

The Rise of Bull Kelp Farming: Innovation, Challenges, and Successes on the Water



Jonny Antoni & Olivia Duner

Sea Quester Farms



Bull Kelp Refined

SUSPENDED



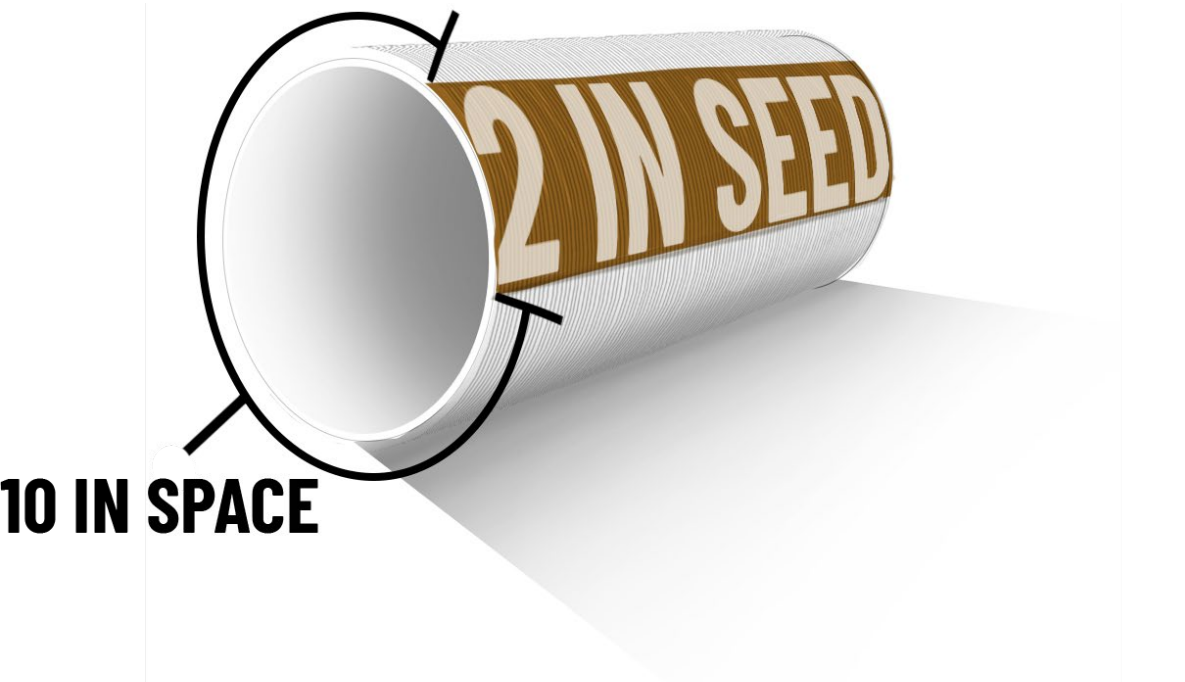
**BENTHIC
FIXED**



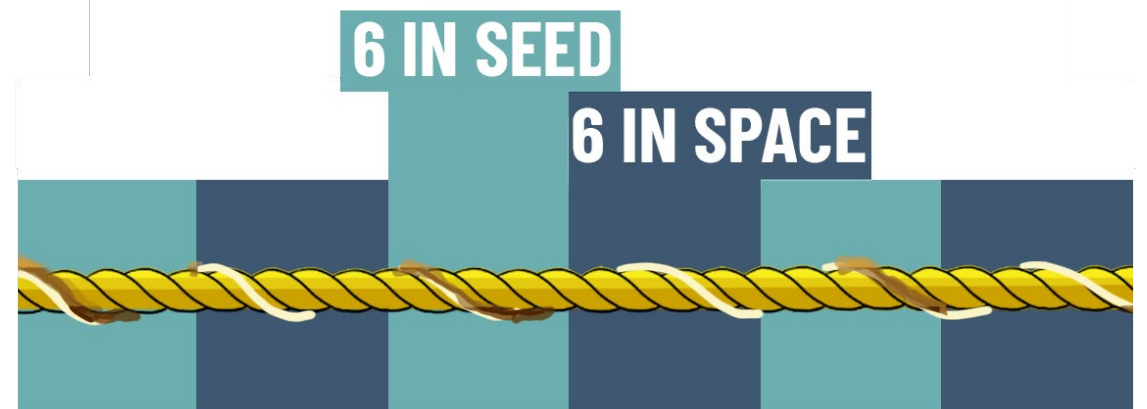
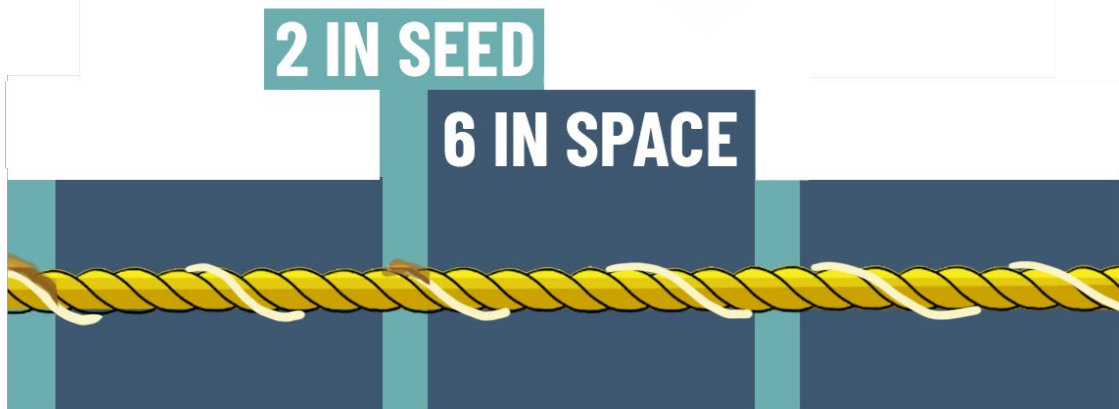
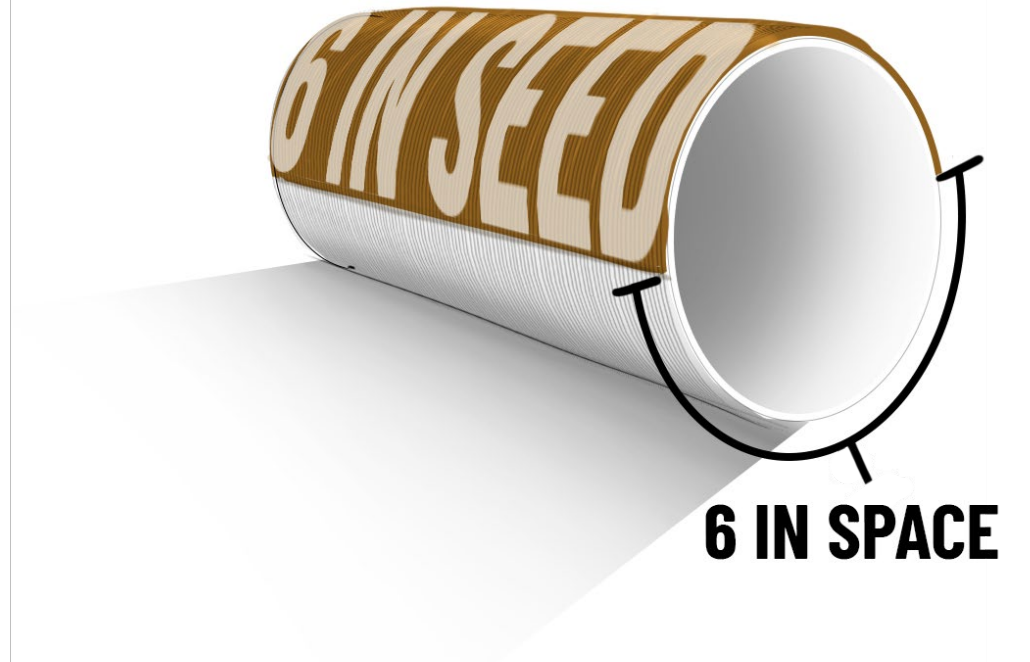
**BENTHIC
SEASONAL**



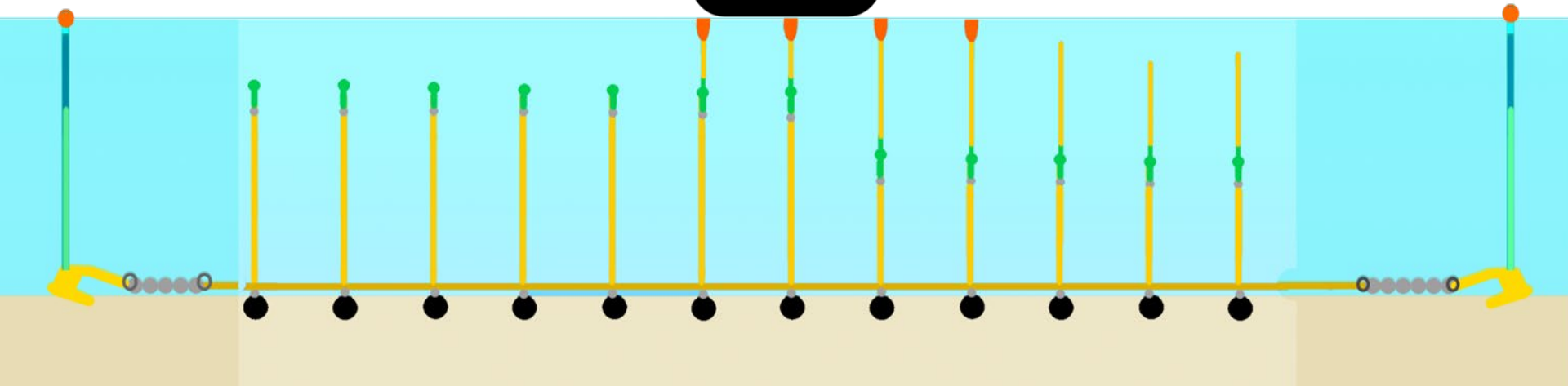
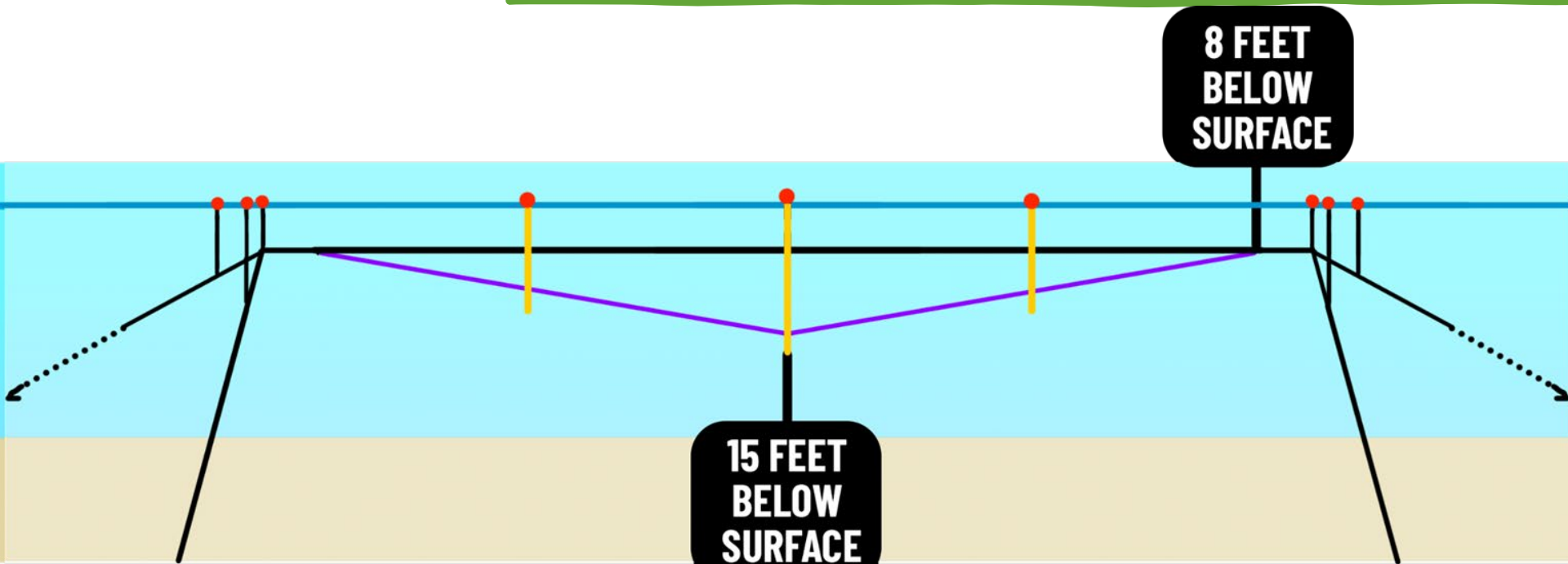
Our Seeding Approach



VS.

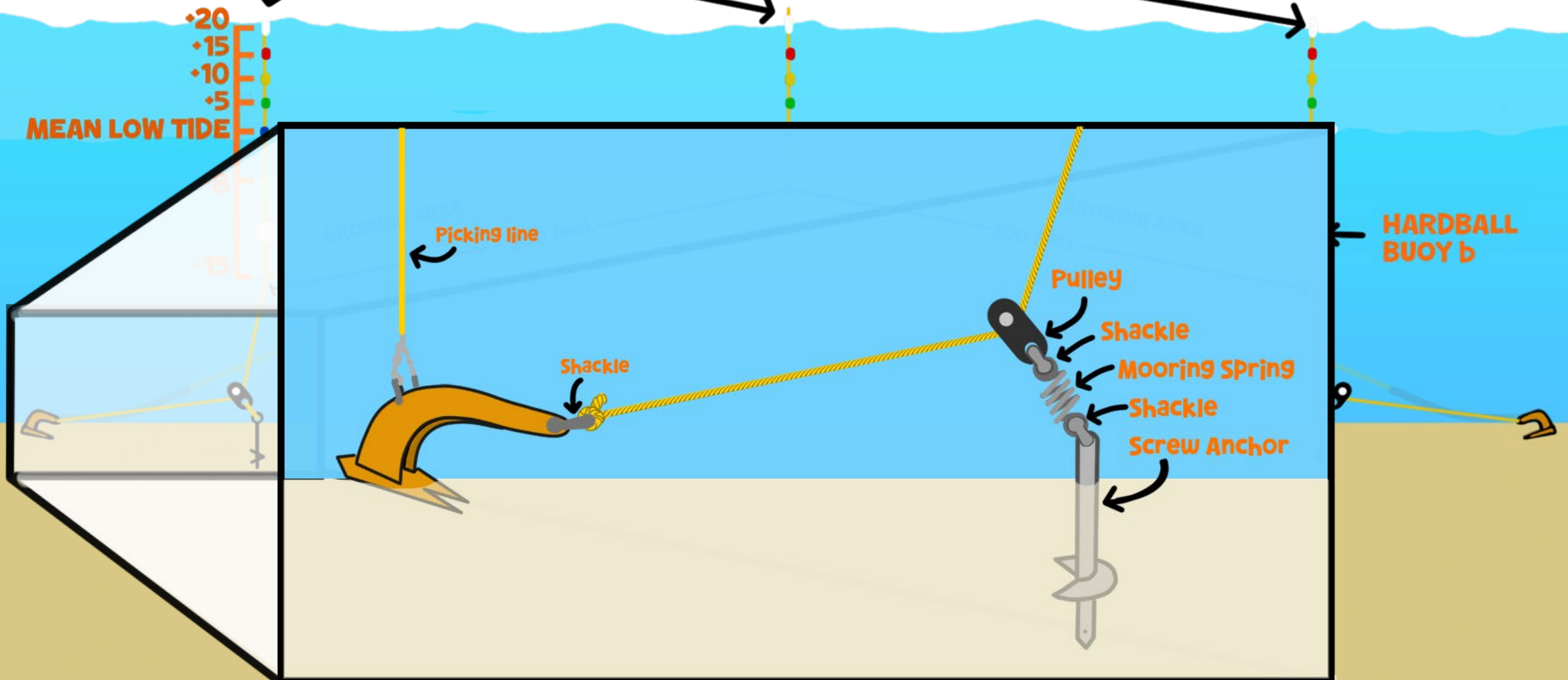


Catenary and Longline



**DEPTH
INDICATING
FLOATS**

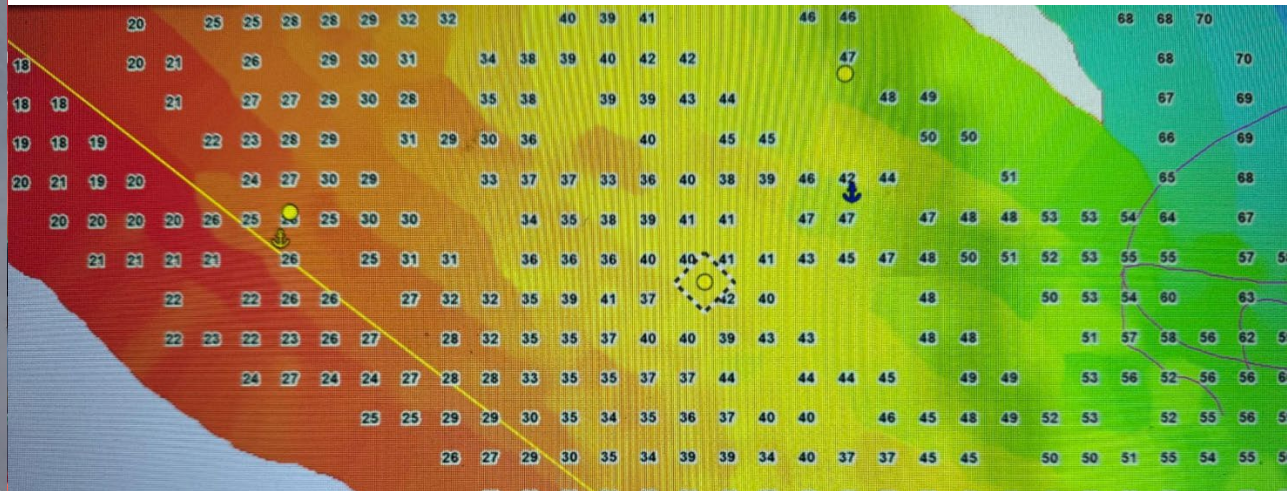
Benthic Pulley



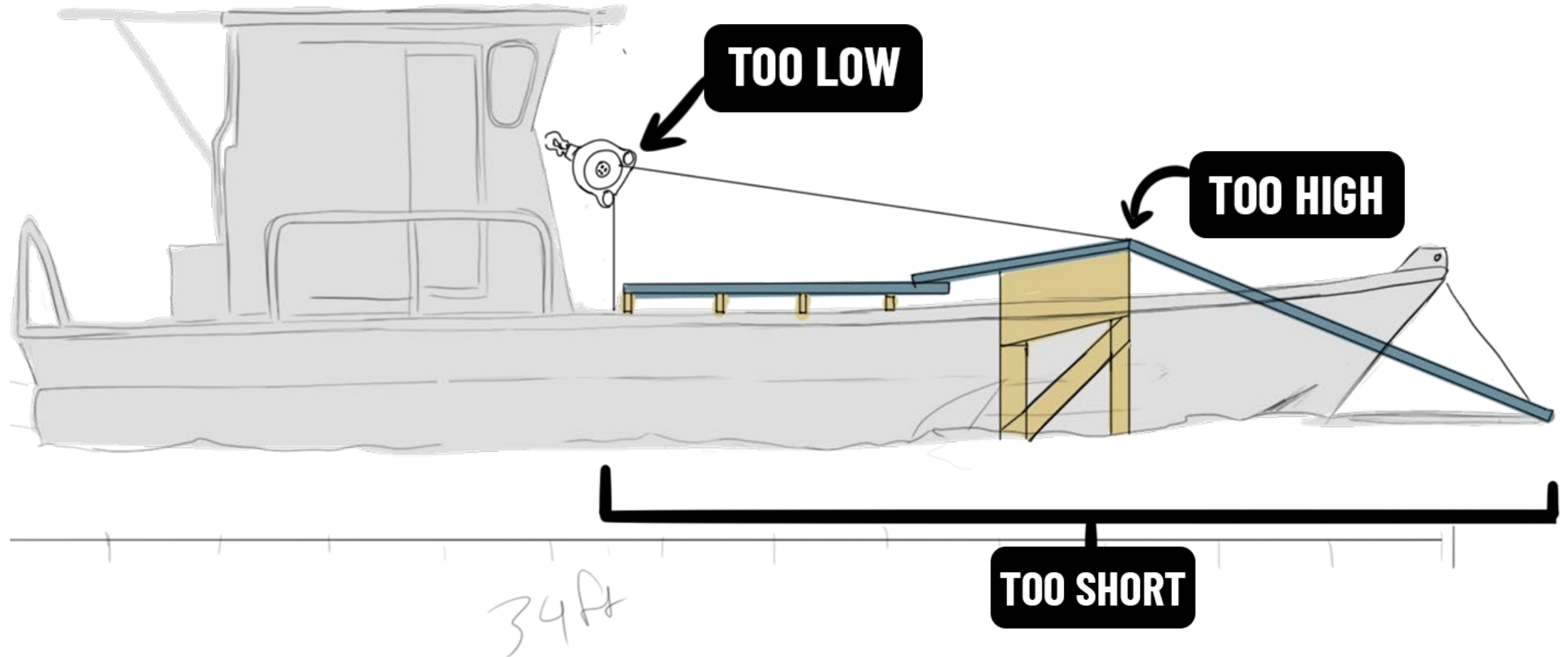
Deployment

- Carbon Fiber comes spring loaded
- Benthic
 - Used a combination of Time Zero and Google Earth
 - Forgot to compensate for tension scope

Note: once the kelp floats do not adjust



Harvest





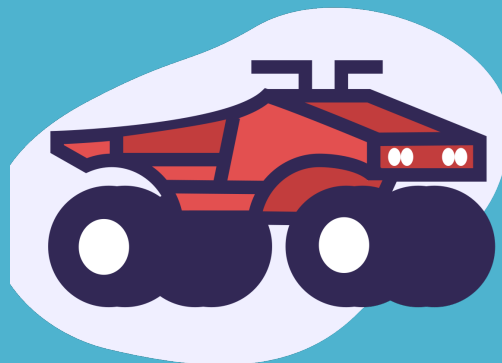
1st Bull Kelp Season

Grew...A whole bit

Harvested... 5,000 lbs

Sold... 5,000 lbs

5X Harvested & 2.8X Sales



Infrastructure Modifications



Emerging Market Demand

2nd Season

Harvested... about 30,000 lbs

Sold... 28,247 lbs

Sold... 14,100 lbs

Research Findings

Array Styles

- Suspended (Catenary)
- Benthic (Peak)

Depth Ranges

- 8-11.5 ft
- 11.5-15 ft

Yield Measurements

- Total per line
- Wild Sized Stipes ($>3/4$ " diameter)



Total / Line (Treatment)



Wild -Type Stipes ($d = >3/4$ ")

Model of the Wild



Wild Bed, Outside of Juneau, AK

Wild-Type, Farmed



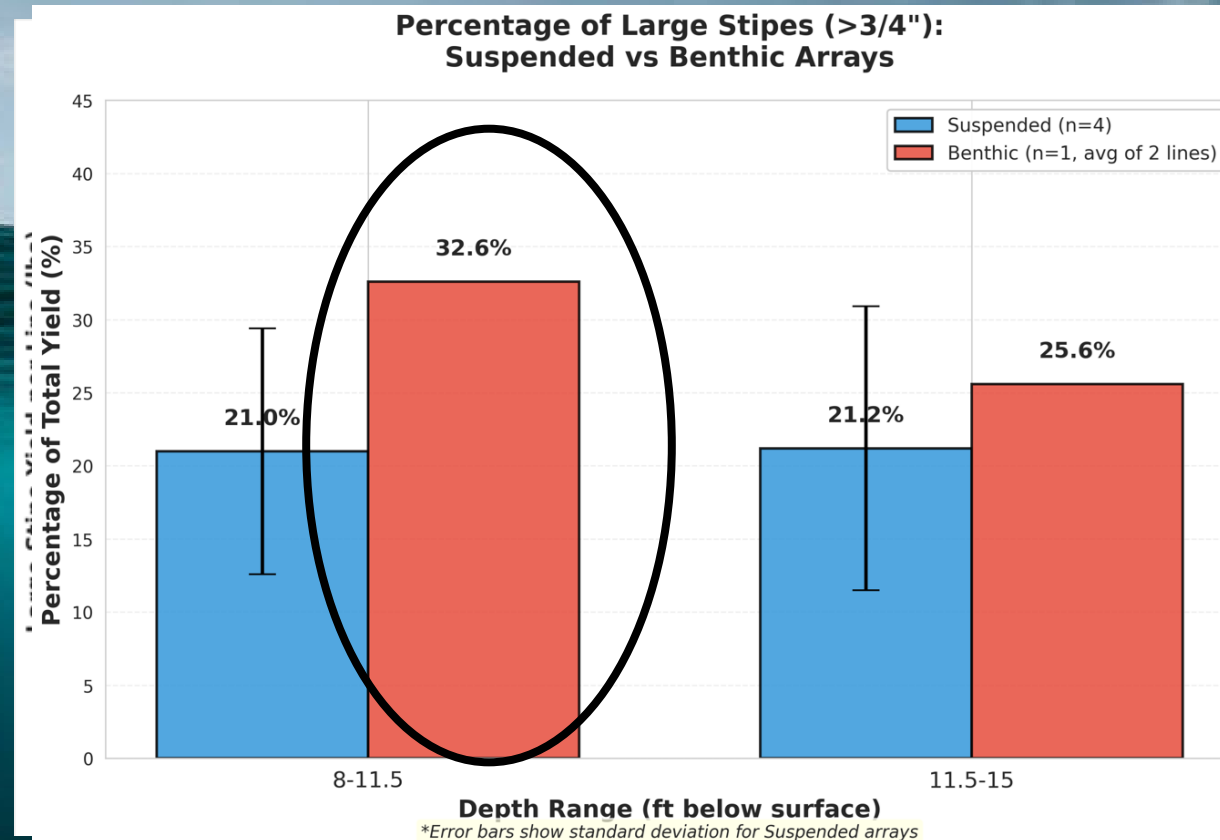
Sea Quester Farms, Photo by Kim Nesbitt

$\frac{3}{4}$ " = 2 cm



5cm Bulb
Farmed Bull Kelp
2025

Leader Board

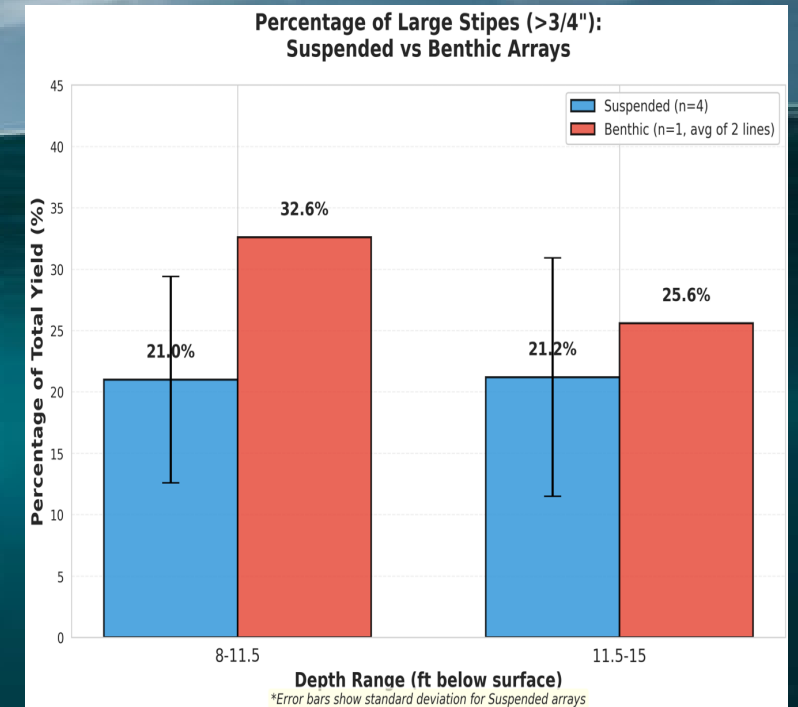
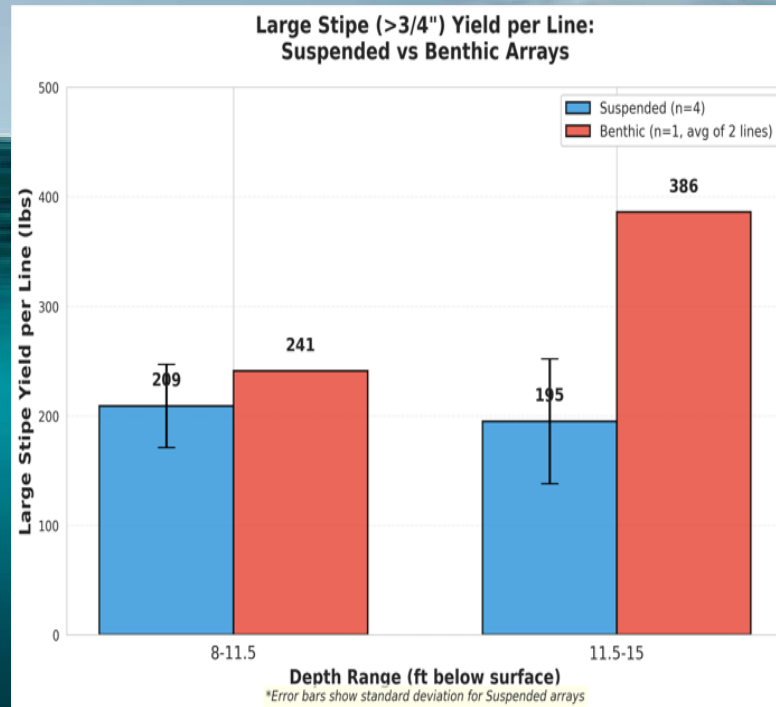
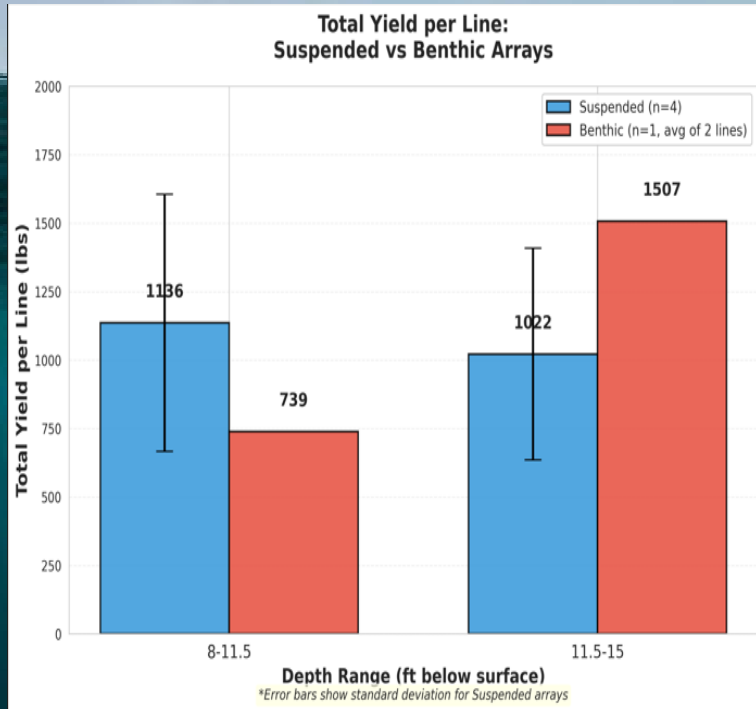


Most Biomass :
Benthic @ Depth
11.5-15'

Highest Yield Large Stipes:
Benthic @ Depth
11.5-15'

Highest % Large Stipes :
Benthic @ Depth
8-11.5'

Suspended Array Wins



Most Productive in Shallow Water :
Suspended @ 54% Higher Yield

Consistency Award :

Lrg Stipe Yield:

SD=38 lbs

Lrg Stipe %:

SD=8%

Less Affected by Depth Ranges

Out-Standing in Their Field

Yield Champion
@Depth

Low Maintenance



No Additional
Weighting

Benthic

Higher % of Large Stipes
21-55% more



Suspended

Still Produces
Wild-Type
Plants

No Divers
Required

Larger Depth
Range for Growth

Currently
Commercially
Scalable

Honorable Mentions

Seed Spacing

Co-MVP

↓ Spore Density,
<250s/ml

↑ Seed Spacing

6" v 10" Did not have
significant difference
-2025 Season

Peeples Longline

UNDERDOG

Research Scale= Promising
(Peeples)

Topography + Ocean Conditions=
Mis Measured Lines
Mis Calculated Deployment

Carbon Fiber

BEST
INTENTIONS

Very Difficult to Harvest

Beats Microplastic Shedding

The Final Weigh -In

Suspended
Depth: 11.5 -15'

10
lbs/ft

Suspended
Depth: 8 -11.5'

11
lbs/ft

Benthic
Depth: 11.5 -15'

15
lbs/ft

Benthic
Depth: 8 -11.5'

7
lbs/ft



Large -Phenotype Farming
Techniques are also efficient for
Bull Kelp Biomass Production

Thank you to our collaborators

