Wetlands and Climate Change: What's the Connection?

Wetlands are very important to maintaining many necessary ecosystem functions, and the overall health of our environment. Wetlands may also have a unique role to play in climate change. This year's Alberta Environment Week topic is climate change, so it's a great time to explore, "what is climate change, and how is it connected to wetlands?"

The topic is complicated. Is our climate changing due to human activities that produce an excess of greenhouse gases? Do our activities affect the rate at which glaciers melt and oceans warm? Do any of our activities help to collect greenhouse gases from the atmosphere; can we collect more than we produce? And where is the wetland connection? Scientists, conservationists and other Albertans are working to answer some of these difficult questions.

Let's start with the basics:

About Climate Change…

The greenhouse effect is natural. Without it, the Earth would be much too cold for life as we know it. Below are some important concepts to keep in mind while discussing climate change:

- ***Greenhouse gases*** – These are the gases that trap heat in the atmosphere, including carbon dioxide (CO_2), methane, water vapour and a number of others, including nitrous oxide. Many of these gases are naturally occurring – whether or not humans are on the planet!

- ***Enhanced greenhouse effect*** – Are increased average temperatures a result of people adding too many greenhouse gases to the atmosphere? We add greenhouse gases through burning fossil fuels and developing land, which release stored carbon into the air. This includes everyday activities like driving vehicles, trimming lawns with gas-powered mowers, heating the house, burning wood and using the electronic equipment we plug-in, like computers. Are our activities changing the climate?

- ***Photosynthesis*** – All plants, including algae, cattails, willows, and trees, will take in CO_2 (carbon dioxide) and release the O_2 (oxygen). The C (the carbon) is stored in the plants and in the soil when plant matter decays. Plants and soil serve as carbon *sinks* – they take in and store carbon.

- ***Sequestration*** - Sequestering carbon (C) means it is removed from the atmosphere and stored. A carbon sink is an area, such as a forest or wetland, which naturally absorbs CO_2 from the atmosphere.

What's the Connection?

So, back to wetlands…

Wetland habitats provide many benefits that support and protect life, and they also perform many functions that "cleanse" or "filter" the environment. Some of these benefits are listed below.

- Wetlands are **essential habitat** for many species of wildlife, including waterfowl, waterbirds, and shorebirds.
- Wetlands **naturally filter water resources**, by holding and breaking down contaminants, improving the quality of the water Albertans drink and use every day.
- Wetlands act like giant sponges, slowing the flow of surface water, **reducing the impact of flooding** and **recharging water supplies**.
- Vegetation surrounding wetlands (riparian) **form buffers** that separate land-use activities (such as agriculture) from the wetland.
- Wetlands help to **prevent soil erosion**.
- Wetlands have the **potential to remove and store greenhouse gases** from the Earth's atmosphere.

Possible implications of climate change for wetland areas:

- Drier seasons/less precipitation for much of Alberta, meaning more evaporation and fewer wetlands.
    - For example, small wetlands could dry up and permanent wetlands could become seasonal.
- Further reduced and degraded habitat for many plants & animals, which depend on wetlands and surrounding areas for survival.
    - This means ecosystem biodiversity (the variety of plants & animals) is decreased.
- Further reduced and degraded habitat for many already threatened species, which depend on wetlands and surrounding areas for survival.
    - For example, the Northern Leopard Frog, Whooping Crane and Western Blue Flag.

Wetlands may be able to help:

- Wetlands act as *Carbon Sinks*. Potentially, wetlands can reduce the intensity of climate change by **sequestering** (removing) some of the excess carbon from the atmosphere.
- Researchers continue to discover more potential benefits of wetland functions on reducing the impact of climate change.

Potentially, climate change would mean a decrease in all the beneficial functions of wetlands discussed above as well as the recreational, aesthetic, and lifestyle opportunities provided by wetland areas. Conserving and protecting our wetlands seems even more important than ever!