GWFO Operations Team Workshop, January 14 and 16, 2026

Summary of Outcomes and Actions for Follow up

The workshop brought together the GWFO Operations Team, which includes all facility leads, managers, technicians, data management personnel, GWFO secretariat, and the Strategic Management Committee. It was attended by approximately 50 people each day. The first day included an update on the GWFO facility, overviews of new partners coming on board in 2026, and updates from each of the main partner institutions. The second day dealt with data management (the central system, GWFNet and the Data Centre, and overviews of data management at the partner institutions) and thematic working groups on eddy covariance flux measurements, water quality, and hydrology.

A recoding of day-1 and the presentations, along with the workshop agenda, are available here: https://gwfo.ca/news-events/gwfo-workshop-jan-2026.php.

Summary of Day-1

The updates provided detailed information on new activities, personnel changes, facility upgrades or expansions, research directions, funding, and other news from the partner institutes.

The GWFO update described how the facility has been addressing several conditions of funding by CFI, including changes to our governance structure and development of a strategic plan, as well as recent high-level activities to raise GWFO awareness and seek support for the facility. Next we heard from the PIs and representatives of major research facilities and networks joining GWFO as partners, including The Cloud to Aquifer Natural Observatories (CANO) network, the MECHE (Monitoring Extreme Climate and Hydrometeorological Events) Observatory, and University of Calgary facilities in the Canadian Rocky Mountains and foothills region. These introduced the facilities and the research they support to the GWFO Operations team.

The University of Waterloo update described UW's GWFO website and services portal, personnel, instrumented observatory sites, fee-for-service activities in the last year, partnerships with provincial and federal agencies, research priorities, and participation in national and international initiatives such as the UNESCO Ecohydrology Demonstration Sites and Analytical Lab Network. There was interest in the engagement of UW with the Six Nations of the Grand River, and some of the linkages were described.

At McMaster University, a new urban–rural observatory, the Ancaster Watershed Monitoring Sites, was introduced. This can be added to the GWFO network. Recent activities and

facility upgrades were described for the Nibi (Water) Observatory for Boreal Ecohydrological Landscapes, Turkey Point Observatory, Wolf Creek Research Basin, and Tombstone Waters Observatory.

The University of Windsor and partners in RAEON presented an overview of instrumentation and recent and planned glider missions in 2025 and 2026, real-time sensor arrays and bouys, laboratories, and notable updates from each of the partners over the past year.

Wilfrid Laurier University's update described the lab facilities in Waterloo and Yellowknife, upgrades to the Yellowknife facility, field sites and instrumentation, science activities around wildfire impacts in the North, new funding and expansion of sites, a new portable lake ice research station, and some institutional advances. There was some discussion after the presentation about the possibility of adding meteorological stations to the fire ecology network, and it was noted this might be something to explore.

The USask update focused recent activities at some of the research basins and the impacts of the drought and wildfires in 2025, some new publications, outreach and engagement activities, and the UN Decade of Action for Cryospheric Sciences.

Outcomes: Materials presented will be used to update information on the GWFO website and inventories, and for year-3 reporting to CFI.

<u>Summary of Day-2</u>

The first session on Day-2 included an overview of the central data management platform, GWFNet, and updates on data management activities at each of the GWFO partner institutes. Discussions throughout focused on interoperability of different systems, data and metadata standards, data flows from collection, QA/QC, through to storage and distribution, and linking technicians with the data management team. The institutional updates listed data holdings in various repositories, which can be linked to and catalogued in the central system. There have been strong efforts made across GWFO to archive data in a variety of platforms and we need to knit this together so that it is all discoverable and extractable via a central site, as required by CFI.

A key point was emphasized, which is that it is a condition of our funding that data be made accessible through a central point of access. It is the job of the technicians to manage data and to deliver it to our data system, so time must be allocated by the faculty administrators of GWFO staff to ensure this is done. This will be a condition of facilities to remain part of GWFO.

Outcomes and Actions: We must work with the technical teams and the data management team to ensure a more timely and complete flow of data into the central

data platform. The priority is to make data discoverable via the GWFO system and make this interoperable with the various other platforms used across the network of facilities.

The second session dealt with the formation of three different GWFO working groups: 1) eddy covariance flux measurements, 2) water quality observations in lakes and streams, 3) hydrology and hydrometeorological observations. A survey questionnaire was circulated in advance to gather information about the approaches and on *what* and *how* different research groups in GWFO do things. This provides detailed information that will help these groups coordinate and move forward.

Eddy covariance fluxes summary

For the most part, different facilities are using common approaches and standards and we can integrate with CanFlux open-source approaches. There are a few groups who are not traditionally flux measurement generators and so getting some of the best practices and protocols implemented at these sites would be of interest. The linkage with CanFlux can have other benefits as well, including local storage of flux data in Canada to mitigate geopolitical issues, and potential training contributions through GWFO to ensure continuity of the community of practice.

The value added by GWFO to CanFlux is that most of our sites have other elements of the water and carbon balance, and towers are in gauged basins with a more full suite of hydrological variables measured, allowing complete quantification of the water balance. This is extremely valuable for evaluating hydrological models and land surface schemes as well as tracking changes in the water cycle over time. With carbon as well, this brings in the vegetation component and its dynamics. This is an area of potential strength for us and we need to make sure we are co-locating sites as best as we can. Through connections with the flux community, we can bring forward the value of those other surface observations for helping interpret the flux data.

Water quality summary

Water quality monitoring and analyses across GWFO are diverse in scope, and the survey circulated ahead of the workshop provides useful information of the different foci of various labs and monitoring systems. A few starting points emerged from the discussions. One was with regard to data; it was suggested that we need to inventory (via annual reporting) what data are generated and what are covered under the data policy, along with the timescale on which it should appear. The data are generally in various stages of processing and quality assurance and control when they are shared, so we need to be clear with flags and indicate fitness for purpose (different levels of uncertainty have different

fitness). A tiered system could be used for our water quality database (e.g., tier 1 include variables that are common across all sites and require low processing … tier 2 include more sophisticated analysis … tier 3 site specific data). Often there is not support for data cleaning and analyses (i.e., research funding to look at trends and patterns across sites, etc.), but perhaps this could be something for a PDF if funds could be found. There will be a need to consider the data management issues for water quality further.

Another issue was the capacity in individual labs and the comparability among labs to be able to do similar of the same analyses. Sometimes there is not enough capacity in a lab, and we should examine where we are over and under capacity in GWFO. The reputation of a lab is essential (QA/QC, well known protocols and standards). We might identify analyses that are shared among different labs, do QA/QC and inter-lab comparisons, with the goal of sharing best practices and distributing the good reputation of a lab across all labs in GWFO. This is an added value of the network.

Hydrology summary

The responses from the questionnaire were reviewed to assess what we are doing across GWFO, where we are doing things similarly, and where we might look to streamline our approaches. The discussion focused mainly on data management aspects. We have much more than just time series data (e.g., large archives of photographs) and need to look for repositories to store these. Publication of data sets and data papers is a good approach and there is a need to update these in a number of instances (data descriptions may be fine but the data itself need updating); an inventory and priorities for where to do this should be a focus. We should also fully utilize the WISKI system for hydrological data.

Outcomes and Actions: We need to continue to foster communities of practice in GWFO, make our systems interoperable, make approaches more uniform and comparable. We will continue this and begin to consider our renewal in 2029 and what the next phase will look like.