

Shellelevator™

Automating Oyster Production on Submersible and Mobile Watercraft

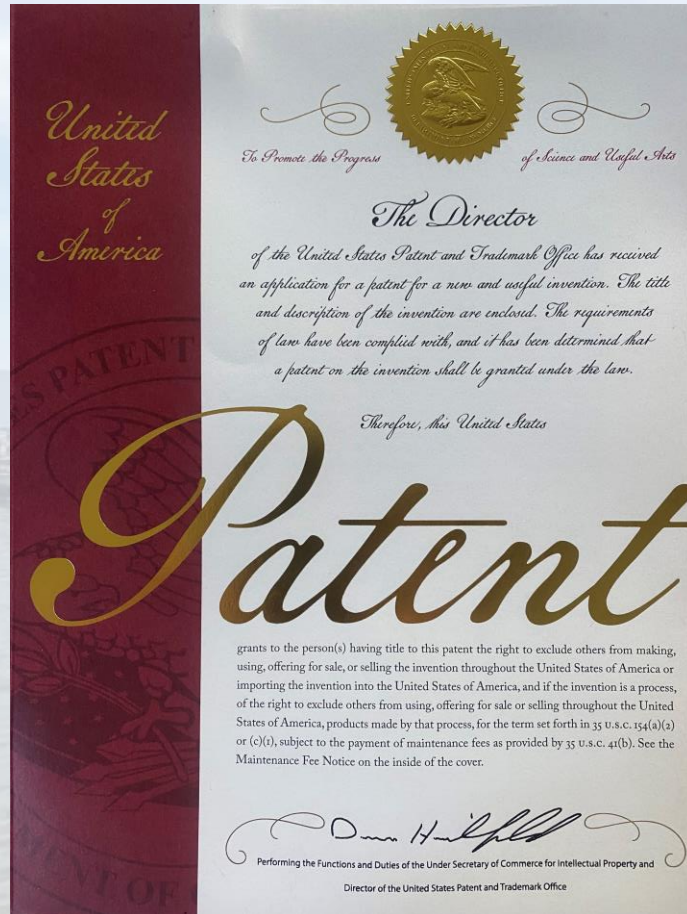
Andy DePaola

National Shellfisheries Association

Baltimore, MD

March 27, 2023

Shellelevator: Novel Invention



- Shellfish Aquaculture Apparatus
 - Issued 2019
 - Tank with air inlet & exhaust port
 - Container holding shellfish above tank
 - Compressed gas source configured to supply gas to the tank via airline connected to the tank
- Pneumatic Method
 - Issued 2021
 - Floating apparatus by displacing water in tank with compressed air
 - Sinking apparatus by refilling tank with water
- Lift vessels above and below aquaculture gear
 - Issued 2022
 - Apparatus and Method
 - Depth unlimited
 - Positioned at selected positions throughout water column



Shellelevator Surfacing

30,000 Oysters

Tumble in Mass Waves & Tilt

- Polish
- Sculpt
- High density >50#/bags



Polished & Sculpted Double Cup



Mobile Oyster Farm

- Avoid harm
 - Mortality
 - Closures
- Control growth
 - Accelerate with high salinity
 - Slow at low salinity
- Enhance flavor or yield
- Improve safety
- Maintain cash flow





Every Shellevator has a Story

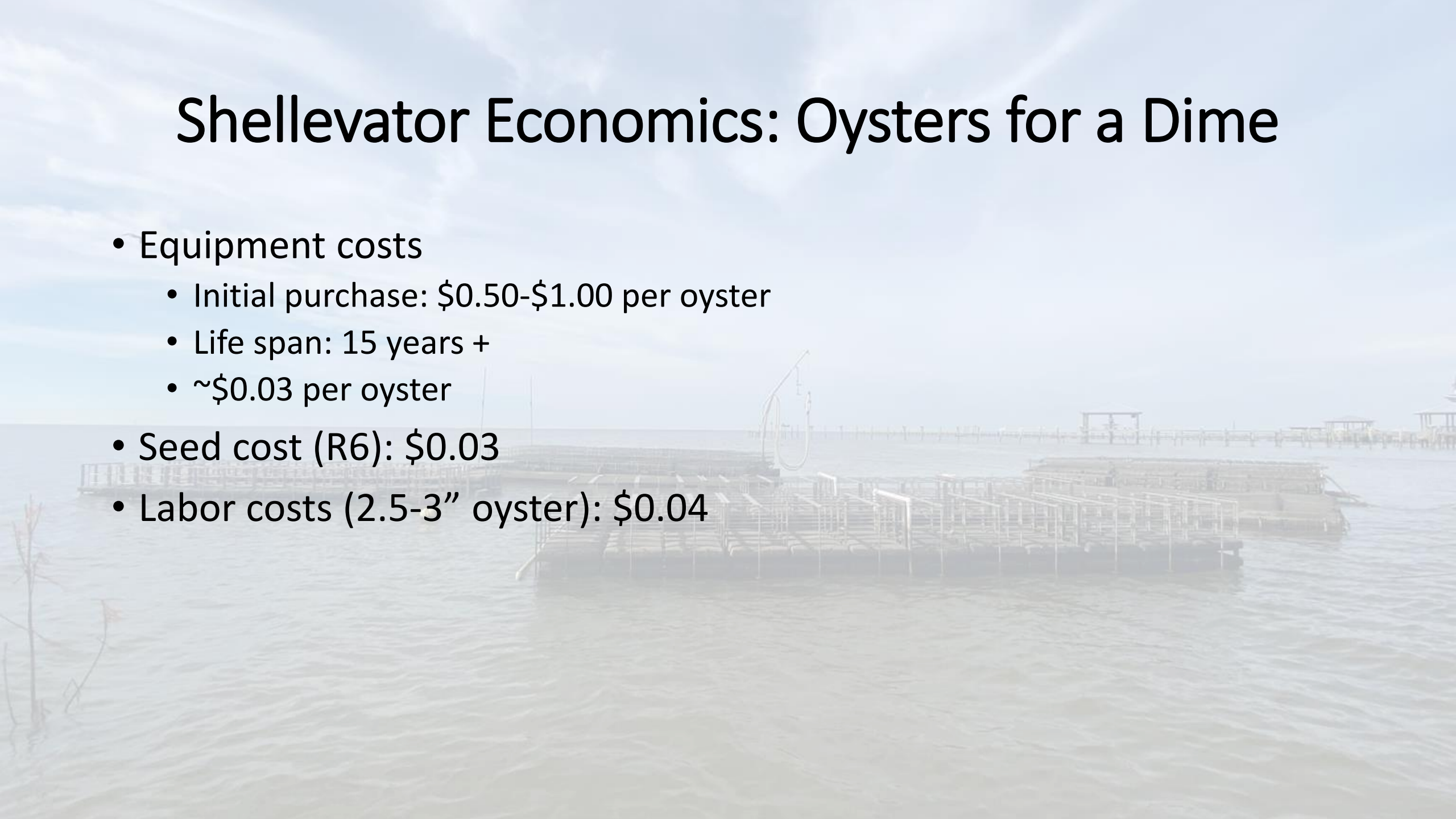
Modular Pin Barge

- Four independent lift vessels
 - 2 bow modules: 16' X 5'
 - 2 stern modules: 15' X 5'
- Marine grade aluminum
- Footprint: 310 square feet
- Depth range: 3.5 – 9'
- Scale
 - Ten tons lift
 - 180 bags
- Modular design
 - Facilitates transportation
 - Increase size or number of modules



Shellevator Economics: Oysters for a Dime

- Equipment costs
 - Initial purchase: \$0.50-\$1.00 per oyster
 - Life span: 15 years +
 - ~\$0.03 per oyster
- Seed cost (R6): \$0.03
- Labor costs (2.5-3" oyster): \$0.04



Shellevator Explorer: Emerging Technology



Sea Trial: Oyster South Savannah >20' in 5 Knot Current



Expands Operational Bandwidth

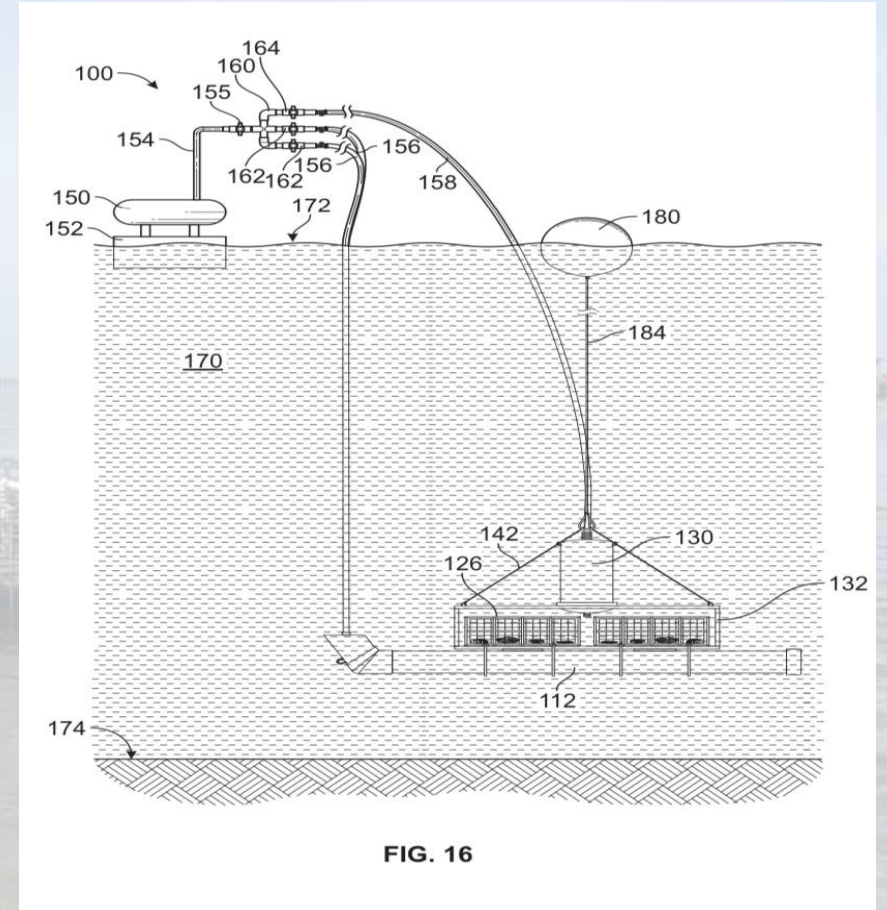


Inversion Proof



Suspend Anywhere in Water Column

- Expands operational bandwidth
 - Depth >100m
 - Position at selected depth
- Applications
 - Position below thermocline for *V. parahaemolyticus* purging
 - Out of sight and off bottom to avoid predators or low oxygen
- Expands aquaculture opportunities
 - Suspend lines mussels or kelp
 - Fish pens below



Shellevator Advantages

- Automation reduces labor and saves \$\$\$\$
- Simple – No submerged moving parts
- Fast/Efficient- raised & sunk in minutes for pennies
- Seamless Portability reduces uncertainty
- Durable/robust – withstood multiple hurricanes
- Compact 3D
- Secure- out of sight