

Natural History Field School

Course: Introduction to Lichens

November 9-13, 2026

Instructor(s):

Lead by Dr. Sean Haughian (Senior Curator of Botany, NSM)
Assisted by Frances Anderson (Research Associate, NSM)

Field trips: Various locations

Times: 08:00-12:00

Classroom: Project Room, lower level, Museum of Natural History

Times: 13:00-16:30

Course Description

This course provides an introduction and practical field experience in the diversity, identification, biogeography, and ecology of lichens. Through daily field trips, students learn to recognize unique microhabitats and what types of lichens they should expect to see. In the afternoons, students learn about lichen anatomy and morphology and practice important foundational skills such as microscopy and the use of taxonomic keys.

Who this course is for

The course provides an opportunity to obtain field experience with Nova Scotian lichens. It is excellent preparation for post-secondary students who plan to conduct lichen surveys as part of their field research, or to build desirable skills for employment with conservation or environmental consulting organizations. It is also good professional development for consulting or government biologists who have a role in monitoring or surveying for rare and at-risk species. The course may also appeal to dedicated amateur naturalists or citizen scientists who are seeking to dive more deeply into the world of lichen biology, or to improve the quality of their contributions to bio-blitzes, online platforms (like iNaturalist), or herbaria within their communities.

Course Prerequisites

An introductory botany or mycology course is helpful but not required.

Course Objectives/Learning Outcomes

By the end of the course, students will be able to:

- Use appropriate terminology to discuss Nova Scotian lichens
- Find and use information on lichens in Nova Scotia and Canada
- Identify several rare or At Risk lichen species in Nova Scotia
- Use standard field sampling techniques, including:
 - Documenting field locations, habitats, and conditions
 - Collect specimens for herbarium preservation

Registration and tuition

Ordinarily, course registration must occur no later than 3 weeks before the start of a course, and course fees (Table 1) must be paid in full by no later than 2 weeks before the start of a course, to ensure that we have the necessary minimum class size and time to order the necessary supplies. Late registrations may be permitted if there is still space and the students reach out to the course instructor so that they can plan accordingly. If course costs are prohibitive, please ask your course instructor about accessing financial support.

Tuition payments can be made through the Zeffy platform online. They accept major credit cards or debit cards, as well as payments from a digital wallet (Apple Pay or Google Pay). Students who wish to pay by cheque can make the cheque out to the Nova Scotia Museum Board of Governors, and should mail it well in advance of the course to guarantee their spot. We cannot accept e-transfers at this time. If alternative payment methods are required for you or your organization, please reach out the course instructor to discuss options.

<https://www.zeffy.com/en-CA/ticketing/introduction-to-lichens>

Table 1: Fee schedule for NSM Courses

Item	Type	5-day course fees
Registration	Senior/student	\$350.00
Registration	Professional	\$450.00
Registration	Out of province student/senior	\$450.00
Registration	Out of province professional	\$550.00
Discount	Repeat student	10% off
Discount	*Collaborating organization	33% off
Discount	**Advanced student / peer mentor	50% off
Discount	Financial support required	Speak to course instructor

*Defined as an organization or person with whom the museum or its staff regularly (at least once per year) collaborate, through outreach events, research activities, specimen exchanges, etc.

**Defined as a student for whom much of the course would be considered a review, but for whom the course remains valuable for the sake of certification, seeing new habitats, networking, or pursuing their own questions with the help of an instructor.

Further information

This course is skills-based and provides practical experience working with Nova Scotian lichens, with its main focus on macrolichens. This course will build on knowledge students have obtained through previous introductory ecology, botany, or mycology courses, but students without that experience can still succeed by reviewing some preliminary material before the course begins.

Students will learn about lichen morphology, lichen species at risk (SAR), and what lichens are typical of the major plant communities of Nova Scotia. Skills include identification methods (including the use of keys, spot testing, and dissection), sampling methods, and data and specimen collection and management.

Brief lectures during afternoons will provide background content. The course will focus mostly on terrestrial and arboreal macrolichens (ground and tree-dwelling species) but will briefly touch on microlichens and the lichens of exposed rock surfaces for those students who wish to go further.

Includes five days of field trips during which students will accompany the instructor to learn about native lichen communities. The schedule will vary through the week and may change due to weather conditions or logistical constraints. Students may need to walk over uneven terrain, on and off trail, through woods and bogs.

Instructor Biographies:

Sean Haughian is the Senior Curator of Botany at the Nova Scotia Museum. He completed his PhD at the University of New Brunswick in 2016. Sean's current research focuses on conserving at-risk plants and lichens in forest ecosystems, developing new methods to grow lichens and mosses for green infrastructure (like green roofs), and understanding how species distributions relate to climate and other environmental features. He has published over 30 peer reviewed articles, sits on the Nova Scotia Lichen Recovery Team and the Mosses and Lichens Specialist Subcommittee with COSEWIC, and has taught courses on botany, ecology, and conservation several post-secondary institutions. Dr. Haughian's recent publications can be found on his ResearchGate website:

<https://www.researchgate.net/profile/Sean-Haughian-2>

Frances Anderson is a Research Associate at the Nova Scotia Museum and has been studying Nova Scotian lichens for over 20 years. She completed an MLSc at Dalhousie University in 1979. Her current research focuses on the ecology, biogeography, and identification methods of lichens in Atlantic Canada. Frances also sits on the provincial Lichen Recovery Team and has led many workshops on lichen identification for post-secondary institutions. She has published over twenty peer-reviewed articles and many technical reports, including the first Nova Scotian checklist for lichens, and contributed to at least seven COSEWIC reports on lichens. Frances also co-authored the field guide "Common Lichens of Northeastern North America".

Field Trips

Students are expected to arrive on time and prepared for field trips. They will need to be ready for all weather conditions (hot, cold, or wet weather). The checklist on the last page of the syllabus will assist in this preparation, but is not exclusive, and students should ensure they have all necessary personal or medical equipment with them in the field.

Field activities will include hikes on uneven dirt trails ranging from 1-4 km per day, as well as short walks of up to 500 m off-trail, sometimes in challenging terrain, while carrying all necessary personal supplies, such as water, food, and safety equipment.

Field trips will generally take place between early morning and late afternoon, but some days require earlier starts to accommodate longer distances, while others will be only a couple of hours. Please note that due to the nature of this course the schedule may change to accommodate inclement weather and the availability of guest speakers or field co-leaders; weather may not allow field work each day, or for just part of the day, so the schedule must be flexible. A detailed schedule with tentative field trip locations will be provided to students over email after they have registered.

Transportation:

Students are expected to determine their own transportation to and from field sites and the museum, although the course instructor will share contact information of students who are interested in carpooling at the beginning of the course, to limit our impact on traffic and fuel consumption. Such contact sharing should not be considered an endorsement of your peers' abilities as drivers, of the safety of their vehicle, or of the sufficiency of their insurance coverage.

Course Materials

All course handouts and announcements will be provided through email, including assigned and recommended readings. Essential materials can be purchased at cost through the NSMNH Field School's online shop:

<https://www.zeffy.com/en-CA/ticketing/nova-scotia-museum-of-natural-history-field-schools-shop>

Field & lab Equipment:

Students are encouraged to purchase and bring their own pocket knife or small sheath-knife, hand lens, field notebook, and a pencil for field trips. In the laboratory, students will be able to use microscopes and lab equipment at the museum and will be provided with a basic dissection and spot-testing kit to take home after the course, but should bring any of their own tools that are preferred. All other laboratory equipment and materials will be provided.

Digital tools:

It will be useful to have your own smartphone with navigation app or a dedicated GPS on field trips, but students who don't have access to these tools may use alternative methods of documenting locations. Please reach out to the course instructor if this applies to you.

1. iNaturalist (iNaturalist.org)
2. a GPS or mapping application that works without a data plan, such as Locus Maps, Avenza, Alpine Quest, GPS Essentials, or Canada Topo Maps

Literature:

The most important book for this course is "Keys to Lichens of North America: Revised and Expanded", by Irwin Brodo, which is available at a reasonable cost through several online stores. Students will need to have a copy of this book handy when we are in the lab, whether as a paper version or a PDF file on their tablet or laptop computer.

- Brodo, I.M. (2016). Keys to Lichens of North America: Revised and Expanded. Yale University Press, New Haven, CT, USA. 424 pp.

Photos of the lichen species contained in the Brodo (2016) keys are available from several online sources. A laptop, tablet, or smartphone with internet access and bookmarks on these websites is a helpful companion to the keys.

1. Sharnoff, S. & Sharnoff, S. 2026. Sharnoff Photos: Lichens Home Page. Available: https://sharnoffphotos.com/lichens/lichens_home_index.html. Accessed August 18, 2026.
2. Goward, T., Bjork, C., & Hollinger, J. 2026. Ways of Enlichenment: Lichen Photo gallery. Available: <https://www.waysofenlichenment.net/>. Accessed August 18, 2026.

Students are encouraged to seek additional literature resources through the Nova Scotia Wild Flora Society website¹, or to obtain copies of the following keys and guides:

1. Hinds, J. W., & Hinds, P. L. (2007). *The macrolichens of New England* (W. R. Buck & T. F. Daniel, Eds.). New York Botanical Garden Press, New York, NY, USA.
<https://www.nybgshop.org/products/the-macrolichens-of-new-england-mem-96>
2. McMullin, R. T., & Anderson, F. (2015). *Common Lichens of Northeastern North America: A Field Guide*. New York Botanical Garden Press, New York, NY, USA.
3. Brodo, I. M., Sharnoff, S. D., & Sharnoff, S. (2001). *Lichens of North America*. Yale University Press, New Haven, CT, USA.

In addition, students are encouraged to purchase, download, or borrow and use regionally-appropriate field guides to shrubs and trees (knowing what tree species your lichen is growing upon can be important when identifying the lichen). Field guides are much easier to carry on long hikes, less likely to suffer water damage, and tend to focus on the most common things, rather than covering everything.

Often it's less expensive to order your guides and books from the publisher than from a large online retailer, but you'll need to place your orders a little earlier. Some recommended guides include (approximate prices in parentheses):

1. Nova Scotia Department of Natural Resources. 2007. **Tree identification guide for common native trees of Nova Scotia**. Nova Scotia Department of Natural Resources, Truro, NS, Canada.
<https://novascotia.ca/natr/forestry/TreeID/TreeID2007.pdf> (free)
2. Boland, T. 2013. **Trees and Shrubs of the Maritimes: Field Guide**. Boulder Books, Portugal Cove-St. Philip's, NL, Canada. (\$35)
3. Saunders, G. 1996. **Trees of Nova Scotia**. Halifax, NS: Nimbus Publishing. 102 pp.
<https://nimbus.ca/store/trees-of-nova-scotia.html> (\$20)

Course Assessment / certification

The NSM Natural History Field School does not generally conduct assessments of student learning, because we believe that our students are sufficiently self-motivated to practice and study outside of the classroom. Consequently, all students who are present for the full duration of a course will receive a certificate of completion.

Post-secondary students who wish to use our courses for credit at their home institutions should reach out to their program coordinator and the Field School course instructor to determine how to obtain credit for these courses. Although a 5-day course is not equivalent to a regular 3-credit course at most institutions, full credit options may be available through one's home institution by combining two or more NSM Field School courses, or by adding a reading, writing, or other component to an experiential learning or directed study option from their primary institution's course calendar.

NSM Natural History Field School Policies

Course Policies

As our courses are 5 days or less and very field-intensive, and because learning as part of a community is an important part of the experience, full attendance and participation are expected. Full participation

¹ <https://nswildflora.ca/publications/reference-literature/lichens/>

includes, but is not limited to, attending all scheduled course activities in the classroom and field, cleaning up workstations after the lab, and being prepared for all field trips, with appropriate personal gear.

Accessibility

Having a disability can make entering, using, or fully experiencing spaces within our museum difficult. Nova Scotia will be accessible when Nova Scotians of all abilities can enjoy everything the province has to offer. Accessibility is a human right and Nova Scotia has a goal of being accessible by 2030. The Nova Scotia Museum is working on identifying barriers and improving accessibility every year as we advance towards 2030. If participants in our Natural History field school need support to obtain the same opportunity as their peers, they are encouraged to reach out to the course instructor to discuss options.

Respectful workplace policy

Everyone at the Nova Scotia Museum, including staff and students of the Natural History Field School, has the right to work and learn in a healthy and safe workplace. This includes having a workplace that is free of disrespectful behaviour. The Respectful Workplace Policy of the Province of Nova Scotia outlines the responsibilities of employees to each other and to students or visitors. This policy supports a respectful workplace that is productive, rewarding, and enjoyable for all. As regular users of both public and staff spaces at the museums, students will similarly be expected to treat others with dignity and respect. Disrespectful behaviour that is inconsistent with acceptable workplace behaviour as outlined by this policy and by the Values, Ethics, and Conduct: A Code for Nova Scotia's Public Servants, may lead to dismissal from the course.

Diversity and Inclusion

We believe inclusiveness and equity are fundamental to education. All organizations are strengthened by our diversity. The Nova Scotia Museum is committed to being a place where everyone feels welcome and supported. If you need inclusion or equity support, please reach out to your course instructor.

<https://www.novascotia.ca/programs-and-services/diversity-and-inclusion>

Recognition of Mi'kmaq Territory

The Nova Scotia Museum acknowledges that it is on Traditional Mi'kmaq Territory. We recognize that we are all treaty people, and are bound by the treaties of peace and friendship that were agreed upon by our ancestors.

Recommended field equipment checklist

- Daypack-style backpack (approximately 25-40 L in size)
- Lunch and snacks for the day
- Water bottles or hydration bladder (1-2 L of water recommended)
- Warm sweater
- Raincoat and rain pants
- Sunhat
- Supportive footwear (hiking boots, rubber boots, or sneakers that won't cause blisters when wet – because they *will* get wet!)
- Pocket knife (locking or fixed blade recommended for safety)
- Insect repellent spray (with DEET or Icaridin)
- Head net or bug jacket
- Sunscreen
- Digital camera, smartphone, or tablet

- Tweezers or other tick-removal device
- Personal First-aid kit for minor cuts and scrapes
- Personal medications (including Epipen, if needed)
- Hand lens (10-16 × magnification, triplet or doublet style, and at least 21 mm diameter recommended)*
- Waterproof notebook*