MFA Shell Recycling Program

2020 Collection Year

Scott Stueber

Fisheries Biologist

Annual Report

NEW JERSEY DIVISION OF Fish and Wildlife

STOCKTON UNIVERSITY

RUTGERS New Jersey Agricultural Experiment Station COOPERATIVE EXTENSION

JETTY ROCK FOUNDATION

Contents

I. Introduction

This document outlines the 2020 collection year of the Marine Fisheries Administration Shell Recycling Program in Atlantic City, New Jersey, including the economic and potential ecological benefits, logistical tasks, partners, and challenges faced. This document intends to outline the operations involved in the Shell Recycling Program that will benefit the health of New Jersey's coastal waters by beneficially using a waste product while reducing disposal costs for Atlantic City businesses. The document will also summarize the origins of the program, roles of partners, as well as identify the challenges and needs that the program still faces.

II. Background Information

In February of 2019, NJDEP Marine Fisheries Administration (MFA), the Jetty Rock Foundation (JRF), Rutgers Cooperative Extension (RCE), and Stockton University Marine Field Station (MFS) partnered on a conceptual shell recycling program in Atlantic City, New Jersey. The program was developed after the Hard Rock Hotel and Casino in Atlantic City (HRC) showed interest in recycling shell. HRC learned of shell recycling efforts already taking place in Long Beach Township and became interested in recycling their shell. Jetty Rock Foundation and Long Beach Township built a successful model through their Oyster Recycling Program, demonstrating how municipalities can make shell recycling efforts successful and it has sparked the interest and development of this program in Atlantic City.

As anticipated, the benefits of shell recycling have become appealing to additional casinos and area restaurants. As the partnership moved forward, many logistical challenges were coming to light. Transportation, storage, and curing locations for the shell being among the most challenging, especially with the prospect of adding more casinos/restaurants. Shell was being collected by RCE using an F-250 pickup truck and stored at the MFS, which was quickly running out of space. Trucks were being manually loaded at the casino and manually unloaded at MFS. The process was incredibly time-consuming and labor-intensive. Additional partners were being sought to help in these areas, but unfortunately to no avail. The program would not likely survive under the current approach, let alone expand in any appreciable way. Beginning in October 2019, after careful consideration and discussions with partners, the MFA agreed to take on a larger coordination role in this project to help continue its growth and success. In doing so, MFA has dedicated staff, equipment, and resources to the program moving forward. The program now serves HRC, Dock's Oyster House (DOH), and the Knife & Fork Inn (KFI) with pressing interest from Caesars Entertainment, which is made up of Harrah's Atlantic City Resort and Casino (HARC), Tropicana Atlantic City (TAC) and Caesars Atlantic City Hotel and Casino (CHC).

III. Project Implementation

A. Partnerships and Roles

NJDEP Marine Fisheries Administration:
MFA is responsible for the protection and management of New Jersey's marine habitat, resources, and industry. Improving the overall conditions of shellfish habitat and increasing shellfish populations through various enhancement and restoration programs is a focus of the MFA and provides a net benefit to the ecology of New Jersey's estuarine waters, as well as providing harvest opportunities for commercial and recreational shellfishermen. The MFA is the coordinating agency for this program and will collect, store, and plant the recycled shell primarily to enhance the Mullica River seed beds, one of the last self-sustaining oyster populations on the Atlantic coast of New Jersey.

Jetty/ Jetty Rock Foundation:
Jetty Apparel/Jetty Rock Foundation is an outdoor coastal lifestyle apparel brand and certified corporation that runs charitable initiatives through its 501(C)3 nonprofit. Jetty is the content/media creation partner of the Shell Recycling Program. Jetty designed the Shell Recycling Program logo, as well as all promotional materials. Jetty will continue to produce media, signage, apparel, and media content for the program moving forward.

Rutgers Cooperative Extension:
RCE provides science-based educational programs and brings knowledge of the state university to local communities. Extension efforts include educational programming and applied research in fisheries, aquaculture, and coastal resource management, part of which is the Barnegat Bay Shellfish Restoration Program that focuses on estuarine ecology, environmental stewardship, and shellfish biology, restoration, and aquaculture. RCE assists the program where necessary in providing resources in Ocean and Atlantic Counties, including personnel, relevant educational programming for the public and volunteers, and support for other logistics involved (i.e., vehicles, shell transport, and planting).

Stockton University Marine Field Station:
The MFS houses research vessels, sampling equipment, and staff to conduct their research-driven programs. Faculty at the MFS conduct oyster restoration and monitoring projects throughout New Jersey's coastal bays and seek external funding and partnerships to support those projects. The University is well situated, both geographically and strategically, to serve the program through student engagement, research, and monitoring.

Areas for Future Partnership:
- Vehicle support for additional pickups at interested smaller restaurants
- Public drop off locations

B. Current and Prospective Participants

- Hard Rock Hotel & Casino (February 2019)
- Dock's Oyster House (January 2020)
- The Knife & Fork Inn (August 2020)
- Caesar's Atlantic City Hotel and Casino (Pending Spring 2021)
- Harrah's Atlantic City Resort and Casino (Pending Spring 2021)
- Tropicana Atlantic City (Pending Spring 2021)

C. Shell Collection[1]

Shell is picked up weekly by MFA staff on an agreed-upon schedule with the participating venues. In 2020, staff used an F-250 equipped with a lift gate to collect shell. In order to streamline the process, MFA has purchased a dump trailer equipped with a hydraulic lift arm that is anticipated to be ready for use in the 2021 collection year.

Each week participating venues keep shells separate from their regular trash stream and put them in designated containers specifically for shell recycling. Each venue provides its own containers, so the sizes of containers do vary. In order to accurately track the amount of shell collected from each participating venue, the total volume of each type of container used was determined. Calculating that total volume and the volume of a US standard bushel, we can determine the maximum number of bushels per container (e.g., a 64-gallon container has a volume of 8.56 CuFt, a standard US Bushel has a volume of 1.24 CuFt. 8.56/1.24= 6.90 bu/container)

During pickups, staff maintains accurate data sheets that display the percentage full of each container. This percentage is used along with the maximum bushels per container to determine the number of bushels collected. This is then entered into a spreadsheet to get an estimated number of bushels per venue, per week (See Figure 2-Sample Data Sheet).

After each venue has had its shell collected, the shell is transported back to Nacote Creek Research Station, where it is left to cure for a minimum of 6 months. Please see the Table 2 for collection numbers from the 2020 collection year.

[1] **Shell collection numbers were significantly lower than anticipated in collection year 2020 as a direct result of COVID-19. Collection was suspended for three months and many restaurants still have not reopened at the time of this report (Jan 2021) *.*

D. Curing Site & Maintenance

Prior to shell being placed back in the water, it has to "cure" or sit subjected to the elements to rid it of any potential pathogens or bacteria that may be left on the shell. This primarily refers to Dermo (*Perkinsus marinus*) disease, which is not harmful to humans but can damage native oyster populations. The curing process reduces risk to the native shellfish population when adding the shell back into the marine environment. According to Bushek et al. (2004), a minimum curing of one month is needed to dramatically reduce the risk of spreading *P. marinus*. Out of an abundance of caution, most shell recycling programs establish a 6-month curing period prior to planting shell back in the marine environment.

In following this protocol, MFA staff spreads collected shell as thin as possible and tends to it regularly using a front-end loading tractor. Keeping piles small, spreading shell out, and regularly rotating shell piles allows for maximum exposure to the sun and elements, thus speeding up the curing process, and ensures all shells are ready to go back in the water after the 6-month mark.

One of the many challenges in recycling shell is finding an adequate storage location to place shell during the curing process. Due to the smell produced while shell is weathering and the amount of space needed it can be difficult to identify appropriate locations, especially along New Jersey's heavily developed coastal communities. The MFA elected to develop two storage sites at the Nacote Creek Research Station in Port Republic, a long-term storage and short-term staging area. Shell is stored in the long-term storage area until it is cured and then is transported down to the short-term staging area. The staging area is located adjacent to MFA's dock that allows for easy loading of shell onto a barge for planting. The Nacote Creek Research Station is uniquely situated being only a short boat ride away from the Mullica River Oyster Reefs, which allows for an efficient shell planting process.

IV. Outreach

The 2020 season marked the first steps in branding the Shell Recycling Program. Jetty, the program's content/media creation partner, developed a series of logos for the program that will help to establish familiarity and recognition of the program. Having a standard logo that is used by all partners and program participants creates a consistent interface with the public, creating greater awareness of the program and its goals. Logos for the program can be seen beginning with Figure 3.

Jetty also created a variety of different styles of apparel for the program. T-shirts, hooded sweatshirts, and long-sleeve T-shirts were produced. This initial apparel request was distributed to MFA staff to wear during shell recycling activities, as well as to display the program to the public.

Due to the COVID-19 Pandemic, further progress in public outreach was unable to be planned and executed as much as would have been desired. Moving forward into 2021, outreach will be a larger part of the program.

V. Plans for Collected Shell

The shell collected by the Shell Recycling Program is intended to be beneficially used as cultch material to be planted on the Mullica River oyster beds, which are one of the last self-sustaining oyster beds on the Atlantic coast of New Jersey. The planted shell will allow for the expansion and continued success of this resilient oyster population. Due to the population's resiliency, these beds are an excellent starting point to expand from.

As a result of COVID-19, shell planting activities were suspended for 2020, and efforts were redirected towards 2021. The collected shell, since the inception of the program, will be planted by the MFA in the Summer of 2021. The MFA is in the process of renting a barge that will be delivered to and loaded at the Nacote Creek Research Station, allowing for easy transport to the oyster beds.

The Shell Recycling Program, while still early in its development and due to the COVID-19 impacts outlines above, currently cannot collect enough shell to meet the MFA's enhancement goals. Plans are underway to augment the recycled shell with additional shell sources for the 2021 planting effort. In total, just over 2,000 bushels of recycled shell is anticipated to be planted in 2021. The volume of recycled shell is expected to increase significantly in subsequent years as additional restaurants are added to the program once restrictions from COVID-19 are lifted. An additional 3,000 bushels of shell will be purchased for the 2021 planting effort, bringing the anticipated total to 5,000 bushels planted on the Mullica oyster beds this summer.

VI. Appendix

A. 2020 Shell Collection Numbers[2]

Table 1. Collection Statistics

Total Number of Trips	Average Run Time (h: mm)	Average number of Bushels per trip	Total Bushels Collected
36	1:22	18.9	679.93

[2] **Shell collection numbers were significantly lower than anticipated in collection year 2020 as a direct result of COVID-19. Collection was suspended for three months and many restaurants still have not reopened at the time of this report (Jan 2021) *.*

Table 2. Collection by Venue Chart

Month	Bushels Collected (Hard Rock)	Bushels Collected (Docks)	Bushels Collected (Knife & Fork)	Total Bushels Collected
January	53.76	24.92	0.00	78.68
February	58.94	92.19	0.00	151.14
March	27.14	45.82	0.00	72.96
April	0.00	0.00	0.00	0.00
May	0.00	0.00	0.00	0.00
June	0.00	4.30	0.00	4.30
July	0.00	58.14	0.00	58.14
August	0.00	63.47	1.45	64.92
September	0.00	89.37	1.25	90.63
October	0.00	67.60	1.50	69.10
November	0.00	53.49	1.08	54.57
December	0.00	32.51	3.00	35.51
Total	**139.84**	**531.80**	**8.29**	**679.93**

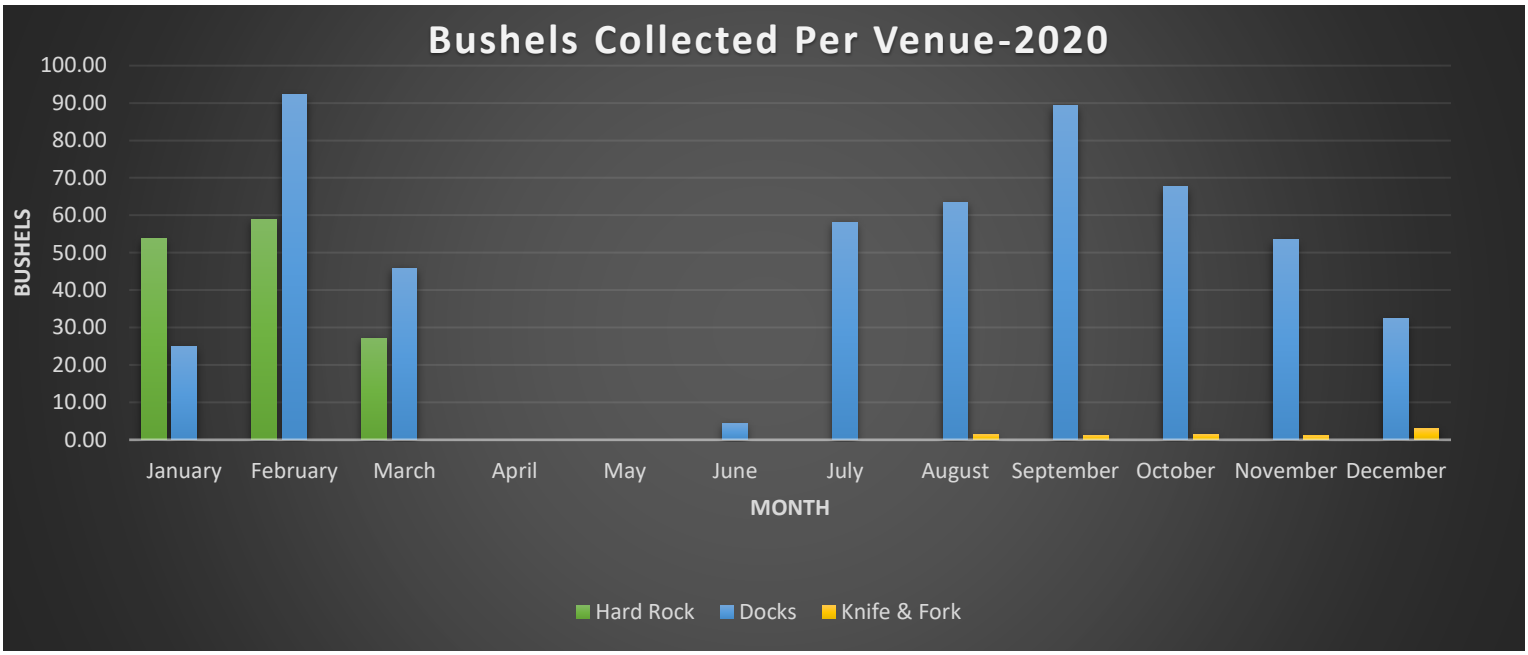

Figure 1. Collection by Venue Graph

Shell Recycling Program

Date:_____

Venue: _____

Staff: _____

Container type: _____

Start Time (Leaving Nacote): _____ End Time (Returned to Nacote): _____

Percentage Filled

# of Bins	Percentage Full
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
Total # of Full bins	
Total # of Bushels	

Comments:

Figure 2. Sample Data Sheet

B. Economic Data[3]

Table 3. Estimated Waste Disposal Savings

Venue	Tons Collected	Estimated Waste Disposal Savings
Hard Rock	9.54	$678.17
Docks	*10.14*	$721.24
Knife and Fork	*0.23*	$16.20
Total	***19.91***	**$1,415.60**

[3] **The economic impact of the program in 2020 is significantly less than anticipated on a full collection year with additional venues* Disposal fees listed by the Atlantic County Utilities Authority at $71.10 per ton* Hard Rock tons collected includes small amount of shell collected at the end of 2019 when they were the only participating venue**

C. Outreach Materials

1. Program logos

Figure 3. Primary Circular Logo

Figure 4. Primary Horizontal Logo

Figure 5. Alternate Logo

D. Program Photographs

1. Shell Collection

Full cans of shell from Docks Oyster House and the Hard Rock Hotel and Casino

MFA Staff loading shell using the liftgate

2. Storage and Maintenance

Short term storage/staging area

Long term storage area

Maintenance of shell using MFA tractor

Newly purchased and equipped dump trailer

VII. References

Bushek D, Richardson D, Bobo MY and Coen LD. (2004). Short-term shell pile quarantine reduces the abundance of Perkinsus marinus remaining in tissues attached to oyster shell. Journal of Shellfish Research, 23(2): 369-373.