

# INTERTIDAL LENTZ SYSTEM BAG CULTURE OF OYSTERS

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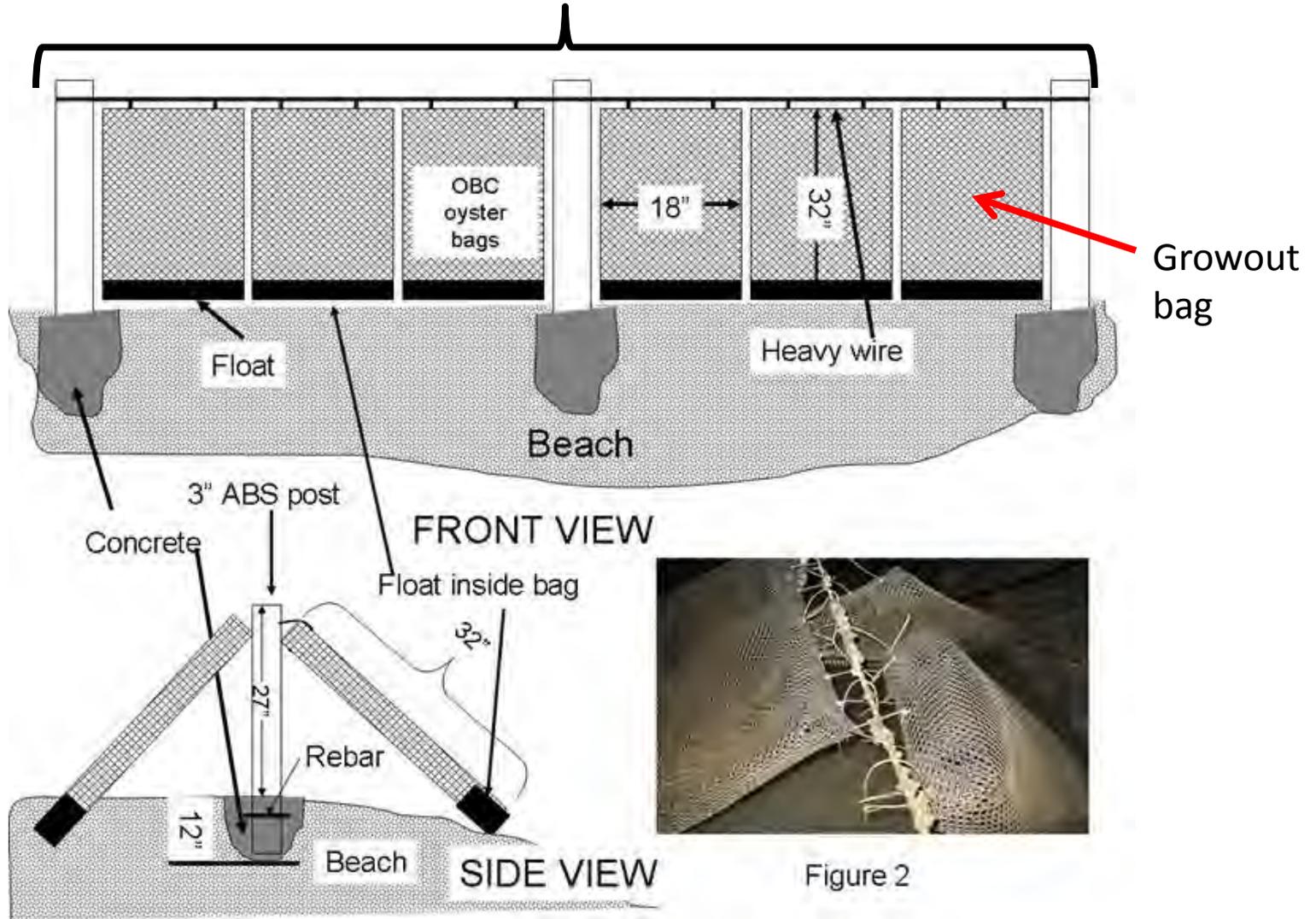
All photos by Jerry Ryggs,

# APPLICATION OF THE LENTZ SYSTEM

The Lentz system is a growout system currently being use in the State of Washington. The system is undergoing a trial study in Alaska. The intent of the Lentz system is to grow a superior quality oyster while utilizing less labor that will enable significant operation cost reduction. This presentation describes a large trial growout study on Oysters LLC farm owned by Jerry Ryggs near Naukati, Alaska located on the east coast of Prince of Wales Island.

# BASIC LENTZ INTERTIDAL SYSTEM

Fence (Frame where growout bags are attached)



# MATERIALS FOR BAG CONSTRUCTION

- A 3,000 foot continuous roll of black mussel sock netting and 2"X 3" X 18 " long pink Styrofoam floatation. Styrofoam is inserted into a 30" section to tubing and enclosed by an overhand knot in the tube at each end. The netting prevents sea gulls from eating the Styrofoam and holds fragmented Styrofoam together.



# GROWOUT BAGS

Precut 18" x 32" vexar bags, opened at each end. The bag is prepared by folding and sealing one end, attaching the float to the outside of the sealed end, oysters planting to the bags through the opposite end opening, and the bag sealed. Bags are purchased from Norplex in Auburn, Washington



# SEALING THE BAG OPENINGS

The bag end are sealed for form a box-like end. This is done by making two cuts on each corner, the small end piece folding in, and the longer net panels folded over to form a box end (refer to the red circle). Once folded, the end is sealed with a zip tie closure (Refer to the green circle). A neat box end is formed.



# OYSTER SEED

Oyster seed grown from the Naukati floating upwelling system nursery (FLUPSY) were stocked in the bags. Preferred size is 25 mm shell length. Each bag is initially stocked with 300 seed.



# SORTING SEED FOR STOCKING BAGS

Sorting oyster seed for stocking bags. Keeping uniformity of seed size is each bag helps growth



# COUNTING SEED FOR STOCKING NETS

Estimating the 300 oyster stocking density is done volumetrically. 300 oysters at 25 mm in length measures out to be approximately 1.5 cups.



# STOCKING THE BAGS

Placing three hundred oysters into each bag. Notice the wire spreader that is used to keep the bag open while oysters are being loaded.



# CLOSING THE END

Bags can be loaded at any location and then transported to the site for attachment to the fence.



# COMPLETED BAG

The completed bag filled with 300 oysters and float attached. Note the wire attached around the middle of the net with zip ties. The wire is number 6 horse wire also used to make the fence to which the bags are attached.



# SEALING THE END OF THE BAG

- Zip ties are used to seal the end ensuring that the oyster stay in the bag during growout. Zip ties are an easy and inexpensive means to seal the bags



# COMPLETED LENTZ SYSTEM SETUP

This is the completed Lentz system setup with one end attached to the fence and the float end setting on the bottom at low tide.



# LENTZ SYSTEM FARM SETUP

Current tidal level -0.2 feet.  
The front row of 36 nets  
contains 7,800 oysters. At  
projected 85% survival over  
two years of growout, the  
crop value by be \$3,900 ex-  
farm value if sold at 50¢  
each.



# OYSTERS IN THE BAGS

During low tide the float sets on the bottom with the oysters contained in the bottom of the net. As the tide rises the float lifts the end of the net causing the oyster to roll down the net to the opposite end when the tide is high. The rolling back and forth with the tide cleans the oysters and forms a deep firm cup filled with oyster meat



# WHEN THE TIDE IS OUT

The end view of the Lentz system shows the construction of the “fence” composed of vertical PVC posts cemented in the substrate, the horse wire attaches through the top of the posts, and the bags are attached with crab bait hook. Notice how the anchor lines are attached to the end posts. In time the wire will become slack and will need tightening. Keep the line tight helps to anchor the system

Crab bait hook



# THE TIDE RETURNS

As the tide returns, the lower end of the bags floats on the surface causing the bags to flip. The oysters should roll easily down that bag as it position becomes vertical. Notice that the bags are free from fouling. The constant movement and drying as the bags are exposed to air during low tides controls the fouling.



# THE TIDE CONTINUIES

Notice that some of the bags have two pink floats. As the oyster grow larger, they become heavier and will require additional flotation. Farmers can also elect to reduce the carrying capacity to 150-200 per bag.



# TIDAL POSITION

Bags anchored at the 0 to +2 tide during a -2 tidal cycle. Notice the eelgrass bed. Eelgrass is an essential fish habitat and must not be disturbed when building an operating a farm.



# ROOM FOR EXPANSION

An important aspect of site selection is to include room for expansion as a criteria. This substrate at this site is relatively easy to dig and anchor posts, and there is a large space for expansion.



# TRANSPORTING

The bags are somewhat bulky, but they are light and easy to transport to the site.



# START TUMBLING

The ends are now horizontal as the rising tide reaches the top of the posts. The oyster will now begin to tumble to the other end of the bag as the tide continues to rise. Rough handling of oysters frays the edges of the shell cause a deep cup and firm shell. With the Lentz system, the ocean does the labor intensive job of tumbling the oysters.



# GROWOUT RESULTS

Oyster are being sorted and show development of a deep cup, hard shell, and firm shell edges



# EXPERIMENTAL TRIALS AND RETRIALS

IF WE KNOW WHAT IS WAS THAT WE  
WERE DOING, IT WOULD'NT BE  
CALLED RESEARCH

# WOODEN POST LENTZ SYSTEM

Wooden posts are being tried because they are easier to pound into the substrate, and tying the horse wire to the post is more secure. This is a deployed fence awaiting attachment of bags.

The posts were jetted into the substrate with a 2" trash pump. The posts were forced in by hand along side of the discharge flow pipe and a shovel was used to remove any larger rocks and clam shells in the way at the bottom of the post. The process worked 5 times faster than without the pump.



# HANGING BAGS

Note attachment of bags with the crag bait hook attached through 1" PVC tubing that is attached to the bag. Yellow tag is an indicator of a growout trial with 250 oysters per bag. Bags are hung vertically, but will be switching back to the angled bags that touch the bottom during low tide.



# ATTACHING THE HORSE WIRE

- Slot made at the top of the post with a chainsaw
- Hole drilled perpendicular to and above the bottom of the slot.
- Horse wire inserted
- The Horse wire is secure by a piece of nine gauge galvanized wire running through the hold, over the horse wire, rapped around the post, and wrapped around the horse wire.



# ATTACHING BAGS

Up to six bags can be attached for every 10 foot section between posts. Possible to double to 12 bags.



# ANOTHER WAY TO ANCHOR

Anchoring the end post with a 5/8" x 6" expansion anchor drilled into bedrock on opposite ends of the fence.



# ATTACHING THE BAGS



# COMPLETED SETUP



# NET CLEANING DANCE



# EXPERIMENTAL “Shark fin” BAG DEPLOYMENT

In this configuration, the floats are attached to the outside of the middle of the bag, causing the bag to float in a vertical manner. The oysters are currently in the bottom of the bag, and their weight cause the bag to remain vertical. One end of the bag is attached causing the line to float freely with the water current. The bags are occasionally flipped to cause fouling to die when exposed to air for an extended period.



# TRANSPORTING TO THE SITE

Shark fin bags stocked with oysters in route to tie out for growout.



Shark fish bag longline is a debris collector if both ends of the line are anchored. Best to anchor on end and let the bags float with the current.



# ATTACHING THE Shark fin SYSTEM

Longline of shark fish bags attached by one end to a log boom.



# Shark fin maintenance

Shark fins on the longline hold 200 oyster per bag and must be flipped by hand once every week or two.

