Fast and Economic Mapping of Potential Wetlands Using Openly Available Remote Sensing Data and Artificial Intelligence

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Wetlands are being degraded, depleted, and destroyed
From Native American *Lands of Plenty* to *Lost Wetlands*

**Pre-settlement Wetlands**
derived from 3 m LiDAR (IA DNR) and hydric soils (SSURGO)
Rivers and streams shown in blue

**Current Wetlands**
derived from Pre-settlement and National Wetlands Inventory
Rivers and streams shown in blue

*Des Moines Lobe of the Prairie Pothole Region*

Golden et al., 2019. *ES&T*
Study Area: U.S. Gulf Coast

Across 6 states
> 300,000 sq km
Input Data

- Traditionally used data in wetland mapping
- Latest available data useful for wetland mapping

**Topography [10 – 250 m]**
- Slope, Curvature, TPI, HAND

**Soil [10 – 30 m]**
- Hydric Condition, Drainage Class, Soil Moisture, Conductivity

**Vegetation [30 m]**
- NDVI, NDWI

**Hydrology [250 m – 4 km]**
- Curve Number, Climate Water Deficit, Drought Severity

**Climate [4 km]**
- Precipitation and Temperature Changes
Results:
Machine Learning-based Potential Wetlands
Estimate of Prediction Accuracy

Machine Learning-based Potential Wetlands (97,500 Km²)

Merged NWI and Land Cover Wetland Data (87,500 Km²)

85.4% accurate

<table>
<thead>
<tr>
<th>Truth Values</th>
<th>Predicted Values</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>NW</td>
<td>63.3%</td>
<td>72.2%</td>
</tr>
<tr>
<td>WL</td>
<td>5.7%</td>
<td>22.1%</td>
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<tr>
<td></td>
<td>69.0%</td>
<td>31.0%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100.0%</td>
</tr>
</tbody>
</table>

WL = Wetland
NW = Non-wetland
Join us for live demo and training on our machine learning wetland mapping framework

https://www.ewricongress.org/program/technical-workshops

2023 World Environmental & Water Resources Congress
Henderson, Nevada | May 21–25, 2023

Technical Workshop: Mapping Wetlands with Machine Learning

Tuesday, May 23, 2023 | 1:00 pm – 4:30 pm
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