Counts of Rhizopsammia corals from islands throughout the Galapagos Islands between January 2024 and August 2025

Website: https://www.bco-dmo.org/dataset/998311
Data Type: Other Field Results, Cruise Results
Version: 1
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Project
» RAPID: Effects of the 2023-24 El Nino on Fish Disease and Population Dynamics in the Galapagos Islands (RAPID Galapagos Fish Disease)

Contributors	Affiliation	Role
Lamb, Robert	University of Florida (UF)	Principal Investigator
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Abstract
This dataset presents counts of Rhizopsammia corals from still frame quadrats taken from video transects carried in-situ by divers. Frame grabs were taken haphazardly from video transects and assessed for total area, number of Rhizopsammi corals observed, and whether corals were single individuals or multi-polyp colonies. These data were collected in the Galapagos Islands between January 2024 and August 2025.

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Coverage

Location: Galapagos Islands

Methods & Sampling

Dives were made from vessels Valeska, Costa and Danubio Azul, under Chief Scientist Robert Lamb (University of Florida). We searched for modern-day corals while diving using a mixed-gas, closed-circuit rebreather (Hollis Prism 2) from the shallows to the mesophotic zone (0 to 60 meters (m)) in July and August 2024. At 0, 10, 20, 30, 40, 50, and 60 m, we recorded rock wall communities along twenty 2 m horizontal transects at 12 sites. The aim was to capture two transects per depth using a GoPro 11 camera with a video light. Due to camera failure by one of the two diver-held cameras at Cuatro Hermanos and Cabo Douglas, only one transect per depth was available for analysis at these sites. Care was taken to include the transect tape in the video for scale and maintain a consistent camera-to-subject angle. Temperature was recorded at the same depths as the video transects using a Shearwater Peregrine 3 wrist dive computer and analyzed with linear regression.

The analytical procedure for the video transects consisted of segmenting each entire video into non-overlapping, continuous screen shot images of the rock walls. The areas of the screen shot images were calculated using Image J software, and the total transect area was calculated as the sum of the areas of all the images (which was always less than the originally intended 40 square meters due to limited availability of high-quality screenshots). *Rhizopsammia wellingtoni* were recognized as solitary, black polyps (corallites) with distinct white septa or as larger aggregations of multiple corallites, which are referred to as colonies. Colonies

were counted as aggregations of 2 or more corallites, while solitary individuals were scored as a single corallite separated by a minimum of 5 corallite diameters from other corallites. All the counts were made by J. Witman for consistency.

Data Processing Description

Coral counts of *Rhizopsammia* are reported in data columns "Colonies" - multi-polyp coral colonies, "Polyps" - solitary corals, and "Total" - the sum of the two morphotypes for that quadrat. Transect images were assessed visually from screenshots taken from video transects (See Methods & Sampling section). Video transect screenshot area calculations (quad_area column) were made using ImageJ software (version 1.54k). The name of the source video file for each observation is noted in the "Video_ID" data column and the screenshot filename is specified in the "Quadrat" column."

BCO-DMO Processing Description

currently being processed

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Related Publications

Lamb, R. W., Pérez-Matus, A., Garmendia, V., Suarez-Moncada, J., Ortega, M. T., Banks, S., Sanchez, N. T., Dubey, A., & Witman, J. D. (2025). Discovery of populations of the critically endangered coral *Rhizopsammia wellingtoni* in the Galápagos mesophotic zone. Conservation Science and Practice, 7(8). Portico. https://doi.org/10.1111/csp2.70103
Results

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Parameters

Parameters for this dataset have not yet been identified

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Instruments

Dataset-specific Instrument Name	GoPro Hero 11
Generic Instrument Name	Camera
Dataset-specific Description	Videos of transects were recorded using a GoPro 11 camera with a video light.
Generic Instrument Description	All types of photographic equipment including stills, video, film and digital systems.

Dataset-specific Instrument Name	Shearwater Peregrine 3 wrist dive computer
Generic Instrument Name	Data Logger
Dataset-specific Description	Temperature was recorded at the same depths as the video transects using a Shearwater Peregrine 3 wrist dive computer.
Generic Instrument Description	Electronic devices that record data over time or in relation to location either with a built-in instrument or sensor or via external instruments and sensors.

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Project Information

RAPID: Effects of the 2023-24 El Nino on Fish Disease and Population Dynamics in the Galapagos Islands (RAPID Galapagos Fish Disease)

Coverage: Galápagos Archipelago

NSF Award Abstract:
Disease is a growing threat facing wild animals in a world increasingly dominated by humans. Marine fish diseases are poorly understood but have increased in recent decades in connection with ocean warming. In the Galapagos Islands of Ecuador, extreme warm waters have led to ulcerative skin disease in several different species of fish. An outbreak of this skin disease is underway in association with a strong El Niño event. This project addresses the growing threat of wildlife disease and the current outbreak of skin disease in fish of the Galapagos Islands by determining what proportion of different species are affected and by examining infected fish from the wild. Infected fish are being assessed for microbes that might cause the disease, and ocean temperature are being monitored along with other factors that may foster skin disease. Isolated microbes are being used in lab tests to see if they cause the same disease seen in the field in order to confirm the cause of this ulcerative skin disease.

This project includes training for students in the US and in Ecuador and development of a virtual teaching module for high school students in English and Spanish. The research team is working closely with the Galapagos National Park to address the threat of fish disease and associated population declines caused by the 2023-24 El Niño event, and to help modify fisheries policy to reflect species' vulnerability. Through public symposia and online learning materials, this work serves as a platform for teaching and engaging students of all ages and industry stakeholders on issues of climate change and wildlife disease. The research advances understanding of how and why these ulcerative skin disease outbreaks occur in the Galapagos, which is very important for marine reserve and fisheries management and can have far-reaching impacts for understanding and addressing diseases in wild fish as well as in aquaculture and aquarium industries.

Climate change increases the frequency and severity of marine heatwaves, such as those experienced in the Tropical Eastern Pacific Ocean during extreme El Niño events. An extreme El Niño that began in summer 2023 and has facilitated an outbreak of an ulcerative skin disease in several species of marine fish. This project: 1) establishes the extent of ulcerative skin disease, species affected, demographic, environmental, and ecological correlates, and timing of disease progression relative to the development of the El Niño event; 2) determines the putative pathogen(s) responsible for ulcerative skin disease through histological and genetic analyses, pathogen cultures, and laboratory challenge trials; and 3) examines the effects of the El Niño event on fish populations by building a database of morpho-ecological traits for 165 species of reef fish and using multivariate ordination analysis to test the ability of these traits to predict El Niño-associated declines relative to an 8-year database of fish populations at 16 sites across the archipelago.

The results advance understanding of a widespread emerging fish disease and reef fish populations dynamics in a warming ocean. This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-2348548

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