Assessment of seagrass habitat quality and plant physiological condition in Texas coastal waters: Summer 2012 and 2013

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Overall Goal:
Provide a State-wide assessment of seagrass condition on both temporal and spatial scales to better evaluate anthropogenic threats to seagrass resources to fulfill seagrass conservation objectives.
Established Methods and Protocols, Data Sharing, and Reporting

Graphics, data, and protocols used in this sampling effort are posted on: www.TexasSeagrass.org

Tier 2 Methods: Site Selection

1. Previously delineated seagrass meadows were used to identify specific regions of interest (NOAA Benthic Habitat Mapping, Texas 2004/2007 Benthic Data Set)*
2. Polygons were used to create a tessellated map overlying these regions of interest
3. Random site locations (567 total) were then identified within each polygon
4. For mapping purposes, the data was interpolated using an inverse distance weighting squared method

*TPWD Seagrass Viewer: http://www.tpwd.state.tx.us/gis/seagrass/
Tier 2 Methods: *Rapid* Sampling

Potential Stressors:
- Light Attenuation
- Total Suspended Solids
- Depth and Secchi Depth
- Temperature, Salinity, pH, DO and Water Column Chlorophyll*

*Measured with YSI Datasonde

Plant Condition Indicators:
- Percent Coverage
- Species Composition
- Canopy Height
- Tissue C:N:P, $\delta N^{15}$ and $\delta C^{13}$
Tier 2 Results: CCBAY/MANERR

All seagrass

2011 CCBAY/MANERR
All Seagrass

Sampling data were collected in 2011 by:
The University of Texas Marine Science Institute
Seagrass Monitoring Program for Texas Coastal Waters
Contact: Ken Dunton <ken.dunton@mail.utexas.edu>

Analysis was limited to seagrass extent.
Seagrass extent provided by:
NOAA Coastal Services Center
Benthic Habitat Mapping, Gulf and Caribbean Region:
Coastal Bend, Texas 2004/2007 Benthic Data Set
http://www.csc.noaa.gov/benthic/data/gulf/bend.htm

Map Projection: UTM Zone 14N, NAD83 datum
Map prepared by: UT-CRWR, 4/27/2012

2012 CCBAY/MANERR
All Seagrass

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Map Projection: UTM Zone 14N, NAD83 datum
Map prepared by: UT-CRWR, 2/22/2013

2011
2012
Tier 2 Results: ULM
All seagrass
Tier 2 Results: LLM
All seagrass

2011 LLM
All Seagrass

2012 LLM
All Seagrass

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Map Projection: UTM Zone 14N, NAD83 datum
Map prepared by: UT-CRWR, 2/22/2013
Tier 2 Results: Entire Study Area

Light Attenuation
Tier 2 Results: Entire Study Area

Salinity

Sampling data were collected in 2011 by: The University of Texas Marine Science Institute Geospatial Monitoring Program for Texas Coastal Waters Contact: Kyle Dunbrick - km.dunbrick@utexas.edu

Analysis was limited to vegetative extent.

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Tier 2 Results: CCBAY/MANERR

*Halodule wrightii*

2011 CCBAY/MANERR

*Halodule wrightii*

Percent Cover 100 0

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2012 CCBAY/MANERR

*Halodule wrightii*

Percent Cover 100 0

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Map prepared by: UT-CRWR, 2/22/2013
Tier 2 Results: ULM

*Halodule wrightii*

**2011 ULM Halodule wrightii**

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Map Projection: UTM Zone 14N, NAD83 datum
Map prepared by: UT-CRWR, 4/27/2012

**2012 ULM Halodule wrightii**

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Map prepared by: UT-CRWR, 2/22/2013
Tier 2 Results: LLM

*Halodule wrightii*

**2011 LLM**

**2012 LLM**

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Contact: Ken Dunton <keendunton@gmail.com>

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Coastal Bend: Texas 2004/2007 Benthic Habitat Dataset
http://www.csc.noaa.gov/benthic/gulfbay/gulfbend.html

Map Projection: UTM Zone 14N, NAD83 datum
Map prepared by: UT-CRWR, 4/27/2012

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http://www.csc.noaa.gov/benthic/gulfbay/gulfbend.html

Map Projection: UTM Zone 14N, NAD83 datum
Map prepared by: UT-CRWR, 2/23/2013
Tier 2 Results: LLM
Syringodium filiforme

2011 LLM
Syringodium filiforme

2012 LLM
Syringodium filiforme

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Future Applications of the Tier 2 Data

The Tier 2 sampling effort provides a quantitative description of both plant condition indicators and habitat quality parameters.

This information can be utilized to develop report cards for specific regions and species-specific habitat suitability indices (HSI) for Texas seagrasses to:

1. Monitor available habitat acreage
2. Identify areas of promise for restoration efforts
3. Predict future impact of climate change, sea level rise and coastal development
Tier 3 Established Sampling Locations

Permanent Transects (North : South)
- Trayler Island
- Hog Island
- Mud Island
- East Flats
- Padre Island National Seashore
- LM 151

1 Transect locations are visited annually to document: % cover, seagrass biomass, light availability, water quality, sediment characteristics and epiphyte/macroalgal cover

2 LM151 is a long-term monitoring site utilized for continuous measurements of underwater irradiance, monthly water quality surveys and quarterly assessments of plant condition
Texas Seagrass Monitoring Program: Summary

Program Status: Tier 2
- A total of 567 individual monitoring sites were identified within the NERR, CCB, ULM and LLM
- These sites were all sampled between August and September 2011 and 2012
- The georeferenced data has been checked for Q/A and mapped for all regions
- Preparations are currently underway for the 2013 sampling season
- 14 stations were added in Little Bay in 2012

Program Status: Tier 3
- A total of 6 permanent transects were identified within the NERR, CCB and ULM
- These transects were all surveyed between August and September 2011, 2012
- The data is currently under review for Q/A

Overall State of the Texas Seagrass Monitoring Program
- We plan to repeat monitoring through most of the study area pending funding through 2013
- All of the raw data currently resides within a professionally developed central database
- A central website has been created to house all of the protocols, sample data, and GIS information
- We are currently completing an updated data report for both years
Acknowledgements

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- Sally Morehead and Ed Buskey, Mission-Aransas NERR
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