

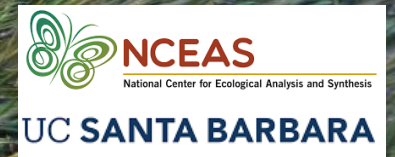


Integrating conservation objectives with human activities and ecological data to develop performance measures for Seagrass Management Area planning in Long Island Sound, USA

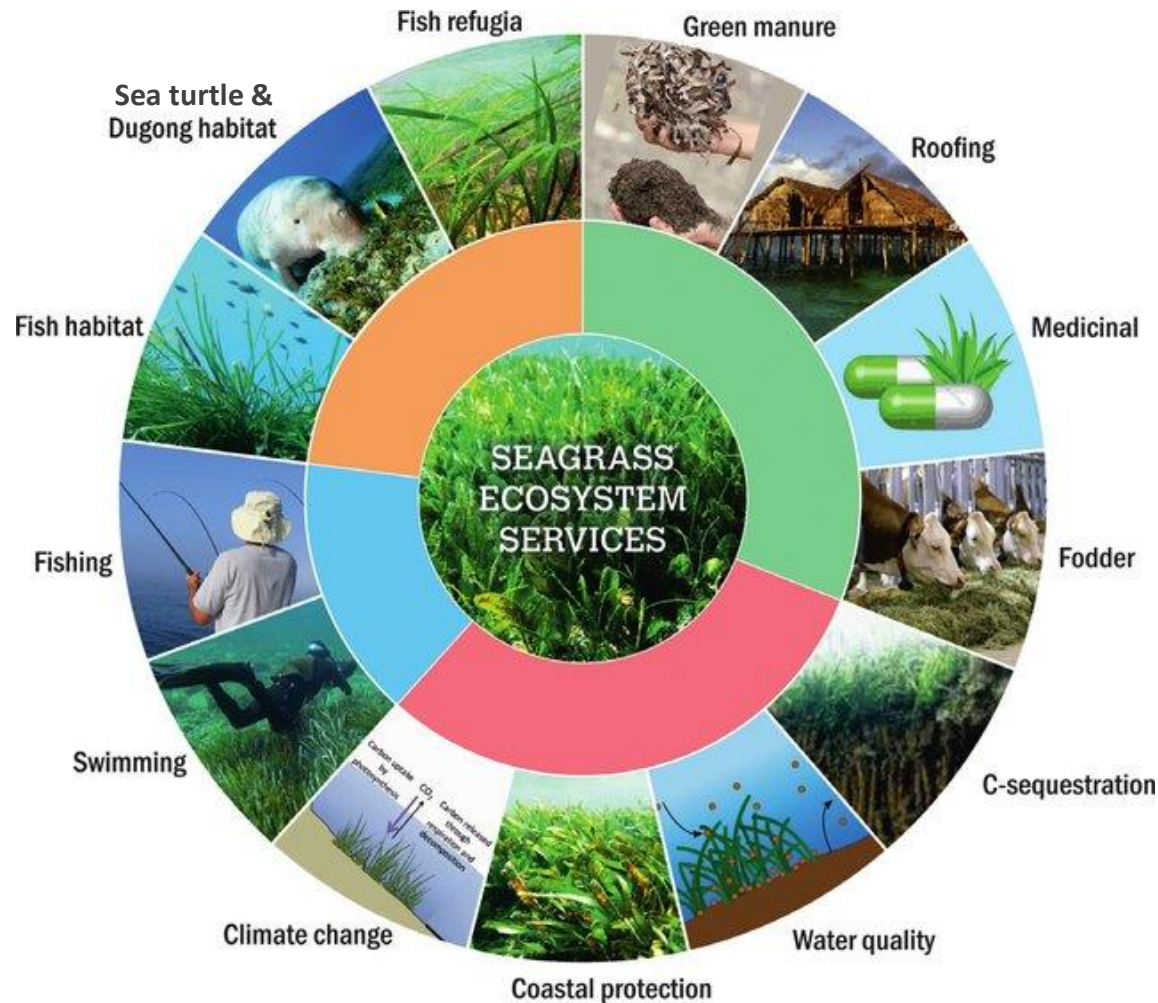
Marine Socio-Ecological Systems Symposium

Yokohama, Japan • June 3-7, 2024

Chantal E. Collier, The Nature Conservancy
William J. McClintock, University of California, Santa Barbara



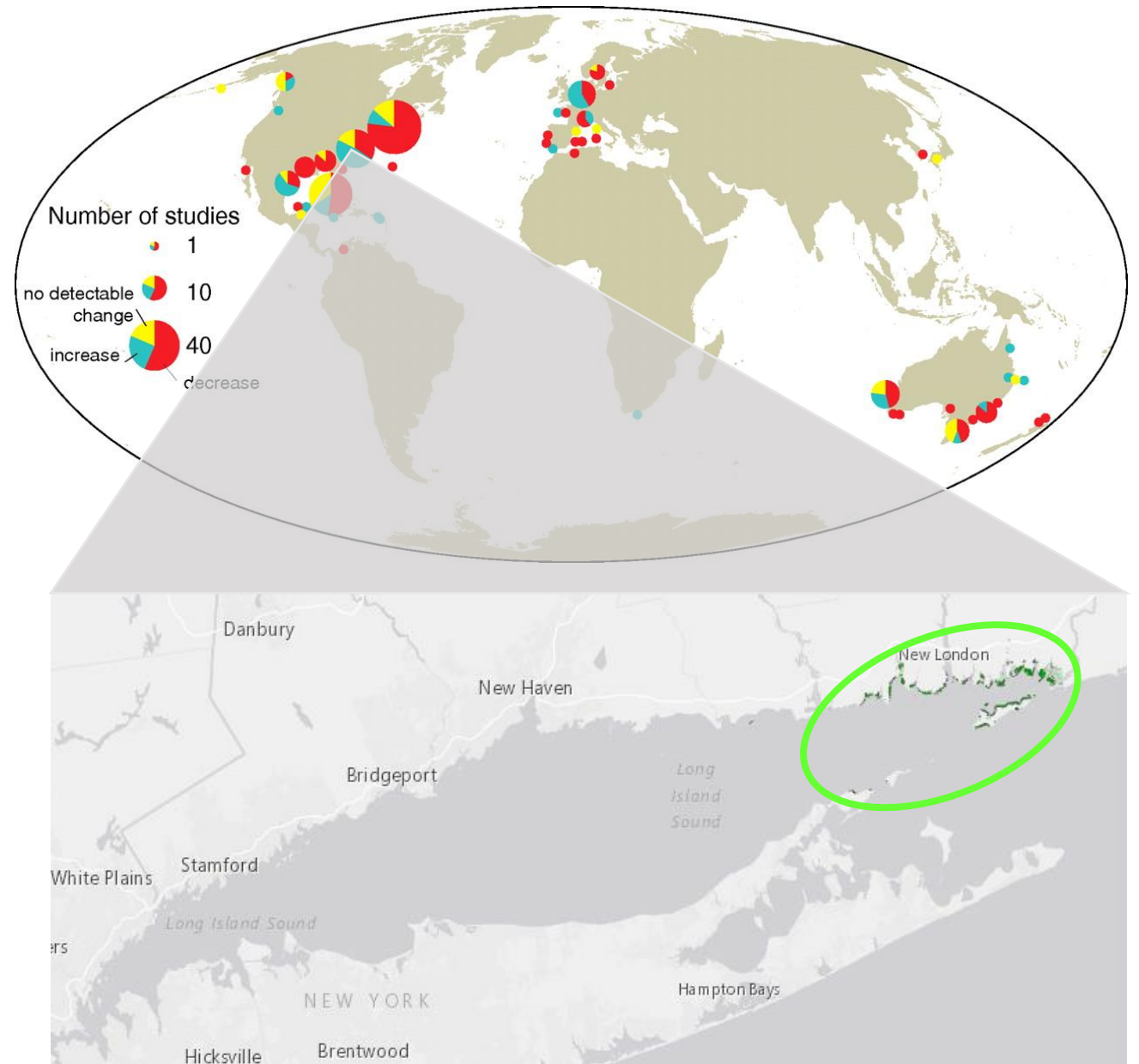
Seagrasses benefit wildlife and people



- **Support biodiversity and provide critical habitat** for species like summer flounder, black seabass, lobster, bay scallops, sea turtles, and brant geese
- **Sustain 20% of the world's largest fisheries**
– 1 ha of seagrass can produce US\$24,000 year⁻¹ in commercially important fish
- **Improve water quality**
– absorb nitrogen, generate oxygen
- **Dampen wave energy, reduce coastal erosion**
– leaves, roots and rhizomes trap and stabilize sediment
- **Serve as blue carbon sinks**
– sequestering CO₂ and storing it in the sediment beneath its roots

Seagrasses are disappearing

- Globally, ~30% of all seagrasses have been lost.
- Between 1940-1990, the rate of decline increased from 1% to 7% year⁻¹
- Major drivers of decline:
 - Nitrogen pollution
 - Climate change
 - Physical damage
 - Biological impacts
- In the northeastern USA, eelgrass ecosystems (*Zostera marina*) are in critical decline.
- In Long Island Sound, less than 10% of the historic extent of eelgrass remains

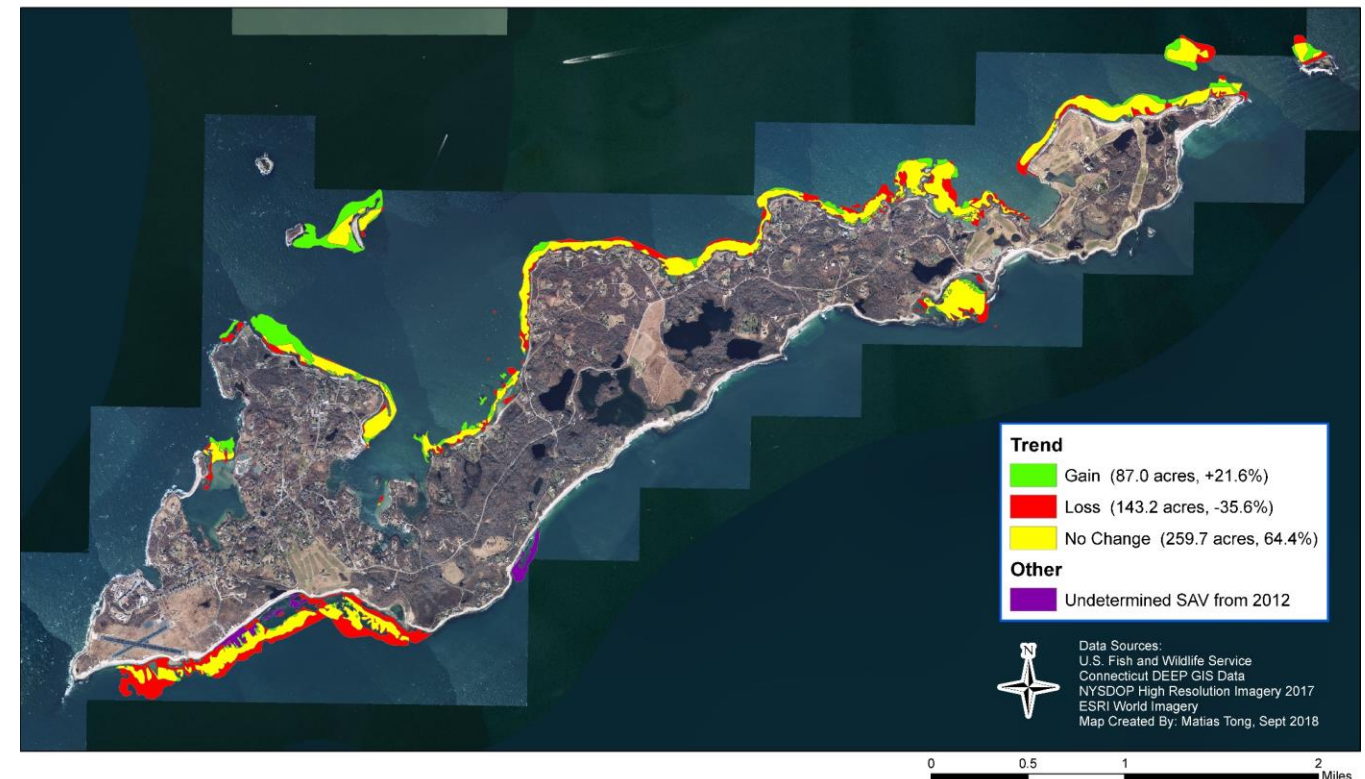


Protecting seagrasses in Long Island Sound (LIS)

Fishers Island, New York

- 24% of remaining eelgrass in LIS
 - Eelgrass in good condition, but at risk
 - 14% net loss from 2012-17
- Enabling legislation
 - Seagrass Protection Act (NY Env. Conservation Law 13-0705)
 - Requires the State to designate Seagrass Management Areas (SMA)
- History of community-based leadership with established local conservation institutions

Changes in Eelgrass Distribution from 2012 to 2017 (USFWS Surveys)
Fishers Island, NY



Fishers Island Seagrass Management Coalition

In 2017, the Henry L. Ferguson Museum and the Fishers Island Conservancy, with support from The Nature Conservancy, formed the Fishers Island Seagrass Management (FISM) Coalition to initiate a collaborative planning process for protecting the island's enduring eelgrass ecosystem.



The FISM Coalition is a local group comprised of 20 island community stakeholder representatives that directly depend upon, interact with, or may affect the island's coastal and marine habitats.

Henry L. Ferguson Museum
Fishers Island Conservancy
Town of Southold
Island Community Board
Fishers Island Harbor
Committee
Fishers Island Development
Corp.
Fishers Island School
Fishers Island Ferry District
Fishers Island Yacht Club
Pirates Cove Marina



Commercial Fishing
Aquaculture
Diving
Spearfishing
Recreational Fishing
Contracted Ferries
Landscapers
Hay Harbor Club
Fishers Island Club



HENRY L. FERGUSON MUSEUM
FISHERS ISLAND





Vision: Fishers Island's thriving eelgrass ecosystem supports healthy marine systems, protects our coastal shorelines, and helps sustain our community's connection between the environment and our quality of life.

Conservation Goals:

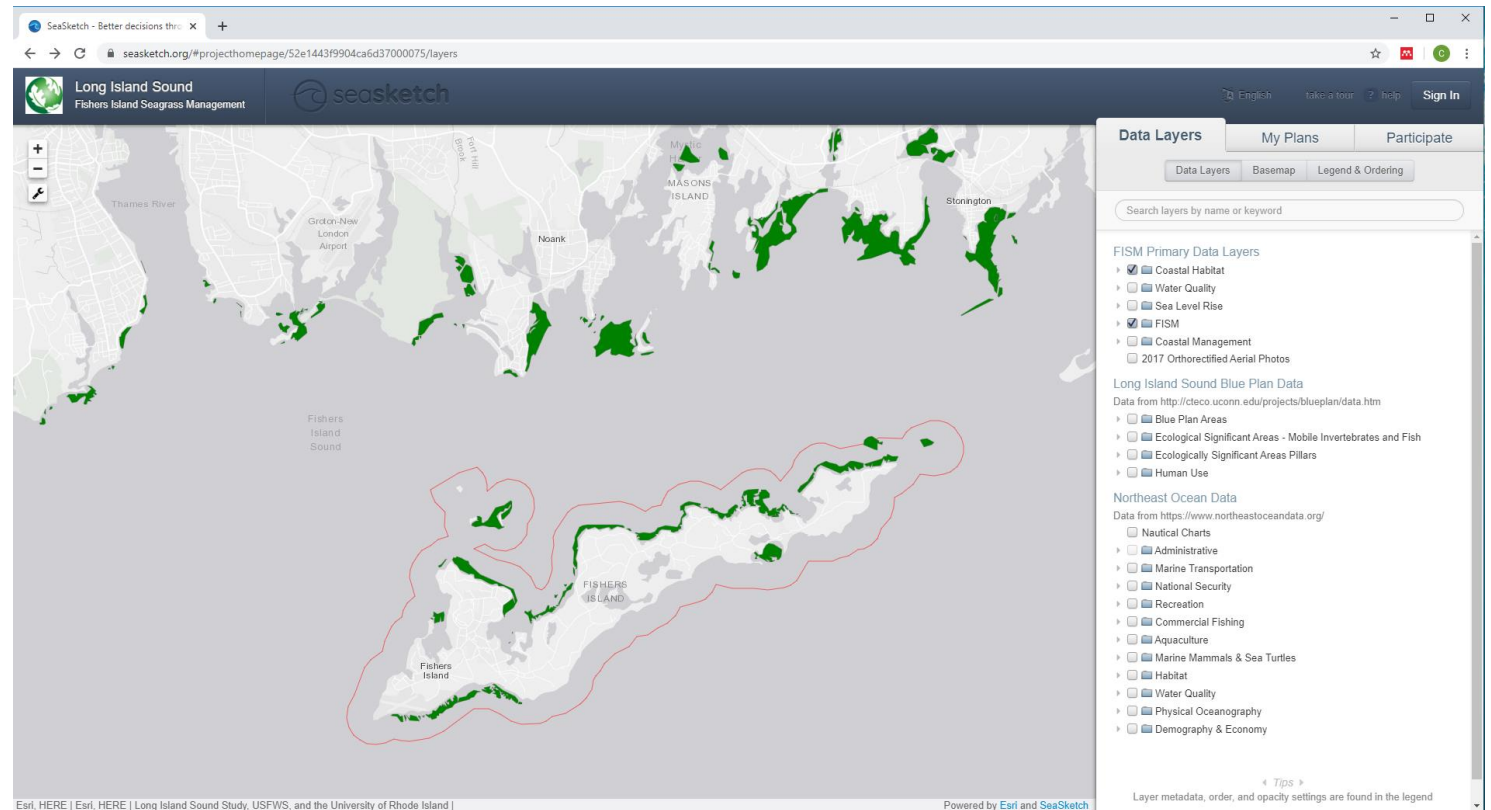
1. 100% of the island's seagrass is effectively managed to sustain seagrass at a level that is greater than or equal to the 2017 extent of 347 acres (i.e., no net loss)
2. Maximize seagrass protection levels within SMAs
3. Maximize suitable area for eelgrass recovery or restoration with SMAs
4. Reduce nitrogen loading to SMAs from land-based sources on the island



Fishers Island Seagrass Management (FISM) Planning

A community-driven Marine Spatial Planning Process

- **Led by the FISM Coalition**
 - in cooperation with Town of Southold and NY State Dept. of Environmental Conservation
 - technical resources and support provided by The Nature Conservancy
- **Using SeaSketch**
 - a web-based decision support platform with tools designed for ocean planners, stakeholders and the public
 - supports inclusive, transparent, participatory, science-based planning
 - facilitated collaborative development of Seagrass Management Area Planning



Fishers Island Seagrass Management (FISM) Planning Area (shown in red), with 2017 seagrass ecosystem extent (shown in green), as seen in the FISM SeaSketch project.

Seagrass Management Area Planning in Long Island Sound using SeaSketch

Data Viewer

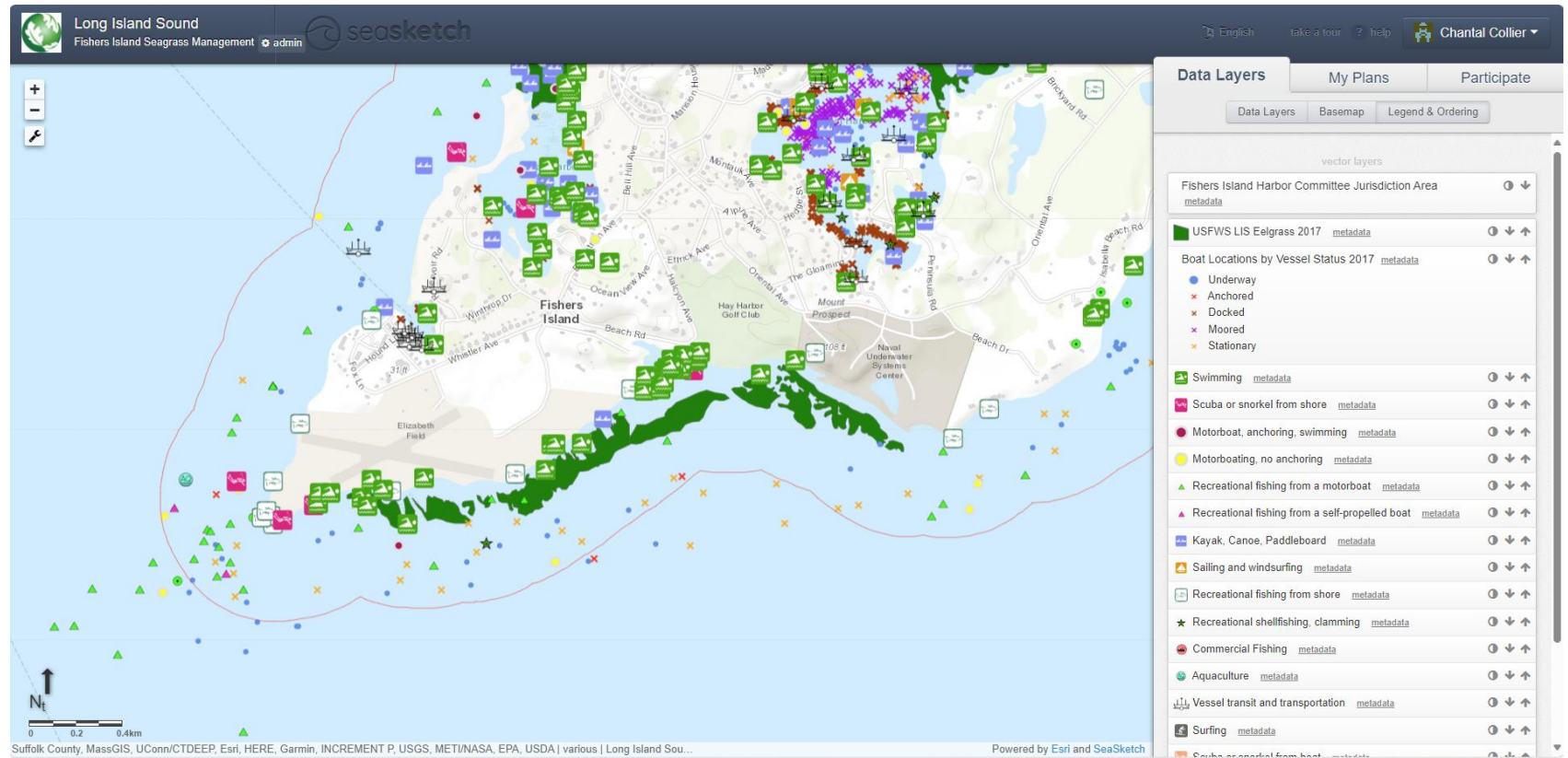
- 300+ data layers uploaded
- Enabled social and ecological data visualization and integration

Survey Tool

- Aided collection of ocean uses data

Forums

- Facilitated interactive spatial planning discussions

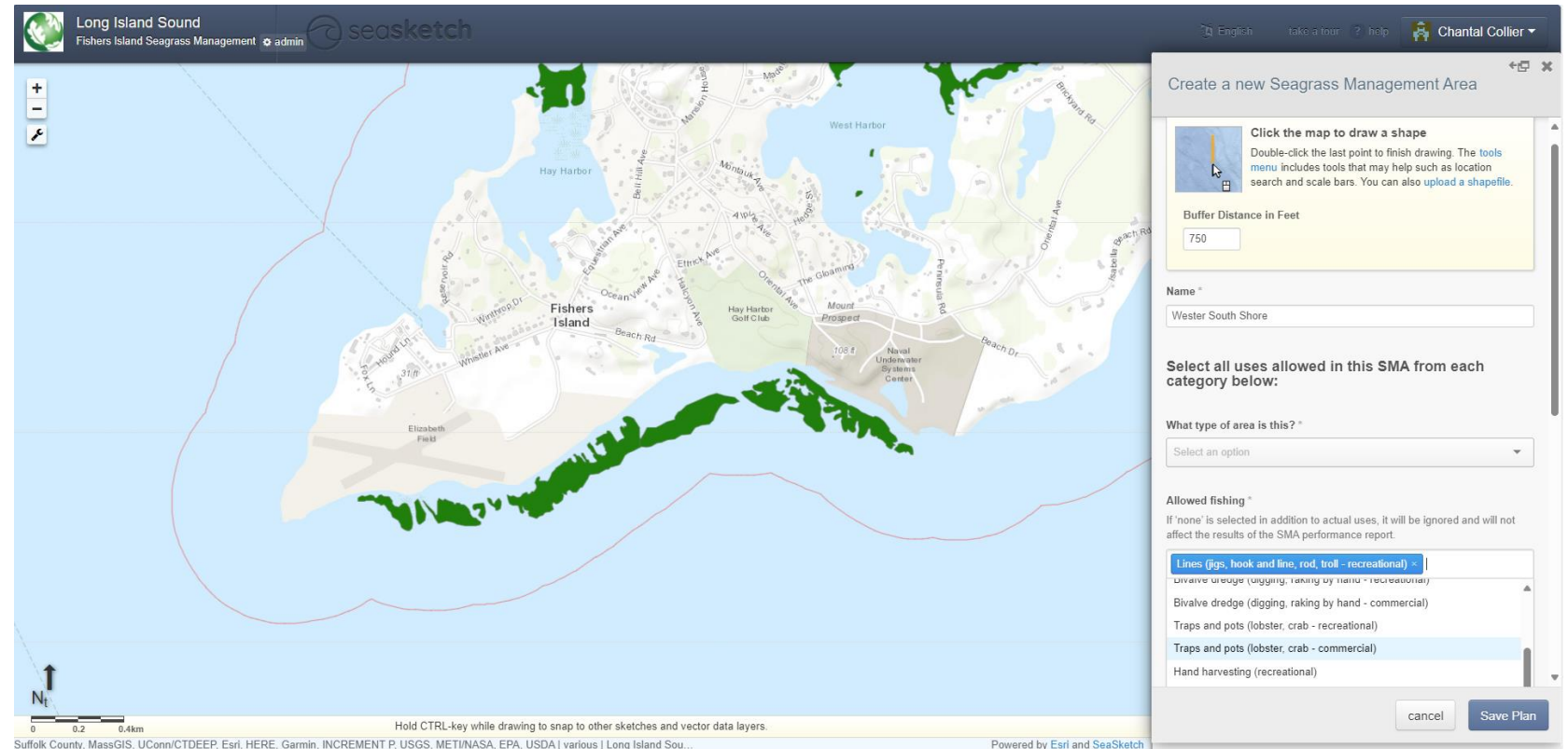


Social and ecological data visualization and integration: Fishers Island Seagrass Management planning area (shown in red), 2017 eelgrass extent (shown in green), with ocean use survey results.

Design and evaluation of Seagrass Management Areas (SMA) using SeaSketch

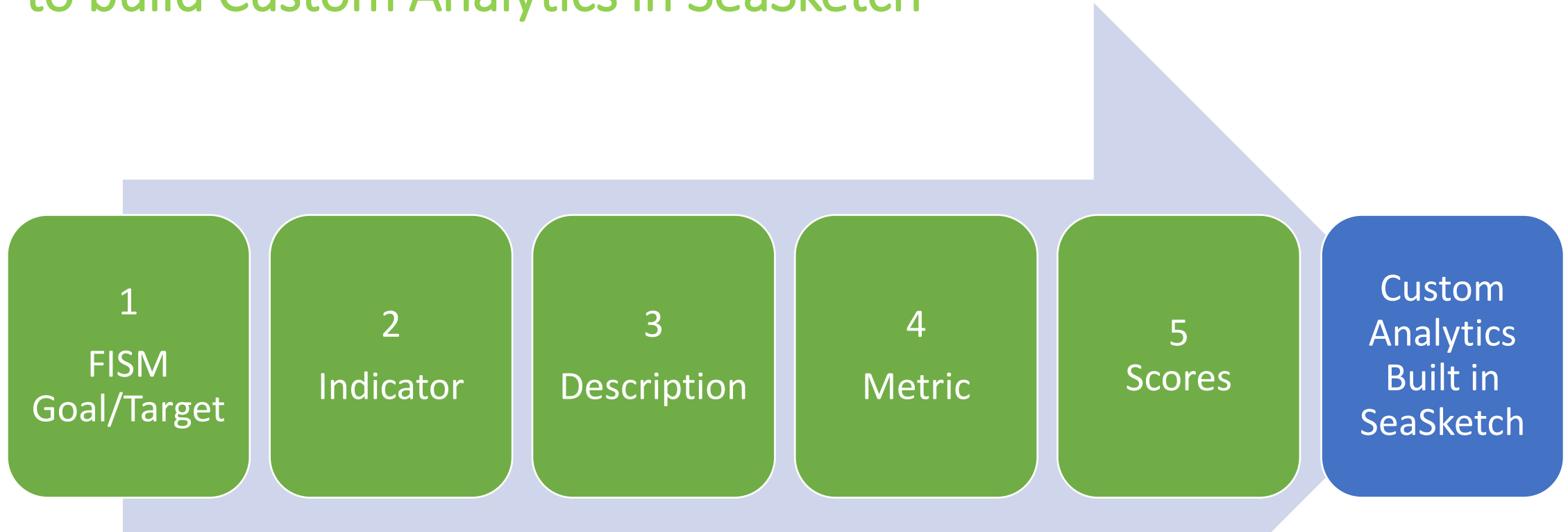
Planning Tool

- Supported creation of custom analytics, based on Fishers Island Seagrass Management Coalition conservation goals
- Enabled SMA scenarios to be developed by stakeholders



Customized analytics facilitated the design and evaluation of proposed Seagrass Management Areas.

Developing Performance Measures from Conservation Goals to build Custom Analytics in SeaSketch



Performance Measures for Fishers Island Seagrass Management Area Planning Analytics

| 1 | 2 | 3 | 4 | 5 | |
|---|--------------------------------|---|---|--|---|
| FISM Target/Goal | Indicator | Description | Metric | Score | Notes & References |
| 100% of seagrass is effectively managed to sustain seagrass at ≥ to the 2017 extent of 347 acres (i.e. no net loss) | Seagrass Ecosystem Composition | a measure of the extent of the target ecosystem types present within the SMA boundaries | Percent of existing or recent seagrass ecosystem | 0 = no seagrass 1 = <25% seagrass 2 = 26-50% seagrass 3 = 51-75% seagrass 4 = >75% seagrass | Calculate acreage and percent of 2017 seagrass extent in SMA. Show a table of percent existing, no-change and lost seagrass area (2012-17). |
| Maximize seagrass ecosystem protection levels within SMAs. | Seagrass Ecosystem Protection | a measure of the level of protection of biodiversity from extractive and destructive activities within the SMA boundaries | Protection level ^{1,2} | 0 = not protected 1 = minimally protected 2 = lightly protected 3 = highly protected 4 = fully protected | To stabilize ecosystems and prevent further decline, scientists recommend protecting at least 30% of marine ecosystems in highly or fully protected areas. (BirdLife International et al., 2019; IUCN, 2016). Protection level analytics are based on research from Horta e Costa et al., 2016; Oregon State University et al., 2019. |
| Maximize suitable area for eelgrass recovery or restoration with SMAs. | Eelgrass Site Suitability | a measure of the extent of benthic habitat suitable for eelgrass colonization present within the SMA boundaries that did not contain eelgrass in 2017 | Percent non-seagrass benthic area that is suitable for eelgrass | 0 = no suitable area beyond 2017 extent 1 = <10% of non-eelgrass area could support eelgrass (≥50 threshold) 2 = 10-20% of non-eelgrass area could support eelgrass (≥50 threshold) 3 = >20% of non-eelgrass area could support eelgrass (≥50 threshold) AND LESS THAN half of that area is highly suitable for eelgrass (≥88 threshold) 4 = >20% of non-eelgrass area could support eelgrass (≥50 threshold) AND at least half of that area is highly suitable for eelgrass (≥88 threshold) | When choosing restoration sites, suitability model scores should be greater than 88 in some portion of the restoration site, though values above 50 may also be supportive of eelgrass. It is important to note that mature eelgrass beds modify the environment and are more resilient to stressors due to their larger size and dense coverage. A restoration planting is typically conducted in areas considered very well suited to eelgrass because newly planted beds are more sensitive to stressors relative to established beds. This is reflected in the minimum score of 88 for restoration plantings and a minimum score of 50 for established beds. (Vaudrey et al., 2013) |
| Reduce nitrogen loading to SMAs from land-based sources on the island (e.g. fertilizer use and wastewater) | Watershed Protection Level | a measure of the level of protection of seagrass from land-based sources of nitrogen pollution | Protection Level | 0 = not protected 1 = minimally protected 2 = lightly protected 3 = highly protected 4 = fully protected | (Short et al., 2012; Watson et al., 2018; Woods Hole Group, 2014) |

¹ Protection Level Definitions (from the 2019 MPA Guide, see references below):

Minimally protected: extensive extraction and other impacts are allowed while still providing some conservation benefit to the area

Lightly protected: some protection exists but moderate to significant extraction and impacts are allowed

Highly protected: only light extractive activities are allowed, and other impacts are minimized to the extent possible

Fully protected: no extractive or destructive activities are allowed, and all impacts are minimized

² Classification is based on the allowed uses within an SMA using methods defined in Horta e Costa et al. (2016) and outlined in the classification table below.

Developing Science-based Seagrass Ecosystem Protection Level Scores

UN WCMC IUCN WCPA NATIONAL GEOGRAPHIC Oregon State University protected planet Marine Protection

For a PDF version of The MPA Guide, go to <https://www.protectedplanet.net/c/mpa-guide>

Momentum to protect the global ocean and to use Marine Protected Areas (MPAs) as a conservation tool is greater than it has ever been. But realizing the potential will require a common, shared language to understand, celebrate and track achievements and provide clarity about our collective, science-based goal.

AN INTRODUCTION TO THE MPA GUIDE

- Conserving biodiversity in the global ocean
- Reflecting shared goals by refining shared language

THE MARINE PROTECTED AREA language and captures a shared and the conservation outcomes the work of many hundreds of a world. It is a timely and important better ocean protection and reflection unity in language and conservation.

THE NEED

MPAs are a central tool for ocean clearly defined by IUCN as areas is the conservation of nature. A geographical space, recognized, through legal or other effective conservation of nature with associated and cultural values. Other Effect Measures (OECMs) also bring is not their primary objective. M constitute the officially recognized global tally of protected areas.

Despite clear definitions of both clarification is still needed about

The MPA Guide

Defining MPAs and their Level of Protection

Version 1

This Guide is intended to help you determine the Level of Protection of your MPA or MPA zone. If you have questions about whether your area is an MPA (i.e., if it is instead an OECM, a Fisheries Management Area, or another area-based management tool, please refer to the IUCN Global Conservation Standards for MPAs. This Guide is specific to MPAs, as per the IUCN definition.

| Minimally Protected | Lightly Protected | Highly Protected | Fully Protected |
|--|--|---|--|
| Extensive extraction and other impacts are allowed, but site still provides some conservation benefit to the area. | Some protection of biodiversity exists but moderate to significant extraction and other impacts are allowed. | Only light extractive activities are allowed with low total impact, and all other abatable impacts minimized. | No extractive or destructive activities are allowed, and all abatable impacts are minimized. |

Marine Policy 72 (2016) 192–198

Contents lists available at ScienceDirect

Marine Policy

journal homepage: www.elsevier.com/locate/marpol

A regulation-based classification system for Marine Protected Areas (MPAs)

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ARTICLE INFO

Article history:
 Received 2 February 2016
 Received in revised form 25 April 2016
 Accepted 17 June 2016
 Available online 28 July 2016

Keywords:
 Human impacts
 IUCN
 Marine protected areas
 New classification
 Partially protected areas
 Regulation-based classification system

ABSTRACT

Marine protected areas (MPAs) are a global conservation and management tool to enhance linked social-ecological systems with the aim of conserving biodiversity and providing services for sustainable use. However, MPAs implemented worldwide include a large range of management schemes from single to multiple-zoning and from no-take to multiple-use. A novel global classification system for MPAs based on regulations of uses as well as complementing the current IUCN system of categories is presented. Scores for uses with potential impact on biodiversity were built. Each zone within a MPA was scored and integrated into the zone scores. This system classifies MPAs as well as each MPA zone individually and unambiguously discriminates the impacts of uses.

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1. Introduction

As anthropogenic activities expand worldwide threatening the maintenance of ecosystem services [20,31], marine protected areas (MPAs) have been increasingly seen as one of the most important tools for managing and conserving marine ecosystems [15]. The exclusion or reduction of extractive and destructive activities within MPAs has been adopted as a way to halt or reverse biodiversity loss and ecosystem degradation, maintain or enhance ecosystem services, and recover and manage exploited resources. After more than thirty years of systematic planning, implementing and monitoring MPAs, they have become part of any conservation and management strategy [15,21].

The current Aichi Biodiversity Targets of the Convention on Biological Diversity call for ten per cent of coastal and marine areas being conserved through MPAs and integrated into the wider seascapes by 2020 [4]. Despite this and other commitments, Spalding et al. [27] reviewed 10,280 MPAs showing that they represent only 5.51% of the areas under national jurisdiction of the high seas. Moreover, 54% of existing fishing activities therefore not providing protection levels of biodiversity [8].

The recent designation of large scale MPAs across than 80% of the area under protection, with the total containing 50% of that area [10,17,28]. This seems to international commitments leading to a 'race' towards MPAs, although many are placed in remote areas, are not monitored, potentially leading to a protection by society at large [17,22,23]. This fact assessment of progress towards conservation targets area coverage alone.

Additionally, the majority of MPAs include a large range of zoning and management schemes, ranging from single-zoning and from no-take to multiple-use areas. An effective classification system for MPAs that can integrate variability is essential since mislabelling may prevent evaluation of the existing types of MPAs and their effectiveness in achieving their objectives and goals [29].

The International Union for Conservation of Nature (IUCN) global categorisation of protected areas distinguishes categories based on their management objectives [3,12]

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<http://dx.doi.org/10.1016/j.marpol.2016.06.021>
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A Regulation-Based Classification System for Marine Protected Areas (MPAs)

Horta e Costa et al. Marine Policy, DOI: <http://dx.doi.org/10.1016/j.marpol.2016.06.021>

Classification System of Zones within MPAs (a decision tree)

How many types of fishing gear?

What is the impact of fishing gear? (highest gear score)*

What is the impact of other activities? (aquaculture or bottom exploitation index)**

Anchoring and/or boating? (anchoring/boating index)***

ZONE Class

ZONE Classification

| | |
|-------------------------------|------------------------------------|
| 1 No-take/No-go | 5 Moderately regulated extraction |
| 2 No-take/Regulated access | 6 Weakly regulated extraction |
| 3 No-take/Unregulated access | 7 Very weakly regulated extraction |
| 4 Highly regulated extraction | 8 Unregulated extraction |

Developing Science-based Seagrass Protection Metrics & Scores

SMA regulation-based use classification system. Use scores are based on the sum of unweighted impact criteria. Scores range from 0 = no impact, 1 = low impact, 2 = medium impact, 3 = high impact. Fishing scores are calculated based on the sum of scores per gear type impact on a) species selectivity, b) size selectivity, and 3) bottom impact. Adapted from Horta e Costa et al. (2016) for nearshore uses occurring at Fishers Island.

| Category of use | Use types | Use impact score |
|----------------------------------|---|------------------|
| Non-extractive recreational uses | Partially or unregulated boating | 2 |
| | Fully regulated boating (no motor or no wake in < 10' of water, no anchoring or conservation moorings) | 1 |
| | SCUBA diving | 1 |
| | Swimming/snorkeling | 0 |
| Bottom exploitation ³ | Construction of new coastal structures, or the expansion of existing coastal structures, movement of earth material (dredging, excavation, filling, dredge spoil placement, dune building, beach nourishment, grading, clearing/removing vegetation) | 3 |
| | Reconstruction of existing coastal structures (boat ramps, boat slips, docks, piers, wharves, boardwalks, groins, jetties, breakwaters, bulkheads, seawalls, retaining walls, rip-rap, dams, dikes, weirs, septic systems, roads, driveways, parking lots, bridges, drainage structures, buildings and building accessory structures) | 2 |
| | Other bottom structures | 1 |
| Aquaculture | Nearshore fish cages | 3 |
| | Offshore fish cages | 2 |
| | Shellfish and algae (suspension culture) | 1 |
| | Shellfish and algae (bottom culture) | 1 |
| Fishing | Beach/haul seines or surrounding nets near shore (recreational) | 8 |
| | Beach/haul seines or surrounding nets near shore (commercial) | 8 |
| | Bivalve dredge (mechanical - commercial only) | 7 |
| | Gill nets (commercial only) | 6 |
| | Traps (fish - commercial only) | 6 |
| | Lines (jigs, hook and line, rod, troll - recreational) | 5 |
| | Lines (jigs, hook and line, rod, troll - commercial) | 5 |
| | Bivalve dredge (digging, raking by hand - recreational) | 5 |
| | Bivalve dredge (digging, raking by hand - commercial) | 5 |
| | Traps and pots (lobster, crab - recreational) | 4 |
| | Traps and pots (lobster, crab - commercial) | 4 |
| | Hand harvesting (recreational) | 4 |
| | Hand harvesting (commercial) | 4 |
| | Spearfishing/diving (recreational) | 3 |
| | Spearfishing/diving (commercial) | 3 |
| | Cast nets (recreational) | 3 |
| | Cast nets (commercial) | 3 |

SMA Protection Levels classified by use impacts

| Use classification | Use classifications | SMA protection level |
|---------------------------------------|---------------------|----------------------|
| 1 – no extraction, no access | 1 or 2 | Fully protected |
| 2 – no extraction, regulated access | 3 or 4 | Highly protected |
| 3 – no extraction, unregulated access | 4 and A | |
| 4 – highly regulated extraction | 5 or 6, and A | Lightly protected |
| 5 – moderately regulated extraction | 6 or A | Minimally protected |
| 6 – weakly regulated extraction | 7 and B | Unprotected |
| 7 – very weakly regulated extraction | | |
| A – regulated access | | |
| B – unregulated access | | |



SMA Protection Level Definitions, derived from the 2019 MPA Guide²:

- **Minimally protected:** extensive extraction and other impacts are allowed while still providing some conservation benefit to the area
- **Lightly protected:** some protection exists but moderate to significant extraction and impacts are allowed
- **Highly protected:** only light extractive activities are allowed, and other impacts are minimized to the extent possible
- **Fully protected:** no extractive or destructive activities are allowed, and all impacts are minimized

³ Activities occurring in or adjacent to (300' inland of wetland edge) vegetated and unvegetated flats and shorelines subject to tides, as defined by the NY Tidal Wetlands Act and regulated by NYSDEC. More information about the NYSDEC Tidal Wetlands Permit Program is available at: <https://www.dec.ny.gov/permits/6359.html>

² Oregon State University, IUCN World Commission on Protected Areas, Marine Conservation Institute, National Geographic Society, and UNEP World Conservation Monitoring Centre (2019) *An Introduction to The MPA Guide*. <https://www.protectedplanet.net/c/mpa-guide>

Developing Seagrass Management Areas (SMA) Scenarios

Proposed SMA

Eastern North Shore I - 750 ft

Protection Level

Percent Protected

The seagrass extent of this SMA is 44.4 acres, or 12.8% of the total 2017 eelgrass extent of 347 acres. To stabilize ecosystems and prevent further... ecosystems in highly or fully protected areas. [BirdLife International et al., 2019](#) and [IUCN, 2016](#)

Show USFWS LIS Eelgrass 2017 Layer

Seagrass Protection

3 Highly protected

This classification ranges from 0 (unprotected) to 4 (fully protected), and is based on the allowed fishing gear types and uses within the area(s) using methods defined in [A regulation-based classification system for Marine Protected Areas](#), a study that evaluated impacts to biodiversity and habitats associated with allowed uses across 100 MPAs worldwide. The resulting score is intended to provide science-based guidelines for achieving protection level targets, but does not account for local differences which should also be incorporated into place-based decision-making.

Attributes

| | |
|--|--|
| Allowed aquaculture | None |
| Allowed bottom exploitation | Re-construction or maintenance of existing coastal structures. Other bottom structures. |
| Allowed fishing | None |
| Allowed non-extractive recreational uses | Fully regulated boating (no motor or no wake in < 10 ft. of water, no anchoring or conservation moorings), SCUBA diving, Swimming/snorkeling |

Summary results for a collection of proposed Seagrass Management Areas (SMA) around Fishers Island

Results shown are based on:

- Eelgrass extent in proposed SMAs
- Allowed uses in proposed SMAs
- Fishers Island Seagrass Management Coalition conservation goals:
 - 100% of the island's seagrass is effectively managed to sustain seagrass at a level that is greater than or equal to the 2017 extent
 - Maximize seagrass protection levels within SMAs

| | Islets & Rocks alt I | | | Islets & Rocks alt II | | | Western South Shore | | | | Western North Shore 500' and HH square | | | | Western North Shore 750' and HH square | | | | |
|--|----------------------|--------------|--------------------------------|-----------------------|---------------|----------------------------------|-----------------------|------------------------|-------------------------|------------------------|--|-------------|-------------|-------------|--|-------------|-------------|-------------|----|
| | Wicopasset I | Seal Rocks I | South Dumping & Flat Hammock I | Wicopasset II | Seal Rocks II | South Dumping & Flat Hammock II | Western South Shore I | Western South Shore II | Western South Shore III | Western South Shore IV | I | II | III | IV | I | II | III | IV | |
| Green=islands Yellow=south shore Blue=north shore | | | | | | | | | | | | | | | | | | | |
| Boundary | 750' | 22' depth | triangle | 750' | 22' depth | triangle | 500' | 500' | 750' | 750' | | | | | | | | | |
| Allowed/Recommended Uses | | | | | | | | | | | | | | | | | | | |
| Fishing | | | | | | | | | | | | | | | | | | | |
| Beach/haul seines or surrounding nets near shore (recreational) | | | | | | | | | | | | | | | | | | | |
| Beach/haul seines or surrounding nets near shore (commercial) | | | | | | | x | | x | | | | | | | | | | |
| Bivalve dredge (mechanical - commercial only) | | | | | | | x | | x | | | | | | | | | | |
| Gill nets (commercial only) | | | | | | | x | | x | | | | | | | | | | |
| Traps (fish - commercial only) | x | x | x | x | x | x | x | | x | | x | | x | x | x | x | x | x | |
| Lines (jigs, hook and line, rod, troll - recreational) | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | |
| Lines (jigs, hook and line, rod, troll - commercial) | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | |
| Bivalve dredge (digging, raking by hand - recreational) | | | | | | | | | | | x | | x | | x | | x | | |
| Bivalve dredge (digging, raking by hand - commercial) | | | | | | | x | | x | | x | | x | | x | | x | | |
| Traps and pots (lobster, crab - recreational) | x | x | x | x | x | x | | | | x | x | x | x | x | x | x | x | x | |
| Traps and pots (lobster, crab - commercial) | x | x | x | x | x | x | x | | x | | x | | x | | x | | x | | |
| Hand harvesting (recreational) | | | | | | | | | | x | x | x | x | x | x | x | x | x | |
| Spearfishing/diving (recreational) | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | |
| Spearfishing/diving (commercial) | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | |
| | yes | 13 | 15 | 11 | 13 | 15 | 11 | 10 | 12 | 10 | 12 | 7 | 11 | 7 | 11 | 7 | 11 | 7 | 11 |
| | no | | | 1 | | | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 |
| | unsure | | | 1 | | | 1 | 2 | | 2 | | | | | | | | | |
| Bottom Exploitation | | | | | | | | | | | | | | | | | | | |
| Construction of new coastal structures, or the expansion of existing coastal structures, movement of earth material (dredging, excavation, filling, dredge spoil placement, dune building, beach nourishment, grading, clearing/removing vegetation) | -- | -- | -- | -- | -- | -- | | | | | x | x | | | x | x | | | |
| Reconstruction of existing coastal structures (boat ramps, boat slips, docks, piers, wharves, boardwalks, groins, jetties, breakwaters, bulkheads, seawalls, retaining walls, rip-rap, dams, dikes, weirs, septic systems, roads, driveways, parking lots, bridges, drainage structures, buildings and building accessory structures), and other bottom structures | -- | -- | -- | -- | -- | -- | x | x | x | x | x | x | x | x | x | x | x | x | |
| | yes | 13 | | 14 | 13 | 14 | 13 | 13 | 13 | 13 | 7 | | | | | | | | |
| | no | | | | | | | | | | 1 | | | | | | | | |
| | unsure | | | | | | | | | | | | | | | | | | |
| Aqua-culture | | | | | | | | | | | | | | | | | | | |
| Nearshore fish cages | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | | | | | | | |
| Offshore fish cages | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | | | | | | | |
| Shellfish and algae (suspension culture) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | (includes d | (includes d | (includes d | (includes d | (includes d | (includes d | (includes d | (includes d | |
| Shellfish and algae (bottom culture) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | | | | | | | |
| | yes | 13 | | 14 | 13 | 14 | 13 | 13 | 13 | 13 | 9 | | | | | | | | |
| | no | | | | | | | | | | | | | | | | | | |
| | unsure | | | | | | | 2 | 2 | 2 | 2 | | | | | | | | |
| Non-extractive Rec Uses | | | | | | | | | | | | | | | | | | | |
| Partially or unregulated boating | x | x | x (includes designated | | | | | | | | | | | | | | | | |
| Fully regulated boating (no wake in <10' of water, trim up motor, use of conservation moorings or no anchoring) | | | | x | x | x (includes designated anchoring | | | | | x | x | x | x | x | x | x | x | |
| SCUBA diving | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | |
| Swimming/snorkeling | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | |
| | yes | 13 | | 13 | 13 | 13 | 14 | 14 | 14 | 14 | 8 | 8 | | | | | | | |
| | no | | | 1 | | | 1 | | | | | | | | | | | | |
| | unsure | | | | | | | | | | | | | | | | | | |
| Watershed Protection | | | | | | | | | | | | | | | | | | | |
| Unregulated fertilizer use and conventional septic systems | -- | -- | -- | -- | -- | -- | | | | | | | | | | | | | |
| Partially regulated fertilizer use only (synthetic time release fert allowed) | -- | -- | -- | -- | -- | -- | x | x | x | x | x | x | x | x | x | x | x | x | |
| Fully regulated fertilizer use only (synthetic time release fert allowed) | -- | -- | -- | -- | -- | -- | | | | | | | | | | | | | |
| Fully regulated fertilizer use and alternative onsite wastewater treatment systems that reduce nitrogen loading below seagrass tolerance thresholds (<3 g TN m-2 y-1) | -- | -- | -- | -- | -- | -- | | | | | | | | | | | | | |
| | yes | 13 | | 14 | 13 | 14 | 15 | 15 | 15 | 15 | 7 | 8 | | | | | | | |
| | no | | | | | | | | | | | | | | | | | | |
| | unsure | | | | | | | | | | | | | | | | | | |
| Seagrass Protection Level (0 = not protected; 1 = minimally; 2 = lightly; 3 = highly; 4 = fully) | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | |
| (0 = not protected; 1 = minimally; 2 = lightly; 3 = highly) | n/a | n/a | n/a | n/a | n/a | n/a | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Total acreage | 77 | 25.4 | 64.2 | 77 | 25.4 | 64.1 | 125.6 | 125.6 | 185 | 184.8 | 322.1 | 322.4 | 322.5 | 322.5 | 464 | 462.8 | 462.5 | 463.5 | |
| Acres of seagrass | 6.2 | 13.8 | 33 | 6.2 | 13.8 | 33 | 36.9 | 36.9 | 50.4 | 50.4 | 125.7 | 125.7 | 125.7 | 125.7 | 128.6 | 128.5 | 128.4 | 128.5 | |
| % of seagrass | 1.8% | 4.0% | 9.5% | 1.8% | 4.0% | 9.5% | 10.6% | 10.6% | 14.5% | 14.5% | 36.2% | 36.2% | 36.2% | 36.2% | 37.1% | 37.0% | 37.0% | 37.0% | |

THANK YOU

For more information, visit:

fiseagrass.org

fism.seasketch.org

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