North American Crane Workshop Proceedings   North American Crane Working Group

1992

A MICROCOMPUTER DATA BASE FOR MANAGING WHOOPING CRANE OBSERVATION RECORDS

Duane A. Asherin
U.S. Fish and Wildlife Service

David B. Hamilton
U.S. Fish and Wildlife Service

Wendy M. Brown
University of Idaho

Roderick C. Drewien
University of Idaho

A MICROCOMPUTER DATA BASE FOR MANAGING WHOOPING CRANE OBSERVATION RECORDS

DUANE A. ASHERIN and DAVID B. HAMILTON, *U.S. Fish and Wildlife Service,*
National Ecology Research Center, Fort Collins, CO 80525-3400
WENDY M. BROWN and RODERICK C. DREWIEN, *Idaho Wildlife Research*
Institute, University of Idaho, Moscow, ID 83843

Abstract: A database called WHOOPER contains whooping crane (*Grus americana*) observations for the Rocky Mountain foster-parent population and currently consists of 1,438 observations covering the period 1975-1987. The dBase III Plus database management system for microcomputers is used for the application. This description of the data base and its capabilities updates the prototype database described in the 1985 Crane Workshop.

A prototype information management system for whooping crane observation data was reported at the 1985 Crane Workshop (Asherin & Drewien 1987). This application used a sample data set of 160 observations from the Rocky Mountain foster-parent population to illustrate typical information organization and searches and demonstrate computerized mapping of whooping crane sighting locations. This report updates the prototype system, describes the operational status of the database and provides contacts for inquiries.

This database project was funded by the U.S. Fish and Wildlife Service. We are grateful to D.A. Wood and J. Zuboy for manuscript review and to D.E. Ibarra for manuscript typing.

WHOOPER database

The WHOOPER database consists of observations of whooping cranes hatched and reared by sandhill crane (*G. canadensis tabida*) foster parents at Grays Lake National Wildlife Refuge, Idaho (Drewien & Bizeau 1978). Sightings were obtained by project biologists and other interested individuals over the 7-state range (Montana, Idaho, Wyoming, Utah, Colorado, Arizona and New Mexico) of the foster-parent population. Future observations are possible from Chihuahua, Mexico. The database presently contains 1,438 observations, including all observations from fall 1982 to spring 1987, and sightings of 4 birds in the 1975 year class over their lifetime.

The prototype WHOOPER observation record form was modified slightly. Table 1 contains a description of the 21 active database fields. Six presently inactive fields also are included, representing the names (in character format) that correspond to numeric codes in active fields for items such as state, county and refuge location of the observation. To construct the data base, field observations were manually coded onto a field data collection form designed around the observation items or fields described in Table 1. Data from the completed forms were then keyed directly into the microcomputer data base manager using an interactive screen image of the data collection form.

Database Manager Employed

The WHOOPER data base was developed on a microcomputer using the dBASE III Plus data base management system from Ashton-Tate Corporation (mention of commercial trade names does not constitute endorsement or recommendation by the U.S. Fish and Wildlife Service). This software provides an interactive user interface (ASSIST) that helps users make complex queries of the data base, perform arithmetic and statistical operations on the data, add or modify records, sort and index records, import and export data to other software packages, and create new data base files, output reports and input screens. Most users of WHOOPER will be concerned only with the interactive query system for retrieving records meeting certain user-specified criteria. For example, by responding to a series of questions in pull-down

menus and pop-up windows, a user can easily specify a complex, multiple condition query such as "Display on the screen, all spring staging area observations of juvenile birds in either Colorado or New Mexico from 1982 to 1984."

Database Files

The primary WHOOPER database file contains all the observation data; the current 1,438 records require about 500 Kbytes of storage. This file can be accessed directly with dBASE III or III Plus, converted for access by dBASE II, or written to disk in a format that could be imported by some other data base management systems.

Four other types of files assist the user when using the database with dBASE III Plus. First, a series of predefined output report formats are available for listing observations or checking data input. Additional report formats can be created from the ASSIST menu. Second, input screen files recreate the field data form on the screen to aid data input. Third, index files and sorted database files organize the observation data in various ways for more efficient searching and analysis. For example, 1 index file has all observations for a single bird grouped together, another has all observations in a state together, then all observations within a state grouped by county, then all observations within a county grouped by bird identification number. Additional index files also can be created from the ASSIST menu. Fourth, several program files have been developed for searches and analyses beyond the capability of the interactive query and report system. These programs can be accessed either directly from dBASE or from a menu system developed especially for the WHOOPER data base. For example, a user might be interested in the average time of first arrival of whooping cranes at a particular refuge each year. To determine this, the earliest arrival dates each year at the refuge are converted to their Julian date equivalents and averaged, and the average Julian date converted back to a month and day. As another example, a user might want all observations for a particular bird displayed on a map. One of the program files conducts a user-specified search of the data base and then creates an ASCII file of the latitude and longitude coordinates for each selected observation. This file can then be read by a geographic information system (GIS), which can overlay the coordinates with resource themes such as state, county and refuge boundaries; towns; roads; and rivers, lakes and reservoirs. The GIS used for this appli-

cation is the Map Overlay and Statistical System (MOSS) developed by the U.S. Fish and Wildlife Service (Lee et al. 1985). Only a few of these program files have been developed to date. Because of their complexity, some of the management and research queries described below will have to be implemented as dBASE programs.

WHOOPER Query Capabilities

The WHOOPER data base can be used to address both management and research oriented questions. From a management or licensing standpoint, federal and state agencies and environmental consulting firms might request information on sighting records for specific locations where some proposed activity invokes the Endangered Species Act. Such activities might include powerline construction, pipeline construction or military training flights. State agencies might also ask for the distribution of sightings by county or the months during which whooping cranes are in their state. A game and fish commission considering a sandhill crane hunt might ask when adult or juvenile whoopers first arrive in the state. In addition to simply organizing and summarizing data, researchers might also use the database to address research questions related to:

(1) migratory movements of an individual bird over some specified time period;

(2) principal locations used by a bird (e.g., principal winter locations used by bird 75-01);

(3) temporal statistics (e.g. mean, standard deviation and range of dates that juvenile whoopers initiate migration from Grays Lake National Wildlife Refuge);

(4) percent utilization information (e.g., percentage of the whoopers that used Alamosa National Wildlife Refuge in 1985); and

(5) habitat utilization information (e.g. does the habitat used by sub-adults differ from adults and family groups?). [Note that this last question cannot be answered solely from information in the data base, it requires correlating observation coordinates for selected records with vegetation information from maps or a GIS.]

Database Support and Maintenance

The whooping crane database has been transferred to the U.S. Fish and Wildlife Service's Regional Office in Albuquerque, New Mexico, for future updating and support. Questions concerning the database and requests for copies of the array of codes (e.g. state, county and refuge codes not included in Table 1) should be directed to:

Jim Lewis, Region 2
U.S. Fish and Wildlife Service
500 Gold Avenue, S.W.
Albuquerque, NM 87102
Comm: (505) 766-1273
FTS: 474-1273

Duane Asherin or David Hamilton
U.S. Fish and Wildlife Service
National Ecology Research Center
4512 McMurray Avenue
Fort Collins, CO 80525-3400
Comm: (303) 226-9402
FTS: 323-5402

LITERATURE CITED

Asherin, D.A. & R.C. Drewien. 1987. Computerized management and display of whooping crane observation data. Pp. 276-282 *in* J.C. Lewis & J.W. Ziewitz, eds.), Proc. 1985 Crane Workshop, Platte River Whooping Crane Habitat Maint. Trust, Grand Island, Neb.

Drewien, R.C. & E.G. Bizeau. 1978. Cross-fostering whooping cranes to sandhill crane foster parents. Pp. 201-222 *in* S.A. Temple (ed.), Endangered Birds: Manage. Tech. Preserving Threatened Species, Univ. Wisc.

Lee, J.E., C.N. Reed, R.L. Frosh, L.C. Sullivan & F. D'Erchia. 1985. MOSS users manual (Version 85.01). U.S. Fish & Wildl. Serv., W. Energy & Land Use Team, Fort Collins, Colo.

Table 1. Observation fields and selected codes and explanations for the WHOOPER database.

Field no.	Observation item or field		Type	Width
1	Observation number		Numeric	4
2	Bird identification (e.g., Canadian 75-01 or Patuxent PA-03)		Character	5
3	Bird age code 1 = Adult 2 = Yearling	3 = Juvenile 4 = Unknown	Numeric	1
4	Observation date or sighting date—from (e.g., 01/24/79 = January 24, 1979)		Date	8
5	Sighting date—to		Date	8
6	Number of observation days		Numeric	3
7	State code		Numeric	1
8	County code		Numeric	3
9	Federal or state refuge code		Numeric	2
10	Latitude - degrees		Numeric	2
11	Latitude - minutes		Numeric	2
12	Longitude - degrees		Numeric	3
13	Longitude - minutes		Numeric	2
14	Accuracy of latitude and longitude coordinates 1 = Nearest 1 minute 2 = Nearest 5 minutes	3 = Nearest 10 minutes	Numeric	2
15	Type of observation 1 = Actual sighting	2 = Radio	Numeric	1
16	Observation from 3 = Ground	4 = Aerial	Numeric	1
17	Season of observation 1 = Summer grounds 2 = Winter grounds 3 = Spring migration	4 = Fall migration 5 = Spring staging area 6 = Fall staging area	Numeric	1
18	Confidence of observation 1 = Positive 2 = Confirmed	3 = Probable 4 = Uncertain	Numeric	1
19	Source of observation		Numeric	2
20	Status of bird 1 = Alive	2 = Dead	Numeric	1
21	Comments		Character	170