



Sub-Antarctic Biocultural Conservation Program
University of North Texas, Universidad de Magallanes & Institute of Ecology and Biodiversity
www.chile.unt.edu & www.ieb-chile.cl/ltser

**Tracing Darwin's Path-UNT course &
 Field Biocultural Conservation (FBC) UMAG-IEB course**

2013-2014 Schedule of Activities, Program & Syllabus

Core Professors:

Dr. Jaime E. Jiménez, *wildlife ecologist*, UNT-UMAG-IEB
 Dr. James Kennedy, *stream ecologist*, UNT-UMAG

Assistant Professors

Dr. Tamara Contador, *stream ecologist*, IEB
 Álvaro Núñez, *music composer & field environmental philosopher*, Omora Park
 Dr. Ana Piñeiro, *ornithologist*, postdoc, IEB

Invited Professors

Dr. Ricardo Rozzi, *conservation biologist & environmental philosopher*, UNT-UMAG-IEB
 Dr. Melinda Coogan, *stream ecologist*, Buena Vista University, Iowa, USA

Course Assistants:

Kelli Moses, *biologist*, UNT coordinator
 Sandro Bernasconi, *regional coordinator*, IEB, Punta Arenas

Omora Staff:

Omar Barroso, *research assistant*, IEB
 Paula Caballero, *extension specialist*, IEB-UMAG, Punta Arenas
 Camila Saldías, *education specialist*, UMAG, Puerto Williams
 Miguel Troncoso, *Omora Park field course support*, IEB

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

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 (www.chile.unt.edu). It is taught in partnership with a masters-level class in conservation, Field Biocultural Conservation (FBC), at the University of Magallanes (UMAG), Chile. Both courses are also taught as part of the Chilean Long-Term Socio-Ecological Research Network's program of field courses, coordinated by the Institute of Ecology and Biodiversity (IEB, www.ieb-chile.cl).

The Field Biocultural Conservation and TDP courses will be held between 26 December 2013 and 12 January 2014. 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, and also post-course activities. Continued analysis of data for those interested.

COURSE GENERAL OBJECTIVES: Biocultural diversity has been defined as the “diversity of life in all its manifestations —biological, cultural, and linguistic— which 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 Omora Ethnobotanical Park (OEP) as a long-term ecological study site that serves to *link society and development with biodiversity, history, and ecosystems* in the Cape Horn Biosphere Reserve (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) and less conspicuous (e.g., aquatic invertebrates) groups of animals.
- 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 approach developed by the Sub-Antarctic Biocultural Conservation program 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 2013-2014 COURSE

The general topic of this course 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 (including handcrafters from the indigenous Yahgan community, teachers from local schools, tourist operators, as well as Chilean and Latin American students, researchers, and artists), and explore together the main habitat types (including the Patagonian steppe, penguin colonies, watersheds dominated by *Nothofagus* forests, etc.).

This year, the class will participate in two long-term studies designed to better understand the ecology of the sub-Antarctic forests of the CHBR (55°). The research activities will include research on:

- 1) The ecology of the bird species that inhabit the sub-Antarctic forests by participating in the long-term bird banding program.

- 2) Long term studies of the diversity and life history of the water invertebrates.
- 3) Water quality of rivers with different human impacts in the Puerto Williams region.
- 4) Ecotourism and Biocultural Conservation.

These activities will include study sites in OEP and in the Róbalo Watershed on Navarino Island. A specific schedule of activities is provided in the tentative schedule of activities on page 5.

1. Forest Bird Ecology and Their Food Resources

Specific ornithological questions, which will be investigated by the students during this course include:

- A) What species compose the forest birds of the CHBR?
- B) How does composition and abundance change with altitude?
- C) How long do birds live?
- D) What do birds eat?
- E) What food is available for birds?

2. Aquatic Invertebrate, 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?

3. Water Quality in Selected Rivers in the Vicinity of Puerto Williams

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

4. Ecotourism and Biocultural Conservation

Finally, freshwater invertebrate and ornithological 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.

GRADING

1) Essay (15%)

Each student will select one of the class topics (see above) and using the readings develop a 5-10 page (12 font, double spaced) essay summarizing that theme of the course. Essays will be collected by the end of January 2014.

2) Description of the Climate and Freshwater (10%)

Each student, using the readings (particularly useful will be Hynes 1975 and Vannote *et al.* 1979 papers), will be required to write a narrative describing the changes they expect to observe and measure in the Róbalo River watershed from the headwaters to the river's mouth. The paper should also contrast annual climatic conditions in the Cape Horn region to those seen at similar latitude in the Northern Hemisphere.

3) Comparison and Description of Avian Inhabitants/Habitats/Habits of Cape Horn and of High Northern Latitudes of the Americas (10%)

Each participant should use the provided list of birds to do a complete worksheet and add pictures and descriptions of each species regarding its morphological characteristics, habitat requirements, behavior, diet or other relevant habits and information. This exercise will help you prepare by way of comparison and analogy to understand new organisms based on their relationship, similarities and differences to other species you know. The completed printed document will be collected on January 11th.

4) Natural History / Art Journal (20%)

When reading Charles Darwin's journal *Voyage of the Beagle* about his 5 year trip around the world, it is striking the way he blends scientific observation with reflections about the broader implications, context and surroundings (including cultures) he was encountering. Other examples include Lewis and Clark's writings about the American West. 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 and/or activities and observations made during field activities. Ideally field notes will 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 and should be protected in a sealable plastic bag. Maximum size for the field notebook should be approximately 8.5" x 11" when two pages are open. This size will enable the journal to be xeroxed conveniently and also to carry in the field, which will be necessary, since recordings in journals are meant to be done on the day of the activities. In addition, an art notebook (can be the same notebook as above) will be needed with the same dimensions, but ensuring a hard cover and 180 to 240 weight paper that allows for water colors. Other art materials will be provided in Chile. Student journals will be checked randomly throughout the course. Suggestions will be made on improving the quality of the journal format. It will be expected that journal entries are, as reasonably as possible, kept up to date, legible and well organized. This document will be key to keep your valuable records, thoughts and experiences while in the field and may serve for your future purposes. *At the end of the class journals will be collected, and may be copied before being returned to the student.*

5) Guided Field Activities (15%)

The course participants will conduct a guided tour for scientists and authorities visiting the OEP. The goal of these "tours" is for students to learn the Omora Park's existing trail systems and interpretive content, as well as synthesize their own experiences into the narrative. As much as possible, the work groups will be structured to represent a cross section of academic interests of the course participants.

6) Participation & Presentation of Research Results (30%)

A list of mandatory, suggested, and supplemental readings is provided in a 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 providing definitive answers. Students will also prepare power point presentations after samples have been analyzed in order to present preliminary results. These presentations will be carried out during January 9th at the Field Station.

COURSE OUTLINE AND TENTATIVE SCHEDULE:

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 instructors control may necessitate changes to the schedule.

TENTATIVE SCHEDULE					
DAY	DATE	CITY	GENERAL ACTIVITIES	THEMATIC TOPICS	READINGS *Required
Thu	12/26	DFW-SCL	Fly from Dallas to Santiago		
Fri	12/27	SCL-PA	Arrive in Santiago & fly to Punta Arenas		
Sat	12/28	PA	Maggiorino Borgatello Nat. Hist. Museum Visit Otway penguin colony	Introduction to region & historical background Environmental Philosophy & Biocultural Conservation	*Darwin 1838: 204-231 *Leopold 1949: vii-ix, 201-226 *Rozzi et al. 2008: 325-330 McEwan et al. 1997
Sun	12/29	PA	Visit Pali Aike National Park Video: Punta Arenas Cemetery	Regional ecosystems Environmental Philosophy & Biocultural Conservation	*Rozzi et al. 2012: 226-236 *Leopold 1949: 108-112 http://www.youtube.com/watch?v=NfMZpD4LMms
Mon	12/30	PA	Punta Arenas walk. & Cemetery Open Museum Inst. Patagonia Lectures on birds, insects & water	Introduction to region & historical background Introduction to sub-Antarctic birds, aquatic insects & water quality	*Vuilleumier 1985 Pyle et al. 1987 Ralph 2005 Ojeda et al. 2010
Tue	12/31	PW	Fly to Puerto Williams Tour to Omora Ethnobotanical Park	Introduction to Omora E. Park Environmental Philosophy & Biocultural Conservation	Rozzi et al. 2006, *2008: 325-336 *Sutherland 2003: 276-279
Wed	1/1	PW	Hike to top of Cerro Bandera Documentary: The Invisible Journey	Altitudinal gradient characterization	*Leopold 1949: 87-92 *Contador et al. 2012 *Vannote et al. 1980: 130-137 Rozzi & Massardo 2011: 246-247
Thu	1/2	PW	Bird mist-netting & aquatic invertebrate & water sampling Field Environmental Philosophy	Sampling & research techniques at OEP Field environmental philosophy & conservation	*Rozzi et al. 2010b: SM19-SM28
Fri	1/3	PW	Bird & aquatic invertebrates sampling & data collection Ethno-ecology activity	Sampling & research techniques at OEP Local traditional culture	*Elphick et al. <i>in press</i> *Pearson Ralph et al. 1985 Ippi et al. 2009: 231-245
Sat	1/4	PW	Hike to & camp at Róbalo Lake	<i>Field environmental philosophy</i> Methodological practice at Camp 5:00-6:00 pm (Step 1 = Reading)	*Leopold 1949: 129-133 *Rozzi et al. 2012: 234 (Box 1)
Sun	1/5	PW	Sampling & data collection of birds & aquatic insects in the Róbalo watershed/water chemistry	<i>Field environmental philosophy</i> Methodological practice 7:30-8:30 pm (Step 2 = Composition of metaphors)	*Rozzi et al. 2012: 234 (Box 1) *Hynes 1975
Mon	1/6	PW	Sampling & data collection of birds & aquatic insects in the Robalo watershed/w.chemistry	<i>Field environmental philosophy</i> Methodological practice 5:00-6:00 pm (Step 3 = Ecologically & Ethically Guided Field Activity)	*Rozzi et al. 2012: 234 (Box 1) *Naess 1973
Tue	1/7	PW	Hiking back to Puerto Williams Visit Martin Gusinde Museum	Introduction to local culture	*Steinbeck & Ricketts 1941: Chapters 4 & 21

Wed	1/8	PW	Analysis of samples & data preparation for presentations	Laboratory work <i>Field environmental philosophy</i> Methodological practice 5:00 – 7:00 pm (Step: 4 = Identify a place at OEP where activity 3 can be conducted, with a contribution to conservation).	*Pearson Ralph et al. 1985 Ojeda et al. 2010 Goffinet et al. 2012 *Rozzi et al. 2012: 234 (Box 1)
Thu	1/9	PW	Analysis of samples & data preparation for presentations Students' presentations Collection of field notebooks Farewell & closing discussions	Laboratory work & synthesis 4 step cycle synthesis	*Pearson Ralph et al. 1985 Ojeda et al. 2010 Rozzi & Jiménez <i>in press</i>
Fri	1/10	PW-PA	Fly to Punta Arenas	-	-
Sat	1/11	PA-SCL-DFW	Fly to Santiago & to the U.S.	-	-
Sun	1/12	DFW	Arrive in Dallas-Fort Worth	-	-
OEP=Omora Ethnobotanical Park					
DFW: Dallas-Fort Worth Airport, SCL: Santiago, PUQ: Punta Arenas Airport, PA: Punta Arenas, PW: Puerto Williams					

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 one in the U.S. 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 health insurance.

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 Departments of Biological Sciences and Philosophy and Religion Studies, in cooperation with the Office of Disability Accommodation (ODA), comply with the Americans with disabilities in making reasonable accommodations for qualified students with disabilities. The University of North Texas is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112– The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act (ADA), pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens. Please present your written accommodation request before the 12th class day. See also <http://www.unt.edu/oda>.

Drop/Withdrawal Information: Drop/Withdrawal Information and other important Academic Dates can be found at www.essc.unt.edu/registrar/schedule/scheduleclass.html. Before dropping the course, please come and discuss this with us.

READINGS

Required Textbook

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*. UNT Press – Ediciones Universidad de Magallanes, Denton, TX and Punta Arenas, Chile.

Required Reading List

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., J. Kennedy, R. Rozzi, F. Massardo, R. Molina, A. Stambuk, J. Ojeda Villarroel, Y. Medina, C. Pizarro, F. Olivares, C. Saavedra, F. Leyton & K. Moses. Applying Field Environmental Philosophy at the Omora Ethnobotanical Park: aquatic invertebrates of southernmost watersheds. *Revista Chilena de Historia Natural*. In review a.
- Contador, T.A., J. Kennedy & C.B. Anderson. Benthic macroinvertebrate distribution and functional feeding structure along the altitudinal gradient of a Sub-Antarctic fluvial system in the Cape Horn Biosphere Reserve, Chile (55°S). *Hydrobiologia*. In review b.
- Darwin C. 1838. Tierra del Fuego. Pp. 204-231, in *The Voyage of the Beagle*. Reprint, London: Everyman's Library, 1975.
- Elphick, C.S., J.E. Jiménez, R. Reyes & R. Rozzi. Seasonal dynamics of the Sub-Antarctic bird community in different habitats of the Cape Horn Biosphere Reserve. Chapter 14, Introduction to Part III. Pp. XX-XX, in Rozzi, R. & J.E. Jiménez (eds.), *Magellanic Sub-Antarctic Ornithology, First Decade of Bird Studies at Omora Ethnobotanical Park: Cape Horn Biosphere Reserve*. In press.
- 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), On a monument to the pigeon (pp. 108-112), 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.
- Naess, A. 1973. The shallow and the deep, long-range ecology movements. *Inquiry* 16: 151-155.
- Pearson Ralph, C., S.E. Nagata & C.J. Ralph. 1985. Analysis of droppings to describe diets of small birds. *J. Field Ornithology* 56: 165-174.
- Rozzi, R., X. Arango, F. Massardo, C. Anderson, K. Heidinger & K. Moses. 2008. Field Environmental Philosophy and Biocultural Conservation: The Omora Ethnobotanical Park Educational Program. *Environmental Ethics* 30: 325-336.
- 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: 27-68. (SM1-SM35).
- 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. 2012. Integrating ecology and environmental ethics: Earth stewardship in the southern end of the Americas. *BioScience* 62: 226-236.
- Steinbeck, J. & E.F. Ricketts. 1941. *Sea of Cortez: A Leisurely Journal of Travel and Research*. Viking Press. Chapters 4 (pp. 23-33) and 21 (pp. 216-218).
- 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.
- Vuilleumier, F. 1985. Forest birds of Patagonia: Ecological geography, speciation, endemism and faunal history. *Ornithological Monographs* 36: 255-304.

Supplementary Textbook

Jaramillo, A. 2003. *Birds of Chile*. Princeton University Press, Princeton.

Supplementary Readings

Darwin, C. 1838. *The Voyage of the Beagle*. Reprint, London: Everyman's Library, 1975.

- Goffinet, B., R. Rozzi, L. Lewis, W. Buck & F. Massardo. 2012. *Miniature Forests of Cape Horn, Ecotourism with a Hand Lens*. UNT Press, Denton, Texas - Ediciones Universidad de Magallanes, 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
- 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.
- Ojeda, J., T. Contador, S. Rosenfeld, C.B. Anderson, A. Mansilla & J. Kennedy. *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.
- 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. & F. Massardo. 2011. A philosophy of cohabitation. *Frontiers in Ecology* 9: 246-247.
- Rozzi, R. & J.E. Jiménez (eds.). *Magellanic Sub-Antarctic Ornithology, First Decade of Bird Studies at Omora Ethnobotanical Park: Cape Horn Biosphere Reserve*. In press.
- 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/>