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Community Science Plays Key Role in Conservation

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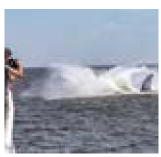
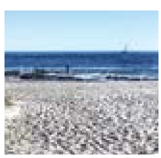
WINTER 2020 VOL. 35 NO. 1

CONTENTS





On the Cover: A humpback whale breaches with the New York City skyline in the background. Photo by Artie Raslich / Gotham Whale.

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From the Executive Director

In many respects, the American Littoral Society started as a community science effort, fostered by Dr. Lionel Walford and Dr. John Clarke. In its earliest efforts, in the early 1960's, scuba divers provided capacity to the newly established Sandy Hook Marine Laboratory, which was in heavy start up mode on a limited government budget. Today, the Society maintains the nation's largest volunteer angler-based fish tagging program, tags thousands of horseshoe crabs, monitors water quality, inventories raptors and terrapins in the heart of New York City, and measures the return of fish to historic spawning grounds. All of this work shares several important qualities: it is done in partnership with established scientists and public resource management agencies, and it relies on the public.

Like the early days of the Sandy Hook lab, scientists often face a lack of capacity – whether from cuts to governmental environmental programs, shifting academic research priorities or simply a need for more data. Into that breach step volunteer community scientists all across the country, across a range of interests and fields of study. Our experience has been that it is often simply a quest to be more involved in understanding the mysteries of the ocean, bays and coast and its wildlife that brings them to the work. You don't have to be a formally trained scientist to possess the singular quality essential to good science – curiosity.

The quest for more information is set to explode. Scientists need more data and the tools to collect information through phone-based apps and other low-cost methods are increasingly available and easy to use.

The Littoral Society thrives on connecting people to the coast. Feet wet and hands sandy is the best approach to education, developing stewards and advocates, and increasingly to provide the information science needs to solve the pressing problems facing our environment and planet. We will continue our traditional approaches to fostering community science, and keep looking – excitedly – for new opportunities.

Tim Dillingham

Why we are changing “Citizen Science” to “Community Science”

By Erin Canter

Manager of Science Literacy and Research
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If you have ever watched a monarch butterfly float erratically through the air, the idea of these delicate insects traveling a few miles, let alone thousands of miles, might seem implausible. If you were ever skeptical that these seemingly fragile critters could survive a mass migration, you are not alone!

Throughout the 20th century, the very concept of butterflies traveling such distances was controversial among western scientists. One well-known naturalist scoffed that "the idea that [monarchs] returned North like birds … is simply another of those endless nature myths."

Though the native Mazahua people of Mexico were well aware of this enormous migration, western researchers had still not located the overwintering grounds of Monarchs–or been able to prove their theories of mass monarch migration—as late as the 1970s.

That is, until ecologists and monarch enthusiasts Paul and Norah Urquhart of Canada found a clever way to track their migration: the application of small adhesive tags that would not damage the fragile wings and were too light to impede monarch flight. These tags each bore unique numbers, which were recorded along with the date and location and then applied to the underwings of hundreds of butterflies.

If someone found a monarch with a tag anywhere in the USA, they could contact the researchers and indicate the number associated with the butterfly's tag. If a monarch with a tag was found in Florida, for example, someone would contact Paul and Norah, who could look up the unique number on the sticker to learn where and when the tag was originally applied.

Previous Page: A Monarch Butterfly (Danaus plexippus) with an identification tag applied on a spot that had its scales rubbed off. The butterfly was part of the Cape May Bird Observatory's program of tagging in Cape May, New Jersey. Photo by Derek Ramsey

In this way, they could start to track the movements of monarchs.

Two people alone, however, cannot tag very many monarchs! In 1952, Paul put a call out for volunteers to assist in the efforts. That year, only 12 people responded, but by 1971, 600 volunteers from all ages and backgrounds responded to the call!

By enlisting the help of hundreds (and now thousands) of volunteer participants, Norah and Paul slowly started to see patterns, learn routes, and track the movements of these incredible butterfly journeys.

Monarch tagging is one of the best-known examples of "citizen science." Put simply, citizen science is a way for researchers to broaden their reach and capacity for data collection and observation. In practice, however, the power of this collaboration extends beyond simply crowd-sourcing information to input into databases. The observations of these trained volunteers have exponentially expanded our ecological knowledge and the reach of education and conservation efforts worldwide.

By enlisting the help of hundreds (and now thousands) of volunteer participants, Norah and Paul slowly started to see patterns, learn routes, and track the movements of these incredible butterfly journeys. However, participation was limited to those in the

US, and Norah soon realized this was insufficient. She reached out to multiple Mexican newspapers, and after following several leads within the country, Paul and Norah arrived at the "Mountain of the Butterflies," in Mexico's Sierra Madre, where they summited and stared in wonder at trees completely covered in orange and black wings. Moreover, the most incredible discovery of all: one wing bore a white tag! Placed there by a volunteer in Minnesota, that tiny round dot helped to confirm this incredible international migration.

…being involved with local, national, and international research connects each participant to a wider community, all working together to understand our planet.

We now know that monarchs travel upwards of 3,000 miles from Northeastern U.S. and Canada to reach their overwintering sites in Mexico. We also know that this journey can span up to five generations. That means the monarchs that leave Mexico in the spring could be the great-great-great grand-butterflies of those that will return south the following winter! We know this, in large part, because an international community of people lent their time and curiosity to help connect the dots of this nature mystery.

Though the word "citizen" in citizen science does not denote the nationality of those who observe, it has become a limitation. At the heart of this kind of collaboration is the network of people empowered to use science to gather data that provides insight into the inner workings of the ecosystems in which they live, regardless of citizenship or country of origin. Just as importantly, being involved with local, national, and international research connects each participant to a wider community, all working together to understand our planet.

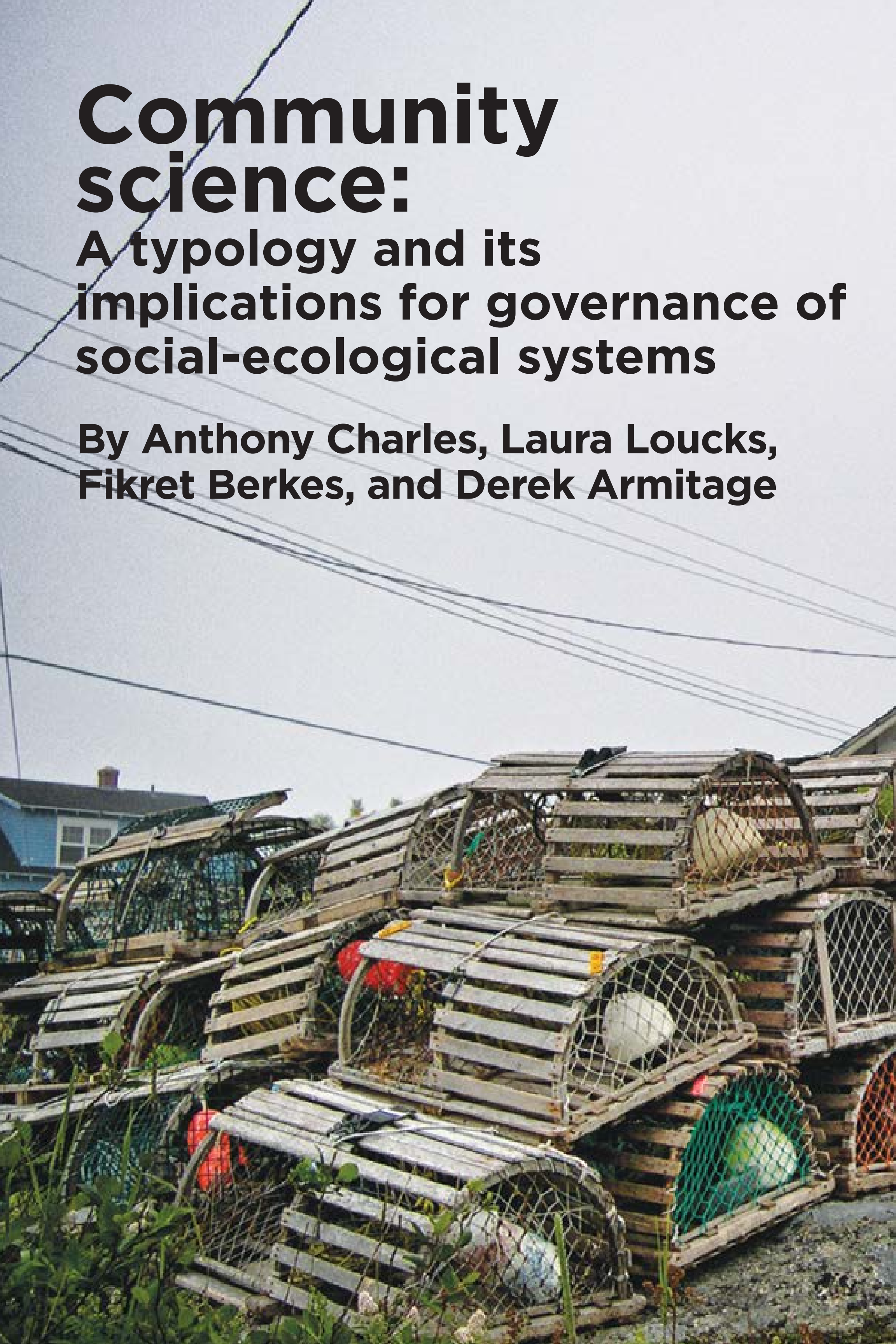
This is why Tremont is joining other leaders in environmental science education in transitioning from "citizen science" to the more inclusive and accurate term "community science." From **Monarch tagging** to air and water quality surveys, from salamander counts to **bird banding**, the data that will help us understand our local bioregion and beyond is collected by anyone who is curious, engaged, and willing to apply their skills of observation.

In partnership with Great Smoky Mountains National Park, the Great Smoky Mountains Institute at Tremont's mission is to deliver experiential learning for youth, educators, and adults through programs that promote self-discovery, critical thinking, and effective teaching, and leadership. We believe that education creates lasting positive change for people and our planet. For more information go to: https://gsmit.org/

Community science:

A typology and its implications for governance of social-ecological systems

By Anthony Charles, Laura Loucks, Fikret Berkes, and Derek Armitage



1. Introduction: community science

In recent decades, consideration of the various sources of knowledge has emerged as an essential component of thinking about environmental and resource governance. This is perhaps most prominent in debates over reliance on 'Western' science versus the expanded and comprehensive use in practice, policy and decision-making of traditional, local and/or 'user' knowledge. This article is not directly about the broad nature of knowledge and how various sources of knowledge are recognized and potentially utilized. Instead, we explore the ground between purely Western science, and local knowledge, by focusing on how scientific methods can be applied at a local scale, in a manner that is community-driven and community-controlled.

This article introduces and critically examines the concept of community science – defined as scientific research and monitoring, based on scientific modes of inquiry, which are (i) community-driven and community-controlled, (ii) characterized by place-based knowledge and social learning, collective action and empowerment, and (iii) with the normative aim to negotiate, improve and/or transform governance for stewardship and social-ecological sustainability.

Previous Page: Lobster traps piled outside a boathouse in Peggy's Cove, Nova Scotia, Canada. Canada's eastern fishing communities relied on cod until fish populations crashed in the 1990s. Then many turned to lobster, only to see declines in the numbers of those crustaceans. At that point, some turned to community science for insight and information that would help them maintain sustainable fishing practicesPhoto by Dylan Kereluk

From the definition, it should be clear that the word 'science' (and 'scientific research') is used here to include systematic collection and analysis of any form of information using a scientific mode of inquiry. We emphasize that this is not necessarily natural science 'data' – it can include all human dimensions, e.g. information that may be classified within social science and humanities. Indeed, we use the word 'science' somewhat reluctantly, as too often in practice when the term is used, the human dimensions are left out or downplayed relative to natural sciences. This can occur even if those using the term explicitly indicate that all forms of knowledge are included, as there may still be, in practice, a bias toward natural science knowledge. Nevertheless, since the term is so widely used in public and policy circles, it remains useful, as long as the breadth of its meaning is clear.

It is also important to highlight that community science is not, by any means, the entirety of knowledge generation taking place in a community. It is merely that which is generated through application of the scientific mode of inquiry, following the modus operandi for specific types of research methods suitable for that discipline. In particular, this paper emphasizes the idea that community science inherently links application of the scientific method with processes of social learning. From a community science perspective, it is crucial that science be understood as broadly encompassing different modes of scientific inquiry for the purpose of understanding and ameliorating complex social-ecological problems. Within community science, the scientific method is a socially constructed mode of inquiry in which research questions are developed in collaboration with community members.

Research methods are determined in a similar manner, through an iterative dialogue between scientists and community knowledge holders from which a shared understanding of the social-ecological system emerges (Woodhill and Roling, 1998). Western science has been historically rooted in reductionist epistemology based on experimental and empirical research to uncover the 'impartial truth'. Community science blends applied research methods with constructivist epistemology based on normative values, interactive learning and communicative action to find opportunities to transform the social-ecological system (Woodhill and Roling, 1998).

In this regard, it is useful to compare community science with the more commonly used concept, citizen science (Shirk et al., 2012; Cigliano and Ballard, 2018). Citizen science is typically instituted not by a community but by a researcher or team of researchers outside the community – i.e., it is driven by scientific professionals and experts (Bonney et al., 2016). In contrast, community science is led by the community, which chooses whether or not to engage with any given scientific experts, whether internal or external. Further, the context in which community science emerges is strongly associated with the social-ecological system (SES) in which a community is embedded (Berkes and Folke, 1998), including a set of shared beliefs, a strong connection to place (Berkes and Ross, 2013) and the self-organizing properties of the community from which iterative social learning arises (Seixas and Davy, 2008).

While citizen science can be collaborative or co-created with a community (Shirk et al., 2012), it tends to be based on involvement of individual citizens as volunteers who collect data as part of a scientific enquiry, as in the Christmas Bird Count (Silvertown, 2009). Thus, in contrast to community science, it is not necessarily focused on the social (collective or community) nature of the endeavor, nor does it involve collective action. Though it is typically "citizens" within a community who are involved in doing community science, the key is that it is based on collective action, that is, action undertaken together by a group of people whose goal is to enhance their status and achieve a common objective (Olson, 1965). Thus, citizen science is inherently social in nature, based on social learning, collective action, and commitment to community goals (Loucks et al., 2017).

This article describes how community science has developed in practice, using a three-model typology, and critically reflects on these diverse ways in which the aims of community science can be met in relation to knowledge and learning processes, governance and the enhancement of social and ecological sustainability. The article demonstrates how community science provides support for social-ecological system transformation (Armitage et al., 2017), and for achieving improved governance fit (Folke et al., 2007; Ekstrom and Young, 2009; Epstein et al., 2015). Indeed, achieving better 'fit' between the social system and the governance system at local and higher levels of decision making is a normative goal of community science.

Community science is examined here within the context of the broad concept of social learning, which has been shown to be an important ingredient in helping those at various levels (e.g., local, regional) to deal with complexity in social-ecological systems (Diduck et al., 2012). Social learning is often based on iterations of action, reflection, and deliberation, creating shared experiences and fostering change in understandings or perspectives aimed at resolving challenges (Diduck et al., 2012; Keen et al., 2005; Reed et al., 2010).

A key requirement of social learning is that the learning extends beyond the individual and becomes embedded in a broader social context through interactions among actors in a social network (Diduck et al., 2012; Reed et al., 2010). Therein lies its close connection to community science. Social learning engages a social network in the expanding process of co-producing knowledge, and is thereby considered important to bridge knowledge gaps in managing change in multi-level and multi-scale governance systems (Cundill and Rodela, 2012; Medema et al., 2014). Indeed, there are strongly dynamic aspects to social learning, drawing on social-ecological memory (Rodríguez Valencia et al., 2019) and on planning aspects (Goldstein, 2009).

Related to this, and crucial to community science, is the need for community empowerment, and the use of local and indigenous knowledge for perceiving and managing dynamic changes in socialecological systems (Díaz et al., 2018). These are important for democratizing conservation science and practice (Salomon et al., 2018), and are also relevant to governance. Later in the paper we focus on the strong connections between community science and governance.

2. A typology of community science

The typology proposed in this section focuses on variations in the social learning processes involved, i.e., the manner by which the local community engages with scientific expertise (individual scientists or agencies, internal or external). In particular, we suggest that community science emerges in three general forms, all sharing the key characteristic that the community decides with whom they wish to engage. This 'engagement typology' arises from (a) the authors' experience in several longstanding community-focused partnerships, over the past three decades, involving communities that are central actors in scientific activities for better conservation and livelihood outcomes, (b) our close interaction with other community-based initiatives, and (c) a range of published literature (as in the previous section and throughout the following sections).

Based on this experience and knowledge base, the three community science models in this typology involve:

- the community engaging with external bodies (universities, governmental research institutes, etc.) to provide the necessary scientific knowledge,

- the community drawing on internal volunteer scientific expertise, and
- the community hiring (or contracting) in-house professional scientific expertise.

Commonalities (and notably, common conditions, principles and features) across these three models are explored later in the paper, after first illustrating the models through three case studies presented in the next section.

3. Illustrating the typology of community science

The above typology is examined using experiences from three coastal communities on the Atlantic coast of Canada – Eastport (Newfoundland), Port Mouton Bay (Nova Scotia) and Lennox Island First Nation (Prince Edward Island). The nature of these illustrations, and of the research interactions involved, is summarized in Table 1. This paper's authors have engaged, to varying extents, with these three communities – indirectly in the case of Eastport (notably through a national network, the Ocean Management Research Network, in the 2000s), and directly with Port Mouton Bay and Lennox Island First Nation (through several research partnerships – see, e.g. Coastal CURA (2019); ParCA (2019a) and OceanCanada (2009).

3.1. Community engages with external science organizations

3.1.1. Context

Eastport is a small fishing community located in Bonavista Bay on the northeast coast of the island of Newfoundland, on Canada's Atlantic coast (Charles and Wilson, 2009). The community and its residents have a long-standing reliance on marine resources, including "a wide range of groundfish, pelagic fish, shellfish, marine mammals, and aquatic plants" (DFO (Department of Fisheries and Oceans), 2007). The impact of the massive collapse of groundfish (notably cod) stocks and fisheries in the early 1990s (Charles, 1995) was immense on Eastport and other coastal communities. To survive after the groundfish collapse, fishers turned more to lobster (Homarus americanus), which had been previously considered only a supplemental fishery (Collins and Lien, 2002; Davis et al., 2006). This greater fishing effort on lobster stocks led to a decline in catches, threatening community livelihoods.

3.1.2. Motivation for community science

Local fishers saw the need for a strong and sustainable local presence in managing the lobster fishery, after the collapse of the cod fishery, and accordingly established the Eastport Peninsula Lobster Protection Committee in 1995 (Rowe and Feltham, 2000; Power and Mercer, 2003). The local fishers wanted a better understanding of local lobster stocks, thereby improving sustainability for the stocks and the fishery itself. In particular, they felt the need to add to their existing knowledge of lobster dynamics, location and movement through scientific research. This was closely interwoven with a desire to implement practical conservation and management actions in their lobster fishery. The following outlines the process followed by the fishers, and their community, to meet these goals for more extensive details, see Davis et al. (2006), as well as Murray et al. (2005).

3.1.3. Model of community science

To build their community's conservation efforts, the fishers engaged in partnerships with a number of scientists from the academic world (Memorial University of Newfoundland) and government (i.e. Parks Canada and Fisheries and Oceans Canada) (Collins and Lien, 2002). The resulting research dealt with the life stages of the lobster, their abundance and their location in the ocean in these different stages. This was carried out by scientists and fishers together, so that throughout the research, local fishers participated not only in the data collection, but in the decision processes of the research. Furthermore, a local high school class became involved in assisting with collecting and analysing information (Collins and Lien, 2002).

The research was carried out alongside conservation and management actions initiated by the fishers, such as "v-notching" the lobster to mark females carrying eggs, and closing certain fishing areas that had been shown to be prime lobster habitats (based on the community science results). In 1997, an agreement between the Committee and DFO was reached to implement those closures (DFO (Department of Fisheries and Oceans), 2007), "setting aside specific areas of 'prime lobster habitat' that have historically and traditionally been recognized and valued by these communities" (Collins and Lien, 2002; Davis et al., 2006). The aim was to build up the lobster stock, through conservation supporting community livelihoods (Collins and Lien, 2002).

At the same time, a co-management arrangement was put in place, based on government recognition of local fishers, and the fishers' experience with research, conservation, and eventually management actions. The co-management arrangement shifted later into an advisory committee (Davis et al., 2006), reflecting the reality that, from a regulatory point of view, the government has not devolved formal powers to the community, e.g. with respect to compliance and enforcement.

Table 1

Illustrations, and underlying source data, for the three models of community science

Community Science Model	Illustration	Key Time Frame	Major Research Collaborators	Key References
Community engages with external science organizations	Eastport, Newfoundland and Labrador, Canada	1995-2005 (continuing thereafter)	Fisheries & Oceans Canada; Memorial University of Newfoundland	Collins and Lien, 2002; Davis et al., 2006; Rowe and Feltham, 2000; Power and Mercer, 2003; (Department of Fisheries and Oceans), 2007
Community engages with resident scientists	Port Mouton Bay, Nova Scotia, Canada	2000-present	Saint Mary's University; Dalhousie University; Conservation Council of New Brunswick	Gilbert, 2007; Hargrave, 2009; Loucks et al., 2012, 2014, 2017; Milewski et al., 2018
Community engages with employee and/or contracted scientists	Lennox Island First Nation, Prince Edward Island, Canada	2000-present	Saint Mary's University; University of PEI; University of Waterloo; Parks Canada	Charles et al, 2010; Bood, 2011; Mitchell, 2015; UPEI Climate Lab, 2018

3.1.4. Concrete results of community science

In 1999, feeling that the closures had been successful, and ready for further steps, a request was made to DFO by the Eastport Peninsula Lobster Protection Committee to institutionalize the closed areas as a formal Marine Protected Area (MPA). This was seen as key to permanently protect the lobster habitat, and to further support conservation initiatives for protecting resources and livelihoods. In addition, the move to formalize the MPA may have (1) helped to ensure that those outside the fishery did not misuse the local marine area, a win–win situation for local fishers, and (2) supported community socio-economic goals and enhanced communication (Charles and Wilson, 2009). Following a successful community-driven co-management approach, along with scientific knowledge acquisition, including biological and socioeconomic studies (Rowe and Feltham, 2000; Power and Mercer, 2003), the Eastport MPA was officially designated in 2005, under the Oceans Act (DFO (Department of Fisheries and Oceans), 2007). It is a rare (in Canada) community-based coastal protected area, based on an initiative that came from the grass roots.

Now, a quarter-century since the fishers of Eastport began this initiative, there continues to be strong local support for this conservation action. Novaczek et al. (2017) note: "As a single-species management tool designed to support the American lobster fishery, the Eastport MPA closures are celebrated and respected by the local community." Thus, the conservation actions are clearly successful from the local perspective. Scientific efforts to assess biological success give mixed results in terms of abundance and biodiversity enhancement (DFO (Department of Fisheries and Oceans), 2014; Lewis et al., 2017; Novaczek et al., 2017; Standing Committee on Fisheries and Oceans, 2018), but the fundamental ingredients for lobster conservation are present (Novaczek et al., 2017):

"The most prevalent habitat of the MPA (shallow rocky) appears to be suitable for juvenile lobster settlement and survival. Monitoring of the Eastport MPA through mark recapture studies have demonstrated higher proportions of ovigerous females inside the MPA compared to the surrounding commercial area, indicating the MPA protects reproductively active adults (Janes, 2009). This contributes to the MPA's primary conservation goal: protecting the American lobster population and, by extension, the local fishery."

3.1.5. Key insights

The Eastport case demonstrates several key features. Underlying the initiative was an inherent commitment to place, and to local values of the community. These formed the basis of the trust and collaboration that grew, albeit gradually, with external science bodies. As that trust grew, the links for community science developed with increasing strength, rooted in the community's sharing of joint objectives and the deeper understanding of the social-ecological system.

Leadership was strong – arising from the fishermen's organization (notably the leader of that organization) and the community. This was important to ensuring that the community kept control of the community science, specifically the prioritization of research questions, even while welcoming and supporting outside researchers.

Partnerships were crucial throughout, including those with the local schools, adjacent communities, and academic institutions, as well as governments and researchers. The latter, through their connections to institutions, conferences, and other vehicles, provided a means for the fishers of Eastport to get their message out nationally and internationally (Charles and Wilson, 2009). The network of partnerships also produced the needed capacity and resources, from outside the community, to facilitate the community science.

The process of participatory community science built community strength and resilience, and had clear links to governance issues, notably the formalization of the Marine Protected Area. The case also showed well how scientific and technical methods can connect with community knowledge (and indeed has been used by governments, academics, and others, to illustrate this).

3.2. Community engages with resident scientists

3.2.1. Context

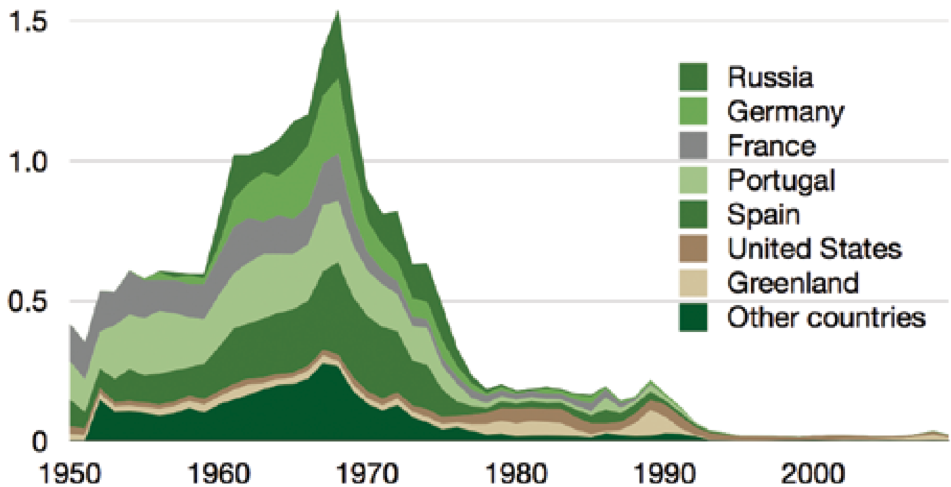
Port Mouton Bay (PMB) is a small coastal area in Nova Scotia, Canada, which is traditionally a fishing community, since fishing families first settled the area in the 1700s. In recent decades, since the cod collapse described above, the PMB community has become highly dependent on lobster fishing, although tourism has become important as well.

Still in use are the lobster fishing territories that became established in the 1700s based on the location of their early village wharves; these areas, which reflect the location of lobster habitat and seasonal lobster migration patterns, continue to be handed down within the same families whose ancestors originally settled the local villages, an affirmation of the important rules-in-use that have guided local fishermen for more than two centuries (Loucks et al., 2017). Indeed, lobster fishing locations shown on hand drawn maps from the 1940s match those still used today, confirming that lobster migration patterns are relatively stable (DFO data files cited in FPMB, 2008).

Certain locations in Port Mouton Bay play crucial roles. One important area is considered a "safe haven", providing a sheltered location where lobster traps can be placed for protection during storms – and serving as a type of lobster spawning commons (Loucks et al., 2017). In another location, identified as the most important spawning habitat for the lobster, fishermen engage in conservation by not using gill-net fishing in that location (Loucks et al., 2017). These lobster fishing and conservation practices are relevant to meeting a particular environmental challenge through use of community science, as discussed below.

3.2.2. Motivation for community science

A finfish aquaculture lease, first issued in 1995, created a challenge for Port Mouton Bay. In particular, when the operation began rearing Atlantic salmon (Salmo salar), fishermen noticed lobster were shifting their traditional routes to avoid a wide area of sludge on the ocean bottom below the salmon net-cages (Gilbert, 2007). Fishermen felt that this degradation of important lobster habitat may explain declining



Atlantic cod stocks were severely overfished in the 1970s and 1980s, leading to their abrupt collapse in the 1990s. Catch figures climbed to more than 1.5 million tons per year before falling to almost none, beginning in 1992.

lobster catches. Further, they observed algae fouling their lobster traps and thought this might be tied to declining numbers of mussels, clams, scallops, and periwinkles in Port Mouton Bay (Gilbert, 2007).

All of this motivated the creation of the Friends of Port Mouton Bay (FPMB), a community organization with the initial goals of monitoring the bay and preventing the siting of aquaculture leases in locations with low flushing rates. The community was further induced to act by the proposal, in 2006, for a second finfish aquaculture site in the same location as the "safe haven" described above.

The FPMB gathered in community meetings to discuss their situation and possible actions. These group conversations helped create a sense of shared community strength and cohesion, and became the foundation for strong relationships and collective action (Loucks et al., 2017) Importantly, the FPMB has no assigned, elected or appointed leader, but rather there is a self-organizing network with a "flat" organizational structure. Leadership at any given time is context-specific: depending on the situation, individuals may naturally gravitate to a role as leader, or be encouraged to take on the task.

3.2.3. Model of community science

The FPMB was comprised of a wide cross-section of the local community, including a strong contingent of fishermen who could see the changes taking place in the bay, and saw the need to document ecosystem (and lobster) sensitivity to those changes. In addition, and a key ingredient for the emergence of community science in Port Mouton Bay, was the shared connection with place among those who attended FPMB meetings, including a marine scientist, and her marine scientist partner, who grew up in and was still a resident in the community. The combination of the fishermen's local knowledge and that of the resident scientists created the particular model of community science in Port Mouton Bay.

During one key meeting of the FPMB, the scientists asked the local fishermen, "How does this Bay work?" (Loucks et al., 2017). The question initiated a conversation between the scientists and fishermen about the Bay ecosystem, revealing the fishermen's knowledge of the biophysical properties influencing water circulation. Indeed, the fishermen's local ecological knowledge of the Bay matched perfectly with the bathymetric contours seen in oceanographic analyses (Loucks et al., 2017).

The fishermen and scientists moved ahead with several collaborative and technical studies that cross-validated each other's knowledge with their shared experience and methods of iterative learning. The studies addressed the location of the proposed fish farm site, and whether there was a risk that finfish farm waste can pollute adjacent beaches and shoreline habitats (FPMB, 2007). This was especially of concern since Carters Beach, a habitat for the endangered Piping Plover shore bird, is located near the existing fish farm lease (Loucks et al., 2017).

Social learning also took place through a study, initiated by the fishermen, to explore whether the finfish farm had a detectable effect on lobster migration patterns. The fishermen collected data on their lobster catches, which showed those catches were at their lowest adjacent to the fish farm, in years the fish feeding was in operation (Loucks et al., 2014).

Fishermen's perceptions of loss of ecosystem services, and the local community science, were later corroborated by a retired federal scientist (Hargrave, 2009). Complementary to this was community science that generated data on metal contamination in the sediments and in the sea-surface microlayer (Loucks et al., 2012), likely contributing to the loss of mussels, scallops, kelp and eelgrass beds and Irish moss, both adjacent to the fish cages and at distance (Loucks et al., 2014).

3.2.4. Concrete results of community science

With all of these efforts since 2006, no new aquaculture applications have been approved in recent years. Fundamentally, this is a key achievement, reflecting the main goals of FPMB. Further, the FPMB has become well recognized for its community science initiatives. A recent review of the province's aquaculture sector (Doelle and Lahey, 2014) provides strong support for this: "The Friends of Port Mouton Bay have done tremendous work to try to fill information gaps that are of significant general interest, and it is critical that their work lead to further research in this area" (Doelle and Lahey, 2014: 28).

On the other hand, Port Mouton Bay has yet to experience a governance and regulatory process that adequately takes into account the nature, functionality, and dynamics of their local social-ecological system. Fishers remain displaced from their traditional fishing territories and an effective informal local governance arrangement, one that previously supported the stewardship of local lobster grounds, has been eroded. There is hope that findings of the above aquaculture review (Doelle and Lahey, 2014) may lead to improvements, but this has not happened to date.

This community science in Port Mouton Bay is continuing, with 26 community-led data reports having been posted on the Friends of Port Mouton Bay website to date (see https://www.friendsofportmoutonbay.ca/documents.html), and with the number of partnerships growing, leading to further biological studies (e.g., Milewski et al., 2018), new community stewardship committees (FPMB, 2018) and an initiative to explore the area's economic future (Posluns, 2016).

3.2.5. Key insights

As for Eastport above, several features are apparent from the Port Mouton Bay case. First, the accomplishments in Port Mouton Bay draw on its sense of place and strong social cohesion, as well as common values, to develop effective community science, leading to action, sometimes successful, for policy change. Second, leadership was and remains crucial though perhaps unusually, it is not an individual but the FPMB as an organization that provides collective leadership for the community. This collective action has itself empowered the community to broker several new social learning partnerships between scientists and community knowledge holders, while maintaining control of research priorities in alignment with local stewardship values.

Third, knowledge exchange between the community and its own local scientists occurs frequently and based on existing trust. Community science could thus benefit from a high level of mutual trust and respect, resulting in knowledge co-creation and continuous social learning, e.g. through voluntary marine monitoring. This community science model benefitted as well from limiting the need for external resources (funds, personnel), so capacity constraints were minimized, a situation likely not easily transportable elsewhere. Fourth, a respect for local (and specifically fisher) knowledge has permeated the entire process, reflecting local values as well as the internal nature of the scientific expertise.

Overall, the FPMB's community science has demonstrated the importance of engaged social learning as a transformative process that links knowledge with collective action, across a social network over time (Loucks et al., 2017).

3.3. Community engages with employee and/or contracted scientists

3.3.1. Context

Lennox Island, an Indigenous First Nation of Mi'kmaq people (Charles et al., 2010; Bood, 2011) is one of the coastal communities situated around Malpeque Bay, on the western side of Prince Edward Island, a small province of Canada in the Gulf of St. Lawrence.

The bay and its watershed represent a social–ecological system that provides a diverse range of livelihoods and cultural values for the neighbouring communities. This includes a multi-faceted conception of well-being that values not only material aspects such as jobs and income, but also social, cultural and subjective aspects such as strong community organizations and a strong sense of place. Notably, Malpeque Bay has been crucial to the Mi'kmaq for food harvesting, transportation and recreation, among other uses, over a long history of thousands of years (Charles et al., 2010). Resilience of the social-ecological system arises out of strong values and varied livelihoods, as well as adaptive capacity of the community (Olsson et al., 2004; Hughes et al., 2005; Berkes and Seixas, 2005). Nevertheless, Lennox Island, and Malpeque Bay more broadly, faces a range of environmental threats, with two in particular examined here.

3.3.2. Motivation for community science

First, Lennox Island, and Malpeque Bay, face resource-based ec nomic and governance challenges, covering fisheries, aquaculture, forests, and tourism. In particular, "the increased and varied use of Malpeque Bay has resulted in conflicts between tourism operators, aquaculturists, fishers, and others who rely on the Bay for their livelihoods or for economic development" (Charles et al., 2010). In an effort to deal with these emerging use conflicts, Lennox Island is being proactive in seeking greater involvement in decisions relating to their local ecosystems and their livelihoods (Charles, 2012).

Second, climate change is the subject of considerable attention in Lennox Island (ParCA, 2019b). For example, major concerns being addressed by the community in conjunction with research and government bodies relate to: (1) saltwater intrusion risks from sea level rise, given that "groundwater is the only source of drinking water in Prince Edward Island" and some locations elsewhere have already had their freshwater supply contaminated with sea water (Anon 2011), and

(2) threats to Mi'kmaq archeological sites around Lennox Island, given that rising sea levels and erosion are already having significant effects in many locations (Mitchell, 2015). In fact, the latter is seen as an emergency situation, given a very rapid loss of sand bars at the entrance to Malpeque Bay, which include not only key archeological sites for the Mi'kmaq, but also certain rare plant species, and are thus of considerable cultural and biodiversity value. This leads Lennox Island to be closely involved in related decision-making (Anonymous, 2011), paralleling the broader governance initiative noted above, with local climate responses in keeping with local conditions (Charles, 2012).

3.3.3. Model of community science

Lennox Island has initiated a range of community science activities. For the first challenge above, that of multi-sectoral space and resource use conflicts, the initiatives include (1) surveying historical resource use of the Mi'kmaq of PEI, identifying the range of resources and stakeholders in the Bay, (2) collecting resource use data, and (3) coordinating collaboration in generating the knowledge base for "a process of defining a common vision for the Bay, which includes all community members, both First Nations and other stakeholders" (Charles et al., 2010). These efforts have been led by the Mi'kmaq Confederacy of PEI (MCPEI), which includes Lennox Island as a member First Nation, and which has strong internal scientific expertise on these topics. MCPEI has drawn also on contracted scientists as needed, together with collaborations with academics. An example of the latter is a project based at Saint Mary's University and led by the first author of this article – see CoastalCURA (2019).

For the second challenge highlighted above, the community's efforts to deal with the impacts of climate change includes community science in various forms. Lennox Island and MCPEI have carried out a range of internal activities in the community, to document household by household, the risks posed by sea level rise, flooding and other climaterelated impacts. The community has also worked with archaeologists on preservation initiatives (Charles, 2012; Mitchell, 2015). Further, Lennox Island collaborates with the University of PEI to develop and apply climate-related mapping and visualization techniques for use within the community (UPEI Climate Lab 2019), and engages with other academic partners, and community counterparts, in Canada and internationally, on using social sciences, mapping approaches, and vulnerability assessments, to explore adaptation options (Fook, 2015; ParCA, 2019b).

3.3.4. Concrete results of community science

These bottom-up community science activities are linked to governance considerations. With respect to climate change and its impacts, community science has produced a strong knowledge base that is now used to inform adaptation actions at the community level, as well as interactions of Lennox Island First Nation with other governments. In terms of integrated spatial and resource management initiatives, the community – armed with the knowledge arising from community science – has emerged as a local leader in spearheading an inclusive integrated management approach to decision-making (Charles et al., 2010; Bood, 2011). Already, there has been success in bringing stakeholders together from around the bay, to begin to discuss conflicts and environmental concerns. This provides a local-level complement to higher-level decision-making (Wiber and Wilson, 2009; Wiber and Bull, 2009). Unfortunately, the latter remains challenged by compartmentalization in government, and limited interactions between national and provincial governments (running contrary to integrated management approaches). Nevertheless, as a result of ongoing engagement of the community, and the reality of Mi'kmaq constitutional rights to be involved in decision-making, there continues to be some progress toward the goal of true multi-level governance.

3.3.5. Key insights

A variety of insights arise from the Lennox Island case, relevant to social learning. With respect to leadership and agency, the reality of Lennox Island First Nation being a formal government in the Canadian context had two major implications. First, the elected Chief and

Council were the leaders for community science, supported by the Mi'kmaq Confederacy of PEI. This leadership in the community brought the knowledge results clearly to community members, and instituted those results into decision-making, within established governance processes, to improve local mechanisms of management and adaptation. Second, Lennox Island had the agency to draw on suitable financial and other resources to carry out the community science.

With respect to the process of community science, Lennox Island's staff scientists were able to draw on inherent trust, to ensure that knowledge exchanges are rapid. With external professional scientists, whether contracted or project based, trust may have developed more slowly, with frequency dependent on reputation. Local and traditional ecological knowledge was an essential ingredient in carrying out community science, drawing on the Mi'kmaq connection to place and the community's collective values. Links to culture were fundamental as a motivation and as a driving force within community science.

4. Key conditions and outcomes of community science

The typology of community science is based on three social learning processes, differentiated on the basis of the mechanism used by the community to connect with scientists/researchers: (1) engaging with external bodies (e.g., universities, governmental research institutes, etc.) to co-design the research (Eastport), (2) drawing on internal volunteer scientific expertise to collectively design research questions and methodology (Port Mouton Bay), and (3) hiring (or contracting) inhouse professional scientific expertise, defining terms and arrangements with staff and/or external consultants (Lennox Island).

Our analysis of the three cases complements other community experiences, as well as the literature cited earlier. All of this suggests that certain common principles, or conditions, underlie all the models of community science. However, there are important differences between the three models with respect to some of the identified principles and conditions of community science: these, and their variations across the models, are described in Table 2.

The examples of community science examined in this study suggest that three major benefits of community science relate to handling complexity and uncertainty, building community resilience and helping to overcome problem with governance. These are described below.

- *Community science creates learning opportunities to cope with complexity and uncertainty.* In decision making, it is crucial to avoid or overcome the 'illusion of certainty' and the 'fallacy of controllability' (Charles, 1998, 2004, 2013; Miller et al., 2010). The former refers to a dangerously-incorrect perception in policy, management and/or operating practices that the world is predictable and controllable, or at least that major elements of uncertainty can be safely ignored. The latter reflects a perception that in resource systems more can be known, and more controlled, than can be realistically expected in practice. A

Table 2

Key Principles/Conditions for Community Science.

Principles/ Conditions	Explanation	Application across Community Science Models
Community-driven and community-controlled	A fundamental requirement for community science, indeed as it is defined, is that the research must be community-driven, with the local community deciding with whom they wish to engage.	The cases examined in this study all share the feature that the science undertaken to deal with issues in the community was initiated and led by the local community itself (in contrast, for example, with many instances of citizen science). In this regard, there is little variation in the extent of community control across the models in the typology of community science.
Connection to place and collective values	A strong sense of place, and the values that accompany it, are critical requirements for community science, which indeed emerges from a connection to place (Chapin and Knapp, 2015). In cases of strong community science, the sense of place will resonate not only with local ecological knowledge holders but also with scientific knowledge holders.	In all three cases, local community members have clearly articulated their collective values and re-affirmed their strong identity. In Port Mouton Bay and Eastport, the primacy of fishing as a livelihood is prevalent in the local community. For Lennox Island, a broad attachment to place drives many community actions. From this evidence, and a range of literature on the subject, it appears that connection to place and collective values lie at the core of all three models of community science.
Empowerment, agency and collective action	Community science is not only about knowledge and learning, but also about empowerment: a community's ability to impact decisionmaking that affects local livelihoods, well-being and capacity for stewardship. Community science also requires, and demonstrates, a high level of agency, which arises as intentional collaboration in a community and the sharing of knowledge across a growing social network, inside and outside the community.	Empowerment and agency of the communities are demonstrated through a range of linkages, e.g. of Eastport fishers to the local school, of the Port Mouton Bay community to government bodies and NGOs, and of Lennox Island to others on Malpeque Bay. Overall, it appears from the cases examined that not only are empowerment and agency crucial in all the three models, the extent to which these are involved is not dependent on the specific model.
Leadership	Community science requires suitable leadership, although it can coexist with a diverse range of leadership models. This can include formal governmental systems, sectoral (e.g., resource user) organizations within a specific place-based community, or other community approaches.	In all three models, suitable leadership is needed to produce community science. The form that leadership takes varies widely, but there is no indication of differing quality of leadership across the models.
Credible Trust	The success, and speed, of knowledge exchange depends on the level of credible trust between the community and the scientists. Depending on the situation, this trust can range from nonexistent to well-established.	In each model of the typology, trust between the community and the scientists developed in different ways, and at different rates, with internal science not surprisingly developing trust faster than completely external science. It may be postulated, from this evidence, that the speed at which credible trust is developed may be higher, the greater the internalization of scientific expertise.
Local knowledge	The role of local knowledge seems essential within community science, as an iterative and cyclical transformation process. Multiple forms of knowledge are blended together within a social learning context, improving understanding of the local social-ecological system and the natural resources on which the community depends.	In all cases illustrating the three models, the community was able to bring local knowledge into community science, alongside scientific sources, as well as into collective decision-making, guided by community values. This is consistent with current trends in conservation and management (Berkes, 2015; Díaz et al., 2018). It seems, from these cases, that the more the involvement of external scientists (e.g., in Eastport), the more local knowledge is balanced with that of scientific organizations.
Links to governance	There are typically close connections between community science and governance, defined here, from a stewardship perspective, as the processes and institutions through which communities and societies take action to improve the environment (Armitage et al., 2012). There are, however, challenges in fitting the messages of the new community knowledge into regulatory frameworks.	All three cases illustrate strong links of community science to decisionmaking. However, in our small sample of three cases, engaging with external scientific organizations led to strong governance results (Eastport's official Marine Protected Area), while a focus on internal community scientists (Port Mouton Bay) produced well-accepted knowledge, but more challenges in finding a role in decision making. One might postulate, then, that engaging with external science may, in some cases, 'grease the wheels' for governance successes. It should be noted that Lennox Island First Nation, as a government itself and with specific rights, cannot be considered to represent generally its particular community science model.
Availability of capacity and resources	There are challenging issues related to 'capacity' (human resource, financial, etc.) that will influence the scope and impact of community science. Often, significant time and effort is needed for community science, through relationship building and co-production of local scientific knowledge, and the reality is that not all communities have the leadership, the agency, the funds or the circumstances to engage with all of the different forms of community science.	Each case of a community science model has its own unique conditions relating to capacity and resources. Lennox Island First Nation is able to draw on financial resources, as a constitutionally recognized government, to employ its own scientific staff. Port Mouton Bay is fortunate to have its own resident scientists, a reality certainly limited nearby, much less globally. Eastport was able to attract the interest of academic researchers, on a voluntary basis, and was fortunate to undertake its initiative at a time when it was able to engage with government scientists. Thus, in varying ways, each community could draw on the needed capacity and resources for one of the three models – a situation that communities elsewhere, and under different circumstances, may have difficulty achieving.

key feature across the community science typology is that, within local communities, *improving the fit between ecosystems and governance systems* is inextricably linked to approaches for dealing with the 'illusion of certainty' and the 'fallacy of controllability', including (1) building an integrative perspective on the social-ecological system involved (Epstein et al., 2015), (2) co-producing the knowledge needed by combining local knowledge and science (Armitage et al., 2011), and (3) aligning management, protection, monitoring and knowledge sharing across multiple levels (Galaz et al., 2008).

- *Community science builds community resilience.* Many of the characteristics of resilient communities, as identified by Berkes and Ross (2013), were observed in the three cases discussed here, including (i) a commitment to place, (ii) strong shared values and beliefs, (iii) a high level of skills and learning, (iv) social networks both within the community and extending outwards beyond the community, (v) governance that includes local political engagement, and (vi) collaborative institutional processes. These characteristics emerged, to varying extents, in the three communities as strategies and self-organizing skills consistent with the community resilience literature (Westley et al., 2013). Also consistent with Berkes and Ross (2013), the co-production of knowledge and communication of this knowledge in each community reflect specific skills and strategies to respond to various drivers and threats.
- *Community science is a boundary spanning process.* In community science, participants negotiate potentially contested visions of social-ecological systems and the governance arrangements needed to help achieve those visions. In particular, community science can help to overcome the problem of a lack of governance fit – the "failure of an institution or a set of institutions to take adequately into account the nature, functionality, and dynamics of the specific ecosystem it influences" (Ekstrom and Young, 2009: p.1). Galaz et al. (2008) take the perspective that problems of fit are between biophysical systems (broadly defined) and governance systems of which institutions are a part. In this sense, governance fit relates here to problems of fit across jurisdictional levels, social fit, or the lack of congruence of different actors around a defined problem (Folke et al., 2007; Moss, 2012). While improved governance fit may be possible in some cases, it must be noted that a significant governance gap can persist between the practice of local conservation, resource management and environmental assessment (e.g. the PMB community's monitoring of their bay) and the protection of ecosystem services (through government policy and action).

This last-mentioned characteristic of community science has major implications with respect to governance for stewardship and socialecological sustainability. Responding to governance gaps and governance fit can lead to better decisions toward community well-being and livelihoods. As Wilson (2006) observed, the mismatch of ecological and management policy levels creates a barrier that often limits the ability of regulators to respond to fine-scale ocean and coastal ecosystem changes that lead to the erosion of fish habitat and subsequent loss of livelihoods at the local community level. This mismatch has a parallel in the social part of the social-ecological system: the mismatch between community goals and government policy, often arising from differences in values and motivations, creates large differences between community and government directions (Garcia et al., 2014). In some cases, this problem can be mitigated. Lennox Island, as an indigenous First Nation, is empowered to bring other government levels to the table to improve collaborative efforts. Such collaboration was also possible, and empowering, in Eastport. But in the case of Port Mouton Bay, there was a fundamental disconnect between community goals and the aquaculture policy of the Nova Scotia government.

5. Conclusion

This paper has explored how community science, as place-based social learning, serves as a catalyst for local well-being and for efforts to transform how interactions with the environment are governed. Parallel to this, the paper highlights how community science provides a means to utilize the scientific method in an active social learning process – implemented by and within the community, effectively linking knowledge sources through a scientific mode of inquiry. Specifically, the three cases examined here show how the scientific method has been used to (1) verify data accuracy and minimize scientific bias through a range of community science practices and products, (2) produce long-term studies using replicable experimental design and results, involving discussion with local knowledge holders, (3) engage in scientific peer review, such that local knowledge holders, local scientists and university scientists publish together in scientific peer reviewed journals.

Community science is both a process and product of collective scientific inquiry at the community level, and thus is inherently one of knowledge co-production – "the collaborative process of bringing a plurality of knowledge sources and types together to address a defined problem and build an integrated or systems-oriented understanding of that problem" (Armitage et al., 2011, p, 996). In community science, participants engage in the scientific method, among other modes of scientific inquiry, to both recognize and build knowledge, through shared communication and learning about their local social-ecological system. At its roots is the place-based relationship between the community's local (and in some cases, traditional) ecological knowledge holders and instrumental scientific knowledge holders. Knowledge sharing is horizontal (as opposed to vertical or hierarchical) and may take place over a long time period.

Each model in the community science typology highlights communities engaged in a range of local interventions, even deliberate transformations (Armitage et al., 2017), originating from the efforts of local people toward social-ecological resilience and better governance. Across the case studies, social learning is fundamental, with the research including an iterative shared

learning process, critical evaluation of existing knowledge gaps, new knowledge generation and application to practice and policy, all of which can lead to transformations. Depending on the model, social learning may occur (i) between community members and scientists, bridging local knowledge and external expertise (Eastport); (ii) between community members and local volunteer scientists, bridging local knowledge and internal expertise (Port Mouton Bay); or (iii) between community leaders and a mix of staff scientists and outside collaborators – bridging local knowledge, internal and external expertise (Lennox Island). In all situations, community science is fundamentally reflecting community empowerment.

The three cases examined here, within Canada's marine/coastal environment, fit with our experience internationally, as well as the literature cited earlier, in indicating that the practice of community science, and the engagement typology presented here, is widely applicable globally. Indeed, numerous published examples of science collaborations with Indigenous communities can be categorized as community science using this typology (Lepofsky and Lertzman, 2018). There are strong reasons to advocate for community science, which, as a process of shared learning, supports broader trends toward ecosystem-based management and environmental sustainability (Charles, 2012). However, community science should not be seen as a panacea for effecting change at the local level, or engaging in the novel science processes needed for the growing complexity of social and ecological challenges (see Willyard et al., 2018). Further critical assessment is needed of the potential for community science, including assessing capacity issues and the applicability of each model of the engagement typology, as well as the different modes of scientific inquiry through which community science is applied, across a range of differing circumstances.

- In practical terms, the availability of capacity, funds and other resources can be a major factor facilitating or limiting community science, and specifically the models that are feasible in a given situation. The required commitment of time and energy may be a limiting factor in many cases. Further, having scientists available within a community, or having the resources to pay for internal staff or contracted scientists, will depend very much on the setting. When deemed appropriate, a community may focus on engaging with external scientific bodies, NGOs and/or donor agencies willing to provide scientific expertise voluntarily.
- In conceptual terms, community science focuses on normative objectives, such as biodiversity conservation and community sustainability, yet when challenged by 'objective' reductionist scientific methodologies, social learning models are often pressured to demonstrate scientific validity within a conventional scientific worldview (Woodhill and Roling, 1998).

Previous Page: A old dory once used for cod fishing in Newfoundland, Canada. Photo by Parsons Photography

Accordingly, we recognize much can be learned from further exploring what can be called the "politics of knowledge" and the barriers that constrain the community science models.
- There is a need for the community science typology to be further developed with case study research. As well, there is a need to examine the various ways in which community science processes are either successful or unsuccessful at shifting and improving governance arrangements, and in particular, filling governance gaps.

Despite these caveats, there is a considerable body of experience that illustrates how community science offers an important direction for community stewardship and sustainability, particularly when the results are discussed within place-based communities and the scientific community. Faced with gaps in knowledge and gaps in governance, communities are mobilizing to monitor threats to local ecosystems, in an effort to maintain or rebuild the flow of ecosystem services and to thereby sustain human well-being (Conrad and Hilchey, 2011).

Community science can play a crucial role in this effort, blending local knowledge with scientific methods of observation within a process of social learning. The result can provide new ways of learning, reflecting, negotiating governance, and taking action within the community and beyond.

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Community Science Plays Major Role in Efforts to Manage Stormwater in the Delaware River Watershed

By Lucia Ruggiero

Delaware Bayshore Program Director
American Littoral Society


RESTORATION CORPS

When it comes to organizations such as the American Littoral Society, people in the community can play a big role in helping to enhance our scientific work. Likewise, the harnessing of community science can help create synergy between non-profits such as the Littoral Society, professional researchers, policy makers at all levels and those living in the areas that will be most directly affected by science-driven decisions.

Looking at community scientists as the producers, they provide the energy for organizations and initiatives to generate data. The makeup of this data will provide an indication of success or tell us we need to head in a different direction. From there, we can use what we have learned to educate others and advocate to promote better policy and further research. Producing informed decision-makers and community members results in the habitat needed for additional green jobs and funding growth, which circles back to fuel the continuing the work with our community science partners.

Community science has become an integral part of the Littoral Society's Delaware Bayshore Program efforts on stormwater and provides support throughout multiple levels of the work that is underway on a number of projects.

A bottom-up view shows the many volunteers and community members who help to install and maintain Green Stormwater Infrastructure (GSI) projects throughout the Cohansey River Watershed. These efforts support longer-term restoration and monitoring programs conducted by our Restoration Corps (R-Corps) program, school partners and staff. Those results are combined with other regional projects to help fuel an even larger effort known as the Delaware River Watershed Initiative (DRWI).

Previous Page: Students in the Littoral Society's South Jersey Restoration Corps unit conduct stream monitoring in the Delaware River watershed.

GSI uses rain gardens and other bioretention projects to collect water that would otherwise runoff into a storm drain or stream, allowing it to slowly percolate into the ground. This process helps recharge our groundwater and filters out things such as fertilizers, sediments and other pollution to improve water quality in nearby rivers and streams.

For example, Bridgeton New Jersey's Buckshutem Elementary School had a problem with reoccurring flooding in the school's pick-up and drop-off area. Too many impervious surfaces, such as parking lots and rooftops, prevented water from seeping into the ground. However, redesigning existing storm drains and paved areas was an expensive and difficult undertaking.

Meanwhile, the Society had a goal of improving stormwater management in the Cohansey Watershed.

School staff had a working knowledge of what parts of the campus had the worst flooding, a willingness to partner, and a long-term source of people power to help maintain and monitor the effects of the project. The Society had the expertise and resources to install a rain garden that captured the excess runoff and allowed it to slowly seep into the ground, helping to minimize the schools flooding issues.

This project turned into a real-life experiment conducted on the campus of the Elementary School. The result demonstrated that green stormwater infrastructure (GSI) can be an effective, inexpensive way to solve problems like localized flooding, which helped pave the way for future projects in the area.

Fast forward to today and the Littoral Society has installed three riparian buffers and seven rain gardens throughout Bridgeton, all with the help of over 500 local youth and community volunteers.

The people who volunteer to help with a project installation are often overlooked when we consider community science. However, without the additional help needed to install and maintain a project, there is little chance of us being able to show measurable improvement in water quality from GSI.

Littoral Society projects manage over one million gallons of stormwater each year, and they are made possible by community scientists, who create opportunities for social learning by familiarizing the community with GSI. Most importantly, they help to generate interest and promote our community science monitoring efforts.

The Society monitors the progress they've made on stormwater management two ways: visual assessments and maintenance of existing projects and in stream data collection. Community scientists contribute to both.

GSI projects, like rain gardens, require maintenance such as weeding and mulching. It is fairly simple, but if it is not done regularly the installation is more likely to fail, which will result in reduced groundwater recharge, water quality, nutrient filtration, and flood prevention. The Society works with teachers, students, school facilities teams, and city departments of public works to ensure the long-term success of our projects. This is done through hosting volunteer days, in class presentations, teacher workshops, and regular communication with school maintenance teams.

Community scientists also aid the Society by helping assess the effects of stormwater runoff in streams.

Stream data can be collected through biological assessments, continuous monitoring stations, and quarterly stream sampling.

Conducting a biological assessment involves taking an inventory of the living things in a section of the stream. This is typically done through collecting, counting, and returning benthic macroinvertebrates, which are the insects that live in the bottom of streams.

Some species, like damselflies, require a very high dissolved oxygen level, and will not survive in a stream that doesn't have good water quality. Other species, like aquatic worms, are much more tolerant to pollution and can be found in almost any level of water quality. So, the species found during a macroinvertebrate sampling can give you a relatively accurate idea of a stream's oxygen levels without the need for any expensive or high-tech equipment.

The Society has conducted such assessments in the Delaware River watershed with the help of schools, scout groups, and clubs.

An example where this has helped further our work involved Cumberland Regional High School in Upper Deerfield, NJ. First, teachers and students received community science training through five in-class presentations. Then they went to nearby Loper Run, a small tributary to the Cohansey River, to conduct sampling.

The 36 students learned about erosion, which seemed to be a likely cause for the high amounts of sediment in the stream, and worked with the Society to plant a riparian buffer on their campus. Later, the Society was also able to install a rain garden to help filter runoff from the school's maintenance shed into the stream.

Since then, an entirely new class of students has continued to work with the society to keep conducting macroinvertebrate assessments, in hopes of seeing improvement.

The community science conducted in the Loper Run has been enhanced by being a part of the Delaware River Watershed Initiative (DRWI), which supports monitoring efforts throughout the region.

Through this initiative, the Society measures chemical parameters at six monitoring sites in the Cohansey and Menantico Creek watersheds, using equipment to measure pH, dissolved oxygen, turbidity, and salinity. Water samples are also collected and then sent back to the lab and checked for nutrient levels.

Much of this work is conducted with community scientists in our R-Corps program, which is funded by the William Penn Foundation. To date, 18 interns have been trained on how to collect samples and operate the sensors which provide more information than our macro invertebrate surveys and produce a snapshot of a stream's water chemistry. The team also conducts flow measurements, allowing us to calculate overall nutrient loads.

Nutrient loads are of particular importance to our work. When excess fertilizers and animal wastes are carried into our waterways, they increase nitrogen and phosphorus levels. These nutrients are carried to the Delaware Bay and can cause harmful algal blooms (HABs) and increased levels of bacteria, resulting in fish kills and unsafe water. Being able to track water quality parameters over an extended period helps us to look for trends that can determine the impact of our stormwater initiatives.

In smaller settings, such as the

Students and Littoral Society staff work on a rain garden outside a Bridgeton area school.

Cohansey watershed, the Littoral Society acts as the facilitator for community science. This provides us with the data needed to influence local practices and can also determine if we need to adjust our future projects.

The Society's goal is to prove the value of stormwater management to municipalities, encouraging them to utilize GSI and commit resources towards installing and maintaining their own practices. In larger settings, the Society itself acts as the community scientists, providing data for a regional network of players within the DRWI. The information gathered in the Cohansey and Menantico watersheds is combined with similar work throughout the region, in hopes of generating improvements throughout the entire Delaware River Watershed.

The joint efforts from community scientists, non-profits, academics, and policy makers have already helped New Jersey to pass new laws to improve stormwater management on a state level, such as the Clean Water and Flood Reduction Act. That law would allow counties and municipalities to create stormwater management utilities. The utilities would be dedicated to reducing flood risk and filtering polluted runoff that goes directly into the New Jersey's waterways. As we continue to work with our community partners, we hope to empower more people to create a measurable improvement in their local waterways, creating a healthier ecosystem throughout the Delaware Bayshore.


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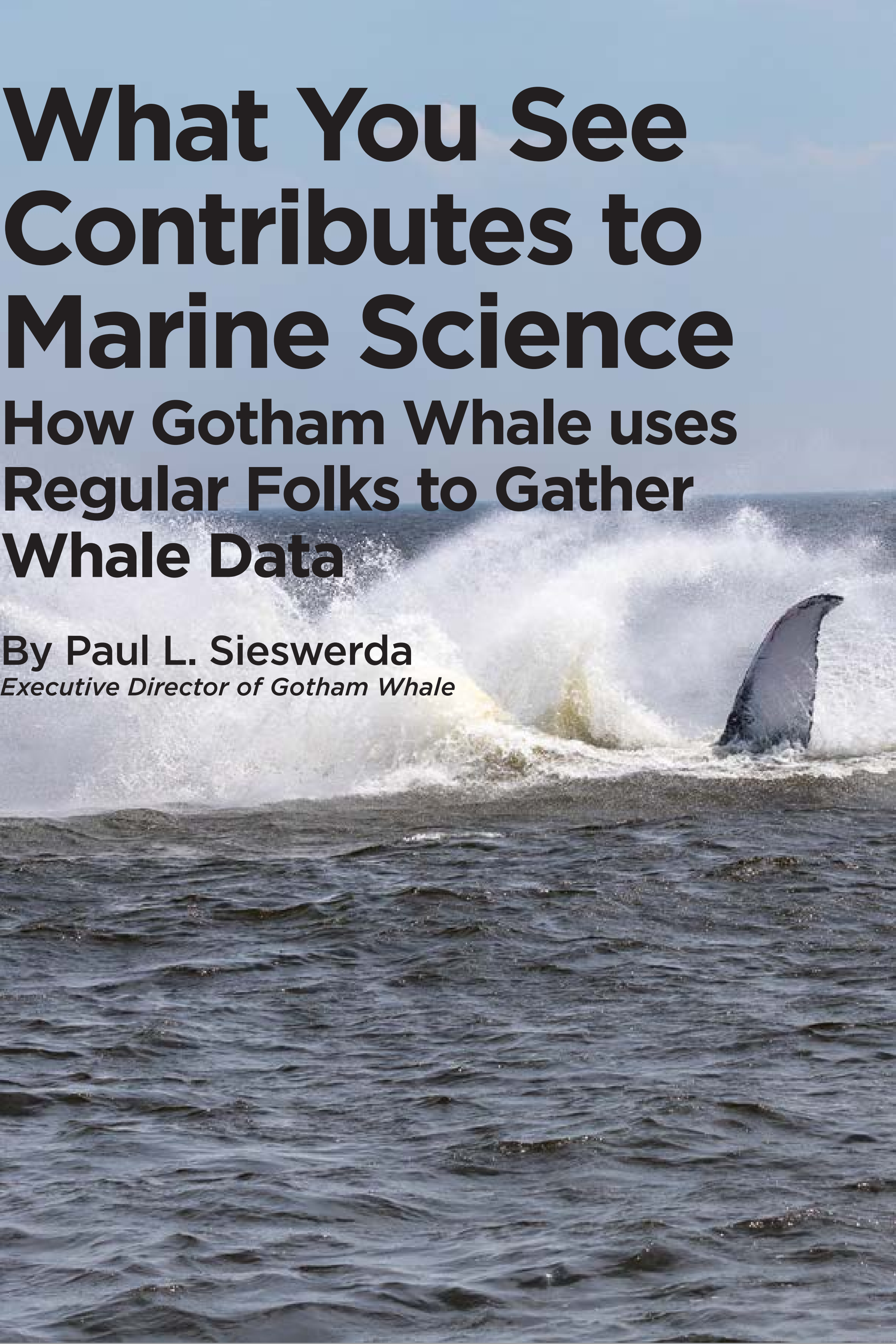
What You See Contributes to Marine Science

How Gotham Whale uses Regular Folks to Gather Whale Data

By Paul L. Sieswerda
Executive Director of Gotham Whale



Eyes on the water.

That's all it takes for data collection about the marine mammals that are returning to New York City.

Gotham Whale has been enlisting community scientists to report sightings of seals, dolphins, and whales since 2009. Be it a private boater out on a weekend fishing trip, a kayaker paddling along the shore, or even beach walkers taking a leisurely stroll, the likelihood on encountering a marine mammal is high.

The ubiquitous availability of smart phones can turn the average person into a contributing scientist with just a couple of clicks to snap a photograph, map the position on a geographic information system and submit the data to Gotham Whale for inclusion into their growing database tracking the marine mammals around NYC. The database contains close to 3,000 datapoints up to the present date.

A major portion of these data come from a partnership with American Princess Cruises, a commercial vessel that offers natural history cruises and now whale watching tours just outside the New York Harbor.

Begun in 2009 to visit the seal colony on Swinburne Island during the winter months, the tours have expanded with the return of whales to the waters around New York in 2011 to the point that whale watching is now so much a summertime activity for city residents and tourists alike that our boat captain coined the phrase, "Rockaway, the new Cape Cod."

It's not much of an exaggeration.

The American Princess provides a platform for Gotham Whale naturalists and photographers to record the exponential rise in the whale population in the Western New York Bight. (The NY Bight is the curve of coastline from Montauk to Cape May NJ. The western point is the apex at the entrance to NY Harbor).

The passengers who pay the whale watching fare provide "mini" grants to Gotham Whale that otherwise would have to charter vessels at great cost to obtain the same observational data.

The all-volunteer organization compiles these data to provide an overview of which species, how many, where, and when these animals occur in the area. The model is the same as that which has been in place for decades in the Gulf of Maine and more northern waters.

Some of the results to date have been to establish that the Western New York Bight is a new feeding ground for humpback whales. The whales come to these waters to feed.

The Hudson River has long been a source of pollution and discharge of contaminates. Now, through the work of environmental groups like the American Littoral Society, and landmark legislation like the Environmental Protection Act, Clean Water Act, Marine Mammal Protection Act, the river brings nutrients to the ocean, feeding a healthy food web of phyto and zoo plankton sustaining the prey species for larger predators up to and including the large whales.

The principal prey species is

Previous Page: Passengers aboard an American Princess Cruise out of New York City watch a humpback whale feed. The popular cruises turn participants into community scientists who provide observational data to Gotham Whale. Photo by Artie Raslich / Gotham Whale.

Brevoortia tyrannus, the Atlantic menhaden. This little fish is called by H. Bruce Franklin, in his book of the same title, The Most Important Fish in the Sea. Everything eats menhaden, except humans.

An oily, bone filled stinky fish that will never be seen at market, menhaden are used as bait, reduced for oil, and pelletized for animal food. A phenomenal food source, local fishers call them "bunker," but their aliases change throughout their distribution along the Atlantic coast and into the Gulf of Mexico.

The biomass of menhaden is greater than any other species although most humans, unless they fish, are largely unaware of their existence.

Great shoals of menhaden inhabit the waters outside the Verrazano Narrows, the entrance to the port of NY/NJ. The flow of the Hudson usually blocks the entrance and disperses the nutrients along the shorelines of Long Island and New Jersey. This is where menhaden gather to filter feed on the lush growth of phytoplankton.

The bottom is fairly shallow so that when chased by predators, the fish cannot escape downward, and rise to the surface in tight balls, presenting a confusing circle to their usual predators, sharks, bluefish and striped bass. Each fish attempts to get in the middle, protected by its mates on the outside where the predators can pick off exposed fish.

Zebras will present the same front to hungry lions that are confused by the spinning stripes. "Eat him, not me" works well enough that the species survives and not well enough that the predators occasionally earn a meal.

However, these tight "bait balls" as those who fish call them, are perfect "bite sized morsels" for humpback whales. Taking advantage of the densely packed concentration of menhaden, the humpback lunge through the bait ball with their jaws wide open, expanding their throat, which is pleated to expand like a pelican's bill, and engulf huge quantities of water along with hundreds of pounds of the fish. They close their mouth and push the water out through the hundreds of sieve-like baleen plates to retain the fish, which they then swallow.

The athletic humpbacks are well adapted for this "lunge feeding" technique, sometimes herding the menhaden into the tight balls with their long, bright white, pectoral fins, or slapping their tails to scare the fish into the desired "bait balls."

The humpbacks take advantage of all these favorable conditions and, like tourists the world over, come to NY for fine dining.

The positive changes in the environment around NY waters brings the happy occurrence of whales and humans together. While this is great for tourists and as a feeding ground, as with many human/wildlife encounters, it has potential conflicts.

Soon to be the busiest port in the nation, the entrance to NY Harbor is traversed by huge vessels, so big in fact that the channels needed to be deepened and bridges raised to accommodate their comings and goings.

Shipstrike and entanglement are the greatest threats to large whales. Fortunately, the tangle of lobster pots and fishing nets are less around NY, than along the coastlines of Massachusetts

or Maine, but the shipping commerce is greater. It is clear that the whales are "playing in traffic."

The work of Gotham Whale is helping to plot the intersect of whales and humans, either to assist in mitigating threats, or bringing the general public greater exposure to these magnificent animals. Our research has produced contributions to the scientific literature, on documenting their occurrence and analyzing the risk of shipstrike, in the respected journals of Marine Mammal Science and Marine Policy. These publications recognized the contributions of Community Scientists, which is a recent allowance.

Photo above: Positive changes in the environment around New York City's waters have brought whales back in big numbers, so much so that some now call Rockaway the New Cape Cod. Photo by Artie Raslich / Gotham Whale.

Gotham Whale is also maintaining the NYC Humpback Whale Catalog currently identifying almost 200 individual whales, known by the unique marking on the underside of their flukes (tailfins). These whales are matched with similar catalogs throughout their range in order to build a picture of which whales return to NY and where

they go during the winter.

The contribution of regular folks, with their eyes on the water, makes it all possible.

To learn more about Gotham Whale, go to https://gothamwhale.org/.

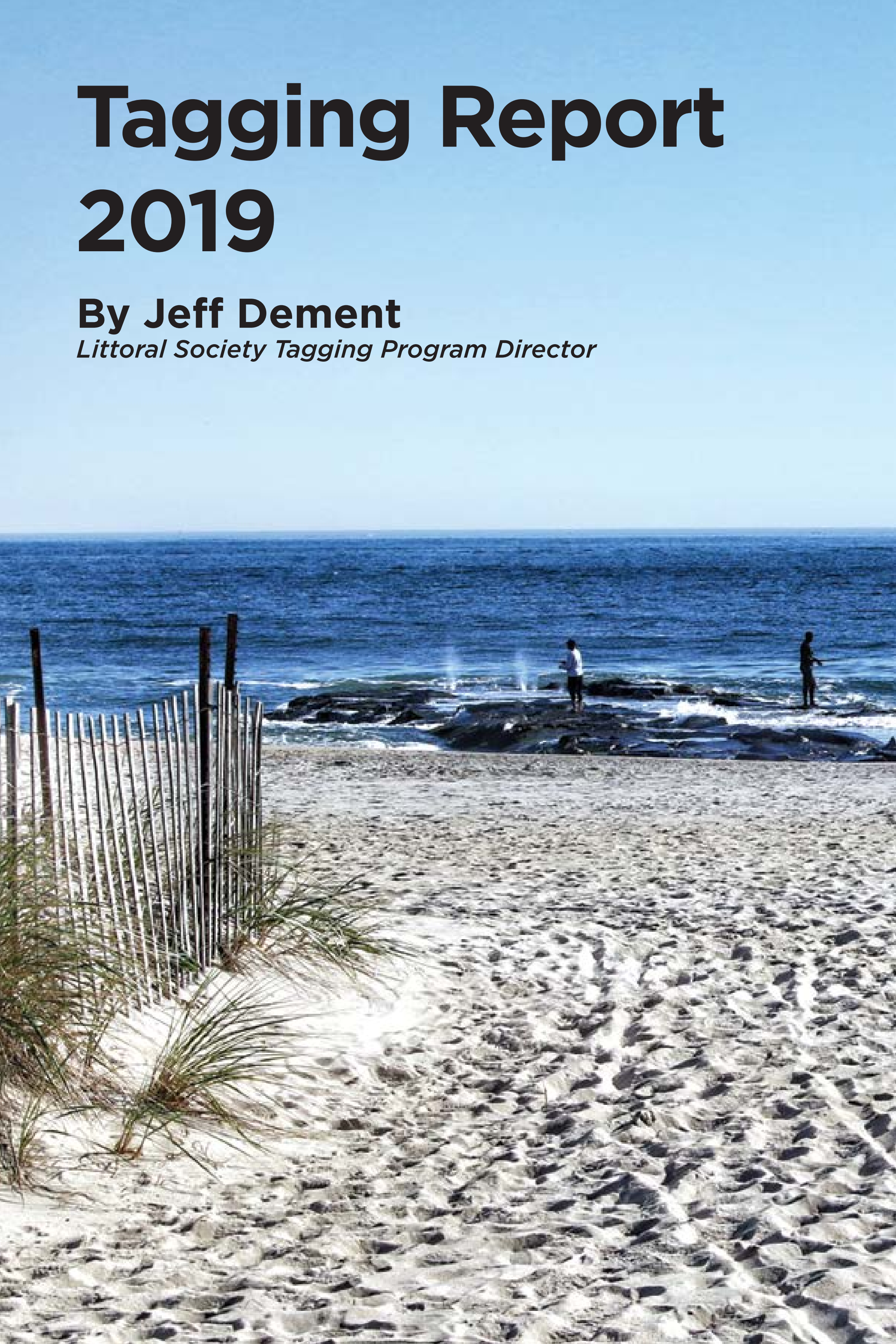
At the Gotham Whale website visitors can find a form for sightings. We call it "Moby Click." The form asks for simple observational data, such as date, location, contact info, a count and species, along with photographs to verify the sighting.

Our volunteer staff vets the submission and enters it into the database. The standardized protocol is necessary because we want to use the data for science and conservation. Without these measures, the data can be dismissed as anecdotal or "just grabbed off the internet."

About the author: Paul L. Sieswerda is Executive Director of New York's Gotham Whale, an advocacy group that combines community activism with science by collecting marine research data from the waters in and around New York City.

Tagging Report 2019

By Jeff Dement
Littoral Society Tagging Program Director



With its mandatory lock downs and school closures, mask wearing, and social distancing, 2020 has been a year that will not fondly remembered or easily forgotten.

Amidst all of the madness, recreational fishing continued and proved itself an excellent way to enjoy the outdoors and the natural world, while still maintaining social distancing. Which may explain why this year has been busier than average year for the Society's Tagging Program. We are seeing an uptick in the number of tags released, tag kits purchased, and new taggers joining our ranks.

So, welcome new member taggers, and thank you existing member taggers.

Community science is the theme of this issue of the Underwater Naturalist, which makes it fitting that this is also a Tagging Report issue. The Society's Tagging Program is one of the oldest and best examples of a community science project in the United States.

The American Littoral Society Fish Tagging Program began in 1965, and has been collecting valuable fisheries data since then. Annually we share the data collected by our volunteer scientists with the National Marine Fisheries Service at Woods Hole, MA (NMFS), The Atlantic States Marine Fisheries Commission (ASMFC), and State Divisions of Environmental Protection and Marine Fisheries.

Given that none of the NMFS research, or NJDEP survey vessels sailed or collected data this year, citizen science fisheries data, and more specifically, data generated by our member taggers, becomes that much more important. Under the circumstances, reports on the fish tagged or recaptured becomes the best available data and is used by fisheries scientists and mangers to make informed decisions about how to maintain healthy fisheries for the future.

This trend of using the general public to collect data is also part of a paradigm change recently sweeping through the National Oceanic and Atmospheric Administration (NOAA) and NMFS (which is an office within NOAA) at the federal level.

As a result, recreational fishing can not only help you stay safe when you do it with your family and closely trusted friends, it can also help guide high-level decision-making on catch limits. So, let's get out and go fishing!

Noteworthy and interesting tag returns
Tales Tags Tell
Striped bass:

- This years' winner for the ***Time at Large*** title (i.e. time between initial tagging and tag recapture) goes to longtime tagger Paul DiDomenico. Paul tagged and released a healthy 24-inch (FL) striped bass at Wellfleet, MA on 09/16/2009. **10 years to the day!** On 09/16/2019, Michael Mateo recaptured Paul's fish at Battery Park in NYC, NY. This fish was now a whopping 52 inches (TL)!
- On 04/28/2019, tagger Michael Purvin, was enjoying fishing and tagging in the often-abundant Raritan Bay pre-migration spring fishery. Michael tagged and released an 18-inch (FL) striper, off Keansburg, NJ. A little over one month later, on 06/05/2019, Robert Plohr, recovered that 19-inch (TL) fish in Kittery, Maine's

Piscataqua River!

- I guess that Maine was the place to be in summer of 2019 given that tagger Thomas Leonardis tagged a 23-inch (FL) striped bass, at Stone Harbor, NJ on 11/03/2018. On 06/04/2019, Angler Paul Korenkiewicz, recaptured this fish at Parson Beach, Kennebunk, ME, at 24 inches (TL).
- On 05/26/2014, longtime Society member/tagger Dennis Kelly (now deceased) tagged a 16-inch (FL) striped bass in Sag Harbor, NY. On 10/01/2019, angler Ed Lombard recaptured that striper at Old Saybrook`, CT, now measuring 37 inches (TL)! This was the 991st recapture of a fish tagged by Dennis. With the number of tags that Dennis has out, we expect him to crack 1000 recaptured tags posthumously.

Traveling flatfish
Noteworthy fluke tag returns
Fluke:

- Record Breaker! On 06/18/2010, Steve Sylvester caught, tagged, and released an 11-inch fluke in the saltmarsh behind Avalon, NJ. Eight years **7 months and 27 days** later, on 02/13/2019 the F/V Nadia Lee recaptured Steve's fish in 60 fathoms (360 feet) of water near the Hudson Canyon, while commercially trawling for fluke on their winter grounds. Steve's fish was now 23.5 inches long. Steve's fish took a boat ride and to a fish house in Beaufort, NC. This beats the program record of eight years and one day out for a summer flounder. Great job Steve!
- Tournament winner! On 08/10/2017, Monster doormat tagger, Howard Lemann, Society tagger and member of the Hudson River Fishermen's Association (HRFA), tagged a 24-inch, 5-pound, 5-ounce fluke off Norton Point, Brooklyn, NY. On 08/24/2019, while fishing in the Jersey Coast Shark Angler's fluke tournament, Joe Firman hooked and landed Howard's welcome mat in the Ambrose Channel off New York. Joe went on to win the tournament with the now 27-inch seven pound fish!
- In contrast to the above tag recapture is member/tagger Jan Beliveau's tag recapture. On 06/06/2019, Jan tagged and released an 18.25-inch fluke in the Shark River Inlet, NJ. The very next day this fish was recaptured by Angler Anthony Bottoms inside the Shark River at Belmar, NJ. Interestingly enough, it was reported that Jan's fish was now 18.5 inches in length.

Tautog:

- **5 years out!** On 11/28/2014, member/tagger Bill Doan tagged and released a 14-inch tautog at the Ocean City Reef, 4.5 nautical miles off Ocean City, NJ. An astounding five years later, Bill's fish had relocated slightly south to Sea Isle City, NJ, where it was recaptured by angler Gordon Adams, measuring in at around 19 inches. Tog are some of the slowest growing fish around, with a growth rate of 1 inch a year to be expected.

Bluefish Winter Vacation:

- On 09/08/2018 while fishing in the Sakonnet River off Portsmouth, RI, member/tagger Dave Garzoli tagged and released a 15-inch (FL) bluefish. Many weeks and months later, on 03/24/2019, Dave's bluefish was reported to be recaptured at Buxton, NC on the Outer Banks of NC, by angler Chris Mustard. Dave's fish was reported to be 16 inches (TL).

Tagger – Fish Reunions:

During the 2019 fishing season there were several reunions between taggers and fish. By reunion I mean that the original tagger recaptures their own tag. While this occurrence is extremely rare is does happen every once in a while.

- On 08/10/2017, Joseph Matzinger tagged and released a 16 inch (FL) striped bass while fishing the waters of Wantagh, NY. The following year on 06/08/2018 Joseph recaptured that same fish in the same spot! The fish was now 19 inches (TL). Joseph re-tagged this fish with a new tag and watched his friend swim away again.
- Member / tagger Steve Bennett accomplished this feat not once, but twice in 2019!
  1) On 7/13/2018, while fishing the Shark River in New Jersey, Steve Bennett tagged and released an 11.38-inch fluke. One year later, on 06/27/2019, Steve recaptured his fish again. Steve's fish was now 13.75 inches in length and was released with the original tag intact.
  2) Perhaps to show that his meetup was no fluke (pun intended), he did it again! On 7/29/2018 Steve tagged and released a 17.25-inch fluke in the Shark River, NJ. Almost a perfect year later, on 07/21/2019, in the same spot, Steve recaptured said fish again! This time the fish was 18 inches in length. Steve and family dined upon flounder française that evening.

It seems that fish and fishermen do occasionally return to the same spots at the same time of year!

In addition to annually providing fisheries scientists with invaluable data on recreationally important fishes, the American Littoral Society Fish Tagging Program also functions as an educational entity for elementary to masters graduate students who are interested in fisheries science and management.

Every year (with the exception of 2020), Tagging Program staff serve as mentors to students of all ages. We furnish elementary school age children with many fishing and tagging opportunities both formally with schools, and informally with summer camps and fishing club related activities.

We also advise students from our neighboring "high tech" high school the Marine Academy of Science and Technology (M.A.S.T.) with their senior thesis reports and presentations. Many of these students utilize our tagging dataset to answer marine-related thesis questions.

In addition, we advise wildlife ecology students from Rutgers University, often bringing these students along on an actual trawl survey and tagging trip aboard the R/V Blue Sea run by the M.A.S.T. school at Sandy Hook, NJ.

One of our most important annual

Littoral Society Tagging Totals (releases) for Major Species

	2016	2017	2018	2019
Striped Bass	5,471	6,455	5,263	4,821
Fluke	2,710	3,149	3,161	2,852
Bluefish	204	295	172	158
Weakfish	38	30	28	57
Tautog (Blackfish)	1,170	1,193	1,217	1,140
Black Sea Bass	619	340	293	146
Total tag releases (All species)*	10,650	11,654	10,348	9,372

*Totals reflect tagging of numerous other fish varieties

Littoral Society Tag Recaptures for Major Species

	2016	2017	2018	2019
Striped Bass	193	314	295	197
Fluke	134	157	200	181
Bluefish	2	10	1	2
Weakfish	0	0	1	1
Tautog (Blackfish)	87	76	52	36
Black Sea Bass	33	36	19	10
Total tag recaptures (All species)*	460	596	575	434

*Totals reflect recaptures of numerous other fish varieties

mentoring positions is our undergrad college summer internship. This program began in 2015 through a generous donation by Capt. Al Anderson of Narragansett, RI. Not only was Capt. Al, who worked much of his life as a Rhode Island charter boat Captain, very generous in his endowment, he was also quite prolific as a fish tagger. During his life he tagged and released well over 90,000 fish.

Having passed away several years ago, Capt. Al still retains the Society record as tagger #1 (based upon number of recaptured tags), with a mind boggling 2,260.

Please consider supporting the Capt. Al Anderson scholarship fund, and support the future for bright and promising students! Your donation is tax deductible.

Bios for Previous American Littoral Society Summer Interns

2015 – Toniann Keiling

Hometown: Massapequa, NY
School: Monmouth University
Undergrad: BS Marine Science and Environmental Biology and Policy
Graduate School: University of Illinois
MS Natural Resources and Environmental Science
Presently: Employed by New York State Department of Environmental Conservation Fisheries

"The American Littoral Society Fish Tagging Program internship taught me about seining, marine fish ID, and the value of tagging programs and how they function. Jeff Dement is a wonderful mentor with a wealth of knowledge. My experience made me a more attractive candidate for future jobs, and I'm very thankful to have had this."

2016 – Bridget Giblin

Hometown: Navesink, NJ
School: Delaware Valley University
BS Conservation and Wildlife Management

She has also worked two US Fish and Wildlife Service internships, one with paddlefish in Alabama and the other panther telemetry is the Florida Everglades, as well as serving two unit; 2 years as a National Park Service Natural Resource Ranger at the Sandy Hook Unit of Gateway National Recreation Area.

2017 – Samantha Glover

Hometown: West Long Branch, NJ
School: Stockton University
BS Marine Biology
Graduate school: Old Dominion University
MS: Biology (presently attending)

"The American Littoral Society Fish Tagging Program Internship was the best internship I had during my undergraduate career. I gained hands-on experience tagging fish, inputting fish tagging information into the database, and speaking to the public about environmental education."

2018 – Emily McGuckin

Hometown: Sparta, NJ
School: Stockton University
BS Marine Biology
Presently: AmeriCorps Watershed Ambassador in New Jersey

2019 – Daphne Yu

Hometown: Holmdel, NJ
School: Rutgers University
BS Ecology, Evolution, and Natural Resources

After college, Daphne worked in upstate NY as a field technician for an environmental engineering company in wetland restoration. She is now working for PSEG in the transmission engineering department

“The littoral society introduced me to a diverse group of People who were all brought together due to a shared love and appreciation for the environment, and it taught me that the more you enjoy your work, the more effort you would want to put in.”

Tagging Business News and Program Participant Appreciation

It has been many years since we have adjusted the price of our tagging kits to conform to cost increases. Beginning January 1, 2020, the price of tag kits will slightly increase, primarily to cover the increasing cost of postage.

Finally, we would like to extend a heartfelt thanks to all of our taggers. It is your continued support and effort that keeps this recreational angler, community science, fish tagging program providing valuable data to marine fisheries managers, and so much more.

When the world gets back to something resembling normal, please stop by our Sandy Hook offices for a personal visit. In the meantime, enjoy the tag recapture data, which is also available online at our website at https://www.littoralsociety.org/fish-tagging.html.

Our best regards to all, and good fishing to you.

Photo above: A fish is prepared for attachment of an American Littoral Society tag.

2019 Recap

Species Length	Tag	Tagger	Place Tagged	Tag Date	Recapturer	Place Recaptured	Length (TL)	Recap Date (FL)
Black Grouper	14	C Miller	Marathon, FL	3/5/2019	D Rybas	Marathon, FL	14	3/26/2019
Black Sea Bass	13.5	B Young	5 NM E Barnegat Light, NJ	9/16/2019	J Marti	Barnegat Light Reef, NJ	13.5	10/19/2019
Black Sea Bass	11.5	M Purvin	Sea Girt Reef, NJ	10/18/2018	D McGivney	15 NM SE Manasquan Inlet, NJ	12.75	10/13/2019
Black Sea Bass	13	D Garzoli	Point Judith, RI	7/29/2018	M Hachey	Point Judith, RI	15	8/20/2019
Black Sea Bass	**16**	**S Tombs**	**1 NM S Matunuck, RI**	**7/30/2016**	**T Brown**	**Newport, RI**	**20**	**8/19/2019**
Black Sea Bass	12	A Maraziti	Long Branch, NJ	8/22/2018	B Pringle	Long Branch, NJ	12.6	8/12/2019
Black Sea Bass	12	L Bleiler	Sandy Hook Channel, NJ	6/30/2018	M Gotman	Jamaica Bay, NY	17.5	8/5/2019
Black Sea Bass	16	S Tombs	Matunuck, RI	5/29/2016	M Ryckman	Montauk Point, NY	18	7/31/2019
Black Sea Bass	11	B Goodman	Fire Island Reef, NY	6/24/2019	J Cavanaugh	Fire Island Reef, NY	12.5	7/10/2019
Black Sea Bass	15	D Forster	4.5 NM SE Sakonnett Point, RI	6/15/2017	F/V Seven Seas	63 NM SSE Montauk Point, NY	16.9	5/10/2019
Black Sea Bass	18	S Tombs	Matunuck, RI	6/9/2018	F/V Kimberly Marie	Baltimore Canyon, MD		1/4/2019
Bluefish	**25**	**D Jurgens**	**Democrat Point, Fire Island, NY**	**6/12/2019**	**K Hunt**	**Montauk Point, NY**	**29**	**7/11/2019**
Bluefish	15	D Garzoli	Sakonnet River, Portsmouth, RI	9/8/2018	C Mustard	Buxton, NC	16	3/24/2019
Fluke	15	B Young	Barnegat Light Reef, NJ	7/21/2017	NCDNR Marine Div.	Spencer Canyon, NJ	18	12/28/2019
Fluke	15	B Young	Barnegat Reef, NJ	9/14/2018	NMFS Observer	59 NM E Ocean City, MD	15.4	12/8/2019
Fluke	13	A Schweithelm	Eatons Neck, NY	8/15/2014	P Williamson	37 NM ESE Manasquan Inlet, NJ		11/3/2019
Fluke	15.75	D Wald	Raritan Bay, NJ	8/10/2019	NMFS Observer	37 NM SSW Montauk Point, NY	15.75	11/2/2019
Fluke	15	T Wyszynski	5 NM E Sea Bright, NJ	8/10/2019	B Griffin	North Of Hudson Canyon, NJ	15	11/2/2019
Fluke	18.5	M Sullivan	Montauk Point, NY	9/15/2019	J Quaresimo	Montauk, NY	18.	5 9/21/2019
Fluke	14	R Anderson Jr	Fire Island Inlet, NY	8/31/2018	N Adragna	Fire Island Coast Guard, NY		9/21/2019
Fluke	**14.5**	**J Beck**	**Cape May Harbor, NJ**	**10/2/2018**	**E Jazdzewski**	**Cape May Harbor, NJ**	**18.5**	**9/20/2019**
Fluke	15	R Anderson Jr	Fire Island Inlet, NY	8/23/2018	B Kavanagh	Fire Island Inlet, NY	17	9/17/2019
Fluke	16	R Schnyderite	Keyport, NJ	9/12/2018	B Batalitzky	Raritan Bay, Keyport, NJ		9/16/2019
Fluke	15	B Shillingford	Ludlum Bay, NJ	6/1/2017	C Savage	Manasquan River, NJ	17	9/16/2019
Fluke	14.5	S Fries	Gerritsen Inlet, NY	6/7/2019	A Singh	Rockaway Reef, NY	16	9/15/2019
Fluke	16.75	S Mihalko	Raritan Bay, NJ	8/7/2019	S Kowal	Sandy Hook, NJ	17	9/11/2019
Fluke	16	M Hoey	Navesink River, NJ	6/26/2019	G Hueth	Navesink River, NJ	18	9/10/2019
Fluke	12	B Young	Barnegat Bay, NJ	5/26/2019	B Adams	Barnegat Inlet, NJ	14	9/9/2019
Fluke	16	G Horvath	Manasquan Inlet, NJ	5/22/2018	E Becker	Long Branch, NJ		9/3/2019
Fluke	16.5	F Truex	Long Branch, NJ	7/5/2019	D Machamer	Long Branch, NJ	16.5	9/1/2019
Fluke	15.6	R Schnyderite	South Amboy, NJ	5/29/2018	J Walker	Raritan Bay, South Amboy, NJ	17	8/31/2019
Fluke	12.5	J Beck	Cape May Point, NJ	8/4/2019	B Yang Cape	May Point, NJ	12.5	8/31/2019
Fluke	17	B Young	Barnegat Bay, NJ	9/2/2017	M Reiner	Manasquan River, NJ	18.13	8/31/2019
Fluke	13.5	J Beck	Cape May Point, NJ	8/11/2019	C Bezaire	Cape May Point, NJ	13.5	8/28/2019
Fluke	**15.5**	**T Matraxia**	**Ambrose Channel, NY**	**8/26/2017**	**A Gehringer**	**Sandy Hook Channel, NJ**	**19**	**8/28/2019**
Fluke	18	S Tombs	Matunuck, RI	5/28/2018	NMFS Observer	4 NM S Charlestown, RI	20.86	8/26/2019
Fluke	15	A D'Amato	Cape May Canal, NJ	7/16/2018	C King	Elberon, NJ	16	8/24/2019
Fluke	**24**	**H Leemann**	**Norton Point, Brooklyn, NY**	**8/10/2017**	**J Firman**	**Ambrose Channel, NY**	**27**	**8/24/2019**
Fluke	15	S Fries	Atlantic Beach Reef, NY	9/3/2018	R Thorne	Debs Inlet, Long Beach, NY	15.75	8/23/2019
Fluke	16	R Anderson Jr	Fire Island Inlet, NY	9/8/2018	R Intindoli	Fire Island Inlet, NY		8/23/2019
Fluke	15	S Fries	Rockaway Inlet, NY	7/16/2017	T Kazary	Hoffman Island, NY	19	8/23/2019
Fluke	18	R Wellman	Montauk, NY	8/11/2017	S Marsh	Montauk, NY	19	8/22/2019
Fluke	12.5	J Beck	Cape May Point, NJ	8/7/2019	J Delgott	Cape May Point, NJ	12.5	8/21/2019
Fluke	15.5	B Klimas	Sandy Hook, NJ	7/13/2019	R Butkiewicz	Scotland Grounds, NJ	16	8/21/2019
Fluke	15	M Skuya	Raritan Bay, NJ	6/10/2018	C Ackerman	Fire Island, NY	16.5	8/21/2019
Fluke	16	B Young	Barnegat Light Reef, NJ	7/27/2019	M Bove	2 nm E Barnegat Inlet, NJ	16	8/20/2019
Fluke	13	J Beck	Cape May Point, NJ	8/10/2019	J Joyce II	Cape May Point, NJ	13.25	8/20/2019
Fluke	16	S Fries	Rockaway Inlet, NY	7/4/2018	J Li	Coney Island Flats, Brooklyn, NY		8/20/2019
Fluke	15	S Fries	Rockaway Inlet, NY	7/7/2019	G Cieslik	Jones Reef, NY	15	8/20/2019
Fluke	15	R Anderson Jr	Fire Island Inlet, NY	7/28/2019	T Falco	Fire Island Inlet, NY	15	8/19/2019
Fluke	**17**	**M DiMatteo**	**Beavertail, Narragansett Bay, RI**	**8/29/2018**	**R Forrest**	**Beavertail Point, Jamestown, RI**	**20.25**	**8/19/2019**
Fluke	17.5	S Rudolph	Rockaway Inlet, NY	6/17/2019	F Buselli	3 NM E Sandy Hook, NJ	17.88	8/18/2019
Fluke	17	L Marrella	Sandy Hook, NJ	7/9/2019	R Hill	Sandy Hook, NJ	17	8/17/2019
Fluke	12	R Budd	Corsons Inlet, NJ	8/6/2019	M Monserrate	Corsons Inlet, NJ	12	8/17/2019
Fluke	13	B Young	Barnegat Light Reef, NJ	7/28/2019	J Dimarco	Barnegat Light Reef, NJ	13	8/17/2019
Fluke	16	B Young	Barnegat Light Reef, NJ	8/13/2017	M Wonderlin	3 NM E Barnegat Inlet, NJ	18	8/17/2019
Fluke	13	S Fries	Rockaway Inlet, NY	7/20/2018	B Magas	Atlantic Beach Reef, NY	16	8/16/2019
Fluke	13	C Gould Jr	Wildwood Reef, NJ	7/26/2019	J Carbutt	Stone Harbor, NJ	17	8/15/2019
Fluke	21	C Gould Jr	North Wildwood, NJ	5/15/2018	C Ashton	Rockaway Reef, NY	24.5	8/14/2019
Fluke	13	R Anderson Jr	Fire Island Inlet, NY	9/8/2018	F Gentile	Misquamicut, RI		8/13/2019
Fluke	11	A D'Amato	Cape May Inlet, NJ	7/25/2019	A D'Amato	Cape May Inlet, NJ	11	8/12/2019
Fluke	16	B Goodman	Fire Island Reef, NY	6/8/2019	B Grasman	2 NM S Fire Island, NY		8/11/2019
Fluke	13.75	R Budd	Corsons Inlet, NJ	8/6/2019	J Scharff	Corsons Inlet, NJ	13.75	8/11/2019
Fluke	15	A Maraziti	Long Branch, NJ	6/24/2019	T Dillon	Long Branch, NJ	15	8/10/2019
Fluke	15.5	M Purvin	Monmouth Beach, NJ	7/5/2019	J Stich	Allenhurst, NJ	15.5	8/10/2019
Fluke	15.5	M Purvin	Monmouth Beach, NJ	7/5/2019	J Stich	Allenhurst, NJ	15.5	8/10/2019
Fluke	16	R Anderson Jr	Fire Island Inlet, NY	8/15/2018	T Budovsky	Fire Island Inlet, NY	18	8/9/2019
Fluke	17	B Young	Barnegat Inlet, NJ	9/25/2016	R Pasko	Barnegat Bay, Waretown, NJ		8/8/2019
Fluke	16.25	R Schnyderite	Sandy Hook, NJ	8/6/2018	P Gepp	Mud Bouy, NJ		8/8/2019

Species Length	Tag	Tagger	Place Tagged	Tag Date	Recapturer	Place Recaptured	Length (TL)	Recap Date (FL)
Fluke	15.25	T Matraxia	Jamaica Bay, NY	5/7/2019	G Hall	Ambrose Channel, NY		8/7/2019
Fluke	12	A D'Amato	Cape May Inlet, NJ	7/10/2019	A D'Amato	Cape May Inlet, NJ	12	8/5/2019
Fluke	12	A D'Amato	Cape May Inlet, NJ	7/15/2019	A D'Aamto	Cape May Inlet, NJ	12	8/5/2019
Fluke	21.75	H Leemann	Gravesend Bay, Brooklyn, NY	7/29/2019	H Leemann	Gravesend Bay, Brooklyn, NY	21.75	8/5/2019
Fluke	25.5	H Leemann	Ambrose Channel, NY	5/29/2019	H Leemann	Verrazano Bridge, Brooklyn, NY	26	8/5/2019
Fluke	16	C King	Bellmore, NY	7/1/2017	J Cole	Off Bartletts Reef Niantic, CT	19.75	8/4/2019
Fluke	16.75	M Hoey	Navesink River, NJ	6/26/2019	D Acquafredda	Flynns Knoll, Raritan Bay, NJ		8/4/2019
Fluke	13.5	R Anderson Jr	Fire Island Inlet, NY	7/19/2019	N H Robert	Moses Bridge, NY		8/3/2019
Fluke	16	T Matraxia	Shrewsbury Rocks, NJ	7/18/2018	J Gogan	2 NM E Long Branch, NJ	16.5	8/3/2019
Fluke	11	A D'Amato	Cape May Inlet, NJ	7/15/2019	A D'Amato	Cape May Inlet, NJ	11	8/1/2019
Fluke	14.5	J Beliveau	Manasquan Inlet, NJ	7/25/2019	P Greene	Manasquan Inlet, NJ	14.5	8/1/2019
Fluke	10	A D'Amato	Cape May Inlet, NJ	7/25/2019	A D'Amato	Cape May Inlet, NJ	11	8/1/2019
Fluke	15.5	R Anderson Jr	Fire Island Inlet, NY	7/19/2019	J Lange	Fire Island, NY	16	7/30/2019
Fluke	16.75	A Maraziti	Manasquan River, NJ	8/22/2018	B Biedinger	Shark River Inlet, NJ		7/29/2019
Fluke	13.5	S Fries	Coney Island, NY	7/20/2018	D Ingrassia	Coney Island, Brooklyn, NY		7/29/2019
Fluke	15.5	R Schnyderite	South Amboy Beach, NJ	6/14/2017	J Machin Great	South Bay, NY	19	7/29/2019
Fluke	24	R Wellman	Montauk, NY	9/2/2018	J Ryan	Long Island Sound, NY		7/29/2019
Fluke	14	B Young	Island Beach State Park, NJ	8/23/2017	M Gallo	Shrewsbury Rocks, NJ		7/28/2019
Fluke	15	R Anderson Jr	Fire Island Inlet, NY	6/15/2018	F Montwill	Moriches Bay, NY	18.5	7/27/2019
Fluke	18.5	F Montwill	Moriches Bay, NY	7/27/2019	C Ronson	Moriches Bay, NY	18.5	7/27/2019
Fluke	13	F Waltzinger III	3 NM E Manasquan, NJ	7/28/2015	W Kitzerow	Montauk, NY	18.2	7/27/2019
Fluke	14	S Kellner	Mattituck, NY	6/22/2017	M Jokajtys	2 NM E Mattituck Inlet, NY	15.5	7/27/2019
Fluke	15.5	P Wetterau	Long Beach, NY	5/18/2019	S Cooney	East Rockaway Inlet, NY	16	7/27/2019
Fluke	13.5	R Anderson Jr	Fire Island Inlet, NY	9/5/2018	Unknown Angler	Moriches Bay, NY	17	7/27/2019
Fluke	12.5	W Kotnik	Breezy Point, NY	5/31/2019	J Seidel	Jamaica Bay, NY		7/26/2019
Fluke	13	B Young	Barnegat Light Reef, NJ	7/5/2017	L Kanoff	Great Egg Reef, NJ		7/26/2019
Fluke	10	J Baumann	Great Egg Inlet, NJ	7/17/2019	J Perri	Somers Point, NJ	10.75	7/25/2019
Fluke	16	B Goodman	Atlantique Beach, NY	6/22/2019	N Adragna	Yellow Bar Reef, Fire Island, NY	16.5	7/25/2019
Fluke	12	A D'Amato	Cape May Inlet, NJ	7/15/2019	Z Kimsey	Cape May Inlet, NJ	12	7/25/2019
Fluke	22.5	H Leemann	Verrazano Bridge, Brooklyn, NY	8/3/2016	J Del Bello	Verrazano Bridge, NY	25	7/24/2019
Fluke	14	B Sciuti	Amityville, NY	9/2/2018	J Lubrano	Moriches Inlet, NY		7/23/2019
Fluke	**13.5**	**R Schnyderite**	**Shrewsbury River, Highlands, NJ**	**9/17/2015**	**R Wasik**	**Black Point, Niantic, CT**	**20**	**7/22/2019**
Fluke	12	B Young	Barnegat Bay, NJ	7/27/2017	R Siegel	Barnegat Bay, Oyster Creek, NJ	17.13	7/22/2019
Fluke	17.25	S Bennett	Shark River, NJ	7/29/2018	S Bennett	Shark River, NJ	18	7/21/2019
Fluke	14.25	J Caprino	Reynolds Channel, NY	6/19/2019	P Siegelman	Long Beach, NY	14.25	7/20/2019
Fluke	13.5	S Fries	Rockaway Inlet, NY	6/7/2019	B Philipchuck	Breezy Point, NY	13.5	7/19/2019
Fluke	10.5	J Beliveau	Manasquan Inlet, NJ	7/17/2019	B Humes	Manasquan River, NJ	12	7/19/2019
Fluke	16.25	T Matraxia	Sandy Hook Bay, NJ	6/22/2018	J Kolias	Raritan Bay, Flynns Knoll, NJ	16.5	7/17/2019
Fluke	11	B Shillingford	Strathmere, NJ	6/15/2019	M Schaub	Strathmere, NJ	12	7/17/2019
Fluke	15.5	S Fries	Sheepshead Bay Channel, NY	9/1/2018	S Rudolph	Marine Parkway Bridge, NY	16	7/17/2019
Fluke	14	B Shillingford	Ludlam Bay, NJ	10/18/2017	J Passarella	Corsons Inlet, NJ		7/17/2019
Fluke	14.5	F Truex	Manasquan River, NJ	5/25/2019	J Rider	Shark River, Belmar, NJ	15	7/16/2019
Fluke	23.75	H Leemann	Ambrose Channel, Brooklyn, NY	7/26/2017	K Schuck	Meadowbrook Bridge, NY	25.5	7/16/2019
Fluke	12	G Horvath	Manasquan Inlet, NJ	10/16/2018	R Ruiz	Sandy Hook, NJ		7/15/2019
Fluke	16	S Kourtesis	Newport, RI	6/28/2019	J Kourtesis	Narragansett Bay, RI	16	7/15/2019
Fluke	14	A D'Amato	Cape May Inlet, NJ	6/4/2019	A D'Amato	Cape May Inlet, NJ	14	7/15/2019
Fluke	11	A D'Amato	Cape May Inlet, NJ	5/30/2019	J Rutherford	Cape May Inlet, NJ		7/14/2019
Fluke	17.5	T Matraxia	Sandy Hook Bay, NJ	6/22/2018	J Silvia	Sandy Hook Bay, NJ	19	7/13/2019
Fluke	16	F Truex	Manasquan River, NJ	5/25/2019	A Devitt	Manasquan Inlet, NJ	16.5	7/13/2019
Fluke	12	A D'Amato	Cape May Inlet, NJ	9/15/2017	X Arreola	Sandy Hook Bay, NJ	16.5	7/13/2019
Fluke	18.5	R Conklin	Westport, CT	6/20/2018	M Cuomo	Montauk, NY	18.88	7/12/2019
Fluke	17	B Shillingford	Corsons Inlet, NJ	7/2/2018	J Passarella	Corsons Inlet, NJ	18.5	7/12/2019
Fluke	15	A An	Manasquan Inlet, NJ	7/8/2019	R Tomkins	Manasquan Inlet, NJ	15	7/10/2019
Fluke	14	C Reutlinger	Matawan Creek, Keyport, NJ	9/22/2018	A Biava	Oceanic Brdige, Navesink, NJ	17	7/8/2019
Fluke	12.5	S Fries	Coney Island, NY	7/20/2018	J Cooney	Atlantic Beach Bridge, NY	14	7/8/2019
Fluke	17.5	S Bennett	Shark River, NJ	7/13/2018	D Ottenthal	Manasquan, NJ	21	7/7/2019
Fluke	15	J Beliveau	Manasquan Inlet, NJ	6/28/2019	A An	Manasquan Inlet, NJ	15	7/7/2019
Fluke	18.5	L Alessi	Navesink River, NJ	6/22/2019	A Greczek	Navesink River, NJ	18.5	7/6/2019
Fluke	11	S Fries	Rockaway Inlet, NY	6/24/2018	J Dymant	Merrick Bay, NY		7/5/2019
Fluke	**15**	**T Valerio**	**Long Beach Island, NJ**	**9/19/2012**	**NMFS Observer**	**44 NM S Nantucket Island, MA**	**23.6**	**7/5/2019**
Fluke	15	A Schweithelm	Smithtown Bay, NY	5/25/2018	F/V Jeremy H.	Gardiners Bay, NY	16.5	7/4/2019
Fluke	13.5	R Dunlop	Amityville, NY	7/30/2017	J Turney	Hampton Bays, NY	19	7/3/2019
Fluke	14	M Purvin	Sandy Hook, NJ	6/21/2018	A Pasternak	Sandy Hook Channel, NJ	18	7/2/2019
Fluke	14	M Purvin	Sandy Hook, NJ	6/21/2018	A Pasternak	Sandy Hook Channel, NJ	18	7/2/2019
Fluke	17	R Dunlop	Amityville, NY	6/16/2019	J Dotzler	Merrick Bay, NY	17	7/1/2019
Fluke	13	R Dunlop	Massapequa, NY	6/24/2018	R Dunlop	Massapequa, NY	17	7/1/2019
Fluke	16	B Shillingford	Strathmere, NJ	6/1/2018	F Fisherman	Sea Isle City, NJ	18	7/1/2019
Fluke	**13**	**R Conklin**	**Norwalk, CT**	**8/31/2016**	**T Moynihan**	**Oak Beach, NY**	**15**	**6/30/2019**
Fluke	16	D Omrod	Strathmere, NJ	6/8/2019	J Davey	Corson's Inlet, NJ		6/30/2019
Fluke	14.5	T Matraxia	Monmouth Beach, NJ	8/7/2018	N Sepe	Deal, NJ	16	6/29/2019
Fluke	14.5	S Fries	Fire Island Inlet, NY	9/20/2018	R Tofano	Fire Island Inlet, NY	17	6/28/2019
Fluke	13	R Dunlop	Massapequa, NY	8/12/2018	S Kourtesis	Newport, RI	16	6/28/2019
Fluke	20.5	A Fasano	Point Pleasant Canal, NJ	6/16/2019	J Samaras	Barnegat Bay, Bayhead, NJ	20.5	6/28/2019
Fluke	16	R Anderson Jr	Fire Island Inlet, NY	9/5/2018	N Ritchie	Jones Inlet, NY		6/28/2019
Fluke	11.375	S Bennett	Shark River, NJ	7/13/2018	S Bennett	Shark River, NJ	13.75	6/27/2019
Fluke	12	B Young	Barnegat Light Reef, NJ	8/13/2016	T Long	Garden State Reef South, NJ	15.5	6/27/2019

Species Length	Tag	Tagger	Place Tagged	Tag Date	Recapturer	Place Recaptured	Length (TL)	Recap Date (FL)
Fluke	20	T Matraxia	Jamaica Bay, NY	5/7/2019	M Teixeira	Jamaica Bay, NY	20	6/26/2019
Fluke	14.5	A Maraziti	Long Branch, NJ	8/22/2018	N Adams	1.2 NM ESE Shark River Inlet, NJ	15.88	6/26/2019
Fluke	13	B Shillingford	Ludlam Bay, NJ	5/11/2018	M Skelly	ICW 172, Brigantine, NJ	15.5	6/24/2019
Fluke	16.25	B Vincent	Breezy Point, NY	9/17/2017	H Leemann	Norton Point, Brooklyn, NY	19	6/24/2019
Fluke	18	E DeSousa	Navesink River, NJ	8/27/2018	J Seger	Leonardo, NJ		6/24/2019
Fluke	20.25	H Leemann	Verrazano Bridge, Brooklyn, NY	7/3/2018	R Rostek	Gravesend Bay, Brooklyn, NY	22	6/24/2019
Fluke	15	F Truex	Manasquan River, NJ	10/19/2018	F Truex	Elberon, NJ	15	6/23/2019
Fluke	15	R Schnyderite	Sandy Hook, NJ	5/25/2019	K Kaczor	Shrewsbury River, NJ	15.25	6/23/2019
Fluke	15	R Anderson Jr	Fire Island Inlet, NY	8/5/2018	J Kramer	Ocean Beach, NY	17.5	6/22/2019
Fluke	16.5	S Bennett	Shark River, NJ	7/13/2018	C Muehter	Manasquan River, NJ		6/22/2019
Fluke	15.25	S Bennett	Shark River, NJ	7/13/2018	A Young	Shark River, NJ		6/22/2019
Fluke	15	J Beck	Cape May Point NJ	6/14/2018	B Sheridan	ICW Wildwood, NJ	17.75	6/22/2019
Fluke	**16.75**	**R Budd**	**Ludlam Bay, NJ**	**7/30/2016**	**H Melrose**	**Margate, NJ**	**22**	**6/20/2019**
Fluke	13	B Shillingford	Ludlam Bay, NJ	10/20/2017	J Lynch	Sea Isle City, NJ	15.5	6/15/2019
Fluke	17.5	S Bennett	Shark River, NJ	9/22/2018	J Forsyth	Manasquan River, NJ	18.5	6/15/2019
Fluke	16	D Forster	Block Island, RI	5/24/2017	J Downs	Shinnecock Bay, NY		6/15/2019
Fluke	14	R Schnyderite	South Amboy, NJ	9/19/2018	J Haggerty	Coney Island Flats, Brooklyn, NY		6/13/2019
Fluke	13.5	R Dunlop	Massapequa, NY	7/29/2018	D Morgese	Jones Beach, NY	15	6/9/2019
Fluke	20.5	J Beliveau	Shark River, NJ	5/16/2019	E Pelko	Shark River, Belmar, NJ	20.5	6/8/2019
Fluke	13	S Fries	Rockaway Jetty, NY	7/21/2018	R Ranghelli	Moriches Bay, NY	14	6/8/2019
Fluke	18.25	J Beliveau	Shark River Inlet, NJ	6/6/2019	A Bottoms	Shark River, Belmar, NJ	18.5	6/7/2019
Fluke	18	D Forster	Sakonnet River, RI	6/4/2017	G Mataronas	Sakonnet River, RI	19	6/5/2019
Fluke	14	B Shillingford	Ludlam Bay, NJ	5/11/2018	D McKee	Strathmere, NJ	16	6/4/2019
Fluke	13	S Fries	Rockaway Inlet, NY	8/26/2018	A Burke	Rockaway Inlet, NY	16	5/31/2019
Fluke	15	F Truex	Manasquan River, NJ	10/19/2018	R Gaudious	Shark River, Belmar Marina, NJ	17	5/30/2019
Fluke	13.5	R Schnyderite	Raritan Bay, South Amboy, NJ	8/1/2017	M Polny	Raritan Bay, NJ	15	5/25/2019
Fluke	16	R Dunlop	Amityville, NY	5/31/2018	NMFS Observer	5 NM SSW Jones Inlet, NY	18	5/22/2019
Fluke	14	S Fries	Plumb Beach, NY	6/13/2018	P McClellan	Barnegat Inlet, NJ	14.5	5/19/2019
Fluke	18	G Horvath	Manasquan Inlet, NJ	10/22/2018	M Gonzalez	Sheepshead Bay, NY		5/19/2019
Fluke	14.5	A Schweithelm	Smithtown Bay, NY	6/2/2018	P Wetterau	Long Beach, NY	15.5	5/18/2019
Fluke	13	J Beck	Cape May Point, NJ	7/12/2017	G Delape	Reynolds Channel, LI, NY	16	5/4/2019
Fluke	15	S Fries	Marine Parkway Bridge, NY	6/9/2018	J Ecock	Reynolds Channel, NY	16.5	5/2/2019
Fluke	11.5	R Dunlop	Amityville, NY	7/8/2018	Belford Seafood Coop	Hudson Canyon Area, NJ		4/25/2019
Fluke	24.5	H Leemann	Norton Point, Brooklyn, NY	6/12/2018	D Marshall	Nantucket West Closed Area, MA		4/24/2019
Fluke	18	J Samyn	Hewlet Point, NY	8/19/2017	G Ayala	Carteret Canyon, NJ		4/8/2019
Fluke	21.5	H Leemann	Gravesend Bay, Brooklyn, NY	6/8/2018	NMFS Observer	70 NM ESE Cape May Inlet, NJ	23.2	2/28/2019
Fluke	11	S Sylvester	Avalon, NJ	6/18/2010	F/V Nadia Lee	Hudson Canyon, NJ	23.5	2/13/2019
Fluke	16	A D'Amato	Cape May Canal, NJ	7/5/2018	F/V Jeffrey Scott	Spencer Canyon, NJ	16.14	2/11/2019
Fluke	16	B Shillingford	Strathmere, NJ	7/8/2018	R Collins	Cape May Rocks, NJ	16	2/8/2019
Fluke	17	J Samyn	Prospect Point, NY	6/12/2018	NMFS Observer	28 NM S Montauk Point, NY	19.6	2/4/2019
Fluke	14	F Waltzinger III	2.5 NM E Manasquan, NJ	8/1/2015	T Przygodzinski	10 NM SSE Cape May Inlet, NJ	16	2/2/2019
Fluke	17.75	C Greenwood	Corson Inlet, NJ	7/5/2018	T Pryzgodzinski	10 NM SSE Cape May, NJ	18.5	2/2/2019
Fluke	17	T Matraxia	Atlantic Beach, NY	8/30/2018	C Caroon	58 NM E Chincoteague Island, VA	17.8	2/1/2019
Fluke	15	B Young	Barnegat Light Reef, NJ	7/15/2017	NCDMF	Spenver Canyon, NJ		1/31/2019
Fluke	16.5	H Smith	Shrewsbury Rocks, NJ	8/11/2018	NMFS Observer	85 NM E Cape May, NJ	17.3	1/27/2019
Fluke	15	A Maraziti	Asbury Park, NJ	8/8/2018	NMFS Observer	88 NM E Cape May, NJ	15.7	1/27/2019
Fluke	17	S Fries	Atlantic Beach Reef, NY	9/3/2018	R Adams	45 NM E Point Pleasant, NJ	18	1/3/2019
Red Drum	26	A Schweithelm	Winyah Bay, SC	5/17/2019	P Marion	Georgetown, SC		7/27/2019
Red Drum	21	A Schweithelm	Winyah Bay, SC	5/15/2019	L Fleming	Winyah Bay, SC	21	5/24/2019
Red Drum	14	T Evangelista	St. Augustine, FL	7/24/2018	J Dwyer	Palm Valley, FL		3/1/2019
Red Grouper	12	B Russo	Rodriguez Key, FL	9/19/2018	D Rybas	Marathon, FL	14	3/26/2019
Red Grouper	15	B Russo	Rodruiguez Key, FL	11/24/2018	T Dyches	Key Largo, FL		1/13/2019
Smooth dogfish	**14**	**J Fusaro Jr**	**Cold Spring Harbor, NY**	**8/16/2019**	**M Marci**	**Oyster Bay, NY**	**18**	**9/1/2019**
Striped Bass	36	T Sherwood	2 NM E Brick Beach, NJ	11/30/2019	B Nichols	10 NM E Assateague Island, MD	38	12/23/2019
Striped Bass	34	Z Kimsey	Cape May Harbor, NJ	6/17/2019	C Stover	James River Bridge, VA	34	12/9/2019
Striped Bass	18	G Kerkhan	Truro, MA	9/7/2019	D Martin	Island Beach State Park, NJ	20	12/8/2019
Striped Bass	19	A Messina MD	Cold Spring Harbor, NY	7/2/2019	J Drew	Re-rel. w/ tag intact	24	11/26/2019
Striped Bass	18	R Labrozzi	Southampton, NY	11/10/2018	B Kuhne	Lavallette, NJ	22	11/24/2019
Striped Bass	**16**	**D Kelly**	**Sag Harbor, NY**	**5/2/2017**	**C Wagner**	**Bay Head, NJ**	**24**	**11/23/2019**
Striped Bass	25.5	J Beck	Cape May Harbor, NJ	5/3/2019	G Call	Avalon, NJ		11/23/2019
Striped Bass	28.5	T Shaheen	Shrewsbury River, Sea Bright, NJ	6/26/2019	J De Stefano	Sea Isle City, NJ	28.5	11/23/2019
Striped Bass	15	D Kelly	Sag Harbor, NY	5/17/2018	P Costello	Jones Beach State Park, NY	22	1/22/2019
Striped Bass	23	R Leja	Bridgeport, CT	10/25/2019	G Blazek	Whitestone, NY	25	11/19/2019
Striped Bass	20.75	T Marburger	Northport, NY	5/8/2018	P Mckiernan	Democrat Point, NY	26	11/17/2019
Striped Bass	17	D Kelly	Sag Harbor, NY	5/5/2018	N Romani	Democrat Point, NY	22.5	11/16/2019
Striped Bass	15	T DeCoene	Stamford Harbor, CT	7/13/2019	C Redmond	Darien, CT		11/15/2019
Striped Bass	17	A D'Amato	Cape May Inlet, NJ	10/2/2019	C Santaniello	Fortescue Beach, New Jersey	17.5	11/14/2019
Striped Bass	17	M DiMatteo	Wickford Harbor, RI	10/22/2017	G Evans	Coles River, Swan Sea, MA	24	11/14/2019
Striped Bass	22	T Leonardis	Sea Isle City, NJ	10/1/2018	J Morrisey	Ludlum Bay, Sea Isle City, NJ	26	11/14/2019
Striped Bass	24	L Alessi	Shrewsbury River, Sea Bright, NJ	10/18/2019	J Toland	Raritan Bay, Atlantic Highlands, NJ	25	11/11/2019
Striped Bass	22	G Kerkhan	Sandy Hook, NJ	4/9/2019	J Ozwirk	Monmouth Beach, NJ	25	11/9/2019
Striped Bass	18	J Fitzpatrick	Moriches Inlet, NY	9/25/2017	E Perez	L. Valentino Jr Park, Brooklyn, NY		11/9/2019

Species Length	Tag	Tagger	Place Tagged	Tag Date	Recapturer	Place Recaptured	Length (TL)	Recap Date (FL)
Striped Bass	14	C DiGerolamo	Wildwood, NJ	8/3/2019	T Boles	Fortescue Beach, NJ		11/8/2019
Striped Bass	20	M Hoey	Oceanic Bridge, Navesink, NJ	11/8/2018	J Sharrott	Raritan Bay, NJ	21.5	11/7/2019
Striped Bass	19	T Shaheen	Shrewsbury River, Sea Bright, NJ	5/6/2019	L Lopez	Raritan Bay, NJ		11/6/2019
Striped Bass	20	T Shaheen	Shrewsbury River, Sea Bright, NJ	6/22/2019	L Lopez	Raritan Bay, NJ		11/6/2019
Striped Bass	16.5	B Scully	Harvest Cove, Harvey Cedars, NJ	9/21/2018	G Kerkhan	Sandy Hook, NJ	20	11/6/2019
Striped Bass	20	D Kelly	Sag Harbor, NY	11/21/2017	R Labrozzi	Sag Harbor, NY	23	11/5/2019
Striped Bass	16	G Kerkhan	Sandy Hook, NJ	11/25/2017	D Gowan	Oceanic Bridge, Navesink, NJ		11/3/2019
Striped Bass	20	A Soiefer	Corson's Inlet, NJ	5/17/2019	R King	Risley Channel, Atlantic City, NJ		11/3/2019
Striped Bass	17	D Kelly	Sag Harbor, NY	4/14/2018	R Labrozzi	Sag Harbor, NY	21	11/2/2019
Striped Bass	20	T Shaheen	Shrewsbury River, Sea Bright, NJ	5/20/2019	J Tirella	Shrewsbury River, NJ	22	10/31/2019
Striped Bass	19	G Kerkhan	Sandy Hook, NJ	10/4/2019	R Carter	Sandy Hook, NJ	20	10/30/2019
Striped Bass	19	G Kates	Newport, RI	5/30/2019	G Hausmen	Montauk, NY	22	10/30/2019
Striped Bass	15	C Gould Jr	North Wildwood, NJ	8/9/2018	J Coyle	West Creek, NJ	18	10/29/2019
Striped Bass	16	S Calitri	Little Bay, NH	5/27/2018	N Aquino	Long Beach, Stratford, CT		10/26/2019
Striped Bass	**32**	**L Fantasia**	**Raritan Bay, West Bank Light, NY**	**4/16/2019**	**D Filipe**	**Monmouth Beach, NJ**	**36**	**10/24/2019**
Striped Bass	22.25	M Baden	Manokin River, MD	9/28/2018	D Bailey	Pocomoke Sound, VA		10/23/2019
Striped Bass	21	G O'Driscoll	Block Island, RI	9/29/2019	R Manglaviti	Westhampton Beach, NY		10/20/2019
Striped Bass	20	T Shaheen	Shrewsbury River, Sea Bright, NJ	7/8/2019	J Lerner	New York Harbor Narrows, NY	23	10/20/2019
Striped Bass	23	T Marburger	Shinnecock Inlet, NY	6/17/2018	G Hulsen	Cupsogue Beach, NY		10/20/2019
Striped Bass	22	J Matzinger	Wantagh, NY	7/2/2019	E Leggio	Jones Beach, NY	26	10/19/2019
Striped Bass	13	T Valerio	Surf City, LBI, NJ	4/16/2019	R Lozava	Smith Point Bridge, NY		10/18/2019
Striped Bass	23.5	G O'Driscoll	Delaware River, Pennsgrove, NJ	4/4/2019	T Van Nostrand	Point Pleasant, NJ		10/15/2019
Striped Bass	34	L Bleiler	Raritan Bay, Keansburg, NJ	4/28/2018	B Loyer	Lower New York Harbor, NY	36	10/14/2019
Striped Bass	30	L Bleiler	Raritan Bay, NJ	4/13/2019	E Larusso	Saybrook Point, CT	35	10/8/2019
Striped Bass	21	T Shaheen	Shrewsbury River, Sea Bright, NJ	9/21/2019	N Linberger	Sandy Hook, NJ		10/8/2019
Striped Bass	**24**	**R Kyker**	**Stratford, CT**	**4/20/2017**	**E Pedruczny**	**Brickyard Point, NY**	**31**	**10/7/2019**
Striped Bass	36	S Dabkowski	Watch Hill, RI	7/28/2018	NMFS Observer	East Hampton, NY	37.4	10/6/2019
Striped Bass	24	P Korenkiewicz	Parsons Beach, Kennebunk, ME	6/4/2019	K Dancause	Spurwink River, ME	24	10/6/2019
Striped Bass	24	V DeGennaro	Sea Bright, NJ	12/2/2018	J Talleri	Manchester, MA		10/5/2019
Striped Bass	22	A Messina	MD Cold Spring Harbor, NY	9/11/2017	S Lastig	MD Cold Spring Harbor, NY	29	10/4/2019
Striped Bass	16	G Kerkhan	Sandy Hook, NJ	12/17/2018	B Adams	Menunketesuck River, Westbrook, CT	19	10/2/2019
Striped Bass	15	B Shillingford	Ocean City, NJ	6/25/2019	T Scranton	Corsons State Park, NJ		10/1/2019
Striped Bass	16	D Kelly	Sag Harbor, NY	5/26/2014	E Lombard	Old Saybrook, CT	37	10/1/2019
Striped Bass	21	M Levasseau	Sakonnet River, RI	9/25/2019	H Schuttauf	Fall River, MA	21	9/30/2019
Striped Bass	16	T DeCoene	Stamford, CT	6/2/2018	R Leja	Bridgeport, CT	20	9/29/2019
Striped Bass	16	T DeCoene	Stamford Harbor, CT	6/1/2018	R Leja	Bridgeport, CT	20	9/29/2019
Striped Bass	18	J Matzinger	Wantagh, NY	8/10/2017	A Grossman	East Rockaway, NY	23	9/28/2019
Striped Bass	24	T Long	Bay Bridge, MD	6/6/2019	S Erisman	Patapsco River, Baltimore, MD	25.5	9/28/2019
Striped Bass	17.5	S Scully	Harvest Cove, Harvey Cedars, NJ	9/17/2018	J Rice	Harvey Cedars, NJ	21	9/28/2019
Striped Bass	23	C Bellinzoni	Jones Inlet, NY	10/22/2018	Z Pine	Democrat Point, NY		9/26/2019
Striped Bass	22	T Shaheen	Shrewsbury River, Sea Bright, NJ	6/14/2019	A Kirschbaum	Mill River, East Rockaway, NY	24	9/25/2019
Striped Bass	19	G Kerkhan	Sandy Hook, NJ	11/27/2018	M Levasseau	Sakonnet River, RI	21	9/25/2019
Striped Bass	26	L Fantasia	Raritan Bay, NJ	5/22/2019	B Scott	Marthas Vineyard, MA		9/25/2019
Striped Bass	17	A Messina	Dr Cold Spring Harbor, NY	11/6/2018	J Fallow	Duxbury Bay, MA	21	9/21/2019
Striped Bass	**25**	**C Gould Jr**	**North Wildwood, NJ**	**7/6/2017**	**C Stickel**	**Ocean City, NJ**	**38**	**9/21/2019**
Striped Bass	15.5	P Gallagher	Hempstead Harbor, NY	5/25/2015	M Mateo	Corlears Hook Park, NY,		9/21/2019
Striped Bass	**24**	**P DiDomenico**	**Wellfleet, MA**	**9/16/2009**	**M Mateo**	**Battery Park, NYC, NY**	**52**	**9/16/2019**
Striped Bass	23	T Long	Bay Bridge, MD	6/6/2019	R Lagrana	Thomas Point Park, Annapolis, MD	23.5	9/13/2019
Striped Bass	20	R Leja	Bridgeport, CT	6/30/2015	W Mazzucco	Nantucket, MA	26	9/10/2019
Striped Bass	18	R Labrozzi	Sag Harbor, NY	5/17/2019	D Walker	Connecticut River, Old Lyme, CT		9/8/2019
Striped Bass	41	M Bona	Execution Light, NY	5/25/2018	R Demaria	Port Jefferson, NY		8/28/2019
Striped Bass	20	T Valerio	Mullica River, NJ	3/11/2019	C Souza	Providence River, RI	22	8/26/2019
Striped Bass	25	M Bona	Steppingstone Light, NY	5/24/2018	D Smith	Duck Island, Westbrook, CT	27	8/25/2019
Striped Bass	**12.5**	**J Beck**	**Cape May Harbor, NJ**	**10/3/2016**	**J Krihwan**	**Bennet Creek, Cape May, NJ**	**20**	**8/25/2019**
Striped Bass	**25.5**	**T Matraxia**	**Raritan Bay, NJ**	**11/10/2016**	**J Kracke**	**Montauk, NY**	**34**	**8/24/2019**
Striped Bass	21.5	M Drouin	MD Merrimack River, Salisbury, MA	6/15/2019	H Sheperd	Merrimack River Mouth, MA		8/24/2019
Striped Bass	23	N Morrissette	Jamestown, RI	7/14/2019	E Claycomb	Jamestown, RI	24	8/23/2019
Striped Bass	17	R Daley	Sandy Point Lighthouse, MD	7/28/2019	J Mcdonald	Sandy Point Lighthouse, MD	18	8/23/2019
Striped Bass	16	S McAuley	Sandy Point Shoal Light, MD	8/16/2019	S Gorrick	Podickory Point, MD	16	8/20/2019
Striped Bass	21	J Dewese	Chesapeake Bay Bridge, MD	5/31/2019	J Avedon	Thomas Point, MD	22.5	8/18/2019
Striped Bass	17	S McAuley	Sandy Point Light, MD	8/8/2019	M Strawser	Chesapeake Bay, Magothy River, MD	17	8/17/2019
Striped Bass	25	D Beetz	Cape Neddick, York, ME	6/27/2019	G Horrocks	York, ME	26.5	8/16/2019
Striped Bass	21	R Kyker	Norwalk, CT	10/31/2018	G LaChance	Watch Hill, RI	24	8/14/2019
Striped Bass	22	D Forster	Point View Marina, RI	6/15/2017	J Kaczynski	Point Judith Pond, RI	28	8/13/2019
Striped Bass	39	S Webber	Raritan Bay, Staten Island, NY	4/11/2016	T Rinker	Stratford Shoals, CT	42.5	8/12/2019
Striped Bass	22	W Brett	Marshfield, MA	9/30/2018	B Welch	Kennebunkport, ME	25	8/12/2019
Striped Bass	20	M Drouin	MD Merrimack River, Salisbury, MA	6/19/2019	M McCarthy	Merrimack River, Salisbury, MA		8/5/2019
Striped Bass	21.5	M Drouin	MD Merrimack River, Salisbury, MA	7/3/2019	S Clarke	Gloucester, MA		8/5/2019
Striped Bass	19.5	M Drouin	MD Merrimack River, Salisbury, MA	9/21/2018	C Hough	Merrimack River, MA		8/4/2019
Striped Bass	20	M Purvin	Martha's Vinyard, MA	7/2/2019	B Scott	Marthas Vineyard, MA	21.5	8/4/2019
Striped Bass	29	L Bleiler	Raritan Bay, NJ	4/13/2019	B Stenson	Revere, MA	31	8/3/2019
Striped Bass	21	T Shaheen	Shrewsbury River, Sea Bright, NJ	6/26/2019	J Falco	Rye, NY	23	8/2/2019
Striped Bass	22	T Shaheen	Shrewsbury River, Highlands, NJ	5/20/2019	K Rodriguez	Raritan Bay, Staten Island, NY		8/1/2019
Striped Bass	20	T Shaheen	Shrewsbury River, Sea Bright, NJ	6/4/2018	R Baran	Navesink River, NJ		7/31/2019
Striped Bass	16	R Torres	Hudson River, Ross Dock, NJ	4/28/2018	C Novak	Stonington Harbor, CT	21.5	7/30/2019
Striped Bass	16	S Brown	Newport, RI	6/10/2019	S Jackson	Newport, RI	18.5	7/27/2019
Striped Bass	19	R Labrozzi	Southampton, NY	11/4/2018	B Chapman	Newport Harbor, RI		7/26/2019

Species Length	Tag	Tagger	Place Tagged	Tag Date	Recapturer	Place Recaptured	Length (TL)	Recap Date (FL)
Striped Bass	**22**	**D Kelly**	**Kennebec River, Bath, ME**	**9/17/2014**	**G Wislar**	**Kennebec River, Bath, ME**	**34**	**7/24/2019**
Striped Bass	28	L Quinn	Cape Cod Bay, MA	7/25/2018	W Butcher	Nantucket Sound, MA	29	7/19/2019
Striped Bass	19	M Drouin	MD Merrimack River, Salisbury, MA	9/21/2018	D Meade	Merrimack River, Salisbury, MA	20	7/18/2019
Striped Bass	19	T Shaheen	Shrewsbury River, Sea Bright, NJ	5/15/2019	D Miller	Shrewsbury River, Sea Bright, NJ	21	7/16/2019
Striped Bass	32	M LaPenta	Merrimack River, Salisbury, MA	6/21/2019	J Valaskatgis	Merrimack River, Newburyport, MA		7/15/2019
Striped Bass	26	P Martin	Great Egg Harbor River, NJ	11/9/2017	J Johnson	Montauk, NY	27.5	7/13/2019
Striped Bass	15	S Tombs	Point Judith Pond, Wakefield, RI	4/24/2017	J Liss	Plum Island, MA		7/13/2019
Striped Bass	18	C Murphy	Cape Cod Bay, Sandwich, MA	11/19/2018	M Drouin	MD Merrimack River, Salisbury, MD	16.5	7/13/2019
Striped Bass	18	T Valerio	Mullica River, NJ	3/28/2018	A Zaborskis	Long Branch, NJ	22	7/12/2019
Striped Bass	15	M Drouin	MD Merrimack River, Salisbury, MA	10/5/2017	J Fortin	Merrimack River, MA	18	7/12/2019
Striped Bass	**34**	**V Martella**	**Raritan Bay, Raritan Beach, NJ**	**4/6/2019**	**D Hirsch**	**Bearse Shoal, MA**	**34.5**	**7/11/2019**
Striped Bass	26	T Leonardis	Sea Isle City, NJ	10/2/2018	A Pillsbury	Monomoy Shaols, MA	29	7/11/2019
Striped Bass	15	A Messina	MD Cold Spring Harbor, NY	11/28/2017	J Fairburn	Connecticut River Breakwater, CT	17	7/11/2019
Striped Bass	20	J Beck	Cape May, NJ	11/8/2018	K Koshland	ICW Cape May, NJ		7/9/2019
Striped Bass	**16**	**T Valerio**	**Graveling Point, NJ**	**3/3/2017**	**G Walsh**	**Green Harbor, MA**	**24**	**7/8/2019**
Striped Bass	38.5	R Dunning	Assateague Island, VA	5/20/2016	C Martin	Block Island, RI	43	7/8/2019
Striped Bass	29	B Shillingford I	CW Strathmere, NJ	11/1/2017	R Willette	Cape Cod Canal, MA	36.88	7/8/2019
Striped Bass	16	C Gould Jr	North Wildwood, NJ	6/9/2017	T Davis	Jarvis Sound, NJ		7/6/2019
Striped Bass	21	W Brett	Marshfield, MA	9/2/2018	B Grant	Bluefish Cove, Brant Rock, MA	22	7/6/2019
Striped Bass	16	M Kupfer	Crisfield, MD	9/27/2018	J Gamble	Chesapeake Bay, Poplar Island, MD		7/5/2019
Striped Bass	16	C Gould Jr	North Wildwood, NJ	6/6/2018	G Tremblay	Block Island, RI		7/3/2019
Striped Bass	14	M Drouin	MD Merrimack River, Salisbury, MA	9/13/2016	M Drouin	MD Merrimack River, Salisbury, MA	19	7/3/2019
Striped Bass	17	E Petronio Jr	Greenwich Bay, RI	5/25/2019	J Botelho	Narragansett Bay, RI		7/2/2019
Striped Bass	19	S Fries	Kennebunk River, ME	8/16/2018	B Foisy	Kennebunkport, ME	19	7/1/2019
Striped Bass	21.25	T Marburger	Northport, NY	5/14/2019	B Patore	Cape Cod, Chatham, MA		7/1/2019
Striped Bass	21	C Mitchell	Point Lookout, MD	12/4/2019	J Davey	Corson's Inlet, NJ		6/30/2019
Striped Bass	24	M Drouin	MD Merrimack River, Salisbury, MA	9/6/2018	H Stearns	Merrimack River, Salisbury, MA		6/28/2019
Striped Bass	28	R Osona	Eel Point, Nantucket, MA	6/3/2019	B Kruczek	Provincetown, MA		6/27/2019
Striped Bass	16	M Drouin	MD Merrimack River, Salisbury, MA	9/8/2017	R Tully	Merrimack River, Newburyport, MA		6/26/2019
Striped Bass	20	R Labrozzi	Sag Harbor, NY	5/15/2019	G Livesey	Point Judith, RI	23	6/26/2019
Striped Bass	14	D Kelly	Sag Harbor, NY	5/23/2015	J Fengler	Orient Point, NY	28	6/25/2019
Striped Bass	18	D Jurgens	Fire Island, NY	11/15/2017	T DeFilippis	Napeague State Park, NY	24	6/21/2019
Striped Bass	17	D Jurgens	Fire Island, NY	10/31/2018	T DeFilippis	Napeague State Park, NY	24	6/21/2019
Striped Bass	43	K Kyker	Norwalk, CT	6/29/2018	G Brown	Milford, CT		6/21/2019
Striped Bass	16	M Drouin	MD Merrimack River, Salisbury, MA	9/5/2017	B Bashore	Merrimack River, Salisbury, MA	18	6/18/2019
Striped Bass	36	L Fantasia	Raritan Bay, West Bank Light, NY	4/16/2019	J Diorio	Old Saybrook, CT		6/18/2019
Striped Bass	**30**	**R Muller Jr**	**Raritan Bay, Raritan Reach, NJ**	**4/25/2019**	**J Buckler**	**Barnstable, MA**	**30**	**6/18/2019**
Striped Bass	16	M Drouin	MD Merrimack River, Salisbury, MA	9/21/2018	M Auger	Merrimack River, Salisbury, MA	24	6/15/2019
Striped Bass	22	M Drouin	MD Merrimack River, Salisbury, MA	9/19/2018	M Auger	Merrimack River, Salisbury, MA	24	6/15/2019
Striped Bass	20	T Shaheen	Shrewsbury River, Sea Bright, NJ	5/11/2019	B Dougherty	Montauk, NY		6/12/2019
Striped Bass	31	A Asquino	Massapequa, NY	5/1/2019	N LaBarbera	Massapequa, NY		6/12/2019
Striped Bass	11	R Pearson Jr	Croton River, NY	5/19/2019	A Pointer	Hudson River, Croton, NY		6/11/2019
Striped Bass	22.5	A Sidlowski	Potomac River, Ragged Point, VA	11/8/2018	S Emig	Potomac River, VA	23.5	6/10/2019
Striped Bass	18	A Messina	Dr Cold Spring Harbor, NY	10/28/2018	S Freeman	Old Saybrook, CT		6/9/2019
Striped Bass	19	M Drouin	MD Merrimack River, Salisbury, MA	9/21/2018	W Hall	Merrimack River, Newburyport, MA	21	6/8/2019
Striped Bass	26	A DiFilippi	Jones Inlet, NY	6/12/2018	J Jutt	Meadowbrook Bridge, NY	27	6/6/2019
Striped Bass	20	A Messina	MD Cold Spring Harbor, NY	11/1/2017	D Fried	The Race, Fishers Island, NY	23	6/6/2019
Striped Bass	**18**	**M Purvin**	**Raritan Bay, Keansburg, NJ**	**4/28/2019**	**R Plohr**	**Piscataqua River, Kittery, ME**	**19**	**6/5/2019**
Striped Bass	**23**	**T Leonardis**	**Stone Harbor, NJ**	**11/3/2018**	**P Korenkiewicz**	**Parsons Beach, Kennebunk, ME**	**24**	**6/4/2019**
Striped Bass	18	M Drouin	MD Merrimack River, Salisbury, MA	9/5/2017	B Bashore	Merrimack River, Salisbury, MA		6/3/2019
Striped Bass	**19**	**T Shaheen**	**Shrewsbury River, Sea Bright, NJ**	**5/19/2018**	**P Marz**	**Meadow Beach, North Truro, MA**		**6/2/2019**
Striped Bass	20	M Drouin	MD Merrimack River, Salisbury, MA	6/26/2018	M Auger	Mertrimack River, Salisbury, MA		6/2/2019
Striped Bass	22	M Drouin	MD Merrimack River, Salisbury, MA	7/10/2018	N Helwig	Merrimack River, Newburyport, MA	24	6/1/2019
Striped Bass	17	M Drouin	MD Merrimack River, Salisbury, MA	8/21/2017	C Ford	Merrimack River, Newburyport, MA	24	6/1/2019
Striped Bass	26	K Kyker	Norwalk, CT	6/29/2018	D Zivkovich	Hudson River, Milton, NY	28	5/31/2019
Striped Bass	16	D Kelly	Sag Harbor, NY	5/4/2018	L Nathan	Western Long Island Sound, NY	18	5/27/2019
Striped Bass	26	P Martin	Great Egg Harbor River, NJ	11/9/2017	D D'Aquila	Peconic Bay, Southold, NY	31	5/26/2019
Striped Bass	19.5	M Drouin	MD Merrimack River, Salisbury, MA	9/21/2018	W Lee	Merrimack River, MA	21	5/25/2019
Striped Bass	22	A Waldhelm	Raritan Bay, NJ	5/8/2019	NMFS Observer	2 NM S East Hampton, NY		5/24/2019
Striped Bass	**13**	**T Valerio**	**Brant Beach, NJ**	**3/31/2019**	**V Losyk**	**Pleasant Bay, Orleans, MA**		**5/23/2019**
Striped Bass	23.5	C Spindelman	Hudson River, Piermont, NY	4/26/2019	J Angler	Cape Cod Canal, MA		5/22/2019
Striped Bass	36	J Plungis	Raritan Bay, NJ	5/22/2018	J Barrett	Hudson River, Germantown, NY	36	5/19/2019
Striped Bass	**13.5**	**G Kerkhan**	**Rahway River, Carteret, NJ**	**9/22/2014**	**R Trenz**	**Hudson River, Newburgh, NY**	**22**	**5/18/2019**
Striped Bass	22	T Shaheen	Shrewsbury River, Sea Bright, NJ	7/11/2017	J Petrie	Hudson River, Kingston, NY	25	5/16/2019
Striped Bass	14	D Kelly	Sag Harbor, NY	11/10/2016	M Salzhauer	Sag Harbor, NY	25	5/15/2019
Striped Bass	14	C DiGerolamo	Cape May Harbor, NJ	9/2/2018	D Heydt	Wildwood, NJ	21	5/11/2019
Striped Bass	**17**	**A Schweithelm**	**Eaton's Neck, NY**	**7/27/2014**	**C Leach**	**Hudson River, Albany, NY**	**36**	**5/10/2019**
Striped Bass	33	L Fantasia	Sandy Hook, NJ	10/24/2015	J Rubino	Great Kills Harbor, NY	38	5/8/2019
Striped Bass	**34**	**A Waldhelm**	**Raritan Bay, NJ**	**11/7/2018**	**A Rose**	**Assateague Island, MD**		**5/7/2019**
Striped Bass	25	W Bond	North Beach, NJ	4/28/2018	K Fahmy	Merrick, NY	31	5/7/2019
Striped Bass	21	R Leja	Bridgeport, CT	10/7/2016	Blazek			5/4/2019
Striped Bass	21	R Leja	Bridgeport, CT	10/7/2016	D Vaughn	Hudson River, Styvesant, NY	27.25	5/4/2019
Striped Bass	22	T Leonardis	Sea Isle City, NJ	10/3/2018	D Doebley	Broad Thorofare, NJ		5/4/2019
Striped Bass	23	T Valerio	Graveling Point, NJ	4/3/2019	C Price	Little Egg Harbor, NJ		5/2/2019
Striped Bass	**16**	**T Valerio**	**Graveling Point, NJ**	**4/9/2014**	**L Shatsman**	**Raritan Bay, Great Kills Park, NY**	**36**	**5/2/2019**
Striped Bass	**22**	**J Matzinger**	**Wantagh, NY**	**6/20/2017**	**A Asquino**	**Massapequa, NY**	**31**	**5/1/2019**
Striped Bass		D Omrod	ICW Ocean City, NJ	7/16/2017	K Koshland	Corsons Sound, NJ	23	4/30/2019

Species Length	Tag	Tagger	Place Tagged	Tag Date	Recapturer	Place Recaptured	Length (TL)	Recap Date (FL)
Striped Bass	**29**	**J Berardino**	**Cold Spring Harbor, NY**	**5/17/2017**	**D Hemmerly**	**Raritan Bay, NJ**	**36**	**4/30/2019**
Striped Bass	16	B Shillingford	Strathmere, NJ	10/5/2016	D Hemmerly	Raritan Bay, NJ		4/30/2019
Striped Bass	17	J Beck	Cape May Harbor, NJ	6/25/2018	J Horne	Elk River, MD	19.5	4/27/2019
Striped Bass	23	M Baden	Love Point, MD	6/9/2018	B Friedman	Podickory Point, MD	25	4/23/2019
Striped Bass	25	R Leja	Bridgeport, CT	9/23/2015	X Huang	Lower New York Harbor, NY		4/19/2019
Striped Bass	23	J Coutsouradis	Hempstead Harbor, NY	11/1/2017	M McGuinness	Hudson River, Albany, NY		4/18/2019
Striped Bass	14	M Munoz	Mill Neck Creek, NY	10/20/2017	M Mateo	East River, New York, NY		4/14/2019
Striped Bass	19	M Drouin	MD Merrimack River, Salisbury, NH	7/10/2018	D Holston	Woodland Beach, DE	22	4/14/2019
Striped Bass	13	R Labrozzi	Sag Harbor, NY	10/16/2016	J Francesconi	Hudson River, Piermont, NY	19	4/12/2019
Striped Bass	25	G O'Driscoll	Montauk, NY	10/23/2018	G De Melis	Croton Point, NY	26	4/10/2019
Striped Bass	17	R Labrozzi	Sag Harbor, NY	5/9/2018	J Francesconi	Hudson River, NY	20	4/4/2019
Striped Bass	22	M Drouin	MD Merrimack River, Salisbury, MA	9/18/2018	A Joffre	Newburyport, MA	24	4/2/2019
Striped Bass	25	B Shillingford	Strathmere, NJ	11/14/2016	J Farley	Egg Harbor, NJ	29	4/1/2019
Striped Bass	20	A Messina	MD Cold Spring Harbor, NY	10/26/2018	D Cuinningham	Housatonic River, Srtatford, CT	20	3/23/2019
Striped Bass	23.5	A Sidlowski	Potomac River, Tall Timbers, MD	10/23/2018	A Loving	Potomac River, Nomini Bay, VA		3/19/2019
Striped Bass	20	C Gould Jr	Avalon, NJ	5/17/2018	J Stanislaw	Great Egg Harbor River, NJ	21.5	3/17/2019
Striped Bass	16	D Kelly	Sag Harbor, NY	4/26/2017	M Kilthau	Sag Harbor, NY	27	2/22/2019
Striped Bass	14	D Kelly	Sag Harbor, NY	5/12/2018	M Kilthau	Sag Harbor, NY	20	2/22/2019
Striped Bass	15	D Kelly	Sag Harbor, NY	12/8/2017	J Lesko	Housatonic River, Shelton, CT		2/16/2019
Striped Bass	16.5	J Fitzpatrick	Mt. Sinai Harbor, NY	10/11/2016	S Muddiman	Housatonic River, Shelton, CT		1/27/2019
Striped Bass	26	T Leonardis	Sea Isle City, NJ	10/3/2018	M Willey	Chesapeake Bay, MD		1/16/2019
Striped Bass	12	D Kelly	Sag Harbor, NY	7/26/2017	M Kilthau	Upper Sag Harbor Cove, NY	18	1/3/2019
Striped Bass	15	D Kelly	Sag Harbor, NY	8/5/2017	M Kilthau	Upper Sag Harbor Cove, NY	18	1/3/2019
Striped Bass	18	L Quinn	Cape Cod Bay, MA	8/6/2018	N Von Duntz	Housatonic River, CT	18	1/1/2019
Tautog	10.25	T Matraxia	Klondike Bank, NJ	5/16/2019	N Barsa	Sea Girt Reef, NJ	11.5	12/20/2019
Tautog	13.5	C Greenwood	Corsons Inlet, NJ	7/28/2018	M Sorrentino	Atlantic City Reef, NJ		12/8/2019
Tautog	15.5	T Matraxia	Shrewsbury Rocks, NJ	10/25/2019	C Jones	Sandy Hook Reef, NJ	15.75	12/1/2019
Tautog	15	A D'Amato	Cape May Inlet, NJ	10/14/2019	J Helms	Cape May Inlet, NJ		11/26/2019
Tautog	11.6	R Musto	Stamford, CT	10/21/2019	P Sit	Stamford Reef, CT		11/26/2019
Tautog	13.6	R Musto	Stamford, CT	10/21/2019	N Pace	Stamford, CT	14	11/23/2019
Tautog	10.1	R Musto	Eaton Neck, NY	10/14/2019	T Catalanotto	Eatons Neck, NY	10.1	11/16/2019
Tautog	10.9	R Musto	Stamford, CT	10/21/2019	C Montero	Stamford, CT	10.9	11/11/2019
Tautog	10.8	R Musto	Stamford, CT	10/19/2019	C Montero	Stamford, CT	10.8	11/11/2019
Tautog	10.1	R Musto	Eatons Neck, NY	11/3/2019	W Harvey	Eatons Neck, NY	10.1	11/11/2019
Tautog	16	U Tautoggers	New Haven, CT	5/4/2019	M Briggs	New Haven Breakwater, CT	16.75	11/11/2019
Tautog	12.3	R Musto	Eaton Neck, NY	11/3/2019	M McBride	Eatons Neck, NY	12.3	11/9/2019
Tautog	10.5	M Purvin	5 NM E Barnegat Inlet, NJ	12/30/2018	S Rescigno	7 NM E Barnegat Inlet, NJ		11/8/2019
Tautog	14	B Doan	Ocean City Reef, NJ	11/28/2014	G Adams	Sea Isle City, NJ	19	11/4/2019
Tautog	12.3	R Musto	Eatons Neck, NY	10/31/2018	R MacDougall	Eatons Neck, NY	13.5	11/4/2019
Tautog	12.3	R Musto	Eatons Neck, NY	11/3/2019	R Musto	Eatons Neck, NY	12.3	11/3/2019
Tautog	10.6	R Musto	Stamford, CT	10/21/2019	G Virag	Stamford, CT	10.6	11/2/2019
Tautog	12.5	S Fries	Brooklyn Yacht Club, NY	10/5/2019	S Fries	Brooklyn Yacht Club, Brooklyn, NY	12.5	11/2/2019
Tautog	15	D Garzoli	Brenton Reef, Newport, RI	11/18/2018	S Prickett	Beavertail State Park, RI	17	11/1/2019
Tautog	17	A D'Amato	Cape May Inlet, NJ	10/24/2019	T Wilson	Cape May Inlet, NJ	17	10/29/2019
Tautog	12.6	R Musto	Stamford, CT	10/19/2019	T Woska	Stamford, CT	12.6	10/28/2019
Tautog	15	D Garzoli	Sakonnet Point, RI	11/8/2018	Z Chen	Little Compton, RI	16	10/27/2019
Tautog	9	C Greenwood	Corsons Inlet, NJ	8/19/2018	C Rizzo	Toll Bridge, Strathmere, NJ		10/26/2019
Tautog	17	D Macha	Thames River, CT 1	0/28/2017	C Mills	Thames River, New London, CT	18.88	10/26/2019
Tautog	13.8	R Musto	Eatons Neck, NY	10/31/2018	R Musto	Eatons Neck, NY	15.75	10/14/2019
Tautog	11.3	R Musto	Eatons Neck, NY	11/7/2018	R Musto	Eatons Neck, NY	12.1	10/14/2019
Tautog	16.25	U Tautoggers	Kelsey Pt., Clinton, CT	10/14/2017	R Kowalski	Clinton, CT	18	10/14/2019
Tautog	18	U Tautoggers	New Haven, CT	5/4/2019	P Mallet Sr	Latimer Reef, Southold, NY	19 1	0/14/2019
Tautog	12.25	C Greenwood	Corsons Inlet, NJ	7/2/2019	M Rodgers	Corsons Inlet, NJ	14	10/10/2019
Tautog	13.5	D Garzoli	Brenton Reef, Newport, RI	11/18/2018	B Lipson	Fort Wetherill, Jamestown, RI		10/5/2019
Tautog	16	D Garzoli	Newport, RI	11/7/2018	K Murgo	Narragansett Bay, RI	16	5/14/2019
Tautog	15	D Forster	Jamestown, RI	5/4/2019	S Corbett	Jamestown, RI	15	5/5/2019
Tautog	22.5	D Garzoli	Point Judith, RI	10/8/2018	C Morlock	Narragansett Bay, RI		5/4/2019
Tautog	13.25	G Waddington	12 NM SSE Indian River Inlet, DE	10/7/2018	M Lewis	Nina Wreck, DE	14	4/6/2019
Tautog	12.5	G Waddington	10 NM SE of DE River, DE	10/7/2018	C Huk		13	4/6/2019
Tautog	19.5	M Hawkins	12 NM SSE Ocean City, MD	1/1/2017	J Azato	18 NM ESE Ocean City, MD	21	1/4/2019
Weakfish	14.5	J Beck	Cape May Point, NJ	5/26/2019	J DiDonato	Cape May Point, NJ		6/15/2019

American Littoral Society Fish Tagging Director Jeff Dement with a proud participant from a 2018 tagging event.

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