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Questioning the adequacy of an invasive plant management technique through remote sensing observations

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Palo Verde National Park, located in the northwest of Costa Rica, contains a wetland plain of international ecological importance in Central America. It is home of a rich biodiversity and provides vital shelter for over 60 species of migratory and resident birds.

From the 1980's onward, the wetland landscape has shifted from diverse vegetation and large open water areas to a near monotypic stand of cattail (Typha domingensis). This resulted into a sharp reduction in the number of birds in the area, as many bird species prefer other native plants and open water for feeding, nesting and for shelter. The Fangueo technique, which consists in crushing the plant under water using a tractor equipped with angle-iron paddle wheels has been adopted to reduce the spread of Typha.

This plant management technique typically results in a significant decrease in Typha population in the first year after its implementation, as well as an increase in plant diversity and open water area.

In this study, we used historical Landsat and Sentinel imagery to investigate the medium to long-term impact of Fangueo on vegetation and open water. We found that invasive vegetation regrowth happened faster than previous studies had indicated. The increase in open water areas was therefore short-lived. This result questions the adequacy of this technique for invasive plant management.

This work highlights how crucial simple remote sensing methods can be for assessing the adequacy of supposedly effective environmental management practices, and for informing stakeholders.