

# Study shows removal of trees makes wetlands wetter

November 14 2014, by Bob Yirka

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Little Llangothlin Lagoon, Australia. Clearance of the forest around this wetland after 1840 by European settlers changed it from an ephemeral wetland to a semi-permanent lake. This wetland is a Ramsar-listed wetland. Credit: Craig Woodward

(Phys.org) —A small team of Australian researchers has found that cutting down trees in a wetland area, tends to make the area even wetter. In their paper published in the journal *Science*, the team describes a study they undertook analyzing wetlands in Australia and historical records from other sites around the world to come to their conclusions.

The modern mantra has always been that cutting down large numbers of trees is always bad for the environment—doing so means less carbon dioxide is taken out of the atmosphere, contributing to global warming,

etc., and planting new ones to replace those that were lost is always a good thing. In this new study, the team in Australia argues that cutting down trees, such as was done in the Northern Tablelands in the New England region of New South Wales Australia, in the mid 1800's, led to what is now Little Llangothlin Lagoon, a protected water body that hosts a wide variety of plant and animals that are now dependant on the wetland ecosystem. Research there by the team uncovered artifacts that suggest that before people arrived on the scene, there wasn't a lake at all, in fact, it was more like what the team calls a swamp that was wet only during certain periods of [heavy rainfall](#).

Wetlands grow wetter when trees are removed, the team claims, because trees pull water out of the ground via their roots, a large amount of which winds up in the atmosphere after being emitted from the leaves. After analyzing data generated by other researchers over time of 317 other wetland areas across the globe, the team has calculated that approximately 10 percent of them have been made wetter by deforestation.

The researchers suggest their findings should be taken into account by land managers—trying to replace trees in wetlands, could they say, reduce water amounts and disrupt sensitive systems that have evolved to take advantage of the changed landscape. Planting [trees](#), they add, could wind up in a loss of rare plant or animal species. They add that their analyses revealed that tree cutting in the areas studied resulted in what would have happened had there been a 15 percent increase in rainfall. They suggest that further studies be done and that changes in water amounts be taken into consideration by land managers when making decisions.



A short core sample from Little Llangothlin Lagoon, Australia. Gravity cores like this one preserve a detailed history of changes in the wetland hydrology through time. The plants on the top are charophytes, which did not become common in this wetland until after 1840, when clearance of the forest nearby changed the wetland into a semi-permanent lake. Credit: Craig Woodward

**More information:** The hydrological legacy of deforestation on global wetlands, *Science* 14 November 2014: Vol. 346 no. 6211 pp. 844-847

[DOI: 10.1126/science.1260510](https://doi.org/10.1126/science.1260510)

## **Abstract**

Increased catchment erosion and nutrient loading are commonly recognized impacts of deforestation on global wetlands. In contrast, an increase in water availability in deforested catchments is well known in modern studies but is rarely considered when evaluating past human impacts. We used a Budyko water balance approach, a meta-analysis of global wetland response to deforestation, and paleoecological studies from Australasia to explore this issue. After complete deforestation, we demonstrated that water available to wetlands increases by up to 15% of annual precipitation. This can convert ephemeral swamps to permanent lakes or even create new wetlands. This effect is globally significant, with 9 to 12% of wetlands affected, including 20 to 40% of Ramsar wetlands, but is widely unrecognized because human impact studies rarely test for it.

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Citation: Study shows removal of trees makes wetlands wetter (2014, November 14) retrieved 2 May 2024 from <https://phys.org/news/2014-11-trees-wetlands-wetter.html>

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