Point intercept transect surveys of benthic macro-invertebrates and macrophytes in marine lakes, Palau, NW Pacific from 2014-2017 (PaPaPro project)

Website: https://www.bco-dmo.org/dataset/541181
Data Type: Other Field Results
Version: 2
Version Date: 2019-05-08

Project
» Do Parallel Patterns Arise from Parallel Processes? (PaPaPro)

Program
» Dimensions of Biodiversity (Dimensions of Biodiversity)

Contributors	Affiliation	Role
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Abstract
Point intercept transect surveys of benthic macro-invertebrates and macrophytes in marine lakes, Palau, NW Pacific from 2014-2017.

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Coverage

Spatial Extent: **N**:7.3237 **E**:134.5089 **S**:7.1506 **W**:134.3447
Temporal Extent: 2014-06-04 - 2016-06-14

Dataset Description

Point intercept transect surveys of benthic macro-invertebrates and macrophytes in marine lakes, Palau, NW Pacific from 2014-2017.

* NOTE: The P.I.'s are using this dataset to write papers. Please contact them before using these data to make sure you are not duplicating efforts.

Methods & Sampling

Sample collection:

Each lake was sampled using the point intercept transect method at no less than 10 randomly chosen sites around its perimeter (unless the small size of a lake precluded this number of non-overlapping sites). At each site, three parallel transects approximately were run 5 m apart from the intertidal (0 m) to the deepest depth

accessible to SCUBA divers (i.e. the bottom of the lake, or bottom of the epilimnion, or the divers' maximum certified depth). In lakes 8m or deeper, a line ('the horizontal') was placed, at eight evenly spaced target depths (1-4 m depth intervals, depending on lake), orthogonal to each of the transect lines so that small (2.0 cm diameter) cells fell over four points A-D each at 15 cm increments to the right of the transect line at the same depth. At each depth, from deepest to shallowest, the actual depth was measured with a dive computer, the 'horizontal' was photographed from ~0.5 m distance, the substrate type was recorded, and then each cell photographed in close-up. A tissue sample of the 'primary' organism within each cell, i.e. the organism at the center of the cell, or if no organism in the centre then the first organisms at the periphery going clockwise from noon, or if only sediment visible, the organism within the sediment directly under the Cell was then biopsied for DNA analyses and placed in a container labeled with site, depth, and cell code A-D. Because the benthos may be three dimensional a 'primary' organism might also have many 'secondary' epibionts and/or epiphytes attached. Any organisms in the photographs but not sampled were classified as 'tertiary'. After all four cells were sampled at a depth, the diver ascended to the next shallowest depth on his/her transect and repeated the procedure. Thus, at each randomly chosen site, we surveyed a total of 96 points from the deepest to shallowest depths of the lake habitable by macro-invertebrates and macrophytes, with two categories of exception. (1) If a lake was <8 m deep, the number of depths sampled was equivalent to the maximum depth in meters. (2) Lakes with gently sloping sides could lead to adjacent target depths being >10 m apart leading to undersampling of horizontal patchiness; in which case the transect distance between adjacent target depths was estimated and divided in half or in thirds so that no two samples were more than 10 transect meters apart. At the surface, at the end of each dive, samples were transferred to individual tubes of 95% ethanol labeled with a field number composed of lake, site, collector, depth, and cell IDs. Each evening, new samples were stored in a freezer, dive profiles were downloaded, and fieldnotes were transcribed to a standardized electronic data sheet.

Data Processing Description

Error-checking biodiversity transect files

Each evening, or as soon thereafter as possible, divers compared specimens to standardize field-identifications and all tissue samples were reconciled to the electronic data sheet for each lake using tube labels, original field notes, photographs of specimens in the field, and visual inspection of tube contents. If necessary, primary and secondary specimens were placed in individually labeled tubes of ethanol. In cases of discrepancy between electronic notes and original field notes, we edited the electronic data sheet to be consistent with original notes and corroborated this by double-checking the original photographs and inspecting tube contents. Significant changes, i.e. samples that could not be reconciled after accounting for tube transpositions, mislabeling, or misidentification in the field, were logged in a separate file highlighting the specific change and justification. If a specimen was unable to be reconciled with notes it was discarded (this was necessary for only one specimen). Subsequently, every tissue sample was assigned a unique identifying number (M0D#) for curation; during this process, every tenth sample was double-checked for agreement between the original field number and new M0D#.

BCO-DMO Processing:

- added conventional header with dataset name, PI name, version date
- renamed parameters to BCO-DMO standard
- added lake names, latitude, and longitude, and date_ISO columns
- removed blank lines and unmatched quote ('); eg. isn't becomes 'is not'
- replaced blanks cells with nd
- removed commas and spaces in lake_name column entries

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Data Files

File
benthic_biodiv_v2.csv (Comma Separated Values (.csv), 2.30 MB) MD5:0e8f7212e8e6553bc0c0572b5ca5a93d Primary data file for dataset ID 541181

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Parameters

Parameter	Description	Units
Lake_id	3-letter code for sampled lake	unitless
lake_name	Name of study lake and island in Palue	unitless
lat	Latitude; north is positive	decimal degrees
lon	Longitude; east is positive	decimal degrees
Date_orig	Sampling date in submitted format (yymmdd)	unitless
Date_ISO	Sampling date in ISO format (yyyy-mm-dd)	unitless
Site	Sampling site identifier	unitless
Person	Observations made by this scientific diver	unitless
depth_target_ft	Depth along transect (0 = surface) at which observations were planned to be made as guide to study design	feet
Cell	One of four 2.0 cm diameter small rings (A/B/C/D) at 15 cm intervals along a horizontal line (orthogonal to transect line) in which the species is observed.	unitless
depth_actual_meas_ft	The actual depth at which observations were made; may differ from the planned depth because a meter-mark on the transect line may not fall at the precise target depth [from Matrix and/or Sensus Pro or measured with string].	feet
depth_actual_m	Actual depth converted to meters using the Excel function "=CONVERT(cell#,"ft","m")" .	meters
Transect_distance_m	Distance to the nearest meter or half meter at shallow depths along the transect from tie-off point in the intertidal.	meters
Main_org_DNA	The organism at the center of the cell; or lacking an organism at the centre then the first organism intercepted at the periphery going clockwise from noon. If no organism visible in the centre or at the periphery or if only sediment visible sift through sediment for organism under the cell; sampled for DNA.	unitless

Other_orgs_DNA_ring	Any other organisms on/in/under the "Main organism"; also was sampled for DNA; separate specimens are separated by a semicolon.	unitless
Substrate	Specific notes about substrate type	unitless
Primary_tube	The unique tube number assigned to identify the tissue sample for the primary organism.	unitless
Tube_i	The unique tube number (i through vii) assigned to identify the tissue sample for the secondary organisms.	unitless
Tube_ii	The unique tube number (i through vii) assigned to identify the tissue sample for the secondary organisms.	unitless
Tube_iii	The unique tube number (i through vii) assigned to identify the tissue sample for the secondary organisms.	unitless
Tube_iv	The unique tube number (i through vii) assigned to identify the tissue sample for the secondary organisms.	unitless
Tube_v	The unique tube number (i through vii) assigned to identify the tissue sample for the secondary organisms.	unitless
Tube_vi	The unique tube number (i through vii) assigned to identify the tissue sample for the secondary organisms.	unitless
Tube_vii	The unique tube number (i through vii) assigned to identify the tissue sample for the secondary organisms.	unitless
Notes	Any notes about collection; sometimes substrate; etc.	unitless

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Project Information

Do Parallel Patterns Arise from Parallel Processes? (PaPaPro)

Website: http://marinelakes.ucmerced.edu/

Coverage: Western Pacific; Palau; Indonesia (West Papua)

This project will survey the taxonomic, genetic, and functional diversity of the organisms found in marine lakes, and investigate the processes that cause gains and losses in this biodiversity. Marine lakes formed as melting ice sheets raised sea level after the last glacial maximum and flooded hundreds of inland valleys around the world. Inoculated with marine life from the surrounding sea and then isolated to varying degrees for the next 6,000 to 15,000 years, these marine lakes provide multiple, independent examples of how environments and interactions between species can drive extinction and speciation. Researchers will survey the microbes, algae, invertebrates, and fishes present in 40 marine lakes in Palau and Papua, and study how diversity has changed over time by retrieving the remains of organisms preserved in sediments on the lake bottoms. The project will test whether the number of species, the diversity of functional roles played by organisms, and the genetic diversity within species increase and decrease in parallel; whether certain species can greatly curtail diversity by changing the environment; whether the size of a lake determines its biodiversity; and whether the processes that control diversity in marine organisms are similar to those that operate on land.

Because biodiversity underlies the ecosystem services on which society depends, society has a great interest in understanding the processes that generate and retain biodiversity in nature. This project will also help conserve areas of economic importance. Marine lakes in the study region are important for tourism, and researchers will work closely with governmental and non-governmental conservation and education groups and with diving and tourism businesses to raise awareness of the value and threats to marine lakes in Indonesia and Palau.

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Program Information

Dimensions of Biodiversity (Dimensions of Biodiversity)

Website: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503446

Coverage: global

(adapted from the NSF Synopsis of Program)
Dimensions of Biodiversity is a program solicitation from the NSF Directorate for Biological Sciences. FY 2010 was year one of the program. [MORE from NSF]

The NSF Dimensions of Biodiversity program seeks to characterize biodiversity on Earth by using integrative, innovative approaches to fill rapidly the most substantial gaps in our understanding. The program will take a broad view of biodiversity, and in its initial phase will focus on the integration of genetic, taxonomic, and functional dimensions of biodiversity. Project investigators are encouraged to integrate these three dimensions to understand the interactions and feedbacks among them. While this focus complements several core NSF programs, it differs by requiring that multiple dimensions of biodiversity be addressed simultaneously, to understand the roles of biodiversity in critical ecological and evolutionary processes.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1241255

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