

## **ES470: Biodiversity & Conservation of Coastal BC**

### **A field course on Calvert Island, Central Coast, BC**

June 5 to June 27, 2014 [Hakai Beach Institute](#), Calvert Island

**Instructor:** Dr. Brian Starzomski, University of Victoria  
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**Course website:** <http://starzomski.weebly.com/es470.html>

ES470 “Biodiversity and Conservation of Coastal BC” is designed to allow students to gain understanding of ecological methods, biodiversity science, and current conservation and restoration topics in coastal, marine, and terrestrial biodiversity. The majority of the course is taught outdoors around the Hakai Beach Institute through field trips, laboratory exercises like a shore crab capture-mark-recapture exercise, and student-led research projects.

The course aims to foster deep disciplinary and interdisciplinary thinking and critical analysis in biodiversity science and conservation, and students learn new techniques for identifying, monitoring, and analyzing biodiversity in coastal British Columbia and around the world. While the host Hakai Luxvbalis region is one of the most removed from industrial exploitation in the province, students are taught to see the 10,000+ year history of human occupation and use of the land.

The major components of the course are a collaborative field project (a 3-person group project to measure and interpret patterns and processes of biodiversity on Calvert Island) and a digital species collection, an individual project to develop a photo collection of vascular and non-vascular plants, birds, intertidal invertebrates, and other taxa. Students work independently and in groups, and return from this field course with a much deeper understanding of biodiversity in BC.

**Grading Scheme:**

\* Collaborative field project (a 3-person group project to measure and interpret patterns and processes of biodiversity, and/or to develop restoration/management plans, on Calvert Island) . The final paper will be due one week after the end of the course.

**30%**

\* Digital species collection (an individual project to develop a digital collection of vascular and non-vascular plants, birds, intertidal invertebrates, and another taxon (or taxa) of your choice. Marks will be given for uniqueness, rarity of species, and depth of surveying). Each student must produce 3 accounts in the style of the “Biodiversity of the Central Coast” (<http://centralcoastbiodiversity.weebly.com/>) website. These must be of species not yet listed on the website. Students will be given authorship rights when their accounts are published online.

Examples:

<http://centralcoastbiodiversity.weebly.com/northern-rice-root-bull-fritillaria-camschatcensis.html>,

<http://centralcoastbiodiversity.weebly.com/yellow-pond-lily-bull-nuphar-polysepala.html>,

<http://centralcoastbiodiversity.weebly.com/black-headed-grosbeak-bull-pheucticus-ludovicianus.html>,

<http://centralcoastbiodiversity.weebly.com/grizzly-bear-bull-ursus-arctos.html>.

**30%**

\* Seminar participation and discussion, field participation and discussion (participation and discussions of research papers and reports once a week, integration into field trips and labs)

**20%**

\* Exam (a mid-course exam on biodiversity concepts and identification, ecological methods, and restoration ideas)

**20%**

**Cost:**

Field expense fee: **\$1000**. This is payable by cheque made out to ‘University of Victoria’. These can be dropped off to Elaine Hopkins in the Environmental Studies office, or mailed to:

Dr. Brian Starzomski  
School of Environmental Studies  
PO Box 3060 STN CSC

Victoria BC V8W 3R4  
Canada

**\*\* IMPORTANT FUNDING INFORMATION \*\* :**

The field cost of the course is \$1000. We will be offering a number of course awards (up to \$1000/student) to offset this field cost. This course is taken with permission of School of Environmental Studies (though minimum course prerequisites include one of ES301, 321, or 341; other courses may be considered as prereqs by consulting with Dr. Starzomski). Contact Dr. Starzomski [starzom@uvic.ca](mailto:starzom@uvic.ca). Accepted students are to provide a \$1000 non-refundable course fee. Scholarships of up to \$1000 are available by application, on a competitive basis. Apply to Dr. Starzomski by email with a 1 page cover letter explaining why the course is important for your career and education goals, how you will personally benefit from the course, and why you are interested in the Central Coast. Please also provide transcripts and a CV/resume.

**Travel and accommodations:**

We will be travelling as a group by boat from Bella Bella to the Hakai Beach Institute on June 5th. **Details will follow on the boat timing, but you must be in Bella Bella on June 5th.** We will travel back to Port Hardy at the end of the course (June 27<sup>th</sup>). Cost of the boat trips will be covered by your course fee.

Accommodations and meals will be taken at the student dorms at the Hakai Beach Institute, and wireless internet access will be available. **Special diets and most food allergies can be accommodated with advance notice: please contact Brian ASAP ([starzom@uvic.ca](mailto:starzom@uvic.ca)) so that the Hakai Beach Institute can be notified. This includes vegan and vegetarian diets. These diets are easily accommodated if we have the information well in advance.** Bed linens and towels will be provided. Costs of accommodations and meals will be covered.

**Course requirements:**

Digital camera (for digital species collection)

Laptop computer

Dunn, J. L. and Alderfer, J. 2011. National Geographic Field Guide to the Birds of North America, Sixth Edition. - National Geographic. (either this one, or Sibley below, not both).

Harbo, R. M. 2011. Revised 2<sup>nd</sup> Edition. Whelks to Whales: Coastal Marine Life of the Pacific Northwest. - Harbour.

MacKinnon, A. and Pojar, J. 2005. Plants of Coastal British Columbia, Revised. - Lone Pine Publishing.

Sibley, D. A. 2003. The Sibley Field Guide to Birds of Western North America. - Knopf. (either this one, or Dunn and Alderfer above, not both. Updated or previous versions of both will work as well)

We will also make heavy use, at times, of parts of the following books (though you do not have to purchase them):

Krebs, C. J. 1998. Ecological Methodology, 2nd edition. Benjamin Cummings.

Zar, J. H. 2009. Biostatistical Analysis, 5th edition. Prentice Hall.

Deur, D., and N. J. Turner. 2005. Keeping it living: traditions of plant use and cultivation on the Northwest Coast of North America. University of Washington Press ; UBC Press, Seattle; Vancouver.

Finally, we will read and discuss papers from the primary literature.

**About the setting:**

This is a remote site where the weather can be sunny and beautiful one day, and cold and wet the next. The open Pacific is on the west side of the island, and conditions can be difficult (and exciting) at the best of times. Once we are at the site, we will not be leaving, so bring everything you need to be comfortable for 3+ weeks. While the site is very comfortable, there are no stores nearby.

**There are numerous middens and culturally modified trees on Calvert Island, and at least one petroglyph. It is essential that you treat these culturally important sites with respect. Please do not disturb them!**

**Key things to bring with you (this is very important: the setting is remote, the weather can be very bad, and rain and cold weather are to be expected on occasion. In other words, don't bring cotton t-shirts and Ugg boots. But polyester, fleece, and hiking & rubber boots will be the height of fashion! Contact Brian if you would like to talk about exactly what you should take):**

- Raingear (Essential!)
  - Waterproof jacket and pants of the best quality possible
  - Waterproof hat and/or toque (I never go anywhere in BC without a toque, rain or shine, 12 months of the year)
  - High rubber boots
  
- Warm Clothes (Essential!)
  - Wool sweaters, fleece, long johns, wool socks etc. **Think more Mountain Equipment Co-op than Club Monaco.** Fleece is lighter and dries faster.

- Wool or Fleece Gloves. A pair of work gloves would also suffice and are occasionally useful (e.g., for handling barnacle covered rocks).
- Bug repellent/bug jacket. **The biting insects can be very abundant.** Bring bug dope, a bug net/jacket, and a sense of humour 😊
- Flashlight/headlamp and batteries
- Personal items
  - Toothbrush, shampoo, other toiletries, coffee/tea mug/thermos.
- Daypack- waterproof ones are very good, but not entirely necessary. Take a couple of garbage bags for waterproofness in a regular daypack.
- Pencils, pen, waterproof notebook or two.
- Money - There are no banks at Hakai and Bella Bella is a 1.5 hour boat ride away. Make sure your banking is in order before you arrive.
- A wetsuit if you like
- Binoculars - Not a necessity but these are very nice to have; waterproof ones are best

#### Course format:

- ~10 hours of lectures frontloaded in the course to allow concentration on the group projects and digital species collections in last 2 weeks
- 3 hour labs (Capture-Mark-Recapture Lab)
- Thursday and weekends free for work on individual/group projects
- The above will be changed where appropriate to accommodate tidal cycles and weather
- We will have occasional guest speakers which may lead to presentations scheduled on short notice, as well as field work and field trips related to their research and presentations

#### Course Objectives

- gain understanding of ecological methods, biodiversity science and current conservation and restoration topics in biodiversity, in coastal, marine, and terrestrial settings
- foster deep disciplinary and interdisciplinary thinking and critical analysis on biodiversity science and conservation
- learn new techniques for identifying, monitoring, and analyzing biodiversity in coastal British Columbia and around the world

#### Tentative Course Schedule (subject to change)

1. Welcome to the course

- Structure of the course
    - Classes and labs
    - Projects
    - Grading
  - Summary of contents of the course
2. Biodiversity on the coast
    - Overall in western North America: what makes it so special?
    - Biodiversity of the coast
  3. Species at risk
    - How are species listed?
      - Sea Otters
      - Abalone
  4. The functions of diversity
    - Diversity - productivity relationships
    - Ecosystem values and services
  5. Coastal environments
    - Survey
    - Field trips
    - Theoretical/empirical concerns
    - Marine-terrestrial links and subsidies
  6. Climate change and coastal biodiversity
    - Disturbance: Press vs. pulse disturbances
    - Sea level
    - Currents
    - Invasive species
  7. Marine-terrestrial interactions
    - from land to sea
    - from sea to land
    - what does it mean?

**General comments:**

What is biodiversity? How do we measure it? How do we value it? How do we use it? How might we restore it? Why are we obsessed with it? How universal is the obsession? Are we on the brink of the "Sixth Great Extinction"? How would we know? How is biodiversity changing? What are the special conservation challenges and opportunities on BC's Central Coast, and why are they globally significant? How have people lived on and used the resources of this coast for millennia? How do they do it now? This course will examine global, regional and local patterns of biodiversity and the underlying

processes of speciation, migration and extinction that generate them. We will also explore the impacts and dependence of humans on biodiversity, the evolution of biodiversity value systems, and approaches to measuring, monitoring and protecting biodiversity. Theoretical work will be complemented with group-based practical projects that contribute to long-term understanding and conservation of local biodiversity. This is an upper level course with lecture, field and seminar components. In general, the course will be weighted toward lecture time (often in the field) in the first half of the course (with a lot of thought given to creating excellent group projects), with the second half of the course focused more on field work and techniques for the group projects. The goals of the course are modest. In addition to addressing the above questions, we will hone our observation, identification, communication and critical thinking skills. The success of the course relies on the commitment and diversity of interests and backgrounds of the participants.

**Library resources:**

A number of items will be available from the personal library of the instructors, including numerous field guides (both general and taxon-specific). I encourage you to bring any additional resources, like field guides, that you may find useful in this environment.