

Community Oyster Project 2019



Purpose

The Community Oyster Project is an oyster research project that reclaims piling structures to study oyster growth and reproduction within Hudson River Park and assesses the potential of these sites as oyster habitat. Research in other urban estuaries has found that piling structures can support assemblages of life similar to those around 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 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 historically (TNC BOP Oyster Monitoring Report). The Eastern oyster has many qualities that are valuable to preserving and improving the health of the River, including filter feeding and habitat engineering. For this reason, many groups including the Park 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.

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 attached via rope clip.
- 6 wraps were filled with adult oysters in July of 2018 and monitored through October 2018. They were left to overwinter in the pile field and monitored monthly between May and October 2019.
- 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 to the oysters.
- Trends in oyster growth over time are analyzed in R Statistics and Microsoft 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 2019, oyster mass increased significantly between the first and last months monitored (May to October, except for wrap 5 which was monitored for the first time in June) ($p \leq 1.03 \text{ E-}05$).
- In all six oyster wraps, oyster length also increased significantly between the first and last measurements ($p < 0.03$).
- Qualitatively, oyster wraps appeared to be popular habitat location for many estuarine species. Animals observed inside the wraps included vertebrate or teleost fish such as oyster toadfish (*Opsanus tau*) and skilletfish (*Gobiosox strumosus*), as well as invertebrates such as blue crabs (*Callinectes sapidus*) and mud crabs (*Panopeus spp.*).
- Qualitatively, oyster wraps also continued to be prime settling habitat for sea squirts (*Molgula manhattensis*), and Park researchers had to frequently clean off this biofouling to maintain flow-through capability of the wraps.
- An increased presence of baby oysters, called spat, recruiting onto the surfaces of existing oysters inside the wraps, as well as onto the mesh surface were observed in 2019 compared to 2018.
- There was an observed presence of oyster drill (*Urosalpinx cinerea*) eggs on the outside of the wraps during some monitoring sessions, which were removed. There were very few oyster drill snails observed inside the wraps and no signs of predation.

Community Engagement

- Community Eco-Paddle participant surveys reported that participants felt they had a greater knowledge of the role of oysters in the river after completing the program.
- Eco-Paddle participants overall responded positively to the program. There was a reported increased in appreciation of the Hudson River, nature, and the impact that individual behaviors can have on the environment.

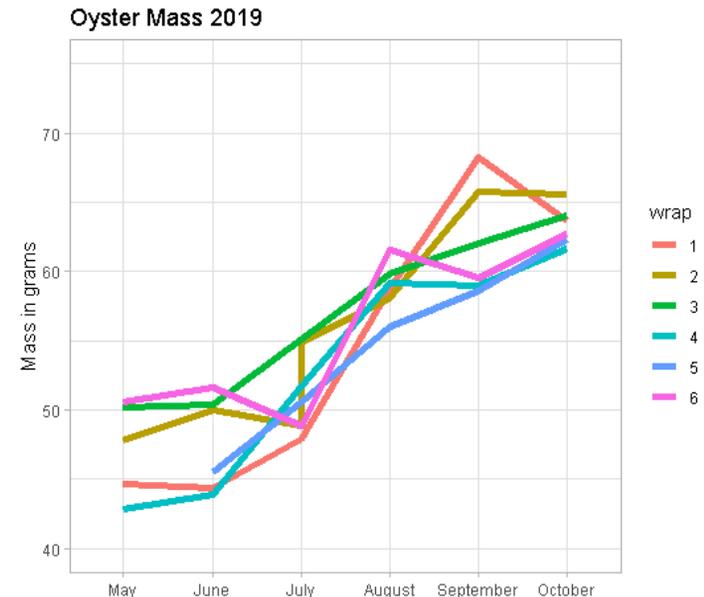


Fig. 3 | Change in average oyster mass across all wraps between May and October 2019.

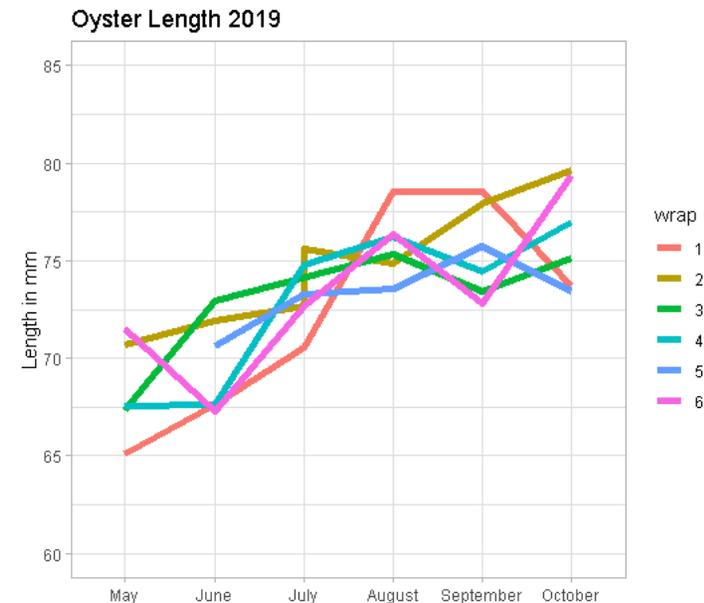


Fig. 4 | Change in average oyster length across all wraps between July and October 2019.

Take Aways

Hudson River Park's Community Oyster Project at Pier 32 demonstrated successful growth of adult oysters between May and October of 2019. The data collected by the Park indicates that oyster wraps are a successful method for growing adult oysters and monitoring oyster growth during a warm monitoring season. On a preliminary basis, it appears that pile fields do have potential as productive, habitats for adult oysters, especially when oysters are suspended a few feet below the surface of the water, and are separated into sections to reduce crowding (Fig. 2b). Future years of monitoring and data will further describe the degree to which pile fields may serve as oyster restoration habitat.

Over 500 individuals participated in oyster-focused Park programs in the summer of 2019. Community Eco-paddle programs were able to reach groups of varying age groups and backgrounds. Notably, a number of individuals joined Eco-paddle multiple times within the summer or repeated after participating in 2018 Eco-paddle programs. Hudson River Park will continue to engage the New York City community in educational ecological restoration programs that meaningfully add to local estuarine data sets.

Future Directions

Hudson River Park's Pier 32 oyster wraps will be retrieved and monitored again on a monthly basis beginning in May 2020. Throughout the summer of 2020, Hudson River Park 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 collected in future oyster monitoring seasons will be analyzed in comparison to past data to determine if oysters are successfully growing over time in the pile field habitat.

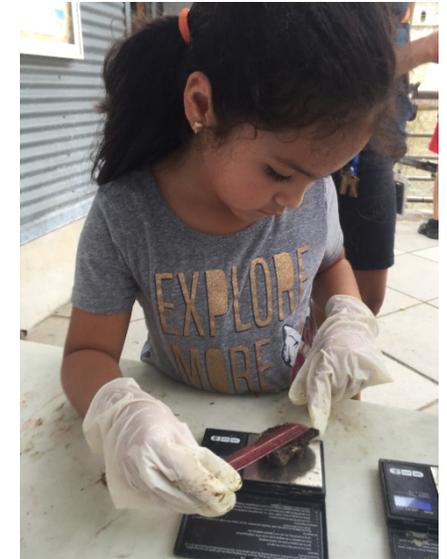


Fig. 5 & 6 | (above) Community volunteers and Park staff measuring the length of an adult oyster.

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.