



# Richardson's Bay Eelgrass Protection and Management Plan

July 28, 2021

Prepared for:

Richardson's Bay Regional Agency  
c/o Marin County Community Development Agency  
Planning Division  
3501 Civic Center Drive, Room 308

Prepared by:

Rebecca Schwartz Lesberg  
Coastal Policy Solutions  
<http://coastalpolicysolutions.com>  
[eelgrass@coastalpolicysolutions.com](mailto:eelgrass@coastalpolicysolutions.com)

Suggested citation:

Lesberg, R.S. 2021. Richardson's Bay Regional Agency: *Richardson's Bay Eelgrass Protection and Management Plan*. Coastal Policy Solutions (Document No. 0721). Vallejo, CA.

## Table of Contents

List of Figures.....	iii
Executive Summary .....	1
Introduction.....	2
Background.....	2
About Richardson’s Bay .....	3
Eelgrass in Richardson’s Bay.....	4
Regulatory/Policy Context.....	6
EPMP Framework .....	7
Development of the EPMP .....	7
Summary of Stakeholder Feedback.....	8
Spatial Analysis and Preliminary Proposed No Anchoring Areas.....	9
Plan Elements .....	15
Eelgrass Protection Zone/No Anchoring Area .....	15
Monitoring and adaptive management .....	16
Implementation.....	16
Acknowledgements .....	18

## List of Figures

Figure 1 - Jurisdictional Map of Richardson's Bay .....	2
Figure 2- Eelgrass covered in herring eggs. ....	4
Figure 3- Birds using Richardson's Bay. ....	5
Figure 4- Organizations represented during stakeholder engagement listening sessions.....	7
Figure 5- Example flier for targeted outreach to mariners .....	8
Figure 6- Eelgrass frequency distribution in Richardson's Bay (2003-2019) .....	10
Figure 7- Herring spawning events, depositional data (2013-2020) .....	11
Figure 8- Eelgrass and herring data layers combined.....	11
Figure 9- Eelgrass Protection Zone/No Anchoring Area (Proposed Boundary A).....	12
Figure 10- Eelgrass Protection Zone/No Anchoring Area (Proposed Boundary B).....	13
Figure 11- Eelgrass Protection Zone/No Anchoring Area (Proposed Boundary A).....	15

## Executive Summary

---

Richardson's Bay, located north of the Golden Gate in Marin County, supports the second largest eelgrass bed in the San Francisco Bay Area. This eelgrass in turn supports tens of thousands of migratory waterbirds every year and is the preferred spawning location for over 90% of the Bay Area's Pacific herring population. Despite its ecological importance, the eelgrass bed of Richardson's Bay has been damaged by the anchors, chains, and other ground tackle of boats in the Richardson's Bay anchorage. In July of 2020, Coastal Policy Solutions was retained by the Richardson's Bay Regional Agency (RBRA) to develop the agency's Eelgrass Protection and Management Plan (EPMP). The goal of the EPMP is to establish boundaries for where anchoring can or cannot occur in Richardson's Bay in order to protect eelgrass resources and prevent further damage to the eelgrass bed from anchor scour. The development of the EPMP proceeded as follows:

- Fall 2020: Policy review and stakeholder engagement
- Winter 2021: Spatial analysis and draft plan development
- April 2021: Draft EPMP released, 30-day comment period opened
- June 2021: Response to Comments Report released, feedback received from RBRA Board of Directors for EPMP finalization
- July 2021: Final EPMP adopted by RBRA Board of Directors

The EPMP consists of three main sections: Introduction, EPMP Framework, and Plan Elements. The first two sections deal mainly with background information and EPMP development. The provisions of the plan, including the adopted boundary for the Eelgrass Protection Zone/No Anchoring Area, are included in the "Plan Elements" section of the document. The adopted boundary is depicted in Figure 11 on page 15 and demarcates an "Eelgrass Protection Zone/No Anchoring Area" northwest of a line extending from Channel/Day Marker Four along the navigation channel offshore of Sausalito to the southernmost tip of the Richardson's Bay Audubon Sanctuary. This boundary will be codified into relevant regulations during the coming months. Also included in the Plan Elements section are recommendations for EPMP implementation, wildlife and water quality monitoring, and reference to possible future mooring and/or restoration programs not proposed in, but which are consistent with, the EPMP.

The development and implementation of the EPMP represents the fulfillment of policies contained in the RBRA's June 2020 Transition Plan for the anchorage, which aims to protect the environment and public health, and support recreational use of the Bay, while reducing the number of occupied and/or abandoned vessels in the Bay. This EPMP was developed with the input of dozens of individual and organizational stakeholders and represents a feasible, cost effective program for protecting eelgrass in Richardson's Bay now and for future generations.



# Introduction

## Background

Richardson’s Bay is managed by the Richardson’s Bay Regional Agency (RBRA), a local government agency serving Belvedere, Mill Valley, Tiburon, and unincorporated Southern Marin County, in coordination with the City of Sausalito (Figure 1). In June of 2020, the RBRA adopted a “Transition Plan<sup>1</sup>” for the Richardson’s Bay anchorage, which aims to protect the environment and public health, and support recreational use of the Bay, while reducing the number of occupied and/or abandoned vessels in the Bay.

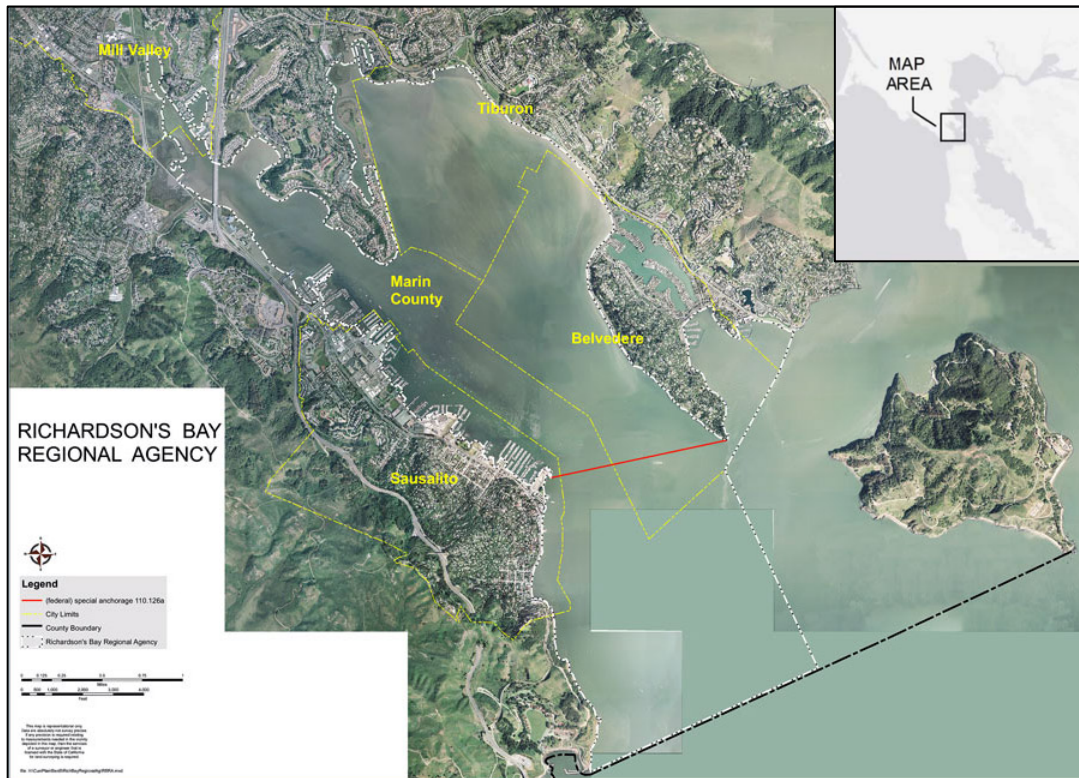


Figure 1 - Jurisdictional Map of Richardson's Bay

The Transition Plan explicitly affirms Richardson’s Bay as a temporary anchorage (*i.e.*, an anchorage with enforceable time limits for a visiting vessel’s length of stay), and includes initiatives aimed at increasing the seaworthiness of vessels on the anchorage and connecting vulnerable individuals living on the water with safe housing alternatives. Of the five Policy Directions included in the Transition Plan, four speak directly to issues relating to vessel enforcement, seaworthiness, and occupied vessels. The fifth Policy Direction relates to the protection and restoration of the Bay’s vital eelgrass beds, and reads as follows:

*5) Working with agencies, organizations, and other stakeholders, develop eelgrass protection measures and consider specific eelgrass restoration funding and projects.*

<sup>1</sup> Available online: <http://rbra.ca.gov/about-rbra/transition-plan/>

The full text of Policy Direction Five establishes “the potential designation of up to four zones in Richardson’s Bay for varying levels of vessel usage and eelgrass restoration and protection,” including the establishment of areas in Richardson’s Bay “where vessels would not be authorized to anchor or moor.”

The Transition Plan was adopted by the RBRA board on June 11, 2020 and RBRA retained Coastal Policy Solutions that July to implement Policy Direction Five. It was identified that the best way to implement this Policy Direction would be to develop and implement an Eelgrass Protection and Management Plan (EPMP) using a spatial planning approach to manage natural resource conflict in Richardson’s Bay. The draft EPMP was delivered to the RBRA Board of Directors in April 2021 and a final EPMP was delivered to the Board in July 2021.

### About Richardson’s Bay

Richardson’s Bay is a relatively shallow embayment covering approximately 1,270 hectares (3,138 acres) of mostly open water habitat in Marin County, California. The Bay is located approximately 1.3 km (0.8 miles) upstream (northeast) of San Francisco’s Golden Gate Bridge and includes areas under the jurisdictions of the Cities of Sausalito, Mill Valley, and Belvedere, as well as the Town of Tiburon and the County of Marin. Richardson’s Bay has a long history of human use, dating back to pre-European settlement of the Bay Area when the land was part of Coast Miwok tribal territory for at least 13,000 years<sup>2</sup>.

Like much of the rest of California, the area ultimately came under Spanish, then Mexican, and finally United States rule through the 18<sup>th</sup>-19<sup>th</sup> centuries, with large ships anchoring in the Bay since at least the 1890s<sup>3</sup>. Through the late 19<sup>th</sup> and 20<sup>th</sup> centuries, the shoreline of Richardson’s Bay was extensively developed for commercial, residential, and maritime purposes. In addition to the floating homes in the marinas of Sausalito, many boaters continued to live on vessels in the anchorage of Richardson’s Bay. In response to the growing number of so-called “anchor out” vessels, as well as ongoing shoreline development pressure, local governments and the San Francisco Bay Conservation and Development Commission developed the “Richardson Bay Special Area Plan”.

Finalized in 1984, the plan’s goals were “protection of [the Bay’s] natural resources; use of the water for water-oriented purposes; restoration and enhancement of degraded tidal wetlands; and provision of public access to and along its shoreline.” To implement this plan and provide coordination amongst the several municipalities with jurisdiction over the Bay, the Richardson’s Bay Regional Agency was established in 1985 as a joint powers authority governing Richardson’s Bay. Despite direction in the Special Area Plan to enforce time limits on boats anchoring in Richardson’s Bay, the population of permanent liveaboards expanded from about 90 boats in the 1970s to over 240 boats in 2016<sup>4</sup> with many boats experiencing disrepair and

---

<sup>2</sup> See: <https://native-land.ca/maps/territories/coast-miwok/> and <https://www.marinmiwok.com/>

<sup>3</sup> Clinton, L. (2001) *Barging in: a short history of liveaboards on the Bay*. Bay Crossings, San Francisco, CA. [http://www.baycrossings.com/Archives/2001/07\\_August/barging\\_in.htm](http://www.baycrossings.com/Archives/2001/07_August/barging_in.htm). Accessed 15 Apr 2018

<sup>4</sup> Fimrite, P. (2017) As more “anchor-outs” live on SF Bay, tension mounts on land. San Francisco Chronicle.

abandonment. Though not the only thing impacting eelgrass in Richardson's Bay (see the section on eelgrass below), these boats have directly removed up to 80 acres of eelgrass from the bay floor as of 2019 due to the scraping of anchors, chains, and other ground tackle<sup>5</sup>.

For a fuller description of the relationship between eelgrass and vessels anchored/moored in Richardson's Bay, see the 2019 "Ecologically-based Mooring Feasibility Assessment and Planning Study" prepared by Merkel and Associates for RBRA. Available online: [http://rbra.ca.gov/wp-content/uploads/2019/11/RBRA-Ecologically-based-Mooring-Study\\_11-11-19.pdf](http://rbra.ca.gov/wp-content/uploads/2019/11/RBRA-Ecologically-based-Mooring-Study_11-11-19.pdf)

### Eelgrass in Richardson's Bay

Historically, the shoreline of Richardson's Bay would likely have supported expansive native bayland habitats, including riparian areas, tidal marsh wetlands, mudflats, and, in subtidal areas, eelgrass beds. Though most of the Bay's shoreline has been developed, and much of these habitats lost, the area remains a critical natural resource owing in large part to its remaining eelgrass bed. The Richardson's Bay eelgrass bed varies in size but has averaged around 197 hectares (487 acres) between 2003 to 2014, with over 800 acres identified in 2019<sup>6</sup>.



Figure 2- Eelgrass covered in herring eggs.  
Photo: California Department of Fish and Wildlife

The attributes that make Richardson's Bay attractive to boaters are also those that contribute to ideal habitat for California's native eelgrass, *Zostera marina*. Shallow depths, regular tidal flushing, and relatively low turbidity have made Richardson's Bay an eelgrass stronghold, even during periods of region-wide eelgrass decline. Eelgrass is critically important for the health of coastal estuaries as well as climate resilience for coastal communities. Eelgrass beds reduce coastal erosion, sequester carbon, reduce ocean acidification, and provide nursery habitat for commercially, recreationally, and ecologically important marine life (e.g., Pacific herring and Dungeness crab)<sup>7</sup>.

The bays and estuaries of California are a stronghold for eelgrass, even as the species experiences significant declines along the Pacific Coast and abroad (at global decline rates of up

---

<sup>5</sup> Kelly, J. J., Orr, D., & Takekawa, J. Y. (2019). Quantification of damage to eelgrass (*Zostera marina*) beds and evidence-based management strategies for boats anchoring in San Francisco Bay. *Environmental management*, 64(1), 20-26.

<sup>6</sup> Merkel & Associates (2019). Ecologically-based Mooring Feasibility Study for Richardson's Bay. *Richardson's Bay Regional Agency*. Sausalito, California.

<sup>7</sup> Orth, Robert J., et al. (2006) "A global crisis for seagrass ecosystems." *Bioscience* 56.12: 987-996.



to 30,000 acres per year<sup>8</sup>). Just five bays support over 80% of our state's remaining eelgrass<sup>9</sup>, with 50% found in San Francisco Bay alone<sup>10</sup>, and the Richardson's Bay eelgrass bed is the second largest in the San Francisco Bay estuary. Beyond its size, the Richardson's Bay eelgrass bed is also disproportionately important in supporting commercial and recreational fisheries – in the 2019/2020 Pacific herring season, for example, 90% of San Francisco Bay's herring spawning biomass occurred in Richardson's Bay<sup>11</sup>. Tens of thousands of migratory waterfowl and shorebirds rely on Richardson's Bay eelgrass beds for feeding and resting during migration along the Pacific Flyway<sup>12</sup>. Without the eelgrass-herring ecosystem, species survival would be in jeopardy.



Figure 3- Birds using Richardson's Bay.  
Photo: B. Hinz, Courtesy of Audubon California

Despite its importance, eelgrass faces myriad threats, both locally and regionally. Human activity (e.g., dredging, boating, and anchoring) and climate change (sea level rise and warming ocean temperatures) are leading threats to eelgrass. This is coupled with limited restoration success, and a lack of both formal valuation and community understanding of its benefits<sup>13</sup>. In Richardson's Bay, eelgrass is only able to survive in up to about 1.7 m (5.5 feet) of water<sup>14</sup>. Because of eelgrass's narrow depth limits, coupled with Richardson's Bay homogeneous bathymetry (i.e., the bay floor is relatively flat), just a few inches of sea level rise will likely drown out the deepest areas of the eelgrass bed. Therefore, improved management of the eelgrass bed is required as part of the area's climate resilience and adaptation efforts.

Since January 2018, RBRA staff have removed more than 180 abandoned and derelict vessels from the Richardson's Bay anchorage. This, coupled with active enforcement of the Bay's 72-hour time limit for visiting vessels, has greatly reduced the impact of boats on eelgrass in Richardson's Bay. However, more specific action is needed to actively protect of eelgrass in Richardson's Bay. This is because existing regulations allow for boats to anchor almost

---

<sup>8</sup> Waycott, M., Duarte, C.M., Carruthers, T.J., Orth, R.J., Dennison, W.C., Olyarnik, S., Calladine, A., Fourqurean, J.W., Heck, K.L., and Hughes, A.R. (2009). Accelerating loss of seagrasses across the globe threatens coastal ecosystems. *Proc. Natl. Acad. Sci.* 106, 12377–12381.

<sup>9</sup> National Fisheries, West Coast Region, National Oceanic and Atmospheric Administration, 2014. California Eelgrass Mitigation Policy and Implementing Guidelines.

<sup>10</sup> Merkel & Associates (2009). San Francisco Bay Eelgrass Inventory: October - November 2009 (San Diego, CA).

<sup>11</sup> California Department of Fish and Wildlife report to the Director's Herring Advisory Committee Meeting (October 13, 2020)

<sup>12</sup> Audubon California. 2018. Eelgrass, herring, and waterbirds in San Francisco Bay: a threats and opportunities assessment. Report to the Gordon and Betty Moore Foundation. Richardson Bay Audubon Center & Sanctuary. Tiburon, California.

<sup>13</sup> *Id.*

<sup>14</sup> Merkel, K. (2004) Baywide Eelgrass Inventory of San Francisco Bay. Merkel & Associates, Inc., San Diego, CA

anywhere in Richardson’s Bay (including in areas of eelgrass), with the exception of the Audubon Sanctuary in northern Richardson’s Bay, Sausalito’s Dunphy Park, and certain channels. As long as boats are in compliance with time limits and seaworthiness, there are currently no anchoring location restrictions to protect the Bay’s eelgrass beds.

### Regulatory/Policy Context

Richardson’s Bay and its natural resources, including eelgrass, exists within an overlapping framework of laws, regulations, policies, and directives. While we do not intend to fully describe or unpack that framework here, several of these policies have significantly informed EPMP development and are described below.

- McAtteer-Petris Act<sup>15</sup> (enacted 1965, amended many times since) – This is the key legal provision under California state law to preserve San Francisco Bay from indiscriminate filling. Established the Bay Conservation and Development Commission (BCDC).
- San Francisco Bay Plan<sup>16</sup> (adopted 1969, amended since) – Includes major policies and findings for the long term use of San Francisco Bay. Objectives: 1) Protect the Bay as a great natural resource for the benefit of present and future generations; and 2) Develop the Bay and its shoreline to their highest potential with a minimum of Bay filling. Several findings and policies are relevant here, including Subtidal Areas Policy #2: “Subtidal areas that are scarce in the Bay or have an abundance and diversity of fish, other aquatic organisms and wildlife (e.g., eelgrass beds, sandy deep water or underwater pinnacles) should be conserved.”
- Richardson’s Bay Special Area Plan<sup>17</sup> (adopted 1985) – Adopted a common set of policies, findings, and regulatory controls for managing Richardson’s Bay. Several of these are relevant for the EPMP, including Aquatic and Wildlife Resources Policy #1: “Eelgrass beds, important to herring spawning and for production of detritus, should also receive maximum protection.”
- California Eelgrass Mitigation Policy<sup>18</sup> (CEMP) and Implementing Policies (adopted 2014) – Established a National Marine Fisheries Service policy of “no net loss of eelgrass habitat function in California” and provided compensatory mitigation ratios for unavoidable loss of eelgrass habitat function. Note that this EPMP does *not* intend to serve as a Comprehensive Management Plan (CMP) as defined on page 17 of the CEMP, but may serve as a basis for future CMP efforts.
- Recent direction from the BCDC Enforcement Committee to “address eelgrass damage and restoration.”<sup>19</sup>
- RBRA Transition Plan (adopted June 2020) – Policy Direction #5 states, “Working with agencies, organizations, and other stakeholders, develop eelgrass protection measures and consider specific eelgrass restoration funding and projects.”

---

<sup>15</sup> Available here: [https://www.bcdc.ca.gov/plans/mcateer\\_petris.html](https://www.bcdc.ca.gov/plans/mcateer_petris.html)

<sup>16</sup> Available here: [https://www.bcdc.ca.gov/plans/sfbay\\_plan.html](https://www.bcdc.ca.gov/plans/sfbay_plan.html)

<sup>17</sup> Available here: [http://rbra.ca.gov/wp-content/uploads/2018/04/Special\\_Area\\_Plan-1.pdf](http://rbra.ca.gov/wp-content/uploads/2018/04/Special_Area_Plan-1.pdf)

<sup>18</sup> Available here: [https://media.fisheries.noaa.gov/dam-migration/cemp\\_oct\\_2014\\_final.pdf](https://media.fisheries.noaa.gov/dam-migration/cemp_oct_2014_final.pdf)

<sup>19</sup> Described here: <https://bcdc.ca.gov/enforcement/2021/20210324-ITEM-7-Richardson's-Bay-Staff-Presentation-FINAL.pdf>

## EPMP Framework

---

### Development of the EPMP

This EPMP was developed in three parts: policy review, stakeholder engagement, and spatial analysis/planning. During the policy review, relevant laws, regulations, policies, and directives were analyzed to identify appropriate actions for protecting and managing eelgrass in Richardson’s Bay (see Regulatory/Policy Context section above).

Following the policy review, stakeholder engagement was conducted during fall 2020 and winter 2021. Stakeholder engagement included the following:

- Five 1.5 hour facilitated listening sessions were held via Zoom, targeting environmental groups, scientists, elected officials, marina operators, resource/regulatory agencies, and Richardson’s Bay mariners. These sessions engaged 40+ participants representing 20+ organizations (Figure 4).

Organizations Represented		
Audubon CA	Marin Audubon Society	Regional Water Quality Control Board
Bay Conservation and Development Commission	Marin Conservation League	San Francisco Bay Joint Venture
Belvedere City Council	County of Marin	San Francisco State University - Estuary and Ocean Science Center
California Department of Fish and Wildlife	Marina Plaza Harbor	Sausalito Yacht Harbor
California State Coastal Conservancy	Merkel and Associates	US Army Corps of Engineers
City of Sausalito	NOAA Fisheries	Waldo Point Harbor
Galilee Harbor	Pew Charitable Trust	

Figure 4- Organizations represented during stakeholder engagement listening sessions.

- During these sessions, participants were provided with an overview of the EPMP process and information about eelgrass, and were then taken through a series of facilitated questions addressing threats to eelgrass in Richardson’s Bay, key uses to consider during EPMP development, and time for additional thoughts/questions.

Despite repeated, targeted attempts to reach the community of individuals living on the water in Richardson’s Bay (Figure 5), none participated in the formal EPMP stakeholder engagement. Unfortunately, this community is notoriously hard to reach using virtual engagement strategies, and in-person outreach was severely limited due to the COVID-19 global pandemic. In efforts to engage mariners, links for participation were shared at three RBRA meetings, posted to social media, and shared directly with key members of the mariner community. Mariner-focused Zoom listening sessions were held on three separate occasions (two during the day, including during and after the free lunch provided by Sausalito Presbyterian Church, and one in the evening). Additionally, an email address was set up where people could email their thoughts directly to project consultants.

Fortunately, significant stakeholder feedback from the mariner community was generated during the 2018/2019 RBRA meetings held during the development of the Ecologically-based Mooring Feasibility Assessment and Planning Study as well as the Transition Plan. This feedback was reviewed during the EPMP development process.

Following the stakeholder engagement, spatial analysis was conducted and two preliminary proposed boundary areas were developed for an “Eelgrass Protection Zone/No Anchoring Area.” These two plans were included in a draft EPMP, which was presented to the public and the RBRA Board of Directors at their April 2021 RBRA Board meeting. Board and public feedback were received at that time and the Board commenced a 30 day comment period. Following the comment period, a Response to Comments Report was prepared and delivered to the public and the RBRA Board of Directors at their June 2021 RBRA Board meeting. At that meeting, the RBRA Board provided direction for EPMP finalization, including a preferred boundary for the Eelgrass Protection Zone/No Anchoring Area.

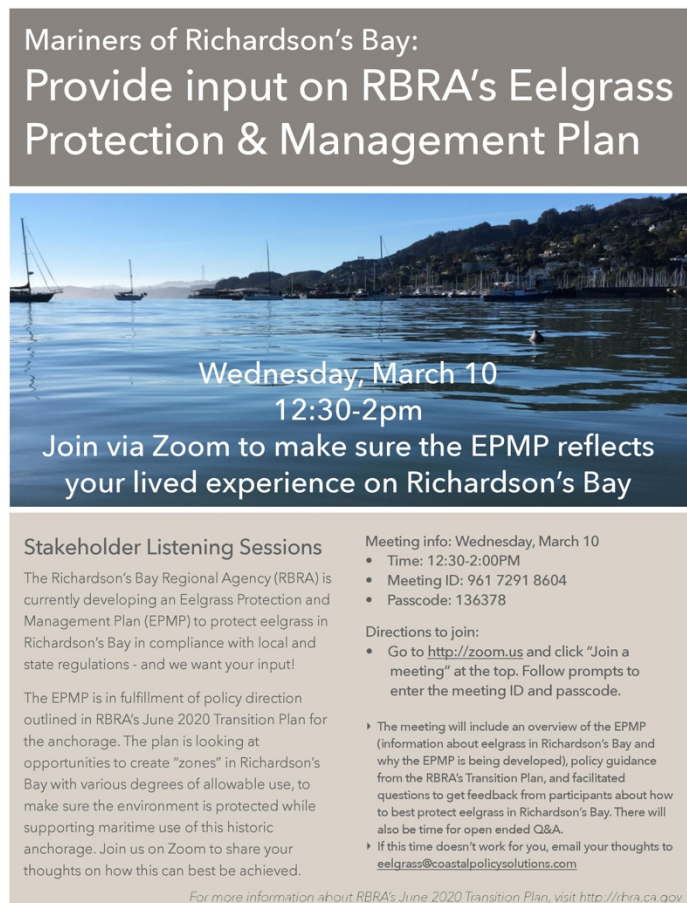


Figure 5- Example flier for targeted outreach to mariners

### Summary of Stakeholder Feedback

A full presentation describing stakeholder feedback was presented to the RBRA Board of Directors during their monthly meeting on December 10, 2020. A recording of that meeting is available online at: <http://rbra.ca.gov/meeting-archives/>. A summary of stakeholder feedback by theme is described below.

#### Theme 1: Threats to Richardson’s Bay to consider during EPMP development

- Sea level rise and other impacts of climate change
- Public safety
- Damage from anchors, chains, and other ground tackle
- Marine debris
- Stormwater runoff/water quality
- Shading and other impacts from docks
- Loss of maritime culture (not just liveaboards), including herring/fishing culture

- Regulatory burdens on marina operators
- Natural fluctuation in eelgrass determining static boundaries
- Lack of awareness about importance of eelgrass to communities

#### Theme 2: Uses to consider during EPMP development

- Richardson’s Bay is an anchorage
- Recreation, especially non-motorized
- RB as a sailing destination for cruisers/visiting vessels
- Education
- Marinas
- Science/research
- Eelgrass restoration and bed migration with sea level rise
- Birds and wildlife
- Beneficial reuse of sediment/dredge material
- Opportunities for deeper water off Belvedere/Tiburon

#### Theme 3: Additional feedback

- Vessel enforcement will be key to success
- Partnerships important
- Should include monitoring on ecological scale (10 years+)
- Don’t make marina operation harder
- Keep zones as simple as possible (anchoring/no anchoring)
- Include an alternatives analysis
- Mooring program: safer, better for eelgrass; should be considered now rather than a separate planning process down the line; visitor-serving, revenue generating
- Need for spatial analysis, not just planning
- Need to consider social issues/impacts of EPMP implementation, especially with regards to people living on the anchorage

### Spatial Analysis and Preliminary Proposed No Anchoring Areas

The spatial analysis used in development of this final EPMP consisted of two main parts: 1- GIS mapping and analysis of eelgrass distribution/ frequency of occurrence as well as the distribution of herring spawning events; 2- Development and consideration of two initial proposed boundaries for an “Eelgrass Protection Zone/No Anchoring Area”, including an estimate of each zone’s size (acreage) and carrying capacity for anchored vessels. The two aspects of spatial analysis are described more fully below.

1. Distribution of eelgrass and herring in Richardson’s Bay: To plan for and mediate natural resource conflict in Richardson’s Bay, the following data layers were analyzed and mapped using geographic information systems (GIS) mapping software:
  - NOAA Nautical Chart #18649 – This navigational chart was used as the base layer for the spatial analysis so that any recommendations for zoning were based on how the space is being used by mariners on the water.





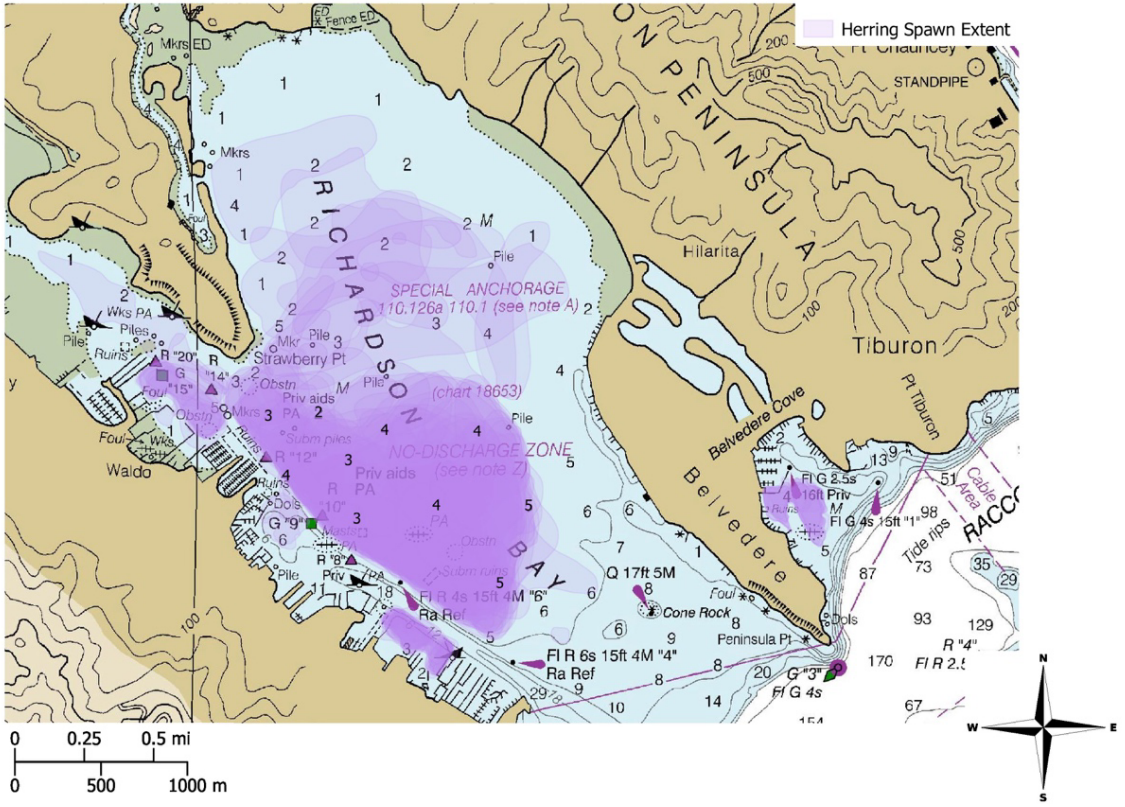


Figure 7- Herring spawning events, depositional data (2013-2020)  
 Each purple polygon represents one spawning event. Note: multiple spawning events occur during each year. Areas of darker purple indicate repeated spawning events.

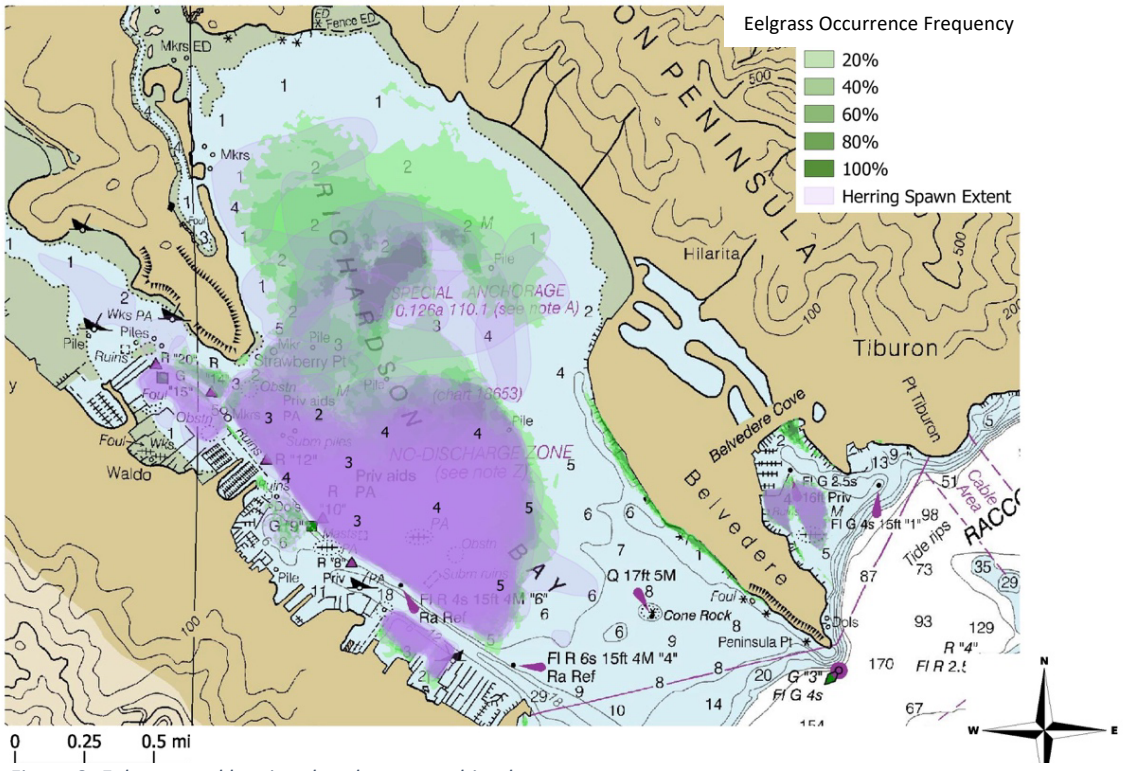


Figure 8- Eelgrass and herring data layers combined.



2. Preliminary Proposed No Anchoring Areas: Based on the policy review, stakeholder engagement, and the eelgrass/herring spatial analysis, two initial “Eelgrass Protection Zone/No Anchoring Areas” were proposed in the draft EPMP.

- **Proposed Boundary A:** This boundary demarcates an “Eelgrass Protection Zone/No Anchoring Area” northwest of a line extending from Channel/Day Marker Four to the southernmost tip of the Richardson’s Bay Audubon Sanctuary, shown in the image below as “Proposed Boundary A” (Figure 9).

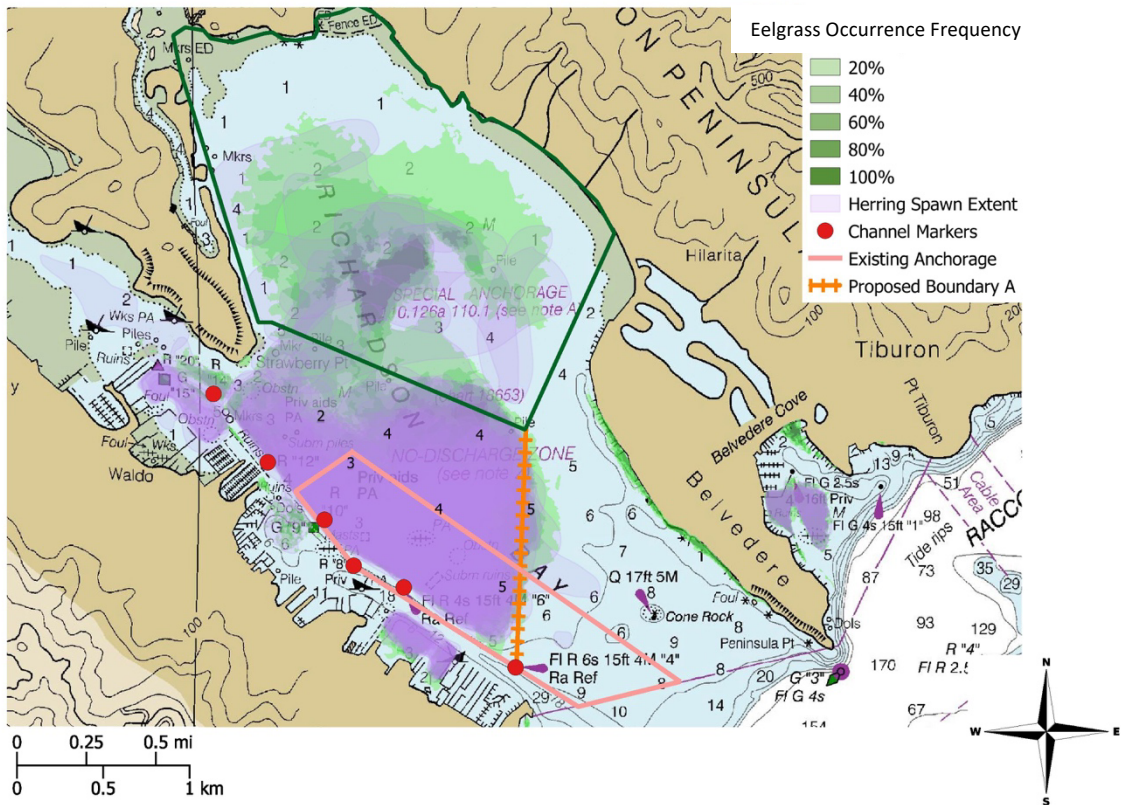


Figure 9- Eelgrass Protection Zone/No Anchoring Area (Proposed Boundary A)

To protect eelgrass in Richardson’s Bay from damage associated with anchor scour, an “Eelgrass Protection Zone/No Anchoring Area” is proposed. The proposed area extends northwest of a line running from Channel Marker Four in the south to the southern tip of the Audubon Sanctuary in the north (the orange hashed line in the figure above). This area would be off-limits for anchoring, but available for all other activities allowed in Richardson’s Bay (e.g., sailing, motoring, kayaking, etc.).

- **Proposed Boundary B:** An alternative boundary for the “Eelgrass Protection Zone/No Anchoring Area” was considered (Figure 10), which followed the six-foot contour shown on the nautical navigation chart for the area, shown below as “Proposed Boundary B”.

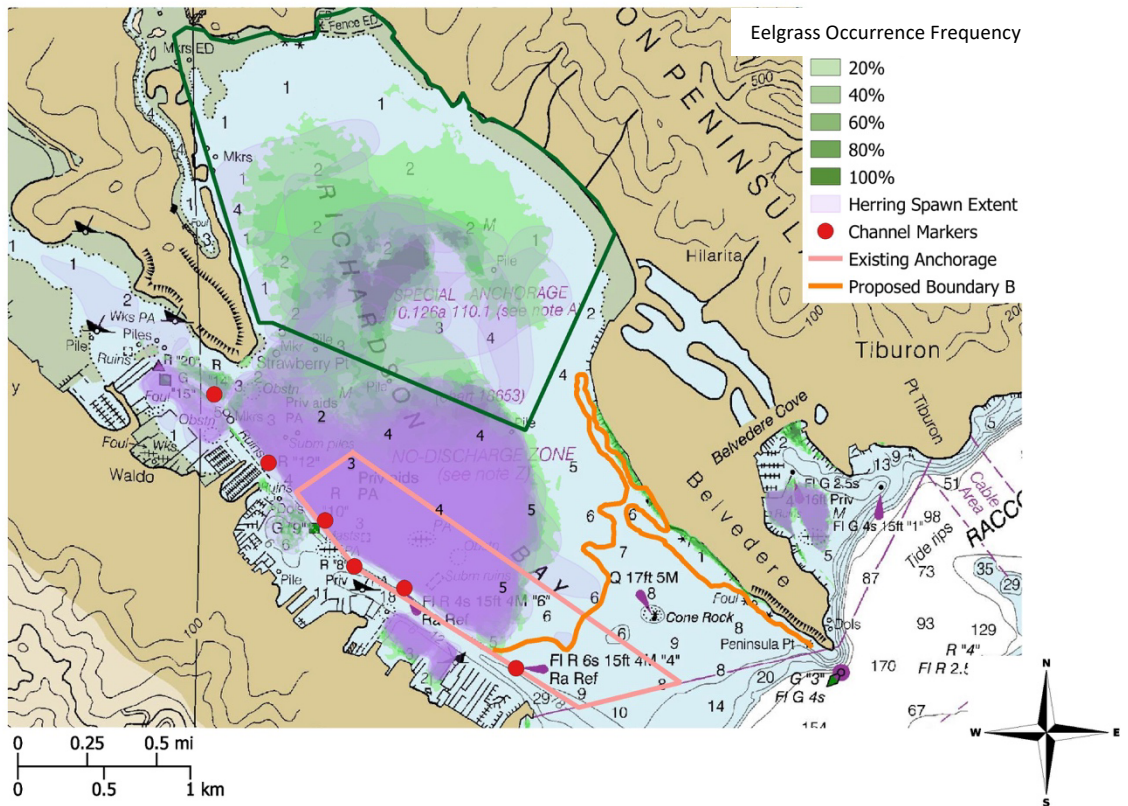


Figure 10- Eelgrass Protection Zone/No Anchoring Area (Proposed Boundary B)

An alternate boundary for the Eelgrass Protection Zone/No Anchoring Area that followed the existing six-foot navigational contour was considered, depicted as the orange line in the image above. While this boundary more fully protected the full extent of eelgrass in Richardson's Bay, with room for bed expansion, the enforcement of such a boundary was deemed infeasible and it provided too little area for anchoring.

- **Analysis of Proposed Boundaries:**

- Because both boundaries prohibit anchoring in areas where anchoring and eelgrass have historically overlapped, both are consistent with the CEMP's no-net-loss policy as described in the Regulatory/Policy Context section above, as well as eelgrass policies in other guiding documents.
- By including the eelgrass along the shoreline of Belvedere, Proposed Boundary B explicitly places 100% of eelgrass within the No Anchoring Zone. However, this boundary would also disallow anchoring in significant portions of unvegetated bay-bottom without additional benefits to the eelgrass.
- By using existing boundaries (Audubon Sanctuary) and existing channel markers (Day Marker Four), and creating one clear Eelgrass Protection Zone/No Anchoring Area, Proposed Boundary A is consistent with stakeholder feedback requesting fewer, simpler zones as compared to the draft zones described in the Transition Plan. Meanwhile, Proposed Boundary B is likely to be confusing for visiting mariners and difficult to communicate with on-the-water signage.

- Both proposals would only prohibit anchoring from occurring in the Eelgrass Protection Zone/No Anchoring Area. All other activities currently supported in Richardson’s Bay (kayaking, sailing, motoring, fishing, etc.) would be unaffected by the proposed changes. However, all allowed activities would be required to avoid damaging the eelgrass below (i.e., avoiding propeller and/or keel dragging along the bay bottom).
- Neither proposal has foreseen consequences on local marinas and do not change regulations affecting their operations.
- **Acreages available for anchoring:** RBRA regulations currently identify an official “RBRA Anchoring Area” in Marin County waters where boats are permitted to anchor for up to 72 hours (shown as the salmon-colored rectangle in Figures 9 and 10). Anchoring in the City of Belvedere waters north and east of the RBRA Anchoring Area is allowed for a maximum of 10 hours. The table below shows acreages for both existing anchoring areas (RBRA and Belvedere), and the acreages of those areas under both proposed No Anchoring Zone boundaries.

Existing area for anchoring (acres)			Proposed Boundary A (acres)			Proposed Boundary B (acres)		
RBRA Anchoring Area	Belvedere Water	Total	RBRA Anchoring Area	Belvedere Water	Total	RBRA Anchoring Area	Belvedere Water	Total
262.7	464.6	727.2	89.5	316.0	405.5	66.0	171.5	237.5
Percent of existing:			34%	68%	56%	25%	37%	33%

- **Carrying Capacity:** The carrying capacity of an anchorage is difficult to estimate because there are many variables to consider, such as boater preference, distance to shore access, water depth, availability of pump-out services, and varying wind and current conditions, etc. However, a rough estimate of carrying capacity of the Richardson’s Bay anchorage under various scenarios was calculated as follows: The maximum number of vessels anchored in Richardson’s Bay was documented at approximately 240 boats in 2016. Assuming that figure approximates the maximum functional carrying capacity of the existing anchorage, the carrying capacities of the reduced-size anchorages can be approximated based on the percent reduction in space for anchoring.
  - Therefore, a very rough approximation of the anchorage’s carrying capacity is:
    - Existing anchorage: 240 boats
    - Proposed Boundary A: 56% of 240 = 134 boats
    - Proposed Boundary B: 33% of 240 = 79 boats
  - As of the date of this writing, 15 vessels are enrolled in the RBRA’s Safe and Seaworthy Program. Either proposed scenario would provide ample accommodation for so-called “legacy” liveaboard vessels and visiting cruisers.



## Plan Elements

### Eelgrass Protection Zone/No Anchoring Area

In adopting this EPMP, the RBRA Board of Directors adopts and plans to implement an “Eelgrass Protection Zone/No Anchoring Area” consistent with “Proposed Boundary A” depicted in Figure 9 (page 12) and copied below for reference:

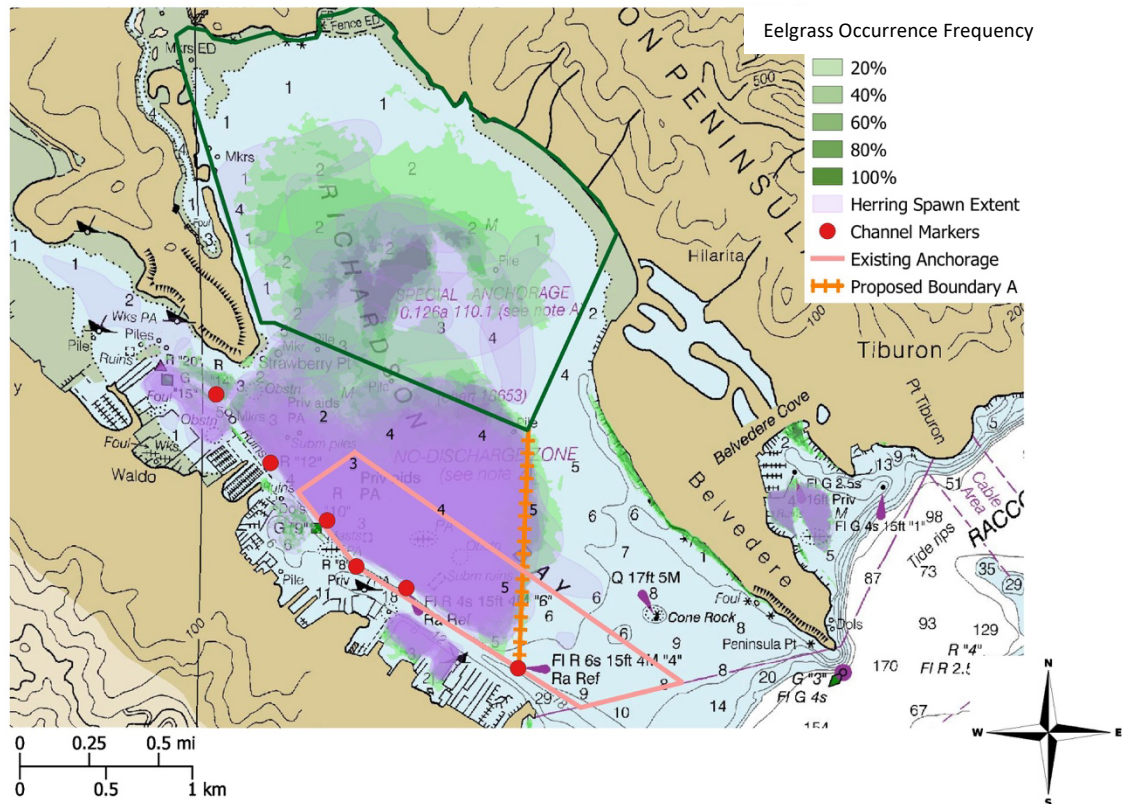


Figure 11- Eelgrass Protection Zone/No Anchoring Area (Proposed Boundary A)

To protect eelgrass in Richardson's Bay from damage associated with anchor scour, an “Eelgrass Protection Zone/No Anchoring Area” is proposed. The proposed area extends northwest of a line running from Channel Marker Four in the south to the southern tip of the Audubon Sanctuary in the north (the orange hashed line in the figure above). This area would be off-limits for anchoring, but available for all other activities allowed in Richardson's Bay (e.g., sailing, motoring, kayaking, etc.).

The proposed “Eelgrass Protection Zone/No Anchoring Area” would reduce the size of the official RBRA Anchorage Area by approximately two-thirds. The Protection Zone would also include (and, therefore, prohibit anchoring in) approximately one third of the Richardson's Bay waters within the City of Belvedere's jurisdiction. City of Belvedere waters outside of the Protection Zone would retain time limits according to Belvedere regulations (currently 10 hours).

In making these changes to areas available for anchoring in Richardson's Bay, it would limit the number of boats the anchorage could support at any one time. However, the following factors were taken into consideration when developing this proposal:

- The proposed “Eelgrass Protection Zone/No Anchoring Area” aligns closely with the five foot mean lower-low water (MLLW) contour in Richardson’s Bay, meaning most of the area is five feet deep or less during low tide. Many cruising/visiting vessels, especially sailboats with keels, are unlikely to choose to anchor in such shallow water.
- The majority of vessels currently enrolled in RBRA’s Safe and Seaworth Program are located outside of this proposed “Eelgrass Protection Zone/No Anchoring Area.”
- Boats currently anchored in Richardson’s Bay could be anchored more closely together than is seen under current conditions, so the functional carrying capacity of the official Anchorage Area is likely to still meet demand for a 72-hour anchorage.

### Monitoring and adaptive management

The following monitoring and adaptive management actions are proposed, pending the availability of funding:

- Annual monitoring: Aerial (UAV or similar) photography and GIS analysis of the anchorage area to quantify anchor scour damage and/or recovery of eelgrass for ten years or until at least 80% of the damage has been recovered (whichever occurs later). After 80% recovery, discontinue annual aerial photography monitoring.
- Tri-annual (every three years) monitoring: Bathymetric mapping of Richardson’s Bay using sidescan sonar or equivalent technology to document eelgrass density and spatial extent of the bed, to be continued until the damage from anchor scour is been at least 80% recovered. After 80% recovery, decrease to mapping once every five years as part of an ongoing monitoring program.
- Water quality monitoring: Expand water quality monitoring efforts in Richardson’s Bay with a focus on evaluating impacts from storm runoff and sewage outflow events. Engage with municipalities surrounding Richardson’s Bay to identify collaborative solutions to municipal water issues potentially impacting the bay. Continue working with the Regional Water Quality Control Board to conduct at least twice-yearly water quality testing and reporting.
- Five-year adaptive management review: Every five years, compare changes in the eelgrass bed with the area of the “Eelgrass Protection Zone/No Anchoring Area.” Consider amending the Protection Zone if it no longer serves the intended needs. For example, if eelgrass has migrated northward in the Bay (which may occur with sea level rise) and the deeper portions of the Protection Zone no longer contain eelgrass, consider shifting the Protection Zone accordingly and increasing areas open for anchoring. Alternatively, if the bed has expanded and the Protection Zone no longer encompasses at least 90% of the eelgrass bed, consider expanding the Protection Zone and reducing anchoring area accordingly.

### Implementation

- Cost:
  - The costs associated with implementation of the EPMP include personnel time to update relevant regulations to codify the adopted Eelgrass Protection Zone/No Anchoring Area boundary, education and outreach to communicate the changes,

wildlife and water quality monitoring, and hard costs associated with installation of new and updated signage (on and off the water).

- In 2021, RBRA was awarded a Proposition 68 Coastal Resilience Grant from the Ocean Protection Council funding all these activities exclusive of water quality monitoring and installation of updated signage. RBRA staff will continue to seek grant funding for expanded water quality monitoring, and the installation of updated signage is likely to be funded with existing RBRA operational budget but may also be the focus of future grant-making endeavors.
- It is not expected that implementation of the EPMP will require an increase in RBRA member agency contributions.
- Social Considerations: Implementation of the EPMP should be mindful of the social impacts of changes to water uses in Richardson’s Bay, particularly as it relates to vulnerable individuals living on the anchorage. RBRA should continue, and where possible expand, efforts to connect these individuals with supportive services.
- Other Considerations:
  - Signage – New and updated signage will be required in order to communicate the boundaries of the Eelgrass Protection Zone/No Anchoring Area. In addition to signage at relevant locations along the Sausalito shoreline (installed in collaboration with the City of Sausalito and other landowners), RBRA should consider the importance of updated signage on the water. Specifically, the installation of a hard piling or marker at the southern tip of the Richardson Bay Audubon Sanctuary, marked appropriately for visibility from Day Marker Four, should be considered.
  - Shore access – As part of EPMP implementation efforts, as well as efforts to implement the full suite of policy directives included in the June 2020 Transition Plan, RBRA should consider efforts to engage with shoreline municipalities and stakeholders to expand shore access. This should include working with marina operators to allow guest dock dinghy access for visiting cruisers and other appropriate user groups in Richardson’s Bay, in accordance with marina rules and regulations.



## Acknowledgements

---

The author would like to thank the numerous stakeholders who engaged with the efforts to develop this EPMP. This document, and the plan it outlines, would not have been possible without the dedicated individuals that spent time reviewing and providing input at all stages of the process.

Special thanks are due to the following individuals and organizations:

- Curtis Havel, RBRA Agency Harbormaster
- James Malcolm, RBRA Assistant Harbormaster
- Beth Pollard, Consultant to RBRA
- Stephanie Moulton-Peters, RBRA Board of Directors (Chair)
- Jim Wickham, RBRA Board of Directors
- Alice Fredericks, RBRA Board of Directors
- Steve Block, RBRA Board of Directors
- Kate Sears, former RBRA Board member
- Paige Fernandez, Richardson's Bay Audubon Center and Sanctuary
- Casey Arndt, Richardson's Bay Audubon Center and Sanctuary
- Barbara Salzman, Marin Audubon Society
- Keith Merkel, Merkel and Associates
- Andrew Weltz, CA Department of Fish and Wildlife
- Adrienne Klein, Bay Conservation and Development Commission

This document was made possible thanks to funding from the California Ocean Protection Council, the Cities of Mill Valley and Belvedere, the Town of Tiburon, and the County of Marin.