

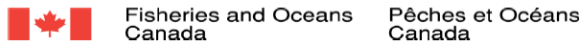
## Science Committee Report

The Scientific Committee met on February 8<sup>th</sup> and 9<sup>th</sup> 2023 at the Quality Inn Hotel in Campbellton. The committee assessed the state of fish and fish habitat in the Restigouche River watershed for 2022. The primary objective of this meeting was for members of various non-government organizations (NGO), government organizations (Federal and Provincial), academics as well as indigenous organizations conducting research in the watershed gather to share their 2022 work. A total of 49 participants joined the meeting to discuss, present and partake in the knowledge sharing.

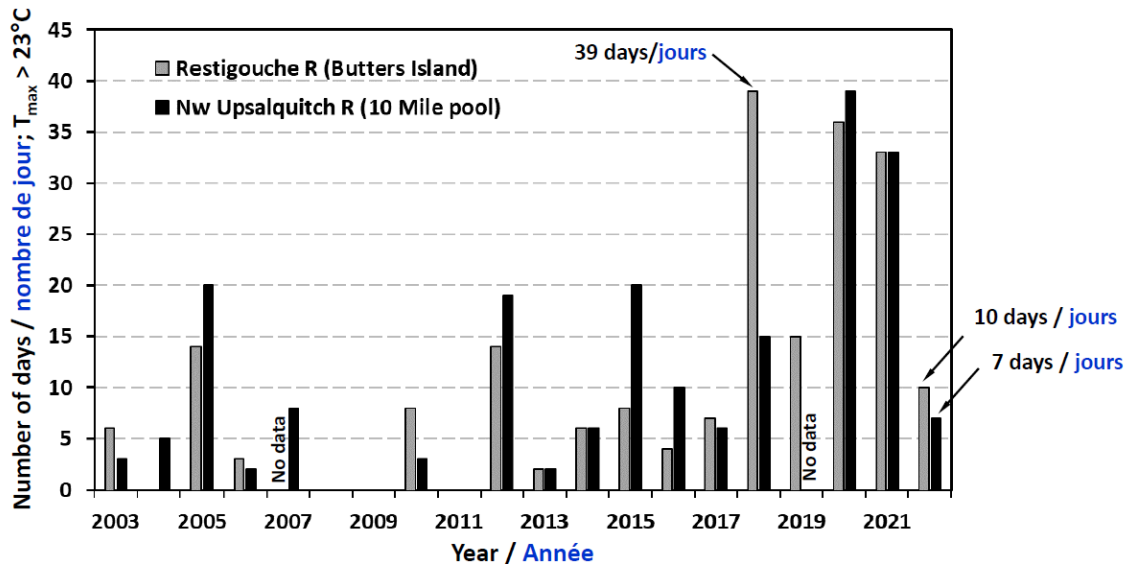
### River Data and Warm Water Protocol

It was decided by the working group working with DFO that the reference sensor for the Restigouche River warm water protocol for 2022 would be the one located on the mainstem at Brandy Brook Lodge operated by GMRC. The data series was not retrievable at the time of the science committee due to a server problem, but temperature and flow data were monitored daily throughout the summer. The warm water protocol was activated only two days in 2022 for partial angling closures. The Environment Canada station on the Upsalquitch River was still operated in 2022 but was also missing data during the summer due to a malfunction of the temperature sensor.

The conditions on the river presented by Fisheries and Oceans showed data attesting of a particularly friendly summer for Atlantic salmon with higher summer low flows and cooler water temperatures than observed in recent years. The following graph illustrates the number of days when water temperature reached the 23 Celsius threshold in the last two decades.



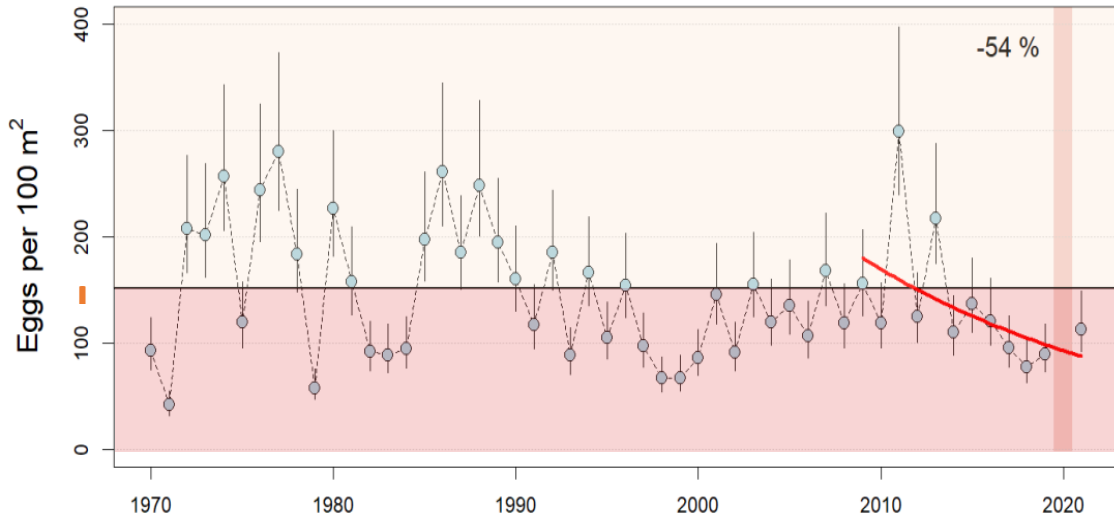
## Water Temperature / Température de l'eau



Fish Counts and Monitoring Science

In 2022, the number of spawners contributing to the recruitment of the Restigouche River was determined by visual snorkel count surveys and the official report will be published later this year. Preliminary results by DFO were however presented and are as follows for the juveniles: fry abundance show an increasing trend over the last two generations but is only significant on the Little Main Restigouche; small parr significantly increased in the Kedgwick River but maintaining in the other tributaries; large parr significantly increased in the Kedgwick and Little Main Restigouche but remained comparable in the Upsalquitch and Little Main Restigouche.

Adult returns were still under the Lower Limit Reference Point for egg deposition in 2021 as per graph below.



However the un-reviewed data for the returns are presented in the table below and seem to be more encouraging for the 2022 season.



Adult Population Estimate:  
 Snorkel Survey

| River                   | Large | Small |
|-------------------------|-------|-------|
| <u>Kedgwick</u>         | 1558  | 373   |
| Little Main Restigouche | 1218  | 426   |
| <u>Upsalquitch</u>      | 1368  | 851   |
| <u>Patapedia</u>        | 327   | 110   |
| Restigouche             | 3876  | 671   |
| <b>Total:</b>           | 8347  | 2431  |



\*Unreviewed data\*



On Quebec rivers, the Ministère de Faune, Forêts Parcs and the CGRMP conducted visual counts in 2022. Here are the main results for counts of grilse (madeleineaux), counts for large salmon (Grands saumons) and the associated estimated egg deposition rate. Both the Patapédia and Causapschal reached their conservation targets, but the Matapédia only attained 88% of the requirement.

| <b>Montaisons Madeleineaux</b> |             |             |                      |
|--------------------------------|-------------|-------------|----------------------|
| <b>Rivières</b>                | <b>2022</b> | <b>2021</b> | <b>moyenne 17-21</b> |
| <b>Matapédia</b>               | 506         | 597         | 636                  |
| <b>Causapschal</b>             | 23          | 15          | 25                   |
| <b>Patapédia</b>               | 193         | 98          | 119                  |

| <b>Montaisons Grands saumons</b> |             |             |                      |
|----------------------------------|-------------|-------------|----------------------|
| <b>Rivières</b>                  | <b>2022</b> | <b>2021</b> | <b>moyenne 17-21</b> |
| <b>Matapédia</b>                 | 1320        | 1837        | 2012                 |
| <b>Causapschal</b>               | 515         | 394         | 440                  |
| <b>Patapédia</b>                 | 506         | 331         | 362                  |

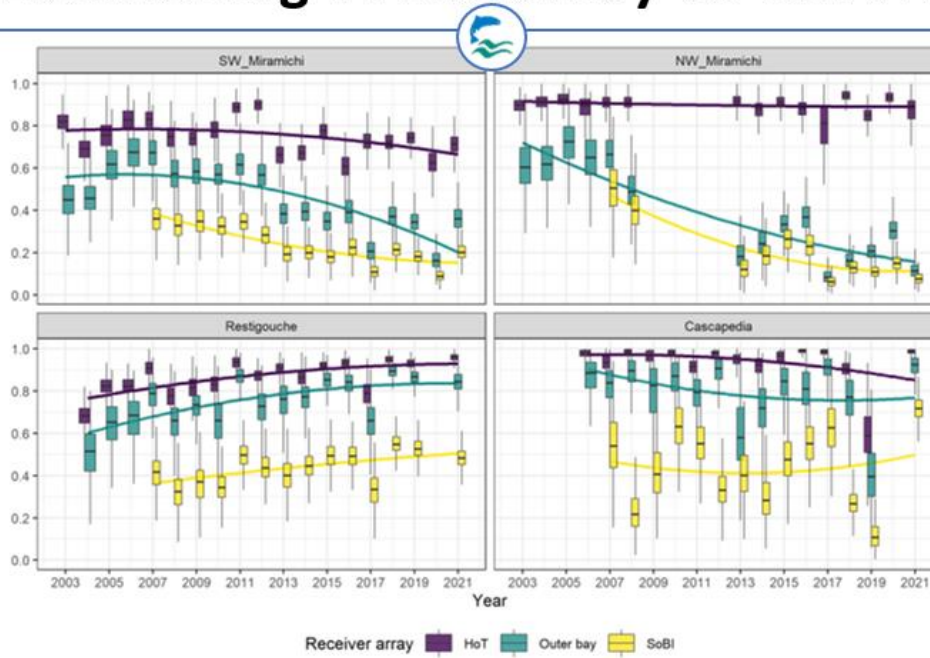
| <b>déposition d'œuf (millions)</b> |             |             |                      |                        |
|------------------------------------|-------------|-------------|----------------------|------------------------|
| <b>Rivières</b>                    | <b>2022</b> | <b>2021</b> | <b>moyenne 17-21</b> | <b>% seuil optimal</b> |
| <b>Matapédia*</b>                  | 9,2         | 12,4        | 13,0                 | 88 %                   |
| <b>Causapschal</b>                 | 3,3         | 2,8         | 3,0                  | 135%                   |
| <b>Patapédia</b>                   | 3,6         | 2,8         | 2,0                  | 129 %                  |

\* Étant donné qu'il a été très difficile de faire l'inventaire cette année et que les saumons étaient déjà remontés très haut en rivière, la déposition enregistrée ici (88%) est un chiffre conservateur. Le pourcentage de déposition est probablement beaucoup plus élevée en réalité.

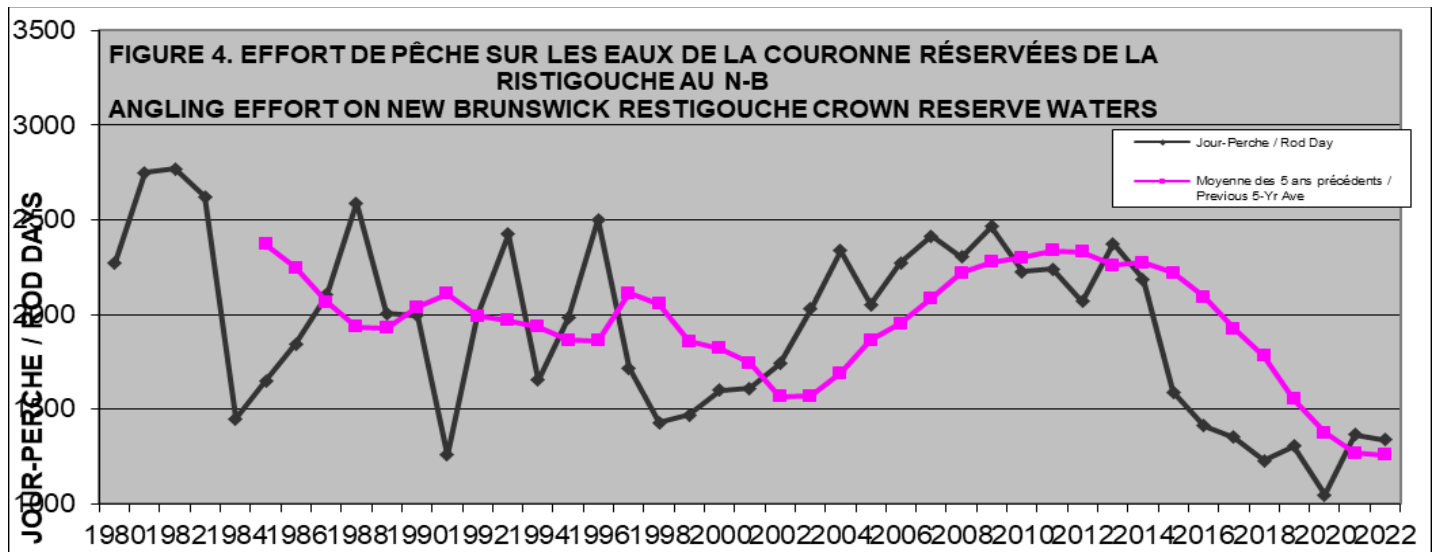
Telemetry efforts were continued again in 2022 following a successful 2021 campaign. The Gespe'gewaq Mi'gmaq Resource Council (GMRC) led the smolt and kelt tagging in spring 2022 in close collaboration with the Atlantic Salmon Federation (ASF), DFO, fishing camps and local Mi'gmaq communities. This large collaborative project was funded by the Environmental Studies Research Fund (ESRF). Acoustic receivers were deployed in the river, between islands, below the Van Horne Bridge and Dalhousie. A total of 18 kelts and 45 smolts were tagged in the Restigouche River watershed. Tagged Restigouche smolts continue to have a relatively good

survival rate to the Head of Tide Outer Bay and Strait of Belle Isle compared to tagged Miramichi smolts; see graph below.

## Estimating Probability of Survival



On the Crown Reserve Waters, as expressed by the following graph, the downward trend continues to be seen for the fishing-rod days.



### Fish Habitat Restoration

The partnership between the GMRC and the RRWMC for habitat restoration was presented at the meeting. The RRWMC continued the beaver dam breaching program and opened 123 km of habitat for spawning access compared to 65 km last year. Furthermore, RRWMC's program to mitigate sediment runoff from forestry activities resulted in the restoration of 3 major sites: (33 diversion ditches, 3 culverts installation/replacement, 6 culvert cleanings and 4 sedimentation traps installed). The GMRC on their part continued their work to increase habitat connectivity: in total this year, 3 Rock weirs, 1 stream reprofile, 1 culvert replacement, 13 diversion ditches were constructed to reconnect 44 km of stream habitat. In regards to silt runoff mitigation into the river, 14 sediments traps were built. Further, the GMRC is researching the long-term effectiveness of habitat restoration in the Restigouche River Watershed as part of the Indigenous Habitat Protection Program (IHPP). Through these monitoring efforts, we have sampled fish communities, water chemistry, algae, plants, and aquatic insects to assess any changes within the food web and the effects of habitat restoration on the Atlantic salmon populations.

### Thermal Refuge Science and Activities

Research was presented on the standardization of a water temperature model for the characterization of northern rivers. Existing river data (740 stations in RivTemp including 338 rivers) was used to evaluate temperature trends. With historical data and using different mathematical methods, it was shown that Quebec river temperatures are increasing significantly since the beginning of the last century.

A presentation on the thermal refuge best practices workshop that was held in Halifax on January 24<sup>th</sup> was done at the event. The summary of the presentations included there were: 1. A decade of thermal refuge research and management, 2. Nova Scotia salmon rivers are warming: What is the NSSA doing about it?, 3. Turning off the heat: Proactive engineering solutions to cold-water habitat loss in a warming world, 4. Cooling off: Installation of engineered cold-water habitat in Nova Scotia and 5. Cold water enhancement put into practice: considerations, challenges and lessons learned. A best practices paper will follow this workshop.

Another research which consisted in the identification of research gaps for thermal refuge science by thoroughly parametrizing habitat conditions, physiological and behavioral aspects and population-level response was presented that day. A scientific paper was published on the matter in 2022. It can be accessed here: <https://tinyurl.com/thegmrc>

A new research initiative will allow the mapping of different thermal refuges with the objective to identify which landscapes drivers aside groundwater influx influence the formation and quality of confluence plumes thermal refuges types. The study wants to look at proxy such as canopy cover, soil drainage, bedrock, or slope percentage to define their relative influence on the thermal refuge quality.

Another new research project will focus on the evaluation of parameters influencing stress on the fish. Tests with living fishes will help determine how stressors such as silt, lack of oxygen or temperature, for instance, will impact survival of fish and the potential cumulative effects of these parameters.

Thermal refuges were also being further investigated on the Matapedia River in 2022. This project was led by the Gespe'gawaq Mi'gmaq Resource Council in collaboration with the Matapedia-Restigouche Watershed Organization. This project focused on priority streams and wetlands providing persistent cold water to the mainstem thus supporting Atlantic salmon thermoregulation during hot water events. Land use mapping was conducted in both Matapedia and Avignon counties and a review of proactive measures to enhance protection on private lands is still underway.

The RRWMC presented preliminary work performed at the 10 Mile for the characterization and enhancement of the thermal refuge and we will resume the tests in 2023. A stand-alone report was drafted for the tests, and it is



available upon request. The GMRC confirmed it has intentions to start enhancement of thermal refuges in the Restigouche in 2023 targeting two potential sites: England brook and Cox brook.

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