

Using Community Collaborative, Rain, Hail, and Snow Network (CoCoRaHS) to Engage Incarcerated Students in the Atmospheric Sciences



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31st Conference on Education

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CoCoRaHS was born in response to the 1997 Fort Collins, Colorado Flood



STORM TOLL

Deaths - 5 confirmed
Injuries - 40
Missing - 16
Rescued - 160

Damages - Tens of millions of dollars at Colorado State University, \$1.5 million to \$2 million to city roads and bridges; \$1 million to city parks and trails; no estimate for private property.

Source: Emergency Officials
All information as of 1 a.m. today

Wednesday

FORT COLLINS
COLORADOAN

City death toll at 5; damage in millions



"I thought I was dead a few times"

FLOOD
p. 57

CSU's book losses speak volumes



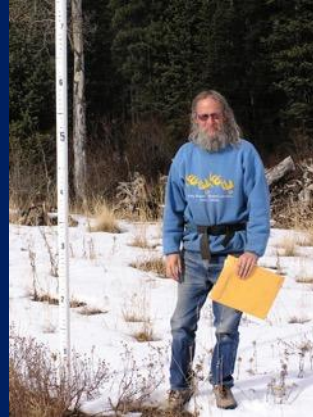
Rainfall breaks 20-year record



July 30th 1997



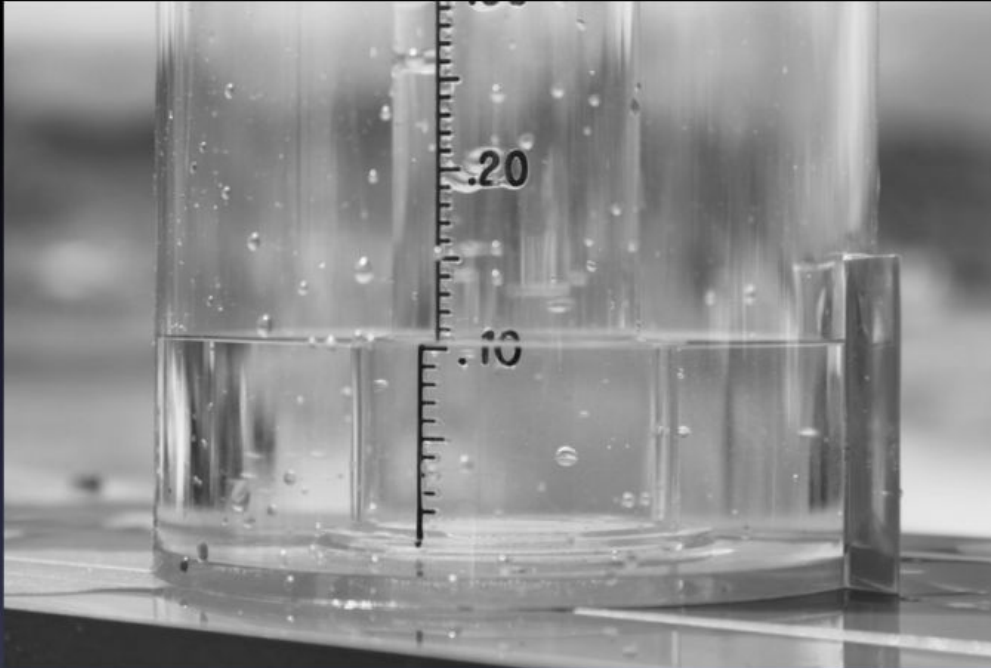
Volunteers of all ages and backgrounds



Observers are trained and take daily measurements of precipitation in their backyards.

25,000 active observers in the network

Who uses CoCoRaHS Observations?



1. Weather Forecasters
2. Hydrologists
3. Water management
4. Researchers
5. Agriculture
6. Climatologists
7. Insurance Industry
8. Engineering
9. Recreation
10. Many others

*"CoCoRaHS is **CRITICAL** (my emphasis) to hazardous weather operations at the NWS Austin-San Antonio Weather Forecast Office. We utilize the daily precipitation reports to produce maps such as the one attached, which are used extensively by the media (directly shown on TV broadcasts), our emergency management partners (for briefing officials and planning search and recovery operations), and the general public."*

Jon Zeitler – NWS Austin-San Antonio Weather Forecast Office

'Inside' Education

- ✓ What it's like teaching inside a youth correctional facility
- ✓ How can we engage traditionally underserved, credit deficient students in STEM through Citizen Science



The
DIRECTION in
which **EDUCATION**
STARTS a man
will **DETERMINE**
his **FUTURE**
LIFE
- Plato



Collaboration is *essential*
for success in education for
incarcerated students



How Do Students end up Here Anyway?



6,830

Total youth referred for criminal offenses in 2019 in Oregon.

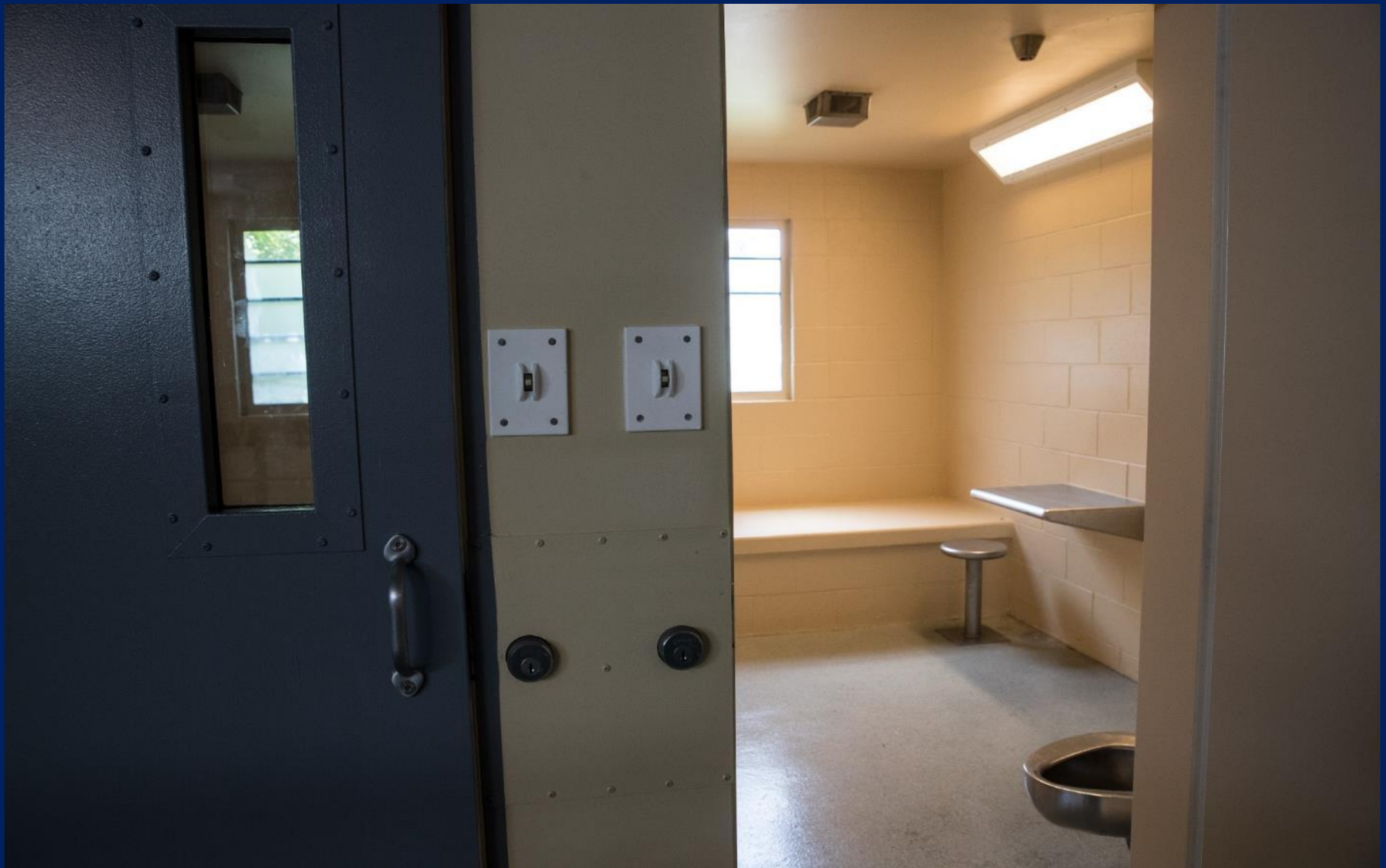
OJJD 2022



- **Charges that my current students are facing right now range from status offenses to serious felony level crimes.**
 - Status offenses include truancy, running away from home, violating curfew, underage use of alcohol.
 - Pending felony charges include murder, attempted murder, manslaughter, robbery, burglary, assault, kidnaping and auto-theft.
 - Many of my students are highly gang involved, some are being treated for drug/alcohol addiction.
 - Most youth are served at the county level, unless all other options have been exhausted.

Donald E. Long Juvenile Detention Center





- ❑ Barriers for both students and teachers:
- ❑ Teachers rotate into classrooms on living units.
- ❑ Limited resources, including classrooms without windows or staffing to go outside.
- ❑ Critical content coursework is needed for students to be successful as they return to community.



**“Inside School”
Classroom at Donald E.
Long Detention**



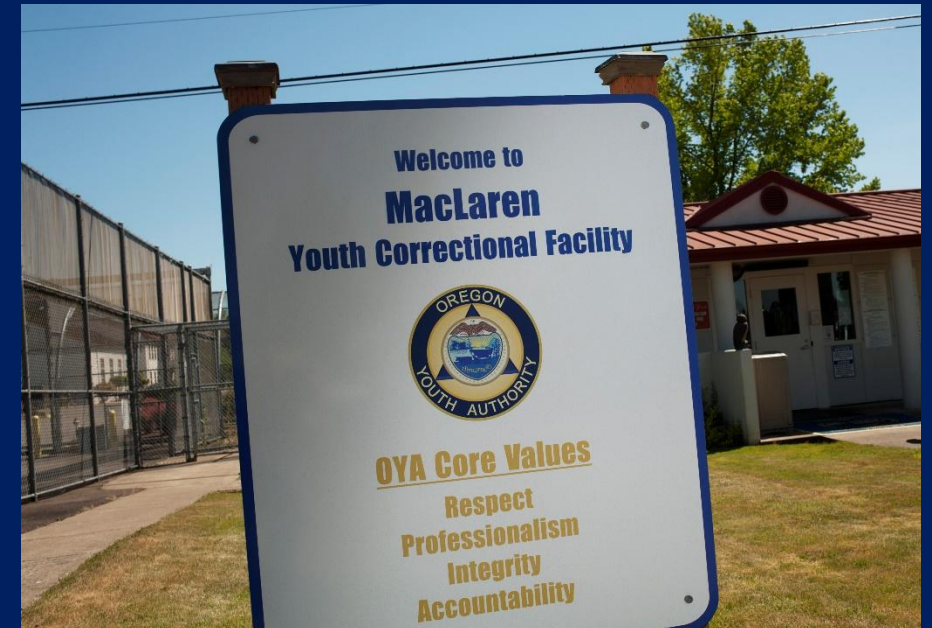
Oregon Youth Authority - State



- Responsible for youth ages 12 to 24 who commit crimes before age 18
- Serve youth who are unsuccessful at the county level, who need more services than the county can provide, or who commit very serious crimes.

MacLaren Youth Correctional Facility

OYA Close-Custody Facilities



OYA, MacLaren Youth Correctional Facility School- Lord High School

- *Completed my Masters Degree while working full time at Oregon Youth Authority's William P. Lord High School.*



Room 15 was my “intake” classroom.

Long term was behind locked gates on the other side of the school.

Youth are separated during their transition from entry in to the facility – this is for safety & security of all students and youth, but can be a barrier in education.



Introducing Students to CoCoRaHS at MacLaren Youth Correctional Facility



Students at OYA were excited to participate in my class using the CoCoRaHS Rain Gauge.

As part of class they were trained, and “certified” as official rain gauge collectors and weather spotters in partnership with National Weather Service PDX.

- Youth here were interested in wildland fire behavior because of the opportunity to transition to Camp Riverbed to fight fire.
- I taught fire behavior as a former wildland fire fighter and fuels boss.
- This provided opportunity for more hands- on tools and continued to build academic skills in Science and Math as well as increased engagement.
- Supported by OYA management = staffing



First Significant Weather-Event & Report & the Impact it had..

A thunderstorm which produced the pictured rain in about 11 min!



National Weather Service in Portland issued a local flash flood alert



Tyree sent an email thanking students for contributing their data.

First time Students understood their data was truly being used.

View Data : View Significant Weather Report US Units ▼

Significant Weather Report

Station Number: **OR-MN-77** Station Name: **Woodburn 1.8 ENE**

Observation Date: 3/27/2019 5:41 PM

Submitted: 3/27/2019 5:47 PM

Notes: Extreme rain shower and rolling thunder started @ 1741. Slowing at 5:44.

Precip Duration Minutes: 4

Gauge Catch: NA

Total Gauge Catch: NA

Snowfall: NA

Snowpack Depth: NA

Flooding: Unusual

View Data : View Daily Precipitation Report US Units ▼

 [View on Map](#) ([Interactive](#) | [Static](#))

Daily Precipitation Report

Station Number: **OR-MN-77** Station Name: **Woodburn 1.8 ENE**

Observation Date: 3/27/2019 8:00 AM

Submitted: 3/27/2019 5:39 PM

Gauge Catch: 2.02 in.

Notes: Read at 1700- Active thunderstorm with cloud to ground lightning strike.

Snow Information

24-hr Snowfall  NA

24-hr Snowfall SWE  NA
(Snow Water Equivalent)

24-hr Snowfall SLR  NA
(Snow to Liquid Ratio)

Snowpack Depth  NA

Snowpack SWE  NA
(Snow Water Equivalent)

Snowpack Density  NA

Duration Information

Precipitation Began --

Precipitation Ended --

Heavy Precip Began --

Heavy Precip Lasted --

Duration Time Accuracy --

Additional Information

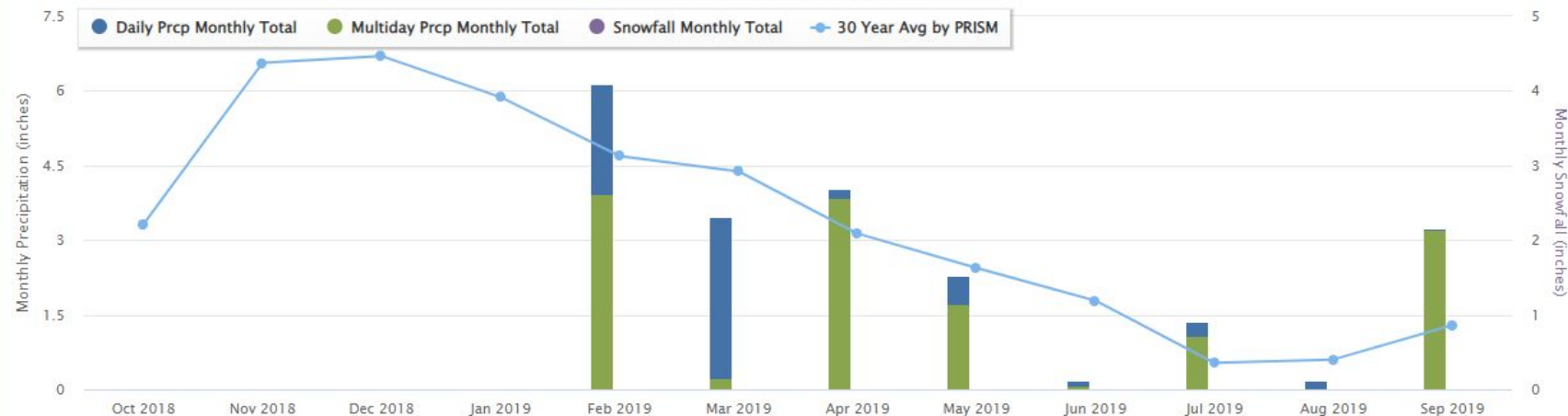
Flooding: Minor

Additional Data Recorded: Yes

Viewing CoCoRaHS Data

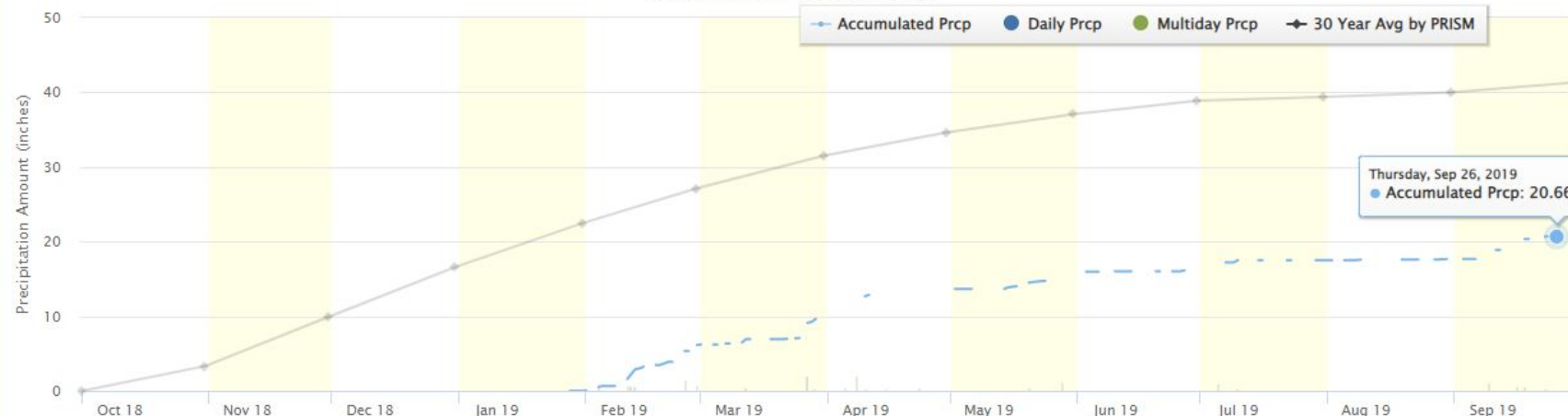
Monthly Precipitation for the 2019 Water Year (Oct 2018 – Sept 2019)

Station: OR-MN-77 Woodburn 1.8 ENE



2019 Water Year (Oct 2018 – Sept 2019) Accumulated Precipitation

Station: OR-MN-77 Woodburn 1.8 ENE

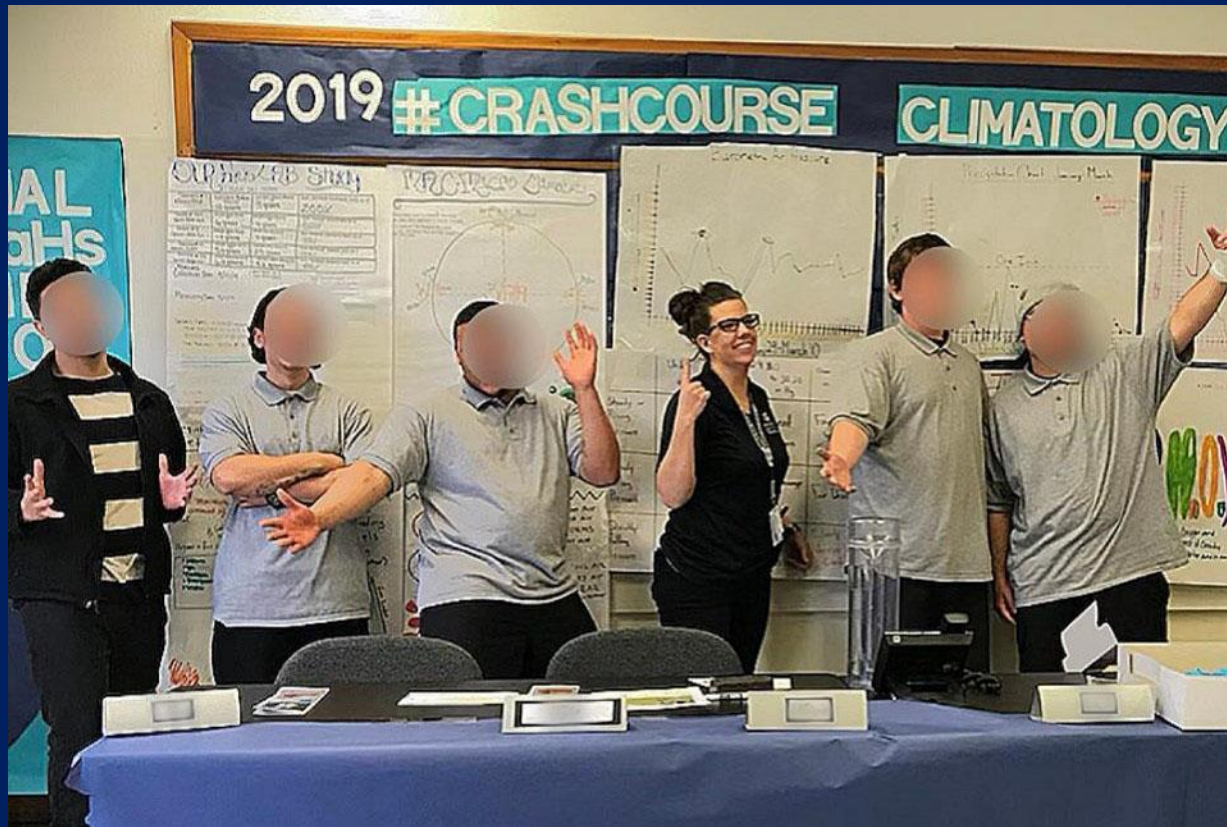




After the students received the email from the PDX NWS, regarding how their data helps the NWS to issue warnings for the area, they became very proud of the CoCoRaHS project, and felt a deep sense of pride in the project.

Youth across campus wanted to “do that rain gauge class”.





For their final project in my class, students wanted to simulate a “climate summit” using their data collected over the year and information they learned.

These student’s presented their collected data to a room full of Probation Officers, Treatment Managers, Security Staff, Teachers, Principal and Facility Living Unit managers.

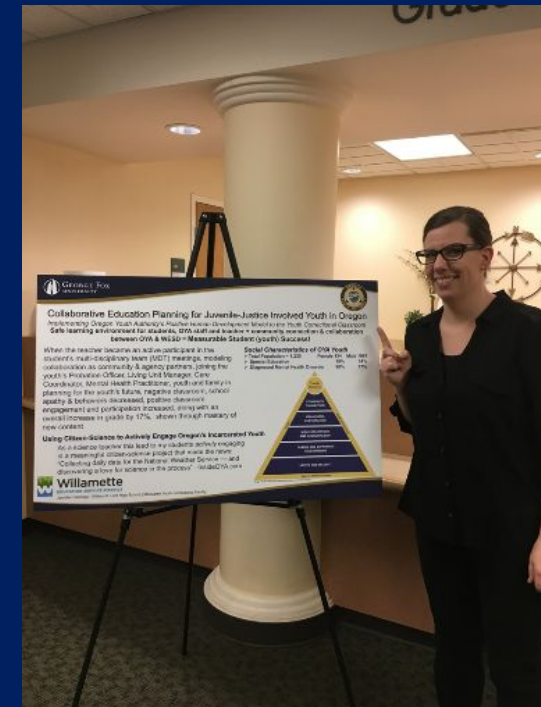
*2019-2020 CoCoRaHS Station Observers
MacLaren YCF*





**#Class of 2019
Valedictorian
My student, A.V
who went on to be
a fire fighter.**

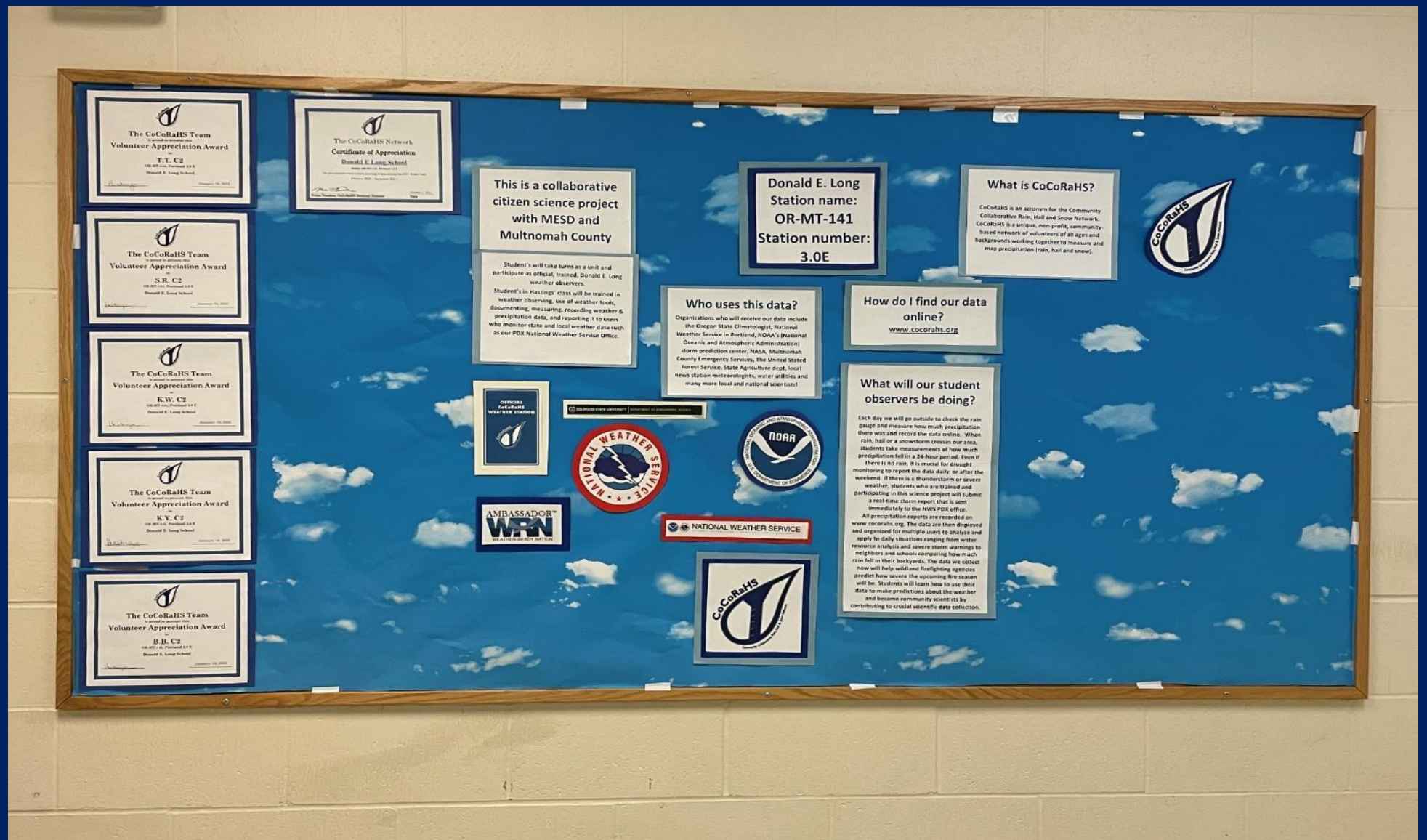
- This student went through two grades, that's over 12 credits in Oregon, and graduated on time as class of 2019 Valedictorian and went to Riverbend to become a firefighter.
- OYA youth were vital to fighting fires in Oregon the last two years.
- To date, 6 out of the 8 students in the first STEM class I started collaborating with NWS & CoCoRaHS, have been accepted to the OYA fire transition camp and have been fighting Oregon's fires.



Also, Class of 2019! I earned my Masters Degree, along with my own students.

Lesson learned from OYA's Sg Wx report-

- True engagement and academic rigor occurred when students felt seen.
- The email from the NWS PDX helped them to understand that their time and effort was truly contributing to our science community.
- This was instrumental to their ability to gain more credit.



Noah Newman at CSU created a special CoCoRaHS Certificate for students at Donald E. Long School. Students who participate, contribute, pass a test, communicate collected data, proudly earn a spot on the “Wx wall of fame”.

#WeatherReady #WeatherHomies



- ❑ The NOAA Weather Ready Nation Ambassador program creates the opportunity for collaboration between students and the NWS PDX.
 - ❑ Students are able to reach a wider variety of communities with their “warnings and messages”
- ❑ Structuring STEM classes for students around “real life” citizen- science projects has bridged a huge gap.
- ❑ Office of Juvenile Justice and Delinquency has repeatedly found and called for, “highly qualified” content- specific secondary educators to teach math and science in close custody education settings.
- ❑ There is a link between lagging skills in math & science during confinement and future youth and adult recidivism rates.
- ❑ Citizen science such as the WRNA and CoCoRaHs provides the opportunity for “real life” learning the content of my classes (primarily atmospheric sciences) to engage with the weather community as they say.

And then, they wrote “Slaps”

The National Weather Service's
Weather Ready Nation Ambassador Program Presents

WRN WEATHER SLAPS

Written, produced & performed by our Weather Ready National Ambassadors from the

Donald E. Long School

Portland, OR

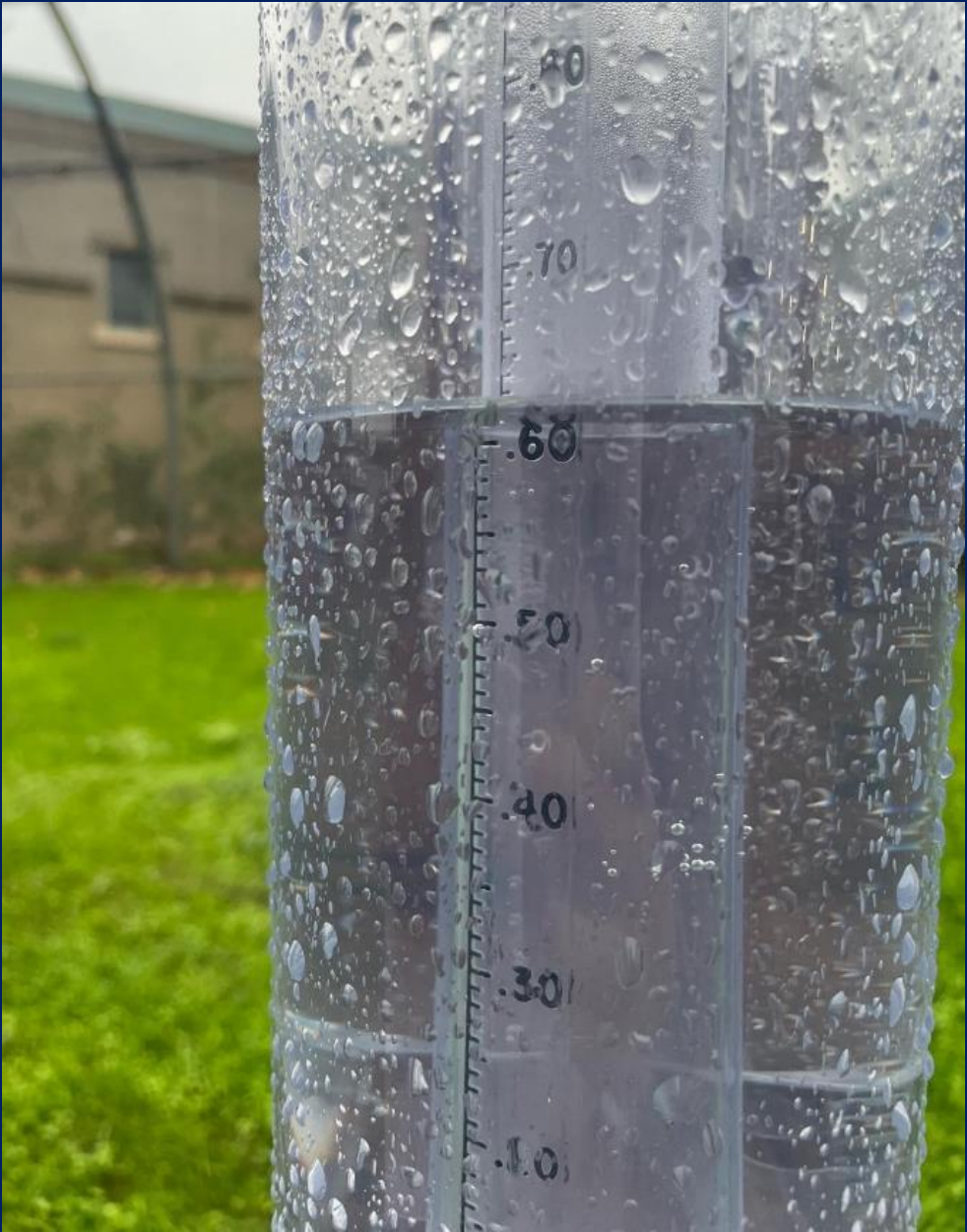


<https://www.youtube.com/watch?v=Et6GlaviPYc>





Donald E. Long Station OR-MT-141 Portland 3.0 E Precipitation collected over winter break.



The app is extremely valuable to the work I do- It allows me to enter data in real time, outside with my students, as part of our routine.

CoCoRaHS
The Rain, Hail & Snow Network

OR-MT-141
Portland 3.0 E

Multi-Day History

| | | |
|-------|-------|-------|
| 01/08 | 01/11 | 0.19" |
| 12/18 | 01/03 | 7.61" |
| 12/05 | 12/07 | 0.88" |
| 12/04 | 12/07 | 0.88" |
| 11/24 | 11/29 | 0.79" |
| 11/21 | 11/22 | Trace |
| 11/13 | 11/15 | 0.58" |
| 11/11 | 11/12 | 2.74" |
| 11/06 | 11/08 | 0.60" |
| 10/28 | 11/01 | 0.65" |
| 10/23 | 10/25 | 0.89" |



**Where
do we
go
Now?**



- ✓ Provide students and educators opportunities to work with hands-on science labs and projects- weather impacts us all!
- ✓ Create courses in collaboration with community-driven, “real-life” citizen science projects such as CoCoRaHS and National Weather Service’s Weather Ambassador Initiative.
- ✓ As a local chapter of AMS, be available and accessible for new members of all backgrounds including a resource for educators as part of the Oregon WX community!
- ✓ Provide on-going, long term support, education and job pathways for youth with a passion for atmospheric and climate sciences- we are their community!

#AMS2022



#AMS2022
#LocalChapter



Thank You

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@Alt_ed_ology



@alt_ed_ology



Thank you to the following for your collaboration!

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American Meteorological Society.