An Ecohydrological Characterization of Geographically Isolated Wetlands in the Lower Coastal Plain of East Texas

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Introduction

Geographically isolated wetlands (GIWs), wetlands with no clear "nexus of connectivity" and seasonally dry conditions, are important ecological systems commonly found in upland environments. All aspects of typical wetland ecosystems are found within GIWs, but due to lack of an obvious hydrologic connection to "waters of the United States" are not afforded jurisdictional wetland status. As non-jurisdictional wetlands, GIWs receive no protections from the Clean Water Act.

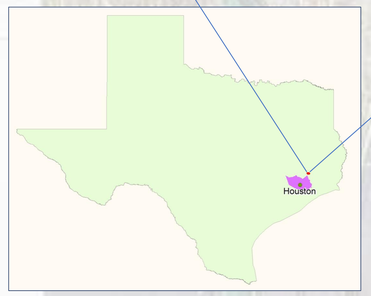
Although no continuity of hydrologic flow is evident, connections with groundwater systems are common. In addition to playing a role in the life of groundwater, these landforms serve as oases to amphibian and waterfowl in upland environments where large pools of surface water may otherwise be uncommon. A deeper understanding of the role GIWs play in the movement of groundwater is an important step toward affording these ecological niches the jurisdictional protection necessary to prevent the loss of more of these essential ecosystems.

The area surrounding the study site has experienced rapid development leading to the loss of natural features. Due to the lack of protections, GIWs may be filled without mitigation leading to increased flooding and reductions in water quality downstream. As urban environments expand into natural areas of water detention, stormwater management will be hampered by the loss of innate water impoundment systems.

Objectives

- Characterize ecohydrologic conditions and dynamics of GIWs of the Lower Coastal Plain of East Texas. This will be achieved by:
  1. Measurement of seasonal hydrologic dynamics
  2. Identification of soil and hydrogeomorphic characteristics
  3. Characterization of in-wetland vegetation

Map



Tarkington Bayou Mitigation Bank, located approximately 60 kilometers northeast of downtown Houston.

Variable Site Conditions

Materials and Methods

Study Site
- Tarkington Bayou Mitigation Bank located in Liberty County, Tx.

Materials
- Hardware
  - HOBO U20L-04 Water Level Loggers (Onset Data Loggers) -
  - HOBO USB Micro Station Data Logger (Onset Data Loggers)
- Software
  - HOBOWare Pro (Onset Data Loggers) – post processing logger data

Data Collection – Summer 2018 – Winter 2019
- Three piezometers within each of three GIWs on site
- One micro station within each GIW with soil temperature and moisture probes
- One weather station onsite
- Vegetation surveys
  - 1/20th acre survey of woody vegetation, one-inch diameter class and species
  - Herbaceous vegetation and litter cover % within 1/1000th acre plots, one at each cardinal direction within woody vegetation plots
- Soil horizons sampled and classified at each well

Data Analysis
- Pressure logged w/in piezometers converted to groundwater depth, barometric pressure from weather station to correct for atmospheric pressure

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