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Richardson's Bay Eelgrass Protection & Management Plan (EPMP)

Implementation Update:

Annual eelgrass and waterbird monitoring – 2021/2022 Report

Presented to: Richardson Bay Regional Agency (RBRA) Board of Directors

Presented by: Rebecca Schwartz Lesberg, Coastal Policy Solutions

Date: September 7, 2022

Contact: rebecca@coastalpolicysolutions.com

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Outline

- About the Eelgrass Protection and Management Plan (EPMP)
- EPMP implementation
- Monitoring overview
- Annual report - results
- Final thoughts
- Next steps
- Q&A

Healthy eelgrass in Central California. Photo: Melissa Ward

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About the EPMP

Main Goal:

Establish boundaries for where anchoring can or cannot occur in Richardson Bay in order to protect eelgrass resources and prevent further damage to the bed from anchor scour.

EPMP Available here: http://rbra.ca.gov/wp-content/uploads/2021/08/Final-EPMP-7-28-21-2.pdf

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Why protect eelgrass?

- Basis of food chain and ecosystem
- Provides habitat for:
  - Seals, porpoises, river otters
  - Dungeness crab, baby fish
  - Migrating birds
- Spawning habitat for herring
  - Last commercial fishery in SF Bay

Clockwise from top left: Herring eggs on eelgrass (CDFW), Dungeness crab for dinner (Halfmoon Bay Brewing Company), and Surf Scoters in flight (Audubon).

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6 Reasons to Protect Eelgrass

1 Protects coastlines

Eelgrass helps stabilize the shore in addition to furnishing habitat for a variety of marine wildlife.

2 Mitigates climate change

Eelgrass absorbs carbon dioxide and methane—climate-warming greenhouse gases—and stores them in its root system.

3 Nurtures fish

Eelgrass beds provide shelter and foraging areas for rockfish, salmon, and Dungeness crabs.

4 Feeds birds

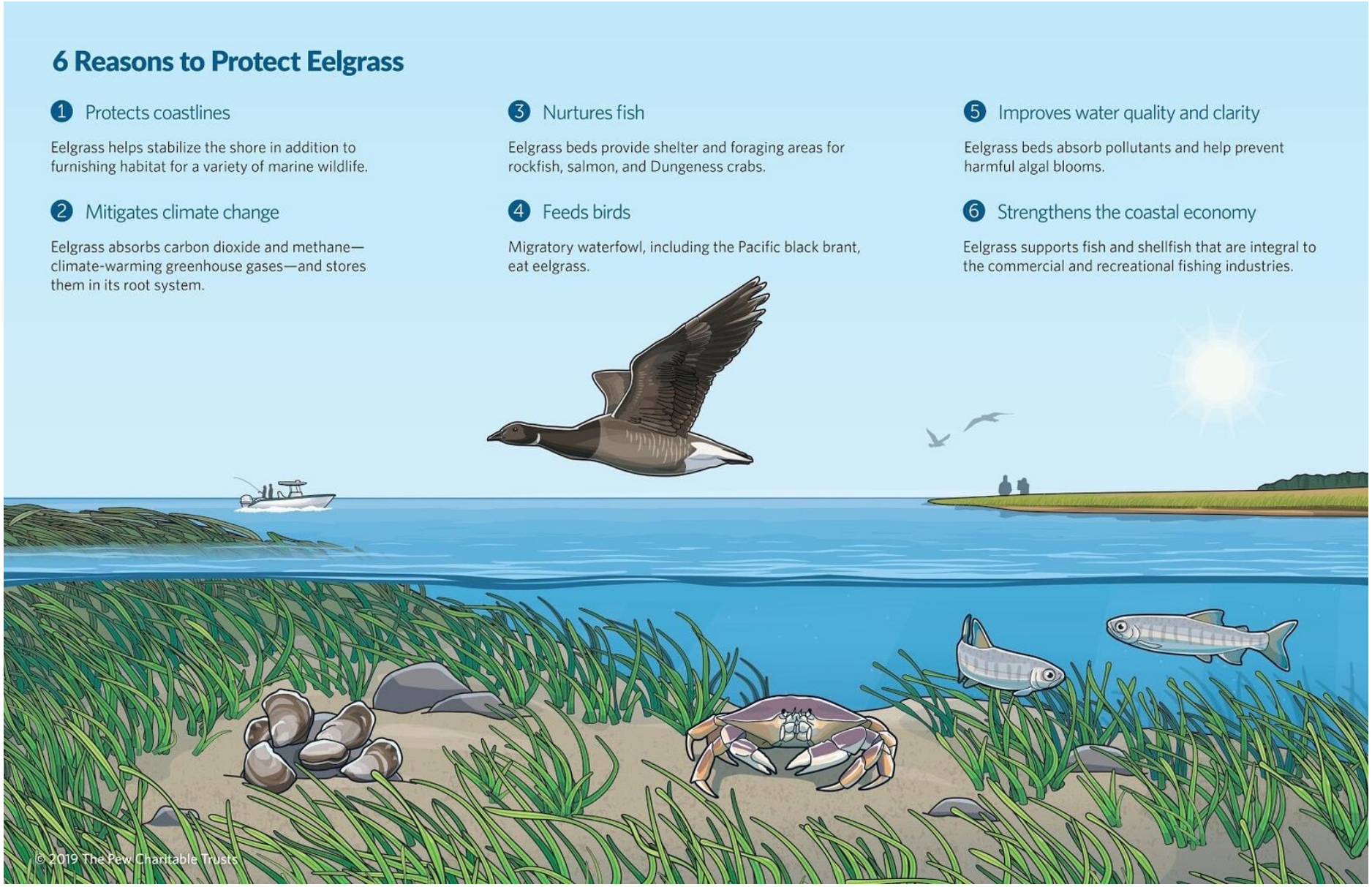
Migratory waterfowl, including the Pacific black brant, eat eelgrass.

5 Improves water quality and clarity

Eelgrass beds absorb pollutants and help prevent harmful algal blooms.

6 Strengthens the coastal economy

Eelgrass supports fish and shellfish that are integral to the commercial and recreational fishing industries.



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About the EPMP

- Implements policies from June 2020 RBRA Transition Plan
- Significant stakeholder outreach
  - Five 1.5-hr Zoom listening sessions
  - Targets: environmental groups, scientists, elected officials, marina operators, resource/regulatory agencies, RB mariners
  - 40+ people, 20+ organizations
  - Reviewed mariner feedback from 2019 community workshops

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	

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About the EPMP

- Spatial analysis:
  - Eelgrass cover
  - Herring spawn

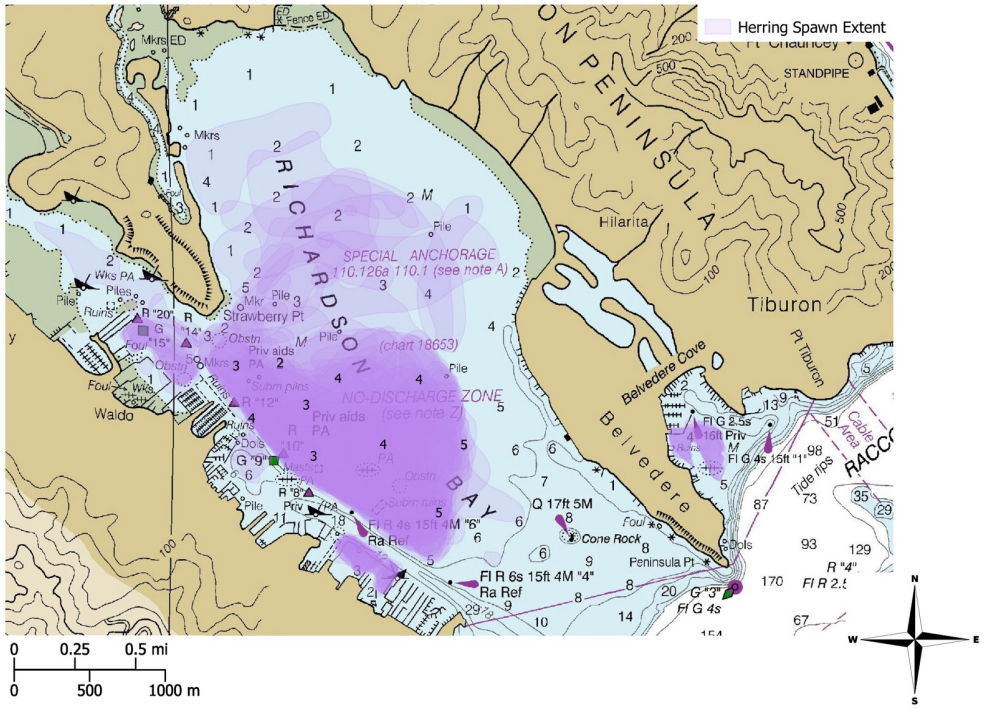

Figure: Herring spawning events (2013-2020). Each purple polygon represents one spawning event. Areas of darker purple indicate repeated spawning events. Data courtesy CA Dept. of Fish and Wildlife. Map courtesy Audubon CA.

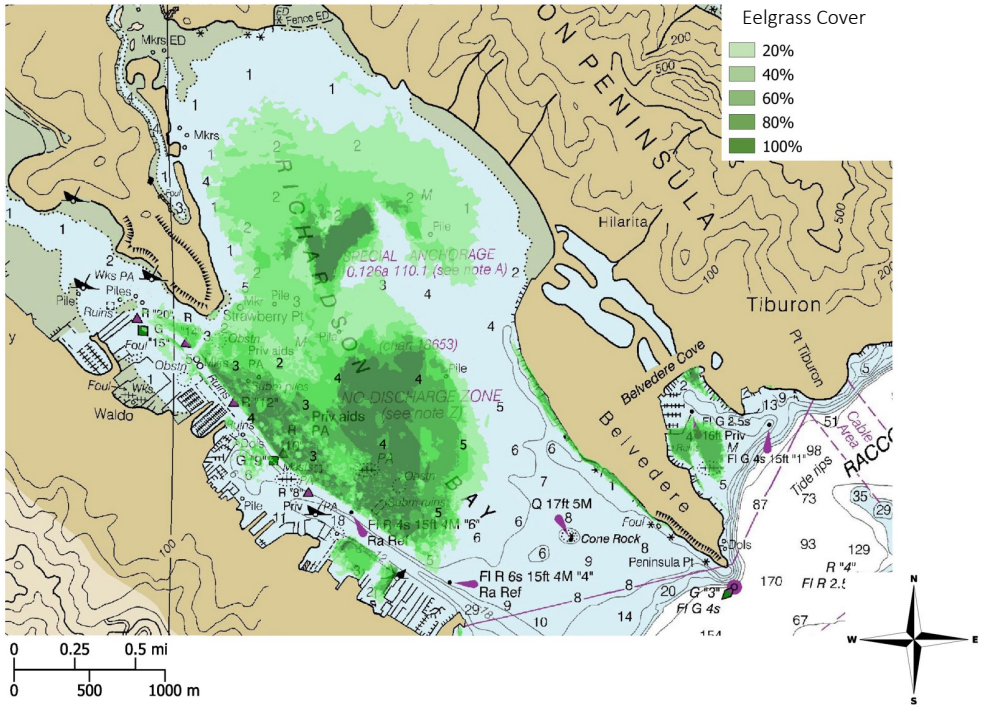

Figure: Eelgrass frequency distribution in Richardson's Bay (2003-2019). Data are derived from side-scan sonar surveys conducted by Merkel and Associates in years 2003, 2009, 2013, 2014, and 2019. Map courtesy Audubon CA.

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About the EPMP – Eelgrass Protection Zone

- Anchoring prohibited NW of orange line
  - Tip of Audubon Sanctuary to Day Marker 4
  - Above the 5-foot MLLW contour
- No change to shore access
- Only applies to anchoring; all other activities (kayaking, sailing, motoring, fishing, marinas, recreation, etc.) unaffected

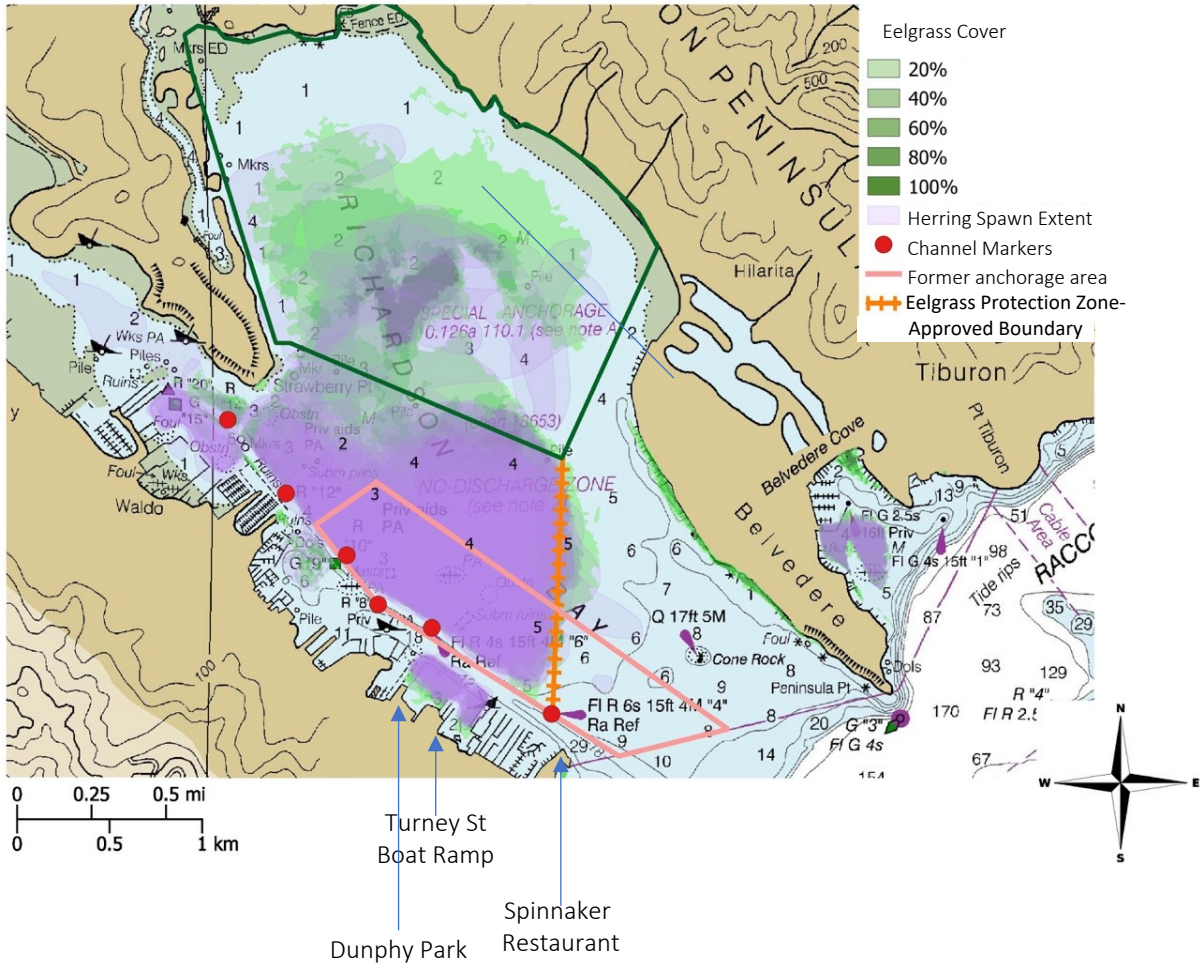

Figure: Combined eelgrass and herring data, overlayed with anchoring boundaries. Map courtesy Audubon CA. Data courtesy CA Dept. of Fish and Wildlife, Merkel and Associates.

Young salmon (smolt) take shelter in eelgrass. Photo: T. Campbell

EPMP Implementation

- Three priorities:
  1. Codify EPZ into regulations
  2. Wildlife and habitat monitoring
  3. Outreach and education

Wildlife and Habitat Monitoring

1. Baseline and seasonal UAV (drone) waterbird monitoring
2. Annual aerial eelgrass surveys to document changes to anchor scour
3. Eelgrass bathymetric survey in 2022

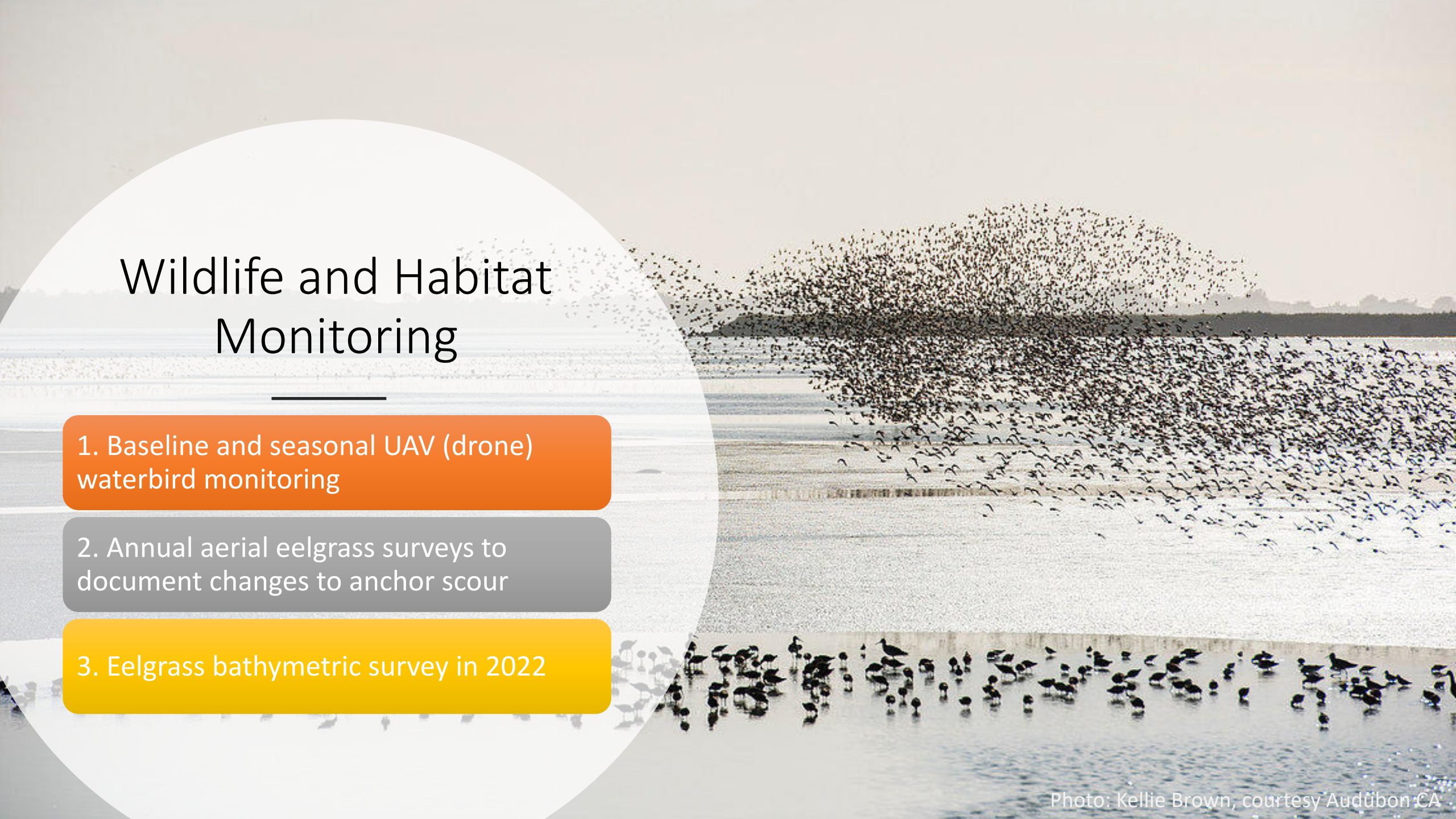

Photo: Kellie Brown, courtesy Audubon CA

Photo: Paige Fernandez flies a monitoring drone over Richardson's Bay; courtesy of Audubon California

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Wildlife and Habitat Monitoring

2021/2022 Annual Report – Prepared by Audubon California

Funding support from NOAA and OPC

NOAA MARINE DEBRIS PROGRAM
https://MarineDebris.noaa.gov

CALIFORNIA OCEAN PROTECTION COUNCIL

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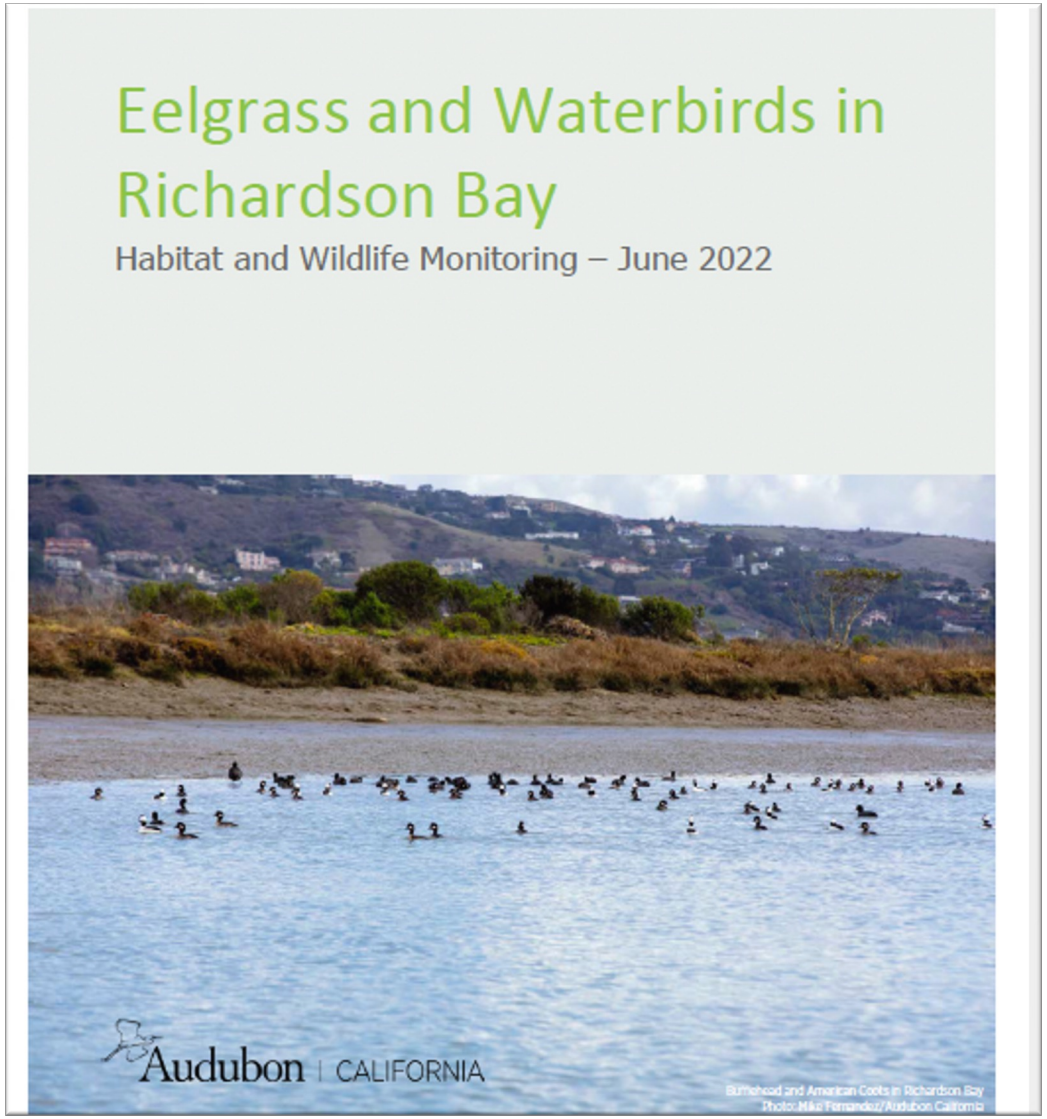
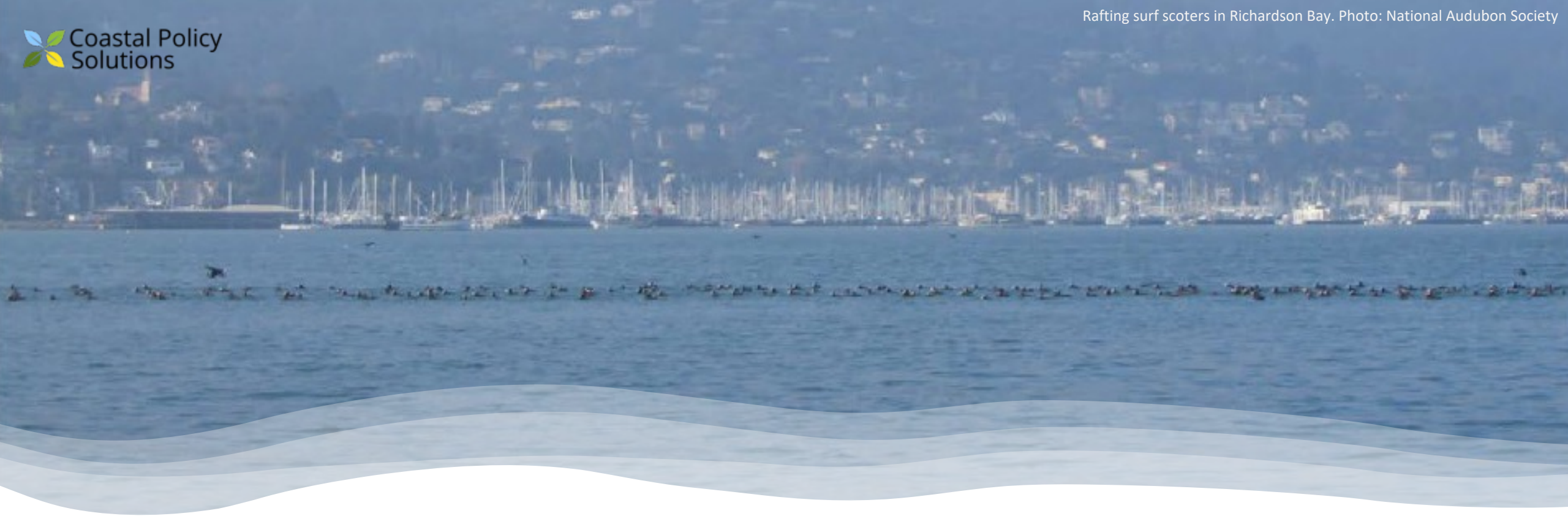


Annual Monitoring Report

- Executive summary
- About eelgrass and waterbirds in RB
- Activities
  - Surveyed rafting waterbirds
  - Measured eelgrass damage from anchor scour
- Goals, results, major takeaways



Rafting surf scoters in Richardson Bay. Photo: National Audubon Society

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Results – Rafting waterbirds

- Goal: Where in Richardson Bay are birds using the water to raft?
- Rafts – groups of up to 10,000 birds resting on the water's surface
- Rafts mostly near north and east shorelines, few near Sausalito (different from previous season)
  - Missed herring runs?

Summer 2022 aerial view of Richardson Bay. Photo courtesy of the 111th Air Squadron Photography.

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Results – Eelgrass damage

- Goal: How much eelgrass is damaged by anchor scour? Does eelgrass recover within an anchor scar?
- Scour – damage from anchors, chains, other ground tackle
- Methods repeated from previous study (Kelly *et al.* 2019)
- Low and high damage estimates

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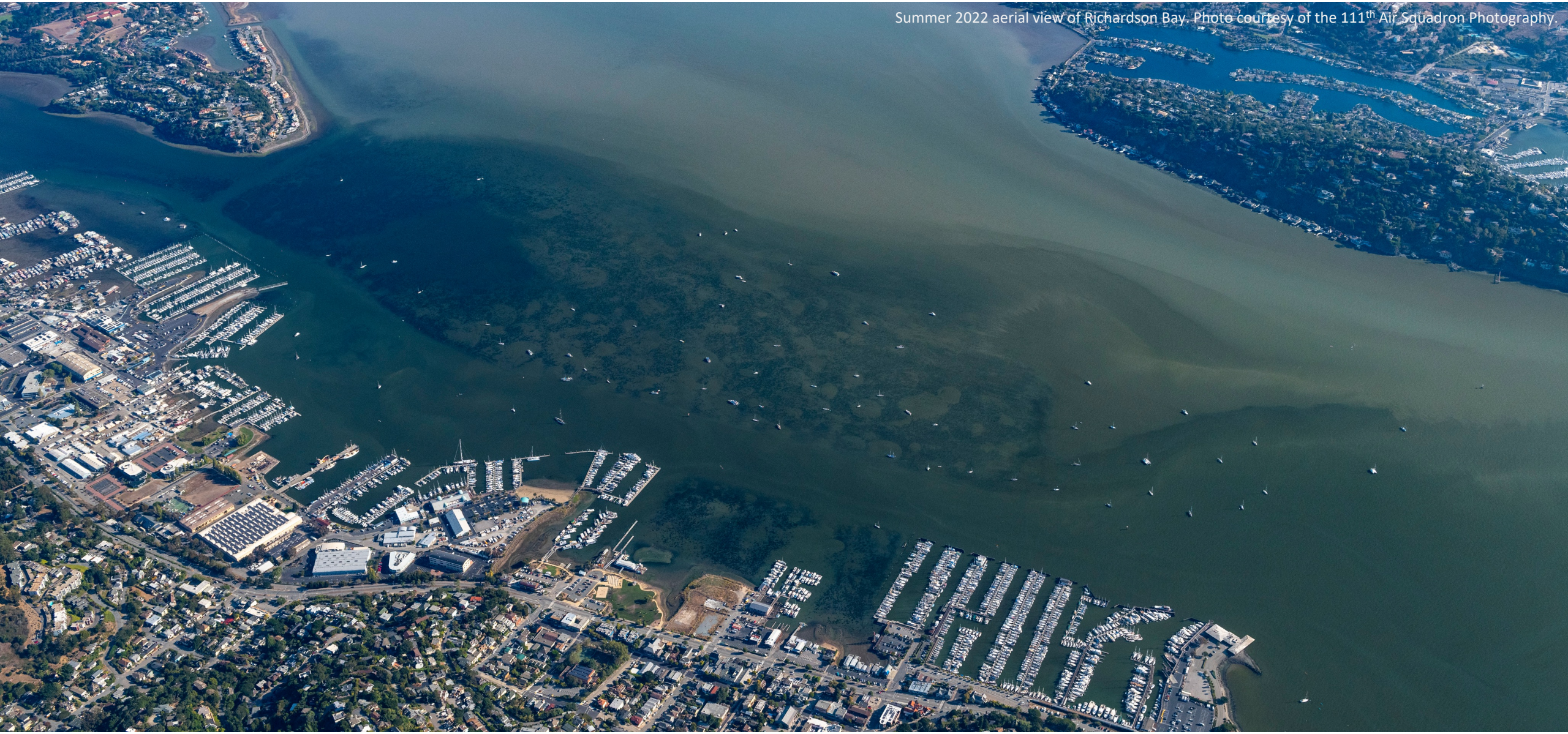

Summer 2022 aerial view of Richardson Bay. Photo courtesy of the 111th Air Squadron Photography.

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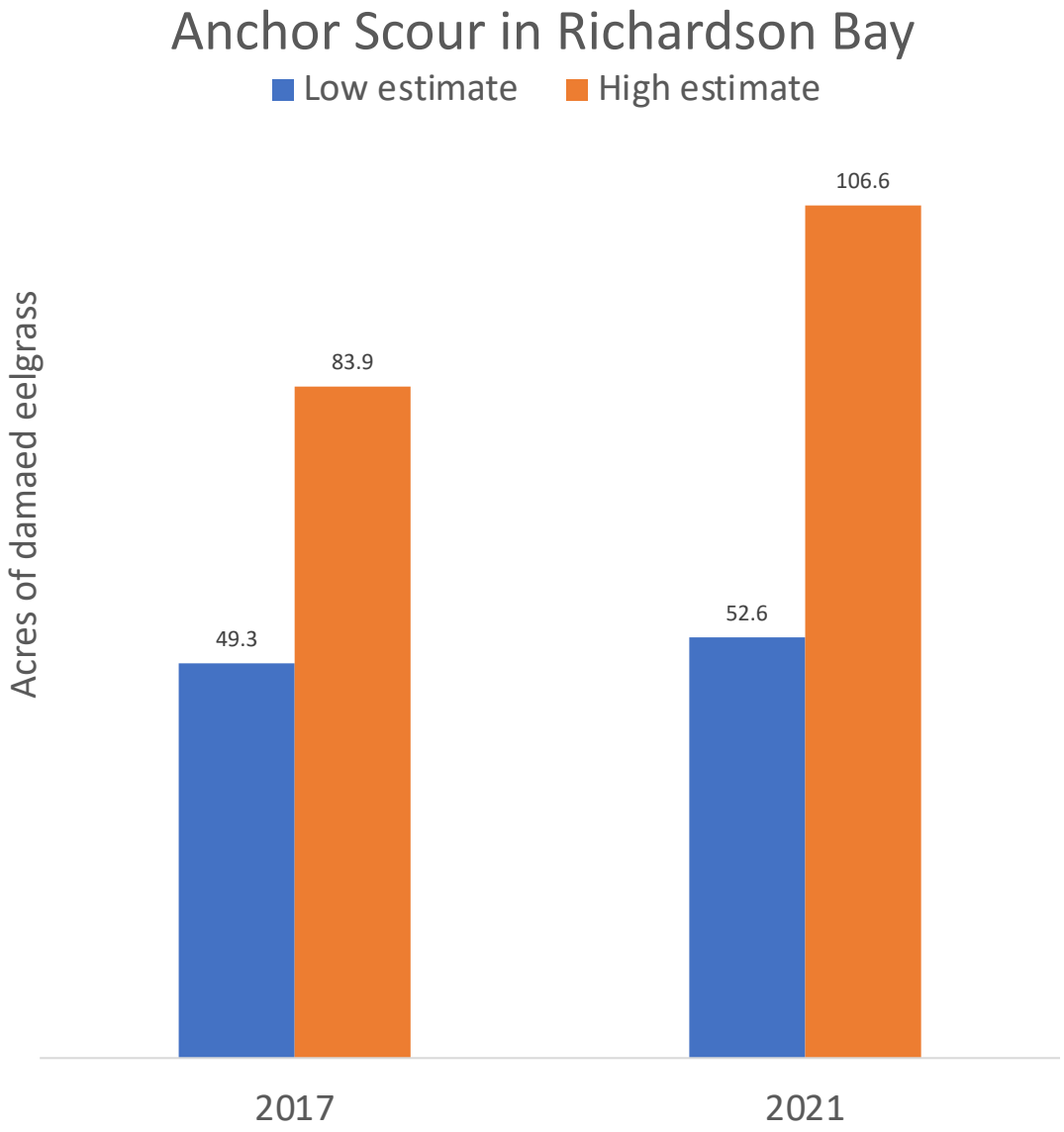
Results – Eelgrass damage

Findings: Likely increase in overall acreage of anchor scour damage from 2017-2021



Data from the 2021/2022 Audubon CA Eelgrass and Waterbirds Monitoring Report

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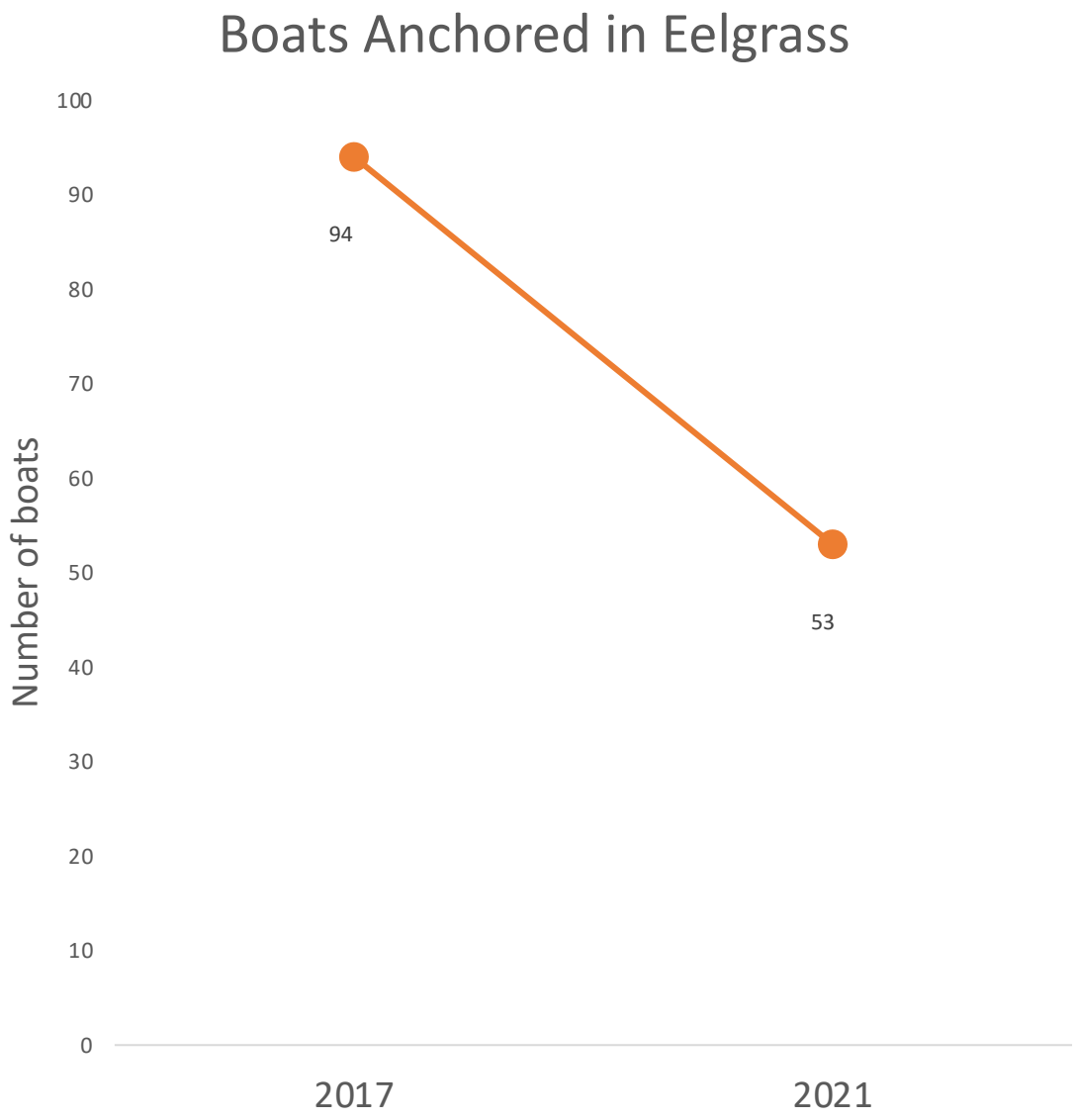
Results – Eelgrass damage

Findings: Decrease in boats anchored in the eelgrass bed from 2017 to 2021 (consistent with Harbormaster reports)



Data from the 2021/2022 Audubon CA Eelgrass and Waterbirds Monitoring Report

Examples of anchor scars in Richardson Bay eelgrass bed from 2017 (left) that scars that appear to have begun to recover in 2021 (right). Images from the 2021/2022 Audubon CA Eelgrass and Waterbirds Monitoring Report

Results – Eelgrass damage

- Findings:
  - Eelgrass can recover when ground tackle is removed
  - Recovery is stronger in denser parts of the bed

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Results – Fewer boats, more damage?

- Total boats have decreased
- Eelgrass recovery where boats were removed
- Total acreage of damage increased – how?

Healthy eelgrass in Central California. Photo: Brian Feulner

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Results – Fewer boats but more damage?

- Possibilities:
    1. Artifact of sampling method
        - Snapshots – can't say what happened in intervening years

Healthy eelgrass in Central California. Photo: Brian Feulner

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Results – Fewer boats but more damage?

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  2. Issues with methodology
     - Image quality
     - Low eelgrass density

Healthy eelgrass in Central California. Photo: Brian Feulner

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Boats move – new scar, more damage

Healthy eelgrass in Central California. Photo: Brian Feulner

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Results – Fewer boats but more damage?

- In general, more boats = more damage, but it's not 1:1
- Pick up and reset anchor – one boat, new scar

An anchor in seagrass. Photo courtesy of https://environment.bm/

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Results – Fewer boats but more damage?

- 2021: Approx. 22 additional acres of damage vs 2017
- Each scar up to 0.75 acres
- If 30 boats (1/3 of 2017 vessels) moved within the anchorage before leaving --> accounts for additional damage

An anchor in seagrass. Photo courtesy of https://environment.bm/

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Final thoughts

- Ground tackle damages eelgrass
- Eelgrass can recover, but it's important to give it a chance
- How/where birds use RB is complicated

Photo: Pelicans and cormorants in Richardson's Bay; B. Hinz, courtesy of Audubon California

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Next Steps

- This summer: eelgrass bathymetric survey (overall bed acreage)
- Nov - April: annual waterbird monitoring
- By Dec 15 – results from 2021 eelgrass aerial survey
- Continuing other portions of EPMP implementation

Photo: Alan Dep/Marin Independent Journal

Questions?

A curious looking sea lion, like the ones in Richardson’s Bay.
Photo: F1Online Digitale Bildagentur GMBH/Alamy