

Aquatic Database
Federal Aid Project F-293R-18

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Federal Aid in Fish and Wildlife Restoration

Job Progress Report

Colorado Division of Wildlife

Aquatic Wildlife Research Section

Fort Collins, Colorado

June 2011

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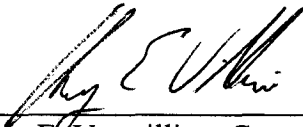
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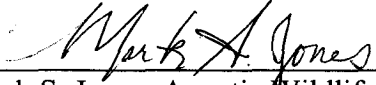
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The results of the research investigations contained in this report represent work of the authors and may or may not have been implemented as Division of Wildlife policy by the Director or the Wildlife Commission.

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State: Colorado

Project No. F-239-R18

Title: Aquatic Data Analysis

Period Covered: July 1, 2010 to June 30, 2011

Study Objective: To develop analysis of aquatic biological data that accurately describes and/or predicts the status of fish communities and the results of management actions on these communities.

Study Objectives:

Job 1. Aquatic Data Management System (ADAMAS)

Objective: To continue to develop and maintain a computer based, statewide aquatic data management system which will facilitate standardized entry of survey data across the state and access to information regarding all aspects of aquatic data including CDOW stream and lake inventories, Scientific Collections (SCICOLL) reports and CDOW creel surveys. Active links between ADAMAS and the Aquatic Animal Health (AAHL) database as well as between those two databases and the Division Hatcheries database (TRANS6) have been established and will be maintained. This job includes aspects of the aquatic portion of the Colorado Vertebrate Ranking System (COVERS).

Job 2. Technical Assistance

Objective: To provide technical assistance to researchers, field biologists, and staff on a variety of aquatic data analysis topics. Topics to include creel survey, inventory survey, management categorization, recording of accurate location data through the use of Global Positioning Systems (GPS), hardware and software review, application development and other computer related data analysis needs.

Job 1. Aquatic Data Management System (ADAMAS)

ADAMAS Database Management and Maintenance

The effort to collect and enter current and historic fisheries survey from field data sheets stored at various Division offices continues. At the beginning of this reporting period, the database held 27,742 surveys at 12,681 locations, with 1,539,764 fish sample records, representing 4,355,329 fish. During the reporting period, we've added 1,559 surveys from 409 new and existing locations, with 230,048 sampling records representing 554,782 fish. Of those, 1,066 surveys were performed by Division biologists during the 2010 field season with another 493 surveys from SCICOLL reports during 2010.

The following table shows survey entry totals with survey and sampling records and representative fish processed for each year in the reporting period.

Surveys Processed by Year

Reporting Year	Surveys	Sample Records	Fish
pre-2003	13,681	356,588	1,909,434
2003-2004	1,313	27,999	48,073
2004-2005	1,735	147,711	177,646
2005-2006	2,146	174,621	351,194
2006-2007	1,130	44,332	113,202
2007-2008	1,566	151,688	230,672
2008-2009	3,408	272,380	724,230
2009-2010	2,763	364,445	800,878
2010-2011	1,559	230,048	554,782
Total	29,301	1,769,812	4,910,111

During this reporting period, a major effort to identify duplicate location, survey and sample records was completed utilizing the Division's GIS hydrology layers and a collection of scanned field data sheets. Over 600 sites were identified as duplicate sites, which led to the identification of over 2,000 surveys which had been submitted at least twice with minor differences in location descriptions, sample date (for example, the date nets were set versus the date they were pulled), the species code used to identify the fish or the manner in which the fish data were recorded (as individual fish, sums of length classes per species or, in some cases, sums of species sampled). This task continues as part of the on-going database maintenance.

The result of this effort, after culling the duplicate records and importing the 2010 field season data, the database stores a total of 27,279 surveys at 13,090 locations, with 1,726,047 sample records representing 4,300,585 fish.

We continue to bring sampling surveys into the system from a variety of sources. Initially, the database was comprised of records from the CDOW Stream and Lake Databank (the predecessor to ADAMAS) compiled by David Weber, a database of historical sampling compiled by Kevin R Bestgen, Ph. D. to support the South Platte and Arkansas Basins' Eastern Plains Natives Fishes reports, CDOW surveys submitted by the biologists and SCICOLL reports. The original ADAMAS database was designed around basic data items collected in the field with enough flexibility to support the variety of inventory sampling protocols used by aquatic biologists, researchers and consultants across the state. We continue to standardize field data reporting formats based on that design, allowing for expansion to accommodate new methods and projects.

Currently, data is reported by CDOW biologists and SCICOLL permit holders via an application written by CDOW researcher Kevin Rogers, Ph. D. - the "JakeOmatic" (JOM) - or standardized spreadsheet templates, but occasionally large groups of survey data located in hardcopy files are compiled and entered by database staff. As surveys are processed, sampling information is verified and compared to data from previously entered surveys. From time to time, historic survey reports with more detail and individual fish data are found to replace previously recorded, summary information.

Prior to and during this reporting period, several related efforts affecting the ADAMAS database and CDOW aquatic data as a whole have taken place:

The work of consolidating the Division's four, independent, Aquatic-themed databases to a single, centralized database with linkage to the Division's Geographic Information System (GIS) continues. The resulting Aquatics Database (AQDB) design meets criteria defined by the Governor's Office of Information Technology (GOIT) and has been implemented with the full participation of the Division's Wildlife Technologies (WT) work group. The resulting consolidated database includes the Division's Hatcheries' stocking and production data, served by the TRANS6 application which accesses AQDB tables over the Division's Wide Area Network (WAN).

A four-month effort to collect electronic copies of creel survey data currently stored in individual copies of the Access database that serves the C-SAP for windows application, as well as the data files used to store data for the DOS version of C-SAP and consolidate them to tables in the AQDB took place during this reporting period. Unfortunately, electronic files stored and analyzed on the CSU Cyber mainframe system prior to 1998 are not recoverable. Hardcopy printouts of analysis summaries of those surveys were entered to an informational table and combined with the results of analyses of all electronic data files that were found. The resulting table has been used to assist in explanations of the overall Aquatics Section decision-making process that involves stocking and regulations as well as a review of the biologists' management categorization of waters in their areas and regions.

After WT's final testing and implementation of the TRANS6 application, the ADAMAS data will migrate to AQDB, along with the consolidation of Creel data. Aquatic disease data from the AAHL database is in the process of being reformatted and will be migrated to the AQDB as portions of that database are finalized and implemented for a Hatchery and Disease certification process, as well as work to identify inventory sampling events from which disease samples were taken, which, due to their location tracking, will allow spatial analyses of disease data.

The ADAMAS Application

Standardization of inventory sampling data entry, analysis and reporting continues to be the primary target of an ADAMAS application within the AQDB. As we have described in previous reports, the applications' designs and implementation were set up to take place at a rate of one application per year, with the Hatcheries production application to be implemented first, followed by ADAMAS, a network-accessible version of C-SAP and then a network-accessible application for the AAHL.

At this time, TRANS6, the Hatcheries' application has been tested and implementation is underway and the portion of the AAHL application that deals with disease certification has been moved up in priority. Unfortunately, the State's budgetary restrictions on GOIT and WT continue to delay work on the ADAMAS application, so use of the JOM as the primary data entry tool will continue.

On an experimental basis, an application from CartoPac, a Fort Collins firm, to record aquatic sampling data in the field utilizing a "smart GPS" unit from Trimble has been developed and is undergoing field testing. The application utilizes downloads of spatial data from the Division's GIS and a variety of domain (lookup) tables to allow biologists to enter fish sampling data in the field, upload it to a central "field server" and then import it to the AQDB for QA/QC and inclusion in the database. It is hoped that this application will replace the current method of recording data on paper forms, entry to the JOM and annual import to the database, where applicable.

Data Requests

Requests for aquatic data from the database continue to be filled in a timely manner, formatted as requested with priority given to support Division research and management needs. Federal, state and local government agencies, their consultants, contractors and educational researchers are accommodated as expeditiously as possible. Angler requests are referred to Aquatic Area biologists.

This remains a manual process for the most part; a summarization process originally used to check the results of the application's test analyses resulted in a summary table that has continued to prove valuable as a consistent format for providing requestors with information about sample inventories without having to provide "raw"

data to requestors who the Aquatic Data Request Group (described below) have determined not to need that level of detail in the data provided.

The centralized process for review of requests by the Division's biologists prior to release of data continues to be revised. At this point in time, a formal request is made via email with the CDOW Aquatic Data Request Form (Appendix A). The form is meant to define the requestor's geographic area of interest, the resolution of the data requested and advise the requestor of the provisional status of the data and their responsibilities as to redistribution of the data.

The request, and sometimes the data requested, is distributed to the Aquatic Data Request Group via email for review and comment. The members include the Aquatic Research Leader, the regional Senior Aquatic Biologists, the Water Unit Manager, the regional Senior Wildlife Species Conservation biologists, the regional Aquatic or Water Quality Wildlife Species Conservation biologists, the Aquatic Toxicologist, the Aquatic GIS Specialist and the Aquatic Database Manager. The members of this group are aware of aquatic issues statewide and are all in contact with Aquatic Area biologists responsible for the management of waters in the requestor's area of interest. Discussions have taken place among the members via email to determine how the request is to be filled. Once everyone is in agreement or have bowed out of the discussion, the request is filled electronically via email and the request deliverable, the request form and a copy of the email discussion, is archived for future reference, distribution to other parties involved in the issue (on request) and possible comparison should there be a question of changes to the data.

It was originally hoped this process would reduce the number of requests, but the number has actually increased: 27 so far in 2011, 54 requests (with only 4 withdrawn or denied) in calendar year 2010, a total of 60 in 2009, 53 in 2008, 42 in 2007 and 30 in 2006 (prior to the development of the request process). The process has resulted in an improved method of communication between requestors and the Division, as well as a reduction in concerns for data re-distributed or possibly changed by the requestor. As the request process improves, some of the return requestors are beginning to attach GIS shapefiles defining their project boundaries, which, in turn, allows us to pull the requested data by a simple spatial query, speeding up the process immensely.

Job 2. Technical Assistance

The primary activities on Job 2 during this reporting period were:

- 1) To advise researchers concerning additional components and upgrades to desktop and laptop computers.
- 2) Perform service-oriented tasks supporting the researchers' projects such as scanning aerial photography for analyses and photographs for use in presentations to public or professional groups.
- 3) To assist researchers with programming needs, as in the current development of an Excel template used as a means to enter stream physical habitat data describing a sampling site recorded in the field and an accompanying program which will import those data from a tab-delimited text file created from the template to the appropriate tables in the database, similar to the existing import process for JOM survey files.
- 4) Assistance with the design and testing of the CartoPac field-entry application.

The three-tiered approach to the standardization of PC allocations depending on a user's level of processing needs and usage has been implemented. The Aquatic Research Group has standardized to the highest tier, resulting in savings for the state in acquisition costs, training, support and maintenance while allowing our researchers to use most available Windows-based applications in the office and in the field, with the only restriction being network access to server-based data and battery life.

We continue to scan the Aquatic Research Group's variety of past annual Federal Aid Reports, Technical Reports, White Papers, Special Reports and the researcher's individual publications to the Adobe portable data format (pdf) for distribution via the Internet and to reduce printing and shipping costs. This continues on an as-requested basis, with copies of the pdf going to the Division's librarian for archiving and future reference or distribution.

Since the standardization of operating systems and the basic office suite of programs to Windows XP operating systems and the XP Office 2007 suite, the resulting "Tier 0" level of "peer support" continues to develop within the Division and the Aquatic Research Group, redefining the group's technology support needs. We will continue to adapt to the situation, providing what informal support is required.

APPENDIX A

CDOW Aquatic Data Request Form

REQUEST FORM FOR COLORADO DIVISION OF WILDLIFE DATA

1. (a) Name (s) of persons requesting data:

1. (b) Organization/Company/Agency Name (s):

1. (c) Organization/Company Agency Contact Information:

PHONE: _____ FAX: _____ email: _____

(Email address is where electronic data files would be sent)

2. (a) We are requesting data for the following water bodies/geographic area:

(Note that CDOW does not typically distribute point-sample locations or generate GIS maps)

2. (b) Describe the data you are requesting (fish species distributions? water quality parameters?):

3. Please describe your intended use for this data:

4. You are advised of the following regarding the requested data:

(a) The data may be exempt from the Colorado Open Records Act, in which case, CDOW may deny your request (refer to CORA for exemptions).

(b) The data may be in provisional status (i.e., error check still in progress).

(c) Raw data values should not be changed. If you have original or copies of data sheets or previous exports with differences in the data you receive, please call or email for possible corrections.

(d) Do not redistribute this data to parties not listed above. Other parties must submit a formal request to CDOW to insure that they receive the most updated version of the data available.

Name of CDOW Contact: Harry Vermillion

EMAIL: harry.vermillion@state.co.us

PHONE: 970-472-4314

Date data sent to email address listed in 1 (c) :