



# CoCoRaHS QA/QC Update 2022

Steve Hilberg  
*CoCoRaHS Project Manager*

Dani Talmadge  
*CoCoRaHS QC*



WERA 1012 Annual Meeting, May 17-19, 2022

# Data QA/QC



- ❖ Quality Assurance (QA)
  - ❖ The planned and systematic activities implemented in a quality system so that quality requirements for a product or service will be fulfilled.
- ❖ Quality Control (QC)
  - ❖ The observation techniques and activities used to fulfill requirements for quality.



# Quality Assurance



- ❖ Training and training materials
- ❖ Field checks on input forms
- ❖ Implement changes to forms, fields and instructions to minimize errors
- ❖ Followup with observers when errors are made





# Quality Assurance

## Recent Changes

- ❖ 2019 - Error checks for snow and snow depth were modified to be more consistent
- ❖ 2021 – Terminology was standardized on input forms (Daily and Multi-Day) and reports
  - ❖ Gauge catch, 24-hour New Snowfall, 24-hour SWE, Snowpack Depth, Snowpack SWE were defined
- ❖ 24-hour Snow to Liquid Ratio and Snowpack Density added to observation confirmation form and daily report listing
- ❖ Correcting and then contacting observers with obvious typo data entry errors with reminder to **“Be sure to check your observation each day after you have entered it to avoid these kind of errors.”**
- ❖ A “repeat offender” report is generated each month and sent to coordinators
  - ❖ Stations with 5 or more tickets in a 3-month period are listed
  - ❖ Coordinators are asked to follow up with observers if needed, and monitor future observations
  - ❖ Has been useful to identify and document chronic problems





## Colorado Stations with Five or More QC Tickets

2/1/2022 to 4/30/2022

### Station

Station	Error Date	Type	Error Description	Status	Submitted by
CO-JF-470	2/8/2022	DATE	Observer reported 0.11 for new gauge catch and 1.1 for new snowfall. QPE data and surrounding reports of 0.00's indicate this could be a date error. Changed report of 0.11 and 1.1 to NA until observer can be contacted to verify	OPEN	Talmadge
	2/11/2022	DATE	Observer reported 0.05 for new gauge catch and 4.2 for new snowfall. QPE data and surrounding reports of 0.00's indicate this could be a date error. Changed reports of 0.05 and 4.2 to NA until observer can be contacted to verify	OPEN	Talmadge
	3/6/2022	DECIMAL	Observer reported 2.30 for new gauge catch. This is high and appears to be a decimal typo. Changed report of 2.30 to NA until observer can be contacted to verify.	OPEN	Talmadge
	3/7/2022	FZERO	Observer reported 0.00 for new gauge catch. QPE data and surrounding reports of precip indicate this could be a date error or a typo. Changed report of 0.00 to NA until observer can be contacted to verify	OPEN	Talmadge
	3/29/2022	DATE	Observer reported 0.29 for new gauge catch and 2.2 for new snowfall. QPE data and surrounding reports of 0.00s indicate this could be a date error or a multi-day report. Changed report of 0.27 and 2.2 to NA until observer can be contacted to verify.	OPEN	Talmadge
Station	Error Date	Type	Error Description	Status	Submitted by
CO-PK-109	2/2/2022	SNOWPR	Observer reported 4.00 for new gauge catch. This is high and it appears new snowfall was entered by mistake. Changed gauge catch of 4.00 to NA until observer can be contacted to verify	OPEN	Talmadge
	2/17/2022	SNOWPR	Observer reported 4.00 for new gauge catch. This is high and it appears snowfall was entered by mistake. Also notes provided indicate observer was out of town. Changed gauge catch of 4.00 to NA until observer can be contacted to verify.	OPEN	Talmadge
	3/6/2022	SNOWPR	Observer reported 2.50 for new gauge catch. This is high and it appears snowfall was entered by mistake. Changed gauge catch of 2.50 to NA until observer can be contacted to verify.	OPEN	Talmadge
	3/8/2022	DATE	Reported 2.00 for new gauge catch and 2.0 for new snowfall with a melted core of 0.15. Surrounding reports of 0.00's indicate this could be a date error and a typo. Changed reports of 2.00 and 0.15 to NA until observer can be contacted to verify.	OPEN	Talmadge



# Overview of CoCoRaHS QA/QC



- ❖ The document “CoCoRaHS Data Quality Assurance and Quality Control” describes the automated and manual processes for QA/QC. This can be found in the FAQ/Help section of the web site. It also describes the quality controls checks by NCEI for GHCN-D precipitation data.

Community Collaborative Rain, Hail & Snow  
*“Because every drop counts”*

Home | Countries | States | View Data | Maps      My Data | My Account

**FAQ / Help**

General Information	Frequently Asked Questions
<a href="#">About the Network</a>	<a href="#">General FAQ</a>
<a href="#">How to get Involved</a>	<a href="#">Data Entry FAQ</a>
<a href="#">Welcome to CoCoRaHS!</a>	<a href="#">Mapping FAQ</a>
	<a href="#">Viewing Data FAQ</a>
	<a href="#">How CoCoRaHS does QC</a>

Main Menu

- [Home](#)
- [About Us](#)
- [Join CoCoRaHS](#)
- [Contact Us](#)
- [Donate](#)

Resources

- [FAQ / Help](#)
- [Education](#)
- [Training Slide-Shows](#)
- [Videos](#)
- [Condition Monitoring](#)
- [Evapotranspiration](#)
- [Soil Moisture](#)



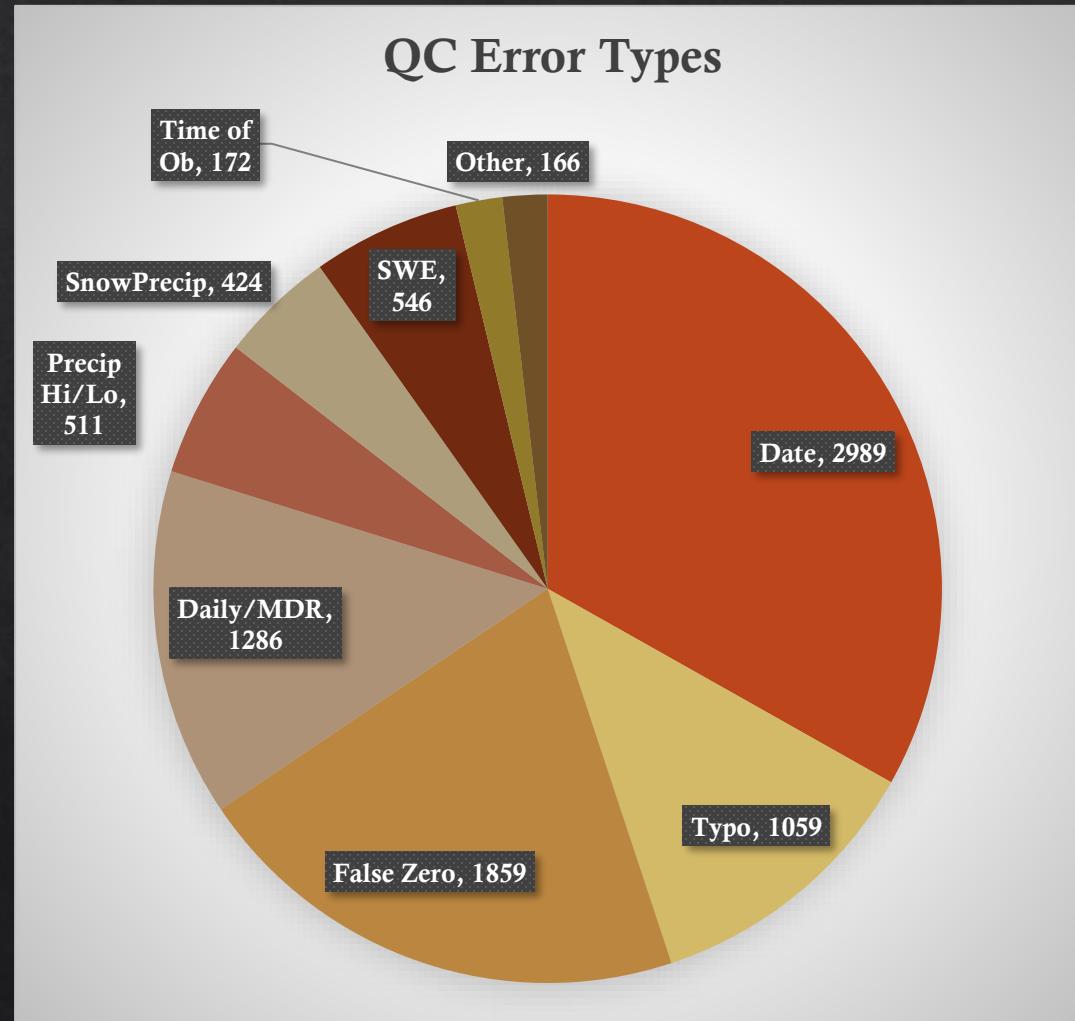


# Data Quality Control

- ❖ Big issue this year (and most years)
  - ❖ Date errors
    - ❖ Twice as many in the past 12 months than previous 12 months
    - ❖ Observers enter data for the wrong date, especially when “catching up”
      - ❖ The input form operation does not make it easy to enter data for a number of days in sequence
    - ❖ Observers mistakenly think data should be entered for the calendar day it occurred
      - ❖ This is a training issue
      - ❖ Unless caught and corrected with the observer, this will continue
      - ❖ Sometimes easy to spot, sometimes not.
  - ❖ Observers changing back obs to incorrect values



# Data Quality Control





# Data Quality Control

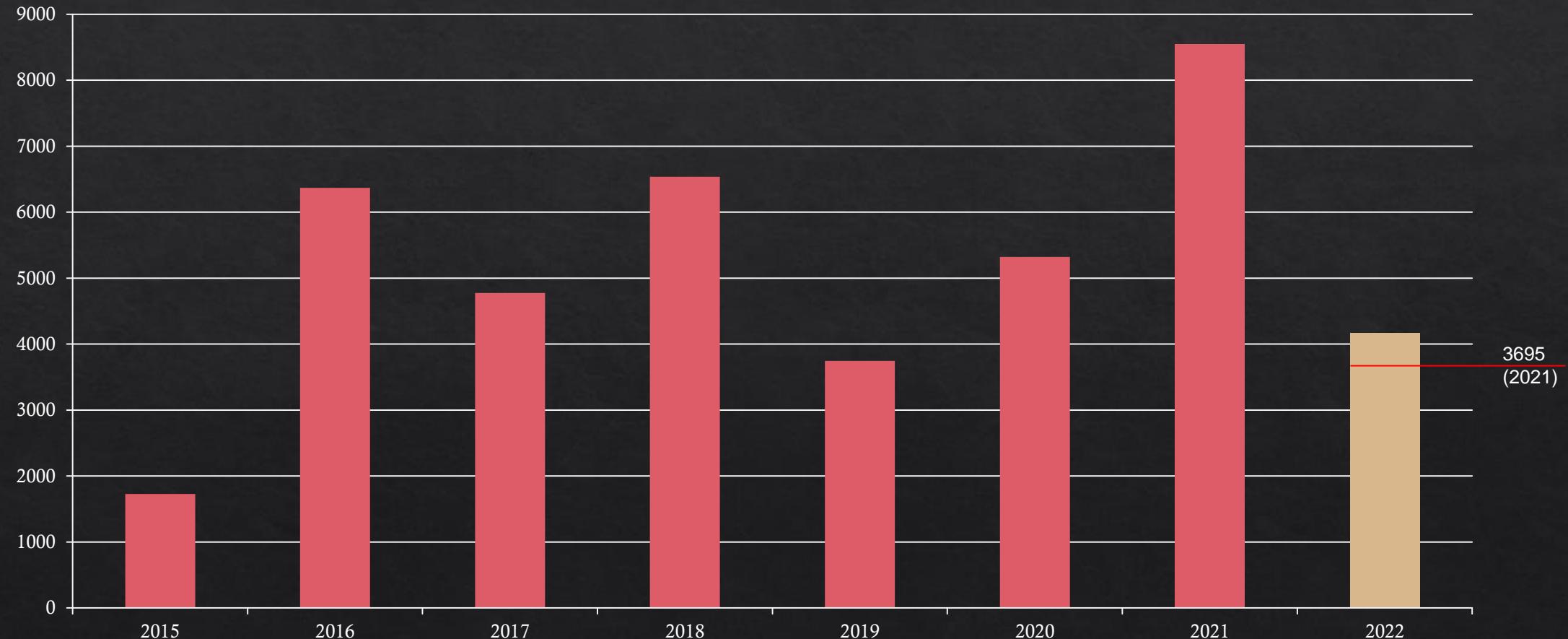
- ❖ Date errors are common
  - ❖ Wrong date
  - ❖ Transposed reports
- ❖ Many False Zeros relate to date errors and multi-day reports
- ❖ Multi-day totals entered as a daily report - still too many
- ❖ Many time of ob errors are likely undetected and underreported





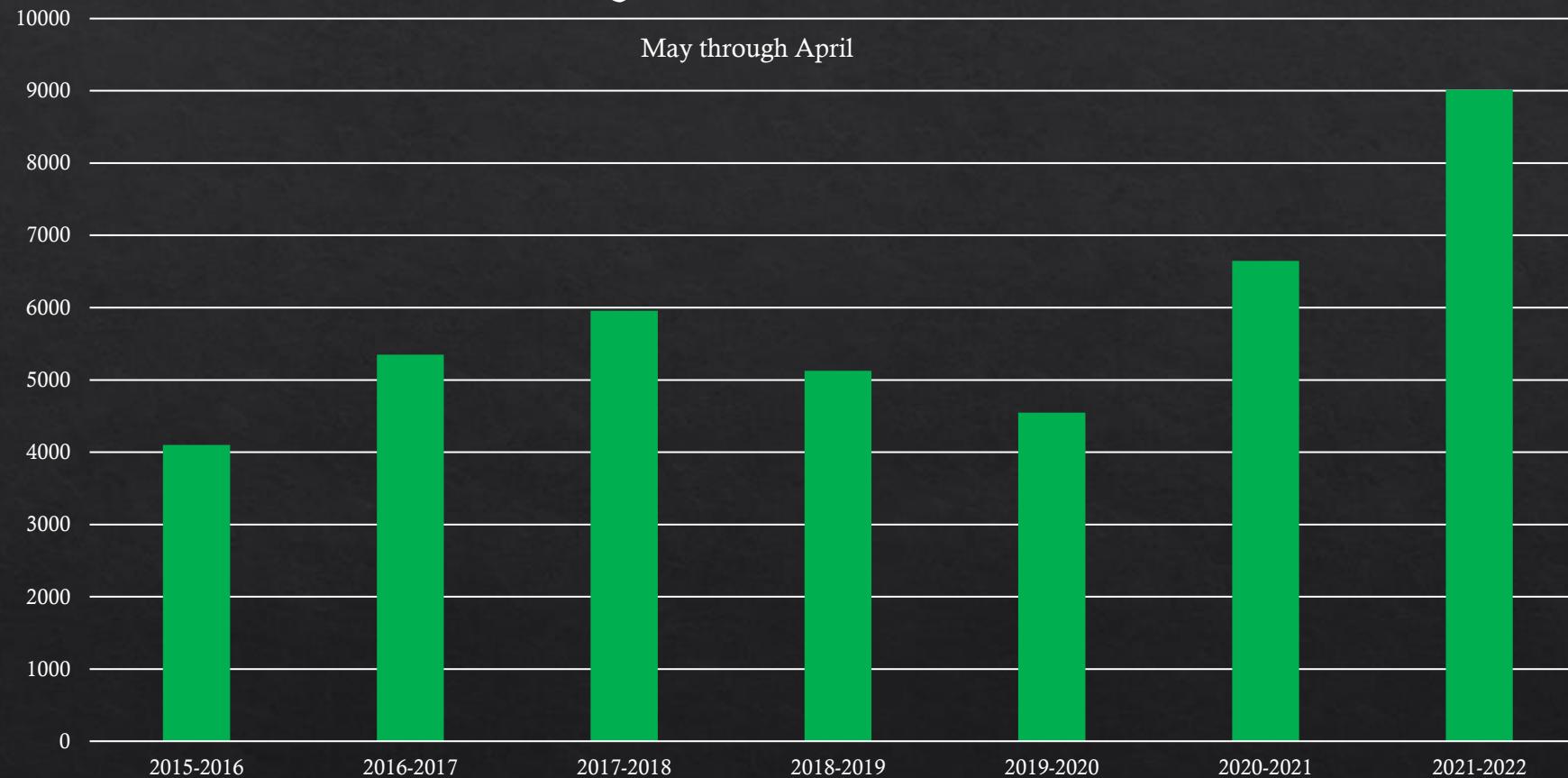
## Annual QC Tickets

2015-2022



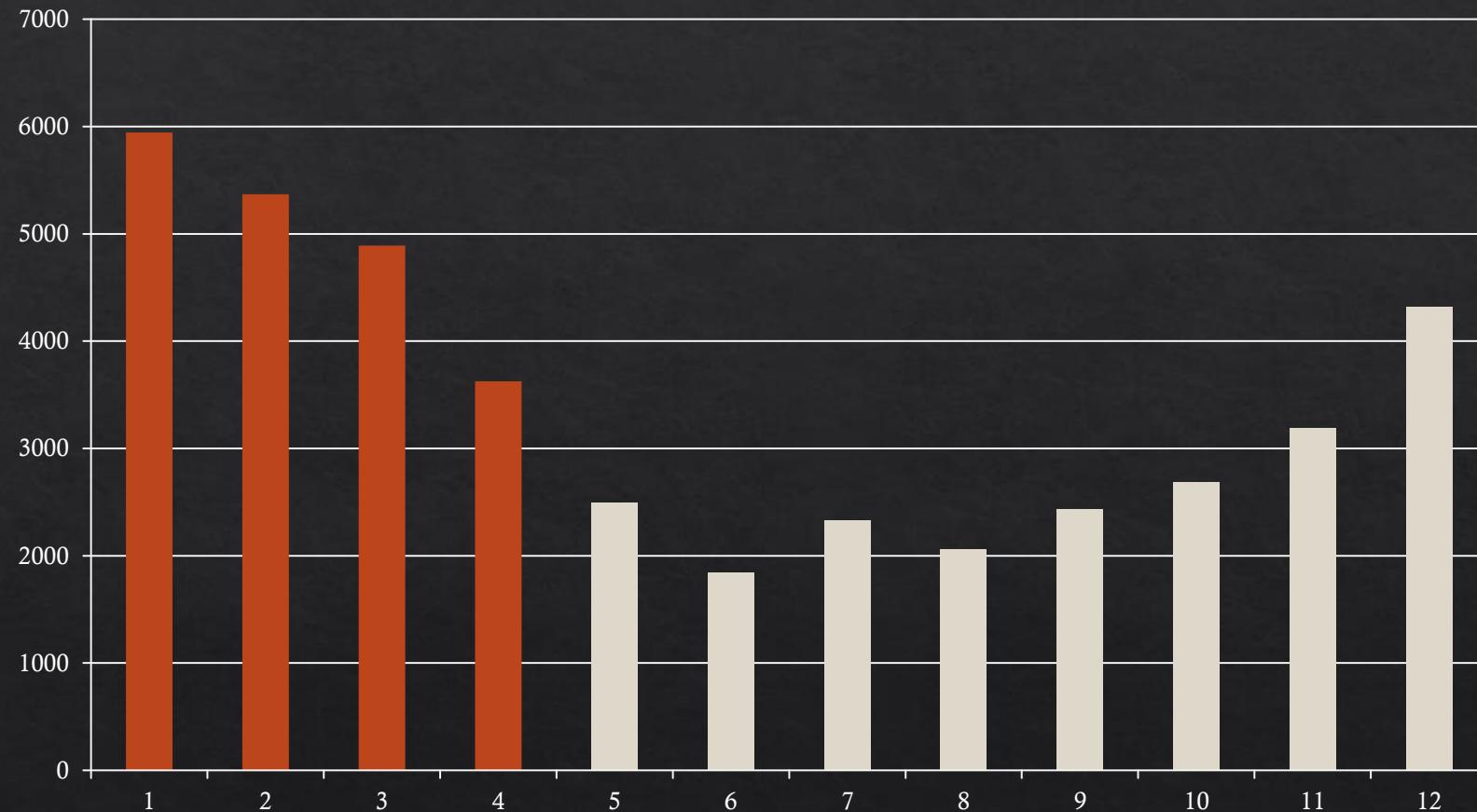


## QC Ticket Total





## QC Tickets by Month 2015-2022





# QA/QC Challenges

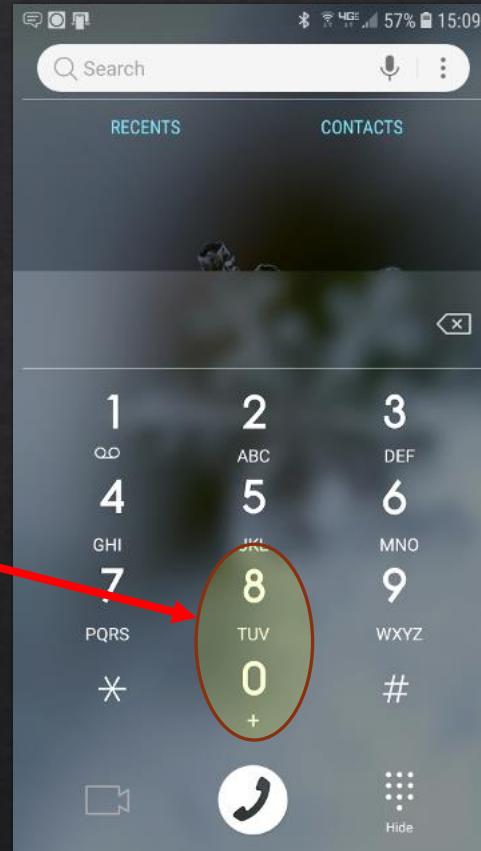
- ❖ Keeping up – more observations = more potential errors
- ❖ The mobile app
  - ❖ Observer exposure to CoCoRaHS is limited to entering and editing precipitation observations
  - ❖ Observers will restore erroneous values thinking they forgot to enter something because they don't readily see their notes (where we indicate the error).
  - ❖ “New” types of errors, e.g. “crazy eights”





# The “Crazy Eights” Error

- ❖ Specific to the mobile app
- ❖ 0.08, and less frequently 0.80 or 8.00, in a field of zeros on the map
- ❖ This results from a "fat finger" entry using the mobile app
- ❖ Treated the same as typo error. Ob is corrected when obvioud and observer notified





# QA/QC Challenges

- ❖ Enlisting coordinators to consistently help with QC
- ❖ Getting observers to respond to questions about their observations so they can be corrected or verified
- ❖ Designing and implementing input form QC checks that prevent errors without degrading the user experience on the web and mobile app
- ❖ Improving training materials (and delivery) to address the major sources of error
- ❖ Re-design the QCTS so it is easier to use and integrated with the CoCoRaHS database (in the planning stages)





# Thank you!

