

# Port of San Diego Nature Based Solutions



**WEDA Pacific Chapter**

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# The Port Act and Tidelands Trust Doctrine



Details responsibility on behalf of the people of the State of California



Manage San Diego Bay and the Waterfront 'Tidelands'



Promote commerce, navigation, recreation, fisheries, and environmental stewardship



# Port of San Diego Granted Lands

**34**

miles of waterfront

**2,404**

acres of Port Tidelands

**3,677**

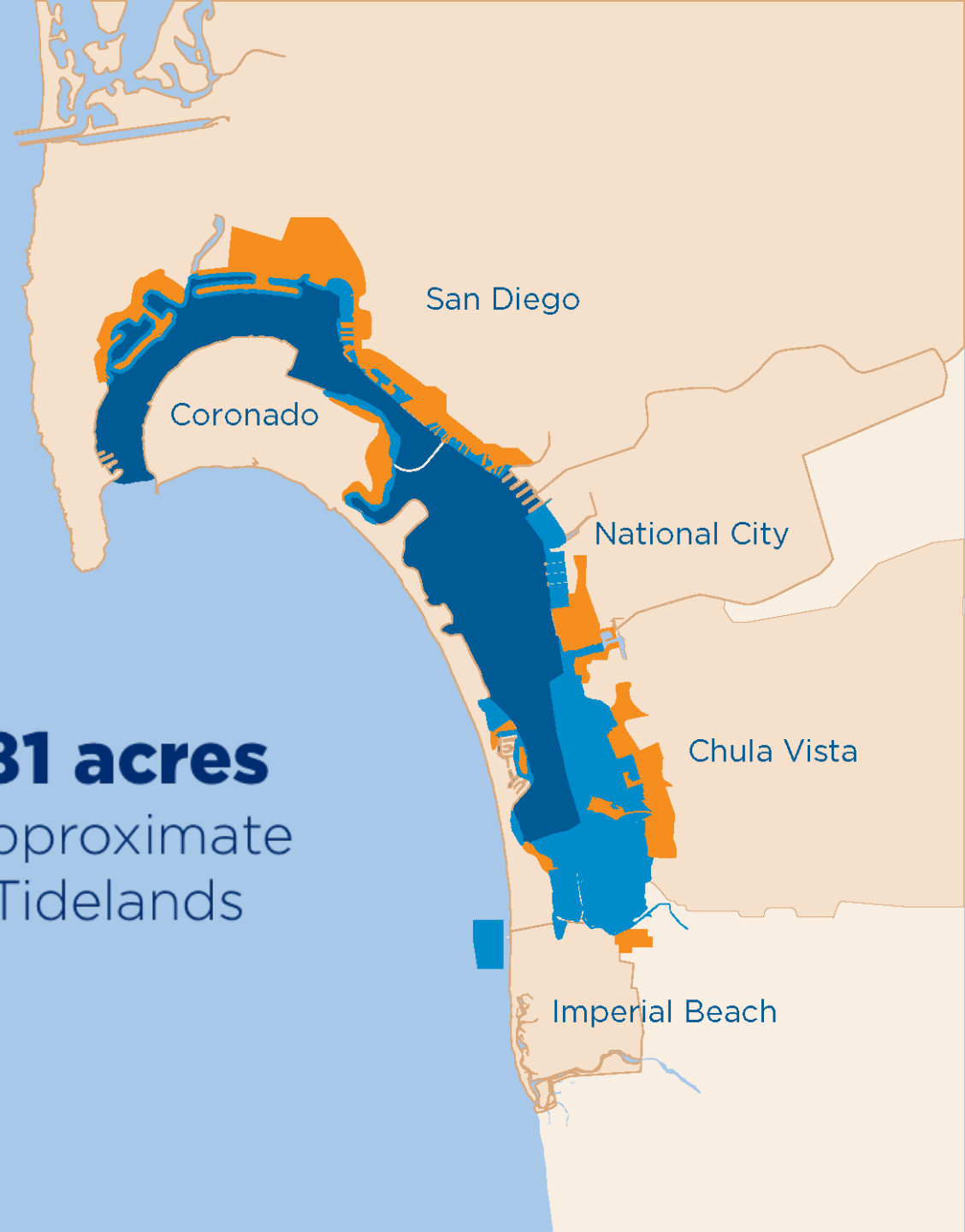
acres of Submerged Tidelands  
prior to January 1, 2020

Approximately

**8,300**

acres of new Submerged Tidelands  
(subject to survey) as of January 1, 2020

**14,381 acres**  
Total approximate  
Port Tidelands





5

public piers



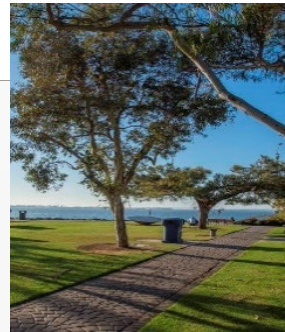
9

museums & attractions



18

hotels



22

parks



70

artworks



74

restaurants



80+

sponsored events

### Economic Engine

*\$9.4 Billion in economic Impact and 70,000 jobs (2017)*

# Building a Profile of Nature-Based Solutions



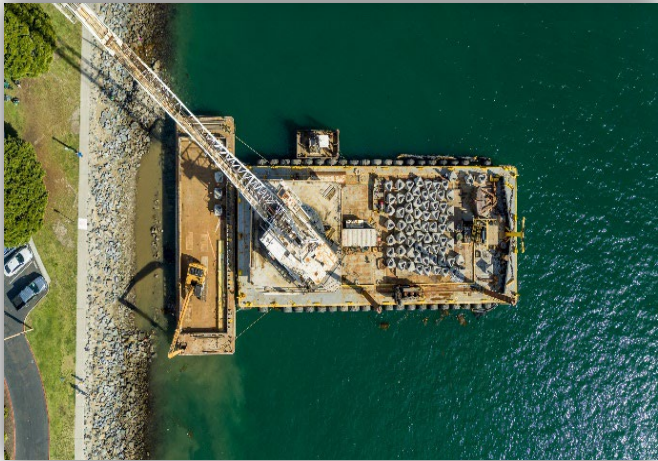
**Building Our Network of Partners & Collaborators**

A horizontal banner containing the logos of various partner organizations and collaborators:

- CALIFORNIA NATURAL RESOURCES AGENCY
- WILDCOAST COSTASALVAJE
- CALIFORNIA STATE UNIVERSITY FULLERTON
- BUILDERS INITIATIVE
- NOAA (NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE)
- Coastal Conservancy
- Navy Region Southwest (One Team, One Voice, One Mission)
- CALIFORNIA AIR RESOURCES BOARD
- U.S. MARITIME ADMINISTRATION (U.S. DEPARTMENT OF COMMERCE)
- NATIONAL WILDLIFE REFUGE SYSTEM
- Middlebury Institute of International Studies at Monterey



# Bio-Enhancing Concrete | ECoConcrete

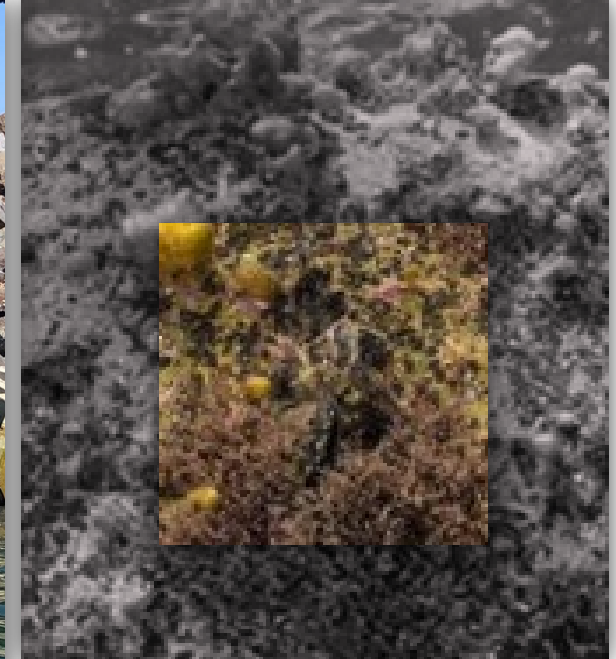


Deployment





# ECOncrete



2 Month Post-Deployment Surveys





# ECOncrete



**8 Month Post-Deployment  
Monitoring**







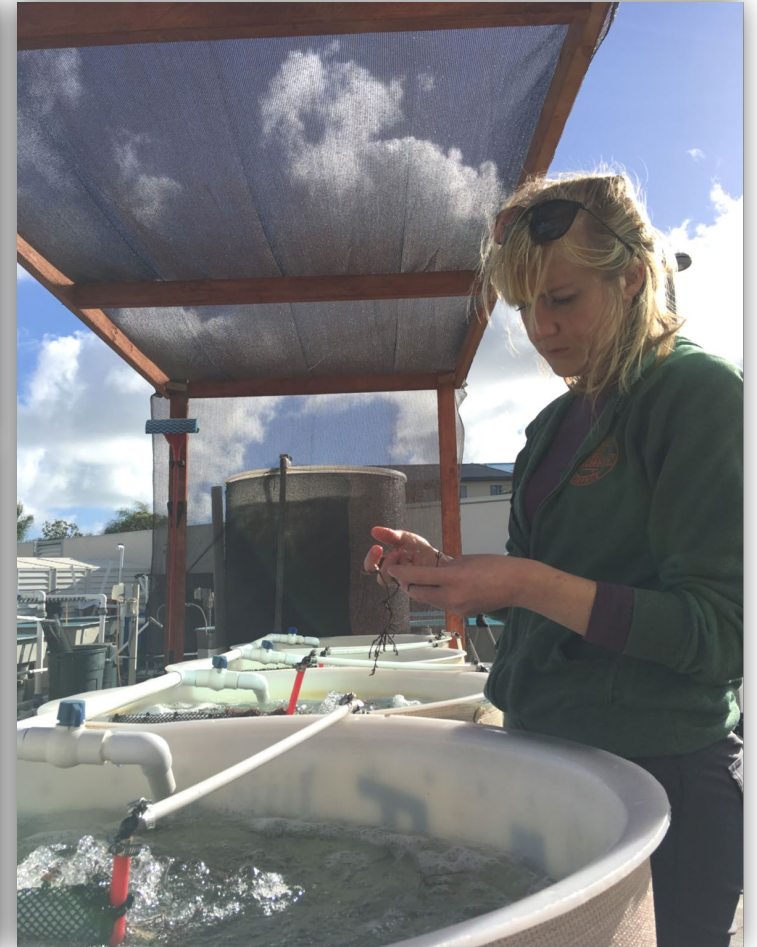
# ECOncrete



14 Month Post-Deployment  
Monitoring



# Seaweed Aquaculture | Sunken Seaweed

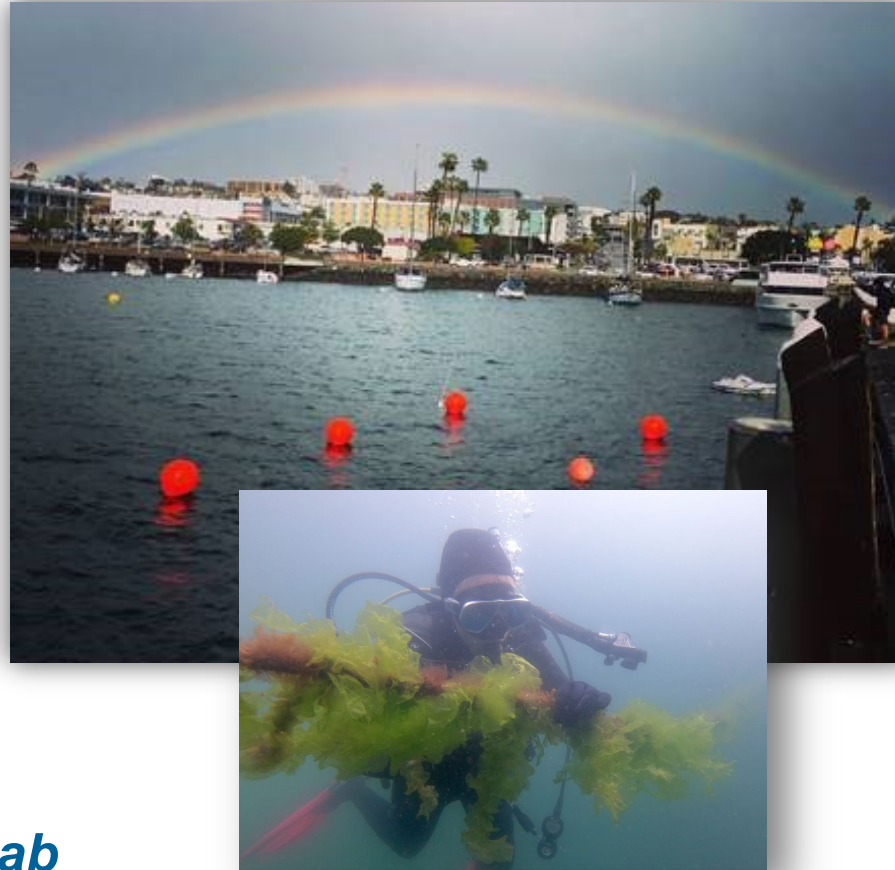




# Seaweed Aquaculture | Sunken Seaweed



*Hatchery at SDSU Marine Lab*



*Pilot Farm at Port Grape St Pier*



*Research supported by ARPA-E*

# Shellfish & Seaweed Aquaculture – Planning

- Bioremediation
- Carbon/nitrogen sequestration
- Food production
- Fisheries enhancement
- New blue economy job opportunities



“Ocean Farming” Method



# Collaborative Partnerships

## Coastal Marine Spatial Planning



**Spatial Opportunity Analysis to Inform Aquaculture Development Planning in San Diego Bay, California**

Lisa C. Wickliffe<sup>1</sup>, Jonathan A. Jossart<sup>1</sup>, Seth Theuerkauf<sup>2</sup>, Barry King<sup>1</sup>, Brandon Jensen<sup>1</sup>, Paula Sylvia<sup>3</sup>, Kenneth Riley<sup>4</sup>, and James A. Morris, Jr.<sup>4</sup>

<sup>1</sup>CSS under contract to NOAA NOS NCCOS  
<sup>2</sup>The Nature Conservancy  
<sup>3</sup>Port of San Diego  
<sup>4</sup>NOAA National Centers for Coastal Ocean Science

**Coupling Spatial Aquaculture Opportunity Analysis with Habitat Interactions Predictions: A case study for San Diego Bay, California**

Brandon M. Jensen<sup>1</sup>, Lisa C. Wickliffe<sup>1</sup>, Jonathan A. Jossart<sup>1</sup>, Paula Sylvia<sup>2</sup>, Kenneth L. Riley<sup>3</sup>, and James A. Morris, Jr.<sup>3</sup>

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<sup>3</sup>NOAA National Centers for Coastal Ocean Science

## Shellfish Health Testing



# Native Oyster Living Shoreline



# Native Oyster Living Shoreline



# Native Oyster Living Shoreline





# Native Oyster Living Shoreline





# San Diego Bay's Eelgrass Habitats

## *Blue Carbon Sequestration & Storage*

### Previous Studies

- The Port and Navy map eelgrass ~3 years.
- As of 2020, San Diego Bay currently has 2,600 acres of eelgrass, which represents:
  - 50% of all eelgrass in Southern California.
  - 17% of all eelgrass in the state.





# San Diego Bay Eelgrass Blue Carbon Study

*Funded by MARAD's Maritime Environmental & Technical Assistance Program*



## Year 1: Assessing Carbon Storage in the Bay

### Study Goals:

- 1) Collect baseline data on above ground (eelgrass) and below ground (sediment) carbon storage.
- 2) Locate carbon storage hot spots.
- 3) Evaluate carbon storage within historic (old) & restored (new) eelgrass beds.
- 4) Model future changes in eelgrass extent & carbon storage due to sea-level rise.



# San Diego Bay Eelgrass Blue Carbon Study

*Funded by MARAD's Maritime Environmental & Technical Assistance Program*



## Year 2: Build a Carbon Budget

### Study Goals:

Assess the **bicarbonate pathway** (how carbon moves in & out of eelgrass ecosystems):

- a) Repeat soil carbon sampling to estimate carbon sequestration rates. *Collaboration with the Navy.*
- b) Calculate primary production rates, carbon burial rates, and detrital export rates.
- c) **\*\***Grain size analysis & nutrient deficiency.

*Final report in August 2023.*

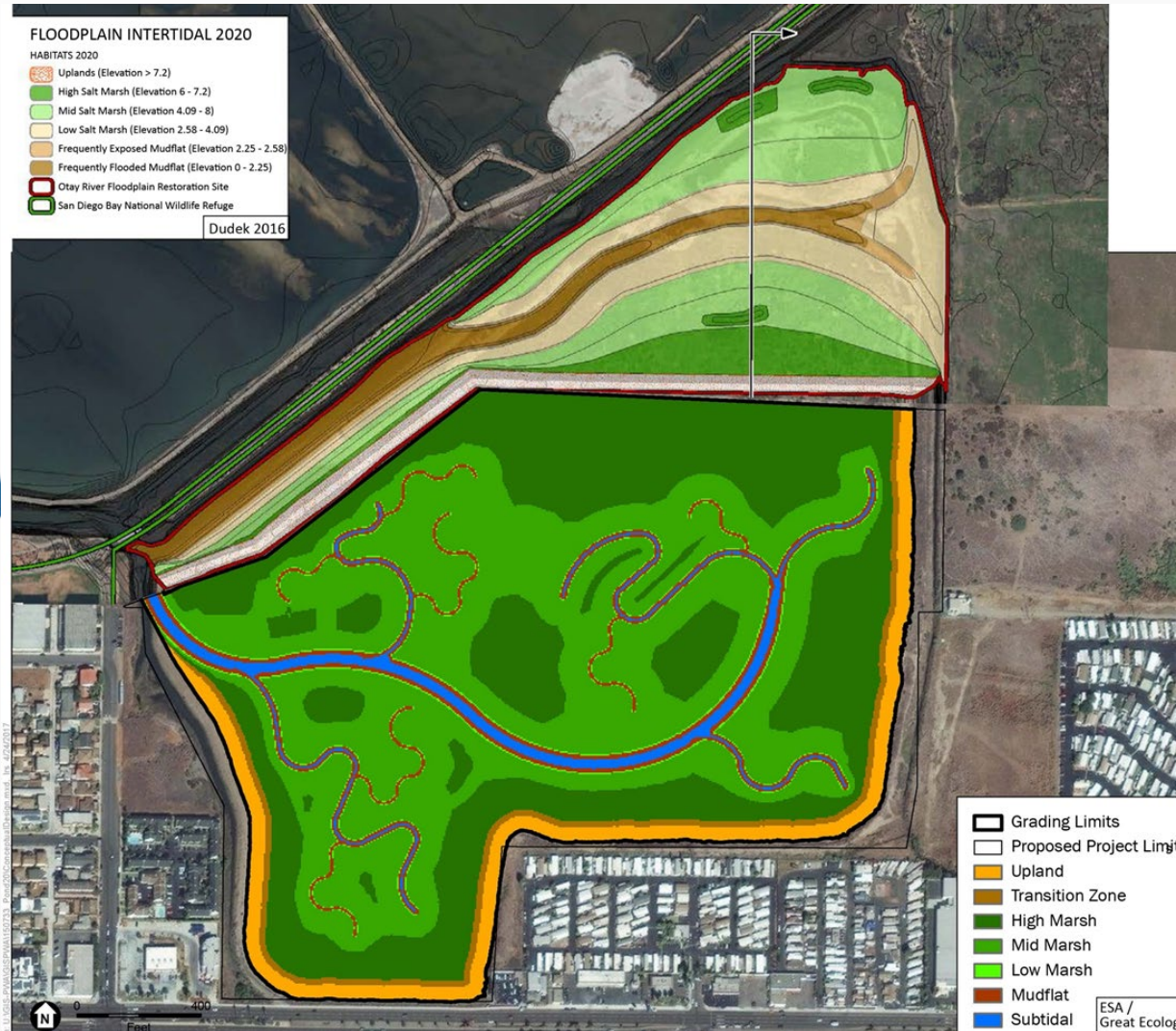
# Mitigation Banking – Pond 20



# Pond 20 – Design



# Otay River Estuary Restoration Project (USFWS Refuge) and Pond 20



- ORERP
  - Construction started last week.
  - Three phases
  - Seasonal work stoppages
    - March-September
  - Completion March 2025
- Wetlands mitigation on adjacent Refuge land
- Coordinating to ensure projects work together



# BPC Policy 774

## Pond 20 - Economic Development Fund

- Net Revenue from mitigation bank credit sales to:
- Environmental Justice Community – City of Imperial Beach and City of San Diego Council District 8.
- To generate jobs or economic benefit and for public improvements



# Resort Hotel & Convention Center - RIDA



Gaylord Pacific Hotel



Approximately 1,600 hotel rooms and 275,000 net usable square feet of convention and meeting space



Associated retail and resort-level amenities



# Maritime Clean Air Strategy

## Vision Statement: Health Equity for All

- **Heavy Duty ZE Truck Transition Plan**
  - 100% ZE truck trips by 2030
- **Port Fleet**
  - Purchase of 16 electric vehicles
- **Urban Greening**
  - Plant 20 trees at Cesar Chavez Park
- **Shore Power**
  - CST and NCMT
- **Electric Cranes at TAMT**
- **1st All Electric Tug in the US**



## Secured Stimulus Funding

- \$26.3 million for electrification.

# 2022 Year In Review

# GREEN PORT MONTH

Celebrating Clean Air, Blue Water and Vibrant Life

### GREEN PORT YEAR IN REVIEW 2021-2022

#### ENVIRONMENTAL CHAMPION

The Port of San Diego champions the safekeeping and environmental care of our dynamic waterfront. We are proud to be a leader in protecting our water, air and land to ensure the complete ecosystem of San Diego Bay remains a vital natural resource for generations to come. The delicate balance of a healthy San Diego Bay ecosystem is upheld through a collaborative network of programs and initiatives, each working on innovative ways to sustain our waterfront.

##### Green Marine Certification

The Port of San Diego has been re-certified by Green Marine, North America's largest voluntary environmental certification program for the maritime industry. The Port of San Diego ranked in the top ten percent of North American ports in the Green Marine program with an average score of 4.3 out of 5 across all categories.

##### Natural Resources

The Port learned about Osprey nesting habits through a solar-powered camera installed on the nesting platform at the Chula Vista Wildlife Reserve. This platform has been providing nesting for over 10 years producing 2-4 fledglings per year.

#### PORT OPERATIONS

##### Renewable energy generated on-site

494,000 kWh

##### Regional Harbor Monitoring Program/Report:

The Regional Harbor Monitoring Program's informational brochure highlights the water quality and marine life health for San Diego bay and other harbors. See the 2018 survey results at: [QR Code]

##### Shellfish & Seaweed Aquaculture Planning:

The Port is engaged in a Shellfish & Seaweed Aquaculture Planning effort funded by the Builders Initiative. Shellfish and seaweed aquaculture has the potential to provide bioremediation and ecosystem services, such as improving water quality, carbon sequestration, and habitat enhancement.

##### Edgrass Blue Carbon Study:

The Port is partnering with the U.S. Maritime Administration (MARAD) funded by the Maritime Environmental & Technical Assistance Program on the first-ever Bay-wide Edgrass Blue Carbon Study to assess carbon storage and sequestration rates in edgrass beds across San Diego Bay. This work will build a baseline for carbon storage in the bay and inform

# Blue Economy Incubator Highlights Report



### Our impact in Numbers

- \$160,000** in royalty payments that can be re-invested in supporting new pilot projects through the Port's Blue Economy Incubator
- \$1.6 MILLION** in funding to support the launch of sustainable aquaculture and blue tech pilot projects
- Over 25 PARTNERSHIPS** created through the work of the BEI
- 250+** INQUIRIES received from organizations seeking partnership and pilot project opportunities
- \$1.2 MILLION** additional research and development funds leveraged by Blue Economy Incubator pilot projects
- 5** metals being tested by FREDsense to develop 5-in-1 system for near real-time stormwater compliance monitoring, including aluminum, copper, lead, zinc, and nickel
- 110,000 POUNDS** of marine debris removed from San Diego Bay by Zephyr- 33,000 pounds during its first year of pilot operations, and an additional 77,000 pounds during a follow-on contract with the Port
- 9** innovative pilot projects launched through a port-wide collaboration process
- 20 MILLION** juvenile-stage oysters expected to be produced annually when San Diego Bay Aquaculture's FLUPSY is fully permitted and operating at full capacity
- 50+** DIFFERENT SPECIES including sessile species, mobile invertebrates, fish, and algae - found living on ECoConcrete's bio-enhancing shoreline protection armor units (Coastalock) eight months after deployment
- 3** control cleaning events and concurrent water quality sampling events to evaluate in-situ release of copper from boat hulls using Rentunder Boatwash technology
- 6** different algae species tested at the seaweed aquaculture pilot farm established by Sunken Seaweed to launch various products and measure restoration benefits
- 468** SPEARS technology deployed into the sediment by ecoSPEARS to demonstrate their innovative approach to sediment and soil remediation in Port environments

# Thank you



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