

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2022 ANNUAL REPORT

PROJECT: 170

Project Title

Development of a Centralized PIT Tag Database for the San Juan and Upper Basin Recover Programs, 2020-2024

Bureau of Reclamation Agreement Number:

R20AP00027

Project/Grant Period:

Start date: 06/01/2020

End date: 12/31/2024

Reporting period end date: 09/30/2022

Is this the final report? Yes _____ No X

Principal Investigator:

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Abstract:

The Colorado Natural Heritage Program (CNHP) at Colorado State University developed an online data system (the Species Tagging, Research and Monitoring System or STRaMS) for the Bureau of Reclamation and the Upper Colorado and San Juan River Endangered Fish Recovery Programs. The database is designed to track PIT tags and endangered fish activities in the Upper Colorado River Basin. The data system can be accessed at streamsystem.org (registration is required). CNHP continues to host and maintain the data system and work with Database Managers to address Recovery Program priorities.

Study Schedule:

FY20-FY24

Relationship to RIPRAP:

General Recovery Program. Conduct interagency data management program to compile, manage, and maintain all research and monitoring data collected by the Recovery Program.

Accomplishment of FY 22 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Deliverables thus far include an enhanced version of the website at <https://streamsystem.org>. The database manager working group has been resurrected. These monthly meetings with members from both Recovery Programs and CNHP have been invaluable in connecting CNHP with Recovery Program data issues from the field to the database and providing cross training opportunities within the group.

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New computer hardware was delayed due to supply chain issues, but we do have the new server on-site. Now we can focus on rebuilding the new server, upgrading MS SQL software, and rebuilding the test environment and source control. We can also move forward with the new direct data uploads for PIA data to enhance security, reliability and resiliency. These two tasks have been delayed from the original proposed timeline due to supply chain issues and turnover affecting CNHP's web programmer position but we anticipate completion of these tasks in FY23.

A list of completed tasks for FY22 is below.

Task 1: Server Maintenance

- Maintained Server and performed Windows updates
- Performed regular back-ups and analyzed back-up file and log sizes
 - Adjusted backups to capture logs at one hour intervals throughout the workday to decrease potential data loss and decrease log file size stored during the evening back-up routine.
- Replaced failing hard drive
- Re-registered domain name
- Updated web certification authentication
- Monitor CPU usage
- Researched specifications and purchased new server to run the website and database (current server is 8 years old), worked with CSU procurement to establish purchase order
- Cleaned up hard drives to free up disk space on both live and test site
- Internal meetings and preparation for new server migration

Task 2: Website Maintenance, Feature Enhancements and Program Priorities

- SQL Server maintenance
 - CDC capture job maintenance and rebuilds after data schema changes
 - Database ownership and permissions
 - Created read only access for R
 - Monitored scheduled tasks
- Support for Database Managers
 - Fixed erroneous tag codes and related data imported to STReaMS
 - Deleted "bad" detections per DB Managers
 - Marked erroneous "dead" fish to live in batch
 - Identified test tags with "fish" from rare fish uploads
 - Assist DB Managers with batch upload issues (memory issues/data issues)
 - Rejected records support
- Updated field collection and stocking templates, posted new versions to website
 - Added Count, DBA Flag and DBA Note to site effort and stocking events
 - Updated web pages to show fields
 - Updated database schema to accommodate new fields
 - Updated batch upload code to incorporate new fields
- River mile/coordinate updates
 - Reworked Lake Powell entries to remove Lake Powell arms (records assigned to river proper instead) and updated related data
 - Updated river miles and coordinates in SQL table with new file from UC program
 - Added coordinates and river miles for lakes and wetlands to SQL table
 - Adjust San Juan river miles/coordinates to match SJ program instead of NHD
 - Summarized changes and sent to DB managers for review

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- Reorganized/consolidated San Juan studies in STReaMs
 - Connected related data to correct study (encounters, samples, stocking events, uploads)
 - Deleted empty studies
 - Sent summary of changes to DB Managers
- Bug fixes/Patches
 - Constrained hydro area search to hydro area type
 - Fixed Days in River calculated field to only report days in river for stocked fish
 - Added “000000000000” as an invalid tag code constraint
 - Removed river mile up and down constraints on Sample and Stocking Event webpages and uploads
 - Fixed Sample and Stocking Event webpages so wetlands and lakes appear in the hydro area field
 - Fixed bug with Sample List entries on upload page so user can specify how many entries to view at a time (5, 10, 25 or 50)
 - Adjusted tool tips on Sample and Stocking Event webpages to incorporate user define ranges for fields in the upload rules tables. In other words, the tool tip is now dynamic and will adjust minimum and maximum acceptable values as they are adjusted by Database Managers
- New release in May 2022
 - Website testing
 - Version control
 - Release notes
 - Updated documentation on website
- Many adjustments to code base for PHP 8 compliance
 - Log troubleshooting
 - Website testing
- Created SQL Server View of recovery program’s R code to track data submissions
- Attended monthly STReaMS Database Manager working group meetings to address data issues, bugs, feature requests and provide database training/support to recovery program staff
- Attended Annual Researchers STReaMS DB Meeting (virtual)
- Created MS Teams group for DB managers working group to store meeting minutes and other collaborative documents
- Updates to STReaMS internal documentation and Database Manager User Guide
- Took over website hosting (site ground) for new recovery program website
 - Moved recovery program websites to Wordpress
 - Upgraded Wordpress version
- Mentimeter purchase to support Program reporting
- Upgraded website usage tracking to Google Analytics 4 (GA4)

Task 3: Project Management

- Annual reporting
- Budget and expense tracking
- CSU administrative requirements and reporting
- Train CNHP staff on database design and tasks

Task 4: Develop Direct Database Upload System for PIA Data (preparation for switch to new upload process)

- Added new PIA units to weekly uploads and imported backlog of data

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- Prior to live imports, data were imported on the test site and duplicate record issues were noted in the Biologic data files. Worked with Merck to fix the duplicate record issue. Stuck tags were also noted. Worked with Peter MacKinnon to address stuck tag issues prior to uploading data.
- New units added include:
 - McElmo Creek Aneth Confluence
 - Yellow Jacket Creek
 - Hogback Bypass Facility
 - Dolores River Disappointment Creek
 - San Rafael Cottonwood Wash
 - San Rafael Hatts Ranch
 - White River Bonanza Bridge
 - Colorado River Price Stubb
 - McElmo Creek UT/CO Line
 - San Juan Restoration Site NM
 - San Rafael River Chaffin Ranch
 - San Juan Waterfall
 - San Miguel Uravan
 - Dolores River Bedrock
 - Hogback Fish Passage
- Added new gear type for PIA data, batch calculated all gear types for PIA detection encounters and incorporated new gear type into batch upload process
- Updated central PIA spreadsheet several times and sent to database managers
- Added new PIA schematics to website
 - Improved visibility of antenna numbers on schematics and reposted to STReaMS
- Added Biologic hardware codes to PIA units in SQL table
- Met with Recovery Program Database Managers and Peter MacKinnon to discuss current PIA data structure and the best way to restructure the database for PIA data capture and data interpretation
- Troubleshoot Price Woodside and Price Mounds connections with Merck and resetting of record IDs and continual duplicate records issue
- Ongoing communications with Peter MacKinnon on potential stuck tags and monitoring units that are not uploading new data
- Revised weekly PIA reporting email content to help with data interpretation

Additional noteworthy observations:

As of November 17, 2022 the database has:

- 2,046,387 PIT Tags
- 1,505,847 Individual Fish
- 5,467,910 Encounters

Between October 1, 2021 and September 30, 2022, Google Analytics show:

31,077 page views

6,644 sessions

Average session duration of 6:12 minutes

Average of 5.06 pages per session

Bounce rate : 42.8%

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Recommendations:

Server maintenance and code upgrades will continue to be the responsibility of CNHP. Recommendations under the FY20-24 agreement are listed below. CNHP will continue to work closely with Database Managers to adapt to emerging needs.

CNHP will continue to maintain the STReaMS database and enhance existing features during the Federal FY20-24. Tasks are broken out below.

Task 1: Server Maintenance

- Replace server on live and test site
- Maintain the server, server security, and perform regular database backups
- Maintain the test server and development environment
- Perform necessary software installs and upgrades including Windows operating system, Windows updates, MS SQL Server, MS TFS, and PHP. Ensure all code performs as expected following updates.
- Assess overall performance and optimize resources
- Maintain Database Manager credentials to access SQL Server
- Replace hardware (e.g. server, hard drives, RAM, etc.) as needed and configure new hardware

Task 2: Website Maintenance and Feature Enhancements

- Enhancements to existing tools as funding allows
 - Batch uploads
 - QC tools
 - Calculated fields
- Work with key recovery program staff to ensure complete PIA data in STReaMS
 - Shift units to new Biologic FTPS upload process as they are upgraded
 - Needs assessment and training with key staff
 - Add and remove PIAs to the automatic upload system as needed
- Work with Database Managers to develop any necessary custom queries
- Bug fixes
- Internal testing and stress tests
- Update online help, data dictionary, user manuals, Data Managers user guide, and system documentation
- Train Recovery Program participants on features and enhancements
- Support hosting for Recovery Program website
- Participate in monthly Database managers working group meetings
- Other priorities identified by Recovery Program Database Managers

Task 3: Project Management

- Prepare annual reports
- Perform project management and CSU compliance
- Maintain regular communication with Database Managers
- Ensure CNHP staff are fully trained on database design and tasks

Task 4: Develop Direct Database Upload System for PIA Data to Enhance Security, Reliability, and Resiliency

- Work with Merck to determine the computer infrastructure needed for direct database access
- Create table (or bin) in STReaMS to receive raw data from PIAs
- Revise upload methodology

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- Crosswalk unit names between organizations
- Record import tracking
- Problem records (stuck tags, etc.)
- Rejected records
- Data retention
- Write PIA upload code to import raw data bin into the main STReaMS database (Tags, Fish, Encounters)
 - Maintain current code for data files (if needed for old files, units not on Biologic system, etc.)
- Gather existing PIA data files, format, and import to a bin so available raw data are in a central location
- Change SQL database schema to accommodate PIA working group discussion results
- Update web interface and email notifications to align with the new import process
- Testing
- Post changes to live site
- Dismantle existing FTPS site

Project Status:

Ongoing

FY2022 Budget Status

Official financial information comes from CSU Sponsored Programs. Budget had a delayed start date of 6/11/2022.

Funds Provided: \$54,449.63

Funds Expended: Estimated \$43,500 (Financial Report will come from CSU Sponsored Programs)

Difference: \$10,949.63

Percent of the FY 2022 work completed, and projected costs to complete: Approx. 80% of work completed, estimate \$10,949 to complete

Recovery Program funds spent for publication charges: \$0

Status of Data Submission

Not Applicable

Signed:

Amy Greenwell

Principal Investigator

11/18/2022