Maddelyn Harden
University of Southern California

with
Sergey Nuzhdin, PhD

California Project Proposal and Information Exchange

June 2023

Alta Seads
CONSERVANCY

SUPPORTED BY: Grantham Foundation for the Protection of the Environment

Our Mission

To Develop, Maintain and Curate Macroalgal Seed Banks To

- **Preserve and analyze genetic diversity**
- **Strengthen kelp restoration practices**
- **Accelerate breeding improved kelp crops**

Seed Bank serves as the center of collaborative ecosystem:

Institutional Research & Universities

University of Wisconsin Milwaukee

University of Southern California 1880

Woods Hole Oceanographic Institution 1930

AltaSeads Conservancy

Industry, Farms, and for-profit Hatcheries

pacific6

Seaweed Breeding Co.

HOLDFAST AQUACULTURE

Conservation Efforts & Non-Profits

AltaSea at the Port of Los Angeles

Builders Initiative

Bigelow Laboratory

Our Vision

UNLOCK THE SEAWEED INDUSTRY—ACROSS RESTORING AND FARMING

- **Collect, Annotate, and Catalogue Variants**
- **Sequence Collection for Data Driven Genomic Modeling**
- **Enable Breeders and Public with User-friendly Access**

EXAMPLE INNOVATION:

Seed Bank Provides Wild Strains

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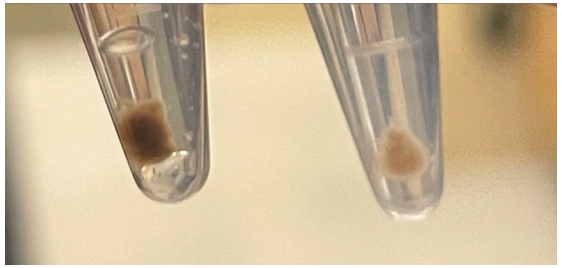
→

Rapid genomic screening facilitates selection process

Novel protocols to determine thermal tolerant, and otherwise resilient genotypes

→

Selected strains for managed restoration efforts



Our Team

- **>150 years of aquaculture and agriculture experience**
- **Genomics, big data, and breeding innovators**
- **Education and outreach practitioners**

EXPERIENCE AND ENERGY:

AltaSeads

Sergey Nuzhdin

Michael Marty-Rivera

Nina Noujdina

Kelly Deweese

Maddelyn Harden

Seaweed breeding Co

Scott Lindell

Filipe Alberto

Charles Yarish

Gary Molano

John Gillis

Relevant Partners

ACADEMIA, INDUSTRY & NON-GOVERNMENTAL SECTOR

GREENWAVE

GREEN CLIMATE FUND

AltaSea
AT THE PORT OF LOS ANGELES

KELP FOREST FOUNDATION

Grantham Foundation
for the Protection of the Environment

arpa·e

The Nature Conservancy

Center for Law & Policy

POLICY: AREAS OF FOCUS

Adaptive Management Framework
- Work in collaboration towards effective restoration management plans, engage in working groups, harness opportunities

Establish a Center for International Law and Policy
- Led by Dr. Robin Craig, Gould School of Law, USC
- At the intersection of conservation genetics, genomics and managed restoration, and commercial seaweed aquaculture.

Sustainable Seaweed Breeding

Address roadblocks to permitting
- Generate data to support & create experimental permits
- Develop public interest criteria

Develop Protocol for Sustainable Breeding Program
- Prioritize important safety features to prevent impacts on wild populations and ocean coastal ecosystems
- Our research platform combines law, policy, and STEM research
- R&D efforts within the context of NOAA's AOA designated areas on how to scale up from a scientific and social perspective

HOW WE GET THERE

Expand on Existing Curricula

Leverage Funding

Strong Engagement with the Public & Stakeholders

Our Campus

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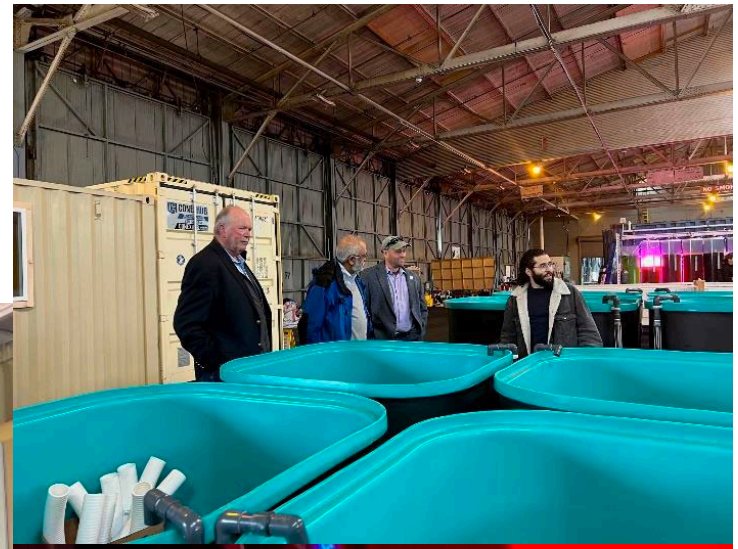

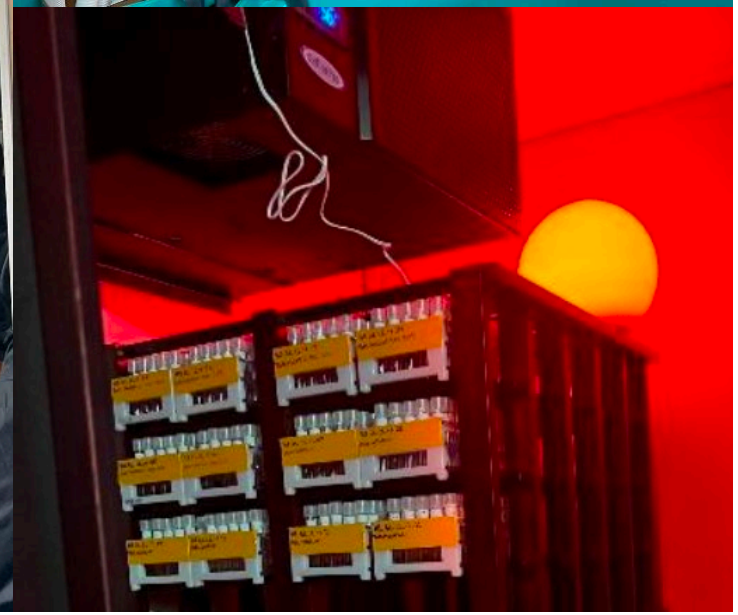

Project Impacts

ALTASEADS CONSERVANCY IMPACT

Short-term, 1-3 years:

- Seedbank expansion & accession sequencing
- Develop analytical frameworks for strain development
- Strengthen relationship with ocean farmers

Long-term, 4 years+

- Become centralized hub for kelp seed-banking
- Foster environmental stewardship and enhanced public knowledge of kelp ecosystems through curated educational curricula.
- Fast-track kelp breeding programs

Social Impacts

- Catalyze a new era of responsible ocean farming and contribute to regional economic growth
- Influence marine conservation policies and advocated for sustainable practices

1. Deliver On Our Mission

- **Expand Seedbank**
- **Expand Accessibility**
- **Ensure Longevity**

2. Partnership

- **Support Research & Industry**
- **Geographic and Species Coverage**

3. Explore Commercialization

Seaweed Breeding Co.

*Presented by **Maddelyn Harden**,*
University of Southern California
with
Sergey Nuzhdin

Supported by our Board
Charles Yarish, Krish Doraiswamy,
Regina Wetzer, Nick Hajek, Eric von Wettberg

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Thank you

Questions?

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