



Australian Government



AUSTRALIAN INSTITUTE
OF MARINE SCIENCE

Facilitating genuine marine research partnerships with First Nations peoples

Presented by Bob Muir,

IP-team@aims.gov.au

ACKNOWLEDGEMENT

We acknowledge the Traditional Custodians and first Nations People of the land & seas on who's County where we are meeting today, and pay our respects to Elders past, present and future.

We honour their continuing culture, knowledge, beliefs and spiritual relationship and connection to Country.

We also recognise Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land and sea Country on which the Australian Institute of Marine Science works, and as Australia's first scientists.

Through collaboration and two-way knowledge sharing, we can learn from each other.



Presentation Overview

About Bob
–my journey

The AIMS
Indigenous
Partnerships
Approach
- What we do

Our work in
the Pacific
region



MY JOURNEY - BOB



Ros & Maddi



Beth & Robbi

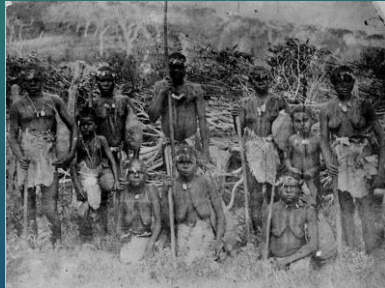
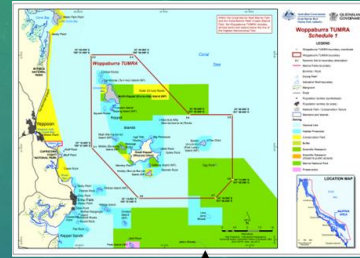


Robert & Skye



Danni & Talon

MY JOURNEY - BOB



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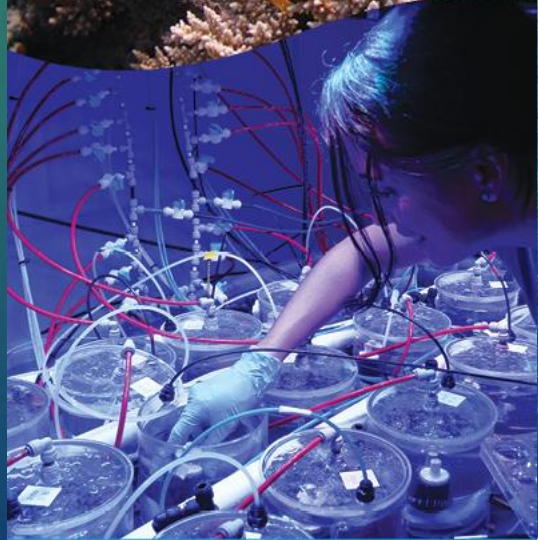
What is AIMS?

(Australian Institute of Marine Science)

- Australia's tropical marine science agency
- Australian government funded
- ~350 staff , 20 postdocs, 80 PhD students
- 3 sites: Townsville HQ; Perth; Darwin

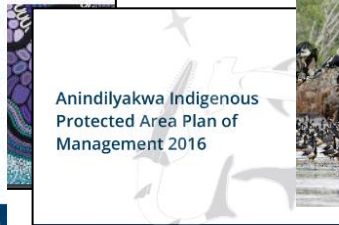
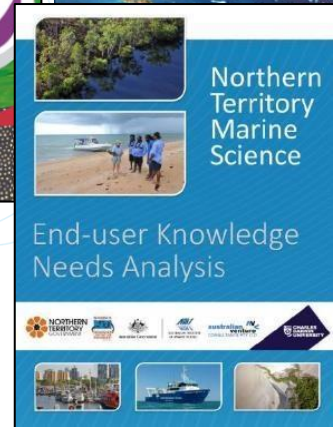
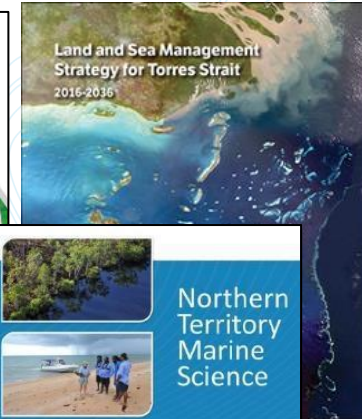
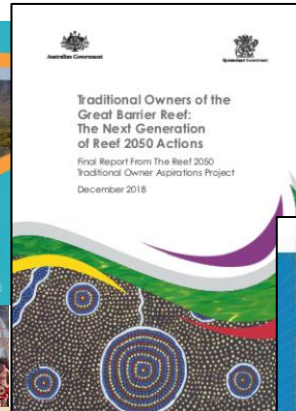
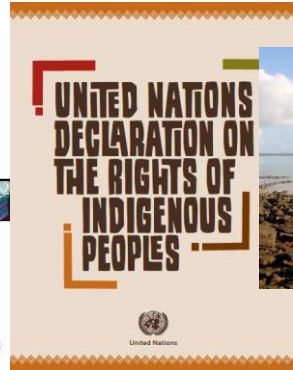
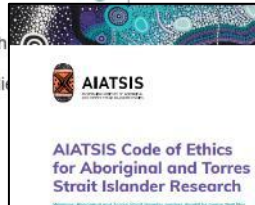
OUR MISSION

To provide the research and knowledge of Australia's tropical marine estate required to support growth in its sustainable use, effective environmental management and protection of its unique ecosystems.



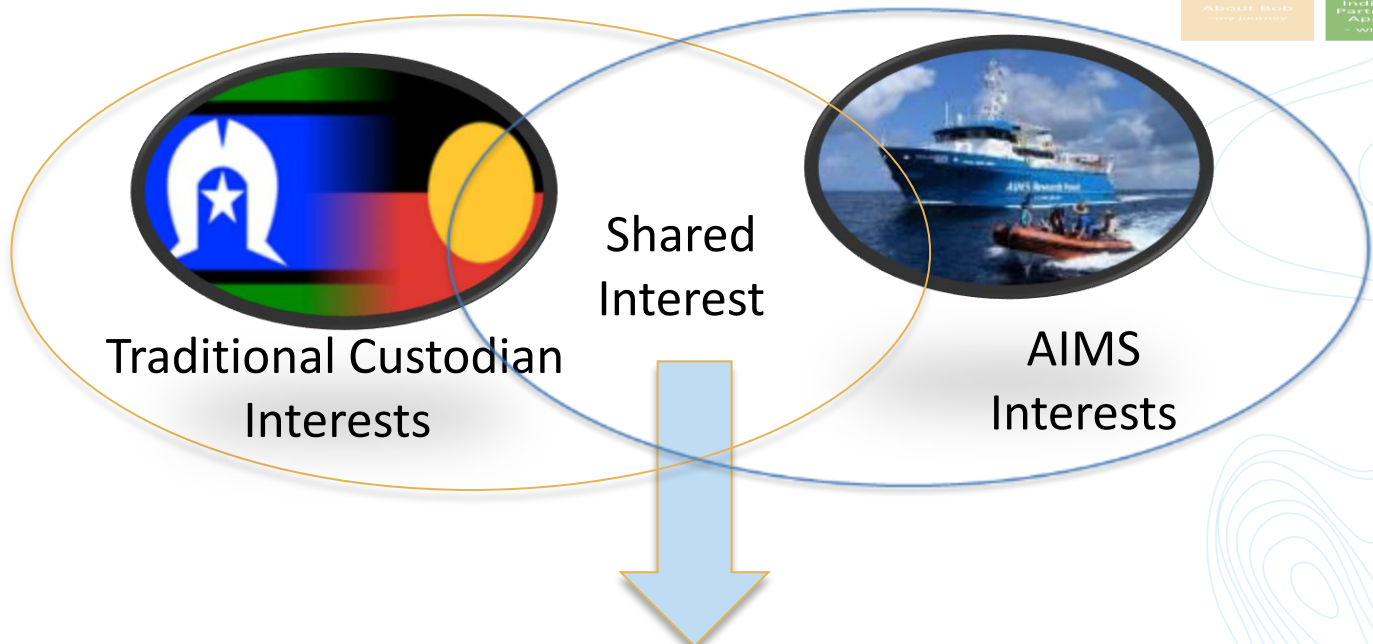
AIMS Indigenous Partnerships Plan & Policy

- Reviewed ethical guidelines (AIATSIS, UNDRIP)
- Found out about Traditional Custodians priorities in marine science
 - ✓ Read huge number of healthy country plans and regional syntheses
 - ✓ Asked Traditional Owners for input



Article 19

"States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their **free, prior and informed consent** before adopting and implementing legislative or administrative measures that may affect them."



The AIMS Indigenous Partnerships Plan & Policy

- Synergies in science, capability and capacity needs and priorities
- Respect and value Traditional Knowledge = western science
- Respect the principle of Free Prior Informed Consent (FPIC)
- Support TC's inherent rights and responsibilities for sea Country

COUNTRY (LAND AND SEA)

- **Country is not just the biophysical**
 - *The place to which a Traditional Custodians group is connected, encompassing all living, non-living, tangible and intangible elements and cultural obligations connected to that place.*
 - *Country is managed according to Lore (not just law).*
 - *Indigenous partnerships plan needs to do both.*



ENGAGEMENT TIERS APPLIED ACROSS AIMS RESEARCH





Libby Evans-Illidge



Carl Grant



Manuwuri Forester



Bob Muir



Davie Flagg



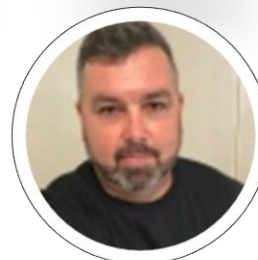
Jordan Ivey



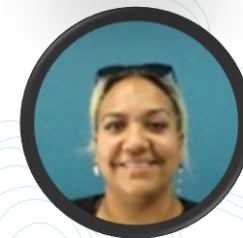
Shenade Muller



Dion Devow



Darin Gaw



Jamiga Cummins

Total 12.1FTE
Across 14 people

10
Aust.
Indig.



Martial
Depczynski



Katherine Cure



Vacant IPC

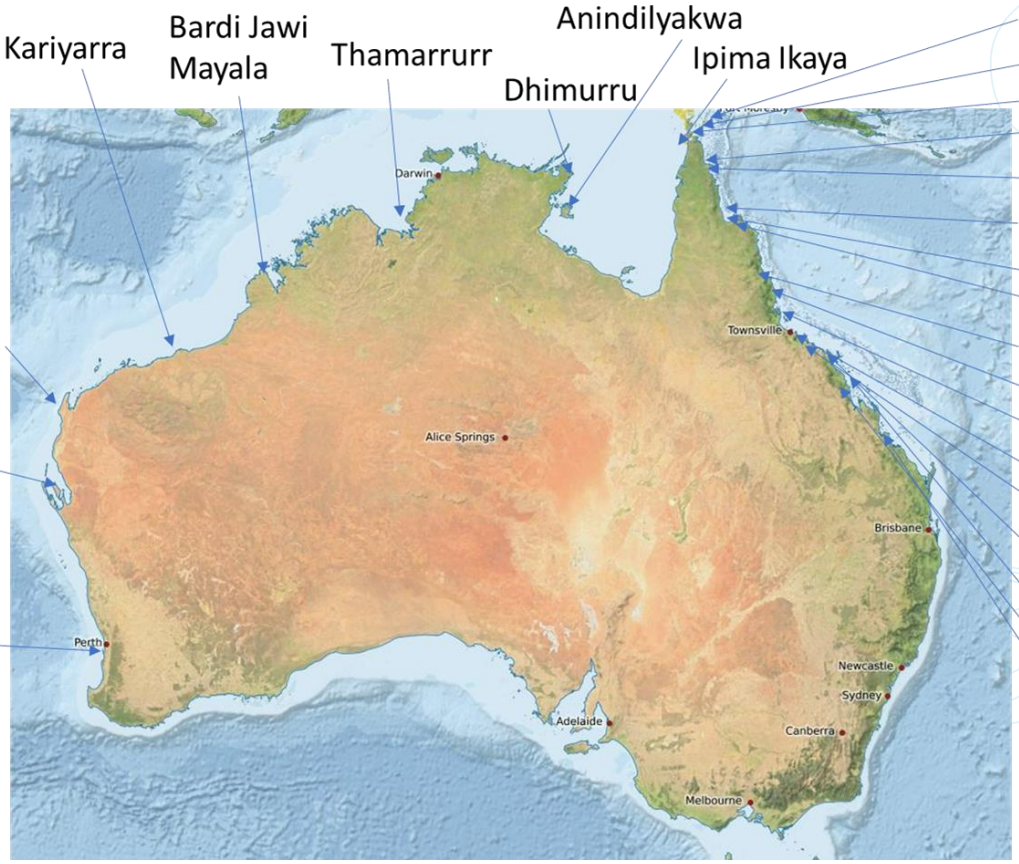


Vacant Indigenous
research scientists

Indigenous Engagement to date – 50 groups



Kariyarra
Bardi Jawi
Mayala
Thamarrurr
Anindilyakwa
Ipima Ikaya
Yamatji Marlpa
Malgana
Whadjuk Noongar



Eurub, Ugar, Mer
Masig
Warraber, Poruma, Iama
Wuthathi
Kuuku Ya'uu
Lama Lama
Cape Melville/Howick (x2)
Hopevale Congress (x7)
Eastern Kuku Yalanji
Gunggandji
Manbarra
Wulgurukaba
Bindal
Ngaro
Darumbal
Woppaburra
PCCC/Gidarjil (x4)

TRAINING AND CAPACITY BUILDING @ AIMS

About the
journey

The AIMS
Indigenous
Partnerships
Approach
- What we do

An example
of
partnership

Co-ordination	Indigenous training coordinator employed Mentorship (internal Indigenous staff group)
The Pipeline	School programs Paid undergraduate internships Graduate Program
Vocational training	4 x Cert III aquaculture trainees Ranger training – reef restoration methods
2-way learning	Traditional Owners involved in projects



The Woppaburra Coral Project

About the
Project

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An example
of
Indigenous
Partnerships

Australian Government



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- Not just about the science (5 year project)
- Bringing Woppaburra families together on Country (1st time for some)
- Co-design study sites and approach
- Training and capacity building in reef restoration methods
- 2-way sharing – knowledge and practices
- New cultural practices
 - A new Woppaburra coral dance
 - Cultural safety of biobanking



About Bob
–my journey

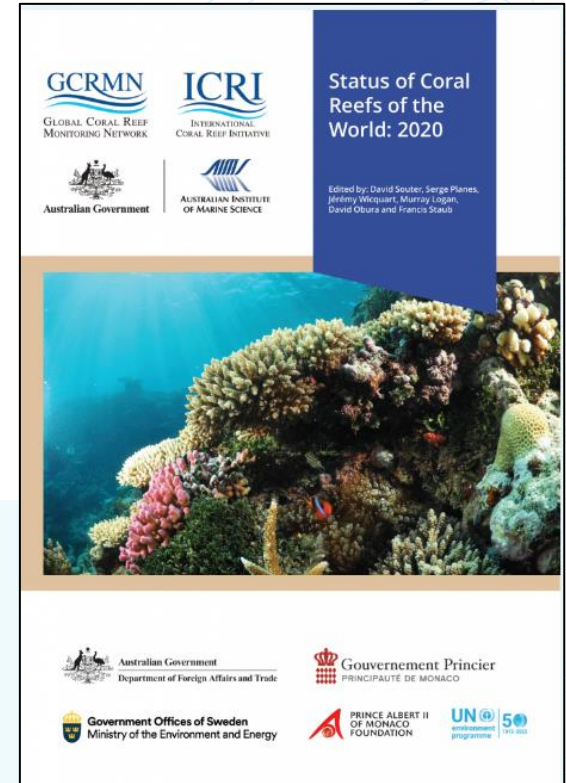
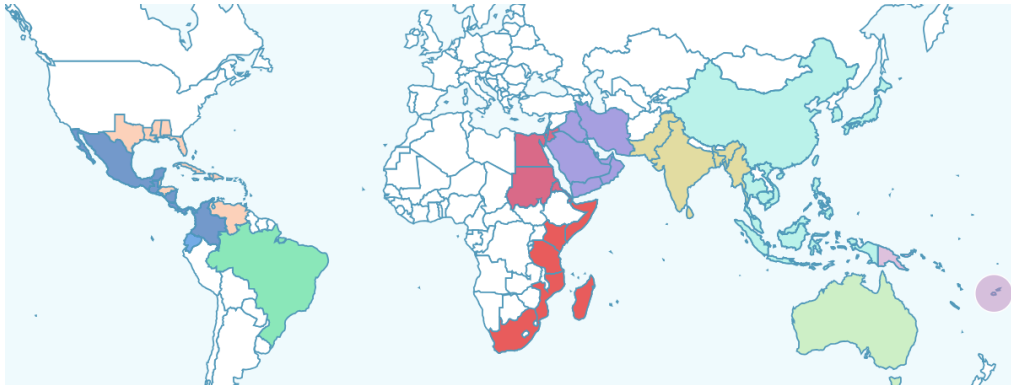
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region



GLOBAL CORAL REEF MONITORING NETWORK (ICRI)

- Monitoring is a core priority of reef sea Country managers and scientists (TOs, Gov, NGOs)
- Truly global community including 24 Pacific countries/territories
- 2020 report Status of Coral Reefs of the World 10 regions, 73 years of data, 300 contributors 2M Observations
- Coordinated by AIMS (DFAT funding)





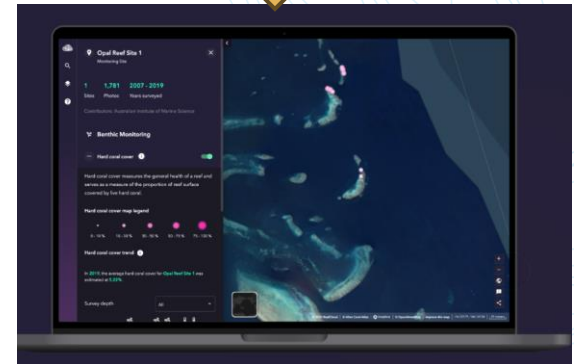
ReefCloud

Towards a global integration of coral reef monitoring



ReefCloud reefcloud.ai

- Joins human collaboration plus Artificial Intelligence (AI) using digital photography of reefs
- Allows the world's reef monitoring community to work together in real time
- Accessible to all - you don't have to be a coral scientist to take good photos
- Standardised methods – integrated monitoring
- The ReefCloud can:
 - Manage and store photo data
 - Analyse images with manual and AI tagging (humans teach the computer)
 - Automated analysis & reports
 - Image and data safety and access controls (data owners have complete control)



HOW DOES IT WORK? FOUR EASY STEPS

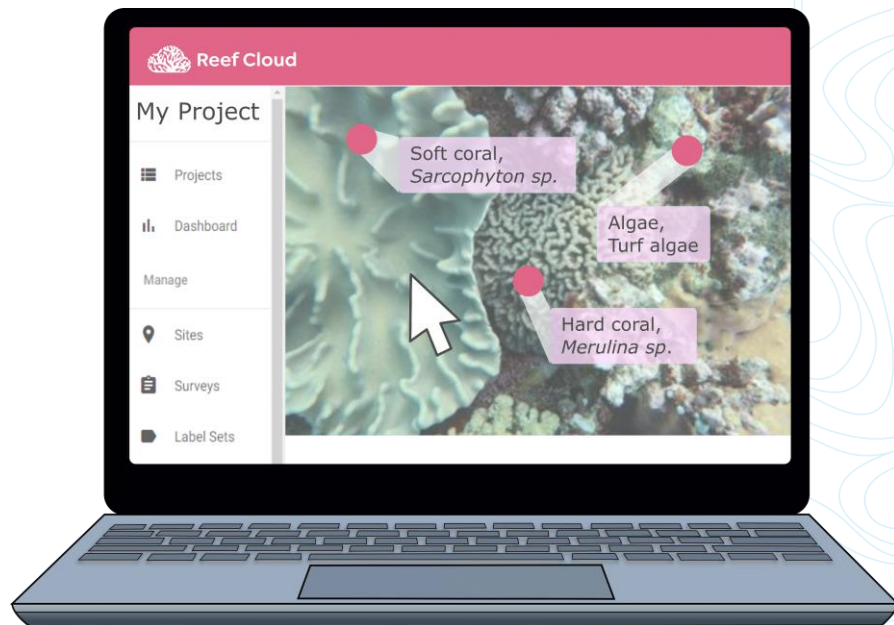
Step 1: Get Started

Create an account

Set up a project

Add users to your team

www.reefcloud.ai



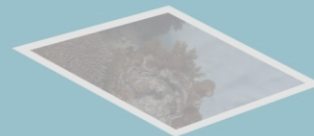
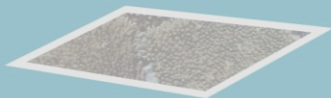
STEP 2

Collect photos

Add surveys to your sites

Upload images

Review your image collection



AIMS

Projects

Dashboard

Manage

Sites

Surveys

Label Sets

Users

Analyse

Image Library

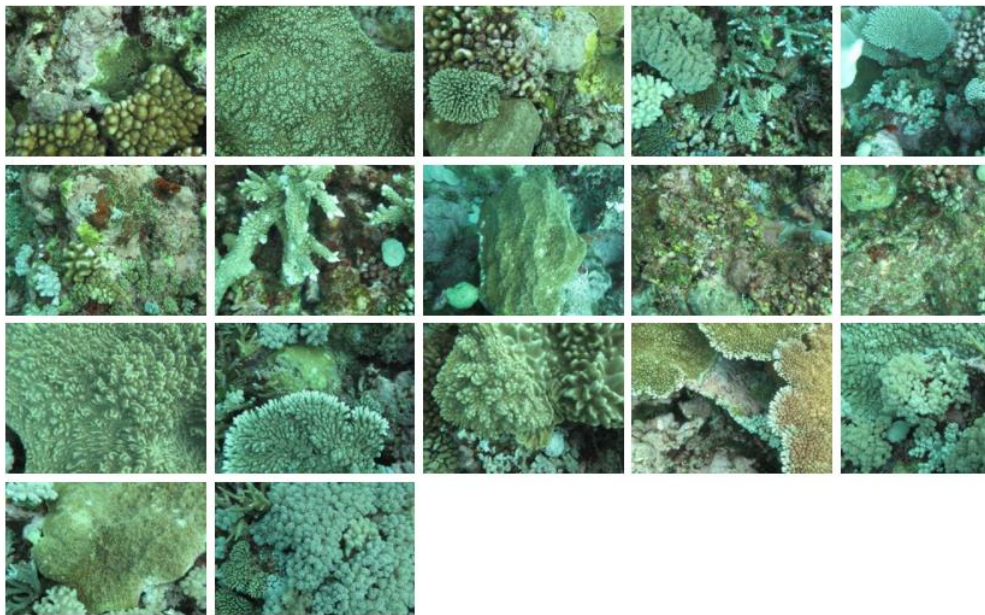
Classify Images

Model

Report

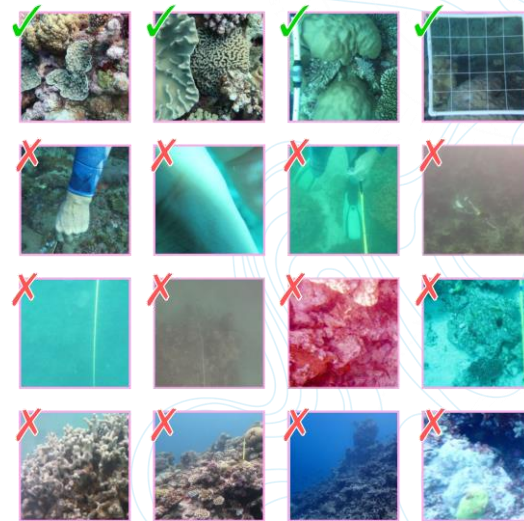
Collapse

Agincourt Reef No.1 Site 1 transect 1 2009-02-06



Items per page:

THEN UPLOAD YOUR PHOTOS AND REVIEW



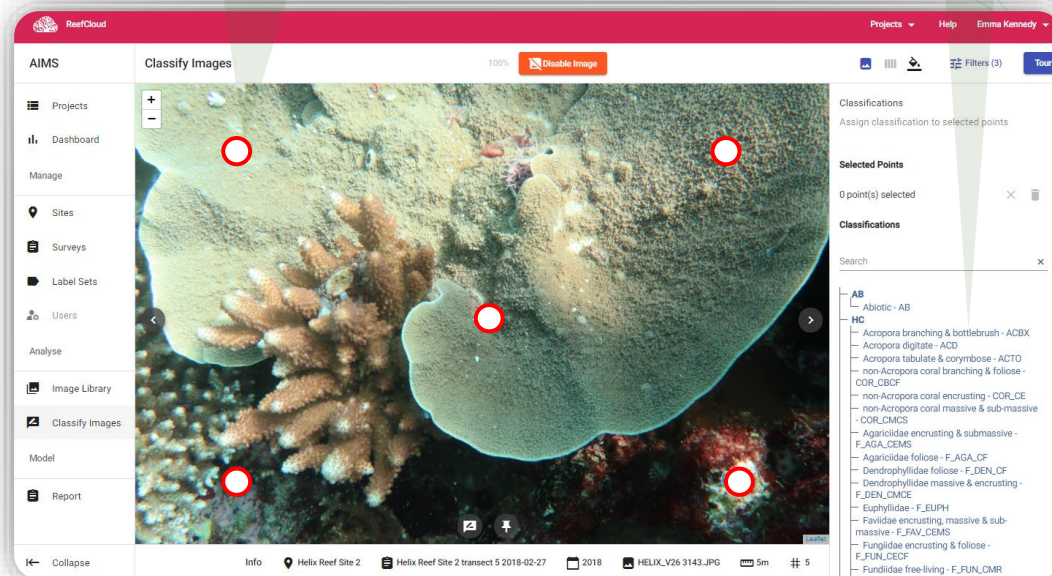
STEP 3

Train your Machine

- Analyse images
- Train AI algorithm
- Validate Results

Annotation points

Assign label



10-20% of points = enough

STEP 4: GET RESULTS

View and download your own results

The screenshot shows the ReefCloud interface. On the left is a navigation sidebar with options like Projects, Dashboard, Sites, Surveys, etc. The main dashboard area displays several key metrics: 309 Sites, 736,416 Images, 3,657,197 Human Annotatable Points, 75.1% classified, and 33,179,544 Transfer learning points, 99.9% classified. A central chart titled 'Hard Coral Cover' for 'Lady Musgrave Island Site 1' compares 'Machine' and 'Human' classification results from 2006 to 2017. A map on the right shows the site location with blue circular markers. Two yellow callout boxes point to 'Export point classifications' and 'Export point summary' buttons in the top right corner.

Year	Machine (%)	Human (%)
2006	78	78
2007	65	75
2008	15	15
2009	5	5
2010	2	2
2011	5	5
2012	8	8
2013	10	10
2014	35	35
2015	55	55
2016	65	65
2017	60	60

Download full dataset as a .csv

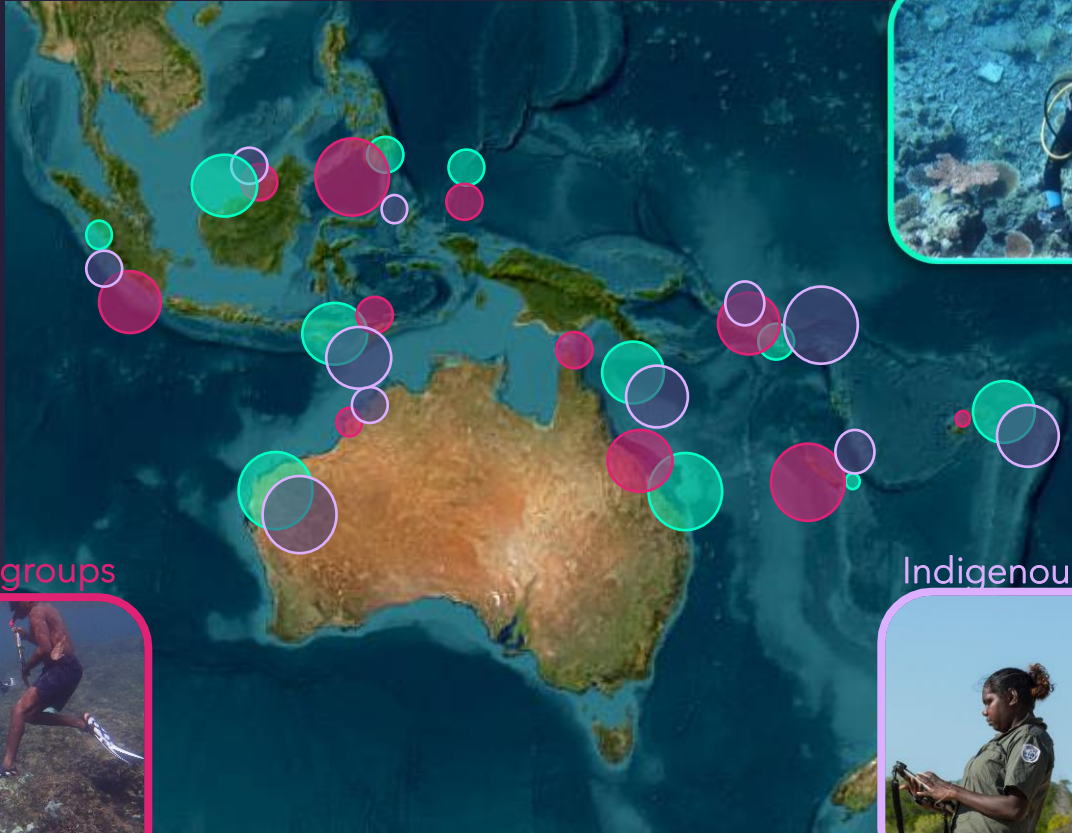
Explore summary data for each site



Technology to broaden participation

Currently:

- 4848 sites
- 2.5M photos
- 75 countries
- 1368 users



Coral reef scientists



Community groups



Indigenous scientists



ReefCloud is an ongoing team effort...

Collaborations

We partner with organizations that **enhance ReefCloud's capabilities and reach**. These partners include:

- Scientific Partners to test and modify ReefCloud's field utility
- Collaborators for communications and connections
- Technical Partners for scaling ReefCloud's functionality
- Funding Partners to sustain efforts to popularize and enhance ReefCloud

Our partners



People

Mat Wyatt
Mark Rehbein
David Crossman
Nader Boutros
Eric Lawrey
Murray Logan
Peran Bray
Kate Osborne
David Souter
Marji Puotinen
Ronen Galaiduk
Sangeeta Mangubhai (WCS)
Stacy Jupiter (WCS)
Yashika Nand (WCS)
Stuart Kininmonth (USP)
Helen Sykes (MEC)
Tedi Rengill (PICRC)
Yim Golbuu (PICRC)
Uly Olsudong (PICRC)
Christina Karanassos (PICRC)
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Amy Stringer (QUT)
David Warne (QUT)
Erin Peterson (QUT)
Kerrie Mengersen (QUT)
Jo Johnson (C2O Pacific)
Hana Amir (MMRI)
Nizam Ibrahim (MMRI)
Melanie Angerer (Accenture)
Dan Baker (Fjord)
Chloe Kim (Fjord)

Reef Monitoring in the Pacific

- AIMS, Samoan Government, and First Nations peoples from Samoa, PNG (Sea Women of Melanesia) and Australia (Gidarjil Development Corporation). Also CI and SPREP.
- Combining TEK and Western Science knowledge and methods
- Field work, knowledge sharing workshops in both Australia and Samoa
- Deliver to the Pacific Coral Reef Action Plan
- Integration of monitoring; building capabilities; incorporation of TEK





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AIMS: Australia's tropical marine research agency.

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Thankyou

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