



# **Training Slide Show**



# What is CoCoRaHS?

The Community Collaborative Rain, Hail and Snow Network

CoCoRaHS is a grassroots, non-profit, community-based, high-density precipitation network across the family islands ....

all ages and backgrounds





... who take daily measurements of <u>precipitation</u> right in their own communities

Once trained, our volunteer observers collect data using low-cost measurement tools ...





4-inch diameter high capacity rain gauges



Hail Figures CoCoRaHS & Hail Hail Pad Examples

<mark>¥<sup>™</sup>¥ S</mark>now

Training is important to assure accurate, high quality data

### Bahamas CoCoRaHS Network





















Officially began June 2016

# www.cocorahs.org

#### Volunteers report their daily observations on our interactive Web site



#### Precipitation Report Form Submit Data Reset Station Number : BHS-NP-0 Station Name : Nassau 2.4 SW **Denotes Required Field** 2/22/2016 🗄 \*Observation Date 🥝 7:00 AM 🖸 \*Observation Time 🥝 \*Rain and Melted Snow to the nearest hundredth inch that has fallen in the 0.24 in. gauge during the past 24 hours, or T for trace, or NA for unknown. Observation Notes: (This will be available to the public) Sunny day with later afternoon shower. Strong NE winds. Temperatures are delightful! New Snowfall NA in. Accumulation of new snow in inches to the nearest tenth @ NA in. Melted value from core to the nearest hundredth 🧐 Total Snow and Ice on Ground at Observation Time NA in. Depth of total snow and ice (new and old) in inches to the nearest half inch 🧐 in. Melted value from core to the nearest hundredth @ NA **Duration Information** If a time is unknown or the storm has not ended leave it blank Precipitation Began 4:15 Precipitation Ended 5:00 OAM OPM Heaviest Precipitation Began 4:20 Heaviest Precipitation Lasted 10 minutes These times are: Reasonably Accurate Additional Information Any Flooding? Select a Flooding Value ∩Yes Did you record hourly precipitation (or other detailed time increments) for this No storm? If yes, CoCoRaHS personnel may request a copy of this data later, so please save it. Submit Data Reset

My Data Entry : Daily Precipitation Report Form

# Immediately viewable

Volunteers observations are viewable in both map and table form within a few minutes

Precipitation • Bahamas •	All Districts •	5/2/2016			US Units 🔹	Update						
Map Satellite Nicholls Town	Station Num Station Nam Report Date: Precipitation Snowfall: 0.0 Snowfall SW Snow Depth: Snow Depth <u>Go to report</u>	iber: BHS-NP-3 ie: Nassau 12.8 WS 2016-05-02 08:00 i: 0.00 in. ) in. /E: NA : NA SWE: NA details	× SW AM		Date: 05/02/2010 Country: BHS District: Units: US Units O Zero	RaHS <b>(i)</b> pitation Map						
	A	Adelaide Village			<ul> <li>Trace</li> <li>0.01 - 0.20 in.</li> <li>0.21 - 0.40 in.</li> <li>0.41 - 0.99 in.</li> <li>1.00 - 2.38 in.</li> <li>2.39 - 3.57 in.</li> <li>3.58 - 3.96 in.</li> </ul>							
Google Staniard Creek	Map data ©2016 Gor	ogle 10	<u>Time</u>	+ Station Numbe	Source: GEOMAC. GEOM <u>n</u> <u>er</u> <u>Station Na</u>	AC wildfire data lavers	Total Precip	New Snow	<u>Total</u> Snow	<u> State</u>	<u>County</u>	Viev
		5/2/2016	8:00 AM	BHS-0	CE-3 Rock Sou	nd 0. 0 N	0.63	0.0	NA	BHS	Central Eleuthera	۵,
		5/2/2016	9:00 AM	BHS-0	CE-4 Tarum Ba	y 0.1 NW	0.02	NA	NA	BHS	Central Eleuthera	۵,
		5/2/2016	7:00 AM	BHS-N	NP-1 Nassau 14	4.4 SW	0.01	NA	NA	BHS	New Providence	۵,
		5/2/2016	7:00 AM	BHS-F	EP-1 Freeport L	ucaya 7.4 WNW	0.00	0.0	NA	BHS	City of Freeport	۵
		5/2/2016	8:00 AM	BHS-N	NP-3 Nassau 12	2.8 WSW	0.00	0.0	NA	BHS	New Providence	4
		5/2/2016	8:00 AM	BHS-0	CE-5 North Pair	netto Point 1.0 SSW	0.00	0.0	NA	BHS	Central Eleuthera	4

# Why CoCoRaHS? Great question!



Precipitation is important and highly variable Data sources are few and rain gauges are far apart



What falls at the airport may not be what falls at your house





### Measurements from many sources are not always accurate

Even though hail is rare here, there is almost no quantitative data being collected about hail on the islands





Storm reports can save lives, but giving advanced warning of possible flooding



Why one observation <u>CAN</u> make a difference

### <u>CoCoRaHS's main focus</u> <u>is to provide:</u>

Quality Precipitation Data & Educational Opportunities

> to help the public better understand weather and climate

### Examples of CoCoRaHS data users

The Bahamas Dept of Meteorology Other Meteorologists Hydrologists NEMA (Emergency Managers) Island Utilities ---Water and Sewage Corporation -BTC (telephone) -BEC (electric) Insurance adjusters Crop production (BAMSI) Engineers Scientists studying storms Mosquito control **Environmental Health** Dept. of Tourism **Outdoor & Recreation** Teachers and students The National Hurricane Center









The Bahamas Meteorology Department

2700





### The Bahamas Department of Meteorology



### NOAA's National Hurricane Center -Tropical system post storm analysis

"We use the CoCoRaHS data in our post-storm summary to describe the overall impacts of a tropical cyclone event." Dan Brown - National Hurricane Center





2015 – Hurricane Joaquin

# Section One

Setting up your equipment and measuring precipitation



#### In this section we will:

a) Show how/where to place your gauge

b) Explain how to measure rainfall with your gauge



# Placement of your gauge

"Location is the key to good data"





gauge





The #1, all time worst place to put your rain gauge is to leave it in the box!

Putting your gauge under your gutter downspout is not a wise choice either!

#### Avoid placing it under trees or any structure





# Although convenient, the deck is still too close to the house

### Also avoid placing your gauge near:



### Sprinklers both big and small







Animals (dogs, birds, potcakes ... iguanas!)

# Avoid anything that would artificially increase or decrease your catch gauge



This can cause updrafting during strong winds, which may reduce your gauge catch.

### residential



### rural



### Ideal placements for your gauge



urban

### Distance from Obstacles

In <u>open areas</u> strive to be <u>twice as far</u> from obstacles as they are high. In <u>developed areas</u> strive to be <u>as far</u> from obstacles as they are high.



### Distance between Trees Ideally, place your gauge equidistant from the nearest trees

### Height above the ground

# In <u>open areas</u> place the gauge top approx. 2 feet off the ground







### Level and Bevel

#### Make sure that your gauge is level





Bevel the top of the post to reduce rain splashing into the gauge

# Measuring Rainfall with your Gauge

"Accuracy and consistency are very important"



One inch of rain in the inner tube looks different than one inch of rain in the outer tube



# A Word about Decimals

Please be careful when recording your measurement. Getting the decimal point correct is <u>essential</u>! 0.40"

There is a large water difference between 0.40 inches and 4.00 inches

### Please do not round up

It is very important to record as accurately to the <u>nearest hundredth</u> of an inch.

Please **do not** round up to the nearest tenth!

If you measured 0.98 "please record that amount. Do not record it as 1.00"

### When should we take our observations?

1111111111111

22 1

7:00AM is preferred

Between 4:30AM and 9:30AM is OK

Other times are accepted, but they will not appear on CoCoRaHS Maps



# Here are the most common situations you will encounter



# YOUR MOST COMMON OBSERVATION WILL BE ...

# ZERO **0.00**"

It is important to know where it did <u>NOT</u> rain.

Please report zeros!



We do experience drought among the family islands

### Your reports of **zero** are extremely helpful



And are used to forecast drought conditions, which can lead to wildfires and water shortages

A "spry" ... only a few drops

# Trace "T"

"When only a drop or two wet the gauge record "T" for Trace



# Between "**T**" and "**two tenths**" of an inch

"That's **0.16**" or sixteen hundredths



### **The Meniscus**

The surface of the water in the gauge looks curved. How do I know where to read?

As water fills up the measuring tube, a curved surface is formed called a meniscus. It is formed by the surface tension of a liquid in contact with the sides of the tube.





# A nice soaking rain

"This is "forty-six hundredths" of an inch and is recorded as 0.46"



# A really good rain !

Almost at the top of the inner-tube.

This is "one inch" and is recorded as 1.00"





### IF THERE IS VERY HEAVY RAIN FALLING

PLEASE submit a

### "Significant Weather Report as soon as possible

# Your report immediately goes to the **Bahamas Dept of Meteorology**

Your report provides them with much needed information to issue severe weather statements such as flash flood warnings and these can save lives!



# Lots of rain !!

When more than an inch of rain falls the precipitation will overflow into the outer cylinder.

The whole gauge has a capacity to hold a little over eleven inches.



# To measure greater than one inch of rain . . .





Pour the remaining water into the funnel and measure the inner tube.



Continue until all of the water has been measured. Make sure you keep track of your measurements along the way.

Pour out the first inch from the inner tube and write it down.

# Finally add up all of your measurements

1.00 inch
0.97 inches
+0.24 inches
Total = 2.21 " <</pre>



Although not common on the islands, if you see hail, please submit an **"On-Line** 

Hail Report"

as soon as possible

Your report goes right to the Bahamas Dept of Meteorology

It provides them with much needed information to issue severe weather statements.



# Section Two

**Reporting Observations** 

#### My Data Entry : Daily Precipitation Report Form



### www.cocorahs.org

#### The Bahamas CoCoRaHS Web site



The **Bahamas Islands are** delighted to be participating in the growing CoCoRaHS network. Bahamas CoCoRaHS observers provide important information about rainfall that is used by meteorologists, hydrologists, farmers, water resource managers, and your friends and neighbors. This effort in the Bahamas is especially important given the great variation in rainfall across the islands from Grand Bahama to Great Inagua.

AMDASSADOD\*\*

### YOUR DAILY "24 HOUR" OBSERVATION

Click on "My data" from the top menu bar



Enter the total precipitation measured in your gauge. Record your measurement in hundredths (0.00")

ORaHS COM	MMUNITY COLLABORATIVE RAIN, HAIL & SNOW NETW "Because every drop counts"	'ORK 🕒 🛃 🖿 🔡
	Home   Countries   States   View Data   Maps My Data   My Account   Logout	
	My Data Entry : Daily Precipitation Report Form	
Enter My New Reports	Precipitation Report Form	Submit Data Reset
Enter my new neports	Station Number : BHS-NP-0	
Daily Precipitation	Station Name : Nassau 2.4 SW	
Multi-Day Accumulation	* Denotes Required Field	
• <u>Hail</u>	2/23/2016 🛨 *Observation Date @	
Significant Weather     Monthly Zeros     Drought Impact Report	7:00 AM C *Observation Time	cord your measurement hundredths (0.00)
Drought Impact Report	*Rain and Melted Snow to the nearest hundredt	h inch that has fallen in the
FROST Reports	gauge Juring the past 24 hours, or T for trace, o	or NA for unknown. 🥝
Optics     Snowflake	Observation Notes: (This will be available to the public)	
• Thunder	Heavy shower at 11AM. Lots of lightning and	thunder.
List/Edit My Reports	Some small street flooding. Sun was back out	at IFM

### You can enter comments under "notes"

These are very helpful to augment your observation



#### Submit your report

Click "Submit Data" and your observation is recorded on our site



#### To see your Observation on our maps

Click on maps from our main page and then click on your country



#### From here click on your island administrative district



Right click on your dot to get additional Information about the observation

You can zoom in on your island to get more detail

Observations are available (and sortable) in table form by clicking on "View Data" from the main menu.

<u>Date</u>	<u>Time</u>	<u>Station</u> Number	Station Name	<u>Total</u> Precip in. ▲	<u>New</u> Snow in.	<u>Total</u> Snow in.	<u>State</u>	<u>County</u>	View
5/2/2016	8:00 AM	BHS-CE-3	Rock Sound 0. 0 N	0.63	0.0	NA	BHS	Central Eleuthera	4
5/2/2016	9:00 AM	BHS-CE-4	Tarum Bay 0.1 NW	0.02	NA	NA	BHS	Central Eleuthera	۵,
5/2/2016	7:00 AM	BHS-NP-1	Nassau 14.4 SW	0.01	NA	NA	BHS	New Providence	۵,
5/2/2016	7:00 AM	BHS-FP-1	Freeport Lucaya 7.4 WNW	0.00	0.0	NA	BHS	City of Freeport	4
5/2/2016	8:00 AM	BHS-NP-3	Nassau 12.8 WSW	0.00	0.0	NA	BHS	New Providence	۵,
5/2/2016	8:00 AM	BHS-CE-5	North Palmetto Point 1.0 SSW	0.00	0.0	NA	BHS	Central Eleuthera	4

Observations are available (and sortable) in table form by clicking on "View Data" from the main menu.

#### Re-entering an erroneous report

Because every drop counts"										
	Home   State	es   View Dat	ta   Maps	My Data   My Acco	ount   Ad	min   Lo	gout			
	My Data	Entry : l	.ist My Dail	y Precipitation Re	ports	US Uni	ts ‡			
Enter My New Persents	Showing	1 - 50 of 2	079 Records		<back< th=""><th>Page</th><th>1 ;</th><th>Nex</th><th><u>d&gt;</u></th><th></th></back<>	Page	1 ;	Nex	<u>d&gt;</u>	
Daily Precipitation	<u>Date</u> ▲	<u>Time</u>	<u>Station</u> Number	Station Name	<u>Total</u> Precip	<u>New</u> Snow	<u>Total</u> Snow	<u>State</u>	<u>County</u>	Action
Multi-Day Accumulation	5/28/2014	7:00 AM	CO-I R-610	Fort Collins 3.5 SW	0.11	NΔ	NΔ	CO	Larimer	a /
Hail Significant Weather	5/27/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	0.02	NA	NA		Larimer	a /
Monthly Zeros	5/26/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	0.02	NA	NA		Larimer	a /
Drought Impact Report	5/25/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	т	NA	NA		Larimer	a /
	5/24/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	0.66	NA	NA	co	Larimer	a /
FROST Reports Frost	5/22/2014	7:00 AM	CO-I R-610	Fort Collins 3.5 SW	0.36	NA	NA	co	Larimer	0
Optics Spowflake	5/18/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	T.00	NA	NA	co	Larimer	a /
Thunder	5/17/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	0.10	NA	NA	co	Larimer	a /
List/Edit My Reports	5/13/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	0.00	NA	NA	co	Larimer	, ,
	5/12/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	0.82	NA	NA	CO	Larimer	a /
Daily Precipitation	5/11/2014	8:00 AM	CO-LR-610	Fort Collins 3.5 SW	1.20	1.0	NA	со	Larimer	a /
Hail	5/9/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	0.17	NA	NA	СО	Larimer	a /
Significant Weather	5/8/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	1.08	NA	NA	со	Larimer	a /
Evapotranspiration	5/7/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	0.03	NA	NA	CO	Larimer	a /
FROST Reports	5/6/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	0.00	0.0	NA	со	Larimer	a /
Optics	5/5/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	0.00	0.0	NA	СО	Larimer	a /
Snowflake	5/4/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	0.00	0.0	NA	со	Larimer	a /
Thunder	5/3/2014	7:00 AM	CO-LR-610	Fort Collins 3.5 SW	0.00	0.0	NA	со	Larimer	a /
	E10/004 4	7.00 414	0010040	Fart Calling 2 5 OW	0.00	0.0	NI A	00	Laulusan	a 0

Click on "Daily Precipitation" under List/Edit My Reports. Click on the date and then enter the corrected data. Be sure to put a short note in the observations box.

### Other Important Reports

Hail Report

Significant Weather Report (Rain and Snow)

Monthly Zeros

Multi-Day Precipitation Report

# Hail Report

CORAHS COM	UNITY COLLABORATIVE RAIN, HAIL & SNOW NETWORK "Because every drop counts"							
0	Home   States   View D	ata   Maps	My Data   My Account   Admin   Logout					
	My Data Entry :	Hail Report For	m					
Enter My New Reports	Hail Report Form		Submit Data Reset					
	Station Number : 0	CO-LR-610						
Daily Precipitation	Station Name : F	Fort Collins 3.5 SW						
<ul> <li><u>Multi-Day Accumulation</u></li> </ul>	* [	Denotes Required F	ield					
• <u>Hail</u>	4/26/2014 🚔 *	Date of Hail Storm	I 🞯					
Significant Weather     Monuny Zeros	4:50 PM \$	ime Hail Storm Be	egan 🞯					
Drought Impact Report     Evapotranspiration	● Yes   No F	Report was taken a	t registered location?					
	Size of hailstones							
FROST Reports     Frost	Smallest:	1/4" Pea Size	\$					
Optics	Average:	1/2" Grape	\$					
• <u>Thunder</u>	Largest:	3/4" Penny Size	\$					
	Hail Lasted							
List/Edit My Reports	15 Minutes T	his time is accurate	e within 2 min. +					
Daily Precipitation	Hailfall was:	Continuous O Int	ermittent					
<u>Multi-Day Accumulation</u> Hail	Hailstones were:							
Significant Weather	(Check all that app	ly)						
Drought Impact Report     Evapotranspiration	✓ Hard □ Soft □ Mixed (Hard & Soft) □ Clear Ice □ White Ice							
EDOOT Deserts	Was there more ra	ain than hail? 🍚 Y	es ONo					
Optics	Hail Started:							
Frost     Snowflake	<ul> <li>Before rain</li> </ul>	After rain	Same time as rain					
• <u>Thunder</u>	Largest Hail Start	ed						
	<ul> <li>Before smaller hail</li> </ul>	<ul> <li>After smaller hail</li> </ul>	Same time as smaller hail					

### Monthly Zeros Report

#### COMMUNITY COLLABORATIVE RAIN, HAIL & SNOW NETWORK

"Because every drop counts"

Home | States | View Data | Maps

My Data | My Account | Admin | Logout

#### My Data Entry : Monthly Zeros Form

#### Enter My New Reports

Daily Precipitation

ocoRaHS

Multi-Day Accumulation

#### ٠ Hail

#### Significant Weathe Monthly Zeros

- Drought impact Report
- Evapotranspiration ٠

#### FROST Reports

- Frost
- Optics
- Snowflake
- Thunder

#### List/Edit My Reports

- Daily Precipitation
- Multi-Day Accumulation
- Hail ۰
- Significant Weather ٠
- Drought Impact Report

Evapotraneniration

Click a empty box in a zero (

Don't for

Monthly 2	Zeros				Submi	t Reset					
Station Nur	t Collins 3.	5 SW									
<u>&lt;</u>		l	May 2014	1			>				
Sun	Mon	Tue	Wed	Thu	Fri	Sat					
27	28	29	30	1	2	3					
				Precip: 0	<b>0.0</b> Pred	0.0 Pre	cip				
4	5	6	7	8	9	10					
0.0 Precip	Precip: 0	Precip: 0	Precip: 0.03	Precip: 1.08	Monthly	Zeros				Submit	Reset
11	12	13	14	15	Station Nu	mber : CO-	LR-610	Station N	lame : Fort	Collins 3.	5 SW
Precip: 1.20	Precip: 0.82	Prosio: 0	0.0 Precip	0.0 Preci	<u>&lt;</u>			May 2014	•		≥
18	19	20	21	22	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Precip: T	0.0 Precip	0.0 Precip		Precip: 0.36	27	28	29	30	1	2	3
25	26	27	28	29		-		-	Precip: 0	Precip: 0	Precip: 0
					4	5	6	7	8	9	10
Precip: T	Precip: 0.10	Precip: 0.02	Precip: 0.11	0.0 Prec	Precip: 0	Precip: 0	Precip: 0	Precip: 0.03	Precip: 1.08	Precip: 0.17	0.0 Precip
1	2	3	4	5	11	12	13	14	15	16	17
			CII		Precip: 1.20	Precip: 0.82	Precip: 0	0.0 Precip	0.0 Precip	0.0 Precip	Precip: 0.10
and it w	/III auto	matically	/ †111		18	19	20	21	22	23	24
0.00") fo	or that c	lay.			Precip: T	0.0 Precip	0.0 Precip	0.0 Precip	Precip: 0.36	0.0 Precip	Precip: 0.66
,		,			25	26	27	28	29	30	31
					Precip: T	Precip: 0.10	Precip: 0.02	Precip: 0.11	0.0 Precip		
rget to h	it subm	it.			1	2	3	4	5	6	7

### Significant Weather Report

(both rain and snow)



### Multi-Day Precipitation Form



If you are away on vacation or out of town this is the form for you.

Just put in the dates that you were gone and record what you found in the gauge.

There is no need to file an additional daily report.

# Section Three

### Frequently asked questions



### Do I have to be home everyday to participate in CoCoRaHS? What if I'm away?





**Answer:** No, report when you are able. If you are gone or away on vacation, you may leave your gauge outside and report a multi-day total when you return.

#### What if I don't have a good place to put my gauge?



**Answer:** Few people have ideal locations. do your best. Send site photos if possible to help interpret the results.

# Although hail in the Bahamas is rare, what if it hails when I'm not home?



**Answer:** We still would like your hail report. Report as much info as you can find out from friends and neighbors.

# Do I report morning dew that has collected in my rain gauge?



Answer: No. Dew is not precipitation, but you may note the dew in the comments

#### How long is my commitment to CoCoRaHS?



**Answer:** Ideally, at least one season, but the longer you contribute, the more valuable the data become.

I have an automated weather station with a rain gauge. Can I use that instead of the CoCoRaHS gauge?



**Answer:** In order to accurately compare CoCoRaHS reports, all observers <u>must</u> use the 4-inch CoCoRaHS gauge. Automated rain gauges tend to underestimate a heavy rainfall and do not accurately measure water content of snow. You are welcome to place the automated gauge beside the 4-inch gauge to compare measurements, <u>but report what falls in the 4-inch gauge.</u>

#### Can I file my observations on my mobile device?





Answer: Yes, a CoCoRaHS app is available for both the iPhone and Android Phone

#### Where can I go for additional resources?



Answer: CoCoRaHS has a variety of resources to connect to from its homepage. There are educational YouTube videos, the CoCoRaHS Blog, Messages of the Day, State Newsletters, Measuring Evapotranspiration and a climate guide for Master Gardeners just to name a few. Your can also connect to CoCoRaHS via social media such as Facebook and Twitter.

#### You are now ready to measure precipitation for the CoCoRaHS Network





Thanks for being one of our volunteer observers!