

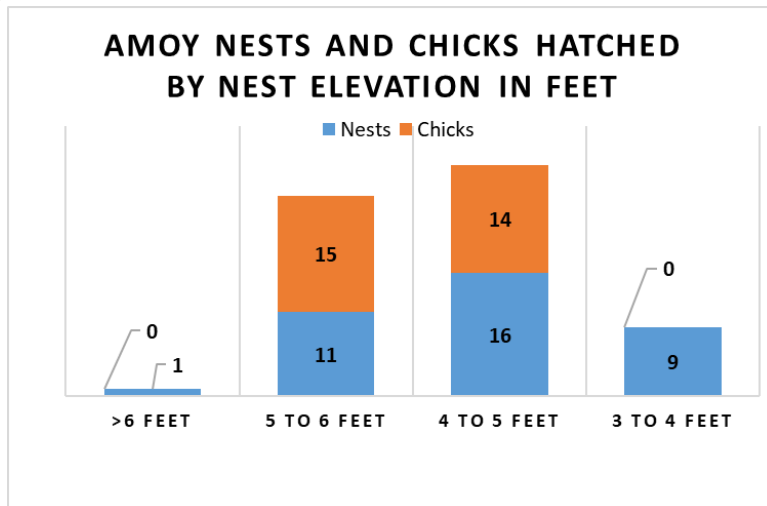
WALTER RABON
COMMISSIONER

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FINAL REPORT for GOS 2021 Bill Terrell Avian Conservation Grant titled “Restoring Shell Rake Habitat for American Oystercatcher”

INTODUCION:

This grant proposed the restoration of a series of shell rakes used by nesting American Oystercatcher (hereafter AMOY). Shell rake habitat supports close to 50% of the breeding pairs of AMOY in Georgia and are becoming more important as mammalian predators have overrun the large barrier islands, and storms and sea level rise has diminished our offshore bars. The importance of shell rakes isn’t just in the number of pairs that use them (62 in 2024) but they often outperform other habitat types for producing chicks. In 2024, Shell rake habitats fledged 0.40 chicks per pair, while beach front and offshore bars only produced 0.14 chicks per pair. Unfortunately, our marsh systems and their embedded shell rakes have not gone undamaged, and many of our nesting rakes have been diminished through storm activity. Given their growing importance to the states AMOY productivity, and the ongoing threat, we proposed augmenting shell rakes with timbers and additional shell to raise their elevation so that they would not be at risk of flooding. We arrived at target elevations for shell rakes based on RTK elevation data from previous nesting AMOY pairs in the area. We concluded that while any elevation enhancement would help, our target was 6’NAVD88. We had not documented any successful nesting below 4’NAVD88.



Nest success by elevation in the project vicinity

METHODS:

We previously conducted an analysis of shell rake habitat in Georgia, and selected sites for restoration considering the following criteria.

- State or Federal Ownership

- No adjacent oyster harvest leases,
- History of fledging AMOY chicks
- Current diminished productivity
- Remote from upland vegetation
- Limited fetch
- Suffered recently from erosion and flooding

Shell rakes on Satilla Marsh Island Natural Area (owned by DNR) and Stafford Island (owned by National Parks Service) fit these criteria and were selected. By the time this project began, a third proposed site (Grass Island on the Medway River) had eroded too much for a restoration project of this scale.

This project required permits from DNR and the Army Corps of Engineers. We applied for and received CMPA permit #810 and ACOE Nationwide Permit 18 numbers SAS-2022-01007 and SAS-2022-01006 allowing us to continue with this project.

We purchased/gathered all materials required for project construction (shell, duck-bill anchors, timbers, geocell fabric & large bags for shell transport). Georgia Power donated the timbers, and we purchased shell from several locations. *See Budget details below.*

We contracted with Zulu-Marine to construct 5 nesting platforms, and work was conducted between February and March 2024. Shell was loaded into large canvass bags at the DNR dock and loaded into a barge with a hoist. The barge utilized a landing ramp to offload bagged shell with a skid steer onto the sites at high tide. Plywood sheets were used to protect marsh around the project sites as timbers and shell were offloaded and the rakes constructed.

Platform construction involved leveling the existing shell rake, constructing and anchoring pressure treated wooden poles in a 15' X 23' rectangle. These were anchored with metal cables attached to duckbill anchors that were driven into the ground at least 4 feet. The wooden frames were then backfilled with shell until the targeted elevation was reached. The two sites exposed to the most open fetch (Satilla Marsh East and Stafford North) were covered with a plastic grid fabric with honeycomb opening that were then filled with shell and covered to help stabilize the site.

The final mounds were shaped to approximate a natural shell rake with the high berm (6' NAVD88) facing seaward, and a flatter wide nesting platform behind (5' NAVD88). This mimics the rakes that AMOY often use to nest on, where they select the flatter wide nest platform behind a higher shell berm. Project final elevations were confirmed by RTK, and construction was completed before the nesting season began allowing for nesting. We monitored these platforms every 2 weeks throughout the nesting season (April through August) and banded Oystercatcher chicks that made it to fledging age.

RESULTS:

Four of the 5 restoration sites were used by pairs of nesting American Oystercatcher immediately upon completion of the project. The 5th site, located on Stafford Island had a pair

nest adjacent to the platform, but did not use it. One nest on Satilla Middle hatched but the young did not survive to fledging. It is unknown what the cause of mortality was but we suspect avian predator such as Laughing Gull. All nests laid on our platforms survived to hatching, indicating that we had provided a suitable nesting location, with high enough elevation not to flood, and with low enough predator density we didn't lose an egg. Six chicks were fledged from our nesting platforms in 2024, exceeding the entire statewide productivity in 2023 (our worst year on record). In 2024, we fledged 36 chicks statewide, so our sites provided 18% of the state productivity.

Site	Starting Elevation	Finished Elevation	Nesting	Hatching	Fledging
Satilla East	4.47	6.7	Yes	Yes	2
Satilla Mid	4.6	5.7	Yes	Yes	0
Satilla West	4.0	5.3	Yes	Yes	3
Stafford North	3.2	4.5	Yes	Yes	1
Stafford Middle	2.8	4.7	No	NA	0

Shell rake construction results: Elevation in feet NAVD88

DISCUSSION:

Habitat Function: With only one nesting season of activity, it was clearly shown that AMOY will use constructed nesting platforms if provided in suitable areas. Smaller scale restoration projects have been tried in the past (SC DNR- pers comm), but AMOY ignored the high ground and nested adjacent to the elevated platform instead. By elevating a large area, in some cases the entire original shell rake, and shaping it to provide the seaward berm and protected nesting platform behind, AMOY readily took to them, using all but one site for nesting in 2024.

Design: Generally, our design seems to have worked, with all but one site being used for nesting by AMOY pairs this summer. The site that was not used, had an extensive shelf of shell adjacent, which was used, but failed due to overwash. In the future, any native shell adjacent to the constructed project should be used to increase the platform elevation leaving no suitable nest sites next to the platform.

One of our sites (which still produced an AMOY chick) ended up being damaged by a prolonged storm which exposed it to 4-5 days of steady southerly winds and waves. The anchors that were used to hold the logs in place did not keep several of the logs from floating and pulling the cables up. This allowed for some of the shell to be washed away exposing some of the geocell fabric covering the project. Fortunately, the nest was not disturbed and the pair continued to use the site. There was a risk at one point of small chicks getting trapped in the geocell, so some of the exposed material was cut and removed. We chose to delay major renovations until the pair had completed nesting so as not to disturb the pair.

We are currently working with the contractor to plan a renovation of the site. There are several options we can try, including using alternate anchoring techniques (possible under our current permit) or using a completely different material to support the shell rake such as Flexamat concrete fabric (requiring a new permit). High water coupled with wave action appears to have floated the logs, pulling the anchors loose. Concrete, or some other dense material that is less prone to floating may survive longer, especially in sites where the substrate is soft enough that duck-bill anchors are not effective.

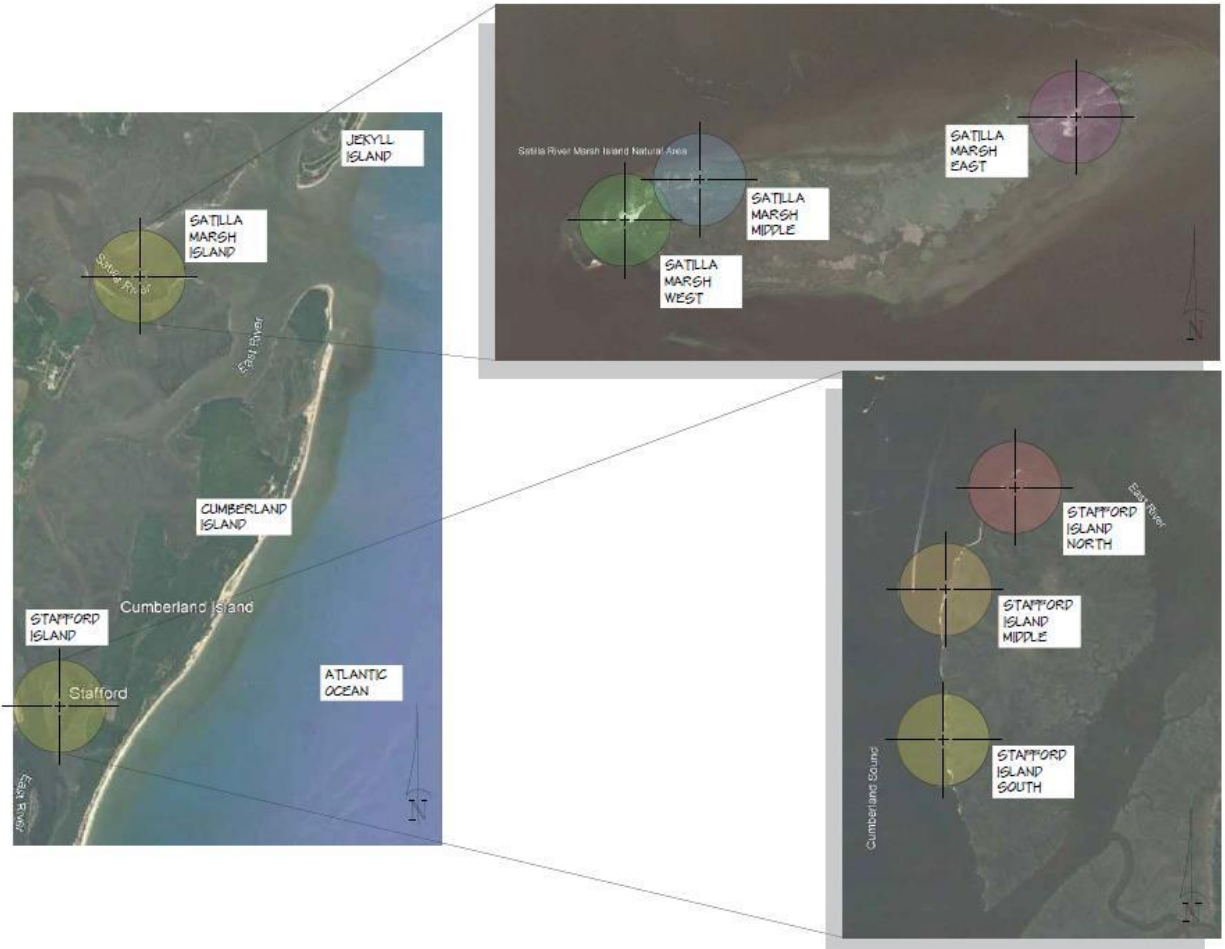
The reason we constructed 5 rather than 6 sites was that the Stafford sites were small enough there wasn't room to use the skid-steer equipment without liquefying the sediment beneath and risking the machine getting stuck. The northmost site on Stafford did suffer this fate, with a skid-steer becoming stuck and flooding as the tide came in. This significantly damaged the equipment and cost the contractor significantly. Use of a conveyor belt on future projects to move shell from the barge to the shell rake could minimize the use of heavy equipment on these sites in the future, limiting the risk of liquefaction, and subsequent damage to marsh and equipment.

Maintenance: There is a reasonable expectation that all platforms will require some maintenance following hurricane season and winter storm season. Any platform construction should plan on a mid-winter rehab visit to make sure all the platforms are in good working order. We currently have funds to visit and repair these 5 platforms in January or February of next year in preparation of the 2025 AMOY nesting season. We also plan to submit a grant request for more funds to continue to expand this project.

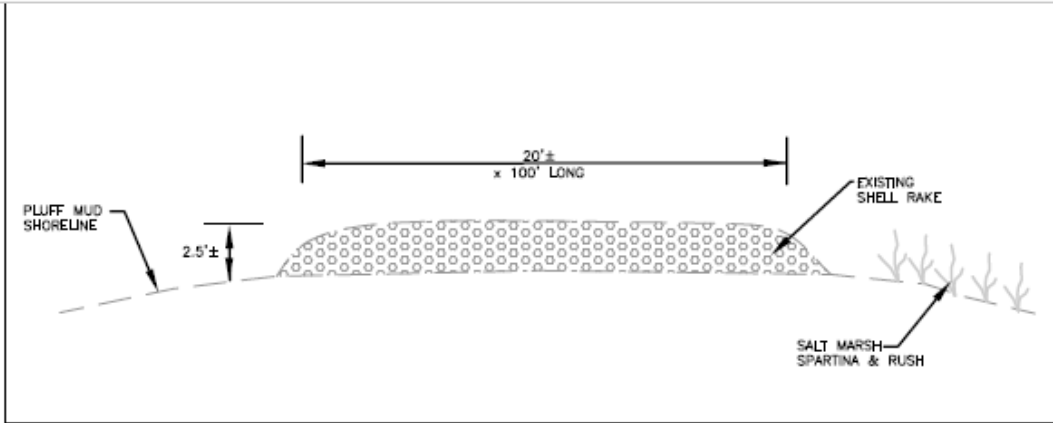
CONCLUSION:

The overall lesson of this portion of the project was that it is possible to enhance nesting habitat for AMOY on shell rakes, which include approximately 50% of the pairs nesting in GA. Scaling this program up may allow us to really move the needle on AMOY productivity for the whole state. It is also clear that at least in the current configuration these sites will likely involve some annual maintenance.

To ensure the maximum benefit from this and other restoration projects, Georgia DNR hosts a working team focusing on habitat restoration and creation for AMOY, and there are several other partners working on similar projects and we are sharing experiences so we can fine tune the process to minimize costs and maximize success and longevity.

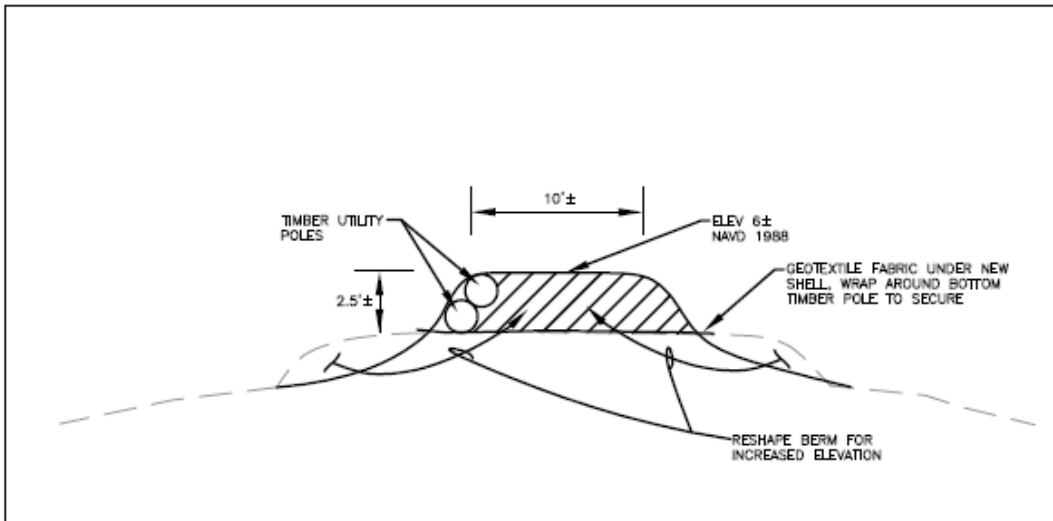


Project locations



**EXISTING SHELL RAKE
SECTION**

NOT TO SCALE



**PROPOSED SHELL RAKE
SECTION**

Designs of generic shellrake project



Various images of moving shell, preparing site, timber frame construction, shell backfilling and geocell fabric use.





Completed Rake on Satilla Marsh Island East.



AMOY Family group on Satilla Marsh Island East.



Banding AMOY chick from Satilla Marsh Island East



Damage on Stafford North following hurricane season. This site will be rehabbed during the winter of 2025.

BUDGET:

ITEM	COST
Shell bags and anchors	2,203.14
Shell Purchase	10,000.00
Zulu Marine Contract for construction	23,998.00
Zulu Contract for rehab	\$3,798.86
TOTAL	40,000.00