



Principal Investigators - please use this form to submit your MPA Baseline Program project annual report, including an update on activities completed over the past year and those planned for the upcoming year. This information will be used by the MPA Baseline Program Management Team to track the progress of individual projects, and will be provided to all MPA Baseline Program PIs and co-PIs prior to the Annual PIs workshop to facilitate discussion of project integration. Please submit this form to California Sea Grant when complete (sgreport@ucsd.edu, Subject [Award Number, project number, PI, "Annual Report"].)

Project Information

Project Year: 1 Study Region: South Coast

Project Title & Number: South coast kelp and shallow rock ecosystems: baseline data collection and long-term trends using historical data

PI name: Jennifer Caselle Co-PI name: Dan Pondella, Jeremy Claisse

PI Contact Info Co- PI Contact Info (please list additional PIs and contact info in the "Project Personnel" section if necessary)

Address: Marine Science Institute University of California, Santa Barbara, CA 93106 Address: Occidental College

Email: caselle@msi.ucsb.edu Email:

Phone: 805-893-5144 Phone:

Project Goals & Objectives

The overall goal of this project is to describe the ecological conditions of kelp and shallow rock ecosystems inside and outside of MPAs in the South Coast Study Region (SCSR) using data collected on SCUBA and to utilize these baseline surveys together with historical data to measure changes in conditions over both short and long time scales. The specific objectives of the proposed surveys and analyses are to: (1) produce a quantitative baseline characterization of the structure of kelp and shallow rock ecosystems in all MPAs in the SCSR, (2) provide quantitative comparisons inside and outside of MPAs, (3) develop easily interpretable ecosystem indicators for assessing the health and status of this ecosystem, (4) inform future monitoring methods while optimizing integration of existing longterm data sets with future monitoring data, and (5) integrate data from the proposed baseline survey with existing long-term data to describe the current trajectory of ecosystem trends.

Summary of Project Activities Completed to Date

Overview of Project Year 1 Activities, including progress towards meeting goals & objectives

This report describes the activities conducted by the University of California Santa Barbara team (PI Jennifer Caselle) as part of the overall project “South coast kelp and shallow rock ecosystems: baseline data collection and long-term trends using historical data”. In year 1, we focussed on a) enumerating all the common kelp forest fishes, invertebrates and algae inside and outside of south coast MPAs using methods previously developed by PISCO, and b) organizing and synthesizing historical data gathered since 1999 by PISCO.

Field program: In 2011 we conducted kelp forest surveys at 70 sites inside and outside of all proposed MPAs in the northern part of the Southern California Bight (Figure 1, Table 1). With additional funding from the Gordon and Betty Moore Foundation we exceeded the number of sites proposed as part of the South Coast Baseline. Our field season kicked off in June 2011 when we conducted our annual 2-week training program which includes intensive classroom and field training, ensuring consistent and high quality field data collection. During 2011, we made a total of 501 dives over a period of 6 months totaling 367 hours of bottom time. In addition to the standard PISCO-style surveys of kelp forest organisms, we gathered size frequency information on a variety of invertebrate species identified as potentially important to south coast MPAs.

Data entry and quality control: All data gathered in 2011 were entered throughout the dive season. Data entry was completed three weeks following the last surveys (Dec. 2011). As part of the PISCO program, we have developed thorough QA/QC procedures to ensure data quality. SAS code for these procedures is available by request from the PI. All QA/QC was completed by February 2012. Datasets are documented in eml (ecological markup language) and will be made available to the public on the PISCO web-based datserver (<http://osu.piscoweb.org/DataCatalogAccess/DataCatalogAccess.html>). Due to major structural overhauls to the PISCO data server, 2011 data are not yet accessible on the site. We anticipate these data being made public (with the 2012 data) by winter 2013.

Historical Data Integration: Historical data (dating back to 1999) from PISCO are available and ready to analyse. During 2011, we worked with Co-PIs Pondella and Claisse to create a single dataset combining data from the CRANE 2004 program, the BIGHT08 program and our own 2011 MLPA South Coast baseline data into a single ‘historical’ dataset. We have also written a detailed outline and begun analyses for a paper utilizing this dataset as a means to characterize baseline conditions in Southern California rocky reefs. We have also completed a Masters taxonomic lookup table that contains taxonomic code information for the following surveys and survey programs: PISCO, Santa Barbara Coastal LTER, Vantuna Research group, CRANE, and Reef Check. This lookup table will greatly facilitate joint analysis by providing logical groupings of species and species groups across programs.

Kelp Forest Indicators of Ecosystem Health: Over the past year, PIs Caselle and Pondella worked with Ken Schiff of SCCWRP to develop a proposal and outline for a workshop to develop a series of data-driven, quantitative indicators of rocky reef health. We have support of SCWRRP and had planned on holding the workshop in the Fall of 2012 but postponed it due to overlap in both timing, topic and potential invitees with the Marine Protected Area monitoring enterprise Expert Judgement workshops. We are tentatively planning on holding our workshop in either Spring 2013 or Fall 2013.

Highlights from project progress so far, such as successes achieved or interesting stories from the past year

The major highlight of 2011 was completing a full survey in a timely fashion despite weather and boat challenges. We faced extremely windy and unpredictable weather conditions at most sites throughout the summer and fall. Completing the survey took careful timing and consideration of the weather and could not have been done without a full time team.

2011 was characterized by relatively cold-water conditions in our kelp forests which resulted in an abundance of recruitment of colder water fishes including rockfishes and surfperches. In particular, in 2011 we noted recruitment of several species of rockfishes that have been uncommon in our region for the prior 10 years including *Sebastes saxicola*, the stripetail rockfish and *Sebastes pinniger*, the canary rockfish.

2011 was a moderate year for the giant kelp density, *Macrocystis pyrifera* when compared with surveys from 1999-2011. In fact, 2011 was an 'average' year for kelp forest communities in southern California. No notable events associated with high or low sea temperatures were recorded.

Description of any unforeseen events and substantial challenges, and resulting effect on data collection

The biggest challenge so far has been the delay in implementation of the south coast MPAs until January 1, 2012. Consequently, the first monitoring season (June-Nov 2011) occurred before implementation of the MPA network while the second year of monitoring will occur after implementation. While we do not expect any large changes due to protection to occur in the first year of regulation, there is evidence from other regions of the world that immediately prior to implementation of spatial closures, fishermen fish areas the 'soon to be closed' areas extremely hard. While we have no evidence at this time of this phenomena happening in Southern California, we will be taking this into account in our analyses and will look for dramatic changes in density of organisms from 2011 to 2012.

Data status (i.e., paper/raw format or digitized; if digitized, what format?)

All of our data from 2011 are entered, quality checked and available for analysis. The metadata is in EML format and is publically accessible on the PISCO web based server while the raw data have not yet been made available at that location due to major upgrades to our data servers over the past year. We anticipate all data being made publically available by winter 2013.

We also have created a very detailed spatial mapbook showing the exact locations of all of our surveys. A pdf is attached to this report and we hope to have this product available on the PISCO website this fall.

Activities Planned for following Project Year _2_ (if applicable) – Please describe remaining work and approximate timelines for completing that work, including any anticipated budget variances necessary to complete the project.

Fieldwork and data entry QA/QC: We are currently approximately half way through our field data collection for 2012. All work is on schedule and we anticipate completion of the fieldwork sometime in November 2012. Data entry is up to date and we are never more than about one week behind on entry. Thus, we should begin our QA/QC procedures in late Nov or early December and have clean data ready to analyze by late January or early February.

Historical Data and Synthesis: In 2012, we will concatenate kelp forest datasets from the Vantuna group and PISCO group into a single South Coast Baseline dataset. We have already assembled the historical CRANE04, BIGHT08 and the 2011 Baseline sets into a single database. In 2012 we will utilize that dataset to analyze patterns of change at our sites over time.

Kelp Forest Indicators of Ecosystem Health: We anticipate holding our data driven workshop on kelp forest indicators in 2012. We have the outline, task list and invite list prepared and simply need to assemble the test datasets and schedule a time to meet.

Data analysis: We have created site-level graphical data summaries for all sites surveyed in 2011. These summaries will be posted to the PISCO website in Fall 2012 and will be provided to the MPA Monitoring Enterprise. Summaries include: density and/or biomass of the most abundant fish, invertebrates and algae, habitat characterization of each site, and size structure comparisons for fish and invertebrates (note: size structure sampling for invertebrates is new for MLPA baseline monitoring).

Project Personnel – Please indicate additional project personnel involved in your MPA baseline project, including students and volunteers, or additional PI contact information if necessary.

	<i>Students Supported</i>	<i>Student Volunteers</i>
<i>K-12</i>		
<i>Undergraduate</i>	<i>3</i>	<i>3</i>
<i>Masters</i>		
<i>PhD</i>	<i>1</i>	

Number of other Volunteers not counted above:

Additional PI contact info not listed on first page:

Cooperating Organizations and Individuals - Please list organizations or individuals (e.g., federal or state agencies, fishermen, etc.) that provided financial, technical or other assistance to your project since its inception, including a description of the nature of their assistance.

Name of Organization or Individual	Sector (City, County, Fed, private, etc.)	Nature of cooperation (If financial, provide dollar amount.)
PISCO funded by the Gordon and Betty Moore Foundation	private	Significant funding for fieldwork and personnel in 2011. See match report for exact amounts.

Additional Information – Please provide any other project-relevant information, such as descriptions of attached materials, media coverage your project has received, etc.

Attachments:

- 1) Figures for Annual Report.
- 2) Mapbook for 2011 kelp forest surveys.

Appendix 1. Figures and Tables for annual report.

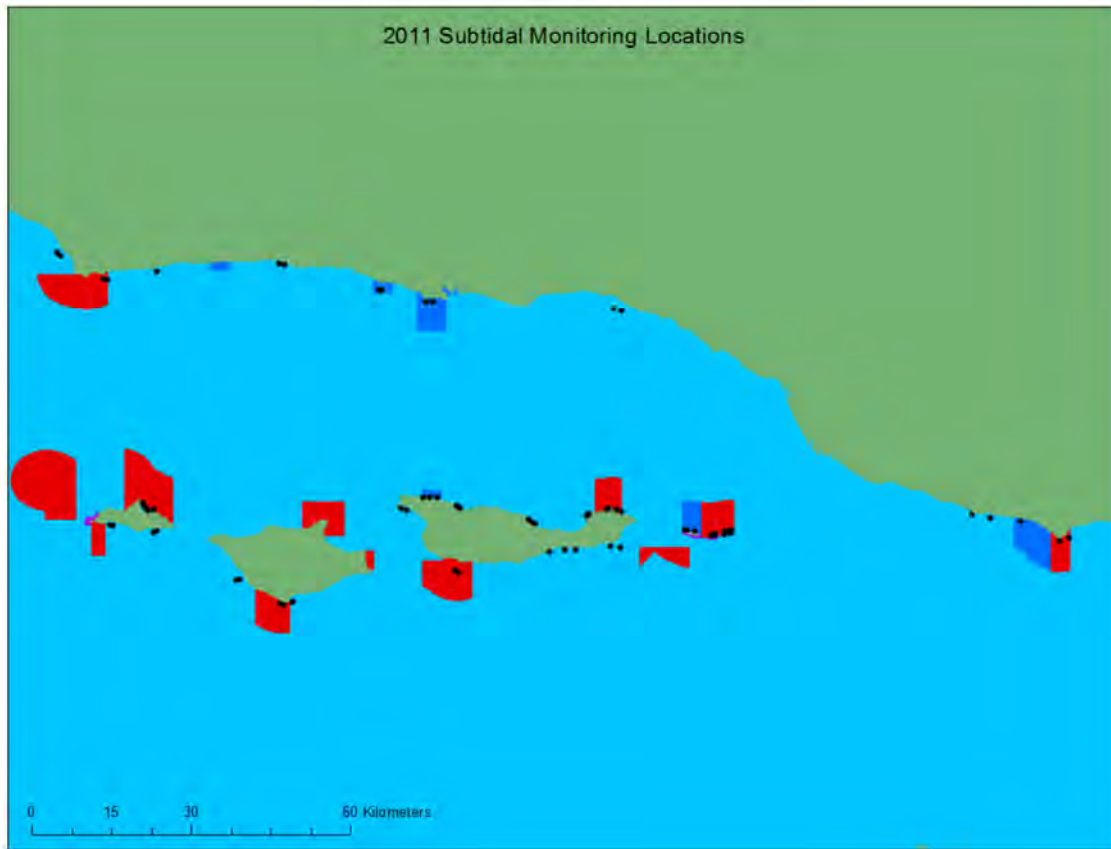


Figure 1. Map showing locations of survey sites (black dots) inside and outside of State Marine Reserves (red) and State Marine Conservation Areas (Blue). In total, 70 sites were sampled in 2011.

Table 1. List of sites surveyed in the northern part of the Southern California bight for the MLPA south coast baseline rocky reef survey in 2011.

SITE NAME	SIDE	LAT	LON	CURRENT RESERVE STATUS
ANACAPA-BLACK SEABASS REEF (FISH SURVEY ONLY)	CENTRAL	34.0127	-119.3889	INSIDE ANACAPA SMR, NO TAKE SINCE 2003
ANACAPA-EAST ISLE	CENTRAL	34.0179	-119.3634	INSIDE ANACAPA SMR, NO TAKE SINCE 1978
ANACAPA-EAST ISLE	EAST	34.0177	-119.3619	INSIDE ANACAPA SMR, NO TAKE SINCE 1978
ANACAPA-EAST ISLE	WEST	34.0161	-119.3712	INSIDE ANACAPA SMR, NO TAKE SINCE 1978
ANACAPA-LIGHTHOUSE REEF	CENTRAL	34.0125	-119.3632	OPEN TO FISHING
ANACAPA-LIGHTHOUSE REEF	EAST	34.0136	-119.3601	OPEN TO FISHING

ANACAPA-LIGHTHOUSE REEF	WEST	34.0106	-119.3722	OPEN TO FISHING
ANACAPA-MIDDLE ISLE	CENTRAL	34.0094	-119.3883	INSIDE ANACAPA SMR, NO TAKE SINCE 2003
ANACAPA-MIDDLE ISLE	EAST	34.0087	-119.3882	INSIDE ANACAPA SMR, NO TAKE SINCE 2003
ANACAPA-MIDDLE ISLE	WEST	34.0078	-119.3947	INSIDE ANACAPA SMR, NO TAKE SINCE 2003
ANACAPA-WEST ISLE	CENTRAL	34.0171	-119.4340	INSIDE ANACAPA SMCA, ALL TAKE PROHIBITED EXCEPT RECREATIONAL AND COMMERCIAL LOBSTER AND PELAGIC FINFISH SINCE 2003
ANACAPA-WEST ISLE	EAST	34.0166	-119.4229	INSIDE ANACAPA SMCA, ALL TAKE PROHIBITED EXCEPT RECREATIONAL AND COMMERCIAL LOBSTER AND PELAGIC FINFISH SINCE 2004
ANACAPA-WEST ISLE	WEST	34.0171	-119.4380	INSIDE ANACAPA SMCA, ALL TAKE PROHIBITED EXCEPT RECREATIONAL AND COMMERCIAL LOBSTER AND PELAGIC FINFISH SINCE 2005
ARROYO QUEMADO	EAST	34.4665	-120.1170	OPEN TO FISHING
ARROYO QUEMADO	WEST	34.4685	-120.1251	OPEN TO FISHING
BULLITO	CENTRAL	34.4554	-120.3317	OPEN TO FISHING
COJO	EAST	34.4414	-120.4157	INSIDE POINT CONCEPTION SMR, NO TAKE SINCE 2012
COJO	WEST	34.4433	-120.4220	INSIDE POINT CONCEPTION SMR, NO TAKE SINCE 2012
COUNTY LINE	CENTRAL	34.0436	-118.9524	OPEN TO FISHING
EL MATADOR	CENTRAL	34.0334	-118.8699	INSIDE POINT DUME SMCA, NO TAKE EXCEPT RECREATIONAL TAKE OF PELAGIC FINFISH BY SPEAR, AND COMMERCIAL TAKE OF COASTAL PELAGIC BY ROUND HAUL NET AND SWORDFISH BY HARPOON SINCE 2012
HORSESHOE REEF	EAST	34.3893	-119.5451	OPEN TO FISHING
HORSESHOE REEF	WEST	34.3920	-119.5578	OPEN TO FISHING
IV REEF	EAST	34.4030	-119.8645	INSIDE CAMPUS POINT SMCA, NO TAKE SINCE 2012
IV REEF	WEST	34.4036	-119.8768	INSIDE CAMPUS POINT SMCA, NO TAKE SINCE 2012
JALAMA	NORTH	34.4872	-120.4998	OPEN TO FISHING
JALAMA	SOUTH	34.4818	-120.4947	OPEN TO FISHING
LEO CARRILLO	CENTRAL	34.0374	-118.9219	OPEN TO FISHING
LITTLE DUME	CENTRAL	34.0049	-118.7892	INSIDE POINT DUME SMR, NO TAKE SINCE 2012
NAPLES	CENTRAL	34.4220	-119.9517	INSIDE NAPLES SMCA, NO TAKE EXCEPT RECREATIONAL TAKE OF PELAGIC FINFISH BY SPEAR AND COMMERCIAL TAKE OF GIANT KELP

				SINCE 2012
NAPLES	EAST	34.4233	-119.9511	INSIDE NAPLES SMCA, NO TAKE EXCEPT RECREATIONAL TAKE OF PELAGIC FINFISH BY SPEAR AND COMMERCIAL TAKE OF GIANT KELP SINCE 2012
NAPLES	WEST	34.4246	-119.9555	INSIDE NAPLES SMCA, NO TAKE EXCEPT RECREATIONAL TAKE OF PELAGIC FINFISH BY SPEAR AND COMMERCIAL TAKE OF GIANT KELP SINCE 2012
POINT DUME	CENTRAL	33.9988	-118.8060	INSIDE POINT DUME SMR, NO TAKE SINCE 2012
SCI-CAVERN POINT	EAST	34.0547	-119.5680	INSIDE SCORPION SMR, NO TAKE SINCE 2003
SCI-CAVERN POINT	WEST	34.0530	-119.5710	INSIDE SCORPION SMR, NO TAKE SINCE 2003
SCI-COCHE POINT	EAST	34.0454	-119.6017	OPEN TO FISHING
SCI-COCHE POINT	WEST	34.0424	-119.6041	OPEN TO FISHING
SCI-FORNEY	EAST	34.0515	-119.9093	OPEN TO FISHING
SCI-FORNEY	WEST	34.0543	-119.9189	OPEN TO FISHING
SCI-GULL ISLE	EAST	33.9465	-119.8232	INSIDE GULL ISLAND SMR, NO TAKE SINCE 2003
SCI-GULL ISLE	WEST	33.9497	-119.8274	INSIDE GULL ISLAND SMR, NO TAKE SINCE 2003
SCI-HAZARDS	CENTRAL	34.0566	-119.8212	OPEN TO FISHING
SCI-HAZARDS	EAST	34.0549	-119.8192	OPEN TO FISHING
SCI-HAZARDS	WEST	34.0578	-119.8248	OPEN TO FISHING
SCI-PAINTED CAVE	CENTRAL	34.0729	-119.8710	INSIDE PAINTED CAVE SMCA, NO TAKE EXCEPT RECREATIONAL TAKE OF LOBSTERS AND PELAGIC FINFISH SINCE 2003
SCI-PAINTED CAVE	EAST	34.0723	-119.8578	INSIDE PAINTED CAVE SMCA, NO TAKE EXCEPT RECREATIONAL TAKE OF LOBSTERS AND PELAGIC FINFISH SINCE 2003
SCI-PAINTED CAVE	WEST	34.0738	-119.8815	INSIDE PAINTED CAVE SMCA, NO TAKE EXCEPT RECREATIONAL TAKE OF LOBSTERS AND PELAGIC FINFISH SINCE 2003
SCI-PELICAN	CENTRAL	34.0307	-119.6969	OPEN TO FISHING
SCI-PELICAN	EAST	34.0285	-119.6910	OPEN TO FISHING
SCI-PELICAN	WEST	34.0355	-119.7024	OPEN TO FISHING
SCI-SCORPION	EAST	34.0483	-119.5462	INSIDE SCORPION SMR, NO TAKE SINCE 2003
SCI-SCORPION	WEST	34.0525	-119.5550	INSIDE SCORPION SMR, NO TAKE SINCE 2003

SCI-VALLEY	CENTRAL	33.9843	-119.6413	OPEN TO FISHING
SCI-VALLEY	EAST	33.9849	-119.6226	OPEN TO FISHING
SCI-VALLEY	WEST	33.9806	-119.6673	OPEN TO FISHING
SCI-YELLOWBANKS	CENTRAL	33.9885	-119.5470	OPEN TO FISHING
SCI-YELLOWBANKS	WEST	33.9894	-119.5646	OPEN TO FISHING
SMI-CROOK POINT	EAST	34.0151	-120.3314	OPEN TO FISHING
SMI-CROOK POINT	WEST	34.0147	-120.3378	OPEN TO FISHING
SMI-CUYLER	EAST	34.0518	-120.3465	OPEN TO FISHING
SMI-CUYLER	WEST	34.0572	-120.3519	OPEN TO FISHING
SMI-HARRIS POINT RESERVE	EAST	34.0523	-120.3385	INSIDE HARRIS POINT SMR, NO TAKE SINCE 2003
SMI-HARRIS POINT RESERVE	WEST	34.0639	-120.3566	INSIDE HARRIS POINT SMR, NO TAKE SINCE 2003
SMI-TYLER BIGHT	EAST	34.0258	-120.4063	OPEN TO FISHING
SMI-TYLER BIGHT	WEST	34.0270	-120.4118	OPEN TO FISHING
SRI-CLUSTER POINT	NORTH	33.9328	-120.1978	OPEN TO FISHING
SRI-CLUSTER POINT	SOUTH	33.9338	-120.1913	OPEN TO FISHING
SRI-JOHNSONS LEE SOUTH	EAST	33.8973	-120.1009	OPEN TO FISHING
SRI-JOHNSONS LEE SOUTH	WEST	33.8951	-120.1041	OPEN TO FISHING
SRI-SOUTH POINT	EAST	33.8918	-120.1187	INSIDE SOUTH POINT SMR, NO TAKE SINCE 2003
SRI-SOUTH POINT	WEST	33.8947	-120.1249	INSIDE SOUTH POINT SMR, NO TAKE SINCE 2003

2011 PISCO Mapbook

includes MLPA South Coast Baseline
monitoring sites

Contact Dr. Jennifer Caselle
Marine Science Institute
University of CA Santa Barbara
Santa Barbara, CA 93117
caselle@msi.ucsb.edu

PISCO SUBTIDAL BENTHIC SURVEYS 2011



MAINLAND



- JALAMA
- COJO
- BULLITO
- NAPLES
- IV REEF
- HORSESHOE REEF
- ARROYO QUEMADO
- COUNTY LINE
- LEO CARRILLO
- EL MATADOR
- POINT DUME
- LITTLE DUME



JALAMA



N OUTER	34° 29.217' N	120° 29.970' W
N INNER/MID	34° 29.350' N	120° 29.742' W
S OUTER	34° 28.896' N	120° 29.670' W
S INNER/MID	34° 28.982' N	120° 29.447' W

N Outer



N Inner/Mid



S Inner/Mid



S Outer



Urchins

DO NOT SAMPLE

(Not enough present)

N OUTER	60-70 FT	120
N MID	25-35 FT	120
N INNER	20-30 FT	120
S OUTER	60-70 FT	120
S MID	25-35 FT	120
S INNER	20-25 FT	120

NOTES: Non-Reserve

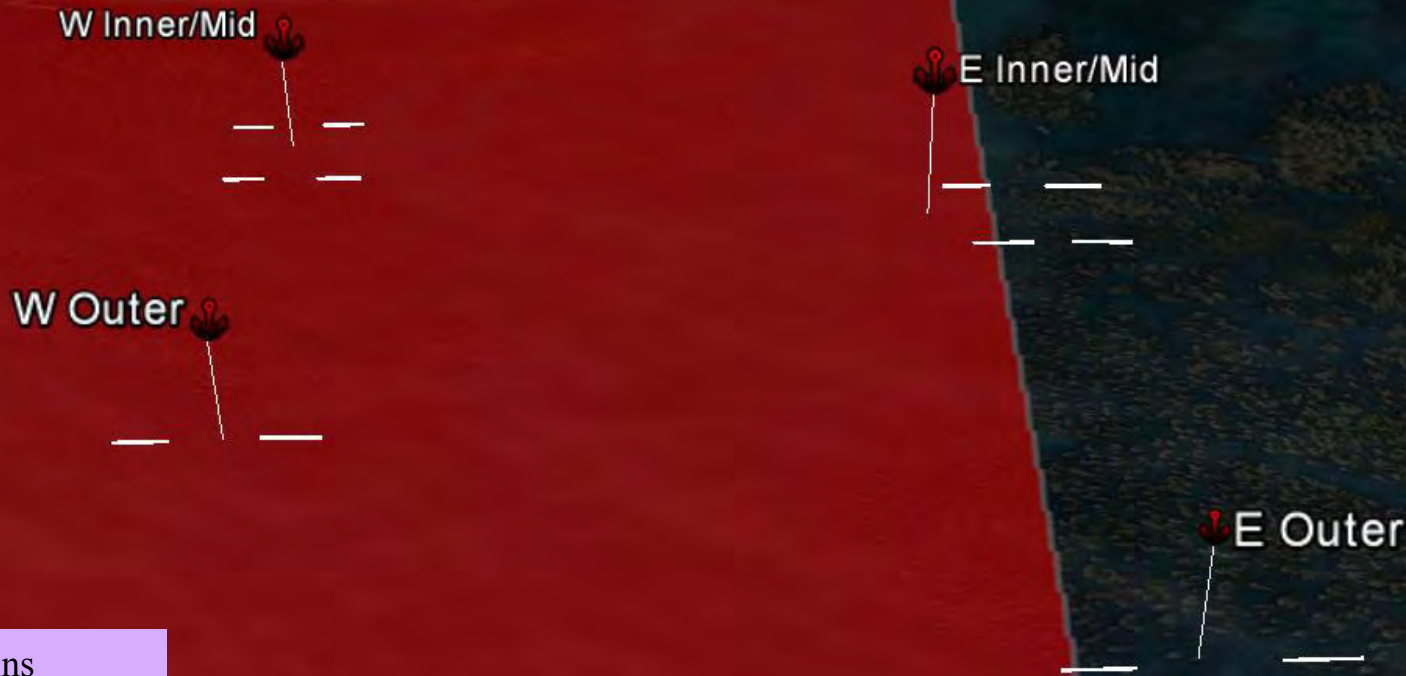
Low relief. Plenty of reef – contiguous. Sand channel between two sides. When there is a lot of kelp, may have to anchor in sand channel and run transects all in one direction. Must survey at anchor points, which means a surface swim if there is a lot of kelp. Inners can be patchy and stirred up. May need to anchor inside of kelp bed for inners/mids. Some years very little kelp present.

S: Inners run along thin reef strip about 50m inshore of kelp bed. Mid run along inshore edge of kelp bed.

N: Inners and innids have more reef to the north than to the south of the numbers.

COJO

W OUTER	34° 26.593' N	120° 25.340' W
W INNER/MID	34° 26.807' N	120° 25.360' W
E OUTER	34° 26.482' N	120° 24.954' W
E INNER/MID	34° 26.749' N	120° 25.031' W



Urchins

DO NOT SAMPLE

(Not enough present)

W OUTER	60-70 FT	90
W MID	25-35 FT	90
W INNER	20-25 FT	90
E OUTER	50-60 FT	90
E MID	25-35 FT	90
E INNER	20-25 FT	90

NOTES: Site straddles Point Conception SMR boundary. No take within reserve.

Large sand channel between the two sides. May need to anchor on one end of side and run transects in one direction due to large kelp bed. Low relief bedrock, easily stirred up.

E: Inner/Mid run transects to the east from anchor. Anchorpoint should be edge of reef

BULLITO



CEN OUTER	34° 27.326' N	120° 19.923' W
CEN MID/INNER	34° 27.490' N	120° 19.894' W



ST 225/75R15



Urchins
DO NOT SAMPLE
(Not enough present)

OUTER	40-42 FT	240
MID	25-30 FT	240
INNER	15-20 FT	240

NOTES: Non-Reserve

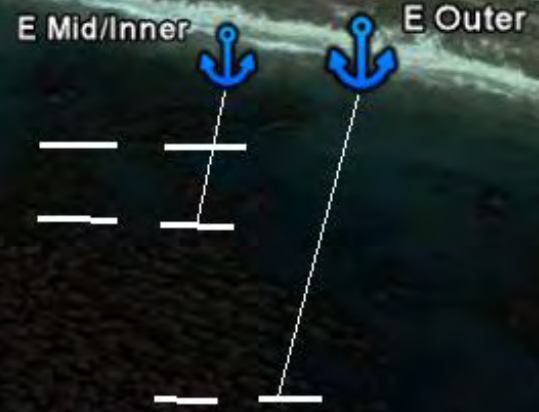
This is a half site (side CEN). Also an LTER site.

Run transects to the west from the anchor points. Outside edge of reef is super flat shale transitioning to sand

ARROYO QUEMADO



W	34° 28.101' N	120° 07.511' W
E OUTER	34° 27.977' N	120° 07.018' W
E MID/INNER	34° 28.050' N	120° 07.030' W



Urchins
East (Outers/Mids)

W OUTER	45-50 FT	70
W MID	25-30 FT	70
W INNER	20-25 FT	70
E OUTER	40-50 FT	70
E MID	25-30 FT	70
E INNER	15-20 FT	70

NOTES: Non-Reserve
 All zones have good, low relief reef except inners which are patchy. Flat bedrock with some low ledges.
 W: Can swim to all zones from one anchor point. Run all transects toward the west from anchor points. Mid transects start ~20m west of anchor.
 E: Sandy channel to the west of transects, make sure to start far enough to the east. Anchor point is center of site.

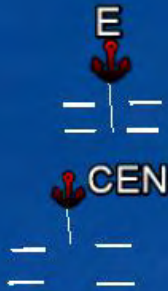
NAPLES



W	34° 25.478' N	119° 57.319' W
CEN	34° 25.311' N	119° 57.090' W
E	34° 25.400' N	119° 57.061' W

Reef Check Site
"Naples Reef"

Urchins
CEN (Inners & Outers)



Reef Check Site
"Naples Reef"

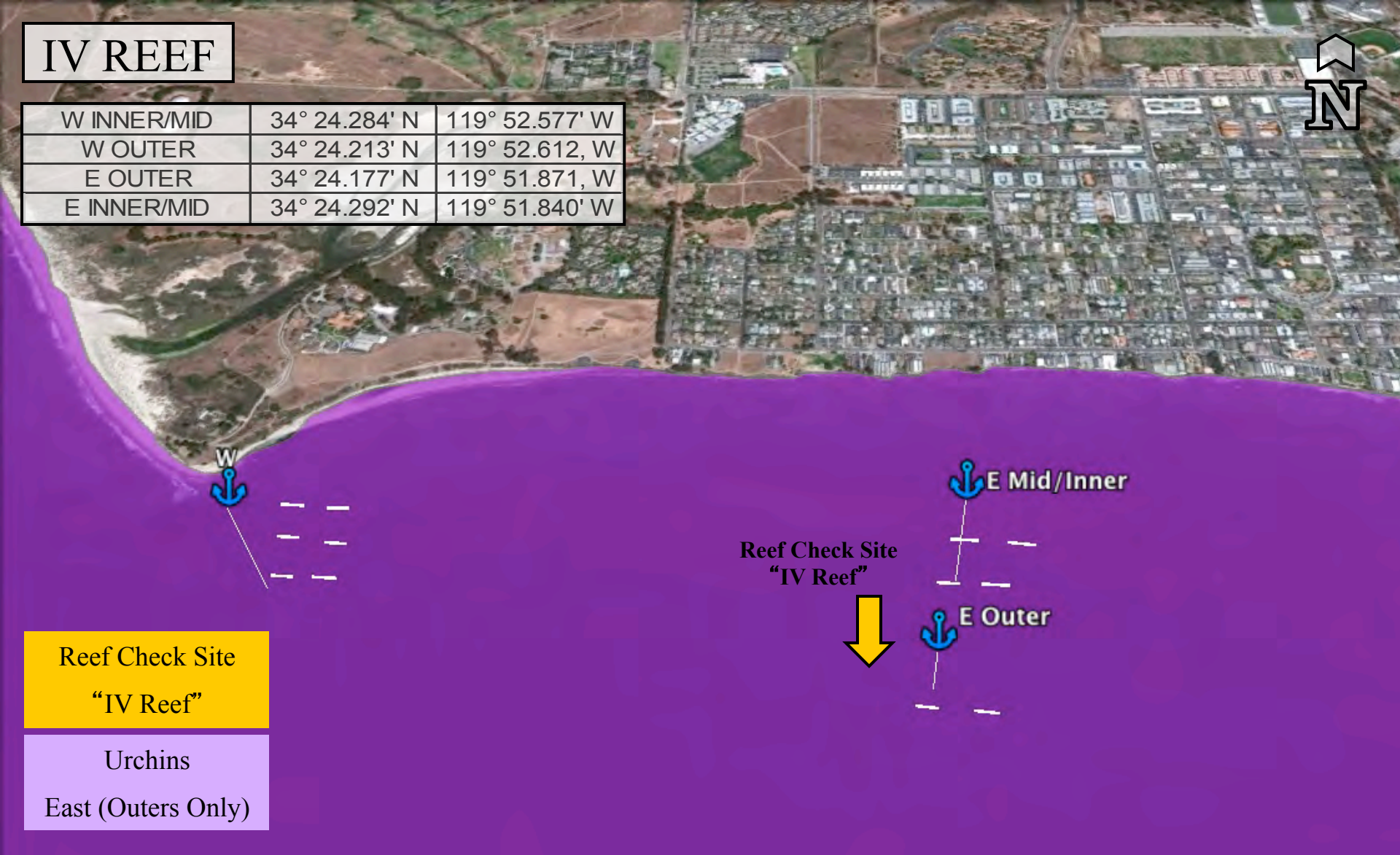
E OUTER	35-45 FT	90
E INNER	35-40 FT	90
CEN OUTER	45-50 FT	90
CEN INNER	25-30 FT	90
W OUTER	40-45 FT	90
W INNER	25-30 FT	90

NOTES: *Inside Naples SMCA, all take prohibited except pelagic finfish by spear and commercial kelp harvest.*
 It is possible to anchor between E and CEN in a large boat and swim to the spots.
 CEN: Is "Three Fingers" - Run inners along the top of the ridge and outers along the offshore down-slope.
 E: Is "Main Naples" - Inners and outers are run at similar depths. Reef has some ridges.
 W: Is "Little Naples." More reef to the east of the anchor point. Reef is flat, shaley, with low ridges. There is a higher ridge that comes up to ~30'. Run inners along that and outers to the North (deeper). Run all transects to the east.
 Reef Check Site "Naples Reef" 34°25.311' N, 119°57.090' W (Same as our side CEN numbers.)

IV REEF



W INNER/MID	34° 24.284' N	119° 52.577' W
W OUTER	34° 24.213' N	119° 52.612, W
E OUTER	34° 24.177' N	119° 51.871, W
E INNER/MID	34° 24.292' N	119° 51.840' W



Reef Check Site
"IV Reef"

Urchins
East (Outers Only)

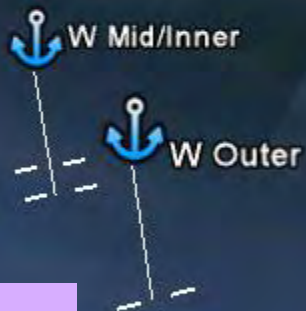
W OUTER	30-40 FT	90
W MID	25-30 FT	90
W INNER	20 FT	90
E OUTER	35-40 FT	90
E MID	25-30 FT	90
E INNER	15-20 FT	90

NOTES: Inside Campus Point SMCA, no take.
 E: Run transects to west from anchor. Reef varies from medium to no relief. Flattens out toward the east so run all transects to the west.
 W: Transects run East from the point. All zones shallow towards the point and get deeper towards the East. No reef less than ~20' depth.
 Reef Check Site "IV Reef" 34°24.183' N, 119°51.965' W

HORSESHOE REEF



W OUTER	34° 23.504' N	119° 33.462' W
W MID/INNER	34° 23.652' N	119° 33.612' W
E OUTER	34° 23.367' N	119° 32.686' W
E MID/INNER	34° 23.452' N	119° 32.473' W



Urchins
West (Inners only)

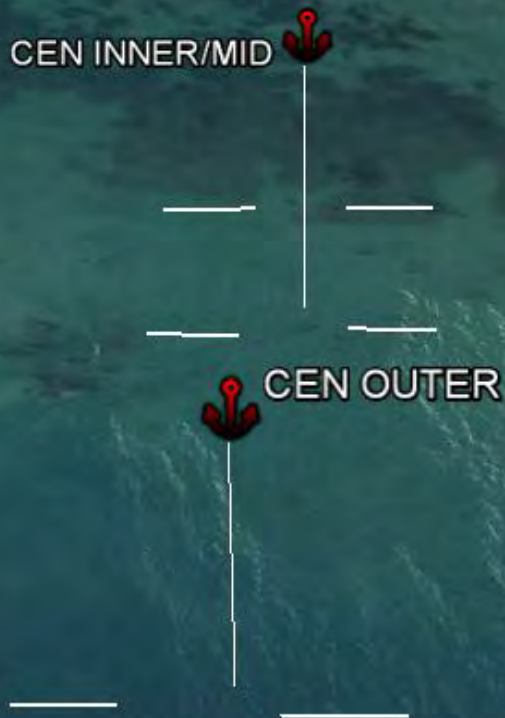
W OUTER	40-45 FT	60
W MID	30 FT	60
W INNER	25-30 FT	60
E OUTER	30-35 FT	90
E MID	25 FT	90
E INNER	15-20 FT	90

NOTES: Non-Reserve
E: Mid/Inner anchor point is over the mids, swim in for the inners. Anchor points are center of site.
W: Numbers are center points.

COUNTY LINE



CEN OUTER/OUTMID	34° 02.615' N	118° 57.141' W
CEN INNER/INMID	34° 02.664' N	118° 57.120' W



Reef Check Site
"Leo Carrillo North" →

Reef Check Site
"Leo Carrillo North"

Urchins
(Outers only)

OUTER	38-40 FT	90
MID	20-25 FT	90
INNER	15-20 FT	90

NOTES: Non-Reserve

OUTER: There are a few sand channels to navigate around. Run one transect in each direction.

MID: anchor spot for INNER/MID is perfect depth for MID transects

Reef Check Site "Leo Carrillo North" 34°2.612' N, 118°56.697' W (0.25 nm due East of OUTER)

LEO CARRILLO



CEN MID/INNER



CEN OUTER



CEN OUTER	34° 02.257' N	118° 55.319' W
CEN MID	34° 02.501' N	118° 55.423' W
CEN INNER	34° 02.557' N	118° 55.424' W

Urchins
(Outers only)

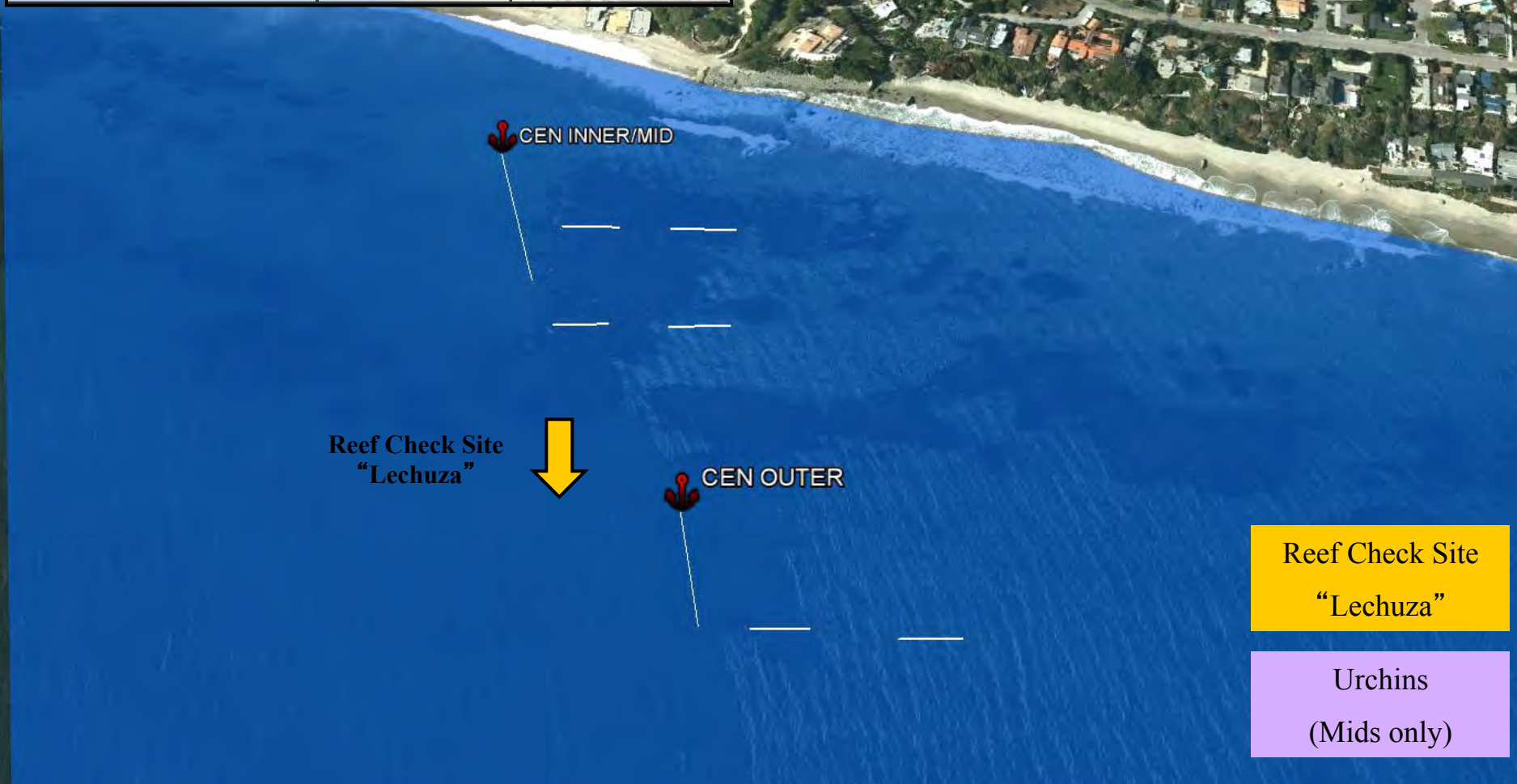
OUTER	38-40 FT	90
MID	25-35 FT	90
INNER	15-20 FT	90

NOTES: Non-Reserve
OUTER: Run transects to West. Large oval shaped reef comes up to ~40' in center.
MID: Swim offshore of inner anchor point to another section of reef.
INNER: Anchor point is midpoint.

EL MATADOR



CEN OUTER	34° 01.997' N	118° 52.210' W
CEN INNER/MID	34° 02.113' N	118° 52.286' W



Reef Check Site
"Lechuza"

Urchins
(Mids only)

OUTER	45-50 ft	90
MID	25-30 ft	90
INNER	15-20 ft	90

NOTES: Inside Point Dume SMCA, all take prohibited except recreational take of pelagic finfish by spear and commercial take of coastal pelagic species by round haul net and swordfish by harpoon.
 OUTER: Run transects to East. Run along middle of large oval shaped reef.
 INNER/MID: Run transects to East.
 Reef Check Site "Lechuza" 34°2.042' N, 118°52.279' W

POINT DUME



CEN OUTER / MID	33° 59.912' N	118° 48.338' W
CEN INNER	33° 59.962' N	118° 48.273' W



Urchins
(Mids only)

CEN OUTER	35 ft	20
CEN MID	25 ft	20
CEN INNER	16 ft	60

NOTES: Inside Point Dume SMR, no take.
CEN: INNERS are to the North against the point. OUTER/MIDS are out off of the point in front of the wash rocks.

LITTLE DUME



CEN OUTER	34° 00.295' N	118° 47.347' W
CEN INNER / MID	34° 00.368' N	118° 47.487' W

CEN INNER/MID

CEN OUTER

Reef Check Site
"Paradise Point"

Reef Check Site
"Paradise Point"

Urchins
(Outers only)

CEN OUTER	38-43 ft	40
CEN MID	25-30 ft	40
CEN INNER	15-20 ft	40

NOTES: Inside Point Dume SMR, no take.
Run transects to East of anchor points.
OUTER anchor point is in ~40ft. Reef gets deeper to the East.
INNER/MID anchor point is correct depth for Inners.
For Mids, swim offshore to 25-30 feet from INNER/MID anchor point.
Reef Check Site "Paradise Point" 34°0.248' N, 118°47.574' W

SANTA CRUZ ISLAND



VALLEY



E	33° 59.033' N	119° 37.358' W
CEN	33° 59.060' N	119° 38.489' W
W	33° 58.853' N	119° 40.028' W



Urchins
West (Inners & Outers)

E OUTER	35-40 FT	90
E INNER	20-25 FT	90
CEN OUTER	30-35 FT	90
CEN INNER	15-25 FT	90
W OUTER	25-30 FT	90
W INNER	20-25 FT	90

NOTES: Non-Reserve
Anchor points are good for outers. Swim inshore for inners.
CEN: Reef is patchy. Will silt out on south swell.

YELLOWBANKS



W OUTER	33° 59.358' N	119° 33.896' W
W MID/INNER	33° 59.519' N	119° 34.045' W
CEN OUTER	33° 59.312' N	119° 32.819' W
CEN MID	33° 59.422' N	119° 33.270' W
CEN INNER	33° 59.546' N	119° 33.268' W

Reef Check Site
"Yellow Banks"



W Inner/Mid



CEN Inner



Reef Check Site
"Sandstone Point"



CEN Mid

W Outer



CEN Outer



NPS Site

Side West

Urchins

Done by NPS

Reef Check Site

"Yellow Banks"

Reef Check Site

"Sandstone Point"

CEN OUTER	50-60 FT	100
CEN MID	30-35 FT	100
CEN INNER	20-30 FT	100
W OUTER	55-65 FT	90
W MID	40-45 FT	90
W INNER	30-35 FT	90

NOTES: Non-Reserve

W and CEN are the two sides of this site. There is no E. Varied substrate over site. Each zone can be very different.

W: Inner/mid anchor point is good for mids. Swim in for inners.

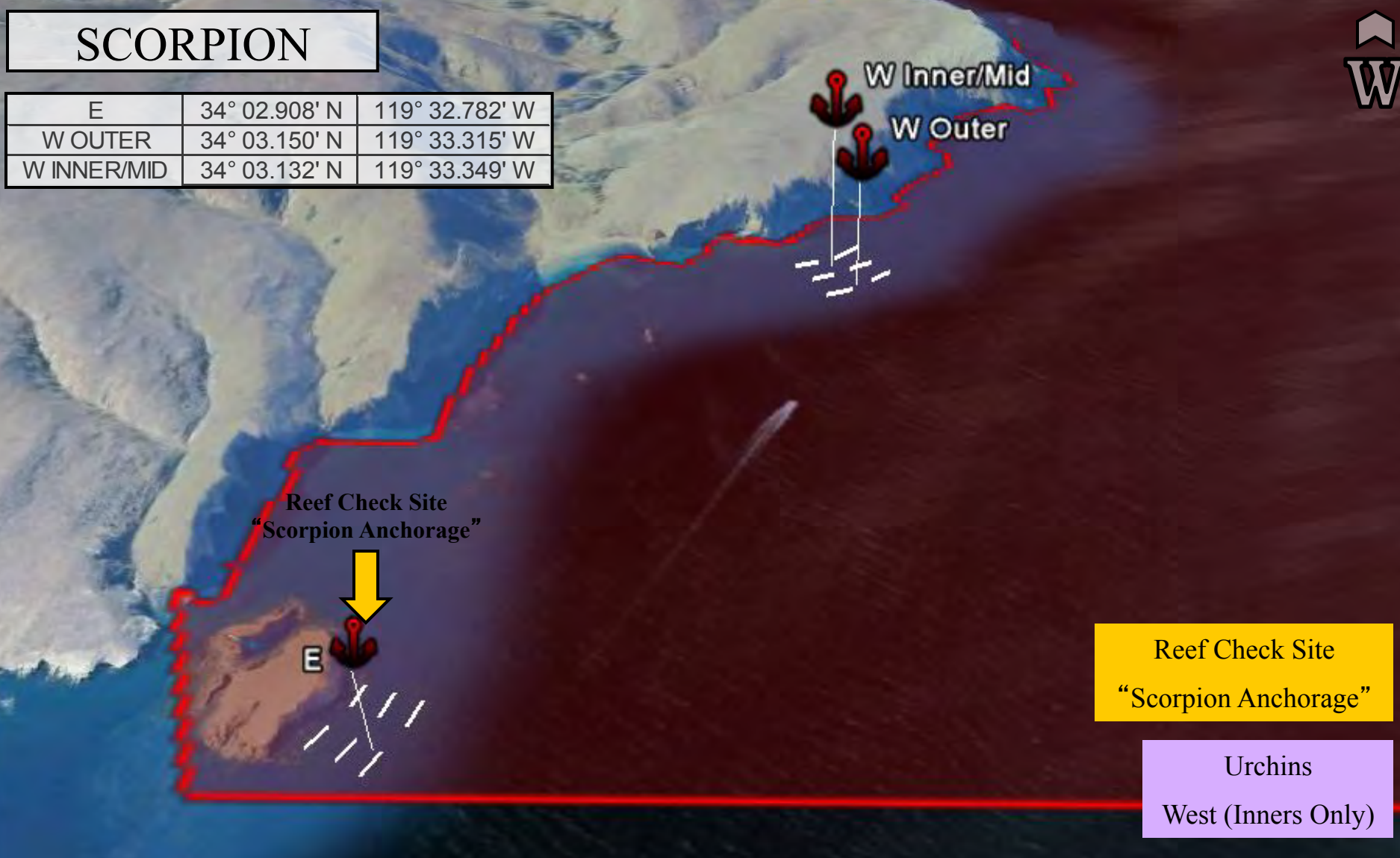
Reef Check Site "Yellow Banks" 33°59.928' N, 119°33.030' W

Reef Check Site "Sandstone Point" 33°59.442' N, 119°33.264' W

SCORPION



E	34° 02.908' N	119° 32.782' W
W OUTER	34° 03.150' N	119° 33.315' W
W INNER/MID	34° 03.132' N	119° 33.349' W



E OUTER	60-65 FT	120
E MID	35-40 FT	120
E INNER	15-25 FT	120
W OUTER	38-40 FT	120
W MID	25-30 FT	120
W INNER	15-20 FT	120

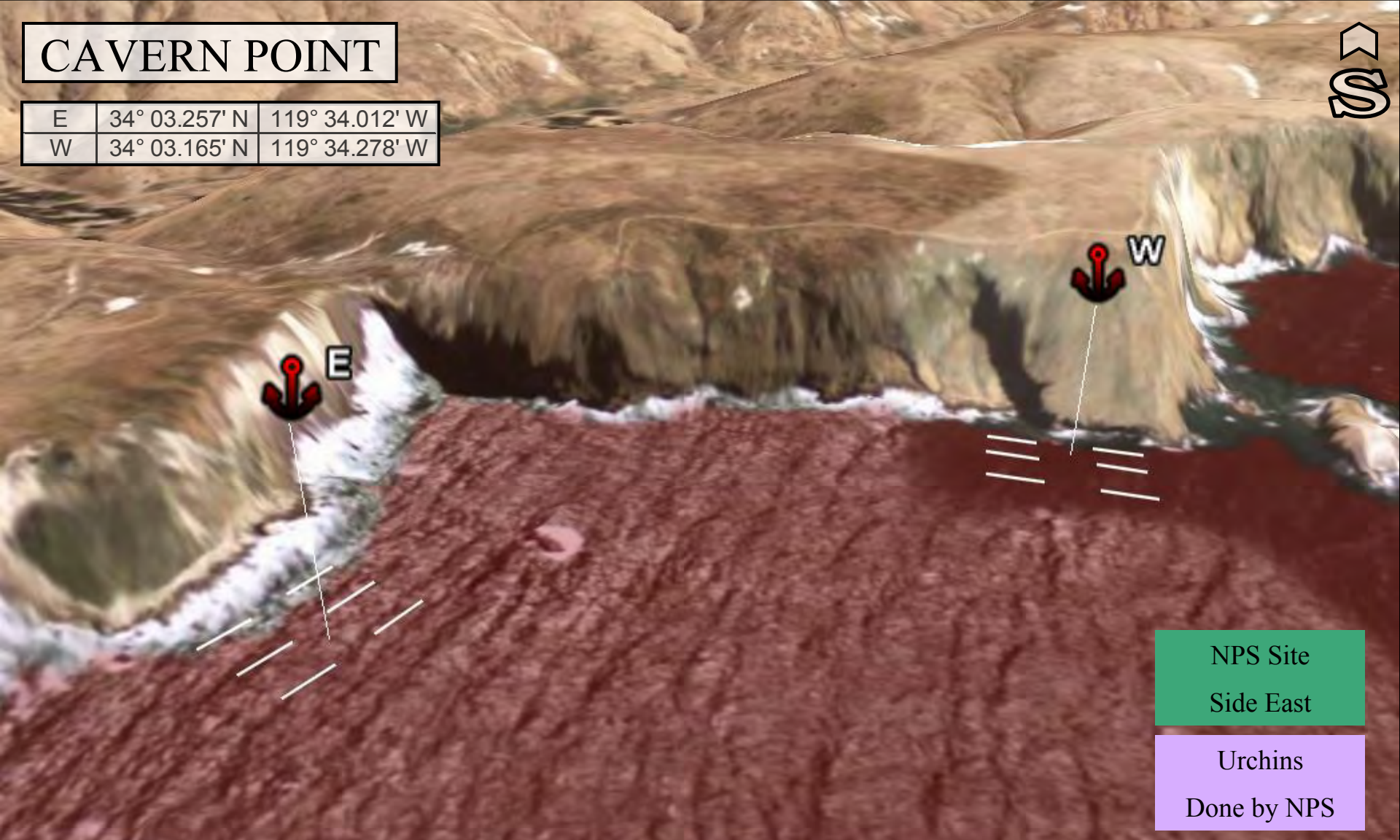
NOTES: Inside Scorpion SMR, no take.
 W: Outers patchy, hard to find reef. Reef is under anchor point. Run west
 E: Inners are up on the wall. Mids are slightly offshore of rock on raised section of reef. Outers are deep.

Reef Check Site "Scorpion Anchorage" 34°02.908' N, 119°32.880' W

CAVERN POINT



E	34° 03.257' N	119° 34.012' W
W	34° 03.165' N	119° 34.278' W



NPS Site
Side East

Urchins
Done by NPS

E OUTER	45-55 FT	30
E MID	30-35 FT	30
E INNER	15-25 FT	30
W OUTER	40 FT	110
W MID	25-30 FT	110
W INNER	15-20 FT	110

NOTES: Inside Scorpion SMR, no take.
 Whole site is very exposed to W swell.
 W: Reef does not extend very far offshore. Midpoint is small point jutting out.
 E: Has extensive high relief reef. Big washrock to the north of anchor point. Run transects to the south of the point on coastline that bends inward. Has permanent KFM transect.

COCHE POINT



E	34° 02.696' N	119° 36.084' W
W	34° 02.559' N	119° 36.240' W



NPS Site
Side East

Urchins
Done by NPS

E OUTER	50-60 FT	30
E MID	30-40 FT	30
E INNER	15-25 FT	30
W OUTER	50-60 FT	30
W MID	30-40 FT	30
W INNER	15-25 FT	30

NOTES: Non-reserve.

E: Midpoint is the part of the cliff that juts out. Has permanent KFM transects.

W: Outers are mostly to the east of the anchor point. Otherwise has extensive reef.

PELICAN

E	34° 01.683' N	119° 41.455' W
CEN	34° 01.839' N	119° 41.799' W
W	34° 02.152' N	119° 42.138' W



Reef Check Site
"Pelican Anchorage"

NPS Site
Side West

Urchins
Done by NPS

E OUTER	35-45 FT	140
E INNER	15-25 FT	140
CEN OUTER	40-45 FT	120
CEN INNER	15-20 FT	120
W OUTER	35-40 FT	30
W INNER	15-25 FT	30

NOTES: Non-reserve.
 W: Midpoint is where rock face changes from white to black.
 CEN: Midpoint is large crack in cliff face. This site has a large cobble channel running perpendicular to the coastline. Avoid laying transects on it.
 E: Midpoint is largest rock at base of rockslide.
 Reef Check Site "Pelican Anchorage" 34°2.142' N, 119°42.150' W

HAZARDS



E	34° 03.263' N	119° 49.161' W
CEN	34° 03.395' N	119° 49.270' W
W	34° 03.486' N	119° 49.490' W



Urchins
West (Inners only)

TX1/TX2

E OUTER	35-45 FT	120
E INNER	15-20 FT	120
CEN OUTER	35-45 FT	120
CEN INNER	15-20 FT	120
W OUTER	40-45 FT	80/30
W INNER	15-20 FT	80/30

NOTES: Non-reserve.

W: Transects 1 outers at base of wall, inners on top of shelf above wall. These are run on the east side of the large cave- Do not run into cave. Transects 2 are run on the opposite side.

CEN: Midpoint is the washrock that juts the farthest out from the island.

E: Midpoint is large phallic rock. Reef doesn't extend very far offshore. Transects angle slightly around contours of reef to maintain a constant depth.

PAINTED CAVE



E	34° 04.314' N	119° 51.453' W
CEN	34° 04.372' N	119° 52.259' W
W	34° 04.469' N	119° 52.928' W



Reef Check Site
"Cueva Valdez"

Reef Check Site
"Cueva Valdez"

Urchins
West (Inner & Outer)

TX1/TX2

E OUTER	40-45 FT	90/30
E INNER	15-20 FT	90/30
CEN OUTER	40-45 FT	90
CEN INNER	15-25 FT	90
W OUTER	40-50 FT	160
W INNER	20-25 FT	160

NOTES: Inside Painted Cave SMCA, Take of all living marine resources is prohibited except for the recreational take of lobster and pelagic finfish.

E: Has plenty of reef that drops steeply and extends deeper than deepest transects. Midpoint is a rocky protuberance that is to the east of a cave. Transect 1 runs along main wall, transect 2 runs in toward the cave.

CEN: Midpoint is crack in cliff-face.

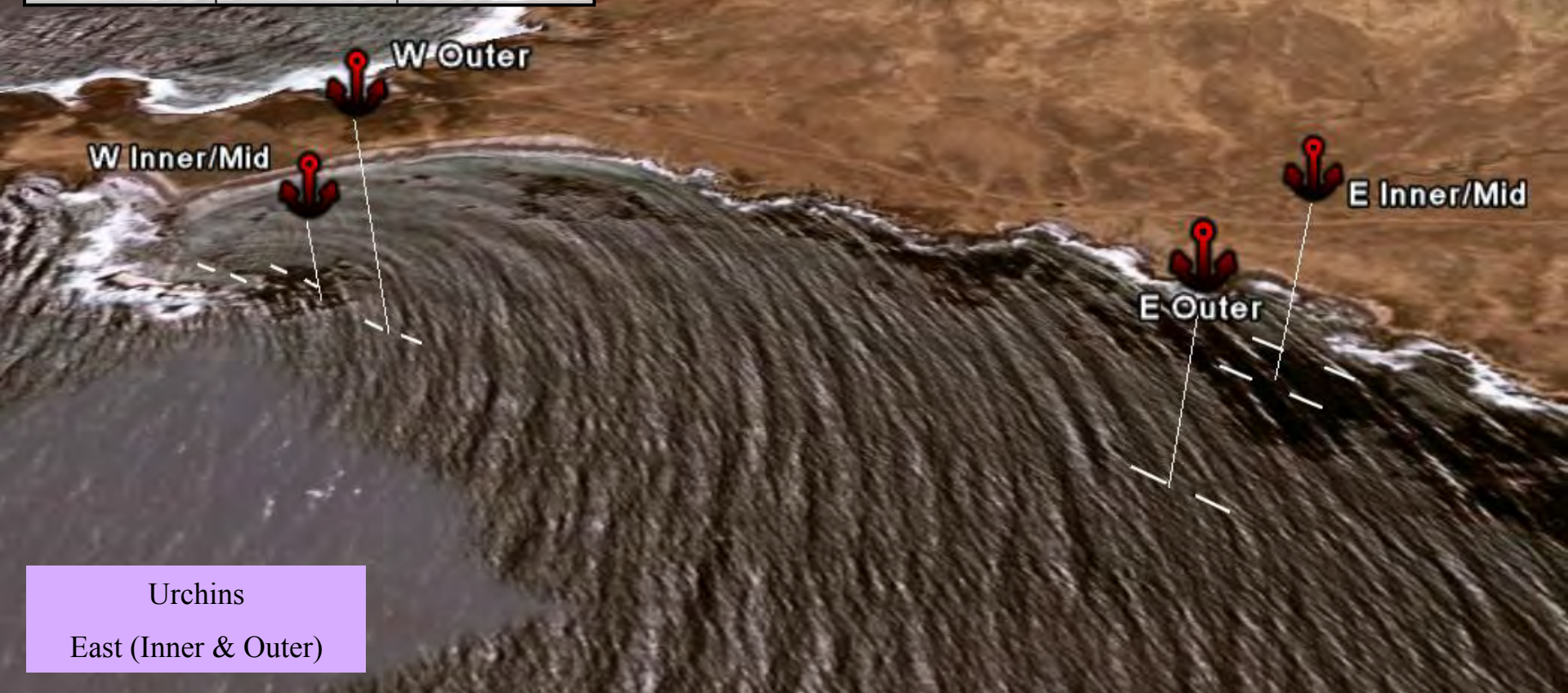
W: Midpoint is a bend in the shoreline.

Reef Check Site "Cueva Valdez" 34°3.300' N, 119°48.600' W (0.5 nm East of side East)

FORNEYS



W OUTER	34° 03.233' N	119° 55.092' W
W INNER/MID	34° 03.273' N	119° 55.155' W
E OUTER	34° 03.089' N	119° 54.580' W
E INNER/MID	34° 03.188' N	119° 54.480' W



Urchins
East (Inner & Outer)

E OUTER	45-50 FT	120
E MID	25-30 FT	120
E INNER	15-25 FT	120
W OUTER	35-40 FT	120
W MID	30-35 FT	120
W INNER	10-20 FT	120

NOTES: Non-reserve.
 W: Inners along rocky finger that runs out at the south of the cove. Mids are offshore to the north of the inners. Outers are off of the point
 E: Outers/mids have more reef to west of anchor point. Outer reef is fairly low relief. Use kelp to indicate where inner reef is. Usually anchor to the west of the kelp bed and run transects toward the east. There is sand between the Outers and Mids.

GULL ISLAND



W OUTER	33° 56.890' N	119° 49.677' W
W MID/INNER	33° 56.915' N	119° 49.582' W
E OUTER	33° 56.788' N	119° 49.391' W
E MID/INNER	33° 56.969' N	119° 49.377' W



E OUTER	60-70 FT	30
E MID	30-35 FT	30
E INNER	15-20 FT	30
W OUTER	55-70 FT	120
W MID	30-35 FT	120
W INNER	20-30 FT	120

NOTES: Inside Gull Island SMR, no take.

Lots of current. Always.

E: Outers are along a steep drop off near to anchor point. Inners/mids has a shallow spot that will break with S swell.

W: Has high relief, follow depth contour.

NPS Site

Side West

Urchins

Done by NPS

ANACAPA ISLAND



WEST ISLE



EAST ISLE



MIDDLE ISLE



LIGHTHOUSE REEF



WEST ISLE



E	34° 00.975' N	119° 25.305' W
CEN	34° 01.020' N	119° 25.974' W
W OUTER	34° 01.053' N	119° 26.275' W
W INNER	34° 00.922' N	119° 26.426' W



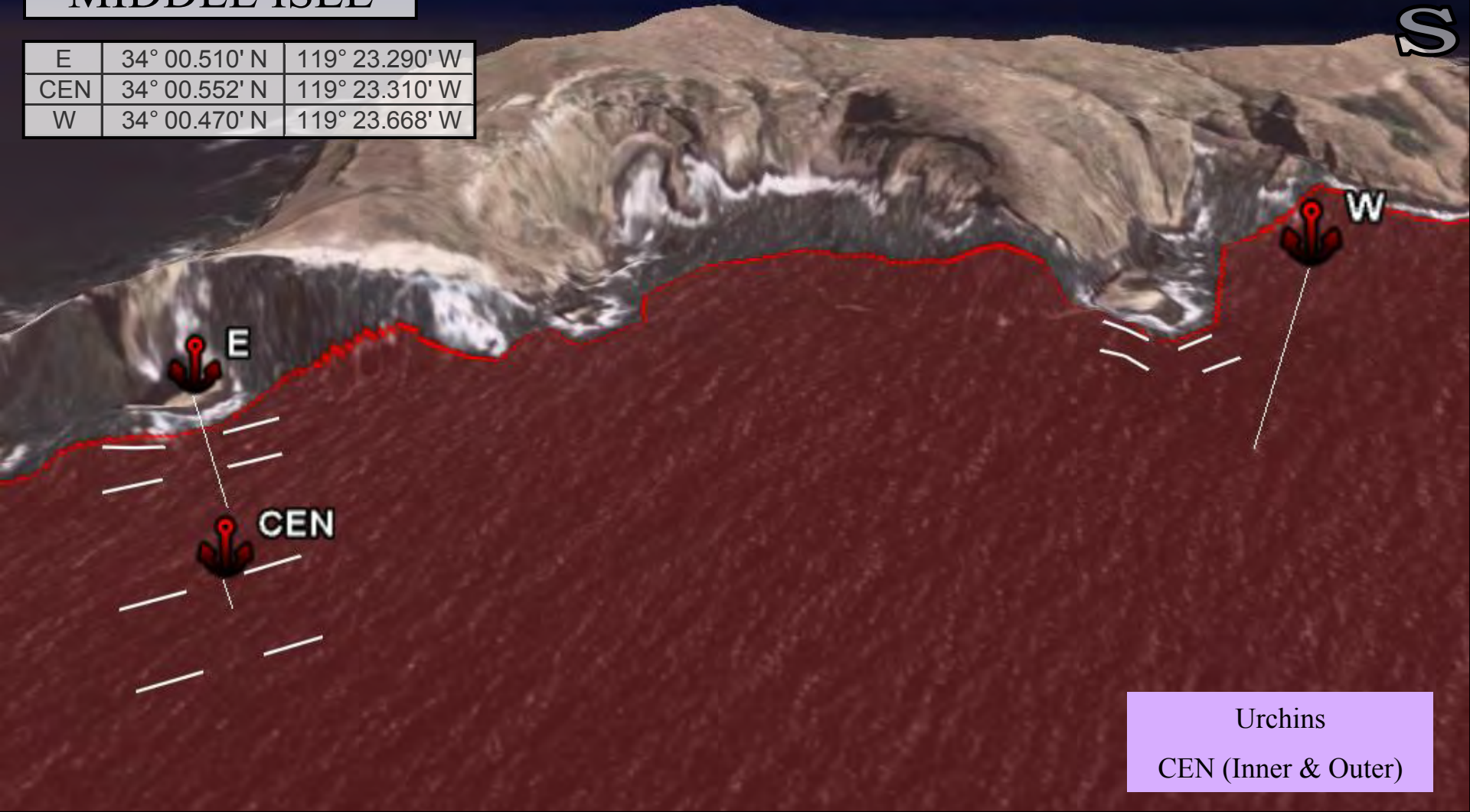
E OUTER	30-35 FT	120
E INNER	15-20 FT	120
CEN OUTER	35-45 FT	90
CEN INNER	15-20 FT	90
W OUTER	80-90 FT	90
W INNER	18-23 FT	90

NOTES: Inside Anacapa Island SMCA, take of all living marine resources is prohibited except for the recreational take of lobster and pelagic finfish and the commercial take of spiny lobster.
 W: Outers are very deep right below anchor point. Small section of reef. Midpoint of inners is a large cave.
 E: Midpoint is large, tall rock.
 CEN: Transects run on wall, midpoint is protuberance.

Reef Check Site "Goldfish Bowl" 34°0.882' N, 119°26.250' W

MIDDLE ISLE

E	34° 00.510' N	119° 23.290' W
CEN	34° 00.552' N	119° 23.310' W
W	34° 00.470' N	119° 23.668' W



TX1/TX2

E OUTER	25-30 FT	60
E INNER	15-20 FT	60
CEN OUTER	35-40 FT	60
CEN INNER	30-35 FT	60
W OUTER	25-30 FT	120/240
W INNER	15-20 FT	120/240

NOTES: Inside Anacapa Island SMR, no take.

W: Transects hug the contours around both sides of the washrock.

CEN: Has more habitat to the east. Possible to for E and CEN to share an anchor point. Anchor point is in sand- you have to swim in to the reef.

Urchins
CEN (Inner & Outer)

EAST ISLE



E	34° 01.040' N	119° 21.620' W
CEN	34° 01.060' N	119° 21.821' W
W	34° 00.965' N	119° 22.283' W



Be mindful of boat traffic in and out of the landing!

Reef Check Sites	NPS Site
“Landing Cove”	Side East
“Cathedral Cove”	Urchins
“Cathedral Wall”	Done by NPS

TX1/TX2

E OUTER	35-40 FT	30/120
E INNER	15-20 FT	30/120
CEN OUTER	35-40 FT	30/120
CEN INNER	20-25 FT	30/120
W OUTER	20-30 FT	60/140
W INNER	15-20 FT	60/140

NOTES: Inside Anacapa Island SMR, no take.
 E: Transects run on opposite sides of the landing. Inner transect 1 on wall, outer 1 at base of wall by underwater arch.
 CEN: Transects are run on either side of cove.
 W: Is “Cathedral Cove.” Transect 1’s run offshore of rock, transect 2’s on wall to the west.
 Reef Check Site “Landing Cove” 34°1.050’ N, 119°21.744’ W
 Reef Check Site “Cathedral Cove” 34°0.990’ N, 119°22.104’ W
 Reef Check Site “Cathedral Wall” 34°0.948’ N, 119°22.290’ W

LIGHTHOUSE REEF



E	34° 00.823' N	119° 21.600' W
CEN	34° 00.767' N	119° 21.788' W
W	34° 00.647' N	119° 22.350' W



Reef Check Site
"Lighthouse Reef"

NPS Site
Side East

Urchins
Done by NPS


E OUTER	25-30 FT	90
E INNER	15-20 FT	90
CEN OUTER	15-20 FT	90
CEN INNER	10-15 FT	90
W OUTER	25-30 FT	90
W INNER	15-20 FT	90


NOTES: Non-reserve.
 W: Transect 2 located south of rock, transect 1 run to west of transect 2.
 CEN: Transects located to the east of large rock. Outers are on offshore reef past large sand channel.
 Anchor point is on part of inner reef which juts out from island.

Reef Check Site "Lighthouse Reef" 34°0.756' N, 119°21.852' W

SANTA ROSA ISLAND



CLUSTER POINT 

 JOHNSONS LEE SOUTH

 SOUTH POINT



JOHNSON'S LEE SOUTH



W OUTER	33° 53.708' N	120° 06.259' W
W MID/INNER	33° 53.781' N	120° 06.394' W
E OUTER	33° 53.852' N	120° 06.045' W
E MID/INNER	33° 53.854' N	120° 06.193' W



Reef Check Site
 "Johnson's Lee"
 NPS Site
 Side East
 Urchins
 Done by NPS

E OUTER	40-50 FT	30
E MID	35-45 FT	30
E INNER	35-45 FT	30
W OUTER	50-55 FT	30
W MID	35-45 FT	30
W INNER	30-35 FT	30

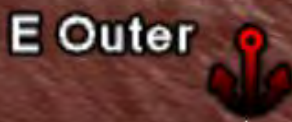
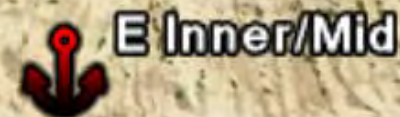
NOTES: Non-reserve.
 W: Outer is boulder field with sand channels. Inner/Mid follow depth contour
 E: Outer is KFM site. Inner is often deeper than Mid and sits on edge of sand channel. Mids are on high relief reef offshore of anchor point.

Reef Check Site "Johnson's Lee" 33°53.824' N, 120°6.407' W

SOUTH POINT



W	33° 53.750' N	120° 07.493' W
E OUTER	33° 53.494' N	120° 07.152' W
E MID/INNER	33° 53.546' N	120° 07.063' W



NPS Site
Side East

Urchins
Done by NPS

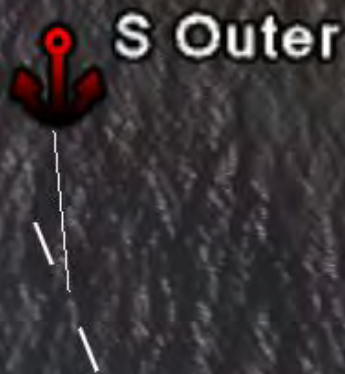
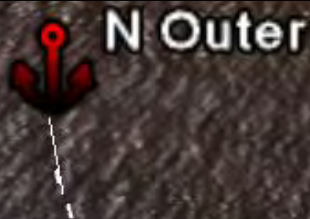
E OUTER	50-55 FT	120
E MID	25-35 FT	120
E INNER	25-30 FT	120
W OUTER	40-50 FT	120
W MID	35-40 FT	120
W INNER	20-30 FT	120

NOTES: Inside South Point SMR, no take.
 W: Outer is boulders with sand channels. Inner/Mid swim inshore, plenty of reef.
 E: Outer is high relief and patchy. Outer is offshore of a sand channel. Inner/Mid is more rock habitat to west, some thin strips of reef.

CLUSTER POINT



N OUTER	33° 55.900' N	120° 11.845' W
N MID/INNER	33° 56.030' N	120° 11.317' W
S OUTER	33° 55.430' N	120° 11.520' W
S MID/INNER	33° 55.607' N	120° 11.129' W



NPS Site
Side South

Urchins
Done by NPS

N OUTER	60-70 FT	150
N MID	35-45 FT	150
N INNER	20-30 FT	150
S OUTER	50-60 FT	150
S MID	30-40 FT	150
S INNER	25-35 FT	150

NOTES: Non-reserve.
 N: Outer is high relief and deep. Anchor in sand inshore of reef. Inners are on inside edge of reef, mids offshore of that.
 S: Outer is high relief and deep. Anchor in sand inshore of reef. Inners are on inside edge of reef, mids offshore of that.

SAN MIGUEL ISLAND



TYLER BIGHT

HARRIS PT. RESERVE

CUYLER

CROOK POINT

CUYLER



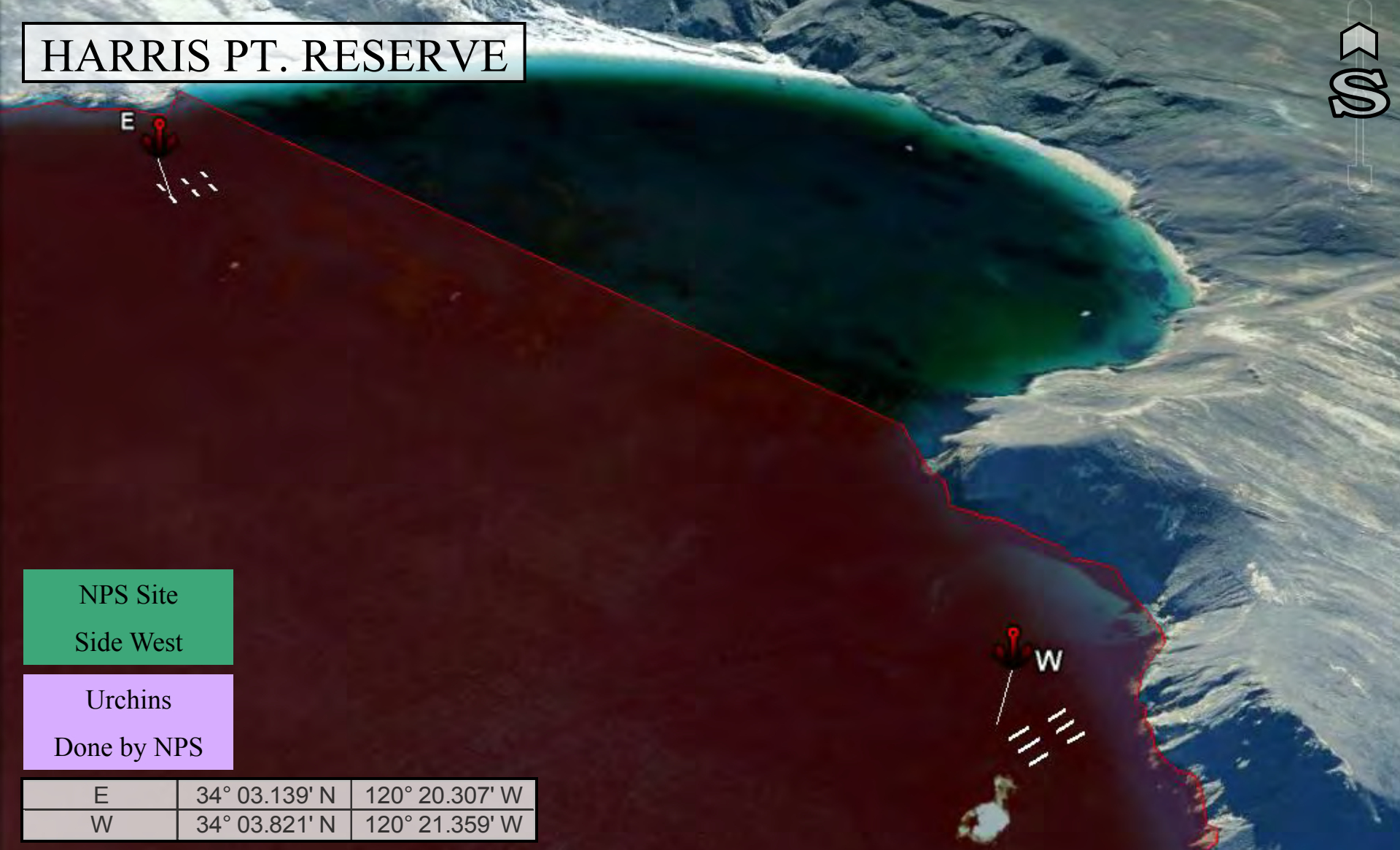
E OUTER	34° 03.103' N	120° 20.771' W
E MID	34° 03.016' N	120° 20.752' W
E INNER	34° 02.961' N	120° 20.659' W
W OUTER	34° 03.423' N	120° 21.156' W
W MID	34° 03.445' N	120° 21.249' W
W INNER	34° 03.453' N	120° 21.304' W

Urchins
West (Inner & Mid)

E OUTER	40-45 FT	90
E MID	30-35 FT	90
E INNER	20-25 FT	90
W OUTER	40-45 FT	60
W MID	20-25 FT	60
W INNER	20-25 FT	60

NOTES: Non-reserve.
 W: Transects go more east-west. They sit up on a big reef/plateau. Anchor point is located to south of transects/kelp bed.
 E: Outer has some high relief, but most is low. Try to find high relief section. Inner/Mid are in separate kelp beds. E Mid swim from eastern edge of kelp bed to the west. Inner, swim from western edge of kelp bed to the east. Inner/Mid are low relief reef

HARRIS PT. RESERVE



NPS Site

Side West

Urchins

Done by NPS

E	34° 03.139' N	120° 20.307' W
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W	34° 03.821' N	120° 21.359' W
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E OUTER	40-45 FT	140
E MID	30-35 FT	140
E INNER	25-35 FT	140
W OUTER	40-45 FT	60
W MID	25-30 FT	60
W INNER	15-25 FT	60

NOTES: Inside Harris Point SMR, no take.

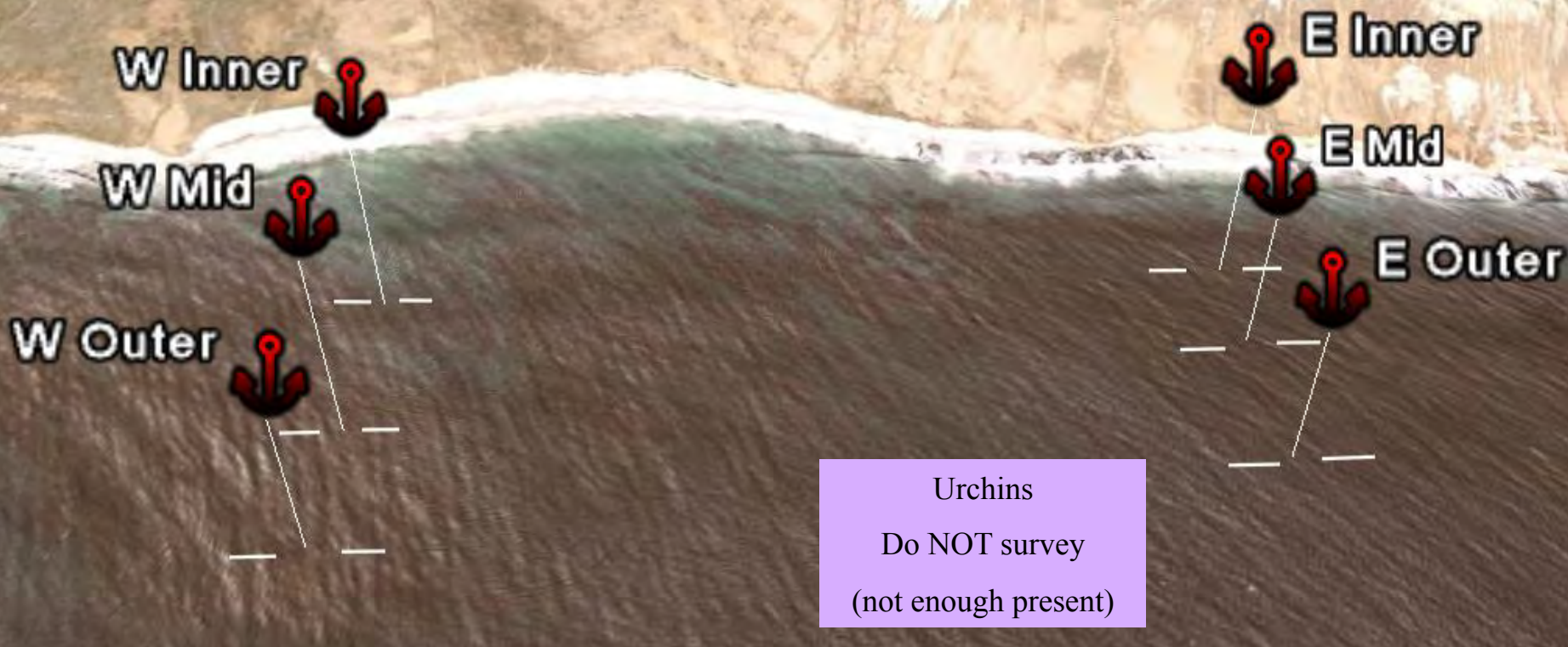
W: Between island and Hare rock. Outers are at base of reef, along edge of kelp. Mid and inners are up on rocky plateau, inners are usually deep in kelp bed.

E: Outer is at base of high relief reef (new numbers are right on the reef), kelp is usually thick and swim from Outer anchor point to Mid/Inner. Inner/Mid in high relief reef. Mid often on top of ridge, with Inners down a little deeper.

CROOK POINT



W OUTER	34° 00.908' N	120° 20.277' W
W MID	34° 00.976' N	120° 20.277' W
W INNER	34° 01.065' N	120° 20.277' W
E OUTER	34° 00.953' N	120° 19.733' W
E MID	34° 01.031' N	120° 19.733' W
E INNER	34° 01.085' N	120° 19.733' W



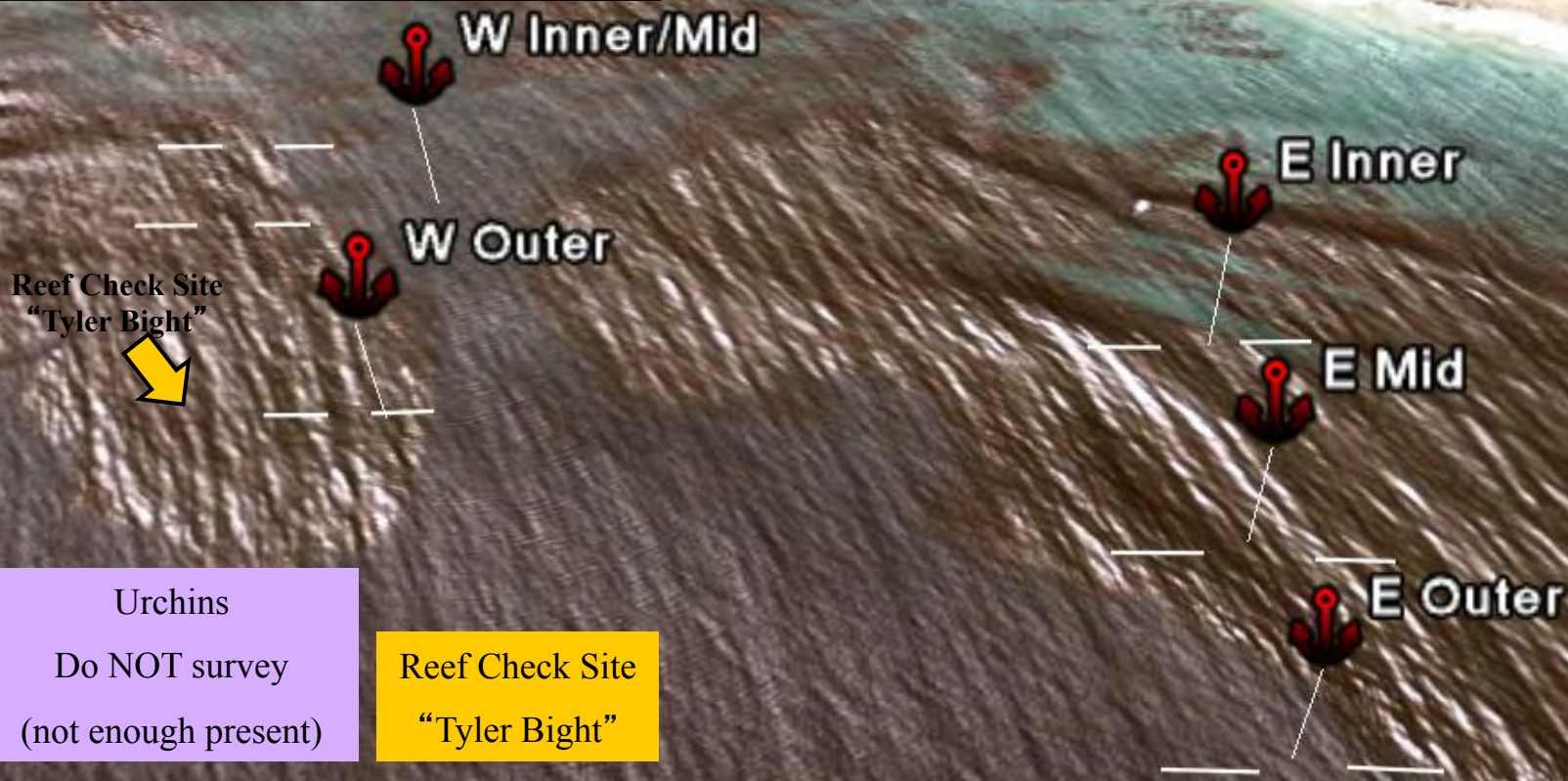
E OUTER	45-50 FT	90
E MID	30-40 FT	90
E INNER	25-30 FT	90
W OUTER	45-55 FT	90
W MID	30-35 FT	90
W INNER	25-30 FT	90

NOTES: Non-reserve.
 W: Outer has high relief ledges and big overhangs, find those! W Inner/Mid are patchy low relief reef. Easily stirred up.
 E: Outer is flat, low relief Laminaria graveyard. Inner/Mid are also low relief, with some low ledges/cracks.

TYLER BIGHT



W OUTER	34° 01.638' N	120° 24.705' W
W MID/INNER	34° 01.730' N	120° 24.708' W
E OUTER	34° 01.545' N	120° 24.379' W
E MID	34° 01.592' N	120° 24.402' W
E INNER	34° 01.664' N	120° 24.402' W



E OUTER	45-55 FT	90
E MID	35-45 FT	90
E INNER	15-20 FT	90
W OUTER	45-55 FT	90
W MID	35-40 FT	90
W INNER	25-35 FT	90

NOTES: Non-reserve.
 W: Outer crazy high relief, stay west of sand channel on eastern edge of kelp bed. Inner/Mid have plenty of reef, more low relief with some boulder, swim to west from anchor into kelp bed.
 E: Outers are mostly continuous rock with sand offshore. Kelp is usually very thick, swim inshore to appropriate depth. Inner/Mid have high relief, some big ledges. All anchor points are center points, run one tx. each way.
 Reef Check Site "Tyler Bight" 34°1.644' N, 120°24.840' W

PISCO SUBTIDAL FISH SURVEYS 2011



MAINLAND



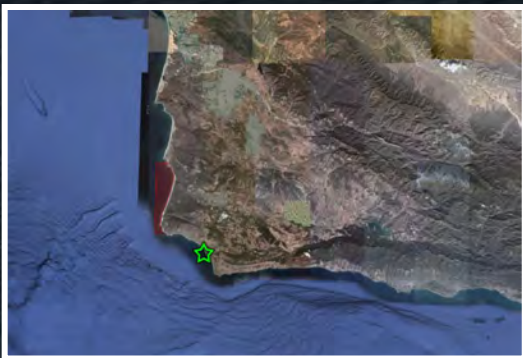
- JALAMA
- COJO
- BULLITO
- NAPLES
- IV REEF
- HORSESHOE REEF
- ARROYO QUEMADO
- COUNTY LINE
- LEO CARRILLO
- EL MATADOR
- POINT DUME
- LITTLE DUME



JALAMA



N OUTER/OUTMID	34° 29.217' N	120° 29.970' W
N INNER/INMID	34° 29.350' N	120° 29.742' W
S OUTER/OUTMID	34° 28.896' N	120° 29.670' W
S INNER/INMID	34° 28.982' N	120° 29.447' W



N OUTER	55-65 FT	120	S OUTER	60-70 FT	120
N OUTMID	40-45 FT	120	S OUTMID	55-60 FT	120
N INMID	35-45 FT	120	S INMID	40-45 FT	120
N INNER	25-35 FT	120	S INNER	25-35 FT	120

NOTES: Non-Reserve

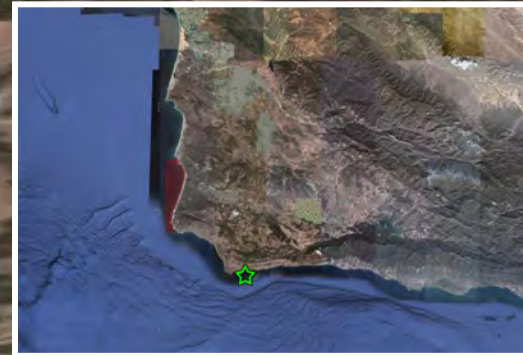
Low relief. Plenty of reef – contiguous. Sand channel between two sides. When there is a lot of kelp, may have to anchor in sand channel and run transects all in one direction. Must survey at anchor points, which means a surface swim if there is a lot of kelp. Inners can be patchy and stirred up. May need to anchor inside of kelp bed for inners/inmids.

N: Inners and inmids have more reef to the north than to the south of the numbers.

S: Inners run along thin reef strip about 50m inshore of kelp bed.

COJO

W OUTER/OUTMID	34° 26.593' N	120° 25.340' W
W INNER/INMID	34° 26.807' N	120.25.360' W
E OUTER/OUTMID	34° 26.482' N	120° 24.954' W
E INNER/INMID	34° 26.749' N	120° 25.031' W



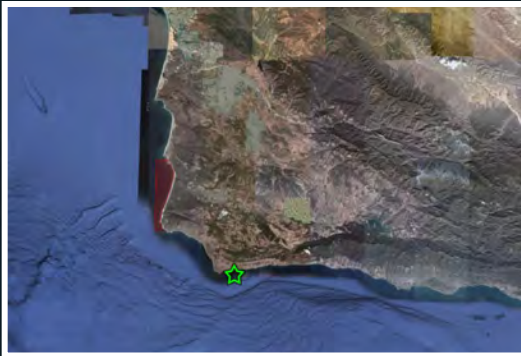
W OUTER	45-55 FT	90	E OUTER	50-55 FT	90
W OUTMID	40-50 FT	90	E OUTMID	40-50 FT	90
W INMID	25-35 FT	90	E INMID	25-35 FT	90
W INNER	20-25 FT	90	E INNER	20-30 FT	90

NOTES: Site straddles Pt. Conception SMR boundary. No-take within SMR. Large sand channel between the two sides. May need to anchor on one end of side and run transects in one direction due to large kelp bed. Low relief bedrock, easily stirred up.

BULLITO



CEN OUTER/OUTMID	34° 27.326' N	120° 19.923' W
CEN INNER/INMID	34° 27.490' N	120° 19.894' W



CEN OUTER	40-42 FT	240
CEN OUTMID	35-40 FT	240
CEN INMID	25-30 FT	240
CEN INNER	15-20 FT	240

NOTES: Non-Reserve

This is a half site (side CEN). Also an LTER site.

Run transects to the west from the anchor points. Outside edge of reef is super flat shale transitioning to sand

ARROYO QUEMADO

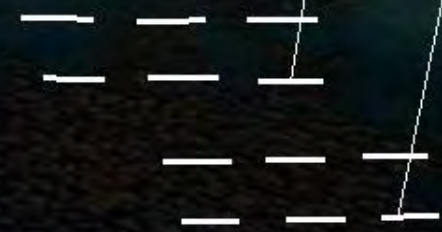
W OUTER/OUTMID	34° 28.101' N	120° 07.511' W
W INNER/INMID	34° 28.186' N	120° 07.513' W
E OUTER/OUTMID	34° 27.977' N	120° 07.018' W
E INNER/INMID	34° 28.050' N	120° 07.030' W



E Outer/Outmid



E Inner/Inmid



W OUTER	45-50 FT	70	E OUTER	40-50 FT	70
W OUTMID	35-40 FT	70	E OUTMID	35-40 FT	70
W INMID	25-30 FT	70	E INMID	25-30 FT	70
W INNER	20-25 FT	70	E INNER	15-20 FT	70

NOTES: Non-Reserve
 All zones have good, low relief reef except inners which are patchy. Flat bedrock with some low ledges.
 W: Added anchor point for inner/inmid for use with small boats, but can swim to all zones from outer anchor spot if need be. Run transects to the west from anchor point. Outmid/Inmid transects start ~20m west of anchor.
 E: Sandy channel to the west of transects, make sure to start far enough to the east. Anchor points are the center of the site.

NAPLES

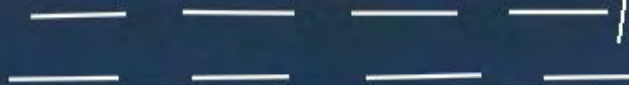


W OUTER/INNER	34° 25.478' N	119° 57.319' W
CEN OUTER/INNER	34° 25.311' N	119° 57.090' W
E OUTER/INNER	34° 25.400' N	119° 57.061' W

West Inner/Outer



East Outer/Inner



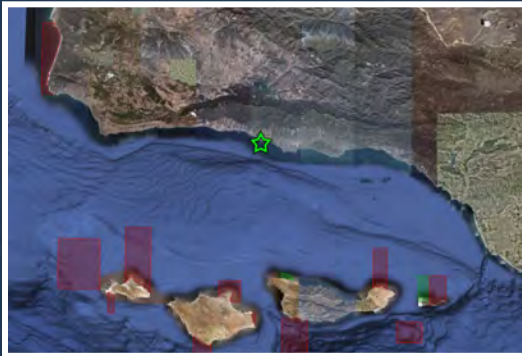
Reef Check Site

“Naples Reef”

Central Outer/Inner



Reef Check Site
“Naples Reef”



E OUTER	40-45 FT	90
E INNER	40-50 FT	90
CEN OUTER	45-55 FT	90
CEN INNER	30-40 FT	90
W OUTER	40-45 FT	90
W INNER	30-40 FT	90

NOTES: *Inside Naples SMCA, all take prohibited except pelagic finfish by spear and commercial kelp harvest.*

It is possible to anchor between E and CEN in a large boat and swim to the spots.

CEN: Is “Three Fingers” - Run inners along the top of the ridge and outers along the offshore down-slope.

E: Is “Main Naples” - Inners and outers are run at similar depths. Reef has some ridges.

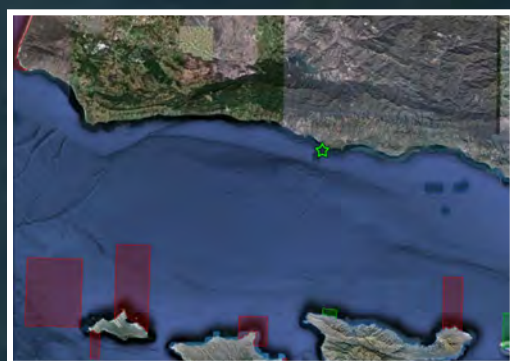
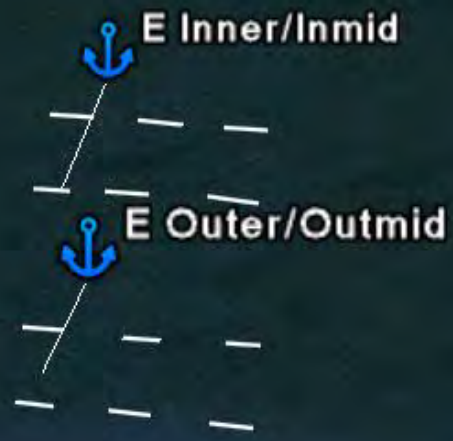
W: Is “Little Naples.” More reef to the east of the anchor point. Reef is flat, shaley, with low ridges. There is a higher ridge that comes up to ~30'. Run inners along that and outers to the North (deeper). Run all transects to the east.

Reef Check Site “Naples Reef” 34°25.311' N, 119°57.090' W (Same as our side CEN numbers.)

IV REEF



W INNER/INMID	34° 24.284' N	119° 52.577' W
W OUTER/OUTMID	34° 24.213' N	119° 52.612, W
E OUTER/OUTMID	34° 24.177' N	119° 51.871, W
E INNER/INMID	34° 24.292' N	119° 51.840' W



Run transects to the West
-Need to edit screenshot

W OUTER	30-40 FT	60	E OUTER	35-40 FT	90
W OUTMID	25-35 FT	60	E OUTMID	35-40 FT	90
W INMID	25-30 FT	60	E INMID	25-30 FT	90
W INNER	20 FT	60	E INNER	15-20 FT	90

NOTES: Inside Campus Point SMCA, No-Take
 E: Reef varies from medium to no relief. Flattens out toward the east so run transects to the west.
 W: Transects run East from the point. All zones shallow towards the point and get deeper towards the East. Outer anchor point for outers, swim in for outmids. No reef less than ~20' depth.

HORSESHOE REEF

W OUTER/OUTMID	34° 23.504' N	119° 33.462' W
W INNER/INMID	34° 23.652' N	119° 33.612' W
E OUTER/OUTMID	34° 23.367' N	119° 32.686' W
E INNER/INMID	34° 23.452' N	119° 32.473' W



W Inner/Inmid



W Outer/Outmid



E



W OUTER	40-45 FT	60	E OUTER	30-35 FT	90
W OUTMID	35-40 FT	60	E OUTMID	25-30 FT	90
W INMID	30-35 FT	60	E INMID	20-25 FT	90
W INNER	25-30 FT	60	E INNER	15-20 FT	90

NOTES: Non-Reserve

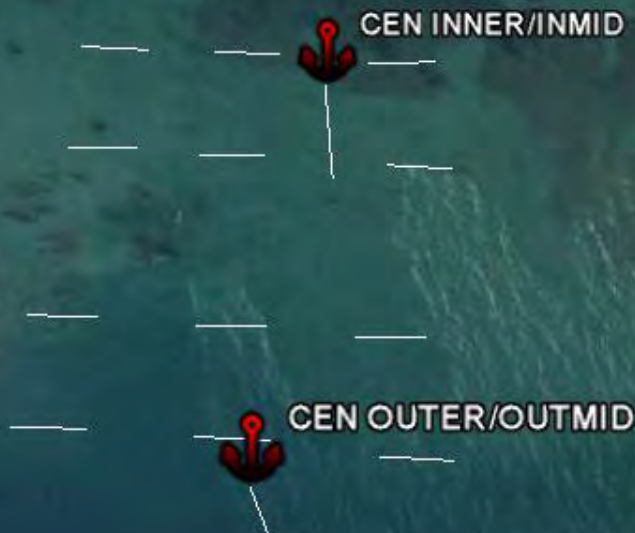
E: Run all transects to the East from anchor. Mid/Inner anchor point is over the mids, swim in for the inners.

W: Numbers are center points.

COUNTY LINE



CEN OUTER/OUTMID	34° 02.615' N	118° 57.141' W
CEN INNER/INMID	34° 02.664' N	118° 57.120' W



OUTER	38-40 FT	90
OUTMID	34-36 FT	90
INMID	20-25 FT	90
W INNER	15-20 FT	90

NOTES: Non-Reserve
Outer/Outmids: There are a few sand channels to navigate around. Run all transects to the west from the anchor.
Inmids: anchor spot for Inner/Inmid is perfect depth for inmid transects

LEO CARRILLO



CEN OUTER/OUTMID	34° 02.257' N	118° 55.319' W
CEN INNER/INMID	34° 02.557' N	118° 55.424' W



OUTER	45-50 ft	90
OUTMID	40-45 ft	90
INMID	25-35 ft	90
INNER	15-20 ft	90

NOTES: Non-Reserve
OUTER/OUTMID: Run transects to West. Large oval shaped reef comes up to ~40' in center.
INNER/INMID: Inners and inmids are separated by sand. Swim offshore of anchor point to inmids and inshore for inners.

EL MATADOR



CEN OUTER/OUTMID	34° 01.997' N	118° 52.210' W
CEN INNER/INMID	34° 02.113' N	118° 52.286' W



CEN OUTER/OUTMID

CEN INNER/INMID

OUTER	35-40 ft	90
OUTMID	30-40 ft	90
INMID	20-25 ft	90
INNER	15-20 ft	90

NOTES: Inside Point Dume SMCA, all take prohibited except recreational take of pelagic finfish by spear and commercial take of coastal pelagic species by round haul net and swordfish by harpoon.
 OUTER/OUTMID: Run transects to East. Run outers on offshore edge of reef, move across to inshore side of reef for outmids
 INNER/INMID: Run transects to East.

POINT DUME



CEN OUTER/OUTMID	33° 59.912' N	118° 48.338' W
CEN INNER/INMID	33° 59.962' N	118° 48.273' W



CEN OUTER	35 ft	20
CEN OUTMID	25 ft	20
CEN INMID	20 ft	60
CEN INNER	15-18 ft	60

NOTES: Inside new Point Dume SMR, No take
CEN: INNERs are to the North against the point in the surfgrass. OUTER/OUTMID/INMID are out off of the point in front of the wash rocks.

LITTLE DUME



CEN OUTER/OUTMID	34° 00.295' N	118° 47.347' W
CEN INNER/INMID	34° 00.368' N	118° 47.487' W



CEN OUTER	38-43 ft	40
CEN OUTMID	38-43 ft	40
CEN INMID	25-30 ft	40
CEN INNER	15-20 ft	40

NOTES: Inside new Point Dume SMR, No take
 Run transects to East of anchor points.
 OUTER/OUTMID anchor point is in ~40ft. Reef gets slightly deeper to the East.
 Outers are slightly offshore, and Inmids slightly inshore from OUTER/OUTMID anchor point.
 Inners are slightly inshore and Inmids are slightly offshore of INNER/INMID anchor point.

SANTA CRUZ ISLAND



VALLEY



E	33° 59.013' N	119° 37.219' W
CEN	33° 59.017' N	119° 38.304' W
W	33° 58.853' N	119° 40.028' W



E OUTER	30-35 FT	90
E INNER	25-30 FT	90
CEN OUTER	40-45 FT	90
CEN INNER	20-25 FT	90
W OUTER	35-40 FT	90
W INNER	15-20 FT	90

NOTES:

W: Run transects to the east. Inners are close to wash rock and can be very surgy. Can swim in for inners.

CEN: Run Transects to the West. Reef is patchy, but some large parts. Can move slightly in/off shore to find more strips. Will silt out on south swell. Cannot swim in for inners

E: Run transects to the west. Rather cobbly flat and patchy reef. Usually kelp on inners. Cannot swim in for inners.

YELLOWBANKS

W OUTER/OUTMID	33° 59.358' N	119° 33.896' W
W INNER/INMID	33° 59.519' N	119° 34.045' W
CEN OUTER/OUTMID	33° 59.312' N	119° 32.819' W
CEN INNER/INMID	33° 59.546' N	119° 33.268' W



W OUTER	60-65 FT	90	CEN OUTER	50-60 FT	100
W OUTMID	45-50 FT	90	CEN OUTMID	45-50 FT	100
W INMID	35-40 FT	90	CEN INMID	30-35 FT	100
W INNER	25-30 FT	90	CEN INNER	25-30 FT	100

NOTES:

W and CEN are the two sides of this site. There is no E. Varied substrate over site. Each zone can be very different.

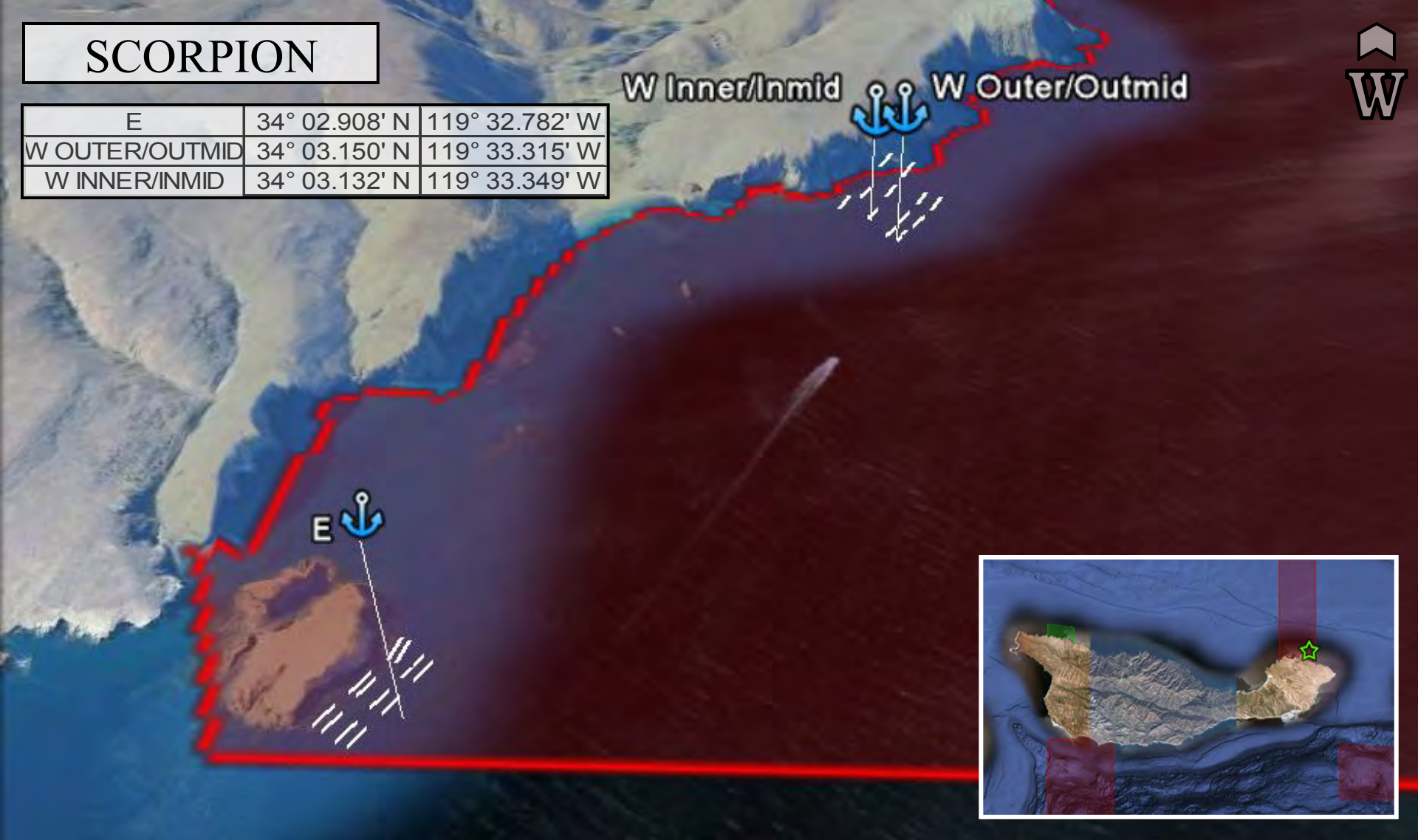
W: Inner/mid anchor point is good for Inmids. Swim in for inners.

SCORPION



E	34° 02.908' N	119° 32.782' W
W OUTER/OUTMID	34° 03.150' N	119° 33.315' W
W INNER/INMID	34° 03.132' N	119° 33.349' W

W Inner/Inmid W Outer/Outmid



E OUTER	55-65 FT	120
E OUTMID	45-55 FT	120
E INMID	30-35 FT	120
E INNER	15-20 FT	120

W OUTER	38-40 FT	120
W OUTMID	35 FT	120
W INMID	30-35 FT	120
W INNER	15-20 FT	120

NOTES: **Inside Reserve*
 W: Outers patchy, hard to find reef. Reef is under anchor point.
 E: Inners are up on the wall. Inmids are slightly offshore of rock on raised section of reef. Outers/Outmids are deep.

CAVERN POINT



E	34° 03.257' N	119° 34.012' W
W	34° 03.165' N	119° 34.278' W



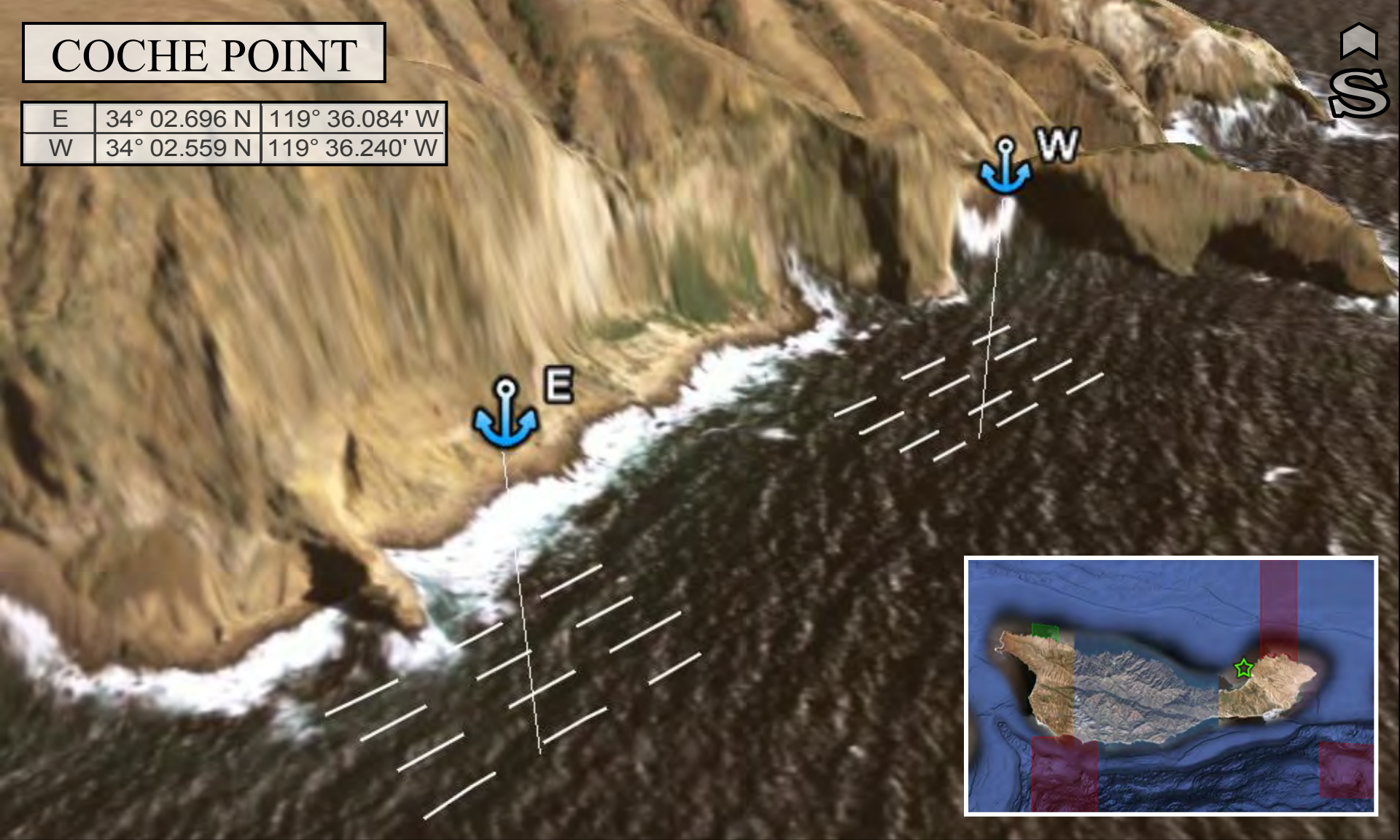
E OUTER	50-60 FT	30	W OUTER	40 FT	120
E OUTMID	40-45 FT	30	W OUTMID	30-35 FT	120
E INMID	25-30 FT	30	W INMID	20-30 FT	120
E INNER	15-20 FT	30	W INNER	15-20 FT	120

NOTES: **Inside Reserve*
 Whole site is very exposed to W swell.
 W: Reef does not extend very far offshore. Midpoint is small point jutting out.
 E: Has extensive high relief reef. Big washrock to the north of anchor point. Run transects to the south of the point on coastline that bends inward. Has permanent KFM transect.

COCHE POINT



E	34° 02.696 N	119° 36.084' W
W	34° 02.559 N	119° 36.240' W



E OUTER	50-60 FT	30	W OUTER	50-60 FT	30
E OUTMID	40-45 FT	30	W OUTMID	40-45 FT	30
E INMID	30-35 FT	30	W INMID	30-35 FT	30
E INNER	15-25 FT	30	W INNER	15-25 FT	30

NOTES:
 E: Midpoint is the part of the cliff that juts out. Has permanent KFM transects.
 W: Outers are mostly to the east of the anchor point. Otherwise has extensive reef.

PELICAN

E	34° 01.683' N	119° 41.455' W
CEN	34° 01.839' N	119° 41.799' W
W	34° 02.152' N	119° 42.138' W



E OUTER	30-40 FT	140
E INNER	20-25 FT	140
CEN OUTER	30-45 FT	120
CEN INNER	15-25 FT	120
W OUTER	35-40 FT	30
W INNER	15-25 FT	30

NOTES:
W: Midpoint is where rock face changes from white to black.
CEN: Midpoint is large crack in cliff face. This site has a large cobble channel running perpendicular to the coastline. Avoid laying transects on it.
E: Midpoint is largest rock at base of rockslide.

HAZARDS

E	34° 03.263' N	119° 49.161' W
CEN	34° 03.395' N	119° 49.270' W
W	34° 03.486' N	119° 49.490' W



E OUTER	30-45 FT	120
E INNER	20-25 FT	120
CEN OUTER	45-55 FT	120
CEN INNER	15-25 FT	120
W OUTER	35-50 FT	80/0
W INNER	15-25 FT	80/0

NOTES:

W: Transect 1 and 2 outers at base of wall, inners on top of shelf above wall. Run transects from cave to the east, do not run into cave. Edge of reef gets shallower in the interior of the cove so those outers (2&3) will be shallower than the others.

CEN: Midpoint is the washrock that juts the farthest out from the island.

E: Midpoint is large phallic rock. Reef doesn't extend very far offshore. Transects angle slightly around contours of reef to maintain a constant depth. Edge of the reef is shallower on the east side of the midpoint.

PAINTED CAVE



E	34° 04.314' N	119° 51.453' W
CEN	34° 04.372' N	119° 52.259' W
W	34° 04.469' N	119° 52.928' W



E OUTER	40-50 FT	90/30
E INNER	20-25 FT	90/30
CEN OUTER	40-55 FT	120
CEN INNER	20-25 FT	120
W OUTER	40-50 FT	160
W INNER	20-25 FT	160

NOTES: **Inside Reserve (State Marine Conservation Area)*

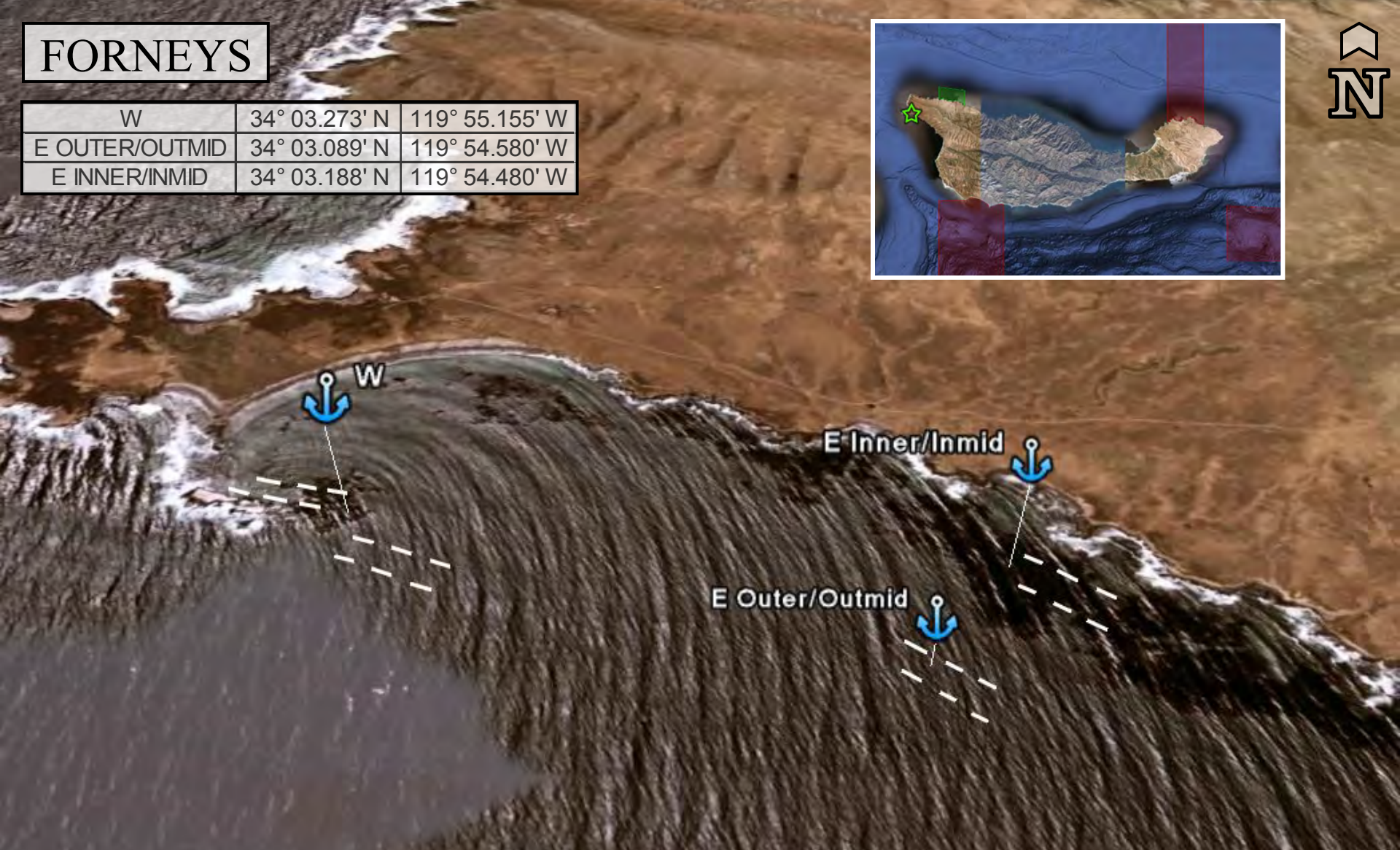
E: Has plenty of reef that drops steeply and extends deeper than deepest transects. Midpoint of E side is a rocky protuberance that is to the east of a cave. Transect 1 runs along main wall, transect 2 runs in toward the cave.

CEN: Midpoint is crack in cliff-face.

W: Midpoint is a bend in the shoreline.

FORNEYS

W	34° 03.273' N	119° 55.155' W
E OUTER/OUTMID	34° 03.089' N	119° 54.580' W
E INNER/INMID	34° 03.188' N	119° 54.480' W



W OUTER	35-40 FT	120	E OUTER	45-55 FT	120
W OUTMID	30-35 FT	120	E OUTMID	35-45 FT	120
W INMID	25-35 FT	120	E INMID	25-30 FT	120
W INNER	15-20 FT	120	E INNER	15-20 FT	120

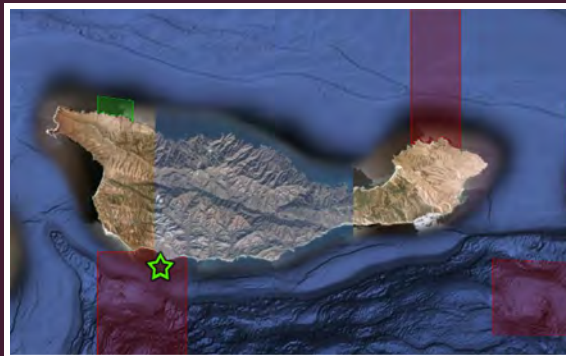
NOTES:

W: Inners/Inmids swim toward the point and run all transects to the west along the rocky point. Outers/Outmids swim out from anchor point and run transects as shown. Outers along reef edge, outmids slightly shallower (to SW)
 E: Anchor on the numbers at the edge of kelp and run transects to the east.
 There are rocky outcropping along the shore which you should be parallel to.

GULL ISLAND



W OUTER/OUTMID	33° 56.890' N	119° 49.677' W
W INNER/INMID	33° 56.915' N	119° 49.582' W
E OUTER/OUTMID	33° 56.788' N	119° 49.391' W
E INNER/INMID	33° 56.969' N	119° 49.377' W



E OUTER	55-65 FT	40	W OUTER	60-65 FT	120
E OUTMID	40-50 FT	40	W OUTMID	40-45 FT	120
E INMID	25-35 FT	40	W INMID	30-35 FT	120
E INNER	20-30 FT	40	W INNER	15-25 FT	120

NOTES:

Lots of current. Always.

E: Outers are along a steep drop off near to anchor point. Hard to keep a constant depth contour and heading simultaneously because reef rises and falls.

Use a general heading but alter between/within transects. Inners/inmids has a shallow spot that will break with S swell.

W: Has high relief, follow depth contour.

ANACAPA ISLAND



WEST ISLE



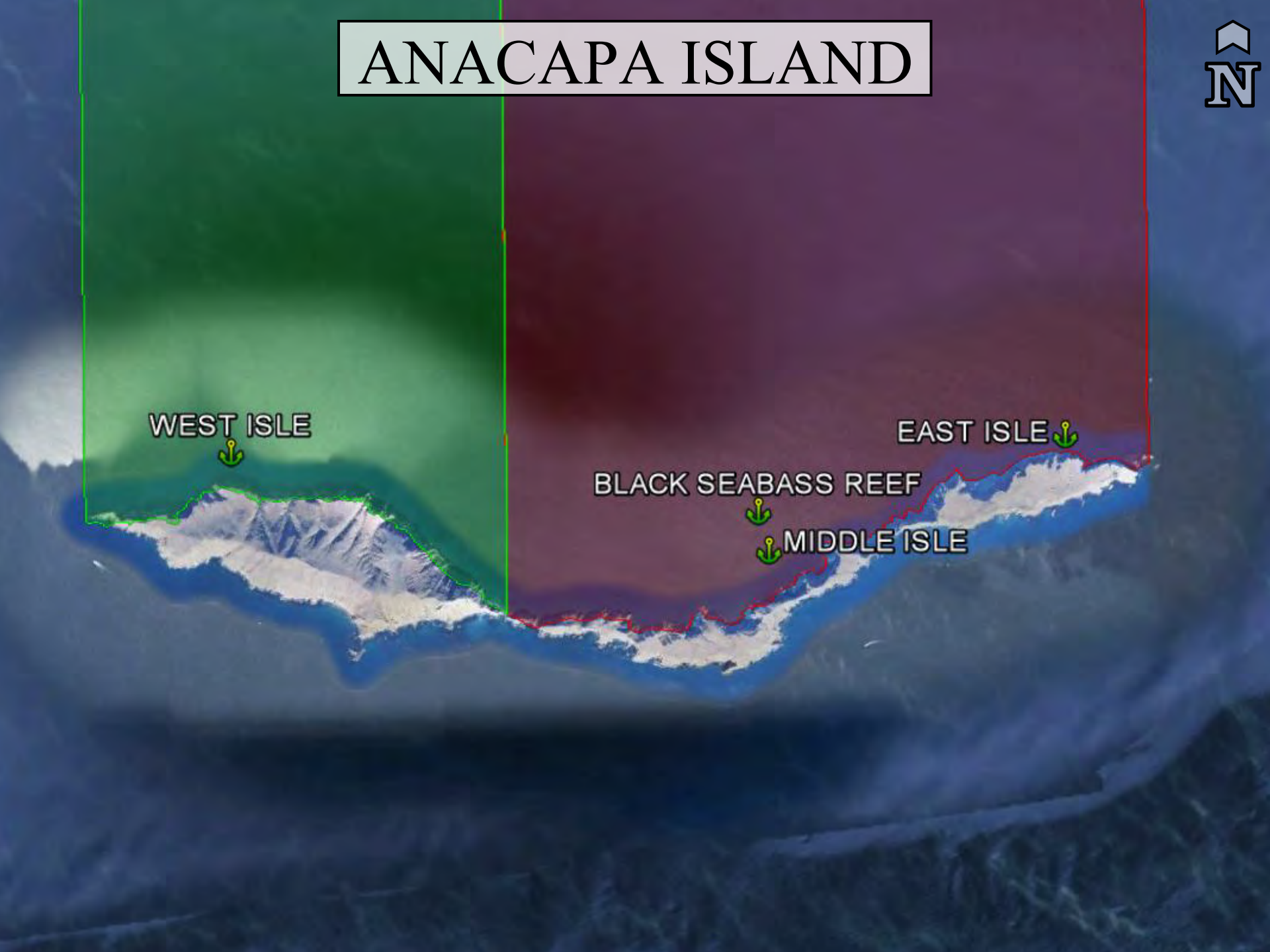
EAST ISLE



BLACK SEABASS REEF



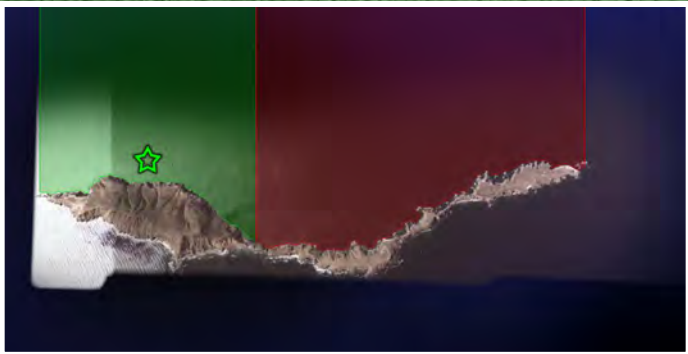
MIDDLE ISLE



WEST ISLE



E OUTER/INNER	34° 00.975' N	119° 25.305' W
CEN OUTER/INNER	34° 01.020' N	119° 25.974' W
W OUTER	34° 01.053' N	119° 26.275' W
W INNER	34° 00.922' N	119° 26.426' W



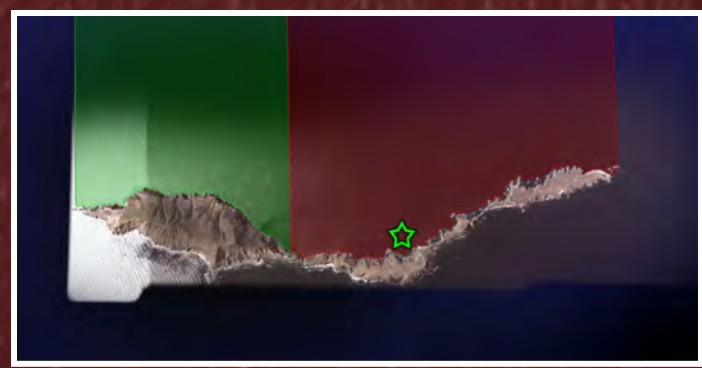
E OUTER	30-40 FT	90
E INNER	20-25 FT	90
CEN OUTER	35-45 FT	90
CEN INNER	15-20 FT	90
W OUTER	80-90 FT	90
W INNER	25-35 FT	90

NOTES: *Inside Conservation Area*
 W: Outers are very deep right below anchor point. Small section of reef. May need to put run transects parallel to each other to fit on reef. More reef to the west of the point. Midpoint of inners is a large cave.
 E: Midpoint is large, tall rock.
 CEN: Transects run on wall, midpoint is protuberance.

MIDDLE ISLE



E	34° 00.510' N	119° 23.290' W
CEN	34° 00.593' N	119° 23.300' W
W	34° 00.470' N	119° 23.668' W



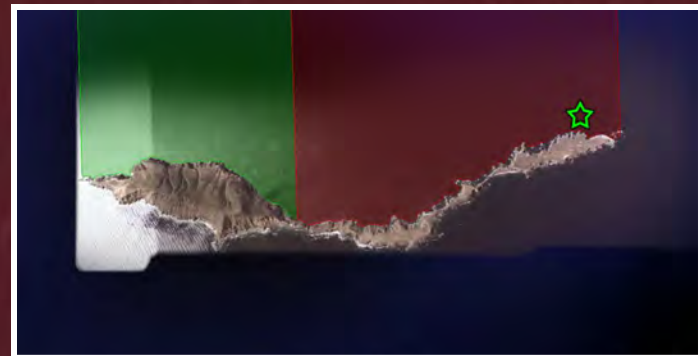
E OUTER	25-35 FT	60
E INNER	15-20 FT	60
CEN OUTER	35-40 FT	60
CEN INNER	30-35 FT	60
W OUTER	25-35 FT	90
W INNER	15-20 FT	90

NOTES: *Inside Reserve*
W: Transects hug the contours around both sides of the washrock.
CEN: Has more habitat to the east. Possible to for E and CEN to share an anchor point. Anchor point is in sand- you have to swim in to the reef.

EAST ISLE



E OUTER/INNER	34° 01.022' N	119° 21.668' W
CEN OUTER/INNER	34° 01.060' N	119° 21.821' W
W OUTER/INNER	34° 00.952' N	119° 22.304' W



E OUTER	45-50 FT	90/0
E INNER	20-25 FT	90/0
CEN OUTER	40-50 FT	50/340
CEN INNER	20-30 FT	50/340
W OUTER	25-35 FT	90/120
W INNER	15-20 FT	90/120

NOTES:

E: Transects run on opposite sides of “Landing Cove” stairs. Inner transect 1 and 2 on wall. Has KFM permanent transect.

CEN: Transects are run on either side of cove. Start transects way out on edges of the cove so that you don't run into each other at the center.

W: Is “Cathedral Cove.” Transect 1 and 2 run offshore of rock, transects 3 and 4 on wall to the west.

BLACK SEABASS REEF

CEN 34.00.756 N 119.23.351 W



CEN OUTER	55-60 FT	60
CEN INNER	60-65 FT	60

NOTES:

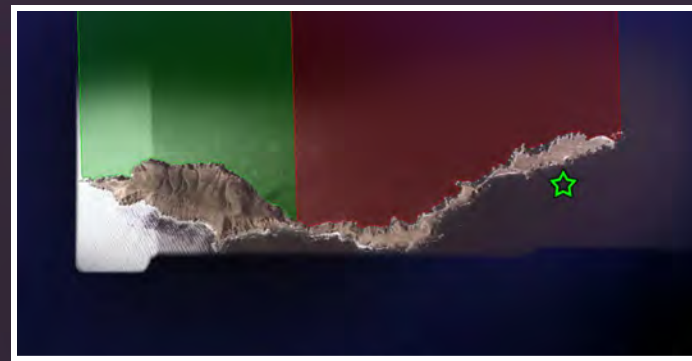
One sided site. Reef perfectly fits transects so start on one edge and work the opposite direction putting only small spaces between transects.

This is a fish survey only site.

LIGHTHOUSE REEF



E	34° 00.823' N	119° 21.600' W
CEN	34° 00.767' N	119° 21.788' W
W	34° 00.647' N	119° 22.350' W




E OUTER	30-35 FT	90
E INNER	15-20 FT	90
CEN OUTER	20-30 FT	90
CEN INNER	15-20 FT	90
W OUTER	35-40 FT	90
W INNER	20-25 FT	90

NOTES:
 W: Transects 3 and 4 located east of rocky point, transects 1 and 2 run to west.
 CEN: Transects located to the east of large rock. Outers are on offshore reef past large sand channel.
 Anchor point is on part of inner reef which juts out from island.

SANTA ROSA ISLAND



CLUSTER POINT 

 JOHNSONS LEE SOUTH

 SOUTH POINT



JOHNSON'S LEE SOUTH



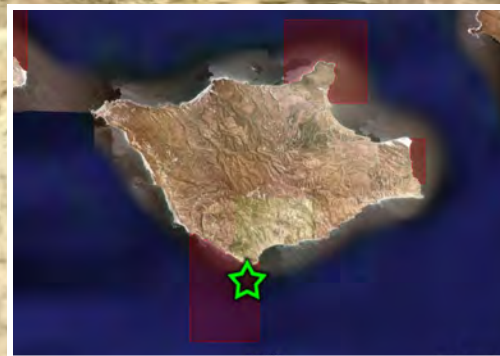
W OUTER/OUTMID	33° 53.708' N	120° 06.259' W
W INMID/INNER	33° 53.781' N	120° 06.394' W
E OUTER/OUTMID	33° 53.852' N	120° 06.045' W
E INMID/INNER	33° 53.854' N	120° 06.193' W



W OUTER	55-60 FT	30	E OUTER	50-55 FT	30
W OUTMID	50-55 FT	30	E OUTMID	45-55 FT	30
W INMID	30-40 FT	30	E INMID	40-50 FT	30
W INNER	25-35 FT	30	E INNER	45-50 FT	30

NOTES:
 W: Outer is boulder field with sand channels. Inner/Inmid follow depth contour.
 E: Outer is KFM site. Inner is often deeper than Inmid and sits on edge of sand channel. Inmids are on high relief reef offshore of the anchor point.

SOUTH POINT



W Outer/Outmid

W Inner/Inmid

E Inner/Inmid

E Outer/Outmid

W INNER/INMID	33° 53.724' N	120° 07.495' W
W OUTER/OUTMID	33° 53.665' N	120° 07.512' W
E OUTER/OUTMID	33° 53.494' N	120° 07.152' W
E INMID/INNER	33° 53.546' N	120° 07.063' W

W OUTER	55-65 FT	120	E OUTER	50-55 FT	100
W OUTMID	40-50 FT	120	E OUTMID	40-50 FT	100
W INMID	30-40 FT	120	E INMID	30-35 FT	100
W INNER	25-30 FT	120	E INNER	20-30 FT	100

NOTES: *Inside Reserve*

W: Outer is boulders with sand channels. Inner/Inmid swim inshore, plenty of reef.

E: Outer is high relief and patchy. Outer is offshore of a sand channel. Inner/Inmid more rock habitat to west, some thin strips of reef.

CLUSTER POINT



N OUTER/OUTMID	33° 55.900' N	120° 11.845' W
N INMID/INNER	33° 56.030' N	120° 11.317' W
S OUTER/OUTMID	33° 55.430' N	120° 11.520' W
S INMID/INNER	33° 55.607' N	120° 11.129' W



N OUTER	70-75 FT	120	S OUTER	60-65 FT	120
N OUTMID	60-65 FT	120	S OUTMID	50-55 FT	120
N INMID	30-35 FT	120	S INMID	30-35 FT	120
N INNER	25-30 FT	120	S INNER	25-30 FT	120

NOTES:

N: Outer is high relief and deep. Anchor in sand inshore of reef. Inners are on inside edge of reef, inmids offshore of that.

S: Outer is high relief and deep. Anchor in sand inshore of reef. High relief reef is to the southwest of anchor point. Inners are on inside edge of reef, inmids offshore of that.

SAN MIGUEL ISLAND



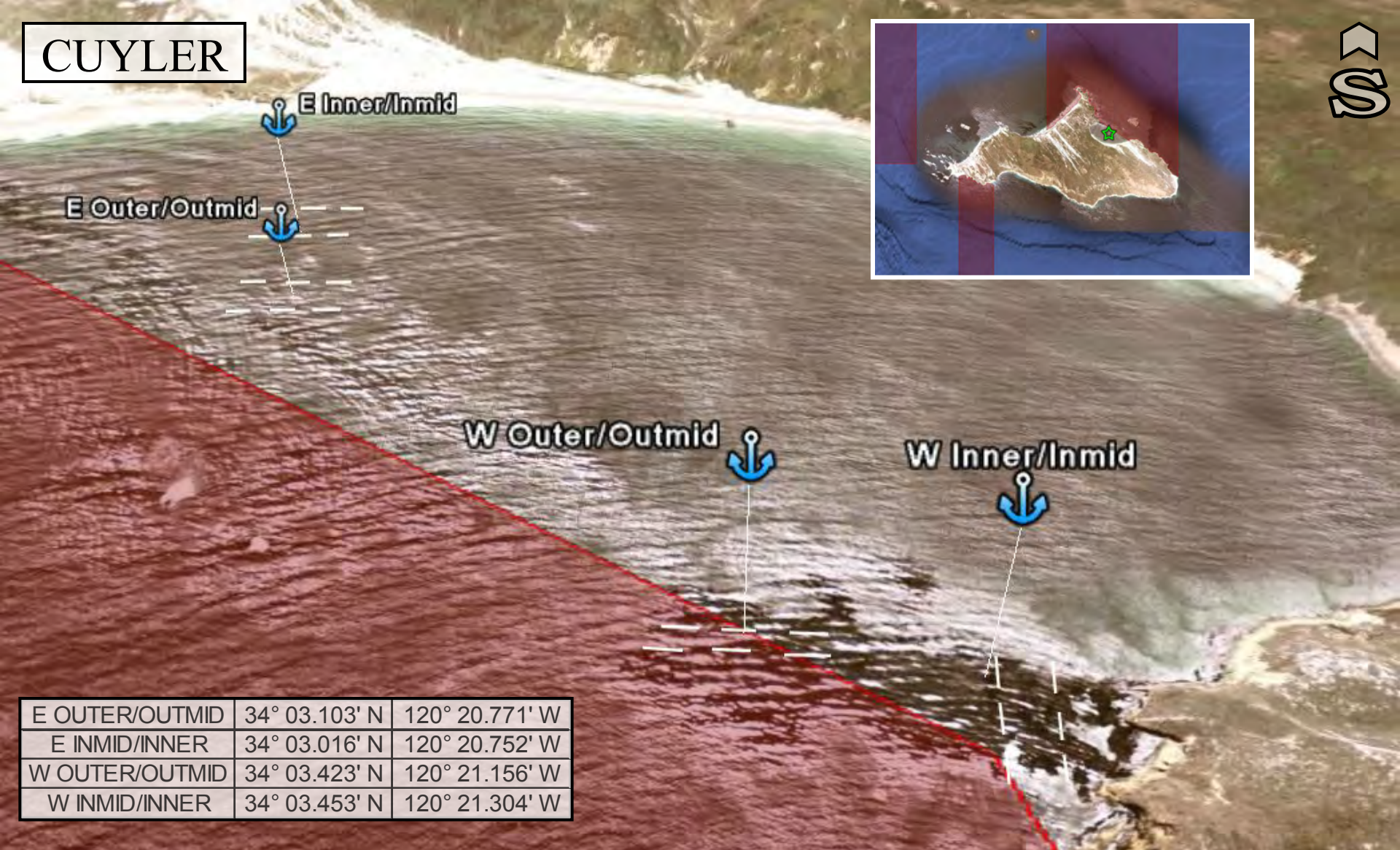
HARRIS PT. RESERVE

CUYLER

TYLER BIGHT

CROOK POINT

CUYLER

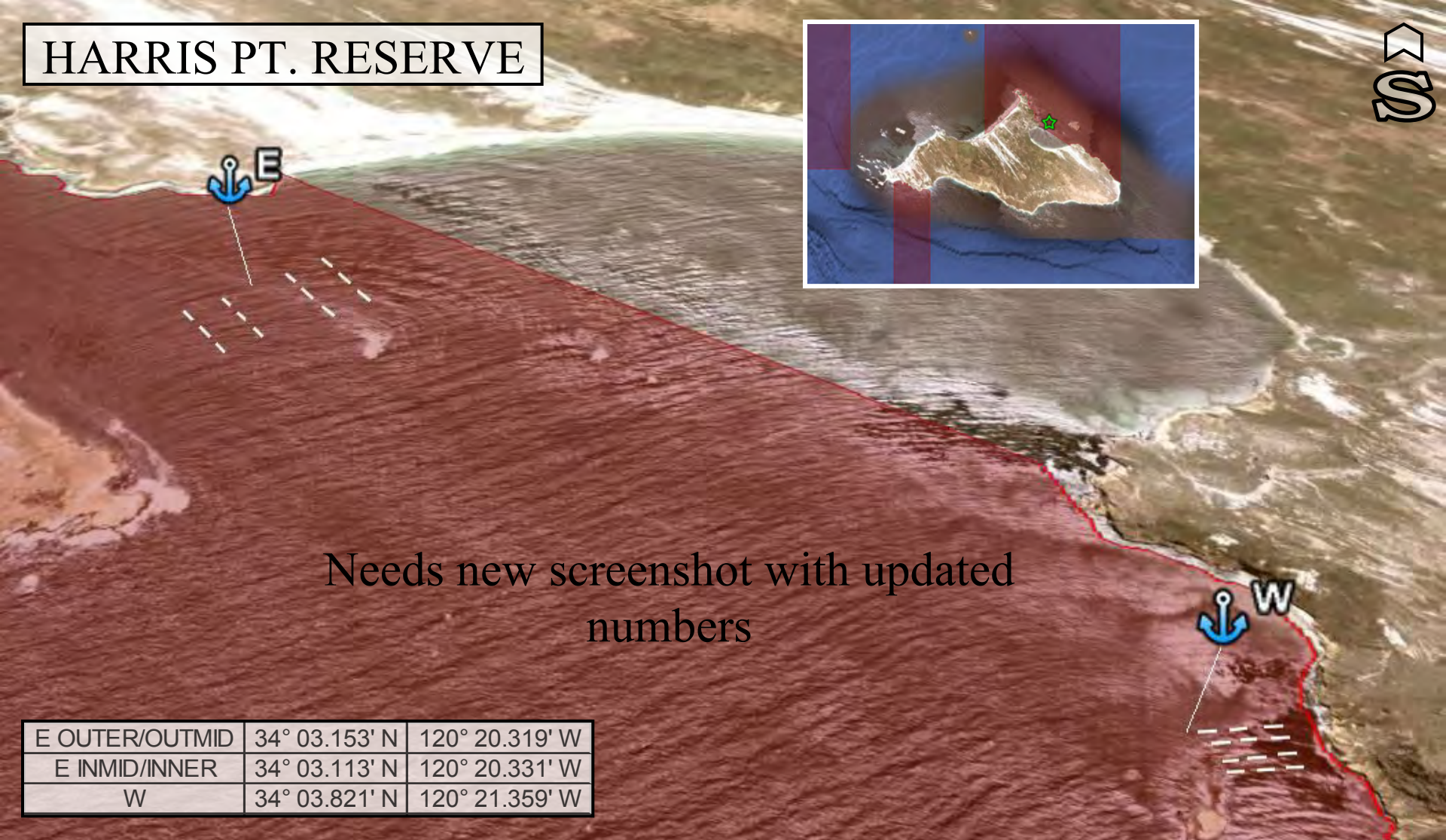
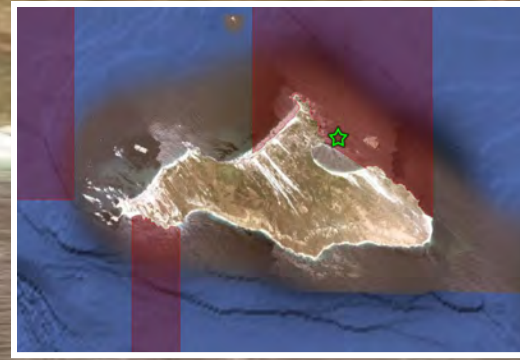


E OUTER/OUTMID	34° 03.103' N	120° 20.771' W
E INMID/INNER	34° 03.016' N	120° 20.752' W
W OUTER/OUTMID	34° 03.423' N	120° 21.156' W
W INMID/INNER	34° 03.453' N	120° 21.304' W

E OUTER	40-50 FT	90	W OUTER	40-50 FT	90
E OUTMID	35-45 FT	90	W OUTMID	35-45 FT	90
E INMID	25-35 FT	90	W INMID	25-35 FT	0
E INNER	15-25 FT	90	W INNER	15-25 FT	0

NOTES:
 W: Outers/outmids go more east-west. They sit up on a big reef/plateau. Anchor point is located to south of transects/kelp bed.
 E: Outer has some high relief, but most is low. Try to find high relief section. Inners/inmids are on one large football shaped reef chunk. Run inmids along north edge of the reef and inners along the south edge.

HARRIS PT. RESERVE



Needs new screenshot with updated numbers

E OUTER/OUTMID	34° 03.153' N	120° 20.319' W
E INMID/INNER	34° 03.113' N	120° 20.331' W
W	34° 03.821' N	120° 21.359' W

E OUTER	45-55 FT	140	W OUTER	30-35 FT	60
E OUTMID	35-40 FT	140	W OUTMID	25-30 FT	60
E INMID	35-40 FT	140	W INMID	20-25 FT	60
E INNER	30-35 FT	140	W INNER	15-20 FT	60

NOTES:

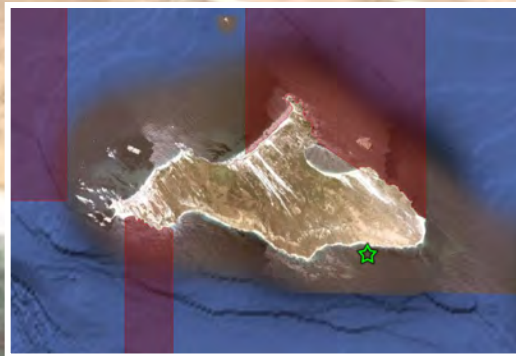
W: Between island and Hare rock. Outers are at base of reef, along edge of kelp. Mid and inners are up on rocky plateau, inners are usually deep in kelp bed.


E: Outer is at base of high relief reef, kelp is sometimes thick. Swim from Outer anchor point to Inmid/Inner. Inmid/Inner in high relief reef. Inners often on top of ridge, with Inmids down a little deeper.

CROOK POINT




W OUTER/OUTMID	34° 00.831' N	120° 20.240' W
W INMID/INNER	34° 01.005' N	120° 20.194' W
E OUTER/OUTMID	34° 00.952' N	120° 19.830' W
E INMID/INNER	34° 01.031' N	120° 19.733' W




 **W Inner/Inmid**




 **E Inner/Inmid**



 **E Outer/Outmid**



 **W Outer/Outmid**



W OUTER	50-55 FT	90	E OUTER	50-60 FT	90
W OUTMID	40-50 FT	90	E OUTMID	40-50 FT	90
W INMID	30-35 FT	90	E INMID	30-35 FT	90
W INNER	20-25 FT	90	E INNER	20-25 FT	90

NOTES:

W: Outer has high relief ledges and big overhangs, find those! W Inner/Inmid are patchy low relief reef. Easily stirred up.
 E: Outer is flat, low relief Laminaria graveyard. Inner/Inmid are also low relief, with some low ledges/cracks.

TYLER BIGHT



W Inner/Inmid



W Outer/Outmid



E Inner



E Inmid



E Outer/Outmid



W OUTER/OUTMID	34° 01.638' N	120° 24.705' W
W INMID/INNER	34° 01.730' N	120° 24.708' W
E OUTER/OUTMID	34° 01.545' N	120° 24.379' W
E INMID	34° 01.592' N	120° 24.402' W
E INNER	34° 01.664' N	120° 24.402' W

W OUTER	45-55 FT	90	E OUTER	45-50 FT	90
W OUTMID	30-35 FT	90	E OUTMID	35-40 FT	90
W INMID	30-40 FT	90	E INMID	25-30 FT	90
W INNER	20-25 FT	90	E INNER	15-20 FT	90

NOTES:

W: Outer crazy high relief, stay west of sand channel on eastern edge of kelp bed. Inner/Inmid have plenty of reef, more low relief with some boulder, swim to west from anchor into kelp bed.

E: Outer could be big boulders with sand or fairly continuous reef. Double check. Kelp is always very thick, swim inshore to appropriate depth. Inner/Inmid tend to have high relief, some big ledges.

Run one TX to the west and two to the east for all zones of side E.