### Hashtags: #earth, #trackwetland

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### Tags: Citizen Science, Imagery

**Challenge Description**

Create an app that allows citizen scientists to observe plant communities within and outside of wetlands and delineate their boundaries, and evaluate wetlands to validate or calibrate satellite data. The app could guide people to locate the edge of a wetland and upload the coordinates for a point at this edge, perhaps with photographs and additional information. These points could be used to validate or calibrate high-resolution remote sensing products for wetlands.

**Background**

Wetlands can be defined as landscapes that are inundated permanently, periodically or intermittently with non-flowing water. They support plants that are adapted to and dependent on living in wet conditions for at least part of their life cycle (so called wetland plants). Wetlands are important because they support high biodiversity and supply a large and diverse number of services to local communities and support both regional and global economies. They play a key role in the cycling methane and carbon dioxide and regulate regional hydrological cycles and climate. They act as areas of water filtration and purification, nitrogen recycling, are culturally important and support tourism, which may be critically important to the livelihood in some regions.

An observer on the ground can determine the boundaries of a wetland by evaluating where wetland plants and non-wetland plants are dominant. This requires the capacity to distinguish between wetland plants and non-wetland plants. In most places a person with no knowledge of botany can do this very simply by finding wet locations in the landscape and observing how the plants that grow in those locations differ from those that grow in dry locations. This task is more difficult if the surface of the wetland is dry but often the same reasoning can be used. By identifying locations that show evidence of prolonged inundation, an observer without any knowledge of botany may often be able to distinguish wetland plants from non-wetland plants and determine the boundary of the wetland.

**Solution Ideas**

Here are some ways for you to frame this solution:

The app can best be used for two types of wetlands : 1) lacustrine wetlands, or “lake like: wetlands, 2) Plustrine or “marshy” - wetlands.

This app could allow users to upload coordinates of the edge of the wetted area using the Global Positioning System (GPS) function of the phone. A photo taken at that point showing the wetland should also be uploaded.

For an advanced version of the app: If the edge of the wetted area is difficult to access an observer can stand at a vantage point in the landscapes close to the water as possible, then access a Google Earth or equivalent image on the mobile phone, identify a point at which the wetted area ends and upload the coordinates for that location.

The user can be guided to spot at least one (preferably three) plants that appear to grow very well in the wetted area (or in areas that show evidence of prolonged inundation) and are not found far away from areas that are wet (or show evidence of prolonged inundation). The user should be able to upload photos of these plants and enter brief descriptions of the plants.

For an advanced version of the app: the usercan have the option of consulting online information on wetland plants to confirm that the plants they chose are indeed wetland plants e.g. photo libraries of wetlands plants of the area, where such information is available.

For a very advanced version of the app: the app can access the best resources available for identifying local wetland plants via the geographic coordinates of the photograph. A directory of resources is available that includes information about the geographic area covered by each resource. All resources that cover the location of the photograph may be extracted from a directory but the user will see these in on order of priority starting from the resource that covers the smallest area (the resource that is most specific to the location of the photograph). The user can identify the resource used to identify plants. An initial directory would be useful, so that users can add to this directory.

For an advanced version of the app: the images may be submitted for examination by online volunteers with expertise in plant identification. Websites can be linked to the app. This would be aided by information provided by the user on the resources consulted for plant identification as described above.

The app could guide users to locate the furthest point away from the water at which one of the wetland plants is observed (walking away from the wetted area). The coordinates at this location can be uploaded alongside a photograph and a description of this wetland boundary (in modified landscapes this could be a road, a fence a farm, etc.

The app could store observation sites in a database, making it an observation site to allow other observers (or the same observer visiting that wetland at another time) to make observations at the same location, or establish new observation sites.

**Sample resources**

* <http://freshwaterwatch.thewaterhub.org>
* <http://www.ramsar.org/cda/en/ramsar-about-faqs-what-are-wetlands/main/ramsar/1-36-37%5E7713_4000_0__>
* <https://www.wetlands-initiative.org/why-wetlands/what-is-a-wetland.html>
* <http://www.wetlands.org/Whatarewetlands/tabid/202/Default.aspx>
* <https://worldwildlife.org/habitats/wetlands>
* <http://atlas.freshwaterbiodiversity.eu/index.php/explore/itemlist/category/38-wetlands>
* <http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/wetlands.pdf>
* <http://www.senrm.sa.gov.au/Portals/10/PDF/Publications/WetlandsPlants-final.pdf>
* <http://wetlandinfo.ehp.qld.gov.au/wetlands/ecology/components/flora/flora-indicator-species-list.html>
* <http://www.lrm.nt.gov.au/plants-and-animals/landscapes-and-wetlands/aridwetlands>
* <http://www.dpiw.tas.gov.au/internnsf/WebPages/RPIO-4Y58LM?open>
* <http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0007/329308/041209-DPI-RWW-PLANT-GUIDE.pdf>
* <https://cmsdata.iucn.org/downloads/ib_chapter_7__the_conservation_of_aquatic_and_wetland_plants_in_the_indo_burma_region.pdf>
* <http://www.nzpcn.org.nz/page.aspx?flora_vascular_flowering_plants_aquatic>
* <http://www.ehow.co.uk/list_7317072_common-species-wetland-plants.html>
* <http://aquaplant.tamu.edu/plant-identification/>
* <https://www.uwgb.edu/biodiversity/herbarium/wetland_plants/wetland_plants01.htm>
* <http://www.npwrc.usgs.gov/resource/plants/florawe/>
* [http://gcmd.gsfc.nasa.gov/](http://gcmd.gsfc.nasa.gov/KeywordSearch/Metadata.do?Portal=GCMD&KeywordPath=Parameters%7CLAND+SURFACE%7CLANDSCAPE%7CRECLAMATION%2FREVEGETATION%2FRESTORATION&OrigMetadataNode=GCMD&EntryId=USDA_NRCS_monocots&MetadataView=Full&MetadataType=0&lbnode=mdlb5)
* <http://www.bwsr.state.mn.us/wetlands/training/PlantID-sedges.pdf> .
* <http://www.cnhp.colostate.edu/cwic/ident/fieldGuide.aspx>