

Wetland Assessment

Student Handbook

Instructor Maggie Pugh





A quick note...

This course contains recommendations, suggestions, and instructor opinions based on personal experience. It is also your responsibility to ensure that any materials used, or activities completed are compliant with ALL applicable laws and regulations. These materials are intended to assist participants as they strive to improve their knowledge of Wetland Assessment. While we attempt to thoroughly address specific topics, it is not possible to include discussion of everything necessary to ensure each participant is in compliance with local laws including a healthy and safe working environment. Thus, course material, and how the information has been interpreted by the end user, is not the responsibility of the instructor or Natural Resources Training Group.



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1.0 GENERAL COURSE INFORMATION

1.1 INSTRUCTOR & CONTACT

Instructor: Maggie Pugh, M.Sc.

I am an Ecologist with more than 19 years specializing in ecosystem assessment. I completed graduate research in Canada's northern wetlands and have worked as an ecologist in the private sector for more than 16 years. I am a seasoned field biologist with expertise in Species at Risk assessments and permitting, flora and fauna inventories, seasonal wildlife surveys, significant wildlife habitat assessment, rare species monitoring programs, wetland and vegetation community assessments, sediment/ erosion control and environmental monitoring. I am an Ontario Wetland Evaluation System (OWES) evaluator, Butternut Health Assessor, and certified in Ecological Land Classification (ELC).

email: MaggiePugh@live.ca

phone: 519-505-2751

1.2 COURSE EXPECTATIONS

1.2.1 Zoom Time

Microphones: keep on mute to eliminate background noise

Cameras: please turn your camera on if possible. Zoom classrooms are more inviting and collaborative when you can put a face to the voice.

Questions: raise your hand for questions or ask a question in the chat – questions let me know you are engaged and paying attention! There are no silly questions.

Breaks: scheduled each hour of zoom time but manage your own energy. If you require a bio break, please take it.

Respect: NRTG supports a safe and inclusive learning space. Please be respectful in all interactions throughout the course.

1.2.2 Attendance and Participation

To receive your course completion certificate, students are expected to be present at all Zoom sessions on Day 1 and Day 2. Students are generally expected to participate in group discussions and share information about their Field Assignment. Please speak to the instructor if you have concerns or circumstances that would prevent participating; accommodations are always available.



1.2.3 Assignment

Assignments and activities are designed to provide an opportunity for students to “try out” the skills discussed in class and ask questions about the process. Assignment instructions are provided in **Section 3.0**. Students may work in groups or pairs, but each person should complete their own paperwork. At the end of Day 2 you will present your Wetland Assessment to the class.

1.3 SCHEDULE

| PACIFIC TIME | DAY 1 | DAY 2 |
|---------------|-------------------------|--------------------------|
| 9:00 – 10:00 | Introductions, Overview | Wetland Soils |
| 10:00 – 10:15 | Break | Break |
| 10:15 – 11:00 | Wetland Types | Boundary Delineation |
| 11:00 – 11:15 | Break | Break |
| 11:15 – 12:00 | Classification Systems | Assessment Documentation |
| 12:00 – 1:00 | Lunch | Lunch |
| 1:00 – 2:00 | Field Assignment Part 1 | Field Assignment Part 2 |
| 2:00 – 2:15 | ↓ | ↓ |
| 2:15 – 3:00 | ↓ | ↓ |
| 3:00 – 3:15 | ↓ | ↓ |
| 3:15 – 4:00 | Field Work Discussion | Presentations & Wrap Up |

1.4 LEARNING OUTCOMES

Upon successful completion, participants will be able to:

- Identify and classify wetlands in the field using keys
- Contrast and identify differences between wetland types
- Identify wetland indicator species and species associations
- Recognize wetland soils
- Delineate wetland boundaries
- Document a wetland assessment



2.0 ONLINE RESOURCES

Resources along with clickable links are listed by province below. If the clickable link does not work for you, try googling the name of the resource.

- Google Earth Pro
<https://www.google.ca/earth/versions/>
- Ducks Unlimited Canadian Wetlands Inventory Mapping
<https://maps.ducks.ca/cwi/>
- Canadian Wetland Classification System
<https://novascotia.ca/natr/wildlife/habitats/pdf/CanadianWetlandsClassificationSystem.pdf>
- Alberta Wetland Classification System
<https://open.alberta.ca/dataset/92fbfbf5-62e1-49c7-aa13-8970a099f97d/resource/1e4372ca-b99c-4990-b4f5-dbac23424e3a/download/2015-alberta-wetland-classification-system-june-01-2015.pdf>
- Alberta Wetland Assessment Policy & Standards
<https://www.alberta.ca/alberta-wetland-policy-implementation.aspx#:~:text=The%20Alberta%20Wetland%20Classification%20System%20groups%20wetlands%20into,and%20type%20%28for%20example%3A%20water%20permanence%2C%20pH%2C%20salinity%29.>
- Boreal Wetland Classes Field Guides
[Ducks Unlimited Canada National Boreal Program - Field Guide of Boreal Wetland Classes in the Boreal Plains Ecozone of Canada \(UPDATED\) - Ducks Unlimited Canada National Boreal Program Ducks-Unlimited-Canada_Landowners-Guide.pdf](https://www.ducks.ca/assets/2020/05/Ducks-Unlimited-Canada_Landowners-Guide.pdf)
- British Columbia Wetlands Identification Guide
<https://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh52.pdf>
- British Columbia Wetland Plants
https://bcwfbogblog.files.wordpress.com/2021/06/wetland_plants_of_british_columbia.pdf
- British Columbia Biogeographic Classification for non-forested Ecosystems
<https://www.for.gov.bc.ca/hfd/pubs/Docs/Tr/Tr068.pdf>
- Prairie Wetland Identification Guide
https://www.ducks.ca/assets/2020/05/Ducks-Unlimited-Canada_Landowners-Guide.pdf
- Ontario Wetland Evaluation System (2022 update)
<https://www.ontario.ca/page/wetlands-evaluation>
- US Army Corps of Engineers Hydrogeomorphic Classification for Wetlands
<https://wetlands.el.erdc.dren.mil/pdfs/wrpde4.pdf>
- Canadian System of Soils Classification
https://sis.agr.gc.ca/cansis/publications/manuals/1998-cssc-ed3/cssc3_manual.pdf
- Field Indicators of Hydric Soils in the United States
https://www.nae.usace.army.mil/portals/74/docs/regulatory/JurisdictionalLimits/Hydric%20Soils%20in%20New%20England/Field_Indicators_of_Hydric_Soils_of_the_US_2017.pdf
- Manitoba Manual for Describing Soils in the Field



https://www.gov.mb.ca/agriculture/soil/soil-survey/pubs/manual_for_describing_soils_in_the_field.pdf

3.0 FIELD ASSIGNMENT INSTRUCTIONS

You will complete a student-led field assignment each day. Field assignment tasks are broken down into tasks to complete before the field, in the field, and after the field. Blank Field Note pages are provided in Section 6.0, they should be printed out to take into the field.

3.1 DAY 1 FIELD ASSIGNMENT

3.1.1 Before Field Work

1. Complete your Hazard Assessment and email to MaggiePugh@live.ca
2. Pick a site nearby that you think has a wetland, use the Ducks Unlimited Wetland Inventory Map if you aren't sure where to find one near you.
3. Make sure your Site is publicly accessible and **safe** to visit now.
4. Natural wetlands are best; restoration project locations are not ideal
5. Look at your site on Google Earth. Sketch a map of your wetland and try to identify two types of wetland units on your Site. These will be Wetland Unit 1 and Wetland Unit 2.
 - Is there a pond? Shoreline (riparian) vegetation? marsh or swamp areas?
 - Make notes on your sketched map about what areas you want to investigate

3.1.2 Field Work

5. Go to your site and walk around. Look at the two wetland units and boundaries you identified on google earth. Take some GPS/ KMZ locations of notable features (open water areas, beaver lodges, rock outcrops, etc.).
6. Fill out the Location/ Site Name section of your Field Notes (through to Wind)
7. Fill out the field notes for Wetland Unit 1:
 - a. record wildlife or wildlife habitat observations.
 - b. record land use observations.
 - c. record the abundance of standing dead trees (dead tree abundance).
 - d. record the abundance of dead trees laying down (deadfall abundance).
 - e. record the topography of Wetland Unit 1 on the landscape.
 - f. Identify and write down as many plants as you can in Wetland Unit 1 (Plant Inventory). Note whether each plant is rare, occasional, abundant, or dominant.
 - g. Repeat steps a-f for Wetland Unit 2.
8. If you texted to "check in", make sure you "check out" by texting again to let me know you're home safely from the field site.



3.1.3 After Field Work

9. Determine which plants from your plant inventory are wetland indicator species. You will need to know this for boundary delineation tomorrow.
10. Look at your site on google earth again, including your KMZ locations of notable features. Does your experience in the field match what you see in the aerial images?
11. Meet back on ZOOM at 3:00 PT to check in and to discuss field assignments.

3.2 DAY 2 FIELD ASSIGNMENT

3.2.1 Before Field Work

1. Review and sign your Hazard Assessment and email to MaggiePugh@live.ca .
2. Select a starting point for identifying the boundary between Wetland Unit 1 and Unit 2.

3.2.2 Field Work

3. Text Maggie at 519-505-2751 to “check in” if you are going to your site alone.
4. Continue filling out the Wetlands Assessment Field Notes, starting with Unit 1:
 - a. Record the dominant plants in canopy, sub-canopy, shrub, ground cover species
 - b. Take a representative photo of the unit. Mark the photo location and direction on your map.
 - c. Complete a soil assessment, try to get down to 40cm. Determine the texture(s). Sketch the soil layers and add notes about texture to each layer.
 - d. Repeat steps a-c for Unit 2.
5. Delineate the outer wetland boundary and the boundary between Units 1 and 2:
 - Look for where the canopy vegetation changes. Take GPS/ KMZ locations or estimate distances to identifiable features.
 - If canopy species not helpful, look at sub-canopy, then shrubs, and then ground cover. Do additional soil samples if necessary.
6. Make sure all sections of your Field Notes are filled in, and that you have a representative photo(s) for each Unit, and photos of any plants you couldn't identify.
7. If you texted to “check in”, make sure you “check out” by texting again to let me know you're home safely from the field site.

3.2.3 After Field Work

8. Determine the Wetland Classification of Unit 1 and Unit 2 based on dominant species and soils information.
9. Determine the soil moisture and drainage, if applicable.
10. Finalize your Site Map (hand drawn, ARCH GIS, Google Earth)



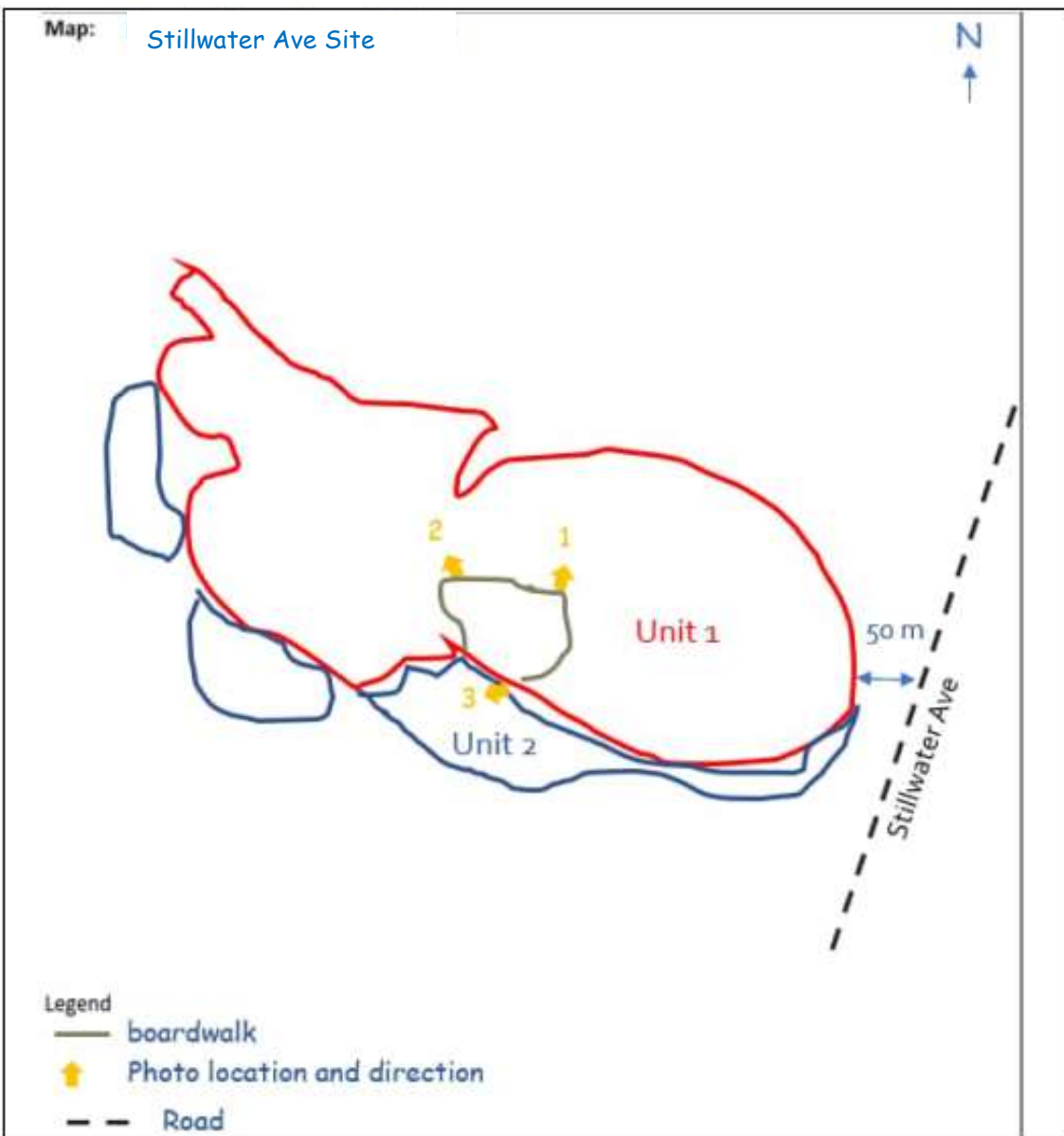
- Draw the overall wetland boundary.
 - Draw the approximate boundaries between each unit.
 - Label Unit 1 and Unit 2, include the classification name in the legend.
 - Indicate where photos were taken, and in what direction.
 - Include a legend so it is clear what your map shows.
11. Meet back on ZOOM at **3:00 PT** to check in and present your field assignment (5 minutes per person).



4.0 SAMPLE WETLAND ASSESSMENT NOTES

Wetland Assessment Field Notes

| | | | |
|------------------------|---|---|--|
| Location/ Site Name: | Stillwater Ave Site | | |
| Date: June 2, 2022 | Time: 11:30am | Assessor Name: | Maggie Pugh |
| Temperature: | 27C | | |
| Precipitation: | none | | |
| Cloud Cover: | 5% | | |
| Wind (Beaufort Scale): | 0 calm, smoke rises vertically 1 Light air movement, smoke drifts 2 Slight breeze, wind felt on face: leaves rustle | 3 Gentle breeze, leaves & twigs in constant motion 4 Moderate breeze, small branches moving, raises dust & loose paper | 5 Fresh breeze, small trees begin to sway 6 Strong breeze, large branches in motion |





Wetland Assessment Field Notes


Page 2 of 3

Unit 1: Wb50 Labrador Tea-Bog Laurel-Peat Moss Bog

| | |
|---|--|
| <p>Wildlife and habitat observations vernal pools, hibemacula, snags/ wildlife trees, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding etc.</p> | <p>Few species encountered; wolf scat observed northeast of boardwalk entrance. American Crow seen flying over. Fallen log near boardwalk exit near Unit 2.</p> |
| <p>Land use observations logging, sugar bush, gaps, livestock, exotic species, plantation, trails, dumping, fill, rec. use, noise, disease/death of trees, wind throw, browse, beaver, flooding, fire, ice etc.</p> | <p>Boardwalk through bog, signage for park area. Unsigned trail off to the north of the bog exit.</p> |
| <p>Plant Inventory Make a list of all plant species you encounter in this wetland unit. Identify plants as best you can using field guides or online apps. Or take several photos and identify them back at your workstation. Try not to collect samples to take with you, incase it turns out to be a rare plant.</p> | <p>Labrador Tea Bog Laurel Bog Cranberry Sweet Gale Pitcher Plant Sundew (round) White Beaked Sedge Peat moss Brown moss (species unknown)</p> |



Wetland Assessment Field Notes

| | | | | |
|---|--|--------------------------------|-----------------------------|------------------------------|
| Canopy species | none | | | |
| Canopy % cover | | | | |
| Canopy height | | | | |
| Subcanopy species | none | | | |
| Subcanopy % cover | | | | |
| Subcanopy height | | | | |
| Shrub species | Labrador Tea > Bog Laurel > Sweet Gale | | | |
| Shrub % cover: | 60 > 20 > 10 | | | |
| Shrub height: | 40 cm > 20 cm > 50 cm | | | |
| Groundcover species | Bog Cranberry > White Beaked Sedge > Peat Moss | | | |
| Ground %cover | 40 > 30 > 20 | | | |
| Community age | Pioneer Young Mid-Aged Mature Old Growth | | | |
| Topography | Low-lying area, treed swamp adjacent is higher ground, likely to be bottomland | | | |
| Dead tree abundance | Rare occasional abundant dominant | | | |
| Deadfall abundance | Rare occasional abundant dominant | | | |
| <p>Soils Dig a small hole so that you can look at the soil layers. Sketch your soil layers and determine what type of soil it is:</p> <p>Substrate depth: >15 cm or <15 cm</p> <p>Type: mineral , organic (peat, humic)</p> <p>Type: Clay, Sand, Silt, Loam</p> <p>Moisture: wet, mesic, dry</p> <p>Drainage: well, moderate, imperfect, poor</p> | <p>50 + cm fibric to mesic peat (poor decomposition, pieces of moss and plants obvious)</p>  <table border="1"> <tr> <td>Ground layer peat moss, 0-5 cm</td> </tr> <tr> <td>Fibric Peat 5 cm - 15 cm</td> </tr> <tr> <td>Mesic Peat 15 cm - 50+ cm</td> </tr> </table> | Ground layer peat moss, 0-5 cm | Fibric Peat 5 cm - 15 cm | Mesic Peat 15 cm - 50+ cm |
| Ground layer peat moss, 0-5 cm | | | | |
| Fibric Peat 5 cm - 15 cm | | | | |
| Mesic Peat 15 cm - 50+ cm | | | | |



Unit 1

Photographic Record for Stillwater Ave Site



Photo 1. Unit 1, facing north from boardwalk. Shrub layer, peat moss, treeless.



Photo 2. Unit 1, facing east from boardwalk. Shrub layer, peat moss, treeless.



Photo 3. Unit 1, facing south west toward Unit 2. View from boardwalk.



Photo 4. Labrador Tea observed in Unit 1



Photo 5. Bog Laurel, observed in Unit 1.



Photo 6. Soil profile for Unit 1.



5.0 BLANK HAZARD ASSESSMENT

Complete this table prior to going out for the field assessment and email to MaggiePugh@live.ca

| Task | Potential Hazard | Control | Risk | Responsible |
|----------------------|--|--|--------------------------|--|
| <i>Describe Task</i> | <i>What is the risk? What could cause damage</i> | <i>How can we control the risk, safer options?</i> | <i>Low, Medium, High</i> | <i>Who is responsible to decide, lead?</i> |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |



6.0 BLANK WETLAND ASSESSMENT NOTES

(on following pages)

Wetland Unit 1: _____

| | |
|--|--|
| <p>Land use observations logging, gaps, livestock, exotic species, plantation, trails, dumping, fill, rec. use, noise, disease/death of trees, wind throw, browse, beaver, flooding, fire, ice etc</p> | |
| <p>Wildlife and Habitat Observations vernal pools, hibernacula, snags/ wildlife trees, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding etc.</p> | |
| <p>Plant Inventory</p> <p>Record all plant species you encounter in this wetland unit.</p> <p>Record whether each species is: R – rare O – occasional A – abundant D – dominant</p> <p>Tips: Identify plants as best you can using field guides (i.e. Wetland Plants of BC) or online apps (iNaturalist, SEEK). Or take photos to identify back at your workstation.</p> <p>Try not to collect samples to take with you unless it is abundant, just in case it is a rare species.</p> | |

Wetland Assessment Field Notes

| | |
|--|--|
| Canopy (tree) species | |
| Canopy % cover | |
| Canopy height | |
| Subcanopy (tree) species | |
| Subcanopy % cover | |
| Subcanopy height | |
| Shrub species | |
| Shrub % cover: | |
| Shrub height | |
| Groundcover species | |
| Ground %cover | |
| Community age | Young Mid-Aged Mature |
| Topography | |
| Standing dead trees | Rare occasional abundant dominant |
| Fallen dead trees | Rare occasional abundant dominant |
| <p>Soils Dig a small hole to 50cm so that you can look at the soil layers.</p> <p>Sketch your soil profile (include depth measurement).</p> <p>Soil sample depth: _____</p> <p>Soil type: mineral organic</p> | |

Wetland Unit 2: _____

| | |
|--|--|
| <p>Land use observations logging, gaps, livestock, exotic species, plantation, trails, dumping, fill, rec. use, noise, disease/death of trees, wind throw, browse, beaver, flooding, fire, ice etc</p> | |
| <p>Wildlife and habitat observations vernal pools, hibernacula, snags/ wildlife trees, fallen logs, tracks, den/nest, scat, carcass, vocalization, feeding etc.</p> | |
| <p>Plant Inventory</p> <p>Record all plant species you encounter in this wetland unit.</p> <p>Record whether each species is: R – rare O – occasional A – abundant D – dominant</p> <p>Tips: Identify plants as best you can using field guides (i.e. Wetland Plants of BC) or online apps (iNaturalist, SEEK). Or take photos to identify back at your workstation.</p> <p>Try not to collect samples to take with you unless it is abundant, just in case it is a rare species.</p> | |

Wetland Assessment Field Notes

| | |
|--|--|
| Canopy (tree) species | |
| Canopy % cover | |
| Canopy height | |
| Subcanopy (tree) species | |
| Subcanopy % cover | |
| Subcanopy height | |
| Shrub species | |
| Shrub % cover: | |
| Shrub height | |
| Groundcover species | |
| Ground % cover | |
| Community age | Young Mid-Aged Mature |
| Topography | |
| Standing dead trees | Rare occasional abundant dominant |
| Fallen dead trees | Rare occasional abundant dominant |
| <p>Soils Dig a small hole to 50cm so that you can look at the soil layers.</p> <p>Sketch your soil profile (include depth measurement).</p> <p>Soil sample depth: _____</p> <p>Soil type: mineral organic</p> | |