



**WILDLIFE CORRIDORS:
THE BANFF NATIONAL PARK PROJECT
SUMMER 2016
JULY 17 – JULY 31**

ACADEMIC SYLLABUS

Instructors:

M. Troy Burnett, PhD, Associate Professor Mount Royal University

Contact Hours:

We will all be in close contact, meeting every day throughout the course. There will be a number of 'check-in days' where we will schedule student-faculty meetings. If you would like to have a meeting outside of those times, you can certainly make an appointment or find an appropriate available time, and we are happy to oblige.

Class Meetings:

This Wildlands Studies Project involves fourteen days of instruction and field research, with little time off during the program. Faculty and staff work directly with students 6-10+ hours a day and are available for tutorials and coursework discussion before and after scheduled activities. Typically, scheduled activities each day begin at 9am, with breaks for meals. Most evenings include scheduled activities, including guest lectures, structured study time, student presentations, and workshops. When in the backcountry or at a field site, our activities may start as early as 6 am or end as late as 10 pm. It is necessary to be flexible and able to accommodate a variety of class times.

Course Credit:

Wildlands Studies students receive credit for one undergraduate course:

ESCI 497T, Environmental Wildlands Studies (5 quarter credits) – Field study of environmental problems affecting the natural and human-impacted ecosystems of our study region, including the role of human interactions.

This course has distinct objectives, and we integrate teaching and learning through both formal learning situations (i.e., lectures and seminars) and field surveys. Academic credit is provided by Western Washington University with support from the Environmental Science Department in WWU's Huxley College of the Environment. An extended description follows in the course description section of this syllabus.

Readings:

Ben Gadd's *Handbook of the Canadian Rockies* and a Course Reader are required. Students will need to purchase a copy of Ben Gadd's book. I recommend addall.com, or amazon.com, to find the most affordable on-line copy. The Course Reader will be sent to students in a series of PDF documents prior to the start of the course. Readings include selections from academic primary literature, technical reports, book chapters, and environmental impact assessments and planning documents. Field guides and textbooks supplement our field activities and are an integral part of our project. We will carry a shared reference library of these on all activities and backcountry trips.

Contents of this syllabus:

- I. Project Overview & Outline
- II. Learning Objectives
- III. Course Descriptions
- IV. Assessment
- V. Grading Scheme
- VI. General Reminders
- VII. Academic Schedule & Course Content
- VIII. Reading List

I. Project Overview & Outline

The focus of our field study will be the wildlife corridors within Banff National Park and assessing their efficacy in the overall framework of the Park's conservation strategy. Typically narrow, funnel-shaped tracts of land through developed areas, wildlife corridors are protected routes that allow species to migrate safely between habitats. They are a vital component in any conservation strategy and have been used recently as a method to mitigate the adverse effects of both climate change and human development. Working in consultation with Parks Canada, the Yellowstone to Yukon Conservation Initiative, local land managers and community members, we will spend two weeks examining on-site the intertwined scientific, cultural, and management dimensions of these corridors.

The first objective of the field project is to develop a broad understanding of the natural history of the study area – its climate, geography, biodiversity, and human landscapes. The second objective is to investigate and evaluate select wildlife corridors throughout the region and their effectiveness as a tool of wildlife management. To do so, we will camp, hike and drive in, through, and around these corridors – primarily those located near the towns of Banff and Canmore.

To meet these objectives the course will emphasize biogeographical fieldwork: transect analysis; faunal tracking, scat identification, numerical assessment, route taking, pathways, and obstacles; floral composition and dynamics; hydrological systems; stress zones and points (bottlenecking/pinching); habitat fragmentation; and human interaction patterns. The curriculum will also be augmented by information exchanges with wildlife management experts and conservation community leaders.

II. Learning Objectives

Following this project, students should have working knowledge of and experience in:

1. ***The ecosystems of the Canadian Rockies in general and the structure of Wildlife Corridors of Banff National Park in particular; in terms of flora, fauna, and ecological processes, including threats, conservation, and ongoing change.*** Species identification is essential to managing and understanding the communities in this region and for identifying any change over time. Through a series of on-site lectures, workshops, and journal assignments students will learn techniques for keying out and confirming identification of plant and animal species using field guides and taxonomic keys. In a series of field excursions, lectures, readings and discussions, students will further their knowledge of ecological concepts and conservation principles, and be able to identify community types and the processes that underlie community development and change.

2. **Geographic tools and spatial analysis.** Students will learn a variety of geographic techniques and mapping skills used in conservation management and wildlife corridor assessment. These skills include: map reading/making/assessment; remote sensing data interpretation; GPS and orienteering; and topographical analysis.
3. **The cultural, political, and management history within Banff National Park, including native perspectives, policies governing use (federal, state, local), and local community involvement.** Following introductory lectures on the cultural, political and management history in the region, students will have the chance to meet local activists and Park managers who may have very different perspectives on sustainability, management, and policy.
4. **Designing a field research project, collecting field data, managing, synthesizing, and presenting interpretations of these data to peers, faculty, and the public both in writing and in presentation.** Students gain significant experience in conducting research through a final field project that is the culmination of this course. The skills learned in this project are transferable to other fields (and to their future careers): working well within a group, taking and using feedback, managing, synthesizing and interpreting information, presenting interpretations in oral presentation and in written form.
5. **Critical reading, discussion, and evaluation of primary literature in ecology, conservation, and geography.** Throughout this course we rely on primary literature in lieu of a textbook, therefore, students gain a significant amount of experience reading and critically discussing primary literature. Following an introductory lecture and workshop on “how to read a scientific paper,” students read at least one piece of primary literature each day, learning over time and with practice where to focus their attention to be able to critically evaluate the work. Each reading is debriefed with a group discussion, ensuring that students have understood the work and are able to critically evaluate it. By the end of the course when students are well-practiced in reading primary literature, less time in discussion is devoted to comprehension and more discussion is devoted to critical evaluation.
6. **Basic theoretical concepts of wildness vs. wilderness, management vs. preservation, sustainable development and environmental sustainability, wildlife corridor design, and the practical applications of these concepts in conservation and human experience.** Students will gain knowledge and appreciation for the differences among these concepts and their usage in the popular and the primary literature. These concepts are frequently encountered throughout this course in readings, discussions, and visits with local experts. Issues surrounding their influence on conservation and management are discussed frequently throughout the course.
7. **Field observation skills, including methods for documenting and sharing findings in multiple formats.** Field observation skills are an integral part of good science and promote understanding of the world around you. Through directed learning of the geography and ecology in the region, students will gain experience observing the world around them and be able to identify and assess changes (habitat analysis; wildlife corridor structure; impediment analysis, etc.). Following an introduction to various techniques of data collection (e.g., transects, mapping, tracking), recording and presenting information, students will gain experience using a variety of techniques to present natural history observations.

These topics will be addressed through on-site lectures and discussions, course readings, field activities, visits with local experts, exposure to ongoing research, backcountry excursions, and field research projects. The course generally progresses from faculty-led instruction in the beginning (i.e., more lectures and readings) to student-led critical evaluation, analysis, and synthesis in the end of the course. Our overarching goal is to have

students leave the course not only with a working knowledge about this particular region, but also broader skills and understanding of ecological, geographic, and social sciences that allow students to critically evaluate information in other contexts in their lives and careers.

III. Course Description

Students will receive transcript credit for the following course (introduced on page 1):

ESCI 497T, Environmental Wildlands Studies (5 quarter credits) – Field study that evaluates the ecosystems and wildlife corridors of Banff National Park, including the role of human interactions.

Experiences/Activities: Extended field study of flora, fauna, biotic communities and ecological relationships at selected sites within the Park. Students participate in field research and evaluation of environmental policy options, focusing on concepts and principles of environmental or geographical research, wildland management and public land planning methods; environmental field study emphasizing on-site instruction and investigation of specific wildlife corridor case studies; field inventories; field evaluation of planning/management options; problems of sampling, quantification and site-specific environmental impact assessment in wildland planning; the role of field research in wildland/wildlife management and corridor analysis; analysis of legislative public land planning mandates and how they affect the case study; survey of the role of wildlife corridors in regional thought and culture.

Outcomes: Students will gain the ability to undertake a substantial, complex field project and be able to synthesize, organize, and present final data in a way that is appropriate to the audience and subject matter. Students will be able to identify the key testable questions for a research project and identify what elements need to be measured to answer that question. Students will analyze (using basic summary statistics), visually represent (e.g., figures, tables), and interpret the results of their data. Students will discuss their results in light of current management or conservation issues and should be able to demonstrate how their results compare with or add to current knowledge of their study subject. Students will prepare a final written assessment and an oral presentation that synthesizes their final data and interpretations. Students should be able to demonstrate their understanding of the geographic, conservation, and/or social science processes and concepts that underlie their research.

IV. Assessment

The following is an overview of the academic requirements for the program.

Course Grade: 100 point scale

Field Journal	35%
Final Essay/Assessment report	25%
Leadership and Discussion skills	10%
Exam I	15%
Exam II	15%

Field Journal (35%)

The field journal is an integral part of the Banff Wildlife Corridor field study experience. It serves as a learning tool, a place for reflection and a record of your experience as a whole. The final essay/assessment will strongly draw from the daily journal entries.

Includes:

- Trip Log: The Trip Log is a structured, narrative record of the backcountry trips. We are using a format that has drawn from the Grinnell Style Field Journal. It includes the basic orienting information, a general route description, natural history observations, species lists, approximate distances, travel times, important route details, thoughts, impressions, and questions. This log is a careful summary of observations and field notes taken throughout the day.
- Specific Wildlife Corridor observations including: transect data; faunal tracking/identification/numerical assessment/route taking/pathways/obstacles; floral composition and vegetative analysis; ecological community; human interaction patterns; geographic data (topography, co-ordinates, GPS waypoints, map sketch and illustrations).
- Questions for investigation, including methods of testing and possible answers or further questions.
- Analysis of assigned Course Readings for the day (when applicable).
- Summary of interaction with guest lecturers/conservation specialists (when applicable).
- Personal experience and thoughts.

Field Journal Grading Criteria:

Orienteering Information: All entries need orienteering information, even if on the same day.

Consistency of entries: This refers to regular and consistent use of the journal.

Organized: You should be able to use your journal as a reference. Information should be accessible and related to specific dates and locations. Include a table of contents in the beginning.

Neatness/Readability: Someone else should be able to use your journal as a reference (or grade it).

Diversity of Expression: We encourage you to use a diversity of journaling techniques. Avoid using only one form of expression.

Detailed Observation: Attention to detail will improve your observation skills.

Effort: We expect to see your field journal improve throughout the course, and will assess this accordingly.

Final Essay/Assessment Report (25%)

At the end of the course, working in groups, students will have prepared a preliminary report on the status of the wildlife corridors of Banff National Park. Given time constraints, the preliminary report will be more of an 'executive brief' on what the team has learned/observed and thoughts/recommendations for the Park and its management of the wildlife corridors. The team will also be required to make a 30-40 minute oral presentation of their report to the instructors and students.

Leadership and discussion skills (10%)

Based upon:

1. Reading/Activity discussion sessions; participation and sharing ideas that are relevant and thought provoking; cooperative practice and consideration of others; safety concerns, group skills, ability to work as a team, and overall enthusiasm and interest.
2. Each day, one student will be Leader of the Day (LoD) and one student will be Naturalist of the Day (NoD). Everyone will be LoD and NoD at least once. Leader of the Day gets up early, wakes the group, and starts a stove or two to get hot water ready for breakfast. LoD leads the group while hiking and helps instructors make decisions about safe backcountry travel; NoD remains at the back of the group to make sure no one gets left behind. NoD is also responsible for putting together a short natural history lecture based on a unique topic in his/her field notebook, which he/she shares at the end of the day (usually over supper).

Exam I (15%) and II (15%)

We will have two exams during the course, the first at the mid-point of the class, and the second at the end. Exam I will be based on a selection of readings to have been done upon arrival. Exam II will draw from the two-week experience in the field.

V. Grading Scheme

To convert final grade percentages to letter grades for the course that will appear on your transcript, we will use the following grading scheme:

Letter grade	Percentage
A	92.5- 100+
A-	90.0- 92.4
B+	87.5- 89.9
B	82.5- 87.5
B-	80.0- 82.4

Letter grade	Percentage
C+	77.5- 79.9
C	72.5- 77.4
C-	70.0- 72.4
D+	67.5- 69.9
D	62.5- 67.4
D-	60.0- 62.4
F	< 60.0

VI. General Reminders

Academic Integrity is as relevant in this field course as it is at your home institution. Plagiarism, using the ideas or materials of others without giving due credit, cheating, or putting forth another student's work as your own will not be tolerated. Any plagiarism, cheating, or aiding another to cheat (either actively or passively) will result in a zero for the assignment. Cases of academic dishonesty may be reported to your home institution.

Assignment deadlines are established to promote equity among students and to allow for ample assessment time from faculty before other assignments are due or other activities are to occur. Therefore, deadlines are firm and late work will receive at a minimum a 10% loss of grade points for each day they are late. If you believe that extenuating circumstances have prevented you from completing your work on time, make sure to discuss this with the relevant faculty as soon as possible and certainly before the work is due.

Participation and attendance are crucial throughout this project. Because of the demanding schedule and limited time, all components of the program are mandatory (unless indicated) and missing even one lecture can have a proportionally greater effect on your final grade. Hence, it is important to be prompt and prepared (i.e., with required equipment) for all activities. Students with special needs should meet with the lead faculty member as soon as possible to discuss any special accommodations that may be necessary.

VII. Academic Schedule & Course Content

Outlined in the following table, but subject to change due to demographic and environmental stochasticity. A more detailed description of daily activities/readings will be provided when you arrive in Calgary/Banff.

Sunday, 7/17	<p>Arrival and meeting in Calgary, afternoon Purchase/Organization of Supplies Drive to Base Camp in Banff National Park</p> <p>Evening Activity (6-8pm). Course Logistics and Overview; Field Notebook requirements</p>
Monday, 7/18	<p>Bow Valley Wild Smart Presentation (Wilderness do's and don'ts; Bear Safety) Guest Instructor (Kim Titchener – BVWS):</p> <p>Ha Ling Peak Hike (Aerial View/Assessment of the Bow Valley topography, wildlife corridor recognition)</p> <p>Evening Classroom Activity (6-8pm). Discussion/Student Presentations Film: Highway Wilding</p>
Tuesday 7/19	<p>Three Sisters Wildlife Corridor Analysis (Day I)</p> <p>Evening Classroom Activity (6-8pm). Discussion/Student Presentations</p>
Wednesday 7/20	<p>Three Sisters Corridor Analysis (Day II) Silvertip Corridor Analysis</p> <p>Evening Classroom Activity (6-8pm). Discussion/Student Presentations</p>
Thursday 7/21	<p>TransCanada Highway crossings/underpass assessment (Canmore) Guest Instructor (John Paczkowski – Alberta Parks): 9:00am, Canmore Provincial Bldg.</p> <p>Quarry Lake/Wind Valley/Dead Man's Flat Corridor Assessment (Canmore)</p> <p>Exam I</p>
Friday 7/22	<p>The 'Yellowstone to Yukon' Initiative Guest Lecturer (Karsten Heuer—Parks Canada Warden): 10:00am-11:00am.</p> <p>Tunnel Mountain, Banff. Aerial View/Assessment of Banff Topography</p> <p>Sustainable Development, Tourism and the Bow Valley Guest Lecturer (Dr. Barbara McNicol – Mount Royal University): 5:00pm-6:00pm</p> <p>Evening Classroom Activity (6-8pm). Discussion/Student Presentations</p>
Saturday 7/23	<p>Cascade Corridor Analysis (Banff)</p> <p>Evening Classroom Activity (6-8pm). Discussion/Student Presentations</p>
Sunday 7/24	<p>Rundle Corridor Analysis (North Bow River Bank, Banff) Banff Townsite/Industrial Park Corridor Analysis (Banff)</p> <p>Evening Classroom Activity (6-8pm). Discussion/Student Presentations</p>
Monday 7/25	<p>Lake Minnewanka Habitat-Wildlife Corridor Analysis (Day 1). Backcountry hike/camp. (LM11)</p>

Tuesday 7/26	Lake Minnewanka Habitat-Wildlife Corridor Analysis (Day 2). Backcountry hike/camp Return to Banff Evening Classroom Activity (6-8pm). Discussion/Student Presentations.
Wednesday 7/27	Plain of the Six Glaciers/Agnes Lake—Lake Louise Yoho National Park-Yoho River corridor Analysis (Day 1). Takakkaw Falls Backcountry
Thursday 7/28	Yoho National Park-Yoho River Corridor (Day 2). Backcountry hike/camp (Little Yoho campsite)
Friday 7/29	Yoho National Park-Yoho River Corridor (Day 2). Backcountry hike/camp (Yoho Lake campsite)
Saturday 7/30	Return to Banff. Group Project/Final Report Journal due Course Evaluation Exam II
Sunday 7/31	End of Course: Return to Calgary, mid-morning

VIII. Reading List

Course Readings

Gadd, Ben. *Handbook of the Canadian Rockies*

Internet sources: <http://www.conservationcorridor.org/>
<http://y2y.net/>

(Selections provided in the course reader)

Alberta Tourism, Parks, and Recreation. 2010. *Eastern Bow Valley Wildlife Corridor Study: An Analysis of Winter Tracking and Monitoring Final Report*.

Anderson, Anthony B. *Applying Nature's Design: Corridors as a Strategy for Biodiversity Conservation*.

Barry Lopez, "The Naturalist," *Resurgence*, no. 219 (July/Aug. 2003).

Bennet, A.F. *Linkages in the Landscape – Habitat Fragmentation and the Consequences for Wildlife*.

Bow River Basin Council. *Nurture, Renew, Protect: A Report of the State of the Bow River Basin (Banff National Park)*.

Chetkiewicz, C.B. et al. *Corridors for Conservation: Integrating Pattern and Process*.

Clevenger, A.P. et al. *Performance Indices to Identify Attributes of Highway Crossing Structures*.

Dean, Cornelia. *Home on the Range: A Corridor for Wildlife*, in the New York Times, May 23, 2006.

Duke, D.L. et al. *Restoration of a Large Carnivore Corridor in Banff National Park*.

Herrero, Stephen. *Biology, Demography, Ecology and Management of Grizzly Bears in and Around Banff*

National Park and Kananaskis Country.

Hilty, J. et al. *Corridor Ecology.*

Kennet, Steven A. *Wildlife Corridors and the Three Sisters Decision – Lessons and Recommendations.*

Lee, Tracy et al. 2010. *Spatio-temporal Patterns of Wildlife Distribution and Movement in Canmore's Benchlands Corridor.*

McNeal, A. *How to Read a Scientific Paper.*

Parks Canada. *Banff National Park of Canada Management Plan.*

Percy, Melanie P. 2003. *Spatio-Temporal Movement and Road Crossing Patterns of Wolves, Black Bears, and Grizzly Bears in the Bow River Valley of Banff National Park.*

Primack, Richard B. 2006. *Essentials of Conservation Biology – Practical Applications.*

Van der Grift, E.A. and R. Pouwels. *Restoring habitat connectivity across transport corridors : identifying high-priority locations for de-fragmentation with the use of an expert-based model*, in J. Davenport *The Ecology of Transportation.*