

# **Boating Demonstration Flow Study**

## **Final Study Plan**

**Turners Falls Hydroelectric Project (No. 1889)**

*Prepared for:*



*Prepared by:*



**NOVEMBER 9, 2021**

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## **LIST OF ABBREVIATIONS**

ADCP	acoustic Doppler current profiler
AFLA	Amended Final License Application
AMC	Appalachian Mountain Club
cfs	cubic feet per second
CRC	Connecticut River Conservancy
DCR	Massachusetts Department of Conservation and Recreation
DEP	Massachusetts Department of Environmental Protection
FERC	Federal Energy Regulatory Commission
FirstLight	FirstLight Hydro Generating Company
ILP	Integrated Licensing Process
NMFS	National Marine Fisheries Service
NRF	Naturally Routed Flow
USFWS	United States Fish and Wildlife Service



## 1 INTRODUCTION

Northfield Mountain LLC is the current licensee of the Northfield Mountain Pumped Storage Project (FERC No. 2485) and FirstLight MA Hydro LLC<sup>1</sup> is current licensee for the Turners Falls Hydroelectric Project (FERC No. 1889), collectively known as the Projects. In December 2020, FirstLight filed its Amended Final License Applications (AFLAs) with the Federal Energy Regulatory Commission (FERC, the Commission) to relicense the Projects using the FERC's Integrated Licensing Process (ILP).

This study is being conducted in collaboration with the Study Team, including representatives from the Massachusetts Department of Environmental Protection (DEP), Massachusetts Department of Conservation and Recreation (DCR), and the Connecticut River Conservancy (CRC).

## 2 STUDY GOALS AND OBJECTIVES

The purpose of this study is to assess the potential effects of discharges from Turners Falls Dam on navigability for recreational boaters in the upper bypass reach of the Connecticut River below Turners Falls Dam. The objective is to perform a demonstration flow study to assess navigability at various flows. For the purpose of this study, "navigable" means that a boater can paddle recreational watercraft through the reach without having to portage around obstacles, even if minor bumping and/or scraping occurs.

## 3 RESOURCE MANAGEMENT GOALS

The resource management goals are to enhance the recreational opportunities associated with the presence and operation of the Turners Falls Project.

## 4 EXISTING INFORMATION & NEED FOR ADDITIONAL INFORMATION

### 4.1 Existing Information

#### 4.1.1 Project Description

The Turners Falls Dam is located on the Connecticut River at approximately river mile 122 (above Long Island Sound) on the Connecticut River, in the towns of Gill and Montague in Franklin County, MA. Below the dam, 2.7-mile-long bypassed section of the Connecticut River is paralleled by the power canal. Station No. 1 and Cabot Station discharge into the Connecticut River approximately 0.9 miles and 2.7 miles downstream of the Turners Falls Dam, respectively.

#### 4.1.2 Project Operations

Flow is maintained in the bypass reach at various times of the year either through fishway attraction flow, ladder flow or via a bascule gate. However, when the hydraulic capacity of the power canal, approximately 18,000 cubic feet per second (cfs), is exceeded and water elevations in the Turners Falls Impoundment start to rise, FirstLight will open bascule or tainter gates accordingly to spill water at the dam and into the bypass reach.

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<sup>1</sup> For purposes of this document Northfield Mountain LLC and FirstLight MA Hydro LLC are collectively referred to as FirstLight.

#### 4.1.3 Minimum Flow Requirements

Under the current FERC license for the Turners Falls Project, FirstLight is required to release a continuous minimum flow of 1,433 cfs or inflow, whichever is less, below the Project. FirstLight typically maintains the minimum flow requirement through discharges at Cabot and/or Station No. 1.

A continuous minimum flow of 200 cfs is also maintained in the bypass reach starting on May 1 and increases to 400 cfs when fish passage starts by releasing flow through a bascule gate. The 400 cfs continuous minimum flow is provided through July 15, unless the upstream fish passage season has concluded early, in which case the 400 cfs flow is reduced to 120 cfs. The 120 cfs continuous minimum flow is maintained in the bypass reach from the date the fish ladders are closed (or by July 16) until the river temperature drops below 7°C, which typically occurs around November 15<sup>th</sup>.

In its AFLA, FirstLight proposed the Turners Falls bypass flows shown in **Table 4.1.3-1** below.

**Table 4.1.3-1: Proposed Minimum Flows for Turners Falls Bypass Reach**

Date	Total Bypass Flow <sup>2</sup>	Turners Falls Dam	<sup>3</sup> Station No. 1
01/01-03/31	1,500 cfs or the Naturally Routed Flow (NRF), whichever is less	300 cfs	1,200 cfs <sup>4</sup>
04/01-05-31 <sup>1</sup>	6,500 cfs or the NRF, whichever is less	4,290 cfs	2,210 cfs <sup>4</sup>
06/01-06/15 <sup>1</sup>	4,500 cfs or the NRF, whichever is less	2,990 cfs	1,510 cfs <sup>4</sup>
06/16-06/30 <sup>1</sup>	3,500 cfs or the NRF, whichever is less	2,280 cfs	1,220 cfs <sup>4</sup>
07/01-08/31	1,800 cfs or the NRF, whichever is less	670 cfs	1,130 cfs <sup>4</sup>
09/01-11/30	1,500 cfs or the NRF, whichever is less	500 cfs	1,000 cfs <sup>4</sup>
12/01-12/31	1,500 cfs or the NRF, whichever is less	300 cfs	1,200 cfs <sup>4</sup>

<sup>1</sup>The flow split during these periods is approximately 67% from the Turners Falls Dam and 33% from Station No. 1. If FirstLight conducts further testing, in consultation with the National Marine Fisheries Service (NMFS), US Fish and Wildlife Service (USFWS) and Massachusetts Department of Fish and Game (DFG) and determines that migratory fish are not delayed by passing a greater percentage of the bypass flow via Station No. 1, it may increase the percentage through Station No. 1 upon written concurrence of those agencies.

<sup>2</sup>If the NRF is less than 6,500 cfs (04/01-05/31), 4,500 cfs (06/01-06/15) or 3,500 cfs (06/16-06/30) the flow split will still be set at approximately 67% of the NRF from the Turners Falls Dam and 33% of the NRF from Station No. 1. If the NRF is less than 1,800 cfs (7/1-8/31), 1,500 cfs (9/1-11/30), or 1,500 cfs (12/1-3/31), the Licensee shall maintain the Turners Falls Dam discharges at 670 cfs, 500 cfs, and 300 cfs, respectively.

<sup>3</sup>To maintain the flow split, Station No. 1 must be automated, which will not occur until Year 3 of the license. FirstLight proposes to maintain the flow split such that the Turners Falls Dam discharge will be as shown above, or higher flows will be spilled, in cases where the additional flow cannot be passed through Station No. 1.

<sup>4</sup>The Turners Falls Hydro (TFH) project (FERC No. 2622) and Milton Hilton, LLC project (unlicensed) are located on the power canal and discharge into the bypass reach upstream of Station No. 1. The hydraulic capacity of the TFH project and Milton Hilton, LLC project is 289 and 113 cfs, respectively. If the TFH project is operating, FirstLight will reduce its Station No. 1 discharge by 289 cfs. If the Milton Hilton, LLC project is operating, FirstLight will reduce its Station No. 1 discharge by 113 cfs.

#### 4.1.4 Previous Studies

During the relicensing process, FirstLight performed Study No. 3.6.3 *Whitewater Boating Evaluation* in the 2.7-mile-long Turners Falls Dam bypass reach (from Turners Falls Dam to Cabot Station) in accordance with FERC's ILP. A study report was prepared in March 2015.

The whitewater boating evaluation was conducted in July 2014. A team of whitewater boaters in various types of watercrafts ran up to six evaluation flows (2,500, 3,500, 5,000, 8,000, 10,000 and 13,000 cfs) over a three-day period. The reach was found to provide an acceptable whitewater boating experience for most watercraft types at all six of the study flows, with overall optimal boating conditions for most watercraft type occurring in the 5,000-8,000 cfs range. Additionally, both lower and higher flows rated well with the participants, although the ratings were dependent on type of watercraft and skill level.

Bypass reach access points were also identified as part of this study. The study identified three areas (fishway put-in, Turners Falls Station No. 1 Fishing Access, Cabot Woods Fishing Access) that currently provide access to the bypass reach, and one site (Poplar Street Access) downstream of the bypass reach that currently serves as both the canoe portage put-in and as a take-out for those boating the bypass reach (see **Figure 4.1.4-1**). Both the fishway put-in area and Turners Falls Station No. 1 Fishing Access could provide adequate access to the bypass reach for skilled and experienced whitewater boaters. The Cabot Woods Fishing Access is not suitable for bypass access due to steep slopes.

**Figure 4.1.4-1: Turners Falls Bypass Reach Access Points**



As part of the Turners Falls Recreation Management Plan filed with the AFLA, improvements are proposed for the put-in below the Turners Falls Dam on river-left<sup>2</sup>. There is an existing informal pathway leading to

<sup>2</sup> River-left and river-right refer in this report to the direction when facing downstream.

the base of the dam just downstream of the existing Spillway Ladder. The proposed access would be provided via the existing bridge spanning the power canal (known as the “IP Bridge”). Once over the canal, a formal 12-foot-wide path would lead to the riverbank put-in, with directional signs along the path.

## 4.2 Need for Additional Information

Additional information is needed for lower flows that could potentially allow recreational boaters to paddle through the Turners Falls bypass reach. Through consultation with the Study Team, it was agreed that boat-ability would be assessed at flows of 500 cfs, 670 cfs, and 900 cfs. If 900 cfs is not navigable, a higher flow may be assessed during the study.

## 5 PROJECT NEXUS

FERC policy requires licensees to provide reasonable public recreation opportunities consistent with the safe and effective operation of the Project.

## 6 METHODOLOGY

### 6.1 Study Area

A map of the proposed study area is shown in **Figure 6.1-1** (overview) and **Figure 6.1-2** (upper bypass reach). The study area was identified by the Study Team as the Connecticut River between the Turners Falls Dam and the Cabot Woods access point below Rawson Island. This reach is approximately 2.5 miles long (as measured by the longest paths around the islands). The Fall River joins the Connecticut River approximately 0.16 miles downstream of the dam on river-right.

The upstream segment of Reach 1 extends from the toe of the Turners Falls Dam to the pool upstream of the Turners Falls Road Bridge. This area includes an expansive plunge pool at the base of the dam, which remains wetted from dam leakage and Fall River flows. Flow exiting the plunge pool has two major outlets, separated by a small island (known as Peskeomskut Island) in the center of the channel.

The river-right channel follows the western shore and immediately bifurcates upon exiting the plunge pool into a far-right channel and a center channel (adjacent to the island). The two sub-channels are divided by a bedrock outcrop and both have well-defined channel cross-sections. The far-right channel is generally uniformly wide and comprised of shallow run and riffle morphologies.

The center channel is separated from the far-right channel by a bedrock terrace. It is bedrock controlled, relatively straight, and flume-like. At a dam discharge of 125 cfs, it is approximately 4 or more feet deep and fast-flowing<sup>3</sup>.

The river-left channel has a poorly defined channel and lacks a distinct thalweg. Flow passes over broken ledge and rubble, through crevasses, and over short vertical drops.

All channels converge near the upstream end of the large pool near the Turners Falls Road Bridge, where the bypass reach narrows. The channel continues relatively straight and riverine in form, with a defined thalweg on the river-left side, to the end of the upper bypass at the confluence with the Station No. 1 tailrace.

The lower bypass is approximately 1.4 miles long extending from the Station No. 1 tailrace downstream, terminating at the Rawson Island complex and a geological feature including a natural ledge drop known as Rock Dam. The bedrock-defined channel bifurcates into left, center right, and far right channels around the island. The reach terminates in a pool downstream of Rawson Island.

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<sup>3</sup> As observed during relicensing Study No. 3.3.1 *Instream Flow Habitat Assessments in the Bypass Reach and below Cabot Station*.



Figure 6.1-1: Study Area Map – Overview





Figure 6.1-2: Study Area Map – Peskeomskut Island Area





Figure 6.1-3: Study Area Map – Rawson Island Area





Turners Falls Hydroelectric Project (No. 1889)  
TURNERS FALLS BOATING DEMONSTRATION FLOW DRAFT STUDY PLAN

Figure 6.1-4: Study Area Map – Parking & Access



## 6.2 Logistics

FirstLight will coordinate logistics for the study, including the following:

- Parking and access
- Release of test flows
- Securing of water rescue and emergency medical personnel on standby
- Collection of liability waivers
- Inspection of study area for safety hazards (e.g., rebar)

FirstLight will coordinate with the Study Team to identify potential volunteer boaters for the study. Potential organizations for boater outreach include the Appalachian Mountain Club (AMC), CRC, and other local paddling groups. Ideally, at least 10-15 volunteer boaters are targeted, recognizing availability and weather may limit participation. Requirements for volunteer boaters will include:

- Minimum age: 18
- Minimum paddling skill: Novice (comfortable running Class II whitewater; higher skill level and/or boater safety training preferred)
- Minimum gear:
  - Canoe or kayak (no paddleboards, rafts, or catarafts)
  - Personal flotation device (Type III or Type V)
  - Helmet
  - Closed-toe shoes
  - Wetsuit w/ splash gear OR thermals with dry suit
  - Warm hat/gloves
  - Optional – drybags full of gear or water to simulate a fully loaded canoe

Parking will be available at the Great Falls Discovery Center, the Second Street public parking lot, and/or the Fishway Parking Lot.

The put-in area will be located near the base of the dam on river-left downstream of the existing Spillway Ladder. The put-in will be accessed by walking across the IP Bridge and down informal pathways leading to the riverbank. Two put-in options will be made available during the study. The upstream-most put-in (labeled as Put-In #1 on **Figure 6.1-2**) is located immediately downstream of the Spillway Ladder and would require paddlers to paddle around Peskeomskut Island via the left, center, or right channels. Put-In #2 is located further downstream along the left bank (approximate location marked on **Figure 6.1-2**) and would allow paddlers to skip paddling around the island. This put-in has some ledges in the area where a boat could be launched; the minimum flow that a boat can be launched in this vicinity is currently unknown and will be evaluated as part of this study. Paddlers will be divided into two groups utilizing each of the put-ins (and be consistent with their put-in location for each test flow) so that the navigability of each route can be assessed during the study. Novice paddlers will be encouraged to use the lower put-in to avoid the more difficult paddling conditions around the island.

Two take-out options will also be available. Take-Out #1 will be located on the upstream side of the Station No. 1 tailrace, which is accessible by an informal pathway leading down from the paved parking area. During the study, Station No. 1 will be generating to be representative of projected actual conditions during the paddling season under the proposed new license. The backwater effect of the tailwater release from the station may improve navigability upstream. A tentative release schedule is provided in **Table 6.2-1**. Prior to the study date, FirstLight will perform a test of Station No. 1 generating at the approximate level proposed for the study and evaluate the proposed take-out location for any safety concerns.

**Table 6.2-1: Tentative Release Schedule**

Approximate Time <sup>1</sup>	Release (cfs)		
	<i>Bascule Gate #2</i>	<i>Station No. 1<sup>2</sup></i>	<i>TOTAL</i>
8:30 AM	500	1000	1500
10:30 AM	670	1130	1800
12:00 PM	900	600	1500
2:00 PM	1100	400	1500

<sup>1</sup>Approximate time, to be confirmed by call to control room.

<sup>2</sup>Approximate target flow. Actual flow will vary slightly based on capacities of Station No. 1 units.

Based on discussions since the draft final study plan was circulated, the study area was expanded to include Rawson Island in order to evaluate the navigability of the river-right channels around the island so boaters could avoid Rock Dam in the river-left channel. Some paddlers may take out at Station No. 1 while other, more experienced paddlers may continue down to Rawson Island. It is anticipated that this group will paddle around Rawson Island and slightly back upstream to take out just below Rock Dam via the Cabot Woods fishing access trail. Personnel will be stationed at the upstream end of Rawson Island to discourage paddlers from taking the left channel toward Rock Dam.

Rock Dam is a known hazard at certain flows. Only experienced whitewater paddlers with a trained rescue spotter (with throw bag) stationed on the shoreline are permitted to navigate the left channel over Rock Dam during this study.

### 6.3 Field Study

The boating demonstration flow study will be conducted by assembling the Study Team and volunteer boaters to visually and directly assess navigability in the study area under various flows.

Test flows will be released from Bascule Gate No. 2 at Turners Falls Dam. Proposed test flows include:

- 500 cfs
- 670 cfs
- 900 cfs

If 900 cfs is not navigable, a higher flow (e.g., 1,100 cfs) may be assessed during the study.

After the adjustment of the bascule gate to release each test flow, a wait time of at least 30 minutes will be provided to allow the flow to move through the bypass reach and stabilize.

The test flows will be confirmed by collecting a flow measurement at a suitable location downstream of the dam, within Reach 1, during each flow release. This flow measurement will be collected using an acoustic Doppler current profiler (ADCP). Additionally, the flow in the Fall River will be measured and recorded on each day of the study using an ADCP or a digital flow meter.

Once a given test flow has stabilized, boaters will paddle the reach. If the channel does not appear to be navigable or unsafe for the class boats being considered, boaters can paddle back to the put-in and request a higher flow.

## **6.4 Evaluation**

Boater evaluation forms are provided in **Appendix A**. The following forms are included:

- **Pre-Run Boater Information Form** – To collect contact information and background about the boater’s type of watercraft, skill level, and boating history.
- **Single Flow Evaluation Form** – To evaluate the navigability of each flow.

Participating boaters will complete the Pre-Run Boater Information Form prior to commencing the boating runs, then a Single Flow Evaluation Form after each flow run. Upon completion of the final boating run, a post-evaluation discussion will be facilitated to discuss the study and gather additional feedback from the participants.

Data and feedback collected from the demonstration flow study will be used to make a determination of navigability of the bypass reach by recreational boaters.

## **6.5 Reporting**

The information gathered during these efforts will be summarized in a study report addressing the study goals and objectives identified above. The report will contain an assessment of boating conditions for the range of flows evaluated, including navigability, level of difficulty, and any portage requirements. The report will include a determination of the navigability of the bypass reach by recreational boaters.

## 7 STUDY SCHEDULE

Tables 7-1 and 7-2 below provide tentative schedules for the proposed study.

**Table 7-1: Proposed Study Schedule**

Task/Milestone	Responsibility	Anticipated Completion Date
Planning Meeting	All	Wed, Sep 15
Draft Study Plan Distributed to Study Team	GSE	Fri, Oct 01
Call to Discuss Study Plan	All	Tue, Oct 05
Draft Study Plan Comments Submitted	Study Team	Fri, Oct 08
Event Logistics Confirmed	FirstLight	Tue, Oct 12
Final Study Plan Distributed to Study Team	GSE	Fri, Oct 15
Field Study	All	Tue, Nov 9

**Table 7-2: Tentative Schedule for Day of Study**

Time	Activity
9:00 am – 9:30 am	Meet at Put-In #1, safety briefing, forms, instructions
9:30 am – 10:30 am	Run #1 (500 cfs)
10:30 am – 11:00 am	Shuttle back to put-in, fill out evaluation form
11:00 am – 12:00 pm	Run #2 (670 cfs)
12:00 pm – 12:30 pm	Shuttle back to put-in, fill out evaluation form
12:30 pm – 1:00 pm	Lunch at Great Falls Discovery Center picnic area
1:00 pm – 2:00 pm	Run #3 (900 cfs)
2:00 pm – 2:30 pm	Shuttle back to put-in, fill out evaluation form
2:30 pm – 3:30 pm	Run #4 (optional flow of 1,100 if needed)
3:30 pm – 4:00 pm	Shuttle back to put-in, fill out evaluation form
4:30 pm	End of study



## **APPENDIX A – EVALUATION FORMS**



**Pre-Run Boater Information Form**  
Turners Falls Hydroelectric Project, FERC No. 1889  
Boating Demonstration Flow Study

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Email Address: \_\_\_\_\_

1. What type of watercraft will you be using for this boating flow evaluation? *(Check one)*

Canoe                       Kayak                       Other (describe): \_\_\_\_\_

2. Please provide the name of your tandem paddling partner (in the same boat with you), if any:

\_\_\_\_\_

3. How many years have you been using this type of watercraft? \_\_\_\_\_ years

4. How would you rate your skill level with this type of watercraft? *(Check one)*

*Whitewater classifications defined on next page.*

- Novice (comfortable running Class II whitewater)
- Intermediate (comfortable running Class III whitewater)
- Advanced (comfortable running Class IV whitewater)
- Expert (comfortable running Class V whitewater)

5. In general, how many days per year do you spend paddling? \_\_\_\_\_ days

*(Please use a whole number rather than a range; it's fine to estimate.)*

6. What is your age? \_\_\_\_\_ *(must be at least 18 years old to participate)*

7. Have you boated this reach before?  Yes  No

8. Will you be using the provided shuttle services for this study? *(Check all that apply)*

Boat Shuttle                       Person Shuttle *(must be vaccinated and masked)*

## International Whitewater Scale

- **Class I** – Fast moving water with riffles and small waves. Few obstructions, all obvious and easily missed with little training. Risk to swimmers is slight; self-rescue is easy.
- **Class II** – Straightforward rapids with wide, clear channels which are evident without scouting. Occasional maneuvering may be required, but rocks and medium-sized waves are easily missed by trained paddlers. Swimmers are seldom injured and group assistance, while helpful is seldom needed.
- **Class III** – Rapids with moderate, irregular waves which may be difficult to avoid, and which can swamp an open canoe. Complex maneuvers in fast current and good boat control in tight passages or around ledges are often required; large waves or strainers may be present but are easily avoided. Strong eddies and powerful current effects can be found, particularly on large-volume rivers. Scouting is advisable for inexperienced parties. Injuries while swimming are rare; self-rescue is usually easy, but group assistance may be required to avoid long swims.
- **Class IV** – Intense, powerful but predictable rapids requiring precise boat handling in turbulent water. Depending on the character of the river, it may feature large, unavoidable waves and holes or constricted passages demanding fast maneuvers under pressure. A fast, reliable eddy turn may be needed to initiate maneuvers, scout rapids, or rest. Rapids may require “must” moves above dangerous hazards. Scouting may be necessary the first time down. Risk of injury to swimmers is moderate to high, and water conditions may make self-rescue difficult. Group assistance for rescue is often essential but requires practiced skills. A strong eskimo roll is highly recommended.
- **Class V** – Extremely long, obstructed, or very violent rapids which expose a paddler to added risk. Drops may contain large, unavoidable waves and holes or steep, congested chutes with complex demanding routes. Rapids may continue for long distances between pools, demanding a high level of fitness. What eddies exist may be small, turbulent, or difficult to reach. At the high end of the scale, several of these factors may be combined. Scouting is recommended but may be difficult. Swims are dangerous, and rescue is often difficult even for experts. A very reliable eskimo roll, proper equipment, extensive experience, and practiced rescue skills are essential.

**Single Flow Evaluation Form**  
 Turners Falls Hydroelectric Project, FERC No. 1889  
 Boating Demonstration Flow Study

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Name: \_\_\_\_\_

1. Please indicate which flow release this survey corresponds to. *(Check one)*

- 500 cfs                       670 cfs                       900 cfs                       Other: \_\_\_\_\_

2. Did you load your boat with gear or other weights for this run?  Yes  No

3. Put-in location for this run:  Put-In #1 (at fish ladder)     Put-In #2 (below Peskeomskut Island)

4. Take-out location for this run:  Take-Out #1 (Station No. 1)     Take-Out #2 (Cabot Woods)

5. Channel taken past Peskeomskut Island: *(Note "left" & "right" refer to direction facing downstream.)*

- Left             Center Right (deep chute)             Far Right             N/A (put in below island)

6. Channel taken past Rawson Island:

- Left (Rock Dam)             Center Right             Far Right             N/A (took out above island)

7. Please evaluate this flow for your watercraft and skill level for each of the following characteristics.  
*(Circle one number for each characteristic.)*

	Totally unacceptable	Unacceptable	Neutral	Acceptable	Totally acceptable	If unacceptable, was flow:	
						Too low	Too high
Navigability	-2	-1	0	1	2		
Safety	-2	-1	0	1	2		
Ease of put-in	-2	-1	0	1	2		
Scrapes/bumps No. of times: _____	-2	-1	0	1	2		
Portages <sup>1</sup> No. of times: _____	-2	-1	0	1	2		

<sup>1</sup>Include any instances where you needed to get out of your boat and carry/drag the boat over or around an obstacle.

8. Did you experience any difficulties during your run **at this flow** (e.g., stuck on obstacles, had to portage, etc.)? Provide a brief description and location of any difficulty.

Difficulty	Location in Bypass

9. Are you likely to return for future boating along this reach at **this** flow? (Check one)

- Definitely not     
  Possibly     
  Probably     
  Definitely yes

10. Based on the International Whitewater Scale (defined below), how would you rate the whitewater difficulty of the run at **this** flow? (If appropriate, provide a range of classifications for **this** flow.)

This flow rates as Class: \_\_\_\_\_

11. What skill level do you think a paddler needs to safely paddle the bypass at **this** flow? (Check one)

- Beginner     
  Novice     
  Intermediate     
  Advanced     
  Expert

12. Please provide any additional comments about **this** flow below.

**International Whitewater Scale**

- **Class I** – Fast moving water with riffles and small waves. Few obstructions, all obvious and easily missed with little training. Risk to swimmers is slight; self-rescue is easy.
- **Class II** – Straightforward rapids with wide, clear channels which are evident without scouting. Occasional maneuvering may be required, but rocks and medium-sized waves are easily missed by trained paddlers. Swimmers are seldom injured and group assistance, while helpful is seldom needed.
- **Class III** – Rapids with moderate, irregular waves which may be difficult to avoid, and which can swamp an open canoe. Complex maneuvers in fast current and good boat control in tight passages or around ledges are often required; large waves or strainers may be present but are easily avoided. Strong eddies and powerful current effects can be found, particularly on large-volume rivers. Scouting is advisable for inexperienced parties. Injuries while swimming are rare; self-rescue is usually easy, but group assistance may be required to avoid long swims.
- **Class IV** – Intense, powerful but predictable rapids requiring precise boat handling in turbulent water. Depending on the character of the river, it may feature large, unavoidable waves and holes or constricted passages demanding fast maneuvers under pressure. A fast, reliable eddy turn may be needed to initiate maneuvers, scout rapids, or rest. Rapids may require “must” moves above dangerous hazards. Scouting may be necessary the first time down. Risk of injury to swimmers is moderate to high, and water conditions may make self-rescue difficult. Group assistance for rescue is often essential but requires practiced skills. A strong eskimo roll is highly recommended.
- **Class V** – Extremely long, obstructed, or very violent rapids which expose a paddler to added risk. Drops may contain large, unavoidable waves and holes or steep, congested chutes with complex demanding routes. Rapids may continue for long distances between pools, demanding a high level of fitness. What eddies exist may be small, turbulent, or difficult to reach. At the high end of the scale, several of these factors may be combined. Scouting is recommended but may be difficult. Swims are dangerous, and rescue is often difficult even for experts. A very reliable eskimo roll, proper equipment, extensive experience, and practiced rescue skills are essential.