



Update on the Tailwater Work Group

*Presentation by Jared Carpenter, NLC VT,
TU National Meeting, Roanoke, VA, September 29, 2017*

TWG Background



Overall Goal of TWG

- To provide guidance to Chapters and Councils who want to engage with dam operators to achieve healthier water flows, temperature and chemical integrity to restore and protect trout fisheries.
- To do this, we utilize the existing knowledge and experience of our members.
- Overall, it's members teaching members, and we have members with experience on achieving solid tailwater flows from coast to coast.

For the Work Group, this has been a learning experience

- Tailwater fisheries differ from region to region, but they have similar flow, chemical, and temperature problems, so some lessons and solutions are universal.
- In the Northeast and Mid-Atlantic, the opportunity arises to change flows and conditions during FERC re-licensing or operational changes to the dam.
- In the Midwest and West, the vast majority of dams are owned by Army Corps, BuRec and other federal agencies, so opportunities to change flows usually only come after a crisis for the fishery.
- Similar issues, different regions. Examples:



Glen Canyon Dam, Lees Ferry Tailwater
Problems are flows levels, temperature and D.O.
AZ TU seeking 8,000 cfs min. cons. flows for the tailwaters

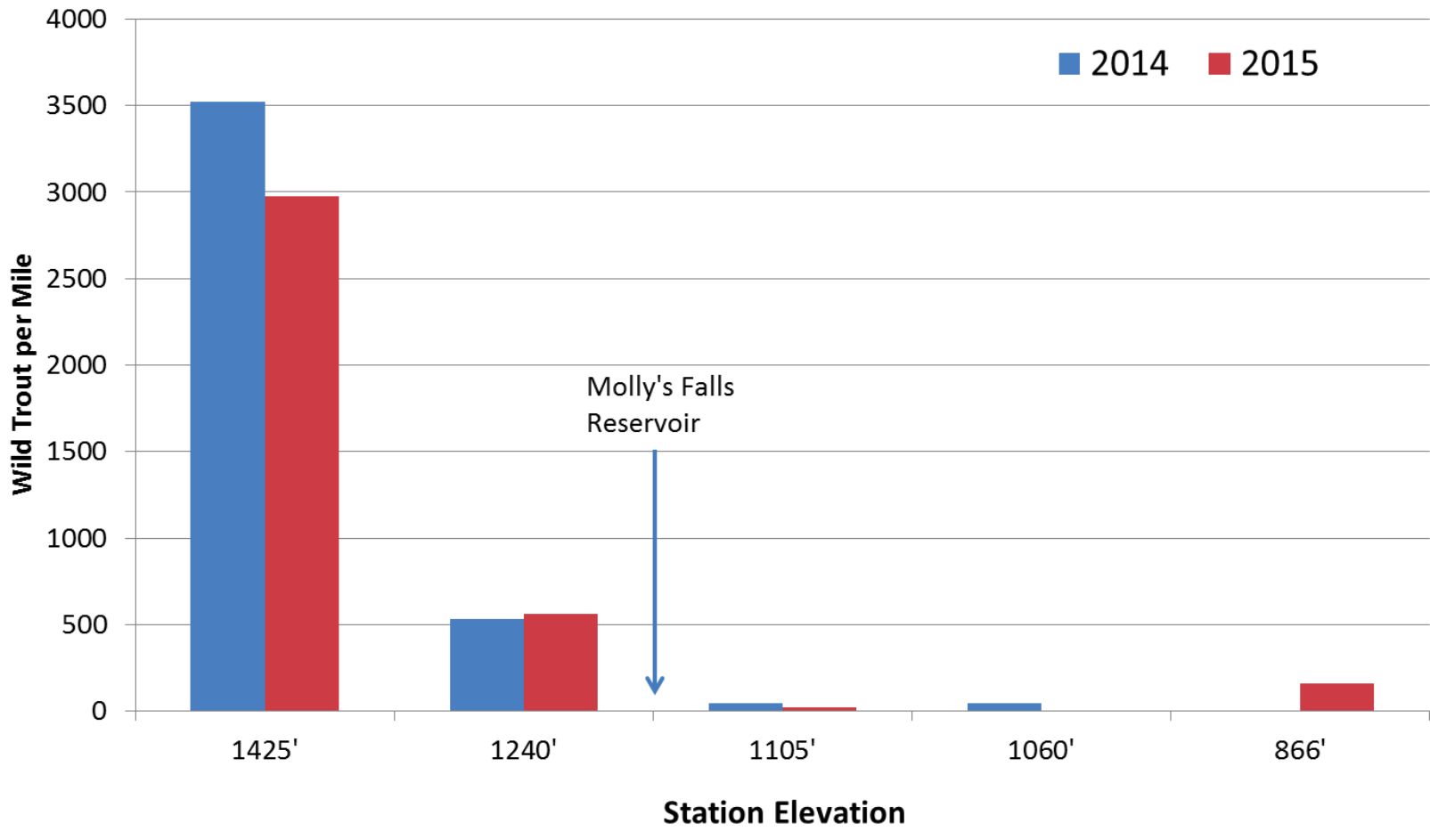


Molly's Brook Dam, Marshfield, VT

Problems are low flows, temperature and low D.O.

Utility wants to make changes in operation and update the emergency sluiceways; opportunity to increase from 1 cfs to hopefully about 12 cfs.

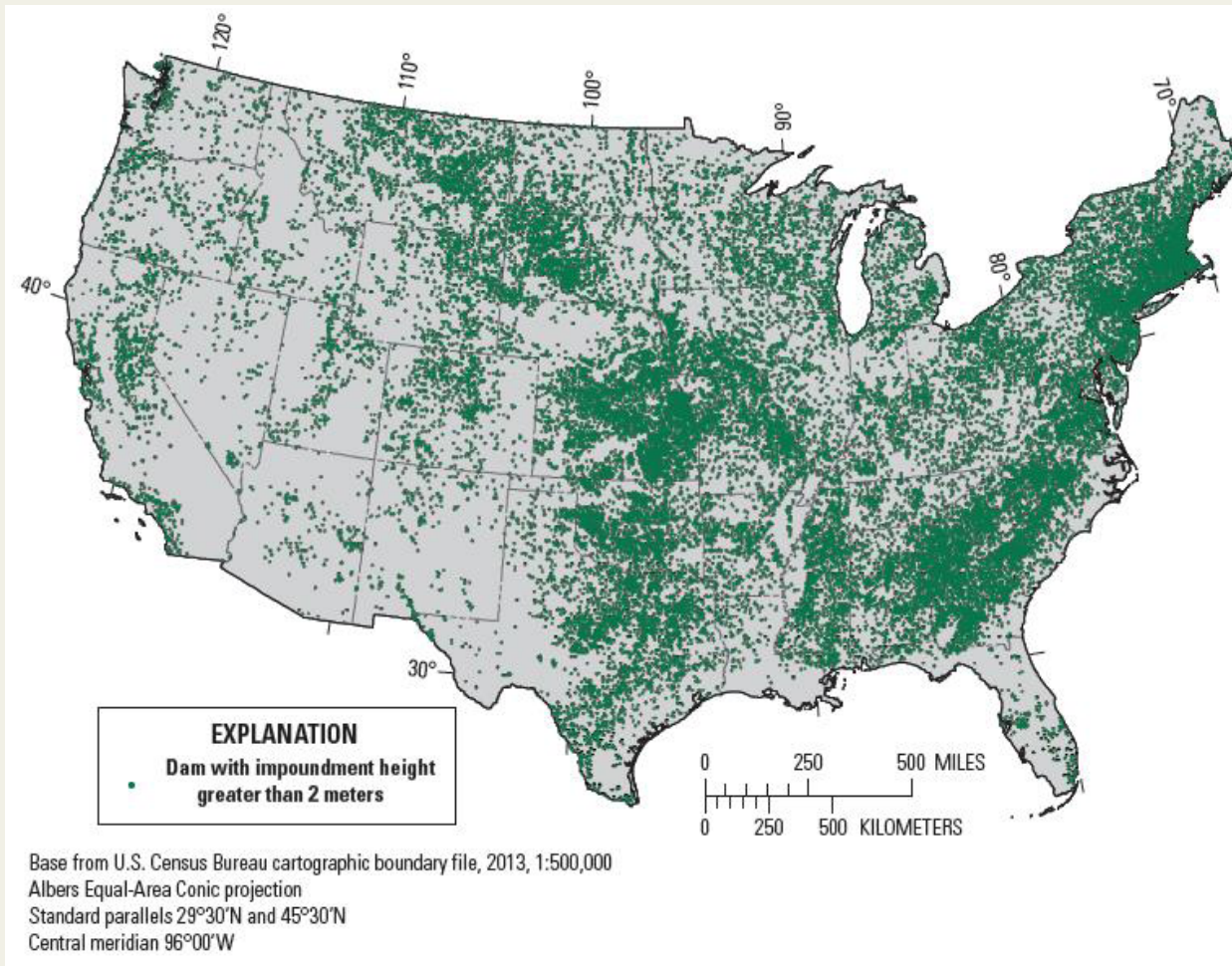
Molly's Brook Wild Trout Population Estimates 2014-2015



**With the vast number of dams nationwide,
Chapters and Councils are looking for
assistance establishing
healthy tailwater fisheries**

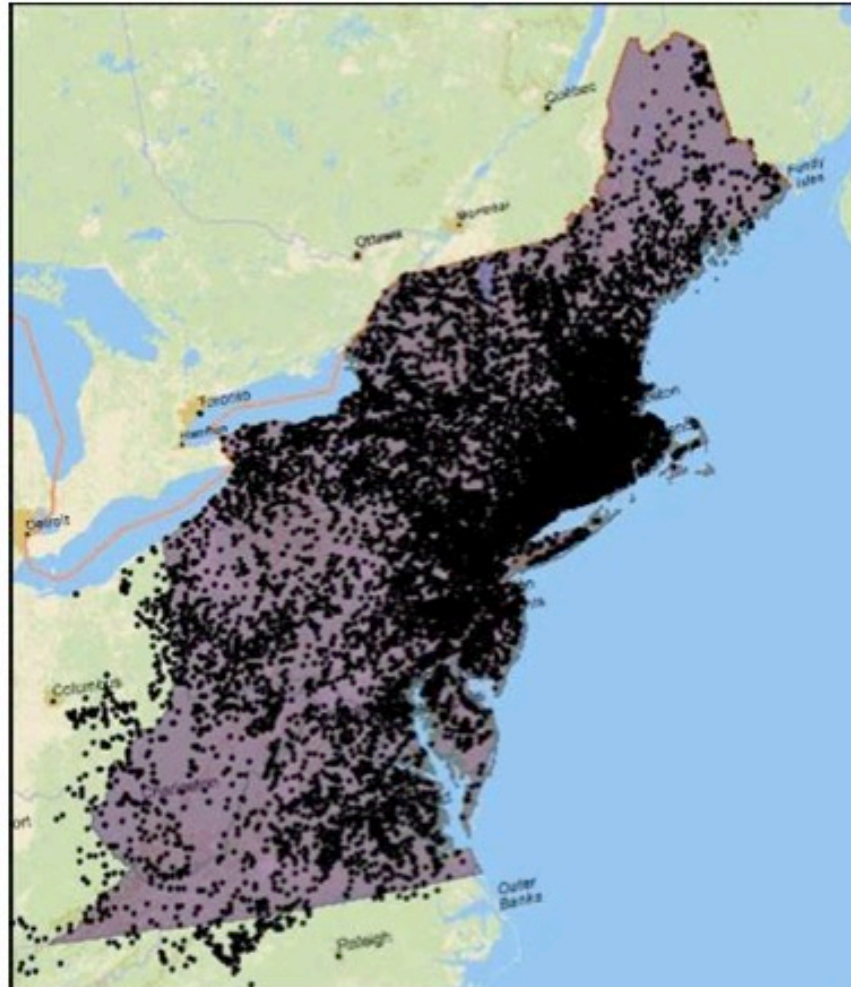


Grand Coulee Dam, Columbia River, Washington, photo from wrsc.org



Dams Nationwide

*USGS estimates 76,000 dams over 6 ft high
Army Corps estimates it is closer to 80,000*



New England and Mid-Atlantic Dams

Estimated 19,000 known dams in state inventories

Tailwaters Work Group: Where we have been so far and where we go from here



Canyon Lake Dam and the Guadalupe River, TX - photo from edwardsaquifer.net

First Step of TWG: Survey to Council Chairs and NLC Reps

December 2015

- 30 Responses from 21 States Total.
- Survey used to find commonalities, build a foundation to move forward.
- No real surprises, everyone basically has the same concerns, no matter their state, geography, climate (wet or arid), and size of tailwaters.
- West is complicated by water allocation rules.

Survey Results Overview

Q: Biggest Concerns with the Health of Area Tailwater Fisheries?

First Response = Flow Levels

- Conservation Minimum / Base Flows – 15
- Generation / ‘Yo-yo’ flows – 7 mentions
- Flow Impacts, ie Scouring – 6 mentions

Survey Results Overview

Q: Biggest Concerns with the Health of Area Tailwater Fisheries?

Second Response = Impacts

- Habitat Impacts – 9 mentions
- Temperature – 9 mentions
- Oxygen Levels – 6 mentions
- Competing Uses for Limited Water – 5

Survey Results Overview

Q: How Involved Has Your Council / Chapter Been in Advocating for Tailwaters?

- Collaboration w/ Other Stakeholders – 11
- Public Advocacy – 8 mentions
- State, Federal Advocacy – 5 mentions
- Agency Assistance – 4 mentions
- Riparian Restoration – 3 mentions

Survey Results Overview

Q: What Have You Found To Be The Major Barriers to Advocating for Better Tailwaters?

- Fed Attitude / Fed Regs – 14 mentions
- Water Availability / Conflicting Uses – 10
- Attitudes Against Conservation – 7 mentions
- Unwillingness of Others to Collaborate – 4
- Cost of Changes – 2 mentions

Mission Statement

Needed To:

- Clarify goals, provide direction, and establish parameters for the WG.

Basically:

- *What do we want to do, and*
- *How are we going to do it?*

Evolved into more of a Mission Statement and Strategic Vision.

Mission Statement and Strategic Vision – Full Version

Mission Statement: The mission of the Tailwaters Work Group is to help TU volunteers advocate for trout populations in tailwater or tailrace fisheries. These are defined as rivers that flow from and are sustained via releases of water from impounded rivers or lakes. The Work Group will explore the issues, challenges and threats to tailwater fisheries and recommend direction and actions for TU staff and volunteers to take to advocate for trout populations in these waters.

Strategic Vision: Our mission will be accomplished through examination of how TU volunteers can participate in complex state and federal regulatory processes with the intent of working collaboratively to resolve disputed issues and mitigate the impact of environmental conditions to protect the quality and quantity of these waters. The Work Group will provide practical informational resources that allow members to determine courses of action for their particular tailwater and to help them as they work through the various steps with strategies, background information, potential partnerships and other guidance to help them be effective coldwater / tailwater fishery advocates. To this end, the Work Group will consolidate guidance based on previous TU advocacy around the country.

Background: Riverine sections below dams (tailwaters or tailraces) provide important recreational and economic benefits to local communities and create habitat that support native and nonnative fish, including trout. Throughout the country, many coldwater rivers have been created and are sustained by release of cooler waters from the depths of these reservoirs. These dams and water releases from these impounded bodies of water have created trout fisheries in places where trout could not otherwise exist. And with the threat of climate change, these coldwater refuges may become more important if temperatures increase and droughts lengthen.

The principal purposes for dams include power generation, flood control, agricultural practices, and public water supply. It cannot be overlooked that dams cause negative impacts to rivers, but in some places these dams have enhanced existing fisheries by ensuring coldwater conditions during hot weather and increasingly warmer summers. Trout fisheries that thrive in the waters downstream of these dams are often incidental and come with a set of unique management problems to sustain the new coldwater environments that have been created. The issues surrounding these waters range from minimum flows, timing of water releases, water quality, and water rights. The downstream trout fisheries that exist are often a secondary concern of the management agencies that operate the dams. Therefore, those who benefit from the coldwater fisheries need to advocate for better water management below these dams to develop and sustain trout populations.

March 2016

Mission Statement – Short Version

Compliments of John Sturgis, Arkansas Council

Mission Statement:

The Tailwaters Work Group will help TU volunteers advocate for trout populations in Tailwaters or Tail Race fisheries. These are defined as rivers that flow from and are sustained via water releases from impounded lakes or rivers.

Objective:

Explore all the issues, challenges and threats to Tailwater fisheries. Recommend direction and actions for TU staff and volunteers to advocate for the Trout population within these waters. Provide practical information resources that enables volunteer leadership to strengthen their resolve to specific concerns. Support action plans with background information, potential partnerships and overall guidance.

Strategic Vision:

TU Vision will be accomplished through specific direction on how Volunteer leadership can participate in complex State and Federal regulatory processes. Working in a collaborative effort to resolve disputed issues and mitigate the impact of environmental conditions to protect the quality and quantity of these waters.



Comerford Dam, Connecticut River
*Largest Dam in New England, NH TU Involved in
2002 Settlement Agreement for Flows*

Statewide Coldwater Meeting

- As a part of the general advice to Councils and Chapters, we recently focused on guidance for a statewide “Coldwater Meeting.”
- Key to develop relationships with state and federal agencies as well as other stakeholders, hopefully before an adversarial situation arises.
- A few states have done these and noticed vastly improved lines of communications and willingness to work cooperatively.

Two ways to form a Coldwater Meeting

Can be

Reactive after a crisis has occurred
and the fishery is impacted.

Or

Proactive before a crisis
harms the fishery



Bull Shoals Dam, White River, Arkansas

Reactive – DO (Dissolved Oxygen) Committee in Baxter County was formed to work on DO issues below the Bull Shoals and Norfork Dams in Arkansas.

Reactive – a crisis occurs and a group comes together to address it.

White River Dissolved Oxygen Committee

- Norfolk and Bull Shoals Dams created as flood control, managed by the Army Corps.
- In Oct 1990, DO levels from Bull Shoals Dam fell below 6 ppm, significantly harming fishery.
- As a result, in 1991 then-Gov. Clinton formed the White River DO Committee made up of state and federal agencies.
- The Committee still meets regularly and the TU Council attends and voices its concerns and suggestions on fisheries management.
- But the management issues are ongoing and need constant attention. This year, there was another issue with low DO due to spring flooding that released excessive organic matter into the White River, which caused low DO levels as that matter decayed.



TVA's Norris Dam, Clinch River, TN

Proactive –The Tennessee Council annually hosts the Cooperative Meeting for the Enhancement of Cold Water Fisheries (aka the 'Coldwater Meeting') with state and federal agencies.

Photo by TVA

Proactive – meet before a crisis occurs and learn to work together.

Tennessee Coldwater Meeting

- Started in the 1990s, includes TU, TVA, wildlife agencies, parks and forests, and has led to good relationships with these agencies.
- Forum provides TN TU leaders the opportunity to interact with state and federal employees, private / corporate actors, and members of academia.
- Meeting provides TU with updates on the status of completed and ongoing coldwater conservation efforts undertaken by the state and federal govt.
- Have been able to address low DO issues, flow issues such as dry river beds during spawning, trout stocking and budget cuts to USFWS hatcheries, and other issues.
- Being proactive rather than in a crisis means less adversarial atmosphere and an opportunity to build relationships to protect fisheries.

Objectives for a Coldwater Meeting

- Presentations and updates on the status of ongoing and completed coldwater conservation efforts and what is being planned for the coming year.
- Question and answer sessions to allow TU members to express concerns with projects and how these activities affect coldwater resources and fishing opportunities.
- The opportunity for TU to offer its volunteer resources and to learn where there are funding shortfalls where TU may be able to contribute.
- The opportunity for TU partners to offer their unique expertise to support TU sponsored activities.
- The opportunity for TU to request additional consideration for protection of coldwater resources.

TU Hydro Website

- *Work In Progress*
- Adapted from the TU Hydropower Relicensing website that was started but never finished.
- Decided that we would continually add materials to the website as developed.
- No need to reinvent the wheel: some of the materials are on the TU site, including: “Dams and trout: the good, bad and ugly,” and A TU Statement regarding hydropower that was submitted as testimony on House and Senate Hearings on energy infrastructure.
- Also, the Hydro Reform Coalition has great materials.
- A focus of the TWG is the Tools & Resources section.

Tools & Resources

Location for the Tailwaters Work Group materials as well as material from the Hydro Reform Coalition.

Topics will include:

- Regional Contacts
- Host a Coldwater Meeting
- Best Practices and General Pointers
- Frequently Asked Questions
- A Hydro Scientific Library

Best Practices and Case Examples

- If a newly-engaged Chapter or Council has an issue to solve, somebody has probably had the same problem and solved it.
- For example: Restoring flows on the Guadalupe.
- For years, the relationship between TX TU and the state river authority was antagonistic, but TX TU changed using the following tenets (partial list):
 - Flow requests based on science, gathered flow and temperature data for years and then modeled what was needed to sustain trout populations.
 - Look for common goals and identify where compromising specifics will not compromise intent.
 - Focus on the issues, not the personalities.
 - Overall, acknowledge and play the politics of the situation and build relationships. Go along to get along.

Tailwaters Regional Contacts

Not people who know all the answers (by any means), but can make suggestions and help find answers.


There are some vacancies.

- Northeast – Jared Carpenter rjaredcarpenter@gmail.com
- Mid-Atlantic
- Southeast
- Mid-South – Bill Thorne thornewillie@yahoo.com
- Rockies Region
- Pacific Coast

4.2.3 Frequently Asked Questions (FAQs)

- How do I ...?
- Problems that are frequently encountered, including more technical questions.
- For example: “How do I track FERC dam relicensing in my area?”
- Or, “How do I track conservation flows and other conditions?”
- This would be continuously developed by WG members as more questions arise.


Example: How do I track conservation flows and other conditions?

science for a changing world  Search USGS

National Water Information System: Web Interface

USGS Water Resources Data Category: Geographic Area:

Click to hide News Bulletins

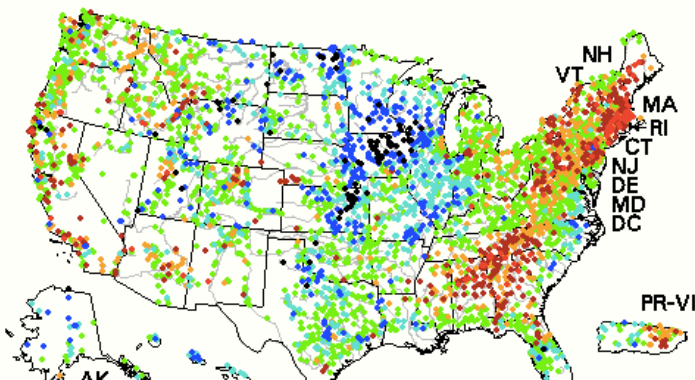
- Data formats changed in August 2016, and additional water-data changes will be coming through 2017. [Read more here](#)
- [Full News](#) 

USGS Current Water Data for the Nation

--- Predefined displays ---

Daily Streamflow Conditions

Sunday, September 25, 2016 07:30ET



Select a state from the map to access real-time data

Current data typically are recorded at 15- to 60-minute intervals, stored onsite, and then transmitted to USGS offices every 1 to 4 hours, depending on the data relay technique used. Recording and transmission times may be more frequent during critical events. Data from current sites are relayed to USGS offices via satellite, telephone, and/or radio telemetry and are available for viewing within minutes of arrival.


All real-time data are **provisional and subject to revision**.

[Build Current Conditions Table](#)

Show a custom current conditions summary table for one or more stations.

<http://waterdata.usgs.gov/nwis/rt>

Click to hide News Bulletins

- Data formats changed in August 2016, and additional water-data changes will be coming through 2017. [Read more here](#)
- [Full News](#) 

USGS Current Water Data for Vermont

Click to hide state-specific text

To view real-time groundwater levels in New Hampshire. [click here](#)

--- Predefined displays ---

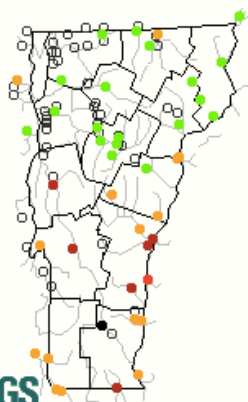
Introduction

go

Daily Streamflow Conditions

Select a site to retrieve data and station information.

Sunday, September 25, 2016 12:30ET



Statewide Streamflow Real-Time Table

Real-time data typically are recorded at 15- to 60-minute intervals, stored onsite, and then transmitted to USGS offices every 1 to 4 hours, depending on the data relay technique used. Recording and transmission times may be more frequent during critical events. Data from real-time sites are relayed to USGS offices via satellite, telephone, and/or radio telemetry and are available for viewing within minutes of arrival.

All real-time data are **provisional and subject to revision**.

[Build Real-Time Table](#)

Show a custom real-time summary table for one or more stations.

00065 Gage height

2007-10-01 2016-09-25

- Graph w/o stats
- Graph w/ (up to 3) parms
- Table
- Tab-separated

Begin date

2016-09-1

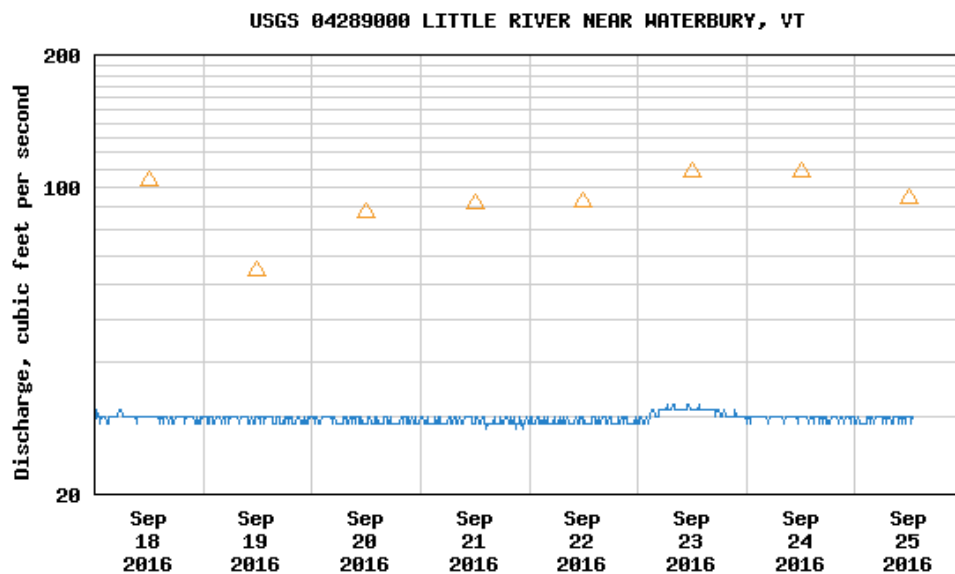
End date

2016-09-2

[Summary of all available data for this site](#)
[Instantaneous-data availability statement](#)

Discharge, cubic feet per second

Most recent instantaneous value: 30 09-25-2016 12:45 EDT



---- Provisional Data Subject to Revision ----

△ Median daily statistic (79 years) — Discharge

Add up to 2 more sites and replot for "Discharge, cubic feet per second"

[? Add site numbers](#) [Note](#)

Enter up to 2 site numbers separated by a comma. A site number consists of 8 to 15 digits

GO

Create [presentation-quality](#) / [stand-alone](#) graph. Subscribe to [WaterAlert](#)

Subscription Form

The U.S. Geological Survey WaterAlert service sends e-mail or text (SMS) messages when [certain parameters](#), as measured by a USGS real-time data-collection station, exceed user-definable thresholds. The development and maintenance of the WaterAlert system is supported by the USGS and its partners, including numerous federal, state, and local agencies.

Real-time data from USGS gages are transmitted via satellite or other telemetry to USGS offices at various intervals; in most cases, 1 to 4 times per hour. Emergency transmissions, such as during floods, may be more frequent. *Notifications will be based on the data received at these site-dependent intervals.*

Site Info:

Number: 04289000
 Name: LITTLE RIVER NEAR WATERBURY, VT
 Agency: USGS
 Transaction ID: 2PWDg

Send Notification To:

[about this...](#)
 My mobile phone
 My email address

10-digit phone number -my carrier-
 For a one-time confirmation only*: email address

Notification Frequency:

[about this...](#)
 Hourly
 Daily

Streamflow Parameter(s):

Discharge, in ft³/s [about this...](#) Recent value: 30 [\[peak chart\]](#)

Alert Threshold Condition:

Greater than (>)
 Less than (<)
 Outside a range (< or >)
 Inside a range (> and <)

Real-time value is greater than: ft³/s

I have read and acknowledge the [Provisional Data Statement](#) and [Disclaimer](#).

*Your email address is required for a one-time confirmation. Shortly after you submit this form, you will receive an email to which you must reply, without altering, in order to activate this SMS subscription.

USGS WaterAlert

[version 2.3]

- [Home](#)
- [Help](#)
- [Contact](#)
- [USGS Water home](#)

Search USGS Water Sites:

WATER DATA FOR THE NATION

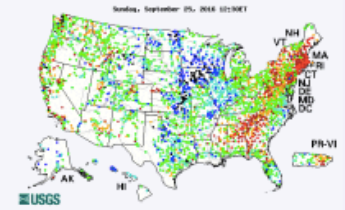
National Water Information System

View current and historical streamflow, ground-water level, and water-quality data

Data by State...

Today's Water Conditions

View comparisons of current and historical conditions using maps



- ◆ Streamflow
- ◆ Flood and high flow
- ◆ Drought
- ◆ Ground water levels
- ◆ Surface water quality

WATER SCIENCE SPECIALTIES

- ◆ Surface Water
- ◆ Ground Water
- ◆ Water Quality
- ◆ Water Use

WATER SCIENCE BY STATE

USGS Water Science Centers are located in each state

USGS WaterAlert

Real-time data parameters available for subscription

The basic real-time parameters supported by WaterAlert are the following:

Surface Water:	Groundwater:	Water Quality:	Precipitation:
Streamflow	Water level (depth)	Water temperature	Total precipitation
Gage height (stage)	Water Level (elevation)	Specific conductance	
Lake/reservoir level		pH	
Stream level		Dissolved oxygen	
Stream velocity		Salinity	
		Turbidity	

[Additional parameters](#) are available at some sites, such as tide elevation, nitrate plus nitrite, or sensor depth. All parameters are not necessarily available at each site.

Related Services

[USGS WaterNow](#)

The USGS WaterNow service lets you send a query for a USGS gaging site, via email or cell-phone text message, and quickly receive a reply with its most recent data for one or more of its monitored parameters.

[USGS National Water Information System Mapper](#)

The National Water Information System (NWIS) provides access to data at over 1.5 million sites. There are 56 possible site types, including 14 primary types and 42 secondary types. Sites may be active or inactive, real-time or historical.

[USGS Flood Inundation Mapper](#)

This mapping tool shows digital, geospatial, flood-inundation maps of flood water extent and depth on the land surface, with current site conditions.

Hydro Scientific Library

Arguments are only effective if backed up with science. But, this is often hard to find. Links to journal and scientific articles on the impacts of dams on fisheries, and constantly expand, such as:

- Cushman, *Review of Ecological Effects of Rapidly Varying Flows Downstream from Hydroelectric Facilities*, North American Journal of Fisheries Management, 1985.
- Faulkner, et al., *Survival Estimates for the Passage of Spring-Migrating Juvenile Salmonids through Snake and Columbia River Dams and Reservoirs*, 2015, NOAA, April 2016.
- Gao, et al., *Development of representative indicators of hydrologic alteration*, Journal of Hydrology, 2009.
- Grantham, et al., *Systematic Screening of Dams for Environmental Flow Assessment and Implementation*, Bioscience, 2014.
- Hogan, et al., *The Status of Environmentally Enhanced Hydropower Turbines*, Fisheries, 2014.
- Kennedy, et al., *Flow Management for Hydropower Extricates Aquatic Insects, Undermining River Flood Webs*, BioScience, 2016.
- Novak, et al., *Final EPA-USGS Technical Report: Protecting Aquatic Life from Effects of Hydrologic Alteration*, EPA and USGS, 2016.

Use of materials drafted by the Hydropower Reform Coalition

www.hydroreform.org

Great material, but long and very dense.

Good reads include:

- “Preparation for the FERC Hydropower Relicensing: An Activist’s Guide for the Six Months to Two Years Before a Relicensing.”
- “Citizen Toolkit for Effective Participation in Hydropower Licensing.”
- “Flows and Recreation: A Guide to Studies for River Professionals.”

Possible Future Topics To Include:

- Western Water Allocation Primer – need an overview not a treatise on the issue.
- Climate change impacts on tailwaters due to temp changes and increase in number and intensity of severe weather events.
- But, also need to continue to add to the aforementioned topics, so please let me know if you would like to contribute.



The End

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Artist Unknown, on Abutment of the Upper Road Bridge, Deerfield River, MA