

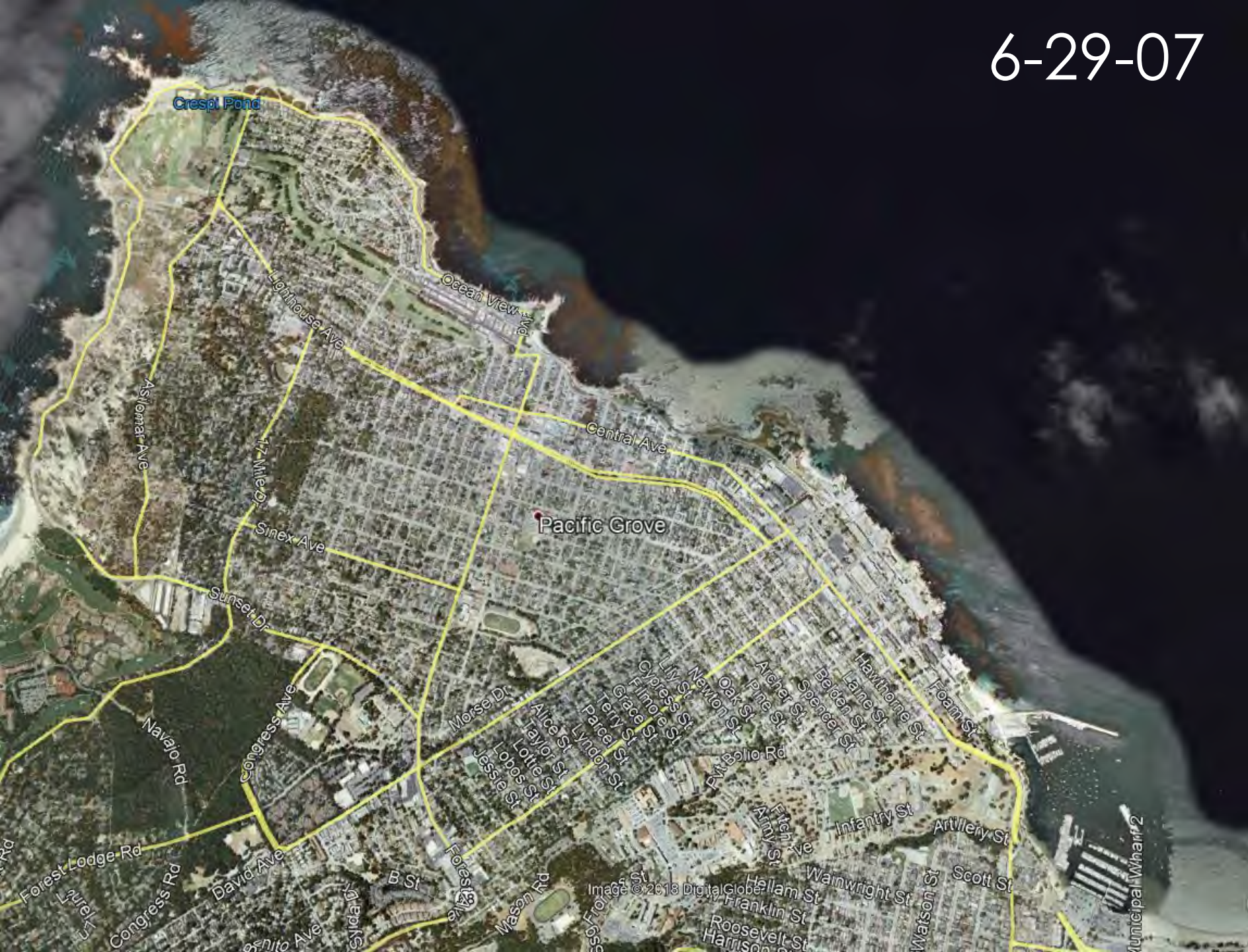
An underwater photograph showing a sandy seabed covered with numerous purple sea urchins. The water is clear and yellowish-green, with some light rays visible. The urchins are densely packed in the foreground and middle ground, with some larger ones in the background. The overall scene is a natural, undisturbed underwater environment.

GIANT GIANT KELP RESTORATION PROJECT

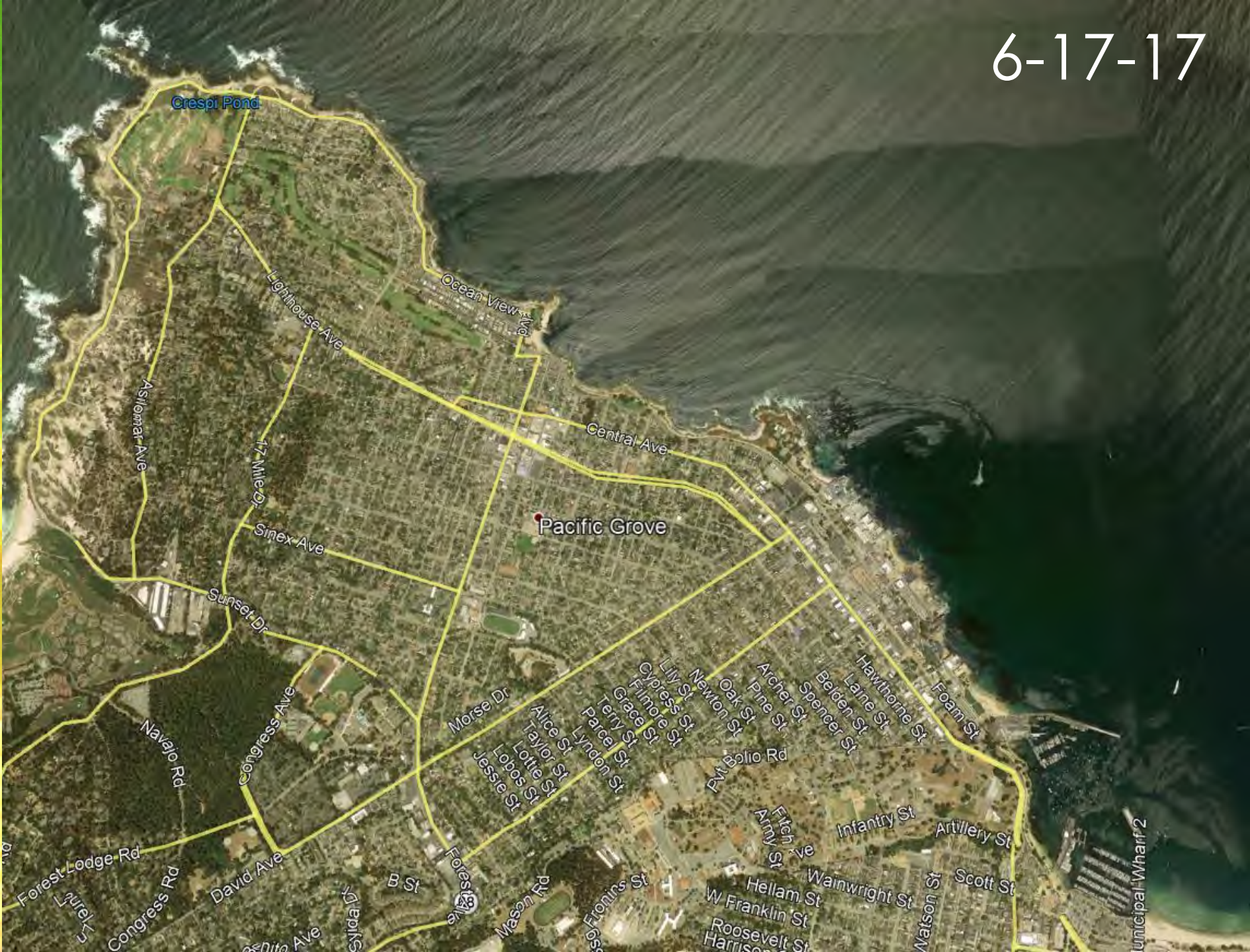
MONTEREY CALIFORNIA

PRESENTED BY: KEITH ROOTSAERT

6-29-07



6-17-17



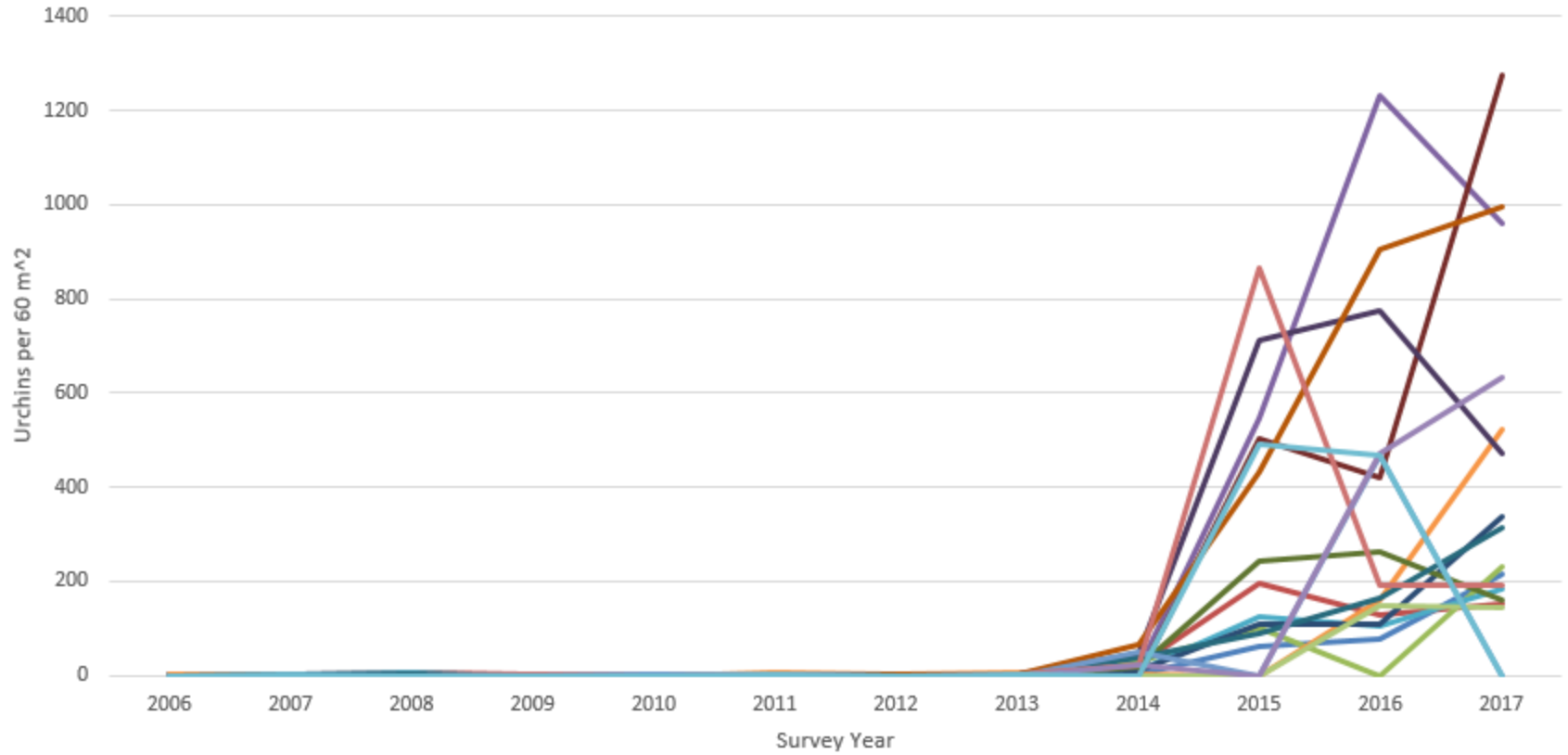
Crespi Pond

Ocean View

Pacific Grove

Asilomar Ave
Lighthouse Ave
Central Ave
17 Mile Dr
Sinex Ave
Sunset Dr
Morse Dr
Congress Ave
Navajo Rd
Forest Lodge Rd
Congress Rd
David Ave
B St
Fores Ave
Mason Rd
Etonins St
Lily St
Cypress St
Filmore St
Glace St
Terry St
Parce St
Lynden St
Alice St
Taylor St
Lottie St
Lobos St
Jessie St
Newton St
Oak St
Pine St
Archer St
Belden St
Spencer St
Hawthorne St
Laine St
Foam St
Fitch Ave
Army St
Infantry St
Artillery St
Wainwright St
Watson St
Scott St
Hellam St
W Franklin St
Roosevelt St
Harrison St
Municipal Wharf 2

RCCA Surveys of Purple Urchins



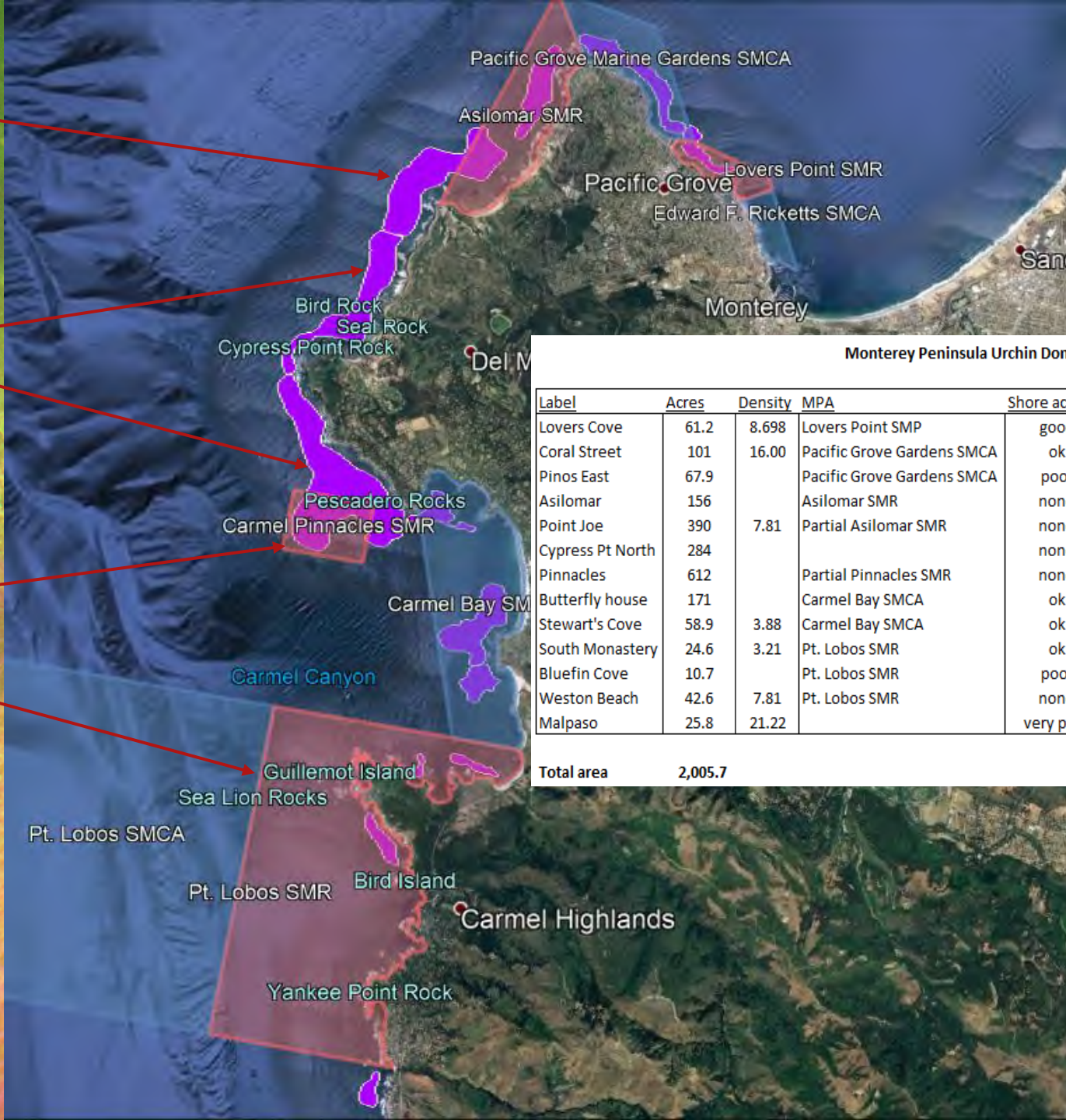
URCHIN POPULATION EXPLOSION

- Aquarium
- Breakwater
- Carmel River
- Coral St Lucus Pt
- Hopkins
- Lovers Point
- MacAbee
- Malpas Creek
- Middle Reef
- North Monastery
- Otter Cove
- Pescadero
- Pt. Joe
- South Monastery
- Spanish Bay
- Stillwater Cove Monterey
- Weston

URCHIN BARRENS

NOT DIVEABLE

MARINE PROTECTED AREAS



Monterey Peninsula Urchin Dominant Areas Estimate

Label	Acres	Density	MPA	Shore access	Boat required	Other
Lovers Cove	61.2	8.698	Lovers Point SMP	good		
Coral Street	101	16.00	Pacific Grove Gardens SMCA	ok		
Pinos East	67.9		Pacific Grove Gardens SMCA	poor		
Asilomar	156		Asilomar SMR	none	yes	Usually not diveable
Point Joe	390	7.81	Partial Asilomar SMR	none	yes	Usually not diveable
Cypress Pt North	284			none	yes	Usually not diveable
Pinnacles	612		Partial Pinnacles SMR	none	yes	Usually not diveable
Butterfly house	171		Carmel Bay SMCA	ok		
Stewart's Cove	58.9	3.88	Carmel Bay SMCA	ok		
South Monastery	24.6	3.21	Pt. Lobos SMR	ok		
Bluefin Cove	10.7		Pt. Lobos SMR	poor	yes	
Weston Beach	42.6	7.81	Pt. Lobos SMR	none	yes	No diving allowed without permit
Malpaso	25.8	21.22		very poor		1/2 mile trail to beach/usually not diveable
Total area	2,005.7					

ALL ACCESSIBLE
URCHIN BARRENS
ARE IN MARINE
PROTECTED AREAS

CALIFORNIA
MARINE
PROTECTED
AREAS



SAFEGUARDING AN UNDERWATER WILDERNESS





TUMBLEWEEDS IN VICTORVILLE, CALIFORNIA

STAR TREK - THE TROUBLE WITH TRIBBLES, 1967





CORAL STREET / LUCAS POINT – MAY 20, 2017

ACCESS

2018 Reef Check SCP Study 2019 Reef Check G²KR Project

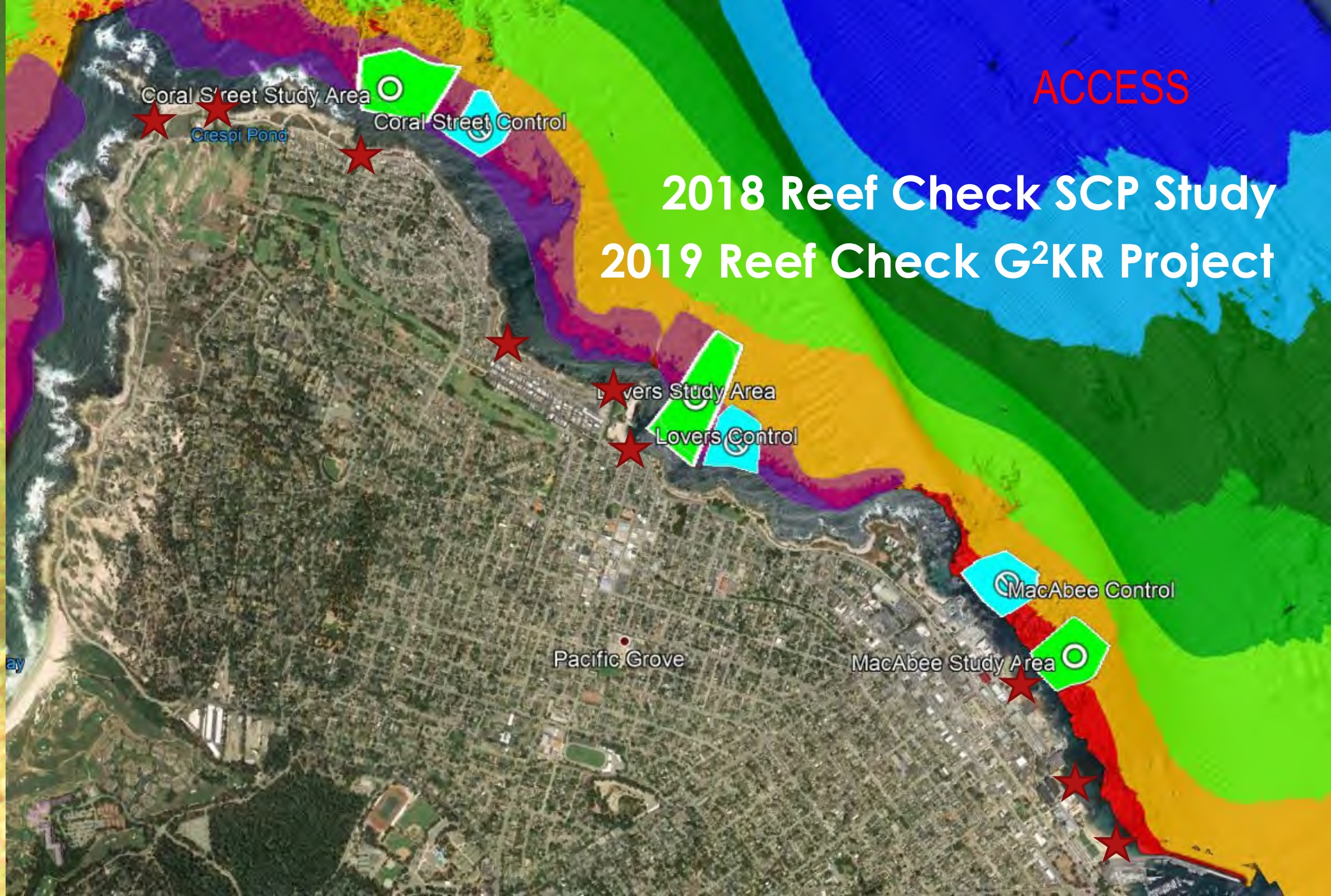
Coral Street Study Area
Crespi Pond
Coral Street Control

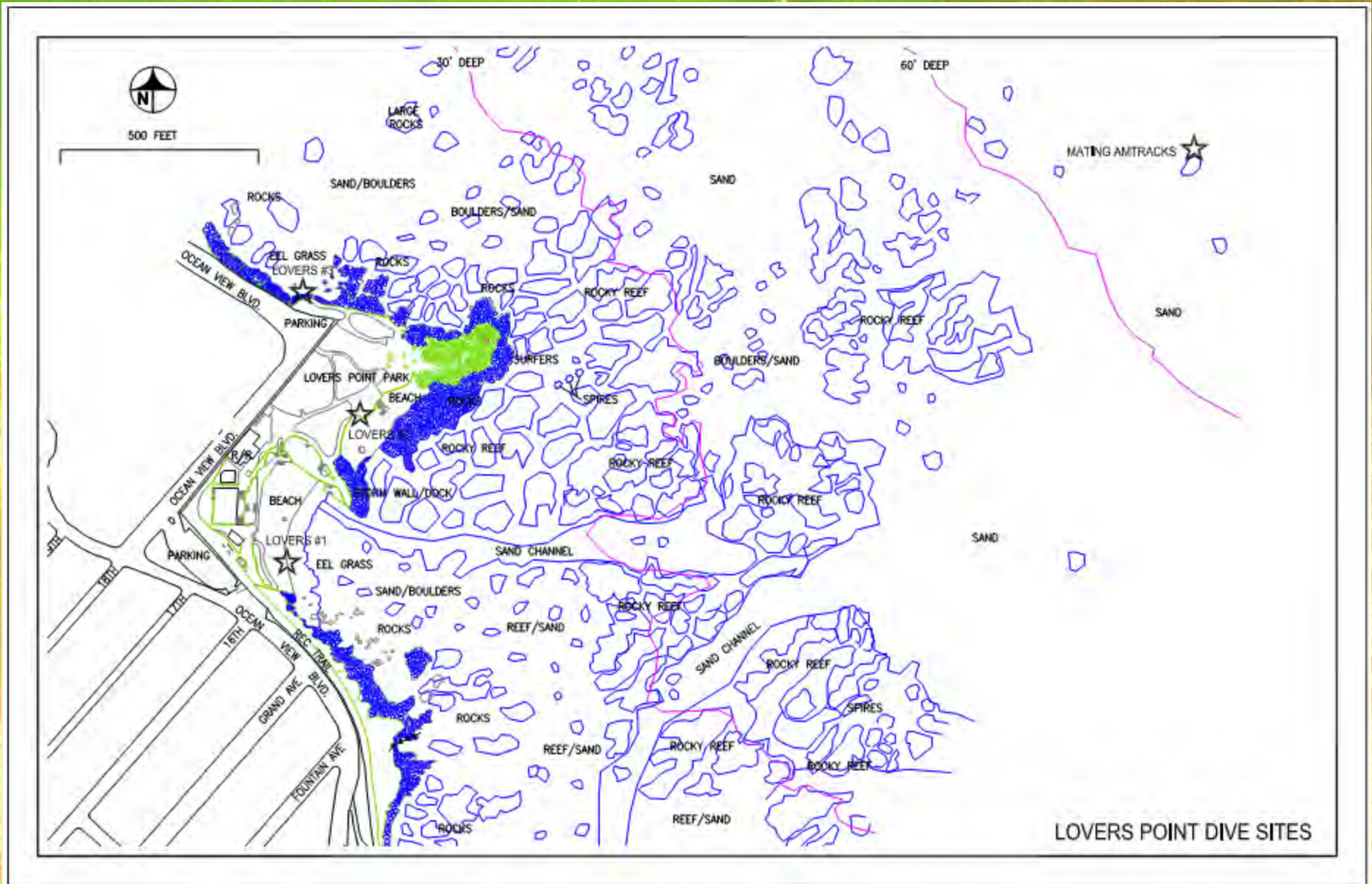
Lovers Study Area
Lovers Control

MacAbee Control

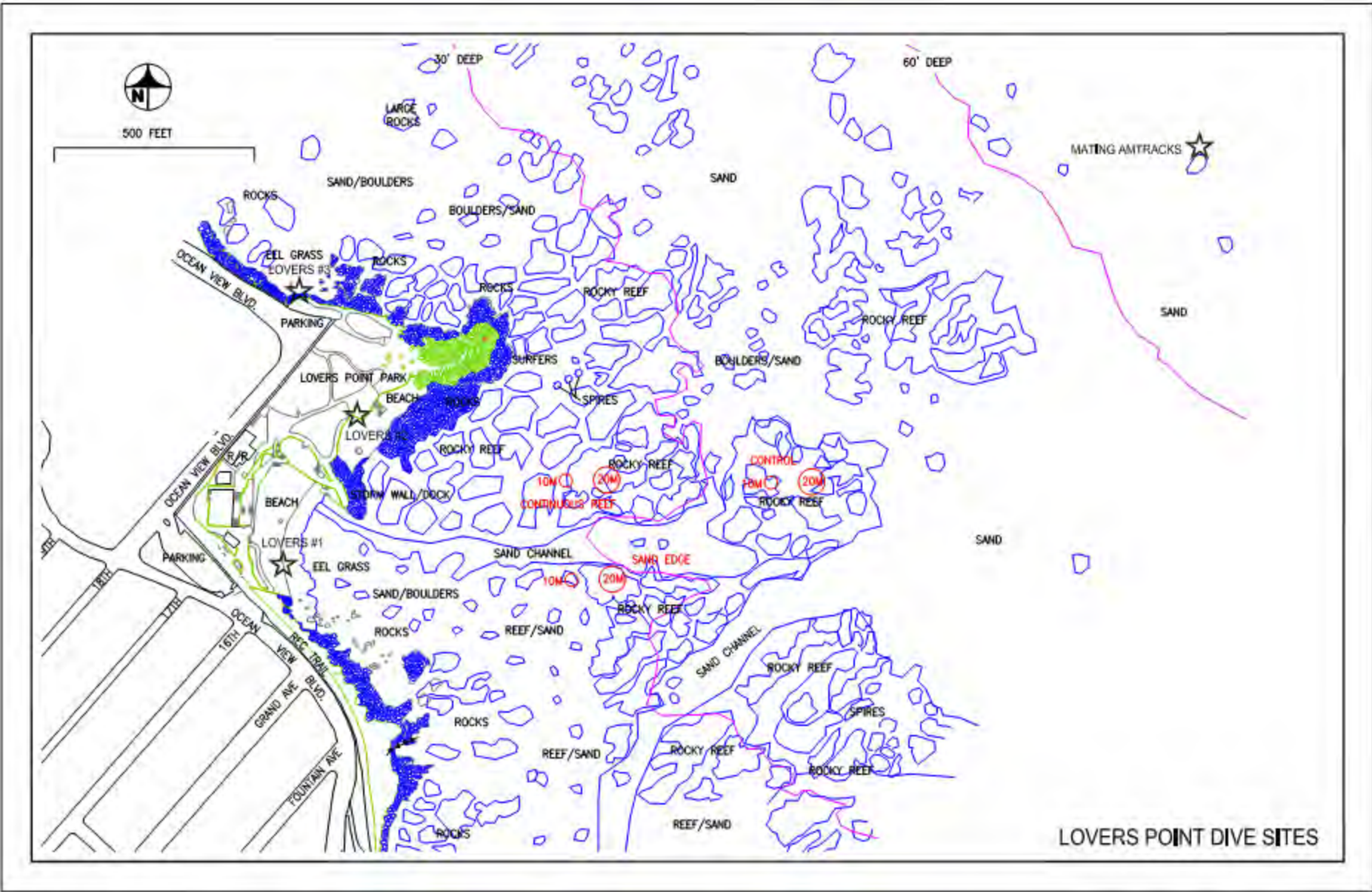
MacAbee Study Area

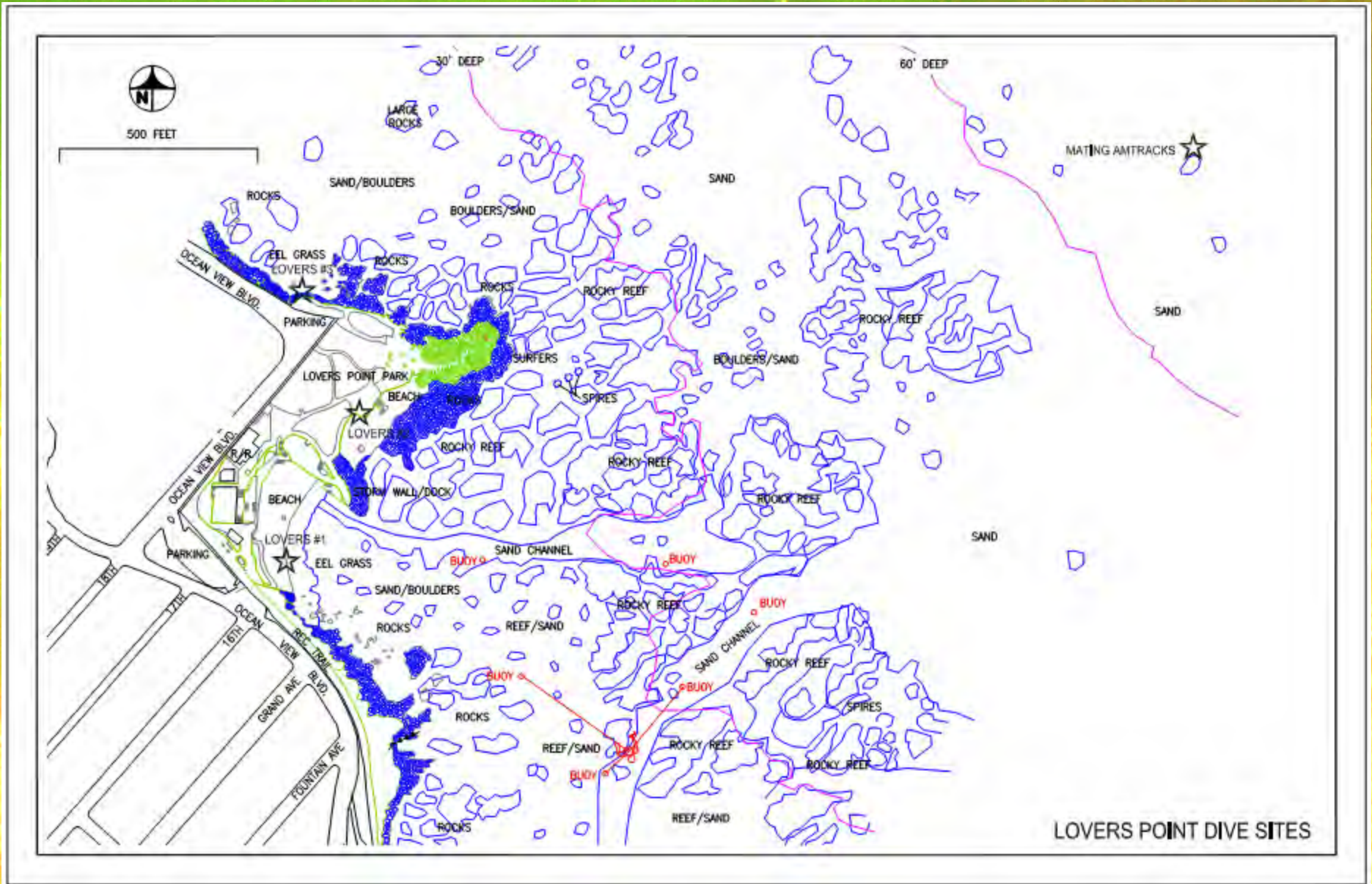
Pacific Grove

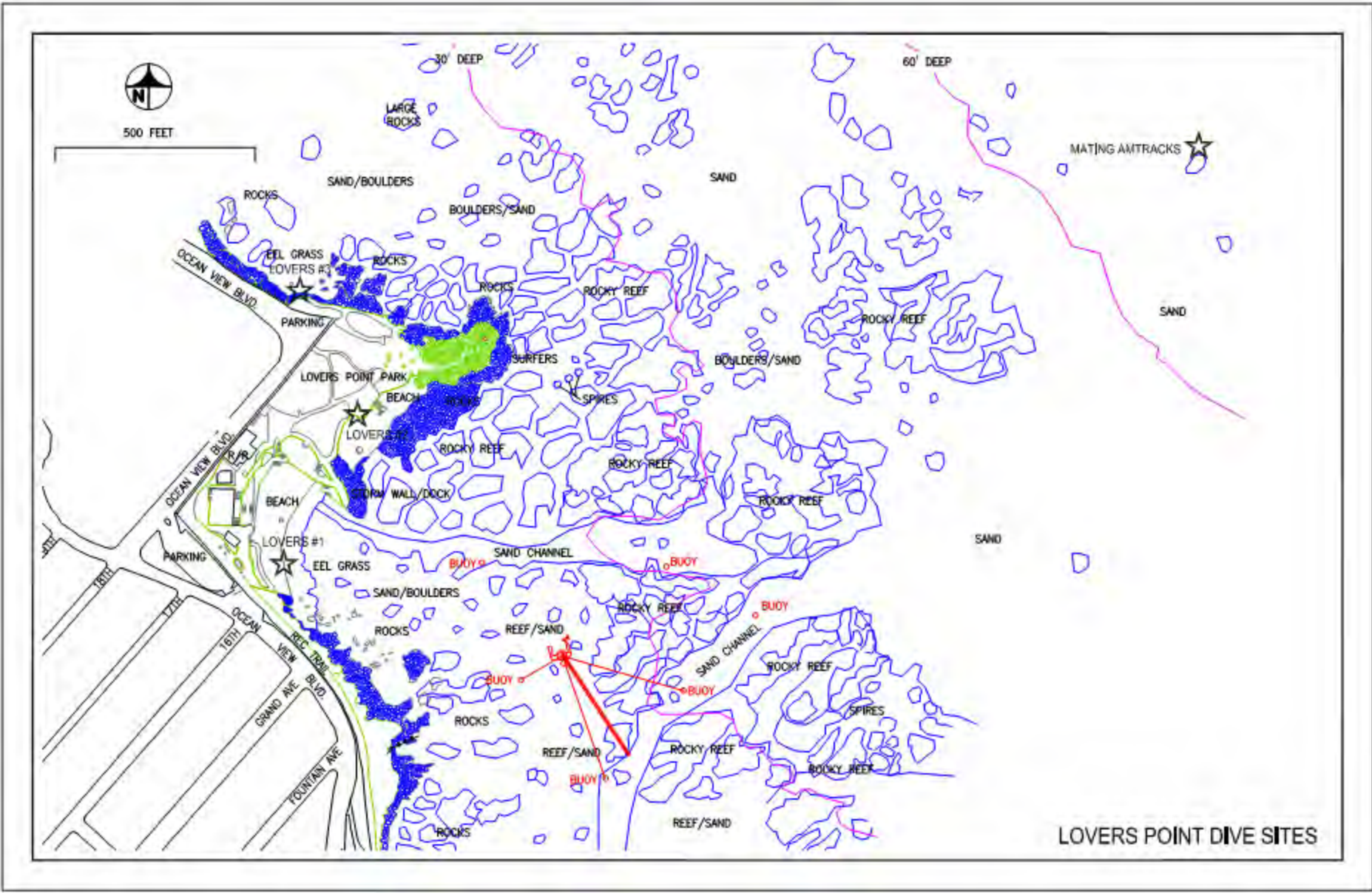




LOVERS POINT DIVE SITES







Metrics

PV Kelp Restoration Project year 4 annual report

Area cleared	40.1622 acres
Restoration	5965.45 hours
Monitoring	1333.5 hours

area clr/hr	0.0067 acres/hr
	27.25 m2 per hour

Cynthia Catton

North Coast urchin culling

Area	78.54 m2
	6 hours
	13.09 m2 per hour
	6000 urchins
	1000 urchins per hour

Nancy Caruso

SoCal urchin removal

	500 urchins
	4 hours
	125 urchins per hour
Culling is 2x as fast as removal	
	250 urchins per hour

Monterey Urchin Barrens Estimated

Label	Acres	Density	MPA	Urchin qty	Shore access	Rate (m2/hr.)	Hours	Urchin rate (#/hr)	Hours
Monterey Peninsula	2005.7	9.80	Various	79,571,570	varies	20	405,753	250	318,286

Large Scale Removal Proposal

Label	Acres	Density	MPA	Urchin qty	Shore access	Rate (m2/hr.)	Hours	Urchin rate (#/hr)	Hours
Lovers Cove	21.1	8.698	Lovers Point SMP	742,740	good	20	4,269	250	2,971
Coral Street	19.8	16.00	Pacific Grove Gardens SMCA	1,282,312	ok	20	4,006	250	5,129
McAbee	13.9	5.59	Edward F. Ricketts SMCA	314,633	good	20	2,812	250	1,259
totals	54.8			2,339,685			11,086		9,359

Percent of total **2.7%** **2.9%**

10 meter circles

Label	m2	Density	MPA	Urchin qty	Shore access	Rate (m2/hr.)	Hours	Urchin rate (#/hr)	Hours
Lovers Cove	78.54	8.698	Lovers Point SMP	683	good	20	3.9	250	2.7
Coral Street	78.54	16.00	Pacific Grove Gardens SMCA	1,257	ok	20	3.9	250	5.0
McAbee	78.54	5.59	Edward F. Ricketts SMCA	439	good	20	3.9	250	1.8
totals	236			2,379			12		10

20 meter circles

Label	m2	Density	MPA	Urchin qty	Shore access	Rate (m2/hr.)	Hours	Urchin rate (#/hr)	Hours
Lovers Cove	314.15	8.698	Lovers Point SMP	2,733	good	20	15.7	250	10.9
Coral Street	314.15	16.00	Pacific Grove Gardens SMCA	5,027	ok	20	15.7	250	20.1
McAbee	314.15	5.59	Edward F. Ricketts SMCA	1,757	good	20	15.7	250	7.0
totals	942			9,517			47		38

An underwater scene featuring a sandy seabed covered with numerous purple sea urchins. The water is clear and greenish-yellow, with sunlight filtering through from above. The urchins are arranged in a somewhat regular pattern across the sand. The overall lighting is bright and natural, creating a serene underwater environment.

THE END

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