



## Sub-Antarctic Biocultural Conservation Program

University of North Texas & Universidad de Magallanes

[www.chile.unt.edu](http://www.chile.unt.edu), [www.umag.cl/williams](http://www.umag.cl/williams), [www.osara.org](http://www.osara.org) & [www.ieb-chile.cl/Itser](http://www.ieb-chile.cl/Itser)

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### Tracing Darwin's Path Field Course Series: Integrating environmental philosophy and ecological sciences for biocultural conservation in the subantarctic ecoregion of southern South America

#### Core Professors:

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

Dr. Christopher Anderson, *ecosystem ecologist*, UNT-UMAG-IEB

Dr. James Kennedy, *stream ecologist*, UNT

#### Collaborators:

Dr. Jeff Johnson, *ornithologist and geneticist*, UNT

Alejandro Valenzuela, Ph.D. candidate, *community ecologist*, OSARA and CADIC

Dr. Bernard Goffinet, *bryologist*, University of Connecticut

Dr. Francisca Massardo, *ethnobotanist*, UMAG

Dr. Andres Mansilla, *marine biologist*, UMAG

#### Course Assistants:

Jean-Paul Zagarola, *UNT program research assistant*

Ernesto Davis, *UMAG assistant*

Cristobal Pizarro, *UMAG local coordinator*

Rodrigo Molina, *Omora Park guard*

Tamara Contador, *UNT Ph.D. student and program assistant*

**Course Catalogue Information:** PHIL 4960/5960 and BIOL 4005/5005

**Class Schedule:** 27 December 2010 – 16 January 2011

**Academic Dishonesty Policy:** [www.vpaa.unt.edu/academic-integrity.htm](http://www.vpaa.unt.edu/academic-integrity.htm)

**ODA Statement:** *The University of North Texas is on record as being committed to both the spirit and the 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.*

**Drop/Add Information:** [www.essc.unt.edu/registrar/schedule/scheduleclass.html](http://www.essc.unt.edu/registrar/schedule/scheduleclass.html)

## **COURSE DESCRIPTION:**

**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 Park 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.

The UNT study abroad course is taught in partnership with a masters-level class in conservation at the University of Magallanes (UMAG), Chile and is also 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](http://www.ieb-chile.cl)).

### ***Specific programs and topics***

- **Global change** – *a holistic approach to social and biological change in an era of globalization*
  - Exotic and invasive species
  - Endangered cultural diversity
  
- **Long-term Socio-Ecological Research (LTSER)** – *moving beyond just monitoring and achieving social integration*
  - Ornithology
    - Long-term monitoring, ethical bird watching and ethno-ornithology
  - “Hidden” biodiversity:
    - aquatic insects, marine invertebrates, algae and nonvascular flora
  - Linking research with education and decision-making

### **Specific goals are:**

- 1) To study various ways of approximating diversity in its multiple manifestation and scales.
- 2) To observe, describe and investigate some of the less conspicuous groups of animals and plants (aquatic invertebrates, and non-vascular plants) and cultures, involving both biological and philosophical questions.
- 3) To utilize the example of the Omora Ethnobotanical Park and the Cape Horn Biosphere Reserve as concrete examples of biocultural conservation.
- 4) To analyze scientific and indigenous natural history views and practices to understand both biological and cultural diversity.

## Grading

### **1) Essays (10%)**

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 collected on Day 1.

### **2) Comparison and Description of Avian Inhabitants/Habitats/Habits of Cape Horn and Texas (10%)**

Each participant should use the provided list of birds to do a complete the worksheet and add pictures and descriptions of each 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. Will be collected on Day 1.

### **3) Natural History / Art Journal (30%)**

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 will enable the journal to be xeroxed conveniently. This size will also be convenient 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. *At the end of the class journals will be collected, and may be copied before being returned to the student.*

### **3) Guided Field Activities (20%)**

The course participants will be divided into work groups for the purpose of developing a final presentation, which will be conducted as a guided tour of scientists and authorities visiting the Omora Park for the January 12<sup>th</sup> inauguration of the Cape Horn Field Station. 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.

### **4) Participation (30%)**

Student responsibilities are to prepare ahead of time, attend all the discussion sessions, field exercises, ask questions, and express yourself creatively and concisely in your 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.

## Reading List

### Dec. 29

- Rozzi, R. et al. 2010. 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
- Rozzi, R. et al. 2008. Field Environmental Philosophy and Biocultural Conservation: The Omora Ethnobotanical Park Educational Program. *Environmental Ethics* 30: 325-336.
- Jones, J. 2001. Habitat selection studies in avian ecology: A critical review. *The Auk* 118(2):557-562.

### Dec. 30

- Mittermeier, R. A. et al. 2003. Wilderness and biodiversity conservation. *PNAS* 100: 10309-10313
- Callicott, J.B. What "wilderness" in frontier ecosystems. *Environmental Ethics* 30: 235-306.
- Darwin, C. Tierra del Fuego Chapter. *Voyage of the Beagle*. Available from: <http://www.literature.org>
- Fondema - *Virgin Landscapes of Cape Horn (to be read together in Chile)*
- Fondema – *Darwin's Route through the Cape Horn Archipelago (to be read together in Chile)*

### Dec. 31

- Rozzi, R. et al. 2006. Ten Principles for Biocultural Conservation at the Southern Tip of the Americas: the Approach of the Omora Ethnobotanical Park. *Ecology and Society* 11: 43
- Rozzi, R. et al. 2006. El Parque Etnobotánico Omora: una alianza público-privada para la conservación biocultural en el confín del mundo. *Revista Ambiente y Desarrollo* 19: 43-55.
- Rodriguez et la. 2007. Globalization of conservation – a view from the south. *Science* 317: 755-756.

### Jan. 1

- Figure 2 obtained from: Rozzi, R. et al. 2006. Ten Principles for Biocultural Conservation at the Southern Tip of the Americas: the Approach of the Omora Ethnobotanical Park. *Ecology and Society* 11: 43
- Gonzalez Guillot. 2010. A brief story about the Andean chain and the geology of Tierra del Fuego.

### Jan. 2

- Sutherland, W. J. 2003. Parallel extinction risk and global distribution of languages and species. *Nature* 423: 279-279.
- Massardo & Rozzi. 2006. Fondema – *Traditional Ecological Knowledge* Book

### Jan. 3

- Anderson, C.B. et al. 2006. Exotic vertebrate fauna in the remote and pristine sub-Antarctic Cape Horn Archipelago, Chile. *Biodiversity and Conservation* 15: 3295-3313.
- Larson, B. 2005. The war of the roses: demilitarizing invasion biology. *Frontiers in Ecology*. 3(9): 495-500.
- McKinney, M.L. and Lockwood, J.L. 1999. Biotic homogenization: a few winners replacing many losers in the next mass extinction. *TREE* 14 (11): 450-453.
- Cruz, F. et al. 2007. Bio-economics of large-scale eradication of feral goats from Santiago Island, Galapagos. *Journal of Wildlife Management* 73: 191-200.
- Haider, S. & Jax, K. 2006. The application of environmental ethics in biological conservation: a case study from the southernmost tip of the Americas. *Biodiversity Conservation* 16(9): 2559-2573

### Jan. 4

Rozzi, R. et al. 2010. 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

#### **Jan. 5**

Goffinet B., W. R. Buck, P. Massardo & R. Rozzi. 2006. *The Miniature Forests of Cape Horn*. Fantastico Sur - Universidad de Magallanes. 255 p. Punta Arenas, Chile.

Rozzi, R. et al. 2008. Changing lenses to assess biodiversity: patterns of species richness in sub-Antarctic plants and implications for global conservation. *Frontiers in Ecology and the Environment* 6, doi:10

Rozzi, R. et al. 2010. 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

#### **Jan. 6**

Anderson, C.B. & Rozzi, R. 2000. Bird assemblages in the southernmost forests of the world: Methodological variations for determining species composition. *Anales Instituto Patagonia* 28: 89-100.

Ippi, S. et al. 2009. Annual variation of abundance and composition in forest bird assemblages on Navarino Island, Cape Horn Biosphere Reserve, Chile. *Ornitologia Neotropical* 20: 231-245.

Anderson, C.B. et al. 2008. Integrating science and society through Long-Term Socio-Ecological Research. *Environmental Ethics* 30: 295-312.

Guevara, S. & Lombardo, J. 2007. The landscape approach: Designing new reserves for protection of biological and cultural diversity in Latin America. *Environmental Ethics* 30: 251-262.

Pickett et al. 2007. Watershed issues in Baltimore: Understanding and application of ecological and social problems. Universities Council on Water Resources – Journal of Contemporary Water Research & Education. 136: 44-55.

#### **Jan. 7**

Estévez, R.A. et al. 2010. Creating a new cadre of academics capable of integrating socio-ecological approach to conservation biology. *Revista Chilena de Historia Natural* 83: 17-25.

Whiteman, N.K. & R.W. Sites. 2008. Aquatic insects as umbrella species for ecosystem protection in Death Valley National Park. *Journal of Insect Conservation* 12:499–509

#### **Jan. 8**

Ethical birding appendix. Rozzi et al. 2010

#### **Jan. 9**

Leopold, A. 1949. Thinking like a mountain. In *A Sand County Almanac*. New York: Oxford University Press

Day	Date	Location	Objective <i>Class &amp; Field Activities</i>	Readings
Mon	Dec. 27	DFW	Fly from Dallas	
Tues	Dec. 28	SCL-PA	Arrive Santiago and fly to Punta Arenas	
Wed	Dec. 29	PA	<ul style="list-style-type: none"> <li>• <b>Initiate group experiences</b></li> <li>• <b>Begin to develop observation skills with birds</b></li> </ul> <i>A.M.: Visit Penguin Colony for “ethical bird watching” experience</i>	Rozzi et al. (2010): <i>Only Appendix on “ethical birding”</i> Rozzi et al. (2008): <i>Field environmental philosophy</i> Jones 2001. Bird habitat selection
			<i>5:00 PM: TDP group boards ferry</i>	
			<i>P.M. IRES group evening in PA</i>	
Thur	Dec. 30	Ferry	<b><u>TDP group:</u></b> <ul style="list-style-type: none"> <li>• <b>Develop appreciation of historic and current landscape change</b></li> <li>• <b>Compare Northern and Southern Hemisphere sub-polar environments</b></li> </ul> <i>Navigate thru CHBR</i> <i>Compare texts of Darwin with landscape</i>	Darwin 1839 – <i>Voyage of the Beagle</i> , Ch 10 - TdF Mittermeier et al. 2003 - <i>Wilderness</i> Callicott 2008 - <i>Wilderness</i>  On the boat read sections of the 2 Fondema books ( <i>Darwin in Cape Horn</i> and <i>Virgin Landscapes</i> )
			<b><u>IRES group:</u></b> <ul style="list-style-type: none"> <li>• <b>Get first on-the-ground discussions about individual projects</b></li> </ul> <i>A.M. IRES group flies to Puerto Williams</i>  <i>P.M. Start to do reconnaissance on projects and update detailed plans for projects with timeline and seeing “reality”</i>  <i>Rozzi and Jimenez leave PW</i>	
Fri	Dec. 31	PW	<ul style="list-style-type: none"> <li>• <b>Reconstitute group (TDP/IRES)</b></li> <li>• <b>Conduct group building art/science exercise about birds/habitats/habits</b> <ul style="list-style-type: none"> <li>• <i>Integrate art thru sculpture project</i></li> <li>• <i>Use birds to understand integration of art to observe other beings and habitats</i></li> </ul> </li> </ul> <i>8:00. Arrive and get into rooms</i> <i>PM: Visit Park and do intro tour</i>	Rodriguez et al. 2007 – <i>Globalization of conservation</i> Rozzi et al. 2006 – <i>10 criteria article in E&amp;S</i> Rozzi et al. 2006 – <i>RAD article on Omora Park in Spanish</i>

			<p><i>Session 1: Rodrigo to start collective sculpture (3 hours)</i>  <i>Place artificial nests (Alejandro)</i>  <i>Evening party on the beach</i></p>	
Sat	Jan. 1	PW	<ul style="list-style-type: none"> <li>• Continue group building exercises</li> <li>• Continue observation and experience of place</li> </ul> <p><i>Climb Cerro la Bandera</i>  <i>Carry notebooks for parcelita drawings of components, patterns and processes during the walk</i></p>	<p>Rozzi et al. 2006 – <i>E&amp;S</i>, Figure 2:  <a href="http://www.ecologyandsociety.org/vol11/iss1/art43/figure2.html">http://www.ecologyandsociety.org/vol11/iss1/art43/figure2.html</a>  Section of Darwin on climbing mountain  Gonzalez Guillot 2010. Geology article</p>
Sun	Jan. 2	PW	<ul style="list-style-type: none"> <li>• Develop an understanding of the “biocultural history” of Puerto Williams</li> <li>• Comprehend the drivers and consequences of cultural homogenization</li> <li>• Develop an understanding of the biota of Cape Horn (native/exotic species and mindsets, linked with previous day on biocultural homogenization)</li> <li>• Comprehend the drivers and consequences of biotic homogenization</li> </ul> <p><i>AM: Biocultural Walking Tour of PW, museum and Presentation Casa UMAG</i>  <i>(Workshop with Julia on basket weaving)</i></p> <ul style="list-style-type: none"> <li>• Continue group building exercise</li> <li>• Use birds as vehicle to understand integration of art and science to observe and depict other beings and habitats</li> </ul>	<p>Section of Fondema TEK book about baskets  Sutherland 2003 – <i>Language and species extinction</i></p>
Mon	Jan. 3	PW	<p><i>AM: Session 2 with Rodrigo (2 hours)</i>  <i>Begin to Practice 4 Steps with Tami/JCP</i>  <i>PM: Jaime/Yanet/RR/JJ/TVN/Film Crew arrive</i></p> <ul style="list-style-type: none"> <li>• Conduct group building exercise</li> <li>• Use birds to understand integration of art to observe other beings and habitats</li> </ul>	<p>Larson 2005 – <i>Frontiers - metaphor paper</i>  McKinney and Lockwood 1999 – <i>biotic homogenization</i>  Anderson et al. 2006 – <i>Exotics of Cape Horn</i>  Cruz et al. 2009 - <i>eradication article</i>  Haider &amp; Jax 2006 - <i>ethics article</i></p>
Tues	Jan. 4	PW	<ul style="list-style-type: none"> <li>• Putting into practice pedagogical and practical methodologies to overcome disciplinary barriers in graduate education to achieve</li> </ul>	<p>Rozzi et al. 2010. <i>RCHN</i></p>

			<p><b>biocultural conservation</b></p> <p><b>4 Step Cycle:</b> AM: Tami PM: Jaime</p> <p><i>(Bernard arrives to PW)</i></p>	
Wed	Jan. 5	PW	<p>• <b>Putting into practice pedagogical and practical methodologies to overcome disciplinary barriers in graduate education to achieve biocultural conservation</b></p> <p><b>4 Step Cycle:</b> AM: Cristobal PM: Yanet</p> <p><i>(Jim flies to PA)</i></p>	<p>Rozzi et al. 2010. <i>RCHN</i> Goffinet et al. 2006 - <i>Green book</i> Rozzi et al. 2008 – <i>Frontiers article</i></p>
Thur	Jan. 6	PW	<p>• <b>Continue the concept of habitats-habits-inhabitants</b> <i>AM: Day time birding and mist netting (alternating groups)</i></p> <p><i>PM: Session 3. Arte. Rodrigo</i></p> <p>• <b>Other strategies to achieve biocultural conservation</b> <i>PM: 18-20:00 Library – Biosphere Reserve Class</i></p>	<p><u>Bird articles</u> Anderson &amp; Rozzi 2008 Ippi et al. 2009</p> <p><u>“Socio-ecological” management and research strategies</u> Guevara and Lomborde 2008 – biosphere reserve article Anderson et al. 2008 – Chilean LTSER network Pickett et al. 2007 – socio-ecological watershed research</p>
Fri ***	Jan. 7	PW	<p>• <b>Direct experience of nature and methods</b> <i>Group goes camping</i></p> <p>Study “hidden” biodiversity:</p> <ul style="list-style-type: none"> <li>- Invasive species surveys</li> <li>- Aquatic insect monitoring</li> </ul> <p><i>(CBA, Bernard, Adam and Jimenez fly to PA)</i></p>	<p>Whiteman &amp; Sites. 2008 - aquatic insects as umbrella species Estevez et al. 2010 – integrating broader social criteria in conservation education</p>
Sat	Jan. 8	PW	<p>• <b>Direct experience of nature and methods</b></p>	<p>Cristobal’s more complete face-to-face encounter class (include Neruda’s chimango poem)</p>



			<p><i>Team 1: Sampling of aquatic insects high up watershed with Tami</i>  <i>Team 2: Sampling upper watershed for invasive species</i></p>	
Sun	Jan. 9	PW	<p>• <b>Direct experience of nature and methods</b>  <i>Team 1: Sampling lower part of watershed for invasive species</i>  <i>Team 2: Sampling for aquatic insects midway with Tami</i></p>	Leopold 1949 ( <i>Thinking like a Mountain</i> )
Mon	Jan. 10	PW	<p><b>Return to town</b>  <i>As the group comes down the mountain, a group will work with Tami on the lowest sites</i></p> <p><i>Session 4: Collective sculpture with Rodrigo (1 hour)</i></p>	
Tues*	Jan. 11	PW	<p><b>Prepare for inauguration of Field Station</b>  • <b>Finish group building exercise using birds to understand integration of art/science to observe/depict other beings and habitats</b></p> <p><i>Session 5: with Rodrigo to install the collective piece</i></p> <p><i>*PM: "Travel Learn" group arrives</i></p>	
Wed*	Jan. 12	PW	<p>Inauguration of Cape Horn Field Station and associated events</p> <ul style="list-style-type: none"> <li>- Students will be involved as "guides" (learn Omora Trails narratives and also synthesize personal experience)</li> </ul>	
Thur	Jan. 13	PW-PA	<p>Most of class flies to Punta Arenas and free afternoon</p> <p><i>Get artificial nests (Alejandro)</i></p> <p><i>11:00 DAP&gt; Masoli, Gilmer, Rozzi</i>  <i>15:00 DAP&gt; Davis, Anderson, Harper, Vio, Bishop, Cagle, Wilson, Jordan, Wold</i></p>	
Fri	Jan. 14	PA	<p><i>Day in Punta Arenas</i></p> <ul style="list-style-type: none"> <li>• Final supper with entire group UNT admin, Travel Learn, TDP, etc.</li> </ul> <p><i>11:00 DAP&gt; Vega, Johnson, Valenzuela, Contador</i>  <i>15:00 DAP&gt; Zagarola, Hernandez, Mighell, Perez, Villanueva, Kennedy</i></p> <p><i>(Travel Learn group leaves PW)</i></p>	
Sat	Jan. 15	PA-SCL	Return to USA	

Sun	Jan. 16	DFW	Arrive to USA	
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Program is subject to modifications based on weather and other logistical considerations.