**Simon Fraser University**  
**School of Resource and Environmental Management**  
**Applied Population and Community Ecology**

**Instructor:** Dr. Anne Salomon  
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Tel: 778-782-8739  
anne.salomon@sfu.ca  
Office hours: by appointment

**Lectures:**  
Tuesday 10:30am – 12:20pm (SECB Rm 1011)  
Friday 12:30am – 2:20pm (SECB Rm 1011)

**Course Overview**  
This course explores the scientific foundations of applied ecology and highlights contemporary conservation strategies designed to balance the needs of people and nature. We will explore topics such as metapopulation theory and reserve design, alternative states and resilience, and ecosystem function and ecosystem-based management. Course readings will include textbook chapters to provide students with the foundations of applied ecology, and cutting-edge, peer-reviewed literature to expose students to the latest innovations in the field of conservation science. Students will also have the opportunity to apply field and modelling approaches to real-world conservation issues. Half and full day field trips to local conservancies and parks will allow students to develop practical field research skills. Finally, classroom sessions will engage students in lively group discussions and will include lectures, hands-on analysis, guest speakers, and group work on current and contentious topics in conservation science.

**Overall Class Goals**  
As new and aspiring graduate students, my aim is to facilitate your development of the skills and knowledge you will need to excel in the field of environmental management and conservation, whether you are interested in an academic career or in doing science-based conservation at government agencies, non-governmental organizations, or international institutions. This class has been designed to hone your creative and critical thinking skills, enhance your communication and debating ability, and expose you to a diverse set of problem solving techniques. I encourage you to challenge current dogma and explore the intersections between applied ecology, your own personal academic interests, and the diversity of fields you will be exposed to at REM.

**Overall Learning Outcomes**  
By the end of this course, you will be able to:

1. Identify and synthesize the core principles of ecology that should be considered while addressing an environmental issue
2. Understand the key processes that drive ecosystem dynamics and their associated uncertainties

3. Communicate complex and/or contentious ecological information clearly and effectively to a target audience

4. Work independently and collaboratively on contemporary environmental problems to formulate and implement solutions

**Required Textbook**

**Field Trips**
*Fri, Sept 25th (3 hrs):*
- Light House Park: Marine Protected Area Design and Analysis
- 8:00am-11:00am (To catch the low tide)
- 801 will switch to REM 611’s 12:30-2:20pm time slot (check with Dr. Karen Kohfeld for details)

*Sat, Oct 24th (7 hrs - full day):*
- Lower-Seymour Conservation Reserve: Ecosystem-based Management of Temperate Rainforests
- 9:00am- 4:00pm

**No Class**
*Tu, Sept 15th:*
- Reading for ‘Future of Conservation’ Debate

*Fri, Oct 16th*
- Compensation for Lower-Seymour Field Trip

*Fri, Nov 6th*
- Compensation for Lower-Seymour Field Trip

*Fri, Nov 20th*
- Compensation for Lower-Seymour Field Trip

**Modules**
*Module 1: Reserve Design*
Part I: An Introduction to Reserve & Protected Area Science
Part II: Island Biogeography & the SLOSS Debate
Part III: Metapopulations & Source Sink Dynamics
Module 2: Ecosystem Services
Part I: Biodiversity, Productivity, Ecosystem Function
Part II: Ecosystem Services Valuation and Critique

Module 3: Ecosystem-Based Management
Part I: Biotic Processes, Competition, Predation, Trophic Cascades and Shifting Baselines
Part II: Abiotic Drivers, Temperate Rainforests, Ecosystem-Based Management

Module 4: Managing for Resilience
Part I: Introduction to Resilience and Alternative State Dynamics
Part II: Adaptive Cycle, Rigidity Traps, Gilded Traps

Module 5: Imperiled Species and Populations Dynamics
Part I: Allee Effects and Exponential Growth Models
Part II: Matrix Models, Population Viability Analysis and Choosing Conservation Actions

Module 6: Global Challenges and Solutions
Part I: Feeding the Planet; Land Conversion, Food Security and Global Climate Change
Part II: Biotic Homogenization; Ecological Consequences of Introduced Species

Evaluation and Grading
Individual Assignments (20)
- Worksheets (10)
- Short oral presentation & critical summary of peer-reviewed journal articles (point - counterpoint critiques & debates) (10)

2 Group Projects (40)
- Marine Reserve Design, Assessment and Feasibility (20)
- Ecosystem-Based Management in Temperate Rainforests (20)

2 Exams (35)
- Midterm Exam (15)
- Final Exam (20)

Class Participation (5)
- Active participation in class dialogues, posing questions, catalysing discussions
- Enthusiastic participation in field trips
- Being present and on time for lectures and field trips
### Simon Fraser University
**School of Resource and Environmental Management**

**Applied Population and Community Ecology**

T: 10:30am-12:20pm F: 12:30-2:20pm Rm SECB (unless otherwise noted)

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<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Required Reading</th>
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| 1    | Tu, Sept 8 | Introduction to Course  
Course Overview & Goals  
Learning Outcomes & Course Mechanics  
How 611 Fits Within REM Program | none                                                 |
| 1    | Fri, Sept 11 | Introduction to Applied Ecology & Conservation  
Human Alteration of Earth's Ecosystems  
Assign Journal Articles | Kareiva and Marvier 2012 Bioscience Ch. 1 |
| 2    | Tu, Sept 15*** | Class off  
Read papers & Ch. for Fri, Sept 18th | Read papers & Ch. for Fri, Sept 18th |
| 2    | Fri, Sept 18 | The Future of Conservation Debate  
*Module 1: Reserve Design*  
Part I: Introduction to Reserves & Protected Areas  
Introduction to Light House Park & Begin Brainstorming  
Marine Reserve Group Project | Doak et al. 2014a TREE Critique  
Marvier and Karieva 2014 TREE Response  
Doak et al. 2014b TREE Reply  
Tallis & Lubchenco 2014 Nature Critique  
Ch. 5  
Ch. 6 |
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<th>Week</th>
<th>Date</th>
<th>Module/Activity</th>
<th>Readings/Notes</th>
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| 3    | Tu, Sept 22 | *Module 1: Reserve Design*  
Part II: Island Biogeography & SLOSS Debate  
Refine Questions & Field Methods for Marine Reserve Group Project | McClanahan 2015 J Biogeography  
Ch. 10 276-286p  
Ch. 15 |
| 3    | Fri, Sept 25*** | *Field Trip to Light House Park:*  
Marine Protected Area Design and Analysis  
*8:00am-11:30am* | Note: 801 will switch to 12:30-2:20pm  
(check with Dr. Karen Kohfeld for details) |
| 4    | Tu, Sept 29 | Light House Park Debrief  
Stats in a Nutshell  
Preparing Manuscripts for Publication  

*Module 1: Reserve Design*  
Part III: Metapopulations & Source Sink Dynamics | Hopf et al. 2015 Eco Apps preprint  
Ch. 10 287-296p |
| 4    | Fri, Oct 2 | *Module 2: Ecosystem Services*  
Part I: Biodiversity, Productivity, Ecosystem Function  
Debate on the Use of Conservation Markets | Essington & Criddle 2014 Eco Apps  
Gerber et al. 2014a Eco Apps  
Smith et al. 2014 Eco Apps Critique  
Gerber et al. 2014 b Eco Apps Reply  
Ch. 3 |
| 5    | Tu, Oct 6  | *Module 2: Ecosystem Services* | Curran et al. 2014 Eco Apps |
|     |     | Part II: Ecosystem Services and Critique  | Quetier et al. 2015 Eco Apps Critique  
Debate on the Use of Biodiversity Offsets  
Curran et al. Eco Apps 2015 Reply  |
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<tr>
<td>5</td>
<td>Fri, Oct 9</td>
<td>Class Presentations of Group Project # 1: Marine Reserve Design, Feasibility and Assessment</td>
<td>none</td>
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| 6   | Tu, Oct 13 | Mid-term Exam  
Mid-term Course Evaluation  | Review previous required readings  |
| 6   | Fri, Oct 16*** | Class off  
(Compensation for Lower-Seymour Field Trip) | none  |
| 7   | Tu, Oct 20 | Module 3: Ecosystem-Based Management  
Part I: Biotic Processes; Competition, Predation & Facilitation, Trophic Structure, Trophic Cascades & Shifting Baselines  | Ferretti et al. 2015 Frontiers  
Ch. 11 319-320  
Ch. 15 432-433  |
| 7   | Fri, Oct 23 | Module 3: Ecosystem-Based Management  
Part II: Abiotic Processes; Temperate Rainforest EBM  
Prep for Field Trip & EBM Group Project  | Duveneck and Scheller Eco Apps 2015  
Ch. 13  |
<p>| 7   | Sat, Oct 24*** | Field Trip to Lower Seymour Conservation Area: Ecosystem-Based Management  | See Assignment  |</p>
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<th>Week</th>
<th>Day, Date</th>
<th>Topic</th>
<th>Readings</th>
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| 8    | Tu, Oct 27 | Field Trip Debrief  
Enter and Plot Data, Begin Analysis  
Scope out Project Paper & Talk | none |
| 8    | Fri, Oct 30 | Module 4: Managing for Resilience  
Part I: Introduction to Resilience and Alternative States  
Functional Responses, Hysteresis | Selkoe et al. 2015 Eco Health & Sus |
| 9    | Tu, Nov 3  | Module 4: Managing for Resilience  
Part II: Adaptive Cycle, Rigidity traps, Gilded traps | Schultz et al. 2015 PNAS |
| 9    | Fri, Nov 6*** | Class Off  
(Compensation for Lower-Seymour Field Trip) | none |
| 10   | Tu, Nov 10 | Group Project #2 Presentations on Temperate Rainforest EBM | none |
| 10   | Fri, Nov 13 | Module 5: Imperilled Species and Populations Dynamics  
Part I: Allee Effects and Exponential Growth Models | Kuparinen et al. 2014 Cons Bio Ch. 7 |
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<th>Week</th>
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<th>Reading/Notes</th>
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<tr>
<td>11</td>
<td>Tu, Nov 17</td>
<td>Minimum viable population size</td>
<td>Ch. 8</td>
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<td><em>Module 5: Imperilled Species and Population Dynamics</em></td>
<td>Stringell et al. 2015 Bio Conservation</td>
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<td>Part II: Matrix Models, Population Viability Analysis and Choosing Conservation Actions</td>
<td>Ch. 9</td>
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<td>11</td>
<td>Fri, Nov 20</td>
<td>Class off</td>
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<td><em>(Compensation for Lower-Seymour Field Trip)</em></td>
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<td>12</td>
<td>Tu, Nov 24</td>
<td>Module 6: Global Challenges and Solutions</td>
<td>Johnson et al. 2014 PNAS</td>
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<td>Part I: Feeding the Planet; Land Conversion, Food Security and Global Climate Change</td>
<td>Ch. 14</td>
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<td>12</td>
<td>Fri, Nov 27</td>
<td>Module 6: Global Challenges and Solutions</td>
<td>Lampert et al. 2014 Science</td>
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<td>Part II: Biotic Homogenization; Ecological Consequences of Introduced Species</td>
<td>Ch. 17</td>
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<td><em>Invasional meltdown</em></td>
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<td>13</td>
<td>Tu, Dec 1</td>
<td>Course Review &amp; Synthesis</td>
<td>Come with Clarifying Questions</td>
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<td>Course Evaluations</td>
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<td>13</td>
<td>Fri, Dec 4</td>
<td>Final Take Home Exam</td>
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<td>Due Dec 4&lt;sup&gt;th&lt;/sup&gt; by Midnight</td>
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