

Summary Report of the New York Bight Sea Turtle Workshop



January 30, 2018

East Setauket, NY

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Introduction

Four species of sea turtles can be found in New York waters: Atlantic green (*Chelonia mydas*), loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*) and Kemp's ridley (*Lepidochelys kempii*) turtles (Morreale, S. and Standora E., 1998, 2005). All of these species are either threatened or endangered at the state and federal level and therefore protected under the Endangered Species Act and New York State Environmental Conservation Law § 11-0535 and Environmental Conservation Regulations, § 6 CRR-NY Part 182.

Previous research and observations from stranding records and aerial surveys indicate that some locations in New York's coastal areas and estuaries may provide valuable developmental habitat for juvenile sea turtles. In the past, it was believed that this was primarily true for juvenile loggerheads and Kemp's ridleys. But, in recent years more juvenile green turtles have been observed (Robert DiGiovanni, Maxine Montello, personal communication). Additionally, New York habitats may be becoming more important to adult sea turtles as evidenced by the first confirmed Kemp's ridley nesting occurring on Long Island in 2018 (Rafferty et al., 2019).

While New York waters and coastal habitats appear to be important to these species, the extent of their use of these areas remains unknown. There is a lack of information about the abundance, distribution and behavior of sea turtles across the New York Bight. This baseline data is needed in order to mitigate growing threats to sea turtles such as cold stunning and fishery interactions (entanglements and incidental catch). The New York Ocean Action Plan (OAP) identified the need to design and implement a monitoring survey for sea turtles in the New Bight in order to determine and implement appropriate conservation actions for these species (New York Ocean Action Plan, 2017). The OAP specified that this monitoring should include a variety of methods and identified a few that might be considered. It also highlighted the collection of data on distribution, seasonal occurrence, health, behavior and identification of important habitat or areas of importance as being of highest priority (New York Ocean Action Plan, 2017).

Due to their wide geographic ranges, long migration and long life spans sea turtles are challenging to monitor (New York Ocean Action Plan, 2017). This is particularly true in areas like the New York Bight which are outside their historic nesting ranges. A workshop of experts from state and federal agencies, NGOs, stranding response groups and academia came together in January of 2018 to discuss needs and options for monitoring sea turtles in New York. The workshop was well attended, with 25 people participating in person and 16 participating via webinar. The day began with a series of talks about past or ongoing monitoring work in the region and the New York Bight. In the afternoon the in-person group was divided into two breakout working groups for discussion. The workshop attendee list, agenda and summary of the presentations are found in Appendix A.

In this report, we share the suggestions made at the workshop and subsequent discussions. New information that has become available since the meeting and current and some upcoming efforts are also discussed. The report begins by defining the workshop objectives. Different methods are then detailed and discussed. Costs, funding options and a timeline for implementation of any of the suggested future actions are not included. A consensus from the workshop identified that designing a comprehensive monitoring and conservation plan for sea turtles will need additional steps to explore the existing efforts and available data and related

data gaps. However, this workshop did also identify some near-term priorities and suggested additional work which could be started now, and which would add to or build upon existing efforts.

Workshop Objectives

The workshop objectives were derived from the New York Ocean Action Plan which calls for 1) designing and implementing the most appropriate monitoring survey for sea turtles and 2) based on data collected during monitoring identify and implement appropriate conservation actions for sea turtles in the New York Bight.

These objectives were further refined to facilitate discussion during the workshop. They were:

- To find the best means of monitoring sea turtles in the New York Bight by gathering baseline data to provide adequate conservation and management for these species.
- To understand sea turtles' basic use of habitat, needs, threats, species-specific population sizes and health, and to begin investigating how this baseline is changing.
- To understand the data we have and the data we need.
- To identify current conservation needs and anticipate future conservation needs, as well as the accompanying data that is needed now to implement conservation activities in the future as conditions change.

Workshop format

The workshop began with an introduction by the DEC. This was followed by presentations on the current monitoring or research efforts in New York, regional monitoring and research in the Mid-Atlantic and Northeast, geospatial modelling and mapping and conservation and NGO priorities. After the presentations the participants were divided into two breakout groups for discussion. The breakout groups were asked to assess current efforts, identify priority questions and data needs and determine the best way to move forward with monitoring and conservation of sea turtles in New York. The groups were asked to consider technical feasibility and limitations, cost and coordination with regional and neighboring efforts. The rest of this summary report is focused on the discussions in the breakout groups.

Breakout Group Discussions Overview

Workshop participants discussed the stated objectives and suggested potential refinements. They developed some questions to help narrow the focus and provide a starting point for ongoing and future monitoring and conservation activities. These questions were prioritized by placing them into two lists, one for primary questions and one for all other suggested questions.

Primary questions

- What data do we already have and what are the gaps?
- What does the current data show?
- What species of sea turtles are here? What are their ages and sexes?
- When are they arriving and how long are they staying?
- What are the specifics of their habitat usage?

- What is the health or condition of these animals when they are here?
- What are the New York/Mid-Atlantic conservation goals?
- What are the population level conservation goals and how does the New York/ Mid-Atlantic impact these?

Other suggested questions

- Where are these animals coming from? (Connecting them to populations)
- What are they eating when they are here?
- What is the impact of by-catch mortality on the population? How do we generate better information from the commercial fishing industry?
- Should threats be prioritized? What threats are of most concern in New York? What is the cumulative effects of threats? What are the potential future ocean use threats?
- Are some species of more concern than others—for example, Kemp’s ridleys?
- How do we best educate the public and involve them in conservation efforts?

The answers to some of these questions were discussed during the workshop, but some were simply identified to be discussed later. Overall, through looking at the objectives and considering the need to answer these questions, four elements emerged as recommended components of a New York state program for sea turtles.

New York State Monitoring and Conservation Program for Sea Turtles Components

1. Data mining and analysis. Examine current data and current/ongoing monitoring efforts
2. Monitoring and research. Maximize current monitoring and begin new efforts
3. Outreach. Dissemination of information and involvement of the public
4. Conservation. Mitigation of threats and species recovery

Geographic Scope of Work and Role of the State

The consensus was that State led efforts should be focused on state waters, including Long Island Sound and bays. For the most part, monitoring beyond state waters and into the rest of New York Bight is a federal responsibility and most participants thought that these areas should not be the focus for the state. However, it was acknowledged that there will be some overlap in efforts. Therefore, collaboration with federal partners such as the National Oceanic and Atmospheric Administration (NOAA) and the United States Fish and Wildlife Service (USFWS) is important. While the State may lead some of this work, it may also be more appropriate for it to assume a supporting role in some cases. Participants also thought that the program should consider that some of the work could be led by academic institutions and/or NGOS as well as by federal agencies. DEC was not expected to take the lead on all aspects, particularly because some efforts have already been started by others, and State resources are limited. Continued communication and coordination among those conducting projects was seen as being important as efforts move forward.

Description of Program Components

During breakout groups, participants discussed ideas for moving forward on the program components they had identified.

1. Data mining and analysis

Participants discussed that there is a need to better identify data gaps and help focus the questions that need to be answered. Suggested initial steps were:

- Asses the data currently available and determine other means of gathering additional data. Data sources could be identified and explored by a hiring a consultant, post-doctoral researcher and/or finding funds for stranding groups to analyze previously collected data.
- Compare and bring together these different data streams. Compiling multiple survey types in this way could provide different perspectives for understanding habitat use and ecology among other things.
- Modelling could also be done at this step.

Some initial data sources to consider were identified during the workshop. These sources included:

- Aerial surveys (NOAA, DEC, New York State Energy Research and Development Authority (NYSERDA)).
- Satellite tagging (New York Marine Rescue Center (NYMRC), Atlantic Marine Conservation Society (AMSEAS), NOAA),
- Fisheries bycatch data (NOAA).
- Diet data (Stony Brook University School of Marine and Atmospheric Sciences (SoMAS), AMSEAS) and stranding data (AMSEAS, NYMRC) .
- Non-traditional data sources. One example given was the pound net fishery, though it was mentioned that is not as large as it once was. Another possibility considered was utilizing the recreational fishing community, possibly engaging party charter boats. Finally, looking at sighting information from the public was suggested.

2. Monitoring and research

The discussion of monitoring and research during the breakout sessions focused on a few different research and monitoring topics. These are detailed below.

Collecting baseline data. The highest priority question identified by workshop participants was “Who is here and how long are they staying?” Specifically, what species and age classes are here and how do they use New York waters and shore habitats? In order to answer these questions collection of more baseline information for these species is needed.

It is known that data for sea turtles in New York state waters is not sufficient. Participants brought up the following specific items to focus on:

- Information on the Long Island Sound, Great South Bay and other bays and estuaries is lacking.
- Most of the data we have in the New York area is for smaller individuals.
- Data from tagging studies has been limited by the size requirements of federal permits and the lengthy nature of the federal permitting process.
- Learning more about individual species when they are here is important because recovery plans are species specific. However, many recovery plans are outdated and

actions specified in recovery plans may not be what is currently most helpful to a species. Additionally, they may not be as helpful at the state level, as they might be at the federal level. For example, more data is available for loggerheads than for other species of sea turtles. Participants asked if some species are more vulnerable to threats.

Targeted surveying via aerial and vessel of nearshore areas was suggested. In addition, more satellite tagging of a wider size range of turtles and inclusion of wild-caught turtles in tagging efforts was discussed. There was also support for continuing on going broad-scale surveying. It was suggested that more money be found for digital aerial surveys, which seem to detect sea turtles better than traditional aerial surveys. However, it was stated these are much more expensive than traditional aerial surveys which is why NYSERDA is currently only doing them seasonally. Therefore, it does not seem realistic to increase the frequency currently, although this could be a future consideration as the technology evolves and hopefully becomes less expensive. Another suggestion was to add personnel to traditional aerial survey to focus on sea turtles during flights, and more staff to interpret photos. This would be more cost effective, however, the flight height may not be ideal since the current surveys are geared towards whales. Also, there may not be space on the plane, depending on its size.

Prioritizing learning about age classes was identified as being important because most of the data currently available is for smaller individuals, with limited data on adults in state waters. In addition, younger (smaller) sea turtles are more susceptible to being cold stunned. Late-stage juveniles and sub-adults are considered extremely important. Participants thought it was worth considering what impact protecting this small section of the population would have. This is perhaps, difficult to determine, but was suggested for consideration.

Difficulties in tagging an adequate number of sea turtles was discussed. Participants stated that sea turtle individuals must be over 30 cm to be tagged (acoustic and satellite), and so tagging data is lacking for particular species. Kemp's ridley typically fall under this requirement. However, a Kemp's ridley was tagged by NYMRC in 2018 and was able to be tracked for 100 days, so some additional data is becoming available.

Participants also suggested exploring whether there is room for a regulation/jurisdictional change at a federal level for permitting for tagging. In addition, tagging has been primarily carried out on stranded animals that have been rehabilitated and released and not healthy animals that may be in the area. Participants thought that more tagging of wild caught animals is needed in order to get a complete picture.

Residence times and seasonality. Workshop participants identified several questions related to this topic that they thought need to be answered:

- When are sea turtles here and how long are they staying?
- How do sea turtles use New York waters?
- Are they selecting this area or are they just “stumbling” upon it and staying for a brief period of time?
- How important are New York state waters and the New York Bight to these species?

Participants thought there was a need to establish the case for monitoring and determine how much would it help these species. Participants questioned whether it should be for the whole

Bight or focused on particular areas. The consensus among participants was to focus on state waters, but continue efforts currently going on in Bight as a whole and to coordinate state efforts with federal.

Habitat use/importance of New York to sea turtles. Better characterization of sea turtle habitat, including oceanographic parameters, ocean acidification, chemical and water sampling (look at and augment work that NOAA is already doing) was suggested. It was also discussed that it was important to try to connect these sea turtles to nesting habitats, in order to answer the questions: where are these sea turtles coming from and when are the younger sea turtles that are visiting New York found in nesting areas? A question that was of importance to participants was: do turtles move between habitats when they are here and are these habitats equally important?

Some possible means of collecting this information was suggested including:

- Tagging (primarily with satellite tags, but acoustic tags could also be used) was the primary method suggested. It was noted that some tagging is already being done, but it could be improved.
- Targeted aerial surveys of nearshore areas were also suggested as an option if resources allowed.
- Genetics were discussed, though it was pointed out that genetics fingerprinting is not very useful yet for sea turtles. Sometimes stock structure can be determined, such as with leatherbacks. But, loggerheads can not be assigned to a particular beach and Kemp's stocks don't differentiate yet. Participants asked: is there a collection of samples that could be used?
- Stable isotope analysis was suggested. Isotopes could help to determine where they've been, where they spend their time and determine their source of food. Samples are beneficial from both live and dead sea turtles, but there is more opportunity with dead sea turtles.

Participants thought that monitoring should consider tracking habitat use in part to more effectively mitigate threats. However, it was asked, what happens if threats are identified but we can't mitigate them? It was considered important to first know about habitat usage before it can be determined if a threat can be mitigated. Information about habitat usage is also needed to assess the impact of a threat on the population, and to consider whether there may be other management actions that could compensate for the impacts of this threat.

Population size/relative abundance. It was discussed that while this was important information to collect there are limitations to being able to determine population size/ relative abundance for any of these species in this area. Participants thought that it was important to answer the question-what is New York's role in the life of these sea turtles? It was discussed that it is difficult to determine population size even in nesting habitats. So, it would be particularly difficult to determine a method of estimating abundance that works in a non-nesting area. However, answering questions about size class distribution, conducting health assessments, determining sex ratios, distribution patterns and looking at relative abundance could be the next best things to focus on. Whether or not all could be determined would depend on what resources are available. The consensus was that this topic would need further thought and discussion if it was decided that it should be pursued.

Health. Participants thought that information on the health of both stranded and non-stranded animals is needed. Some questions that participants thought were important related to health were:

- Are stranded animals or animals who are caught accidentally in fishing gear healthy to begin with?
- Are turtles healthy when they reach New York waters? Are they healthy when they leave?
- Are there differences in the health and condition of sea turtles in New York from sea turtles observed in other areas along their migratory route.

It was suggested that some information about health of sea turtles in this area may be available from past stranding data. For example, NYMRC has tissue samples in house, sea turtle rehabilitation book, standard health assessments that specifies what normal is. However, there is a need to get data from turtles that are sampled in the wild (that have not stranded and/or needed rehabilitation). Participants thought that there needs to be an ongoing assessment of the local population in order to recognize changes in health.

Coordination of monitoring. Participants discussed the importance and challenges of coordination monitoring efforts both with the New York Bight and the wider region. In addition, they spoke about who would be leading, coordinating and carrying out the work. They thought that this topic needed further discussion (that there was not enough time or information to be able to figure out during the course of this workshop). They spoke about options such as outsourcing the work, new data vs. what we have. It was discussed that there are different levels of cooperation involved in sharing and coordinating new data (may be more difficult). They brought up issues with work capacity-holding people on task is difficult because we are already at capacity (need to be realistic about how that can happen).

3. Outreach: disseminate information to public and facilitate citizen involvement

Citizen engagement, outreach/education the public and fishermen. Participants thought that the public could contribute to monitoring and conservation efforts in an important way. Outreach and education are necessary in order to involve them, and this could include:

- Helping them to identify what a turtle looks like in the water and how to report sightings.
- What to do when a turtle is hooked with fishing gear/line.
- What to do when a turtle is cold stunned.

It was mentioned that DEC has an app for reporting sightings. It was suggested that more effort be put into making the public aware about the app. Education for boaters and recreational fishermen was suggested. It was also discussed that the education component needs to be improved to get more people more excited about and interested in sea turtles across Long Island.

4. Conservation: Mitigation of threats/recovery

Mitigation of Threats

Behavior and gear interactions. Participants thought it would be important to examine the relationship between species, behavior and fishing gear interactions. They thought that if it can determine which species are utilizing certain areas, it may be possible to determine what habitats should be protecting from interactions. The following questions were brought up as important to consider:

- What specific times of year are they here and how long do they stay?
- Are closures for particular gear types necessary to protect sea turtles in New York?
- When federal regulations are already in place what can/should the State do further?

A number of suggestions were made as to how best to approach this issue. One of the suggestions made was expanding fisheries observer coverage for protected species. However, New York already did this and few turtles were seen, possibly because observer trips are not ideal for getting adequate estimates of bycatch for protected species and data seems particularly poor in the New York Bight. It was suggested that a better option might be to reinstate the pound-net monitoring program. This has more potential, though there are not as many participants in this fishery as in the past. Also, this has its challenges in that fishermen fear this will result in increased regulation and are afraid of incrimination. Collecting data from turtles caught in pound nets could be particularly fruitful for the collection of some data because these turtles are usually alive and not injured from this gear which means incrimination should be less of a deterrent. In particular, this could provide an opportunity to collect health data, sex, age, and these turtles could also be tagged. However, given the low number of fishermen using this gear it would not likely give good information on fisheries bycatch issues.

Participants thought that comparing pound net data, stranding data and aerial surveys could provide a better, more comprehensive understanding about sea turtle habitat use and the potential to interact with gear. A suggested action was to look at state and federal bycatch and gear regulations for gear types that sea turtles are likely to get caught in. Specifically, to focus on gillnets, trawls and pound nets and see if any changes could be suggested for sea turtles in this area.

For entanglements/marine debris, participants thought that there was a need to identify what type of debris is the greatest threat to sea turtles. It was suggested that this could be done by examining stranding data, including stomach content data. Also, by quantifying the type of litter at beach cleanup events. The question was asked-is the beach a major source of litter/debris washing up on shore? This was considered possible, since there are no covers on bins on beaches in some cases. It was mentioned that understanding the kind of marine debris that injures marine life and creating awareness is important for consumers to change habits. Banning balloons initiatives, skip the straw campaigns and having more fishing gear buy back events were suggested. However, it was also mentioned that not all fishermen will want to participate and there needs to be funds for these programs.

Examine the impacts of vessel strikes on sea turtles. Whale aerial survey data may be used to inform vessel speed restrictions. It was asked, could this also benefit sea turtles? Other suggestions included-after understanding spatial and temporal occurrence, seasonal speed restrictions could be considered. Smaller vessel (recreational) boater education was thought to be necessary. Participants also thought that citizen science surveys could be helpful; these

surveys have a low cost and provide the added benefit that they raise awareness of sea turtle presence and vessel strikes. It was suggested that data on vessel strikes can be obtained from stranding data and the public, and it could be a good idea to reach out to boat repair facilities to understand if they are seeing impacts from turtle (or other species) ship strikes.

Examine potential impacts of wind energy development on sea turtles. Participants thought that all comprehensive/relevant data must be identified and analyzed. Baseline population information is largely unexamined/unanalyzed. Some sources of data to examine could be- NYSEERDA digital aerial survey, AMAPPS (though it has only been expanded in more recent years). It was thought that turtle biologists/experts need to be involved in understanding how noise, increased vessel traffic and other activities related to the design and construction of offshore wind development could possibly impact populations. The question was asked-how can we collaborate with multiple researchers to acquire data from individuals that aren't utilizing specific information?

Nesting potential. It was brought up that a nesting response plan is needed. As mentioned previously, since this workshop was held there was a nesting event on Long Island. After this event there has been discussion between USFWS, DEC, the New York Marine Rescue Center and the Atlantic Marine Conservation Society about working together on a plan for responding to future nesting events in New York. Work on this plan is expected to begin following the 2019-2020 sea turtle cold stun season.

Cold stunning. Participants thought that from stranding data, we can possibly determine "hot spots". But, it was asked is this because the areas where turtles have been seen stranded is where turtles are most often found or where people are most often walking? It was pointed out that non-accessible beaches may provide valuable data. Expanding effort and identifying areas to be surveyed is a priority. It was emphasized that public outreach is essential in creating awareness that sea turtles exist on local beaches. It was also suggested that stranding response effort is a good (already existing) way of engaging the public and creating awareness, so the State could expand on/add to this effort.

Climate change. Sex ratio changes due to climate change were brought up as an issue of concern. This was brought up in discussions as something that should be kept in mind, but that is currently difficult to address. The topic was not discussed further during this workshop.

Species Recovery

Sea turtle recovery plans were discussed. However, the goal of recovery plans is to reduce the threats, recover the population numbers to the point that sea turtles can be delisted as threatened or endangered. It was noted that it may not be practical to have that as a goal for New York, but it is worth keeping in mind. It was also mentioned that some recovery plans are outdated. It is, therefore, necessary to identify what recommended actions are most pressing now to the recovery of the species.

It was noted that as a state entity, New York is co-managing our waters with the federal government (dealing with species protection, fisheries, offshore wind development, etc). In order to manage we want to know general information "from a biological point of view". It was also

mentioned that there is federal mandate to protect sea turtles. As a starting point- look at state and federal plans and identify gaps.

It was asked-if New York does nothing how does this impact recovery? While it is not currently possible to answer this question, it was pointed out that New York is a leader in environmental conservation initiatives and could model/create policies that could be duplicated elsewhere. This could result in a positive impact that extends beyond the New York state and the New York Bight area.

Methods Summary Table

The primary methods that emerged as providing the most information during these breakout sessions were:

Method	Information Provided	Some advantages	Some caveats
Review and analysis of past and current data	What baseline data we have and what the gaps are	Data already collected Examine spatial and temporal changes	Need time and staff
Tagging-satellite	Habitat use, behavior, residency, migration	Provides more info than acoustic tags and doesn't need presence of acoustic array	Higher cost than acoustic tags
Tagging-acoustic, archival or real-time	Similar to satellite tagging, but more limited info	Lower cost than satellite tags	Dependent on having an array and no info on diving behavior
Aerial survey-traditional	Presence, possibly seasonal, spatial distribution, habitat use	Data can be collected during already happening whale surveys (DEC) or during surveys that target nearshore areas	Not as good as digital survey at providing species ID
Aerial survey-digital	Presence, possibly seasonal and spatial distribution	Better than traditional aerial surveys at providing species ID, can be collected during multispecies surveys (NYSERDA)	More costly, may not be able to survey as frequently
Small boat surveys	Best for small scale and /or locating animals for tagging, behavior data and biological sampling	Good for looking in areas where turtles are likely to be, better for targeted smaller scale work, could integrate with acoustic or aerial surveys	Can be easy to miss turtles, not the best for large scale surveys. Integrating with other methods like acoustic or aerial surveys could help
Drones	Best for small scale and /or locating animals for tagging, behavior data and biological sampling	Good for looking in areas where turtles are likely to be, better for targeted smaller scale work	Operators need to be trained and FAA and other regulations need to be considered (may

			not be able to use in all areas)
Analysis of Stranding data	Some presence data and info on threats	Already being collected, no additional cost	Does not give information (generally) about healthy animals
Analysis of Bycatch data	Gives information about prevalence of bycatch in different fisheries. May have data on immediate bycatch mortality/injury	Already being collected, no additional cost	There are very few cases of turtles in bycatch data on observed trips and fishermen tend to not report, may be better to focus on pound net fishery
Collection of blood & other bio samples	Health, sex ratio, stress hormone levels	Health of animals while they are in the area, sex ratios	Collecting from stranded animals only gives partial info on animals in area, need from healthy animals as well.
Genetics	Links to populations	Well established techniques and registry of known haplotypes	mtDNA techniques may tell more about females (dispersal and behavior) than males
Stomach content and/or stable isotope analysis	Diet info, ecosystem position, habitat use	Can be collected from stranded deceased animals	May be differences between stranded and healthy animals
Outreach-recreational fishing	Presence, help with mitigation or some fisheries interaction and vessel strikes	Relatively low cost	Need time and staff to implement
Outreach-general public/citizen science	Presence, help with marine debris and other issues	Relatively low cost	Need time and staff to implement

Discussion

This workshop identified a series of questions that participants thought should be of highest priority to address, in order have sufficient information needed to conserve sea turtles in New York. Discussion of these questions lead to a consensus that a program for New York should contain four elements. These were 1) data mining and analysis, 2) monitoring and research, 3) outreach and 4) conservation. Participants thought that New York should focus its efforts on state waters, while coordinating with other monitoring efforts occurring in the rest of the New York Bight. They thought that continuing to gather data on sea turtles in the whole Bight during the course of existing survey efforts that were already ongoing should also be supported. Several methods for monitoring were discussed. New and ongoing action items were identified. Some of these are listed below.

New or Ongoing Action Items:

- Identify the resources which would allow stranding groups that have collected historical data to analyze this data to see what information we already have, understand gaps and guide future monitoring work.
- Continue and expand on monitoring methods that collect sea turtle baseline data including
-aerial surveys, vessel surveys, tagging, stranding response (data collection, rehabilitation), and health assessments.
- Increase satellite and acoustic tagging- DEC and AMSEAS are working collaboratively on increasing satellite tagging of wild-caught sea turtles; NYMRC is continuing to conduct acoustic and satellite tagging of rehabilitated and released sea turtles.
- Create a sea turtle nesting response plan-USFWS, NYMRC, AMSEAS and DEC will be working on this after the 2019/2020 cold stun season.
- Continue to support sea turtle stranding response-DEC continues to support AMSEAS and NYMRC through partial funding of operations and helping with logistical assistance.
- Increase outreach efforts-Public lectures, signs, using citizen volunteers in beach patrolling, beach cleanups, efforts to reach out to boaters at marinas and other locations are all suggested actions. Since the workshop there has been considerable outreach effort by AMSEAS and NYMRC. This includes continuing to host free public lecture series to bring more awareness to sea turtles and also to involve the public in patrolling beaches for sea turtles during cold stun season. NYMRC also has been working on other outreach items such as key tags with information on reporting and signage on beaches.
- Coordinate with other state and federal monitoring. DEC plans to continue to coordinate, and on some cases, collaborate, with NOAA, NYSERDA, Wildlife Conservation Society, AMSEAS, NYMRC and others as sea turtle monitoring efforts continue and expand.

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Appendix A: Workshop Materials

Agenda



Department of
Environmental
Conservation

DEC Division of Marine Resources
205 N. Belle Mead Rd., Ste. 1
East Setauket, NY
Office: 631-444-0448

New York Bight Sea Turtle Workshop January 30, 2018

Webinar information: 1-844-633-8697

Meeting number and access code: 642 647 035

<https://meetny.webex.com/meetny/j.php?MTID=mc2a8201ae1829392562348784164da48>

Agenda:

- 9:00am Welcome and Remarks on the New York Ocean Action Plan *NYSDEC*
- 9:15am Introductory Remarks and Setting the Stage *Lisa Bonacci, NYSDEC*
- 9:30am **Current monitoring or research efforts in New York**
- Presentations:
Meghan Rickard, NYSDEC
Greg Lampman, NYSERDA
 - Local Stranding Network:
Rob DiGiovanni, Atlantic Marine Conservation Society
Maxine Montello, New York Marine Rescue Center (formerly Riverhead Foundation for Marine Research and Preservation)
 - Discussion by all participants
- 10:45am BREAK (coffee and snacks provided)
- 11:00am **Regional monitoring and research efforts in the Mid-Atlantic and Northeast**
- Presentations:
Rob DiGiovanni, Atlantic Marine Conservation Society
Carrie Upite, NOAA GARFO

Heather Haas, NOAA NEFSC

- Discussion by all participants

12:15pm LUNCH (provided)

1:00pm **Geospatial Modeling and Mapping**

- Presentations:
Jason Roberts, MDAT Duke University

- Discussion- modeling vs. monitoring

2:00pm **Conservation and NGO priorities**

- Presentations:
Alison Chase, NRDC
Noah Chesnin, Wildlife Conservation Society

- Discussion- opportunistic and citizen science data

3:00pm BREAK

3:10pm **Discussion and Breakout Groups**

Assessment of current efforts, priority questions/data needs and determining the best strategy moving forward to create the best monitoring program for the New York Bight

Considerations:

- Technical feasibility and limitations
- Cost- consider tiers of expense (e.g., minimum, moderate and ideal)
- Coordination with regional and neighboring efforts

4:30pm **Summary of Discussion, Next steps, and Closing Remarks** *NYSDEC*

5:00pm Workshop Adjourns

New York Bight Sea Turtle Workshop Objectives:

- To find the best means of monitoring sea turtles in the New York Bight by gathering baseline data to provide adequate conservation and management for these species.
- To understand sea turtles' basic use of habitat, needs, threats, species-specific population sizes and health, and to begin investigating how this baseline is changing.
- To understand the data we have and the data we need. Establish a monitoring network.

- ✎ To identify current conservation needs and anticipate future conservation needs, as well as the accompanying data that is needed now to implement conservation activities in the future as conditions change.

Workshop attendees

Rob DiGiovanni (Atlantic Marine Conservation Society)

Hannah Winslow (AMSEAS)

Gregory Lampman (NYSERDA)

David Barnet (DEC)

Matt Schlesinger (NYNHP)

Emily Runnells (NYNHP)

Meghan Rickard (NYNHP)

Heather Haas (NOAA, Fisheries)

Wendy McFarlane (Manhattanville College)

Maxine Montello (New York Marine Rescue Center, *formerly* The Riverhead Foundation for Marine Research and Preservation)

Charles Bowman (NYMRC)

Samir Patel (Coonamessett Farm Foundation)

Kate Sampson (NOAA)

Maureen Murphy (Citizens Campaign for the Environment)

Robert Moore (Wildlife Conservation Society)

Jason Roberts (Duke University)

Nicole Mihnovets (Columbia University)

Noah Chesnin (WCS)

Jake LaBelle (WCS)

Ali Chase (NRDC)

Allison Deperte (AMSEAS)

Kim McKown (NYSDEC)

Lisa Bonacci (DEC)

Nicole Starkweather (DEC)

Sherryll Huber Jones (DEC)

Attended via webinar:

Mina Innes (NYSDOS)

Carrie Upite (NOAA)

Debi Palka (NOAA)

Connie Kot (Duke)

Ellen Keane (NOAA)

Bob Kenney (University of Rhode Island)

Merry Camhi (WCS)

Mindy Sweeny (Normandeau)

Marta Ribera (The Nature Conservancy)

Felicity Arengo (American Museum of Natural History)

Corrie Curtice (Duke)

Julia Donaton (Stony Brook University)

Amy Whitt (Azura)

Emmy Andrews (Tetra Tech)

Ann Zoidis (Tetra Tech)

Howard Rosenbaum (WCS)

Workshop presentations summary

Introductory Presentation: Lisa Bonacci, Sherryll Jones, NYDEC

Short introduction about the Ocean Action Plan and the workshop objectives.

Current Monitoring and Research Efforts in New York

Meghan Rickard, NYSDEC-New York Bight Whale Monitoring Aerial Survey Sea Turtle Sightings

Summary of sea turtle sightings in DEC aerial surveys. Survey is able to give a good preliminary idea of where and when sea turtles are found in the NY Bight. However, the nearshore areas are not well covered and species identification capacity is limited due to time and other constraints.

Greg Lampman, NYSERDA-NYSERDA's Turtles

Summary of sea turtle sighting in NYSERDA digital aerial surveys. Survey is only conducted once a season. But, this method is very good for identification of sea turtles to species.

Rob DiGiovanni, Atlantic Marine Conservation Society- Sea Turtle Strandings in New York

Rob's presentation summarized sea turtle strandings in New York from 1980 to 2017. Most of the cases involve disease or cold stunning, with other threats including entanglement, ingestion, boat strike, and contaminants.

The first sea turtle to be reported stranded was in 1980, and in 1984 New York saw its first cold stun case and first plastic case. Major cold stunning events occurred in 1985, 1986, 1987, and 1995. Most people assume that cold stunned turtles are dead, so treatment protocols were re-evaluated in 1996/1997. Cold-stunning typically starts around mid-October when temperatures stay below 50 degrees. The first cold stun of 2015 happened on December 4th and most cases came in in January, which were revived and released. Cold-stunning numbers by species are as follows: loggerhead: 780; green: 208; Ridley: 585; leatherback: 405.

In general, strandings occur mostly July through December (loggerhead: 1,024; green: 283; leatherback: 404; Ridley: 677; hybrid: 7) and in 2017, strandings occurred mostly in December.

Less and less loggerheads are being seen. Sea turtles are often cold-stunned in Long Island Sound and found on North Shore beaches. In 2014, a leatherback stranded in Southampton with plastic debris and evidence of ship strike. Multiple entanglements occur each year around the Shinnecock and Montauk areas.

As a next step, Rob suggests preparing for unusual events and working with the data to understand how strandings relate to wild populations.

Maxine Montello, Riverhead Foundation for Marine Research and Preservation-Sea Turtles Near and Far

In 2017, RFMRP responded to 42 live sea turtles. Two loggerheads had evidence of human interaction, with a fishing hook and a boat strike. Of the 42 turtles, 40 were cold-stunned. To revive them, a slower temperature regime of no more than 5 degrees C increase per day was used. From November 11 to December 25, the cold-stunned turtles washed up, most of which were Kemp's Ridley (23). Loggerheads had eye damage, and the success rate of response was 68% for the year.

Rob DiGiovanni, AMSEAS- Sea turtle research in NY

Rob also presented on sea turtle research in New York. In the Peconic Estuary, a pound net fishery study was conducted from 2002 to 2006 from July through November. Over that time, 75 animals were recovered, two of which were loggerheads. Health assessments were done, including blood work and biopsies, with 11 fishermen participating. AMAPPS has been conducted annually since 2010, and in the fall of 2016, sea turtles were sighted in Long Island Sound. Flights for these surveys are done at 600 feet, so are more likely to identify sea turtle species. Acoustic tags (Vemco) were deployed on fifteen sea turtles in 2010, including 9 Kemp's Ridley and 6 loggerhead. There have been many data hits for the acoustic tags since then.

Current Monitoring and Research Efforts in the Mid-Atlantic and Northeast

Debra Palka, NOAA, NEFSC-Atlantic Marine Assessment Program for Protected Species (AMAPPS)

Debra presented a summary of findings from NOAA's AMAPPS monitoring program. Times series data of sea turtle (and other protected species) from aerial and shipboard surveys . Recently, more aerial survey lines have been added in the NY Bight.

Carrie Upite, NOAA, GARFO-Regional monitoring efforts in the Mid-Atlantic and Northeast

Carrie presented on regional monitoring efforts from the management perspective. Joint recovery plans for sea turtles with FWS (and Mexico for Kemp's ridleys) identify actions that would fulfill the recovery objectives. NMFS anticipates, evaluates, and monitors sea turtle take through ESA Section 7 consultations with other Federal agencies, as well as evaluates post-interaction mortality. Work is ongoing on vessel interactions and/or strikes, and integrating information on sea turtles into the boating registration process is being considered. A gear research team is looking at low profile gillnets, TEDs, and vertical line options to reduce mortalities from fishery bycatch. Regulations have been developed for scallop dredges (using turtle deflector dredges and chain mats), pound nets (using modified leaders), and large mesh gillnets (using seasonal closures). The annual determination process identifies fisheries that will be required to take observers upon NMFS' request. NMFS efforts also include coordinating stranding and disentanglement efforts, assisting with the development of Habitat Conservation Plans (particularly for fisheries in state waters), and coordinating the Section 6 program.

In terms of regional trends, in Massachusetts, sea turtle strandings are mostly cold stunned turtles, while in Virginia most strandings occur during the warmer months and are due to fisheries hooks and boat strikes. Most entanglements occur in MA and involve leatherbacks. On a regional level, there is a NMFS Northeast Sea Turtle Strategic Plan that helps guide the sea turtle program, and on a national level there have recently been several status reviews (loggerhead, green, and leatherbacks), critical habitat reviews (loggerhead and green), and 5-year reviews (all species). There is also an ongoing sea turtle climate vulnerability assessment.

Heather Haas, NOAA, NEFSC- Collaborative Turtle Research in the Greater Atlantic Region

Heather presented on current collaborative sea turtle research. Bycatch data on all four local species is being collected. CFF-NEFSC tags have been deployed, 176 tags total, that collect dive profiles and Argos locations. Heather also presented a list of projects underway:

- Loggerheads as ocean observers (collecting oceanographic data)
- Long-term datasets: BACI (before after impact control) and time series data sets
- Healthy and physiology projects (sex ratios, stress hormones)
- Loggerhead density from multiple data sources (aerial, sat tag, bycatch)
 - Megan Winton (UMass), Gavin Fay, Smolowitz, Patel, Haas
 - Done within a year or sooner (absolute or relative density?)
- Availability to visual observers (order of magnitude impact)
 - Estimating proportion of turtles at the surface (water column stratification plays role because they need to come up for thermal regulation if in cold water)
- Reconstruction of animal movement track (sat tag data)
- Commercial fishing effort in relation to tagged loggerheads
- Loggerhead distribution to predict future distribution due to climate change
- Leatherback field work
- NOAA vessel access but need operating budget
 - Future field work with additional funding (collaborative proposal)
 - AMAPPS III?

Geospatial Modeling and Mapping

Jason Roberts, Duke University- Mapping and Modeling: What do you do with your data?

Jason presented on various methods of survey analysis and the pros and cons of each.

Sightings maps are relatively “easy” to create; as long as species is identified, it can include any data. However, it’s hard to draw conclusions from just those points; if there are lots of points, are there lots of animals in that particular area or are people just checking there mostly? To get at this problem, effort tracklines can be underlaid to account for effort. He used the 1851 example of Maury doing a seasonal analysis of whaling off Brazil with the data from whaling log books to create relative density and seasonality by species.

Which brings the discussion to **Sightings Per Unit Effort** maps to account for differences in effort between areas (essentially, a comparison). These maps give more realistic depictions of species distributions, such as the sea turtle products in the MARCO and NROC data portals. However, SPUE maps don’t estimate absolute density (individuals per unit of area) or abundance, which makes it difficult to quantify the effects of activities. The denominator here is effort and not area; animals are present but not seen, which makes it hard to extrapolate to unsurveyed areas. It’s also hard to integrate different sources of data (shipboard versus aerial surveys). The next level of analysis is **Distance Sampling**, which samples in a fixed area, finds the density of animals in the area covered, and multiplies up for abundance. This method relies on observers, such as those that do ship transects. It also assumes observers see every animal, which is not realistic. The detection function $g(0)$ relates to the higher likelihood of observing an animal closer to the trackline. By multiplying by a truncation distance, a new estimate for the area is determined.

Distance Sampling Models estimate absolute abundance (individuals/square kilometer) and account for animals not seen, as well as other factors like turbidity, sea state, or glare. Distance Sampling Models require the distance to each sighting on transects that need to be laid out systematically for even coverage. To accomplish this per species, there should typically be about 60 sightings, but hundreds are preferred. The result is a single number for a large area, but it doesn’t reflect variation across seascape.

This is where **Habitat Modeling** comes in. By adding effort, sightings, and covariates into a statistical model, the result will be a habitat suitability map on a 0 to 1 scale (sometimes referred to as a Presence/Absence Model). Presence only models with just sightings and no effort can be done by creating “fake sightings” and adding them to the presence data to a Generalized Additive Model to produce predictions. Advantages of Habitat Modeling are that they show detailed variation in habitat suitability across space and time; they can predict uncertainty around predictions; they are adaptable to many types of data; they can use unsystematic surveys; they can extrapolate to unsurveyed areas (cautiously); and don’t require effort data (so citizen science can be used). Disadvantages are that predictions are on a 0 to 1 scale; they can’t mix data from different sources (telemetry and line transect surveys); and their accuracy depends heavily on the quality of pseudo-absence data generated.

Density Surface Modeling combines Distance Sampling and Habitat Modeling, and is what the US Navy uses to predict harassment and mortality. Line transect surveys (distance sampling) is used with correlates (sea state, group size, etc.) in the model, which accounts for availability bias (which is difficult to account for in sea turtle species) and perception bias. Advantages to DSM include showing the variation in absolute density and uncertainty in space and time, tolerating unsystematic surveys, and extrapolating to unsurveyed areas. Disadvantages include the requirement of data with a measure of distance to sighting, it can’t easily take different types of data, and hundreds of data points are preferred (more is better).

Applying these methods to the task of monitoring sea turtles meets the difficulty of differentiating species of sea turtle at sea; usually, only “hard-shelled” turtle can be distinguished. Sightings distances should be collected when surveying so as much analysis can be done as possible. The dive pattern of sea turtles can vary greatly, so it’s often difficult to gather this data. He suggests working backwards from the goals, looking at the approaches likely to be used, and figuring out what data to collect from there. He also suggests creating the study area based on ecological boundaries instead of political boundaries to identify habitat relationships. If behavior is an important part of monitoring, other approaches will be needed. In situ studies and telemetry are particularly useful here, such as strandings data.

Conservation and NGO priorities

Alison Chase, NRDC- Designing New York’s sea turtle monitoring plan & management program

Ali encouraged the state to work expeditiously to design and implement a sea turtle monitoring plan and management program in line with the work called for by the *New York Ocean Action Plan*. She recommended that sea turtle experts – including those present in the room – develop a monitoring plan that piggybacks on existing state and federal monitoring efforts and factors in opportunistic sightings and citizen science data to help augment data collection or, at the least, help validate density models from official survey estimates. Data should be used to improve understanding about species abundance, distribution and behavior and advise the state’s protective management actions in state waters to address known stressors to these animals (e.g., ship strikes, cold stunning). She also recommended that a state management program work to educate and engage the public.

Jake LaBelle & Robert Moore, Wildlife Conservation Society- Wildlife Monitoring in the New York Seascape and Beyond

Jake and Robert spoke about many wildlife monitoring activities that have been, or are being, conducted by WCS. These included shark tagging and health assessments, NY whale research, citizen science megafauna monitoring and sea turtle research. Monitoring methods and some results were discussed.