



Inside this issue:

Welcome Message	1
Seasonal Climate Outlook for February through April	1
New Climate Normals	2
The Difference between Snowfall, Snow Depth, and Snow Water Equivalent	3
CoCoRaHS goes to School	4
ARBCON observers reporting snowfall	5
Meet the Northwestern North Dakota Regional Coordinator	5
Meet the Western and Central North Dakota Regional Coordinator	6



The Dakota Thunder

Welcome Message

By: **Tony Merriman**

It is with great excitement that we introduce the Winter Edition of the North Dakota state CoCoRaHS newsletter! The purpose of this publication is to keep North Dakota residents informed about the latest weather events in the state and how observers like you assist the National Weather Service (NWS) create better river and weather forecasts.

This newsletter will continue to be issued twice a year, one in the summer and one in the winter. The content is truly a team

effort and is produced by a team of North Dakota CoCoRaHS coordinators.

If you have any requests for information you would like to see in any future editions of this newsletter, please email me at

Tony.Merriman@noaa.gov

Thanks again for being great weather observers!



The 4-inch rain gauge required to participate in the program

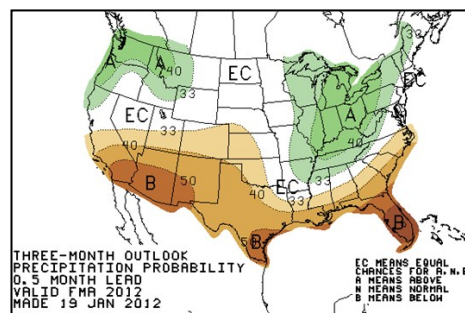
Seasonal Climate Outlook for February - April

By: **Lindsay Tardif-Huber**

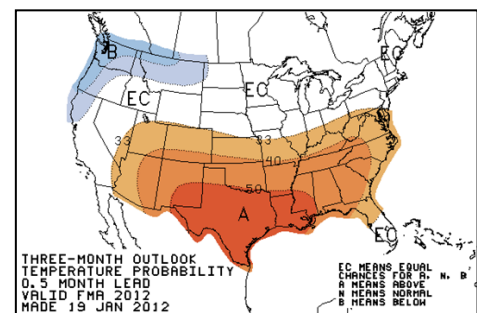
After a mild and dry start to winter in North Dakota, what is in store for the remainder of the winter and the beginning of spring? Looking ahead, the latest seasonal climate outlooks for February through April issued by the Climate Prediction Center on January 19th no longer expect greater probabilities for cooler and wetter than normal conditions. Concerning the precipitation potential, there will be equal chances for normal, wetter than normal, or drier than normal conditions over North Dakota February through April. Con-

cerning the temperature probabilities, far western North Dakota has a slightly higher probability for colder than normal temperatures while the rest of the state has equal chances for normal, warmer than normal, or colder than normal temperatures.

Looking towards late spring around May, North Dakota has a slightly higher probability for wetter than normal conditions with equal chances for a normal, warmer than normal, or colder than normal temperatures.



For North Dakota: (Source: NOAA)
Equal Chances for Above, Near, or Below Normal Precipitation



For North Dakota: (Source: NOAA)
Equal Chances for Above, Near, or Below Normal Temperatures

New Climate Normals

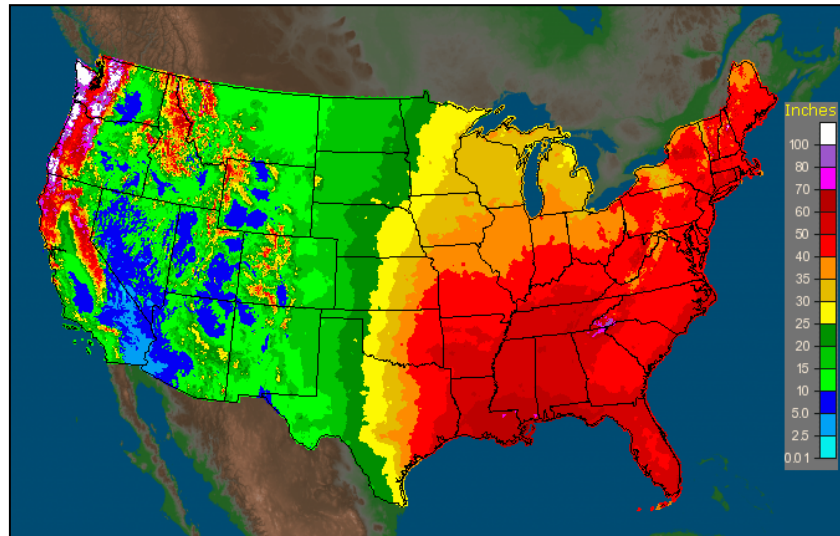
By: Lindsay Tardif-Huber

On August 1st, 2011, the National Weather Service started using the new 1981-2010 Climate Normals in all climate products. These new normals were released on July 1st by the National Climatic Data Center and replaced the 1971-2000 normals.

Common climate variables such as temperature, precipitation, snowfall, snow depth, and heating and cooling degree days were included in the released data set for the Global Historical Climatology Network (GHCN) sites. In North Dakota, there are 169 GHCN sites.

From now through 2020, the new 30-year period of 1981-2010 will be used to calculate climatological normals. The tables below show the monthly temperature, precipitation, and snowfall normals for Williston, Bismarck, Grand Forks, and Fargo.

For more information on the new climate normals, please go to the National Climatic Data Center web page: <http://www.ncdc.noaa.gov/oa/climate/normals/usnormals.html#WHATARENORMALS>



Annual Normal Precipitation Amounts across the United States

(Source: NOAA)

1981-2010 Monthly Normal Temperatures

Site		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Williston	High	21.9	27.5	40.4	57.0	67.7	76.8	84.4	83.8	71.3	56.3	37.9	24.4	54.2
	Low	0.1	6.3	18.2	29.7	40.5	49.7	55.8	53.9	42.1	29.8	16.4	3.3	28.9
Bismarck	High	23.4	28.3	40.4	57.0	68.4	77.3	84.7	83.5	72.1	57.5	39.6	26.2	55.0
	Low	2.2	7.9	19.4	30.7	42.6	52.0	57.4	55.5	45.0	32.2	18.8	6.1	30.9
Grand Forks	High	16.0	22.4	34.6	54.5	68.2	76.6	81.2	80.4	69.7	54.1	34.9	20.1	51.2
	Low	-1.3	4.6	17.6	31.5	43.3	53.9	58.4	56.2	46.3	34.0	19.1	4.3	30.8
Fargo	High	18.4	23.7	36.3	55.8	69.3	77.4	82.5	81.2	70.8	56.0	37.3	22.3	52.7
	Low	0.1	5.6	19.4	32.7	44.9	54.9	59.5	57.3	47.4	35.1	20.3	5.9	32.0

1981-2010 Monthly Normal Precipitation

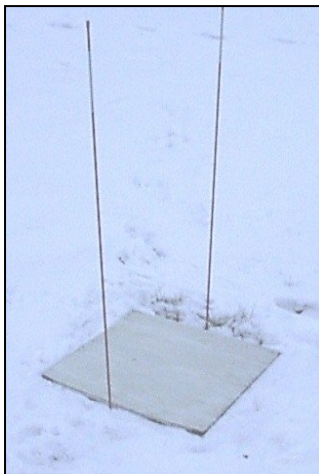
Site		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Williston	Precip	0.59	0.39	0.71	1.00	1.92	2.52	2.54	1.45	1.06	0.92	0.65	0.62	14.37
	Snowfall	10.0	5.7	6.2	3.7	1.3	0.0	0.0	0.0	0.2	2.6	6.1	9.5	45.3
Bismarck	Precip	0.43	0.51	0.87	1.26	2.40	3.17	2.89	2.28	1.59	1.25	0.71	0.49	17.85
	Snowfall	8.9	8.1	9.1	4.2	0.4	0.0	0.0	0.0	0.2	2.2	8.8	9.3	51.2
Grand Forks	Precip	0.71	0.59	1.02	0.98	2.75	3.74	3.17	3.14	2.05	1.92	0.90	0.65	21.62
	Snowfall	10.4	6.9	6.4	1.0	0.1	0.0	0.0	0.0	0.0	1.0	6.1	10.9	42.8
Fargo	Precip	0.70	0.61	1.30	1.36	2.81	3.90	2.79	2.56	2.57	2.15	1.00	0.83	22.58
	Snowfall	11.2	7.0	9.1	3.0	0.0	0.0	0.0	0.0	0.0	0.7	7.9	11.2	50.1

The Difference between Snowfall, Snow Depth, and Snow Water Equivalent

By: Jimmy Taeger

Snowfall, snow depth and snow water equivalent are all different observations that many observers measure after it snows. Compared to measuring the amount of rainfall after a summertime storm passes, various measurements of the fragile flakes require slightly more knowledge. Don't worry! After reading this article, you will be able to take proper snow observations like a pro.

Before it snows, place a white board (about 2'x2') outside away from trees and shady spots. It is helpful to place a stake near the board so it is easy to find post-snowfall (see image below).



(Source: NOAA)

Clearly mark the snow board so it can be found after it snows.



After a storm passes and it stops snowing, measure the greatest amount of snow on the board with a ruler to the nearest tenth of an inch. If the snow is melting as it lands, only a trace of snow should be reported. It is best to measure snowfall as soon as possible after a storm passes incase any of it begins to melt. Make sure to clean off the board afterwards so the next snowfall event can be properly measured.

Snow depth is the current depth of all snow on the ground measured to the nearest inch. When measuring snow depth, it is encouraged

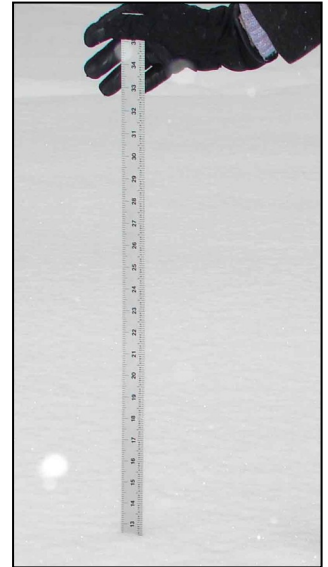
to take the average of multiple measurements in open, non-shady areas. Snow water equivalent (SWE) is the amount of liquid water contained in snow. To measure SWE, push the outer tube of your rain gauge into the snow removing a core of the snow, then melt the snow and measure the liquid to the nearest hundredth of an inch.

We at the NWS rely heavily on reports from observers like you all year long. To report snowfall amounts or other weather information 24 hours a day, call the NWS Bismarck's toll-free storm report line 1-800-247-0212.



(Source: Tony Merriman)

DO NOT measure snow drifts.



(Source: NOAA)

An observer uses a snow stick to measure snowfall (in tenths of an inch) and snow depth (to the nearest whole inch).



"To report snowfall amounts or other weather information 24 hours a day, call the NWS at 1-800-247-0212"



CoCoRaHS goes to School

By: Mark Ewens

School: It's not just for learning, it's about doing! CoCoRaHS goes to school.

Reading, writing, and arithmetic are staples in every kid's school day from early on through college graduation. In the 1940s and 1950s, the old slang was "The Three R's". Young men and women would listen while learned teachers espoused the wisdom they had garnered over the years. In the modern classroom, teaching is all about doing.

Many schools have embraced aggressive "hands-on" campaigns to teach students a wide variety of subjects. Everything from environmental studies to community projects has made their way into the classroom. One such program that has spread rapidly through many schools is the Community Collaborative Rain, Hail and Snow Network – *CoCoRaHS*.

Not only does an involvement in CoCoRaHS provide an extra level of hands on experience to the classroom science teacher, it also provides "real-world" information that helps a wide audience. Since its inception in 1998, CoCoRaHS has quickly spread to all 50 states. This demonstrates the value of the information being collected by the CoCoRaHS network.

Students become involved in data analysis, comparing rain and snow reports to those of their neighbors, learning that precipitation amounts vary from place to place. They learn about the 'hydrologic cycle' and how weather affects more than just what to wear to school. From farmers and ranchers to businesses and

sports teams, the users of the data collected are endless.

There are several examples of CoCoRaHS in school in North Dakota. Two NWS Partners are the International Water Institute (IWI) and the Red River Basin Commission (RRBC). Both have embraced and fully support the CoCoRaHS program.


The data that are collected by the partner schools is used in a wide variety of ways. Science teachers get students involved in collecting rain, snow and frost data – all crucial to forecasting – giving them an appreciation of science at the root level. By involving students in data collection and dissemination, they develop a greater appreciation for why they are learning; it takes it from the abstract to the practical. A listing of schools involved in the CoCoRaHS program is available on the IWI and RRBC web sites; they also have a Facebook Page so sponsors and interested folks can keep track of the

latest weather.

The folks at CoCoRaHS HQ have developed several wonderful aides to help teachers get their program up and running. The *CoCoRaHS School Pilot Program* has a tremendous amount of information on the website, assisting educators in a firm start to the program.


The "Sponsor a School" program is a great way for anyone – small businesses, civic minded individuals, corporations – to help a willing school become involved. A mentoring program is also available.


In a short period of time, CoCoRaHS in school has become a tremendous success. Educators and students alike are keen on the idea that they can help their communities be better prepared for whatever nature has to offer. By taking a few minutes a day, students have become part of something rich and rewarding. Learning while doing is what CoCoRaHS is all about!



cocorahs
 Subscribe
 Add as Contact |
 Block User | Send Message

Profile
 Name: CoCoRaHS
 Channel Views: 4,921
 Total Upload Views: 6,275
 Joined: Jan 26, 2009
 Latest Activity: 2 weeks ago
 Subscribers: 118
 Website: <http://www.cocorahs.org>
 Community Collaborative Rain, Hail & Snow Network
 Country: United States

Recent Activity
 cocorahs uploaded a new video
 (2 weeks ago)

 CoCoRaHS in Canada
 cocorahs uploaded a new video
 (4 weeks ago)

 CoCoRaHS WxTalk Webinar: Snow State Climatologists Nolan Doesken of Colorado and David Robinson of New Mexico
 cocorahs uploaded a new video
 (4 weeks ago)

 CoCoRaHS Snow Training Webinar
 CoCoRaHS founder and State Climatologist for Colorado, Nolan Doesken hosts...
 cocorahs uploaded a new video
 (1 month ago)


(Source: YouTube)

CoCoRaHS has a YouTube channel available at:

www.youtube.com/cocorahs

"By taking a few minutes (to take an observation) a day, students have become part of something rich and rewarding."




COMMUNITY COLLABORATIVE RAIN, HAIL & SNOW NETWORK
 "Because every drop counts"

Home | States | View Data | Maps | My Data Entry | Login

Welcome to the CoCoRaHS School Pilot Program!

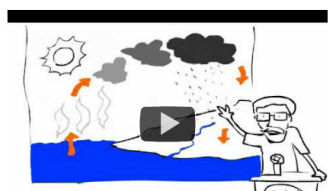
Main Menu
 Home
 About Us
 Join CoCoRaHS
 Contact Us
 Donate

Resources
 FAQ/Help
 Education
 Training Slide-Shows
 Videos
 Drought Impacts
 Volunteer Coordinators
 Hail Pad
 Distribution/Drop-off
 Help Needed
 Printable Forms
 The Catch
 Message of the Day
 Data Analysis
 CoCoRaHS Blog
 Web Groups
 State Newsletters
 Master Gardener Guide
 State Climate Series
 Sponsors
 Links
 CoCoRaHS Store

CoCoRaHS Schools Home Page
 For Teachers
 For Sponsors
 For Mentors

Public, private and home schools are now joining "CoCoRaHS for Schools"!

View this video and then click on 'For Teachers' above for tips on getting started, FAQ's, training materials, lesson plans and more!



Questions? Contact: education@cocorahs.org

(Source: CoCoRaHS)

The CoCoRaHS School Pilot Program Website

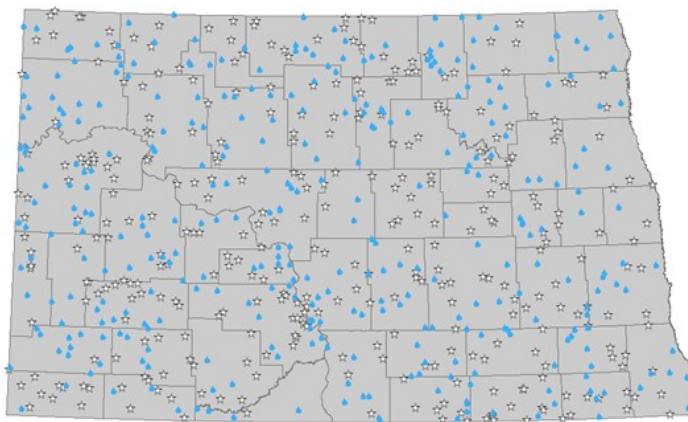
http://www.cocorahs.org/Content.aspx?page=CoCoRaHS_Schools

ARBCON Observers Reporting Snowfall

By: Darin Langerud

The Atmospheric Resource Board's Cooperative Observer Network (ARBCON) is in its second year of winter observations. The network of volunteers has been in operation since 1977, but until recently only reported seasonal observations of rainfall and hail during the months of April through September. Year-round operations began in October 2010 with more than 200 of the network's nearly 700 observers volunteering for the extra duty.

ARBCON added many more year-round observers to its ranks for the 2011-12 winter season. A total of 339 volunteers are "braving" the North Dakota winter to conduct daily observations this year, up significantly from last winter. Nearly 100 of them are reporting online, making their observations immediately available



(Source: Atmospheric Resource Board)

Locations of ARBCON observers. Stars indicate year-round observers, raindrops are summer only.

on ARB's Internet website at <http://www.swc.nd.gov/arb>.

While most North Dakotans welcome the mild, relatively snow-free winter we have experienced so far, we're not out of the woods yet. There's still a

pretty good chance that our intrepid observers will have a snowstorm or two to measure before winter is over. When that day comes, ARBCON observers will be ready to measure what Mother Nature throws at them.

"A total of 339 volunteers are braving the North Dakota winter to conduct daily observations."



Meet the Northwestern North Dakota Regional Coordinator

By: Rick Krolak



Rick Krolak is the CoCoRaHS coordinator for northwestern North Dakota. Rick began his weather career in 1983 as a weather observer in the US Navy, and eventually rose through the ranks as a weather forecaster. Rick's navy career highlights included observing and forecasting weather around the world including the Mediterranean

Sea, the Middle East, Japan, Florida, and California.

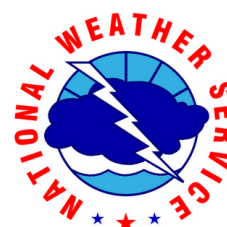
Shortly after retiring from the Navy, Rick joined the National Weather Service in November 2001, serving as a Meteorology Technician at the Weather Service office in Williston, ND. In November 2005, Rick was promoted to the Official in Charge of the Williston Office.

Rick was recently selected as the Observing Program Leader at the National Weather Forecast Office in Bismarck, ND. Rick also holds a Bachelor of Science degree in Resources Management from Troy State University. If you have any questions about CoCoRaHS,

Rick may be reached the Weather Forecast Office, Bismarck, ND. (701) 250-4495.

If you would like to be featured in the Summer 2012 edition of the CoCoRaHS newsletter, please email

Tony.Merriman@noaa.gov

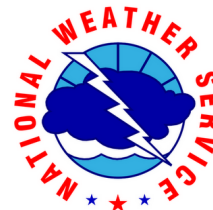


NATIONAL WEATHER SERVICE - BISMARCK, ND

2301 University Drive
Building 27
Bismarck, ND 58504
(701) 223-4582
<http://www.weather.gov/bis>

National Weather Service Mission Statement:

The National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.



COCORAHS NATIONAL HEADQUARTERS

1371 Campus Delivery
Fort Collins, CO 80523-1371
(970) 491-1196
<http://www.cocorahs.org>

CoCoRaHS Mission Statement:

CoCoRaHS is a unique, non-profit, community-based network of volunteers of all ages and backgrounds working together to measure and map precipitation (rain, hail and snow). By using low-cost measurement tools, stressing training and education, and utilizing an interactive Web-site, our aim is to provide the highest quality data for natural resource, education and research applications.



Winter 2011 - 2012 Dakota Thunder Team:

Tony Merriman (editor) - Western and Central North Dakota Regional CoCoRaHS Coordinator
- Lead Forecaster (NWS Bismarck)

Darin Langerud - North Dakota State CoCoRaHS Coordinator
- Division Director for the Atmospheric Resource Board (NDSWC)

Mark Ewens - Eastern North Dakota Regional CoCoRaHS Coordinator
- Data Acquisition Program Manager (NWS Grand Forks)

Rick Krolak - Northwestern North Dakota Regional CoCoRaHS Coordinator
- Observing Program Leader (NWS Bismarck)

Jimmy Taeger - Burleigh County CoCoRaHS Coordinator
- Meteorologist Intern (NWS Bismarck)

Lindsay Tardif-Huber - Meteorologist Intern (NWS Bismarck)



Meet the Western and Central North Dakota Regional Coordinator

By: Tony Merriman



Tony Merriman is the Western and Central North Dakota Regional Coordinator and is a Lead Forecaster at the National Weather Service – Bismarck Forecast Office. He is originally from northern Indiana where he became interested in weather at age 5 when a tornado passed a few miles north of his house.

Tony attended college at Indiana University in Bloomington, Indiana. During his time in college, he interned at the

NBC affiliate in Fort Wayne and worked at the Northern Indiana National Weather Service Forecast Office. He graduated with a Bachelor of Science degree in Geography with a concentration in Atmospheric Science and a Minor in Mathematics.

Tony joined the National Weather Service full-time in 2004 at the Forecast Office in Corpus Christi, Texas. He was the South Texas CoCoRaHS Regional Coordinator

from 2007-2010 and grew the network to over 210 observers.

He traded in his surfboard and flip-flops for a sled and snowshoes in October 2010 when he was promoted to a Lead Forecaster position at the National Weather Service Office in Bismarck, ND. He is excited about this new opportunity to work with the good people of North Dakota and to expand the Western and Central North Dakota CoCoRaHS rainfall network!