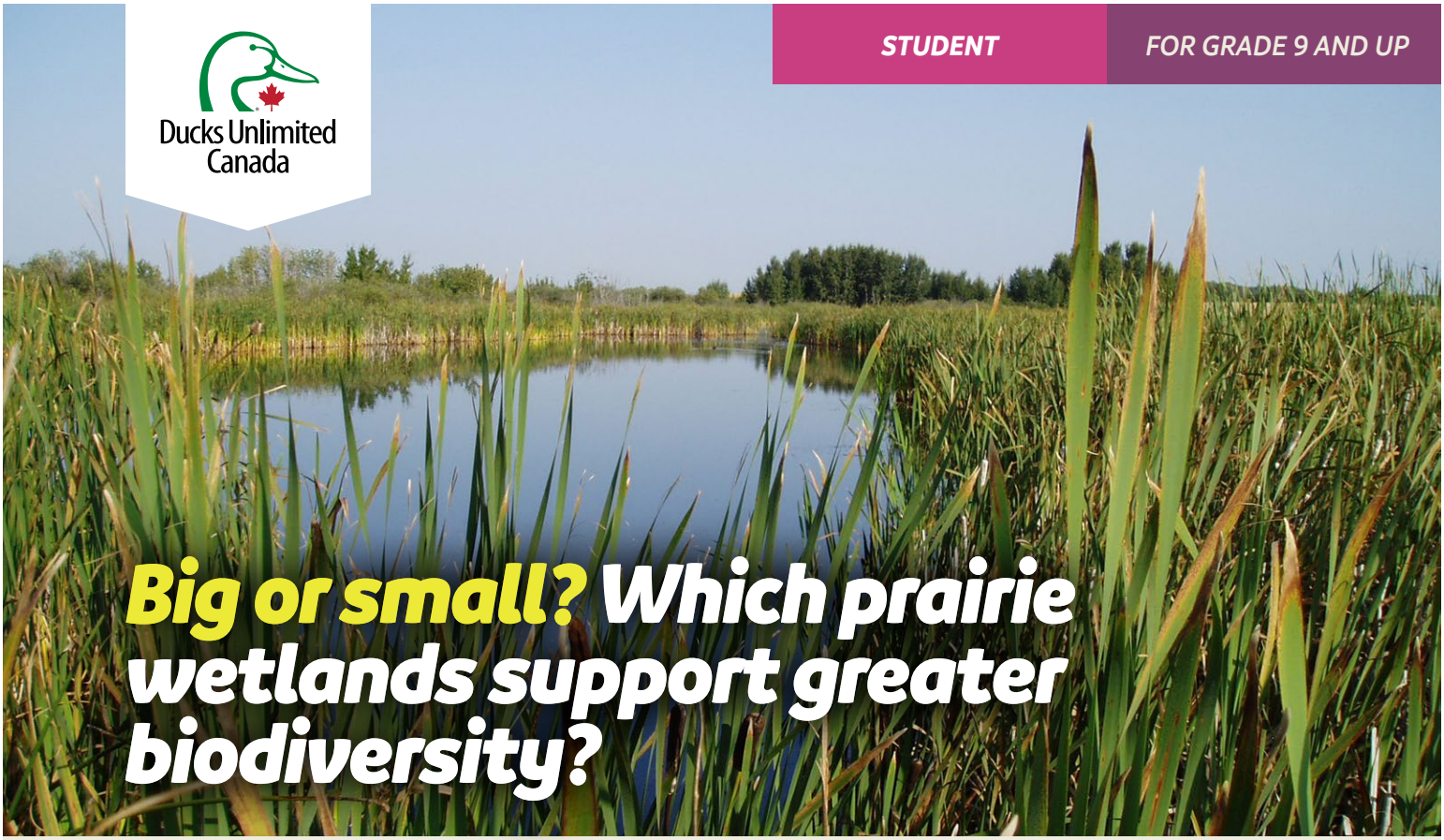
Ducks Unlimited Canada

STUDENT | FOR GRADE 9 AND UP



Big or small? Which prairie wetlands support greater biodiversity?

THE PRAIRIE POTHOLE REGION CASE STUDY

The **Prairie Pothole Region** covers the northern extent of the largest expanse of grasslands in the world: the Great Plains of North America. This wetland-rich landscape provides the primary breeding range for approximately half of North America's breeding ducks as well as many wetland-dependent birds and other wildlife species. The remaining wetlands in this region are considered to be some of the most important and threatened waterfowl habitats on the continent.

More than 40 per cent of wetlands in the Prairie Pothole Region have been drained. Why? Minerals deposited by glaciers blended with decomposing vegetation to form fertile soils As European settlers discovered more than 125 years ago, these rich soils made the region ideal for farming. Agriculture is an important way of life on the Prairies — and the pressure to drain wetlands to make room for production and development remains. As a result, more than 10,000 hectares of pothole wetlands continue to be lost each year in the Canadian prairies.

Ducks Unlimited Canada (DUC) and its partners are working together across North America to conserve these vital wetland ecosystems. DUC researchers at the Institute for Wetland and Waterfowl Research (IWWR) use science to identify the best ways to invest our resources to achieve maximum conservation benefits, while respecting the growing needs of agriculture.

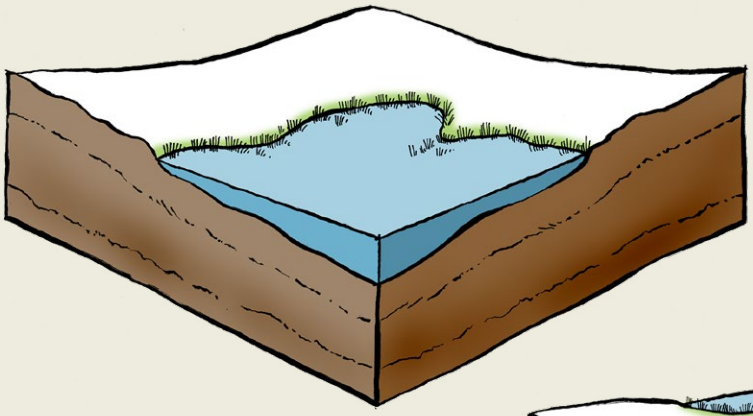
DUC has strong partnerships with the agricultural community. We are proud to work alongside farmers and ranchers not only to benefit the crops and animals under their care, but to safeguard natural areas and the many benefits they provide all Canadians.

THE CASE STUDY: BIG OR SMALL? WHICH PRAIRIE WETLANDS SUPPORT GREATER BIODIVERSITY?

Location: Rural Municipality, Prairie Pothole Region, Canada

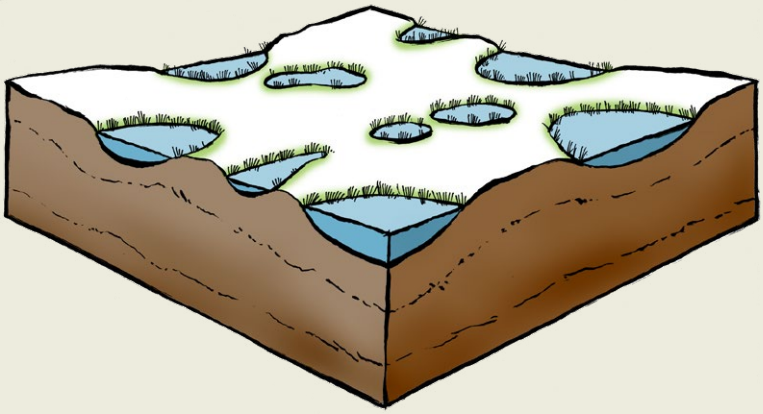
You have been hired for a summer internship in your municipality as the Sustainability Apprentice. Your job is to assist the Sustainability Manager. This involves researching and providing summaries of your findings to help the municipality make the best sustainable decisions, which benefit the environment, economy and community. You have been assigned to research best practices for wetland and biodiversity conservation. **The municipality needs to decide if they should conserve Option 1 or Option 2 in order to support more biodiversity.**

Which option would support more biodiversity?



OPTION 1: One 10-hectare wetland

OPTION 2: 10 smaller wetlands adding up to 10 hectares



PART 1

1 What is biodiversity?

a) In your own words, define biodiversity in one or two sentences.

2 Research the biodiversity of wetlands and their benefits.

a) Create a list of species that use wetlands (mammals, amphibians, invertebrates and birds).
b) List the benefits that wetlands provide for humans and wildlife.

3 Research the Prairie Pothole Region landscape.

a) What kind of biodiversity does this region support?
b) Research the impacts of land use on biodiversity.

4 Research best conservation practices for biodiversity.

a) Identify the pros and cons of conserving one large wetland.
b) Identify the pros and cons of conserving multiple smaller wetlands.

Here are some useful links to begin your research:

- https://www.ducks.ca/places/prairie-pothole-region
- https://www.ducks.ca/stories/waterfowl/seasonal-ponds-support-wildlife
- https://www.nwf.org/Home/Educational-Resources/Wildlife-Guide/WildPlaces/Prairie-Potholes
- https://www.youtube.com/watch?v=DPqz8hDYM0o *(video about the Prairie Pothole Region from Ducks Unlimited, Inc., DUC's counterpart in the United States)*
- https://www.youtube.com/watch?v=GJETHYaVJvs *(learn about biodiversity at 2:00 min.)*

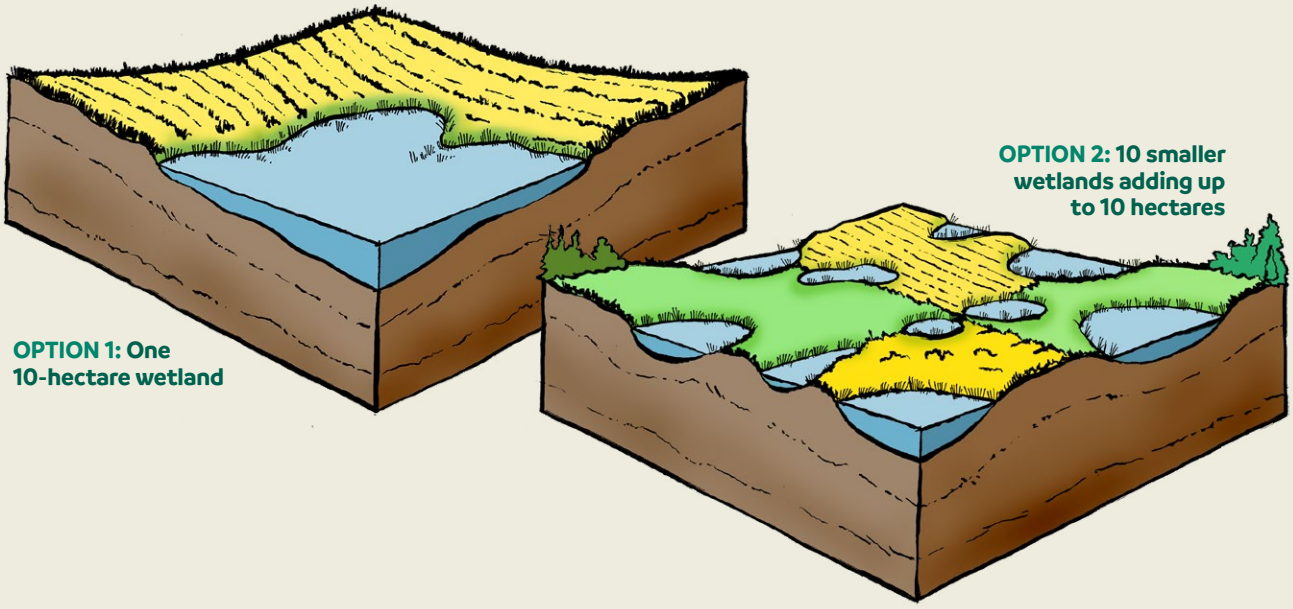
Helpful Terms

- **Ecology** – the relation of living organisms to one another and their physical surroundings.
- **Matrix** – when you have multiple land uses in one area, like in the Prairie Pothole Region (grassland, cropland and wetlands), the matrix refers to the dominant land use – in this case cropland.
- **Cropland** – land used to produce crops for harvest.
- **Grassland** – an open landscape where the natural vegetation is primarily grasses.
- **Wetland** – land consisting of marshes, bogs, swamps, etc. (i.e., land saturated with water long enough to support aquatic plants and animals).
- **Waterbirds** – birds that habitually wade or swim in water (includes waterfowl but also grebes, sandpipers, rails, etc.).
- **Waterfowl** – aquatic birds with webbed feet that may use waterbodies for feeding, nesting, or safety from predators. This group includes ducks, geese, and swans.

PART 2

You've done your research, and understand the important role that wetlands play in supporting biodiversity. You decide to visit the sites of the two options to find out more about the environments where they're located. You discover that:

- **Option 1** is in the middle of an agricultural field.
- **Option 2** is a mix of agricultural fields, grassland and forest.
- Both sites are at risk of losing their wetlands to crop production.



5 Research how wetland conservation in these landscapes would contribute to biodiversity.

a) Identify how the biodiversity of a wetland is influenced by its surroundings.

b) Both sites are equally likely to expand their crop production due to fertile soil, which could result in wetland loss or degradation. Which site should be conserved to maximize biodiversity? And why?

PART 3

6 Prepare your recommendation by answering the question:
Which option would support more biodiversity?

It's time to prepare your oral (three minutes) or written (450 words max.) recommendation for your Sustainability Manager. From your research you will have discovered the other great benefits of wetlands (flood prevention, filtering water and more), however for this recommendation remember to focus only on the biodiversity aspects of wetlands. Good luck!

7 Upload your video or document to the Wetland Centre of Excellence hub to gain access to the "Case Study Explained" video.

For simplicity, this case study only considered biodiversity in the decision-making process. In a real-world conservation scenario, one should consider the different stakeholders' (farmers, citizens, business owners and scientists) perspectives and interests in order to reach win-win solutions. **Ducks Unlimited Canada (DUC) strives to work with other land users to find and deliver pragmatic solutions at a landscape scale.**

Meet some of DUC's IWWR scientists who specialize in the Prairie Pothole Region and helped create this case study.

Jim Devries, PhD
Research Scientist

Co-ordinates research and provides key feedback to enhance conservation program delivery.

Vanessa Harriman, PhD
Conservation Scientist

Answers key research questions, builds partnerships and translates knowledge into conservation delivery programs.

Lauren Bortolotti, PhD
Research Scientist

Quantifies the ecosystem services wetlands provide to society.

David Howerter, PhD
Chief Conservation Officer

Uses scientific information to guide conservation investments.