 during these tracking dates ranged from 5 to 30 m (5 October) and 15 to 30 m (22 October). The subsequent geolocation included in this analysis (6 November 2006) was 139 miles south of the 22 October position, directly outside of Delaware Bay; travel rate between these two estimated locations was 9.3 miles per day. The remaining geolocations were generally outside of Delaware Bay off the coasts of New Jersey and Delaware.

Track locations shown in Figure 9 represent the median latitude and longitude of all possible locations estimated by our algorithm. Examples of the extent for each point estimate are shown in Figure 10. Each color represents the extent of individual geolocation estimates. The procedure we used to reduced the range of possible estimates considerably relative to using only light geolocation (i.e., 0.5 degrees (latitude) x 0.23 degrees (longitude) for the 22 October geolocation estimate).

Although the analyses are not complete, it appears we will have numerous (> 20) geolocaitons for PAT 18. Those data will be presented in the next draft of this report.

Summary of Results and Future Plans:

We found that PATs are effective for describing depths, temperature preferences, and migration routes for Atlantic sturgeon while in the open ocean. We are the first to report geolocations for any sturgeon species. Data described herein represent only two individuals, therefore, the following inference could be completely erroneous. This small data set is suggestive of (a) a narrow migratory corridor along the Atlantic coast and (b) concentration sites off (and between) Delaware and Chesapeake Bays for Atlantic sturgeon that spawn in the Hudson River. If our increased sample size (i.e., more tagged fish) support these results, then we will be able to satisfy our primary objective of identifying the most likely threats to Atlantic sturgeon (Hudson River stock) while in the Atlantic ocean.

More data are anticipated from fish tagged during 2006. Three PATs will release later this year, and PATs that did not transmit may be found and returned for a $100 reward.

We plan to tag up to 15 to 20 additional sturgeons in the Hudson River with PATs during 2007 (tags will be purchased by NYDEC using funds provided by National Fish and Wildlife Foundation; NFWF; tagging will be conducted with project partners from NYDEC and USFWS). We also plan to expand our geographic coverage to the Altamaha River during 2007. The Norcross Foundation provided funding for PIOS staff to tag one Atlantic sturgeon in the Altamaha River, Georgia with a PAT. We are waiting for notification from NFWF on a proposal that will purchase seven additional PATs for Altamaha River fish. This increased sample size and comparison among stocks is necessary to draw strong inference from PAT results.

A second year of funding will be requested from HRF to support the efforts of PIOS staff to continue tagging Atlantic sturgeon in both the Altamaha and Hudson rivers during 2007, and to complete the data analysis for fish tagged during 2006. Note that Dan Erickson, who worked with WCS during the first year of this project, recently accepted employment with PIOS. Hence, we ask HRF to change the grantee from WCS (who was the grantee during the first year) to PIOS for all subsequent years.

This report clearly satisfies all of the objectives listed in the original proposal to HRF (enclosed) for the first year of a three-year project. Those first-year objectives were:

1.) Project planning and coordinating,
2.) Purchase and program PATs; set up and coordinate ARGOS accounts.
3.) Assist NYDEC with capture and tagging of Atlantic sturgeon caught in the Hudson River., and
4.) Initiate GIS work.

Many of the objectives described for the <u>second year</u> in the original proposal have also been satisfied. These second-year objectives that were completed during this first-funding period were:

1.) Continue project planning and coordination for the second year (PIOS staff met with NYDEC and USFWS staff on 2 March 2007 in PA to plan the second year of field work; this trip was funded by PIOS.
2.) Download and analyze data recovered from PATs (October 2006 and February 2007). This work was completed and results are shown herein.
3.) Compose a brief report describing the success of recovering data from PATs scheduled to release and transmit during October 2006 and February 2007. This report satisfies this third objective.
4.) Discuss PAT success with project collaborators and with HRF; decide whether a second year of tagging with PATs is appropriate.

The results and this report will be shown and possibly presented to HRF staff and board members during March, April, and/or possibly May. A decision to fund the second year of this three-year project is dependent on results demonstrated within this report.

At first glance, it may appear that PATs may be too risky for use on Atlantic sturgeon. The PATs used for this project cost $3,500 each. Three of seven PATs provided some data; two of seven provided complete data sets, including tracking information (i.e., migratory corridors by depth and numerous track locations per individual fish). Obtaining this type of information from conventional mark-recapture methods would require hundreds of thousands (or millions) of dollars. In fact, the type of information we obtained from these PATs cannot be obtained from any mark-recapture program, unless archival tags are recovered from recaptured fish.

Objectives/Tasks for the Second Year (as shown in the original proposal):

a. Purchase and program PATs (40 each). Set up or coordinate setting up ARGOS accounts for 40 PATs.
    i. Note: This will be reduced to 15 to 20 PATs for the Hudson River and 8 to 10 PATs for the Altamaha River.
b. Download data from PATs (up to 3) during June 2007.
    i. Note: Data will be downloaded from 1 PAT (March 15 2007) and 2 PATs (June 2007).
c. Assist NYDEC with capture and tagging of Atlantic sturgeon caught in the Hudson River (~ June 2007).
d. Assist University of Georgia with capture and tagging of Atlantic sturgeon caught in the Altamaha River (~May/June 2007).
    i. This may be postponed to as late as April 2008.
e. Analyze depth and temperature data from PATs (up to 10) that were attached to Atlantic sturgeon during 2006.
f. Use light and sea-surface temperatures to estimate tracks for Atlantic sturgeon prior to tag release.

g. GIS analysis - Create preliminary data bases that illustrate essential habitat for Atlantic sturgeon and specific threats (fisheries, sand mining, dredge dumping).
h. Travel to regional meetings (i.e., ASMFC meeting or working group meeting) to share and discuss preliminary findings (if needed).

Funding requested for the second year of this project has not changed. We respectfully request the same funds shown in the original proposal.

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Table 1. Data associated with Atlantic sturgeon that were caught in the Hudson River and tagged with Satellite Pop-off Archival Tags during May, June, and July 2006. Data includes capture date, capture location (river mile, rm), total length (TL, m), fork length (FL, m), sex, presence of an internal sonic transmitter (Y/N), intended release date of the PAT from each specimen, actual release (date if proper release and transmission; P = premature release, and N = no transmission or tag recovery. Sex was recorded by USFWS and NYDEC staff as 1 = male and 2 = female.

Tag ID	Capture date	Capture location (rm)	TL (m)	FL (m)	Sex	Sonic tag? (y/n)	Intended release date	
[a]23/65720	05/23/06	84	1.917	1.676	1	Y	11/30/06	P[a]
48/66461	05/26/06	84	2.089	1.917	1	N	11/30/06	11/30
[b]25/65722	07/05/06	80	2.000	1.770	1	Y	11/30/06	P[b]
[c]11/65733	05/23/06	84	1.841	1.625	1	N	02/15/07	N[c]
27/65724	06/19/06	84	1.981	1.727	1	N	02/15/07	N
[d]18/65734	06/20/06	84	2.006	1.803	1	Y	02/15/07	02/15[d]
26/65723	07/05/06	80	1.920	1.710	1	N	02/15/07	N
28/65725	05/25/06	84	1.930	1.689	1	Y	03/15/07	
49/66462	06/19/06	84	2.082	1.816	2	Y	06/01/07	
24/65721	06/28/06	80	2.420	2.120	2	N	06/01/07	

[a]PAT 23 detached prematurely, but began transmitting on 11/30/06 from the beach on Long Island, NY. This tag was never found. Although data were transmitted, all depth transmissions show 0 m.

[b]Pat 25 detached prematurely on 21 August 2006 while in the Hudson River. This tag was recovered. Archived data were downloaded.

[c]PAT 11 never heard from. Note that this fish was also tagged internally with a sonic transmitter. The Sonic tag was extruded on the river bed at approximately RM 70. It is possible that this fish died somehow.

[d]The fish carrying PAT 18 extruded the internal sonic tag while in the Hudson River.

Figure 1. Locations of gillnetting operations on the Hudson River, New York by NYDEC and USFWS staff during 2006 (black circles). Gillnetting was conducted to (a) tag Atlantic sturgeon with sonic transmitters (NYDEC-led project) and (b) tag Atlantic sturgeon with PATs (WCS-led project). PAT-tagged Atlantic sturgeon where caught at Norrie Point and Roger Point.

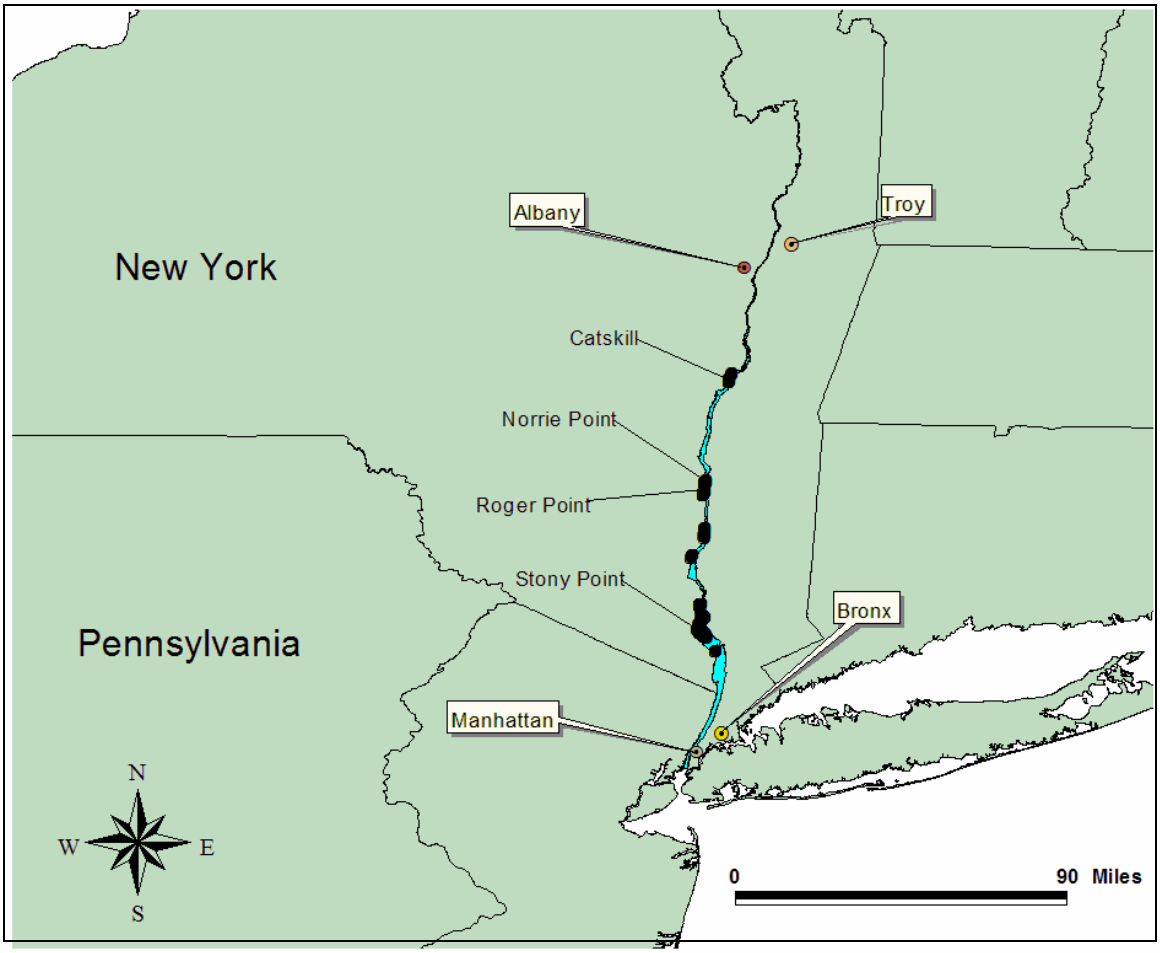

Figure 2. Pop-off archival tags (PATs) were attached to Atlantic sturgeon at the base of the dorsal fin using 400-pound monofilament. The tag will remain attached to Atlantic sturgeon, collecting data until the programmed release date. At that time, the PAT will release from the monofilament, float to the surface, and transmit data to the ARGOS satellite system.

Figure 3. Size frequency distribution of Atlantic sturgeon caught during 2006 in the Hudson River by NYDEC and USFWS staff. Lengths are shown in meters. A midpoint of 1.55 meters represents fish ≥ 1.50 meters and < 1.60 meters. Black = PAT-tagged sturgeon; Gray = other sturgeon.

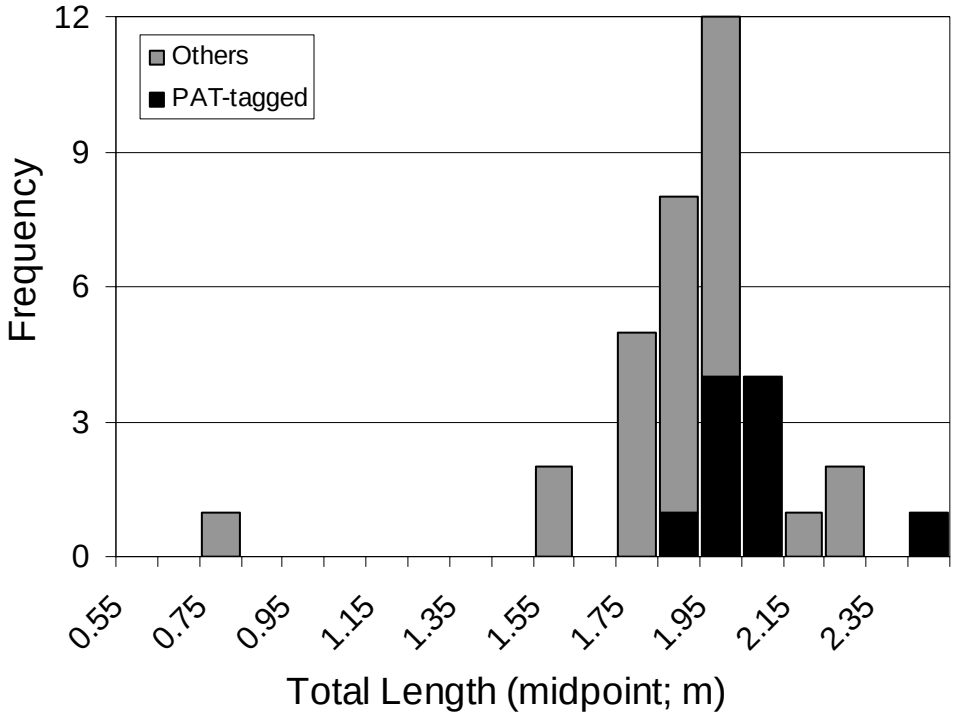

Figure 4. Bubble plot of depth (m) recorded every minute by PAT 25. This fish was of fish caught, tagged, and released on 5 July 2006. The PAT was shed from this fish while in the Hudson River on 21 August 2006.

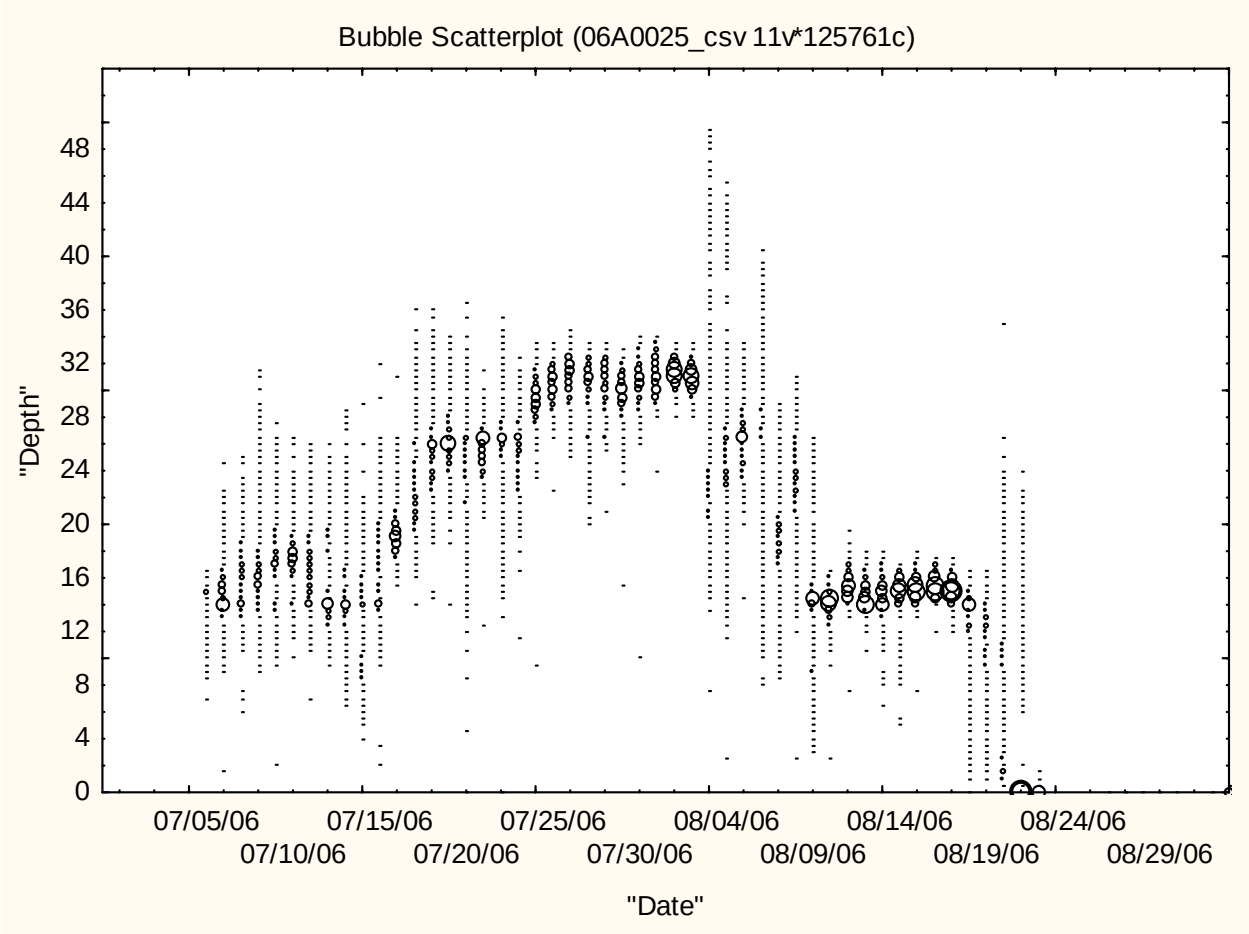

Figure 5. Water temperatures recorded by PAT 48 (squares) and by a USGS gaging station on the Hudson River at Poughkeepsie, NY (diamonds).

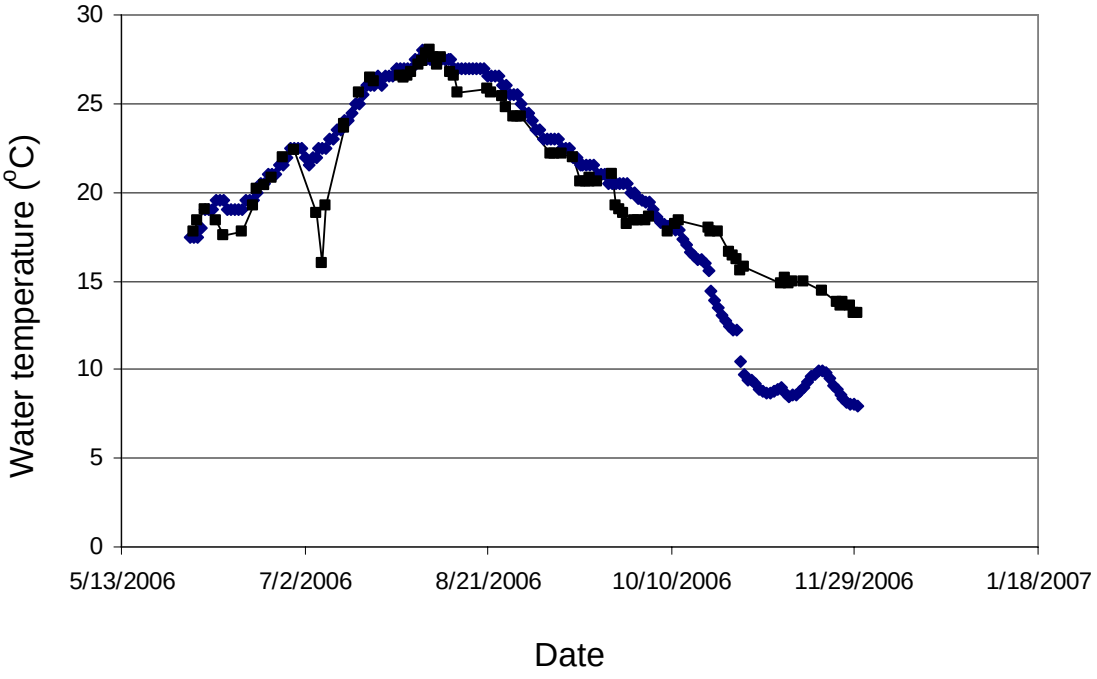

Figure 6. Average depths recorded by PAT 48.

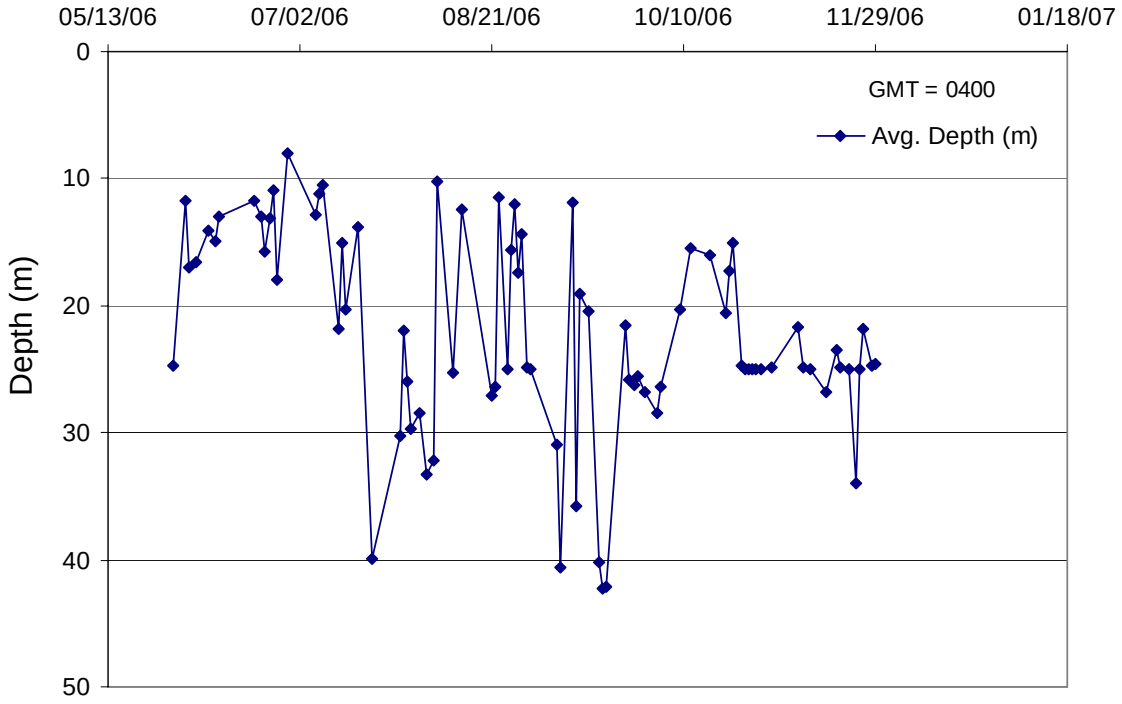

Figure 7. Minimum and maximum depths recorded by PAT 48.

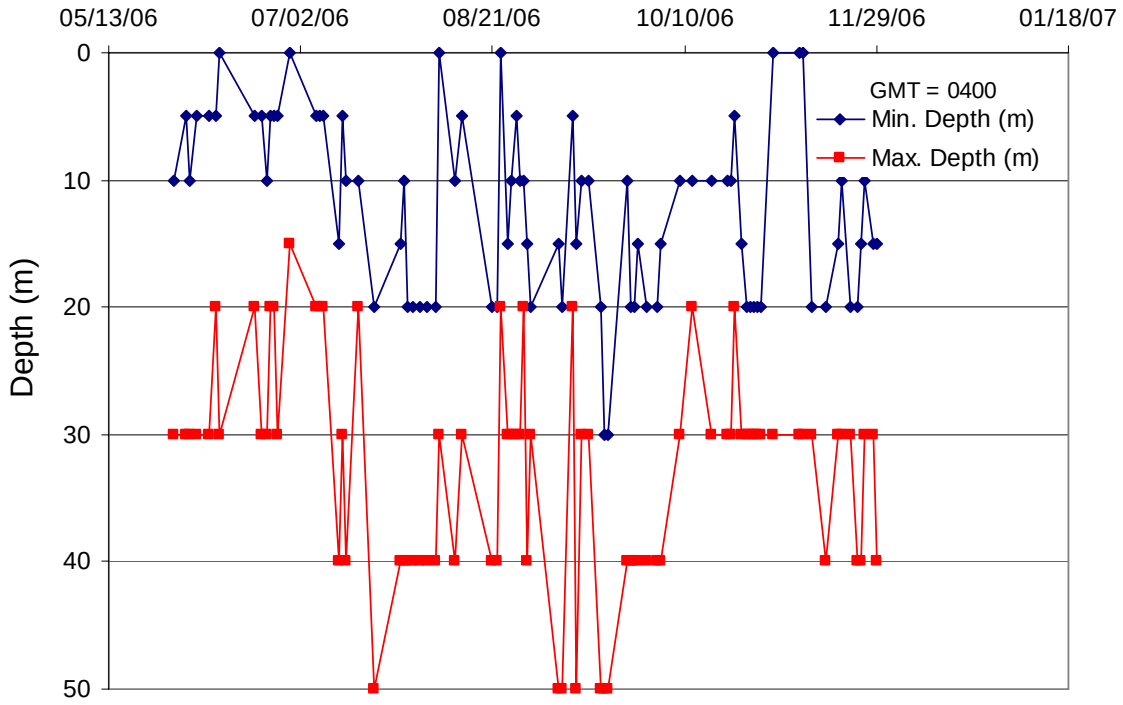

Figure 8. Pop-off locations for two PATs: A = PAT 48 which released off the coast near Delaware Bay on 30 November 2006. B = PAT 18 which released approximately Virginia coast near Chesapeake Bay. Contours (m) are: 20, 50, 100, 150, 200, 250, 500, 1000, 3000, and 5000.

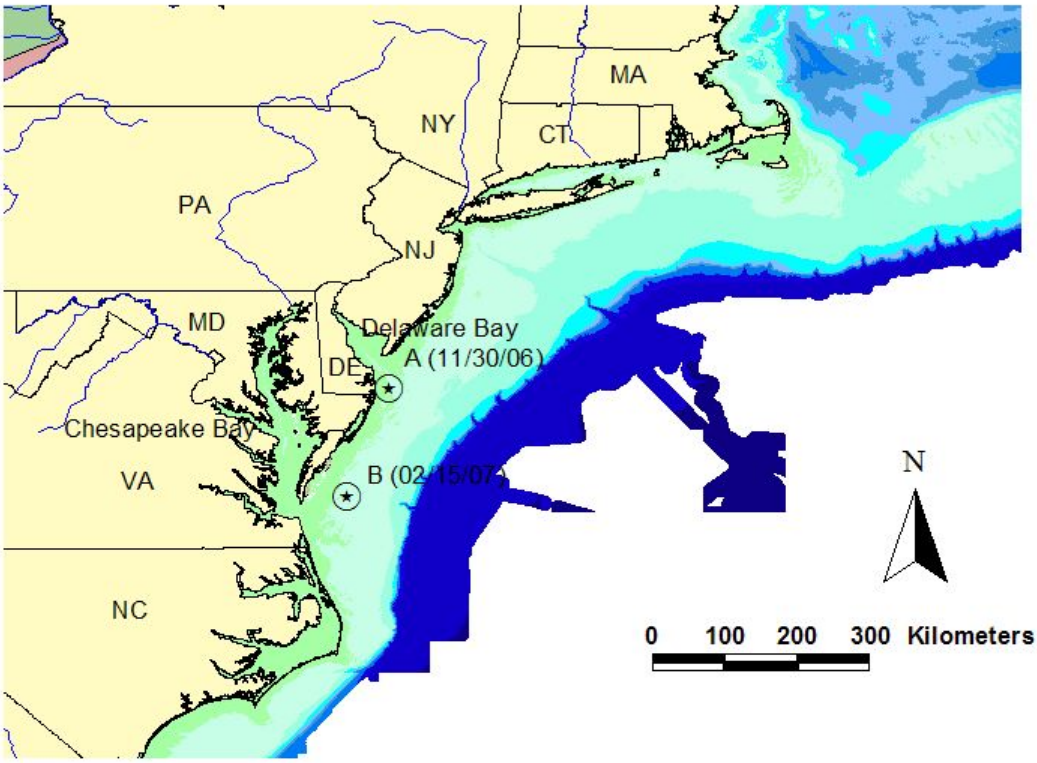

Figure 7. Pop-off location (star) and estimated tracks (median, circles) for PAT 48. Tracks were estimated using light, depth, and SST. Track estimates were made (north to south) on 10/5/06, 10/22/06, 11/6/06, 11/14/06, 11/10/06, and 11/26/06. Contours (m) are: 20, 50, 100, 150, 200, 250, 500, 1000, 3000, and 5000.

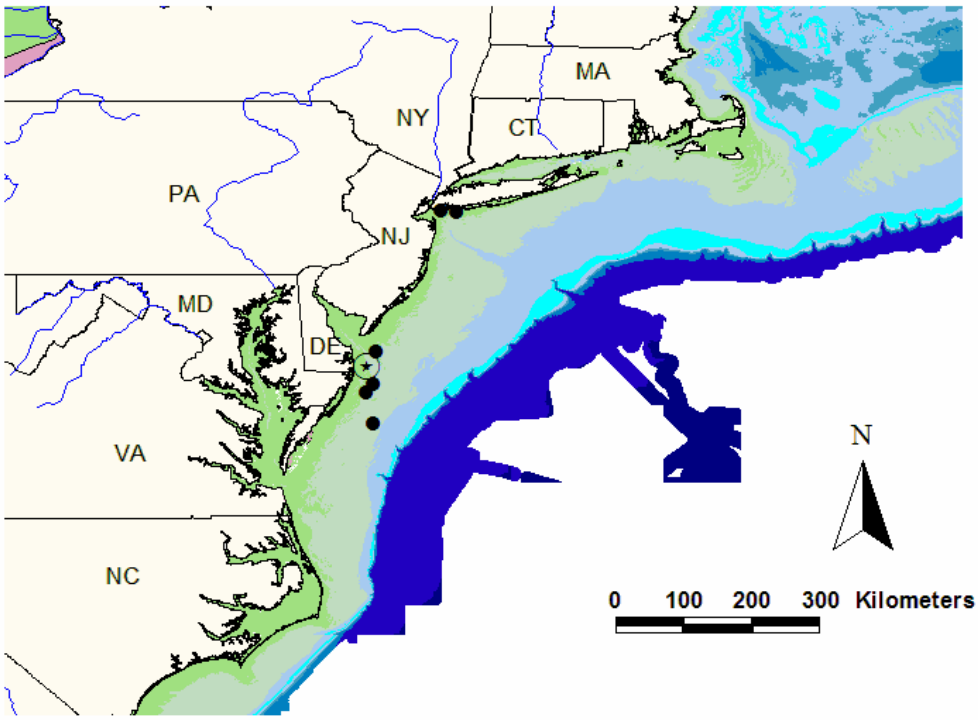
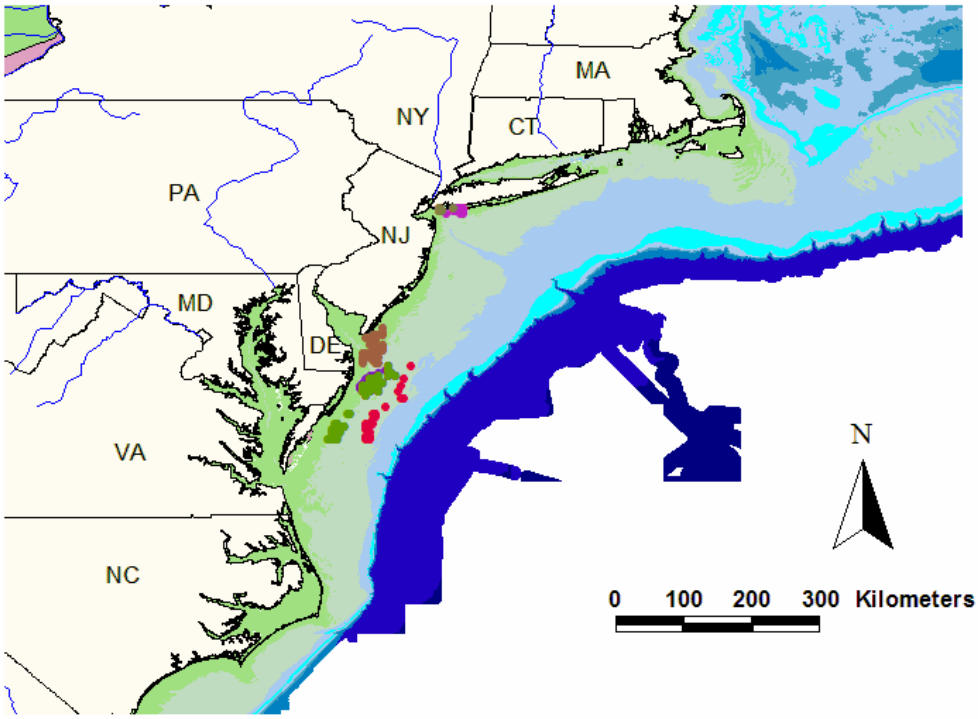
Figure 8. Examples of all possible track locations (e.g., range) for for PAT 48 using light, depth, and temperature. Each color represents the range of position estimates for a single day.