# Aquatic Data Analysis

## Federal Aid Project F-239-R14

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Federal Aid in Fish and Wildlife Restoration

Job Progress Report

Colorado Division of Wildlife

Fish Research Section

Fort Collins, Colorado

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State: Colorado

Project No. F-239-R14

Title: Aquatic Data Analysis

Period Covered: July 1, 2006 to June 30, 2007

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 stream and lake inventories, Scientific Collections (SCICOLL) reports and 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, TRANS5 will be established and 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)

We are continuing the effort to collect and enter current and historic fisheries survey data stored at various Division offices, verifying locations and comparing those to data from previously entered surveys. This year, the results of a year-long effort to digitize historic, hardcopy files documenting sampling surveys on Colorado's West Slope waters added 1,604 surveys with 35,954 sample records representing 130,167 fish to the database, with data from an additional 59 surveys and 4,461 sample records on hold for spatial referencing.

The database now includes 20,037 surveys at 11,715 locations. A total of 750,646 sample records, representing 2,598,702 fish, have been submitted.

As we add surveys, we verify, reconcile and consolidate location information and cull duplicate survey and sample records. We are currently bringing sampling surveys and creel surveys from 2005 and 2006 into the system.

The ADAMAS Application

Standardization of data recording, entry, analysis and reporting remains the target of the ADAMAS application. A committee of Aquatic Section field biologists is tracking the requested, field-user features of the Graphic User Interface (GUI), monitoring standardization of report formats, and reviewing calculations used in the standard analyses available within the program. We contracted with Gnomon, Inc. of Carson City, Nevada to provide coding of the system, in order to take advantage of their experience with Division's aquatic data as well as Microsoft's network and database management software packages.

During this reporting period, Gnomon has delivered another test build of the application which has been tested and commented on for problems, as requested, by me, my temporaries and one of the biologists on the design committee. Once again, this test version of the application failed to provide the desired analysis results from a standardized set of test data, as well as actual sample survey data entered via the application.

Given the length of time this has project gone on, the availability and acquisition of a better programming and database management environment in the Division and the frustrations of all of the Division's Aquatic biologists and the database manager, the Aquatic Research Leader is ending the contract. We will expand the "interim" application (the "JakeOmatic" or JOM) to further suit the needs of the Division's biologists including interaction with centralized Division databases.

As we have described in previous reports, the application's design was set up in two phases. The first phase was to get the application into the field with standardized

entry and reporting intact. The second phase, inclusion of an updated, Windows-based version of the Creel Survey Analysis Program (C-SAP).

In the case of the second phase, Dr. George Schisler, a Division Aquatic Researcher, has employed Colorado State University students to translate the C-SAP program into the desired, Windows-based application. Testing the application has moved forward to use by Division aquatic biologists to enter and analyze actual field data with very good results, so far. A comparison of converted creel records in the ADAMAS system's structures and hardcopy results stored over the years has revealed a number of creel surveys not yet in electronic form. This has led to a search for any electronic data files held by the Aquatic Research Group, as well as the individual biologists. Files found will be converted to the new format for a complete, consistent set of creel surveys performed since the late 1980's.

Data Requests

Requests for data from the database are filled in a timely manner, formatted as requested with priority given to support Division research and management needs. External government agencies, consultants, contractors and educational researchers are accommodated as expeditiously as possible.

This remains a manual process for the most part. During the testing of the Gnomon application, a summarization process was developed to check the results of the application's analyses. The resulting summary table has proved valuable as a consistent format for providing requestors with information about sample inventories without having to provide "raw" data to requestors who don't need that level of resolution 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. Their restrictions and reservations to some requests led to refinements in the process. Overall, the process hasn't reduced the number of requests - 30 formal requests, so far in calendar year 2007, as compared to 33 formal requests, total, in 2006, but 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 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 development of an Access database used as a virtual, intermediate work area to process water quality data between the instrument that conducts the analyses and records the results and the server-based database used by our parent organization, Department of Natural Resources, to store and serve the results across the internet.

The changes in available data storage devices and management software - moving from a PC-based database backed up to tape systems, CD writers and DVD writers to a server-based Relational Database Management System (RDBMS) on the network that is routinely backed up, mirrored and maintained by our IT staff - has improved the database' reliability. This combined with less expensive storage costs, has made the concept of archiving scanned images of hard copy reports and photographs more desirable as those documents and images become readily available as referential support to on-going projects.

In the last two years, we have been scanning and cataloging a library of photographic slides made during research efforts over the last 30 years in an effort to reduce storage space, retain the images and make them available for future reference and presentations. This effort has proved valuable to Division researchers and scanned images have been included in request packages from time to time.

In addition, we have begun to publish the Aquatic Research Group's variety of 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 to reduce printing and shipping costs. This has resulted in scanning past reports from hardcopy for re-distribution as pdf's.

Since the standardization of operating systems and the basic office suite of programs to Windows 2000/Windows XP operating systems and the XP Office suite, the resulting 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.