

Seaside Sparrow Habitat Monitoring

Relationship to Gulf Coast Joint Venture (GCJV) Habitat Conservation:

Priority Species: Seaside sparrow (*Ammodramus maritimus*)

Planning Objective: To implement land use and conservation practices to ensure sufficient acreages ($\geq 10,000$ acre blocks) of contiguous brackish and salt marsh to meet the annual lifecycle needs for target numbers of Seaside Sparrows.

Type of Monitoring: Habitat

Monitoring Metric: Acres of brackish and salt marsh in $\geq 10,000$ acre blocks.

Monitoring Frequency: About every 5 years, when the emergent marsh vegetation type delineation following the methodology of Enwright et al. (2015) and CCAP land cover classification are updated and available.

Monitoring Objective: Estimate the acres of brackish and salt marsh in $\geq 10,000$ acre blocks in all GCJV Initiative Areas. Habitat deficits relative to objectives provide impetus for intensifying the promotion and delivery of habitat conservation actions described in GCJV Initiative Area plans.

Brief Methodology: Landcover classification derived from remote sensing is used to estimate the acres of brackish and salt marsh in $\geq 10,000$ acre blocks for all GCJV Initiative Areas. Enwright et al. (2015) is used to identify potential habitat blocks, except in the Laguna Madre Initiative Area, where Texas Ecological Mapping Systems data [<https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/>] is used. To be considered contiguous, discrete salt and brackish marsh blocks may not be separated by ≥ 100 meters. Salt and brackish marsh blocks can contain inclusions of benign non-habitat (fresh and intermediate marsh from Enwright et al. (2015), unconsolidated shore, palustrine and estuarine aquatic bed, palustrine and estuarine scrub-shrub and open water as defined by 2010 Coastal Change Analysis Program [CCAP] data) ≤ 100 meters in width. All other habitats are considered a barrier to sparrow movement between habitat patches regardless of their width. Barriers to movement are identified using 2010 CCAP landcover data and labeled as hostile non-habitat. To identify patches of habitat less than 100 meters apart, the benign, non-habitat patches are shrunk by 50 meters using the Shrink function in ArcGIS. The Clump function in ERDAS Imagine is then applied to generate unique ID numbers for each contiguous patch. This “Clumped” layer is then combined with the original habitat layer to assign a unique value to patches of habitat within 100 meters of another habitat patch. This raster layer is then converted to vector and acres of each habitat patch are calculated. All patches $< 10,000$ acres are removed, leaving only patches $\geq 10,000$ acres.

Monitoring Responsibilities:

Data Collection: The GCJV Remote Sensing/GIS Analyst will utilize the emergent marsh vegetation type delineation following the methodology of Enwright et al. (2015) and CCAP land cover classification as these are updated and available. These datasets are anticipated to be updated about every 5 years.

Data Compilation and Analysis: When new data is available, GCJV Remote Sensing/GIS Analyst will analyze the data to estimate the acres of brackish and salt marsh in $\geq 10,000$ acre blocks, including benign habitat within blocks ≤ 100 meters in width in all GCJV Initiative Areas.

Report Development: Acreage estimates will be compiled in a chronological database, by initiative area by the GCJV Monitoring Coordinator. Tables and graphs are produced by the GCJV Monitoring Coordinator, with specific comparison to GCJV Seaside Sparrow habitat objectives.

Report Distribution: Data, tables, and graphs are made available upon request to the GCJV Monitoring Coordinator. When available, updated tables and graphs may be posted on the GCJV website.

Timing and Frequency:

Data Collection: About every 5 years, when the emergent marsh vegetation type delineation following the methodology of Enwright et al. (2015) and CCAP land cover classification are updated and available.

Data Analysis: About every 5 years, when data is updated and available.

Report Development: Data, tables, and graphs depict the relationships to GCJV Seaside Sparrow habitat objectives and are updated about every 5 years.

Detailed Methodology:

Processing Steps: The first step is to identify potential habitat. Brackish and saline marsh from Enwright et al. (2015) data is recoded to 1, everything else is recoded to 0. Because Enwright et al. (2015) does not cover the Laguna Madre Initiative Area, the Texas Ecological Mapping Systems, Western Gulf Coastal Plain region data (TXVEG) is used instead. The TEXVEG landcover data is clipped to the Laguna Madre Initiative Area boundary. The clipped TEXVEG dataset is recoded so Coastal: Salt and Brackish Low Tidal Marsh, Coastal: Salt and Brackish High Tidal Marsh, and Coastal: Sea Ox-eye Daisy Flats classes are set to 1 and everything else is recoded to 0. These two recoded datasets are then mosaicked, the resulting dataset, *Potential Habitat*, is then recoded with potential Seaside Sparrow habitat (brackish marsh, saline marsh,

Low Tidal Marsh, High Tidal Marsh, and Sea Ox-eye Daisy Flats) set to 1 and everything else set to 2. Pixels considered to be barriers to movement, *Hostile Habitat*, are identified by recoding 2010 CCAP landcover data, so High, Medium, and Low Intensity Developed, Developed Open Space, Cultivated Crops, Pasture/Hay, Grassland/Herbaceous, Deciduous Forest, Evergreen Forest, Mixed Forest, Shrub/Scrub, Palustrine Forested Wetland, Estuarine Forested Wetland, and Bare Land are set to 1 and everything else to 0. The *Hostile Habitat* dataset is then used as a mask to remove any pixels of habitat from the Enwright/TXVEG dataset that are classified as hostile by the 2010 CCAP. This masked habitat is then recoded so *Potential Habitat* is set to 1 and everything else is set to 0 (*Potential Habitat Minus Barriers*). *Potential Habitat Minus Barriers* is then recoded so the potential habitat (with barriers removed) is kept at 1 and everything else (benign non-habitat) is recoded to 2 (*Shrink_Input*). The Shrink function in ArcGIS is then applied to *Shrink_Input*, shrinking the benign non-habitat by 5 pixels (50 meters). This results in a dataset where patches of Potential Habitat ≤ 100 meters apart are now part of a contiguous block (*Shrink*). *Hostile Habitat* is applied as a mask again to break up patches of habitat that are blocked by a barrier, resulting in a dataset with contiguous habitat blocks set to 1 and everything else set to 0 (*Shrink Minus Barriers*). *Shrink Minus Barriers* is then used as the input to the ERDAS Imagine Clump function with number of neighbors set to 4, which assigns a unique ID value to each contiguous clump (*Clumped*). *Clumped* is then multiplied by the *Potential Habitat Minus Barriers* dataset, which results in each original habitat patch being assigned a clump value, patches < 100 meters of another patch having the same value (*Marsh Patches*). *Marsh Patches* is then converted to vector format, using Value as the field and the Create multipart features option selected. After removing all polygons with a Gridcode value of 0, the ArcGIS Add Geometry Attributes function is used to calculate the area of each multipart polygon in acres. All multipart polygons with an area of $< 10,000$ acres are deleted, resulting in the final dataset showing all functional SESP habitat patches.

See Y:\Monitor\SESP\SESP_Processing_Steps.xlsx for processing steps in spreadsheet format.

Data and Report Archival

Y:\Monitor

- Contains a readme.doc file that describes directories and the files within them.

Y:\Monitor\SESP\Data

- Contains compiled data (Excel spreadsheets), tables (Word documents), and graphs relating to habitat monitoring for Seaside Sparrow.

Monitoring Related Issues to Consider

Securing dedicated funding for emergent marsh vegetation type delineation following the methodology of Enwright et al. (2015) every 5 years should be a high priority.

GCJV Landbird Plans call for prescribed fire to be conducted on a 3-year rotation to improve Seaside Sparrow habitat, but does not recommended areal extent. It is unknown if marsh burns can be identified via remote sensing to assess fire return intervals and extent. The GCJV Remote Sensing/GIS Analyst and Monitoring Coordinator will review Landsat Imagery which includes the identified Seaside Sparrow blocks (~21 Blocks) and identify areas burned and their acreage. By analyzing historic and current imagery GCJV staff will explore the size and frequency of burns occurring within the identified Seaside Sparrow blocks. If marsh burns can be identified via remote sensing, and the GCJV Landbird Working Group clarifies the desired aerial extent of fire within Seaside Sparrow habitat blocks, fire return interval and aerial extent should be incorporated into the existing Seaside Sparrow monitoring summary.

Habitats used by Seaside Sparrow in the Laguna Madre Initiative Area differ significantly from the remainder of the GCJV region. GCJV staff and the Landbird Working Group believe that TEXVEG classes selected to represent potential Seaside Sparrow habitat are appropriate. As additional information becomes available, it may be necessary to either add additional TEXVEG habitat classes, or refine the existing classes to improve Seaside Sparrow habitat monitoring in the Laguna Madre Initiative Area.

References

Enwright, N.M., Hartley, S.B., Couvillion, B.R., Brasher, M.G., Visser, J.M., Mitchell, M.K., Ballard, B.M., Parr, M.W., and Wilson, B.C., 2015, Delineation of marsh types from Corpus Christi Bay, Texas, to Perdido Bay, Alabama, in 2010: U.S. Geological Survey Scientific Investigations Map 3336, 1 sheet, scale 1:750,000, <http://dx.doi.org/10.3133/sim3336>.