

Benthic coverage data collected from 2012 to 2014 in the Federated States of Micronesia and the Caroline Islands (Disturb Impacts Coral project)

Website: <https://www.bco-dmo.org/dataset/684031>

Data Type: Other Field Results

Version: 1

Version Date: 2017-03-09

Project

» [The impact of a large episodic disturbance on an invasive \(outbreak\) coral: Will Typhoon Maysak promote or suppress an invasive Montipora sp. Coral on reefs of Ulithi Atoll, Federated States of Micronesia?](#) (DisturbImpactsCoral)

| Contributors | Affiliation | Role |
|-----------------------------------|---|------------------------------------|
| Bernardi, Giacomo | University of California-Santa Cruz (UC Santa Cruz) | Principal Investigator |
| Crane, Nicole | Cabrillo College | Co-Principal Investigator, Contact |
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Abstract

Benthic coverage data collected from 2012 to 2014 in the Federated States of Micronesia and the Caroline Islands (Disturb Impacts Coral project)

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Coverage

Spatial Extent: N:7.058531 E:-146.976536 S:5.933554 W:-158.368892

Temporal Extent: 2012-06-28 - 2014-07-14

Dataset Description

Benthic cover data for 2012, 2013 and 2014.

Data associated with publication: Crane NL, Nelson P, Abelson A, Precoda K, Rulmal J Jr, et al. (2017) PLOS ONE.

Acquisition Description

Surveys were conducted using snorkel on the reef crest and the reef table, in shallow sites at depths between 1.5 and 3 meters. Benthic community structure was evaluated using 0.25m quadrats placed randomly on the reef crest area at each site. Quadrat locations were selected by using a random number generator to set the distance between quadrats and direction of swim within the reef crest corridor. Percent cover of key organisms was determined within each quadrat (counts were used for larger mobile invertebrates and giant clams). Each quadrat was documented photographically. A total of 10 functional group categories were used to assess benthic cover: stony coral, octocorals, hydrocorals, macroalgae, algal turfs, encrusting algae, cyanobacteria, bare substrate and non-coral sessile and mobile invertebrates. Stony corals and hydrocorals were categorized into one of 12 morphological groups and identified to genus when possible. Instances of disease, paling, and bleaching within each quadrat were noted. Stony coral colony sizes were measured by recording maximum length, width, height, nearest live coral neighbor and coral functional group for each coral that intercepted the 50 m Lish transect lines.

Processing Description

BCO-DMO Data Processing Notes:

- nd was added to all blank cells
- site, date, researcher, and quad columns were added to incorporate the information contained in the header of the file

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Related Publications

Crane, N. L., Nelson, P., Abelson, A., Precoda, K., Rulmal, J., Bernardi, G., & Paddack, M. (2017). Atoll-scale patterns in coral reef community structure: Human signatures on Ulithi Atoll, Micronesia. PLOS ONE, 12(5), e0177083. doi:[10.1371/journal.pone.0177083](https://doi.org/10.1371/journal.pone.0177083)

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Parameters

| Parameter | Description | Units |
|--------------------------|--|----------|
| site | Site where species were sampled | unitless |
| date | Date of sampling; YYYY/MM/DD | unitless |
| researcher | Researcher that collected the data | unitless |
| quad | Quadrat where species were sampled | unitless |
| liveCoral_noCabbage | Percent coverage of live coral (not including cabbage coral) | percent |
| invasiveCoral | Percent coverage of invasive coral (not included in live percentage) | percent |
| deadCoral | Percent coverage of dead coral | percent |
| bleachedCoral | Percent coverage of bleached coral | percent |
| turfAlgae | Percent coverage of turf algae | percent |
| macroalgae | Percent coverage of macroalgae | percent |
| otherInverts | Percent coverage of other invertebrates | percent |
| acroporaThicket | Percent coverage of Acropora thicket | percent |
| tableCoral | Percent coverage of Acropora table coral | percent |
| mounding1_simple_UnID | Percent coverage of unidentified simple coral | percent |
| mounding1_Porites_lobata | Percent coverage of Porites lobata | percent |

| | | |
|--|--|---------|
| mounding1_Astreopora | Percent coverage of Astreopora | percent |
| mounding1_Leptastrea | Percent coverage of Leptastrea | percent |
| mounding2_complex_UnID | Percent coverage of unidentified complex coral | percent |
| simpleBranching_UnID | Percent coverage of unidentified branching simple coral | percent |
| simpleBranching_AcroporaSpp | Percent coverage of simple branching Acropora spp | percent |
| simpleBranching_Porites_rus | Percent coverage of Porites rus | percent |
| simpleBranching_Porites_cylindrica | Percent coverage of Porites cylindrica | percent |
| simpleBranching_Pocillopora_eydouxi | Percent coverage of Pocillopora eydouxi | percent |
| simpleBranching_Pocillopora_meandrina | Percent coverage of Pocillopora meandrina | percent |
| simpleBranching_PocilloporaSpp | Percent coverage of Pocillopora spp | percent |
| simpleBranching_Heliopora | Percent coverage of simple branching Heliopora | percent |
| simpleBranching_Millepora | Percent coverage of simple branching Millepora | percent |
| complexBranching_UnID | Percent coverage of unidentified complex branching coral | percent |
| complexBranching_Pocillopora_damicornis_varicosa | Percent coverage of Pocillopora damicornis or varicosa | percent |
| | | |

| | | |
|---|---|---------|
| complexBranching_AcroporaSpp | Percent coverage of complex branching Acropora Spp | percent |
| complexBranching_Millepora | Percent coverage of complex branching Millepora | percent |
| complexBranching_Stylaster_Distichopora | Percent coverage of Stylaster and Distichopora | percent |
| encrusting_UnID | Percent coverage of unidentified encrusting coral | percent |
| encrusting_Pocillopora | Percent coverage of encrusting Pocillopora | percent |
| encrusting_Porites_solida | Percent coverage of encrusting Porites solida | percent |
| encrusting_Leptastrea | Percent coverage of encrusting Leptasrea | percent |
| encrusting_nonInvasive_MontiporaSpp | Percent coverage of non invasive encrusting Montipora spp | percent |
| encrusting_Isopora | Percent coverage encrusting Isopora | percent |
| encrusting_Astreopora | Percent coverage of encrusting Astreopora | percent |
| encrusting_Millepora | Percent coverage of encrusting Millepora | percent |
| lettuce_foliose_UnID | Percent coverage of unidentified lettuce or foliose coral | percent |
| sheeting_UnID | Percent coverage of unidentified sheeting coral | percent |
| solitary_Fungia | Percent coverage of solitary Fungia | percent |
| | | |

| | | |
|---------------------------------|--|---------|
| solitary_other | Percent coverage of other solitary species | percent |
| columnar_UnID | Percent coverage of unidentified columnar coral | percent |
| columnar_Isopora | Percent coverage of columnar Isopora | percent |
| uncategorized_invasiveMontipora | Percent coverage of uncategorized invasive Montipora | percent |
| sheeting_invasiveMontipora | Percent coverage of sheeting invasive Montipora | percent |
| foliose_invasiveMontipora | Percent coverage of foliose invasive Montipora | percent |
| columnar_invasiveMontipora | Percent coverage of columnar invasive Montipora | percent |
| dead_stoneyCoral | Percent coverage of dead stoney coral | percent |
| diseased | Percent coverage of diseased coral | percent |
| softCoral_UnID | Percent coverage of unidentified soft coral | percent |
| leatherCoral | Percent coverage of leather coral | percent |
| corallimorph | Percent coverage of corallimorph | percent |
| zooanthid | Percent coverage of zooanthid | percent |
| encrusting_fleshyRedAlgae | Percent coverage of encrusting fleshy red algae | percent |
| | | |

| | | |
|---|--|---------|
| fleshyBrownMacroalgae | Percent coverage of fleshy brown algae (general) | percent |
| fleshyBrownMacroalgae_turbinaria | Percent coverage of turbinaria | percent |
| fleshyBrownMacroalgae_styopodium | Percent coverage of styopodium | percent |
| fleshyRedMacroalgae | Percent coverage of fleshy red algae (general) | percent |
| fleshyGreenMacroalgae | Percent coverage of fleshy green algae (general) | percent |
| fleshyGreenMacroalgae_microdictyon | Percent coverage of microdictyon | percent |
| fleshyGreenMacroalgae_Dictyosphaera_cavernosa | Percent coverage of Dictyosphaera cavernosa | percent |
| filamentousGreenMacroalgae | Percent coverage of filamentous green macroalgae | percent |
| calcareousGreenMacroalgae_halimeda | Percent coverage of calcareous halimeda | percent |
| calcareousRedMacroalgae | Percent coverage of calcareous red macroalgae | percent |
| rhodoliths_freeCoralline | Percent coverage of rhodoliths | percent |
| turfAlgae_solidSubstrate | Percent coverage of turf algae on solid substrate | percent |
| turfAlgae_rubble | Percent coverage of turf algae on rubble | percent |
| CCA_turf | Percent coverage of crustose coralline algae with turf | percent |
| CCA | Percent coverage of crustose coralline algae | percent |
| | | |

| | | |
|--------------------------------------|---|---------|
| cyanobacteria | Percent coverage of cyanobacteria | percent |
| cyanobacteria_covering | Percent coverage of cyanobacteria covering | percent |
| seagrass | Percent coverage of seagrass | percent |
| sand | Percent coverage of sand | percent |
| bare | Percent coverage of bare space | percent |
| encrusting_sponge | Percent coverage of encrusting sponge | percent |
| upright_sponge | Percent coverage of upright sponge | percent |
| encrusting_tunicate | Percent coverage of encrusting tunicate | percent |
| upright_tunicate | Percent coverage of upright tunicate | percent |
| anemone | Percent coverage of anenomes | percent |
| acroporaThicket2 | Percent coverage of Acropora thickets | percent |
| tableCoral_acropora | Percent coverage of table coral (Acropora) | percent |
| mounding1_UnID2 | Percent coverage of unidentified simple coral | percent |
| mounding2_UnID2 | Percent coverage of unidentified complex coral | percent |
| simpleBranching_UnID2 | Percent coverage of unidentified branching simple coral | percent |
| simpleBranching_Pocillopora_eydouxi2 | Percent coverage of Pocillopora eydouxi | percent |

| | | |
|---|---|---------|
| simpleBranching_Heliopora2 | Percent coverage of simple branching Heliopora | percent |
| simpleBranching_Acropora2 | Percent coverage of complex branching Acropora Spp | percent |
| complexBranching_UnID2 | Percent coverage of unidentified complex branching coral | percent |
| complexBranching_Pocillopora_damicornis_varicosa2 | Percent coverage of Pocillopora damicornis or varicosa | percent |
| complexBranching_Acropora2 | Percent coverage of complex branching Acropora Spp | percent |
| complexBranching_Millepora2 | Percent coverage of complex branching Millepora | percent |
| encrusting_UnID2 | Percent coverage of unidentified encrusting coral | percent |
| encrusting_Millepora2 | Percent coverage of encrusting Millepora | percent |
| lettuce_foliose_UnID2 | Percent coverage of unidentified lettuce or foliose coral | percent |
| sheeting_UnID2 | Percent coverage of unidentified sheeting coral | percent |
| solitary_UnID2 | Percent coverage of unidentified solitary coral | percent |
| columnar_UnID2 | Percent coverage of unidentified columnar coral | percent |

| | | |
|---|--|---------|
| uncategorized_invasiveMontipora2 | Percent coverage of uncategorized invasive Montipora | percent |
| sheeting_invasiveMontipora2 | Percent coverage of sheeting invasive Montipora | percent |
| foliose_invasiveMontipora2 | Percent coverage of foliose invasive Montipora | percent |
| columnar_invasiveMontipora2 | Percent coverage of columnar invasive Montipora | percent |
| trochus | Percent coverage of trochus | percent |
| urchin | Percent coverage of urchins | percent |
| seaStar | Percent coverage of sea stars | percent |
| seaCucumber | Percent coverage of sea cucumbers | percent |
| seaCucumber_Chlorostichopus_notatus | Percent coverage of Chlorostichopus notatus | percent |
| clam_Tridacna | Percent coverage of Tridacna spp | percent |
| tube snail [table of contents back to top] | Percent coverage of tube snails | percent |
| | | |

Instruments

| | |
|---|--|
| Dataset-specific Instrument Name | Camera |
| Generic Instrument Name | Camera |
| Dataset-specific Description | Used to capture quadrats |
| Generic Instrument Description | All types of photographic equipment including stills, video, film and digital systems. |

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Deployments

Bernardi_2012

| | |
|-------------------|---|
| Website | https://www.bco-dmo.org/deployment/684153 |
| Platform | shoreside Micronesia |
| Start Date | 2012-06-28 |
| End Date | 2014-07-14 |

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Project Information

The impact of a large episodic disturbance on an invasive (outbreak) coral: Will Typhoon Maysak promote or suppress an invasive Montipora sp. Coral on reefs of Ulithi Atoll, Federated States of Micronesia? (DisturbImpactsCoral)

Website: <http://onepeopleonereef.ucsc.edu>

Coverage: Ulithi Atoll, Yap State, Federated States of Micronesia. Western Pacific Ocean, Caroline Islands

Extracted from the NSF award abstract: Ulithi Atoll, in the Federated States of Micronesia, is

the fourth largest Atoll in the world, and was an important staging area for the US Navy 3rd fleet during WWII. The Atoll contains dynamic coral reefs, and communities of people that depend on them. Ulithi has been subjected to a number of human and natural disturbances, including Typhoon Ophelia that hit in 1960. Local fishermen believe that this event started an invasion process by a 'weedy' invasive coral that covers reefs, and removes essential habitat for fish and octopus, potentially threatening these ecosystems. Four years ago, local people invited the investigators to Ulithi to study the reefs and work together to enhance fisheries and reef health. The investigators sequenced the invading coral DNA and identified it as a new species of Montipora. However, its invasion dynamics remain a mystery. In early April 2015, Ulithi was hit again by a major disturbance: super Typhoon Maysak. The Typhoon destroyed most structures on the island, and removed much of the coral formations visible from shore. Using their baseline data of the past four years, the investigators, along with a team of students, seek to map the effect of the Typhoon on the invasive Montipora. Using genomic sequencing, they hope to better understand the role of Typhoon Maysak on the establishment and dispersal of this invasive coral. This project provides a unique opportunity to study the effects of a rare event, and invasion processes, and to broadly disseminate findings, raising awareness about coral reefs, climate change, and unique human-natural coupled systems. Super typhoon Maysak struck Ulithi Atoll on March 31, 2015, where an invasive/outbreak species of Montipora has affected shallow coral reefs over at least the last 50 years. The research the investigators propose will elucidate the effects of this rare but high impact event on a biological invasion using genomics and reef sampling to investigate Micronesian reefs that were dominated by Montipora before the typhoon, and more 'pristine' reefs where Montipora was absent or in low densities. The investigators will be relating these findings to existing data that were collected from these sites over the past four years. These studies will advance our understanding of biological invasions in coral reef systems, explore the unusual occurrence of a coral species as an outbreak organism, and contribute to our knowledge of how high impact, episodic disturbances - likely to increase in frequency with the advance of global climate change - may affect threatened coral reef ecosystems world-wide.

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Funding

| Funding Source | Award |
|--|-----------------------------|
| NSF Division of Ocean Sciences (NSF OCE) | OCE-1546374 |

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