

2024 Work Plan for Instream Flow Program Field Activities

(Baseline Data Collection, Protected Instream Flow Studies and
Long-Term Monitoring)



Swift River, Albany, NH – Near real-time water level station installation at USGS-01064485



Table of Contents

Introduction	3
Baseline Environmental Data Collection.....	3
Protected Instream Flow Study Environmental Data Collection	3
Protected Instream Flow Long-Term Monitoring.....	4
Proposed Environmental Data Collection Activities for 2024	5
Water Quantity/Quality Data Collection	5
Baseline Streamflow Data Collection.....	5
Baseline Surface Water Data Collection	8
Long-term Monitoring Data Collection.....	9
Datalogger Deployment Parameters	9
Electrofishing	13
Baseline Data Collection	13
Electrofishing Parameters.....	13
Floodplain Transect Elevation and Riparian Ecosystem Surveys.....	14
Baseline Data Collection	14
Floodplain Transect Survey Parameters	14
Other Field Support Activities.....	16
Contractor Oversight	16
Daily Review of US Geological Survey Gaging Station Time-Series Instream Flow Data.....	16
Schedule.....	19
Appendix A - <i>Instream Flow Monitoring Protocols for Conductivity, Temperature and Water Level Dataloggers</i> (2020, rev. 2023).....	21
Appendix B - <i>NHDES Protocols for Collection, Identification and Enumeration of Freshwater Fishes</i> (2018).....	22
Appendix C - <i>NHDES Protocols for Stream Gradient and Floodplain Transect Survey</i> (2020)	23
Appendix D - <i>NHDES Protocols for Assessing Long-Term Monitoring of Riparian Ecosystems</i> (2021).....	24
Appendix E - <i>NHDES Protocols for Relief Pulse Test Study</i> (2023, rev. 2024)	25

Introduction

The New Hampshire Instream Flow Program annually collects and manages environmental data pursuant to three categories of field data needs:

- Environmental data necessary to establish baseline conditions on designated rivers in advance of Protected Instream Flow Studies, in many cases to eliminate data gaps to facilitate such studies.
- Environmental data collected as part of Protected Instream Flow Studies.
- Long-term environmental monitoring data to assess the effectiveness of instream flow protection and the Water Management Plans on meeting Water Quality Standards as demonstrated by long-term trends in biological conditions.

This Work Plan describes the tasks to be performed during the 2024 field season in support of these objectives, to organize activities associated with all three categories in a way that maximizes efficiency. This work plan also serves to inform associated NHDES Bureaus, other State departments and the public of the Instream Flow Program's planned activities.

Baseline Environmental Data Collection

Baseline environmental data are needed to assess the effectiveness of instream flow protection and the Water Management Plans on maintaining or improving water quality as demonstrated by long-term trends in hydrological conditions. Baseline data will be used to evaluate the effectiveness of the Water Management Plans on meeting instream flow objectives and the Water Quality Standards.

Lack of sufficient baseline environmental data can be a data gap which impedes performing a Protected Instream Flow Study for a designated river. A substantial portion of Instream Flow Program resources are dedicated to elimination of data gaps, primarily stream flow data quality and quantity, for the most part through contracts with private and public entities, such as US Geological Survey for stream gage development and rating curve maintenance. NHDES' Instream Flow Program staff provide contract development, technical review and, in the way of field activities, limited field oversight of data acquisition activities. In 2022, NHDES will install eight (8) near-real-time streamflow stations to eliminate data gaps on ungaged designated rivers.

In addition, baseline environmental data are also collected to assess conditions at possible, future long-term monitoring stations. Future long-term monitoring stations are selected from among existing electrofishing and other sampling stations. One or two of these stations are selected to represent each Target Fish Community segment. Final selection of the representative long-term monitoring station for each segment will be based on observations and photos taken during deployment and retrieval, representativeness of the positions of the stations within the Target Fish Community segment and evaluation of the suitability for electrofishing by the Biomonitoring Section staff. Baseline environmental data are collected primarily by deploying dataloggers at points of interest along designated rivers and their major tributaries and includes electrofishing and riparian habitat surveys.

Protected Instream Flow Study Environmental Data Collection

Instream Flow Program staff collect environmental data to support certain components of Protected Instream Flow Studies performed on designated rivers included on the Priority List (see the [Instream Flow](#) webpage for the current [Priority List](#)). Refer to [Administrative Rule Env-Wq 1904](#) for further details regarding the components of a Protected Instream Flow Study. At this time, such data collection is limited to the following tasks:

- A windshield survey of the length of the designated river, to identify flow-dependent instream public uses, including:
 - Access points/parking for the On-The-Water Stream Survey.
 - Broad characterization of stream classification, including Gradient Class and Size Class.
 - Documentation of recreational uses of the river.
 - Location and identification of access to existing electrofishing stations.
 - Preliminary identification/inspection of potential hydraulic and floodplain transect locations.
- An On-the-Water Stream Survey of the length of the designated river, to document the following items:
 - The location of each previously identified instream public use.
 - Characterization of riparian ecosystems located along the designated river.
 - Identification of future riparian ecosystem long-term monitoring transects.
- Perform Riparian Ecosystem Surveys at future riparian ecosystem long-term monitoring transects in accordance with SOP *NHDES Protocols for Long-Term Monitoring of Riparian Ecosystems*.

In addition, the Instream Flow Program contracts many of the tasks associated with Protected Instream Flow Studies to outside contractors. Instream Flow Program staff typically perform limited field oversight of these contractors, coordinating field activities with other Instream Flow Program activities to the degree possible. For example, the Instream Flow Program will contract the Aquatic Habitat Survey, which is accomplished during an On-the-Water Survey; Instream Flow Program staff will identify their Riparian Ecosystem Survey transects during an On-the-Water Survey synchronously with their contractor, maximizing data compatibility and communication between the program and its contractor, as well as providing an opportunity for quality control/quality assurance.

Finally, as part of the development of the Water Management Plans for designated rivers where protected instream flow criteria have been established by NHDES, the Instream Flow Program evaluates dams within the watershed for their ability to provide relief pulses to manage instream flow. The evaluation begins with desktop research (which screens many dams out of the process), proceeds to onsite inspections and interviews with dam owners/operators and concludes with relief pulse testing in accordance with SOP *NHDES Protocols for Relief Pulse Test Study*. The fieldwork associated with relief pulse testing is included in this Work Plan.

Protected Instream Flow Long-Term Monitoring

Long-term monitoring is performed to assess the effectiveness of instream flow protection and the Water Management Plans on meeting Water Quality Standards, by looking for long-term trends in physical and biological conditions. These results will determine whether the Water Management Plans are meeting Water Quality Standards, or whether the Water Management Plans should be modified using adaptive management practices. The program collects environmental data at long-term monitoring stations on each Designated River, located within segments having similar character under its Target Fish Community assessment.

NHDES' Instream Flow Program conducts long-term monitoring on the designated Cold, Lamprey and Souhegan Rivers, the only three designated rivers with Water Management Plans (the Cold River plan is expected during 2024). The components of the long-term monitoring program under the Water Management Plans are subject to revision utilizing adaptive management practices if the proposed management activities do not prove to be effective in meeting the Water Quality Standards. The assessment measures and methods of this program are designed to measure changes in the protected entity communities resulting from the application of management for maintaining protected instream flow. Currently, such data collection is limited to the following tasks:

- Daily comparison of mean daily discharge at selected USGS gages to protected instream flow values.
- Monitoring of relief pulses in response to Critical or Rare Flow events relative to protected instream flow values (there were no such releases during 2023).

- Periodic aquatic habitat monitoring utilizing the following environmental data:
 - Water quality monitoring using dataloggers to determine aquatic habitat suitability.
 - Electrofishing in accordance with SOP *NHDES Protocols for Collection, Identification and Enumeration of Freshwater Fishes* to identify the fish species present in the river.
- Periodic Riparian Ecosystem Surveys at riparian ecosystem long-term monitoring transects in accordance with SOP *NHDES Protocols for Long-Term Monitoring of Riparian Ecosystems*.

In addition to the above-listed long-term monitoring stations, the Instream Flow Program coordinates with the Watershed Bureau’s River Trend Monitoring and Biomonitoring Programs to identify locations for water quality/quantity data collection that may provide datasets for the future long-term monitoring stations on the designated Ashuelot, Isinglass, Pemigewasset and Warner Rivers.

Proposed Environmental Data Collection Activities for 2024

Water Quantity/Quality Data Collection

Baseline Streamflow Data Collection

During 2023, the Instream Flow Program successfully installed and operated eleven (11) Onset® MicroRX 2104 near real-time streamflow stations at former USGS gages and new NHDES streamflow stations on the designated Ammonoosuc, Contoocook, Lamprey (designated tributaries), Piscataquog and Swift Rivers. One of the streamflow stations initially deployed in 2021 (on the designated Exeter River) failed to provide adequate stage and flow data due to the nature of the river in its lower reach. The station was recovered during the summer and redeployed to the designated Swift River in November 2023. During the final week of 2023, streamflow station 28G-AMM/USGS-01136350 was lost during a 100-year storm event on the upper Ammonoosuc River.

USGS remains contracted by NHDES to make discharge measurements at two (2) of these stations (28G-AMM/USGS-01136350 and USGS-01137940) and a few selected stations at higher flows than can be measured by ISF Program staff in 2024 and NHDES will update their rating curves based on these measurements. The Instream Flow Program will also make two streamflow measurements at each remaining streamflow station and NHDES’ Dam Bureau gaging station WCNN3/USGS-01145000 on the Mascoma River to verify the continuing validity of their stage-discharge rating curves. Should deviations from the existing rating curves be noted at any station, indicative of changes in channel geometry, the Instream Flow Program will make additional streamflow measurements to re-establish a valid rating curve. The addition of NHDES’ wireless, near-real time water level stations at these locations allows the Instream Flow Program to transform river stage data to streamflow data and extend the period-of-record for the gages, both by collecting new streamflow data and by applying the new streamflow data to estimation of discharge during the data gaps using the QPPQ Method. For the remaining nine (9) streamflow stations, Instream Flow Program staff makes discharge measurements and creates rating curves based on these measurements. Links to the near real-time data available have been posted to the [NHDES Instream Flow webpage](#), using the Public Dashboard feature of Onset® Cloud storage/reporting.

Table 1 summarizes the streamflow stations maintained by the Instream Flow Program. Figure 1a depicts the streamflow stations in the designated Ammonoosuc River, Figure 1b depicts the streamflow stations in the designated Contoocook and Piscataquog River watersheds and Figure 1c depicts the streamflow stations in the designated Exeter and Lamprey River watersheds.

Table 1: Streamflow Stations on the Designated Ammonoosuc, Contoocook, Lamprey, Mascoma, Piscataquog and Swift Rivers

Station	Station Type	River	Town	Latitude (D.ddddd°)	Longitude (D.ddddd°)
USGS-01137940	Onset® MicroRX 2104	Ammonoosuc	Lisbon	44.21250° N	-71.91417° W
28G-AMM	Onset® MicroRX 2104	Ammonoosuc	Crawford's Purchase	44.26306° N	-71.40737° W
USGS-01084000*	Onset® MicroRX 2104	Contoocook	Antrim	43.08166° N	-71.97885° W
01A-LTR	Onset® MicroRX 2104	Little	Epping	43.11133° N	-71.01196° W
USGS-01073460	Onset® MicroRX 2104	North	Lee	43.08417° N	-71.04191° W
03-PIS	Onset® MicroRX 2104	Piscassic	Newmarket	43.06895° N	-70.96195° W
04-PAR	Onset® MicroRX 2104	Pawtuckaway	Nottingham	43.07239° N	-71.14000° W
02M-NBR	Onset® MicroRX 2104	North Branch	Candia	43.07339° N	-71.27740° W
USGS-01145000	Sutron® 9210B	Mascoma	Enfield	43.65118° N	-72.08481° W
USGS-01090812	Onset® MicroRX 2104	Piscataquog	Goffstown	43.02410° N	-71.628427° W
01-MIP	Onset® MicroRX 2104	Piscataquog	New Boston	43.00587° N	-71.66419° W
USGS-01064485**	Onset® MicroRX 2104	Swift	Albany	43.20751° N	-71.99308° W

D.ddddd° – Degrees to five decimal places

* - deployed in 2021 ** - deployed in 2023

Figure 1a: Streamflow Stations on the Designated Ammonoosuc and Swift Rivers

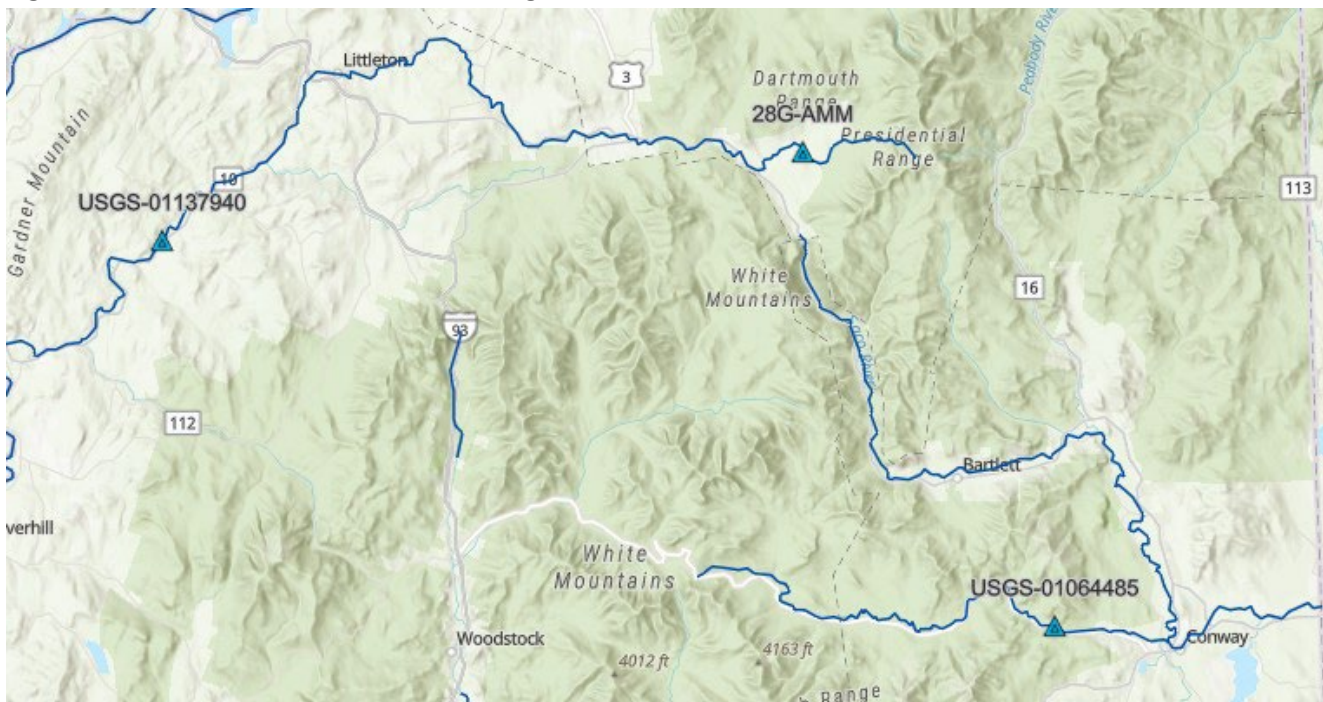


Figure 1b: Streamflow Stations on the Designated Contoocook and Piscataquog Rivers



Figure 1c: Streamflow Stations on the Designated Lamprey River



Baseline Surface Water Data Collection

The sampling design for the designated Isinglass, Pemigewasset and Warner Rivers is intended to collect baseline water quality and quantity data pertinent to water use, including impoundments/withdrawals, recreational use, the maintenance and support of fish and aquatic life and riparian habitats. These data will be used to develop the Water Management Plan for each designated river. The water quality and quantity data include the following parameters:

- Evaluate conductivity as an indicator of water quality at select stations where water quality issues are suspected.
- Evaluate water temperature as a parameter related to:
 - The relationship between impoundments and river reaches in the Designated River.
 - The use of water temperature as a surrogate for dissolved oxygen for use as an aquatic habitat suitability.
 - The suitability of the river for Target Fish Communities previously identified within the Designated River.
- Evaluate water depth as a surrogate for discharge at stations remote from current US Geological Survey gages or at discontinued US Geological Survey gages, to improve the understanding of the hydrology of each designated river.
- To eliminate critical gaps in the US Geological Survey gage network where water depth data, combined with stream flow measurements, can be used as a surrogate.
- To document the retention and alteration of water passing through impoundments along the rivers.
- To evaluate dams within designated river watersheds, during the development of Water Management Plans, for their capability to produce relief pulses to help maintain compliance with protected instream flow criteria.
- To extend the record for prior sampling performed by other parties (i.e., US Geological Survey and NH Fish and Game Department).

During the 2024 field season, two (2) baseline measurements will be made on the Berrys River (a non-designated tributary to the Isinglass River) and nineteen (19) baseline measurement stations will be utilized in the Pemigewasset River. These monitoring station locations are based on expanding the datasets available for existing monitoring stations, as well as the locations of confluences with major tributaries and impoundments, and possible future electrofishing and floodplain transect stations.

Additional dataloggers will be deployed to five (5) the mainstem and tributaries in the Warner River watershed to support relief pulse testing required for the development of the Warner River Water Management Plan. Dataloggers will be used to measure temperature and water level at the stations. The dataloggers will be deployed in the spring as soon as each river allows for safe wading access and recovered in the fall before the rivers and their banks freeze and become unsafe. Streamflow measurements will be made at the stations during the season in order to extend the rating curves created in 2023. Refer to *NHDES Instream Flow Monitoring Protocols for Conductivity, Temperature and Water Level Dataloggers* (Appendix A) for details regarding deployment, recovery and data management methods.

Long-term Monitoring Data Collection

To track trends in water quality and quantity necessary to maintain and support fish and aquatic life in the designated Ashuelot River, two (2) stations will be used to measure conductivity and temperature at newly established long-term monitoring stations along the mainstem. The dataloggers will be deployed in the spring as soon as each river allows for safe wading access and recovered in the fall before the rivers and their banks freeze and become unsafe. Refer to NHDES Standard Operating Procedure (SOP) *Instream Flow Monitoring Protocols for Conductivity, Temperature and Water Level Dataloggers* (Appendix A) for details regarding deployment, recovery and data management methods.

Datalogger Deployment Parameters

Frequency: Annual

Tasks:

- Late spring - Conductivity/temperature/water level dataloggers are deployed, with simultaneous hand-held measurements for specific conductance, conductivity, temperature and water depth (for QA/QC).
- Mid-summer - The dataloggers are checked mid-deployment to confirm their locations remain representative and mid-season hand-held QA/QC check.
- Late fall - The dataloggers are recovered at the end of the season, with simultaneous hand-held measurements for specific conductance, conductivity, temperature and water depth (for QA/QC).
- Winter - Data download and data management.

Applicable Standard Operating Procedure(s):

- *Instream Flow Monitoring Protocols for Conductivity, Temperature and Water Level Dataloggers* (2020)

Table 2 summarizes the proposed datalogger deployment stations. Figure 2a depicts the datalogger deployment stations in the designated Ashuelot River watershed, Figure 2b depicts the datalogger deployment stations in the designated Isinglass River watershed, Figure 2c depicts the datalogger deployment stations in the designated Pemigewasset River watershed and Figure 2d depicts the datalogger deployment stations in the designated Warner River watershed. See the Schedule section of this work plan for the estimated schedule of these activities.

Table 2: Stations Proposed for Datalogger Deployment on the Designated Cold, Isinglass, Pemigewasset, Souhegan and Warner Rivers

Station	Datalogger Parameters	River	Town	Latitude (D.ddddd°)	Longitude (D.ddddd°)
20A-ASH	Conductivity/Temperature	Ashuelot	Keene	42.96115° N	-72.30250° W
23C-ASH	Conductivity/Temperature	Ashuelot	Gilsum	43.05860° N	-72.23970° W
04-ISG	Conductivity/Temperature	Isinglass	Barrington	43.24771° N	-70.98473° W
USGS-01072845	Conductivity/Temperature	Isinglass	Strafford	43.25261° N	-71.10356° W
04D-BRY	Temperature/Water Level	Berrys	Barrington	43.28791° N	-71.06190° W
04G-BRY	Temperature/Water Level	Berrys	Barrington	43.28966° N	-71.06430° W
04D-BRY(BARO)	Air Temperature/ Barometric Pressure	Berrys	Barrington	43.28966° N	-71.06430° W
06X-PMI	Temperature	Pemigewasset	New Hampton	43.58541° N	-71.72431° W
01-NFD	Temperature	Pemigewasset	Bristol	43.59041° N	-71.73984° W
07-PMI	Temperature	Pemigewasset	Bristol	43.59070° N	-71.73122° W
11-PMI	Temperature	Pemigewasset	Ashland	43.68008° N	-71.65100° W
01-SQM	Temperature	Pemigewasset	Campton	43.68815° N	-71.64062° W
13-PMI	Temperature	Pemigewasset	Bridgewater	43.70892° N	-71.65422° W
01-BKR	Temperature	Pemigewasset	Rumney	43.76826° N	-71.68605° W
USGS-01076500	Temperature	Pemigewasset	Plymouth	43.75924° N	-71.68574° W
18R-PMI	Temperature	Pemigewasset	Campton	43.83507° N	-71.65499° W
01-MAD	Temperature	Pemigewasset	Campton	43.85048° N	-71.63889° W
19A-PMI	Temperature	Pemigewasset	Campton	43.84815° N	-71.66043° W
21-PMI	Temperature	Pemigewasset	Thornton	43.91727° N	-71.68311° W
USGS-01075000	Temperature	Pemigewasset	Woodstock	43.97601° N	-71.67928° W
23-PMI	Temperature	Pemigewasset	Woodstock	44.02204° N	-71.68185° W
02-EBP	Temperature	Pemigewasset	Lincoln	44.04219° N	-71.66459° W
24-PMI	Temperature	Pemigewasset	Lincoln	44.03003° N	-71.68489° W
25-PMI	Temperature	Pemigewasset	Lincoln	44.04678° N	-71.68549° W
28-PMI	Conductivity/Temperature	Pemigewasset	Franconia	44.14330° N	-71.68347° W
05B-WNR	Temperature/Water Level	Warner	Warner	43.27686° N	-71.81150° W
08-WNR	Temperature/Water Level	Warner	Bradford	43.28861° N	-71.88601° W
10-WNR	Temperature/Water Level	Warner	Bradford	43.26750° N	-71.91880° W
10-WNR(BARO)	Air Temperature/ Barometric Pressure	Warner	Bradford	43.26750° N	-71.91880° W
13-WNR	Temperature/Water Level	Warner	Bradford	43.26795° N	-71.96389° W
01-LNE	Temperature/Water Level	Lane	Sutton	43.29409° N	-71.89948° W

D.ddddd° – Degrees to five decimal places

* - deployed by NHDES' Trend Program

** - deployed by NHDES' Synoptic Program

Figure 2a: Proposed Baseline Data Collection Stations on the Designated Ashuelot River



Figure 2b: Proposed Baseline Data Collection Stations on the Designated Isinglass River

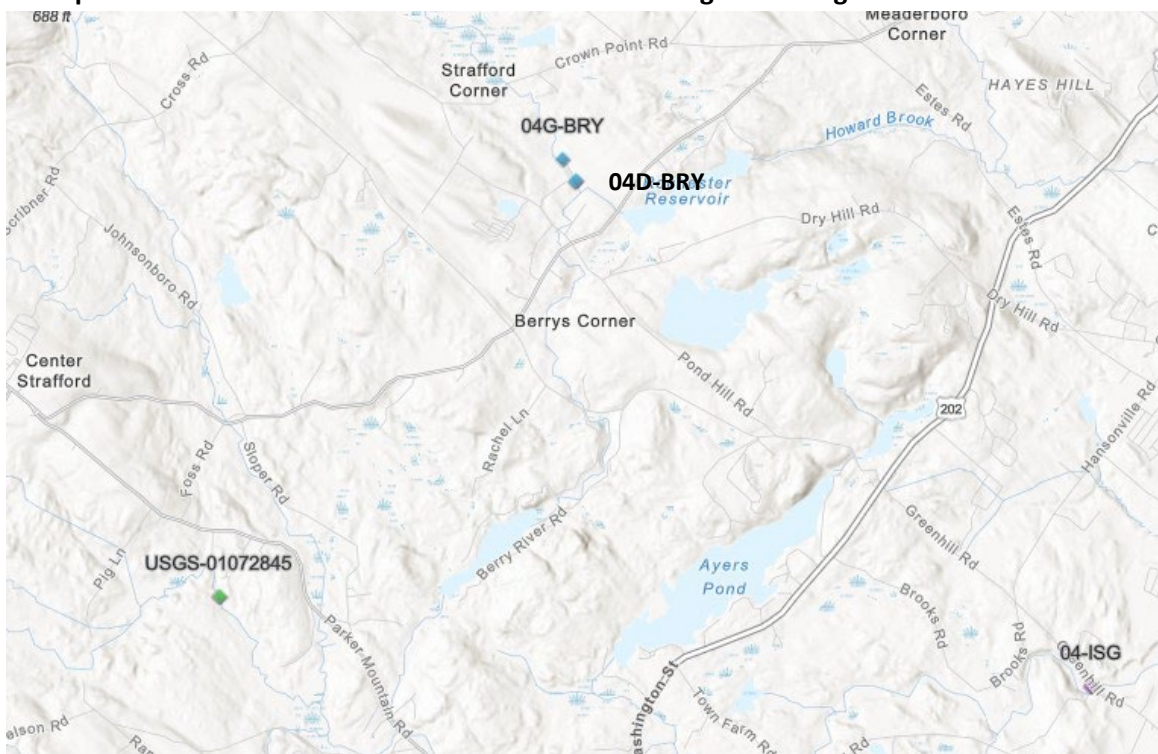


Figure 2c: Proposed Baseline Data Collection Stations on the Pemigewasset River



Figure 2d: Proposed Baseline Data Collection Stations on the Warner River



Electrofishing

Baseline Data Collection

Prior to their Protected Instream Flow Studies, a number of electrofishing locations were used to identify the Target Fish Communities for different reaches of the designated Ashuelot River. With the completion of its Protected Instream Flow Study and the development of its Water Management Plans anticipated in the near future, baseline data collection for comparison to future long-term monitoring for changes in ecosystem conditions, will begin. Regular Fish Community monitoring is performed in each designated river under its Water Management Plan for three consecutive years, followed by a five-year hiatus. The first round on the Ashuelot River at two (2) locations: 01V-ASH and 20B-ASH, the second round on the Isinglass River at two (2) locations: 07-ISG and USGS-01072870 and the second round on the Warner River at two (2) locations: 11P-ASH and 05B-ASH are proposed for 2023.

Electrofishing Parameters

Frequency: Annual for three consecutive years, followed by a five-year hiatus.

Tasks:

- Backpack electrofishing.
- Data management.

Applicable Standard Operating Procedure(s):

- *NHDES Protocols for Collection, Identification and Enumeration of Freshwater Fishes (2018)*

Table 3 summarizes the proposed electrofishing stations. Figure 2a depicts the electrofishing stations in the Ashuelot River watershed, Figure 2b depicts the electrofishing stations in the Isinglass River watershed and Table 2d depicts the electrofishing stations in the Warner River watershed. See the Schedule section of this work plan for the estimated schedule of these activities.

Table 3: Stations Proposed for Electrofishing on the Designated Souhegan and Warner Rivers

Station	Station Information	Town	Latitude (D.ddddd°)	Longitude (D.ddddd°)
20A-ASH	Ashuelot River, Lower Reach	Keene	42.96115° N	-72.30250° W
23C-ASH	Ashuelot River, Upper Reach	Gilsum	43.05860° N	-72.23970° W
USGS-01072845	Isinglass River, Upper Reach	Greenville	42.77666° N	-71.80647° W
07-ISG	Isinglass River, Lower Reach	Milford	42.83024° N	-71.62768° W
11P-WNR	Warner River, Entire Reach	Bradford	43.26752° N	-71.91880° W
05B-WNR	Warner River, Entire Reach	Warner	43.27697° N	-71.81168° W

D.ddddd° – Degrees to five decimal places

In addition to the above-listed electrofishing stations, the Instream Flow Program coordinates with the Watershed Bureau’s Biomonitoring Program to identify locations for electrofishing that may provide datasets for the possible, future long-term monitoring stations on the designated Ammonoosuc, Ashuelot, Cold, Connecticut, Exeter, Lower Merrimack and Pemigewasset Rivers. The Instream Flow Program staff assists Biomonitoring Program staff with such sampling, who, reciprocally, assist with electrofishing at long-term monitoring locations.

Floodplain Transect Elevation and Riparian Ecosystem Surveys

Baseline Data Collection

During the 2021-22 Protected Instream Flow Study of the Ashuelot River, three (3) prospective floodplain transects were identified. During the 2023 Protected Instream Flow Study of the Isinglass River, two (2) prospective floodplain transects were identified. The Instream Flow Program will further investigate these prospective locations during the 2024 field season, to complete their Elevation and Riparian Ecosystem Surveys.

Floodplain transect monitoring is typically performed at each floodplain transect at three times during the field season (spring, summer and fall), in order to account for seasonal changes in flow and vegetation; elevation survey is typically performed during the Spring survey to take advantage of minimum foliage. In addition, one or more permanent benchmarks are installed at each floodplain transect, to facilitate reacquisition during future long-term monitoring.

Floodplain Transect Survey Parameters

Frequency: During spring, summer and fall, baseline and repeated once every eight years.

Tasks:

- Floodplain transect elevation survey from an established benchmark using an auto level/stadia rod during the spring visit.
- Riparian ecosystem and vegetation surveys during the spring, summer and fall visits.
- Data management.

Applicable Standard Operating Procedure(s):

- *NHDES Protocols for Stream Gradient and Floodplain Transect Survey (2020).*
- *NHDES Protocols for Assessing Long-term Monitoring of Riparian Ecosystems (2020).*

Table 4 summarizes the floodplain transects selected along the designated Ashuelot River. Figure 3a depicts the floodplain transects proposed for monitoring in the Ashuelot River watershed; the transect locations on the

Isinglass River will not be identified until the Protected Instream Flow Study of the Isinglass River commences. See the Schedule section of this work plan for the estimated schedule of these activities.

Table 4: Floodplain Transects Proposed for Riparian Ecosystem Surveys

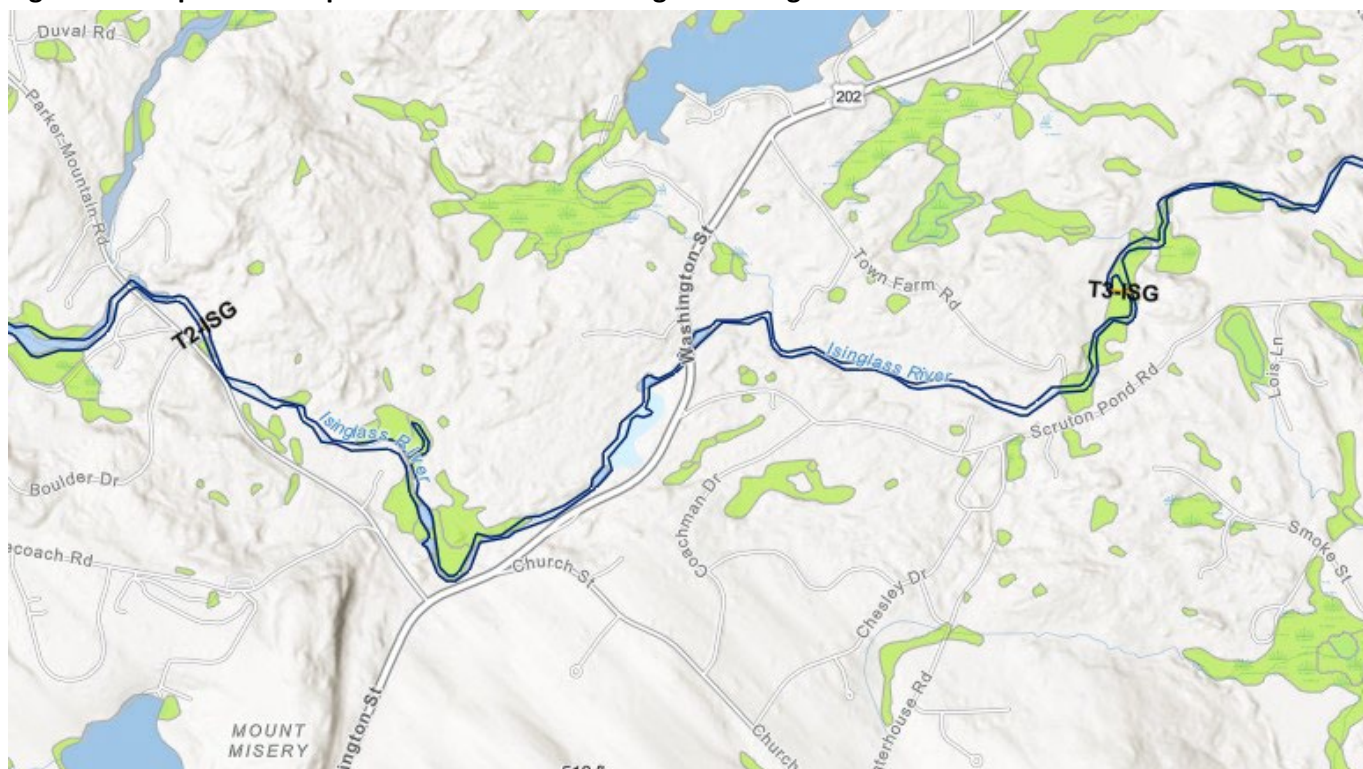
Station	Transect Habitat	River	Town	Coordinates (Point 1) (D.ddddd°)*	Coordinates (Point2) (D.ddddd°)*
T2-ASH	Red Maple Floodplain Forest	Ashuelot	Marlow	43.01942° N -72.31249° W	43.01951° N -72.31135° W
T4-ASH	Sycamore Floodplain Forest	Ashuelot	Surry	43.05848° N -72.23973° W	43.05885° N -72.23965° W
T5-ASH	Silver Maple Floodplain Forest	Ashuelot	Swanzey	43.06038° N -72.23093° W	43.06065° N -72.23099° W
T1-ISG	Red Maple Floodplain Forest	Isinglass	Barrington	43.24220° N -71.03420° W	43.24226° N -71.03301° W
T2-ISG	Red Maple Floodplain Forest	Isinglass	Barrington	43.24100° N -71.07861° W	43.24102° N -71.07855° W

D.ddddd° – Degrees to five decimal places

Figure 3a: Proposed Floodplain Transects on the Designated Ashuelot River



Figure 3b: Proposed Floodplain Transects on the Designated Isinglass River



Other Field Support Activities

Contractor Oversight

During the 2024 field season, contractors to NHDES will be conducting a Protected Instream Flow Study for the designated Pemigewasset River. NHDES Instream Flow Program staff will coordinate with the contractor to observe a variety of protected instream flow study field activities and familiarize themselves with each transect location, such that selected initial floodplain transects can be reacquired for use as long-term monitoring locations.

Daily Review of US Geological Survey Gaging Station Time-Series Instream Flow Data

The Instream Flow Program Environmentalist will perform daily maintenance of the protected instream flow tracking spreadsheets using mean daily discharge data for each index point from the US Geological Survey stream gages listed in Table 5. Figure 4a depicts the location of the Cold River US Geological Survey gage, Figure 4b depicts the location of the Lamprey River US Geological Survey gage, Figure 4c depicts the locations of the Souhegan River US Geological Survey gages and Figure 4d depicts the location of the Warner River US Geological Survey gage (which will be monitored upon establishment of its protected instream flow criteria during 2023).

Table 5: US Geological Survey Gaging Stations Used for Long-Term Instream Flow Monitoring

Station Name / US Geological Survey ID	Coordinates (D.ddddd°)	Protected Instream Flow Monitoring Spreadsheet
Cold River at High Street, at Alstead, NH / 01154950	43.14944° N -72.36167° W	Cold River Protected Instream Flow Tracking Tool
Lamprey River near Newmarket, NH / 01073500	43.10279° N -70.95246° W	Lamprey River Protected Instream Flow Tracking Tool
Souhegan River (Site WLR-1) near Milford, NH / 01093852	42.84679° N -71.67868° W	Upper Souhegan River Protected Instream Flow Tracking Tool
Souhegan River at Merrimack, NH / 01094000	42.85758° N -71.50617° W	Lower Souhegan River Protected Instream Flow Tracking Tool
Warner River at Davisville, NH / 01086000	43.25091159° N -71.7322996° W	Warner River Protected Instream Flow Tracking Tool

D.ddddd° – Degrees to five decimal places

In addition, the Instream Flow Specialist will develop and maintain streamflow dashboards using mean daily discharge data from the near real-time streamflow stations maintained by the Instream Flow Program (refer to the Streamflow Data Collection subsection, above).

Figure 4a: Protected Instream Flow Index Point on the Designated Cold River

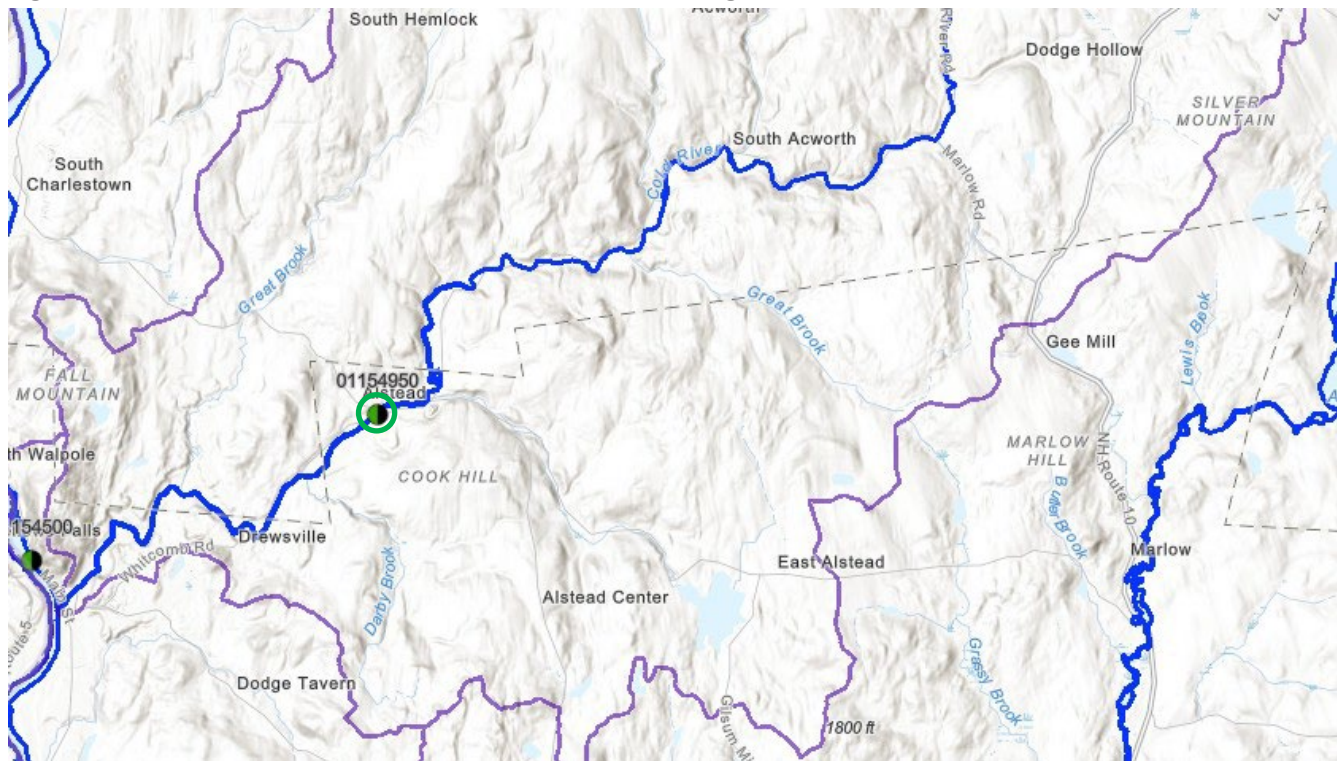


Figure 4b: Protected Instream Flow Index Point on the Designated Lamprey River

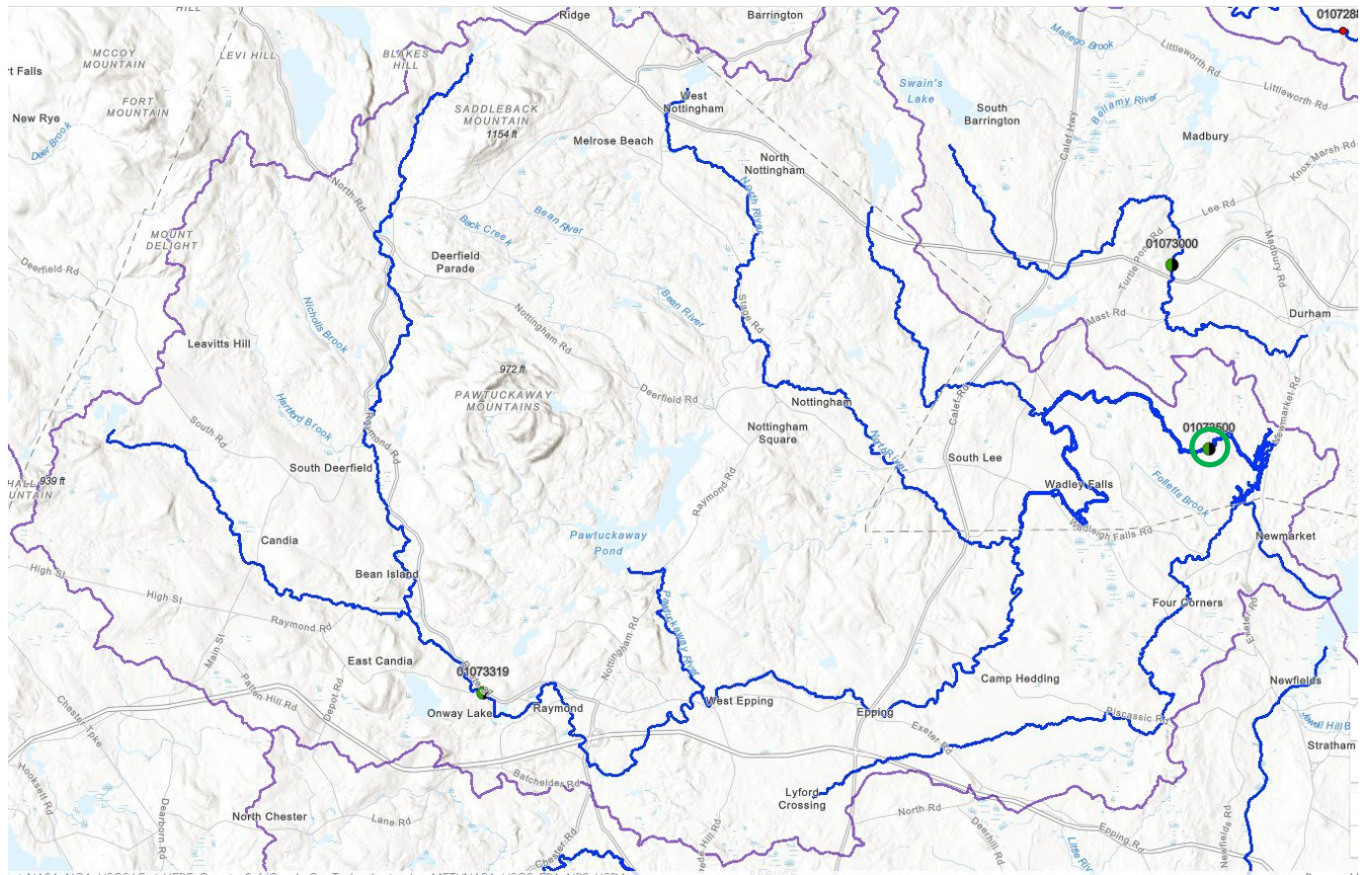
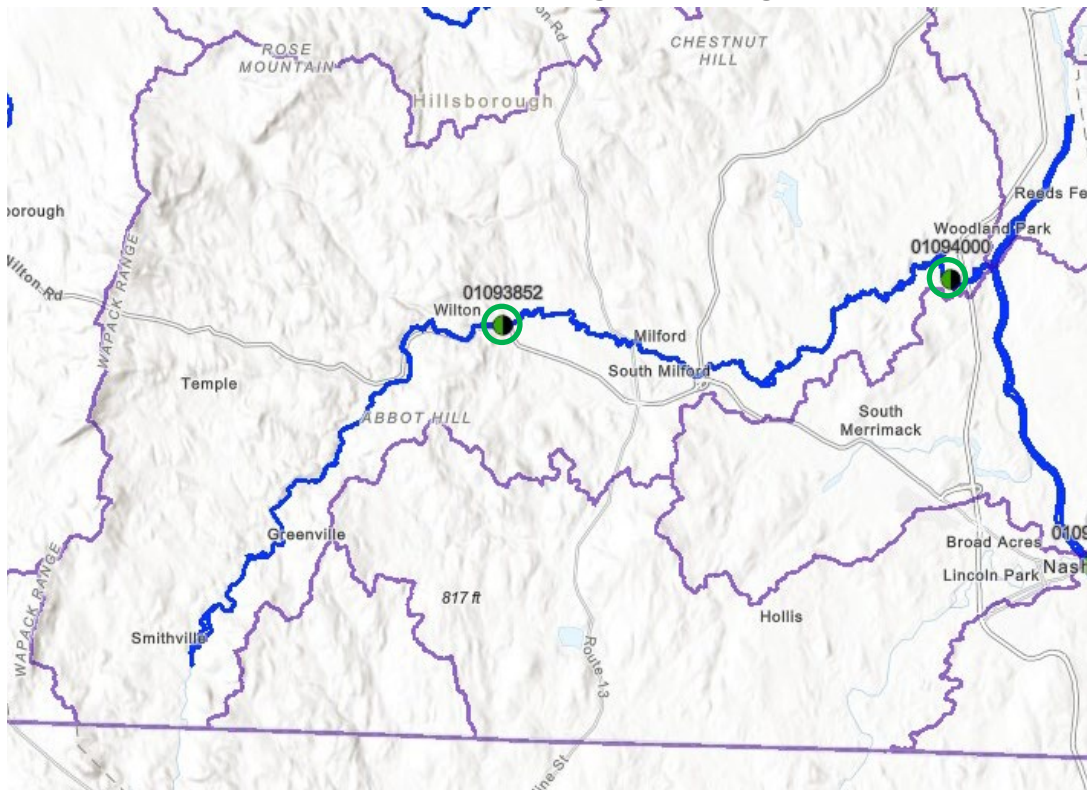
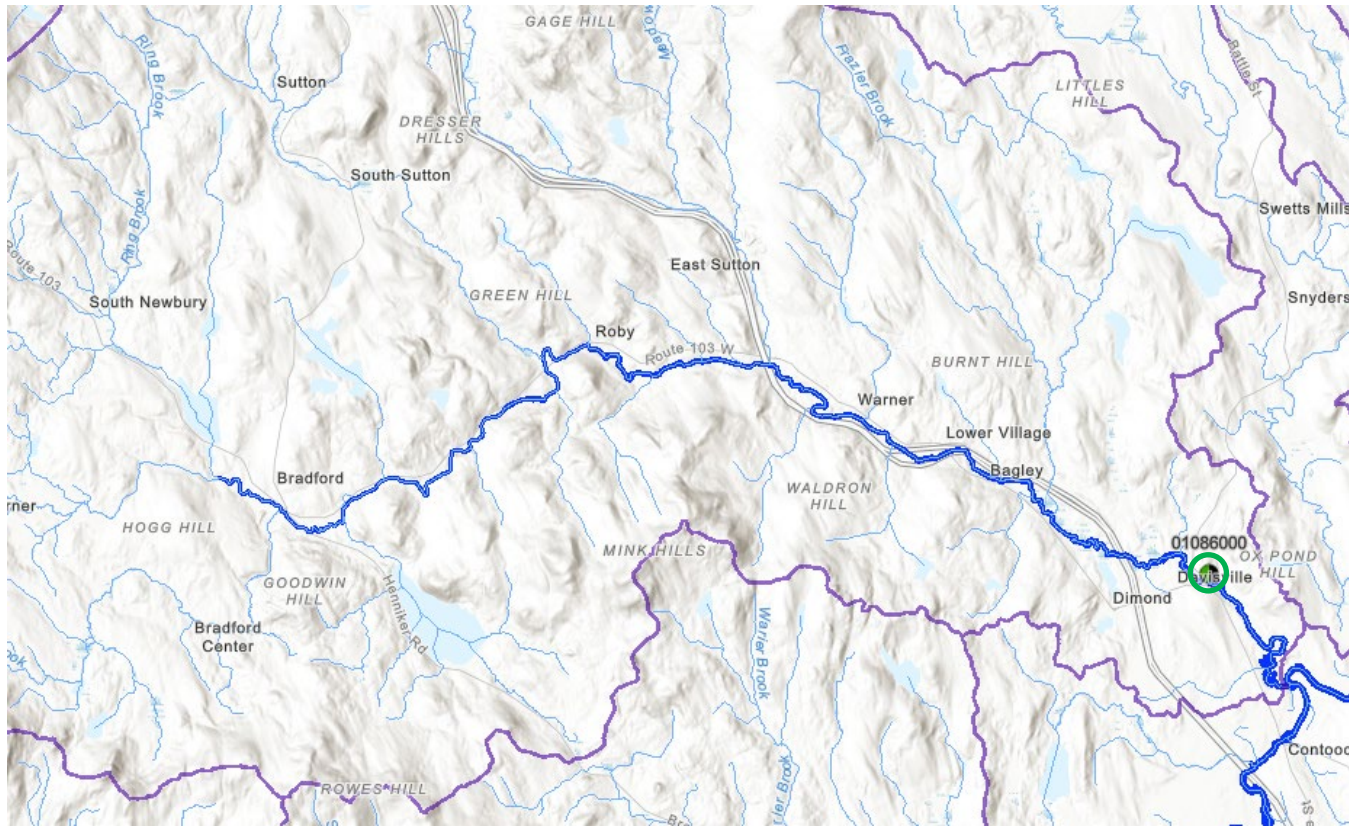


Figure 4c: Protected Instream Flow Index Points on the Designated Souhegan River



USGS Figure 4d: Protected Instream Flow Index Point on the Designated Warner River



Schedule

The proposed schedule for tasks performed by NHDES staff depends on favorable streamflows and weather, as well as the availability of equipment, as noted previously. Table 6 summarizes the overall schedule for data acquisition tasks for the 2024 field season.

Table 6: Proposed Instream flow Program 2024 Field Activity Schedule

Schedule	Activity	Station(s)
April-November	Streamflow measurements at Contoocook, Lamprey, Piscataquog and Swift streamflow stations	USGS-01084000, 01A-LTR, USGS-01073460, 04-PAR, 02N-NBR, 03-PIS, USGS-01090812, 01-MIP, USGS-01064485
First Week of May	Isinglass River datalogger deployments	04-ISG, USGS-01072845, 04D-BRY, 04D-BRY(BARO), 04G-BRY
Second week of May	Ashuelot and Warner River datalogger deployments	20A-ASH, 23C-ASH, 05B-WNR, 08-WNR, 10-WNR, 10-WNR(BARO), 13-WNR, 01-LNE, 11P-WNR
Second week of May	Ashuelot/Isinglass River elevation/ecosystem/vegetation floodplain transect surveys	T2-ASH, T4-ASH, T5-ASH, T2-ISG, T3-ISG
Third week of May	Pemigewasset River datalogger deployments	34-MER, 01-WIN, 01-PMI, 06-PMI, 06X-PMI, 01-NFD, 07-PMI, 11-PMI, 01-SQM, 13-PMI, 01-BKR, USGS-01076500, 18R-PMI, 01-MAD, 19A-PMI, 21-PMI, USGS-01075000, 23-PMI, 02-EBP, 24-PMI, 25-PMI, 28-PMI
July	Isinglass River electrofishing	04-ISG, USGS-01072845
July	Ashuelot River electrofishing	20A-ASH, 23C-ASH
July	Warner River electrofishing	05B-WNR, 11P-WNR
Last Week of July	Ashuelot/Isinglass River ecosystem/vegetation floodplain transect surveys	T2-ASH, T4-ASH, T5-ASH, T2-ISG, T3-ISG
First week of August	Pemigewasset River datalogger mid-season checks	34-MER, 01-WIN, 01-PMI, 06-PMI, 06X-PMI, 01-NFD, 07-PMI, 11-PMI, 01-SQM, 13-PMI, 01-BKR, USGS-01076500, 18R-PMI, 01-MAD, 19A-PMI, 21-PMI, USGS-01075000, 23-PMI, 02-EBP, 24-PMI, 25-PMI, 28-PMI
First week of August	Warner River Relief Pulse Tests	Todd Lake
Second week of August	Warner River Relief Pulse Tests	Blaisdell Lake, Kezar lake
First Week of October	Ashuelot/Isinglass River ecosystem/vegetation floodplain transect surveys	T2-ASH, T4-ASH, T5-ASH, T2-ISG, T3-ISG
Third week of October	Pemigewasset River datalogger recoveries	34-MER, 01-WIN, 01-PMI, 06-PMI, 06X-PMI, 01-NFD, 07-PMI, 11-PMI, 01-SQM, 13-PMI, 01-BKR, USGS-01076500, 18R-PMI, 01-MAD, 19A-PMI, 21-PMI, USGS-01075000, 23-PMI, 02-EBP, 24-PMI, 25-PMI, 28-PMI
Fourth week of October	Ashuelot and Warner River datalogger recoveries	20A-ASH, 23C-ASH, 05B-WNR, 08-WNR, 10-WNR, 10-WNR(BARO), 13-WNR, 01-LNE, 11P-WNR
First week of November	Isinglass River datalogger recoveries	04-ISG, USGS-01072845

Appendix A - Instream Flow Monitoring Protocols for Conductivity, Temperature and Water Level Dataloggers (2020, rev. 2023)

Appendix B - NHDES Protocols for Collection, Identification and Enumeration of Freshwater Fishes (2018)

Appendix C - NHDES Protocols for Stream Gradient and Floodplain Transect Survey (2020)

Appendix D - NHDES Protocols for Assessing Long-Term Monitoring of Riparian Ecosystems (2021)

Appendix E - NHDES Protocols for Relief Pulse Test Study (2023, rev. 2024)