

## Appendix A.1: 2007-2008 University Research Grant Proposal Cover Sheet

Faculty Rank of Principal Contact: <b>Assistant Professor</b>		
Last Name: <b>Grace</b>		
First Name: <b>Sean</b>		
Department: <b>Biology</b>		
Funding Request: <b>\$5000.00</b>		
Is this a Joint Proposal? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
If Yes, please fill in information for co-proposer(s) adding separate sheets as needed:		
Name	Rank	Department
Name	Rank	Department
Is this a Continuation Project? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
University: Southern Connecticut State University		
E-mail of Principal Contact: graces2@southernct.edu Phone Number of Principal Contact: 203-392-6216		
Campus Address of Principal Contact: 222a Jennings Hall, New Haven, CT 06515		

Please mark one research category that best fits this project:

- Fine Arts and Humanities
  Social Sciences, Business and Education  
 Life and Physical Sciences, Mathematics, Computer Science, Engineering and Technology

Project Title: A Long Island Sound survey of the temperate scleractinian coral *Astrangia poculata*.

**ABSTRACT (Limit: 100 words)**

The temperate scleractinian coral *Astrangia poculata* is one of four corals known world-wide to exhibit a facultative symbiosis with its zooxanthellae and occupies many hard bottom and boulder communities in Narragansett Bay, however little is known about its morphology, growth rates, and distribution on subtidal surfaces in Long Island Sound. A study examining this coral's local distribution and growth rate would provide valuable information on how the scleractinia adapt to low energy waters with high sedimentation, higher temperatures and fresh-water input. Studies will quantify the ecological distribution of this coral in the Long Island Sound's many subtidal microhabitats.

### IRB/IACUC Statement

(If "yes" to either question please see section 5 of "Proposals", p. 3.)

YES NO

Does your research involve human beings as research subjects?

Does your research involve vertebrate animals?

**Sign-Off Statement** (To be signed individually by every faculty applicant; **–please add separate sheets as needed**)

I hereby acknowledge my understanding that the lack of compliance with the format and terms required in the University Research Grant Guidelines – 2007-08 may result in the proposal being disqualified without review.

Signature of Permanent, Full-Time Faculty	Date
Signature of Permanent, Full-Time Faculty	Date
Signature of Permanent, Full-Time Faculty	Date

### Appendix A.3: BUDGET AND BUDGET JUSTIFICATION FORM

Budget Item	Amount (Whole Dollars)	Brief Justification
Faculty Stipend	2500	Field collected data using SCUBA is intensive and time consuming work (Approximately 150 hours of work).
Support Services *	0	
Supplies and Equipment	1000	Purchase of equipment and maintenance of existing SCUBA gear required. 1 Extra Large Wetsuit = \$250.00 1 West Suit Hood = \$35.00 10 air fill cards for SCUBA tanks = \$350.00 2 regulator service for breathing = \$145.00 5 dive slates for recording data = \$60.00 2 Buoyancy compensator service = \$60.00 2 Pelican Dive Lights for visibility = \$100.00
Travel	1500	DEP Fee for use of the Research Vessel (R/V) Patricia Lynn (6 days at \$250.00/day) = \$1500.00
<b>Total</b>	<b>5000</b>	<b>N/A</b>

\* For definition see Section 9.4 of the CSU-AAUP Contract, 2002-2006

Note: This Budget Proposal Form enables you to very briefly describe proposed expenditures, their adequacy, and their appropriateness and importance. The “Amount” column delineates the requested amounts. The “Brief Justification “ column permits you to provide some detail for each cost, (e.g., cost of flights or per diem for travel, approximate number of hours and hourly rate for student assistants) and to indicate that the amount requested is sufficient to complete the proposed research. In the space below, you may use up to 100 words of text to spell out any additional justification you consider necessary to make a case for the proposed expenditures.

I would like to further justify the supplies needed and use of the DEP’s research vessel the R/V Patricia Lynn. Yearly maintenance is needed for SCUBA gear that is used regularly. That is why I requesting the yearly maintenance of the regulators and the buoyancy compensators. Both are integral to diving. In addition, the RV Patricia Lynn is available for rental usage during the day from April to September and I am requesting funding for 6 days. This vessel is a great dive platform, safe and allows easy access to the water.

## 2) Proposal Narrative:

### 1) Significance:

The distribution and ecology of tropical corals is well-studied, however the basic biology and ecology of temperate corals is little known. One unique temperate coral that has been found recently in Long Island Sound is the scleractinian (hard) coral *Astrangia poculata*. It is unique in that it is one of four corals known world-wide to exhibit a facultative symbiosis with its zooxanthellae (single-celled plants living within the coral host). Most tropical corals die or “bleach” when they lose their zooxanthellae, however, this coral can be found subtidally existing both with and without. The with colonies appear brownish in color and the without colonies appear white in color. This co-appearance is rarely seen in coral ecology and has been little documented subtidally. This study will examine the distribution of these colonies in Long Island Sound.

*Astrangia poculata* has been found in the shallow and deep subtidal regions of the east coast from Cape Cod south through the northern most reef tracts of Florida and throughout the Gulf of Mexico (Cummings 1983). Thus, this coral has a large geographic distribution and can inhabit waters whose physical parameters (i.e. salinity, temperature, turbidity) vary widely. In no other area of its distribution do these factors vary more than in the Long Island Sound. The Sound represents a unique habitat for this coral, in that constant freshwater input would seem to put this coral at a disadvantage. This input results in salinity changes and increased sedimentation (particles suspended into the water column) which could interfere with coral feeding (tentacular) by smothering the coral. In addition to constant changes in salinity, sedimentation and temperature may play a positive role in coral growth and survival. Jacques and Pilson (1983) found, for Narragansett Bay corals, that coral growth was equal to that of tropical corals when exposed to increased temperatures. Given the higher water temperature in Long Island Sound, in comparison to Narragansett Bay, it is hypothesized that coral growth in Long Island Sound is greater, and subsequently, that local corals are larger. Examining this

coral's distribution and growth rate in Long Island Sound will provide data that demonstrates how corals may respond to changes in temperature, salinity, and sedimentation.

Literature Cited:

Cummings, C. E. 1983. The biology of *Astrangia poculata*. University of Rhode Island, Ph.D. dissertation. Pp. 149.

Jacques, T.G. and M.E.Q. Pilson. 1980. Experimental ecology of the temperate scleractinian coral *Astrangia poculata*. I. Partition of respiration, photosynthesis and calcification between host and symbiont. *Marine Biology* 60:167-178.

**2) Work Plan: I will provide the objective and corresponding work plan for completion.**

a) objective one:

Determine the subtidal distribution of *Astrangia poculata* at 10 sites in Long Island Sound? To determine the basic distribution of this coral in Long Island Sound, at each site, and at 10 meters depth, a 30 meter transect line will be laid out along the substrate. At 10 random intervals, along this transect line, a 0.25m<sup>2</sup> quadrat will be laid on the substrate and each coral colony will be counted. In addition, the height of the first 100 colonies counted will be measured to the nearest cm using a caliper. This will provide information on the presence/absence of corals from particular sites, as well as the basic morphology of the coral in Long Island Sound.

b) objective two:

What is the summer growth rate of corals in Long Island Sound? To determine the basic growth rate of *Astrangia poculata*, at three sites (East, Middle and Western Sound) 35 colonies will be tagged with aluminum tree tags. Each coral colony will be photographed and the number of polyps counted. Since an increase in polyp number is an indication of growth, I will take baseline measurements in the Late Spring/Early Summer of 2007, and then repeat these measurements in the Late Summer/Early Fall of 2007. Any change in polyp number will

indicate growth. I will then use a 1 factor ANOVA to examine the effects of site (East, Middle and Western Sound) on the change in polyp number (dependent variable).

### **3) Outcomes and reporting:**

The significant outcome of this research will include a publication submitted to the Journal of Experimental Marine Biology and Ecology. In addition, the results of this research will be presented in part at two scientific conferences, the Benthic Ecology Meeting, and the CSU-Research symposium. Also, results from this study will be used to aide in generating a larger grant proposal to the National Undersea Research Center at UCONN's Avery Point Campus examining the deeper distribution of this coral in Long Island Sound and Stellwagon Banks.