

Study shows benefits of wetland restoration

February 2 2021



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Wetland restoration in the Wairarapa provides significant benefits to people and ecosystems, including contributing to a more stable climate, diminished flooding, and cleaner waterways, a Te Herenga Waka—Victoria University of Wellington study has found.

Speaking on the eve of [World Wetlands Day](#) on Tuesday 2 February, study leader Dr. Stephanie Tomscha, a postdoctoral fellow in the School of Biological Sciences, says the Wairarapa was chosen because of its growing need for [wetland restoration](#).

The region's area of [wetlands](#) has declined by 98.7 percent from its pre-colonial extent, more than the global average loss of 71 percent and the New Zealand average loss of 90 percent.

Phosphorus and nitrogen influxes have badly affected the quality of water, particularly in Lake Wairarapa, which is now classified as supertrophic.

Within the region, landholders, farmers, iwi, and community groups are restoring wetlands on private and public property, often with the goal of improving water quality.

"We found that restoration on [private land](#) provided significant gains in soil [organic carbon](#), native plant species richness, and saturated hydraulic conductivity, and also achieved desirable declines in plant-available phosphorus. These changes in soil quality contribute to a more stable climate, diminished flooding, and cleaner waterways," says Dr. Tomscha.

"Restoration also led to significant gains in nitrogen and phosphorus retention and minor gains in sediment retention. Additionally, people perceived many intangible benefits from their restored wetlands, such as beautifying their property, restoring natural heritage, and providing family memories."

Although it is widely accepted wetland loss reduces biodiversity, quantifying the success of restoration is more difficult, says Dr. Tomscha, who specialises in ecosystem services—the benefits nature

provides people (including food, clean water and clean air, beauty, and recreational and educational opportunities) and buffers against floods and storms.

Dr. Tomscha is co-author of a paper about to be released in *Ecosystems and People*, along with School of Biological Sciences colleagues Shannon Bentley, Associate Professor Stephen Hartley, and Dr. Julie Deslippe, the School of Geography, Environment and Earth Sciences' Associate Professor Bethanna Jackson, Associate Professor Mairead de Roiste, and Associate Professor Kevin Norton, and Elsie Platzer, an intern at Columbia University in the United States.

"Rather than just looking at one benefit—in other words, one ecosystem service—our paper looks at many different benefits from wetlands, using different methods, says Dr. Tomscha.

"Many ecosystem services are difficult to measure directly, so multiple approaches were needed for a broader picture of restoration success. For example, interviews and surveys revealed how people use wetlands for recreation, while field measurements and modeling estimated biophysical benefits, such as nutrient capture, which contributes to cleaner waterways."

The Wairarapa research, largely funded by the Holdsworth Charitable Trust, took place between December 2018 and February 2019 and used a mixture of in-person surveys, geospatial modeling, [field measurements](#), and participatory mapping to identify changes in ecosystem services through wetland restoration.

The researchers wanted to answer several questions, including what ecosystem services people perceive from restored wetlands and what modeled and measured ecosystem services are enhanced through restoration.

Dr. Tomscha says that after asking landholders to map their restored wetlands the area upstream that contributed to each wetland was modeled and how much each restoration project improved water quality could be estimated.

Field surveys of plant diversity and characterised soil properties in restored wetlands and adjacent unrestored land estimated differences in ecosystem services attributable to restoration activities.

"Using multiple methods allowed us to capture a wide range of [ecosystem services](#) and how they interacted, providing comprehensive and quantitative estimates of the gains when wetlands are restored on private lands," says Dr. Tomscha.

"This evidence of significant gains from wetland restoration shows the need for continued restoration efforts. Harnessing the potential of wetland [restoration](#) may be the key for meeting a range of policy objectives in New Zealand and globally."

Provided by Victoria University of Wellington

Citation: Study shows benefits of wetland restoration (2021, February 2) retrieved 7 August 2024 from <https://phys.org/news/2021-02-benefits-wetland.html>

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