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Programa de Conservación Biocultural Subantártica
Sub-Antarctic Biocultural Conservation Program
 Universidad de Magallanes, Instituto de Ecología y Biodiversidad, Chile
 & University of North Texas, USA

Sub-Antarctic Biocultural Conservation Program
University of North Texas & Universidad de Magallanes
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Tracing Darwin's Path (UNT) & Field Biocultural Conservation (UMAG-IEB)
27 December 2018 – 13 January 2019 (includes travel dates) Program & Syllabus (Tentative)

UNT Professors

Dr. James Kennedy, *stream ecologist*, UNT-UMAG

Dr. Ricardo Rozzi, *conservation biologist & environmental philosopher*, UNT-UMAG-IEB

UMAG Professors

Dr. Tamara Contador, *stream ecologist*, UMAG, Chile

Dr. Christian Formoso, *writer & poet*, UMAG, Chile

Dr. María Teresa La Valle, *philosopher*, visiting profesor UMAG & Universidad Nacional Tres de Febrero, Buenos Aires, Argentina

Dr. Roy MacKenzie, *biologist*, UMAG, Chile

Dr. Laura Sánchez, *biologist*, UMAG, Chile

Dr. Elke Schüttler, *invasive species ecologist*, UMAG, Chile

MFA Paola Vezzani, *sculptor*, UMAG, Chile

Invited Professors

Dr. Thorne Anderson, *journalist*, UNT (Mayborn School of Journalism)

Dr. Thora Herrmann, *geographer*, University of Montreal

Dr. Mary Power, *freshwater ecologist*, University of California – Berkley

Dr. Michael Thompson, *philosopher*, UNT

Teaching Assistant

Javiera Malebrán, *environmental biologist*, Universidad de Chile & IEB

Student Teaching Assistants

Gaelle Crete

Sabrina Moore

Coordinators

Kelli Moses, *international coordinator*, UMAG-IEB-Omora Ethnobotanical Park(OEP), Puerto Williams

Jennifer Torres, *regional coordinator and accountant*, UMAG-IEB-OEP, Punta Arenas

Omora Staff

Omar Barroso, *field ornithologist*, UMAG-IEB-OEP, Puerto Williams

Miguel Troncoso, *education coordinator*, UMAG-OEP, Puerto Williams, Puerto Williams

Course Catalogue Information: BIOL 4054/5054 and PHIL 4054/6781

COURSE DESCRIPTION:

Overview: The University of North Texas (UNT), study abroad course, Tracing Darwin's Path (TDP) is part of UNT's Sub-Antarctic Biocultural Conservation Program (SBCP; www.chile.unt.edu). It is taught in partnership with a masters-level class in conservation, *Field Biocultural Conservation* at the University of Magallanes (UMAG), Chile. Both courses are also taught as part of the Chilean Long-Term Socio-Ecological Research (LTSER) Network's program of field courses, coordinated by the Institute of Ecology and Biodiversity (IEB; www.iebchile.cl).

The Field Biocultural Conservation (FBC) and TDP courses will be held between the 27th December 2018 and 13th January 2019 (dates include travel days). Students participating in both courses will be involved in the same activities throughout the duration of the courses. These activities involve preparatory tasks prior to the course, post-course activities, and for those interested, continued analysis of data.

COURSE GENERAL OBJECTIVES:

Biocultural diversity has been defined as the “diversity of life in all its manifestations -biological, cultural, and linguistic-that are interrelated within a complex socio-ecological adaptive system.” Addressing modern day environmental issues requires approaches that take into account this multi-faceted meaning of diversity. In this context, this course will provide students with an interdisciplinary research, conservation, and education experience at one of the most pristine wilderness areas remaining in the world. The course will explore ways of defining, studying, communicating, and conserving biocultural diversity. These goals will be achieved by exposing students to a first-hand experience using the case study of the creation and implementation of the OEP as a long-term ecological study site that serves to *link society and development with biodiversity, history and ecosystems* in the CHBR.

SPECIFIC OBJECTIVES:

- 1) To study various ways of approximating diversity in its multiple manifestation and scales.
- 2) To observe, describe, and investigate in a philosophically-comparative way, and ecologically-integrated way, conspicuous (e.g., birds, mammals) and less conspicuous (e.g., aquatic invertebrates, non-vascular plants) taxonomic groups.
- 3) To utilize the OEP and the CHBR as concrete examples of integrating environmental ethics and ecological sciences into biocultural conservation, using the Field Environmental Philosophy (FEP) approach developed by the SBCP research team.
- 4) Partner students from different cultures along with different academic interests, cultural issues, and perspectives to provide the opportunity for an interdisciplinary experience that integrates philosophical, ecological, environmental, and conservation issues. Through these opportunities, students will discover and better understand their roles as global citizens.

Instructors will strive to provide a characterization of scientific and philosophical research to help make distinctions between these two approaches, as well as identify complementarities between them.

Research topics of the TDP-FBC January 2018 courses

The general topic of these courses is biocultural conservation. It has a strong field component in which students get first-hand encounters with the diversity of people inhabiting the sub-Antarctic Magellanic ecoregion and explore together the main habitat types (including penguin colonies, watersheds dominated by *Nothofagus* forests, etc.). Course participants include handcrafters from the indigenous Yahgan community, teachers from local schools, tourist operators, as well as Chilean and Latin American students, researchers, and artists.

The class will participate in long-term studies designed to better understand the ecology of the sub-Antarctic forests of the CHBR (55°). The activities will include research on: 1) the ecology of forest bird species through the Omora Park long-term bird-banding program. 2) Human-wildlife conflict: the exotic

mammals of Navarino Island. 3) Long term studies of the diversity and life history of the water invertebrates. 4) Water quality of rivers with different human impacts in the Puerto Williams region. 5) Ecotourism and Biocultural Conservation in the Miniature Forests of Cape Horn and plant biology.

These activities will include study sites in OEP and in the Robalo Watershed on Navarino Island. A specific schedule of activities is provided in the Tentative Schedule.

Birds, Exotic Mammals, Aquatic Invertebrate, and Water Quality Studies and Ecotourism

Here are some of the questions that will be addressed in the research:

Small brown forest birds, the most conspicuous and diverse, but little-known vertebrates

- A) How many species exist and how abundant are they in the forest?
- B) How long do birds live? What do they eat?
- C) How are birds affected by habitat disturbances?
- D) What food is available for birds?

There are more exotic than native mammals on the Island

- A) Which mammals were here 100 years ago and which are here now?
- B) How did exotics arrive and became established?
- C) What are their roles or impacts in these ecosystems?
- D) How can we manage established exotic mammals?

Aquatic invertebrates, as a barometer for watershed and long-term climate change

- A) What are the life cycles of the major aquatic invertebrates in the rivers of the CHBR?
- B) How are life cycles of aquatic invertebrates influenced by external factors such as temperature and changes to environmental conditions in the watershed?
- C) How do aquatic insects link terrestrial and aquatic ecosystems?
- D) How do aquatic invertebrates change relative to human impacts?

Water quality in selected rivers near Puerto Williams

- A) How do key water quality characteristics change along a stream gradient?
- B) How does water quality change relative to human impacts?

Ecotourism and Biocultural Conservation

Finally, ornithological, plant, and freshwater ecology work will involve the practice of ecotourism as a tool to achieve biocultural conservation.

- A) Students will be required to take what they have learned from the course and prepare activities for tourists and other visitors to Omora Park that include an ecological and ethical orientation.
- B) Activity approaches will aim for visitors to gain not only an understanding and knowledge about the unique sub-Antarctic biodiversity, but also provide a transformative experience to cultivate an ethical and sustainable relationship with this biodiversity, both locally and globally. Experience will focus on ecotourism with a hand-lens.
- C) How do vascular and non-vascular plant diversity contrast in lower and higher elevations at Omora Park? How can the little non-vascular plants be included in ecotourism? How can you communicate the ecological, economic, aesthetic, and ethical values of bryophytes?
- D) The heart-to-heart encounter with the forests birds. How these birds respond to disturbances? How they communicate among themselves? What do they teach us? As part of the living community, our close relatives deserve respect and ethical considerations.

Course Itinerary

The dates and times of the course activities are given in the Syllabus Appendix. This itinerary is tentative and subject to change due to events beyond the control of the course instructors. For example, much of the course is structured around field activities which may be impacted by weather events. A daily schedule with the day's activities will be posted at the field station.

IN-COURSE ACTIVITIES AND ASSIGNMENTS

Ecotourism with a Hand Lens in the Miniature Forests of Cape Horn

Students will gain a general overview of bryology and identify mosses, liverworts, and lichens on different substrates (bark, soil, rock) and their ecological interactions with other plants, animals, and ecosystem functions. Students will also clearly define economic, aesthetic, ecological, and ethical values of bryophytes and biodiversity in general. They will integrate this understanding with the metaphor of the hand lens and the activity of ecotourism with a hand lens, designing their own way of guiding this activity. This will prepare for practicing the biocultural conservation approach to promote the integration of ecological sciences and environmental ethics, and the conservation of the tiny plants and animals inhabiting the Miniature Forests of Cape Horn that so often are overlooked in traditional conservation initiatives.

Natural History / Art Journal

Field notebooks are critical tools for the field biologist or philosopher to record observations, thoughts, and experiences while in the field. Throughout history, field notes have enabled, not only the person recording the observations but generations of scientists that follow, to think about problems and theories in new ways. When reading the observations that Charles Darwin's summarized from his journals in the Voyage of the Beagle, it is striking the way he blends scientific observation with reflections about the broader implications, context, and surroundings (including cultures) he encountered in his 5-year trip around the world. Other examples include Lewis and Clark's writings about the Western United States. We would like to "trace Darwin's path" and ask each student to keep a journal of the day's reading, reflections, activities, and achievements. Entries should consist of reflections on the assigned readings, activities and observations made during field activities. Ideally, field notes should be made using a waterproof pen (or pencil) in a journal with waterproof paper (such as Rite in the Rain, All-Weather Journal). However, other notebooks can be used, but they must be bound. Notebooks whose pages are made with 20 lb. paper and have a high cotton content are best. If the notebook is not waterproof, it should be protected in a sealable plastic bag. The maximum size for the field notebook should be approximately 8.5" x 11" when two pages are open. This size enables the journal to be conveniently xeroxed and carried in the field. The class will include drawing exercises. While the same field book, some students may want to use a separate book for these activities. It is expected that journal entries are legible, and kept current. At the end of the class, journals will be collected on 11 January 2018. The journals will be returned after they are graded.

Presentation of Research Results

Students will also prepare PowerPoint presentations after samples have been analyzed to present preliminary results. These presentations will be carried out during January 10th, 2019 at the Field Station.

Grading

Participants in Tracing Darwin's Path are expected to attend and participate in all course activities. Participation ***In-course activities and assignments*** will be count for 75% of the final grade. A list of mandatory, suggested, and supplemental readings is provided in the section following the list of activities. Student responsibilities are to prepare ahead of time, attend all the discussion sessions, field exercises, ask questions, and express themselves creatively and concisely in their work. Ways of earning points for participation include contributing positively to class discussion of readings and participate in field exercises. Contributing positively requires having read, and as thoroughly as possible understood, the assigned readings, and at least being able to raise important questions, if not provide definitive answers. The ***Post-course assignment Essay*** will count for 25% of grade you receive in the course.

Post-course assignment Essay (30%)

Each student will select one of the research topics/themes covered in the class (listed above) and develop a 5-7 page essay (12 font, 0.5 inch margins, double-spaced). The paper must incorporate the readings, observations from you field books, and class discussion. The paper should include an Introduction, a review of the literature and discussion of the topic you choose especially as it relates to sub-Antarctic region of Chile. Students taking TDP for Biology credit must follow the appropriate format for a citing and preparing a bibliography/literature cited section. Either the format for Ecological Society of America or Entomological Society of America is acceptable. I am including the guidelines for the Entomological Society of America because they provide excellent examples (https://academic.oup.com/aesa/pages/Manuscript_Preparation).

To receive credit, essays should be submitted by email (to ([DeCuir, Victoria](mailto:Victoria.DeCuir@unt.edu) <Victoria.DeCuir@unt.edu>@unt.edu and) no later than 5:00 PM on 27 February 2019.

UNIVERSITY OBLIGATIONS AND POLICIES

BEHAVIOR

Study abroad trips require considerable flexibility, maturity, and cultural sensitivity. The culture and the political system you will be exposed to in this class will be different than the US and may provoke strong emotional responses. We expect that you will strive to understand the culture and learn to reason through any uncomfortable, but productive, experiences.

HEALTH, SAFETY, LEGAL ISSUES ABROAD

UNT's study abroad program will provide guidance regarding legal issues associated with travel to Chile. They will also provide travel health insurance information via the study abroad application link.

Academic Dishonesty Policy: Students are responsible for reading, understanding, and knowing UNT's Academic Dishonesty Policy that can be found at: http://www.vpaa.unt.edu/academic_integrity.htm. Academic dishonesty in this class is unacceptable and will not be tolerated in any form.

Disability Accommodation Statement: The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid

any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. *Students are strongly encouraged to deliver letters of accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student.* For additional information see the Office of Disability Accommodation website at <http://www.unt.edu/oda>. You may also contact them by phone at 940.565.4323.

Drop/Withdrawal Information: Drop/Withdrawal Information and other important Academic Dates can be found at www.essc.unt.edu/registrar/schedule/scheduleclass.html

READINGS

Most readings can be found on-line and downloaded as PDFs documents from:

UNT library site (UNT student credentials required; Password: chile2018)

<http://guides.library.unt.edu/c.php?g=415168&p=2828887>

UMAG-Omora site (Password: biocultural)

http://www.umag.cl/facultades/williams/?page_id=4212

Required Textbooks

- Goffinet, B., R. Rozzi, L. Lewis, W. Buck & F. Massardo. 2012. *The Miniature Forests of Cape Horn: Eco-Tourism with a Hand-lens* ("Los Bosques en Miniatura del Cabo de Hornos: Ecoturismo con Lupa"). Bilingual English-Spanish edition. UNT Press-Ediciones Universidad de Magallanes, Denton, TX and Punta Arenas, Chile. 448 pp. ISBN 978-1-57441-282-6.
- Rozzi, R., F. Massardo, C. Anderson, S. McGehee, G. Clark, G. Egli, E. Ramilo, U. Calderón, C. Calderón, L. Aillapan & C. Zárraga. 2010a. *Multi-Ethnic Bird Guide of the Sub-Antarctic Forests of South America*. University of North Texas Press-Ediciones Universidad de Magallanes, Denton, TX and Punta Arenas, Chile. 235 pp. ISBN-13: 978-57441-282-6.

Required Readings

- Contador, T.A., J.H. Kennedy, R. Rozzi & J. Ojeda. 2015. Sharp altitudinal gradients in Magellanic sub-Antarctic streams: patterns along a fluvial system in the Cape Horn Biosphere Reserve (55°S). *Polar Biology* DOI 10.1007/s00300-015-1746-4
- Darwin, C. 1838. Tierra del Fuego. Pp. 204-231, in *The Voyage of the Beagle*. Reprint, London: Everyman's Library, 1975.
- Hynes, H.B.N. 1975. The stream and its valley. Edgardo Baldi Memorial Lecture. *Verhandlungen des Internationalen Verein Limnologie* 19: 1-15.
- Leopold, A. 1949. Foreword (pp. vii-ix), 65290 (pp. 87-92), Thinking like a Mountain (pp. 129-133), The Land Ethic (pp. 201-226), in *A Sand County Almanac and sketches here and there*. Oxford University Press, New York.
- Miller, K.K., E.G. Ritchie & M.A. Weston. 2014. The human dimensions of dog-wildlife interactions. Pp. 286-303, in M.E. Gompper (ed.), *Free-ranging dogs & wildlife conservation*. Oxford University Press, Oxford, U.K.
- Rozzi, R. 1999. The Reciprocal Links between Evolutionary–Ecological Sciences and Environmental Ethics. *BioScience*. 49(11):911-921.
- Rozzi, R., C. Anderson, C. Pizarro, F. Massardo, Y. Medina, A. Mansilla, J. Kennedy, et al. 2010b. Field environmental philosophy and biocultural conservation at the Omora Ethnobotanical Park: Methodological approaches to broaden the ways of integrating the social component ("S") in Long-Term Socio-Ecological Research (LTSER) Sites. *Revista Chilena de Historia Natural* 83: SM19-SM28 (27-68).
- Rozzi, R., X. Arango, F. Massardo, C. Anderson, K. Heidinger & K. Moses. 2008a. Field Environmental Philosophy and Biocultural Conservation: The Omora Ethnobotanical Park Educational Program. *Environmental Ethics* 30: 325-336.
- Steinbeck, J. & E.F. Ricketts. 1941. *Sea of Cortez: A Leisurely Journal of Travel and Research*. Viking Press. Chapters 4 and 21. Sutherland, W.J. 2003. Parallel extinction risk and global distribution of languages and species. *Nature* 423: 276-279.
- Vannote, R.L., G.W. Minshall, K.W. Cummins, J.R. Sedell & C.E. Cushing. 1980. The river continuum concept. *Canadian Journal Fisheries and Aquatic Sciences* 37: 130-137.
- White, L., Jr. 1967. The historical roots of our ecological crisis. *Science* 155: 1203-1207.

Supplementary Textbooks

- Contador, T.A. & J.H. Kennedy. 2014. Habitantes sumergidos bajo los ríos del Cabo de Hornos/Underwater inhabitants of the rivers of Cape Horn. Ediciones Universidad de Magallanes, Punta Arenas, Chile. 96 pp. ISBN: 978-956-358-063-1
- Jaramillo, A. 2003. Birds of Chile. Princeton University Press, Princeton.
- Joosten, H. & Clarke, D. (eds) 2002. Wise use of Mires and Peatlands. International Mire Conservation Group and International Peat Society. Saarijärvi, Finlandia (253 pp). ISBN 951-97744-8-3.
- Rozzi, R. & J.E. Jiménez (eds.). 2014. *Magellanic Sub-Antarctic Ornithology. First decade of long-term bird studies at the Omora Ethnobotanical Park, Cape Horn Biosphere Reserve, Chile*. University of North Texas Press- Ediciones Universidad de Magallanes, Denton, TX and Punta Arenas, Chile. 364 pp. ISBN-13: 978-1-57441-531-5.
- Rozzi, R., L. Lewis, F. Massardo, Y. Medina, K. Moses, M. Méndez, L. Sancho, P. Vezzani, S. Russell & B. Goffinet. 2012a. *Ecotourism with a Hand-Lens at Omora Park*. It includes the documentary “The Invisible Journey” by Jaime Sepúlveda, and photography by Adam Wilson. Ediciones Universidad de Magallanes, Punta Arenas, Chile. (190 pp.) ISBN 978-956-9160-00-4.

Supplementary Readings

- Anderson, C.B., R. Rozzi, J.C. Torres-Mura, S.M. McGehee, M.F. Sherriffs, E. Schüttler & A.D. Rosemond. 2006. Exotic vertebrate fauna in the remote and pristine sub-Antarctic Cape Horn Archipelago, Chile. *Biodiversity and Conservation* 15: 3295-3313.
- Bonnet, X., R. Shine & O. Lourdais. 2002. Taxinomic chauvinism. *Trends in Ecology and Evolution* 17:13.
- Contador, T., J. Kennedy, J. Ojeda, P. Feinsinger & R. Rozzi. 2014. Ciclos de vida de insectos dulceacuícolas y cambio climático global en la ecorregión subantártica de Magallanes: investigaciones ecológicas a largo plazo en el Parque Etnobotánico Omora, Reserva de Biosfera Cabo de Hornos (55°S). *Bosque* 34: 429-437.
- Contador, T.A., J. Kennedy & R. Rozzi. 2012. The conservation status of southern South American aquatic insects in the literature. *Biodiversity and Conservation* 21: 2095-2107.
- Contador, T.A., Kennedy, J.H. (2016). The life histories of *Meridialaris chiloeensis* (Demoulin) (Ephemeroptera: Leptophlebiidae) and *Gigantodax rufescens* (Diptera: Simuliidae) on a Magallanic sub-Antarctic island (55oS). *Aquatic Insects – An International Journal Freshwater Entomology*. 37(2): 145-158
- Crego, R.D., J.E. Jiménez & R. Rozzi. 2016. A synergic trio of invasive mammals? Facilitative interactions among beavers, muskrats, and mink at the southern end of the Americas. *Biological Invasions* 18:1923-1938. DOI 10.1007/s10530-016-1135-0
- Darwin, C. 1838. *The Voyage of the Beagle*. Reprint, London: Everyman’s Library, 1975.
- Darwin, C. 1913. *A Naturalist's Voyage Round the World: The Voyage Of The Beagle*. Reprint, US: Skyhorse Publishing, 2014.
- Drobnik, J. & Stebel, A (2017). Tangled history of the European uses of Sphagnum moss and Sphagnol. *Journal of Ethnopharmacology*. 209:41-49
- Elphick, C.S., J.E. Jiménez, R. Reyes & R. Rozzi. 2014. Seasonal dynamics of the Sub-Antarctic bird community in different habitats of the Cape Horn Biosphere Reserve. Introduction to Section 2, pp. 185-187, in Rozzi, R. & J.E. Jiménez (eds.), *Sub-Antarctic Magellanic Ornithology, First Decade of Bird Studies at Omora Ethnobotanical Park: Cape Horn Biosphere Reserve*. UNT Press-Ediciones Universidad de Magallanes, Denton TX, USA -Punta Arenas, Chile.
- Ippi, S., C. Anderson, R. Rozzi & C. Elphick. 2009. Annual variation of abundance and composition in forest bird assemblages on Navarino Island, Cape Horn Biosphere Reserve, Chile. *Ornitología Neotropical* 20: 231-245
- Jiménez, J.E., A.E. Jahn, R. Rozzi & N.E. Seavy. 2016. First documented migration of individual White-crested Elaenias (*Elaenia albiceps chilensis*) in South America. *Wilson Journal of Ornithology*

- Jiménez, J.E., R. Crego, G.E. Soto, I. Román, R. Rozzi & P.M. Vergara. 2014. Potential impact of the alien American mink (*Neovison vison*) on Magellanic woodpeckers (*Campephilus magellanicus*) in Navarino Island, southern Chile. *Biological Invasions* 16: 961-966.
- Leopold, A. 1949. A Sand County Almanac and sketches here and there. Oxford University Press, New York.
- McEwan, C., L.A. Borrero & A. Prieto (eds.). 1997. Excerpts from *Patagonia: Natural History, Prehistory and Ethnography at the Uttermost End of the Earth*, Princeton University Press.
- Naess, A. 1973. The shallow and the deep, long-range ecology movements. *Inquiry* 16: 95-100.
- Ojeda, J., T. Contador, S. Rosenfeld, C.B. Anderson, A. Mansilla & J. Kennedy. 2010. *Guía para la identificación de los invertebrados marinos y dulceacuícolas de la Reserva de Biosfera Cabo de Hornos*. Ed. Universidad de Magallanes, Punta Arenas.
- Pyle, P., S.N. Howell, R.P. Yumick & D.F. DeSante. 1987. *Identification guide to North American Passerines*. Slate Creek Press, Bolinas, California.
- Rozzi, R. & F. Massardo. 2011. The road to biocultural ethics. *Frontiers in Ecology* 9: 246-247.
- Rozzi, R., F. Massardo, C. Anderson, K. Heidinger & J. Silander, Jr. 2006. Ten principles for biocultural conservation at the southern tip of the Americas: The Approach of the Omora Ethnobotanical Park. *Ecology & Society* 11(1): 43. [online] URL: <http://www.ecologyandsociety.org/vol11/iss1/art43/>
- Ralph, C.J. 2005. The body grasp technique: a rapid method of removing birds from mist nets. *North American Bird Bander* Apr-Jun: 65-70.
- Rozzi, R., J. Armesto, J. Gutierrez, C. Anderson, F. Massardo, G. Likens, A. Poole, K. Moses, E. Hargrove, A. Mansilla, J. Kennedy, M. Willson, K. Jax, C. Jones, J.B. Callicott & M. Arroyo. 2012b. Integrating ecology and environmental ethics: Earth stewardship in the southern end of the Americas. *BioScience* 62: 226-236.
- Rozzi, R., J.J. Armesto, B. Goffinet, W. Buck., F. Massardo, J. Silander, Jr., M.T.K. Arroyo, S. Russell, C.B. Anderson, L.A. Cavieres, & J.B. Callicott. 2008b. Changing lenses to assess biodiversity: patterns of species richness in sub-Antarctic plants and implications for global conservation. *Frontiers in Ecology* 6: 131-137.
- Schüttler, E., R. Rozzi & K. Jax. 2011. Towards a societal discourse on invasive species management: A case study of public perceptions of mink and beavers in Cape Horn. *Journal for Nature Conservation* 19: 175-184.
- Vuilleumier, F. 1985. Forest birds of Patagonia: Ecological geography, speciation, endemism and faunal history. *Ornithological Monographs* 36: 255-304.

Appendix:



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Programa de Conservación Biocultural Subantártica

Sub-Antarctic Biocultural Conservation Program

Universidad de Magallanes, Instituto de Ecología y Biodiversidad, Chile
& University of North Texas, USA

Tentative Schedule and Activities

TRACING DARWIN'S PATH

Field Biocultural Conservation (Conservación Biocultural de Campo)

Course Dates: 28 December 2018 - 12 January 2019; Travel Dates: 27 December & 13 January

On days when multiple activities are scheduled, course participants will be divided into smaller groups that will rotate through all of the laboratory and field activities. Please note that this schedule is tentative. Weather or other events beyond the program's control may require changes to the syllabus.

Unit 1: Introduction to the Region, Course Topics & Ecotourism with a Hand-Lens (EHL)

27 Thursday	Departs U.S. (on individual itineraries)
28 Friday	Morning: Arrive to Santiago Afternoon: Depart Santiago to Punta Arenas Late afternoon/evening: Arrive to Punta Arenas; Transport to <i>Hostel</i> Evening (20 hrs): Dinner at Club Chile
29 Saturday	0730: Breakfast at Hostel 0900: The Enchanted world of Magellanic Subantarctic Fungi by Laura Sánchez 1030: "Introduction to Field Biocultural Conservation" by Ricardo Rozzi 11:00: Depart to <i>Reserva Magallanes</i> Introduction to the Magellanic Subantarctic Ecoregion & Taxonomic Bias I by Ricardo Rozzi, María Teresa La Valle & IRES Students 1300: Lunch box at <i>Reserva Magallanes</i> 1345: Taxonomic Bias I 1530: Bus to Punta Arenas 1600: "The most beautiful cemetery," Punta Arenas, by Christian Formoso 2000: Dinner Readings: Rozzi et al. 2008a: 325-330
30 Sunday	0700: Depart Hostal Hain to Monte Tarn 0900: Guided visit to Mount Tarn (following Darwin's Path) by Ricardo Rozzi & Jim Kennedy Box lunch in the field 1600: Visit to Fort Bulnes 2000: Arrive to Hostal Hain and dinner
31 Monday	0700 : Breakfast at hostel 0800: Depart to airport to travel to Puerto Williams 1100: Arrive to Puerto Williams and check-in to Hostal 1230: Introductory walk to Omora Ethnobotanical Park (OEP) by Miguel Troncoso 1330: Lunch at OEP 1430: "Introduction to the "3 Hs" of Biocultural Ethics" at OEP by Ricardo Rozzi and María Teresa La Valle , in preparation for the basket weaving experience 1700: Yaghan Indigenous Community Handcrafter: Weaving Baskets with Wetland Rushes by Julia González 2030: New Year's Patagonian lamb barbecue 0100: Return to Puerto Williams

1 Tuesday	<p>AM: Breakfast at hostel & free time</p> <p>1300: Lunch at Cape Horn Field Station (CHFS)</p> <p>1500: Hike to top of Cerro Bandera ("Flag Hill") guided by Omar Barroso & OEP team; reading of "Thinking Like a Mountain" guided by Ricardo Rozzi & Maria Teresa La Valle</p> <p>1830 : Boxed dinner on top Cerro Bandera</p> <p>1930 : Hot soup at CHFS (upon arrival from hike)</p> <p>2030 : The enchanted world of freshwater ecosystems and its keystone species by Mary Power</p>
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Unit 2: Field Environmental Philosophy, Biocultural Conservation & Field Research

2 Wednesday	<p>0700: Breakfast at hostel</p> <p>Morning: Hike to Lake Robalo (lunch on the trail)</p> <ul style="list-style-type: none"> • 0800: Fast-paced hiking group • 0900: Slow-paced hiking group • 1000: Medium-paced hiking group • 1100: Medium/fast-paced hiking group <p>Afternoon: 1) Set up camp, 2) form groups (students rotate), and 3) preparation for next day's field work</p> <ul style="list-style-type: none"> • Group: <i>Sub-Antarctic birds, invasive mammals, bryophytes & lichens, and invasive plants</i> (Roy MacKenzie, Omar Barroso, Gaelle Crete) • Group: <i>Watershed ecology & freshwater invertebrates</i> (Jim Kennedy, Mary Power, Tamara Contador) <p>1800: Dinner at camp site</p> <p>1930: Night 1 at Lake Robalo</p> <ul style="list-style-type: none"> • Field Environmental Philosophy (FEP): Step 1 (María Teresa La Valle, Laura Sánchez, Ricardo Rozzi, Michael Thompson) <p>Readings: Contador et al. 2015, Elphick et al. 2014, Ippi et al. 2009, Vannote et al. 1980</p>
3 Thursday	<p>0700: Breakfast at campsite</p> <p>0800 - 1700: Day 1 Field work (lunch in the field)</p> <p>1800: Dinner at camp site</p> <p>1930: Night 2 at Lake Robalo</p> <ul style="list-style-type: none"> • FEP: Step 2 (María Teresa La Valle, Laura Sánchez, Ricardo Rozzi, Michael Thompson) <p>Readings: Rozzi & Jiménez 2014 Chapter 1, Rozzi et al. 2010: SM19-SM28, Hynes 1975: 1-15, Ojeda et al. 2010, Readings: Rozzi et al. 2010: SM19-SM28</p>
4 Friday	<p>0700: Breakfast at campsite</p> <p>0800 - 1700: Day 2 Field work (lunch in the field)</p> <p>1800: Dinner at camp site</p> <p>1930: Night 3 at Lake Robalo</p> <ul style="list-style-type: none"> • FEP: Steps 3 & 4 (María Teresa La Valle, Laura Sánchez, Ricardo Rozzi, Michael Thompson) <p>Readings: Rozzi & Jiménez 2014 Chapter 1, Rozzi et al. 2010: SM19-SM28, Hynes 1975: 1-15, Ojeda et al. 2010, Rozzi et al. 2010: SM19-SM28</p>

5 Saturday	<p>0700: Breakfast at campsite</p> <p>0800: Pack-up camp and distribute gear/trash/weight to be carried back</p> <p>1000: Hike back to Puerto Williams (lunch on the trail)</p> <p>Afternoon: Free time for showers/resting, data and presentation preparation</p> <p>1700: Seminar at CHFS (Part 1): “Introduction to Biodiversity Monitoring”</p> <ul style="list-style-type: none"> • <i>Invasive species in the Cape Horn Biosphere Reserve-CHBR</i> Elke Schüttler (30 min) • <i>Minature Forests of Cape Horn</i> by Roy MacKenzie (30 min) • <i>Sub-Antarctic (& Antarctic) Freshwater Ecology</i> by T. Contador & J. Kennedy (30 min) • <i>Sub-Antarctic Forest Birds mistnetting</i> by Omar Barroso & Ricardo Rozzi (30 min) <p>1900 -21:00 : Dinner at Cape Horn Field Station</p> <ul style="list-style-type: none"> • 1900 -1945: Dinner Group A • 2000-2045: Dinner Group B <p>Reading: Steinbeck & Ricketts 1941: Chapters 4 & 21</p>
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Unit 3: Omora Ethnobotanical Park (OEP) & Biodiversity Monitoring

6 Sunday	<p>0630: Breakfast at hostel (Bird group)</p> <p>0700: Breakfast at hostel (All groups except the bird group)</p> <p>Walk to Omora Ethnobotanical Park (OEP)</p> <p>Morning: Biodiversity monitoring – Day 1 (rotating groups)</p> <ul style="list-style-type: none"> • 0700: Bird Mist-netting by Ricardo Rozzi, Omar Barroso & MT La Valle • 0800: Invasive mammals of Cape Horn by Elke Schüttler • 0830 : Underwater with a Hand Lens by Tamara Contador, Jim Kennedy • 0900 : Minature Forests of Cape Horn by Roy MacKenzie, Laura Sánchez <p>1230: Lunch at OEP</p> <p>1400: Drawing and narrative composition oriented by Paola Vezzani</p> <p>1800: Transport to CHFS</p> <p>1900-2030: Dinner at CHFS</p> <ul style="list-style-type: none"> • 1900-1945: Dinner Group A • 1945-2030: Dinner Group B
7 Monday	<p>0600-0800 : Breakfast at hostel</p> <p>Morning: Biodiversity monitoring – Day 2 (rotating groups)</p> <p>1230 : Lunch at OEP</p> <p>1400 : Field drawing excercises & design of interpretive signs by Paola Vezzani</p> <p>1800 : Transport to CHFS</p> <p>19:00-20:03 : Dinner at CHFS</p> <ul style="list-style-type: none"> • 1900-1945 : Dinner Group A • 1945-2030 : Dinner Group B <p>Readings: Ralph 2005, Rozzi & Jiménez 2014 Chapter 1, Goffinet et al. 2012, Chapters 1, 2, & 3, Contador et al. 2015, Contador & Kennedy 2014</p>

8 Tuesday	0600-0800: Breakfast at hostel 0700 -1200: Biodiversity monitoring – Day 3 (rotating groups) 1230: Lunch at OEP 1400 hrs: FEP Workshop: poetry & metaphor composition by Paola Vezzani & Michael Thompson 1800: Transport to CHFS 1900-2030: Dinner at CHFS <ul style="list-style-type: none"> 19:00-19:45 hrs: Dinner Group A 19:45-20:30 hrs: Dinner Group B Readings: Ralph 2005, Rozzi & Jiménez 2014 Chapter 1, Goffinet et al. 2012 Chapters 1, 2, & 3, Contador et al. 2015, Contador & Kennedy 2014
9 Wednesday	0600-08:00: Breakfast at hostel 0700 -12:00: Biodiversity monitoring – Day 4 (rotating groups) 1230: Lunch at OEP 1330: FEP Workshop: Wood burning of interpretive signs at CHFS by Paola Vezzani 1900-2030 : Dinner at CHFS <ul style="list-style-type: none"> 1900-1945 hrs: Dinner Group A 1945-2030 hrs: Dinner Group B Readings: Ralph 2005, Rozzi & Jiménez 2014 Chapter 1, Goffinet et al. 2012 Chapters 1, 2, & 3, Contador et al. 2015, Contador & Kennedy 2014
10 Thursday	0800 : Breakfast at Hostel Forjadores 0900 - 13:00 : Presentation preparation by students 1300: Lunch at CHFS 1500-17:00: Student Presentations; turn in notebooks 1730: Tea/coffee and snack break 1830: Packing and preparations for next day's travel to Punta Arenas 2030: Farewell celebration at Laguna Zañartu
11 Friday	0700: Breakfast at Hostel Forjadores 09:00: Transport to airport 1130: Depart Puerto Williams to Punta Arenas Afternoon: Arrive in Punta Arenas and check-in at Hostel Hain 1300: Lunch at Hostel 1345: Bus to Tres Puentes ferry port (2:30 pm present in port) 150 : Depart by ferry to penguin colony on Magdalena Island <ul style="list-style-type: none"> Environmental Philosophy & Biocultural Conservation reflections 2100: Dinner Reading: Rozzi et al. (2008a). <i>Field Environmental Philosophy and Biocultural Conservation: The Omora Ethnobotanical Park Educational Program</i> . Env. Ethics 30: 325-336.
12 Saturday	Morning: Transport to airport Afternoon: Depart Punta Arenas to Santiago Evening: Depart Santiago to U.S. on individual itineraries
13 Saturday	Morning: Arrive in the U.S.