Application

Instructionally Related Activities Funds Request
2010-2011 Academic Year
DEADLINE: Fall and Academic Year 3/31/10
Spring TBD

Applications must first be sent to the appropriate program chair. Chairs will the recommend and route them to the Dean’s Office for review and authorization. The Dean’s Office will then forward them to the IRA Committee for consideration.

Activity Title: Habitat Choice in Hawaii’s Humpback whales
An interdisciplinary field based research and service learning opportunity.

Project Sponsor/Staff (Name/Phone): Rachel Cartwright 805 437 2635
Blake Gillespie 805 437 2404

Activity/Event Date(s): March 19th – 26th 2011
Date Funding Needed By: Spring 2011

Please Note that for Fall Requests the earliest that you will be notified of funding availability will be early June 2010 and for Spring Requests early January 2011.

Please check if any of the following apply to your IRA:

- X Equipment Purchase
- X Field Trip
- □ Event
- □ Participant data collection for public dissemination, i.e. interviews/surveys that result is a journal/poster session/newsletter
- □ IT Requirements
- □ Risk Management Consultation
- □ International Travel
- □ Late Submission
- □ Space/OPC Requirements
- □ Previously Funded: X YES □ NO
- □ Yes, Request #3 – previous trips ran in 2009 and 2010.

Does your proposal require IRB (Institutional Review Board) approval: No

Assessment submitted for previously Funded Activity: □YES

Academic Program or Center Name and Budget Code: Biology / chemistry

Date of Submission: October 2010

Amount Requested:

Estimated Number of Students Participating: 9
Application
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2010-2011 Academic Year

Conditions and Considerations

**Equipment Purchase**: If requesting large equipment, Project Sponsor must show proof of correspondence with OPC Administration. In addition, all other purchases must follow Procurement Guidelines.

**Events**: Attach copy of Events and Facilities Use Request Form (Public Folders-Events & Facilities folder). Consider time frame for set-up and take down.

**Participant Data Collection for Public Dissemination**: If Project Sponsor proposes to conduct research with human participants then it may be subject to IRB (Institutional Review Board for the Protection of Human Subjects) review. It is the Project Sponsor’s responsibility to inquire with the IRB prior to IRA application submission to determine if the project is exempt from IRB review so that funding is not delayed. Please indicate on the cover page if your project is exempt from IRB review.

**Field Trip**: If approved, Identified Risks of Participation and Release Agreement must be submitted for each student to the Program Office (Public Folders-HR Forms).

**IT Requirements**: Requires proof of correspondence and approval from IT Administration.

**International Travel**: Requires International Travel application be submitted to Center for International Affairs.

**Risk Management Consultation**: Requires proof of correspondence with Risk Management.

**Space/OPC Requirements, Infrastructure/Remodel**: Requires proof of correspondence with OPC Administration.

**Late Submission**: Requires explanation for emergency funding.

**Fiscal Management**: Project Sponsor’s program will be responsible for all costs incurred over and above what is funded through the IRA award and will be responsible for seeing that any revenue that is intended to offset the amount of the IRA award is transferred accordingly.
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Requirements and Signatures

Please provide the following in your application:

1. **Brief Activity Description.** Describe the activity and its relationship to the educational objectives of the students' program or major.

2. **Relation to IRA to Course Offerings.** All IRAs must be integrally related to the formal instructional offerings of the University and must be associated with scheduled credit courses. Please list all classes that relate to the program proposed.

3. **Activity Assessment.** Describe the assessment process and measures that the program will use to determine if it has attained its educational goals. **Please note a report will be due at the end of the semester.**

4. **Activity Budget.** Please enclose a complete detailed budget of the entire Activity **bold specific items of requested IRA funding.** (Page 4)

5. **Sources of Activity Support.** Please list the other sources of funding, and additional support for the activity.

7. **Acknowledgment.** Project Sponsor and Program Chair acknowledge that they have reviewed and accepted the Conditions and Considerations detailed on page 2.

**Signatures and Dates**

Project Sponsor ________________________________ Date: 1/28/10

Program Chair/Director _________________________ Date: 1/28/10

Dean of the Faculty _____________________________ Date: 11/03/10
Habitat Choice in Hawaii’s Humpback Whales
A field based research and service learning opportunity for Science Majors.

1. Brief Description:

This field trip is a continuation of a research experience and service learning project that ran for the first time in spring '09 and for a second time in March 2010. The course provides students with the opportunity to participate in a conservation-based research study, associated outreach activities and to experience first-hand the unique culture of the Hawaiian Islands.

The field trip runs over spring break each year; 9 enrolled students will head to Maui, Hawaii, where they will be working with a local research organization, the Keiki Kohola Project. This is a non-profit research organization that includes experienced field biologists, local boat captains and naturalists. Our students will join this research team and participate in all aspects of their on-going study of habitat preference within this critical habitat.

Pre-trip Preparation
Prior to the trip we will meet with students on a weekly basis. At these meetings, students will receive a comprehensive introduction to the behavioral ecology of large cetaceans, and the research methodology that is used in field research of this nature. Students will work in small teams to develop a detailed understanding of a particular research task assigned to them. They will then be responsible, as student mentors, for teaching fellow team members to accurately gather the data in question and for the post trip analysis of this data.

Field Activities
Whilst on the islands, students will meet with representatives from other local NGO’s, local management officials from the Hawaiian Island Humpback Whale National Marine Sanctuary, and other researchers who are active in the conservation arena in the region. These different entities will inform our students on the politics and the practicalities of the unique challenges of marine management and conservation. Through first hand experiences on the water, combined with the information the students will gain from these meetings, students will gain a very realistic picture of the current conservation challenges that face this region.

Student Participation in Research Dissemination
Additionally, students involved in the project will participate in a variety of media projects planned for this year that aim to publicize the remarkable results that we have compiled from this project to date. These results present a compelling picture of a region where human activity, in the form of vessel traffic, is heavily impacting the critical habitat of this endangered species. A documentary of the project is being prepared for broadcast on a local Hawaiian television. We are working on bringing an exhibition of project-related humpback whale photography and artwork to the Channel Islands Gallery, and we plan to encourage students to participate in the production of this show. Most importantly, the crux of our recent findings is that human activity has a clear impact on whale behavior in the Au’au channel; the students will be challenged with how to present this information outside the normal science-dissemination channel. How can our results be communicated to the public and whale-watching industry in a way that respects the role of each in endangered species management?
The Research and Student Capstone Projects
In previous years, students have researched and produced synopses on a wide variety of management issue impacting this region, from outreach activities to underwater noise. Many of the participating students have subsequently chosen to continue these studies, incorporating their work into capstone and other independent research projects. We see this as one of the most valuable outcomes of the course, as students voluntarily pursue their own original interests, alongside the contribution that they make to the larger research effort. This year, we will again encourage students to develop their own areas of interest, and to actively research these areas during their time on the island. On completion of the trip, students will be invited to present these studies on the Keiki Kohola Project website (www.caringforcalves.org) and to include these studies in their end of year research presentations at the Sage Research Forum.

Student-centered Improvements in the Course
In response to student feedback from previous years, we plan to include several cultural experiences as part of the trip: students will take a hike through the rainforest to a waterfall. A local guide will lead the trip, and give the students an overview of Maui’s biogeography, plant and animal life. Guided visits to a number of cultural sites around the island will develop the human dimension of the project, highlighting the relationship of Hawaiian native culture to the ocean, and the impact of western culture on native traditions. The traditional Hawaiian Luau we attended last year was very popular with the students, and provides an interesting counterpoint to the students’ ‘local’ experience. These activities are crucial; research must have a context to be meaningful and we are as dedicated to showing the students why we do research as much as how.

Taken together, these activities will ensure that their experience is well rounded and reaches beyond their own immediate disciplines and interests. This year we are particularly keen to encourage students from the arts program and English majors to participate in the course. Several inquiries from students in these majors have already been received. We plan to augment this by advertising the trip across the university, to ensure that all interested students have the opportunity to apply.

2. Relation of IRA to existing course offerings

Students who participate in the course will:

- Design experiments to test scientific hypotheses, collate data, conduct statistical analyses and evaluate research outcomes.
- Gain first-hand experience in problem solving – always a component of field research which involves animals in their natural setting.
- Identify topic appropriate research materials, synthesize information from a variety of sources and gain experience in effective communication of results in a variety of media.
- Develop communication skills and the ability to work as an effective team member in a diverse cultural setting
- Use analytic and data collection equipment in situ.
- Work as part of federally permitted research team, and contribute to ongoing efforts for the conservation of a federally listed, endangered species.
The content of the course as outlined addresses the larger program objectives of the Biology and Chemistry departments, as well as many of the specific objectives of Chemistry and Biology 492/494 courses.

Students will enroll in one of a number of potential courses, underscoring the interdisciplinary nature of the training and research. Biology students will enroll in either Biol 492 or 494, chemistry students will enroll in either Chem 492 or 494; in either case the course can fulfill a major requirement. Additionally, chemistry majors may substitute this course for Chem 251, Quantitative Analysis Lab. Students from other majors, for example ESRM, will be encouraged to enroll in any of these classes for credit as well. The goal is to involve students from diverse majors so that each can enrich the educational benefit of the other.

The work covered in the course complements a range of other biology and chemistry courses, including Behavioral Ecology (Biol 407), Marine Biology (312), Science and Public Policy (Biol 345) Quantitative Methods in Biology (Biol 203), Environmental Chemistry (Chem 301) and Quantitative Analysis (Chem 250/251).

Biology and chemistry students are already actively involved in a related laboratory based research project, under the supervision of the applicants (Chem/Bio 494), which explores the dietary and behavioral implications of blubber stratification and the ontogeny of neonate muscle tissues. The field course proposed here provides a practical, field based extension of this work and as we develop a core of students who are experienced in marine mammal studies such as this, we will be well placed for extending this work to include more local settings, with a regional focus on the marine mammal populations of the Santa Barbara Channel.

3. Activity assessment

The course assessment will comprise two components, related to its two key deliverables:

1. Student research projects will be assessed according to a rubric that measures their engagement with research planning and preparation, design and subsequent data analysis; grades will be assigned based on this rubric.

2. The topics-based component of the course will be assessed not only by the instructors, but by members of the target audience for the different media as well, using a voluntary survey form.

The students will also complete a self evaluation of both their research and their outreach activities using a rubric that they develop at the beginning of the term.

4. Activity budget.

*(Costs are based on 9 students and 2 instructors)*

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadrunner shuttle to LAX</td>
<td>460</td>
</tr>
<tr>
<td>Flights</td>
<td>11 x 750</td>
</tr>
</tbody>
</table>
Accommodation    7 nights

*(Accommodation will be in two adjoining self catering duplexes)*

Total accommodation:          5000
Transport – SUV for 8 days + airport shuttles       800
Food (all self catering – budget $100 per person)  1100

Research activities:

Additional Vessel hire 4 days                  2000

*(The Keiki Kohola Project has a small research vessel, which would be used in the project, however a second vessel would be required (see Attachment 2 for further details / explanation)*

Insurance *(additional liability insurance to cover students on research boat)*  2500

Vessel running costs (Captains stipends, boat fuel, dock fees) 4500
*(On boat days when two vessels are out on the water, we will require two licensed captains - total 10 boat days – 250 per day is a typical stipend for captains)*

Equipment required – SRL camera and lens         1650
*(As students will be on two different boats, an additional camera will be required. It needs to be sufficient to operate at high shutter speeds, we need to obtain a high resolution image and we need a long lens (300m). Previously, we have used loan cameras from the library, however these are not compatible with the research software and also they do not meet the required performance standards outlined)*.

Context-building activities
speaker fees, guide costs, luau costs          2000

Commercial whale watching trips                  450

Total:                                      28,710

*(Student contribution estimated as $500 each)*  (4,500)

**Total requested from the IRA**  24,210

5. Sources of additional support.

The Keiki Kohola project will provide access to its research vessel, logistic support and most of the field equipment required by the students.
This represents an in-kind donation of around $2000 per student, based on current equivalent Earthwatch-type programs, which charge for participation in this type of project.

Monitoring equipment will be provided by Keiki Kohola Project. Dr. Gillespie will provide additional equipment for field measurements from his research laboratory.

Students will also be involved in fund raising activities after the trip. Planned activities include the sale of photography and t-shirts. Production costs of these items will be covered by the Keiki Kohola Project. Profits generated will primarily be donated to offset the carbon footprint of the trip.

### Application

**Instructionally Related Activities Funds Request**

**2009-2010 Academic Year**

**ACTIVITY BUDGET FOR 2010-2011**

1. Operating Expense Budget

   A. Lodging
      - Self catering condos
      - Total - $5000

   B. Vendor Printing
      - Shuttle to LAX - 460

   C. In-State Travel
      - Roundtrip LAX – Maui: 11 X 750 = 8250

   D. Out-of-State Travel
      - Additional research vessel 4 days
      - = $2000, minivan rental - $800

   E. Equipment Rental

   F. Equipment Purchase

   G. Contracts/Independent Contractors

   H. Honorarium

   I. OPC Chargeback

   J. Copier Chargeback

   K. Other (Please Specify) (See above)

   **TOTAL Expenses** $28710

- 8 -
2. Revenue
   A. Course Fees  
   B. Ticket Sales  
   C. Out of Pocket Student Fees  
       (exclusive of course fees)  
   D. Additional Sources of  
       Funding  
   
   E. Requested Allocation  
       from IRA  

   Total Revenue  

   
   4500
   
   24,210

Attachment 1 – Appendix

Habitat Choice in Hawaii's humpback whales – Proposed research for Spring '11.

We are pleased to inform the IRA committee that results from the first two years of this project are currently in review for publication. As mentioned in our outline, the results are compelling and demonstrate a clear response to vessel traffic by female-calf humpback whales that use this area as a key breeding ground. We attach the abstract and key figures below.

For the students involved over the last two trips, the experience of seeing their work translated into a published research study that directly addresses a key management issue in this region is certainly noteworthy. Beyond this, the study will establish the presence of CSUCI within the marine mammal research community, but perhaps most importantly, this study will make a real and tangible contribution to the conservation of humpback whales in this region, by providing accurate and up to date information that is directly applicable to the management of this critical region.

Experience gained in the previous years of operation allow us to continue to develop this field experience; undoubtedly students responded very positively to the inclusion of additional cultural activities and we intend to build this portion of the field trip. Students also continue to request more focused instruction before the trip. Pre-trip student activities this year will therefore focus on the research protocols that they will be using while in the field, so that they are fully equipped with the pre-requisite skills. While this request perhaps reflects the diverse backgrounds of students applying for the trip, we feel that this accessibility for students with little or no field experience is one of the trips strengths.

Please find attached the abstract for our manuscript. Note, Kevin Eden is a student author who participated in the trip in Spring 10.
Fine scale changes in habitat use in response to vessel activity within the critical breeding habitat of a migratory mysticete, the humpback whale (*Megaptera novaeangliae*).

*Cartwright, R. 1,2, LaBonte, K.1,2, Gillespie, B. 1,2, Eden, K.1,2 and Sullivan, M.3

*Corresponding author: rachel.cartwright@csuci.edu
Running Title: Habitat preference in female-calf humpback whales

Abstract

The impact of vessel traffic and other human activity on wildlife has long been a subject of scientific inquiry, especially in areas where economically lucrative human activities overlap with critical habitat for endangered or recovering species. The Au‘au channel between the islands of Maui and Lanai, Hawaii represents such a region. This protected channel comprises critical breeding habitat for humpback whales (*Megaptera novaeangliae*) of the Central North Pacific stock, however it is also the focus of a flourishing local whale watching industry. Our study focuses on fine scale trends in female-calf habitat preference within this region and reveals that while mysticete female-calf pairs within breeding regions typically favor shallow, inshore waters, these waters are under-utilised in this locale. Regions between 2-4 km from the shoreline and water depths between 40-60 m comprise preferred habitat, with further shifts offshore seen in areas of high vessel traffic. While this may have few consequences for the adult portion of the population, energetically conservative behavioural strategies that characterize maternal mysticetes in breeding regions may be compromised by this habitat shift. These differential impacts of anthropogenic activities on specific age and gender cohorts of a population warrant targeted management to ensure that the quality of critical habitat is maintained.
Figure 5: Distribution of humpback whales along the eastern shoreline of the Au’au Channel.