

The Middle Harbor Enhancement Area



April 11, 2019



US Army Corps
of Engineers®
San Francisco District



Port Of Oakland Current Geographical Jurisdiction



Middle Harbor
Enhancement Area



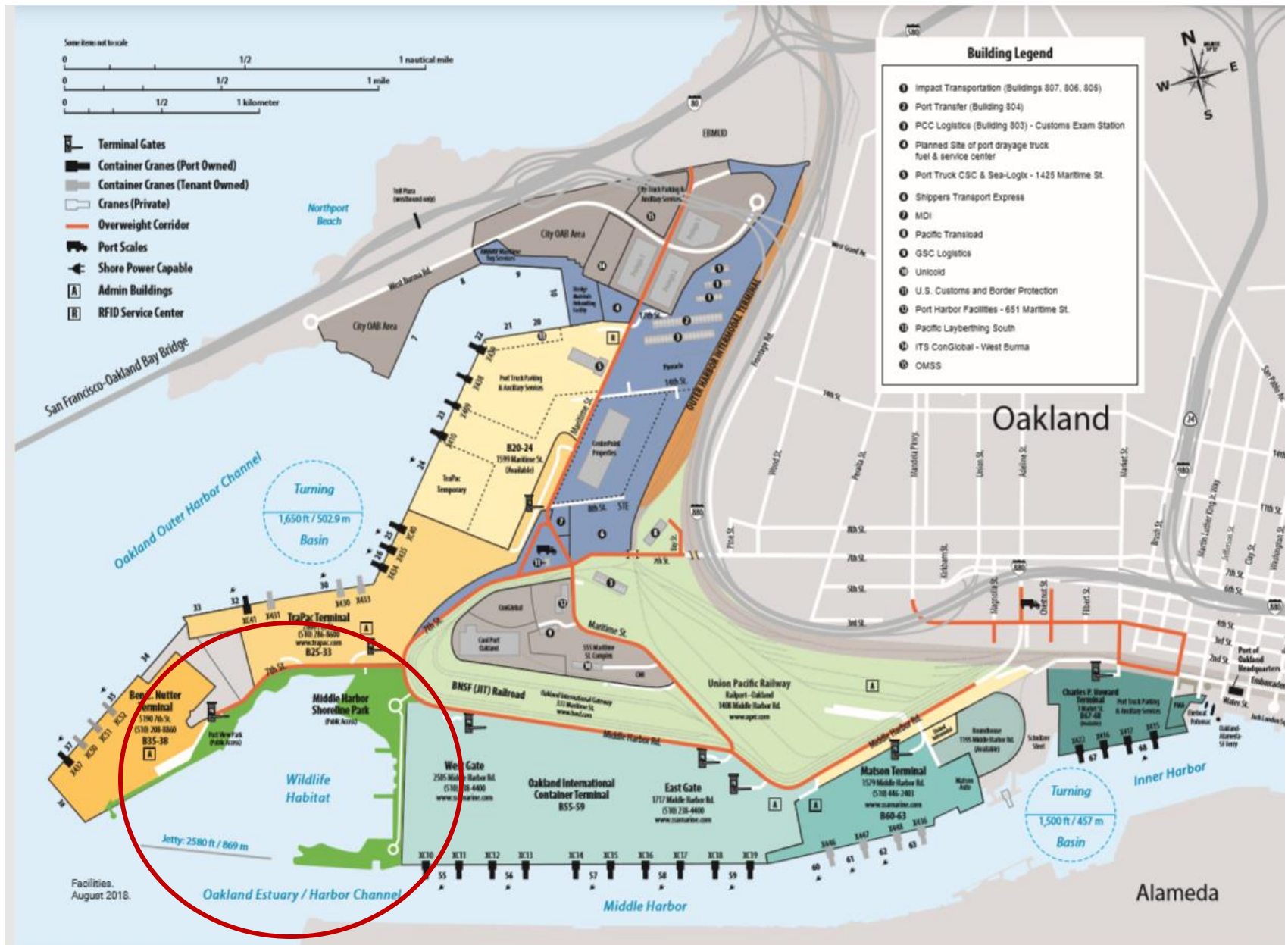
An Early Experiment

Creating Subtidal
Habitat in an
Industrialized Port



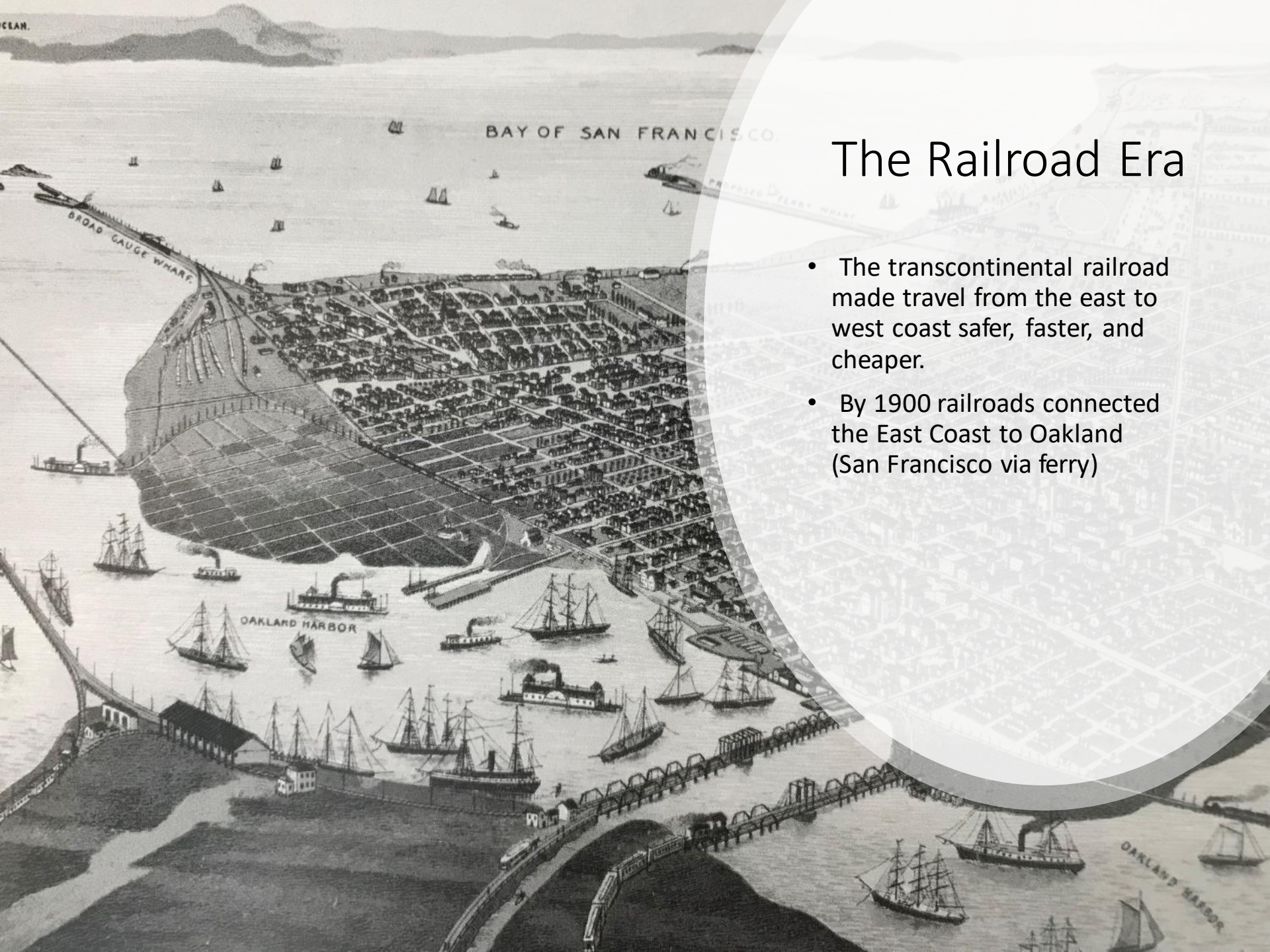
PORT OF OAKLAND

Maritime Area



Oakland 1859 - Not Much to Harbor





The Railroad Era

- The transcontinental railroad made travel from the east to west coast safer, faster, and cheaper.
- By 1900 railroads connected the East Coast to Oakland (San Francisco via ferry)

Middle Harbor in 1942 – Naval Base

January 1942

The Naval Supply Depot was commissioned just 8 days after the Japanese attacked Pearl Harbor on December 7, 1941. Within weeks construction on the base accelerated. Less than a month later the USS Albatross was the first ship to arrive at the depot with war supplies for

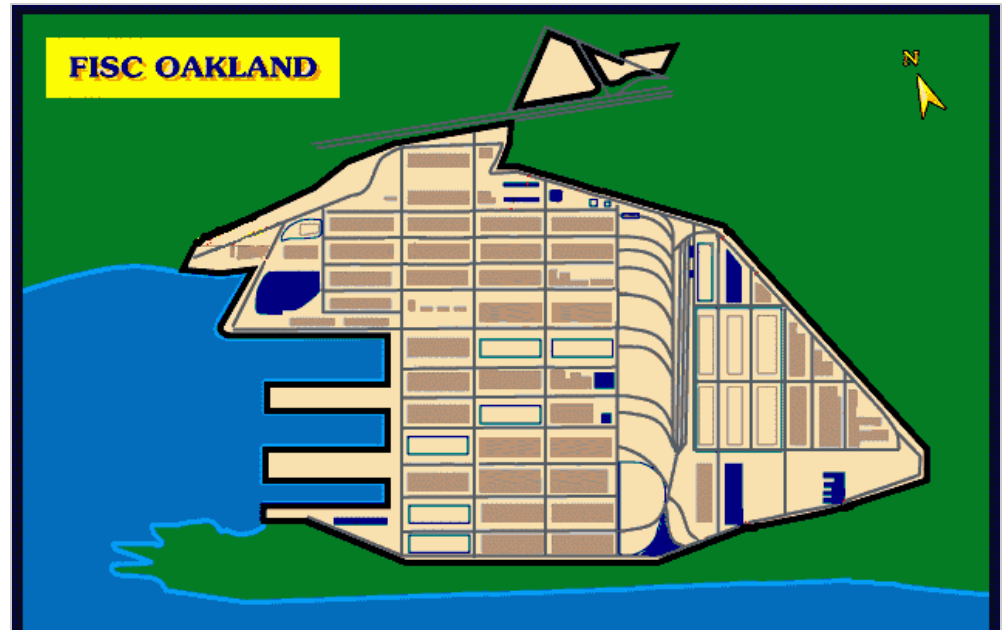


Containerization

- Started in Late 1950s
- Previously Palettes and Burlap Sacks
- Unloading a ship went from weeks to days
- Crane moves container every 2 minutes
- Intermodal Transportation – Rail, Truck, Ship



Naval Base Closure



Navy - Fleet and Industrial Supply Center Oakland (FISCO) –Closed September 1998.

Port bought for \$1

Middle Harbor in the 1990s



Vision 2000 - Oakland Harbor Navigation Improvement (-50 Foot) Project



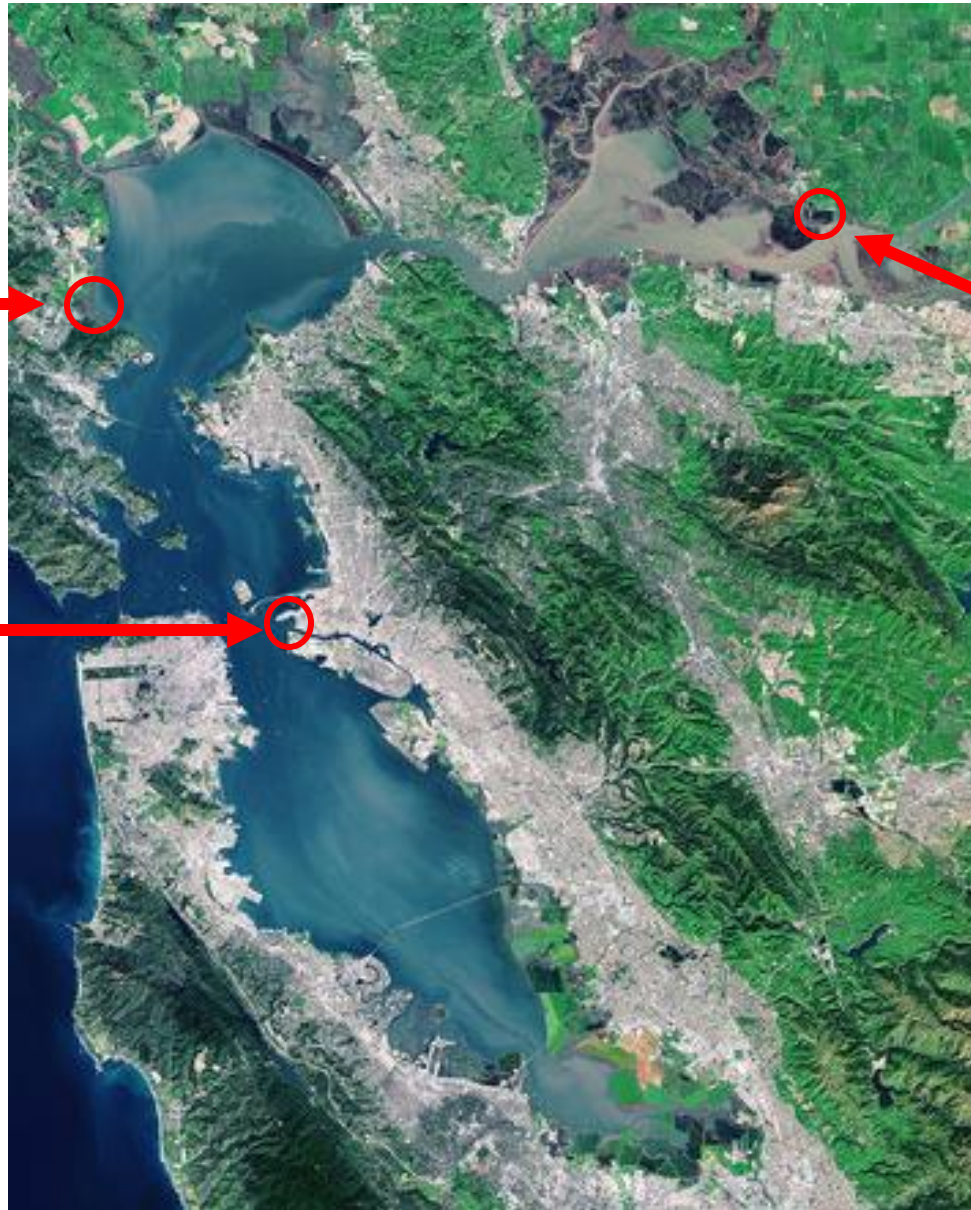
Restoration Projects Receiving Dredge Material

(millions of cubic yards – mcy)

Hamilton
Airforce Base
(5.9 mcy)

Middle
Harbor
Enhancement
Area
(5.6 mcy)

Montezuma
(2.8 mcy)

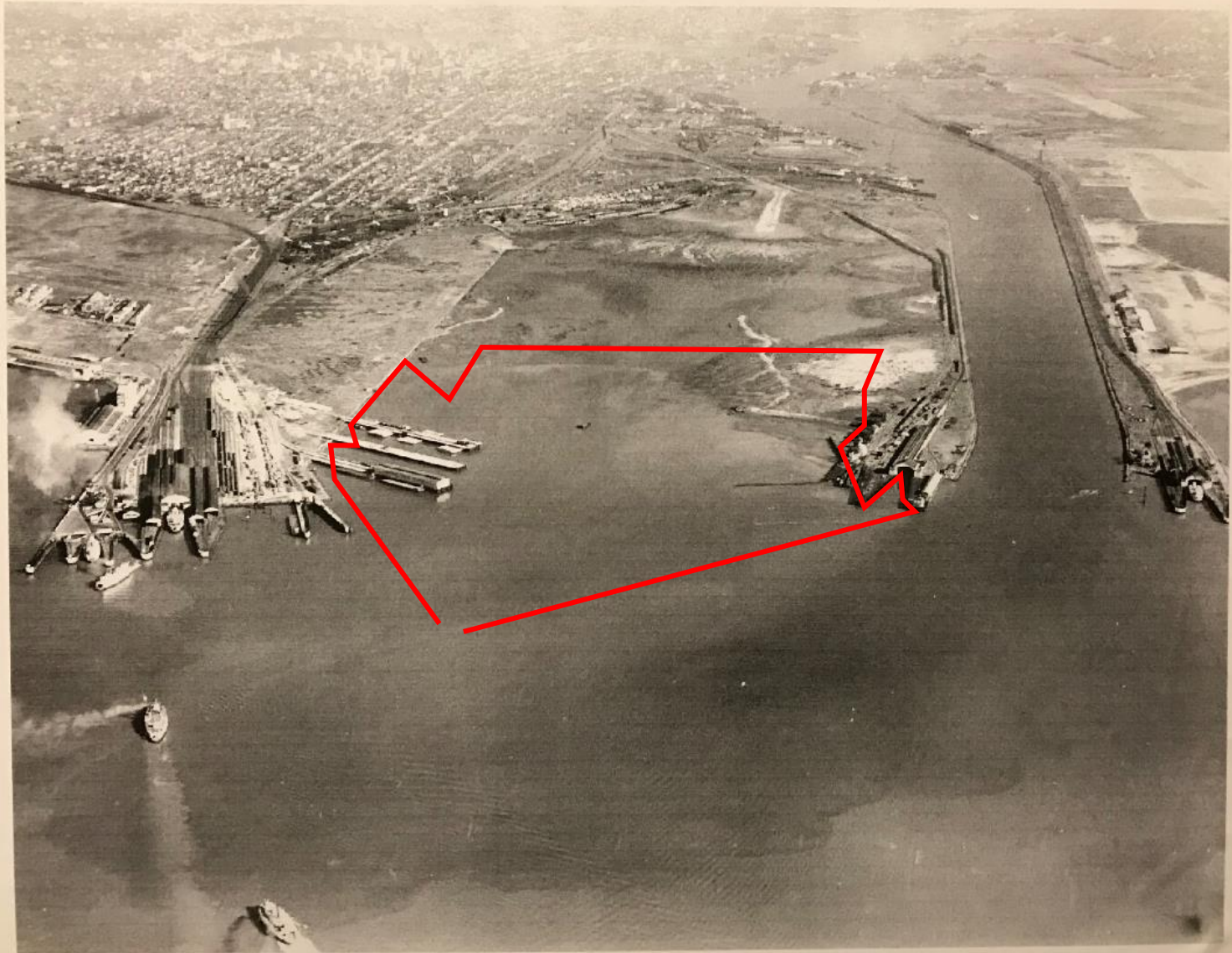


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Middle Harbor Enhancement Area Today

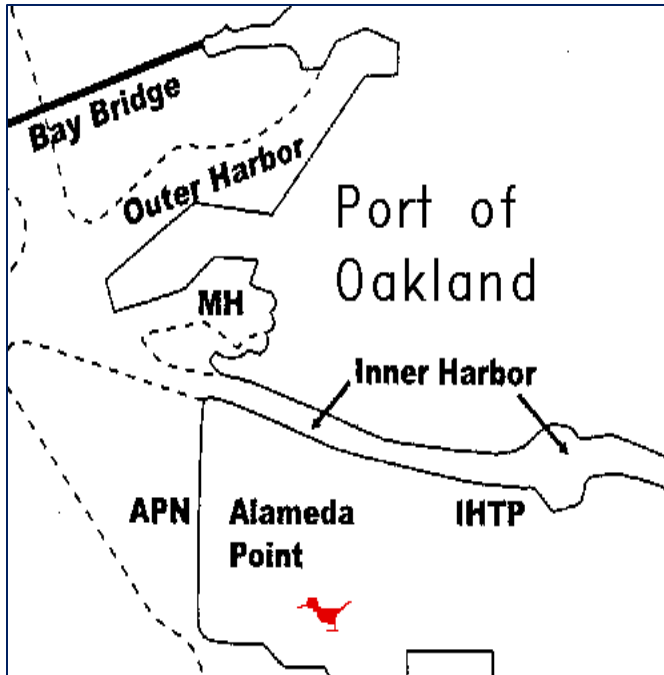


1930's Historical Habitat – Mudflats

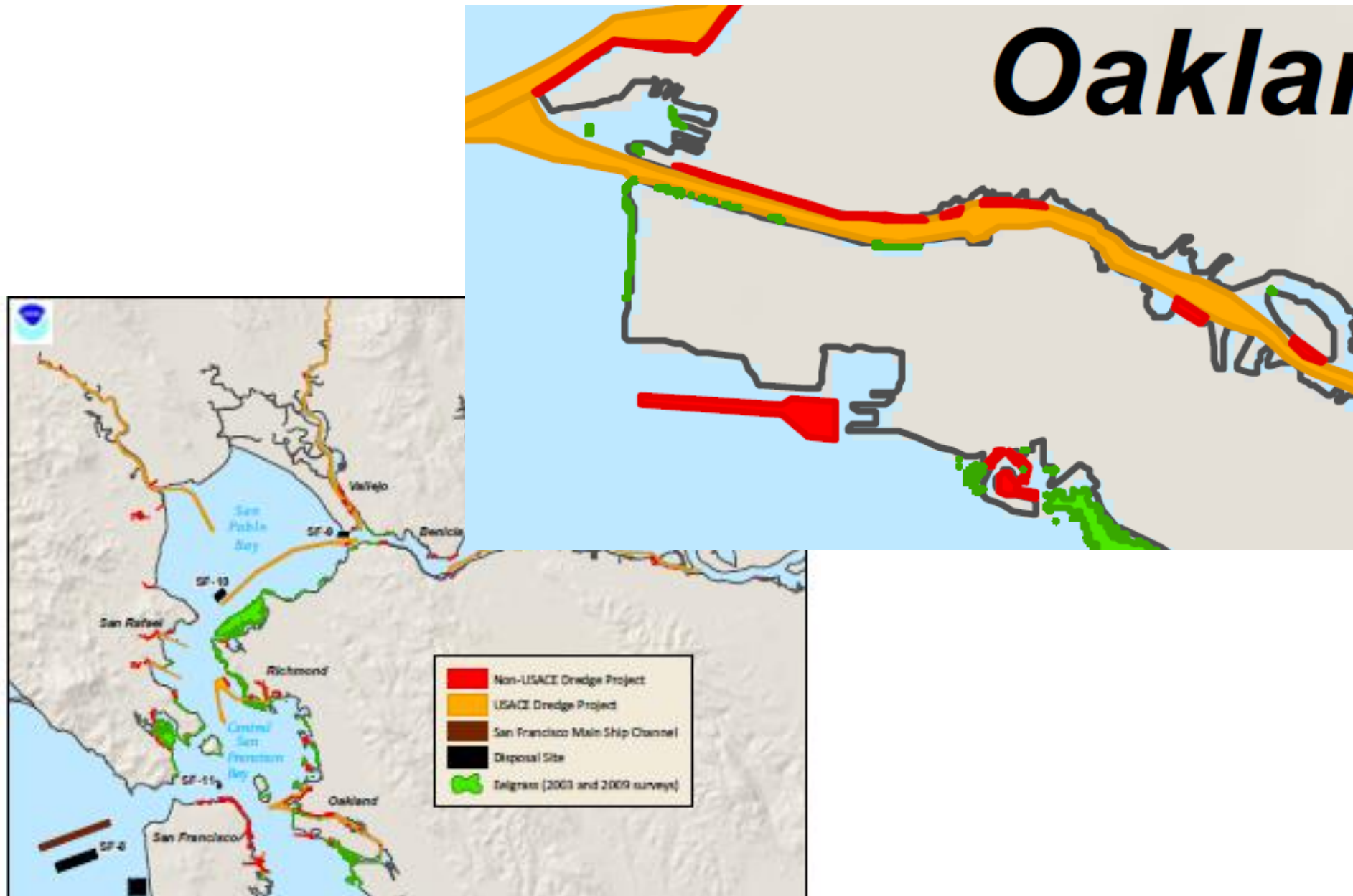


Middle Harbor Basin in the early 1930s, before the tideland shallows were filled and deepened for the Navy.

Endangered Species Nearby Alameda Least Tern Colony and Brown Pelican



Inventory/Existing Condition - Eelgrass



MHEA Goals

Subtidal Habitat (Eelgrass)

Birds (Avian Foraging Habitat)

Fish (Increase Diversity & Populations)

Beach

Marsh

Goals - Middle Harbor Target Habitats



MHEA Implementation ?



2002 – 2012 Consolidation Period



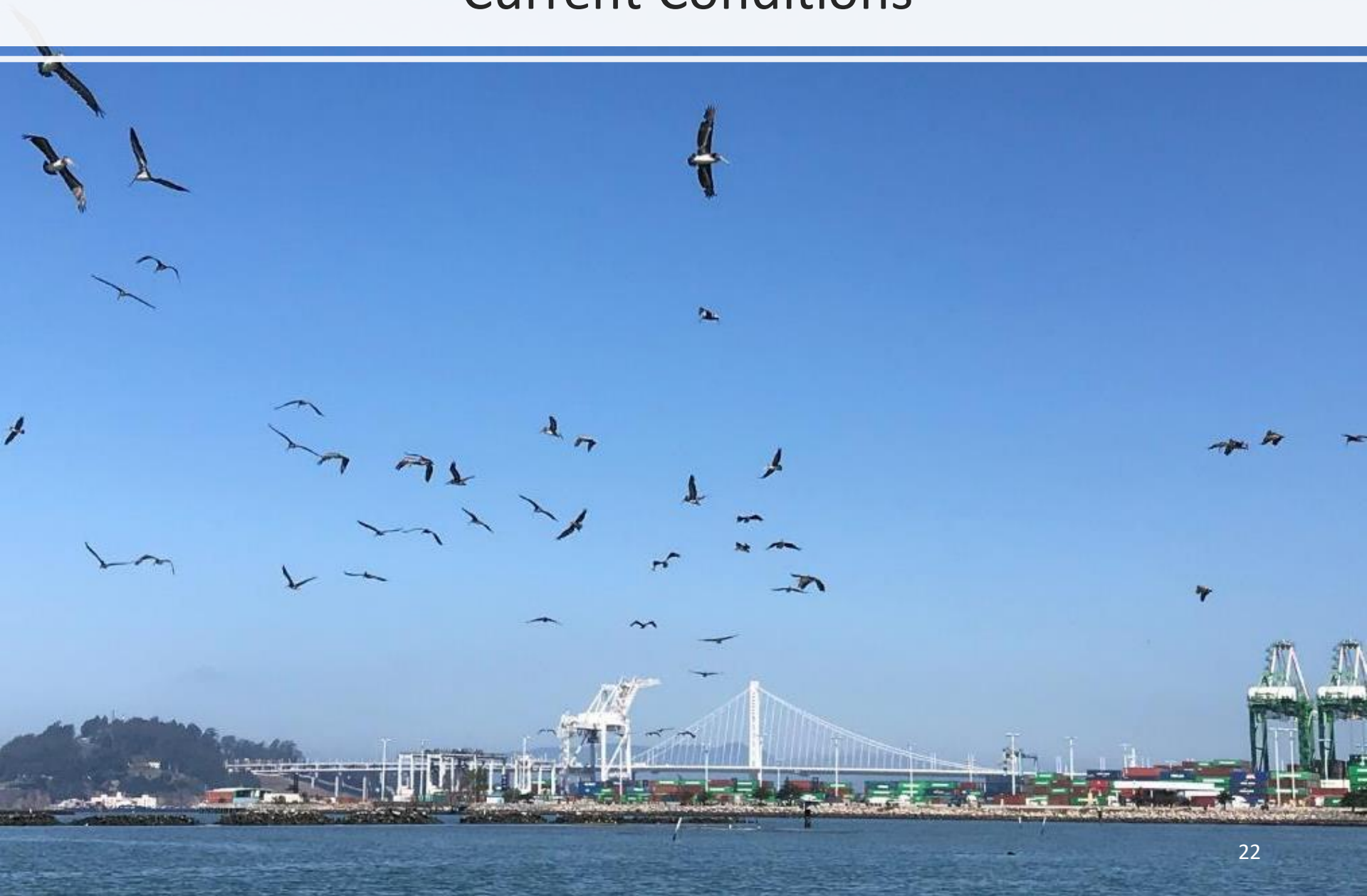
Image USDA Farm Service Agency

Google Earth
September 2010

2012 & 2014 Dredging & Sculpting

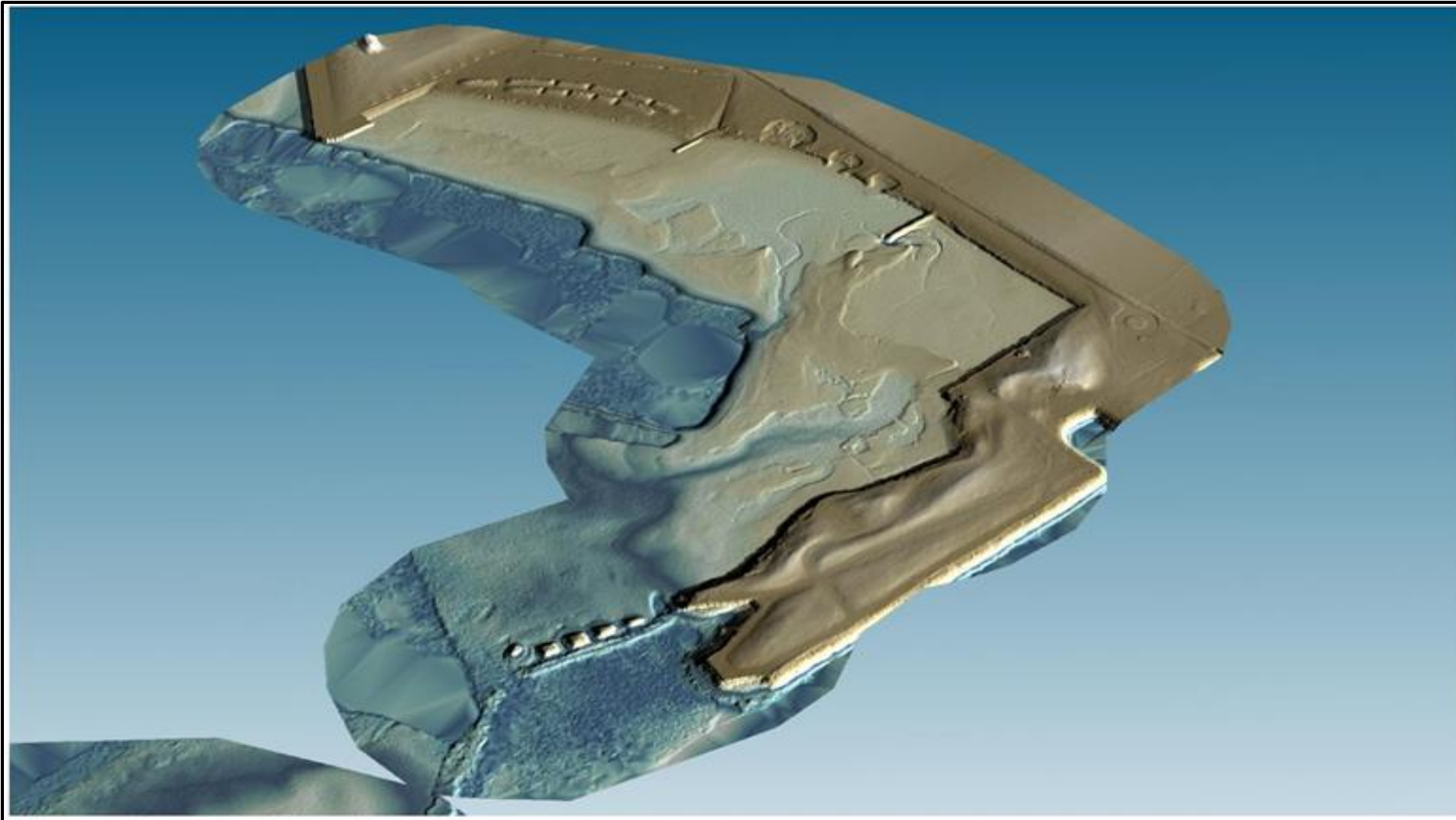


Current Conditions



MHEA TOPO & BATHYMETRY

OCTOBER 3, 2018



QSI TopoBathy LiDAR Survey of Eastern Shoreline

Eelgrass

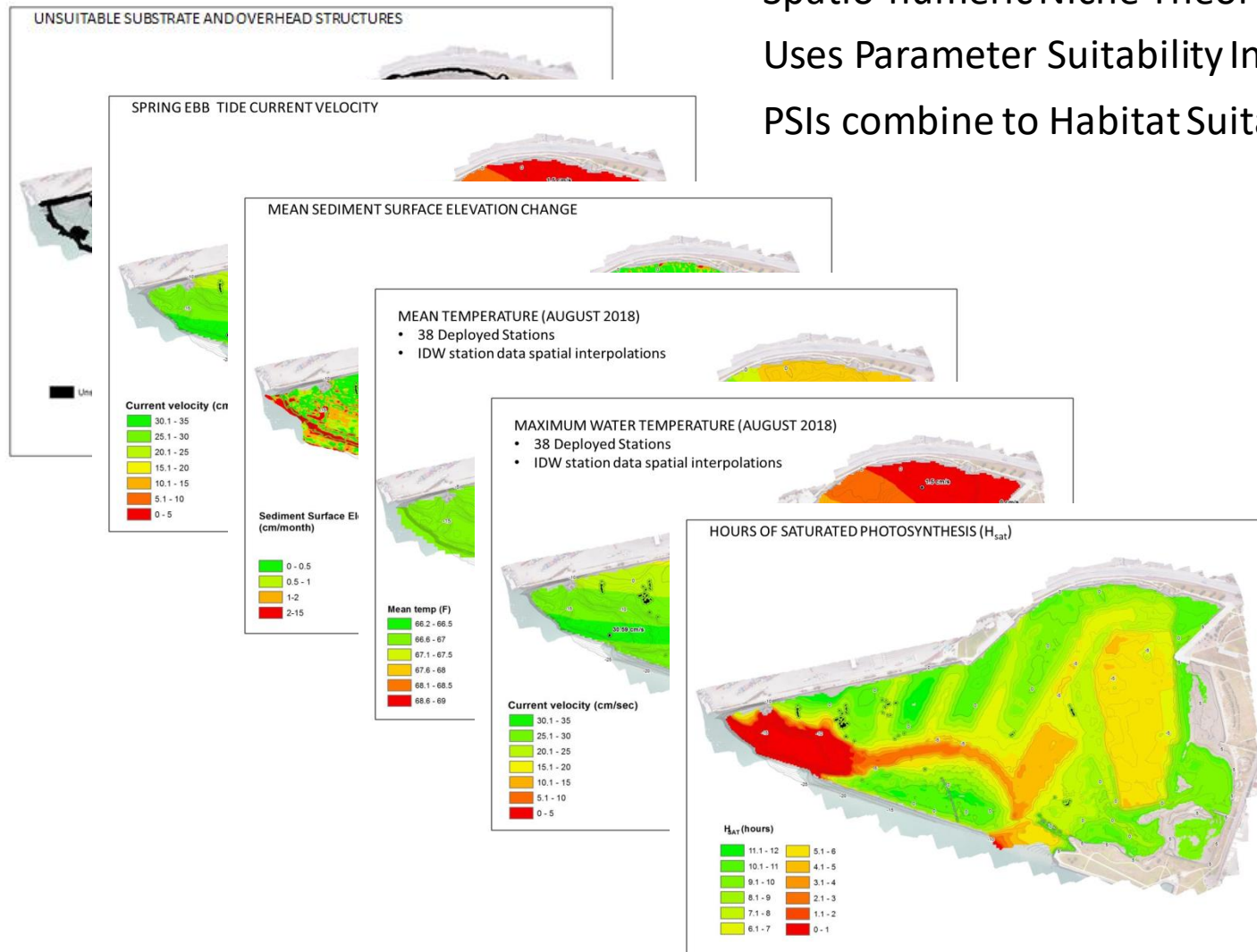


Ecological Limits, Viability and Sustainability (ELVS) Model Habitat Suitability For Eelgrass

Spatio-numeric Niche Theory Model

Uses Parameter Suitability Indices (PSI)

PSIs combine to Habitat Suitability Index (HSI)



Eelgrass Habitat Metrics

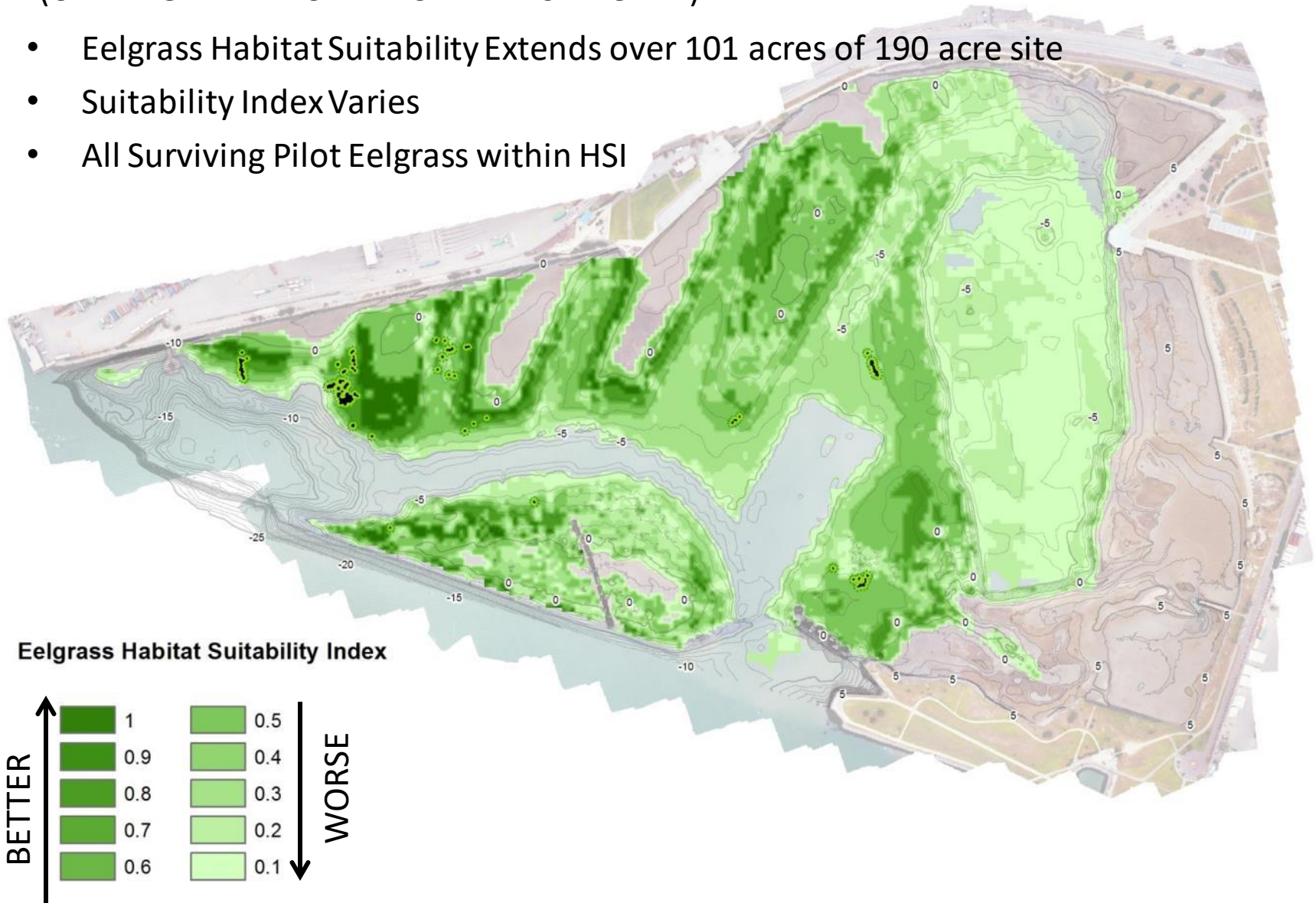
Create a minimum of 55 acres of habitat suitable for eelgrass habitat development, 110 acres of other shallow water.

Metrics	Design	2019
Bathymetry (0 to -6 ft MLLW)	117 acres	88 acres
Bathymetry (-2 to -4 ft MLLW)	36 acres	30 acres
Eelgrass suitable habitat (similar to natural)	55 acres	101.1 ac
Dominated by sand (D_{50} range)	0.15-0.25 mm	0.19±0.08 mm
Maintain wave intrusion w/ no sig. waves	Min. wave scour	Meets standard
Erosion/Accretion	<2 cm/mo	0.3±0.4 cm/mo
Flow rate (1-20 cm/sec, goal 10-16 cm/sec)	10-16 cm/sec	Slightly High
PAR levels suitable to support eelgrass	5hrs H_{sat}	Meets criterion
Peak daily temperatures (submerged)	<30°C (86°F)	24.1°C (75.3°F)
Maintain dissolved oxygen (DO) levels	>5.0 ppm	>5.15ppm (ave. 9.20)



INTEGRATED HABITAT SUITABILITY INDEX FOR EELGRASS (UNWEIGHTED MULTIPLICATIVE PSI MODEL)

- Eelgrass Habitat Suitability Extends over 101 acres of 190 acre site
- Suitability Index Varies
- All Surviving Pilot Eelgrass within HSI



Public Access Beach – Current Condition

Provide new public access beach area that will also provide storm refuge to birds.



Current Beach Advantages



MHEA 3-5 Acre Educational Marsh



MATTER

Birds Are Vanishing From North America

The number of birds in the United States and Canada has declined by 3 billion, or 29 percent, over the past half-century, scientists find.



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Abstract

Species extinctions have defined the global biodiversity crisis, but extinction begins with loss in abundance of individuals that can result in compositional and functional changes of ecosystems. Using multiple and independent monitoring networks, we report population losses across much of the North American avifauna over 48 years, including once common species and from most biomes. Integration of range-wide population trajectories and size estimates indicates a net loss approaching 3 billion birds, or 29% of 1970 abundance. A continent-wide weather radar network also reveals a similarly steep decline in biomass passage of migrating birds over a recent 10-year period. This loss of bird abundance signals an urgent need to address threats to avert future avifaunal collapse and associated loss of ecosystem integrity, function and services.



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Avian Habitat is Critical



Avian Uses in MHEA





Golden Gate Birder

Birding News & Inspiration from Golden Gate Audubon

Home about authors donate

Middle Harbor Shoreline: Birding Hotspot

August 20, 2014

Posted by GCAS in Birding, Birding Hotspots

By Maureen Lahiff

Come see a really good mudflat. Come see a really good restored mudflat.

From late July to early April, Middle Harbor Shoreline Park in Oakland hosts a wealth of water birds. The encircling arms of the park make it easy to observe the mudflat fairly close up even when the tide is out, though having a spotting scope (or a trip leader who has one) is really helpful.

I've had a number of Bay Area birding firsts at Middle Harbor. The first Eared Grebe I ever saw with his "ears on" was at Middle Harbor, in late March a few years back. Here is where I first saw a Bay Area Peregrine Falcon on the hunt. On a cold and windy winter's morning, the ducks and shorebirds at adjacent Point Arnold all took off at once. Sure enough, a Peregrine soared in over the water from the north, close in and on the hunt.

Owned and operated by the Port of Oakland, Middle Harbor is one of the East Bay's newest parks. If you didn't know it was there, you'd never think to look for it in the middle of the sprawling container ship port.



Birding at Middle Harbor / Photo by Ilana Dallas

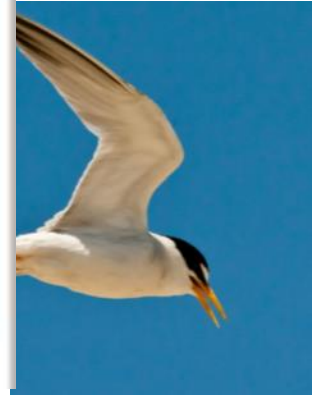
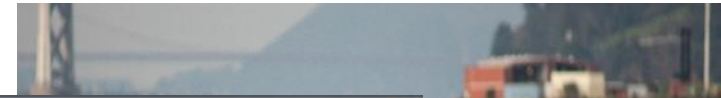


About Golden Gate Audubon Society

Golden Gate Audubon Society engages people to:

- * Experience the wonder of birds and translate that wonder into action, and
- * Protect Bay Area native bird populations and their habitats.

Visit our website at www.goldengateaudubon.org.



<https://goldengateaudubon.org/blog-posts/middle-harbor-shoreline-birding-hotspot/>

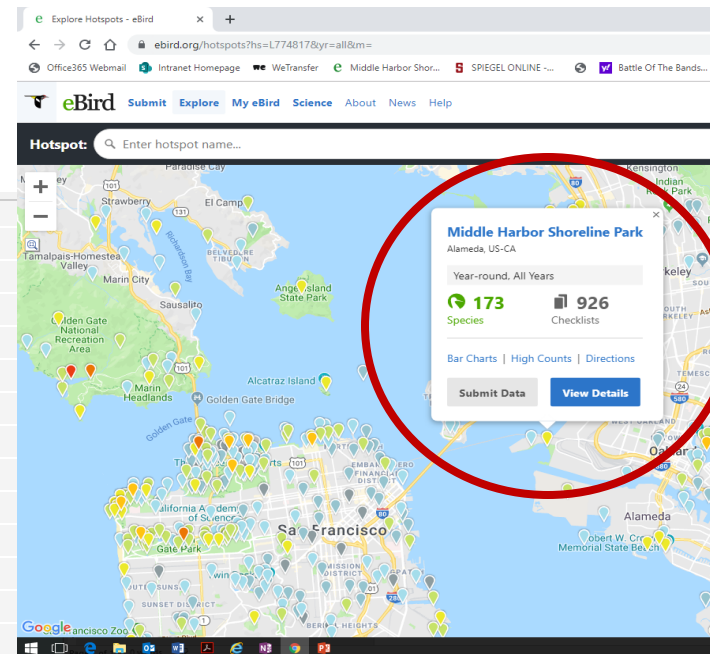


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Bird Species – 1997 Survey vs. 2010-October 2019 (Citizen Science)

Table 3-2. Summer Bird Counts by Site and Habitat Type.

Summer Bird Counts by Site and Habitat										
Gen'l Bird Site(s)	4,5	7,8	10,11	1	17	9	1	8,9		
ird Habitat	1	1	1	1	1,2	6	2,4,5	3		
Fish Site	A	H	B	C	G	G	C	M		
Location in Harbor	Outer	Mid	Inner	Outer	Mid	RI	SI	CP		
Habitat	DD	DD	DD	SS	SS					
code	Species Common Name	AREA (acres)	635	173	275	184	39	6	1	1
WEGR	western grebe									1
WCGR	western and/or Clark's grebe									20
BRPE	brown pelican		1							3
DCCO	double-crested cormorant		24	3	3	61	3		2	96
BRCO	Brandt's cormorant								1	1
GBHE	great blue heron									1
GREG	great egret		1	1	1					3
SNEG	snowy egret		1		3			6		10
BNHE	black-crowned night heron								1	2
BLSC	black scoter									1
SUSC	surf scoter		1				25			26
KILL	killdeer				2					2
WILL	willet						1		3	4
WESA	western sandpiper				68					68
CAGU	California gull			2	3					5
HERM	Heermann's gull		5	1						6
WEGU	western gull		57	13	40		20	1	30	164
XXGU	unidentified gull				2					2
CATE	Caspian tern		20	12	15		2	2		51
FOTE	Forster's tern		25	3	12			1		41
LETE	California least tern			1	19		2	4		26
RODO	rock dove			13	1					14
MODO	mourning dove				1					3
BRSW	barn swallow			7	3					10
AMCR	American crow				4					4
EUST	European starling				2					2
RWBB	red-winged blackbird				1					1
number of taxa			9	11	17		11	5	3	3
									2	27



A Pod of Pelicans Feeding in MHEA



Fish Productivity/Diversity

July 2003 Beach Seining in Middle Harbor Cove



Sept. 21, 1999

Future Work - Eelgrass Planting



- Eelgrass Planting Will Occur in Spring 2019
- 10-yr Monitoring Starts After Planting
- Plans to Fix Marsh, Beach, Avian Roosting Habitat are Underway



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Eelgrass Planting

Middle Harbor – Lessons Learned

- Converting a Harbor to Subtidal Habitat - an Experiment!
- Adaptive Management Requires Maximum Flexibility
- Secondary Habitat Features aren't Self-Sustaining
- Get Credit for Over-Achieving Successes to Offset Targets Not Met?
- Allow Extra Time for Multi-Agency Coordination



The Takeaway

- Creating Nature in Industrialized Environments is Possible
- This Place is Amazing!
- A Great Accomplishment, Even if Success Criteria Don't Agree (Yet)

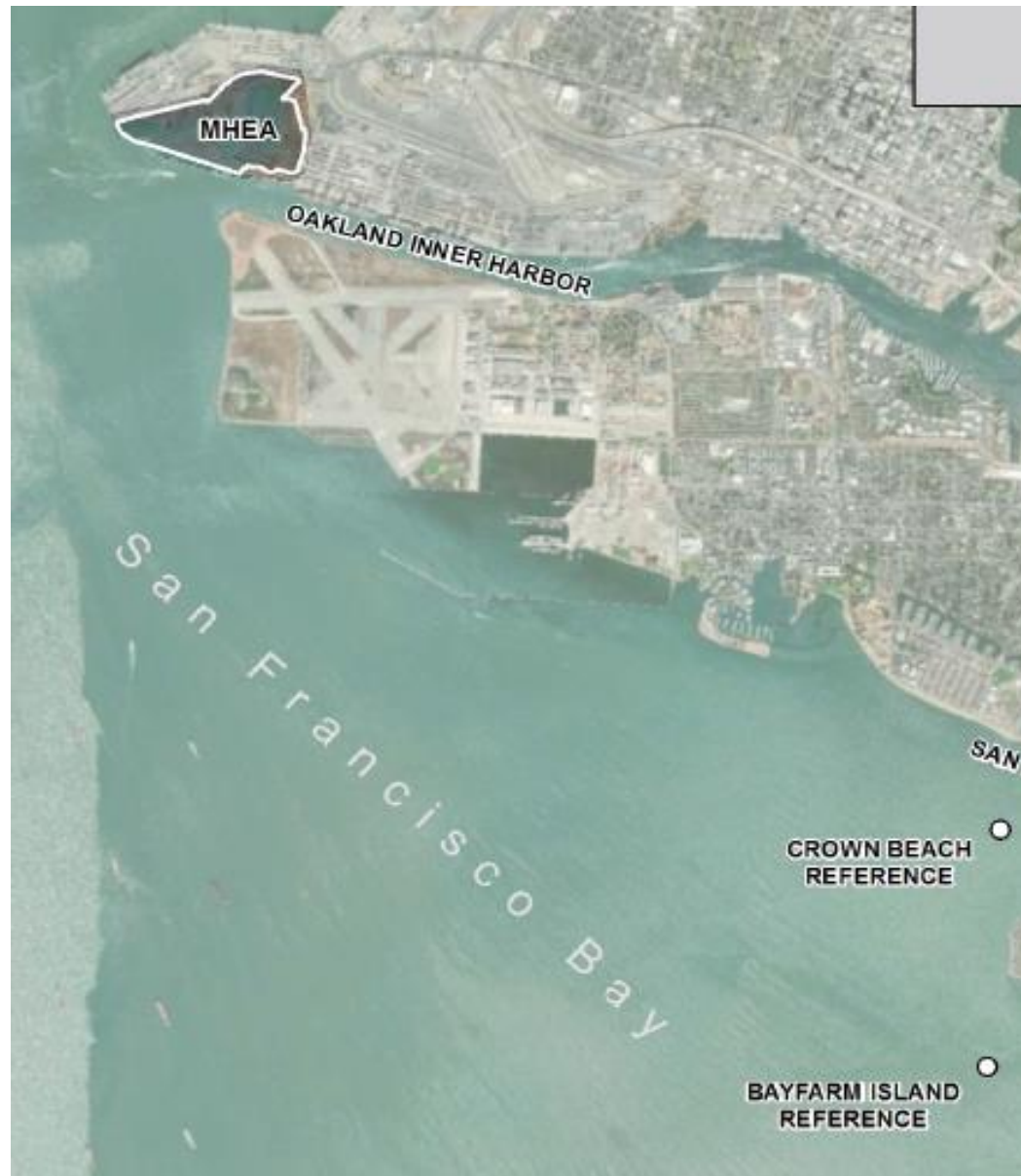


Project
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Keith Merkel,
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and Eric Jolliffe
for their
assistance



Jan Novak, PWS*
Associate Environmental Planner/Scientist
Port of Oakland

Reference Sites



The photograph shows a coastal scene with a large, moss-covered rock formation in the foreground. In the background, a body of water is visible, with a pier and industrial structures on the far shore. A red arrow points to the 'Port View Park' area on a map inset in the top left corner.

01.29.2018 16:08

01.29.2018 16:08