

Course Title:	Fish Ecology & Fisheries: The Science Behind Conservation and Management	
Instructor(s):	Dr. Chris Elvidge (Carleton University); chris.k.elvidge@gmail.com	
Dates:	May 3 – May 16, 2020	
Location:	Queen’s University Biology Station (north of Kingston, ON: https://qubs.ca)	
Cost:	<p>\$1350 includes all accommodations, meals, wi-fi, use of boats and equipment, transportation during the course. Payable as \$350 non-refundable Deposit to your home university; and \$1000 Balance by cheque (deadline March 27th, 2020) to: Carleton University 814308-166-228000 Mail to: Haiyun Bo, Dept. Biology Nesbitt Bldg., Carleton University 1125 Colonel By Dr, Ottawa, ON K1S 5B6.</p> <p>Excluded: Students are responsible for travel costs to and from QUBS.</p>	
Prerequisites:	<p>Second- or third-year course work in ecology, conservation biology, environmental science, geography, or behavioural science/psychology.</p> <p>NOTE: Students must be comfortable around water and boats. Approximately half our working time will be spent outdoors under variable weather conditions. All participants MUST, at some point, handle live fish.</p>	
Enrolment*:	12 (3 reserved for Carleton University)	
Course Description (brief):	<p>Eastern Ontario is home to a diversity of freshwater ecosystems and fish species, providing an ideal backdrop for a field course examining the ecology, conservation and management of fish and fisheries.</p> <p>The objective of the course is to introduce students to the conceptual foundations of fisheries science and aquatic ecology research while providing them with some of the practical skills needed for experimental design, research execution, data analysis, and communication. Through lectures and hands-on activities students will be exposed to diverse practices in contemporary fish & fisheries research, conservation, and management.</p> <p>Students will work in groups with the guidance of the instructors to execute their own research projects with the aim of generating data to publish in peer reviewed journals. At the conclusion of the course students will be able to collect fish using a variety of gear types (e.g. electrofishing, seine nets, hoop nets, rod and reel), safely handle, and enumerate (e.g. identify, measure, tag) a variety of fish species. Students will also be able to characterize fish habitat (e.g. snorkelling surveys) to gain insight on fish-environment interactions.</p> <p>In addition, students will be exposed to a variety of research tools used to study the behaviour, ecology, and physiology of wild fish potentially including surgical techniques, biotelemetry, archival loggers, respirometers, field physiology sampling kits, and underwater video.</p>	
Evaluation:	<p>Oral presentation (20 min + 10 min discussion)</p> <p>Field notebook</p> <p>Participation</p> <p>Quiz</p> <p>Research paper (due on June 15, 2020)</p>	<p>25%</p> <p>5%</p> <p>5%</p> <p>25%</p> <p>40%</p>

An Average Day – What to Expect

(a) Daily timeline	In general, we will be working around the meal schedule at QUBS. QUBS serves meals three times per day (breakfast at 7:30-8:30, lunch at 12:00-13:00, dinner at 17:30-18:30). A typical day will involve starting in the field or the classroom at 8:30, breaking for lunch, working until dinner, and then reconvening for group or classroom activities from 19:00-21:00. These details may change as opportunities presents themselves, e.g. fishing at 05:00 or night-sampling at 00:00. Replacement sleep/rest time will be allocated as needed.
(b) Work habitat & Physical exertion	We will be working in and around water, and on boats of varying sizes, as well as in a seminar room. Being comfortable around water is a must. Life jackets will be present at all times, and chest waders will be available for shallow-water sampling. Working with animals involves keeping them healthy and in good condition – in the case of fish, this means carrying lots of buckets and coolers full of fresh water. Electrofishing will involve wading in hip-deep water with a heavy backpack for a short period of time.
(c) Common activities	We will be capturing and handling fish, which can involve minor stabbings from hooks, fish spines, and small blades. Boat work always comes with the risks of slipping, docks give splinters, working in water leads to dry skin, etc., so being cognizant of these minor hazards and working to avoid them as much as possible are imperative. In addition, seasickness may be an issue for some students (Opinicon is a small lake, but it is still possible). All students MUST handle live fish at some time, and some fish may be lethally sampled. No one will be required to swim. Activity-specific risks will be covered when relevant.
(d) Weather, dehydration, & biting insects	At this time of year (early May), temperatures can range from lows of 0 at night to highs of 30 during the day, and precipitation can range from light snow and frost to torrential rain. In short, weather can be quite variable so bring a wide range of clothing suitable for working outdoors: everything from rain gear to summer clothes/bathing suits with fall/winter gear as well. Quick-dry clothing (e.g. running or trekking gear) is great for aquatic work - spending a day in wet jeans is no fun at all. In 2017, the course occurred during the Great Flood and the station lost electricity for 3 days during 2018, both of which significantly curtailed our activities. I hope it's hot and sunny, but we won't know until we get there. Biting insects generally are not bad at this time of year, but if you are sensitive to bites, bring some insect repellent. Sunscreen is also highly recommended for when we are working outdoors.
(e) Toxic/poisonous, wildlife/ plants	This area of Ontario has very high abundance of ticks, and Lyme disease infections are reported every year. Students need to visually inspect themselves daily. Most of our activities will be in or on the water, but vigilance is still needed.
(f) Sleeping, washroom & laundry facilities	Accommodations will be shared (2 or more people per room). If this is an issue, let me know ASAP to see if alternate arrangements can be made. Room-mates will be assigned by gender. There are beds with mattresses but you should bring your own pillow(s) and bedding. I tend to bring a set of sheets, pillow and a sleeping bag for myself. Water is hot and potable, and if it is not potable, it will be clearly marked and large blue jugs of drinking water will be available. You will need to bring your own soap and toiletries and you should bring two or more towels (one for showering, one for drying off after lake work). There are kitchen facilities in many of the cabins, including fridge & freezer for personal items. Fridge space may be shared with boxes of worms for fish catching purposes. There are coin-operated laundry facilities, and the kitchen staff can make change during their operating hours. The kitchen staff are also responsible for the sale of QUBS-branded merchandise (hats, shirts, mugs). All washrooms are equipped with running water and flushing toilets. While we are on-land at QUBS, washrooms will always be available and nearby. When we are not at the station, boat excursions will be limited to <4 hours with the option of returning in case of emergencies.
(g) Meal plans & food allergies	QUBS serves three meals per day (7:30-8:30, 12:00-13:00, 17:30-18:30). Outside of meal times, snacks (fruit, bread, jams, peanut butter, cereal and milk) and beverages (tea, coffee, milk, hot chocolate) are available 24 hrs. The kitchen can accommodate most food allergies (dairy, gluten, seafood, nut-free) and requirements (vegan/vegetarian). Note that there is peanut butter present, as are epi-pens, for students with nut allergies. Religious diets (Halal, Kosher) usually default to the vegetarian option when pork is served; strict religious diets (particular foods not cooked in the same facilities) cannot be accommodated.

(h) Non-academic responsibilities	Students are required to keep their living spaces (bedrooms and shared areas like kitchens and living rooms) clean, and to leave these areas clean at the end of the course. Other QUBS users will be present and on their own schedules, so mutually respecting spaces is important. There is no housekeeping service.
(i) Degree of isolation	<p>QUBS has full electricity, potable water, WiFi, and cell coverage (although you might have to stand outside to get good reception). It is less than an hour from Kingston and about 90 minutes from Ottawa. Smith's Falls is about 30 minutes away, so we are not dealing with remote conditions. In fact, the area is very much in the Rideau Lakes cottage country. We are well-connected, professional medical attention is nearby, we are covered by 911 service, and several people on-site will have both basic and wilderness first aid training, but using common sense and not being reckless are always assets.</p> <p>There is a convenience store/LCBO outlet a few kilometers away in Chaffey's Lock, with more grocery options ~15km from the station, if needed.</p> <p>The station is used by researchers from several Canadian and international universities, and often hosts concurrent OUPFB courses. Attendees of this course will likely constitute only a small portion of QUBS residents while we are there.</p>
(j) Alcohol & drugs	QUBS is part of the Queen's University campus, so their policies on alcohol and drugs must be followed. Alcohol is only permitted inside the residences. Smoking (tobacco and cannabis) is not permitted on Queen's property. Students are expected to not be under the influence of any non-prescription substances during course work hours. Missed work, e.g. due to hangovers, will not be able to be made up. Students are further encouraged to conduct themselves responsibly.
(k) Vaccinations/ Insurances	This course is offered on a university campus in Ontario. As such, no special insurance or vaccinations are required. We are within 911 coverage in the case of emergencies. Students are reminded to bring their provincial health care cards.
(l) Social Situations	<p>Students will be spending 2 weeks together in fairly close quarters and working on group research projects. We plan to have access to a firepit at night, and everyone is encouraged to mingle with other QUBS users outside of our active hours.</p> <p>Harassment of, or violence towards, other students or users of the facilities will not be tolerated. Any incidents should be immediately reported to your instructor, another instructor present at QUBS, or the station management, all of whom will be identified to you on the first day of the course. Appropriate actions will be determined by QUBS management to ensure the safety and security of all present.</p>
(m) Final comments	This course has been very well received by past students, and while we do have academic components to cover, we will also spend as much time as possible outside (weather permitting) and students will have the opportunity to develop and perform their own group research projects during the second week based on questions and activities that were of interest. Some of those projects have been published in peer-reviewed journals, so beyond information on fish, this course has the potential to provide students with experience in the full research process (conception-design-execution-analysis-publishing).