Re-wetting peatlands

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Why do we carry out re-wetting?

Biogeochemical processes occurring in peat are related to the hydrological regimes, especially the depth of peat groundwater table. Draining and desiccating peatlands will enhance the oxidation of organic materials, and the emissions of carbon dioxide (CO_2), the primary climate-warming greenhouse gas. Wet peatlands, which is the natural condition of peat swamp forests, may be achieved by blocking natural and man-made canals to raise the water table and therefore mitigate the cause of climate change.

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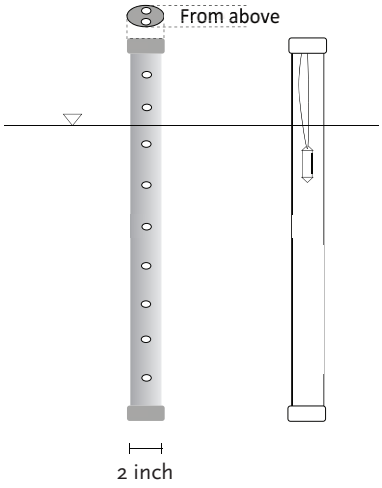
Monitoring re-wetted peatlands



To monitor the temporal variation of the groundwater table depth, a water-level data logger, known as a 'diver' is commonly used. The HOBO water level data logger records the absolute water pressure. Air pressure data is required to convert the recorded water pressure into the actual groundwater table depth.

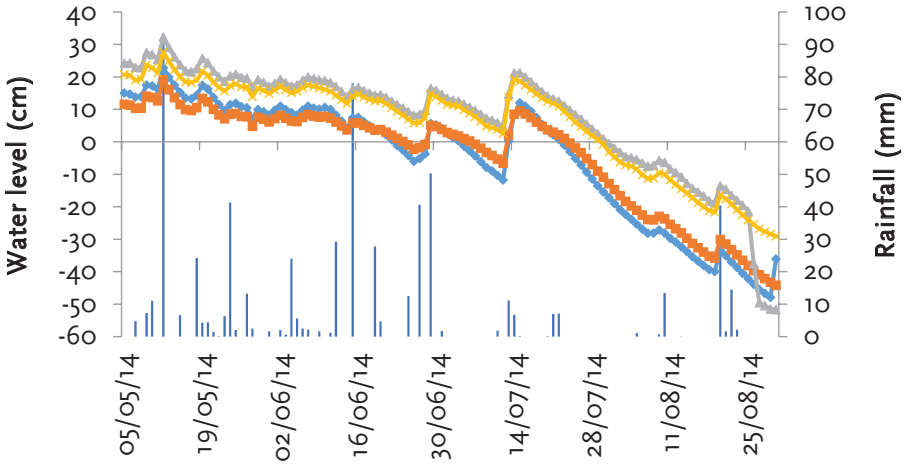
The panel above shows the installation of the diver using a 2-inch PVC pipe drilled down from the peat surface. The pipe acts like a well with as many holes as possible to allow the well to fill with water. The well should be driven into the soil at the lowest groundwater table depth level.

What does the data tell us?

The chart below shows the fluctuation of the groundwater table over a three-month period in a landscape covered in different types or stages of vegetation growth.

In general, the pattern is the same and follows rainfall inputs, as shown in blue vertical bars. The lands were submerged in the wet season and getting 'drier' towards the dry season.

The gaps between those lands covered by less disturbed forests (gray and yellow) and area covered by shrubs and sparse vegetation (orange and blue) that are close to the canal are getting towards the drier season or period with less rainfall.



Facts and figures

- The rule of thumb is that every cm of lowered water table would cause CO_2 emissions of as much as 0.91 t ha^{-1} y^{-1}. However, it remains highly uncertain regarding large spatial variability in both degraded and restored peatlands.
- Raising the water table by blocking canals is practiced in drained peatlands. Unless (native or exotic) vegetation is reintroduced, CO_2 sequestration does not take place.
- Rewetting and re-vegetating should be practiced together for optimal restoration.

References

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Photo by James Maiden/CIFOR

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