

Mobile Oyster Restoration Operation Proposal

The Chesapeake Bay Foundation (CBF) Virginia Oyster Restoration Center and its programs are consistently evolving to embrace the best available science and technology, giving us a cutting edge in our efforts to increase Virginia’s oyster populations.

CBF’s worksite at the Virginia Institute of Marine Science (VIMS) is a prepping area for many of CBF’s oyster restoration activities; however, the distance from the worksite to our restoration sites has hindered our ability to increase spat-on-shell production in VA. Reducing the significant travel time to and from the worksite could nearly double annual spat-on-shell production. An innovative and exciting way to accomplish this would be to relocate the portion of our work that produces live oysters (our spat-on-shell setting) from the VIMS worksite onto a mobile unit.

By relocating our setting operation located at VIMS, and moving it onto mobile setting operation, CBF will achieve the following goals:

- Create mobility, allowing us to work in new places.
- Increase the “CBF presence” within the tributaries where we work.
- Maximize staff time and workload capacity.
- Increase our visibility and the public’s awareness of our work.
- Significantly broaden our volunteer base by having more centrally-located, community-based work locations (Gloucester is remote to most of the region’s population).
- Investigate engaging more diverse and low-income communities in oyster restoration activities (and therefore, CBF initiatives) by bringing the work to their neighborhoods.
- Set an innovative precedent as we did with aquaculture and spat-on-shell production.
- Double our spat-on-shell production.
- Increase the number of volunteer events
- Embrace better practices: By using seawater directly from the locality where we are working, we are better emulating the local natural conditions; and by reducing travel time, we prevent mortality.
- Create excitement for oyster work in the funding community, including a naming opportunity for the barge and tanks (in coordination with Development).

The time saved by having a mobile setting unit would allow us to plant more oysters per day, which would free up tank space for more larvae. We could also reach new volunteers by bringing our resources to the various watersheds throughout Virginia.

Production Capacity Comparison

<u>Unit of Production</u>	<u>Current Production</u>	<u>Increased Production</u>
Tank Capacity	6,400 gallons	9,000 gallons

Larvae Capacity	70M per year	100M per year
Spat-on-Shell Production	5-7M per year	10-14M per year
Reef Ball Production	200 per year	200 per year
Shell Recycling Capacity	2,000 bushels per year	3,000 bushels per year
Spat-on-Shell Production Capacity	1,800 bushels per year	2,500 bushels per year
# of Shell Bagging Events*	8-10 per year	20+ per year

**The VAORC work plan includes growing our shell recycling program annually which will add the supplemental shells needed for spat-on-shell production as well as the need for more volunteer activities.*

Description of a Mobile Setting Unit

A barge can be designed for the purpose of being used as a MSU for spat on shell and reef balls. We could look for a new barge, and an ideal size is 70'x30'x4' which would be hauled out as needed for maintenance. The barge will accommodate up to four 3,000-gallon setting tanks, increasing our tank capacity by thirty percent and reducing unnecessary travel that costs the organization and program time and money. Ideally, the barge will be able to accommodate up to 30 passengers while docked, and will include all the required safety features to accomplish this.

Powering the MSU

The MSU needs power for two water pumps, two air blowers, and multiple bilge pumps for five months per year. The barge will create power through solar panels, wind turbines, and battery storage with options to plug into shoreside facilities, and a backup generator for emergencies. Spuds will be mechanical (hand cranked) to reduce power needs. The estimated daily power consumption will be up to 161.76kWH. This initial draw may be doubled when the pumps are started.

What is Needed

Water Pumps

Two (2) Haywards Super 2.5HP Water Pumps need 89.76 kWh to run both for 24 hours.

Air Pumps

Two (2) S453 Sweetwater Regenerative Blower 1.5HP need 72.0 kWh to run both for 24 hours.

Tank Heaters

One heated tank on barge. One heater=144kW/day.

Bilge Pumps

These could be run off of a 12-volt battery – consult contractor about number of pumps needed.

Lighting

One anchor light will be required if the vessel is 50' or less in length (can be solar powered with backup battery).

What is Generated

Solar Panels

A total of 52 SolarWorld SW345 XL Silver Mono Panels could be installed above the proposed barge footprint of 48'x24' to provide shade protection on the deck while they generate 18kW per day. Part of the deck will not be covered by panels to allow the crane aboard vessel *Chesapeake Gold* to access the tanks when loading and unloading reef balls.

Wind Turbine

Up to four (4) Turbinator Wind Turbines can be installed to generate 16kW total per day.

<u>Power Needed/day</u>	<u>Power Generated/day</u>	<u>Power Deficit/day</u>
305.76 kW	34kW	271kW

The power deficit will be compensated through the use of battery storage and a diesel generator as needed. Excess power generated through green features at the Brock Environmental Center will also be used to compensate for the power deficit while the MSU is docked at at this location.

The picture below demonstrates the size and style of barge needed. Size ~ 70' x 30' x 4'



Railings: We may want to install railings or a wall for safety; something similar to the two barges pictured below:



Conceptual Drawings:





