| | |
|---|---|
| **From:** | Irvine, Melanie |
| **To:** | Gosse, Matthew; Dawn Chaplin; Julia Schwarz |
| **Cc:** | Andrews, Catherine |
| **Subject:** | RE: New Water Control Structure, Torbay File #22-HNFL-00651 |
| **Date:** | Monday, November 7, 2022 3:46:03 PM |
| **Attachments:** | image002.png<br>image003.png<br>image004.png<br>image005.png |

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Thank you very much Matthew for your email. I was able to download the file, and we look forward to hearing from you next week,

Cheers,

Melanie

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**From:** Gosse, Matthew <matthew.gosse@wsp.com>
**Sent:** Monday, November 7, 2022 3:28 PM
**To:** Irvine, Melanie <Melanie.Irvine@dfo-mpo.gc.ca>; Dawn Chaplin <dchaplin@torbay.ca>; Julia Schwarz <jschwarz@torbay.ca>; matthew.gosse@wsp.com
**Cc:** Andrews, Catherine <Catherine.Andrews@dfo-mpo.gc.ca>
**Subject:** RE: New Water Control Structure, Torbay File #22-HNFL-00651

Hi Melanie,

There was an EA registration prepared for this project (which was submitted after this Request for Review) which might address some of the details that you are looking for. Unfortunately, the document is quite large, and I won't likely be able to email it. I will follow up this email with a OneDrive link for the document. The document was submitted to the provincial government for informal review, and we were then informed that EA registration was not required (letter from the province is attached).

We will be meeting next Monday to discuss this project, next steps and your information requests. I will advise you after that meeting the status of anything that may be outstanding, and tentative timelines for completion.

Thanks Melanie!

Matt

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**From:** Irvine, Melanie <Melanie.Irvine@dfo-mpo.gc.ca>
**Sent:** Monday, November 7, 2022 1:59 PM
**To:** Dawn Chaplin <dchaplin@torbay.ca>; Julia Schwarz <jschwarz@torbay.ca>; matthew.gosse@wsp.com
**Cc:** Andrews, Catherine <Catherine.Andrews@dfo-mpo.gc.ca>
**Subject:** RE: New Water Control Structure, Torbay File #22-HNFL-00651

**CAUTION:** External email. Please do not click on links/attachments unless you know the content is genuine and safe.

Hello all,

Thank you very much for submitting the project review for a new water control structure in Torbay (File #22-HNFL-00651).

The report *Great Pond Fish and Fish Habitat* provided excellent information onto the fish and habitat of the area, thank you for this.  In order for us to proceed with the review of the project, we will need more details onto the project itself, in particular on the fishway, access roads and control structure. When you have additional information, please forward it directly to myself and Catherine Andrews, who is the senior biologist working on this file. We do not need detailed engineering drawings at this stage, but sketches (even hand-drawn), information on the location of the infrastructure and when the work will be conducted  are required for us to be able to determine the potential impacts of the project on fish and fish habitat, and for us to suggest mitigation measures.

We will keep the file open, but will put it on hold until we have additional information.

Thank you for your assistance on this project, and let us know if you have any questions or concerns.

Melanie

*Melanie Irvine*

Melanie Irvine, MSc
Biologist | Biologiste
Fish and Fish Habitat Protection Program | Programme de protection du poisson et de son l'habitat
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans | Pêches et Océans Canada
Northwest Atlantic Fisheries Centre| Centre des pêches de l'Atlantique Nord-ouest
80 East White Hills Road | 80 chemin East White Hills
St John's, NL A1C 5X1 | St John's, TN A1C 5X1
melanie.irvine@dfo-mpo.gc.ca
Cellular| Cellulaire (709)-327-8162

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**From:** Julia Schwarz
**Sent:** Wednesday, November 2, 2022 3:20 PM
**To:** 'Irvine, Melanie' <Melanie.Irvine@dfo-mpo.gc.ca>; chaplin@torbay.ca; matthew.gosse@wsp.com
**Subject:** RE: New Water Control Structure, Torbay File #22-HNFL-00651

Hello Melanie,

I acknowledge receipt on behalf of the Town of Torbay. To best of my knowledge, we have not proceeded to detailed engineering drawing stage as of yet. We will discuss with WSP (formerly Wood) and get back to you as to anticipated timelines.

Best regards,
Julia

**Julia Schwarz,** MCIP, CSLA
Director of Planning & Development

t. (709) 437-6532 ext. 224 f. (709) 437-1309 w. torbay.ca
1288 Torbay Road, P.O. Box 1160, Torbay, NL A1K 1K4


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**From:** Irvine, Melanie <Melanie.Irvine@dfo-mpo.gc.ca>
**Sent:** Wednesday, November 2, 2022 11:59 AM
**To:** Julia Schwarz <jschwarz@torbay.ca>; chaplin@torbay.ca; matthew.gosse@wsp.com
**Subject:** New Water Control Structure, Torbay File #22-HNFL-00651

Hello,

In order for us to continue the review of your project for a new water control structure in Torbay (File number #22-HNFL-00651), would you be able to provide information onto the following?

1. Please provide full scale engineering drawings of the proposed structures in water (fish passage structure, water intake and control structure)
2. Can you identify areas where clearing of riparian vegetation will be required
3. Please provide the timeline for the proposed work
4. Please provide details on the location of any access roads for roads near water or where stream crossings (e.g. bridges, culverts) will be required.

Thank you for your assistance. Please let me know if you have any questions or concerns, Melanie

*Melanie Irvine*

Melanie Irvine, MSc
Biologist | Biologiste
Fish and Fish Habitat Protection Program | Programme de protection du poisson et de son l'habitat
Ecosystems Management | Gestion des écosystèmes
Fisheries and Oceans | Pêches et Océans Canada
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# Request for Review

Please note that Guidance on Submitting a Request for Review is available at the end of this form. This guidance explains the requirements for a Request for Review by DFO under the fish and fish habitat protection provisions of the *Fisheries Act*. All information requested must be provided. If you attach documents to your application with additional information, you must still provide appropriate summaries in the spaces provided on the application document or your application will be considered incomplete.

## A) Contact information

|  |  | Select additional contact: Contractor/Agency/Consultant *(if applicable)*: |
|---|---|---|
| Name of Business/Company: | Town of Torbay | Wood Environment & Infrastructure Solutions<br>Attn: Matthew Gosse |
| Name of Proponent: | Julia Schwarz or Dawn Chaplin | |
| Mailing address: | 1288 Torbay Road | 36 Pippy Place |
| City/Town: | Torbay | St. John's |
| Province/Territory: | NL | NL |
| Postal Code: | A1K 1K4 | A1B 4A5 |
| Tel. No. : | 709-437-6532 | 709-722-7023 |
| Fax No.: | 709-437-1309 | 709-722-7353 |
| Email: | jschwarz@torbay.ca / dchaplin@torbay.ca | matthew.gosse@woodplc.com |

Is the Proponent the main/primary contact? (●) Yes ( ) No

**All definitions are provided in Section G of the Guidance on Submitting a Request for Review*

If no, please enter information for the primary contact or any additional contact.

## B) Description of Project

If your project has a title, please provide it.

Great Pond Drinking Water Supply

Is the project in response to an emergency circumstance*? ◯ Yes ◉ No

Does your project involve work in water? ◉ Yes ◯ No

If yes, is the work below the High Water Mark*? ◉ Yes ◯ No

What are you planning to do? Briefly describe all project components you are proposing in or near water.

Develop and utilize Great Pond as a public drinking water supply for the Town of Torbay. This will include the construction of a water intake, control structure at the outflow, a water treatment plant, and associated infrastructure. Fish passage will be maintained with a constructed Fish Passage Facility.

How are you planning to do it? Briefly describe the construction materials, methods and equipment that you plan to use.

Construction of the Great Pond water treatment plant, intake line, water control structure and fishway and associated components will follow standard construction methods. The intake line is expected to be 400 mm HDPE. The control structure and fishway will be of concrete construction. The treatment plant building will have concrete foundations and wood or steel frame construction. The work that is anticipated near or in water includes the construction of the water intake, control structure and fishway. All work will be completed in adherence to requirements of permits and approvals from applicable regulatory agencies and environmental protection guidelines.

Include a site plan (figure/drawing) showing all project components in and near water.

Are details attached? ◉ Yes ◯ No

Identify which work categories apply to your project.

- ☐ Aquaculture Operations
- ☐ Aquatic Vegetation Removal
- ☐ Beaches
- ☐ Berms
- ☐ Blasting / Explosives
- ☐ Boat Houses
- ☐ Boat Launches / Ramps
- ☐ Breakwaters
- ☐ Bridges
- ☐ Cable Crossings
- ☐ Causeways
- ☐ Culverts
- ☐ Dams
- ☐ Dewatering / Pumping
- ☐ Docks
- ☐ Log Handling / Dumps
- ☐ Log Removal
- ☐ Moorings
- ☐ Open Water Disposal
- ☐ Piers
- ☒ Riparian Vegetation Removal
- ☐ Seismic Work
- ☐ Shoreline Protection
- ☐ Stormwater Management Facilities
- ☒ Surface Water Taking
- ☐ Tailings Impoundment Areas
- ☐ Temporary Structures
- ☐ Turbines
- ☒ Water Control Structures
- ☒ Water Intakes / Fish Screens

**All definitions are provided in Section G of the Guidance on Submitting a Request for Review*

- ☐ Dredging / Excavation
- ☐ Dykes
- ☒ Fishways / Ladders
- ☐ Flow Modification (hydro)
- ☐ Groundwater Extraction
- ☐ Groynes
- ☐ Habitat Restoration
- ☐ Ice Bridges
- ☐ Water Outfalls
- ☐ Watercourse Realignment
- ☐ Weirs
- ☐ Wharves
- ☐ Wind Power Structures
- ☐ Other    Please Specify: 

Was your project submitted for review to another federal or provincial department or agency? (●) Yes ( ) No

If yes, indicate to whom and associated file number(s).

Project will be registered for Environmental Assessment with the Government of Newfoundland and Labrador Department of Environment and Climate Change. Registration is anticipated for Fall 2022.

## C) Location of the Project

Coordinates of the proposed project Latitude ______ N Longitude ______ W

OR UTM zone 22 ; 367471 Easting

5280541 Northing

Include a map clearly indicating the location of the project as well as surrounding features.

| | |
|---|---|
| Name of Nearest Community (City, Town, Village): | Torbay |
| Municipality, District, Township, County, Province: | Torbay |
| Name of watershed (if applicable): | Big River |
| Name of watercourse(s) or waterbody(ies) near the proposed project: | Great Pond and Big River |

Provide detailed directions to access the project site:

Great Pond is accessed from Bauline Line Extension, where an undeveloped lot is located approximately 200m west of the Torbay Bypass intersection. Great Pond Outflow crosses Bauline Line Extension through a culvert, approximately 500m west of the Torbay Bypass intersection.

## D) Description of the Aquatic Environment

Identify the predominant type of aquatic habitat where the project will take place.

- ( ) Estuary (Estuarine)
- (●) Lake (Lacustrine)
- ( ) On the bank/shore at the interface between land and water (Riparian)
- ( ) River or stream (Riverine)
- ( ) Salt water (Marine)

**All definitions are provided in Section G of the Guidance on Submitting a Request for Review*

○ Wetlands (Palustrine)

Provide a detailed description of biological and physical characteristics of the proposed project site. This description should include information on aquatic species at risk* (https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html), their residence* and critical habitat* if found in the area. An overview of the distribution of aquatic species at risk and the presence of their critical habitat within Canadian waters can be found here http://dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html

An initial fish and fish habitat study was completed in Great Pond, the Great Pond Outflow and Big River during the summer of 2021. This included fyke netting within the lacustrine habitat (Great Pond) and electrofishing in the riverine habitats.

Within the Great Pond outflow, Brook Trout (Salvelinus fontinalis) was the most abundant species captured (mean abundance estimate of 42.4 fish/100m2)m, with Threespine Stickleback (Gasterosteus aculeatus) and Rainbow Trout (Oncorhynchus mykiss) also being present. Rainbow Trout were present in much lower abundance (8.4 fish/100m2). Species assemblage was the same in Big River, however, Rainbow Trout were the most abundant species in that area (25.5 fish/habitat unit).

Brook Trout and Threespine Stickleback were captured within Great Pond. Threespine Stickleback were captured in large quantities, with estimates of 2,279.33 fish/net-night, while Brook Trout were much less abundant (4.13 fish/net-night). Rainbow Trout were not captured in Great Pond throughout the fish habitat study, however there are anecdotal observations of them within the pond.

There are no species at risk or critical habitats present within the project area.

The 2021 Fish and Fish Habitat Study is appended to this Request form.

Include representative photos of affected area (including upstream and downstream area) and clearly identify the location of the project.

## E) Potential Effects of the Proposed Project

Have you reviewed the Pathways of Effects (PoE) diagrams (http://www.dfo-mpo.gc.ca/pnw-ppe/pathways-sequences/index-eng.html) that describe the type of cause-effect relationships that apply to your project?

◉ Yes ○ No

If yes, select the PoEs that apply to your project.

- ☐ Addition or removal of aquatic vegetation
- ☒ Change in timing, duration and frequency of flow
- ☐ Cleaning or maintenance of bridges or other structures
- ☐ Dredging
- ☐ Excavation
- ☒ Fish passage issues
- ☐ Grading
- ☐ Marine seismic surveys
- ☐ Organic debris management
- ☐ Placement of marine finfish aquaculture site
- ☒ Placement of material or structures in water
- ☐ Riparian Planting
- ☐ Streamside livestock grazing
- ☐ Structure removal
- ☐ Use of explosives
- ☐ Use of industrial equipment
- ☒ Vegetation Clearing
- ☐ Wastewater management
- ☒ Water extraction

Will there be changes (i.e., alteration) in the fish habitat*? ◉ Yes ○ No ○ Unknown

If yes, provide a description.

A control structure will be placed at the outflow of Great Pond, with all work being completed in the dry to avoid sedimentation issues. This will result in a temporary reduction in habitat quantity. Once work is completed, the construction area will be rewatered. A fish passage facility will be incorporated into the design to ensure fish passage is unimpeded.

A treatment plant will be designed to handle 0.05m3/s, which will result in a flow reduction of approximately 30% for the Great Pond Outflow. A wetted perimeter model has been developed to determine the minimum flow release required to maintain fish habitat within Great Pond inflow, and has been incorporated into the design of the treatment facility.

*All definitions are provided in Section G of the Guidance on Submitting a Request for Review*

Riparian vegetation clearing is expected in the immediate area of the control structure and any access roads that may be required. Any riparian clearing will be minimized, and all other buffer areas will be maintained.

Additional details on the Wetted Perimeter Model area included in the 2021 Fish and Fish Habitat Report, which is attached to the Request form.

Is there likely to be a harmful alteration, disruption or destruction of habitat used by fish? ○ Yes ◉ No ○ Unknown

Is there likely to be destruction or loss of habitat used by fish? ○ Yes ◉ No ○ Unknown

What is the footprint (area in square meters) of your project that will take place below the high water mark*?

<200m2 (footprint of the control structure and intake valve)

Is your project likely to change water flows or water levels? ◉ Yes ○ No ○ Unknown

If your project includes withdrawing water, provide source, volume, rate and duration.

Great Pond is proposed to become a water supply for the Town of Torbay. Treatment plants are being designed to handle 0.05m3/s (50L/second). Current project design does not include decommissioning.

If your project includes a water control structure, provide the % of flow reduction.

A water control structure is being designed for the outflow of Great Pond, and a 30% flow reduction is anticipated. Using a Wetted Perimeter Model (see attached), a minimum flow of 0.05m3/s will be required to maintain fish habitat within the Great Pond Outflow. Flow reductions in Big River are expected to be negligible (<5% reduction).

If your project includes discharge of water, provide source, volume and rate.

Waste water from the proposed water treatment plant will be discharged at the site to a rock sump.

Will your project cause death of fish? ○ Yes ◉ No ○ Unknown

If yes, how many fish will be killed (for multi-year project, provide average)? What species and lifestages?

What is the time frame of your project?

The construction will start on 06/01/2023 and end by 10/31/2024

If applicable, the operation will start on ______ and end by ______

If applicable, provide schedule for the maintenance

If applicable, provide schedule for decommissioning

Decommissioning of this project is currently not planned or anticipated.

Are there additional effects to fish and fish habitat that will occur outside of the time periods identified above? ○ Yes ◉ No

(If yes, provide details)

Can you follow appropriate Timing Windows (http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html) for all your project activities below the High Water Mark*? ◉ Yes ○ No

*All definitions are provided in Section G of the Guidance on Submitting a Request for Review*

(If no, provide explanations.)

Big River is a non-scheduled river for Atlantic Salmon, Brown Trout or Rainbow Trout. Dewatering of Great Pond Outflow will not occur later than September 15.

Have you considered and incorporated all options for redesigning and relocating your project to avoid negative effects to fish and fish habitat?

(●) Yes ( ) No

If yes, describe.

Relocation of the Project is not feasible. Design of the project has been developed to minimize any impact to fish or fish habitat.

Have you consulted DFO's Fish and Fish Habitat Protection Measures Habitat (https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html) to determine which measures apply to your project? (●) Yes ( ) No

Will you be incorporating applicable measures into your project? (●) Yes ( ) No

If yes, identify which ones. If No, identify which ones and provide reasons.

1. Preventing fish death - No fish will be intentionally harmed as a result of this project, and timing windows will be adhered to as close as logistically possible for any in water works. If logistically feasible, in water work will occur under low flow conditions.
2. Maintain fish passage - While fish passage will temporarily be obstructed, a fish passage facility will be incorporated into the final design to ensure no permanent obstruction is present.
3. Carry out works, undertakings and activities on Land - Where applicable, all works, equipment maintenance and fueling, will be completed on land, away from any shorelines. Any in water works (i.e. construction of the control structure) will be carried out in the dry (dewatered) stream bed.
4. Ensure proper sediment control - All outlined sedimentation control measures will be adhered too.
5. Prevent entry of deleterious substances in water - All outlined control measures to avoid spills of deleterious substances will be adhered too.

Have you considered whether DFO standards and codes of practice apply to your project? ( ) No (●) Yes

If Yes, include a list.

End-of-pipe fish protection screens for small water intakes in freshwater
Temporary cofferdams and diversion channels

Have you considered other avoidance and mitigation measures? ( ) No (●) Yes

If Yes, include a list.

Access roads and construction methods will adhere to all applicable guidance as outlined by DFO. Required in water work will occur outside of Brook Trout spawning season (prior to September 15). If logistically feasible, in water work will occur under low flow conditions.

Are there any relevant measures that you are unable to incorporate? ( ) Yes (●) No

(If yes, identify which ones.)

All relevant measures will be adhered too.

What harmful effects to fish and fish habitat do you foresee after taking into account the avoidance and mitigation measures described above?

No harmful effects to fish or fish habitat are expected as a result of this project.

*All definitions are provided in Section G of the Guidance on Submitting a Request for Review*

Do these include effects on aquatic species at risk*? (●) Yes ( ) No

If yes, please describe, including how many individuals will be harmed, harassed, or otherwise affected by the project, and how?

No harmful effects to aquatic species at risk are expected as a result of this project.

Do these include effects on areas identified as their residence or critical habitat? (●) Yes ( ) No

If yes, please describe

No harmful effects to aquatic critical habitat are expected as a result of this project.

Are there any aquatic invasive species in the vicinity of your project area? ( ) Yes (●) No

(If yes, identify which ones.)

Aquatic invasive species are not anticipated within the project area.

Does your project aim to, or will it be likely to, effect any of these aquatic invasive species? ( ) Yes (●) No

If yes, how?

## F) Signature

I, Dawn Chaplin (print name) certify that the information given on this form is to the best of my knowledge, correct and completed.

N. DAWN CHAPLAN

Signature

31/08/2022

Date

Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the Fish and Fish Habitat protection provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank DFO-PPU-680. Under the *Privacy Act*, Individuals have a right to, and on request shall be given access to any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at www.infosource.gc.ca or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provision of the *Access to Information Act*.

**All definitions are provided in Section G of the Guidance on Submitting a Request for Review*

# Guidance on Submitting a Request for Review

This document explains the requirements for a Request for Review by DFO under the fish and fish habitat protection provisions of the *Fisheries Act*. To determine whether you should request a review, visit DFO's Projects Near Water webpage (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html).

Incomplete Requests for Review will be returned to the applicant without review by DFO. All information requested must be provided. If you attach documents to your application with additional information, you must still provide appropriate summaries in the spaces provided on the application document or your application will be considered incomplete.

## Section A: Contact Information

Provide the full legal name of the proponent and primary mailing address for the proponent. When the proponent is a company, identify the full legal registered name of the company.

If applicable, also provide the contact information of the duly authorized representative of the proponent. Please note that a copy of correspondence to Contractor/Agency/Consultant will also be sent to the Proponent.

## Section B: Description of Project

This information is meant to provide background about the proposed project. All components of the proposed project in or near water, must be described.

Proponents should provide information about all appropriate phases of the project, i.e., the construction, operation, maintenance and closure phases for the proposed project.

All details about the construction methods to be used, associated infrastructure, permanent and temporary structure, structure type (e.g. corrugated steel pipe vs box culvert), structures dimension, building materials to be used, machinery and equipment to be used must also be provided. For example, the construction of p**ermanent structures** may require the construction of temporary structures such as temporary dikes, in conjunction with other associated activities like the withdrawal of water, land clearing, excavation, grading, infilling, blasting, dredging, installing structures, draining or removing debris from water. Similarly, the equipment and materials to be used may include hand tools, backhoes, gravel, blocks or armor stone (provide the average diameter), concrete (indicate if pre-cast or poured in-water), steel beams or wood.

When physical structures in or near water are proposed, provide the plan and specifications of those works which would require a review.

## Section C: Location of the Project

The purpose for this information is to describe and illustrate the location of the proposed project, and to provide geographical and spatial context. The information should also facilitate an understanding of how the project will be situated in relation to existing structures.

The details to be provided must include:

- Coordinates of the project (e.g., Latitude and Longitude or Universal Transverse Mercator Grid coordinates);
- A map(s), site plan, or diagrams indicating the high water mark and the location, size and nature of proposed and existing structures (e.g., floating or fixed), landmarks and proposed activities. In a marine setting, it may be helpful to depict the approximate location of the proposed development on a nautical chart or showing the relation of the site to sea marks or other navigational aids. These plans, maps or diagrams should be at an appropriate scale to help determine the relative size of the proposed structures and activities, the proximity to the watercourse or waterbody and the distance from existing structures;
- The community nearest to the location of the proposal as means to provide a general reference point. When possible, proponents should use geographical names recognized by the Geographical Names Board of Canada (http://www.nrcan.gc.ca/earth-sciences/geography-boundary/geographical-name/11680).
- If available, provide aerial photographs or satellite imagery of the water source(s) and waterbody(ies);
- Names of the watershed(s), water source(s) and/or waterbody(ies) likely to be affected by the proposal; and
- Brief directions to access the proposed project site.

## Section D: Description of the Aquatic Environment

Proponents must describe the environmental context and aquatic resources present at the proposed site. The information must identify the current state of the fish and fish habitat prior to the carrying on of the project.

It is important to include information about the fish species present, the biological, chemical, physical features present (habitat characteristics), and the fish life-cycle functions (fish characteristics).

The spatial scope for assessing fish and fish habitat should encompass the direct physical footprint of the project, and the upstream and downstream areas affected.

As an example, the following is a non-exhaustive and non-prescriptive list of some common attributes which may characterize the aquatic environment:

- Type of water source or watercourse (groundwater, river, lake, marine, estuary, etc.);
- Characteristics of the water source or waterbody could include:
  - Substrate characterization - describe the types of substrate (e.g., bedrock, boulder, cobble, gravel etc.), identify the predominant substrate type (e.g., 80% cobble, 20% gravel etc.) and provide maps of the substrate;
  - Aquatic and riparian vegetation characterization - identify the prevalent types of vegetation (e.g. rooted, submerged, emergent, etc.), identify the relative abundance of the vegetation (e.g., 10% cattails, 80% grass, 10% sedge) , indicate the predominant vegetation (e.g., by species or types) and identify the vegetation densities (e.g., type of vegetation/ area);
  - Flow characterization - specify if the flow is controlled or if it is natural, identify if the flow is permanent or intermittent, identify the current and tide (marine environment) etc.;
  - Physical waterbody characterization - identify the average depth of water for water bodies, identify bathymetry of water bodies, provide bathymetric maps where available, channel width ( determine the width of the channel from the high water mark), slope ;
  - Water quality characterization - (e.g., annual or average pH, salinity, alkalinity, total dissolved solids, turbidity, temperature etc.);
  - Biological water quality characterization - (e.g., benthic macro-invertebrates, zooplankton, phytoplankton, etc.)
- Fish species characterization - identify the fish species (including molluscs, crustaceans, etc.) known or suspected to be in the area, predator prey relationships etc. Identify what source of information was used to determine the presence of fish in that area; and
- Estimate the fish abundance - estimate the number of fish present, estimate the year class for each species etc.

There are many different methods and attributes available to characterize fish and fish habitat. Proponents must describe all sources of information used, all fish and environment sampling techniques used, all modelling techniques used and all other approaches used to define the fish and fish habitat. Proponents are encouraged to use recognized fisheries inventory methods such as those approved by DFO or provinces and territories, and/or scientifically defensible methodologies and techniques whenever possible.

Whenever possible, proponents should support descriptions of the aquatic environment with the use of detailed drawings, such as plans or maps and photographs of the habitat features. In an offshore marine setting, photos may not be useful to depict the proposed development site. Instead describe and/or sketch the specific features of the sea floor which may include the presence of submarine features such as canyons, cliffs, caverns, etc.

## Section E: Potential Effects of the Proposed Project

The objective of this section is to identify all anticipated effects on fish and fish habitat likely to be caused by the project. Proponents should consider all mitigation or avoidance techniques.

The description must include qualitative and/or quantitative information about the predicted/potential effects to fish species and fish habitat. Some examples of likely effects may include mortality to fish, area of habitat loss, change to flow, changes to habitat function, reduction in prey availability etc.

**All definitions are provided in Section G of the Guidance on Submitting a Request for Review*

The spatial scope of the aquatic effects assessment would include the direct physical "footprint" of the proposed project, and any areas indirectly affected, such as downstream or upstream areas. The footprint of each component of the project below the higher water mark should be provided individually. This may also include areas in or on the water, on the shoreline, coast or bank(s) (i.e., in the riparian zone).

The assessment must include the following attributes:

- Identification of all fish species affected by the proposed project as well as their life stages (e.g., juvenile, yearling, adult, etc.);
- Identification of the type of fish habitat affected (e.g., spawning habitat - gravel and cobble, feeding and rearing areas - side channel slough, small tributaries, etc.), estimate of the affected area (e.g., square meters or hectares);
- Description of the effect (e.g., mortality to fish from entrapment, delayed migration of spawning adults, reduction in prey availability, etc.)
- Probability of the effect - this is the likelihood of the effect occurring (e.g., probability of fish strike from turbines for specific fish sizes, probability of sediment plume within a distance from source, etc., or qualitative assessment: low, medium, high)
- Magnitude of the effect - this is the intensity or severity of the effect (e.g., total number of fish affected, or qualitatively assessment: low, medium, high).
- Geographic extent of the effect - this is the spatial range of the effect (e.g., localized to 100m from the work, channel reach or lake region, entire watershed etc.); and
- Duration of the effect - this is the temporal period for which the effect will persist (e.g., duration of delay to fish migration in hours, days, months or years).

The information to be provided must also describe the methods and techniques used to conduct the assessment. As much as possible, methods and techniques used should be scientifically defensible.

The schedule should, at minimum, identify the proposed start and end dates for carrying out each proposed activity, and where applicable, identify the respective phase of the proposal; i.e., the construction, operation, maintenance and closure phases. In some cases, in order to provide additional context, it may be relevant to identify other information such as the expected life span of permanent and temporary structures.

Proponents must provide comprehensive information about all available measures that are proposed to avoid or mitigate potential harmful alteration, disruption or destruction of fish habitat, or death of fish (e.g., in standards or codes of practice).

Residual harmful impacts that remain after the application of such measures.

It is important to clearly describe and quantify harmful impacts because DFO will use this information as part of its decision making on whether harmful alteration, disruption or destruction of fish habitat or death of fish is likely and an authorization is required under subsection 35(2)(*b*) or 34.4(2)(b) of the *Fisheries Act*.

## Section F: Submission and Signature

The proponent must sign their application. A signed original of the Request for Review must be provided to the regional DFO office (http://www.dfo-mpo.gc.ca/pnw-ppe/contact-eng.html), even if an electronic copy was sent by email. Should the review of your project indicate that harmful alteration, disruption or destruction of fish habitat or death of fish is likely, the information provided in the Request for Review document can be referred to in the subsequent application for an authorization under Paragraphs 35(2)(*b*) or 34.4 of the *Fisheries Act*.

## Section G: Definitions

**Aquatic Species at Risk**: an extirpated, endangered, threatened species, or a species of special concern. A non-exhaustive list of aquatic species at risk found in Canadian waters can be found here (http://www.dfo-mpo.gc.ca/species-especes/sara-lep/identify-eng.html).

**Aquatic Species at Risk Critical Habitat**
the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species critical habitat in the recovery strategy or in an action plan for the species.

**Aquatic Species at Risk Residence**: the specific dwelling place, such as a den, nest or other similar area or a place that is occupied or habitually occupied by one or more individuals during all or part of their life cycles, including breeding, rearing, staging, wintering, feeding, or hibernating.

**Aquatic invasive species**: are fish, invertebrate or plant species that have been introduced into a new aquatic environment, outside of their natural range. Once introduced, aquatic invasive species populations can grow quickly because they don't have natural predators in their new environment. As a result, they can outcompete and harm native species. They can even alter habitats to make them inhospitable for the native species. A non-exhaustive list of aquatic invasive species can be found here (http://www.dfo-mpo.gc.ca/species-especes/ais-eae/identify-eng.html).

**Emergency circumstance**: If your project must be conducted in response to an emergency, you may apply for an Emergency Authorization. The emergency situations are:

- The project is required as a matter of national security
- The project is being conducted in response to a national emergency where special temporary measures are being taken under the federal *Emergencies Act*
- The project is required to address an emergency that poses a risk to public health or safety or to the environment or property.

**Fish habitat**: means habitat that can directly or indirectly support life processes. This includes but is not limited to: spawning grounds, nursery, rearing, food supply and migration areas.

**Harmful alteration, disruption or destruction** means any temporary or permanent change to fish habitat that directly or indirectly impairs the habitat's capacity to support one or more life processes of fish.

**High Water Mark**: The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to leave a mark on the land.

TOWN OF TORBAY
Great Pond Fish and Fish Habitat

**Town of Torbay**
1288 Torbay Road
P.O. Box 1160
Torbay, NL A1K 1K4

**December 10, 2021**
Project Number: TF1969415.2000

**BASELINE REPORT**

DRAFT

**Great Pond Fish and Fish Habitat**

Submitted to:

**Town of Torbay**

1288 Torbay Road

P.O. Box 1160

Torbay, NL

Submitted by:


**Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited**

133 Crosbie Road

PO Box 13216

St. John's, NL  A1B 4A5


10 December 2021

Wood Project #: TF1969415.2000

**IMPORTANT NOTICE**

This report was prepared exclusively for Town of Torbay by Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood). The quality of information, conclusions and estimates contained herein is consistent with the level of effort involved in Wood's services and based on: i) information available at the time of preparation, ii) data supplied by outside sources and iii) the assumptions, conditions and qualifications set forth in this report. This report is intended to be used by Town of Torbay only, subject to the terms and conditions of its contract with Wood. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

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# 1.0 INTRODUCTION

The Town of Torbay is currently investigating the possibility of using Great Pond as a future water supply to accommodate increased demand for potable water. Wood Environment & Infrastructure Solutions, a division of Wood Canada Limited (Wood) has been aiding in the investigations since 2019, when water level monitoring began. Water level has been monitored for over two years in the outflow of Great Pond with the objective of determining the long term capacity of Great Pond as a drinking water supply.

**Figure 1-1: Western shoreline of Great Pond, October 2021**

One of the possible public and regulatory issues with developing Great Pond as a water supply is the potential effect on fish and fish habitat. To better quantify the fish and fish habitat in the system, field surveys were completed during August 2021. Data collected throughout the Fish and Fish Habitat surveys will be incorporated into a Request for Project Review from Fisheries and Oceans Canada (DFO), which is part of the permitting phase for the Project. The Request for Project Review is anticipated to be prepared and submitted to DFO in early 2022.

# 2.0 METHODOLOGY

Presented below is a summary of the methodologies employed throughout the Great Pond fish and fish habitat sampling program. All field surveys were completed as per generally accepted techniques in the province of Newfoundland and Labrador (Scruton and Gibson 1995, Sooley et al. 1998, DFO 2012) and Wood Standard Operating Procedures (SOPs). All field staff involved in this program have been conducting similar programs throughout Newfoundland and Labrador for over 15 years.

## 2.1 Sample Areas

Field surveys completed in August 2021 were concentrated in Great Pond, the Great Pond Outflow and Big River downstream of Great Pond (Figure 2-1).

## 2.2 Riverine Habitat Assessment

Riverine habitat was surveyed in 2021 for physical habitat quantification, fish populations and benthic macroinvertebrate abundance and diversity. A summary of the methods used to measure each parameter is presented below.

### 2.2.1 Stream Surveys

Stream surveys were conducted as part of electrofishing and stream habitat compensation monitoring. The methods used to classify and quantify the aquatic habitat were based on standardized DFO methodologies such as Scruton and Gibson (1995), Sooley et al. (1998) and DFO (2012). Survey data collection consisted of a series of measurements for each habitat reach including:

- Channel dimensions (channel width, wetted width, ice scour height);
- Substrate composition (percentage of each class of substrate found within the stream bed, e.g., cobble, gravel);
- Instream features (discharge, water depths and velocity);
- Riparian vegetation (dominant species, percent cover, instream woody debris); and
- Upstream and downstream photos at each transect.
- A general habitat description was also used to classify each section of stream with similar habitat features (e.g., pool, riffle, run) and the quantity of each in the surveyed section of the stream.

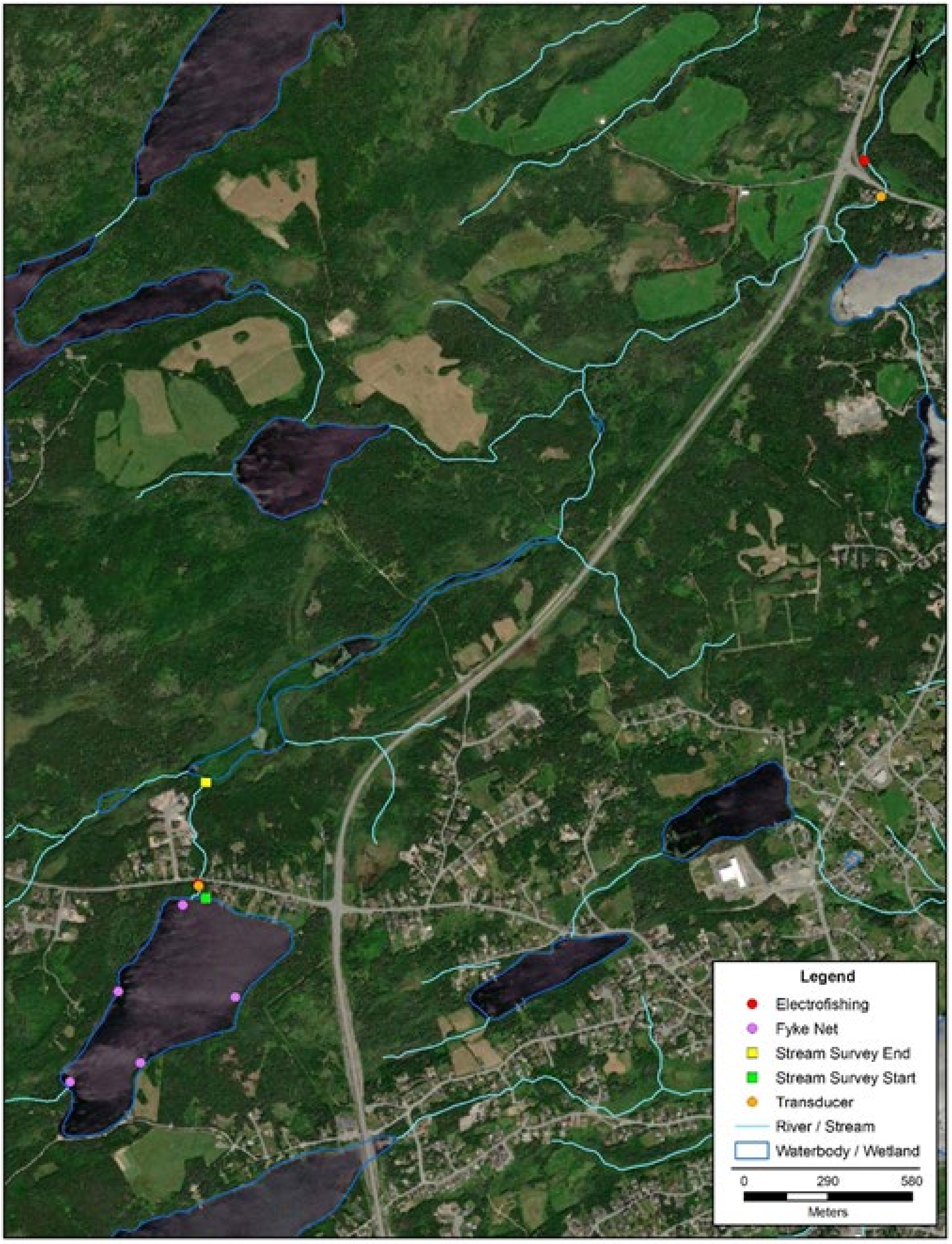


**Figure 2-1: Great Pond Fish and Fish Habitat Assessment sampling locations**

### 2.2.1 Instream Flow Monitoring

Habitat surveys at the outflow of Great Pond included an elevation survey that can be tied to existing LiDAR data. The elevation survey included a cross section of the base of the outlet river. Measurements were conducted using standard procedures as outlined in Sooley et al. (1998) and McCarthy et al. (2007). Standard measurements such as wetted width, water depth and mean water velocity were recorded across each transect. Depth was recorded using a metre stick while mean velocity will be recorded using a Global Flow Probe (Model 101a). Wood's standard flow equipment provides instantaneous calculation of mean water velocity at an accuracy of +0.01m/s. This data was also be used to calculate discharge rates for each survey transect.

A datalogger was installed at the outlet of Great Pond to conduct continuous flow monitoring. The elevation data collected from the datalogger was calibrated with flow data to create a flow curve.

### 2.2.2 Wetted Perimeter Modelling

The Wetted Perimeter Method (WPM) is a fixed flow hydraulic rating method based on the hydraulic relationship between flow (i.e. discharge) and wetted river perimeter at selected transect(s) (Stalnaker et al. 1995). Using the relationship, the flow corresponding to the wetted perimeter (wetted width of the stream transect), which is needed to minimally protect all habitats, can be estimated. Figure 2-2presents a schematic of a wetted perimeter/flow relationship and indicates the point of inflection for that relationship. The point of inflection is taken as the flow below which dewatering would take place rapidly for the represented habitat. Field surveys typically cover the range of natural flows. Where this is not achievable, Manning's equation can be applied to estimate extreme values. Manning's equation is given by:

$$V = \frac{R^{\frac{2}{3}} \times S^{\frac{1}{2}}}{n}$$

| | |
|---|---|
| V | Velocity (m/s) |
| R | Hydraulic Radius (area/wetted perimeter) |
| S | Slope |
| n | Manning's n (roughness) |

The cross-sections, or transects, selected to determine the minimum flow for habitat protection is very important in this technique. The selected transects for assessment must stand as an index habitat for the rest of the river or river section being assessed (Stalnaker et al. 1995). Riffles are typically selected because cross sections in these areas exhibit sensitivity of width, depth and velocity to changes in flow. They are usually the shallowest habitat type found and as such, would indicate adequate water levels needed to protect all habitats. Therefore, once a minimum level of flow is estimated for a riffle, it is assumed that other habitat areas, such as pools and runs, are also satisfactorily protected. Because the shape of the channel can influence the results of the analysis, transects are usually located in areas that are wide, shallow, and rectangular.

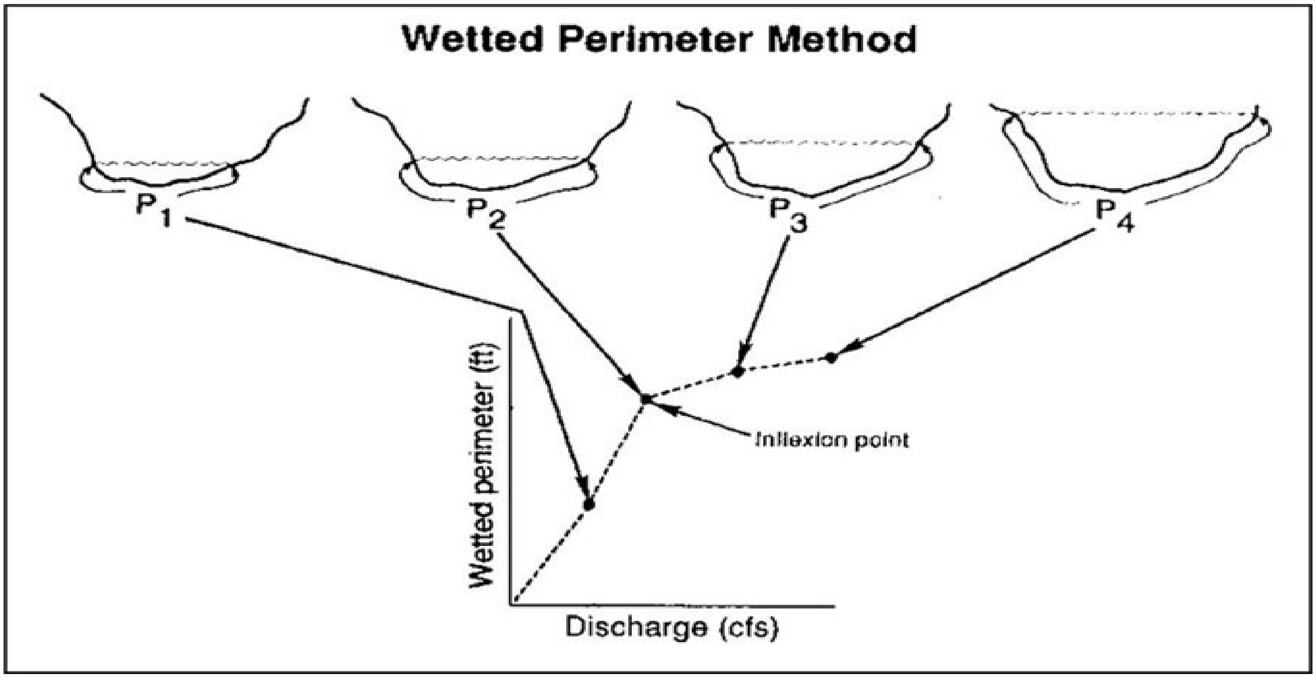


**Figure 2-2: Example of wetted perimeter model to estimate instream flows (Nelson 1980)**

### 2.2.3 Fish Population Assessment

Riverine fish populations were sampled using quantitative electrofishing in Great Pond Outflow and Big River (Figure 2-1). Each electrofishing station was blocked off using barrier nets at the upstream and downstream boundaries. The isolated area was then electrofished with a minimum of four sweeps, or until the last sweep had a total catch of less than half of the previous sweep.

#### Population Estimates

Abundance and biomass estimates were calculated using the Zippen removal method using the FSA package (Ogle et al. 2019) for R (R Core Team 2019). This approach was applied to abundance and biomass of all species combined, and then estimates were calculated based on the proportion of the total catch for each species. This approach helps to overcome any issues associated with low catch rates of some species.

#### Fish Biometrics

Each fish captured during electrofishing was processed following the completion of each sweep. Processing included:

- Identification to species;
- Measuring to nearest millimeter; and,

- Weighing to nearest 0.1 gram.

Length (L) and weight (W) data was then used to calculated Fulton's Condition Factor (K; Peterson and Harmon 2005), which is length-weight relationship:

$$K = \frac{(W \times 10^5)}{L^3}$$

Smaller fish often have errors associated with the calculation of condition factors. Likewise, instrument error can also affect the data. In order to account for this, two conditions were considered;

- Fish smaller than 80mm in length were removed from estimates of fish condition as slight errors in the weights of these individuals could skew the estimates.
- Ranges were calculated using three standard deviations of the mean for each species and values outside of the calculated range were removed from further analysis as they most likely included errors in length and/or weight measures. This was completed separately for each species in order to account for varying body types.


**Figure 2-3: Sonar Equipment used in Great Pond, June 2020**

## 2.3 Lacustrine Habitat Assessment

All sampling was completed using standard fish and fish habitat monitoring methods (DFO n.d., Bradbury et al. 2001), and followed Wood SOPs.

### 2.3.1 Bathymetric Surveys

The bathymetric survey was conducted using a differential GPS sonar unit attached to a Zodiac style inflatable boat (Figure 2-3). The unit links GPS and sonar technology in a digital environment so that depths and location (differential GPS) are digitally mapped.

The Lowrance sonar/GPS unit was set up in the field to collect combined positional and depth data once every second. The boat was generally moving at a rate of less than 2 metres per second (m/s) for optimal coverage. The unit has been tested using known survey pin locations for positional accuracy and has been recorded at being less than one metre. The error associated with sonar depth detection has been given as 1 centimetre (cm); however, weather conditions such as wave height and variable water temperatures can also affect this slightly.

Quality assurance/quality control (QA/QC) was conducted on all data collected with respect to validity (e.g., positional data and/or depth data acquired) prior to contour generation. Water surface elevation was recorded before and after surveys to better tie generated contours to elevation datum. Final contours were completed and assessed using GIS to provide a bathymetric contour of the study area.

### 2.3.2 Fish Population Assessment

A total of 15 fyke net-nights were completed in the Great Pond between August 11-13, 2021. Fyke nets were fished for a minimum of 16 hours, which covered the dawn and dusk periods when fish are most active. All fish captured were marked with a small clip on the top of the caudal fin to identify recaptures. All fish were live released near the capture area, and during subsequent net checks, any recaptures were weighed, measured and noted as a recapture (see Section 2.2.4). Population estimates and confidence intervals were calculated using the Schnabel multiple mark-recapture method (Ricker 1977, Ogle 2016).

# 3.0 RESULTS

Fish and fish habitat was assessed in Great Pond, Great Pond Outflow and Big River during the summer of 2021.

## 3.1 Riverine Habitat Assessment

Habitat surveys, instream flow monitoring and fish populations were monitored in riverine habitats downstream of Great Pond. A summary is of the results is provided below.

### 3.1.1 Stream Surveys

In total, Great Pond Outflow was 484 m in length, with 17.4 habitat units (one unit = 100 $m^2$). A summary of the habitat throughout Great Pond Outflow is presented in Table 3-1. The majority of the habitat present is classified as riffle (eight of 15 reaches), which is typically considered good salmonid rearing habitat (Grant and Lee 2004). There was also migratory habitat present in the form of cascades (three reaches) and rapids (one reach). Run (two reaches) and pool (one reach) made up the remaining habitat types. Overall, cobble, bedrock and rubble made up the majority of the substrate present throughout Great Pond Outflow. Gravel, used for Brook Trout spawning, was observed in low quantities, typically less than 20% coverage, with the exceptions of Reaches 5, 6 and 15, which had coverages ranging from 25% to 50%.

Stream survey data is presented in Appendix A, while representative photographs of each reach are presented in Appendix B.

**Figure 3-1: Pressure transducer installed in Great Pond Outflow**

### 3.1.1 Instream Flow Monitoring

Pressure transducers were installed at the outflow of Great Pond (Figure 3-1), immediately downstream of Great Pond, and have been collecting data continuously since December 2019. One transducer is located in the stream, and measures water temperature and pressure, while a second sensor is located nearby to measure air pressure. This is used to calculate the depth of the transducer. During regular downloads, discharge transects (that measure flow rates in the stream) are also completed in order to develop a regression to estimate discharge based on water depth (Figure 3-2).

Using the water level-discharge relationship, discharge was calculated throughout the period December 2019 to early January 2021 (Figure 3-3 and Table 3-2). Figure 3-3 also presents the prorated discharge based on the gauging station in Northeast Pond River (Station # 02ZM006). Both methods of discharge estimation produced similar mean annual discharges.

**Table 3-1: Summary of habitat surveys completed in Great Pond Outflow, August 2021**

| Transect # | Section Length (m) | Wetted Width (m) | Channel Width (m) | Area (Units) | Depth (m) | | Veolocity (m/s) | | Substrate Composition (%)* | | | | | | | | | | | | Habitat Classification | Dominant Riparian Vegetation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Average | Maximum | Average | Maximum | B | LgB | SmB | R | C | G | S | St | Cl | D | M | AqV | | |
| 1 | - | 2.9 | 3.8 | - | 0.08 | 0.13 | 0.06 | 0.11 | 0 | 0 | 10 | 40 | 40 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | Riffle | Grass |
| **2** | **31** | **3.8** | **5.6** | **1.18** | **0.05** | **0.10** | **0.10** | **0.35** | **0** | **0** | **10** | **30** | **50** | **10** | **0** | **0** | **0** | **0** | **0** | **0** | **Riffle** | **Grass** |
| 3 | 33 | 3.4 | 4.6 | 1.12 | 0.08 | 0.16 | 0.02 | 0.09 | 0 | 0 | 15 | 35 | 40 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | Riffle | Grass |
| **4** | **25** | **3.5** | **4.1** | **0.88** | **0.10** | **0.13** | **0.05** | **0.16** | **0** | **0** | **5** | **35** | **50** | **10** | **0** | **0** | **0** | **0** | **0** | **0** | **Riffle** | **Shrub** |
| **5** | **25** | **3.7** | **5.5** | **0.93** | **0.06** | **0.10** | **0.07** | **0.22** | **0** | **0** | **5** | **10** | **35** | **50** | **0** | **0** | **0** | **0** | **0** | **0** | **Riffle** | **Conifer** |
| 6 | 45 | 5.5 | 6.2 | 2.48 | 0.15 | 0.22 | 0.00 | 0.00 | 0 | 0 | 10 | 15 | 40 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | Riffle | Shrub |
| 7 | 40 | 2.4 | 3.2 | 0.96 | 0.06 | 0.14 | 0.20 | 0.38 | 25 | 10 | 15 | 20 | 25 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | Riffle | Conifer |
| 8 | 25 | 3.7 | 4.8 | 0.93 | 0.23 | 0.44 | 0.00 | 0.00 | 5 | 0 | 5 | 20 | 40 | 20 | 5 | 5 | 0 | 0 | 0 | 0 | Pool | Conifer |
| 9 | 3 | - | - | - | - | 0.00 | - | 0.00 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Cascade | - |
| 10 | 65 | 3.3 | 4.2 | 2.15 | 0.06 | 0.12 | 0.11 | 0.60 | 10 | 15 | 25 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Rapids | Conifer |
| 11 | 17 | 3.4 | 4.7 | 0.58 | 0.10 | 0.24 | 0.06 | 0.28 | 80 | 5 | 10 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Cascade | Conifer |
| 12 | 10 | 5.4 | 5.9 | 0.54 | 0.31 | 0.80 | 0.00 | 0.00 | 65 | 0 | 10 | 10 | 0 | 10 | 0 | 0 | 0 | 5 | 0 | 0 | Run | Grass |
| 13 | 30 | 4.0 | 4.7 | 1.20 | 0.13 | 0.23 | 0.01 | 0.05 | 75 | 0 | 5 | 10 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Cascade | Conifer |
| **14** | **95** | **3.7** | **5.0** | **3.52** | **0.09** | **0.15** | **0.04** | **0.09** | **0** | **5** | **20** | **20** | **40** | **15** | **0** | **0** | **0** | **0** | **0** | **0** | **Riffle** | **Conifer** |
| 15 | 25 | 3.5 | 4.0 | 0.88 | 0.30 | 0.48 | 0.01 | 0.05 | 0 | 0 | 0 | 0 | 35 | 25 | 0 | 20 | 0 | 20 | 0 | 0 | Run | Grass |

Note: Bolder lines indicate transects selected for Wetted Perimeter Modelling

Substrate

| | | | | | |
|---|---|---|---|---|---|
| B | Bedrock | C | Cobble | Cl | Clay |
| LgB | Larger Boulder | G | Gravel | D | Detritus |
| SmB | Small Boulder | S | Sand | M | Mud |
| R | Rubble | St | Silt | AqV | Aquatic Vegetation |

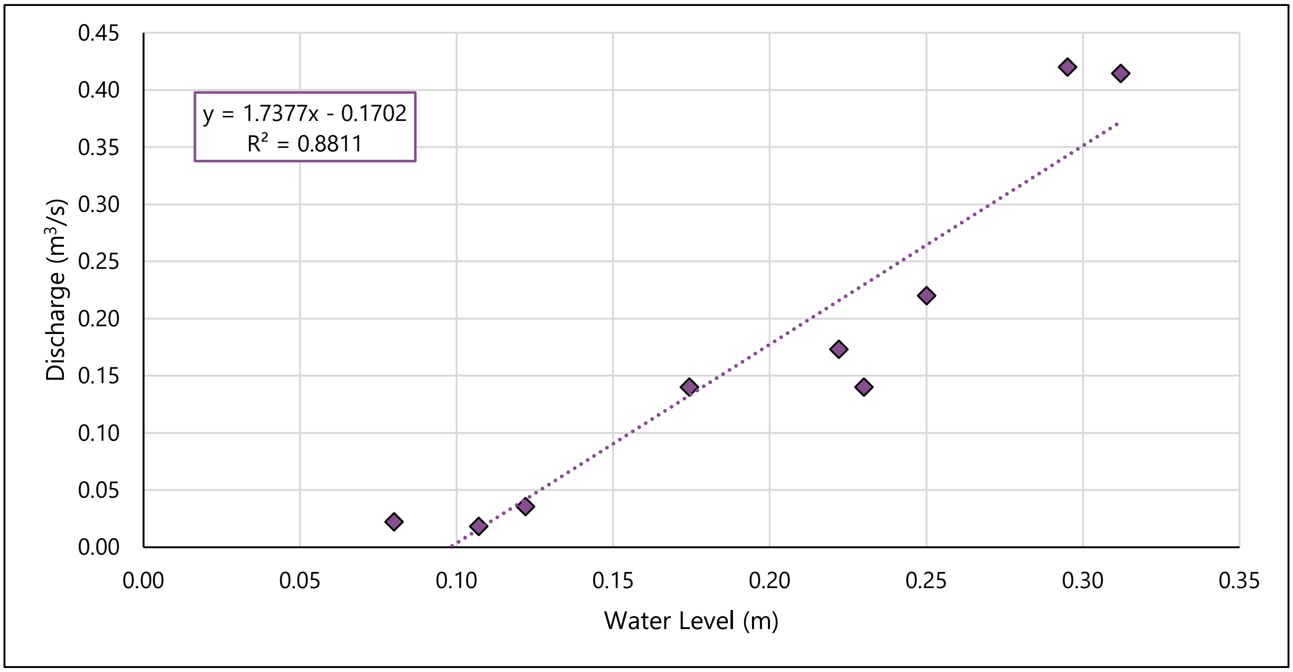


**Figure 3-2: Discharge-water level relationship for Great Pond Outflow**

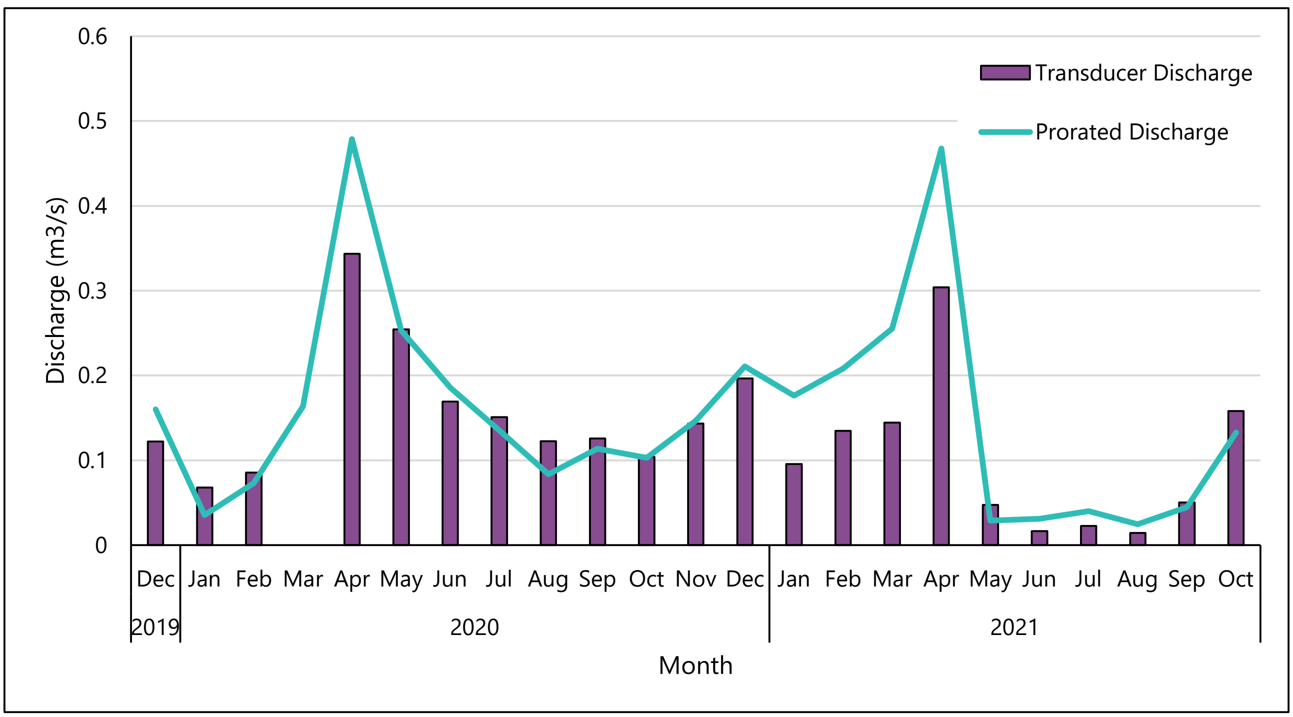


**Figure 3-3: Hydrograph for Great Pond Outflow, December 2019-October 2021**

**Table 3-2: Summary of estimated discharge from Great Pond, 2020-2021**

| Month | 2020 | | 2021 | |
|---|---|---|---|---|
| | Transducer | Prorated Hydrology | Transducer | Prorated Hydrology |
| January | 0.07 | 0.04 | 0.10 | 0.18 |
| February | 0.09 | 0.07 | 0.13 | 0.21 |
| March | - | 0.16 | 0.14 | 0.26 |
| April | 0.34 | 0.48 | 0.30 | 0.47 |
| May | 0.25 | 0.25 | 0.05 | 0.03 |
| June | 0.17 | 0.19 | 0.02 | 0.03 |
| July | 0.15 | 0.14 | 0.02 | 0.04 |
| August | 0.12 | 0.08 | 0.01 | 0.02 |
| September | 0.13 | 0.11 | 0.05 | 0.04 |
| October | 0.10 | 0.10 | 0.16 | 0.13 |
| November | 0.14 | 0.15 | - | - |
| December | 0.20 | 0.21 | - | - |
| Mean Annual Flow | 0.15 | 0.17 | 0.10 | 0.14 |

Note At time of preparation, only data up to October 22, 2021 was available

### 3.1.2 Wetted Perimeter Modelling

Wetted Perimeter Models (WPM) were completed for four representative transects; T2, T4, T5 and T14 (Table 3-3 and Figures 3-4 through 3-7). A model was also developed for T12, however, it was deemed to be an unsuitable location (i.e. channel shape and measured conditions did not result in an inflection point being determined). This location has not been included in any further summaries. Inflection point discharges ranged from 0.003-0.043 $m^3$/s, with a mean inflection point discharge of 0.020$m^3$/s (Table 3-3).

**Table 3-3: Summary of wetted perimeter models from Great Pond Outflow**

| Transect # | Measured | | Inflection Point | |
|---|---|---|---|---|
| | Perimeter | Discharge ($m^3$/s) | Perimeter | Discharge ($m^3$/s) |
| 2 | 3.82 | 0.022 | 3.82 | 0.022 |
| 4 | 3.71 | 0.017 | 3.59 | 0.003 |
| 5 | 3.75 | 0.017 | 4.67 | 0.043 |
| 14 | 3.77 | 0.015 | 3.73 | 0.010 |
| Mean | - | 0.018 | - | 0.020 |

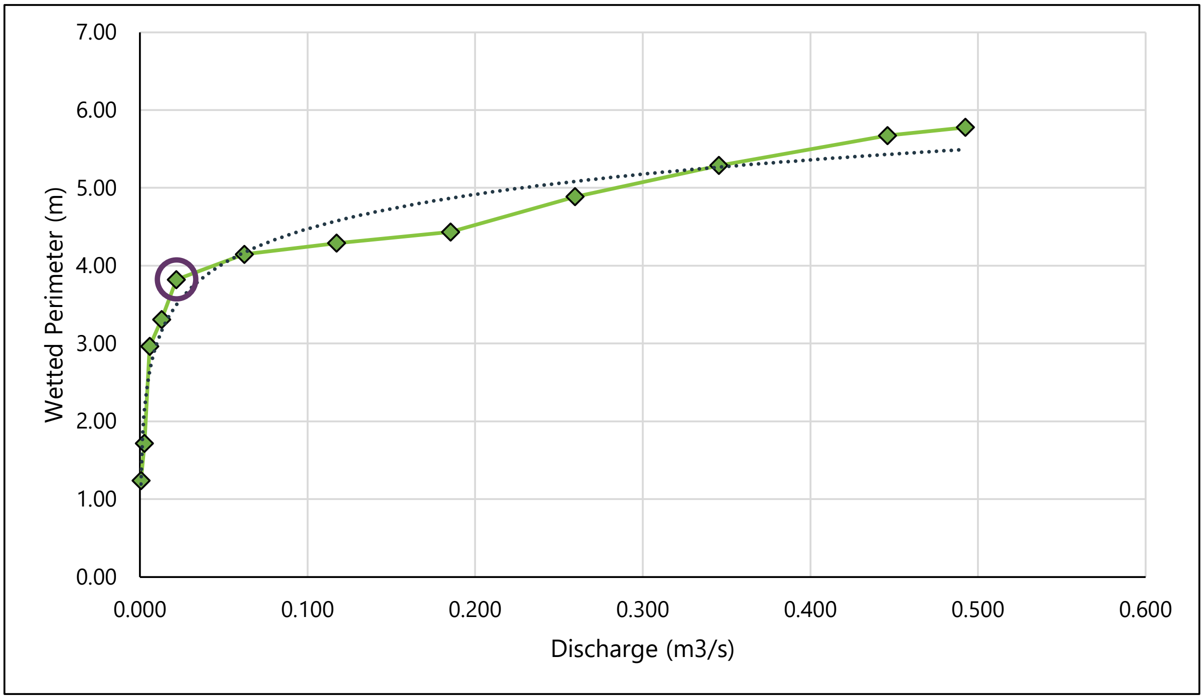


**Figure 3-4: Wetted perimeter model for T2, inflection point circled**

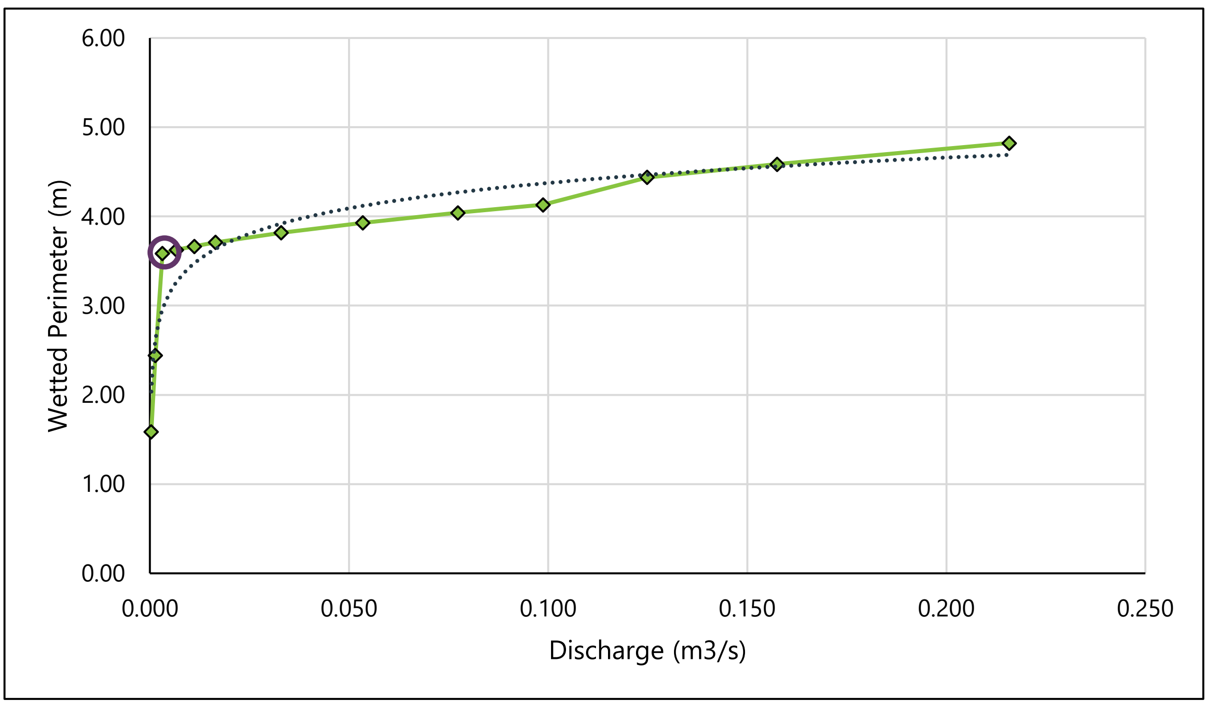


**Figure 3-5: Wetted perimeter model for T4, inflection point circled**

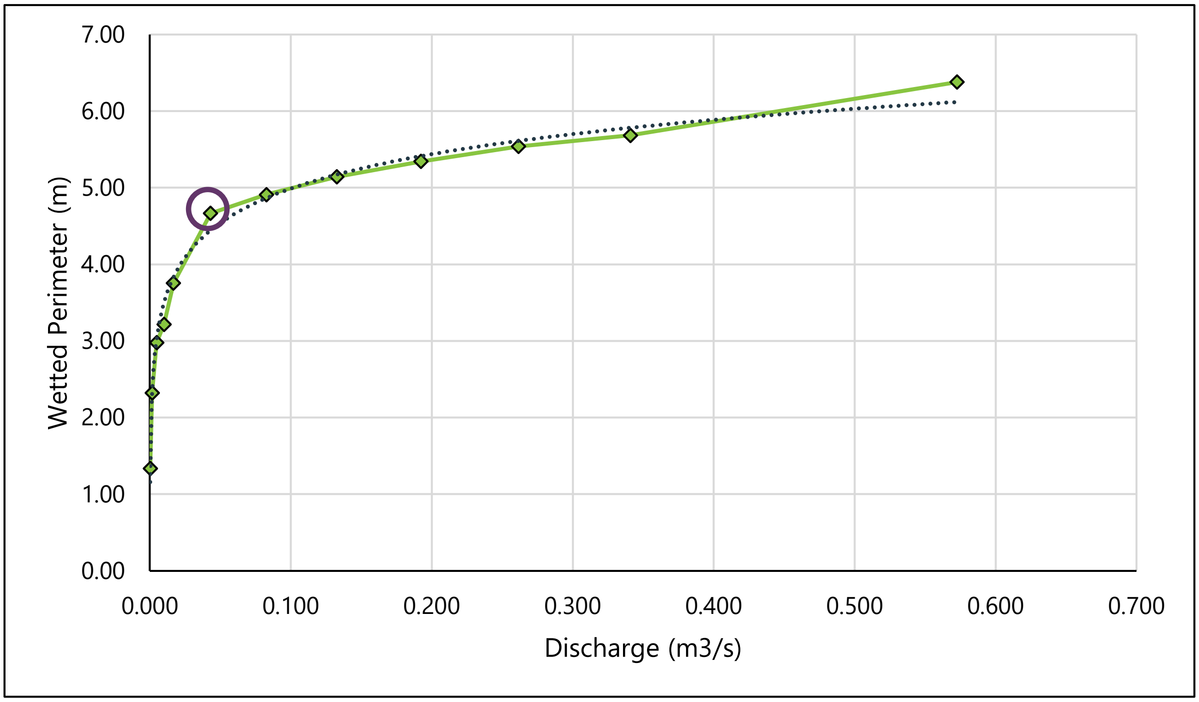


**Figure 3-6: Wetted perimeter model for T5, inflection point circled**

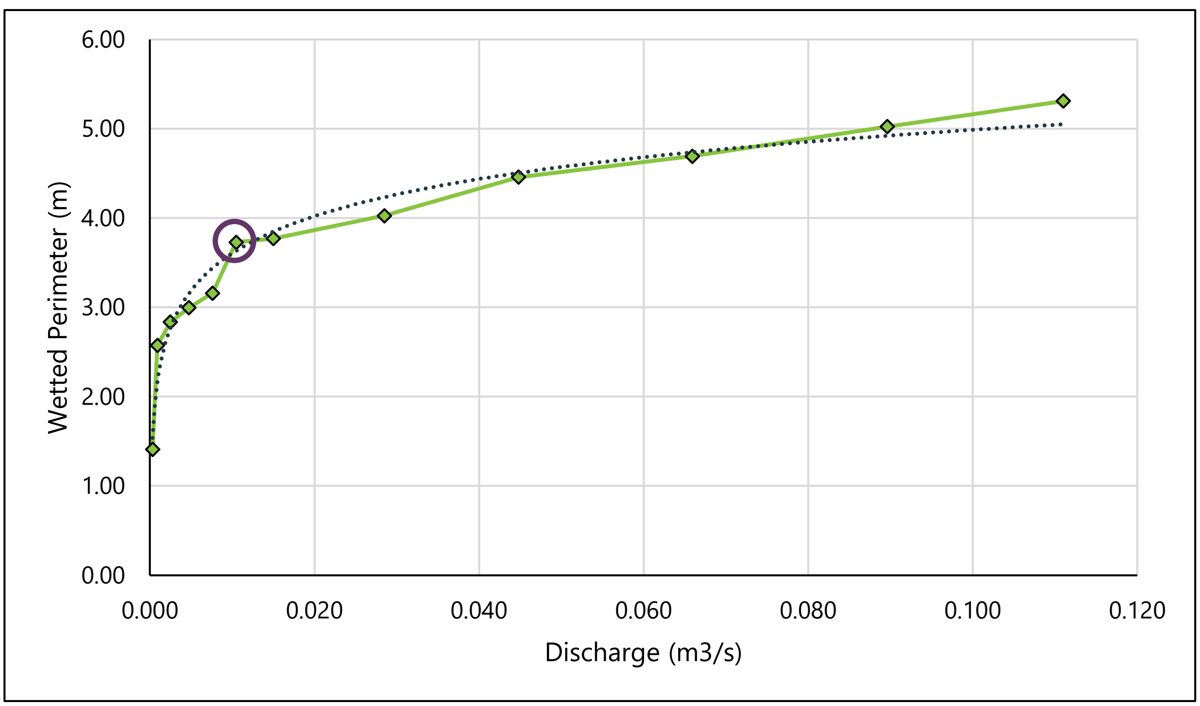


**Figure 3-7: Wetted perimeter model for T14, inflection point circled**

### 3.1.3 Fish Population Assessment

Two quantitative electrofishing stations were completed in Great Pond Outflow and Big River, downstream of Great Pond Outflow, during August 2021. Brook Trout (*Salvelinus fontinalis*), Rainbow Trout (*Oncorhynchus mykiss*) and Threespine Stickleback (*Gasterosteus aculeatus*) were captured in each location, with Brook Trout being the most abundant (Table 3-4).

**Table 3-4: Summary of population and biomass estimates in the Great Pond Outflow and Big River, August 2021**

| Location | Species | Population Estimate (fish/habitat unit) | | | Biomass Estimate (grams/habitat unit) | | |
|---|---|---|---|---|---|---|---|
| | | Station #1 | Station #2 | Mean | Station #1 | Station #2 | Mean |
| Great Pond Outflow | Brook Trout | 59.5 | 25.3 | 42.4 | 207.7 | 117.4 | 162.6 |
| | Rainbow Trout | 2.6 | 14.2 | 8.4 | 4.3 | 70.9 | 37.7 |
| | Threespine Stickleback | 38.8 | 35.5 | 37.2 | 37.1 | 85.2 | 61.2 |
| Big River | Brook Trout | 12.1 | 14.5 | 13.3 | 190.3 | 321.3 | 255.8 |
| | Rainbow Trout | 26.8 | 24.2 | 25.5 | 382.9 | 609.8 | 496.4 |
| | Threespine Stickleback | 14.7 | 14.5 | 14.6 | 7.5 | 8.2 | 7.8 |

Overall, Brook Trout and Rainbow Trout were larger in Big River than Great Pond Outflow (Table 3-5). On average, salmonids in each sampling location were in good condition ($K \geq 1.00$). Rainbow Trout had similar condition in each location ($p = 0.90$), while Brook Trout had higher condition in Great Pond Outflow ($p<0.05$). The majority of the Brook Trout captured in Great Pond Outflow were young-of-year (YOY; Figure 3-8) indicating that this area may primarily be used for spawning and rearing. Brook Trout spawning behaviour was observed in Great Pond Outflow, primarily downstream of Bauline Line during field surveys in October 2021.

Electrofishing data is presented in Appendix C.

**Table 3-5: Summary of biometrics in Great Pond Outflow and Big River, August 2021**

| Location | Species | Mean Length (mm) | Mean Weight (g) | Mean Condition (K) |
|---|---|---|---|---|
| Great Pond Outflow | Brook Trout | 61.0 | 3.8 | 1.29 (9) |
| | Rainbow Trout | 66.4 | 4.6 | 1.27 (3) |
| | Threespine Stickleback | 63.0 | 1.6 | - |
| Big River | Brook Trout | 111.7 | 19.5 | 1.10 (24) |
| | Rainbow Trout | 102.1 | 19.6 | 1.16 (33) |
| | Threespine Stickleback | 32.8 | 0.6 | - |

Note Number of fish included in condition factor (as per section 2.2.4) summaries presented in brackets.

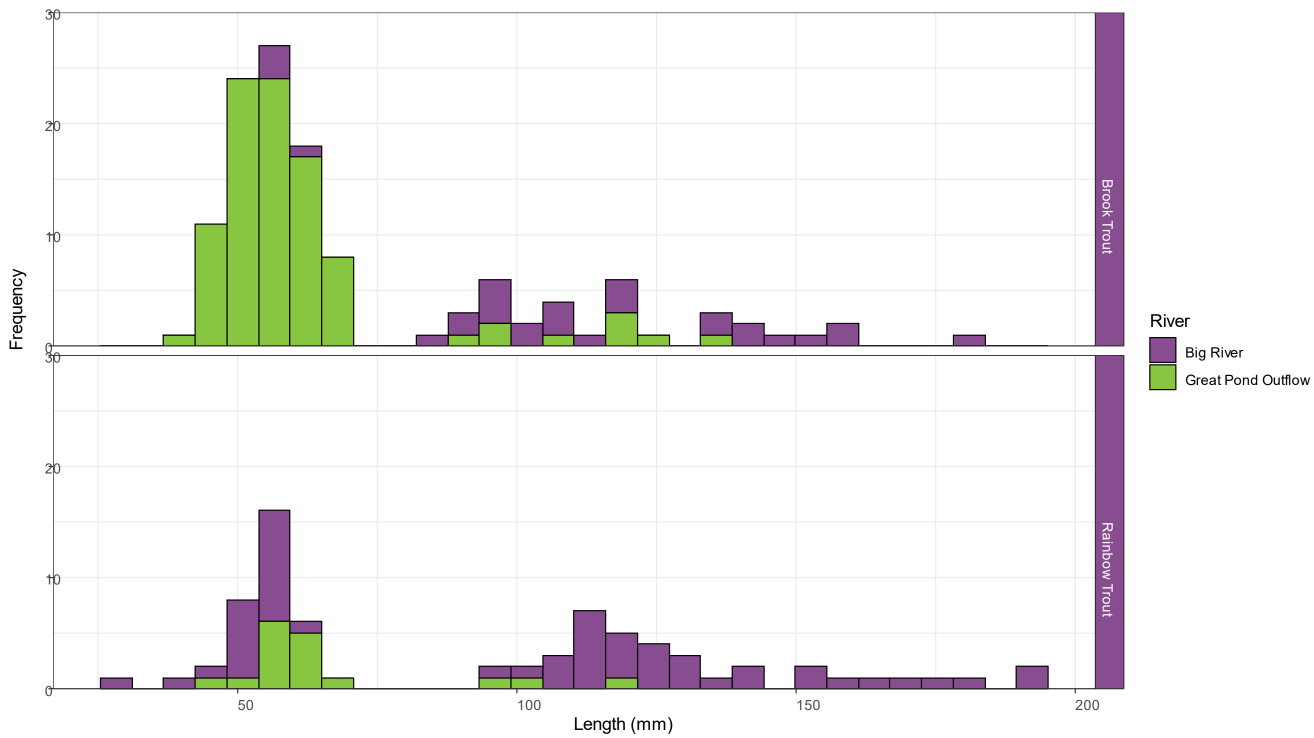


**Figure 3-8: Length distributions of salmonids from Great Pond Outflow and Big River, August 2021**

## 3.2 Lacustrine Habitat Assessment

Lacustrine habitats surveys were completed in Great Pond with bathymetric surveys being completed in June 2020, and fish surveys completed in August 2021. A summary of the results is presented below.

### 3.2.1 Bathymetric Surveys

A bathymetric survey of Great Pond was completed by Wood staff on June 5, 2020 (Figure 3-9) to support the development of a geo-referenced bathymetric contour map of the water supply. At the time of the bathymetric survey (June 5, 2020), the measured water surface elevation was 117.75 m. The lowest measured elevation at the bottom of the pond was 109.6 m, resulting in a maximum water depth at the time of survey of approximately 8.2 m. The deepest portion of the pond is in the northwest corner, which will be beneficial if any future intake is to be sited near the outlet of the pond.

### 3.2.1 Fish Population Assessment

Brook Trout and Threespine Stickleback were the only species captured, with Stickleback accounting for most of the total catch and total biomass (Table 3-6). Due to the quantities of Stickleback captured, total catch was estimated based on total biomass and mean weight per individual. All Brook Trout captured were marked with a small fin clip on the top caudal fin to identify any recaptured fish. Throughout the netting, there were no recaptures observed. Therefore, to calculate a population estimate, a single recapture was assumed, yielding a population estimate of 575 Brook Trout (95% Confidence Interval 175-1,122).

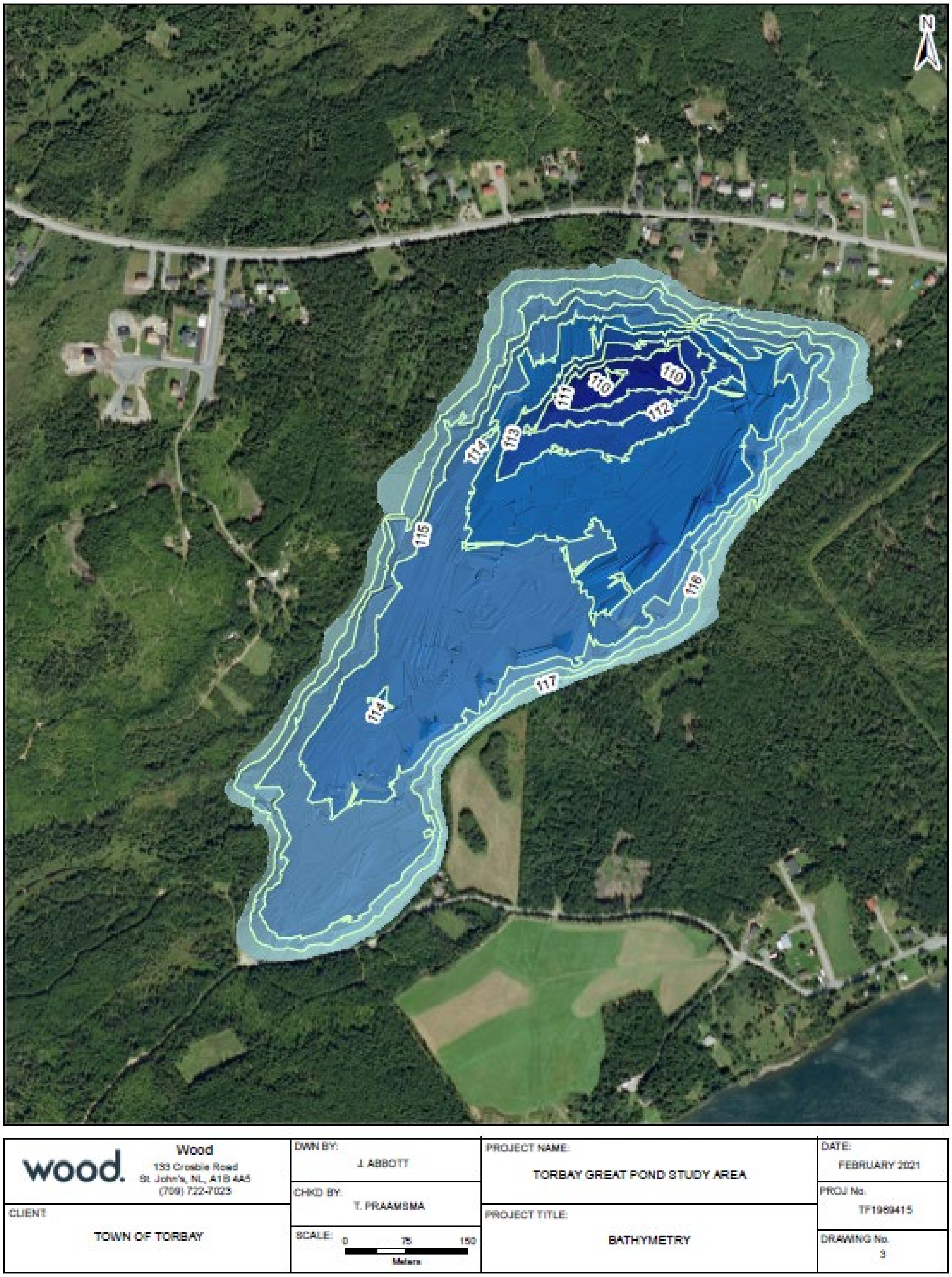


**Figure 3-9: Bathymetric map of Great Pond**

**Table 3-6: Summary of catch-per-unit-effort in Great Pond, August 2021**

| Species | Abundance | | Biomass | |
|---|---|---|---|---|
| | Total Catch | CPUE (fish/net-night) | Total Catch | CPUE (grams/net-night) |
| Brook Trout | 62 | 4.13 | 9,397.6 | 626.51 |
| Threespine Stickleback | 34,190[1] | 2,279.33 | 70,608.6 | 4,707.24 |

Brook Trout had a mean length of 218mm and a mean weight of 161.8g. Following the removal of outliers, 59 Brook Trout were included in condition analysis, and had a mean condition of 1.29. All Brook Trout included in the analysis had condition factors greater than 1.00, indicating they are in good condition.

Fyke netting data is presented in Appendix D.

# 4.0 SUMMARY

There were 17.4 habitat units surveyed in Great Pond Outflow during August 2021, the majority of which have been characterized as riffle habitat. Riffle habitat is typically suitable for salmonid spawning and rearing. Electrofishing was completed in Great Pond Outflow and Big River, downstream of Great Pond. Brook Trout, Rainbow Trout and Threespine Stickleback were present in all electrofishing stations, with Brook Trout being the most abundant in both locations. Population estimates were higher for Brook Trout in Great Pond Outflow, while biomass estimates were higher in Big River. The majority of the Brook Trout captured in Great Pond Outflow were YOY, indicating that the area is suitable for spawning and juvenile rearing.

Within Great Pond, Brook Trout and Threespine Stickleback were the only species present, with Threespine Stickleback being significantly more abundant. Brook Trout captured in Great Pond were larger on average than those in Great Pond Outflow, with no YOY being observed, indicating Great Pond is primarily utilized by juvenile and adult Brook Trout.

## 4.1 Recommendations and Future Works

As part of the environmental assessment and permitting process for any project potentially affecting fish and fish habitat, the project may require provincial environmental assessment registration and a federal Fisheries and Oceans Request for Project Review. Field data collected during 2021 can be used to further quantify fish habitat should it be required. Habitat quantification would be used by DFO to determine potential HADD and possible offset requirements. Additional effort will be required to identify and design suitable design/offsets, if DFO determines offsets are required. Also note, any habitat offsets as part of a *Fisheries Act* authorization will also require public consultation and well as monitoring of habitat stability and suitability.

## 5.0 CLOSURE

We trust that you will find the information within this document satisfactory in meeting requirements and expectations. Should you have any questions or concerns regarding the information presented in this document, please do not hesitate to contact us at your convenience.

**Sincerely**
**Wood Environment & Infrastructure Solutions**

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## 6.0 REFERENCES

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# APPENDIX A
# STREAM SURVEY DATA

Stream Survey Data

| | GPS Coordinates | | | Section | | | Bank Heights (m) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Length | Wetted | Channel | | | | | | |
| Transect # | Zone | Easting | Northing | (m) | Width (m) | Width (m) | L→ | | | | | |
| 1 | 22T | 367594 | 5280857 | 0 | 2.9 | 3.8 | 0.00 | 0.08 | 0.10 | 0.24 | | 0.00 |
| 2 | 22T | 367570 | 5280878 | 31 | 3.8 | 5.6 | 0.00 | 0.10 | 0.08 | 0.19 | 0.15 | 0.00 |
| 3 | 22T | 367569 | 5280908 | 33 | 3.4 | 4.6 | 0.00 | 0.10 | 0.09 | 0.10 | 0.02 | 0.00 |
| 4 | 22T | 367578 | 5280932 | 25 | 3.5 | 4.1 | 0.24 | | | | | 0.00 |
| 5 | 22T | 367587 | 5280954 | 25 | 3.7 | 5.5 | 0.00 | 0.07 | 0.12 | 0.42 | 0.43 | 0.00 |
| 6 | 22T | 367594 | 5281011 | 45 | 5.5 | 6.2 | 0.00 | 0.11 | 0.31 | 0.34 | | 0.00 |
| 7 | 22T | 367576 | 5281039 | 40 | 2.4 | 3.2 | 0.00 | 0.12 | 0.26 | 0.45 | 0.40 | 0.00 |
| 8 | 22T | 367553 | 5281040 | 25 | 3.7 | 4.8 | 0.00 | 0.10 | 0.18 | 0.31 | | 0.00 |
| 9 | 22T | 367549 | 5281048 | 3 | | | | | | | | |
| 10 | 22T | 367553 | 5281106 | 65 | 3.3 | 4.2 | 0.00 | 0.09 | 0.21 | 0.35 | | 0.00 |
| 11 | 22T | 367544 | 5281124 | 17 | 3.4 | 4.7 | 0.00 | 0.04 | 0.33 | 0.25 | 0.38 | 0.00 |
| 12 | 22T | 367538 | 5281135 | 10 | 5.4 | 5.9 | 0.32 | | | | | 0.00 |
| 13 | 22T | 367541 | 5281164 | 30 | 4.0 | 4.7 | 0.00 | 0.07 | 0.30 | 0.47 | | 0.00 |
| 14 | 22T | 367576 | 5281420 | 95 | 3.7 | 5.0 | 0.00 | 0.06 | 0.10 | 0.24 | | 0.00 |
| 15 | 22T | 367605 | 5281257 | 25 | 3.5 | 4.0 | 0.00 | 0.17 | | | | 0.00 |

Stream Survey Data

| Transect # | | | | | | | | | | Bank Lengths (m) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ←R | | | | L→ | | | | | | | |
| 1 | 0.10 | 0.05 | 0.12 | | 0.00 | 0.25 | 0.37 | 0.44 | | | 0.00 | 0.19 |
| 2 | 0.06 | 0.09 | 0.36 | 0.34 | 0.00 | 0.17 | 0.36 | 0.52 | 0.74 | 0.88 | 0.00 | 0.19 |
| 3 | 0.10 | 0.08 | 0.15 | 0.22 | 0.00 | 0.12 | 0.31 | 0.49 | 0.53 | | 0.00 | 0.20 |
| 4 | 0.13 | 0.14 | 0.18 | 0.37 | 0.00 | | | | | | 0.00 | 0.22 |
| 5 | 0.07 | 0.13 | 0.14 | | 0.00 | 0.32 | 0.46 | 0.67 | 1.00 | | 0.00 | 0.24 |
| 6 | 0.13 | 0.23 | 0.38 | | 0.00 | 0.09 | 0.15 | 0.36 | | | 0.00 | 0.13 |
| 7 | 0.15 | 0.41 | | | 0.00 | 0.14 | 0.29 | 0.41 | 0.57 | | 0.00 | 0.10 |
| 8 | 0.06 | 0.18 | 0.25 | | 0.00 | 0.21 | 0.40 | 0.46 | | | 0.00 | 0.23 |
| 9 | | | | | | | | | | | | |
| 10 | 0.17 | 0.25 | 0.37 | | 0.00 | 0.23 | 0.45 | 0.50 | | | 0.00 | 0.16 |
| 11 | 0.09 | 0.24 | 0.27 | | 0.00 | 0.15 | 0.35 | 0.73 | 1.00 | | 0.00 | 0.10 |
| 12 | 0.10 | 0.09 | 0.19 | | 0.00 | | | | | | 0.00 | 0.12 |
| 13 | 0.13 | 0.24 | 0.40 | | 0.00 | 0.15 | 0.25 | 0.44 | | | 0.00 | 0.14 |
| 14 | 0.25 | 0.36 | 0.56 | 0.81 | 0.00 | 0.25 | 0.38 | 0.52 | | | 0.00 | 0.25 |
| 15 | 0.20 | | | | 0.00 | 0.27 | | | | | 0.00 | 0.20 |

Stream Survey Data

| Transect # | | | | Length (m) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ←R | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1 | 0.35 | 0.45 | | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 2.90 | | |
| 2 | 0.41 | 0.74 | 0.89 | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | 3.80 |
| 3 | 0.37 | 0.52 | 0.66 | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.40 | |
| 4 | 0.34 | 0.47 | 0.61 | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | |
| 5 | 0.46 | 0.84 | | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | 3.70 |
| 6 | 0.27 | 0.31 | | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 |
| 7 | 0.22 | | | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.40 | | | |
| 8 | 0.40 | 0.60 | | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | 3.70 |
| 9 | | | | | | | | | | | | |
| 10 | 0.27 | 0.39 | | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.30 | |
| 11 | 0.19 | 0.25 | | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.40 | |
| 12 | 0.37 | 0.50 | | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 |
| 13 | 0.26 | 0.27 | | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 |
| 14 | 0.36 | 0.56 | 0.81 | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | 3.70 |
| 15 | | | | 0.00 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | 3.00 | 3.50 | |

Stream Survey Data

| | | | | Depth (m) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transect # | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1 | | | | 0.02 | 0.09 | 0.13 | 0.13 | 0.11 | 0.09 | 0.01 | | |
| 2 | | | | 0.00 | 0.05 | 0.04 | 0.06 | 0.09 | 0.10 | 0.09 | 0.02 | 0.01 |
| 3 | | | | 0.00 | 0.03 | 0.10 | 0.11 | 0.10 | 0.16 | 0.09 | 0.02 | |
| 4 | | | | 0.09 | 0.13 | 0.12 | 0.07 | 0.06 | 0.08 | 0.10 | 0.11 | |
| 5 | | | | 0.02 | 0.02 | 0.08 | 0.05 | 0.07 | 0.10 | 0.09 | 0.08 | 0.02 |
| 6 | 4.50 | 5.00 | 5.50 | 0.02 | 0.12 | 0.12 | 0.15 | 0.18 | 0.17 | 0.14 | 0.18 | 0.19 |
| 7 | | | | 0.05 | 0.05 | 0.14 | 0.04 | 0.04 | 0.05 | | | |
| 8 | | | | 0.10 | 0.23 | 0.44 | 0.37 | 0.42 | 0.28 | 0.15 | 0.07 | 0.02 |
| 9 | | | | | | | | | | | | |
| 10 | | | | 0.02 | 0.04 | 0.12 | 0.09 | 0.09 | 0.05 | 0.02 | 0.03 | |
| 11 | | | | 0.00 | 0.07 | 0.06 | 0.24 | 0.24 | 0.11 | 0.09 | 0.02 | |
| 12 | 4.50 | 5.00 | 5.40 | 0.00 | 0.16 | 0.12 | 0.21 | 0.38 | 0.42 | 0.60 | 0.80 | 0.70 |
| 13 | | | | 0.11 | 0.17 | 0.21 | 0.23 | 0.17 | 0.15 | 0.04 | 0.07 | 0.02 |
| 14 | | | | 0.02 | 0.04 | 0.15 | 0.10 | 0.10 | 0.15 | 0.14 | 0.08 | 0.02 |
| 15 | | | | 0.12 | 0.38 | 0.47 | 0.46 | 0.48 | 0.38 | 0.09 | 0.02 | |

Stream Survey Data

| Transect # | | | | Average Depth (m) | Velocity (m/s) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 | 11 | 12 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | | | | 0.08 | 0.000 | 0.090 | 0.110 | 0.11 | 0.08 | 0.00 | 0.00 | |
| 2 | | | | 0.05 | 0.000 | 0.000 | 0.000 | 0.06 | 0.35 | 0.34 | 0.13 | 0.00 |
| 3 | | | | 0.08 | 0.000 | 0.000 | 0.000 | 0.09 | 0.04 | 0.00 | 0.00 | 0.00 |
| 4 | | | | 0.10 | 0.000 | 0.030 | 0.090 | 0.08 | 0.00 | 0.16 | 0.00 | 0.00 |
| 5 | | | | 0.06 | 0.000 | 0.000 | 0.110 | 0.00 | 0.09 | 0.22 | 0.10 | 0.12 |
| 6 | 0.22 | 0.19 | 0.09 | 0.15 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7 | | | | 0.06 | 0.000 | 0.250 | 0.210 | 0.32 | 0.38 | 0.05 | | |
| 8 | | | | 0.23 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9 | | | | | | | | | | | | |
| 10 | | | | 0.06 | 0.00 | 0.00 | 0.60 | 0.08 | 0.18 | 0.00 | 0.00 | 0.00 |
| 11 | | | | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.28 | 0.00 |
| 12 | 0.19 | 0.05 | 0.04 | 0.31 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13 | | | | 0.13 | 0.00 | 0.05 | 0.03 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 |
| 14 | | | | 0.09 | 0.00 | 0.00 | 0.09 | 0.09 | 0.08 | 0.00 | 0.07 | 0.06 |
| 15 | | | | 0.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 |

Stream Survey Data

| Transcect # | | | | | Average Velocity (m/s) | Substrate (% | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 9 | 10 | 11 | 12 | | Bedrock | LgB | SmB | Rubble | Cobble | Gravel | Sand |
| 1 | | | | | 0.06 | 0 | 0 | 10 | 40 | 40 | 10 | 0 |
| 2 | 0.00 | | | | 0.10 | 0 | 0 | 10 | 30 | 50 | 10 | 0 |
| 3 | | | | | 0.02 | 0 | 0 | 15 | 35 | 40 | 10 | 0 |
| 4 | | | | | 0.05 | 0 | 0 | 5 | 35 | 50 | 10 | 0 |
| 5 | 0.00 | | | | 0.07 | 0 | 0 | 5 | 10 | 35 | 50 | 0 |
| 6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 10 | 15 | 40 | 35 | 0 |
| 7 | | | | | 0.20 | 25 | 10 | 15 | 20 | 25 | 5 | 0 |
| 8 | 0.00 | | | | 0.00 | 5 | 0 | 5 | 20 | 40 | 20 | 5 |
| 9 | | | | | | 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | | | | | 0.11 | 10 | 15 | 25 | 30 | 20 | 0 | 0 |
| 11 | | | | | 0.06 | 80 | 5 | 10 | 5 | 0 | 0 | 0 |
| 12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 65 | 0 | 10 | 10 | 0 | 10 | 0 |
| 13 | 0.00 | | | | 0.01 | 75 | 0 | 5 | 10 | 10 | 0 | 0 |
| 14 | 0.00 | | | | 0.04 | 0 | 5 | 20 | 20 | 40 | 15 | 0 |
| 15 | | | | | 0.01 | 0 | 0 | 0 | 0 | 35 | 25 | 0 |

Stream Survey Data

| | ) | | | | | | Bank | | | Cover (%) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transect # | Silt | Clay | Detritus | Muck | Aq Veg | Total | Undercut L | Undercut R | Bank Stability | Instream | Overhang | Canopy |
| 1 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | Good | 20 | 30 | 40 |
| 2 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 10 | Good | 20 | 30 | 20 |
| 3 | 0 | 0 | 0 | 0 | 0 | 100 | 10 | 10 | Good | 15 | 10 | 10 |
| 4 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | Good | 20 | 40 | 40 |
| 5 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | Good | 20 | 30 | 40 |
| 6 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | Good | 30 | 25 | 15 |
| 7 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 10 | Good | 15 | 40 | 25 |
| 8 | 5 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | Good | 20 | 20 | 20 |
| 9 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | Good | 10 | 10 | 10 |
| 10 | 0 | 0 | 0 | 0 | 0 | 100 | 5 | 0 | Good | 20 | 35 | 20 |
| 11 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | Good | 10 | 50 | 10 |
| 12 | 0 | 0 | 5 | 0 | 0 | 100 | 10 | 10 | Good | 25 | 25 | 25 |
| 13 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | Good | 10 | 20 | 40 |
| 14 | 0 | 0 | 0 | 0 | 0 | 100 | 5 | 5 | Good | 20 | 30 | 40 |
| 15 | 20 | 0 | 20 | 0 | 0 | 100 | 0 | 0 | Good | 15 | 35 | 0 |

Stream Survey Data

| Transcect # | Total | Riparian Vegetation LHS (%) | | | | | | Total | Riparian Vegetation RHS ( | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Conifer | Deciduous | Shrub | Grass | Bog | No Veg | | Conifer | Deciduous | Shrub | Grass |
| 1 | 90 | 15 | 40 | 15 | 30 | 0 | 0 | 100 | 10 | 30 | 15 | 45 |
| 2 | 70 | 10 | 30 | 20 | 40 | 0 | 0 | 100 | 20 | 20 | 20 | 40 |
| 3 | 35 | 10 | 45 | 15 | 30 | 0 | 0 | 100 | 5 | 10 | 35 | 50 |
| 4 | 100 | 35 | 5 | 40 | 20 | 0 | 0 | 100 | 25 | 10 | 25 | 40 |
| 5 | 90 | 40 | 10 | 35 | 15 | 0 | 0 | 100 | 30 | 5 | 15 | 50 |
| 6 | 70 | 25 | 10 | 40 | 25 | 0 | 0 | 100 | 25 | 15 | 35 | 25 |
| 7 | 80 | 40 | 0 | 30 | 30 | 0 | 0 | 100 | 45 | 0 | 20 | 35 |
| 8 | 60 | 30 | 10 | 35 | 25 | 0 | 0 | 100 | 40 | 10 | 20 | 20 |
| 9 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 75 | 45 | 5 | 20 | 30 | 0 | 0 | 100 | 35 | 5 | 10 | 40 |
| 11 | 70 | 45 | 10 | 15 | 30 | 0 | 0 | 100 | 20 | 5 | 45 | 30 |
| 12 | 75 | 30 | 10 | 20 | 40 | 0 | 0 | 100 | 25 | 25 | 20 | 30 |
| 13 | 70 | 40 | 10 | 30 | 20 | 0 | 0 | 100 | 35 | 0 | 30 | 35 |
| 14 | 90 | 50 | 10 | 20 | 20 | 0 | 0 | 100 | 30 | 0 | 45 | 25 |
| 15 | 50 | 5 | 5 | 50 | 40 | 0 | 0 | 100 | 10 | 0 | 30 | 60 |

Stream Survey Data

| Transect # | %) | | Total | Comments |
| --- | --- | --- | --- | --- |
| | Bog | No Veg | | |
| 1 | 0 | 0 | 100 | |
| 2 | 0 | 0 | 100 | |
| 3 | 0 | 0 | 100 | |
| 4 | 0 | 0 | 100 | |
| 5 | 0 | 0 | 100 | |
| 6 | 0 | 0 | 100 | |
| 7 | 0 | 0 | 100 | |
| 8 | 0 | 10 | 100 | |
| 9 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 90 | |
| 11 | 0 | 0 | 100 | Series of small cascades and falls |
| 12 | 0 | 0 | 100 | Pool between two cascades |
| 13 | 0 | 0 | 100 | |
| 14 | 0 | 0 | 100 | |
| 15 | 0 | 0 | 100 | |

# APPENDIX B
# REPRESENTATIVE PHOTOGRAPHS

Representative Photos – Great Pond Outflow

*Photo 1: Great Pond Outflow Transect 1*

*Photo 2: Great Pond Outflow Transect 2*

Representative Photos – Great Pond Outflow

*Photo 3: Great Pond Outflow Transect 3*

*Photo 4: Great Pond Outflow Transect 4*

Representative Photos – Great Pond Outflow

*Photo 5: Great Pond Outflow Transect 5*

*Photo 6: Great Pond Outflow Transect 6*

Representative Photos – Great Pond Outflow

*Photo 7: Great Pond Outflow Transect 7*

*Photo 8: Great Pond Outflow Transect 8*

Representative Photos – Great Pond Outflow

*Photo 9: Great Pond Outflow Transect 9*

*Photo 10: Great Pond Outflow Transect 10*

Representative Photos – Great Pond Outflow

*Photo 11: Great Pond Outflow Transect 11*

*Photo 12: Great Pond Outflow Transect 12*

Representative Photos – Great Pond Outflow

*Photo 13: Great Pond Outflow Transect 13*

*Photo 14: Great Pond Outflow Transect 14*

Representative Photos – Great Pond Outflow

*Photo 15: Great Pond Outflow Transect 15*

# APPENDIX A
# ELECTROFISHING DATA

| River Name | Station # | Station Type | Sweep | Station Area ($m^2$) | Electrofisher Time | Species | Count | Length (mm) | Weight (g) | Condition |
|---|---|---|---|---|---|---|---|---|---|---|
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 122 | 21.8 | 1.20 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 134 | 27.1 | 1.13 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | SB | 1 | 28 | 0.5 | 2.28 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 123 | 22.3 | 1.20 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 113 | 17.3 | 1.20 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | BK | 1 | 95 | 8.4 | 0.98 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | BK | 1 | 145 | 38.2 | 1.25 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 113 | 16.7 | 1.16 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | BK | 1 | 158 | 47.6 | 1.21 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 117 | 18.6 | 1.16 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | SB | 1 | 30 | 0.3 | 1.11 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | BK | 1 | 109 | 13.6 | 1.05 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 56 | 1.9 | 1.08 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | BK | 1 | 87 | 6.8 | 1.03 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 176 | 64.4 | 1.18 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | BK | 1 | 63 | 2.8 | 1.12 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | BK | 1 | 118 | 19.6 | 1.19 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | BK | 1 | 103 | 11.4 | 1.04 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 56 | 2 | 1.14 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | SB | 1 | 34 | 0.5 | 1.27 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 56 | 1.9 | 1.08 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 128 | 25.6 | 1.22 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 58 | 2.2 | 1.13 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 65 | 2.6 | 0.95 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 108 | 15.2 | 1.21 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 55 | 1.9 | 1.14 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | BK | 1 | 119 | 19 | 1.13 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | BK | 1 | 96 | 9.5 | 1.07 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 123 | 21.2 | 1.14 |
| Big River | 1 | Quantitative | 1 | 123 | 442 | RB | 1 | 127 | 24.2 | 1.18 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | SB | 1 | 24 | 0.1 | 0.72 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | SB | 1 | 31 | 0.2 | 0.67 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | SB | 1 | 43 | 0.6 | 0.75 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | SB | 1 | 28 | 0.3 | 1.37 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | RB | 1 | 166 | 56.7 | 1.24 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | SB | 1 | 32 | 0.6 | 1.83 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | SB | 1 | 24 | 0.1 | 0.72 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | SB | 1 | 26 | 0.1 | 0.57 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | SB | 1 | 36 | 0.4 | 0.86 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | SB | 1 | 56 | 2.1 | 1.20 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | RB | 1 | 121 | 21.1 | 1.19 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | RB | 1 | 113 | 18.3 | 1.27 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | RB | 1 | 154 | 42.2 | 1.16 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | RB | 1 | 55 | 1.8 | 1.08 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | RB | 1 | 28 | 0.1 | 0.46 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | SB | 1 | 29 | 0.2 | 0.82 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | BK | 1 | 90 | 8.6 | 1.18 |
| Big River | 1 | Quantitative | 2 | 123 | 454 | BK | 1 | 143 | 32.7 | 1.12 |
| Big River | 1 | Quantitative | 3 | 123 | 505 | SB | 1 | 56 | 1.1 | 0.63 |
| Big River | 1 | Quantitative | 3 | 123 | 505 | SB | 1 | 22 | 0.1 | 0.94 |
| Big River | 1 | Quantitative | 3 | 123 | 505 | SB | 1 | 48 | 1.8 | 1.63 |
| Big River | 1 | Quantitative | 3 | 123 | 505 | RB | 1 | 49 | 1.3 | 1.10 |
| Big River | 1 | Quantitative | 3 | 123 | 505 | RB | 1 | 54 | 1.9 | 1.21 |
| Big River | 1 | Quantitative | 3 | 123 | 505 | BK | 1 | 101 | 11.4 | 1.11 |
| Big River | 1 | Quantitative | 3 | 123 | 505 | BK | 1 | 56 | 1.8 | 1.02 |
| Big River | 1 | Quantitative | 3 | 123 | 505 | RB | 1 | 109 | 15.4 | 1.19 |
| Big River | 1 | Quantitative | 3 | 123 | 505 | RB | 1 | 51 | 1.6 | 1.21 |
| Big River | 1 | Quantitative | 3 | 123 | 505 | RB | 1 | 49 | 1.7 | 1.44 |
| Big River | 1 | Quantitative | 3 | 123 | 505 | RB | 1 | 49 | 1 | 0.85 |
| Big River | 1 | Quantitative | 3 | 123 | 505 | SB | 1 | 26 | 0.1 | 0.57 |
| Big River | 1 | Quantitative | 4 | 123 | 367 | RB | 1 | 51 | 1.3 | 0.98 |
| Big River | 1 | Quantitative | 4 | 123 | 367 | RB | 1 | 114 | 14.4 | 0.97 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 151 | 36.4 | 1.06 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | BK | 1 | 182 | 64.7 | 1.07 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | SB | 1 | 22 | 0.1 | 0.94 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 99 | 19.2 | 1.98 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | BK | 1 | 110 | 13.9 | 1.04 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 50 | 1 | 0.80 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | BK | 1 | 110 | 14.5 | 1.09 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 46 | 1.2 | 1.23 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 112 | 26.1 | 1.86 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 96 | 10.6 | 1.20 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | BK | 1 | 114 | 12.4 | 0.84 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | SB | 1 | 38 | 0.6 | 1.09 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | BK | 1 | 89 | 7.6 | 1.08 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | SB | 1 | 23 | 0 | 0.00 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | SB | 1 | 32 | 0.4 | 1.22 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | BK | 1 | 143 | 34.6 | 1.18 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | BK | 1 | 154 | 42.2 | 1.16 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 182 | 65.5 | 1.09 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 59 | 2.2 | 1.07 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 168 | 56 | 1.18 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 112 | 16 | 1.14 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 108 | 14.7 | 1.17 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | BK | 1 | 160 | 46.4 | 1.13 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 58 | 1.4 | 0.72 |

| River Name | Station # | Station Type | Sweep | Station Area ($m^2$) | Electrofisher Time | Species | Count | Length (mm) | Weight (g) | Condition |
|---|---|---|---|---|---|---|---|---|---|---|
| Big River | 2 | Quantitative | 1 | 105 | 505 | SB | 1 | 23 | 0.1 | 0.82 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | BK | 1 | 136 | 27.3 | 1.09 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | SB | 1 | 26 | 0 | 0.00 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | SB | 1 | 26 | 0 | 0.00 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | SB | 1 | 23 | 0 | 0.00 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | SB | 1 | 68 | 2.8 | 0.89 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | SB | 1 | 27 | 0.1 | 0.51 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 132 | 24.7 | 1.07 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 132 | 26.4 | 1.15 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 116 | 17.6 | 1.13 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | RB | 1 | 139 | 34.9 | 1.30 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | BK | 1 | 119 | 17.4 | 1.03 |
| Big River | 2 | Quantitative | 1 | 105 | 505 | SB | 1 | 59 | 1.9 | 0.93 |
| Big River | 2 | Quantitative | 2 | 105 | 416 | BK | 1 | 95 | 8.9 | 1.04 |
| Big River | 2 | Quantitative | 2 | 105 | 416 | RB | 1 | 143 | 32 | 1.09 |
| Big River | 2 | Quantitative | 2 | 105 | 416 | SB | 1 | 23 | 0.1 | 0.82 |
| Big River | 2 | Quantitative | 2 | 105 | 416 | BK | 1 | 58 | 2.2 | 1.13 |
| Big River | 2 | Quantitative | 2 | 105 | 416 | SB | 1 | 31 | 0.2 | 0.67 |
| Big River | 2 | Quantitative | 2 | 105 | 416 | RB | 1 | 192 | 81.7 | 1.15 |
| Big River | 2 | Quantitative | 2 | 105 | 416 | RB | 1 | 157 | 47 | 1.21 |
| Big River | 2 | Quantitative | 2 | 105 | 416 | RB | 1 | 116 | 16.3 | 1.04 |
| Big River | 2 | Quantitative | 2 | 105 | 416 | BK | 1 | 95 | 9.6 | 1.12 |
| Big River | 2 | Quantitative | 2 | 105 | 416 | RB | 1 | 42 | 0.9 | 1.21 |
| Big River | 2 | Quantitative | 2 | 105 | 416 | SB | 1 | 26 | 0.1 | 0.57 |
| Big River | 2 | Quantitative | 2 | 105 | 416 | SB | 1 | 28 | 0.1 | 0.46 |
| Big River | 2 | Quantitative | 3 | 105 | 462 | RB | 1 | 52 | 1.3 | 0.92 |
| Big River | 2 | Quantitative | 3 | 105 | 462 | RB | 1 | 113 | 18.5 | 1.28 |
| Big River | 2 | Quantitative | 3 | 105 | 462 | RB | 1 | 192 | 77.3 | 1.09 |
| Big River | 2 | Quantitative | 3 | 105 | 462 | BK | 1 | 138 | 29.1 | 1.11 |
| Big River | 2 | Quantitative | 3 | 105 | 462 | RB | 1 | 59 | 2.3 | 1.12 |
| Big River | 2 | Quantitative | 4 | 105 | 387 | BK | 1 | 55 | 1.8 | 1.08 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 58 | 1.9 | 0.97 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 57 | 2.2 | 1.19 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 59 | 2.5 | 1.22 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 51 | 1.5 | 1.13 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | SB | 8 | | 1.9 | |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 120 | 21.3 | 1.23 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 55 | 2 | 1.20 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 48 | 1.2 | 1.09 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 44 | 0.9 | 1.06 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | SB | 3 | | 4.4 | |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 65 | 3 | 1.09 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 65 | 3.2 | 1.17 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 52 | 1.8 | 1.28 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 55 | 2.1 | 1.26 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 60 | 2.7 | 1.25 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | SB | 9 | | 3.2 | |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 63 | 2.7 | 1.08 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 58 | 1.7 | 0.87 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 52 | 1.7 | 1.21 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 60 | 2.4 | 1.11 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 49 | 1.2 | 1.02 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 54 | 1.5 | 0.95 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 66 | 3.8 | 1.32 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | SB | 3 | | 1.1 | |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 68 | 3.2 | 1.02 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 49 | 1.6 | 1.36 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 59 | 2.4 | 1.17 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 50 | 1.5 | 1.20 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 52 | 1.9 | 1.35 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 58 | 2.2 | 1.13 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 64 | 3.8 | 1.45 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 135 | 35.2 | 1.43 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 60 | 2.9 | 1.34 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 58 | 2.2 | 1.13 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 64 | 3.3 | 1.26 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | SB | 5 | | 2 | |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 52 | 1.6 | 1.14 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | RB | 1 | 52 | 1.6 | 1.14 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 60 | 2.5 | 1.16 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 50 | 1.4 | 1.12 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 52 | 1.6 | 1.14 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | RB | 1 | 60 | 2.3 | 1.06 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 50 | 2 | 1.60 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 60 | 2.3 | 1.06 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | RB | 1 | 45 | 1.2 | 1.32 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 45 | 1.5 | 1.65 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 46 | 1 | 1.03 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 53 | 1.5 | 1.01 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | BK | 1 | 48 | 1.2 | 1.09 |
| Great Pond Outflow | 1 | Quantitative | 1 | 119 | 595 | SB | 2 | | 1 | |
| Great Pond Outflow | 1 | Quantitative | 2 | 119 | 425 | BK | 1 | 68 | 4.2 | 1.34 |
| Great Pond Outflow | 1 | Quantitative | 2 | 119 | 425 | BK | 1 | 51 | 1.6 | 1.21 |
| Great Pond Outflow | 1 | Quantitative | 2 | 119 | 425 | SB | 1 | 65 | 2.1 | 0.76 |
| Great Pond Outflow | 1 | Quantitative | 2 | 119 | 425 | BK | 1 | 51 | 1.4 | 1.06 |
| Great Pond Outflow | 1 | Quantitative | 2 | 119 | 425 | BK | 1 | 45 | 1.2 | 1.32 |

| River Name | Station # | Station Type | Sweep | Station Area ($m^2$) | Electrofisher Time | Species | Count | Length (mm) | Weight (g) | Condition |
|---|---|---|---|---|---|---|---|---|---|---|
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 50 | 1.6 | 1.28 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 50 | 1.6 | 1.28 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | SB | 1 | 48 | 1.8 | 1.63 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 57 | 2.4 | 1.30 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 55 | 2.3 | 1.38 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | SB | 1 | 76 | 4.5 | 1.03 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 48 | 1.3 | 1.18 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | SB | 5 |  | 4.7 |  |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 119 | 25.9 | 1.54 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 50 | 1.4 | 1.12 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 95 | 8.9 | 1.04 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 65 | 3.8 | 1.38 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 48 | 1.2 | 1.09 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 63 | 3 | 1.20 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 56 | 2.2 | 1.25 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 68 | 4.1 | 1.30 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 58 | 2 | 1.03 |
| Great Pond Outflow | 1 | Quantatitive | 2 | 119 | 425 | BK | 1 | 54 | 1.9 | 1.21 |
| Great Pond Outflow | 1 | Quantatitive | 3 | 119 | 301 | BK | 1 | 66 | 3.5 | 1.22 |
| Great Pond Outflow | 1 | Quantatitive | 3 | 119 | 301 | BK | 1 | 67 | 4 | 1.33 |
| Great Pond Outflow | 1 | Quantatitive | 3 | 119 | 301 | BK | 1 | 51 | 1.7 | 1.28 |
| Great Pond Outflow | 1 | Quantatitive | 3 | 119 | 301 | BK | 1 | 54 | 1.7 | 1.08 |
| Great Pond Outflow | 1 | Quantatitive | 3 | 119 | 301 | BK | 1 | 59 | 2.1 | 1.02 |
| Great Pond Outflow | 1 | Quantatitive | 3 | 119 | 301 | SB | 6 |  | 13.3 |  |
| Great Pond Outflow | 1 | Quantatitive | 3 | 119 | 301 | BK | 1 | 70 | 4.6 | 1.34 |
| Great Pond Outflow | 1 | Quantatitive | 3 | 119 | 301 | BK | 1 | 50 | 1.3 | 1.04 |
| Great Pond Outflow | 1 | Quantatitive | 3 | 119 | 301 | SB | 4 |  | 2.5 |  |
| Great Pond Outflow | 1 | Quantatitive | 4 | 119 | 275 | BK | 1 | 92 | 7.7 | 0.99 |
| Great Pond Outflow | 1 | Quantatitive | 4 | 119 | 275 | BK | 1 | 50 | 1.3 | 1.04 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 124 | 24.7 | 1.30 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 45 | 1.1 | 1.21 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | SB | 5 |  | 9.4 |  |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | RB | 1 | 95 | 10.2 | 1.19 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | SB | 2 |  | 7.7 |  |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 60 | 2.5 | 1.16 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 62 | 2.7 | 1.13 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 52 | 1.8 | 1.28 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | SB | 8 |  | 19.5 |  |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 69 | 4.5 | 1.37 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 49 | 1.5 | 1.27 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | SB | 2 |  | 5.2 |  |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 120 | 23.1 | 1.34 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 65 | 3.5 | 1.27 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | RB | 1 | 120 | 24.7 | 1.43 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 110 | 17.3 | 1.30 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 94 | 12 | 1.44 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | RB | 1 | 65 | 3.1 | 1.13 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 57 | 2 | 1.08 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 50 | 1.4 | 1.12 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 54 | 1.7 | 1.08 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 54 | 1.2 | 0.76 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 63 | 3 | 1.20 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | RB | 1 | 68 | 3.2 | 1.02 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | BK | 1 | 59 | 2.4 | 1.17 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | RB | 1 | 58 | 2.1 | 1.08 |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 306 | SB | 4 |  | 10.1 |  |
| Great Pond Outflow | 2 | Quantatitive | 1 | 104 | 275 | RB | 1 | 56 | 1.9 | 1.08 |
| Great Pond Outflow | 2 | Quantatitive | 2 | 104 | 275 | BK | 1 | 45 | 1 | 1.10 |
| Great Pond Outflow | 2 | Quantatitive | 2 | 104 | 275 | RB | 1 | 60 | 2.1 | 0.97 |
| Great Pond Outflow | 2 | Quantatitive | 2 | 104 | 275 | BK | 1 | 42 | 1.2 | 1.62 |
| Great Pond Outflow | 2 | Quantatitive | 2 | 104 | 275 | RB | 1 | 55 | 1.3 | 0.78 |
| Great Pond Outflow | 2 | Quantatitive | 2 | 104 | 275 | SB | 5 |  | 14.1 |  |
| Great Pond Outflow | 2 | Quantatitive | 2 | 104 | 275 | RB | 1 | 61 | 2.4 | 1.06 |
| Great Pond Outflow | 2 | Quantatitive | 3 | 104 | 286 | RB | 1 | 65 | 3.3 | 1.20 |
| Great Pond Outflow | 2 | Quantatitive | 3 | 104 | 286 | RB | 1 | 55 | 2 | 1.20 |
| Great Pond Outflow | 2 | Quantatitive | 3 | 104 | 286 | BK | 1 | 62 | 2.7 | 1.13 |
| Great Pond Outflow | 2 | Quantatitive | 3 | 104 | 286 | RB | 1 | 57 | 2.2 | 1.19 |
| Great Pond Outflow | 2 | Quantatitive | 3 | 104 | 286 | BK | 1 | 58 | 2.1 | 1.08 |
| Great Pond Outflow | 2 | Quantatitive | 3 | 104 | 286 | BK | 1 | 55 | 2 | 1.20 |
| Great Pond Outflow | 2 | Quantatitive | 3 | 104 | 286 | SB | 8 |  | 14.4 |  |
| Great Pond Outflow | 2 | Quantatitive | 3 | 104 | 286 | RB | 1 | 57 | 2.3 | 1.24 |
| Great Pond Outflow | 2 | Quantatitive | 3 | 104 | 286 | BK | 1 | 55 | 2 | 1.20 |
| Great Pond Outflow | 2 | Quantatitive | 3 | 104 | 286 | SB | 4 |  | 6.7 |  |
| Great Pond Outflow | 2 | Quantatitive | 4 | 104 | 269 | RB | 1 | 99 | 11.6 | 1.20 |
| Great Pond Outflow | 2 | Quantatitive | 4 | 104 | 269 | BK | 1 | 47 | 1.2 | 1.16 |
| Great Pond Outflow | 2 | Quantatitive | 4 | 104 | 269 | BK | 1 | 52 | 1.4 | 1.00 |

# APPENDIX A
# FYKE NETTING DATA

Fyke Netting Data

| Date | Sample Location | Gear Type | Net ID | Northing | Easting | Zone | Species | Fish ID | Total Catch | Length (mm) | Weight (g) | Condition |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK01 | 1 | 162 | 46.4 | 1.09 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 207 | | 427.6 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 187 | | 387.0 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 334 | | 690.6 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 353 | | 729.6 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 268 | | 552.8 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 224 | | 461.8 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 183 | | 377.0 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 110 | | 226.6 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 120 | | 248.8 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 90 | | 185.7 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 62 | | 128.9 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 3 | | 8.1 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK02 | 1 | 236 | 175.7 | 1.34 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK03 | 1 | 208 | 117.7 | 1.31 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK04 | 1 | 252 | 233.8 | 1.46 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK05 | 1 | 284 | 351.1 | 1.53 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK06 | 1 | 156 | 47.7 | 1.26 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK07 | 1 | 245 | 214.0 | 1.46 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK08 | 1 | 212 | 132.0 | 1.39 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK09 | 1 | 162 | 55.7 | 1.31 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK10 | 1 | 212 | 126.2 | 1.32 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK11 | 1 | 236 | 165.4 | 1.26 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK12 | 1 | 164 | 101.1 | 2.29 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK13 | 1 | 172 | 65.0 | 1.28 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK14 | 1 | 153 | 47.3 | 1.32 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK15 | 1 | 162 | 52.6 | 1.24 |
| 11-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | SB01 | 1 | 80 | 4.6 | 0.90 |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | Batch | 3574 | | 7380 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | Batch | 142 | | 293.8 | |

Fyke Netting Data

| Date | Sample Location | Gear Type | Net ID | Northing | Easting | Zone | Species | Fish ID | Total Catch | Length (mm) | Weight (g) | Condition |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | Batch | 188 | | 387.2 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | Batch | 129 | | 266.1 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | Batch | 122 | | 252.6 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | Batch | 96 | | 198 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | Batch | 58 | | 118.8 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | Batch | 45 | | 93.7 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | Batch | 44 | | 90.5 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | Batch | 19 | | 38.6 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | BK | BK16 | 1 | 189 | 89.3 | 1.32 |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | BK | BK17 | 1 | 240 | 186.6 | 1.35 |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | BK | BK18 | 1 | 230 | 169.8 | 1.40 |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | BK | BK19 | 1 | 212 | 96.7 | 1.01 |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | SB02 | 1 | 69 | 3.4 | 1.03 |
| 11-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | BK | BK20 | 1 | 123 | 20.2 | 1.09 |
| 11-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | Batch | 6455 | | 13330.0 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | BK | BK21 | 1 | 219 | 130.9 | 1.25 |
| 11-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | BK | BK22 | 1 | 165 | 51.7 | 1.15 |
| 11-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | BK | BK23 | 1 | 144 | 33.9 | 1.14 |
| 11-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | BK | BK24 | 1 | 232 | 160.7 | 1.29 |
| 11-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | SB | Batch | 1139 | | 2352.0 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | BK | BK25 | 1 | 216 | 144.0 | 1.43 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | Batch | 3564 | | 7360.0 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK26 | 1 | 226 | 138.3 | 1.20 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK27 | 1 | 301 | 383.8 | 1.41 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK28 | 1 | 243 | 196.7 | 1.37 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK29 | 1 | 236 | 197.8 | 1.50 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK30 | 1 | 218 | 131.0 | 1.26 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK31 | 1 | 258 | 220.6 | 1.28 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | Batch | 727 | | 1502.0 | |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK32 | 1 | 221 | 135.7 | 1.26 |

Fyke Netting Data

| Date | Sample Location | Gear Type | Net ID | Northing | Easting | Zone | Species | Fish ID | Total Catch | Length (mm) | Weight (g) | Condition |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK33 | 1 | 276 | 263.7 | 1.25 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK34 | 1 | 267 | 239.4 | 1.26 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK35 | 1 | 282 | 264.3 | 1.18 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK36 | 1 | 210 | 123.4 | 1.33 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK37 | 1 | 222 | 157.4 | 1.44 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB03 | 1 | 71 | 4.5 | 1.26 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB04 | 1 | 59 | 3.0 | 1.46 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB05 | 1 | 60 | 3.1 | 1.44 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB06 | 1 | 52 | 2.6 | 1.85 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB07 | 1 | 53 | 2.7 | 1.81 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB08 | 1 | 65 | 3.4 | 1.24 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB09 | 1 | 54 | 1.6 | 1.02 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB10 | 1 | 46 | 1.3 | 1.34 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB11 | 1 | 48 | 1.3 | 1.18 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB12 | 1 | 39 | 0.6 | 1.01 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB13 | 1 | 84 | 7.5 | 1.27 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB14 | 1 | 57 | 1.5 | 0.81 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB15 | 1 | 58 | 1.7 | 0.87 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB16 | 1 | 48 | 0.8 | 0.72 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB17 | 1 | 76 | 3.8 | 0.87 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB18 | 1 | 52 | 1.4 | 1.00 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB19 | 1 | 57 | 2.4 | 1.30 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB20 | 1 | 43 | 1.5 | 1.89 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB21 | 1 | 44 | 1.9 | 2.23 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB22 | 1 | 58 | 1.7 | 0.87 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB23 | 1 | 53 | 1.8 | 1.21 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB24 | 1 | 46 | 1.4 | 1.44 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB25 | 1 | 43 | 2.2 | 2.77 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB26 | 1 | 51 | 1.5 | 1.13 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB27 | 1 | 51 | 2.3 | 1.73 |

Fyke Netting Data

| Date | Sample Location | Gear Type | Net ID | Northing | Easting | Zone | Species | Fish ID | Total Catch | Length (mm) | Weight (g) | Condition |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | | SB28 | 1 | 60 | 2.7 | 1.25 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB29 | 1 | 62 | 3.1 | 1.30 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB30 | 1 | 46 | 1.3 | 1.34 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB31 | 1 | 53 | 1.4 | 0.94 |
| 11-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | SB32 | 1 | 56 | 2.1 | 1.20 |
| 12-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 107 | | 221.6 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 107 | | 221.7 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 93 | | 191.8 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 27 | | 56.4 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | Batch | 1511 | | 3120.0 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | BK | BK01 | 1 | 126 | 21.6 | 1.08 |
| 12-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | BK | BK02 | 1 | 298 | 303.7 | 1.15 |
| 12-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | SB | Batch | 3656 | | 7550.0 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | BK | BK03 | 1 | 245 | 188.4 | 1.28 |
| 12-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | BK | BK04 | 1 | 248 | 202.1 | 1.32 |
| 12-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | BK | BK05 | 1 | 284 | 272.9 | 1.19 |
| 12-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | Batch | 250 | | 515.7 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | Batch | 260 | | 536.7 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | Batch | 150 | | 309.6 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | Batch | 136 | | 280.7 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | Batch | 22 | | 45.4 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | Batch | 156 | | 321.7 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | Batch | 141 | | 291.5 | |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB01 | 1 | 59 | 1.5 | 0.73 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB02 | 1 | 46 | 1.0 | 1.03 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB03 | 1 | 76 | 3.9 | 0.89 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB04 | 1 | 63 | 3.2 | 1.28 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB05 | 1 | 24 | 0.1 | 0.72 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB06 | 1 | 29 | 0.3 | 1.23 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB07 | 1 | 38 | 1.1 | 2.00 |

Fyke Netting Data

| Date | Sample Location | Gear Type | Net ID | Northing | Easting | Zone | Species | Fish ID | Total Catch | Length (mm) | Weight (g) | Condition |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB08 | 1 | 52 | 1.6 | 1.14 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB09 | 1 | 54 | 1.6 | 1.02 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB10 | 1 | 55 | 2.4 | 1.44 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB11 | 1 | 63 | 1.8 | 0.72 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB12 | 1 | 55 | 1.6 | 0.96 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB13 | 1 | 56 | 1.4 | 0.80 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB14 | 1 | 53 | 1.7 | 1.14 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB15 | 1 | 22 | 0.1 | 0.94 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB16 | 1 | 53 | 2.1 | 1.41 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB17 | 1 | 53 | 1.9 | 1.28 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB18 | 1 | 44 | 1.4 | 1.64 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB19 | 1 | 49 | 1.1 | 0.93 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | SB20 | 1 | 61 | 2.1 | 0.93 |
| 12-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | BK | BK06 | 1 | 178 | 67.2 | 1.19 |
| 13-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 1070 |  | 2210.0 |  |
| 13-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | SB | Batch | 407 |  | 840.0 |  |
| 13-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK01 | 1 | 252 |  | 0.00 |
| 13-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK02 | 1 | 185 |  | 0.00 |
| 13-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK03 | 1 | 136 | 29.7 | 1.18 |
| 13-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK04 | 1 | 237 | 188.3 | 1.41 |
| 13-Aug-21 | Great Pond | Fyke Net | FN01 | 5280295 | 367353 | 22T | BK | BK05 | 1 | 285 | 236.4 | 1.02 |
| 13-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | SB | Batch | 1893 |  | 3910.0 |  |
| 13-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | BK | BK06 | 1 | 249 | 213.4 | 1.38 |
| 13-Aug-21 | Great Pond | Fyke Net | FN02 | 5280235 | 367108 | 22T | BK | BK07 | 1 | 262 | 250.2 | 1.39 |
| 13-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | SB | Batch | 2823 |  | 5830.0 |  |
| 13-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | SB | Batch | 402 |  | 830.0 |  |
| 13-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | BK | BK08 | 1 | 202 | 108.6 | 1.32 |
| 13-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | BK | BK09 | 1 | 219 | 143.8 | 1.37 |
| 13-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | BK | BK10 | 1 | 186 | 79.4 | 1.23 |
| 13-Aug-21 | Great Pond | Fyke Net | FN04 | 5280544 | 367283 | 22T | BK | BK11 | 1 | 143 | 32.2 | 1.10 |

Fyke Netting Data

| Date | Sample Location | Gear Type | Net ID | Northing | Easting | Zone | Species | Fish ID | Total Catch | Length (mm) | Weight (g) | Condition |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | Batch | 378 | | 780.0 | |
| 13-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK12 | 1 | 235 | 176.3 | 1.36 |
| 13-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK13 | 1 | 223 | 119.7 | 1.08 |
| 13-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK14 | 1 | 179 | 72.3 | 1.26 |
| 13-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK15 | 1 | 282 | 276.7 | 1.23 |
| 13-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | BK | BK16 | 1 | 182 | 78.6 | 1.30 |
| 13-Aug-21 | Great Pond | Fyke Net | FN05 | 5280836 | 367513 | 22T | SB | Batch | 213 | | 440.0 | |
| 13-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | Batch | 1738 | | 3590.0 | |
| 13-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | SB | Batch | 155 | | 320.0 | |
| 13-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | BK | BK17 | 1 | 228 | 155.4 | 1.31 |
| 13-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | BK | BK18 | 1 | 243 | 177.8 | 1.24 |
| 13-Aug-21 | Great Pond | Fyke Net | FN03 | 5280514 | 367687 | 22T | BK | BK19 | 1 | 266 | 245.2 | 1.30 |