

## **Appendix M. Database Enhancements Technical Team Report**

**Prepared by Greg Krakow and Anna Yellin, Team Leaders**

### **Technical Team Members**

#### *Team Leaders*

Greg Krakow, WRD

Anna Yellin, WRD

#### *Team Members participating in Database Enhancement Meeting*

Jon Ambrose, WRD, Nongame Conservation Section

Joanne Baggs, U.S. Forest Service

Chuck Barger, UGA, Bugwood Network

Larry Carlile, DOD

Jamie Collazo, GDOT, Ecology Section

Sonny Emmert, GA DNR, Coastal Resources Division

Sara Gottlieb, The Nature Conservancy

Tom Govus, Independent Contractor

Alex Jaume, U.S. Forest Service

Greg Krakow, WRD, Wildlife Biologist

Thom Litts, WRD, Fisheries Management Section

KC Love, Edwards-Pitman, Consultant

Katy McCurdy, U. S. Fish and Wildlife Service

Eric McRae, UGA

Ani Popp, WRD, Nongame Conservation Section

Becky Pudner, WRD, Nongame Conservation Section

Melanie Riley, WRD, Fisheries Management Section

Carrie Straight, U. S. Fish and Wildlife Service

Jacob Thompson, WRD, Nongame Conservation Section

Deb Weiler, WRD, Nongame Conservation Section

David Whitehouse, International Paper

Anna Yellin, WRD, Nongame Conservation Section

#### *Team Members available to participate through e-mail and correspondence*

Nikki Castleberry, UGA, Natural History Museum

Brad Dethero, Geo-Source

Matt Elliott, WRD, Nongame Conservation Section

Trina Morris, WRD, Nongame Conservation Section

Cristin Walters, UGA, Herbarium

#### *Invited but unable to participate:*

Shawna Babin, Rocky Branch Elementary School

Pete Pattivina, U. S. Fish and Wildlife Service,

Dirk Stevenson, The Orianne Society

Wendy Zomlefer, UGA Herbarium

## **Objectives**

The primary objectives of the Database Enhancement Team are to address the strengths and weaknesses of the Georgia DNR biodiversity database, how the data are used, how the data can be improved, and what additions or changes are needed to make the database a more valuable conservation tool. Participants were invited from a diverse group of organizations (above) that use biodiversity data in a variety of ways.

Technical team members were asked what their needs are and where the database has proven to be difficult to use or does not meet expectations. A meeting was held at the Charlie Elliott Conference Center on March 4, 2014. Twenty-two members of the team were in attendance.

## **Data for Input**

### *Increase Data Sources*

Data are obtained from contributors in many forms. This is sometimes done by submission of reports of individual sightings through the U.S. mail or e-mail. More common sources of data are e-mailed or digitally submitted data (through the website) from surveys conducted by contractors (who submit environmental reports due to NEPA requirements), DNR biologists, federal agency biologists, or staff of cooperating organizations, such as The Orianne Society and The Nature Conservancy.

There are certainly more surveyors that continue to collect valuable information regarding Georgia rare species than WRD staff are aware of. Identification of new data sources (and obtaining data from) these individuals and organizations is essential. Underutilized data sources identified by the group included the Tennessee Valley Authority, utility companies, timber companies, the National Park Service, and biological staff on military bases. These organizations and more should be contacted to help fill data gaps that have been identified.

### *Standardize How Large Amounts of Biodiversity Data Are Provided To Georgia DNR*

Given the number of records that are submitted, maintaining the timeliness of EO entry is a challenge. One of the identified problems is that data are submitted in many different formats. These include, but are not limited to, the following: anecdotal e-mails, historic records, museum records, rare species submission datasheets, literature, shapefiles (with varied projections), Google Earth images, points / polygons on satellite imagery, points/ polygons on topographic maps, tax records, and survey reports. Although all forms of records will continue to be accepted, standardizing the format to will lead to greater efficiency by decreasing the amount of time spent interpreting the data.

One solution is to insist that DNR employees and contractors hired by DNR to perform surveys submit records using a standard format or template. The WRD staff has developed an EXCEL spreadsheet that should be completed and submitted with each report. Shapefiles that link to the locations to the entries in the spreadsheet should also be submitted.

This EXCEL sheet is available on the WRD website at the following location: ([http://www.georgiawildlife.com/conservation\\_data\\_electronic\\_submission](http://www.georgiawildlife.com/conservation_data_electronic_submission)). Publicizing the preference that data is turned in on this sheet will be necessary. Requesting frequent cooperators to use these standard data forms in their submissions (such as GDOT contractors) should be encouraged.

#### *Add Methods As Technology Improves*

Many wildlife organizations are encouraging the use of ‘apps’ on smart phones to aid in data submission. It is recommended that WRD staff and cooperators utilize this technology. Different methods of internal data collection are also being developed through the use of tablets, which may be used by contractors in certain cases. This could be made available on the WRD website for others to utilize for rare species reporting.

In order to gather data with the use of ‘apps’ we need forms. Currently under development is the use of ODK (Open Data Kit) XForms for gathering data. ODK XForms (formally known as OpenRosa XForms) is an open standard for making entry forms that is currently used by many related technologies. What distinguishes these forms is that they can be used from remote areas without internet connection, they are easy to develop and they have little or no cost for usage. Apps and Web pages have been developed to utilize this technology on iPhones, Android phones and tablets as well as other devices like laptops and desktops.

Because ODK XForms is a standard, forms can be created using one technology and then implemented by any other related technology. The aggregated data can then be viewed and used by those who administer the server site.

#### *Schedule Information Requests*

One identified cause of data not reaching the WRD databases is the lack of an established schedule for obtaining data. Without deadlines, it is easy for a task to be overlooked. Although WRD staff inputs data that are submitted, they don’t recognize the lack of data when we are not sent reports. A simple method that can be used to remedy this is to create a Google Calendar with ‘go-to’ people that should be contacted to request data. Staff will need to obtain assurances that these people that they will send us data and they will follow up with their organization when it does not come. This will need to be done for requests of information within Georgia DNR as well.

#### *Coordinate With Special Permits Unit Of Georgia DNR*

In the past, scientific collecting permits for special concern animals and plants were reviewed only by the Special Permits office of the Georgia DNR Law Enforcement Division. In many cases, insufficient information was submitted by scientific collection permit holders to determine or confirm rare species occurrences. In addition, these survey reports were rarely seen by staff of the Nongame Conservation Section. This situation has been remedied by updating the permit reporting form to include all of the necessary data fields for developing an element occurrence record, and by coordinating with staff of the Special Permits office to extract useful data from

collection reports. Nongame Conservation Section staff now review the collection reports and identify useful location information on special concern species. The relevant data are then extracted for development of element occurrence information in the Biotics database.

#### *Obtain Data From Smartphone Applications Utilized By Other Wildlife Organizations*

Citizen science applications such as ebird and inaturalist can be used for obtaining data. Biologists within NCS and cooperating organizations will need to review the records to verify that the species is correctly identified and the location information is from a reliable source. Staff will work with cooperators to identify priority sources for data acquisition.

#### *Expand Collection And Use Of Negative Data*

Typically only positive occurrence data are entered into Biotics, not updates from surveys in which the species surveyed for was not observed. It is planned that this will change. The Nongame Conservation Section is awaiting the development of the Georgia Natural, Archaeological, and Historical GIS (GNAHRGIS) <https://www.gnahrgis.org/gnahrgis/index> to provide the technology for this improvement. This reporting tool is being developed at the University of Georgia and meetings are ongoing.

WRD aquatic zoologists that conduct periodic field surveys for fishes and mollusks maintain databases that are used to track the results of these efforts. Negative data can be inferred by results of these periodic surveys when species don't show up in the surveys. Such negative data can be very valuable for conservation assessments. Similar survey databases for plants and other groups should be developed.

### **Data Provided to Others**

#### *Improve Accessibility of Species Profiles on the Web*

The Database Enhancements Team made the following recommendations to improve the accessibility of species profiles on the WRD website:

- 1) Convert the rare species profiles from pdf format into a web based application that stores treatments locally on mobile phones, tablets, and computers for viewing offline.
- 2) Make the species profiles accessible from links embedded in lists of special concern species. (Note: the ability to click on species in lists on the web was implemented in early 2015 and the same is being done to quickly link to range maps.)

#### *Ensure That All Species in Georgia Are Acknowledged As Present in the Biotics Database*

This is particularly necessary in the case of invertebrates. According to the National Wildlife Federation website (<http://www.nwf.org/wildlife/wildlife-library/invertebrates.aspx>), there are over 140,000 species of invertebrates in the United States. Because of a lack of baseline species data, a very small percentage of terrestrial invertebrates are tracked. If a particular species isn't tracked (or even if it is), relatively few have been entered into Biotics as 'present.' However, we do not need to know the status of these species to put them on the map as being present in

Georgia. Of all species entered into the database as present in Georgia, just 1000 of them are terrestrial invertebrates. Getting these species into Biotics as present is a necessary action item.

### *Create A Profile For Every Tracked Species*

The Nongame Conservation Section maintains a set of rare species profiles that can be referenced for information on habitat, distribution, rarity, seasonality, and photographic identification. This page ([http://www.georgiawildlife.org/rare\\_species\\_profiles](http://www.georgiawildlife.org/rare_species_profiles)) is utilized by students, educators, biologists, ecologists, etc. The profiles are of state protected species and some other rare species that are tracked in the Biotics database. A recommendation of the Database Enhancements Team is to increase the number of profiles to eventually include all species tracked in the Biotics database. Identification information is essential if we expect contractors to be able to identify tracked species in the field.

### *Add Range Maps to Species Profiles*

Predicted range maps should be included with our species profiles. The team expressed significant interest in having these maps downloadable from the WRD website to a shapefile. There have been a number of attempts at creating species range maps. For aquatic species it is often enough to list species by HUC10 (USGS ten digit hydrologic unit code) watersheds. Terrestrial species are sometimes a problem, especially with some plant species that have disjunct ranges or that can persist under variable environmental conditions. For these species, range extensions and new disjunct populations are frequently showing up.

Downloadable information and instructions to make range maps of known locations of species are available on the WRD website. Information is provided by HUC8, HUC10, Georgia county and quarter quads (1/4 of USGS 7.5 minute quadrangle maps). Fishes, crayfishes and mollusks already have links to range maps from their species profiles.

Aquatic biologists in the Nongame Conservation Section have developed a methodology for developing Conservation Status Maps that display occurrences of a given species within a HUC10 watershed. Date ranges of the last documented occurrences of a species are color-coded, and indicate areas in which additional surveys may be needed to confirm the continued existence of the species in a watershed. This method and similar methods can be used to show areas of the data that could be improved by further field work or data scrutiny.

### **QC (Quality Control) of Data**

Currently WRD staff uses an established methodology to QC rare species and natural community occurrence (EO, element occurrence) data. This usually works well for newly entered or revised data, but occasionally errors get through this process. There are many older records that have not gone through the current QC process. These records as well as errors in newer records could be addressed by using adjunctive QC methodologies. One such method would be to run special QC queries against Biotics data to find fields that aren't filled in or contain lower quality data. The team recommends including a link on the website to report data errors or website problems.