14950

Western Great Plains Depressional Wetland Systems

BpS Model/Description Version: Aug. 2020

Update 6/22/2018

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
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Vegetation Type

Herbaceous Wetland

Map Zones

36

Geographic Range

This system can be found throughout ECOMAP (Cleland et al. 2007) section 315E and subsection 255Da, south of Corpus Christi Bay along the western shorelines of Laguna Madre system.

Biophysical Site Description

Coastal ponds in south Texas and Tamaulipas are dynamic systems due to alternating wet and dry climatic cycles. Many ponds are quite shallow. The presence, depth and physiochemical characteristics of surface water determine species cover and composition. Following significant rainfall, ponds fill with fresh water and either reduce existing water salinities or provide a new freshwater resource. Depending on basin topography and size, wetland plant communities may develop and persist for extended periods. Ultimately, pond water evaporates, increasing soil salinities and changing vegetation community composition. Soils on the mainland range from highly permeable sands to poorly drained clays. Dynamic processes that affect these depressions are hydrological changes and grazing.

Vegetation Description

Local rainfall variability may result in ponds exhibiting varying stages of vegetation composition, salinity and water depth. The amount of freshwater emergents changes in relation to the timing of drawdown and reflooding events. During complete inundation, salinities are lowered, emergent vegetation and submerged vegetation may develop. During partial inundation, basin perimeters may become exposed mudflats, or terrestrial vegetation may invade. Transitional species which line the perimeter of the pond may include gulf cordgrass (*Spartina spartinae*), seaoxeye daisy (*Borrichia frutescens*), saltgrass (*Distichlis spicata*), and/or shoregrass (*Monanthochloe littoralis*) depending on elevation and soil salinities. Under brackish soil conditions, American bulrush (*Schoenoplectus americanus*) may increase in cover. During wet years, the emergents may include sand spikerush (*Eleocharis montevidensis*). When surface water is present for extended periods of time, two submergents may occur, muskgrass (*Chara* spp.) and widgeongrass (*Ruppia maritima*), however, open water is generally the predominant cover class. Wetland located further inland are predominantly freshwater, can maintain floating-leaved plants such as waterlilies (*Nymphaea* spp.) and lotus (*Nelumbo* spp.).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| SCAM6 | *Schoenoplectus americanus* | Chairmaker's bulrush |
| RUMA5 | *Ruppia maritima* | Widgeongrass |

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

Disturbance Description

The hydrologic cycle drives the fluctuations in vegetation composition and productivity. Replacement fire from adjacent prairies would occur when fine fuels are dry. Herbivores utilize these depression areas, grazing on vegetation during relatively dry years. The frequency of pond inundation from tropical depressions is estimated to be about seven years (McAdams 1987).

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 3 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 3 | 100 |  |  |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

Basin size ranges from 0.1-8.0ha, depending on water regime (Adair 1990).

Adjacency or Identification Concerns

These occurred within a matrix of biophysical setting (BpS) 1442 (South Texas Sand Sheet Grassland), BpS 1434 (Texas Louisiana Coastal Prairie) and BpS 1486 (Texas Louisiana Saline Coastal Prairie). Conversion to row crop agriculture has occurred in the upper and lower sections of this system.

Issues or Problems

Sedimentation from agricultural production reduces water holding capacity and increases water column turbidity, which may affect vegetation dynamics. Exotic species include water hyacinth (*Eichhornia crassipes*). Overgrazing may also impact vegetative production. Due to a decrease in salinity within the Laguna Madre from construction of the Gulf intercoastal waterway, seagrass cover has increased, therefore this system is heavily utilized by wintering waterfowl. For example, 80% of the continental population of redheads feeds on seagrasses in this hypersaline system and use coastal ponds for dietary freshwater.

Native Uncharacteristic Conditions

Comments

For map zone (MZ)36 this system was adapted from MZ26 BpS 14951 (Western Great Plains Depressional Wetland Systems - Playa) modeled by Lee Elliot, John Karges and Bonnie Warnock and reviewed by Sandra Rideout-Hanzak and Douglas Zollner. Significant changes were made to the description in MZ36 due to geographic differences resulting in a change in modelership. This BpS setting did not receive review for MZ36. Suggested reviewers for this type: Steve Adair (Ducks Unlimited) and Bart Ballard (TAMU-K).

Succession Classes

**Mapping Rules**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Upper Layer Lifeform** | **Height (m)** | **Canopy Cover (%)** | | | | | | | | | |
| **0-10** | **11-20** | **21-30** | **31-40** | **41 - 50** | **51-60** | **61-70** | **71-80** | **81-90** | **91-100** |
| Herb | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Herb | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Herb | >1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0-0.5 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

**Description**

Class A 100 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SCAM6 | Schoenoplectus americanus | Chairmaker's bulrush | Upper |
| RUMA5 | Ruppia maritima | Widgeongrass | Middle |

Description

In the dry condition, vegetation is restricted to adjacent coastal prairie dominants. Depending on water conditions, including amount of rainfall and length of inundation, vegetation ranges from emergent to submergent. Fire occurs in this system, but does not serve to move it to any other class. Fire interval depends on the surrounding matrix of coastal prairie ~3-5yrs and presence of surface water. Heavy rainfall events (Optional 1), including tropical storms and seasonal cycles, increase diversity for some time and are modeled. Rainfall cycles may result from regional and local scale climate processes such as storm tracks.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Early1:OPN | 999 |

Probabilistic Transitions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disturbance Type** | **Disturbance occurs In** | **Moves vegetation to** | **Disturbance Probability** | **Return Interval (yrs)** | **Reset Age to New Class Start Age After Disturbance?** | **Years Since Last Disturbance** |
| Optional 1 | Early1:OPN | Early1:OPN | 0.15 | 7 | No | 0 |
| Replacement Fire | Early1:OPN | Early1:OPN | 0.3333 | 3 | Yes | 0 |

Optional Disturbances

Optional 1: Rainfall events

References

Adair, S.E., 1990. Factors influencing wintering diving duck use of coastal ponds in south Texas. Master of Science thesis, Texas A&M University, College Station, TX, U.S.A

Cleland, D.T.; Freeouf, J.A.; Keys, J.E.; Nowacki, G.J.; Carpenter, C.A.; and McNab, W.H. 2007. Ecological Subregions: Sections and Subsections for the conterminous United States. Gen. Tech. Report WO-76D [Map on CD-ROM] (A.M. Sloan, cartographer). Washington, DC: U.S. Department of Agriculture, Forest Service, presentation scale 1:3,500,000; colored

Gould, F.W. 1975. The Grasses of Texas. Texas A&M University Press, College Station, TX.

McAdams, M.S. 1987. Classification and waterfowl use of ponds in south Texas. M.S. thesis, Texas A&M University, College Station. 112 pp.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 10 February 2007.

Weller, M.W. 1999. Wetland Birds: Habitat Resources and Conservation Implications. Cambridge University Press, Cambridge, UK.