

QUEEN'S UNIVERSITY
Ontario Universities Program in Field Biology

Course Title:	Effects of human development on aquatic environments and biodiversity in Canada and China.
Instructor(s):	Prof. Yuxiang Wang (Biology, Queen's) 613-533-6134 yuxiang.wang@queensu.ca Prof. Steve Lougheed (Biology, Queen's) 613-533-6128 steve.lougheed@queensu.ca
Dates:	Sunday, Aug 11 – Saturday, Aug 24, 2024 (14 days)
Location:	Queen's University Biological Station and environs including the St. Lawrence River.
Cost:	Cost: \$1,300 (\$350 deposit to home university at the time of application plus \$950 due Friday July 12, 2024) including fees, 13 nights' accommodation and board at QUBS, in class travel. Transportation to QUBS not included.
Prerequisites:	Completion of 2 nd year biology or environmental program or permission of the instructors.
Enrolment*:	Maximum of 14 (4) students from OUPFB).
Course Description (brief):	<p>Based at the Queen's University Biological Station, this course provides Canadian & visiting Chinese students (approx. 14 from Tongji University, Shanghai China) with insights into the impacts of human development on the environment, with focus on selected aquatic ecosystems in North America as well as in developing countries like China. We introduce key conservation and environmental challenges pertaining to freshwater environments in both regions. Students learn methods for surveying biodiversity, classifying wetlands, and quantifying variation in habitat structure, hydrology and water chemistry. We provide overviews of the diversity of fish, amphibians, reptiles, birds, and plants. Students will also develop practical skills in experimental design, developing hypotheses based on observations of diversity and ecosystem variation and then testing these as independent group research projects. The course is organized around five themes: i) Biodiversity assessment, ii) Habitat assessment or natural and reconstructed wetlands, iii) Aquatic environmental degradation, iv) Water control & usage, v) Relationships between socioeconomic development and aquatic environments. The course also provides students with excellent opportunities for exchange of ideas on culture, academic, and socioeconomics in China vs. Canada.</p> <p>Each student group (2-3 members) will present a research seminar on a topic assigned by the faculty. Students maintain a field journal to record all data and field observations. Each student will write a final report based on data from their independent project that will be submitted 6 weeks after the completion of the course.</p> <p>http://post.queensu.ca/~yuxiangw/teaching/fieldcourse.html for more information.</p>
Evaluation:	Course participation (20%), Field journal (10%), Blog (10% - e.g. see https://chinacanada2018.sclougheed.ca), Seminars (20%), Final report (40%)

An Average Day – What to Expect

<p>(a) Daily timeline</p>	<p>Activities will vary across days. Here is an example of what one such day might look like: 6:00am Bird hike, 7:30 am breakfast, 8:30am GPS instruction and basic training practicum, 9:30 am GeoCaching exercise, 12:00 Lunch, 13:00 wetland plant diversity survey, 16:00-17:30pm free time, 17:30 Dinner, 19:00-22:00 student seminars and discussion, 22:30-23:30 field journal and group debriefing.</p> <p>The second week is dedicated to group projects, and daily timeline will depend on the nature of student-designed projects and group schedules.</p> <p>Note that our time will be mainly spent outdoors under variable conditions; fieldwork will be conducted, rain or sunshine.</p> <p>It won't be unusual for us to work together 10 to 12 hours most days and students should be prepared for physical exertion. Our goal is to explore many themes, see lots of habitats and varied local species and give you lots of practical experience, ensuring that have a suite of new skills and knowledge by the end of the course. The course will also give you some perspective on the demands, but also the rewards of field work. Despite these full days, we will make time for self-reflection, recreation (canoeing and swimming), and personal work.</p>
<p>(b) Work habitat & Physical exertion</p>	<p>We will engage in some activities that require physical exertion. For example, we will undertake a few daily hikes in the field that might be 4-6km carrying field gear. We will also do some boating and canoeing, and fish seining, wetland surveys, and lake shore walks that will require using hip or chest waders. Be prepared for some heat and humidity during the day, long-hours in the field (rain-or-shine), some biting insects and ticks. As there are no outhouses or toilets in the field away from the station buildings, you may have to use the woods should the need arise.</p>
<p>(c) Common activities</p>	<p>Activities in the course will be varied and involve hiking, sometimes with field gear, canoeing and possibly rowing small skiffs, water work using hip and chest waders. Some activities may involve observations requiring standing or sitting for long periods. Students should bring suitable footwear (hiking boots), wide-brimmed hats, long, light-weight pants, and rain jackets. We will ensure that we bring sufficient water and use sunscreen as some days may be quite hot and some walks somewhat arduous. We may do some work along road sides and will exert all due caution wearing bright clothing and exiting vehicles cautiously. We will also do some night work and all participants should bring head lamps.</p>
<p>(d) Weather, dehydration, & biting insects</p>	<p>July and August are typically the hottest months at QUBS with daytime temperatures on occasion exceeding 30 degrees. We will work in such heat, rain or shine, but will be sure to carry water and always use appropriate clothing. There will be mosquitoes and potentially deer and horse flies, as well as black-legged ticks. Students can use repellent and tuck the cuffs of their field pants into their socks to mitigate these concerns.</p>
<p>(e) Toxic/poisonous, wildlife/ plants</p>	<p>Risk: Insect stings & bites. Hazard: During spring and summer field personnel there is a possibility of insect bites (mosquitoes and tabanid flies are common), or bee or wasp stings. Even personnel without history of allergic reaction may react because they have never before been exposed. Mitigation: At any sign of anaphylaxis one should contact medical facility for immediate evacuation via cell phone if there is signal or land-line from the lodge. Always carry benadryl as this may lessen the reaction. For researchers working far from roads or our facility it may be well to carry an epipen or two, although these require prescriptions.</p> <p>Risk: Ticks & Lyme Disease. Hazard: Ticks are becoming increasingly common at QUBS, including blacklegged ticks, which carry the bacterium, <i>Borrelia burgdorferi</i>, which causes Lyme Disease. The first sign of infection is usually a circular rash. Other common symptoms include fatigue, chills and fever, headache, muscle and joint pain, and swollen lymph nodes. If untreated Lyme disease can cause nervous system disorders, additional skin rashes, arthritis, heart palpitations, and fatigue and general weakness. It is seldom fatal. Note that, as of 2012, about 2/3rd of the ticks in the QUBS area were Eastern Dog Ticks which do not carry Lyme Disease (Bruce Smith, pers. comm.). Mitigation: Personnel should wear long pants with the legs tucked, long-sleeved shirts that fit tightly at the wrist, and closed shoes and avoid sandals. Light-coloured clothing makes ticks more visible. Insect repellents containing DEET may help repel ticks. After being in the field it is wise to do a careful self-inspection for attached ticks. Prompt removal of attached ticks reduces the transmission of the Lyme disease causing bacterium. Carefully remove attached ticks using tweezers. Be sure to remove the entire tick including the mouth parts. This is best done using special tick-removal forceps not standard tweezers (several pairs of these are available in the First Aid Kits at QUBS). Be sure to save the tick in 95% or absolute alcohol for identification. It is also now possible to do PCR to determine whether the ticks are infected (and by what) and preservation in ethanol permits this. Note that only about 2/3 of the cases of Lyme Disease develop the diagnostic bulls-eye rash. There are other disease-causing organisms to be aware of (<i>Ehrlichia</i> spp. (causes ehrlichiosis), <i>Anaplasma phagocytophilum</i> (causes human granulocytic anaplasmosis), and <i>Babesia microti</i> (protozoan parasites that cause a hemolytic disease known as babesiosis.) - the last two are also primarily vectored by the black-legged tick, and white-footed deer mice are the reservoir host}. After removing ticks, wash the bite site with soap and water or disinfect the area with alcohol or antiseptic. Should symptoms arise personnel should contact a doctor as soon as possible.</p> <p>Risk: Poison ivy. Hazard: Poison ivy is a common plant at QUBS and can be found in forest understory, forest edges, fields, fence rows, and roadsides. All parts of poison ivy (leaves, stems, roots) contain a poisonous substance (urushiol), which typically causes inflammation, frequently with blisters and extreme itchiness. Mitigation: People working in the field should learn to identify the plant (see the Ontario Ministry of Agriculture, Food and Rural Affairs web site). Long pants and long-sleeved shirts can help minimize exposure, although cloths should be washed with detergent to remove. When possible one should walk through along</p>

	<p>cleared pathways. If in contact with poison ivy one should gently wash the area with cool water and soap as soon as possible. Calamine lotion may help reduce itchiness.</p> <p>Risk: Bears. Hazard: Black bears have been sighted at QUBS albeit very rarely (see the Ontario Ministry of Natural Resources Fact Sheet). Black bears can cause injury or death but in the main are timid. Mitigation: To reduce the probability of contact with bears one can make noise when walking through wooded areas. This will alert bears to your presence. Be aware of your surroundings and do not wear music headphones in the field. Watch for signs of bear activity, like tracks, claw marks on trees, flipped-over rocks, or fresh bear scat. Field workers should not leave gear unattended (especially if there is food in it). If food is to be left behind behind, it should be hung it in a tree. If a bear is seen, back away slowly back away and change direction to avoid contact with the bear. Do not run. Do not linger around the bear or try to approach it.</p> <p>Risk: Giant hogweed. Hazard: This invasive plant from Asia is spreading rapidly throughout southern and central Ontario. Contact with its sap with subsequent exposure to light can result in painful blistering and rashes/dermatitis (wishing 48 hours). Contact with eyes has been reported to cause temporary and even permanent blindness although this as to be substantiated. For more information visit the OMAFRA page on this species. Mitigation: Wear protective clothing (long-sleeved shirts and long pants) and stay on pathways. If your skin comes in contact with the sap, wash thoroughly wish soap and water. If your eyes come into contact with sap then immediately flush with water. If you end up with photodermatitis or your eye comes into contact seek medical attention.</p> <p>Risk: Wild parsnip, cow parsnip. Hazard: This invasive plant native to Eurasia is spreading rapidly throughout southern and central Ontario. As with hogweed, contact with parsnip sap with subsequent exposure to light can result in painful blistering and rashes/dermatitis (wishing 48 hours). Contact with eyes has been reported to cause temporary and even permanent blindness although this as to be substantiated. Here is the City of Kingston page on this species. Mitigation: Similar to the precautions and other mitigation measures listed for giant hogweed. Wear protective clothing (long-sleeved shirts and long pants) and stay on pathways. If your skin comes in contact with the sap, wash thoroughly wish soap and water. If your eyes come into contact with sap then immediately flush with water. If you end up with photodermatitis or your eye comes into contact seek medical attention.</p>
(f) Sleeping, washroom & laundry facilities	Students will have indoor accommodations typically in shared rooms with bunk beds or multiple beds. Students should bring their own sleeping backs and pillows. There are shared flush toilets and showers either in the same buildings as bedrooms or in another building. A coin-operated washing machine and drier is available but students should bring a small amount of clothing detergent.
(g) Meal plans & food allergies	All meals are provided by the kitchen at the Queen's University Biological Station. Most food allergies can be accommodated including peanut, seafood, and gluten.
(h) Non-academic responsibilities	Students are expected to keep their shared living accommodations clean, and to ensure that they leave it as they found it at the end of the course. The kitchen asks that field course students 'bus' their dishes after every meal. Students are also responsible for ensuring that scientific equipment and field guides are cared for.
(i) Degree of isolation	While we are somewhat isolated, we will make local trips where students can pick up snacks. The station itself provides cookies, fruit and tea and coffee in non-meal times. There is WiFi in the central lodge and there is no issue with recharging telephones, cameras or computers. The station has first aid supplies and we are within 50 minutes of hospitals.
(j) Alcohol & drugs	Alcohol consumption is discouraged at QUBS. Marijuana is not allowed on premises. QUBS is a campus of Queen's University and follows the university's policies on alcohol and marijuana use: See https://www.queensu.ca/secretariat/sites/webpublish.queensu.ca.uslclwww/files/files/policies/board/StudentCodeOfConduct.pdf
(k) Vaccinations/ Insurances	Students should have all routine vaccinations including an up to date tetanus shot.
(l) Social Situations	QUBS is an active research station with many researchers arising very early (pre-dawn) or working very late. This means that we request that all users respect the space and needs of others and this includes limiting noise late at night or early in the morning. The station is welcoming and has hosted field courses for many years and the dynamic intellectual atmosphere enhances the learning experience.
(m) Final comments	We have run this course since 2005 alternating between China and QUBS. The QUBS version of the course has always been well received and the station has many amenities that make it an extremely pleasant place to learn (including a very nice place to swim in Lake Opinicon and a volleyball court). Bringing together Chinese and Canadian students offers a wonderful opportunity to learn about different cultures and approaches to conservation and science. QUBS (https://www.qubs.ca) itself offers an intellectually vibrant place to learn with many researchers from different institutions working on a range of research questions.