

SESSION H- COMMUNITY ENGAGEMENT AND EDUCATION

Mrs. Betsy Peabody - THE ROLE OF STAKEHOLDERS IN PUGET SOUND
NATIVE OYSTER RESTORATION

Ms. Emily Vogler – OYSTER FRAMEWORKS; SCULPTURAL FORMS AS
INFRASTRUCTURE OF COASTAL RESILIENCE AND EDUCATION

Dr. William Walton – OYSTER SOUTH: OYSTER FARMING IN THE
SOUTHERN US

Ms. Meredith Comi & Ms. Debbie Mans - THE INTERSECTION OF SCIENCE
AND POLICY- HOW STAKEHOLDER INVOLVEMENT AFFECTS
RESTORATION EFFORTS

Mr. Peter Malinowski - BILLION OYSTER PROJECT – EDUCATION
THROUGH ECOSYSTEM RESTORATION

Mrs. Andrea Bearbower - BIVALVES TAKING UP RENT IN MANHATTAN

Dr. Dana Morse – THE MAINE OYSTER TRAIL
Co-Authors: Belle, S., Morse, D.L. *, Schmitt, C., and Springuel, N.

Dr. Richard Carey – LESSONS OF EXPERIENCE IN A CHANGING WORLD

THE ROLE OF STAKEHOLDERS IN PUGET SOUND NATIVE OYSTER RESTORATION

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Abstract:

Puget Sound Restoration Fund works collaboratively to rebuild Olympia oyster (*Ostrea lurida*) populations and habitat at 19 priority locations in Puget Sound, Washington. These locations are identified in Washington Department of Fish & Wildlife's Olympia oyster Stock Rebuilding Plan. Native oyster restoration is also an express goal of the Washington Shellfish Initiative.

Historically, native oyster beds provided a significant intertidal habitat feature – spanning 10,000 – 20,000 acres in Puget Sound circa 1850. While sparse native oyster populations still persist throughout much of their historic range, structured, dense Olympia oyster beds have dwindled to 5% of historic abundance (WDFW, 2013).

To date, 40 acres of Olympia oyster populations and habitat have been restored in priority locations and collaborative efforts at 2 of the 19 priority areas have successfully met the State's conservation objectives.

None of this would be possible without extensive involvement from multiple stakeholders. Washington Department of Fish & Wildlife's strategic plan guides restoration actions. Puget Sound Restoration Fund spearheads on-the-ground restoration efforts and co-manages a conservation hatchery at NOAA's Manchester Research Station. Tribes embody the cultural importance of native oysters, expanding restoration to tribal tidelands. Commercial growers generously share knowledge and expertise. NOAA, The Nature Conservancy, National Fish & Wildlife Foundation, Washington departments of Ecology and Natural Resources, Northwest Straits Commission, the U.S. Department of Agriculture, and the U.S. Navy help fund these efforts. All parties, including private and public tideland owners and local communities, welcome these actions as a way to reclaim heritage and rebuild a healthy coastal ecosystem.

OYSTER FRAMEWORKS: SCULPTURAL FORMS AS INFRASTRUCTURE OF COASTAL RESILIENCE AND EDUCATION

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Successful implementation of oyster reef restoration projects require the integration of scientific knowledge about coastal ecosystems with an understanding of the economic, social, and cultural factors affecting governance, decision making, and the implementation of action based solutions. A key element of this process is public engagement, however oyster reef restoration projects are often located in remote areas or underwater making public engagement difficult. This project integrates art and science to develop and implement a highly visible restoration project at an urban waterfront site in Providence, RI that will directly engage the public in the creation and monitoring of shellfish habitat.

This project developed 3 spherical sculptural forms to be placed in the intertidal zone at a waterfront site in Providence. The goal of the sculptural forms is to enhance shellfish settlement in a coastal urban area, contribute to the resilience of those systems to the impacts of rising sea water levels and climate change, and to elevate public awareness and understanding of these issues. An area of historically rich but now compromised oyster habitat, the Providence waterfront is highly visible to pedestrian, boat, and vehicular traffic. Through research on structures and materials promoting larval settlement, presentations at local schools, community involvement in the construction of the forms, ongoing citizen-science to monitor shellfish settlement on the forms, and the visibility of the sculptural forms, this project strives to increase public awareness of oysters as a critical part of a healthy coastal ecosystem. This project was funded by the Rhode Island Research Alliance.



Figure 1 : Artists rendering of the sculptural forms on site.

#OYSTERSOUTH: OYSTER FARMING IN THE SOUTHERN US

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Oyster aquaculture using off-bottom techniques has recently gained a foothold in the southern US, with a number of relatively newly established oyster farms from North Carolina around to Louisiana. Despite the geographic span, oyster farmers and sellers throughout the region share a number of challenges (hurricanes, heavy biofouling, market perceptions, etc.) and opportunities (rapid growth, growing Southern raw bar market, etc.). To encourage the sustainable development of oyster aquaculture in the southern US, help the region's economy, improve the coastal environment, and preserve the coastal culture and traditions, OysterSouth (<http://casom.org/>) was established as a coalition of over 41 growers, dealers, chefs, researchers and others to share information, seek funding and research opportunities together, and highlight the region's world class oysters and oyster farmers. Here I will highlight the shared challenges and opportunities, and summarize the current status of the industry from North Carolina to Texas.

THE INTERSECTION OF SCIENCE AND POLICY- HOW STAKEHOLDER INVOLVEMENT AFFECTS RESTORATION EFFORTS

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The NY/NJ Baykeeper's work focuses on the Hudson-Raritan Estuary, one of the world's most densely populated estuaries. Day-to-day restoration efforts are focused on bringing back oyster populations, managing community volunteer efforts, and restoring coastlines to natural systems using living shoreline concepts. Coupled with issues like the 2012 Superstorm Sandy, oil spills, rising sea level, port activities, and an uncooperative regulatory environment, it can be a complex and ever-changing effort that requires innovative partnerships, practices, and advocacy.

NY/NJ Baykeeper is in the unique position of not only researching and implementing urban estuary restoration techniques, but also helping to change shellfish restoration policy. The organization is able to leverage experience and expertise in on-the-ground projects and volunteer engagement to educate and inform decision-makers about why it is important to have restoration opportunities in all waterways, especially those where it is often the most difficult.

Although Baykeeper was able to recover part of its oyster restoration program after its forced removal in 2010, the program still faces regulatory challenges. Research is able to continue, but only within the confines of a US Naval Security Zone, excluding most Northern NJ waterways.

Support from local, state, and federal stakeholders is crucial for restoration efforts to be successful. Urban restoration programs can be complicated and need a mix of policy and science to succeed. Baykeeper uses science to inform and forward our policy and regulatory initiatives which hopefully will lead to a consensus with regulators on how to move urban restoration projects forward.

BILLION OYSTER PROJECT – EDUCATION THROUGH ECOSYSTEM RESTORATION

Peter Malinowski*

The Billion Oyster Project (BOP) is an ecosystem restoration and public education project aimed at returning one billion live oysters into New York Harbor and in the process engaging thousands of public school students in the restoration of their local waterways. Students reach key benchmarks in both Career and Tech Ed and general academic classes through an innovative curriculum that requires hands-on participating in the project. They build skills in relevant Marine Careers through career training programs. These programs, Professional Diving, Aquaculture, Vessel Operations, Marine Systems Technology, Ocean Engineering and Marine Biology Research happen to represent the fields required for large-scale ecosystem restoration in marine environments. Students in each program work together to grow oysters and construct innovative reef infrastructure that is installed underwater by student scuba divers from vessels navigated and maintained by teenagers. Students in the aquaculture program learn to support algae and bivalves at commercial scale in an extremely challenging environment. The three year program is designed around BOP and teaches students the theory and business of shellfish aquaculture as they prepare for careers in the rapidly expanding shellfish aquaculture industry. Students' commitment to the work is evident in their academic successes, the thousands of volunteer hours logged before school, after school and on weekends. To date students have conducted thousands of construction and monitoring dives in New York Harbor, restored over 11 million oysters and become the leaders in the in-water restoration movement in New York City.

BIVALVES TAKING UP RENT IN MANHATTAN

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When I mention that I grow oysters in Manhattan as a fun, passing conversation among colleagues it elicits reactions that range from disbelief to snarky jokes about the oysters having six heads due to pollution. I'm not growing oysters in Chernobyl but I might as well be because people can't comprehend the relationship of nature and New York City nowadays. The opportunity in oyster restoration starts with changing the paradigm from separation of nature and New York to a delicate and respectful interdependence.

I work with the Billion Oyster Project and NJ Baykeeper. At BOP, I grow oysters for research in a cage that I built at the NY Harbor School. At NJ Baykeeper, I conduct research on oysters at Soundview Park in the Bronx. I am delighted in the discovery of how beautifully nature envelops this city.

It's easy to forget that Manhattan is an island in a harbor surrounded by waterways that connect to the ocean. We spend time underground in the subways only to emerge into glass buildings all to the tune of the hurried sounds of vehicular traffic. Our urban environment has muted nature.

How nature entwines through New York is all together absurd, hysterical and hopeful. Oysters grow on tires. Fish swim through cars can be found in the water near LaGuardia. Orange sponges grow on the oyster cage. All of these experiences demonstrate how nature and urban elements collide. But can we marry them? These projects teach me that although I am not a scientist, or even a nature hippy, I can live in an urban environment and be more connected to the elements that surround me so that I can better understand it, protect it and educate others so that when I'm sitting at a table making conversation with someone that I might convince just one person that we can live interdependently if any of us want to survive.

THE MAINE OYSTER TRAIL

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The New England oyster industry has matured during a time of increasing interest in local and sustainable food. In Maine, oyster aquaculture has grown from a research and development enterprise in the 1970s to a \$4.5 million industry today. This growth speaks to the quality of Maine's coastal ecosystems, which are integral to the state's natural, rural image: a unique place where people still make a living from the water and the land. Where traditional wild fisheries are declining, communities have identified tourism as a means to maintain their identity while achieving economic success, and significant opportunities are beginning to emerge from the intersection of tourism and shellfish aquaculture. The Maine Oyster Trail takes advantage of trends in place-based tourism and culinary tourism to generate business while raising awareness of Maine's natural and cultural heritage. Initiated in 2011, the Maine Oyster Trail has been propelled by interest from the aquaculture industry, the state tourism office, and international media. While challenges do exist, such as with licensing, insurance, and coordination with farm production activities, entrepreneurs are finding substantial benefit to revenue and diversification, market presence and success through collaboration.

LESSONS OF EXPERIENCE IN A CHANGING WORLD

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Experiences and progress made under community volunteer initiatives in markedly different communities at 3 localities, the Magothy River area in Anne Arundel County, Maryland, and coastal fishing communities in Liberia and Sierra Leone, West Africa concludes community volunteerism can contribute importantly to the monitoring and restoration of environmentally important shellfish and marine species. Data, qualitative and quantitative, shows cross-community and country engagements between volunteer initiatives are productive. Reported are challenges and positive outcomes of these community science initiatives in these very different communities and summarizes the “lessons of experience in a changing world”.

Magothy River Association community science initiatives provide practical “hands-on” training to volunteers necessary for the regular, and standardized monitoring of water quality, restored oyster bars, reef balls, floating gardens and the dark false mussel eruption.

Positive experience with community science in the Magothy River area helped inform the design of a World Bank community science initiative launched in 2010 in artisanal coastal fishing communities in Liberia and Sierra Leone which included a focus on mangrove swamps and shellfish. Community Science Toolkits were prepared to guide procedures and practices in communities for volunteers with limited formal education, very limited knowledge of environmental concerns, and essentially no experience with basic science procedures or volunteering. (217 Words)