

Community Oyster Project 2018



Purpose

The Community Oyster Project is an oyster research project that reclaims piling structures to study oyster growth and reproduction and assesses the potential of these sites as oyster habitat. Research in other urban estuaries has found that piling structures can support similar assemblages of life and productivity as rocky reef habitat (Connell 2000). Through the development and installation of oyster wraps, marine-grade mesh enclosures filled with oysters and secured to pilings in Hudson River Park's Pier 32 piling field, the Park is engaging the community in studying the strength of this oyster restoration technique. The Eastern oyster (*Crassostrea virginica*) is endemic to the Hudson River and once grew with great abundance; the oyster population today is less than 0.01% what it once was (TNC BOP Oyster Monitoring Report). The Eastern Oyster has many qualities that are valuable to preserving and improving the health of the River, such as filter feeding, and for this reason, many groups, including Hudson River Park's Estuary Lab, are interested in successfully restoring the Hudson River's oyster population.

Key Research Questions

- Do oysters increase in size and weight when they are wrapped around piles at Hudson River Park's Pier 32?
- Do spat recruit onto oysters in the pile field environment?
- Does copper guarding protect against oyster drill predation?



Fig. 1 | Map of Pier 32 pile field with all oyster wrap locations marked. (Brown squares show wraps that have copper guarding)

Methods



Fig. 2a (left) | Oyster wrap on a pile in deployment process.
Fig. 2b (right) | Interior of an oyster wrap with oysters sitting on shelves in order to reduce crowding inside wraps.

- Oyster wraps are C-shaped enclosures made of marine-grade mesh. They are sealed by lacing steel cable through the mesh and attaching a rope clip.
- A total of 12 wraps were deployed in 2017 and 6 wrap were monitored monthly between July and October in 2018 at Community Ecopaddle events and all wraps will be monitored at the conclusion of the project in 2020.
- Each wrap was filled with 150 adult oysters and 75 oysters from each wrap were randomly monitored to record length (mm) and weight (g). The wraps were also scrubbed as needed to reduce bio-fouling and maintain the flow of water and plankton.
- Trends in oyster growth over time are analyzed in R Statistics and Excel.
- At the end of Community Ecopaddle public events, participants complete a questionnaire and self-report on the influence of oyster restoration on their environmental attitudes, understandings, and behaviors.

Major Findings

Oysters

- In all six oyster wraps monitored in 2018, oyster mass increased significantly between July and October (paired t-test, $p < 0.0002$) (Fig. 3).
- In all six oyster wraps, oyster length also increased significantly between July and October (paired t-test, $p < 0.01$) (Fig. 4).
- Qualitatively, oyster wraps appeared to be popular habitat location for many estuarine species. Animals observed inside the wraps included oyster toadfish (*Opsanus tau*), skillefish (*Gobiesox strumosus*), blue crabs (*Callinectes sapidus*), and mud crabs (*Rhithropanopeus harrissii*).
- Qualitatively, oyster wraps also appeared to be prime settling habitat for sea squirts (*Asciacea sp.*), another filter feeder and an invasive species in the Hudson River. These tunicates settled on oyster wraps so densely that they had to be cleaned off of the wraps every few weeks in the summer in order to maintain water flow-through capacity.
- Qualitatively, oyster wraps recruited juvenile oysters, called spat.
- There was no evidence of oyster drillers in or on the wraps and no oysters perished from this predatory snail in 2018.

Community Engagement

- Community Eco-Paddle participant surveys showed a 70% increase in reported appreciation of the Hudson River, the role of oysters, and the effect that participants could have on nature and wildlife, following the oyster monitoring program.
- Eco-Paddle participants overall responded positively to the program. Participants left comments including, "I am excited to know that I played a part in oyster restoration in the Hudson River," and "Extremely educational".

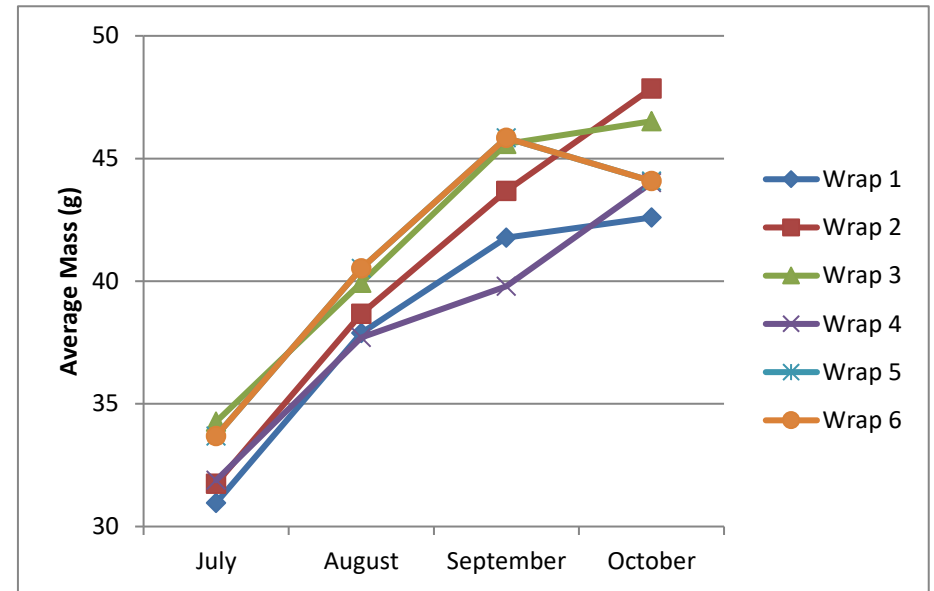


Fig. 3 | Change in average oyster mass across all wraps between July and October.

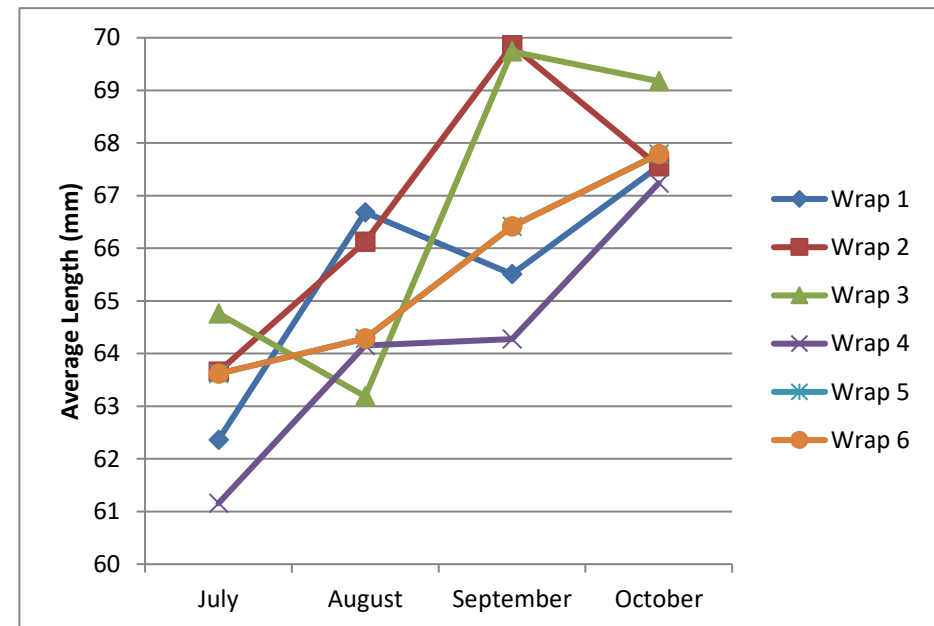


Fig. 4 | Change in average oyster length across all wraps between July and October.

Take Aways

Hudson River Park's Community Oyster Project in Pier 32 demonstrated successful growth of adult oysters between July and October of 2018. The data collected by The Estuary Lab indicates that oyster wraps are a successful method for creating adult oyster habitat and monitoring oyster growth during a warm monitoring season. Future data will answer further questions, including the extent of oyster success during winter seasons and the potential of oyster wraps as a zone for spat recruitment.

Community outreach efforts associated with the project also proved to be successful, with an overall turnout of 1690 park visitors and students to the Park's oyster education programs in 2018. After Community Eco-paddle programs, Park visitors reported improved perceptions of the Hudson River and its environs. Continued community engagement and impact reporting will ensure the Community Oyster Project in Pier 32 leaves a legacy of increased community support for ecological restoration activities in the Park.

Future Directions

Hudson River Park's Pier 32 oyster wraps will be retrieved and monitored again beginning in June 2019. Throughout the summer of 2019, Hudson River Park's Estuary Lab will continue to host oyster monitoring events to engage the public with the Community Oyster Project and educate New Yorkers about oyster research and restoration. The data from future oyster monitoring seasons will be analyzed in comparison to 2018's data to determine if oysters are successfully growing over time in the pile field habitat.

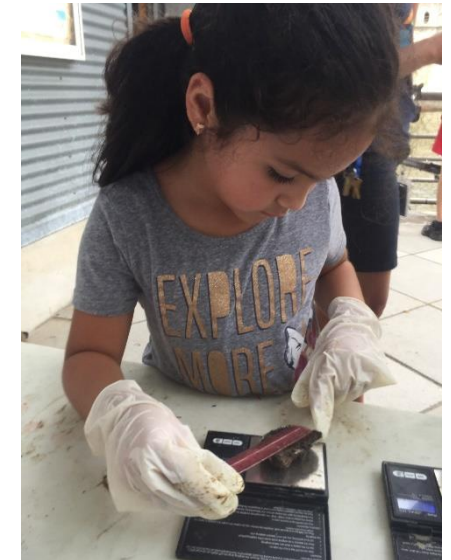


Fig. 5a & 5b | (above) Community volunteers and Estuary Lab staff measuring the length of an adult oyster.

References:

Connell SD (2001) Urban structures as marine habitats: an experimental comparison of the composition and abundance of subtidal epibiota among pilings, pontoons and rocky reefs. *Mar Environ Res* 52:115–125

McCann, Mike. 2018. New York City Oyster Monitoring Report: 2016-2017. The Nature Conservancy, New York, NY.