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COMMENTARY

The Economic Role of Wetlands in Climate Change Mitigation

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Wetlands cover 13% of Canada's total land mass; these 1.25 million km^2 (125 million hectares) make up around 25% of wetlands globally (Government of Canada, 2025). Canada's wetlands act as an important carbon sink, directly mitigating the effects of climate change, and should be conserved as a highly valuable resource. Conserving these wetlands is essential to maintain the carbon stored in these sinks and preserve their potential to continue sequestering greenhouse gases that, in the atmosphere, lead to warming.

"Wetland" is a broad term encompassing marshes, fens, bogs, swamps, and other areas with soils that are saturated for long periods (Watersheds Canada, 2024). Carbon is taken up by plants through photosynthesis and is stored in their tissues. When carbon-storing vegetation dies in these waterlogged conditions, the soil becomes a sink for this carbon. Carbon-rich, waterlogged soils act as a much more efficient sink, as excess water leads to a much slower decomposition rate. This means that wetland soil stores a much larger quantity of carbon than typical dry, forested soils. Along with storing greenhouse gases, wetlands are also important ecosystems for water purification and flood mitigation (Ontario Nature, n.d.). Land use changes

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and deforestation lead to the destruction of wetland ecosystems; this inevitably results in massive outputs of these stored greenhouse gases into the atmosphere. “94 percent of Canada’s stored carbon is found in the top one meter of soil (with 32% of this soil carbon found in peatlands)” (Sothe et al., 2022).

It is estimated that wetlands store 20% of the world's organic ecosystem carbon (Temmink et al., 2022). According to various Canadian studies, the value of the carbon storage services provided by the wetlands in Canada’s boreal forest has been estimated at $561.5 billion in 2024 CAD (Statistics Canada, 2025). Other ecological goods and services of boreal forest wetlands are valued at $125.8 billion. The annual value of one hectare of wetlands from high-value, settled landscapes (considering GHG sequestration, flood mitigation, water filtration, and habitat) is estimated to be between $8,901 and $37,390. Applying these values to the Lower Fraser Valley wetlands leads to ecosystem services in the order of $356 million per year at the lower end and $1.5 billion per year at the upper end. Given that most Canadian wetland area is in remote regions, the total annual value of wetlands to Canadians is estimated at $31.3 billion per year. Finally, the value of coastal wetlands’ life support for oysters is estimated at $205–24,060 per ha per year. Table 1 summarizes the above information and provides the sources.

Table 1: *Valuation of the Canadian Wetland Ecosystems*

Description	2024 Value (CAD) per Year	Original Source
Total annual value of wetlands to Canadians (all ecosystem services)	31.3 billion	Campbell & Rubec (2003), Wetland Stewardship: New Directions
Carbon storage value of Canada's boreal forest wetlands	561.5 billion	Anielski & Wilson (2005), Counting Canada's Natural Capital
Other ecological goods and services from boreal wetlands (biodiversity, flood control, water filtration, etc.)	125.8 billion	Anielski & Wilson (2005)
Annual value of ecosystem services per hectare of wetlands	8,901–$37,390	Olewiler (2004), The Value of Natural Capital in Settled Areas of Canada
Annual value of ~40,000 ha of Lower Fraser Valley wetlands	356.1–$1,496 million	Olewiler (2004)
Economic contribution of migratory bird hunting in Canada (2004)	140.9 million per year	Government of Canada (2005), Regulations Amending the Migratory Birds Regulations
Value of coastal wetlands' life support for oysters per hectare	205–$24,060 per year	Olewiler (2004)

Note. All monetary figures were standardized to 2024 Canadian dollars using the all-items CPI from Statistics Canada (Table 18-10-0005-01). The following base years were assumed from source publication dates: 2002 for Anielski & Wilson (2005), 2003 for Campbell & Rubec (2003) and NRTEE (2003), 2004 for Olewiler (2004), and 2004 values reported in Government of Canada (2005). Inflation factors ranged from 1.504 to 1.609 for 2024.

Wetlands are a declining natural asset, as they are often disturbed during urban expansion and development, deforestation, and drainage for peat extraction. As stated above, Canada holds roughly a quarter of the world's remaining wetlands, but settled regions, such as Southern Ontario, the Prairies around major cities, and the Lower Fraser Valley, have lost up to 70% of their wetlands since European settlement.

Using Olewiler's (2004) ecosystem-service valuation for wetlands in settled areas, updated to 2024 dollars, this loss corresponds to an annual economic cost on the order of $178 billion to $748 billion per year, depending on the per-hectare value applied. A midpoint estimate of $463 billion per year loss reflects the substantial flood protection, water purification, habitat support, nutrient cycling, and recreational benefits that these wetlands previously provided.

Maintaining wetland ecosystems is an effective way to reduce GHG emissions. The more wetlands are disturbed, the fewer carbon-storing capabilities they retain. Ensuring these ecosystems remain undisturbed will not eliminate GHG emissions or "save the planet"

independently; however, it is an achievable and crucial step in that process. Educating the general public about the benefits of wetland ecosystems is a step in the right direction and may raise awareness and influence individuals to advocate for their conservation. Further research into the exact amounts of greenhouse gases that Canada's wetlands sequester is suggested, as making this information easier to access will allow it to reach a larger audience. With a larger audience, conservation has a better chance of being taken seriously, and our wetlands have a real chance of being preserved as a highly valuable resource.

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