3.0 RESULTS

The composite map and underlying three layers are designed to assess the State of Texas by ecoregion and to identify the optimum ecological areas for protection and mitigation based on ecological theory (i.e., no political boundaries or regulatory programs). For presentation purposes, this report identifies "ecological importance" as percentages of the total score (theoretical maximum of 300) a grid cell can receive. Figures depicting the individual sub-layer data for the entire state can be found in Appendix B.

3.1 Diversity Layer

The diversity layer was designed to show land cover continuity and diversity in Texas (Figure 5). The statewide depiction shows a number of locations that scored in the top 1% per ecoregion. The individual sub-layer maps can be found in Appendix B. The diversity layer consists of four sub-layers: (1) appropriateness of land cover (Figure B1), (2) contiguous size of undeveloped land (Figure B2), (3) Shannon land cover diversity index (Figure B3), and (4) significant stream segments (Figure B4).

3.2 Rarity Layer

The rarity layer was designed to show rarity of species and land cover in Texas (Figure 6). The individual sub-layer maps can be found in Appendix B. The rarity layer consists of four sub-layers: (1) vegetation rarity (Figure B5), (2) natural heritage rank (Figure B6), (3) taxonomic

richness (Figure B7), and (4) rare species richness (Figure B8).

The overall rarity map shows large areas of high rarity in the Stockton Plateau, Edward's Plateau Chihuahuan Desert Basin and Range, Mid Coastal Plains Western Section, and the southern portion of the Rio Grande Plain (Figure 6).

3.3 Sustainability Layer

The sustainability layer (Figure 7) consists of eleven sub-layers that can be loosely grouped into fragmentors: (1) contiguous land cover type (Figure B9), (2) regularity of ecosystem boundary (Figure B10), (3) appropriateness of land cover (Figure B11), (4) waterway obstruction (Figure B12), and (5) road density (Figure B13) and stressors: (1) airport noise (Figure B14), (2) Superfund NPL and state Superfund Sites (Figure B15), (3) water quality (Figure B16), (4) air quality (Figure B17),(5) RCRA TSD, corrective action and State VCP Sites (Figure B18), and (6) urban/agricultural disturbance (Figure B19). The individual sub-layer maps can be found in Appendix B. The more sustainable areas occur where there are fewer human disturbance activities.

3.4 Composite Layer

The composite map is the combination of the diversity, rarity, and sustainability layers (Figure 8). The top 1% highly important ecological areas in each ecoregion in Texas are highlighted in red. Most of the highly important ecological areas (1%, 10%) are those areas that

represent the intersection of the top 1% for diversity, rarity, and sustainability. Ecoregion results (Figures 9-26) are explained in the following section.

3.4.1 Ecoregion Composites

Descriptions of each of the ecoregions analyzed as well as representative photos appear in Appendix A. The following paragraphs contain brief summaries of the TEAP results by ecoregion.

3.4.1.1 Southern High Plains

The Southern High Plains is represented by a thin section on the north edge of the Texas panhandle. Most of the ecologically important areas (e.g., 1%, 10%, 25%) occur in the eastern portion of this ecoregion (Figure 9).

3.4.1.2 Texas High Plains

The Texas High Plains ecoregion shows several areas with high ecological importance. For example, the Canadian River is highlighted at the 1% and 10% levels as well as a larger riparian buffer at the 25% level. The northwest corner and an area southeast of the Canadian River are also highlighted and may have a high degree of rarity (Figure 10).

3.4.1.3 Rolling Plains

The southern portion of the Rolling Plains ecoregion shows a high level of ecologically important areas (Figure 11). Other areas representing the top 1% ecologically important areas are scattered throughout the ecoregion and may indicate locations of high rarity.

3.4.1.4 Rio Grande Plain

The Rio Grande Plain ecoregion contains areas of high levels of ecological importance throughout, although the northeastern portion of the ecoregion contains areas of lower importance (Figure 12). Relatively large ecological diversity and sustainable areas can be noted at the 10% level in this ecoregion.

3.4.1.5 Redbed Plains

The Redbed Plains is a very small, disjunct ecoregion in Texas, but extends into Oklahoma. Most of the ecologically important areas occur in the western portion of this ecoregion in Texas (Figure 13).

3.4.1.6 Cross Timbers and Prairie

The Cross Timbers and Prairies ecoregion shows ecological areas in the top 1% and 10% levels in the western half of the ecoregion (Figure 14). Several important riparian areas are noted.

3.4.1.7 Oak Woods and Prairies

There are ecologically important locations scattered throughout the Oak Woods and Prairies Ecoregion (Figure 15). The northern portion of this ecoregion may include the outskirts of large population centers such as Fort Worth. Several riparian corridors within this ecoregion are highlighted.

3.4.1.8 Blackland Prairie

The Blackland Prairie ecoregion may be one of the least sustainable ecoregions because of the large population centers, such as Dallas, located there; and the amount of ongoing agricultural activities. There seems to be a noticeable difference between the northern portion and the southern portion of this ecoregion (Figure 16). The southern portion shows much higher levels of ecologically important areas, including noticeable riparian areas.

3.4.1.9 Mid Coastal Plains Western Section

Traditionally called the “pineywoods”, the Mid Coastal Plains Western Section contains many areas of high ecological importance (Figure 17). Primarily in the southern portion of this ecoregion, several areas of high rarity and riparian areas are highlighted.

3.4.1.10 Coastal Plains and Flatwoods Western Gulf Section

Like the Mid Coastal Plains ecoregion, the Coastal Plains and Flatwoods Western Gulf Section ecoregion shows several areas of ecologically importance, primarily related to a high

degree of rarity throughout the ecoregion (Figure 18).

3.4.1.11 Edwards Plateau

The Edwards Plateau ecoregion has been studied extensively and is noted for its ecological importance, especially in terms of rare, endemic biota. The results of the TEAP indicate several relatively large areas in the south and southwest portions of the ecoregion due to the high degree of rarity (Figure 19). The northeastern portion of this ecoregion has primarily lower diversity, rarity, and sustainability. This area also includes the metropolitan center of Austin.

3.4.1.12 Stockton Plateau

The Stockton Plateau contains several relatively large areas of highly important ecological locations scattered throughout the ecoregion (Figure 20). These areas have a high level of rarity as well as diversity.

3.4.1.13 Chihuahuan Desert Basin and Range

The Chihuahuan Basin and Range ecoregion is a fairly large ecoregion in West Texas. Ecologically important areas at the 1%, 10% and 25% levels are scattered throughout the ecoregion. A relatively large ecologically important area is located in the southern portion of this ecoregion, representing a high degree of land cover diversity, rarity, and sustainablility (Figure 21).

3.4.1.14 Sacramento-Manzano Mountain

The Sacramento-Manzano Mountain ecoregion is represented in Texas, but extends into New Mexico and Arizona. In this small ecoregion, the highly important areas occur near the Guadalupe Mountains (Figure 22).

3.4.1.15 Louisiana Coast Prairies and Marshes

The Louisiana Coast Prairies and Marshes ecoregion is represented as a small wedge in eastern Texas, but extends further into Louisiana. There are a few areas that are within the top 1% and 10% for ecological importance near the Louisiana border (Figure 23).

3.4.1.16 Eastern Gulf Prairies and Marshes

The Eastern Gulf Prairies and Marshes ecoregion contains highly ecologically important areas on the coastline in the eastern portion ecoregion (Figure 24). The Houston metropolitan area is located on western border of this ecoregion. A relatively large ecological area with a high degree of rarity, is located just north of Galveston Bay.

3.4.1.17 Central Gulf Prairies and Marshes

The Central Gulf Prairies and Marshes ecoregion represents a large portion of the Texas coastline. Several important ecological areas, mostly representing riparian areas or coastal areas appear in this ecoregion (Figure 25).

3.4.1.18 Southern Gulf Prairies and Marshes

The Southern Gulf Prairies and Marshes ecoregion represents the southern portion of the Texas coast and includes South Padre Island. Several ecologically important areas occur on the barrier islands as well as being scattered throughout the ecoregion near the coastline (Figure 26).

3.4.2 Overlays

The TEAP results can be used in conjunction with other databases to show where public lands (Figure 27) or transportation corridors (Figure 28) or watershed boundaries (Figure 29) are in relation to the ecologically important areas identified using TEAP. Each TERS agency can use the TEAP and data and overlay other GIS layers of interest. For example, Figure 29 shows the composite TEAP map with 6-digit HUCs overlaid.

3.4.3 Accuracy Assessment

Figure 30 shows the overlap between highly ranked TEAP composite layer pixels and The Conservancy portfolio locations. As mentioned in Section 2.0, the Tamaulipan Thornscrub and Crosstimbers and Southern Tallgrass Prairie portfolio locations are excluded. In general, highly scored TEAP locations corresponded to the locations of The Conservancy portfolio sites. Correspondence was particularly high for pixels in classes 26 to 30 which represent TEAP composite scores of 251 to 300 (Figure 31a). At lower ranked TEAP composite layer locations, the match between TEAP and The Conservancy portfolio sites is lower. This relationship can also be expressed as a percentage of the TEAP pixel classes residing inside or outside The

Conservancy portfolio. For example, Figure 31b shows that 93.42% of the pixels in class 30 (TEAP scores of 291 to 300) are found inside The Conservancy portfolio, whereas only 6.58% of the pixels in this class exist outside The Conservancy's portfolio.

A similar accuracy assessment was performed for the proposed IH69 corridor in Texas (Figures 32 and 33). Most of the IH69 corridor is covered by The Conservancy portfolio except for locations in south Texas (Tamaulipan Thornscrub and Crosstimbers and Southern Tallgrass Prairie) (Figure 32). The results are similar to those seen for the entire state. Highly scored TEAP composite layer locations (approximately classes 24 to 30) showed high correspondence with The Conservancy portfolio sites and lower scored TEAP composite locations showed a weaker match (Figure 33a). All TEAP composite layer pixels in the highest ranked classess (classes 29-30) were located inside The Conservancy portfolio (Figure 33b). The opposite trend is seen for TEAP scores located outside The Conservancy portfolio. For example, 90-100% of the pixels in classes 1 to 7 fall outside The Conservancy porfolio. This is expected since TEAP classified all lands in Texas whereas The Conservancy's conservation process focuses on identifying the highest quality ecological communities only.