Ducks Unlimited Canada

TEACHER NOTES | **FOR GRADE 9 AND UP**

Invasive species management case study

Moths, goats and herbicide: What tools can protect wetlands from invasive phragmites?

The St Lawrence-Great Lakes Region, located in southern Ontario, Québec, and eight American States, is one of the largest watersheds in the world. It contains one fifth of the world's freshwater, supporting millions of people and thousands of native plant and animal species.

The invasive grass *Phragmites australis* (common reed), which has no natural predators in North America, has spread quickly in Ontario and Quebec. With reeds growing up to six metres tall, dense stands of phragmites reduce space for habitat, impede native vegetation growth, and lower biodiversity and food supply in wetlands. Recreation and agriculture are also impacted: phragmites can absorb water from irrigation systems, dry out and become a fire hazard, obscure the sightline of drivers and block access to shorelines.

Conservation specialists with Ducks Unlimited Canada (DUC) work with academics, community groups and other partners to manage invasive species and protect these important aquatic environments. DUC uses science to understand the spread of invasive species and the most effective management tools.

Invasive phragmites threaten healthy wetlands. What are the possible solutions to address the invasive plant? For this case study, you will be exploring how to help revive biodiversity in a wetland invaded by phragmites.

Above: *The Great Lakes-St. Lawrence watershed (shown in green) is one of the largest watersheds in the world.*

This case study explores invasive phragmites as an example of a real-life conservation challenge. Your students will learn about biodiversity, wetland environments and the impacts of invasive species. For simplicity, students focus on proposing a tool or set of tools to manage invasive phragmites incorporating their research on a variety of possible management techniques. This activity can be adapted for different classes including environmental studies, environmental science, geography or civics and social studies. We encourage you to adapt the content and focus on the case study to fit the needs of your curriculum. **At the end of the case study, students will have developed problem-solving skills and have learned about:**

- Conservation
- Wetland ecosystems
- Biodiversity
- Invasive species
- Invasive species management tools
- Community engagement in conservation action
- Researching, summarizing and communicating scientific knowledge

Method

This case study is best completed in multiple small groups with each group submitting one recommendation. The recommendation can be delivered as an oral presentation or written submission. We encourage you to adapt this suggested structure to best fit your class.

This case study will require several class sessions depending on research depth and presentation complexity. Completing the questions provided in the student notes will guide students through the background knowledge required to prepare an informed management proposal.

Session 1: Research

- **Part 1:** Students answer questions about the importance of wetland biodiversity and invasive phragmites.
- **Part 2:** Students answer the consideration questions. Students can all answer these questions or tackle them in small groups and share their findings.

  Alternate method: Split the class into three groups and assign each a management consideration A-C (chemical, mechanical, biocontrol) to be the 'experts' in. These groups answer the consideration questions and present the benefits and challenges of their method. This can be followed by a class discussion guided by the Consideration D questions on the best management practice or combination of practices for invasive phragmites to review the material before creating their proposals.additional questions.

Session 2: Proposal

In small groups, students work together to create a conservation plan for managing invasive phragmites.

Session 3: Presentation

Students present proposals in a 500-word document or a seven-minute oral presentation. Subject-matter experts from local community groups or conservation organizations can be invited to act as judges and ask additional questions.

Materials

- Access to the internet
- Library (optional)

Suggested Resources

Note: These links vary in terms of media and depth of content. It also contains plain language articles and peer-reviewed articles. These are suggested readings and media to assist students' research. Because these links vary in complexity, be sure to direct your students to the most appropriate articles for their level. **A condensed list of resources is provided in the student notes.**

Online Articles

- Ducks Unlimited Canada: Great Lakes-St. Lawrence – https://www.ducks.ca/places/the-great-lakes-st-lawrence
- Ducks Unlimited Canada: Phragmites Biocontrol in Ontario – Progress So Far – https://www.ducks.ca/places/ontario/biocontrol-in-ontario/phragmites-biocontrol-progress
- Ducks Unlimited Canada: Fighting back against invasive Phragmites – https://www.ducks.ca/stories/partnerships/fighting-back-invasive-phragmites
- Ducks Unlimited Canada: Two moth species now in the fight against invasive Phragmites – https://www.ducks.ca/news/provincial/ontario/two-moth-species-now-in-the-fight-against-invasive-phragmites
- Invasive Species Centre: Invasive Phragmites – https://www.invasivespeciescentre.ca/invasive-species/meet-the-species/invasive-aquatic-plants/phragmites
- British Columbia: Biological Control – https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/biological-control
- UWaterloo: Moths are the new tool to protect Canada's wetlands – https://uwaterloo.ca/news/moths-are-new-tool-protect-canadas-wetlands

Videos

- TVO Today: Can Ontario Stop Invasive Phragmites' Chokehold on Wetlands? (11:15) – https://www.youtube.com/watch?v=S0Kfm-VfxPc
- CHCH news: Niagara Parks to use goats to battle invasive plant species at Gonder's Flats (1:49) – https://www.youtube.com/watch?v=FBETGQUqVDA
- Nature Conservancy of Canada: Controlling invasive phragmites australis (8:31) – https://www.youtube.com/watch?v=IPRt2FtHay8&t=1s
- Ontario Invasive Plant Council: Overview of the First Four years of Biological Control of Introduced Phragmites in Ontario (19:59) – https://www.youtube.com/watch?v=NIquh662_V8

Newspaper Articles

- CBC News: Ontario scientists are using caterpillars to combat an invasive aquatic plant – https://www.cbc.ca/news/canada/hamilton/phragmites-control-1.7216345
- CBC News: These women teach First Nations how to stop an invasive plant from choking Ontario's ecosystems – https://www.cbc.ca/news/canada/london/first-nation-phragmites-control-1.7212070
- CBC News: Goats are helping Niagara Parks mow down a big problem – https://www.cbc.ca/news/canada/hamilton/niagara-goats-phragmites-1.7250226

Factsheets

- Invasive Species Centre: Socio-Economic Impacts of Phragmites – https://www.invasivespeciescentre.ca/wp-content/uploads/2023/10/Phragmites-FactSheet-D2-Online.pdf

Reports

- Ontario Invasive Plants: Invasive Phragmites Best Management Practices in Ontario – https://www.ontarioinvasiveplants.ca/wp-content/uploads/2024/02/OIPC_BMP_Phragmites_Feb212024_D13_WEB.pdf
- Ducks Unlimited Canada: A Landowner's Guide to Invasive Phragmites in Wetland Habitats – https://www.ducks.ca/assets/2023/03/phrag-guide-140323.pdf

Podcasts

- Emerging Environments Podcast: On the resurgence of wetlands and the ecology of Phragmites biocontrol with Rebecca Rooney (54 min) – https://podcasts.apple.com/ca/podcast/25-on-the-resurgence-of-wetlands-and/id1560839043?i=1000571441258

Journal Articles

- Brooks, H., Jacobson, S., Baldwin, A., McCormick, M., Kettenring, K., Buehl, E., & Whigham, D. (2024). Long-term periodic management of *Phragmites Australis* maintains native brackish wetland plant communities. *Wetlands Ecology and Management*, 32, 409–421 – https://link.springer.com/article/10.1007/s11273-024-09984-1
- Rohal, C. B., Hazelton, E. L., McFarland, E. K., Downard, R., McCormick, M. K., Whigham, D. F., & Kettenring, K. M. (2023). Landscape and site factors drive invasive phragmites management and native plant recovery across Chesapeake Bay Wetlands. *Ecosphere*, 14(1) – https://esajournals.onlinelibrary.wiley.com/doi/epdf/10.1002/ecs2.4392