

# Integrated Information Management System, Development of Web Interface, a.k.a. Online Data Portal (ODP)

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## USBR Science and Technology Project ID 3625

Eric Peterson, May 2014.

**Duration:** Fiscal Year 2010 through Fiscal Year 2011

### Project Abstract

We regard the development of IIMS prior to this proposal as highly successful, yet several limitations were identified that endangered the purpose of IIMS as information repository for intergovernmental restoration partnerships.

Proposed Solution. Implementing full IIMS capabilities through the web would solve the limitations identified AND would improve data stewardship.

The completed project, now called the Online Data Portal (ODP) has been implemented as a “cloud server”, with a replicable server image that can be implemented by other programs on demand. The ODP continues to grow beyond the original S&T proposal with added funding from the Trinity River Restoration Program. TRRP's ODP implementation is publicly accessible at <http://odp.trrp.net>.

### Research Question

Starting in 2006, the Science and Technology (S&T) Program provided a 3-year grant to develop IIMS (Proposal No. 165 IIMS--an Information and Data Management System for Science Based River Management, 2009). Combined with additional funds from partners, this produced a system for data maintenance and access that has improved river management. However, limitations were identified that this project sought to overcome.

Original IIMS highlights:

- Centralized database
  - Modular data structure for multiple data types
  - Automated import of select data types
- Desktop application with access to centralized database
  - Data query and extraction for external analysis
  - Time series analyst (TSA) to graphically view data
  - Document library
  - Preliminary data management tools including upload capabilities
- ArcGIS extension for spatial query of data
- Realty module for land access agreements
- Web portal with simplified versions of:
  - Document Library
  - TSA

- A geospatial viewer

Limitations identified included:

- Maintaining links between desktop software and centralized databases was IT-intensive
- Deployment to additional area offices required customized SMS packaging
- These limits endangered the utility of IIMS for river management by making it difficult to deploy!

Proposed solution. Implementing full IIMS capabilities through the Web would solve the limitations identified AND would improve data stewardship (data management and documentation) by:

- Simplifying interface-database connections by restructuring to a single dedicated link.
- Eliminating need for desktop installs.
- Equilibrating data access for river restoration partnerships.
- Leveraging Web access for more robust data stewardship.

## Lessons Learned

Database technologies have expanded considerably over the years in parallel with the Trinity River Restoration Program's (TRRP's) efforts with the Integrated Information Management System (IIMS), now called the Online Data Portal (ODP). If the project were to begin completely anew today, there might be several off-the-shelf options to consider.

However, we began the endeavor in 2006, with this proposal in 2010 being another major point of advancement, when alternatives were still weak, if they existed at all. Development of the IIMS / ODP has thus provided additional years of collaborative information resources for the Trinity River Restoration Program than would have otherwise been possible!

The result is an online information database system very well tuned to the needs of multiagency restoration programs, and which is available as needed for other collaborative programs.

## Conclusion

TRRP's implementation of ODP is at <http://odp.trrp.net>. See figures below for examples.

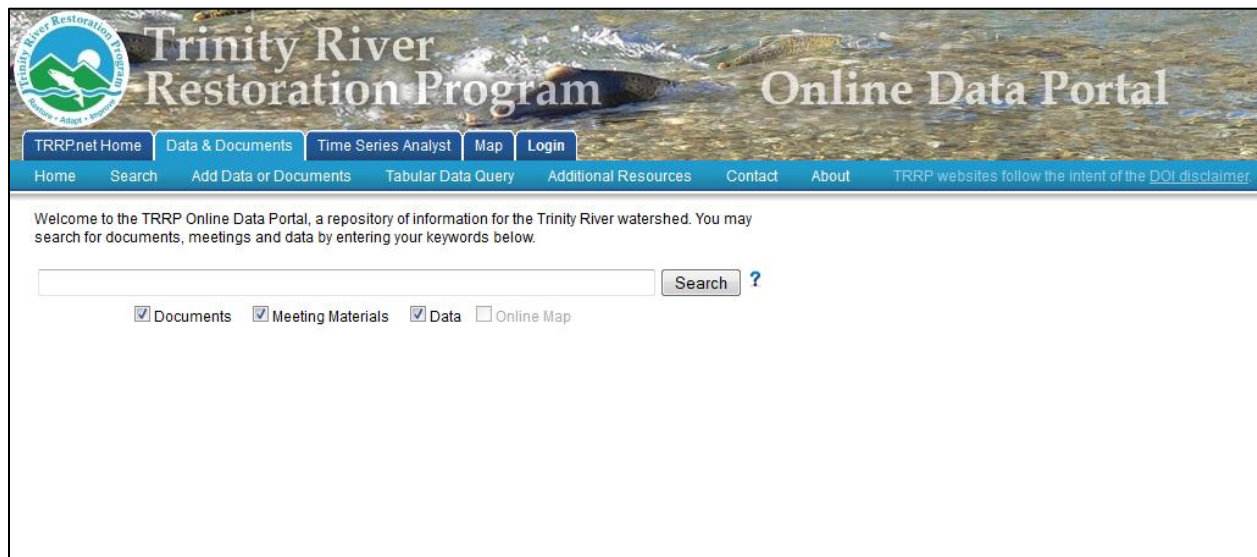
The implementation includes:

- An Amazon-based Cloud Server
- Modular data structure
- Extensive data importation and management features
- Libraries for:
  - Documents
  - Data Packages
  - Meeting Materials
- Data visualization with the Time Series Analyst
  - Locations over time such as streamgages, reservoir data, temperature monitoring
  - Depth profiles for data such as temperature at various depths in reservoirs
  - Longitudinal profiling of data along stream networks, including tributaries
- Geospatial viewer for exploration of both raster and vector data services from ArcServer
- A separately funded Project proposal and management system
- Web-services for interacting with external websites through secure pre-established data queries

An image of the ODP cloud server suitable for standing up within the Amazon Cloud services is available upon request to the TRRP Data Steward: Eric Peterson.

## Future

The TRRP is continuing development of the ODP. The current focus is on refinement of an Investigation Planning module and enhancements of the ODP Map.



The screenshot shows the home page of the Trinity River Restoration Program Online Data Portal. The header features the TRRP logo on the left, which includes a circular emblem with a mountain, river, and sun, and the text "Trinity River Restoration Program" and "Restore • Adapt • Sustain". To the right of the logo, the text "Trinity River Restoration Program" and "Online Data Portal" is displayed over a background image of a river with a fish. Below the header is a navigation bar with links: "TRRP.net Home", "Data & Documents", "Time Series Analyst", "Map", and "Login". A secondary navigation bar contains links: "Home", "Search", "Add Data or Documents", "Tabular Data Query", "Additional Resources", "Contact", "About", and a disclaimer: "TRRP websites follow the intent of the [DOI disclaimer](#)". The main content area begins with a welcome message: "Welcome to the TRRP Online Data Portal, a repository of information for the Trinity River watershed. You may search for documents, meetings and data by entering your keywords below." This is followed by a search input field, a "Search" button, and a help icon (?). Below the search field are four checkboxes: "Documents" (checked), "Meeting Materials" (checked), "Data" (checked), and "Online Map" (unchecked).

Figure 1: Clean and simple search interface on home page.

**Trinity River Restoration Program Online Data Portal**

TRRP.net Home | Data & Documents | Time Series Analyst | Map | Login

Home | Search | Add Data or Documents | Tabular Data Query | Additional Resources | Contact | About | TRRP websites follow the intent of the DOI disclaimer

Search:   ?

☒ Documents ☒ Meeting Materials ☒ Data ☐ Online Map

Showing documents, meetings and data packages containing the text "Douglas City". 40 matching items found. Sort by:  Order:

**A** [Trinity River at Douglas City Gages](#)  
 Streamflow: Annual Maximum Annual Mean Annual Minimum Daily Maximum Daily Mean Daily Minimum Instantaneous (15 minutes) Water Temperature: River

[Indian Creek Near Douglas City](#)  
 Streamflow: Annual Maximum Annual Mean Annual Minimum Daily Maximum Daily Mean Daily Minimum Instantaneous (15 minutes)

[Trinity River below Limekiln Gulch](#)  
 Streamflow: Annual Maximum Annual Mean Annual Minimum Daily Maximum Daily Mean Daily Minimum Instantaneous (15 minutes) Water Temperature: River


[Weaver Creek near Douglas City](#)  
 Streamflow: Daily Mean

**B** [Trinity River Restoration Program TRRP Environmental Study Limit \(ESL\) Boundaries, Version 2014-04-07](#)  
 TRRP\_ESL\_2014-04-07.zip Last changed on 7 Apr 2014 by Eric Peterson.  
 Environmental Study Limits for channel rehabilitation and other restoration projects by the Trinity River Restoration Program. These boundaries describe the areas over which TRRP projects might be implemented, including access, equipment storage,...

**C** [Graham Matthews & Associates, 2014, Trinity River WY2012 sediment transport monitoring final report, Report with appendices to the U.S. Bureau of Reclamation, Trinity River Restoration Program, Graham Matthews & Associates, Weaverville, CA.](#)  
 GMA 2014 - WY2012 TrinitySedimentMonitoring FinalReportandAppendix.pdf, 13 MB Publication Date: 2014-03-00 Last changed on 28 Mar 2014 by Eric Peterson.  
 Measurements of sediment transport (bedload and suspended sediment load) were collected at four sites during a high flow dam release on the Trinity River in May 2012. Water Year 2012 was a "Normal" water year type as classified by the...

**D** [TMC, Meeting Date: 2013-12-11 9:00 AM, Trinity Management Concil \(TMC\), December 11, 2013](#)  
 3 attachments, 430 KB. Last changed on 9 Dec 2013 by Eric Peterson.

Figure 2: Results from a search at the home page, showing (A) time series data, (B) a "Data Package" from the Data Package Library, (C) a document from the Document Library, and (D) a meeting from the separately funded meeting management module.



# Trinity River Restoration Program


## Online Data Portal

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### Document Details

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**Citation:** U.S. Department of Interior. 2000. Record of decision, Trinity River mainstem fishery restoration final environmental impact statement/environmental impact report. Decision by the U.S. Department of Interior, December 2000.

**Document source:** [Trinity River Record of Decision 12-19-00.pdf](#) (229 KB)

**River system:** Trinity River

**Title:** Record of decision

**Document type:** Document or Report

**Category:** Tech Report

**Publication date (yyyy-mm-dd):** 2000-12-19

**Physical location:**

**Description:**

Record of Decision (ROD) Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement / Environmental Impact Report. This is the formal decision by the Secretary of the Interior, Bruce Babbitt, in December 2000 that formed the current Trinity River Restoration Program, with it's guidance by the Trinity Management Council (TMC) and the Trinity Adaptive Management Working Group (TAMWG). The document establishes TRRP as an adaptive management program within the assigned implementation fields of infrastructure (e.g. bridges), channel rehabilitation, gravel augmentation, and watershed restoration.

Additional keywords: USDI, TRRP, Trinity River Restoration Program

**Author:** U.S. Department of Interior

**Organization:** U.S. Department of Interior

**Added:** 2007-04-19 14:18 by nkuit


**Updated:** 2014-05-09 16:17 by ebpeterson@usbr.gov

**Tags**

Foundational

Figure 3: Details page for a document in the Document Library.





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### Data Package Details

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**Title:** Trinity River bathymetric data for the year following the peak restoration flow in 2012, plus a few surveys immediately prior

**River system:** Trinity River

**Description:** This data package contains bathymetric data in three formats for the Trinity River between the North Fork Trinity River and Lewiston Dam, for a period of several months starting from the peak restoration flow release in 2012. Data were collected by Graham Matthews and Associates (GMA) under contract to the U.S. Bureau of Reclamation, Trinity River Restoration Program. This metadata file describes the organization of the Data Package and typical attribute data fields for TRRP bathymetric data. Data were collected primarily with boat-based sonar systems, but also include RTK GPS surveys. Details on methodology and accuracy are covered by a separate report (see Supplemental Information, below). Organization of the Data Package performed by TRRP minimized changes from the as-delivered condition of the data, including retention of all CSV files without change (see also the included Organization\_by\_TRRP.pdf).

**Map location URL:**

**Citation:** GMA and TRRP (2012) Trinity River bathymetric data for the year following the peak restoration flow in 2012, plus a few surveys immediately prior. Data Package for the Trinity River Restoration Program.

**Data package:** [GMA\\_2012\\_Post.zip](#) (770 MB)

**Metadata XML file:** [Bathv\\_2012\\_Post\\_METADATA.xml](#)

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#### Point of Contact

**Name:** Eric Peterson

**Email:** [ebpeterson@usbr.gov](mailto:ebpeterson@usbr.gov)

**Organization:** Trinity River Restoration Program


**Telephone:** 530-623-1810

**Added:** 2012-10-23 16:32 by ebpeterson@usbr.gov

**Updated:** 2013-05-02 11:47 by ebpeterson@usbr.gov

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#### Associated Documents


 [Graham Matthews and Associates \(2012\) 2010-2012 Trinity River bathymetric mapping. Report to the U.S. Bureau of Reclamation, Trinity River Restoration Program by Graham Matthews & Associates, Weaverville, CA](#)  
 GMA (2012) 2010-2012 Trinity River Bathymetric Mapping.pdf (10 MB)  
 Added: 2013-05-02 11:47 by ebpeterson@usbr.gov

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#### Tags

*There are no tags associated with this item.*

Figure 4: Details page for data in the Data Package Library. Note inclusion of a metadata file, which is included in the search on the ODP home page.



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### Data Query

River system:

Dataset:

Variable:

Locations:

☒ All

☐ Selected locations:

Trinity River above Coffee Creek

Trinity River at Lewiston, Gage

Rush Creek

Trinity River below Limekiln Gulch

Dates:

☒ All

☐ Date range

From:

To:

Output type:

☒ HTML (display only)

☐ Excel spreadsheet

☐ CSV file

Figure 5: Simple query interface for time series data.

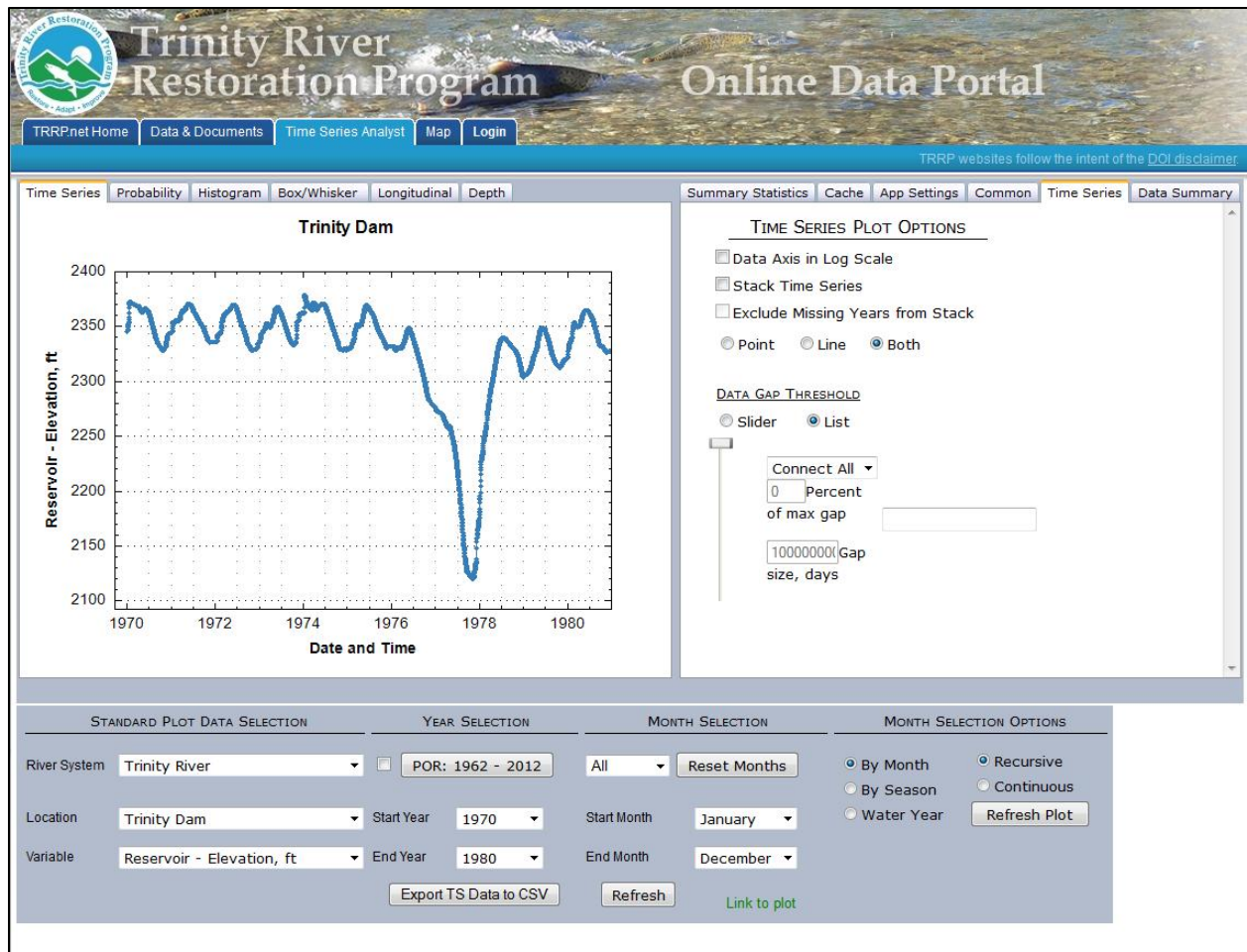


Figure 6: Time Series Analyst demonstrated showing data for the surface elevation of Trinity Reservoir, 1970-1980.



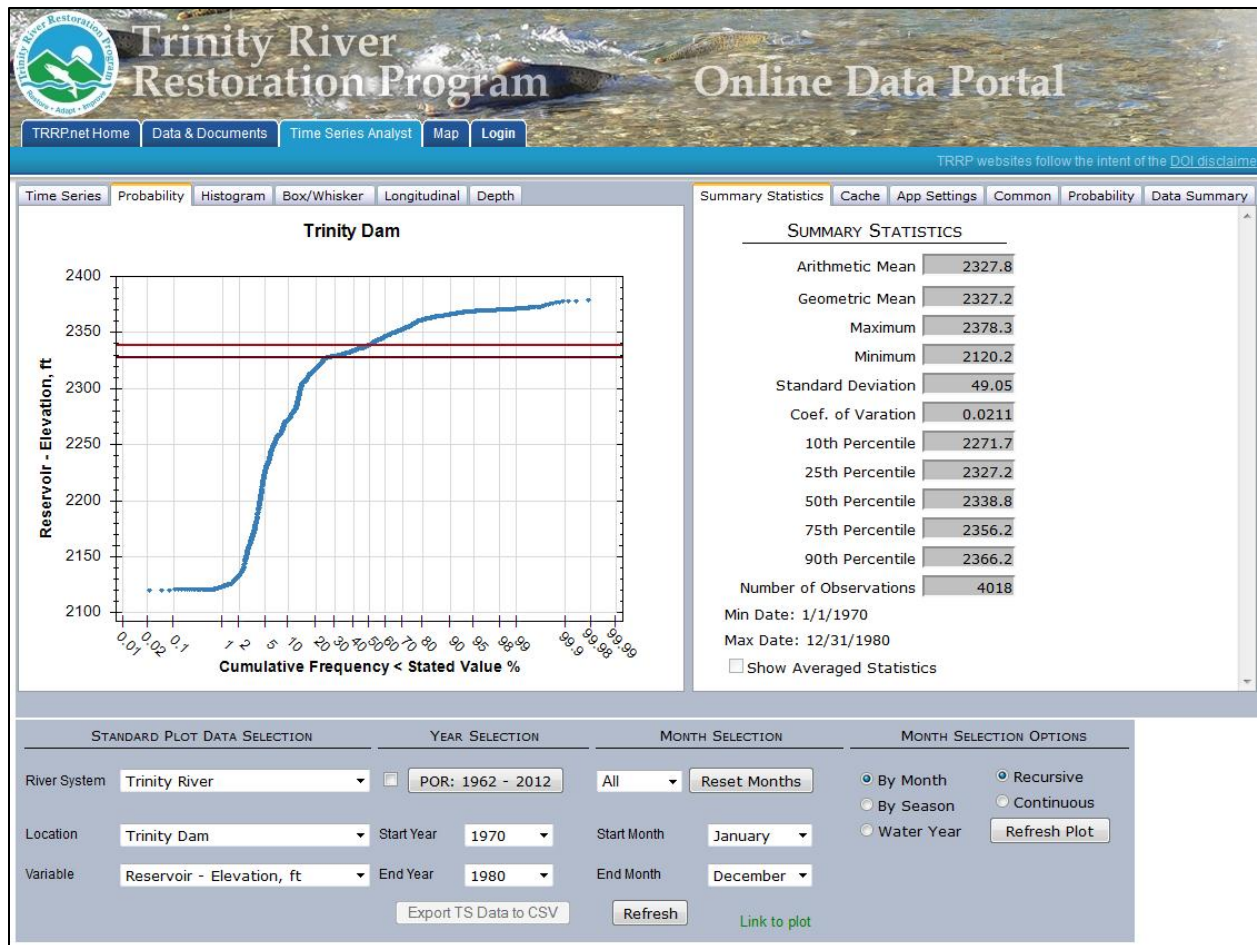


Figure 7: Time Series Analyst showing the same data as Figure 6, but as a probability plot, and with control lines interactively added for the mean (red) and median values (orange).

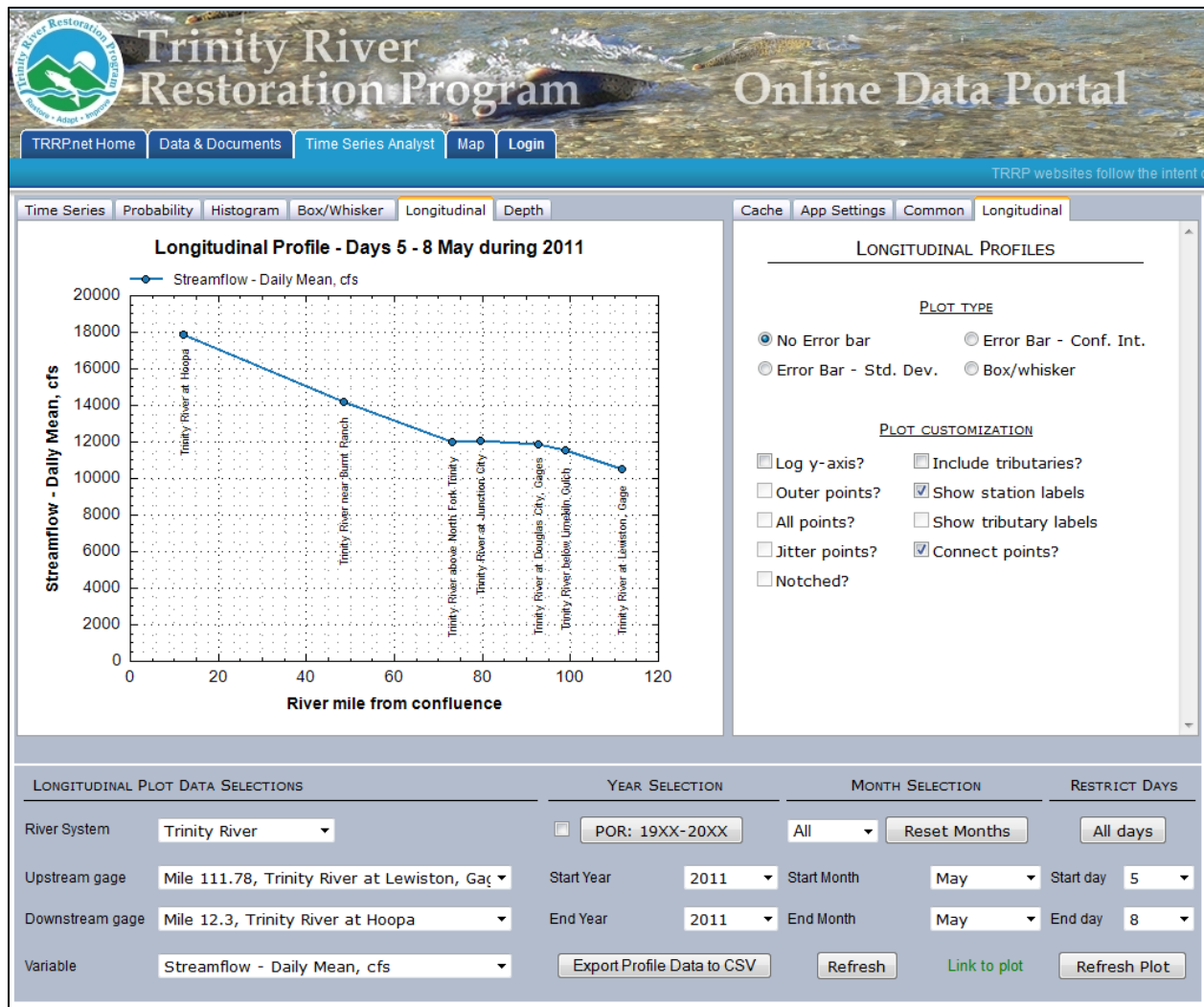


Figure 8: Time Series Analyst showing a longitudinal plot of seven streamgages during a restoration flow release in 2011.

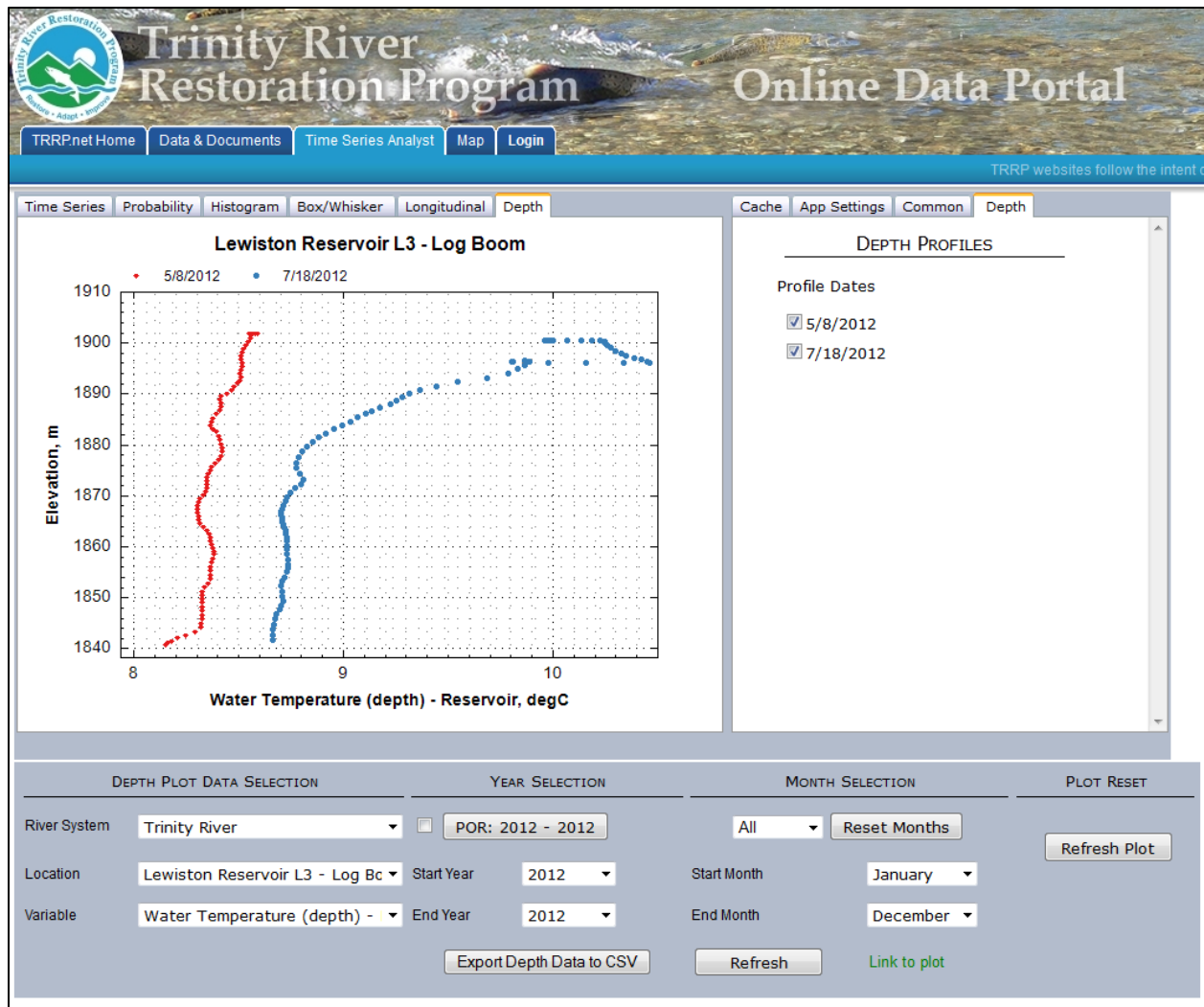


Figure 9: Time Series Analyst showing depth profile plots of temperature in Lewiston Reservoir.

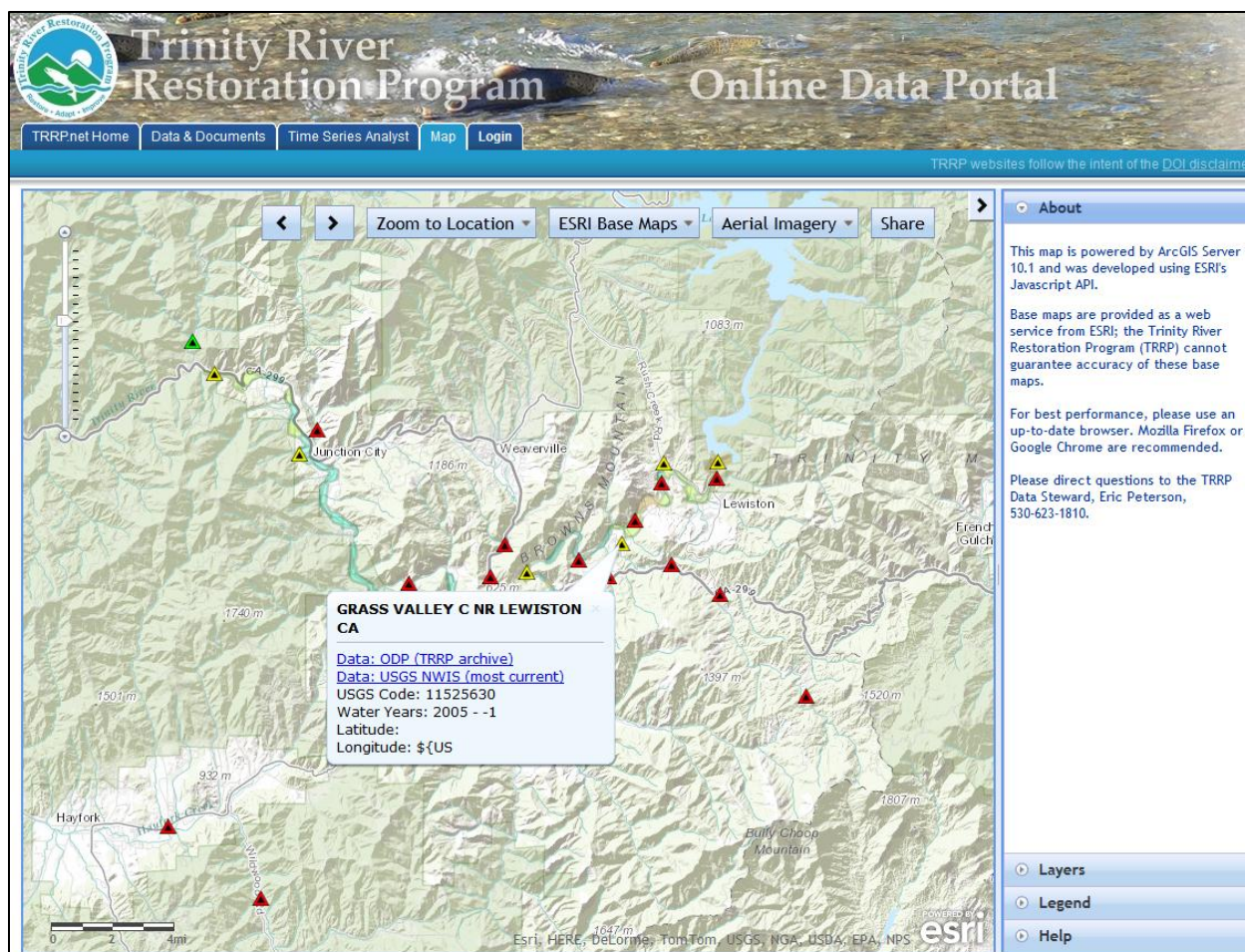


Figure 10: The ODP interactive map displaying default layers (streamgages and TRRP restoration sites) with the call-out box displayed for one streamgage. Note the hyperlinks within the call-out that link to the streamgage data values both within the ODP and from the USGS NWIS database (The ODP includes streamgage data from other sources not available in NWIS).






Figure 11: The ODP interactive map zoomed to a 2013 restoration site, displaying site boundaries and restoration features within the site, overlaying high resolution aerial photography from 2011. Note layer controls on right, a description of the most recently clicked on layer, and a link to download the data from the ODP Data Package Library.





Figure 12: The ODP interactive map showing 1944 aerial photography overlain by the 2011 wetted channel and the modeled maximum restoration flow. Note display of map legend in this figure.



# Trinity River Restoration Program


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### What type of data would you like to add?


[Documents or Reports](#)


Each document is a separate file that represents various kinds of media such as memos, reports, spreadsheets, pictures, images, videos etc. You will need to describe the document by providing a title and optionally a description, citation, physical location of the original.

Uploaded documents can be associated with data packages.

[Meeting Minutes & Agendas](#)



Each meeting represents a distinct event. Once you have added a meeting and provided basic information such as a description and location etc, you can upload multiple attachments. These attachments can represent the agenda, notes or any other kind of material associated with the meeting.

[Data Packages](#)


Data packages represent bundles of data. The data can be of any kind; tabular quantitative information, anecdotal, graphical etc and stored in multiple items all bundled up into a single compressed file (e.g. [WinZip](#), [7Zip](#) or [WinRAR](#) archive).

You will need to describe the data package contents and optionally provide location information specifying where the data were collected and who is the point of contact.

Once you have uploaded a data package you can associate any documents in the system, providing a way to reference monitoring protocols or background information about the underlying data.

[Point & Depth Observation Tabular Data](#)


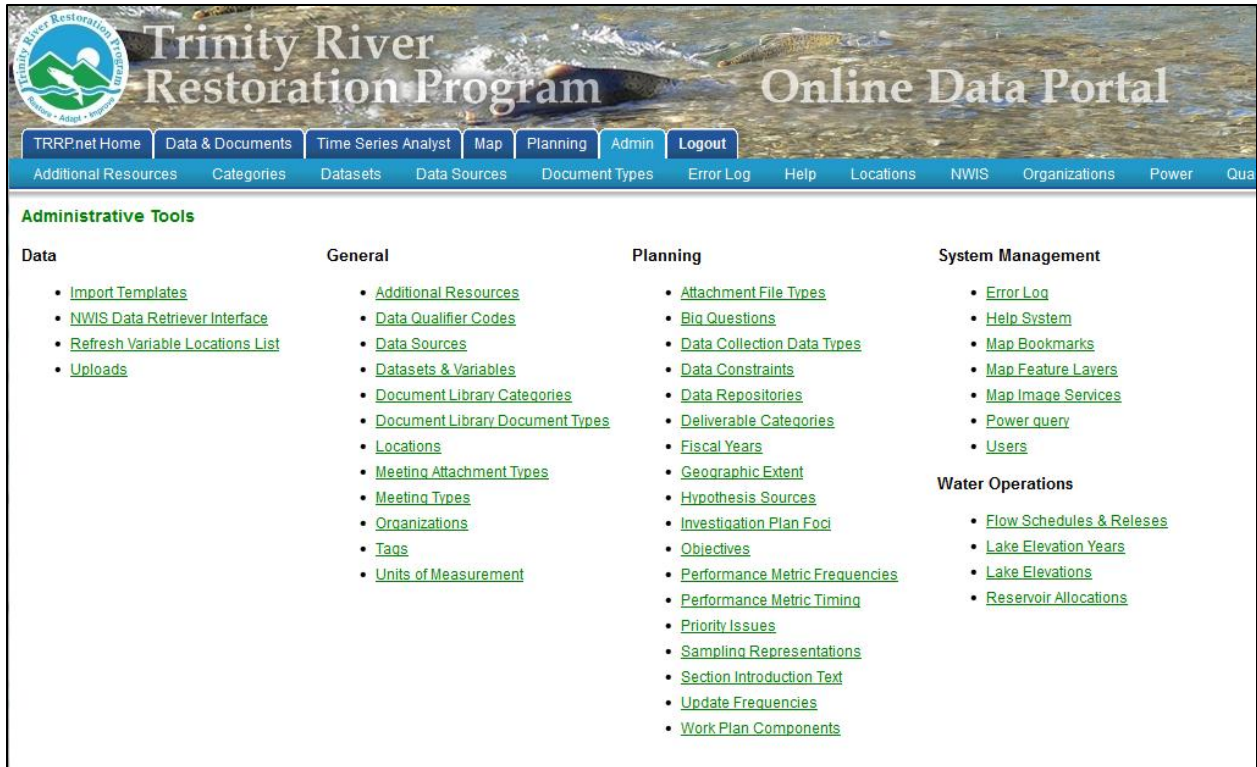
Point and depth observation data for variables such as streamflow, water temperature and dam releases are stored in tables so that they can be queried and graphed. To add these data you need to download the appropriate import template, populate with your data and then send it to the [TRRP Data Steward](#). The Data Steward will then quality control the data before importing it and making it available in the Online Data Portal.

Complex data that cannot be represented as a single measurement data value at a specific point location (and/or depth) are stored in the Online Data Portal as Data Packages (see above).

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*You will need to login into the system before you can add data. Contact the Online Data Portal Administrator ([odp@trrp.net](mailto:odp@trrp.net)) if you need an account.*

Figure 13: Data and Document upload page.



The Administrative Control Panel is divided into four main sections: Data, General, Planning, and System Management. Each section contains a list of links to various data management and system administration tools.

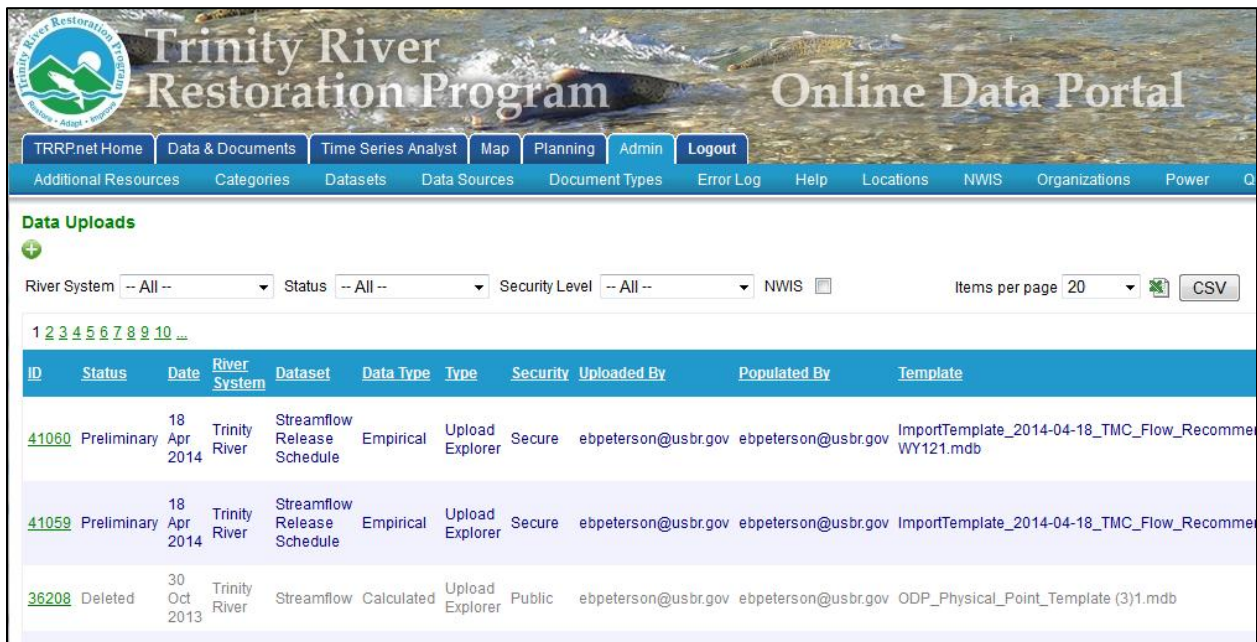
### Administrative Tools

Data	General	Planning	System Management
<ul style="list-style-type: none"> <li><a href="#">Import Templates</a></li> <li><a href="#">NWIS Data Retriever Interface</a></li> <li><a href="#">Refresh Variable Locations List</a></li> <li><a href="#">Uploads</a></li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Additional Resources</a></li> <li><a href="#">Data Qualifier Codes</a></li> <li><a href="#">Data Sources</a></li> <li><a href="#">Datasets &amp; Variables</a></li> <li><a href="#">Document Library Categories</a></li> <li><a href="#">Document Library Document Types</a></li> <li><a href="#">Locations</a></li> <li><a href="#">Meeting Attachment Types</a></li> <li><a href="#">Meeting Types</a></li> <li><a href="#">Organizations</a></li> <li><a href="#">Tags</a></li> <li><a href="#">Units of Measurement</a></li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Attachment File Types</a></li> <li><a href="#">Big Questions</a></li> <li><a href="#">Data Collection Data Types</a></li> <li><a href="#">Data Constraints</a></li> <li><a href="#">Data Repositories</a></li> <li><a href="#">Deliverable Categories</a></li> <li><a href="#">Fiscal Years</a></li> <li><a href="#">Geographic Extent</a></li> <li><a href="#">Hypothesis Sources</a></li> <li><a href="#">Investigation Plan Foci</a></li> <li><a href="#">Objectives</a></li> <li><a href="#">Performance Metric Frequencies</a></li> <li><a href="#">Performance Metric Timing</a></li> <li><a href="#">Priority Issues</a></li> <li><a href="#">Sampling Representations</a></li> <li><a href="#">Section Introduction Text</a></li> <li><a href="#">Update Frequencies</a></li> <li><a href="#">Work Plan Components</a></li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Error Log</a></li> <li><a href="#">Help System</a></li> <li><a href="#">Map Bookmarks</a></li> <li><a href="#">Map Feature Layers</a></li> <li><a href="#">Map Image Services</a></li> <li><a href="#">Power query</a></li> <li><a href="#">Users</a></li> </ul>

### Water Operations

- [Flow Schedules & Releases](#)
- [Lake Elevation Years](#)
- [Lake Elevations](#)
- [Reservoir Allocations](#)

Figure 14: Administrative Control Panel.




The Data Uploads management page features a table of uploaded data records. The table includes columns for ID, Status, Date, River System, Dataset, Data Type, Type, Security, Uploaded By, Populated By, and Template. The records are filtered by River System (Trinity River) and Status (Preliminary). The table shows three records, with the first two being preliminary and the third being deleted.

ID	Status	Date	River System	Dataset	Data Type	Type	Security	Uploaded By	Populated By	Template
<a href="#">41060</a>	Preliminary	18 Apr 2014	Trinity River	Streamflow Release Schedule	Empirical	Upload Explorer	Secure	ebpeterston@usbr.gov	ebpeterston@usbr.gov	ImportTemplate_2014-04-18_TMC_Flow_Recommen WY121.mdb
<a href="#">41059</a>	Preliminary	18 Apr 2014	Trinity River	Streamflow Release Schedule	Empirical	Upload Explorer	Secure	ebpeterston@usbr.gov	ebpeterston@usbr.gov	ImportTemplate_2014-04-18_TMC_Flow_Recommen
<a href="#">36208</a>	Deleted	30 Oct 2013	Trinity River	Streamflow	Calculated	Upload Explorer	Public	ebpeterston@usbr.gov	ebpeterston@usbr.gov	ODP_Physical_Point_Template (3)1.mdb

Figure 15: Data uploads management page.





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Restoration Program

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Data Sources

Document Types

Error Log

Help

Locations

NWIS

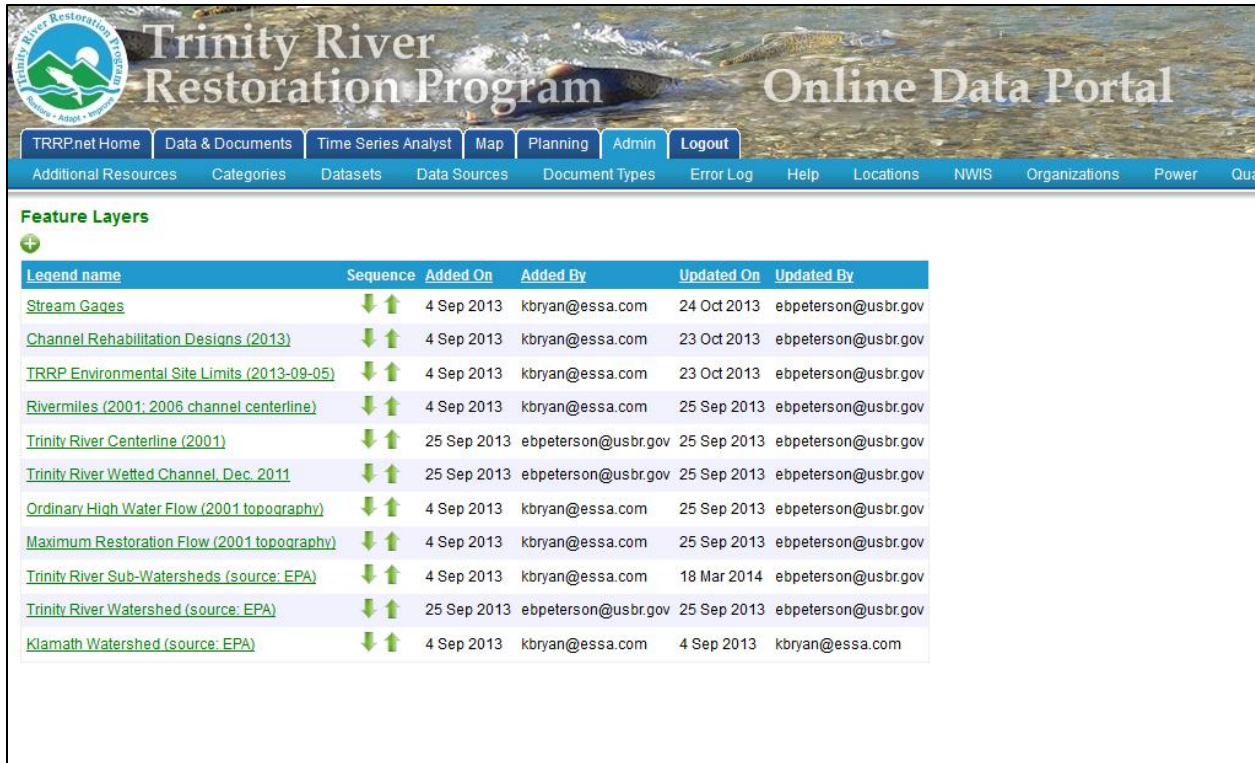
Organizations

Power

Locations

Name	Official Name	County	Easting	Northing	UTM Zone	Elevation	River Miles	Added On	Added By	Updated On	Updated By
<a href="#">Klamath River at Orleans</a>	KLAMATH R A ORLEANS	Humboldt	455254.11	4572582.65	10	108.502704		11 Jul 2006	dbo	11 Jul 2006	dbo
<a href="#">Klamath River near Klamath</a>	KLAMATH R NR KLAMATH CA	Del Norte	418260.16	4595943.42	10			11 Jul 2006	dbo	11 Jul 2006	dbo
<a href="#">Klamath River below Iron Gate Dam</a>	KLAMATH R BL IRON GATE DAM CA	Siskiyou	546083.01	4641922.56	10	2162.44		3 Aug 2006	dbo	3 Aug 2006	dbo
<a href="#">Carr Power Generation Facility</a>		Shasta	531532.85915	4499627.513769	10			13 Oct 2006	dbo	11 Sep 2012	ebpeterson@usbr.gov
<a href="#">Klamath River near Seiad Valley</a>	KLAMATH R NR SEIAD VALLEY CA		480719.7	4633563.2	10			24 Jan 2007	dbo	24 Jan 2007	dbo
<a href="#">Salmon River at Somes Bar</a>	SALMON R A SOMES BAR CA		460112.41	4580664.92	10	482.97		5 Aug 2009	dbo	5 Aug 2009	dbo
<a href="#">Shasta River near Yreka</a>	SHASTA R NR YREKA CA		533585.75	4630194.35	10	2000		5 Aug 2009	dbo	5 Aug 2009	dbo
<a href="#">Klamath River below Fall Creek near Copco</a>	KLAMATH R BL FALL C NR COPCO CA		552265.45	4646869.39	10	2310		5 Aug 2009	dbo	5 Aug 2009	dbo
<a href="#">Klamath River below John C. Boyle Powerplant</a>	KLAMATH RIVER BLW JOHN C. BOYLE PWRPLNT, NR KENO, OR		576641.98	4659583.41	10	3274.82		5 Aug 2009	dbo	5 Aug 2009	dbo
<a href="#">Klamath River at Spencer Bridge near Keno</a>	KLAMATH R AT SPENCER BRIDGE NR KENO, OREG.		579797.46	4665016.3	10	3774.72		5 Aug 2009	dbo	5 Aug 2009	dbo
<a href="#">Klamath River at Keno</a>	KLAMATH RIVER AT KENO, OR		585766.56	4665086.42	10	3961		5 Aug 2009	dbo	5 Aug 2009	dbo

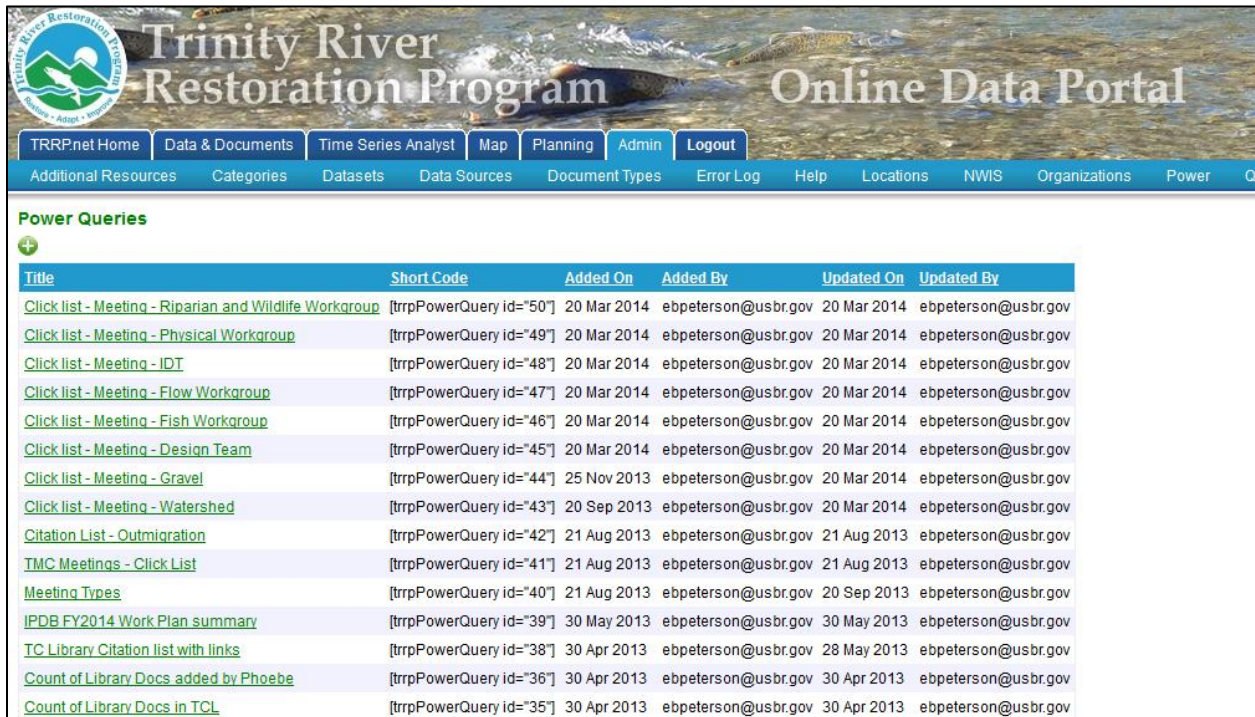
Figure 16: Data location management page.



The screenshot shows the 'Feature Layers' management page of the Trinity River Restoration Program Online Data Portal. The page has a header with the program logo and title, and a navigation bar with links like 'TRRPnet Home', 'Data & Documents', 'Time Series Analyst', 'Map', 'Planning', 'Admin', and 'Logout'. Below the navigation bar is a secondary bar with links for 'Additional Resources', 'Categories', 'Datasets', 'Data Sources', 'Document Types', 'Error Log', 'Help', 'Locations', 'NWIS', 'Organizations', 'Power', and 'Our'. The main content area is titled 'Feature Layers' and contains a table with columns: 'Legend name', 'Sequence', 'Added On', 'Added By', 'Updated On', and 'Updated By'. Each row represents a map layer with a green up/down arrow icon in the 'Sequence' column for reordering. The layers listed include 'Stream Gages', 'Channel Rehabilitation Designs (2013)', 'TRRP Environmental Site Limits (2013-09-05)', 'Rivermiles (2001; 2006 channel centerline)', 'Trinity River Centerline (2001)', 'Trinity River Wetted Channel, Dec. 2011', 'Ordinary High Water Flow (2001 topography)', 'Maximum Restoration Flow (2001 topography)', 'Trinity River Sub-Watersheds (source: EPA)', 'Trinity River Watershed (source: EPA)', and 'Klamath Watershed (source: EPA)'.

Legend name	Sequence	Added On	Added By	Updated On	Updated By
<a href="#">Stream Gages</a>	↓ ↑	4 Sep 2013	kbryan@essa.com	24 Oct 2013	ebpeterson@usbr.gov
<a href="#">Channel Rehabilitation Designs (2013)</a>	↓ ↑	4 Sep 2013	kbryan@essa.com	23 Oct 2013	ebpeterson@usbr.gov
<a href="#">TRRP Environmental Site Limits (2013-09-05)</a>	↓ ↑	4 Sep 2013	kbryan@essa.com	23 Oct 2013	ebpeterson@usbr.gov
<a href="#">Rivermiles (2001; 2006 channel centerline)</a>	↓ ↑	4 Sep 2013	kbryan@essa.com	25 Sep 2013	ebpeterson@usbr.gov
<a href="#">Trinity River Centerline (2001)</a>	↓ ↑	25 Sep 2013	ebpeterson@usbr.gov	25 Sep 2013	ebpeterson@usbr.gov
<a href="#">Trinity River Wetted Channel, Dec. 2011</a>	↓ ↑	25 Sep 2013	ebpeterson@usbr.gov	25 Sep 2013	ebpeterson@usbr.gov
<a href="#">Ordinary High Water Flow (2001 topography)</a>	↓ ↑	4 Sep 2013	kbryan@essa.com	25 Sep 2013	ebpeterson@usbr.gov
<a href="#">Maximum Restoration Flow (2001 topography)</a>	↓ ↑	4 Sep 2013	kbryan@essa.com	25 Sep 2013	ebpeterson@usbr.gov
<a href="#">Trinity River Sub-Watersheds (source: EPA)</a>	↓ ↑	4 Sep 2013	kbryan@essa.com	18 Mar 2014	ebpeterson@usbr.gov
<a href="#">Trinity River Watershed (source: EPA)</a>	↓ ↑	25 Sep 2013	ebpeterson@usbr.gov	25 Sep 2013	ebpeterson@usbr.gov
<a href="#">Klamath Watershed (source: EPA)</a>	↓ ↑	4 Sep 2013	kbryan@essa.com	4 Sep 2013	kbryan@essa.com

Figure 17: Map layers management page. Note arrows providing controls to move layers up or down in the drawing order.



The screenshot shows the 'Power Queries' management page of the Trinity River Restoration Program Online Data Portal. The page has the same header and navigation bar as Figure 17. The main content area is titled 'Power Queries' and contains a table with columns: 'Title', 'Short Code', 'Added On', 'Added By', 'Updated On', and 'Updated By'. The table lists various queries related to meetings, design, and library documents. Each row includes a link to the query and its corresponding short code and dates.

Title	Short Code	Added On	Added By	Updated On	Updated By
<a href="#">Click list - Meeting - Riparian and Wildlife Workgroup</a>	[trrpPowerQuery id="50"]	20 Mar 2014	ebpeterson@usbr.gov	20 Mar 2014	ebpeterson@usbr.gov
<a href="#">Click list - Meeting - Physical Workgroup</a>	[trrpPowerQuery id="49"]	20 Mar 2014	ebpeterson@usbr.gov	20 Mar 2014	ebpeterson@usbr.gov
<a href="#">Click list - Meeting - IDT</a>	[trrpPowerQuery id="48"]	20 Mar 2014	ebpeterson@usbr.gov	20 Mar 2014	ebpeterson@usbr.gov
<a href="#">Click list - Meeting - Flow Workgroup</a>	[trrpPowerQuery id="47"]	20 Mar 2014	ebpeterson@usbr.gov	20 Mar 2014	ebpeterson@usbr.gov
<a href="#">Click list - Meeting - Fish Workgroup</a>	[trrpPowerQuery id="46"]	20 Mar 2014	ebpeterson@usbr.gov	20 Mar 2014	ebpeterson@usbr.gov
<a href="#">Click list - Meeting - Design Team</a>	[trrpPowerQuery id="45"]	20 Mar 2014	ebpeterson@usbr.gov	20 Mar 2014	ebpeterson@usbr.gov
<a href="#">Click list - Meeting - Gravel</a>	[trrpPowerQuery id="44"]	25 Nov 2013	ebpeterson@usbr.gov	20 Mar 2014	ebpeterson@usbr.gov
<a href="#">Click list - Meeting - Watershed</a>	[trrpPowerQuery id="43"]	20 Sep 2013	ebpeterson@usbr.gov	20 Mar 2014	ebpeterson@usbr.gov
<a href="#">Citation List - Outmigration</a>	[trrpPowerQuery id="42"]	21 Aug 2013	ebpeterson@usbr.gov	21 Aug 2013	ebpeterson@usbr.gov
<a href="#">TMC Meetings - Click List</a>	[trrpPowerQuery id="41"]	21 Aug 2013	ebpeterson@usbr.gov	21 Aug 2013	ebpeterson@usbr.gov
<a href="#">Meeting Types</a>	[trrpPowerQuery id="40"]	21 Aug 2013	ebpeterson@usbr.gov	20 Sep 2013	ebpeterson@usbr.gov
<a href="#">IPDB FY2014 Work Plan summary</a>	[trrpPowerQuery id="39"]	30 May 2013	ebpeterson@usbr.gov	30 May 2013	ebpeterson@usbr.gov
<a href="#">TC Library Citation list with links</a>	[trrpPowerQuery id="38"]	30 Apr 2013	ebpeterson@usbr.gov	28 May 2013	ebpeterson@usbr.gov
<a href="#">Count of Library Docs added by Phoebe</a>	[trrpPowerQuery id="36"]	30 Apr 2013	ebpeterson@usbr.gov	30 Apr 2013	ebpeterson@usbr.gov
<a href="#">Count of Library Docs in TCL</a>	[trrpPowerQuery id="35"]	30 Apr 2013	ebpeterson@usbr.gov	30 Apr 2013	ebpeterson@usbr.gov

Figure 18: Custom query management page.



**Trinity River Restoration Program**

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**Juvenile Salmonid Outmigrants**

The Trinity River juvenile salmonid outmigrant assessment is conducted to assess juvenile Chinook salmon production from the upper 40 miles and the Trinity Basin to estimate salmon and steelhead emigration timing from the Trinity River basin.

Assessments utilize rotary screw traps at two trapping locations, typically monitored from January through August. The upper trap location – at Pear Tree Gulch, just above the North Fork – provides an estimate of the upper Trinity salmonid production. Meanwhile the lower trap location – just below the town of Willow Creek – provides an estimate for production across the entire Trinity River basin.

Outmigrant monitoring also tracks fish growth, health, and timing of outmigration relative to river temperature and flow rate.

**Trinity River Outmigration Studies (linked to ODP)**

Petros P, Harris N, Pinnix WD (2013) Juvenile Salmonid Monitoring on the Mainstem Trinity River, California, 2010. Yurok Tribal Fisheries Program, Hoopa Valley Tribal Fisheries Department, U. S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, Arcata Fisheries Data Series Report Number DS 2013-28, Arcata, California.

Pinnix WD, Heacock A, Petros P (2013) Juvenile Salmonid Monitoring on the Mainstem Trinity River, California, 2011. U. S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, Yurok Tribal Fisheries Program, and Hoopa Valley Tribal Fisheries Department. Arcata Fisheries Data Series Report Number DS 2013-29, Arcata, CA.

Harris, N; petros, P; and Pinnix W D (2012) Juvenile Salmonid Emigration Monitoring on the Mainstem Trinity River, California, 2009. Yurok Tribal Fisheries Program, Hoopa Valley Tribal Fisheries Department, U. S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, Arcata Fisheries Data Series Report Number DS 2012-27, Arcata, California.

Pinnix, W.D.; Harris, N.J.; and Quinn, S. (2010) Juvenile Salmonid Monitoring on the Mainstem Trinity River at Willow Creek, California, 2008. U. S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, Arcata Fisheries Data Series Report Number DS 2010-20, Arcata, California.

Schwarz, C J; Pickard, D; Marine, K R; and Bonner, S J (2010) Trinity River Restoration Program's juvenile salmonid

Figure 19: TRRP's primary website with a reference citation list built dynamically from the ODP Document Library. All documents given the "outmigration" tag will be identified by a custom query (Figure 18) for display on this page, with links to take end users to the documents themselves.