

THE SCHOOL FOR FIELD STUDIES

DIRECTED RESEARCH TURKS & CAICOS

Center for Marine Resource Studies · South Caicos. A complete record of student research projects from the four most recent semesters.



SPRING 2026

6 projects · 22 student authors

FALL 2025

5 projects · 15 student authors

SPRING 2025

9 projects · 32 student authors

FALL 2024

8 projects · 26 student authors

28

RESEARCH PROJECTS

95

STUDENT AUTHORS

6

FACULTY ADVISORS

4

SEMESTERS

FALL 2024 – SPRING 2026

ABOUT THIS GUIDE

Directed Research is the capstone of every SFS semester: students work in small teams with resident faculty on questions set by the needs of the host community and its ecosystems. This guide collects only the projects completed at the Center for Marine Resource Studies on South Caicos, Turks and Caicos Islands, over the four most recent semesters.

Projects are listed newest first. Each entry gives the project title, its faculty advisor or advisors, and the student authors with their home institutions, followed by the project’s research abstract. Where a report carried no formal abstract, a summary drawn from the faculty project report stands in its place, labelled as such.

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FACULTY ADVISORS

Directed Research at the Center for Marine Resource Studies was advised by 6 faculty and researchers across these semesters.

ADVISOR	PROJECTS	SEMESTERS
Dr. C.E. O'Brien	10	All four semesters
Dr. Stephan Bruns	9	All four semesters
Dr. Yuqian Zhang	8	All four semesters
John DeBuysser	4	Fall 2024, Spring 2025, Spring 2026
Dr. Heidi Hertler	1	Spring 2025
Mikayla Carrier	1	Fall 2025

LONG-RUNNING RESEARCH LINES

Several South Caicos projects recur semester to semester, building continuous datasets rather than one-off studies.

RESEARCH LINE	SEMESTERS
Octopus behavior, skin patterning, and camouflage	All four semesters
CASITAS — lobster casita and habitat monitoring	Fall 2024, Spring 2025, Spring 2026
Coral reef assessment and fish diversity	Fall 2024, Spring 2025, Spring 2026
Coastal ecosystem services and marine sustainability	Fall 2024, Spring 2025, Fall 2025
Elasmobranch surveys — BRUVS, then juvenile lemon sharks	All four semesters
Bonefish ecology and ecotourism livelihoods	Fall 2024, Spring 2025
Queen conch and midden avoidance behavior	Fall 2024, Spring 2025

01 Observing Ocellated Octopuses: Differences in Defensive Body Patterning Between *Octopus hummelincki* and *Octopus taganga* in the Tropical Western Atlantic

Faculty advisor: Dr. C.E. O'Brien

Kade Charlton¹, Yuzuki Ogawa², Greta Persian³

¹ Colorado College, ² Hollins University, ³ Johns Hopkins University

RESEARCH SUMMARY

Eyespots (ocelli) are conspicuous markings used in defensive display by many marine animals, but their use is poorly documented in the small ocellated octopuses of the tropical western Atlantic. This project compared defensive body patterning in *Octopus hummelincki* and *Octopus taganga* around South Caicos, recording the conditions under which each species displays its ocelli and the skin patterns and postures that accompany the display. The work establishes a comparative baseline for defensive display in the two species, and the advisor intends to extend its scope to eyespots and other markings — eye stripes, polka dots — in local fishes and invertebrates such as butterflyfish, damselfish, and crustaceans.

02 Substrate Associations, Skin Patterning, and Camouflage Strategies in Three Newly Identified *Paroctopus* Species in the Tropical Western Atlantic

Faculty advisor: Dr. C.E. O'Brien

Zoe Gabriel¹, Solvie Smestad², Lucas Tafara³

¹ Williams College, ² University of Vermont, ³ University of Michigan

RESEARCH SUMMARY

Three *Paroctopus* species in the tropical western Atlantic have only recently been identified, and little is known about how they use the seafloor. This project documented substrate associations, skin patterning, and camouflage strategies across the three species around South Caicos, pairing in-situ observation of dens and foraging animals with characterization of the surrounding substrate. The results contribute to the ongoing formal description of these species and to a growing South Caicos record of pygmy octopus habitat use. The project continues in the following semester.

03 When Life Gives You Lemons: Assessing the Juvenile Lemon Shark Population Around South Caicos

Faculty advisor: Dr. Stephan Bruns

Peyton Dixon¹, Jenna Goff², Emerson Levin³, Alexandra Otto⁴

¹ Grinnell College, ² West Virginia University, ³ Williams College, ⁴ College of William and Mary

RESEARCH SUMMARY

Juvenile lemon sharks are upper-level predators in the shallow coastal systems around South Caicos, and those same habitats are nursery grounds for reef fish of commercial interest. Building on the previous semester's baseline, this project continued to assess the juvenile population and the case for a nursery on South Caicos, capturing, measuring, and tagging sharks alongside environmental monitoring. Fishing time was reduced to stay within contact-hour limits, so a small number of individuals was caught. Environmental data showed a changing system, with water temperature

fluctuating by as much as 7 °C in a single day, and more leeches were recorded on sharks than in the fall, indicating individuals under greater stress. Understanding the population structure helps assess the health of a nursery habitat that supports recruitment of commercially important reef fish.

04 **CASITAS: Monitoring Lobster Casitas and Their Surrounding Habitat for Ecological Impacts**

Faculty advisor: Dr. Stephan Bruns

Autumn Cochran¹, Shannon Downer², Satya Kluth³, Elsa Nielsen⁴

¹ Point Loma Nazarene University, ² University of Michigan, ³ Williams College, ⁴ Grinnell College

RESEARCH SUMMARY

In a third consecutive semester of casita monitoring, this project extended the standing survey of Caribbean spiny lobster (*Panulirus argus*) at artificial “casita” shelters with new questions on the surrounding prey and predator community. Results indicate that casitas increase predation pressure on the adjacent sandflats and seagrass beds, and that the structures aggregate mainly juveniles rather than lobsters of legal commercial size. New sites sampled inside the marine protected area held almost no lobster, most likely because of their proximity to natural reef. Casitas are a government tool for improving the Caribbean spiny lobster fishery — the highest-earning fishery on South Caicos — so this dataset supports more sustainable management of the stock.

05 **Assess Tourism Impact on South Caicos with Mixed Approaches**

Faculty advisor: Dr. Yuqian Zhang

Jordan Berner¹, Lydia Bicknell², Mollie Nelson³, Stella Simonds⁴

¹ Trinity College, ² Whitman College, ³ Brandeis University, ⁴ Bates College

RESEARCH SUMMARY

This project assesses the socioecological impact of tourism on South Caicos, examining how tourism growth may reshape seafood flows, local food access, and pressure on coastal ecosystems. It inherits the integrated mixed-methods approach of the preceding ecosystem services assessment, combining literature review, interviews, in-water transect survey, and drone-based air monitoring, and shifts the emphasis toward semi-structured community interviews, with eighteen conducted across a diverse set of stakeholders. The findings reflect community priorities for sustainable development and are intended to support informed conservation and development planning in the Turks and Caicos Islands.

06 **Coral Reef Assessment and Fish Diversity in South Caicos**

Faculty advisors: Dr. Yuqian Zhang and John DeBuysser

Jada Deane¹, Nikolas Karvelas², Olivia Atkins³, Rauwen Panchmatia⁴

¹ Hollins University, ² College of the Holy Cross, ³ University of Vermont, ⁴ Sweet Briar College

RESEARCH SUMMARY

This project continues the long-term monitoring of coral reef condition and fish diversity at established sites around South Caicos. Calm conditions allowed 10 m and 20 m surveys to be completed at every long-term site, including the Maze, though the moorings at the Maze and the Plane show fraying that will need watching. Surveys at 30 m remain suspended given that depth’s susceptibility to recent bleaching events, and methods for resuming them are under discussion. The resulting dataset extends one of the region’s longer continuous records of reef and fish community change and contributes to ecosystem assessment across the Turks and Caicos Islands and the wider Caribbean.

01 **CoastWISE (Coastal Wealth, Integrity, and Service Evaluation): Using Mixed Methods to Assess and Value Coastal Ecosystem Services in South Caicos**

Faculty advisor: Dr. Yuqian Zhang

Sylvie Archer¹, Alyssa Castro²

¹ University of Michigan, ² Davidson College

RESEARCH SUMMARY

CoastWISE assesses and values the coastal ecosystem services of South Caicos through a mixed-methods design that pairs field measurement with community valuation. Driven by the interest of community stakeholders and building on the spring 2025 assessment, this semester concentrated on a single site, Jerry Camp, and expanded the community component to twenty interviews. Underwater snorkel surveys using transects and quadrats recorded seagrass, reef, fish identification, and biodiversity; drone flights supplied aerial coverage, with three pilots trained and certified under UK and TCI aviation regulation. Three field days were given to underwater and drone survey as weather and tide allowed, and roughly seven to community interviews in downtown Cockburn Harbour.

02 **Decipher the Secret Language of the Sea: An Assessment of South Caicos' Nearshore Reef Soundscapes**

Faculty advisors: Dr. Yuqian Zhang and Mikayla Carrier

Nora Hakimian¹, Gregory Garlisch², Marguerite Bartlett³

¹ Amherst College, ² Whitman College, ³ Bowdoin College

RESEARCH SUMMARY

Reef soundscapes carry the acoustic cues that guide larvae toward suitable settlement habitat, and those cues weaken as coral health declines. Co-led with a visiting scientist from North Carolina State University, this project assessed the nearshore reef soundscapes of South Caicos as part of a wider Darwin Plus study of biodiversity, acoustic cues, and larval recruitment. Students deployed an acoustic array with HydroMoth, ST300, and ST600 hydrophones across nearshore sites and processed the recordings to characterize each reef's acoustic signature, learning acoustics, underwater technique, and scientific scuba diving in the process. The work builds toward a replay experiment testing whether broadcasting healthy reef sound in degraded areas can boost larval settlement.

03 **When Life Gives You Lemons: Assessing the Juvenile Lemon Shark Population Around South Caicos**

Faculty advisor: Dr. Stephan Bruns

Agata Hodkova¹, Brenna Burak², Eala Sloan³, Julia DeChaves⁴

¹ University of Richmond, ² University of Puget Sound, ³ University of Washington, ⁴ College of the Holy Cross

RESEARCH SUMMARY

Previous work assessing South Caicos as a potential lemon shark nursery dates back more than fifteen years, so this project provides an updated baseline on juvenile lemon shark demographics in the island's shallow coastal waters. Students captured 31 juveniles across three sites, with the highest abundance — and the smallest individuals — in the

sheltered water behind the mangroves near Bell Sound National Park, suggesting relatively high juvenile abundance compared with earlier reports. All individuals were fitted with both dart and PIT tags to enable future recapture-based assessment of residency, growth, and site fidelity. Because these habitats are also nursery grounds for snappers, jacks, and other commercially important reef fish, protecting lemon shark nursery areas may indirectly support their recruitment.

04 **Itty Bitty Pygmy Committee: Behavior, Skin Patterning, and Substrate Use by Two *Paraoctopus* spp. of South Caicos**

Faculty advisor: Dr. C.E. O'Brien

Gilang Arifin¹, Caroline Brecke², Delia Parco³

¹ University of Wisconsin–Madison, ² Duke University, ³ Smith College

RESEARCH SUMMARY

Two recently identified *Paraoctopus* species occur in the shallows around South Caicos, and their basic natural history is largely undescribed. This project recorded behavior, skin patterning, and substrate use in both species through in-situ observation at shallow reef and sand sites, contributing to the ongoing formal description of the genus. The dataset lays the groundwork for a larger effort the following semester, which may extend to a third *Paraoctopus* species and to shallower sites worked by SNUBA.

05 **OctoPop: Prey Selection, Prey Handling, and Skin Patterning in *Octopus insularis* of South Caicos**

Faculty advisor: Dr. C.E. O'Brien

Sebastian Gemberling¹, Samantha Shea², Lucy Short³

¹ University of Washington, ² College of the Holy Cross, ³ University of Puget Sound

RESEARCH SUMMARY

In the final semester of the OctoPop series, this project examined prey selection, prey handling, and skin patterning in *Octopus insularis* around South Caicos, continuing a multi-semester record of the species' foraging ecology at the den. Observations covered which prey were taken, how each prey type was opened or subdued, and the skin patterns displayed while foraging and at the den. The accumulated OctoPop dataset now supports a graduate master's thesis and at least one manuscript prepared for peer review, alongside related work on *O. insularis* interactions with other species at the den.

01 Coastal Ecosystem Service Assessment and Mapping in South Caicos

Faculty advisor: Dr. Yuqian Zhang

Ana Rowley¹, Isabella Andrus²

¹ Scripps College, ² University of Richmond

ABSTRACT

This project integrated multiple field (air and underwater) and survey (community interview) techniques to assess and value the environmentally and socioeconomically significant coastal areas of South Caicos (Jerry Camp and East Bay). The project estimated the economic value of both sites through three valuation approaches (benefit transfer, stated preference survey, and tourism-based travel cost). The results indicated that Jerry Camp has a higher total economic value than East Bay, reflecting greater ecological value and higher community-perceived importance. With the status of South Caicos transitioning its economy from a marine-based provisional economy to a tourism economy, this project provided a baseline to capture the economic values from different stakeholders and contributed timely and essential information for decision making and sustainable development planning.

02 Coral Reef Assessment and Fish Diversity in South Caicos

Faculty advisors: Dr. Yuqian Zhang and John DeBuysser

Jaeyun An¹, Stephanie Friedman², Jayne Morley³, Islay Morrison⁴

¹ Franklin and Marshall College, ² Whitman College, ³ Harvard College, ⁴ Brandeis University

ABSTRACT

In the Turks and Caicos Islands, coral disease, bleaching, and other disturbances have resulted in a significant loss of coral cover and coral reef degradation. Studies have assessed these changes over time, but there is a lack of research assessing coral reef health's impact on fish diversity in South Caicos. This project continued the long-term marine ecosystem monitoring and investigated coral reef community composition and biodiversity, the relationship between benthic substrate cover and herbivorous fish, and whether invasive fish impact coral reef fish biodiversity. Results showed that live coral cover, diversity, and evenness were significantly higher at 20 m sites than at 10 m sites; that of six species analyzed *S. siderea* and *P. asteroides* were dominant while *D. labyrinthiformis* and *O. faveolata* were among the least dominant; that herbivore abundance has decreased over time and correlates significantly with stony coral cover, which has also declined; that surgeonfish abundance correlates positively with benthic coral coverage and *Acanthurus coeruleus* negatively with macroalgae coverage; that surgeonfish are not an ideal indicator species of potential coral reef phase shifts; and that the presence of *Pterois volitans* had no significant effect on fish biodiversity. As climate change and invasive species pressure worsen, a baseline understanding of coral health and herbivorous species is crucial to guiding policy that protects marine health and stock productivity.

03 Coral Gardening in the Anthropocene: Developing Outplanting Methodology and Monitoring Coral Attachment, Health, and Growth in South Caicos

Faculty advisors: Dr. Heidi Hertler and John DeBuysser

Anna Amha¹, Charles Stearns², Jayson Leem³, Gwyneth Wiseman⁴

¹ Brown University, ² Davidson College, ³ Whitman College, ⁴ United International College

ABSTRACT

This project developed coral outplanting methodology at three shallow reef sites in South Caicos — Admiral's Aquarium, Shark Alley, and Tucker's Reef. A total of 360 coral fragments representing four species (*Acropora palmata*, *Orbicella annularis*, *Madracis auretenra*, and *Porites astreoides*) were outplanted and subsequently monitored for attachment, health, and growth. The habitat at each location was characterized via benthic transect photography, fish surveys, coral bleaching surveys, and water temperature data loggers. Species exhibited variable growth across sites: *P. astreoides* showed the most consistent positive change, while *O. annularis* experienced significant tissue loss, potentially due to shorter lab holding times prior to outplanting. Bleaching surveys of 176 surrounding colonies revealed widespread but minor stress, with average CoralWatch color scores of 2.56 (lightest) and 3.49 (darkest). Fish and benthic surveys identified distinct trophic structures and substrate compositions across sites, including variation in herbivore abundance and algal cover. Although constrained by small sample sizes, these findings underscore the importance of ecological context, standardized restoration protocols, and continuous monitoring.

04

BRUVS: Assessing Species Diversity, Richness and Relative Abundance Within the ACLSNP of Elasmobranchs (Sharks and Rays) and Predatory Reef Fish

Faculty advisor: Dr. Stephan Bruns

Liv Auerbach¹, Erin Fraser¹, Maryann Huffman², Charlotte Wilner¹

¹ University of Vermont, ² Dickinson College

ABSTRACT

Elasmobranch and predatory fish abundance are key indicators of ecosystem health and can be used to assess the effectiveness of marine protected areas. The study evaluates the effectiveness of the Admiral Cockburn Land and Sea National Park (ACLSNP), South Caicos, by assessing the relative abundance, richness, and diversity of elasmobranchs and predatory fishes of interest within the MPA. Using baited remote underwater video systems (BRUVS), elasmobranchs and predatory fish were observed across varying depths and habitat categories, along with examination of bait preference and elasmobranch behavior. The ACLSNP was found to be relatively healthy, with similar diversity of elasmobranchs and predatory fish across habitats. The BRUVS were effective in attracting elasmobranchs, and there were trends in the taxa attracted to different bait types. Dominant behavior types were identified for each species, but BRUVS methods proved less suitable for select species due to behavior type.

05

CASITAS: Monitoring Lobster Casitas and Their Surrounding Habitat for Ecological Impacts

Faculty advisor: Dr. Stephan Bruns

Alex Zoner¹, Anwen Hudson², Myla Cáceres³, Rose Clarke⁴

¹ University of Vermont, ² Smith College, ³ University of San Diego, ⁴ Rice University

ABSTRACT

Caribbean spiny lobsters (*Panulirus argus*) frequently aggregate at artificial structures known as "casitas." Although controversial in some regions, casitas are used to benefit fishers in the Turks and Caicos Islands. Previous studies show varying results: casitas act as ecological traps for juveniles, whereas other findings show that casitas increased survival, foraging range, and sociability. This study investigates the population structure, habitat use, biological characteristics, and behavioral patterns of *P. argus* at ten casita sites around South Caicos, evaluating their ecological function through biological and population surveys using a capture-mark-recapture method. Casitas in TCI were found to function primarily as juvenile refuges. The aggregation of juveniles in casitas occupied by adults suggests that social or chemical cues may influence habitat selection, and a higher proportion of juveniles than adults was observed, likely due to selective fishing of legal-sized adults. Social network and recapture analyses revealed high site fidelity and strongly

casita-based social structures with infrequent interchange between sites. Comparison with historical data revealed decreases in female lobster size over time, and size-maturity analysis demonstrated highly variable size at sexual maturity. Mean abundance in relation to distance from a local marine reserve revealed no evidence of a spillover effect. These findings highlight the role of casitas in shaping *P. argus* population dynamics and underscore the need for further research to assess long-term ecological impacts and inform fisheries management in TCL.

06 Bonefish Ecology: Sustainable Ecotourism and Income Opportunities

Faculty advisor: Dr. Stephan Bruns

Olivia Byrd¹, Kayleigh Long², Chris Northup³, Nate Woods⁴

¹ University of Michigan, ² Bucknell University, ³ University of Massachusetts Amherst, ⁴ Dickinson College

ABSTRACT

Bonefish (*Albula vulpes*) are a popular target for recreational fly fishermen, making them an important resource for ecotourism in many tropical and subtropical nations. However, this species is historically data-poor, calling for an increased amount of research to properly maintain these stocks. The Caicos Bank contains shallow sandflats where bonefish are known to reside, making South Caicos an ideal bonefishing destination, yet little is known about the population around the island. Using catch-and-release fly fishing and drone video surveys, this study assessed differences in population size, behavior, diet, weight, and length across three bonefishing sites: Jerry Camp, West Sound, and East Bay. Abundance studies showed similar populations at Jerry Camp and West Sound, and the school sizes present suggest a large spatial distribution throughout the sites. The results also suggest a negative correlation between tailing frequency and school size, and a few instances of flashing were documented. Analysis of stomach content revealed varying diets by site and by size of the consumer, and length-weight calculations found a difference in fish weight between Jerry Camp and West Sound.

07 Grave Conch-erns

Faculty advisor: Dr. C.E. O'Brien

Emma Boling¹, Sofia Gonzalez², David March³, Emma Pranger⁴

¹ Hollins University, ² Wellesley College, ³ Dickinson College, ⁴ Yale University

ABSTRACT

We found mixed support for the "Graveyard Hypothesis" — the idea that conch move away from knocked conch shell middens — which we had set out to test. A lab trial with bait cues found that conch moved more in response to conch than to seawater, but a field trial did not find any difference in movement response to rocks, old knocked conch, or freshly knocked conch.

08 OctoChow

Faculty advisor: Dr. C.E. O'Brien

Roman Curry¹, Amanda Jenkins², Claire Tuttle³

¹ Lewis and Clark College, ² Bates College, ³ University of Michigan

ABSTRACT

We found that *Octopus insularis* shows no difference in foraging excursion time between a site with a higher number of predators and competitors, that the prey it consumed differed by location and substrate type, and that octopuses preferentially drilled bivalves near the hinge but showed no preferred drilling location for gastropods.

OctoFoe

Faculty advisor: Dr. C.E. O'Brien

Lindsey Bloom¹, Anya Lalwani², Nora Tripp¹

¹ Mount Holyoke College, ² Bowdoin College

ABSTRACT

We found circumstantial evidence of collaborative hunting between *Octopus insularis*, Nassau grouper, yellowtail snapper, and coney, but no definitive signaling between them, as has been observed in other species during hunting collaborations. *Octopus insularis* appeared to use different skin patterns when entering and leaving the den, and showed longer but lighter sleep episodes in an area with more predators and competitors.

01 Assessing Marine Sustainability in Small-Island Developing States

Faculty advisor: Dr. Yuqian Zhang

Mason Tompkins¹, Hollis Albrecht², Lucia Kitsos³

¹ Muhlenberg College, ² University of San Diego, ³ Hamilton College

ABSTRACT

By conducting a baseline study assessing four targets of Sustainable Development Goal 14 (Life Below Water) — ocean plastic pollution, ocean acidification, marine protected areas, and sustainable fishing — we found that the Turks and Caicos Islands are currently achieving moderate levels of ocean sustainability. Plastic pollution is both a regional and a national issue, and water quality monitoring is necessary to safeguard marine ecosystems in the long term. Marine protected areas need to be restricted to improve effectiveness, based on the case of the Queen Conch analysis. Sustainable fisheries are difficult to define, emphasizing the need for long-term monitoring and stock assessment.

02 Coral Reef Assessment and Fish Diversity in South Caicos

Faculty advisors: Dr. Yuqian Zhang and John DeBuysser

Dylan Hutchinson¹, Melanie Forney², Madison Eaton³, Patty McHugh⁴, CJ Richard⁵

¹ Pitzer College, ² Middlebury College, ³ The University of Redlands, ⁴ Ithaca College, ⁵ Robert Morris University

ABSTRACT

Coral reefs are in decline globally and in the Caribbean, including South Caicos, and losses in coral biodiversity, cover, and health cascade into reef fish communities. Surveys at seven sites show herbivorous fish abundance may be positively correlated with algal cover and bleaching potential; a positive trend with live coral cover may indicate limits to the benefits herbivores receive under local coral loss. Because herbivorous fish can reverse algal regime shifts, this relationship bears on the potential for natural reef recovery and on restoration strategy. Analysis of temperature variability, bleaching and recovery trends, and depth dynamics indicates shallow reefs are the most degraded — driven by thermal fluctuation, more frequent and intense bleaching, storm damage, and disease susceptibility — while deeper reefs are more stable.

03 The Graveyard Hypothesis: Avoidance Behavior of Queen Conch (*Aliger gigas*) in Response to Middens (Grave Conch-erns)

Faculty advisor: Dr. C.E. O'Brien

Zachary Baskin¹, Eva Connor², Corrina Schell³

¹ Dickinson College, ² Wheaton College, ³ University of Colorado at Boulder

ABSTRACT

This semester was the preliminary step in this project. We determined that conch are most active during the day and less active in the evening, and that size was not correlated with any differences in distance traveled. With only one trial per time-of-day by stimulus-type treatment combination (N = 9), a post hoc power analysis showed that we had only a 20% chance of detecting an effect of stimulus type if one exists — and indeed, we did not detect any differences according to stimulus type.

04 The Nexus of *Octopus insularis* Prey, Habitat, and Camouflage Between the Turks and Caicos Islands and Brazil (OctoChow)

Faculty advisor: Dr. C.E. O'Brien

Tori Trimble¹, Malena Podolsky², Bianca Ropeter³

¹ Colorado College, ² Reed College, ³ College of the Holy Cross

ABSTRACT

This project compared the diet and prey handling tactics of *O. insularis* in the Turks and Caicos Islands to those in Brazil. We compiled a list of prey species and found that octopuses tend to drill rather than pull apart larger clams and gastropods of any size; typically show a uniform white pattern inside the den but a greater variety outside it; eat on the go in Brazil while bringing prey back to the den in TCI; and prefer certain den dimensions according to substrate type.

05 An Analysis of the Predators, Competitors, and Population Dynamics of *Octopus insularis* in South Caicos and Fernando de Noronha (OctoFoe)

Faculty advisor: Dr. C.E. O'Brien

Quin Berfield-Brewer¹, Kirby Merlo², Ellie Pohlig³

¹ Smith College, ² University of Colorado at Boulder, ³ Colby College

ABSTRACT

This project examined the populations of *O. insularis* according to predator and competitor density and examined interactions with organisms at the den in Brazil and the Turks and Caicos Islands. We found some indication — not statistically significant — of a negative relationship between predator and competitor density and octopus population, no indication that inter-den distances varied by substrate type, and that octopuses react differently to different types of organisms that approach their dens.

06 Bonefish Ecology: Sustainable Ecotourism and Income Opportunities

Faculty advisor: Dr. Stephan Bruns

Coco Le Roy¹, Gavin Santos², Ian Harrington³

¹ Williams College, ² College of the Holy Cross, ³ Denison University

ABSTRACT

The study provided new baseline data on *Albula* spp. in South Caicos after more than two decades. Key findings include:

- **School size and fork length (drone survey):** bonefish length is positively correlated with school size, with larger individuals tending to aggregate in smaller groups or remain solitary.
- **Tidal influence:** movement patterns are influenced by tides, suggesting a strong link between tidal change and fish activity or habitat use.
- **Weight and length (catch data):** heavier and longer bonefish were observed to be solitary or in smaller groups, indicating potential size-based social structuring.
- **Flashing behavior:** flashing events correlated with proximate movements from conspecifics, hinting at behavioral communication or interaction triggers.

These trends are observable but preliminary; further research is necessary to draw statistically robust conclusions.

CASITAS: Monitoring Lobster Casitas and Their Surrounding Habitat for Ecological Impacts

Faculty advisor: Dr. Stephan Bruns

Elizabeth Malley¹, Rami Hayes-Messinger², Wyatt Albright³

¹ Bucknell University, ² Wesleyan University, ³ Whitman College

ABSTRACT

This baseline study evaluates the role of casitas — artificial reefs — in supporting Caribbean spiny lobster (*Panulirus argus*) populations in South Caicos. Key findings include:

- **Juvenile habitat:** a significant juvenile majority (82.76%) was observed, indicating that casitas may function as nursery habitat for young lobsters — though the study was conducted during fishing season.
- **Movement and site fidelity:** recaptured lobsters largely exhibited site fidelity with limited intersite movement, aligning with established homing behavior patterns.
- **Protective habitat:** casitas provide shelter and effectively aggregate lobster, but concerns exist about their potential as ecological traps.
- **Disease absence:** no diseased individuals were recorded, likely due to environmental factors and lobster avoidance behavior, though further surveillance is needed.

A juvenile-focused casita design was proposed and deployed. Future research should examine long-term effects on *P. argus* populations to support sustainable fisheries.

BRUVS: Assessing Species Diversity, Richness and Relative Abundance Within the ACLSNP of Elasmobranchs (Sharks and Rays) and Predatory Reef Fish

Faculty advisor: Dr. Stephan Bruns

Alexis Knight¹, Lily Bulczynski², Cole Evans³

¹ University of Minnesota, ² Middlebury College, ³ Dickinson College

ABSTRACT

This study investigated the effectiveness of different bait types for monitoring elasmobranch and reef fish populations of commercial interest using BRUVS within a marine protected area. Key findings include:

- **Bait type effects:** Caribbean reef shark (*Carcharhinus perezi*), southern stingray (*Hypanus americanus*), and three reef fish species showed significant differences in relative abundance depending on the bait used (great barracuda versus Caribbean spiny lobster).
- **Habitat and tide influence:** habitat and tidal conditions significantly affected species abundance, whereas deployment depth did not.
- **Shark presence impact:** the presence of sharks influenced the relative abundance of predatory reef fish.
- **Overall abundance:** high abundance of sharks and reef fish, especially yellowtail snapper.

These findings emphasize selecting bait types tailored to target species to ensure accurate population assessment, and advocate further method refinement to strengthen BRUVS support for MPA management.

THE SCHOOL FOR FIELD STUDIES

Center for Marine Resource Studies, South Caicos, Turks and Caicos Islands. Titles compiled from the Directed Research project lists for Fall 2024, Spring 2025, Fall 2025, and Spring 2026.