

# Aquatic Data Analysis

Federal Aid Project F-239R-19

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Federal Aid in Fish and Wildlife Restoration

Job Progress Report

Colorado Parks & Wildlife

Aquatic Wildlife Research Section

Fort Collins, Colorado

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State: Colorado

Project No. F-239R-19

Title: Aquatic Data Analysis

Period Covered: July 1, 2011 to June 30, 2012

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 CPW stream and lake inventories, Scientific Collections (SCICOLL) reports and CPW 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.

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 27,266 surveys at 10,843 locations, with 1,722,449 fish sample records, representing 4,515,705 fish.

During the reporting period, we've added 1,231 surveys from 1,036 new and existing locations, with 143,556 sampling records representing 237,261 fish. Of those, 431 surveys were performed by CPW biologists during the 2011 field season with another 800 surveys from SCICOLL reports during 2011.

The following table shows current 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	12,887	372,077	1,693,768
2003-2004	1,309	24,786	43,690
2004-2005	1,647	100,430	126,877
2005-2006	2,013	170,609	323,316
2006-2007	1,168	43,901	112,703
2007-2008	1,312	147,642	221,132
2008-2009	2,599	269,618	664,213
2009-2010	2,773	365,542	781,914
2010-2011	1,558	227,844	548,092
2011-2012	1,231	143,556	237,261
Total	28,498	1,866,006	4,752,972

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. In the 90's, 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. Since 1993 there have been annual reports of surveys submitted by CPW biologists and SCICOLL permit holders. The original ADAMAS database was designed around basic parameters 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.

After John Alves, the Senior Biologist for the Southwest Region noticed that several historic surveys were missing from the database, we began an effort to systematically review area office hardcopy files, scanning field data sheets to pdf for entry by database staff in the next reporting period. 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 CPW 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).

After WT's implementation of the TRANS6 application, that portion of the AQDB was moved to a separate database (AquaticsT6) on the same server, to accommodate user permissions required by the application. The remaining ADAMAS data will be moved to that database as applications are developed and WT resources can be focused on the overall Aquatics Database solution.

Currently, field sampling data is reported by CPW biologists and SCICOLL permit holders via an application written by CPW researcher Kevin Rogers, Ph. D. - the "JakeOmatic" (JOM) - or standardized spreadsheet templates. With the continued delay of the ADAMAS application, we began work on a series of expanded Excel spreadsheet templates to allow consistent entry of survey details formerly entered in the "Notes" area of the JOM forms, but required a manual extraction of those data to their respective tables for storage. We also began the design of the programming which will import the data in the resulting spreadsheet files. We anticipate the use of these templates for the 2011 field season by CPW crews and SCICOLL permit holders. In the event that the ADAMAS application is finally developed, CPW crews will use the application to access the database, while SCICOLL permit holders will continue to use the templates, in lieu of a secure web-based application.

## 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 implemented with the portion of the planned AAHL application that deals with disease certification and management of the "Level1" data within the AQDB. Unfortunately, the State's budgetary restrictions on GOIT and WT continue to delay work on the ADAMAS application.

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 its field testing continues. THE CPW GIS group is implementing a "field server" to accommodate the data in-house. 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. The intention is that this application will augment the current method of recording data on paper forms, entry to the JOM and annual import to the database, where possible.

## 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 continues 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 CPW Aquatic Data Request Form (Appendix A). The form is meant to allow the requestor to define waters or geographic area of interest, the resolution of the data requested while and advising the requestor of the provisional status of the data and their responsibilities as to redistribution of the data.

The request, and often 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 has deferred decision-making on the request to other members of the group, the request is filled electronically via email. The request deliverable, the request form and a copy of the email discussion are archived for future reference, distribution to other parties involved in the issue (on request) or possible comparison of the data, should there be a question of changes to the data.

The number of requests have recently increased with 40 so far in calendar year 2012, and 57 in 2011. The process has resulted in an improved method of communication within the CPW, between requestors and CPW, 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 extended Excel templates used as a means to enter sampling data with more detail than addressed by the JOM and the accompanying program which will import those data directly from the spreadsheet file to the appropriate tables in the database, while maintaining compatibility with the JOM for custom analyses of sampling data.
- 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 on an as-requested basis

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

CPW Aquatic Data Request Form

**REQUEST FORM FOR COLORADO DIVISION OF PARKS AND WILDLIFE DATA**

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

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

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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:

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(Note that CPW 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?):

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3. Please describe your intended use for this data:

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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, CPW 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 CPW to insure that they receive the most updated version of the data available.

Name of CPW Contact: Harry Vermillion

EMAIL: harry.vermillion@state.co.us

PHONE: 970-472-4314

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