

## 1. DATA AND INFORMATION TYPES

### A. Provide a contextual description of the data stream.

This site provides public access to real-time hydrometric data collected at over 1800 locations and access to historical data collected at over 7600 stations (active and discontinued) in Canada. These data are collected under a national program jointly administered under federal-provincial and federal-territorial cost-sharing agreements. It is through partnerships that the Water Survey of Canada program has built a standardized and credible environmental information base for Canada.

Website URL: Real-Time Sensor: Source: Canada Water Office:

<http://portal.aos.org/#module-metadata/10d90f26-0154-11e4-bd46-00219bfe5678/47e776b8-3306-11e4-8dee-00219bfe5678>

### B. How many station locations are there for this data stream?

269

### C. What are the specific parameters of the data.

The parameters of these data include: date, time, stream flow, stream height, air surface temperature, wind speeds, precipitation, and snow depth.

### D. Provide information about the sampling platform or instrumentation.

This sampling platforms include hydrometric gauging and meteorological stations.

## 2. DATA PATHWAY

### A. Is a data sharing agreement required?

Disclaimer for near real-time and historical water level and streamflow information:

Users should use the information on this website with caution and do so at their own risk. The Government of Canada accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

The near real-time information presented on this website is received via satellite or land-line transmissions from hydrometric gauging stations operated by Environment Canada and its Partners. These data are normally posted (in graphical form) within six hours of observation. The data are preliminary and have been transmitted automatically with limited verification and review for quality assurance. Subsequent quality assurance and verification procedures may result in differences between what is currently displayed and what will become the official record.

It is the responsibility of all persons who use this site to independently confirm the accuracy

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**B. In which format(s) were data received by AOOS?**

Data are received as CSV file from originator website.

**C. How can the information be accessed?**

The data are available through the AOOS data portal, where it can be downloaded or explored through interactive visualizations. Specifically, data are available from two unique access points:

- File Downloads (CSV)
- ERDDAP

**D. What file formats will be used for sharing data, if different from original?**

Data are shared as CSV and through ERDDAP. Data are also available for exploration in the AOOS portals via interactive, graphical visualizations.

**E. Describe how the data are ingested(e.g. the flow of data from source to AOOS data portals) and any transformations or modifications made to share data in the AOOS data portal.**

Data are downloaded from the source to the AOOS storage. Custom Java, Scala, and Python scripts are used to convert data formats suitable for internal and external interoperability services. Data are made available in the AOOS portals through the access points and via graphic displays generated through internal JSON-format data requests from these services.

Graphic displays include a mapping service, customized interactive visualizations, and

time-series plots of the unit values wherein each parameter is graphed independently. Back-end scripts handle the conversion of visualized data from CF standards to other, non-CF units that may be requested by the user. Data files may be downloaded by the user from the AOOS data portal. A user request for a CSV file request pulls the data from the server cache. A user request for ERDDAP pulls data from the ERDDAP service using the same cache. For this data, no CF-standard names or units exist, therefore custom names of abundance\_of\_{scientific\_name} were used. Refer to Appendix I for CF standards.

Summary statistics generated within the interactive graphical displays may be requested by the user. Summary statistics may include minimum, maximum and mean values. Seasonal statistics, available on time series longer than 3 years, include mean, and 10th and 90th percentiles. Note: the number of points visually available to interactive users from the source data are limited when necessary using temporal binning, such as daily, weekly, monthly, seasonally and yearly.

**F. What metadata or contextual information is provided with the data?**

Metadata.txt file provided with the data for each parameter. Data are shared in the AOOS portals with descriptive narratives describing the data and linking back to the originator's site.

**G. Are there ethical restrictions to data sharing?**

No

**a. If so, how will these be resolved?**

N/A

**H. Who holds intellectual property rights (IPR) to the data?**

Canada Water Office

**I. Describe any effect of IPR on data access.**

None

**3. DATA SOURCE AND QUALITY CONTROL**

**A. Indicate the data source type (i.e. Federal, Non-Federal, University, State Agency, Local Municipality, Military Establishment (branch), private industry, NGO, non-Profit, Citizen Science, Private individual)**

Global

**a. If Federal data source, were changes applied to the data?**

N/A

**b. If Yes, describe any changes to the data that require documentation?**

N/A

**B. Indicate the data reporting type (e.g. real-time, historical).**

Real-time

**C. If real-time, list the QARTOD procedures that are currently applied.**

There are five required QARTOD tests for weather parameters Wind Speed, Wind Direction and Wind Gusts, of which three are implemented by the AOOS Data System -- the syntax, gross range and time gap tests (see 3G). A version of the Timing Gap Test, which with QARTOD is intended to ensure ingestion of minimum hourly time series, is performed by AOOS. The AOOS version of the timing gap test changes the station color to a grey shade ("shade-flags") on the real-time sensor map display after 4 hours of missed data reports, and removes the station from the map (though not the archive) after a week of missed reports. Data remain available in the Historical Sensors catalogue.

QARTOD requires two additional tests to the three implemented by AOOS on the weather data -- a location test and climatology test. Three additional tests are required for water (stream) level data that may be included in this data stream -- gross range tests, location and climatology tests.

The gross-range test for water level will be implemented within 12 months of certification (Target June 2017).

Given that these Weather stations are land-based and fixed position, and are not at risk of "breaking" mooring, the location test is considered unwarranted for this data stream. However, the Location Test will be implemented by June 2017 for stations that produce GPS output in the reported data.

The Climatology Test is more rigorous, and currently, the AOOS Data System does not have the historical data in place to perform meaningful climatology tests on non-federal sourced weather assets. It is a test that may be considered after there are 7+ years of data in the AOOS archive.

**D. If real-time, list the QARTOD procedures that are planned for implementation.**

Remaining required tests are planned for implementation within 12 months of certification.

**E. What is the status of the reported data? (e.g. raw, some QC, incomplete, delayed mode processed but not QC'd)**

QC by originator, link to data source website for more information.

**F. Describe the data control procedures that were applied by the originator.**

The data shown below is considered raw data and is provided "as-is" with no claim made to its accuracy or its appropriateness to an intended use.

**a. Provide a link to any documented procedures.**

[https://wateroffice.ec.gc.ca/disclaimer\\_info\\_e.html](https://wateroffice.ec.gc.ca/disclaimer_info_e.html)

## **G. Describe the data control procedures that were applied by AOOS.**

AOOS currently applies three standard QC procedures to real-time and historical observation data before it is stored in the AOOS Data System. These tests include the following:

1. *Syntax Test*: Each regional data source uses unique syntax to transfer data. Some (e.g., Canada Water Office) have standardized data storage protocols and provide files whereas others (e.g., Alyeska Weather stations) are merely html web pages that are scraped for data. Therefore, each regional source requires a custom syntax test, which merely checks for parity errors by testing if data can be extracted from the downloaded or scraped data. If no data can be extracted, the test fails, and no data are accessed, served or stored for that record.
2. *Gross Range Test*: This test checks data values against minimum and maximum values defined for each parameter. In addition to parameters outlined in QARTOD manuals, AOOS includes gross range tests for parameters not covered by QARTOD (see Appendix H for the list and minimum and maximum values). Parameters in this data stream with gross range checks include Air temperature (-130 and 130 deg F); barometric pressure (355 and 1085 mbar); wind speed and gust speed (0 and 253 mph); wind direction and gust direction (0 and 360 degrees); relative humidity (0 and 100%); precipitation amount (0 min only); snow depth (0-500 inches). Values outside of the prescribed parameter ranges are rejected and replaced with missing value flags in data storage connected to access points and the graphic displays.
3. *Time-Gap Check*: AOOS implements a “*time-gap check*” that informs observational assets (e.g., weather stations) displayed on its “Real-Time Sensor Map”. If no data are received from an existing observational station for four hours, the icon on the map changes from a scaled color to a small grey-shade dot. If no data are received from an existing observational station for one week, the asset is automatically removed from the map, although assets are still made available on a historical sensor map.

AOOS QC syntax and gross range tests qualify as legitimate QC checks for many data stream parameters described by US IOOS Quality Assurance of Real-Time Oceanographic Data (QARTOD) protocols. The AOOS version of the “*time-gap check*” does not flag data or gaps in the underlying AOOS data storage, thus may not completely satisfy the “*time-gap test*” proposed by QARTOD.

### **a. Provide a link to any documented procedures.**

AOOS Data Assembly Center and Data Management Plan (2016).

## **H. List the procedures taken for data that could not be QC'd as directed.**

N/A

## **4. STEWARDSHIP AND PRESERVATION POLICIES**

### **A. Who is responsible for long-term data archiving?**

Data are aggregated for visualization and exploration with other layers in the AOOS data portal. AOOS stores the real-time and historical data internally using the AOOS data servers.

International Data source, so not required to archive in US National Archive at this time.

**B. Which long-term data storage facility will be used for preservation?**

N/A

**C. Describe any transformation necessary for data preservation.**

N/A

**D. List the metadata or other documentation that will be archived with the data.**

N/A