



Pacific Islands Fisheries Science Center
NOAA National Marine Fisheries Service

Massive-Scale Online Collaboration

Benjamin L. Richards
NOAA Pacific Islands Fisheries Science Center



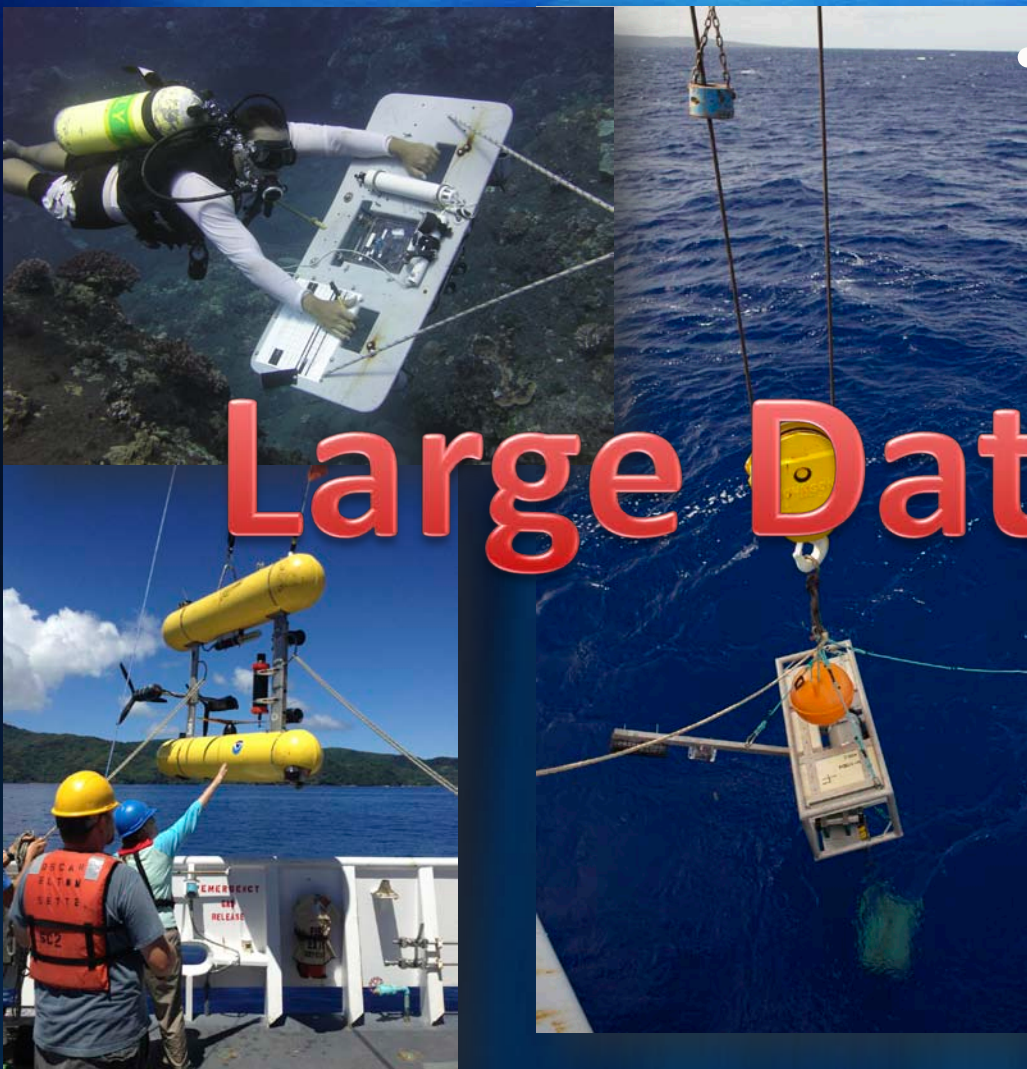


Advanced Technologies

Large Data Sets

- **Benefits**

- Increase stock assessment efficiencies
- More accurate, precise, and synoptic
- Increase temporal and spatial survey coverage
- Reduced measurement/calibration errors
- Fishery-Independent
- Non-extractive
- Deployable from vessels of opportunity

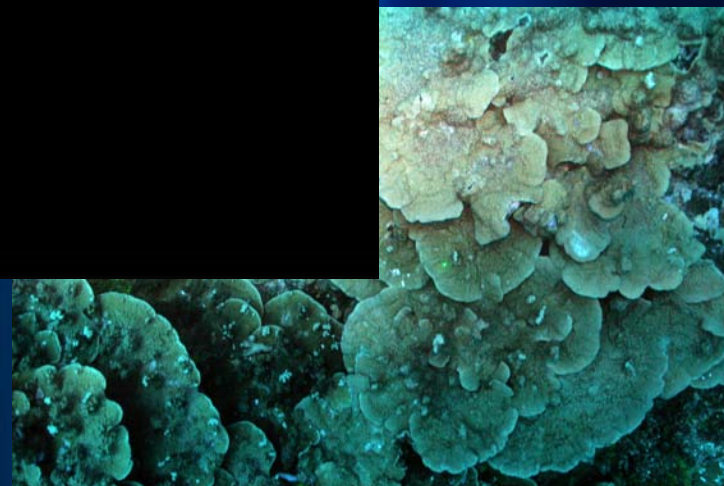
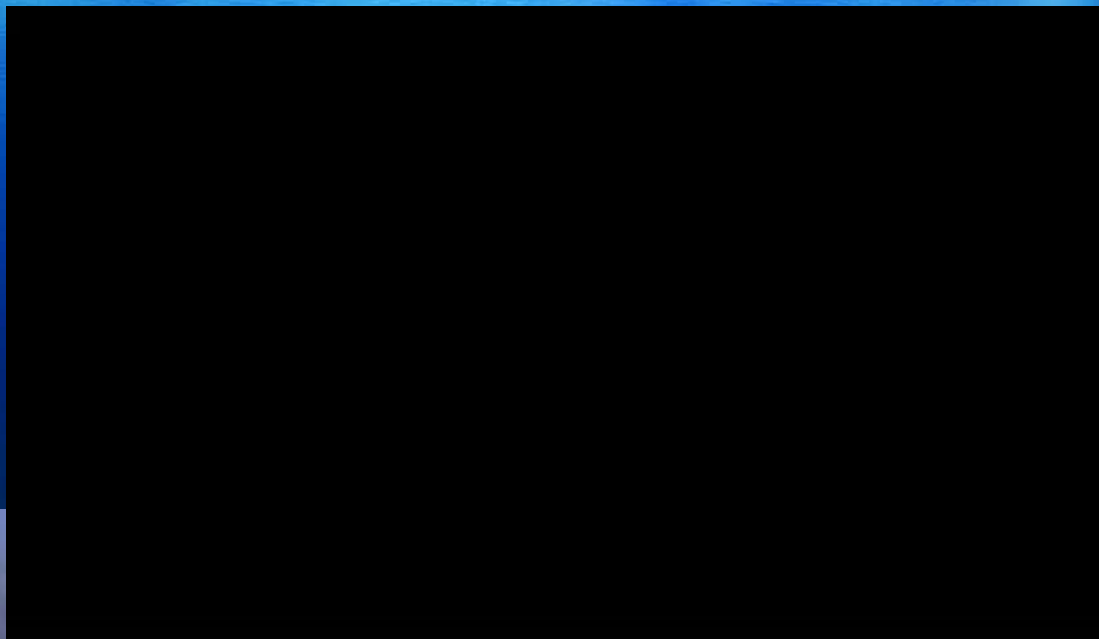




Pacific Islands Fisheries Science Center

NOAA National Marine Fisheries Service

Towed-Diver Surveys



2,300 hours of video – 250 new hours per year
558,000 benthic images - 60,000 new per year



Pacific Islands Fisheries Science Center

NOAA National Marine Fisheries Service

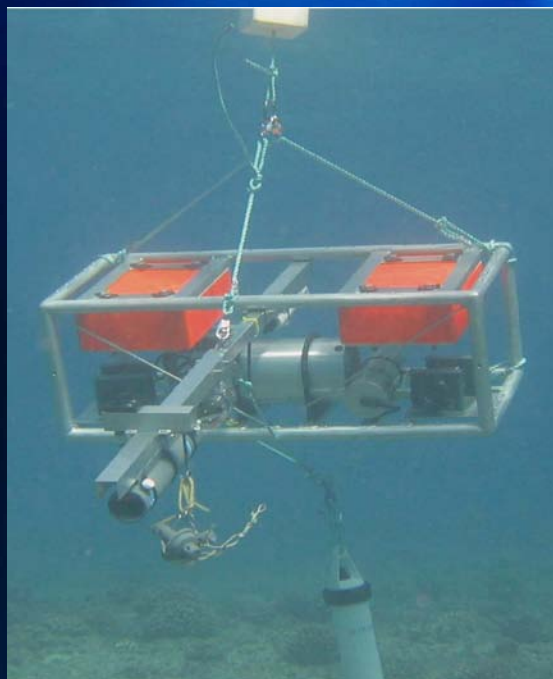
BRUVS



5,000 hours of video – 1200 new hours per year



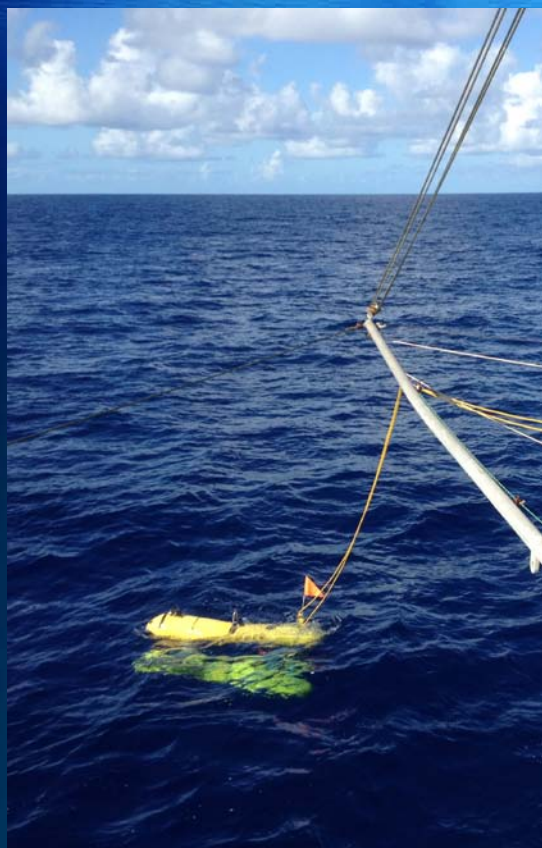
BotCam



1,000 hours of video – 200 new hours per year



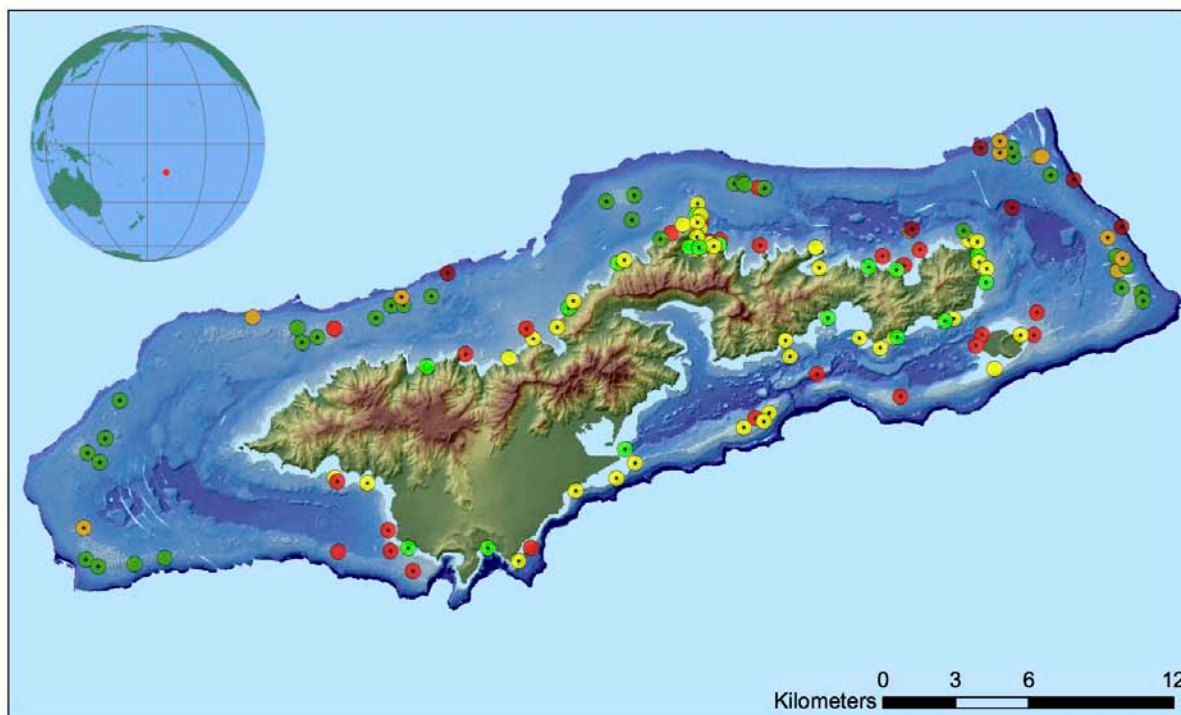
SeaBed



80 hours of video – 80 new hours per year
250,000 benthic images – 100,000 new per year



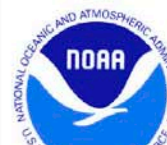
American Samoa 2012



- 138 BRUVS stations
 - 350 hours of video
- 17 AUV Dives
 - 78 hours of video
 - 53,000 images
- 33 Towed Diver Surveys
 - 27 hours of video
 - 6,600 images

SE1202:
BRUVS Sampling
Comparison of Fishery-Independent
Methods for Sampling Coral Reef Fish
Coordinate System: WGS1984 UTM2S
Map Created (2012) by Benjamin Richards (benjamin.richards@noaa.gov)

BRUVS Samples	
Depth_zone, Samples	
● 0-6m, Unbaited	● 18-30m, Baited & Unbaited
● 0-6m, Baited & Unbaited	● 30-53m, Unbaited
● 06-18m, Unbaited	● 30-53m, Baited & Unbaited
● 06-18m, Baited & Unbaited	● 53-76m, Unbaited
● 18-30m, Unbaited	● 53-76m, Baited & Unbaited
	● 76-100m, Baited & Unbaited





Processing?

- Benthic Image analysis
 - \$10 per hour
 - 90 sec per image
 - 4 hours per day
 - Towed-Diver image backlog: \$279,000.00
 - AUV image backlog: \$100,000.00
 - \$80k annually
- Process Subsets

Sign up - Windows Live - Windows Internet Explorer

https://signup.live.com/signup.aspx?ru=http%3a%2f%2fmail.live.com%2f%3fru%3dinbox&wa=wsignin1.0&rpsnv=11&ct=1272967204&rver=6.0.5285.0&wp: Live Search

Hotmail Email Generator - ... TIS's Office Sign up - Windows Live

Windows Live

Create your Windows Live ID

It gets you into all Windows Live services—and other places you see
All information is required.

i Already using **Hotmail, Messenger, or Xbox LIVE?** Sign in now

Windows Live ID: @ **hotmail.com**

Create a password:
6-character minimum; case sensitive

Retype password:

Alternate e-mail address:

[Or choose a security question for password reset](#)

First name:

Last name:


Country/region: **Australia**

State/Territory: **Select one**

Postal Code:

Gender: Male Female

Birth year: Example: 1990



This helps us prevent automated programs from creating accounts and sending spam. [Get help with this.](#)

Characters:

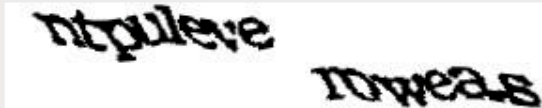
Send me e-mail with promotional offers and survey invitations from Windows Live, Bing, and MSN. (You can unsubscribe at any time.)

Clicking **I accept** means that you agree to the [Microsoft service agreement](#) and [privacy statement](#).

© 2010 Microsoft | [Privacy](#) | [Legal](#) [Help Central](#) | [Account](#) | [Feedback](#)

- 200 million CAPTCHAS per day
 - 10 seconds per CAPTCHA
 - 500,000 human hours

Security Check



- New Words
- Vision Impaired
- Help

Please type both words separated by a space:

You are forbidden to access this site using an automated program.

Continue

Security Check provided by reCAPTCHA.
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The Security Check allows us to:

Ensure Fair Access to Tickets

Automated programs known as "Bots" cannot read distorted text as well as humans. The Security Check helps prevent automated programs from blocking other customers from getting tickets.

Digitize Books One Word at a Time

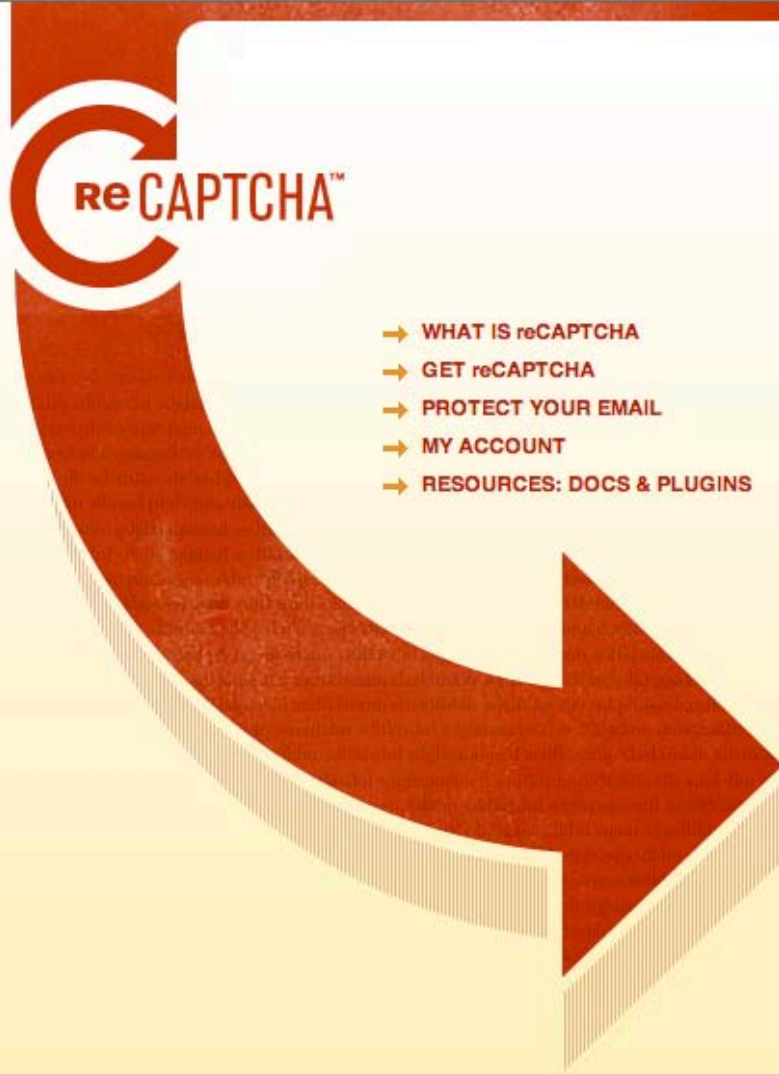
By entering the words in the box, you are also helping to digitize books from the Internet Archive and preserve literature that was written before the computer age.

Provide an Audio Option for Visually Impaired Customers

An audio option allows visually impaired customers to hear words/numbers that can be entered instead of the visual challenge.

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reCAPTCHA IS A FREE ANTI-BOT SERVICE THAT HELPS DIGITIZE BOOKS.

steamboat train, from New
this **morning** ran off the track
New-London. Four cars plunged



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- 🔒 STRONG SECURITY
- 🔊 ACCESSIBLE TO BLIND USERS
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- 200 million CAPTCHAS typed per day
- 10 seconds per CAPTCHA
- 500,000 human hours

- = 100 million words per day
- = 2.5 million books per year


[Pictures](#)

Welcome to Galaxy Zoo, where you can help astronomers explore the Universe

Galaxy Zoo: Hubble uses gorgeous imagery of hundreds of thousands of galaxies drawn from NASA's Hubble Space Telescope archive. To understand how these galaxies, and our own, formed we need your help to classify them according to their shapes — a task at which your brain is better than even the most advanced computer. If you're quick, you may even be the first person in history to see each of the galaxies you're asked to classify.

More than 250,000 people have taken part in Galaxy Zoo so far, producing a wealth of valuable data and sending telescopes on Earth and in space chasing after their discoveries. The images used in Galaxy Zoo: Hubble are more detailed and beautiful than ever, and will allow us to look deeper into the Universe than ever before. To begin exploring, click the 'How To Take Part' link above, or read [The Story So Far](#) to find out what Galaxy Zoo has achieved to date.

Thanks for your help, and happy classifying.

The Galaxy Zoo team.

Classifier Log In

[Click here to log in](#)

- ✘ [Register](#)
- ✘ [Forgotten Password?](#)

Explore galaxies

Latest News

Voorwerpje paper submitted

by The Zooniverse - Jul 25, 2011

Bill has written an excellent post about the Voorwerpje, or small Voorwerp, hunt over on the main Zooniverse blog. You should ...

- ✘ [Lens Zoo is Coming!](#)
- ✘ [Visualizing FITS Images In Browser](#)
- ✘ [New Features Coming to Galaxy Zoo](#)
- ✘ [Voorwerpje paper submitted](#)



[+ Invert galaxy image](#)

[+ Add to my favourites](#)

Classify galaxies

Answer the question below using the buttons provided.

Is the galaxy simply smooth and rounded, with no sign of a disk?



Smooth



Features or disk



Star or artifact



[+ Invert galaxy image](#)

[+ Add to my favourites](#)

Classify galaxies

Answer the question below using the buttons provided.

Is there any sign of a spiral arm pattern?



Spiral



No spiral

[Restart classification](#)

GALAXY ZOO

HUBBLE

[Home](#) [How To Take Part](#) [My Galaxies](#) [Contact Us](#)

[Profile](#) [Logout](#)



[+ Invert galaxy image](#)

[+ Add to my favourites](#)

Classify galaxies

Answer the question below using the buttons provided.

How many spiral arms are there?



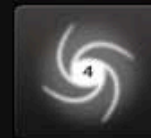
1



2



3



4



More than 4



Can't tell

[Restart classification](#)



[+ Invert galaxy image](#)

[+ Add to my favourites](#)

Classify galaxies

Answer the question below using the buttons provided.

Is there anything odd?

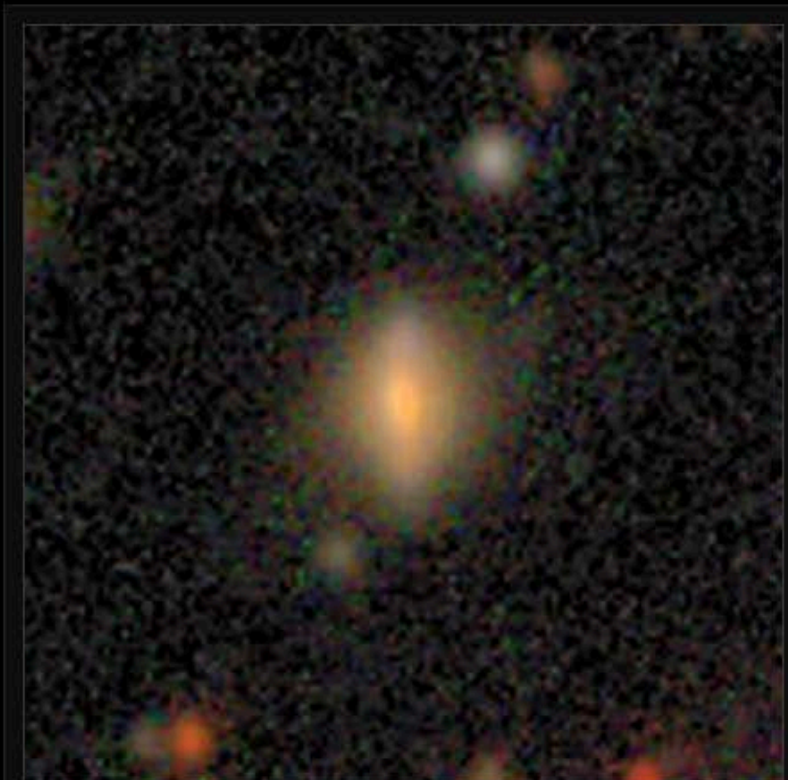


Yes



No

[Restart classification](#)



[+ Invert galaxy image](#)

[+ Add to my favourites](#)

Classify galaxies

Answer the question below using the buttons provided.

Is the galaxy simply smooth and rounded, with no sign of a disk?



Smooth



Features or disk



Star or artifact

- Launched July 2007
- 1 million images
- 1st hour: 70,000 classifications
- 1st year: 150,000 volunteers
- 1st year: 50 million classifications

MOON ZOO

Play

Craters
Boulder Wars
My Moon Zoo
Live!

About

Explore Moon
Glossary
Tutorials
FAQ

Community

Forum
Blog
Moonometer
Log Out

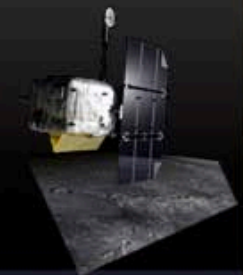


Welcome to the Moon

With your help, we hope to study the lunar surface in unprecedented detail. Thanks to the help of the Moon Zoo community we have already visually classified 3,136,366 images from NASA's Lunar Reconnaissance Orbiter (LRO). Read more [about the LRO and Moon Zoo](#) or learn [how to take part](#)

EXPLORE THE MOON

LUNAR
RECONNAISSANCE
ORBITER



LAUNCH

MOON ZOO

- Play
 - Craters
 - Boulder Wars
 - My Moon Zoo
 - Live!
- About
 - Explore Moon
 - Glossary
 - Tutorials
 - FAQ
- Community
 - Forum
 - Blog
 - Moonometer
 - Log Out

Crater Survey

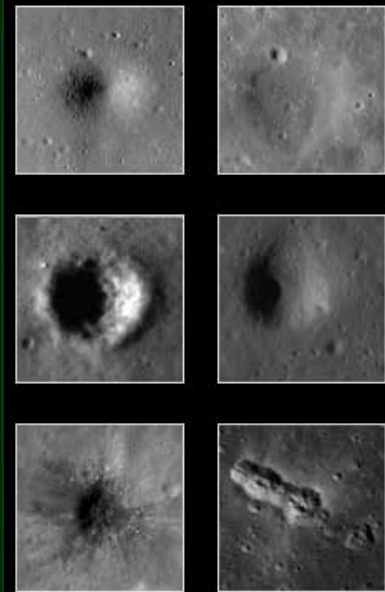


HIDE ALL

 HIDE CURRENT

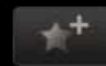
 SUBMIT

Examples



Illumination
 Crater
 Mound

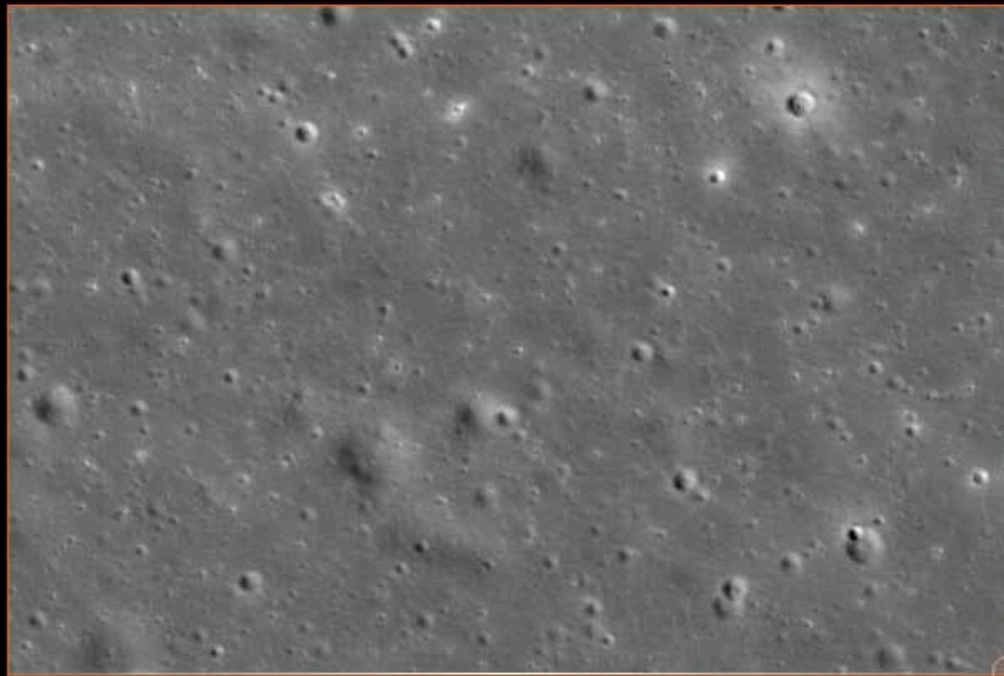
Empty text input field for user comments or notes.



MOON ZOO

- Play**
 - Craters
 - Boulder Wars
 - My Moon Zoo
 - Live!
- About**
 - Explore Moon
 - Glossary
 - Tutorials
 - FAQ
- Community**
 - Forum
 - Blog
 - Moonometer
 - Log Out**

Crater Survey



HIDE ALL



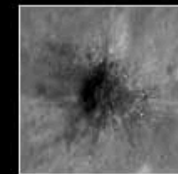
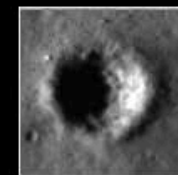
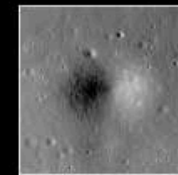
HIDE CURRENT



SUBMIT



Examples



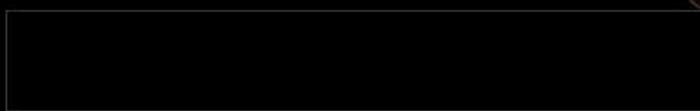
Illumination



Crater



Mound



- Launched May 2010
- 350,000 volunteers
- 3 million image classifications

HMS Mutine
Active: West Indies

81% COMPLETE

bpb42 is the Captain and 297 volunteers are following this vessel

Jump Aboard

Map data ©2012 Google - Terms of Use

Old Weather: Our Weather's Past, the Climate's Future

Introduction

Help scientists recover worldwide weather observations made by Royal Navy ships around the time of World War I. These transcriptions will contribute to climate model projections and improve a database of weather extremes. Historians will use your work to track past ship movements and the stories of the people on board.



1. Follow vessels



2. Digitise pages



3. Get promoted

Project Statistics

Old Weather transcriptions so far

27,636 VOLUNTEER TRANSCRIBERS

1,009,984 PAGES DONE
273 SHIPS COMPLETE

**Cadet benjamin.richards**

0 weather reports on 0 pages contributed to this voyage. 30 weather reports more for promotion to Lieutenant

1. DATE

2. LOCATION

3. WEATHER

4. OTHER

5. FINISH

H.M.S. "Mutine", Sunday 22 nd day of May, 1921.												
Time	Patent Log	Miles	Tide	Distance from port	Wind	Weather	Height of Barometer and attached Thermometer	Temperature	Position	Latitude	Longitude	REMARKS
1100	No Steam	6.3	83°	100					0100	16 57.4	54 07.4	0100 Admired about 15 minutes
1200	a	4.7	"	"					0200	16 50.0	54 08.0	0200 Emerged from bank
1300	4	6.3	"	"					0300	16 50.0	54 08.0	0300 Emerged from bank
1400	Revolving mud	6.3	"	"	ENE 2	6	30.07	92.77	0400	16 50.0	54 08.0	0400 Emerged from bank
1500	"	6.3	"	"	ENE 2	6	30.05	92.77	0500	16 50.0	54 08.0	0500 Emerged from bank
1600	"	6.3	"	"	ENE 2	6	30.05	92.77	0600	16 50.0	54 08.0	0600 Emerged from bank
1700	"	6.3	"	"	ENE 2	6	30.05	92.77	0700	16 50.0	54 08.0	0700 Emerged from bank
1800	"	6.3	"	"	ENE 2	6	30.05	92.77	0800	16 50.0	54 08.0	0800 Emerged from bank
1900	"	6.3	"	"	ENE 2	6	30.05	92.77	0900	16 50.0	54 08.0	0900 Emerged from bank
2000	"	6.3	"	"	ENE 2	6	30.05	92.77	1000	16 50.0	54 08.0	1000 Emerged from bank
2100	"	6.3	"	"	ENE 2	6	30.05	92.77	1100	16 50.0	54 08.0	1100 Emerged from bank
2200	"	6.3	"	"	ENE 2	6	30.05	92.77	1200	16 50.0	54 08.0	1200 Emerged from bank
2300	"	6.3	"	"	ENE 2	6	30.05	92.77	1300	16 50.0	54 08.0	1300 Emerged from bank
2400	"	6.3	"	"	ENE 2	6	30.05	92.77	1400	16 50.0	54 08.0	1400 Emerged from bank
2500	"	6.3	"	"	ENE 2	6	30.05	92.77	1500	16 50.0	54 08.0	1500 Emerged from bank
2600	"	6.3	"	"	ENE 2	6	30.05	92.77	1600	16 50.0	54 08.0	1600 Emerged from bank
2700	"	6.3	"	"	ENE 2	6	30.05	92.77	1700	16 50.0	54 08.0	1700 Emerged from bank
2800	"	6.3	"	"	ENE 2	6	30.05	92.77	1800	16 50.0	54 08.0	1800 Emerged from bank
2900	"	6.3	"	"	ENE 2	6	30.05	92.77	1900	16 50.0	54 08.0	1900 Emerged from bank
3000	"	6.3	"	"	ENE 2	6	30.05	92.77	2000	16 50.0	54 08.0	2000 Emerged from bank

HMS Mutine

Active: West Indies

Depot Ship - [Learn more](#)**Map and timeline**

DATE

POSITION

I've finished with this page

Logbooks

Royal Navy logbooks are available for public viewing at The National Archives and the National Maritime Museum. Follow the links below to find out more.

[National Archives ADM53](#)

oldWeather

VESSELS **TUTORIAL** **TRANSCRIBE** **ABOUT** **BLOG** **FORUM** **benjamin.richards**

HOME

★ **Cadet benjamin.richards**
 0 weather reports on 0 pages contributed to this voyage. 30 weather reports more for promotion to Lieutenant

HMS Mutine

Active: West Indies



- 1. DATE
- 2. LOCATION
- 3. WEATHER
- 4. OTHER
- 5. FINISH

Enter the vessel's location [Show help](#)

Date	Location	Weather	Event
Lat	Long	Port	
16 57'2 N	84 07'W	or	<input style="width: 100px;" type="text"/>
		OK	

Time	Part	Lat	Long	Wind	Barometer	Therm	Humid	State of Sky	Remarks
1100	No. 1	6 3	85° 100						0100. Advanc'd chds 16 miles
1200	Shroud	6 3							0200. Emerg'd. Soud. chds 100
1300	2	6 3							0300. Emerg'd. chds 100
1400	3	6 3		E 1/2 E	30.07	76.77			0400. Emerg'd. chds 100
1500	4	6 3			30.07	76.77			0500. Emerg'd. chds 100
1600	5	6 3							0600. Emerg'd. chds 100
1700	6	6 3							0700. Emerg'd. chds 100
1800	7	6 3		4 1/2 N	30.13	77.78			0800. Duvors - Road Frigate
1900	8	6 3							
2000	9	6 3							
2100	10	6 3							
2200	11	6 3							

Timeline

DATE: 22/5/1922

I've finished with this page

Logbooks

Royal Navy logbooks are available for public viewing at The National Archives and the National Maritime Museum. Follow the links below to find out more.

[National Archives ADM53](#)

★ **Cadet benjamin.richards**
 0 weather reports on 0 pages contributed to this voyage. 30 weather reports more for promotion to Lieutenant

1. DATE 2. LOCATION 3. WEATHER 4. OTHER 5. FINISH

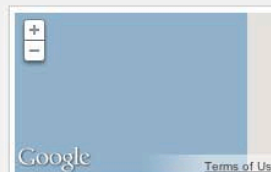
HMS Mutine

Active: West Indies



Depot Ship - [Learn more](#)

Map and timeline



DATE: 22/5/1922
 POSITION: lat:16 57'2 N lng:84 07W

I've finished with this page

Logbooks

Royal Navy logbooks are available for public viewing at The National Archives and the National Maritime Museum. Follow the links below to find out more.

[National Archives ADM53](#)

H.M.S. "Mutine", Sunday 22nd day of May, 1922.

Time	Direction	Force	Code	Heights	air	bulb	sea	Other
1100	ENE	2	b	30.0 / 82.5	80	76	78	0325
1200	ENE	2	b	30.07 / 82.5	90	76	78	
1300	ENE	2	b	30.07 / 82.5	90	76	78	
1400	ENE	2	b	30.07 / 82.5	90	76	78	
1500	ENE	2	b	30.07 / 82.5	90	76	78	
1600	ENE	2	b	30.07 / 82.5	90	76	78	
1700	ENE	2	b	30.07 / 82.5	90	76	78	
1800	ENE	2	b	30.07 / 82.5	90	76	78	



Cadet benjamin.richards

0 weather reports on 0 pages contributed to this voyage. 30 weather reports more for promotion to Lieutenant

1. DATE

2. LOCATION

3. WEATHER

4. OTHER

5. FINISH

H.M.S. "Mutine", Sunday 22nd day of May, 1921.

Time	Wind Dir Force	Baromet Pres	Temp Air	Temp Surf	Temp Wind	Temp Wet Bulb	Temp Dew	Position Long	Latitude	Remarks
0100	NE	30.0	83	100				0150	Admiral's cabin 15 miles	
0200	NE	30.0	83	100				0200	Admiral's cabin 15 miles	
0300	NE	30.0	83	100				0300	Admiral's cabin 15 miles	
0400	NE	30.0	83	100				0400	Admiral's cabin 15 miles	
0500	NE	30.0	83	100				0500	Admiral's cabin 15 miles	
0600	NE	30.0	83	100				0600	Admiral's cabin 15 miles	
0700	NE	30.0	83	100				0700	Admiral's cabin 15 miles	
0800	NE	30.0	83	100				0800	Admiral's cabin 15 miles	
0900	NE	30.0	83	100				0900	Admiral's cabin 15 miles	
1000	NE	30.0	83	100				1000	Admiral's cabin 15 miles	
1100	NE	30.0	83	100				1100	Admiral's cabin 15 miles	
1200	NE	30.0	83	100				1200	Admiral's cabin 15 miles	
1300	NE	30.0	83	100				1300	Admiral's cabin 15 miles	
1400	NE	30.0	83	100				1400	Admiral's cabin 15 miles	
1500	NE	30.0	83	100				1500	Admiral's cabin 15 miles	
1600	NE	30.0	83	100				1600	Admiral's cabin 15 miles	
1700	NE	30.0	83	100				1700	Admiral's cabin 15 miles	
1800	NE	30.0	83	100				1800	Admiral's cabin 15 miles	
1900	NE	30.0	83	100				1900	Admiral's cabin 15 miles	
2000	NE	30.0	83	100				2000	Admiral's cabin 15 miles	
2100	NE	30.0	83	100				2100	Admiral's cabin 15 miles	
2200	NE	30.0	83	100				2200	Admiral's cabin 15 miles	

Remarks: 0150 Admiral's cabin 15 miles. 0200 Admiral's cabin 15 miles. 0300 Admiral's cabin 15 miles. 0400 Admiral's cabin 15 miles. 0500 Admiral's cabin 15 miles. 0600 Admiral's cabin 15 miles. 0700 Admiral's cabin 15 miles. 0800 Admiral's cabin 15 miles. 0900 Admiral's cabin 15 miles. 1000 Admiral's cabin 15 miles. 1100 Admiral's cabin 15 miles. 1200 Admiral's cabin 15 miles. 1300 Admiral's cabin 15 miles. 1400 Admiral's cabin 15 miles. 1500 Admiral's cabin 15 miles. 1600 Admiral's cabin 15 miles. 1700 Admiral's cabin 15 miles. 1800 Admiral's cabin 15 miles. 1900 Admiral's cabin 15 miles. 2000 Admiral's cabin 15 miles. 2100 Admiral's cabin 15 miles. 2200 Admiral's cabin 15 miles.

HMS Mutine

Active: West Indies

Depot Ship - [Learn more](#)

Map and timeline



DATE

22/5/1922

POSITION

lat:16 57' 2" N lng:84 07' W

	80 °F	76 °F	78 °F
	AIR	BULB	WATER
	82 °F	77 °F	78 °F
	AIR	BULB	WATER
	84 °F	78 °F	80 °F
	AIR	BULB	WATER

I've finished with this page

Logbooks

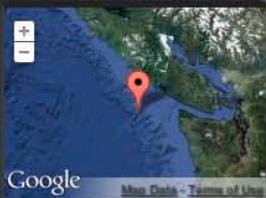
Royal Navy logbooks are available for public viewing at The National Archives and the National Maritime Museum. Follow the links below to find out more.

[National Archives ADM53](#)

- Launched October 2010
- 27,637 volunteers
- 274 ships complete
- 1,010,186 pages transcribed
- 33,000 human hours

Digital Fishers

Mobile Dive Camera Depth: 570m
 Latitude: 48.3490
 Longitude: -126.1484



Date: 27-Jun-2008 07:52:39

Share this: [Social media icons]

2008-06-27 07:52:54
 N4820.9365 W12608.9122 0571 2712



Replay Next Clip Random

Sealife:	Presence	Comment:
Water:	Clear	Presence
Seafloor:	Flat	Absence
Objects:	Absence	Trawl Marks
		No comment

Annotation

Level

Level 1 Next card in 2 annotations.

Level 2

Level 3

Level 4

Level 5

View My Cards

My Status

Level: 1
 Total Annotations: 0
 Today's Annotations: 0

Digital Fishers Leaders

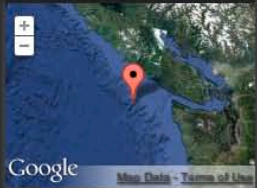
All Time Today

Name: Harold Smith
 Level: 5
 Total Annotations: 12592

About Us | Current Mission

Digital Fishers

Mobile Dive Camera
Depth: 570m
Latitude: 48.3490
Longitude: -126.1484



Date: 27-Jun-2008 07:52:39

Share this: [Facebook] [Twitter] [Google+] [LinkedIn] [YouTube]

2008-06-27 07:52:54
N4820.9365 W12608.9122 0571 2712



Replay Next Clip Random

[How to Play](#) | [Level 1 Tutorial](#)

Sealife:	Presence	Comment:	
Water:	Clear		
Seafloor:	Flat		
Objects:	Absence		

Save Annotation

Clear Selections

Level

Level 1
Next card in 2 annotations.

Level 2

Level 3

Level 4

Level 5

[View My Cards](#)

My Status

Level: 1
Total Annotations: 0
Today's Annotations: 0

Digital Fishers Leaders

All Time Today

Name: Harold Smith
Level: 5
Total Annotations: 12592

[About Us](#) | [Current Mission](#)

Video material copyright: CSSF-ROPOS/ONC

- Launched December 2011
- 34 hours of video
 - 8280 15-sec clips
- 550 volunteers
- 52,000 annotations



Benthic Habitat

The image shows a close-up view of a benthic habitat, likely a coral reef. The habitat is characterized by large, flat, light-colored coral plates and smaller, more complex structures. Numerous green circular markers with numbers are overlaid on the image, indicating specific points of interest. A white rectangular area is visible in the lower center of the image. On the right side, there is a data table with 22 rows and 2 columns. Below the table are several buttons for data management and a zoom control panel.

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Cache Header Data
Retrieve Header Data
View/Edit Header Data
Save Image with Points

Zoom: 100%
Lolick Rolick Mwheel
100% 300% 600%



Massive Scale Online Collaboration & NOAA

- Fulfills 2 missions
 - Getting large amounts of data processed quickly and at low cost
 - Education & Outreach
 - Bringing data to the public and allowing them to assist with data processing



Expansion

- PIFSC needs are not unique
- What other science centers or Line Offices could benefit from this resource?
 - Joint proposal?
 - Proposals due Sept 2012
- benjamin.richards@noaa.gov