East Victoria
Marine Reef Restoration Project

Proudly Supported by:

- Victorian Fisheries Authority (VFA)
- Department Environment, Land, Water & Planning (DEWLP)
- Fisheries Research & Development Corporation (FRDC)
- Eastern Zone Abalone Industry Association (EZAIA)
- Victorian Sea Urchin Divers Association (VSUDA)

Presented By:
John Minehan

Centro Stock Assessment 2002

BLACK URCHIN	Area 22	Area 23	Area 24
Mean Density (individuals per sqm)	0.510	3.079	9.732
Area (sqm)[2]	1,386,500	3,672,300	8,318,200
Total urchin count	706,602	11,305,289	80,951,795
BIOMASS (whole weight in tonnes)			
At 431g per urchin[4]	305	4,873	34,890

Calibrated for 2002 results (to account for veg biomass)[5]

	BIOMASS (whole weight in tonnes)				TOTAL
	At 431g per urchin	29	461	3,300	3,790
TACC	1% biomass	0	5	33	38
	2% biomass	1	9	66	76
	3% biomass	1	14	99	114
	5% biomass	1	23	165	189

EASTERN ZONE ABALONE INDUSTRY ASSOCIATION INC.

State Government Victoria Department of Primary Industries

Removing sea urchins (*Centrostephanus rodgersii*) to recover abalone (*Haliotis rubra*) habitat

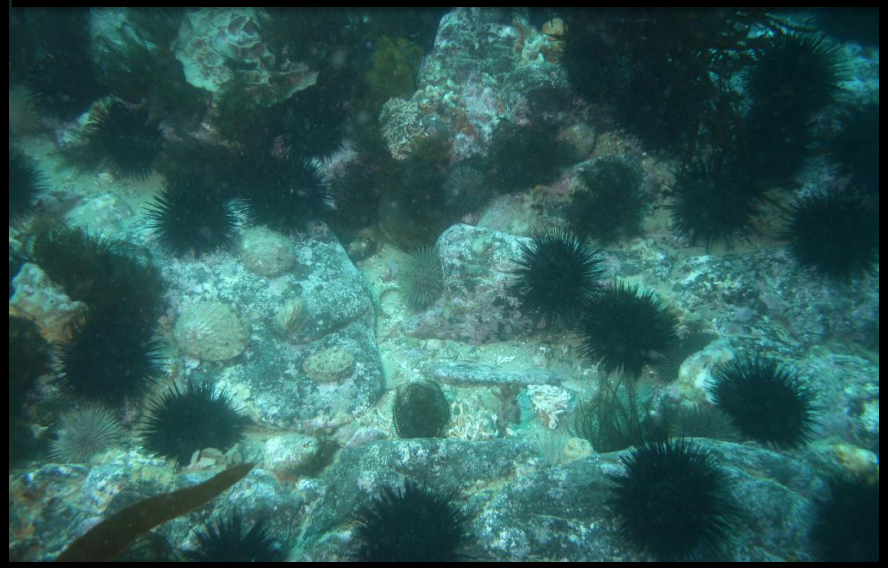
Harry Gorfine[a], Geoff Ellis[b], John Minehan[b], Justin Bell[a] and Zac Lewis[a]

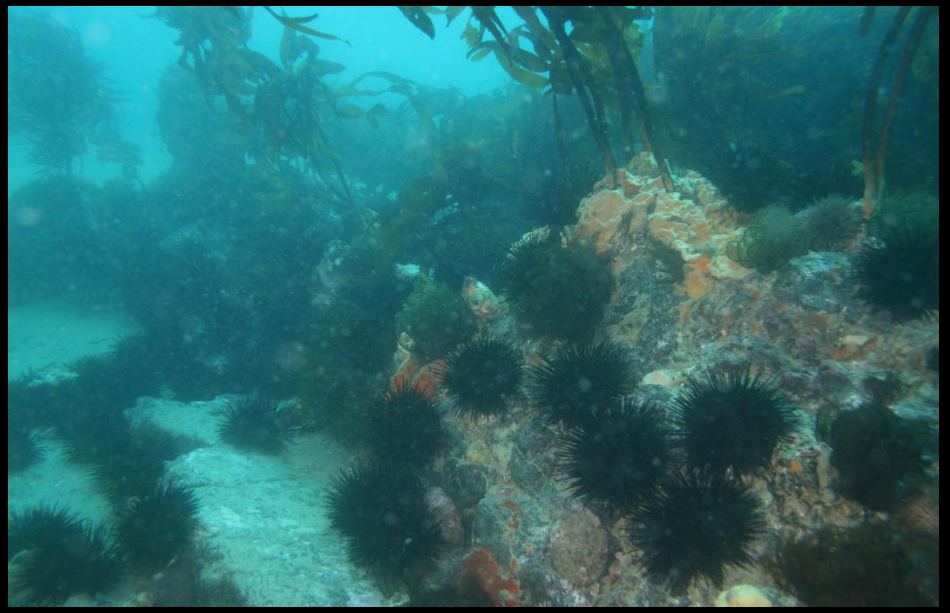
[a] Department of Primary Industries, Fisheries Research Branch

[b] Eastern Zone Abalone Industry Association

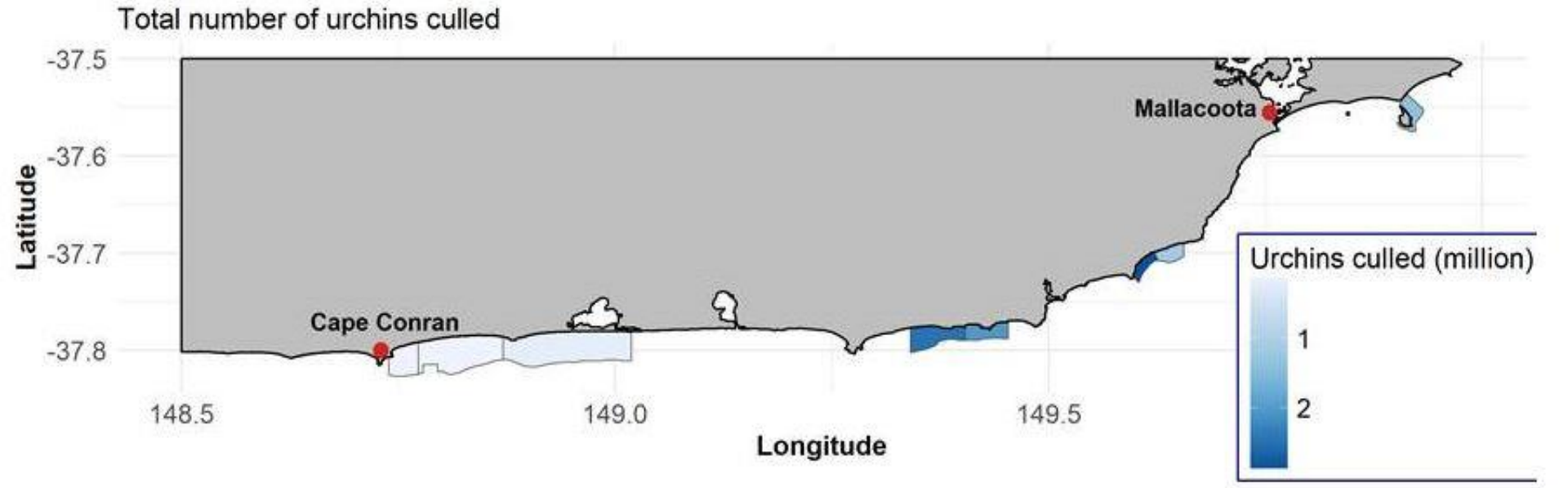
The Black Urchin (Centrostephanus Rodgersii)

DEPI Research Site – Petrel Point





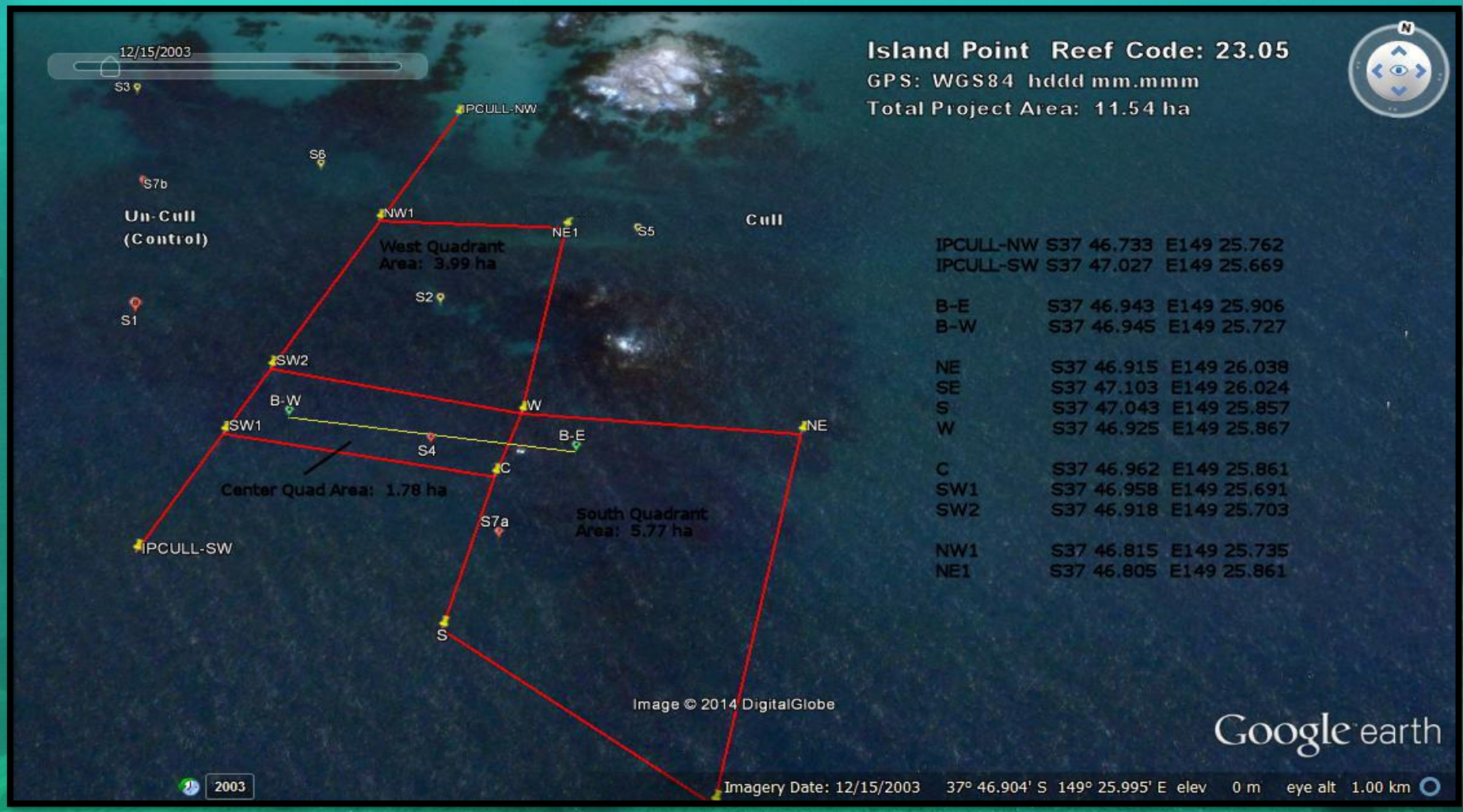
Project Scope



Project Summary

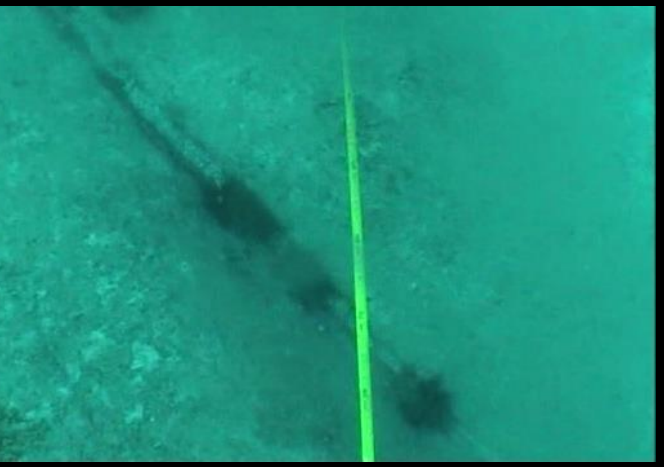
- Commenced January 2011
- EZAIA $500,000
- DEDJTR $70,000 initial funding, (Island Point joint project)
- FRDC $150,000 over 3 years (Urchin biomass reduction)
- UTAS / FRDC $50,000 (Juvenile Monitoring Project extension EZ)
- DEWLP / VFA $200,000 over 2 years (new Gunshot project)
- Total number of Reefs: 9
- Total area under management: 130 ha
- Total area of reef recovered: 65 ha
- Total number of urchins removed: 1.9 million

1. Island Point



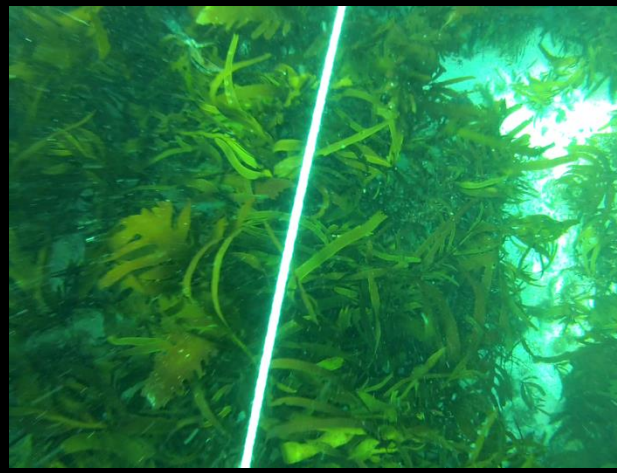
YEARS	DIVE HOURS	CULLED	COMMENTS
2011 – 2014	273	401,400	Urchins increasing

1. Island Point – Before & After



IP Site 7 Jan 2011

IP Site 7 Sept 2011



IP Site 7 Aug 2013

IP Centre Quad Nov 2012

IP Centre Quad Nov 2014

Abalone Translocation Project

- **FRDC Project titled** "Rebuilding abalone populations to limit impacts of the spread of urchins, AVG and theft" Abalone Translocation component

- **350,000 URCHINS WERE REMOVED** from Island Point over a four year period 20011 to 2014. Habitat has largely been restored, but abalone populations slow to inhabit the new areas.

- **3,000 ABALONE** were translocated from Airport reefs to Island Point in two stages during September and October 2016. Ten percent of the abalone were tagged and measured.

- **PRE-SURVEY**: a total count of **27 resident abalone** most of which were >120mm in length.

- **FIRST ANNUAL SURVEY**: a total count of **530 abalone**, mostly in the 90-120mm size class but an increasing number >120mm. The data indicates a high survival rate of the translocated abalone.

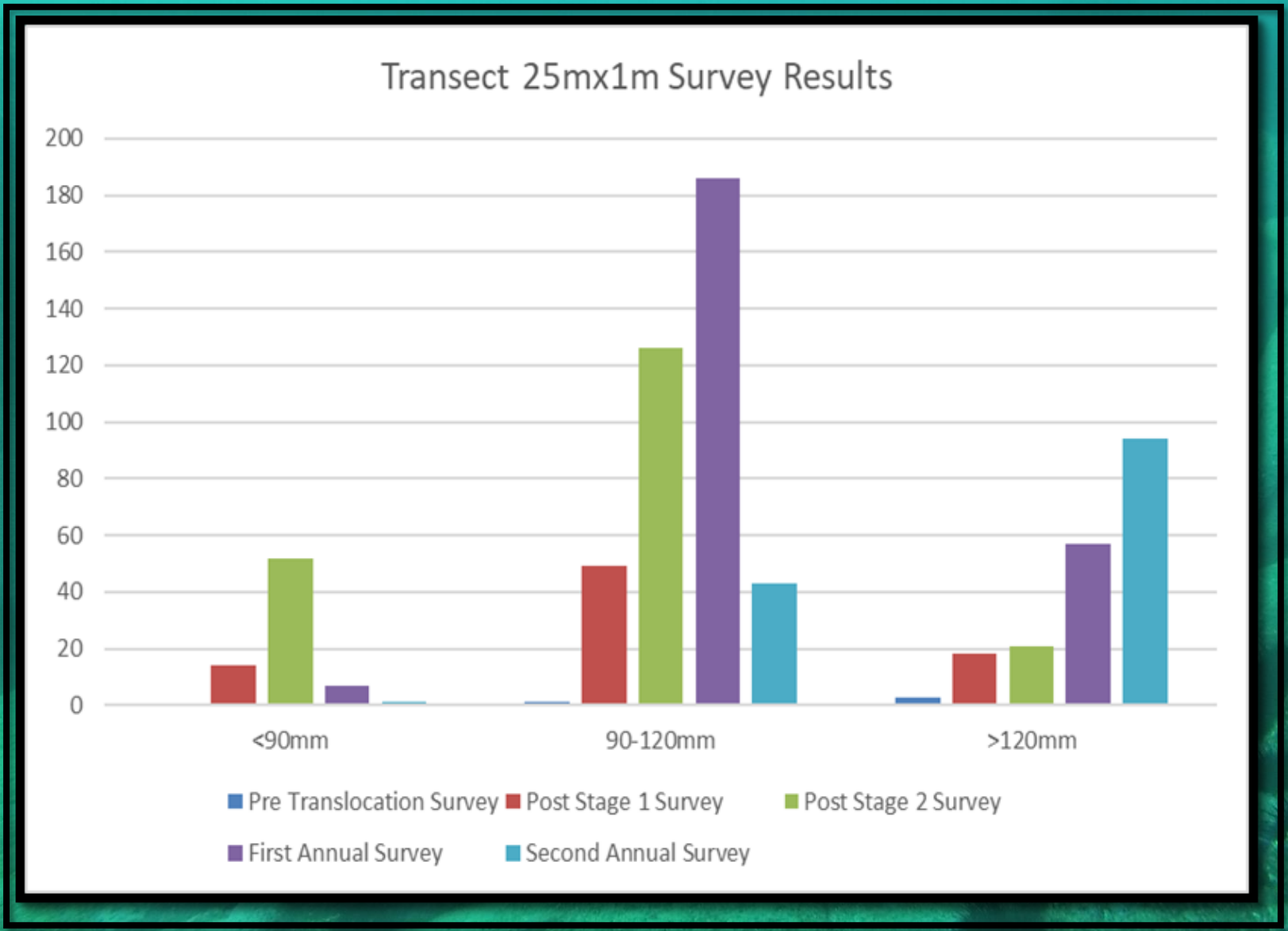
- **SECOND ANNUAL SURVEY**: a total count of **342 abalone**, now mostly > 120mm in size. The analysis charts clearly depict the abalone growing through the size classes

Ab Translocation Project – Tagged Abalone

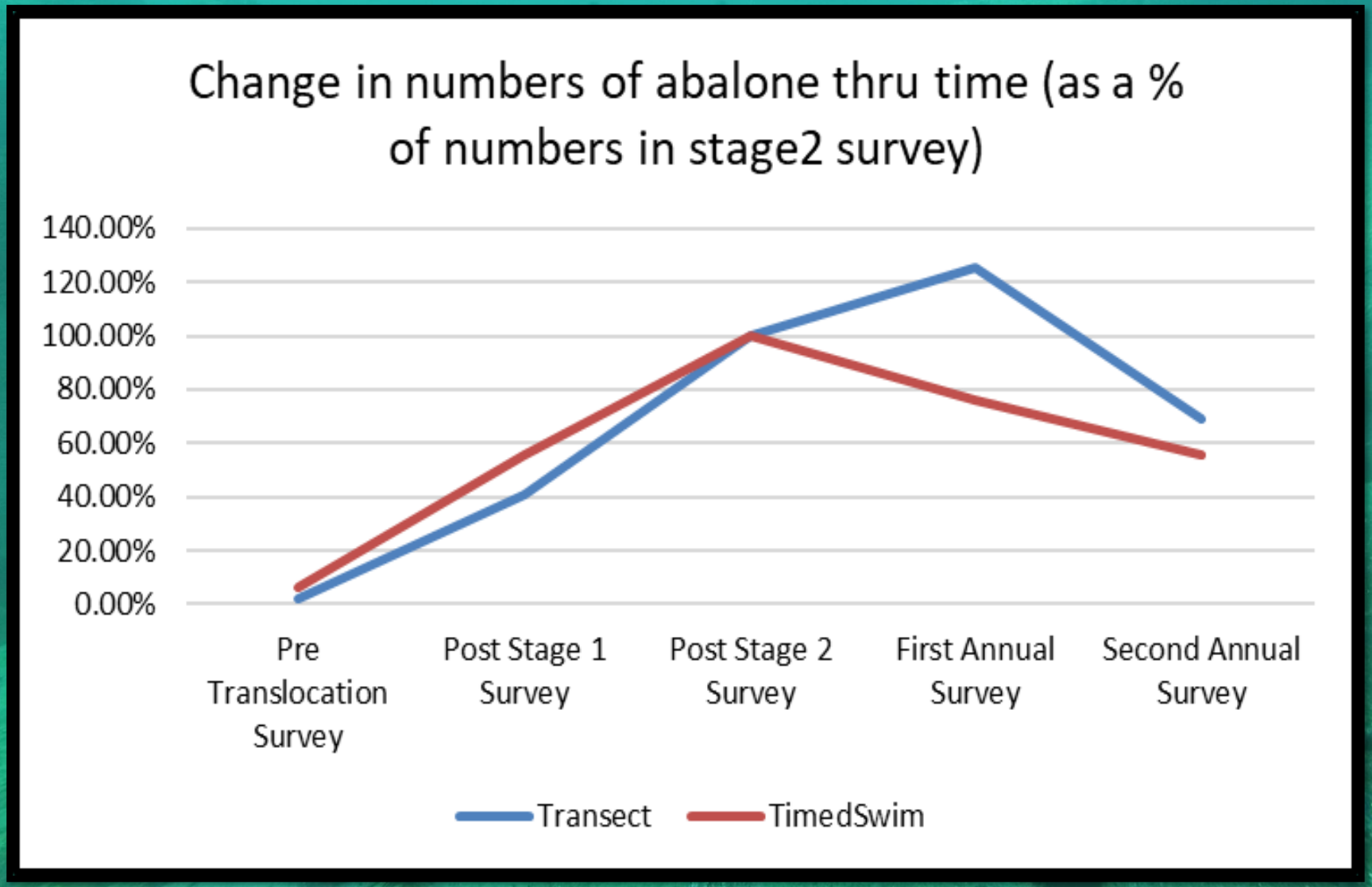
Abalone Translocation Project – Survey Site

Abalone Translocation Project – Growth Rate after 18 months

Abalone Translocation Project – Survey Results



Abalone Translocation Project – Survey Results



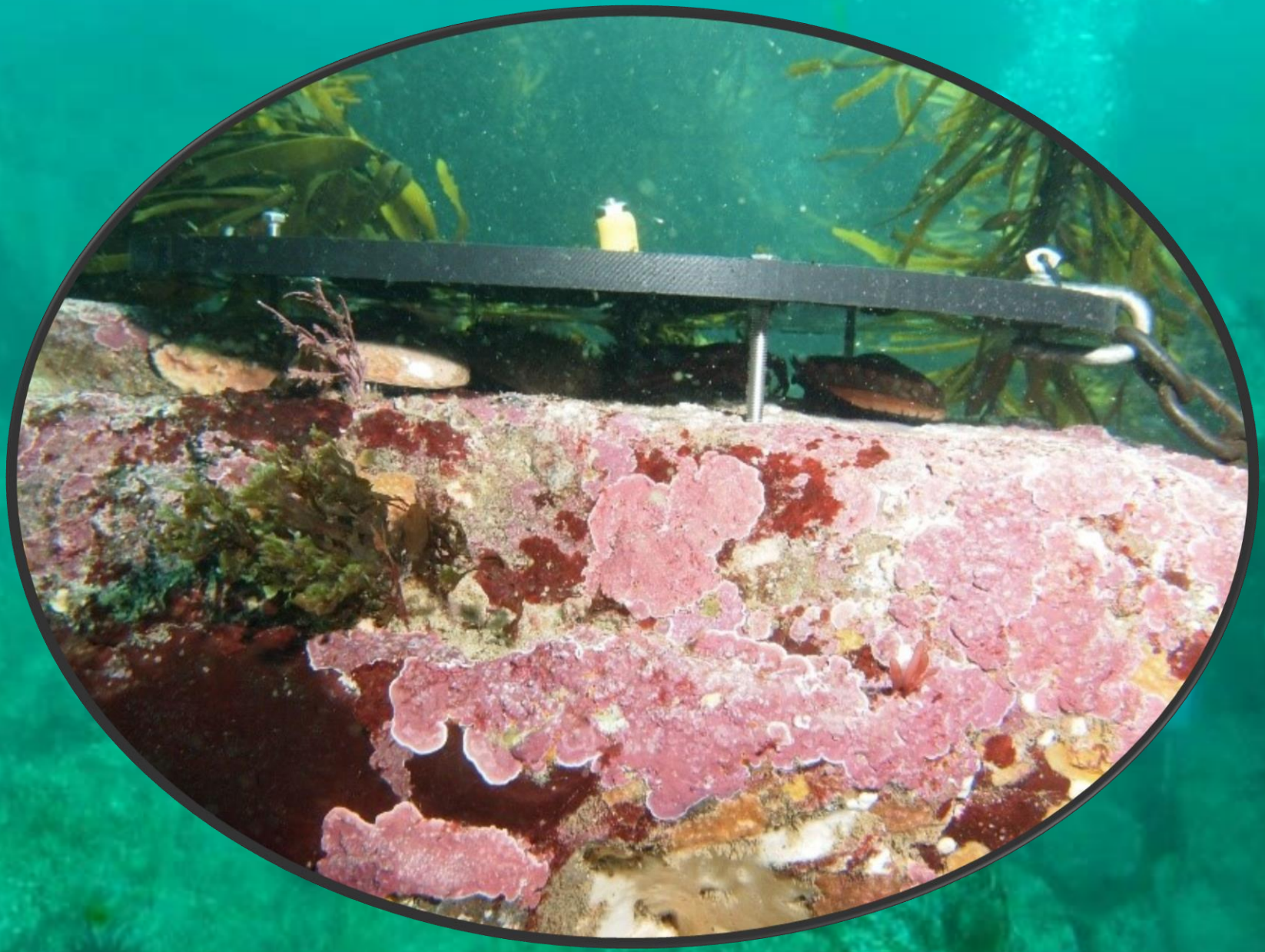
Abalone Recruitment Monitoring System

- Project: Install Juvenile Abalone collection plates at four sites in E.Z.
- Location: Island Point (2 sites) and Petrel Point (2 Sites).
- UTAS team: Craig Mundy, Sara-Jane Pyke, Jamie McAllister and Simon Talbot.
- EZAIA team: Brendon Wadsworth, Doug Boyle, Reinhard Strauss, John Minehan, Gavin Hayes and Jason York.
- Description: Each site consists of 20 collections plates fixed to the rock (pins drilled in) and linked together by chain 40 metres long.
- Installation: Completed 25th August 2018,
- First Survey: Completed 16th March 2019.

ARMS Project: Installation

ARMS Project: Installed Juvenile Collector

ARMS Project: Established Juvenile Collector



ARMS Project: First Survey Results

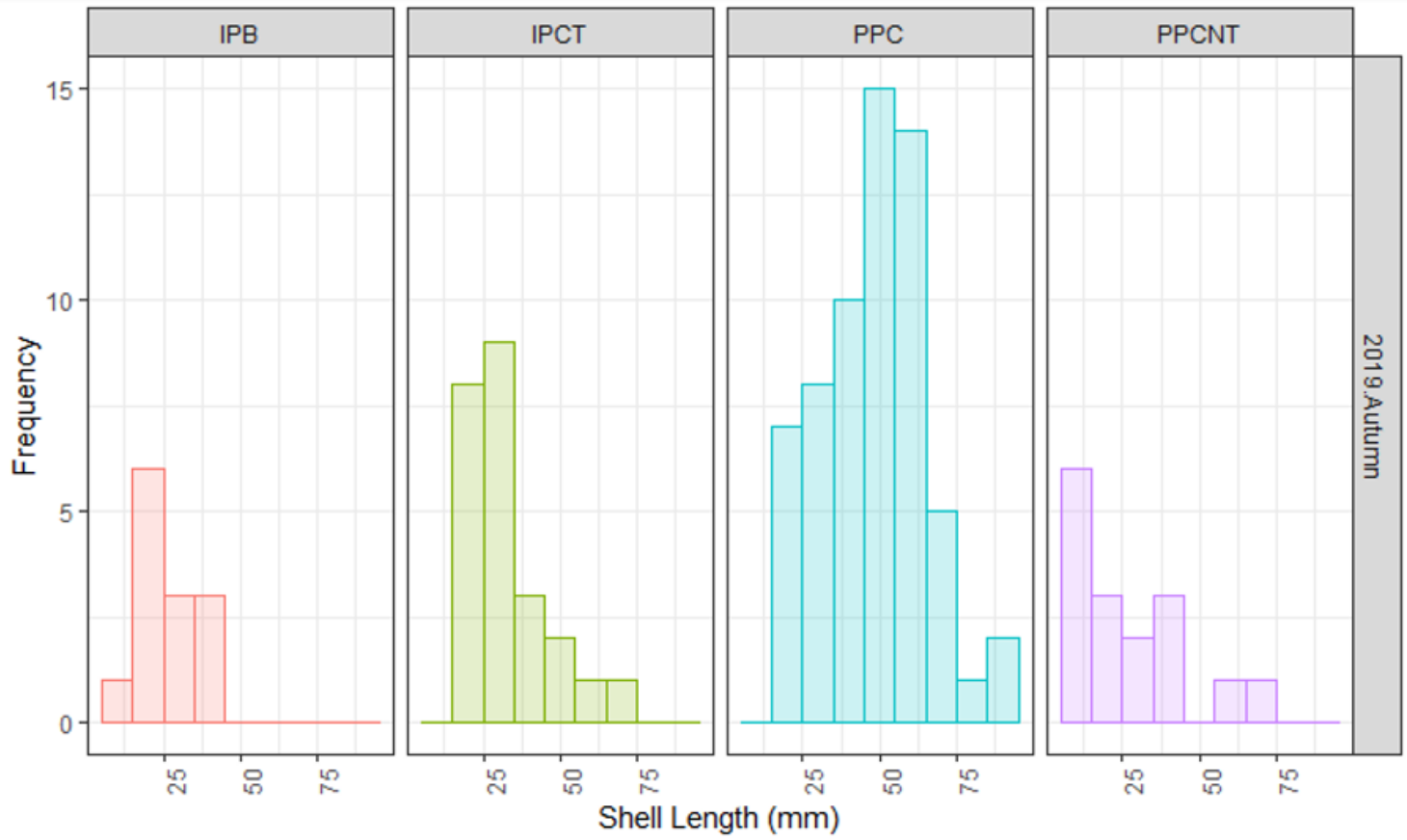


Figure 3. Size frequency of juvenile abalone recorded underneath ARMs across four sites. IPB = Island Point barren, IPCT = Island Point urchin cull and abalone translocation, PPC = Petrel Point control (no cull or translocation), and PPCNT = Petrel Point cull and no translocation.

ARMS Project: Re-Survey March 2019 - Summary

- Overall condition of ARMs was excellent, only minor repairs required,
- All four sites recorded juvenile abalone underneath the ARMs,
- Highest densities of juvenile abalone were recorded at the Petrel Point control (PPC) followed by Island Point Urchin Cull and Abalone Translocation (IPCT), Petrel Point Cull and no Translocation (PPCNT) and lowest at the Island Point barren (IPB),
- The modal shell length of abalone was 20-30 mm at Island Point sites and PPCNT, and slightly larger at 40-50 mm at the PPC site (Figure 3).
- The smallest individual being 9 mm recorded at PPCNT.

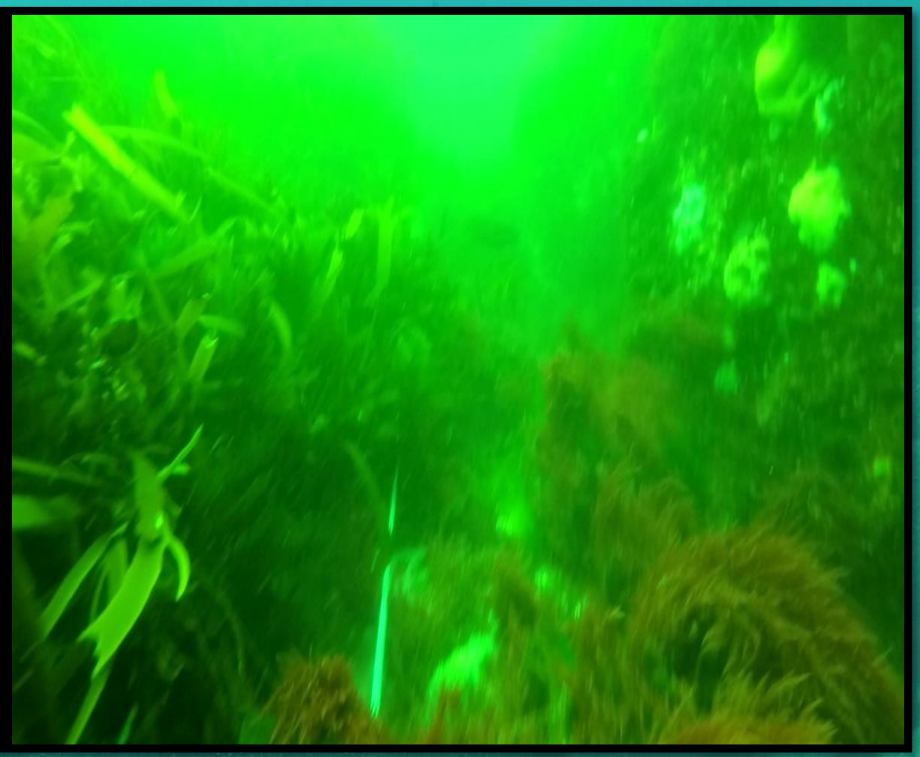
2. SandPatchLee

YEARS	DIVE HOURS	CULLED	COMMENTS
2012 – 2017	361	538,500	Restored

2. SandPatchLee – Before & After

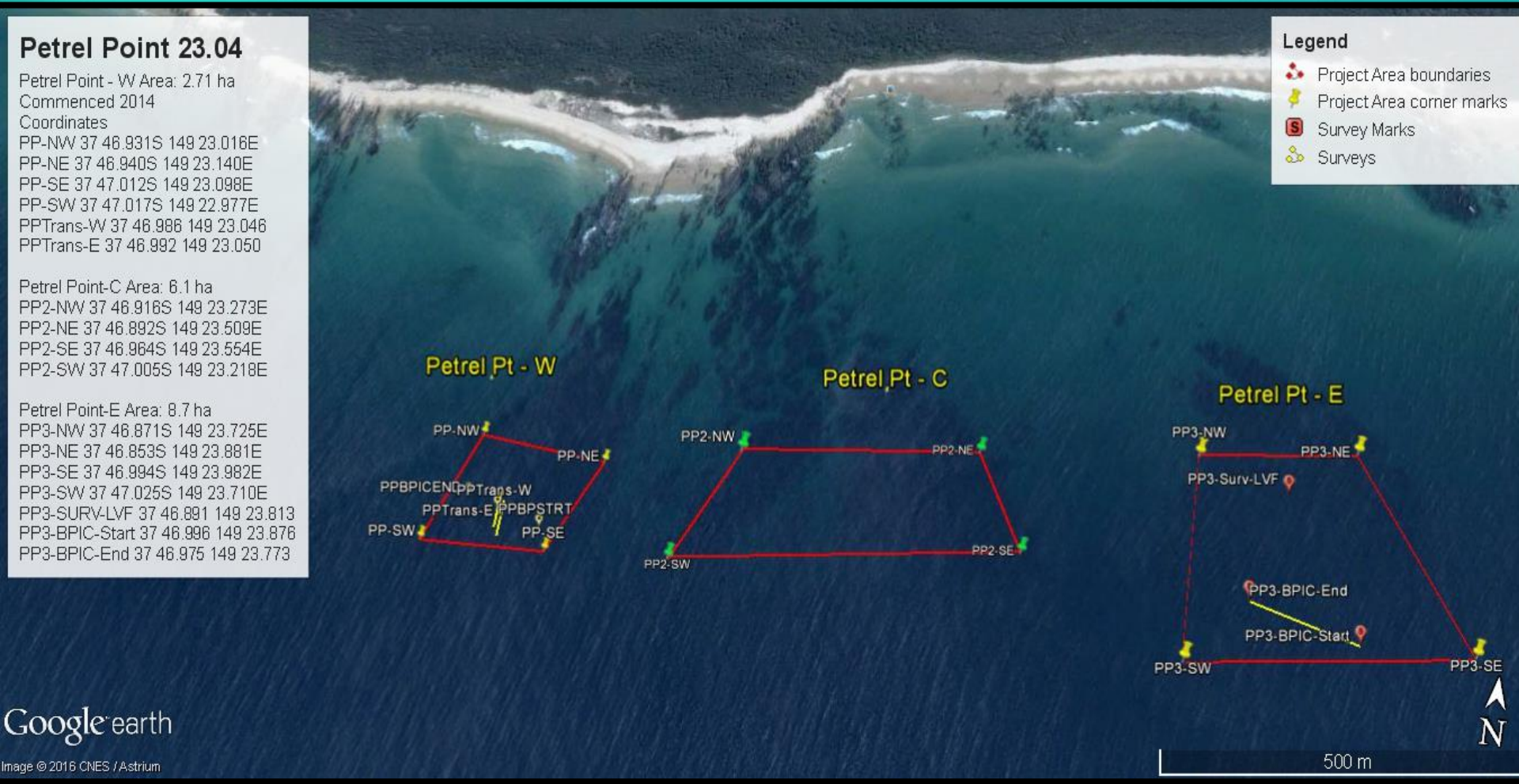
2. SandPatchLee – More Photos

SPL Survey site – March 2014



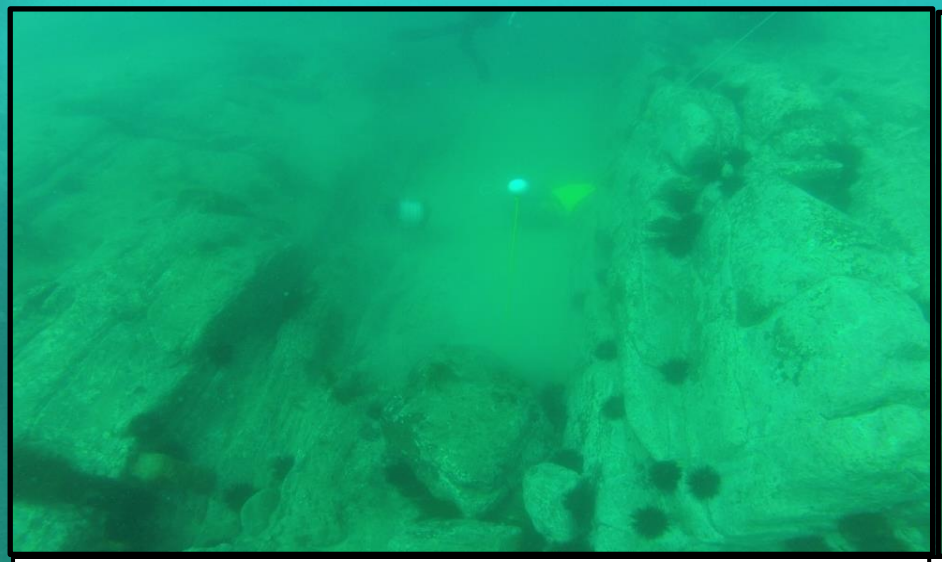
SPL Survey site – November 2017

3. Petrel Point

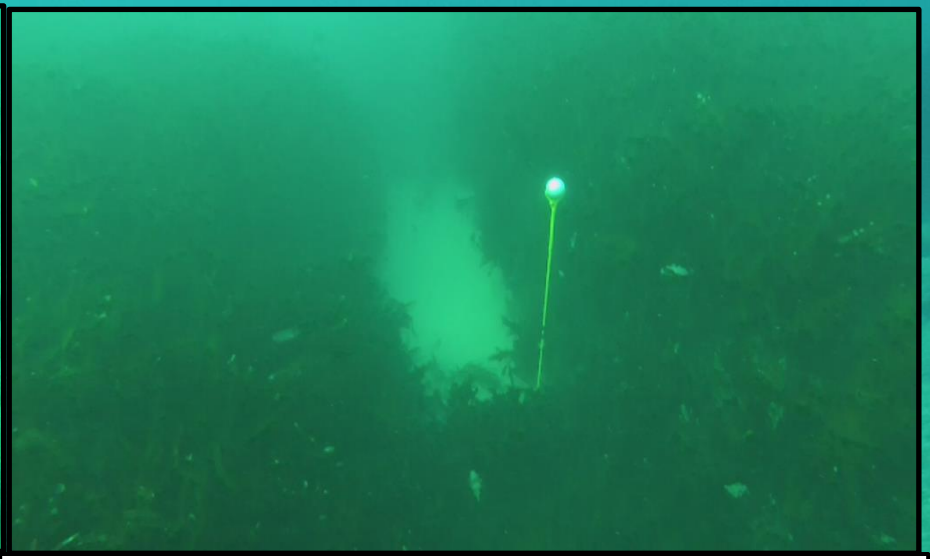


YEARS	DIVE HOURS	CULLED	COMMENTS
2013 – 2018	294	423,600	More work required

3. Petrel Point West – Survey Site



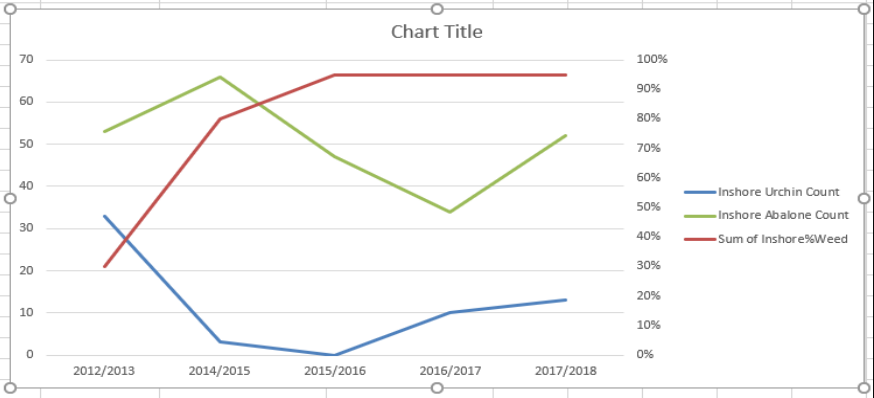
Petrel Point –W (TransW) December 2013



Petrel Point – W (TransW) February 2016

PPTrans W

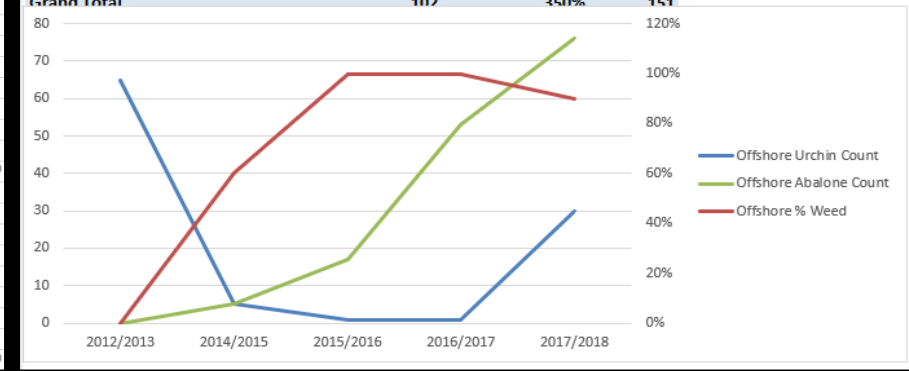
Row Labels	Inshore Urchin C	Sum of Inshore%Weed	Inshore Abalone Coun
2012/2013	33	30%	53
2014/2015	3	80%	66
2015/2016	0	95%	47
2016/2017	10	95%	34
2017/2018	13	95%	52



PPTrans W-Inshore Survey Data

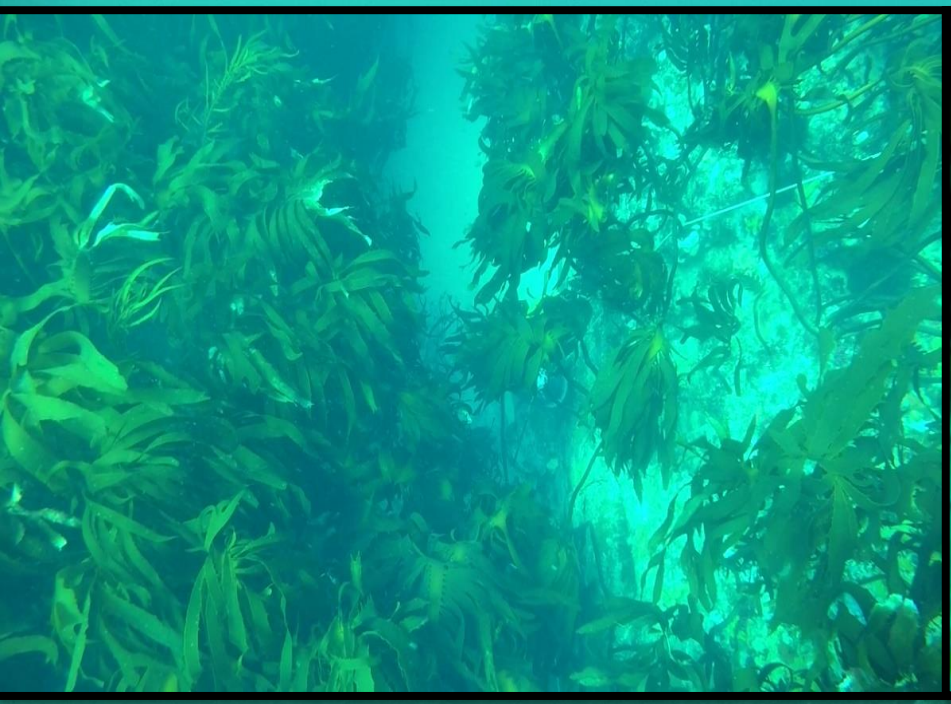
SurveySite PPTrans W

Row Labels	Offshore Urchin Count	Offshore % Weed	Offshore Abalone Count
2012/2013	65	0%	0
2014/2015	5	60%	5
2015/2016	1	100%	17
2016/2017	1	100%	53
2017/2018	30	90%	76
Grand Total	102	350%	151



PPTrans W – Offshore Survey Data

3. Petrel Point - Photos



Petrel Point W (TransW) November 2017

Abalone colonising restored reef area.

3. Petrel Point - Central

Petrel Point Central – November 2017
Reef recovering slowly, Wade Bowerman on duty.

Petrel Point Central – November 2017
More work to be done.

4. Benedore

YEARS	DIVE HOURS	CULLED	COMMENTS
2016 - 2018	99	166,200	Recovering

4. Benedore – Before & After

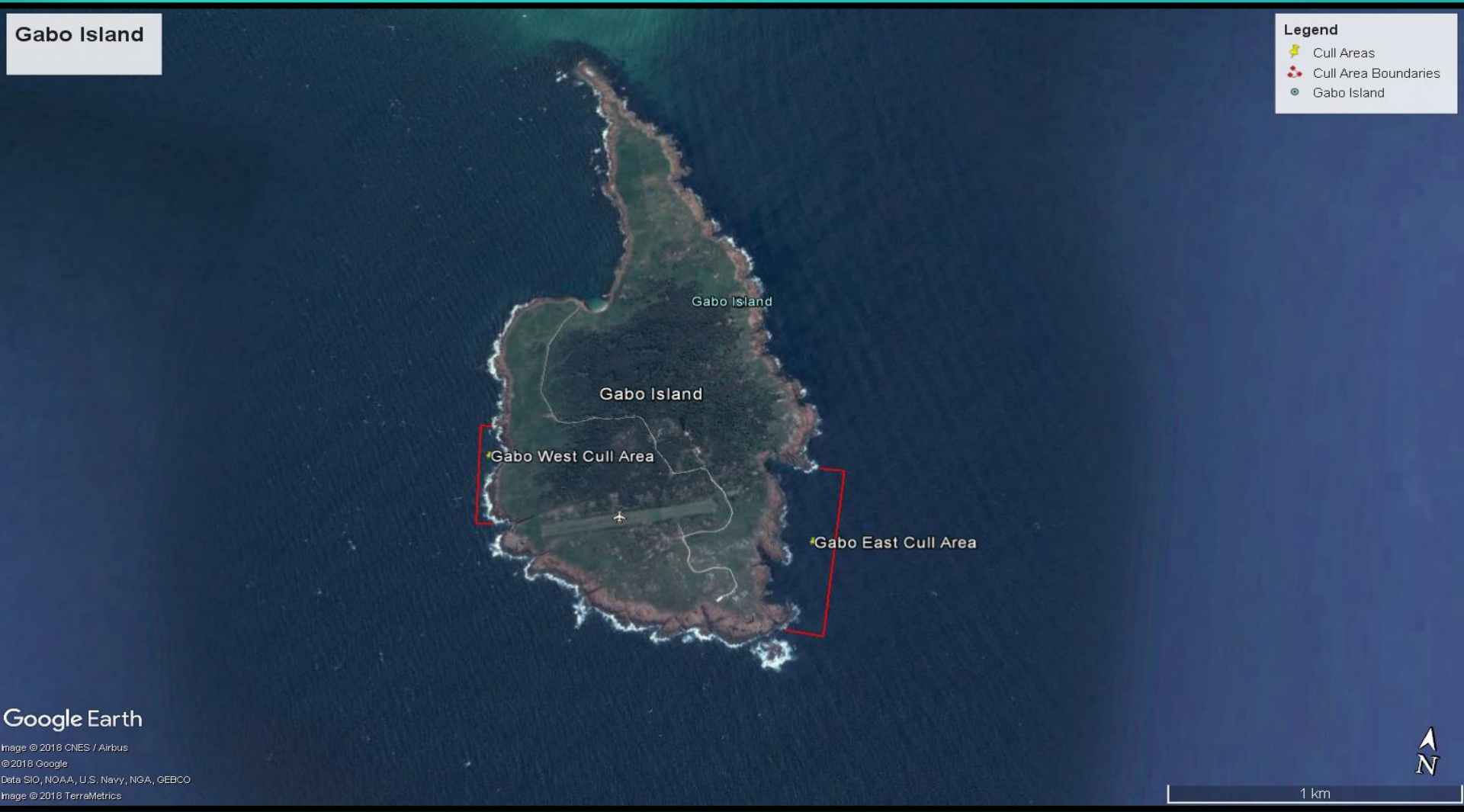
Ben Surv Offshore – December 2016

Ben Surv Offshore – December 2017

Some of the area still recovering.

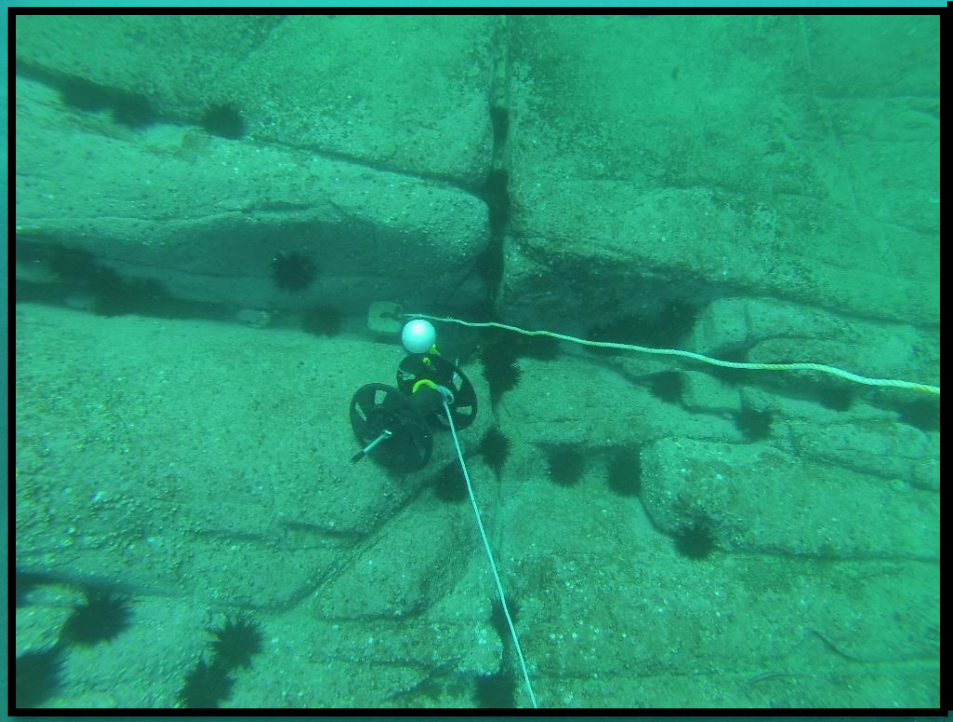
Barrens extend to the East and deeper.

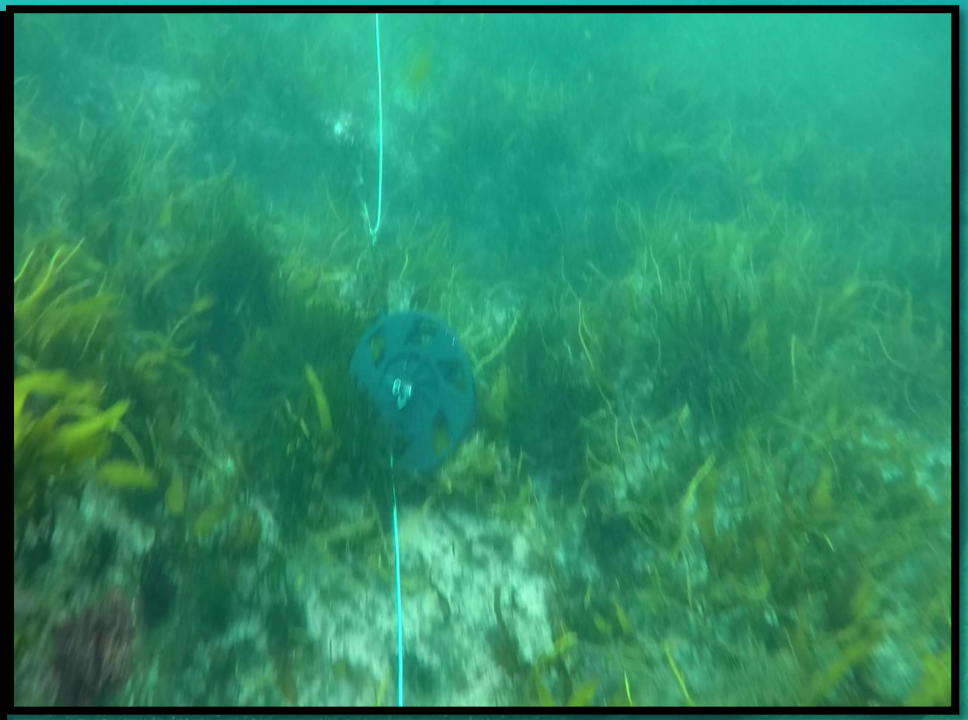
5. Gabo Island



YEARS	DIVE HOURS	CULLED	COMMENTS
2016 – 2018	67	109,200	Early Stages

5. Gabo Island – Before & After





GI Survey site – February 2016	GI Survey Site – February 2018

5. Gabo Island – More Photos

Abalone & Urchins competing for space

Rick Opdenbrou – On the job

5. Gabo Island – Still more photos

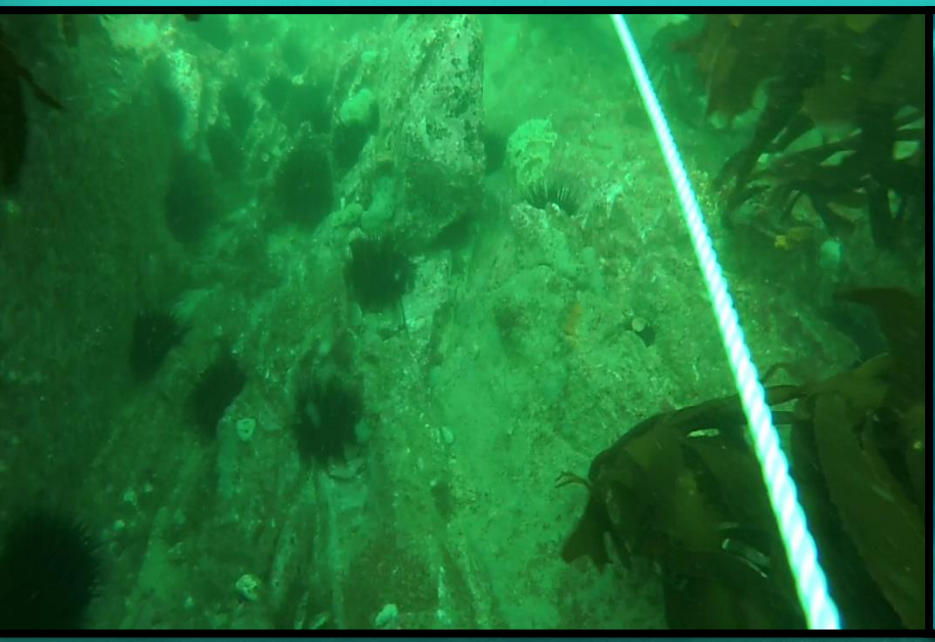
High Urchin Density – April 2018

Gavin Hayes – up to the task!

6. Pearl Point

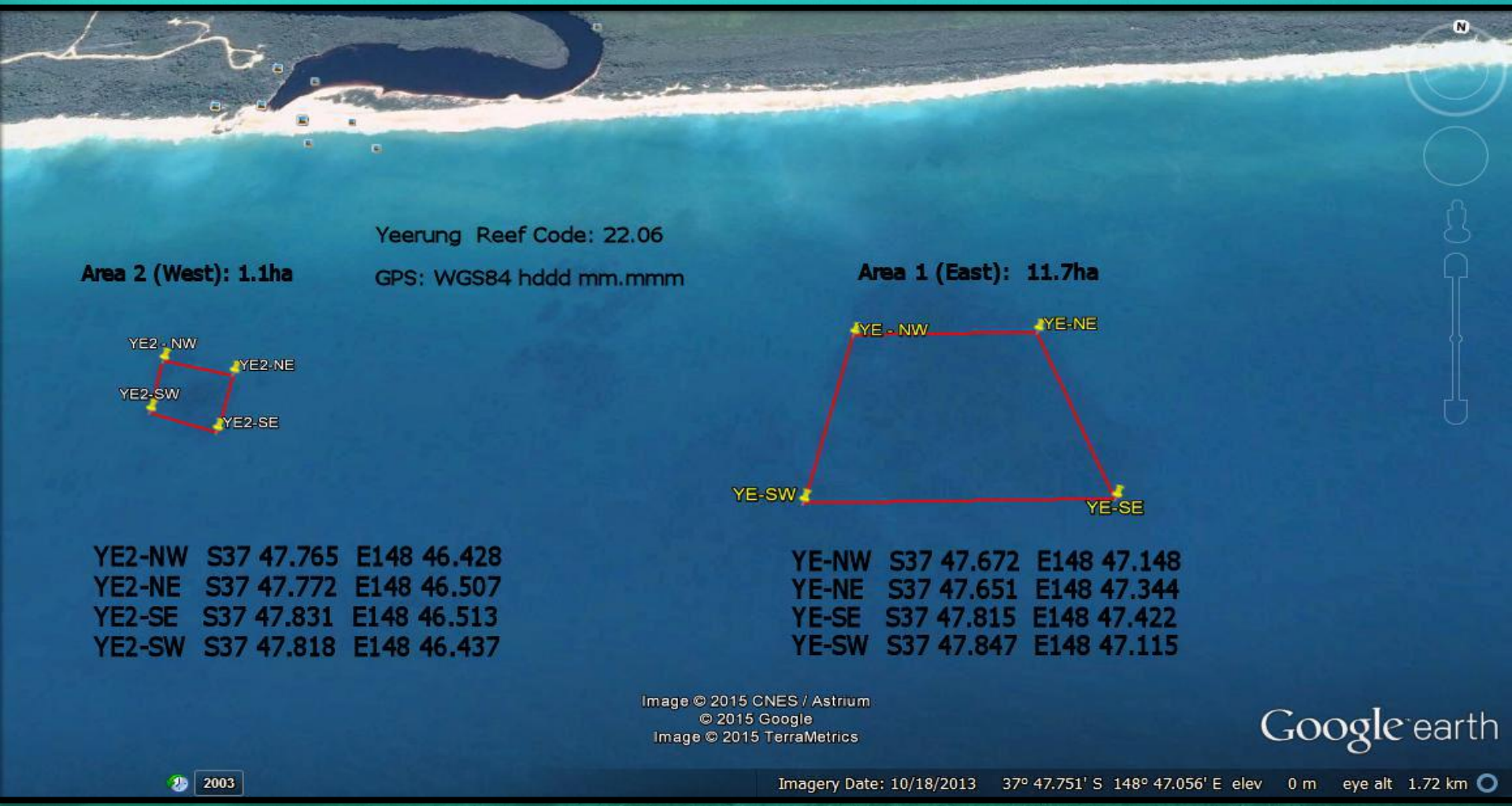
YEARS	DIVE HOURS	CULLED	COMMENTS
2015 – 2018	33	35,100	Under control

6. Pearl Point – Before & After



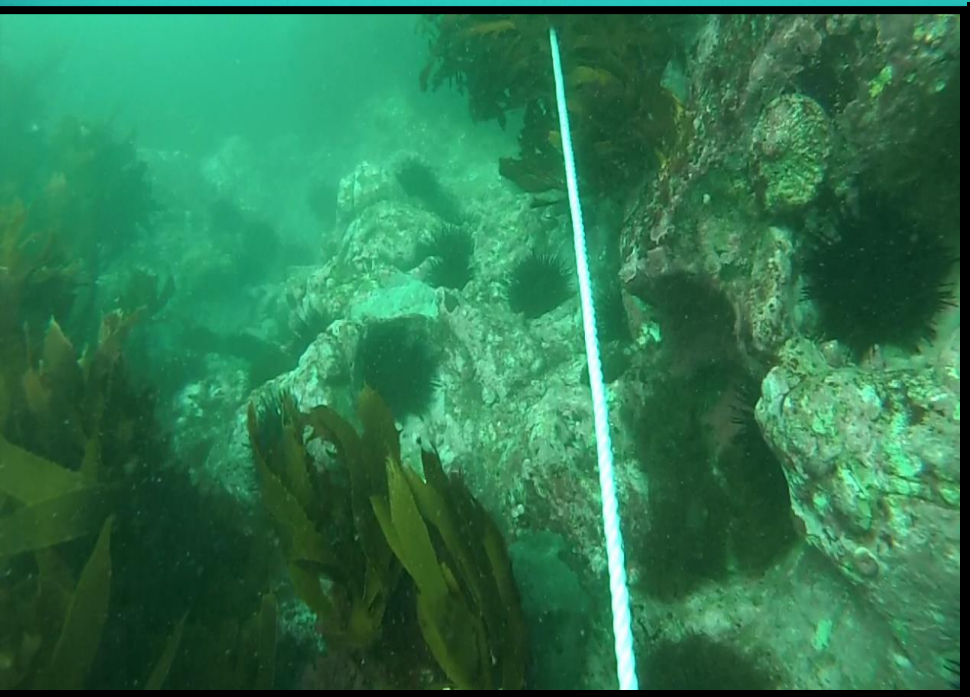
Pearl Survey Site – March 2015 Typical small incipient barren.	Pearl Survey Site – March 2018 Urchins removed and incipient barren recovering.

7. Yeerung



YEARS	DIVE HOURS	CULLED	COMMENTS
2014 – 2017	23	16,300	Under Control

7. Yeerung – Before & After

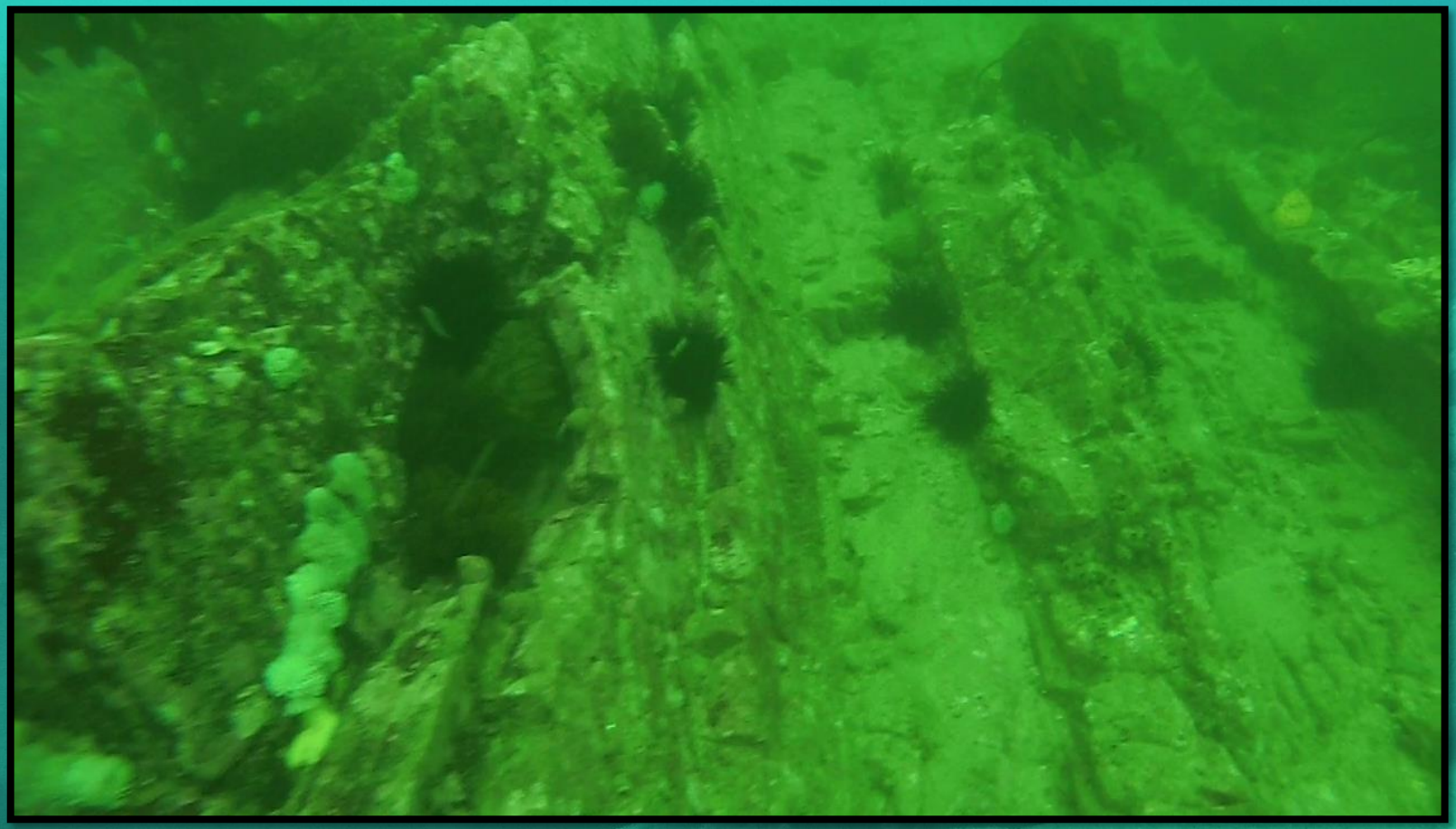


Yeerung Survey Site – March 2015 Typical small urchin incipient barren.	Yeerung Survey Site – March 2018 Urchin reduced, barren recovering.

8. East Cape

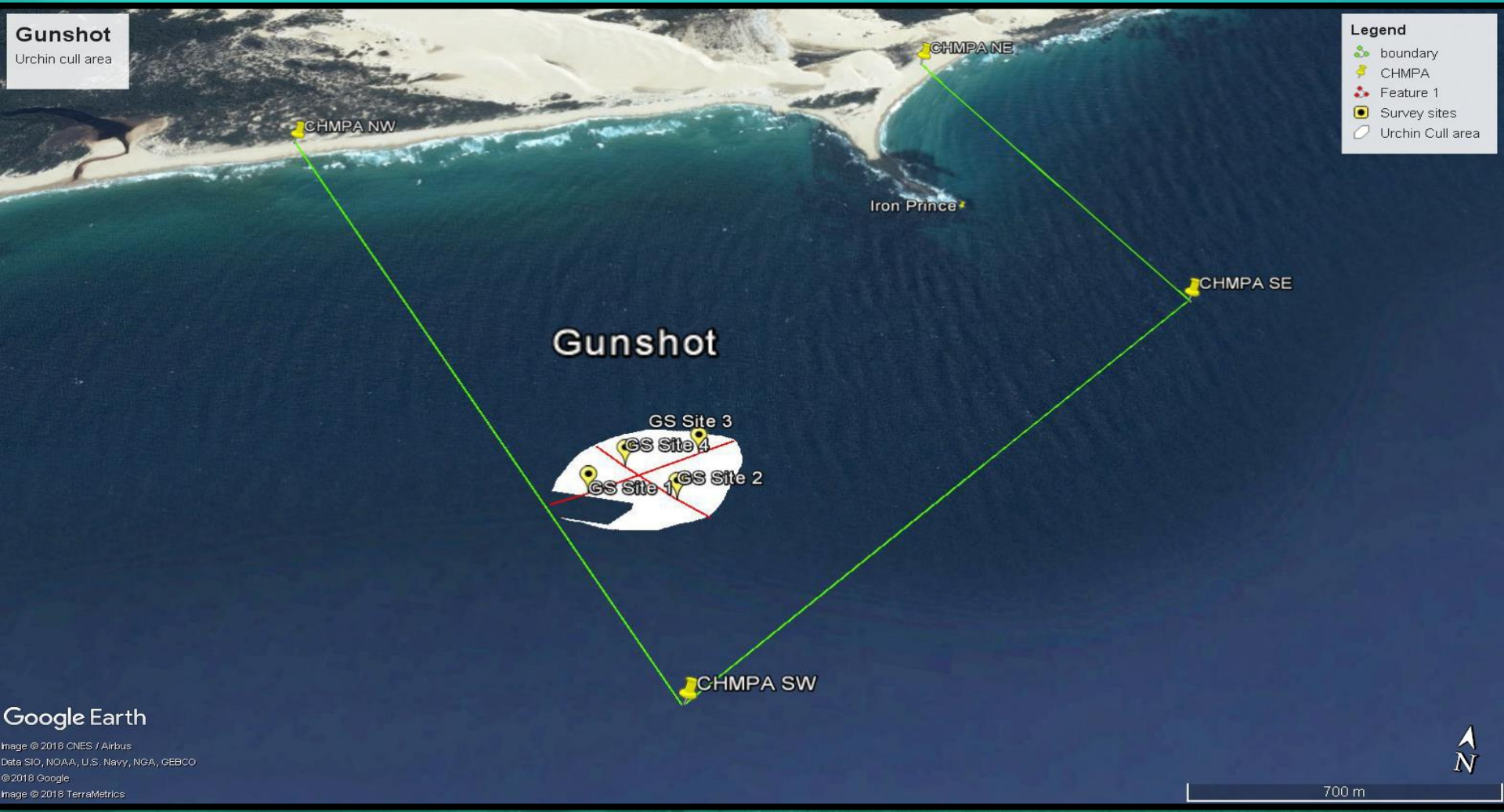
YEARS	DIVE HOURS	CULLED	COMMENTS
2016 – 2018	11	12,600	Under Control

8. East Cape - Photos



East Cape – March 2015
Typical Ridge affected by urchins.

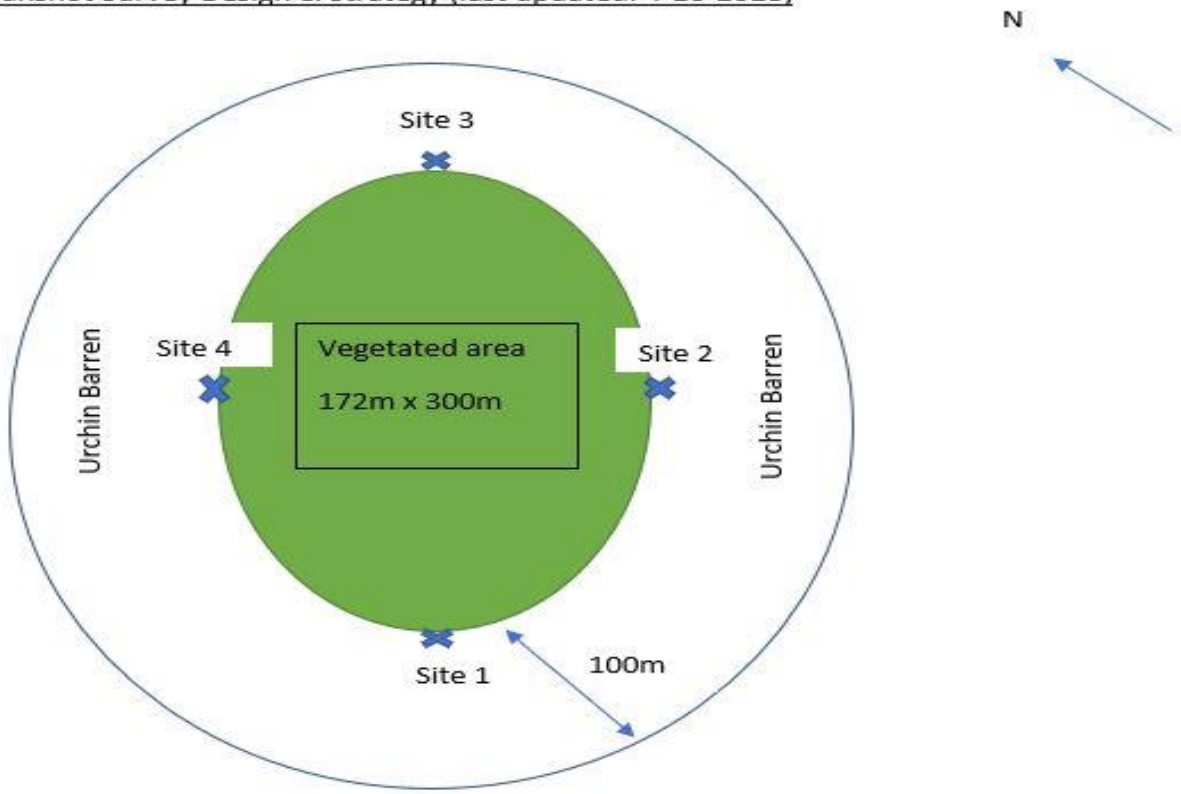
9. Gunshot



YEARS	DIVE HOURS	CULLED	COMMENTS
Commencing soon	0	0	At risk of losing reef

9. Gunshot – Strategy

Gunshot Survey Design & Strategy (last updated: 4-10-2018)



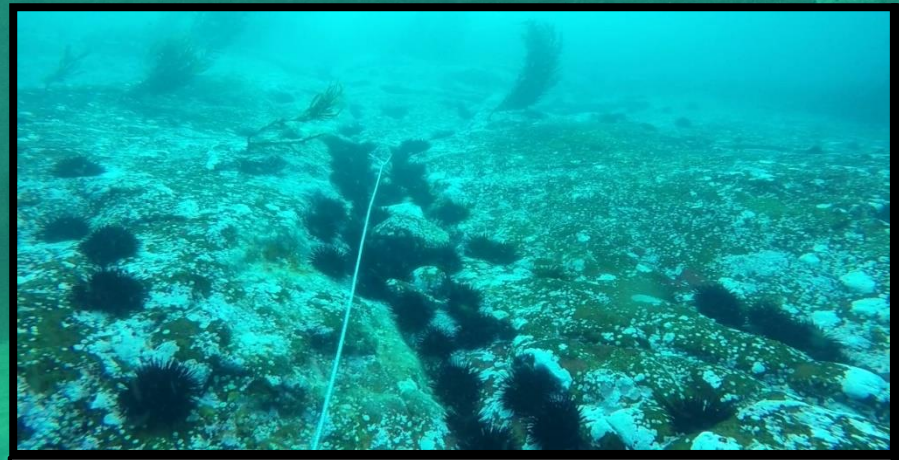
Site Name	Latitude WGS 84 dd.ddddd	Longitude WGS 84 ddd.ddddd	Depth metres
GS Site 1	-37.52921	149.95638	10.0
GS Site 2	-37.52902	149.95891	11.0
GS Site 3	-37.52763	149.95917	10.0
GS Site 4	-37.52831	149.95718	8.0

Strategy: Cull urchins to restore reef 100m in all directions from the current weed edge.

9. Gunshot – Before

GS Site 3 Inshore: Typical habitat on the best parts of the reef, gutter containing abalone

GS Site 3 Inshore: Incipient barren within vegetated reef area.



GS Site 3 Offshore: Barrens start in 10m depth on all sides of the reef and extend into the distance.

GS – Typical barren >10m depth.

Locals impress Sir David

On the evening of March 8, 2018, at the High Commission in England, the Britain-Australia Society awarded Sir David Attenborough the annual award for services to the natural world and building relations between the two countries. On receiving his award he acknowledged Marlo's Dr Holly Baird for her photography along the East Gippsland coastline and Mallacoota's abalone divers for protecting the local reefs.

Former Marlo resident, Jacqueline McKeown, had the privilege of meeting Sir David in person at the event, describing him as an "an extra-ordinary humble man and visionary man".

"He sounds the same in persons as he does in his stunning documentaries," she said.

Surrounded by the glittering marble at Australia House, footage was shown of Sir David's magnificent new series, *Blue Planet II*, the documentary largely filmed in Australia. It took three years to complete, with 30 cameramen and 12 film directors each playing their part.

In Sir David's gracious award acceptance speech he mentioned a little known fact – of all of Earth's creatures, it is the leafy sea dragon, which is found off the coast of East Gippsland, that he likes best.

Holly Baird, a Marlo resident, photographed this unique creature in November 2017.

While underwater, Holly also captured Abalone Fishermen's Co-operative Ltd (AFCOL) wild abalone divers from Mallacoota removing black sea urchins, a predator species, preventing them from denuding the beautiful reefs.

Sir David Attenborough's favorite creature in the world - the leafy sea dragon. (Photos: Dr Holly Baird, November 2017)

Mallacoota wild abalone divers remove destructive black sea urchins from the reef.

Sir David was impressed with Holly's photos, taken with an underwater GoPro camera, and praised the work of the wild abalone divers for their environmental work and AFCOL for helping to restore the valuable reefs.

He highlighted how actions, however large or small, make a big difference to us all.

Commercial and recreational diving, with a mission to restore the reef floor, is very important for the sea creatures that live there.

A funding application has been submitted by AFCOL, with Member for Gippsland, Darren Chester, overseeing this process.

A further little known fact was revealed on the night - some of the marble in the Great Hall of Australia House in London was sourced from Buchan in 1914. At the spritely age of 92, the building is not much older than the world's greatest natural filmmaker himself.

Healthy flora and fauna off the coast of Mallacoota.

Inquisitive underwater friends that must be looked after.