The Four Seasons

National Weather Service Burlington, VT

VOLUME VI, ISSUE II

Summer 2019

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Letter from the Editors

Welcome to the Summer Edition of The Four Seasons, a quarterly newsletter issued by the National Weather Service in Burlington, VT. In this edition we'll take a look back at the wetter than normal spring and early summer this year. We'll also take you to a workshop on Decision Support Services which one of our forecasters attended, as well as highlight a new flood stage on the Otter Creek at Middlebury and do a quick Q&A with three meteorologists on the Radar & Applications course. Lastly, we brought the Meet-A-Forecaster back, this time featuring our Summer Student Volunteer. Thanks for reading and we hope you enjoy the newsletter.

Wetter Than Normal Spring and Early Summer

- Scott Whittier

If you thought that April-May and June seemed unusually cloudy and wet, well you were right. Figure 1 below shows the departure from normal precipitation for the period of April-June. You can see that a strip from Lake Ontario, NY, into central Vermont witnessed 4-6 inches of precipitation above normal or approximately 150% of normal (Figure 2, next page). The upper St. Lawrence Valley of NY and extreme southern VT was the "driest" with 90-100% of normal precipitation.

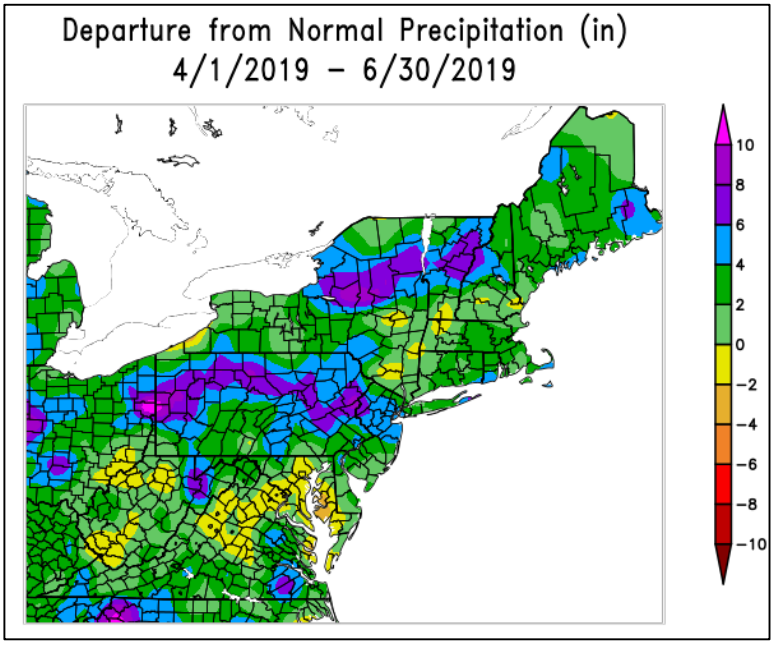

Figure 1: Departure from Normal Precipitation (inches) from 1 April 2019 through 30 June 2019. From the NOAA Regional Climate Centers.

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Within this axis of heavy rainfall, Montpelier received their 2nd most April-June precipitation total with 17.32 inches (Figure 3) or 176% of normal (normal is 9.83 inches). St. Johnsbury saw their 3rd wettest period (since records began in 1894) with 17.28 inches and Burlington witnessed 13.67 inches or 137% of normal (normal is 9.96 inches), which was the 14th wettest April-June period (Figure 3). Looking at the annual rankings of total precipitation from April through June (Figure 3), you may notice two years that show up within the Top 5 of all three sites; 2011 and 1973. Many of you can remember the record flooding of 2011 due to near record snowfall, followed by record precipitation in March, April and May.

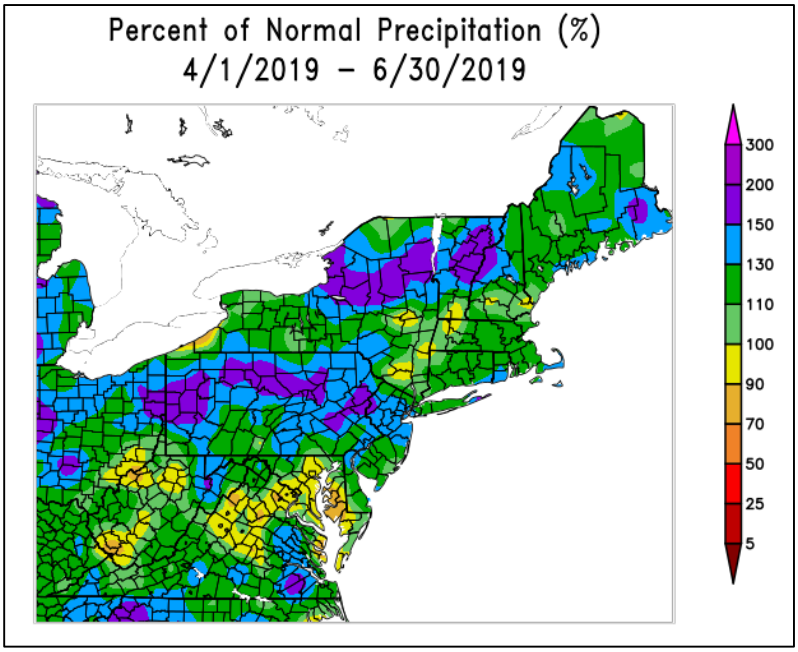

Figure 2: Percent of Normal Precipitation (%) from 1 April 2019 through 30 June 2019. From the NOAA Regional Climate Centers.

Burlington, Vermont

Rank	Ending Date	Total Precipitation Apr 1 to Jun 30
1	2013-06-30	20.65
2	2011-06-30	20.07
3	1973-06-30	16.87
4	2006-06-30	16.79
5	1996-06-30	15.99
6	2017-06-30	15.91
7	1922-06-30	15.52
8	2000-06-30	14.69
9	1897-06-30	14.65
10	1983-06-30	14.35
11	2015-06-30	14.23
12	1998-06-30	14.06
13	1929-06-30	13.80
14	2019-06-30	13.67
15	2002-06-30	13.38

Montpelier, Vermont

Rank	Ending Date	Total Precipitation Apr 1 to Jun 30
1	2011-06-30	20.33
2	2019-06-30	17.32
3	2017-06-30	17.28
4	2006-06-30	16.91
5	1973-06-30	16.21

St. Johnsbury, Vermont

Rank	Ending Date	Total Precipitation Apr 1 to Jun 30
1	2011-06-30	19.97
2	1973-06-30	18.45
3	2019-06-30	17.28
4	1945-06-30	16.33
5	1996-06-30	15.97

Figure 3: Annual Rankings of Total Precipitation from 1 April 2019 through 30 June 2019 for Burlington, Montpelier, and St. Johnsbury, Vermont.

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Nearly all watersheds witnessed flooding in the spring of 2011, including an ALL-TIME RECORD lake level on Lake Champlain, which remained in flood for 68 days. There were also two devastating flash floods; 1) Lamoille river watershed in April and 2) Winooski/southern Passumpsic watersheds in May, both as a result of training thunderstorms. In June of 1973, several episodes of training thunderstorms brought flash flooding to the same watersheds as in 2011 in addition to the White River watershed.

This year we saw two flooding events in mid-April 2019, largely due to the melting of a substantial late season snowpack in the valleys and higher elevations as well as two rainfall events that brought more than 1-2 inches of rain in each event. The first event occurred during the night of April 14th into the early morning hours of April 15th, when continuous training of heavy rain showers and actually a thunderstorm or two moved from Glens Falls, NY northeast across Rutland, Windsor, Orange and southern Caledonia counties. This heavy rainfall in a 6 to 8 hour timeframe along with tremendous snow melt, due to temperatures in the 60s/70s, produced another 2-4 inches of runoff causing significant flooding across these regions, including some flash flooding. The second event occurred on the morning of April 20th, where an inch of rainfall fell across the northern tier of Vermont, combined with 1 to 2 inches of snow melt leading to flooding of the larger rivers. This was largely due to delayed river ice melt that formed ice jams along the Passumpsic and Mississquoi rivers. Besides the flooding impacts, this prolonged wet period caused many farm lands to be saturated at the time when crops are supposed to be planted, thus delaying many crops and possibly damaging others.

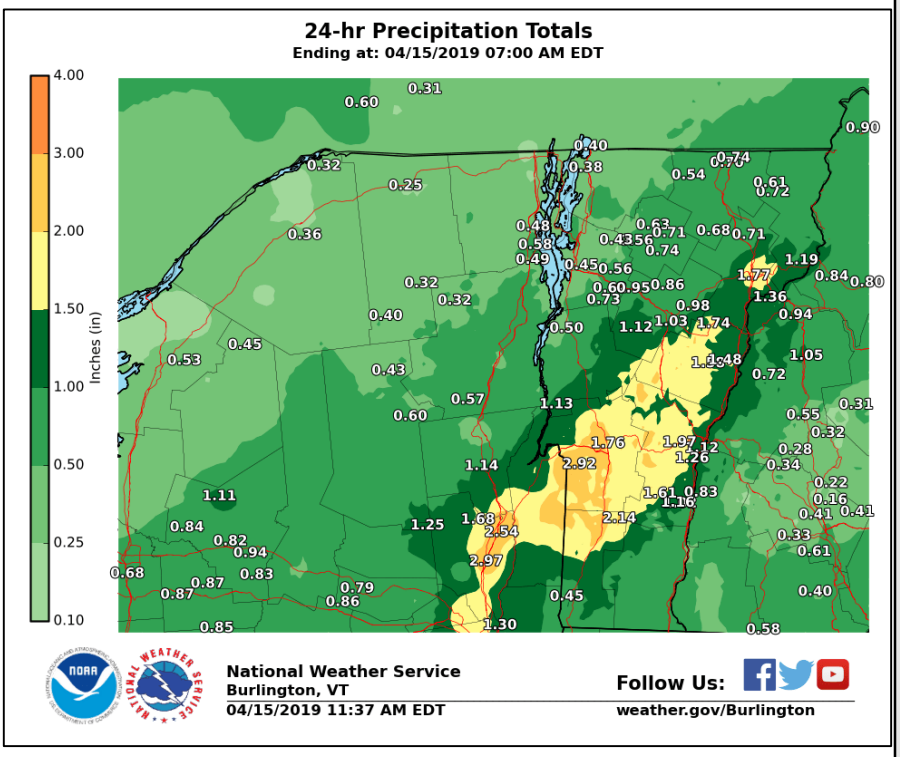

Figure 4 (above): 24-hour precipitation totals ending 7:00 AM 15 April, 2019

Figure 4 (left): Flooding at Bethel, VT on Lilliesville Brook Road, photo credit to Aaron Lamb

Decision Support Services Training Workshop

-Rebecca Duell

The National Weather Service works closely with local emergency managers and other partners during many weather events to make sure key decision-makers have the accurate and timely weather information they need to make the best decisions possible to protect the lives and livelihood of the American people. I recently had the opportunity to travel down to Albany, New York, to participate in intensive decision support services training to learn and practice new and improved ways of communicating weather information to our partners and to the public. Many topics were covered over the three day workshop, including briefing techniques, media training, on-site deployment training, VIP interactions, and social media training.

One of the highlights of the workshop was an all-day exercise simulating the impactful snow storm of March 14, 2017 (also known as the Pi Day Snowstorm). We worked together with forecasters from many different offices throughout the northeastern US to create and deliver briefings for emergency managers during the simulation. The feedback we received during the simulation helped us to be better prepared to provide the best services we can when working with partners in future events.

Figure 1: NWS Burlington forecaster Rebecca Duell giving a weather briefing on a significant winter storm to an Emergency Manager from the New York State Division of Homeland Security & Emergency Services

In addition to the briefings, we also participated in mock interviews, both on and off camera. During these interviews, the NOAA Senior Media Relations Specialist acted as a reporter and challenged us with many difficult questions. As NWS meteorologists, we work closely with the media on a daily basis. We rely on the strong relationships with our media partners that we strive to build to help distribute important weather and safety messages during impactful weather events. As such, it is important that we are comfortable being interviewed and can get our key messages across in any interview situation to ensure the public gets all the information they need to stay safe.

Overall, the workshop was a great training opportunity and I look forward to bringing best practices and lessons learned back to the office.

New Flood Stage to Take Effect on the Otter Creek in Middlebury, Vermont

-John Goff

On July 1, 2019 a new flood stage will be established at the river gage on the Otter Creek in Middlebury, VT (MDBV1). National Weather Service offices provide daily stage and flow forecasts for select river gages in their areas of responsibility through coordination with regional River Forecast Centers. NWS Burlington is no exception, issuing daily forecasts for 22 gages across Vermont and northern New York including the Otter Creek at Middlebury. These forecasts are available at https://water.weather.gov/ahps2/forecasts.php?wfo=btv.

Figure 1: Picture of Otter Creek gage at Middlebury, VT

While the MDBV1 gage has a long period of record (1903-present), until now no official flood stage had been established. To address this issue, staff of NWS Burlington met with Middlebury town officials this past March during which an evaluation of the flood plain was performed. The outcome of these efforts led to an agreement that setting a minor flood stage would be beneficial to the town by assisting local emergency management decisions during times of flooding. The agreements sets a new minor flood stage of 6.5 feet above gage zero and took effect on July 1, 2019. For more specific information on the MDBV1 gage, including daily stage forecasts, historical crest data and forecast probability information please visit: https://water.weather.gov/ahps2/hydrograph.php?wfo=btv&gage=mdbv1

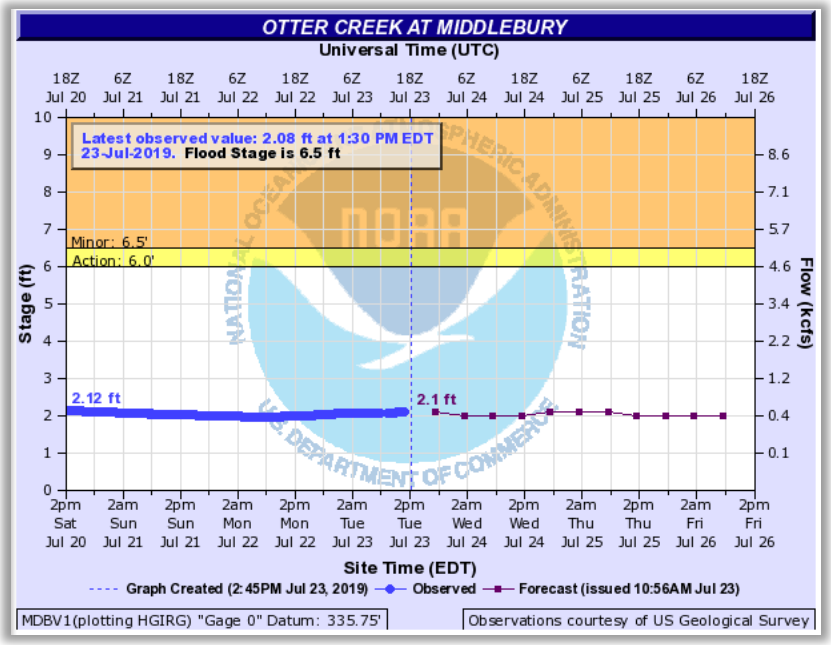

Figure 2 (left): Hydrograph for Otter Creek at Middlebury showing the new "Minor Flood" stage

Q&A: Radar & Applications Course

- Andrea LaRocca, Robert Haynes, and Matthew Clay

Every October, one of the most highly anticipated courses offered by the National Weather Service (NWS) begins. Entitled Radar & Application Course (RAC), this training program emphasizes the use of WSR-88D radar in forecasting and warning applications, including radar signatures and operational warning procedures. It consists of over 100 hours of online module work as well as a 1-week intensive in-residence workshop in Norman, Oklahoma. Typically this course is offered to recently hired new employees of the NWS, but experienced forecasters may wish to retake this course to learn the latest science regarding the best warning decision practices.

Recently, three meteorologists at NWS Burlington took part in this course, two new-hires: Robert Haynes and Andrea LaRocca, and a returning forecaster, Matthew Clay. This article will take a look at their experiences at RAC.

What were some of your thoughts before you began the simulations at the workshop?

Robert: I knew the one week course was going to be intense, and that it would be my first time really getting tested and observed while analyzing the radar, how different environmental factors played into what I should expect, and how I drew each box. But I also knew I was getting ready to meet several new meteorologists in the same boat, and that few opportunities like the Radar & Application Course would present itself again.

Figure 1: Meteorologist Matthew Clay running through one of the simulations assigned at RAC

Matthew: There was a lot of excitement leading up to RAC, as I was looking to continue to hone my skills as a warning forecaster. I was lucky enough to be selected as a returning forecaster (previously took the course in January 2011) and strengthen the fundamentals from my previous time while also learning some of the newest innovations within warning operations. I knew it was going to be a rough week of training as we would be spending 8 hours a day going through warning ideology and then practicing it in a lab with supervision from some amazing instructors.

Did you learn something you did not expect to learn?

Andrea: Working in a team setting can be both challenging and rewarding. I definitely learned new skills in dealing with individuals you may not get along with in order to collectively come together to tackle the task at hand; especially something as demanding on working warning operations. It gave me a new perspective on how I work both as an individual and as a part of a team, and how I can handle difficult personalities in the work environment.

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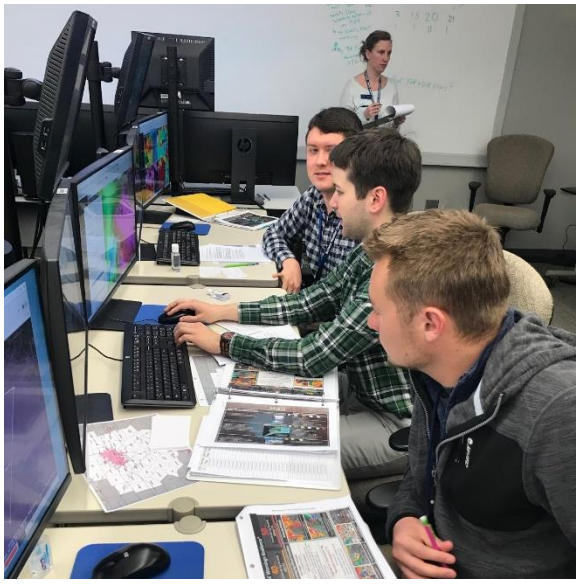


Figure 2: Meteorologist Robert Haynes (center of image) and group analyzing a storm on screen at RAC

How were radar duties assigned during simulations?

Robert: We looked at maps of regions like Nebraska looking for winds coming together or where there was the highest shear and instability. From there, we would make a quick forecast of where we expect the most storms to develop and what kind of threats we were looking at. We all worked in groups of three, with one forecaster issuing warnings, another keeping an eye on potential flash flooding, and then the last would be a jack-of-all-trades updating us on any changes to the weather pattern. Other times, we would split the region up by interstates. At some points while working through the simulation, we would need to adapt our strategy if one forecaster was getting overwhelmed. All these we tried to verbalize while drawing new warning boxes.

Why do forecasters go through the Radar & Applications Course?

Matthew: The Radar & Applications Course is geared toward newer forecasters but it also allows experienced forecasters to work with colleagues and instructors to learn about techniques, tools and latest research as it applies to storm interrogation and the issuing of severe weather warnings. Each year, the course changes as newer technology and products, such as Muli-Radar/Multi-Sensor Systems (MRMS) gets introduced to the National Weather Service. Forecasters are required to take over 100 hours of coursework and simulations before being able to attend the residence class in Norman, Oklahoma.

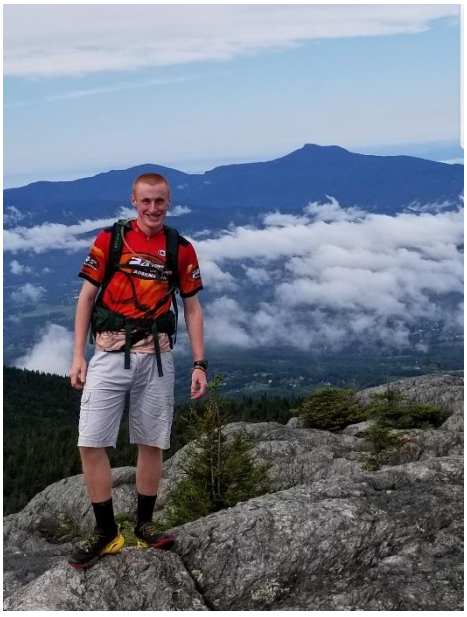
Figure 3: Meteorologist Andrea LaRocca (second from right in front row) and her class of RAC students in front of National Weather Center

What was your favorite aspect of the trip?

Robert: I thought it was great to hear from peers in the National Weather Service and their experiences. I also got to catch up with some old friends, which was great too.

Andrea: Getting to work radar was definitely the highlight of the experience. It was very fulfilling to see that all my years of schooling and all the work that I put in leading up to it really paid off. I now feel I have a more solid understanding on the structures of severe weather. Secondly, it would be the BBQ in Oklahoma! I definitely missed good, smoky BBQ moving to New England.

Meet-A-Forecaster (Summer Volunteer Edition): Carter MacKay



How and when did you become interested in meteorology?

When I was right around the age of three, I was glued to everything weather related that would go on that I could attempt at understanding. When I was younger, I began to understand more and more about different weather elements and that was a fundamental part of what built upon my passion for meteorology. This interest has carried with me my whole life and began to take the shape of more a career path in High School, where my Earth System Science professor inspired me to take my passion and transform it into something I could make a career out of.

Do you have a favorite type of weather?

Winter weather has got to be my favorite type of weather, mostly due to my fond memories of growing up in Vermont during our very snowy winters. There might not be any other form of weather that gets me more excited than a good snow storm as being a skier my whole life has prepared me to embrace the cold, snow, and everything else that comes with it with a smile.

What's your favorite part of volunteering for the NWS?

My favorite part of volunteering here at NWS Burlington this summer has been getting to meet so many incredible meteorologists who take such pride and care with their work. A close second favorite has to be having the opportunity to utilize the equipment and materials that I hope to make a career out of. Getting more familiar with software, procedures, and meteorology in general has been substantially beneficial.

What do you like to do in your free time?

During my free time, you can almost always guarantee you'll find me somewhere outside no matter the season. From kayaking and rock climbing, to backcountry skiing and mountain biking, growing up in Vermont has given me the opportunity to embrace the great outdoors and make the most out of this beautiful area. Hiking is what I dedicate most of my free time too with goals of within the next three years being to complete the NH 48, the Long Trail, and the Appalachian Trail.

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Contributors:
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Rebecca Duell, Meteorologist
John Goff, Meteorologist
Robert Haynes, Meteorologist
Andrea LaRocca, Meteorologist
Carter MacKay, Student Volunteer
Scott Whitter, Warning Coordinator Meteorologist

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Andrea LaRocca, Meteorologist
Marlon Verasamy, Observing Program Leader

We Need Your Storm Reports!

Please report snowfall, flooding, damaging winds, hail, and tornadoes. When doing so, please try, to the best of your ability, to measure snowfall, estimate hail size, and be specific as to what damage occurred and when. We also love pictures!

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Or visit:
http://www.weather.gov/btv/stormreport

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