Monitoring Wyoming's Birds: 2002 Database Report

A report from the Wyoming Natural Diversity Database
to Wyoming Partners in Flight regarding database updates for 2003

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Introduction

Monitoring Wyoming's Birds (*MWB*) was initiated in 2002 to provide habitat-based, bird population monitoring resulting in statistically-robust, population trend data for a majority of breeding birds in Wyoming. The Rocky Mountain Bird Observatory (RMBO) and Wyoming Partners In Flight (WY-PIF) cooperatively developed this program. RMBO is organizing the field survey and reporting efforts and providing statistical trend analysis on an annual basis. To facilitate long term storage and dissemination of the data, the Wyoming Natural Diversity Database (WYNDD) will serve as the repository of the raw data. By applying our standard quality assurance procedures to this continually growing base of information we can assure its long term viability. Also, WYNDD is set up to facilitate requests for data, so agencies and interested parties can request data from WYNDD, thereby freeing RMBO of this burdensome task so they can focus on data collection and analysis.

In the summer of 2003 the Wyoming Natural Diversity Database (WYNDD) received raw data from bird surveys conducted by the Rocky Mountain Bird Observatory (RMBO) in the spring and summer of 2002. The data came as an impressive set of 3 tables containing almost 14,000 records of bird observations for Wyoming, spatial coordinates for transects and survey stations, and habitat information. An enormous effort went into organizing and conducting the surveys as well as entering the data in a timely fashion. Logistically this first year of the project appears to be a success.

Although the level of organization and amount of data collected was impressive, there were some problems with the data that needed to be overcome before it could be effectively stored in a relational database. This was expected for the first year of a large scale monitoring project and it was WYNDD's job to find obvious errors in the raw data and problems with data collection and organization in order to create a usable relational database in MS Access. This report presents the basic structure of the resulting database, how data can be distributed to partners, and an account of the problems that were solved in its construction, with the idea that such information might inform future database efforts. Attached to the report is a CD-ROM that contains a copy of the database in which the MWB data is stored. This database will be updated annually as new information is received from RMBO, and a new copy will be submitted to WY-PIF during each major update.

Database Structure and Use

The MWB database has three tables containing data, with five other tables functioning as lookup and reference tables. The data entry form contains all necessary fields for location, species and habitat data, some of which are linked to lookup tables for convenience and to maintain data integrity.

Data Tables

The LocationTotal table contains fields for transect codes and point numbers, dataset name, decimal degree and UTM coordinates.

The BirdTotal table holds data for each individual observed at a particular point. Species are identified by a code consisting of the first letters of the common name. For consistency, users should refrain from creating new codes; consult the MWB_Species_List table for the proper code. Lookup tables are available for consulting Habitat and ID method ("How") codes.

The HabitatTotal table contains fields for the presence of roads and private land, best and next best habitat types and seral stages, primary and secondary understory types and quintiles. Users should consult MWB documentation for definitions of the categories and their associated codes.

Lookup/Reference Tables

Lookup tables for habitat and understory codes and ID methods are self-explanatory. Two additional tables contain various types of information about species in the database. The MWB_Species_List table lists all species observed, with their 4-letter ID code and scientific name. The WYNDD_status_June2003 table contains heritage program element codes, G- and SRanks and whether WYNDD tracks that species. At the request of PIF, WYNDD added several new fields including the PIF species rank, federal and state regulatory and management status, and area importance and population trend ranks.

Database Construction

Since the database will be used as an ongoing monitoring tool, it was designed to append each subsequent year's information. Most of the problems outlined below have been solved, but any changes to data structure should be considered in light of how they will impact long-term data storage and distribution.

Troubleshooting and Quality Assurance

Below are listed some of the problems that needed to be overcome before a relational database could be created. They have been divided into two categories: data structure issues and data recording issues. In large part, work by WYNDD staff was able to correct problems with data structure, so these issues were fully resolved. Additionally, such issues were discussed with RMBO staff who agreed to modify some of their practices to avoid these problems in the future.

Data recording issues are specific to the field data collection and transcription procedures, so they are often more difficult to resolve. Also, although we were able to work with RMBO to correct specific data recording errors in the current dataset, we do not have control over data collection and are therefore unable to impact future efforts. Moreover, data recording errors always occur in field projects, so a similar set of issues will likely have to be dealt with in future years. This is to be expected with such a large data collection effort and should in no way reflect badly on those who collected the data. In fact, given the large amount of data collected, the error rate was quite small. The fact that our independent data review was able to catch and correct these errors reaffirms the value of having an independent database of Wyoming's bird monitoring data and should provide PIF with more confidence in the final product.

Data Structure Issues

1) The data we received consisted of 3 sets of data each containing 3 associated tables. These data sets contained identical information for different regions of Wyoming. Tables containing the same data type needed to be collected in a single table. This wouldn't have been a big problem had there not been duplicate information from each region in the tables and had we been informed of or noticed this duplication before new tables were created.

2) There were different transects with the same name in the datasets. Unfortunately we made the presumption that this would not occur and this too was not noticed until late in creating the database. There is no way to define relationships in a relational database when the fields you need to define the relationships by are not unique. The transects with the same names needed to be identified and the names changed. Confounding the problem was the fact that there were 3 sets of data.

3) Data were provided in UTM for the 2 UTM zones in Wyoming. WYNDD works with unprojected data (Geographic) when using a GIS so that we can view all data across Wyoming in a single View. This in effect created 6 datasets (2 for each original dataset) that needed to be placed in a Geographic coordinate system.

Data Recording Issues

1) Bird observations outside of the survey stations were given a unique station number for each transect (99), but were not given a geographic coordinate. There were other observations without coordinates as well. When there was no coordinate provided and the observation fell on a transect with a duplicate name, there was no way to tell where the observation was made. Corrections were made with the help of Doug Faulkner (RMBO). Also, if there was no coordinate provided, one was assigned at a broader precision level based on the center of the transect.

2) Some of the monitoring stations had incorrect coordinates. These were detected by the obvious dislocation along its assigned transect while viewed in ArcGIS. New coordinates

needed to be generated following its logical progression along its transect (each station has a number and transect name).

3) There were a small number of stations along a transect with the bird observation field blank.

4) There were 95 bird observations with no related habitat information. These were typically birds observed along a transect that were not counted at a station, but not always.

5) There were 16 duplicate habitat records. This creates a problem in a relational database. One of each duplicate needed to be identified and deleted before the database could work properly.

Data Distribution Procedures

Data requests should be submitted to the data management personnel at WYNDD, particularly Alan Redder (307-766-3018, wndd@uwyo.edu). Written requests are most easily submitted via the data request form on the WYNDD website (http://uwadmnweb.uwyo.edu/WYNDD/). Please specify that the request is for the MWB database. Feel free to contact Alan to discuss the details of your request.

Most requests can be filled within 5 business days. Data reports can be delivered in spreadsheet or ArcView/GIS shapefile formats. MWB data requests are free of charge.