

Aquatic Data Analysis

Federal Aid Project F-239-R-26

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Aquatic Research Data Analyst



Federal Aid in Fish and Wildlife Restoration

Job Progress Report

Colorado Parks & Wildlife

Aquatic Research Section

Fort Collins, Colorado

August 2019

STATE OF COLORADO

Jared Polis, Governor

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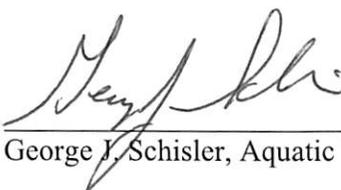
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The results of the research investigations contained in this report represent work of the authors and may or may not have been implemented as Colorado Parks & Wildlife policy by the Director or the Wildlife Commission.

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State: Colorado

Project No. F-239R-26

Project Title: Aquatic Data Management

Period Covered: July 1, 2018 through June 30, 2019

Project Objective:

To develop and maintain a centralized depository of aquatic biological data from across the state and to provide the expertise and single point-of-contact for requests relating to data, data application development, and data analysis. The overall goal of the project is the development of statistical models and analyses that accurately describe and/or predict the status of fish communities and/or the results of management actions on these communities.

Relationship with Other Grants:

This project is also strongly tied to Federal Aid Grant F-86 – Statewide Fishery Inventory. While F-86 provides the funding for the field work, data collection, and data entry to be completed (sportfish only), the data collected from those efforts are stored in CPW’s Aquatic **Data Management System** (ADAMAS) and the summary statistics for the F-86 annual report are generated from data within ADAMAS. Additional sources of data (aquatic species conservation surveys, aquatic research data and scientific collection permit data) are included in this report, but are not included in the F-86 report.

Job No. 1. Aquatic Data Management System (ADAMAS)

Job Objective: Develop and maintain a server-based, statewide aquatic data management application that facilitates the standardized entry and analysis of survey data across the state, as well as providing centralized access to information from all sources of aquatic data including CPW stream and lake inventories, Scientific Collection (SCICOLL) reports and CPW creel surveys.

Need: Management of the state’s vast aquatic resources requires standardized data collection and analysis procedures, as well as a centralized data source that is easily accessible to biologists, managers, and researchers.

Specific Objectives:

1. Maintain Microsoft SQL database, the ADAMAS C# application, and various Access front ends.
2. Oversee the upload and verification of aquatic survey data by CPW biologists and researchers
3. Upload and verify aquatic survey data from external scientific collection permit holders

Approach:

Action #1- Maintain current and accurate data from aquatic biological surveys statewide

- Level 1 Action Category – Data Collection and Analysis
- Level 2 Action Strategy – Research, Survey or monitoring-fish & wildlife populations
- Level 3 Action Activity – N/A

Initially, CPW’s aquatic database was comprised of records from the (former) Colorado Division of Wildlife’s Stream and Lake Databank (the predecessor to ADAMAS). 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. In 2015, we completed a systematic review of all the area offices, scanning all fisheries-related documents to PDF and entering the data into the database.

The effort to collect and enter both current and historic fisheries data from across the state continues. At the beginning of this reporting period, the database held 53,069 surveys at 18,444 locations across the state, with 3,736,228 fish sample records, representing 9,091,200 fish.

During the reporting period (July 1st, 2018 to June 30th, 2019) 1,843 new surveys were added, 148 new sampling sites were created, and 441K new fish records were entered into the database. This brings the total holdings of CPW’s ADAMAS database (as of June 30th, 2019) to 54,912 surveys, 18,592 unique sampling sites, and 9.53M total fish handled (Table 2.). Of the surveys added in 2018-19, 526 surveys were performed by CPW biologists and researchers, 161 historic surveys were added by database staff, and another 1,155 surveys from SCICOLL reports. A summary of the surveys added to the database over the course of this reporting period is provided in Table 1.

Table 1. Source and content of surveys performed and added to the database during this reporting period. Note that the number measured refers to the number of fish that had at least length recorded, whereas the number of fish enumerated represents the total number of fish encountered.

Project	# Surveys	#Fish (Measured)	#Fish (Enumerated)
Aquatic Database	161	574	15,200
Aquatic Research	19	2,469	3,928
Northeast Region Fisheries Management	132	22,170	32,640
Northwest Region Fisheries Management	75	20,736	24,466
Scientific Collections Permit	1,155	131,133	254,906
Southeast Region Fisheries Management	64	8,201	11,761
Southwest Region Fisheries Management	171	23,080	30,363
Species Conservation	65	17,929	65,384
Total For 2018-19	1,842	226,292	438,648

The following table shows the total database holdings, including the number of surveys, fish samples, and fish counts, summarized by reporting cycle (July 1st – June 30th). Note that these numbers are adjusted annually as erroneous or duplicate surveys are discovered and removed, and new surveys are added.

Table 2. Current data holdings within the CPW aquatic database

2003-2004	# Surveys	# Stations	#Fish-Measured	#Fish-Enumerated
Pre-2003	11,212	6,874	352,150	1,753,177
2003-2004	867	282	24,584	43,154
2004-2005	1,500	543	91,734	109,848
2005-2006	1,946	601	167,855	333,667
2006-2007	1,146	162	45,467	93,159
2007-2008	1,286	434	142,948	216,319
2008-2009	2,557	709	264,671	651,944
2009-2010	2,622	435	339,212	707,484
2010-2011	1,487	367	193,174	390,710
2011-2012	1,073	423	135,620	218,826
2012-2013	1,979	899	131,781	336,225
2013-2014	6,048	1,145	365,787	1,231,568
2014-2015	7,565	2,143	662,785	1,439,098
2015-2016	6,333	2,806	305,021	659,638
2016-2017	2,556	364	260,886	465,720
2017-2018	2,776	242	251,547	435,943
2018-2019	1,843	148	226,293	438,649
Totals at end of FY-2018	54,796	18,577	3,961,515	9,525,129

Action #2- Ongoing development and Maintenance of aquatic SQL database(s)

- Level 1 Action Category – Data Collection and Analysis
- Level 2 Action Strategy – Database Development & Management
- Level 3 Action Activity – Database Development

The AquaticsT6 database platform is comprised of four basic sections: (1) TRANS6 houses all of the hatchery stocking requests and records, (2) ADAMAS holds all of the aquatic survey data from across the State, (3) AAHL tracks all of the disease testing done on waters through the state and connects with Trans6 to control where fish can be stocked and where they cannot, and (4) the currently-in-development CREEL application will store and analyze data from fisheries creel surveys and interviews conducted across the state. Altogether, these data applications consist of several hundred data tables, views, and scripts used to summarize, manipulate and analyze the aquatic data collected from a variety of sources statewide. New tables, views, and scripts are created as new analyses or increased functionality are required.

Several related efforts affecting the ADAMAS database and CPW aquatic data as a whole took place during this reporting period:

- i. Added new watercodes to the database as new managed waters came online.

- ii. Coordinated with special licensing unit and various scientific collection permit holder to ensure that all obligations under SciColl permits were met and that data uploaded to the database was complete and accurate.
- iii. Updated species status table (denoting drainage-specific native/nonnative status).
- iv. Worked with area and senior biologists to update all management codes for CPW managed waters across the state.
- v. Updated links between CPW aquatic database and Colorado Department of Public Health and the Environment's (CDPHE) Stream Temperature Water Segments.
- vi. Performed updates and improvements to SQL scripts used to analyze and summarize the database.
- vii. Continued to develop and refine data checking and verification routines in SQL.
- viii. Re-assigned waters to new biologists when former biologists retired (ability to enter and edit data is tied to whether or not a water is assigned to a specific biologist).
- ix. Expanded temperature data inventorying and analysis capabilities.
- x. Incorporated more Passive Integrated Transponder (PIT) tag data from across the state and expanded the front-end functionality and back-end analysis capability.
- xi. Worked with programming contractor to modify database schema and import routines to accommodate data from the Colorado River Recovery Program, which up to this point has been handled differently and inefficiently.

Action #3 – Management and support of ADAMAS data application

- Level 1 Action Category – Data Collection and Analysis
- Level 2 Action Strategy – Database Development & Management
- Level 3 Action Activity – Information systems operations & maintenance

The ADAMAS application allows biologists across the state to directly link to the SQL database, query the database, upload or directly enter data, and analyze individual surveys results. Standardization of inventory sampling data entry, analysis and reporting continues to be the primary target of the Aquatic Data Management System (ADAMAS) within the aquatics data umbrella. As 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 (creel survey analysis) and then a network-accessible application for the AAHL (disease inspections and certifications).

At the time of this report, the ADAMAS and TRANS6 (Hatcheries) applications have been utilized for about five years. An upgrade to both ADAMAS and TRANS6 applications, as well as a redesigned AAHL module was completed in 2016 and work continues to deal with any remaining bugs that are discovered. The final aquatics Application (CREEL) has been developed and is currently close to being fully-tested and implemented.

Specific efforts related specifically to the ADAMAS application that occurred during this reporting period include:

- i. Several updates and bug fixes for our aquatic data application, ADAMAS, were installed on the main database server to address bugs and enhance capabilities.
- ii. Continued testing new Creel analysis application on test servers. The complexity of this program, coupled with issues with the previous analysis program (C-SAP) limiting its value for comparative purposes, have meant that testing is progressing slowly.
- iii. Provided training session for biologists and researchers in the use of the ADAMAS application at the annual meeting and continue to serve as the primary contact for any questions regarding data collection, data entry and data analysis.
- iv. Development of a parallel analysis platform in R was initiated in the event that ADAMAS is no longer supported.

Action #4 – Ancillary Front Ends

- Level 1 Action Category – Data Collection and Analysis
- Level 2 Action Strategy – Database Development & Management
- Level 3 Action Activity – Database Development

Development of need-specific front-ends for other CPW users to access the data within the database, while controlling what data they have access to, or how it is summarized, is another continuing aspect of this project. Currently an ADAMAS-Links (MS Access) database has been developed for biologists to summarize and analyze data across multiple surveys and continues to be improved and updated. A separate Access front end that allows the CPW water quality coordinator to identify species assemblages for specific water segments is also being maintained. In addition, level one data (stream/lake/station name, location, sampling dates) and some basic survey information are accessible internally through a web-based GIS application (the CPW Watercode and Station locator). The general public may also access some fisheries data through the Colorado Fishing Atlas web-GIS portal.

Activities relating to ancillary front ends to the main aquatics database from this reporting period include:

- i. Continued to update functionality of ADAMAS-Links database, which provides biologists and researchers with various querying and analysis functions across multiple surveys, that are not available in the ADAMAS application.
- ii. Developed 18 area-specific Tableau reader files for each area biologist, which includes all the survey data for their specific area, and allows the user to quickly generate graphic visuals of their data including: distribution maps, length-frequency histograms, relative abundance charts, and site sampling histories.
- iii. Worked with GIS staff to maintain up-to-date spatial links to aquatic data for use with internal-facing Watercode Locator and external-facing CPW Fishing Atlas.

Job No. 2. Supplemental Database Development

Job Objective: Development and maintenance of additional computer based, aquatic data management systems to facilitate the management and analysis of data that is not readily incorporated into the ADAMAS database. Examples include the CPW Passive Integrated Transponder (PIT) tag study data, Time Allocation data, Temperature logger location data, boreal toad and herptile data, and bulk water temperature data.

Need: There are aquatic projects whose data needs to not fit the ADAMAS schema, so supplemental databases need to be developed to accommodate data storage and analysis. Often these databases may be linked through primary tables (i.e. waters and species) to the ADAMAS system.

Specific Objectives:

1. Identity data management needs that do not conform to ADAMAS schema
2. Work with biologists/researchers to develop a customized solution in Microsoft SQL server or Access

Approach:

Action #1- Ongoing development and Maintenance of aquatic SQL database(s)

- Level 1 Action Category – Data Collection and Analysis
- Level 2 Action Strategy – Database Development & Management
- Level 3 Action Activity – Database Development

As the expert in data management and database development for the aquatic section, the data analyst is often called upon to develop databases that are linked or completely separate from the main aquatics data application. Development of new database products may include stand-alone MS Access databases or SQL linked Access front ends residing on external servers.

Supplemental database development activities that relate to this reporting period were:

- i. Continued to modify and improve the Data Analysis Time Allocation database that links to the data request and scientific collections (SciColl) database to track hours allocated to the various components of data request and SciColl process, as well as facilitating a more efficient method of generating quarterly reports.
- ii. Served as the coordinator for the development of the various database applications. Represented CPW as primary contact between the aquatics program and software vendor(s); compiled a list of bugs from users, tested new beta versions and monitored system performance.
- iii. Continued development and improvements to a CPW Statewide Passive Integrated Transponder (PIT) tagging database, as well as working with a vendor to merge this database with the primary ADAMAS database.
- iv. Participated on the development team for Species Tagging Research and Monitoring System (STREAMS), led by Colorado Natural Heritage Program and sponsored by the US Fish and Wildlife Service, and the Bureau of Land Management.

- v. Continued to gather temperature data and develop data tables within Aquatics database to house temperature logger data from across Colorado.

Job No. 3. Data Requests

Job Objective: To facilitate the review, consolidation, and delivery of aquatic data requests from individuals and agencies both internal and external to CPW. Develop data request and data sharing documents, serve as the main point of contact for internal/external data requests and coordinate the review of each external request with the review committee. Consolidate data requests, obtain signed data sharing agreements, and maintain records of all requests and outgoing data.

Need: Under the Colorado Open Records Act (CORA) (24-72-201-24-72-309, C.R.S.), virtually all data collected by CPW is open to public request, with the exception of data relating to private lands (Section 204(3)(a)(XXI), C.R.S) and ongoing research (Section 204(2)(a)(III), C.R.S. A coordinator is needed to be the single point-of-contact for all aquatic data and ensure that Colorado Statutes concerning open access to data and protection of privacy/ongoing research are adhered to.

Specific Objectives:

1. Provide a single point-of-contact for both internal and external requests for aquatic data.
2. Provide timely and accurate data summaries to internal and external sources as needed
3. Ensure data sharing agreements are in place and comply with relevant Colorado Statutes.
4. Maintain log of data requests and data sets that were sent out for future reference

Approach:

Action #1- Ongoing development and Maintenance of aquatic SQL database(s)

- Level 1 Action Category – Data Collection and Analysis
- Level 2 Action Strategy – Database Development & Management
- Level 3 Action Activity – Information Systems Operations & Maintenance

Requests for CPW aquatic data continue to be filled in a timely manner, with priority given to support CPW research and management needs. Federal, state and local government agencies, consultants, contractors and educational researchers are accommodated as expeditiously as possible. Requests concerning fishing opportunities from the general public are generally referred to Aquatic Area biologists and/or the Colorado Fishing Atlas. A total of 73 scientific-based requests for aquatic data from outside entities were received during the timeframe of this report, which is the second highest number of requests handled to date. Note that this does not include the numerous requests for data that came internally from biologists, researchers, and managers at CPW.

Table 3. Number of Data Request received annually since 2012.

Fiscal Year	# Requests
FY 2012-13	23
FY 2013-14	47
FY 2014-15	62
FY 2015-16	59
FY 2016-17	77
FY 2017-18	70
FY 2018-19	73

The source and number of external data requests handle in FY2018-19 is provided in table 4.

Table 4. Source of external data requests in 2018-19 for CPW aquatic data

Organization Type	# Requests
Private Consultant	23
Academic Institution	9
State-external to CPW	8
Internal	7
NGO	6
Federal Agency	6
Other	4
Watershed Council	3
General Public	3
Water Company	2
Municipality	1
Law Firm	1
CWCB	1
Total	73

A centralized process for review of external data requests by CPW’s biologists and resource managers prior to release of data has been formally adopted. A formal request for data is made via email to the data analyst with a completed CPW Aquatic Data Request Form (Appendix A). The form allows the requestor to declare their intended use for the data, define the specific waters or geographic area of interest, and identify the final user of this data (i.e. their client). The second page allows the requestor to further define the resolution (both temporal and spatial) required and the justification for the level of detail requested.

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 the various aquatic area biologists, who are responsible for the ‘on-the-ground’ management of waters in the requestor’s area of interest. Discussions take 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, a data sharing agreement is sent to the requestor for signature (See Appendix B). This form simply states that the data is provisional, will not be passed to a third party and that raw data, when distributed, will not be displayed or published in its raw form. Once this signed agreement is on file, the request is filled electronically via email. The requested deliverable, the request form, signed agreements and a copy of the email discussion are archived for future reference. All aspects of the data request process are tracked and inventoried using the Data Request and SciColl Tracking database.

Job No. 4. Technical Assistance and Data Mining

Job Objective: To provide technical and statistical assistance to researchers, field biologists, and staff on a variety of aquatic data analysis topics, as well as attempting to answer questions pertinent to the management of aquatic resources in Colorado by analyzing current and historical data. Topics include creel survey, inventory survey, management categorization, fishery trends, spatial data analysis, hardware/software upgrades, application and supplemental database development, as well as other computer related data analysis needs.

Need: The complexity of the aquatic data management system and its many relationships with other aquatic applications (hatcheries, aquatic animal health lab, creel) requires that someone knowledgeable in these relationships and the functioning of the system as a whole be available to provide technical support to users when needed. In addition, senior aquatic managers and researchers require the ability to pool and analyze data from across the state to identify trends and develop models concerning fishery populations.

Specific Objectives:

1. Provide technical assistance to biologists and researchers in application functioning, data extraction/manipulation and data analysis
2. Identify trends and patterns in long-term fishery data, utilizing both spatial and temporal data sets
3. Collaborate with internal and external researchers to answer research hypothesis
4. Publish significant results in peer-reviewed literature or as management briefs

Approach:

Action #1- Ongoing development and Maintenance of aquatic SQL database(s)

- Level 1 Action Category – Data Collection and Analysis
- Level 2 Action Strategy – Database Development & Management
- Level 3 Action Activity – Information Systems Operations & Maintenance

The data analyst is also responsible for providing technical support relating to all of the data applications in the aquatics program, as well as assisting biologists and researchers with specific data questions and data summaries. This includes working with CPW GIS staff in support of numerous inter-and intra-net aquatic geo-spatial applications. Finally, utilizing various database and data mining software, the data analyst develops new research questions and identifies informational gaps in the data.

Specific topics of investigation undertaken during this reporting period include:

- i. Provided countless hours of technical support to researchers and area biologists in the areas of data interpretation, collection, and data analysis.
- ii. Continued to develop various Tableau dashboards for internal use and monitoring of aquatic data, as well as the evaluation of the potential benefits of adding a Tableau network license for report generating.
- iii. Continued collaboration with researchers at Colorado State University to assess factors that may influence the magnitude of climate change on high elevation lakes in Colorado.
- iv. Continued to participate in joint research project with Colorado State University and the Lake and Reservoir researcher to look at current and historic trends in smelt and walleye dynamics in Horsetooth Reservoir
- v. Continued involvement with Temperature Advisory Committee (TAC), a group made up of members from CPW, CDPHE, Water quality control division (WQCD), and several water companies, to provide analysis and technical support to issues relating to water temperature, thermal discharge permits, and their effects on local fisheries.
- vi. Continued to update data and research the realized thermal niches of various fish species in Colorado and share the results with various stakeholders.
- vii. Continued to utilize data from the database and visual displays from linked Tableau projects as a basis for an update to 'Fishes of Colorado', which will hopefully be ready for publishing by the end of next year.
- viii. Served as the primary author of a white paper summarizing the history of the fisheries community in the transition zone of the Cache La Poudre River, as part of a proposal to re-segment part of the Cache La Poudre River.
- ix. Continued to provide database technical support to other CPW units outside of aquatics.

Appendix A: CPW Data Request Form



COLORADO
Parks and Wildlife
Department of Natural Resources

Aquatic Data Analysis / Aquatic Research Section
317 West Prospect Rd.
Fort Collins, CO 80526-2097
P: 970.472.4372 | F: 970.472.4458 | C: 970.817.1366

Request for Aquatic 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)

1. (d) Ultimate person/organization asking for the data (i.e. if a consultant is making this request, who is the client?):

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

(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?):

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, 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.

5. Resolution:
In order to speed up the approval and data distribution process, please further define you data needs. While we will strive to give you the data you have requested in a timely manner, keep in mind that the lower the resolution of your data request, the less scrutiny (and thus time) required by the data request review committee, and also the more likely that your

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James Velt, Secretary •  Adams • Betty  • Robert W. Bray • Charles Garcia • Marie  • Carrie  • Luke B. Schaefer • Eden Vandy





COLORADO

Parks and Wildlife

Department of Natural Resources

Aquatic Data Analysis / Aquatic Research Section
317 West Prospect Rd.
Fort Collins, CO 80526-2097
P: 970.472.4172 | F: 970.472.4458 | C: 970.817.1366

request will be approved. Note that requests for raw data will need to demonstrate this need to the committee before approval will be granted.

(a) What level of fish data are you requesting (Species Resolution):

- i. Species Occurrence (For all species? For specific species?)
- ii. Species numbers, size ranges, population estimates, and biomass
- iii. Data on individual fish collections
- iv. Creel Survey Data?
- v. Fish Stocking Data

(b) At what scale do you want this data summarized (Spatial Resolution):

- i. Basin (6 digit HUC)
- ii. Sub basin (8 Digit HUC)
- iii. Watershed (10 Digit HUC)
- iv. Sub-Watershed (12 digit HUC)
- v. Catchment
- vi. Individual water body/Survey Sample points

(c) How far back do you want to go (Temporal Resolution):

- i. Only the most recent surveys
- ii. Back to a specific year? Please specify: _____
- iii. All data in the CPW Aquatics Database

Additional Explanation or requirements:

Return to Andrew Treble, Aquatic Research Data Analyst

Andrew.treble@state.co.us



Appendix B: CPW Electronic Data Sharing Agreement



COLORADO
Parks and Wildlife
Department of Natural Resources

Aquatic Data Analysis / Aquatic Research Section
317 West Prospect Rd.
Fort Collins, CO 80526-2097
P: 970.472.4372 | F: 970.472.4458 | C: 970.817.1366

Non-disclosure Agreement for the Use of Colorado Parks and Wildlife Electronic Information

1) Colorado Parks and Wildlife (CPW) will provide information on aquatic species, statewide, as requested by [REDACTED] of [REDACTED] for the purposes of [REDACTED]. These data will be used solely by [REDACTED] for the purpose of this project and will be destroyed afterwards.

2) CPW, for management and conservation reasons, considers this information confidential and sensitive due to the elements' vulnerability to intentional and unintentional disturbance, interpretation, and due to agreements made with, and statutory requirements for, the protection of individual landowners' privacy.

3) We, the undersigned, will provide a copy of any published report or peer-reviewed article that results, in whole or in part, from the fulfillment of this data request, to Colorado Parks and Wildlife.

4) We, the undersigned, acknowledge that the information noted above is considered sensitive and confidential, and agree to the following stipulations:

For Raw Data

- i. Raw data will only be accessible to [REDACTED] and to no other individual or entity, nor will it be published or made available for public viewing in its raw state. It may be used in analysis and summaries that are then published or reported to clients without issue.
- ii. The information may not be transcribed or reproduced in any manner, unless authorized in writing by the CPW representative and signatory identified below. Locations may be displayed spatially if necessary to their stated purpose, but only in a manner and at a scale where specific locations of individual points cannot be derived.
- iii. The information will be used for the requested purpose described above and for no other purpose. The information will be destroyed upon completion of the project and may not be kept for future use. Any future requirements for the data will involve a new data request to ensure the most up-to-date data is used.
- iv. Requests involving biological interpretation or use of the information beyond the stated purposes will be referred to CPW aquatic biologists.
- v. CPW does approve the passing of summary reports, based on this data, to the reported client [REDACTED] at the end of this project.

For Summarized Data

- i. The information will be used for the requested purpose described above and for no other purpose.
- ii. The information will be destroyed upon completion of the project and may not be kept for future use. Any future requirements for the data will involve a new data request to ensure the most up-to-date data is used.
- iii. Requests involving biological interpretation or use of the information beyond the state purposes will be referred to CPW.
- iv. CPW does approve the submission of summary reports, based on this data, to the reported client [REDACTED] at the end of this project.

Signed by:

Den [REDACTED] Director, Colorado Parks and Wildlife • Parks and Wildlife Committee: Michelle Zimmerman, Chair • Kevin McDaniel, Chair
James Vigi, Secretary • [REDACTED] Adams • Betty [REDACTED] • Robert W. Bray • Charles Garcia • Mark [REDACTED] • Carrie [REDACTED] Kaiser • Luke E. Schaefer • Eden Yardy



