CoCoRaHS CANADA
CEC MEETING
SEPT 2019

Prepared by:
Rick Fleetwood
Meteorological Service of Canada (MSC)
Environment & Climate Change Canada

Canada

OUTLINE

- MSC interest and role
- Network expansion
- Volunteer engagement
- Challenges
- Data usage and feedback
- Data quality
- Questions

MSC INTEREST AND ROLE

- CoCoRaHS Canada is a not for profit organization managed by Weather Innovations (WIN) in Chatham Ontario

- MSC a supporting member of CoCoRaHS Canada since 2012 along with:
  - WIN, AAFC, FFCF & CoCoRaHS USA
  - In-kind support and start-up contribution funding (2013-2017)
  - Well organized and managed network and observing procedures & equipment similar to the MSC - good fit

- Goal: Assist/support CoCoRaHS Canada to further expand the network nationally to meet the need for high quality supplementary precipitation data

NETWORK EXPANSION

- Slow but steady network expansion continuing in all regions with currently just over 600 active volunteers (as of Sept 2019)

- Promotion in Quebec started more recently following development of French version of website (19 active stations)

- CoCoRaHS has worked with many groups to develop the network such as:
  - Agricultural Associations
  - Watershed and Conservation Authorities
  - First Nations – (recent INAC contract)
  - Municipalities
  - Schools and universities
  - MSC Severe Weather Watcher groups
  - General public and other weather enthusiast groups/social media
  - Several federal and provincial /territorial departments
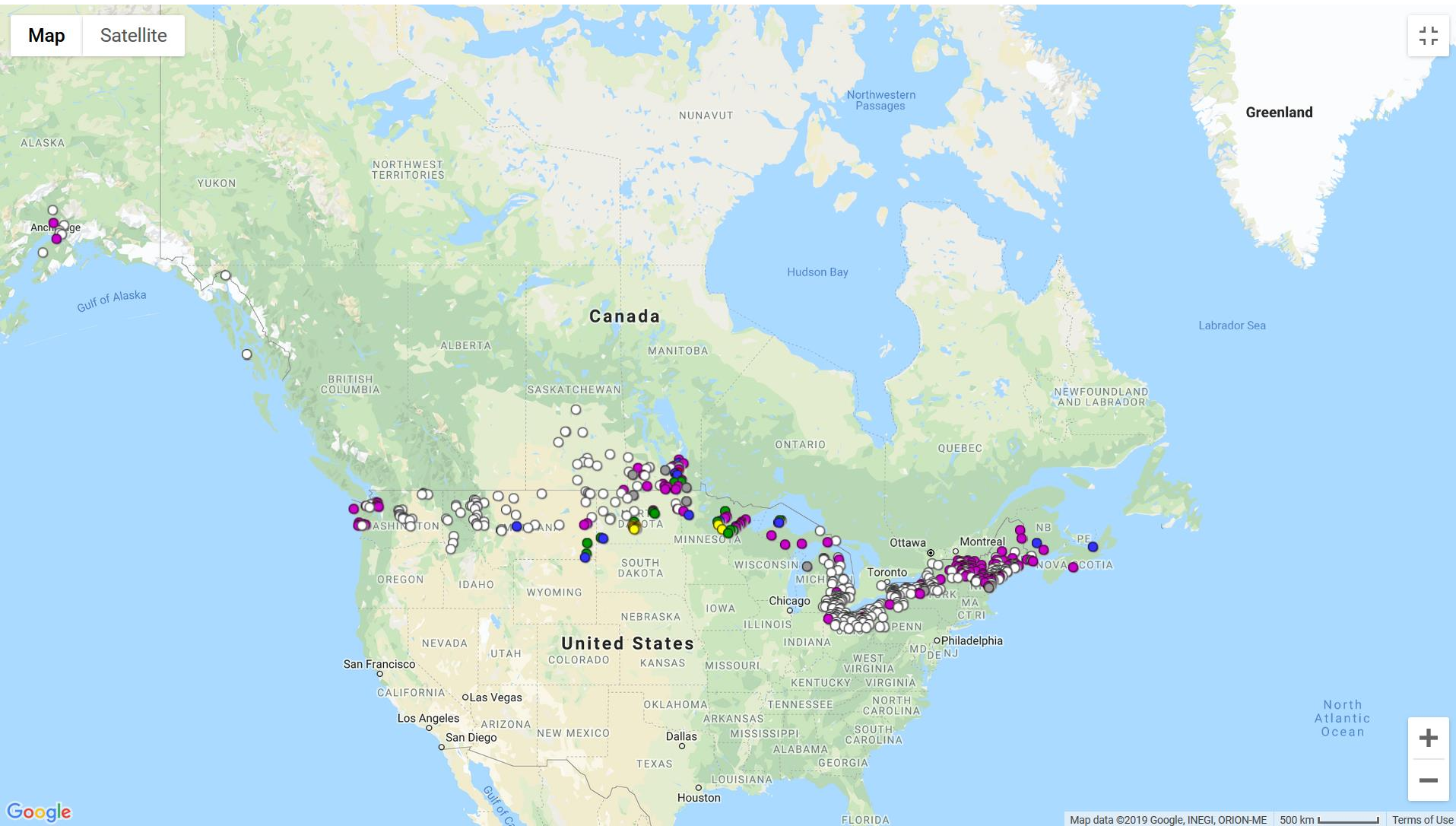 - Private sector organizations

NETWORK EXPANSION

COCORAHS ESTABLISHED IN CANADA IN LATE 2011 BEGINNING IN MB
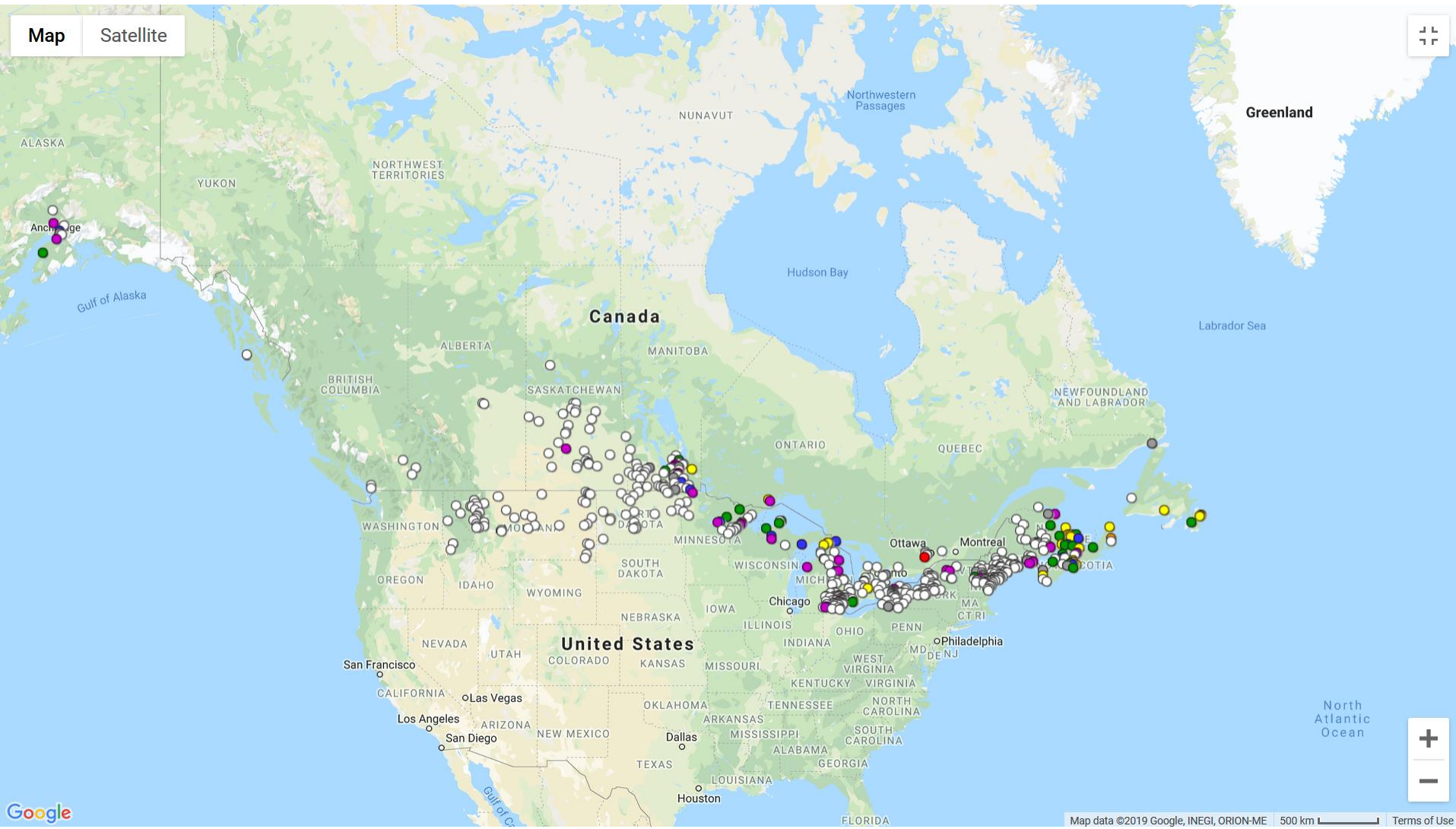## SEPTEMBER 2012 - **46 STATIONS** REPORTING MB
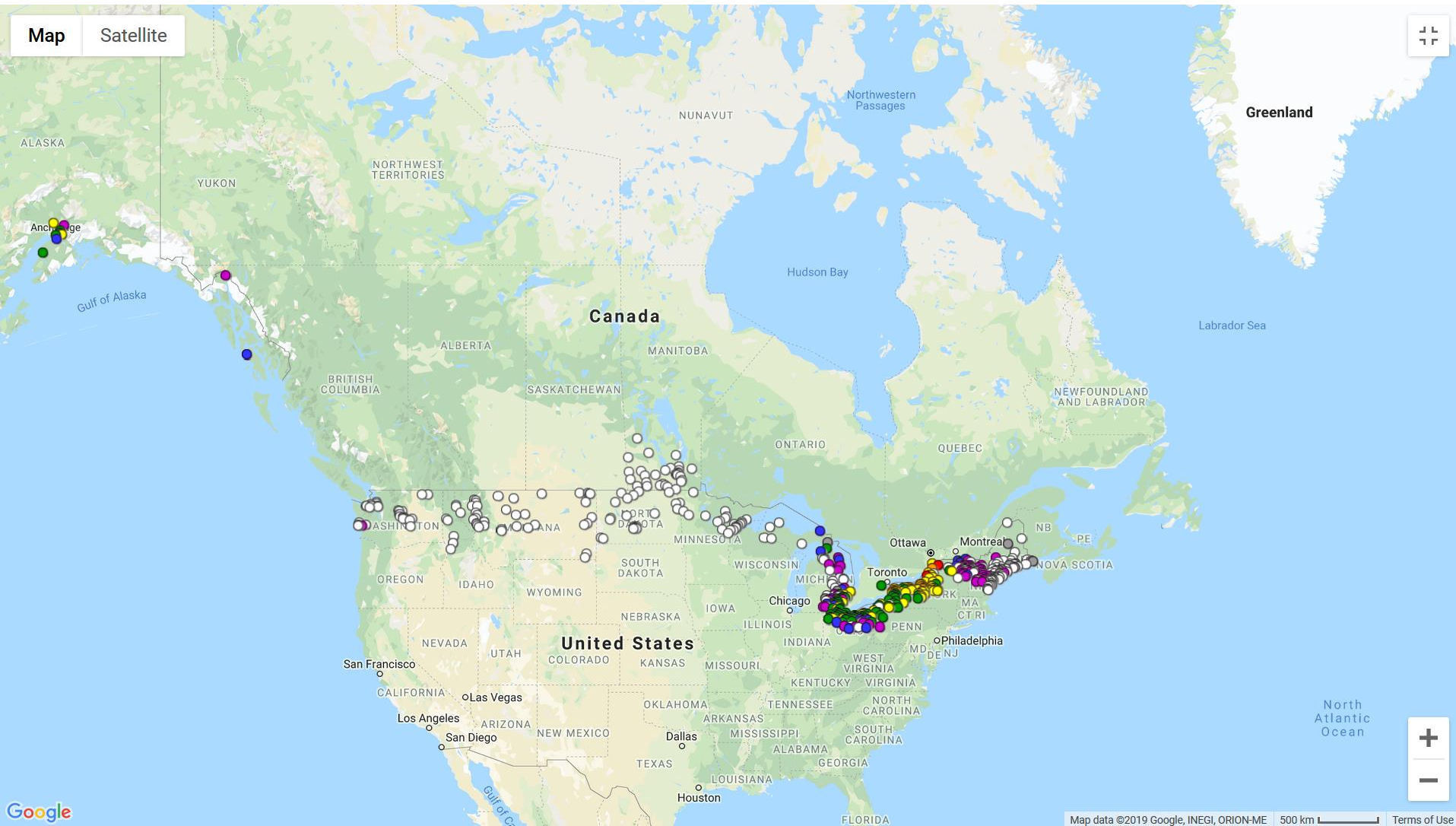
NETWORK EXPANSION
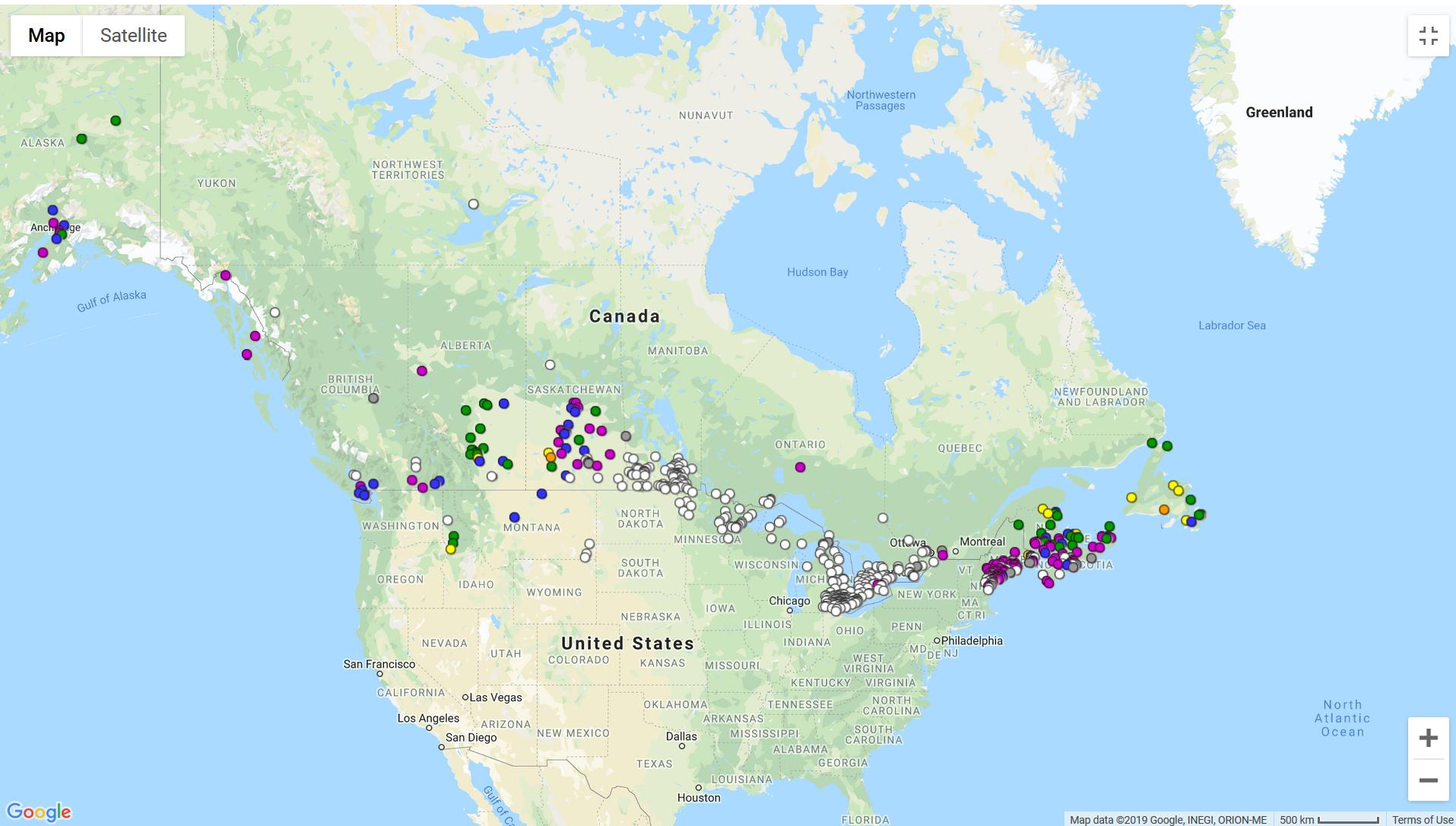## SEPTEMBER 2013 - **90 STATIONS** REPORTING MB, SK AND ATLANTIC PROVINCES

NETWORK EXPANSION

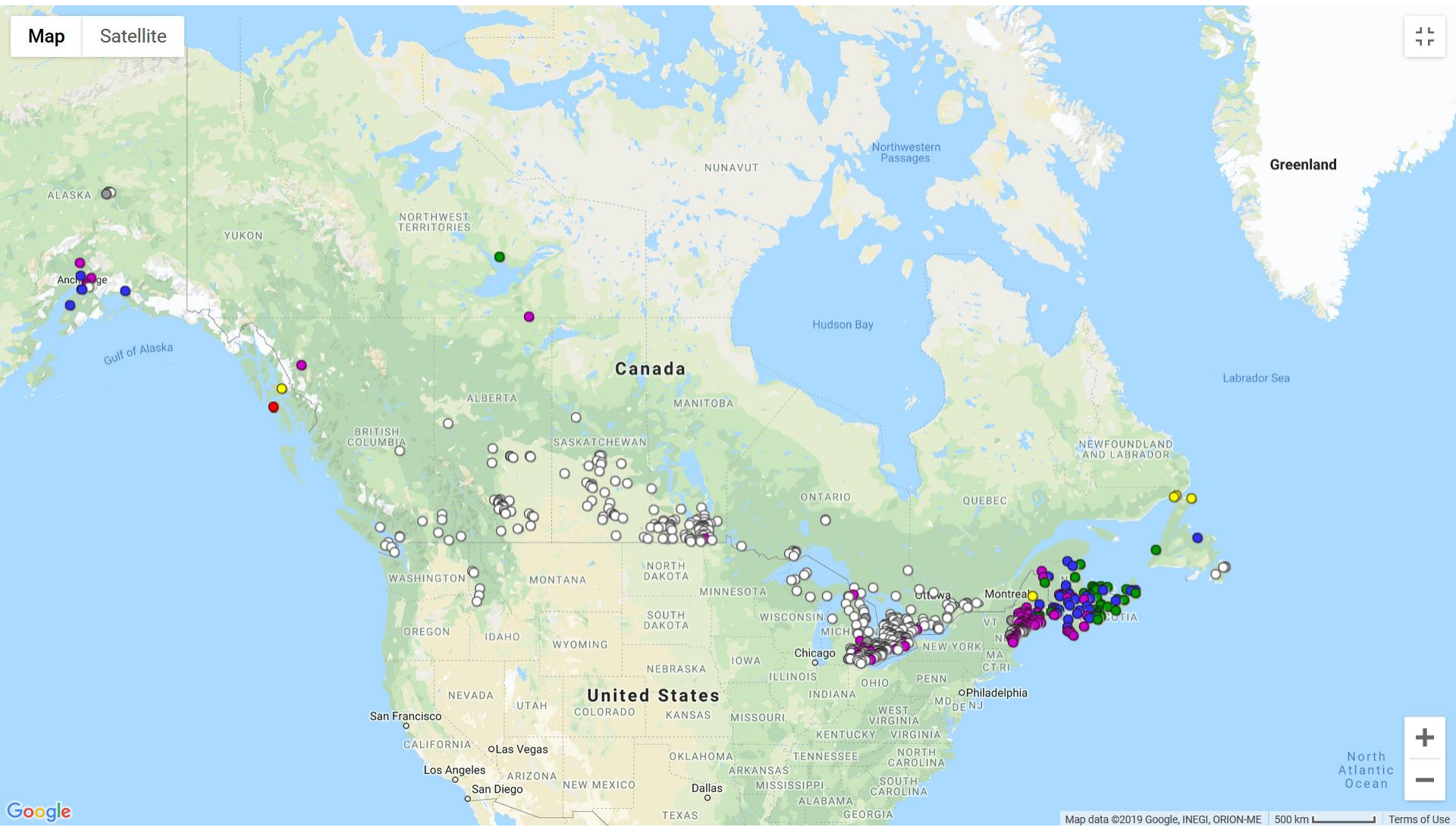## SEPTEMBER 2014 - **309 STATIONS** REPORTING AB, BC, SK, MB, ON AND ATLANTIC PROVINCES

NETWORK EXPANSION
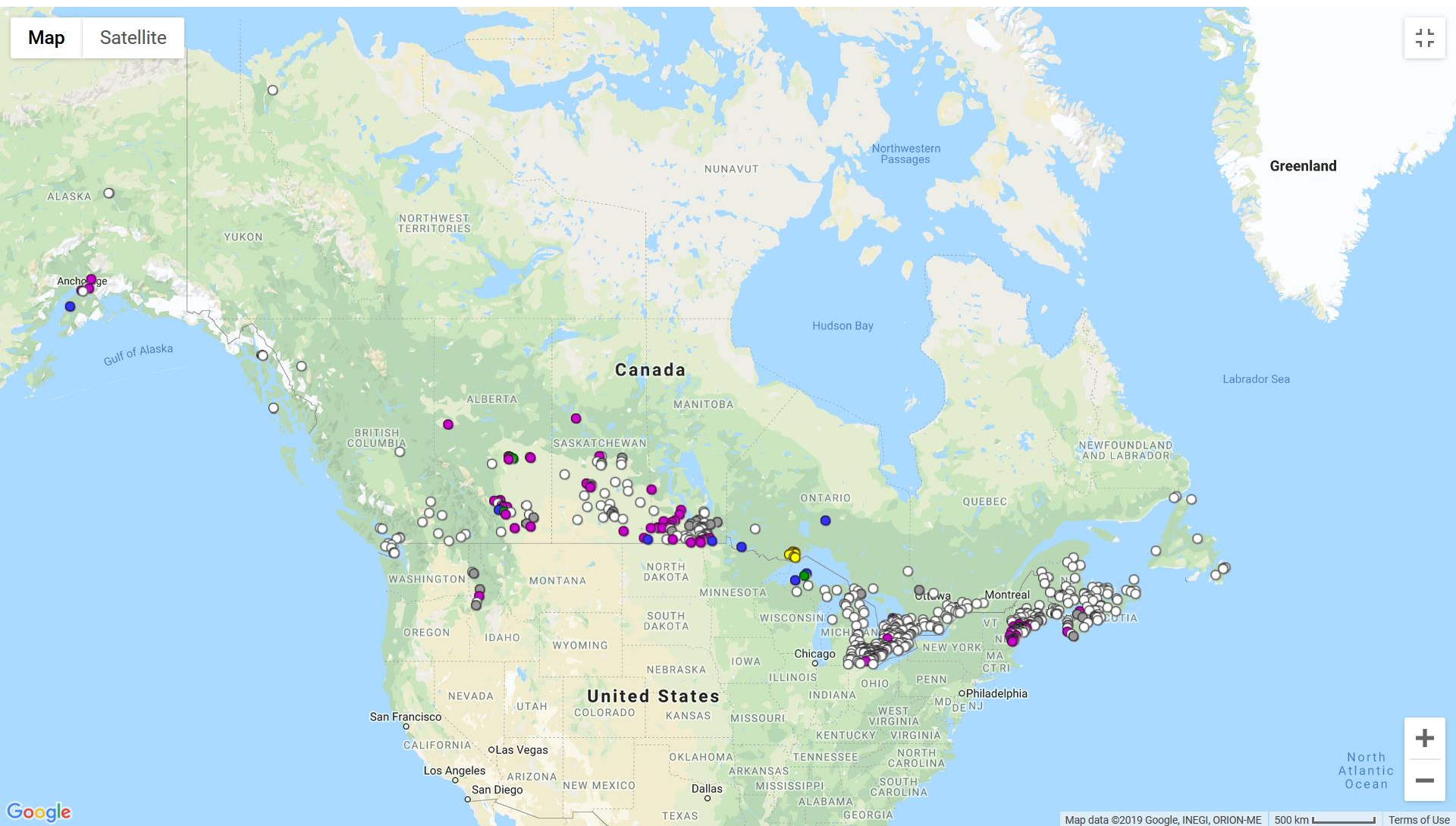## SEPTEMBER 2015 - **489 STATIONS** REPORTING ALL PROVINCES

NETWORK EXPANSION
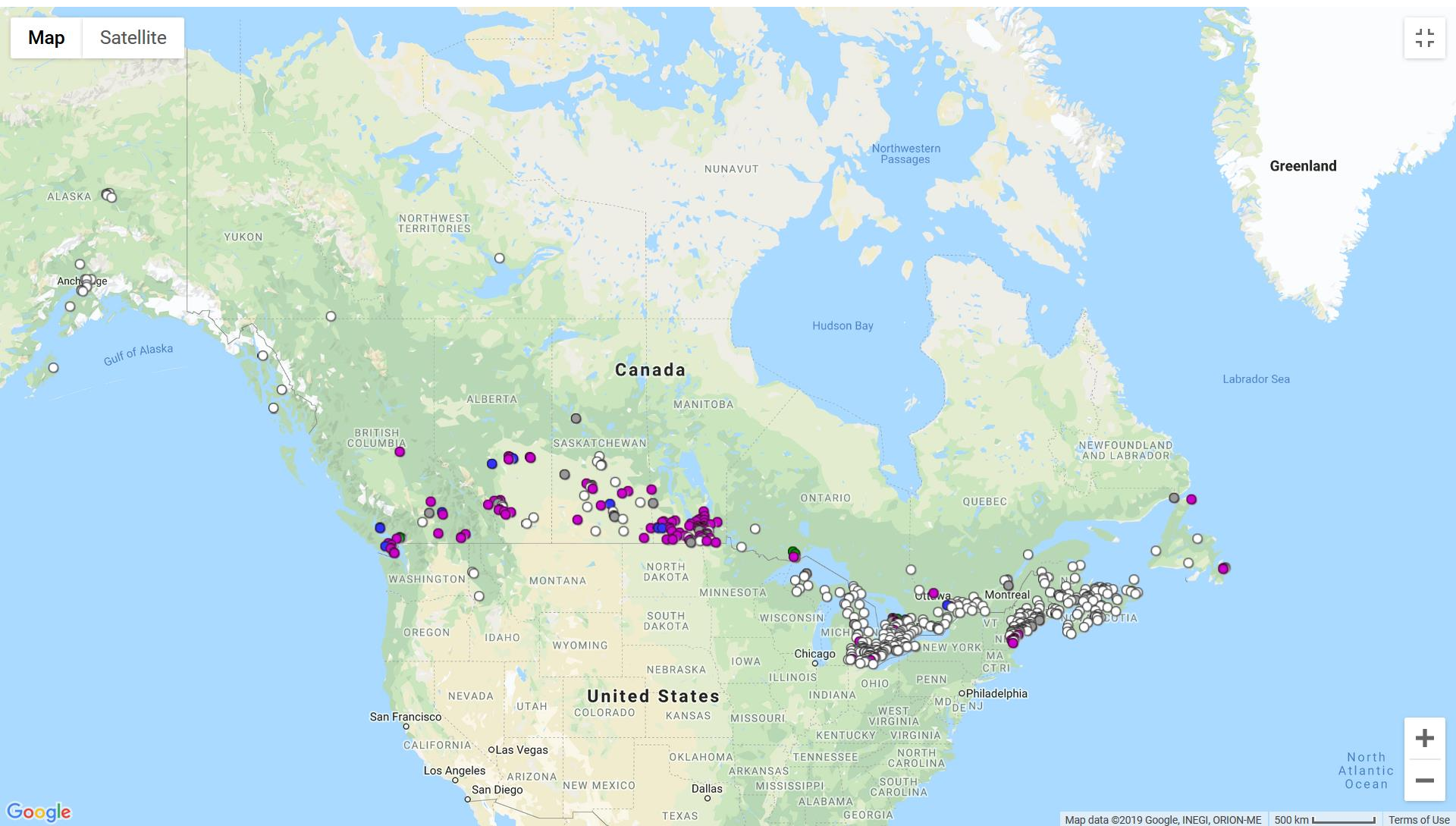## SEPTEMBER 2016 - **625 STATIONS** REPORTING ALL PROVINCES

NETWORK EXPANSION
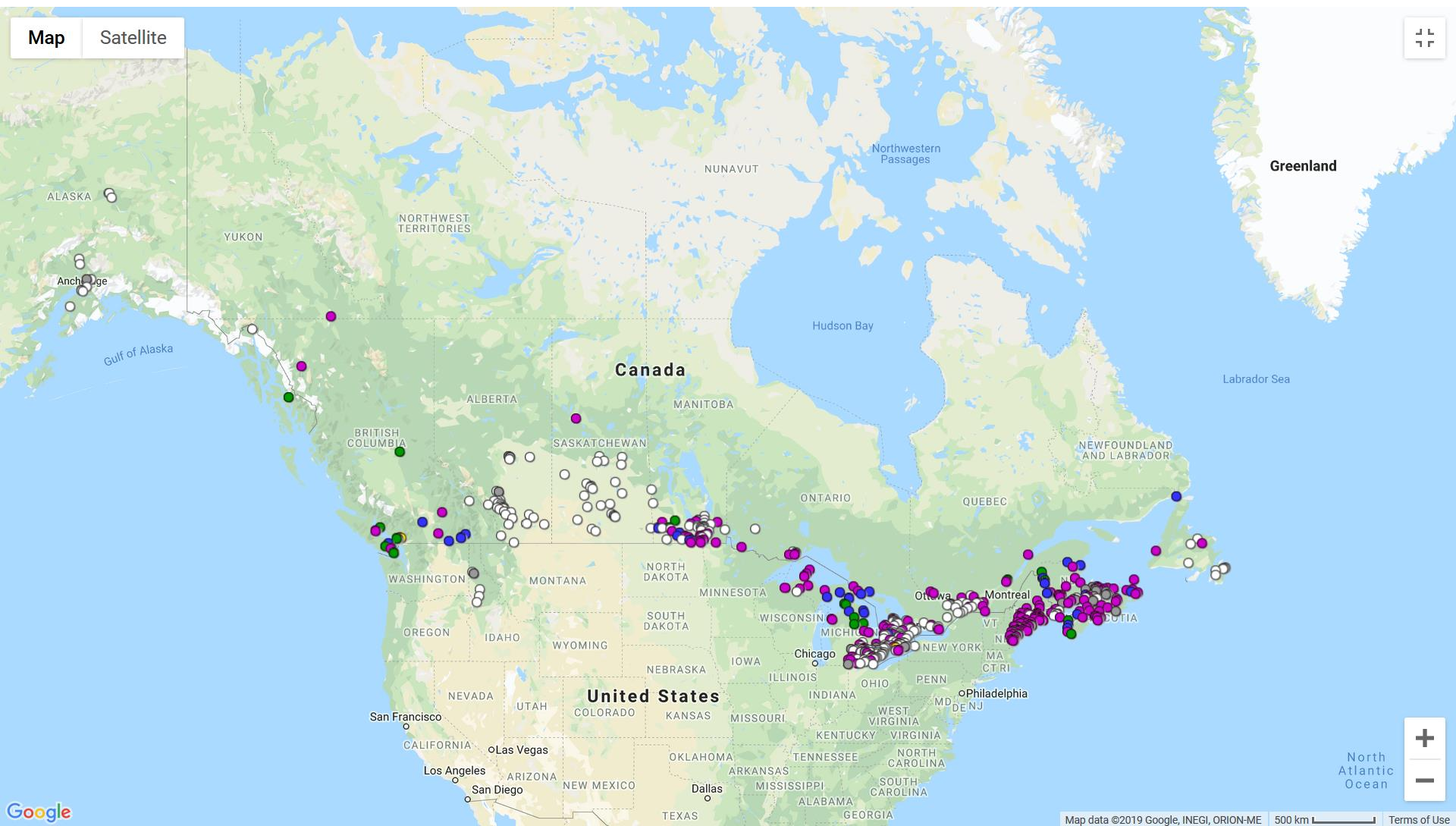SEPTEMBER 2017 - 597 STATIONS REPORTING ALL PROVINCES

NETWORK EXPANSION
SEPTEMBER 2018 - **585 STATIONS** REPORTING ALL PROVINCES

NETWORK EXPANSION
SEPT 2019 - **615 STATIONS** REPORTING ALL PROVINCES

VOLUNTEER ENGAGEMENT

Various methods used to recruit volunteers

- Direct contact with existing groups
  - Conservation/Watershed groups – groups are often interested as both volunteers & users of the data – generally reliable participation
  - First Nations – volunteers in part motivated by interest in the environment
  - MSC Severe Weather Watcher Groups – volunteers are already part of an organized weather network – generally reliable participation and good interest
  - MSC/AAFC staff/retired staff) – as users of the information participation is generally very good

VOLUNTEER ENGAGEMENT

- Direct contact with existing groups con't
  - Provincial environment/transportation and municipal – some success with recruiting but limited # willing/able to participate
  - Agriculture associations – good success with recruiting through a few associations in Ontario ~90 registrations – more to be done
  - AAFC AIR Network – a few registered but more follow-up needed

- Web presence
  - A significant # of volunteers are general public discovering the network on the CoCoRaHS website and social media (FB-TW)
  - MSC has done promotion on the Weather App and linked on the MSC/AAFC websites. Weather App very successful recently

VOLUNTEER ENGAGEMENT

- Social Media
  - Social media (FB/TW) weather groups – can be a quick way to recruit – in some cases fairly higher rate of volunteers stopping after a short time or not purchasing a gauge (ex NL)

- TV/Radio/Newspaper
  - Can pick up new registrations quickly especially with a good TV piece – as with social media many do not purchase a gauge or remain long term (recent TV piece in AB)
  - Targeted media can be more productive (e.g. CBC Radio)

- Promotion and conferences/workshops/trade shows
  - Where opportunities arise and especially where a talk is given on the network this usually results in several registrations

VOLUNTEER ENGAGEMENT
SOME TIPS

- Consider holding local training session if possible in cases where there may be several new registrions in an area
- Important to have good communication with volunteers to maintain interest and encourage reporting
    - FB/TW, newsletters
    - Highlights from sig events, volunteer photos/stories, examples of use by others like media etc.
- Encourage volunteers/groups to help recruit others
    - Consider an incentive for most referrals

CHALLENGES

- Network expansion has slowed somewhat in the last few years in Canada
  - There are just 3 dedicated coordinators working nationally – despite efforts difficult to recruit/retain volunteer coordinators
  - More coordinators would help accelerate recruitment and make administration workload easier to manage
  - Where population density low more difficult to recruit volunteers in significant numbers

- Work required to manage/promote network, website and operate web store for equipment purchase is substantial
  - Work/cost for bilingual website substantial taking several months
  - Administration (registration, equipment purchase/shipping, and answering vol questions and errors follow-up) takes time daily
  - Important to be able to take orders and ship gauges regularly…this has been a challenge at times

CoCoRaHS CANADA RECRUITMENT AND PARTICIPATION RATES (AUG 2013- MAY 2015)
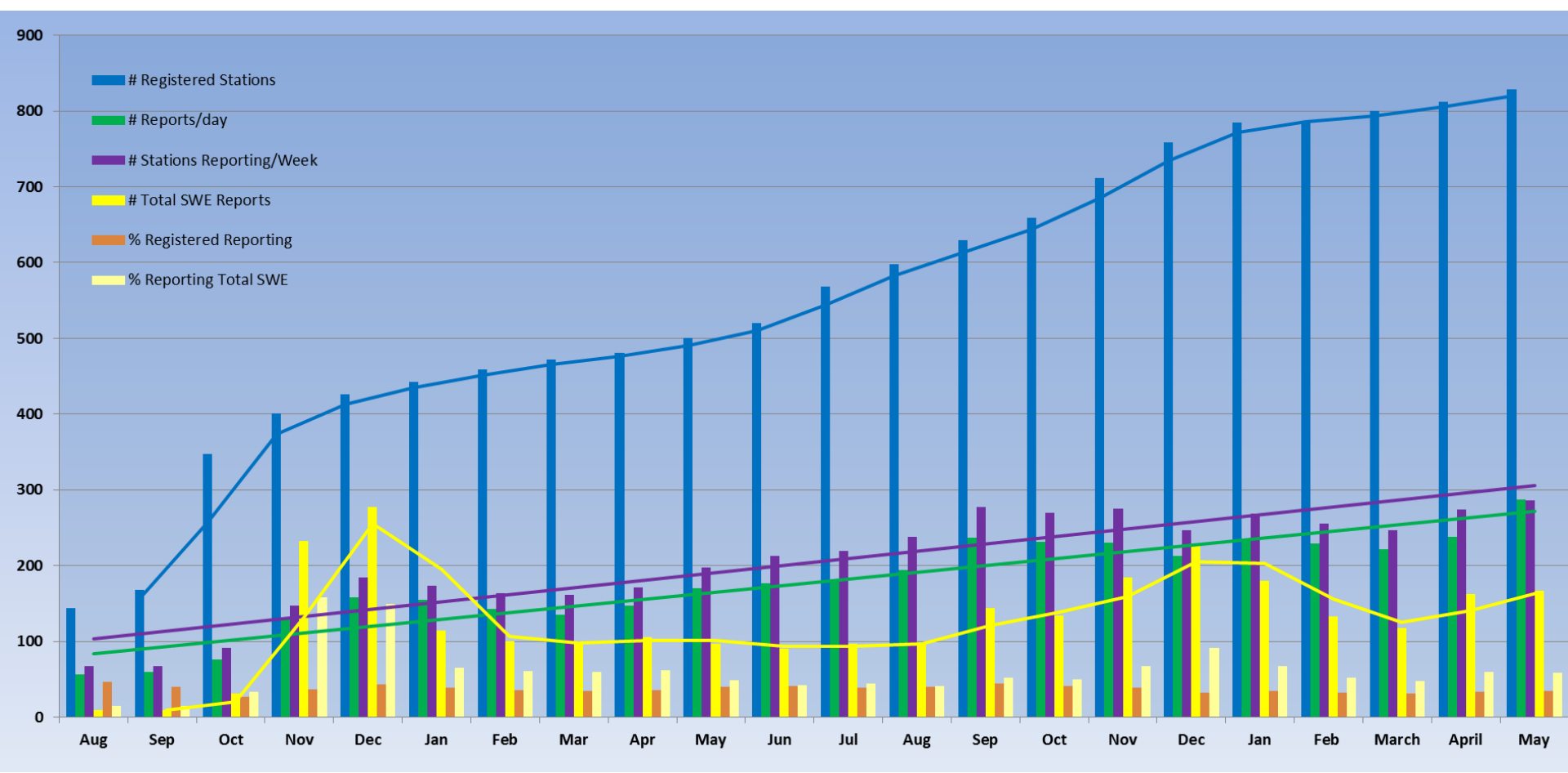
CHALLENGES

- Retention rate of volunteers relatively low ~ 30% (similar to the US) As of Sept 2019 in Canada:
  - 2032 registered volunteers (2011-present)
  - 1350 purchased provided reports
  - 750 reported in the last year
  - ~615 currently active (reporting in the last month)

- Canadian winters can be harsh and measurements more difficult/time consuming in the winter
  - Some volunteers do not participate in the winter (Feb 2019, 386 reporting, June 2019, 603 reporting)
  - We have lost some as a result of challenging winter conditions

CHALLENGES

- CoCoRaHS operates as a not-for-profit entity within WIN
  - Currently WIN supports the network with no outside funding and cost is substantial
  - Despite early success on funding agreements (some provinces and MSC), no long-term funding agreements are in place
  - Funding remains a challenge and more work is required to address this to ensure it remains on a stable footing

ECCC AND AAFC CoCoRaHS DATA USAGE

- Used as a supplement in the provision of precipitation information to commercial clients and media and inclusion in official Storm Summaries

- Help confirm the validity of other nearby observations and a supplement when needed in compiling monthly/seasonal climate summaries

- Forecasters using the data in near real time to help validate the performance of official forecasts, warnings and raw forecast model data

- Data helps Water Survey staff to verify or provide more value to data interpretation for river flows. The data is of particular value in adjusting flow records during winter periods.

- AAFC has incorporated the data in regular Drought Watch products and it helps in the QC of other data sources

SOME FEEDBACK FROM MSC STAFF

- **Client Services Western Region:**
  - *We in SK most certainly use it to supplement rainfall and snowfall amounts. Often it will be included in AWCN messages with credit to CoCoRaHS*
  - *I do find the data gathered by COCORAHS to be useful especially when looking for localized precipitation events. Having the additional data points give you the ability to feel confident in the limited data that the ECCC network provides.*
  - *As a WPM, I will sometimes look to CoCoRaHS reports if a severe weather event was possible and our network did not record anything impressive. It would be great to have more CoCoRaHS reporters in PYR.*

- **Client Services Atlantic:**
  - *I use it to supplement other data to determine the severity of rainfall events. CoCoRaHS has become a tool that between entering data and looking at data, I end up using almost every day"*
  - *I use the CoCoRaHS data most frequently in the winter. It helps fill in some of the gaps on PEI for storm summaries, media interest after storms and the PEI Snowfall amounts for PEI Transportation.*

SOME FEEDBACK FROM MSC STAFF

- ***Client Services East:***
  - *The OSPC and the WPMs use the CoCoRaHS data on a regular basis...winter and summer.* *It helps to augment reports from our network and it is invaluable in isolated, intense rainfall situations that may result in flash flooding where the event occurs where no EC gauge exists.* *I have also referred others to this site and have encouraged participation in the program during presentations and CANWARN storm spotter training sessions.*

- ***Prediction Services Atlantic:***
  - *Our staff use this information almost daily. On the desk, meteorologist are using this information to brief media, construct AWCN (storm summary) messages, self verify their warnings.* *Our Performance Management group use this information for our Regional and National Forecast verification.* *This data has proved very useful to supplement observations for data sparse areas when talking with the media and creating storm summaries.* *Most observations are reliable, very seldom do we run into suspect observations.*
  - *We use the data: for warning verification, storm summaries and case studies. With all the "holes" in our observing network these obs are great for that. We find that for the most part the data from the sites is good.*

SOME FEEDBACK FROM OTHER USERS

- *AAFC:*
  - *We collect CoCoRaHS data daily from the web and integrate it into our national Near-Real-Time weather and climate data network.* All the data we ingest daily (from multiple sources) are used to produce the maps we post daily on the AAFC Drought Watch web site. *Through our daily data quality assurance/control process, the quality of CoCoRaHS data has been at least as good as that of ECCC's network.* The CoCoRaHS solid precipitation (snow) data for the winter months have been very useful for us, improving the observed winter conditions and snowpacks. Automated snowfall collection has historically been, and still is, problematic, and having the additional information from the CoCoRaHS network is useful for our assessments over the winter and into the growing season.

- *Maitland Valley Conservation Authority ON:*
  - *We use CoCoRaHS as a supplemental dataset to our real-time precipitation monitoring network for our flood forecasting operations.* The data has proven useful for quality assurance of our automatic rain gauges, tracking the pathway/variability of storm events, and helping to improve the overall density of our monitoring coverage.

SOME FEEDBACK FROM OTHER USERS

- *Manitoba Infrastructure and Transportation:*
  - *CoCoRaHS is being used for flood forecasting simulations. The CAPA data is our primary source of information in which we understand CoCoRaHS is an input. CoCoRaHS is also an input to the NWS meteorological data which we use. We do need sort out what is a gold versus a bronze CoCoRaHS volunteer is in terms of reliability, accurate measurements etc.*

- *ClimAction Services NS:*
  - *An example was our support and advice to validation work an engineering company (Jens Jensen Consulting) was contracted to do with the Whycocomagh community wastewater treatment plant. In order to complete it, they needed daily precipitation values to feed into a hydrological flow model that could be compared to plant values. We recommended using the CoCoRaHS site at Baddeck Forks. One of the key advantages of these sites is that they tend to "fill holes" in a fairly scarce data field and have good overall reliability.*

- **Seine-Rat River Conservation District**
  - *CoCoRaHS volunteer weather observers play an important role in our communities by providing us with a better understanding of localized precipitation. Watershed residents in our district use the website because they like to see how much water is coming their way. We use the data at the Seine-Rat River Conservation District to monitor precipitation amounts and model surface water flows in our watershed. CoCoRaHS is an important grassroots network that increases capacity for communities, local government, and organizations like us to implement sustainable surface water management strategies*
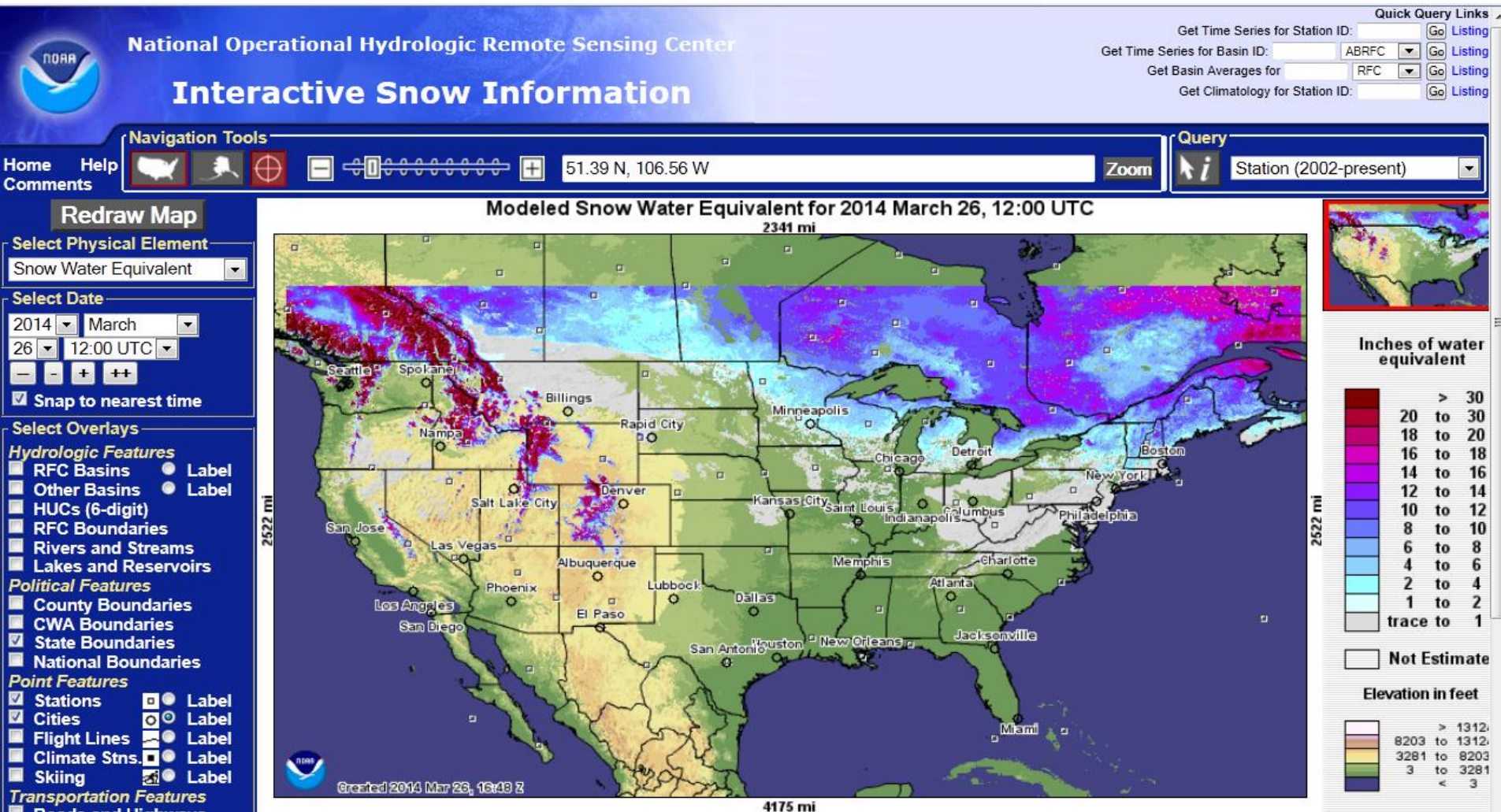
MSC CaPA MAPPING - TESTING INDICATES ADDITION OF CoCoRaHS DATA IMPROVES PRECIPITATION ANALYSES. DATA ADDED TO OPERATIONAL CMC CaPA MAPS IN 2018
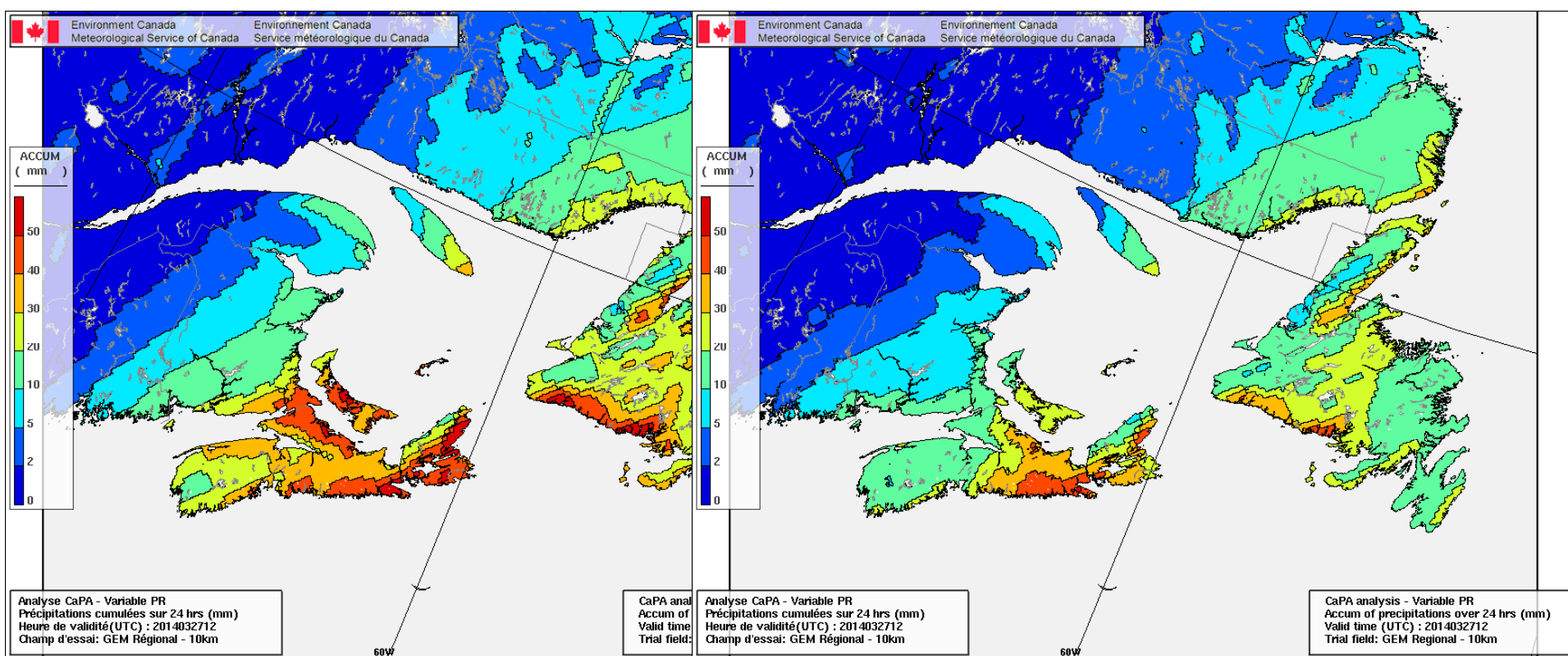
Standard CaPA

CaPA with CoCoRaHS

NOHRSC INCORPORATES ALL US AND CDN CoCoRaHS DATA WHICH ARE USED OPERATIONALLY TO SUPPORT FLOOD FORECAST PROGRAMS IN BOTH COUNTRIES
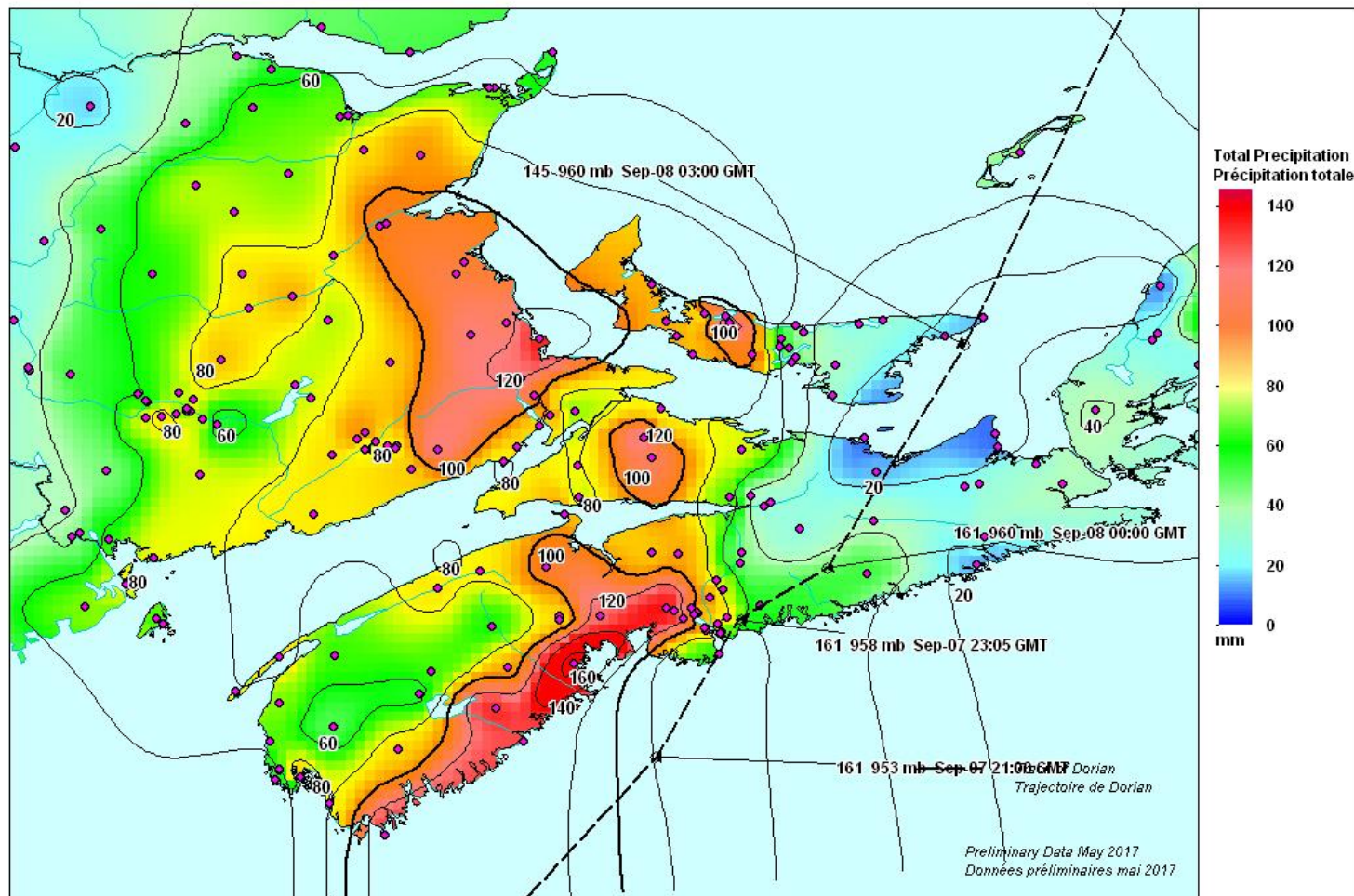
TOTAL RAINFALL HURRICANE DORIAN SEPT 7-8 2019 (INCLUDES 165 CoCoRaHS REPORTS)

Total Precipitation Sept 7-8 2019
Précipitation totale 7-8 sept 2019

NB Flood Forecast Briefing
March 30, 2015

062	023
174	238

070	013
204	241

+50?

098	019
262	264

034	010
078	238

072	023
189	248

043	008
xxx	269

065	016
174	261

083	048
358	310

1	2
3	4

078	020
263	293

085	026
420	323

032	047
208	322

106	063
xxx	323

1. **Snow on ground (cm)**
2. **Snow melt in last week (cm)**
3. **Snow water equivalent (mm)**
4. **Normal total precip. Jan- Mar**

Briefing material includes significant amount of CoCoRaHS data
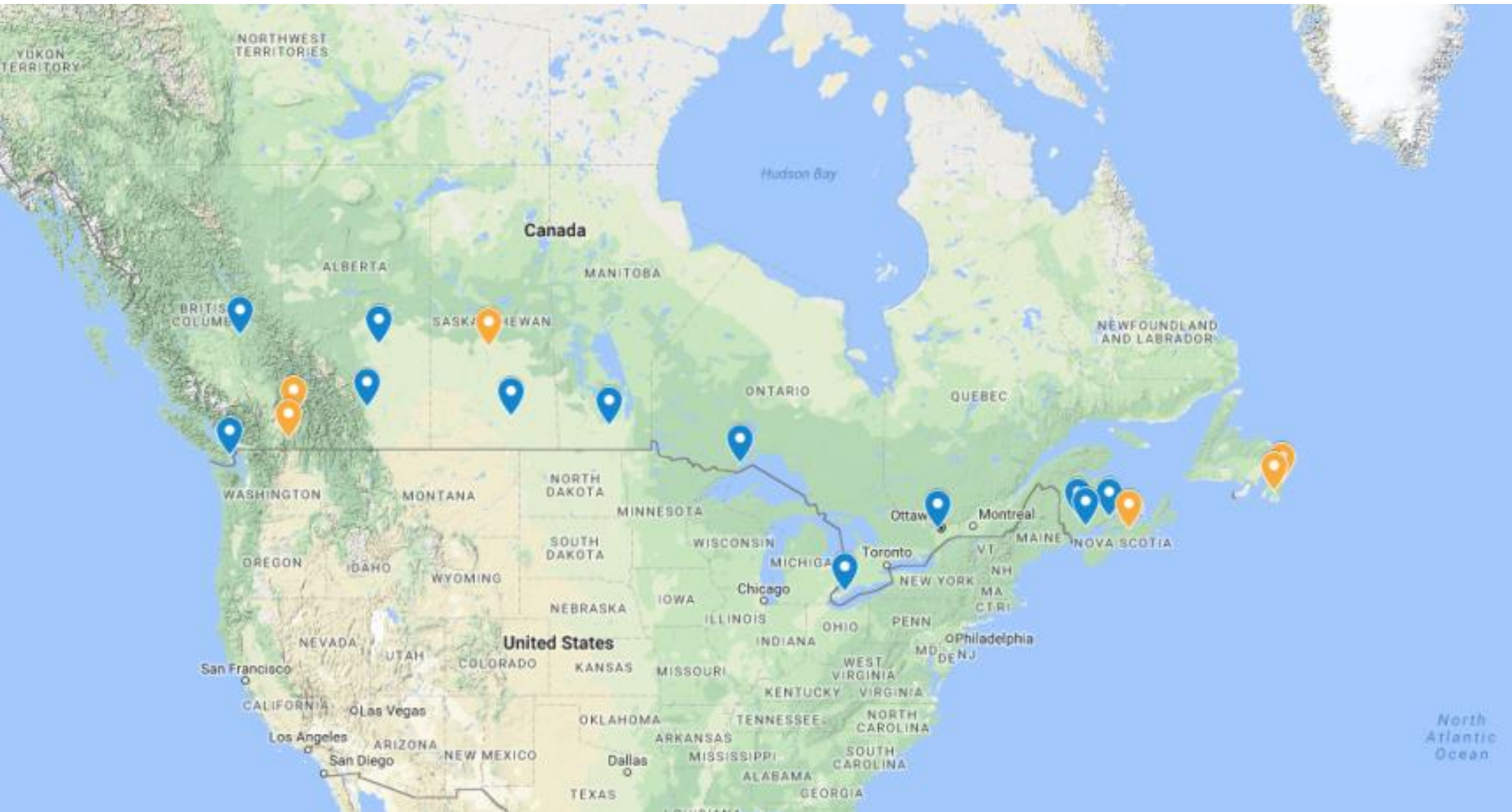
CoCoRaHS IN THE MEDIA

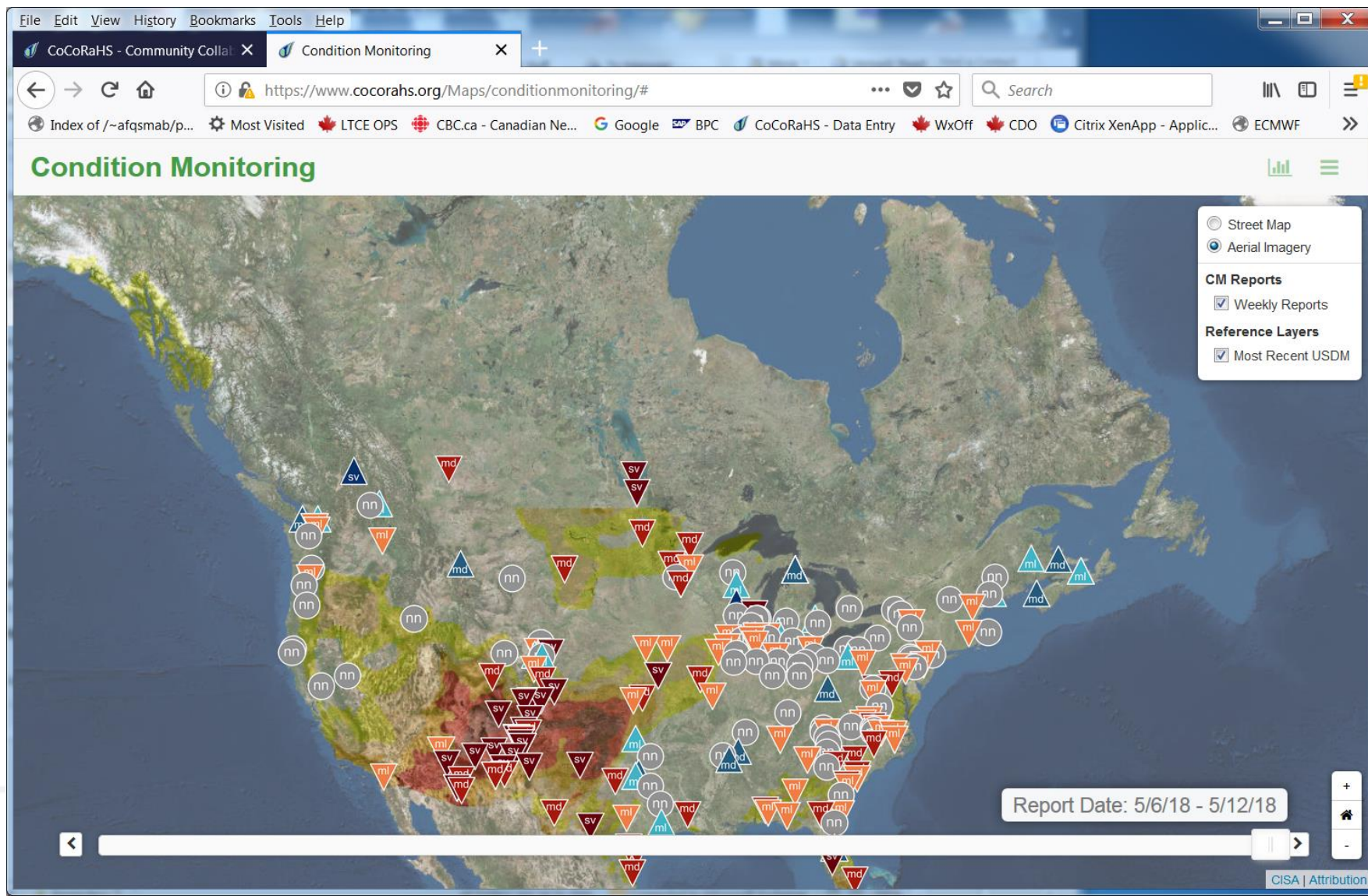- CBC TV Meteorologist using CoCoRaHS reports for the evening newscasts

ET NETWORK 2018
AAFC CONSIDERING USING TO VALIDATE ET ESTIMATES

CANADA PROMOTING CONDITION MONITORING
AAFC USING DATA ALONG WITH AIR NETWORK

CoCoRaHS WEBSITE STATISTICS (SEPT 2016)

Website statistics indicate substantial demand for data access from the CoCoRaHS website for Canadian users:

- Canadian map requested 3021 times
- 709 data export requests (direct data feed)
- 15,587 page views
- 5,530 website visits
- 1,278 unique visitors
- 98,793 web site hits

Statistics are 10 to 15 % of the US statistics indicating website usage on par with the US

DATA QUALITY

- Data considered good and reliable compared to other MSC data
    - Based on staff/user feedback
    - Spatial data checks

- Data screened daily by CoCoRaHS coordinators
    - where required follow-up with volunteers to have suspicious data checked and corrected or suppressed normally the same day

- Obvious errors are infrequent with only a few per week needing follow up

QUESTIONS?
PREGUNTAS?