

# University of Northern British Columbia

## CONSERVATION BIOLOGY (BIOL 411) – Winter 2015

### Course Syllabus

|               |                          |                     |                         |
|---------------|--------------------------|---------------------|-------------------------|
| Instructor:   | <b>Dr. Chris Johnson</b> | Teaching Assistant: | <b>Kristy Rasmus</b>    |
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| Phone:        | 960-5357                 | Phone:              | NA                      |
| Office:       | 10-4522                  | Office:             | 8-211                   |
| Office hours: | Friday 11:30-12:30       | Office hours:       | By appointment          |

### Class Meeting Rooms and Timing

Lecture room: 5-140D

Lecture time: Tuesday & Thursday 3:30-4:20

Tutorial room: 8-127 (L2), 8-127/5-140D (L1)

Tutorial time: Friday 9:00-10:50 (L1); Tuesday 11:30-1:20 (L2)

### Course Description and Learning Objectives

Conservation biology is a “crisis” discipline with the primary goals of preventing, reversing, and understanding declines and threats to biological diversity. This is a truly integrative discipline that is premised on not just study, but also action. In this class, we will explore the full range of theory, knowledge sets, and tools that guide and shape the practice and study of conservation biology. This includes exposure to important disciplinary perspectives not typically found in biology curricula including law, economics, psychology, and anthropology. Through instructor-led lectures and tutorials and hands-on exercises, we will approach the full range of challenges and explore the tools necessary to practice conservation biology.

Following completion of the course, students should have an in-depth understanding of the five principal problem areas confronting conservation biologists: 1) the conservation of genetic diversity; 2) the conservation of species; 3) the conservation of ecosystems; 4) the management of landscapes; and 5) the sustainable development of human populations. Students will come from this course with the skills and knowledge necessary for integrating and applying these five themes to the conservation and restoration of biological diversity. Integration will involve theoretical and practical understanding through hands-on exercises and group learning.

### Text Book and Supplementary Material

There is no required text for this class; however, for supplemental reading I recommend: Primack, R.B. 2014. Essentials of Conservation Biology (6<sup>th</sup> ed.). Sinauer Associates. Primack is the standard for undergraduate courses in conservation biology and provides a broad overview of the subject. The text can be purchased online (at discount used prices) or through the bookstore. For those of you on a budget, the 5<sup>th</sup> (and even the 4<sup>th</sup>!) edition will provide nearly all the content you will require for the course.

The text has many examples of the current challenges (and successes) facing conservation biologists. Fortunately, conservation biology is well represented in more popular and less expensive media! On the student drive (S:\Biol411\podcast) you will find a number of podcasts from the CBC and NPR that further illustrate the material that we will discuss in class and tutorial. The podcasts are referenced to a lecture topic (see below), but many stories have multiple or broad themes that apply to numerous lectures. This is a great resource linking lectures to the real and complex world of practice.

## Evaluation

The grade for this course will be based on exams, individual assignments, and a conservation plan for a species of your choice.

- One midterm worth 20% is prescheduled (see syllabus); the midterm will test lecture material presented over that examination period.
- The final exam is worth 35% and will be scheduled by the Registrars Office; the final exam will focus on material presented following the midterm, but will assume a comprehensive understanding of the course material.
- The course has a number of interactive tutorials where preparation and participation is expected and will be marked (4%)!
- The tutorial includes two short assignments worth 4% and 5% of the total mark.
- Students will be asked to form groups and develop a quantitative risk analysis and recovery report for a species of their choice. This assignment is worth a substantial proportion of the total course mark (32% = individual + group mark). The recovery 'team' will use a population viability analysis (PVA) to develop their recommendations according to current COSEWIC criteria. The development, writing, and presentation of the report are group activities. Individually, students are expected to develop a funding proposal and to complete an exercise that teaches the workings of Vortex, the stochastic population model (PVA) that will serve as the primary tool for assessing the relative merits of the team's recovery recommendations.

| Component   | Grade      | Due Date        |
|---|------------|-----------------|
| <b>Major Project:</b> Phase 1 – Funding Proposal  | 6.5        | Jan. 27,30      |
| <b>Major Project:</b> Phase 2 – Question set for Vortex population viability analysis (PVA) software              | 3.5        | Feb. 10,13      |
| <b>Major Project:</b> Phase 3 – Conservation analysis report  | 20         | Apr. 14,17      |
| <b>Major Project:</b> Phase 3 – Conservation analysis presentation  | 2          | Apr. 7/14,10/17 |
| <b>Tutorials:</b> <i>Participation</i> – Discussion (Tut. 1); Finding Solutions (Tut. 5) & Wolf Recovery (Tut. 7) | 4          | See below       |
| <b>Tutorials:</b> Short Assignments   |            |                 |
| Diversity calculations  | 5          | Feb. 3,6        |
| International policy & legislation (presentation)   | 4          | Mar. 24,31/27,3 |
| <b>Midterm Exam</b>   | 20         | Feb. 12         |
| <b>Final Exam</b>   | 35         | TBA             |
| <b>TOTAL:</b>   | <u>100</u> |                 |

## Dishonesty and Professional Conduct

Purposeful dishonesty and plagiarism is a series offence both in the classroom and the work place.

Ignorance is not a valid excuse. Please consult the Calendar (2014-2015, P.43) for definitions of **Plagiarism** or **Cheating** and potential consequences. Following graduation, many of you will apply for admission to a professional association. Members of the BC College of Applied Biology (<https://www.cab-bc.org/ethics-requirement-information>) and the BC Association of Forestry Professionals ([http://www.abcfp.ca/regulating\\_the\\_profession/bylaws/code\\_of\\_ethics.asp](http://www.abcfp.ca/regulating_the_profession/bylaws/code_of_ethics.asp)) are guided by standards of professional practice and codes of ethics. Those guidelines provide a solid measure of conduct, applicable to both the professional activities and private life of the member, which I urge you to adopt for this class.

## Expectations

For this class to succeed, we must all cooperate. I will provide the structure, atmosphere, and learning material that will stimulate and challenge you to grow intellectually within the confines of the course objectives and hopefully beyond. However, each student must come prepared to learn. A great way to learn

is to attend lecture and tutorial regularly and review your notes periodically. Considering the conservation risk analysis and tutorial discussions, learning and ultimately success will be impeded if you fail to contribute and work fairly with other participants in the class. This includes meeting your obligations to other group members and preparing and participating in facilitated discussions.

I expect all assignments to be turned in by the end of the tutorial period on the day they are due. Late assignments will be penalized 10%/day up to a maximum of 50%, after which a grade of 0 will be assigned. Unless confronted by unexpected circumstances, I will have your assignments marked within 1 week. You also may face situations that will prevent timely completion of assignments. I will attempt to accommodate extensions, but out of fairness to others in the class the argument and evidence should be compelling. Acceptable reasons for late assignments might include illness for you or a direct member of your family, etc. Conflicts with other class work, sporting or entertainment events, and computer/media crashes are normally insufficient. Regardless of the argument, granting of extensions is at my discretion.

### **Other Details**

- The schedule of topics and assignments, as currently outlined in the syllabus, are subject to change with notification.
- Persons with disabilities requiring special learning approaches should contact the instructor and the Access Resource Centre early in the semester (<http://www.unbc.ca/access-resource-centre>).

## Schedule of Course Topics and Tutorials

| <b>Part I: Context for Conservation</b>                                       |  |                                    |
|---|--|------------------------------------|
| Jan 6   | Introduction to course   |                                    |
| Jan 8   | History and purpose of Conservation Biology  | Ch 1                               |
| Jan 13  | Relating Conservation Biology to Biodiversity  | Ch 2 & 3                           |
| Jan 13,16 Tut   | (1) Introduction to risk analysis. (2) The role of CB in science   | <b>Posted Readings<sup>1</sup></b> |
| Jan 15  | Relating Conservation Biology to Biodiversity – continued  | Ch 2 & 3                           |
| Jan 20  | Fitting biodiversity to conservation biology – hotspots  |                                    |
| Jan 20,23 Tut   | Calculating biological diversity – measurements and concepts   |                                    |
| Jan 22  | Threats to biodiversity  | Ch 9 & 10                          |
| Jan 27  | Extinction processes   | Ch 7 & 8                           |
| <b>Part II: Conservation of Genetic Diversity and Species</b>                 |  |                                    |
| Jan 27,30 Tut   | Population Viability Analysis – Introduction to Vortex   |                                    |
| Jan 29  | Population and conservation genetics – Dr. Allan Costello  | Ch 11                              |
| Feb 3   | Applications of population ecology to conservation biology   | Ch 12                              |
| Feb 3,6 Tut   | Population Viability Analysis – Vortex continued   |                                    |
| Feb 5   | Single species conservation strategies   | Ch 8                               |
| Feb 10  | Single species conservation strategies – continued   | Ch 8                               |
| Feb 10,13 Tut   | Finding solutions for important issues in conservation   | <b>Discuss a Solution</b>          |
| Feb 12  | <b>Mid-Term Exam</b>   |                                    |
| Feb 17-27   | <b>Mid-semester break – get some sleep!</b>  |                                    |
| Mar 3   | <i>Ex Situ</i> conservation strategies   | Ch 13 & 14                         |
| Mar 3,6 Tut   | Developing your quantitative risk analysis   |                                    |
| <b>Part III: Conservation and Restoration of Ecosystems Across Landscapes</b> |  |                                    |
| Mar 5   | Landscape ecology and conservation practices   | Ch 16                              |
| Mar 10  | Multi-species approaches for conservation  | Ch 18                              |
| Mar 10,13 Tut   | Restoration and recovery planning – Yellowstone wolves   | <b>Read and Prepare!</b>           |
| Mar 12  | Spatial process and conservation biology – metapopulations and the Equilibrium Theory of Island Biogeography | Ch 7 & 12                          |
| Mar 17  | Parks and conservation area design   | Ch 15, 16 & 17                     |
| Mar 17,20 Tut   | Effectiveness of international policy and legislation  | <b>Country Present.</b>            |
| Mar 19  | Parks and conservation area design – Continued   | Ch 15, 16 & 17                     |
| <b>Part IV: Human Dimensions of Conservation</b>                              |  |                                    |
| Mar 24  | Social values and their role in conservation   | Ch 17 & 20                         |
| Mar 24,27 Tut   | Effectiveness of international policy and legislation – continued  | <b>Country Present.</b>            |
| Mar 26  | New conservation – community involvement and monitoring  | Ch 17 & 20                         |
| Mar 31  | Conservation policy, legislation, and treaties   | Ch 20 & 21                         |
| Mar 31, Apr 3 Tut   | <b>Good Friday – holiday/no class</b>  | <b>Present Plans</b>               |
| Apr 2   | Conservation policy, legislation, and treaties – continued   | Ch 20 & 21                         |
| Apr 7   | Conservation economics   | Ch 4 & 5                           |
| <b>Part V: Advancing Conservation Biology</b>                                 |  |                                    |
| Apr 7,10 Tut  | Recovery plans – group presentations   | Mar 31, Apr 3 Tut                  |
| Apr 9   | Future directions – pressing problems for conservation biologists  | Ch 22                              |
| Apr 14  | How to be a conservation biologist   | Ch 22                              |
| Apr 14,17 Tut   | Recovery plans – group presentations continued   | <b>Present Plans</b>               |
| Apr 16  | Course review – preparing for the final exam   |                                    |

<sup>1</sup> Note: tutorials with **Posted Readings** require 1 page summary of main arguments – see outline posted on S:

## Podcasts and Supporting Broadcast Material

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### Part I: Context for Conservation

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|--------|---|---|
| Jan 8  | History and purpose of Conservation Biology – <b><i>Ethics of conservation – panel discussion</i></b>             | Ethics_Conservation_CBC_Curr.mp3                                  |
| Jan 8  | History and purpose of Conservation Biology – <b><i>Saving the great apes: benefits to the human species</i></b>  | Planet_No_Apes_Quir_Quar.mp3                                      |
| Jan 15 | Relating Conservation Biology to biodiversity – <b><i>Invasive species and changing patterns of diversity</i></b> | Fish_Nile_Perch_Invasive_Adapt_QandQ.mp3                          |
| Jan 15 | Relating Conservation Biology to biodiversity – <b><i>‘Counting’ difficult biodiversity</i></b>                   | CBC_Quirks_Quarks_Inventory_Biodiversity_Count_All_Arthropods.mp3 |
| Jan 22 | Threats to biodiversity – <b><i>Overfishing: a historical threat to biodiversity.</i></b>                         | CBC_Ideas_Historical_Overfishing.mp3                              |
| Jan 22 | Threats to biodiversity – <b><i>Overharvest of sharks</i></b>   | Shark_Overharvest_CBC_AiH.mp3                                     |
| Jan 22 | Threats to biodiversity – <b><i>Bycatch and sea birds</i></b>   | CBC_Quirks_Quarks_Seabird_Fishing_Deaths.mp3                      |
| Jan 22 | Threats to biodiversity – <b><i>Decline of coral reefs in the Caribbean</i></b>                                   | CBC_Quirks_Quarks_Coral_Decline.mp3                               |
| Jan 22 | Threats to biodiversity – <b><i>Threat of plastic in the ocean</i></b>  | CBC_Quirks_Quarks_Plastic_Pollution_Ocean.mp3                     |
| Jan 22 | Threats to biodiversity – <b><i>Introduced species as emerging epidemics: whitenose syndrome and bats</i></b>     | CBC_Quirks_Quarks_Bats_Whitenose_Syndrome.mp3                     |
| Jan 27 | Extinction processes – <b><i>De-extinction of the passenger pigeon</i></b>  | CBC_Current_Passenger_Pigeon_and_De-extinction                    |
| Jan 27 | Extinction processes – <b><i>Island birds and long-term extinction risk</i></b>                                   | CBC_Quirks_Quarks_Humans_Cause_Extinction_Island_Birds.mp3        |
| Jan 27 | Extinction processes – <b><i>Recent trends in global extinction rates</i></b>                                     | Extinction_Rates_NPR.mp3  |

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### Part II: Conservation of Genetic Diversity and Species

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| Jan 29   | Population and conservation genetics – <b><i>Mutation and genetic diversity: white coyotes and white bears</i></b>   | White_Coyote_Genet_QandQ.mp3                                |
| Feb 5-10 | Single species conservation strategies – <b><i>Conserving caribou with predator exclosures</i></b>                   | Pen_Caribou_CBC_AiH.mp3                                     |
| Feb 5-10 | Single species conservation strategies – <b><i>Extreme intervention: assisted migration and feeding wildlife</i></b> | CBC_Line_in_the_Sand_Risk_of_Environmental_Intervention.mp3 |
| Feb 6-11 | Single species conservation strategies – <b><i>Freeing threatened marine mammals from fishing gear</i></b>           | CBC_Quirks_Quarks_Endangered_Whales_Entangled_Fish_Nets.mp3 |
| Feb 5-10 | Single species conservation strategies – <b><i>Is Conservation triage practical and ethical?</i></b>                 | CBC_Tooth_Claw_What_Species_Should_We_Save.mp3              |
| Mar 3    | <i>Ex Situ</i> conservation strategies – <b><i>The future of zoos</i></b>  | Future_Zoo_CBC_Sund_Edit.mp3                                |
| Mar 3    | <i>Ex Situ</i> conservation strategies – <b><i>Breeding and euthanizing animals in zoos</i></b>                      | Zoo_Captive_Breeding_CBC_Day_6.mp3                          |
| Mar 3    | <i>Ex Situ</i> conservation strategies – <b><i>De-extinction of the passenger pigeon</i></b>                         | CBC_Current_Passenger_Pigeon_and_De-extinction.mp3          |
| Mar 3    | <i>Ex Situ</i> conservation strategies – <b><i>Supplementing woodland caribou populations in BC</i></b>              | Caribou_Supplement_CBC_AiH.mp3                              |

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### Part III: Conservation of Ecosystems Across Landscapes

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| Mar 10 | Multi-species approaches for conservation – <b><i>Tree snakes on Guam and community collapse</i></b> | Guam_Tree_Snake_CBC_Quir_Quar.mp3    |
| Mar 10 | Multi-species approaches for conservation – <b><i>The</i></b>  | Salt_Marsh_Ecosystem_Threat_Quir_Qua |

|  |  |   |
|--|--|---|
| Mar 10   | <i>importance of conserving salt marsh ecosystems</i><br>Multi-species approaches for conservation – <i>Ocean collapse and the increase in jellyfish</i> | r.mp3<br>CBC_Quirks_Quarks_Jellyfish_Ocean_Health.mp3   |
| <b>Part IV: Human Dimensions of Conservation</b> |  |   |
| Mar 24   | Social values and their role in conservation – <i>Is Conservation triage practical and ethical?</i>  | CBC_Tooth_Claw_What_Species_Should_we_Save.mp3          |
| Mar 24   | Social values and their role in conservation – <i>Impacts of recreation on woodland caribou, or not?</i>   | Caribou_Snowmobile_Predator_Story_Response_AiH.mp3      |
| Mar 24   | Social values and their role in conservation – <i>Climate change: restricting the trade in polar bear parts</i>  | CBC_AiH_Climate_Change_Polar_Bear_Harvest.mp3           |
| Mar 26   | New conservation – <i>US- Canada discord on risk to polar bears</i>  | Polar_Bear_Cons_CBC_Curr.mp3                            |
| Mar 26   | New conservation – <i>IRDNC programs - People managing and benefiting from wildlife conservation</i>   | IRDNC_Program_NPR.mp3                                   |
| Mar 31   | Conservation policy, legislation, and treaties – <i>US- Canada discord on risk to polar bears</i>  | Polar_Bear_Cons_CBC_Curr.mp3                            |
| Mar 31   | Conservation policy, legislation, and treaties – <i>Controlling elephant poaching</i>  | Elephant_Poach_CBC_Curr.mp3                             |
| Apr 7  | Conservation Economics – <i>Human nature (Homo economicus) and the flaw of economics</i>   | CBC_Current_Economics_and_Humans.mp3                    |
| Apr 7  | Conservation Economics – <i>Should the media pay for their use of ‘conservation’?</i>  | Should_Media_Pay_for_Nature_Cons_Scientist_American.mp3 |
| Apr 7  | Conservation Economics – <i>Should we give-up on “economic growth”?</i>  | CBC_Ideas_Debate_End_Economic_Growth.mp3                |
| <b>Part V: Advancing Conservation Biology</b>    |  |   |
| Apr 9  | Future directions – <i>Conservation success stories!</i>   | Conservation_Success_Guardian.mp3                       |
| Apr 14   | How to be a conservation biologist – <i>Valuing and practicing conservation – Jane Goodall</i>   | Jane_Goodall_CBC_Curr.mp3                               |
| Apr 14   | How to be a conservation biologist – <i>The life and legacy of Rachel Carson’s Silent Spring</i>   | Rachel_Carson_Biog_Quir_Quar.mp3                        |