

Category: Ecosystem Health

Indicator: Native Biological Communities

Methodology

Native Biological Communities is an indicator that describes the native biological diversity of Texas freshwater ecosystems and summarizes the conservation status of aquatic biological communities. Currently, this indicator includes information on the native freshwater fishes of Texas, but will likely be expanded in the future to include freshwater mussels and other taxonomic groups.

We developed this indicator in close collaboration with staff from the Fishes of Texas (FoTX) project at The University of Texas Biodiversity Center – Ichthyological Collections. We utilized the FoTX database and expert review to compile a list of all native fishes in each sub-basin (i.e., U.S. Geological Survey HUC8) in Texas. We then used this information to summarize native fish communities.

We did not consider all fishes in Texas, but only those that are exclusively freshwater species or estuarine fishes that spend significant time in freshwater. Native distributions were defined as the full natural extent of each species within Texas prior to human influence over the last 500 years (i.e., before European immigration). Determinations of native status in a HUC8 were made primarily based on FoTX's georeferenced occurrence data and an initial draft of native HUC8 determinations that originated from the Hubbs et al. 2008 checklist of Texas fishes. Final determinations were also aided by references such as NatureServe Explorer, Peterson Field Guide to Freshwater Fishes (Page and Burr 2011), Fishes of Oklahoma (Miller and Robison 1973), The Fishes of Arkansas (Robison and Buchanan 1988), Atlas of North American Freshwater Fishes (Lee et al. 1983), Fishes of New Mexico (Sublette et al. 1990), Freshwater Fishes of Louisiana (Douglas 1974) and Freshwater Fishes of Mexico (Miller et al. 2005).

Each species was placed in one of three categories in each HUC8 based on our confidence in our native range determinations: 1) Native – strong confidence and consensus that the species is native to the HUC8, 2) Probable – likelihood, but not strong confidence that the species may be native to the HUC8, or 3) None – species is not native to the HUC8. In general, we defined all HUC8s with credible FoTX occurrence points as well as any HUC8s connected hydrologically between those HUC8s as Native. We then defined as Probable a range of HUC8s abutting those Native HUC8s. A subset of HUC8s (those in the Llano Estacado, two endorheic HUC8s in West Texas, and coastal sand plain HUC8s between Corpus Christi and the Rio Grande) river were almost always determined to be non-native.

We generated two maps to summarize native fishes: 1) Number of Native Fish, which is the number of fish in each HUC8 that we classified as Native or Probable, and 2) Pct. Of Native Fish Species in Conservation Need, which is the percent of the Number of Native Fish that are either listed as Texas Species of Greatest Conservation Need (SGCN) or are extinct or extirpated from Texas (and therefore not on the SGCN list). The first map provides a spatial summary of the pattern of fish diversity in Texas and the second map provides a summary of the areas of the

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Methodology

state where fishes have been most heavily impacted. Maps were made by linking the tabular data for HUC8s to the GIS.

Data Sources

University of Texas. Fishes of Texas database. Data provided to TNC on May 15, 2017.

<http://www.fishesoftexas.org/home/>

Other References

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