PRISM Update

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PRISM Climate Group
Northwest Alliance for Computational Science and Engineering
College of Engineering
Oregon State University

WERA-1012
17 May 2022
Back in Estes Park, CO!!

USDA Risk Management Agency

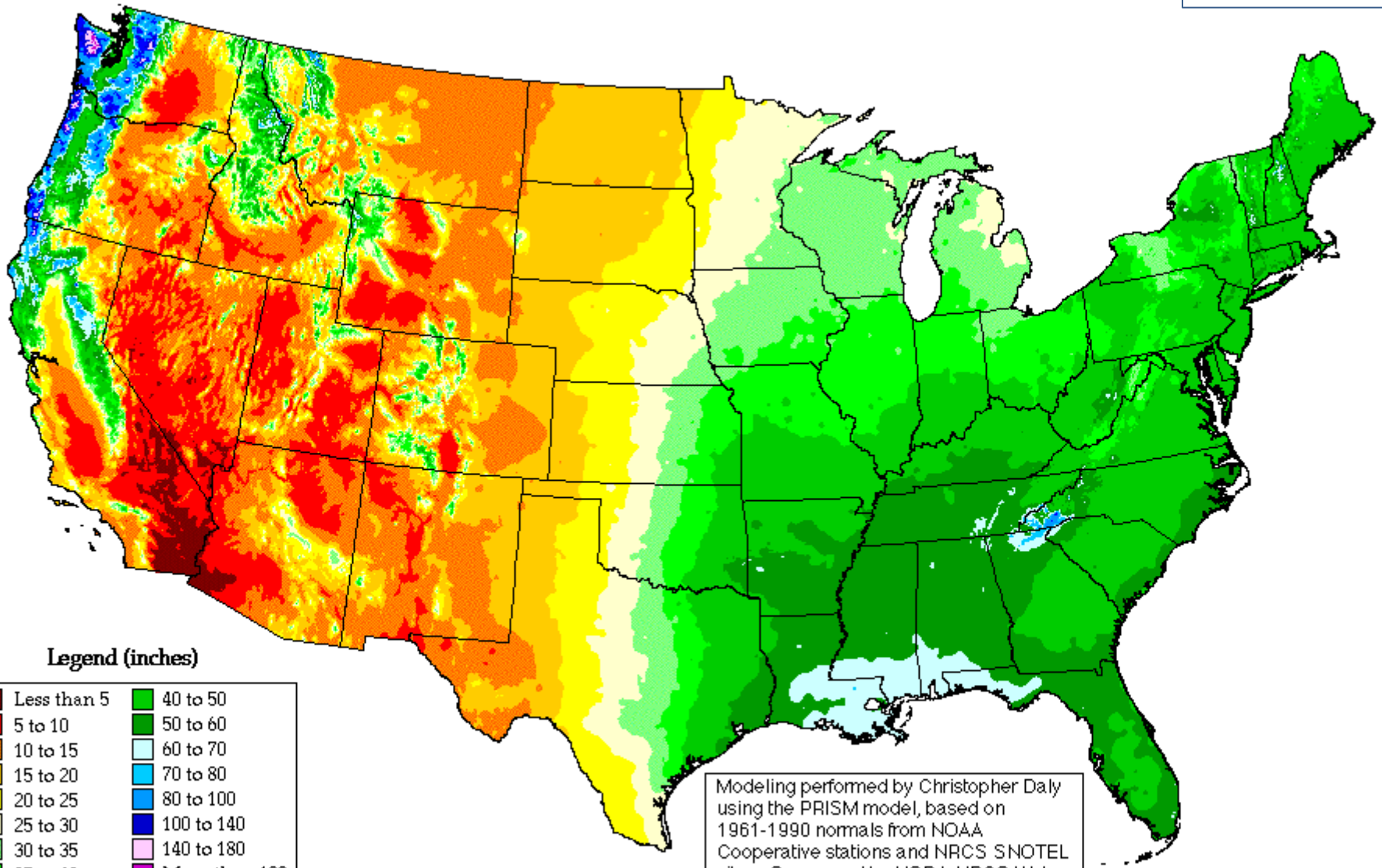
Topics

- PRISM 1991-2020 precipitation normals
- How are volunteer networks contributing to the PRISM precipitation normals?
- New challenges in incorporating CoCoRaHS data into the normals

Annual Average Precipitation

United States of America

1961-1990
(2000)



Legend (inches)

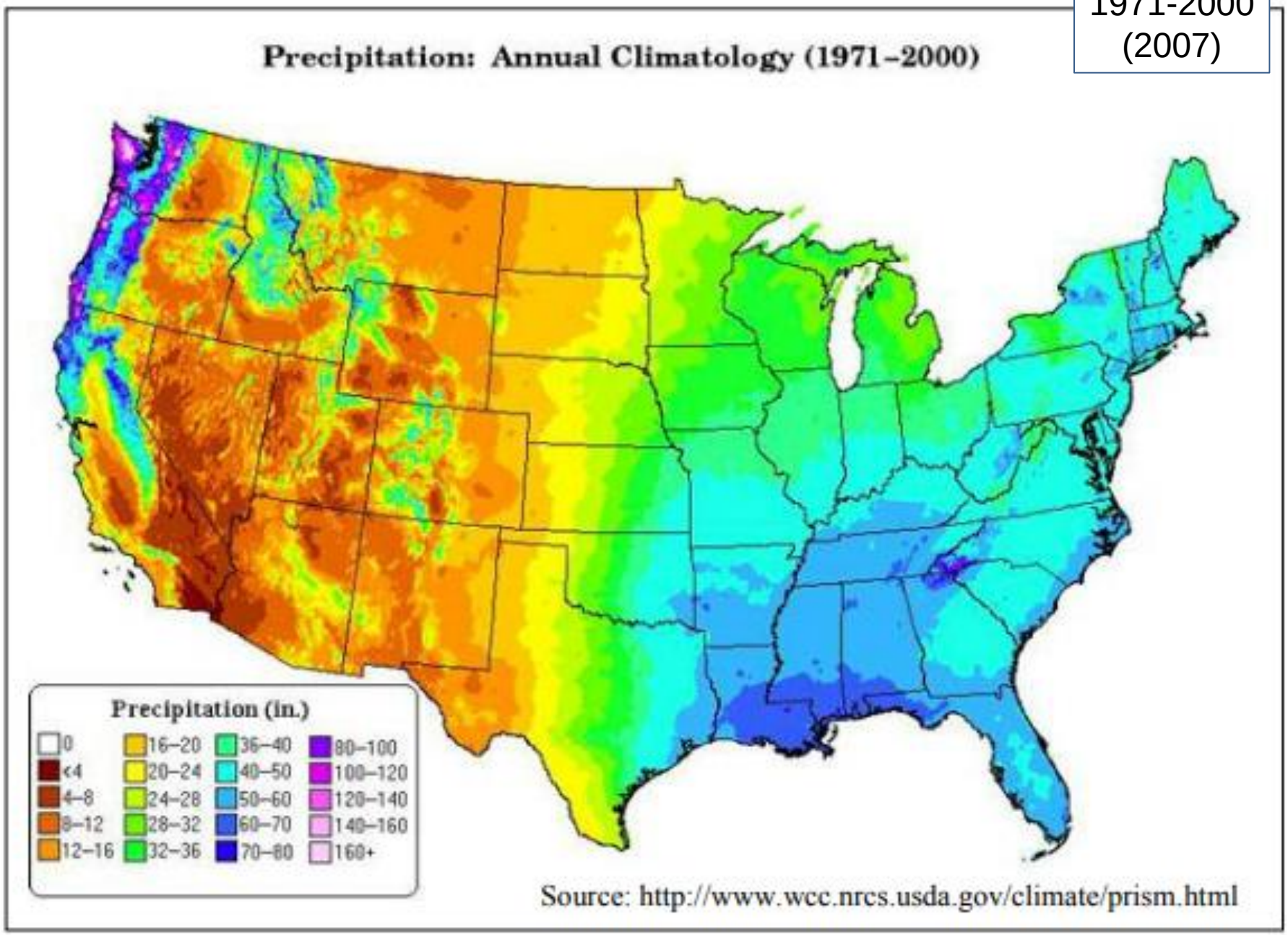
Less than 5	40 to 50
5 to 10	50 to 60
10 to 15	60 to 70
15 to 20	70 to 80
20 to 25	80 to 100
25 to 30	100 to 140
30 to 35	140 to 180
35 to 40	More than 180

Period: 1961-1990

Modeling performed by Christopher Daly using the PRISM model, based on 1961-1990 normals from NOAA Cooperative stations and NRCS SNOTEL sites. Sponsored by USDA-NRCS Water and Climate Center, Portland, Oregon.

Oregon Climate Service
George Taylor, State Climatologist
(541) 737-5705

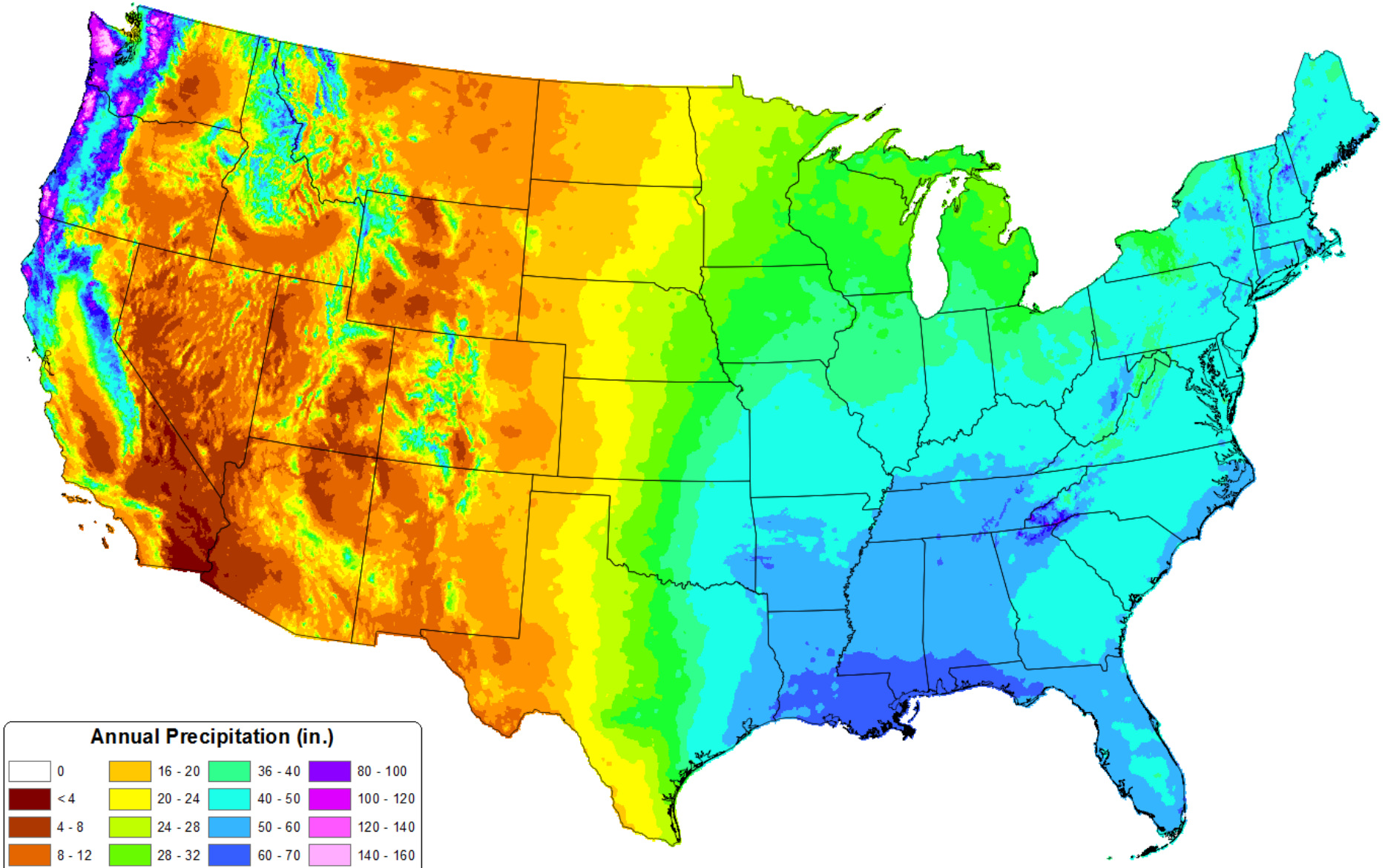
1971-2000
(2007)



30-yr Normal Precipitation: Annual

Period: 1981-2010

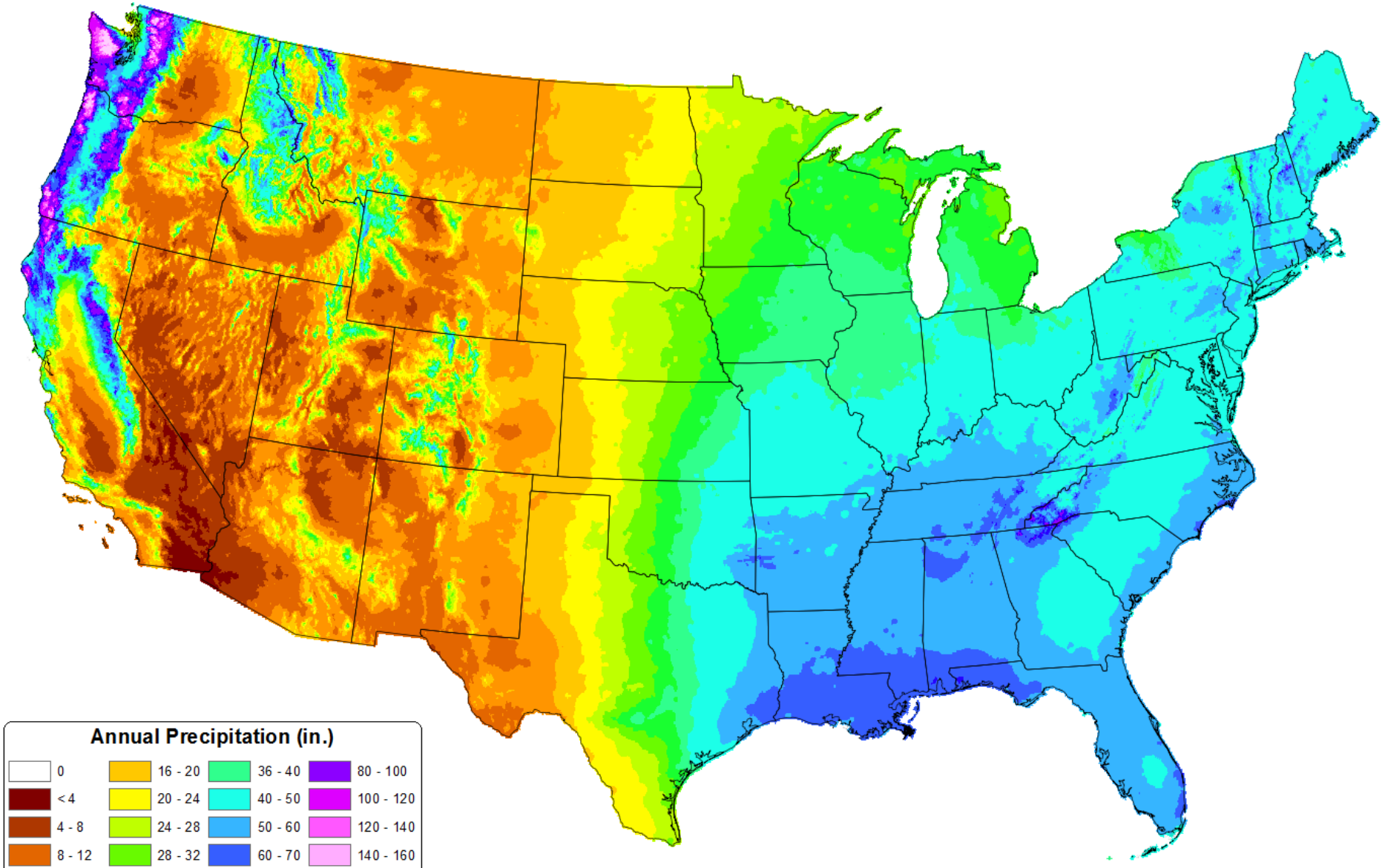
1981-2010
(2014)



30-yr Normal Precipitation: Annual

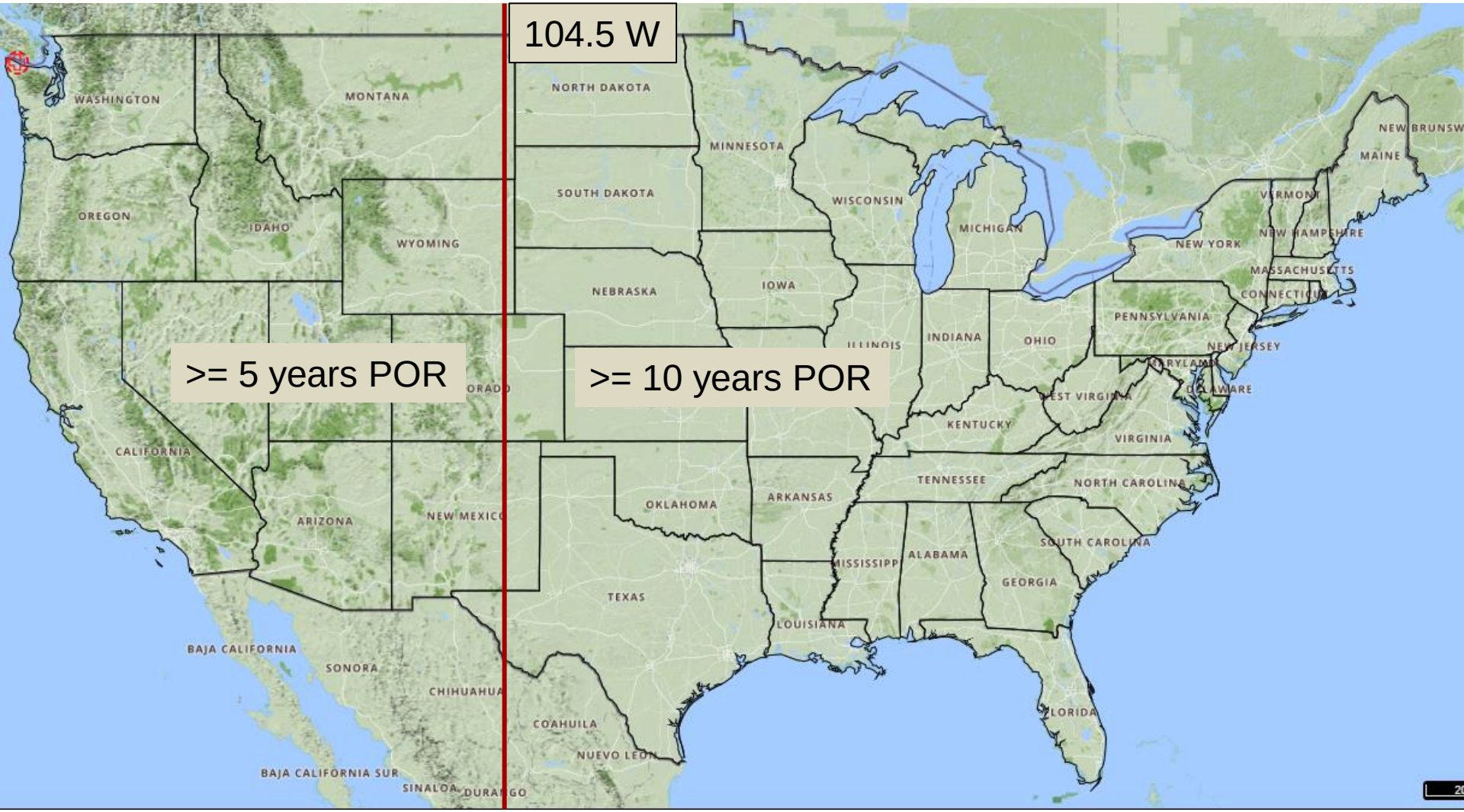
Period: 1991-2020

1991-2020
(2021)



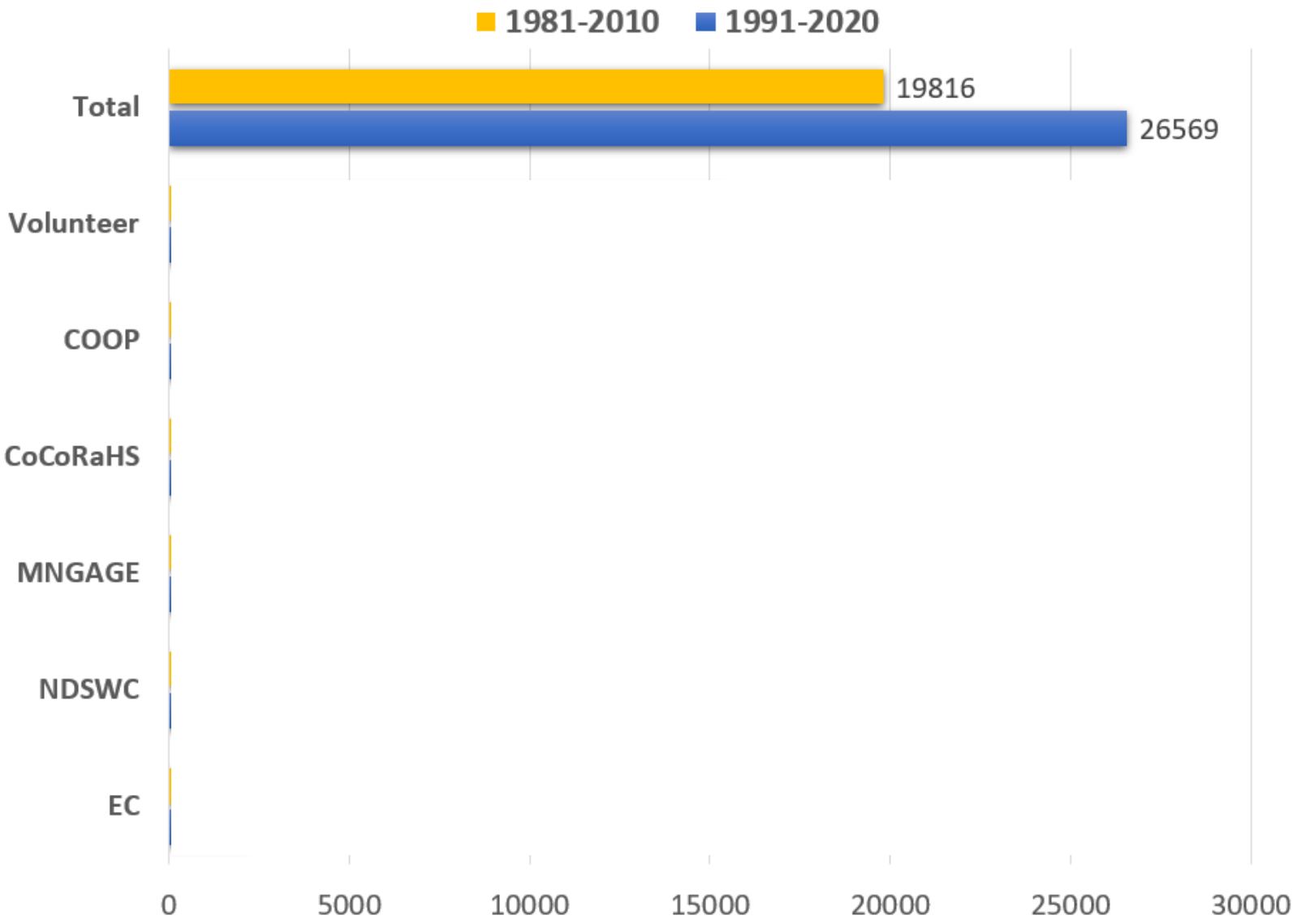
Period of Record Criteria for Inclusion in the 1991-2020 Normals

Calculated for Each Month Separately



Stations Used in PRISM 1981-2010 vs 1991-2020 Precipitation Normals

(At least one qualifying month)



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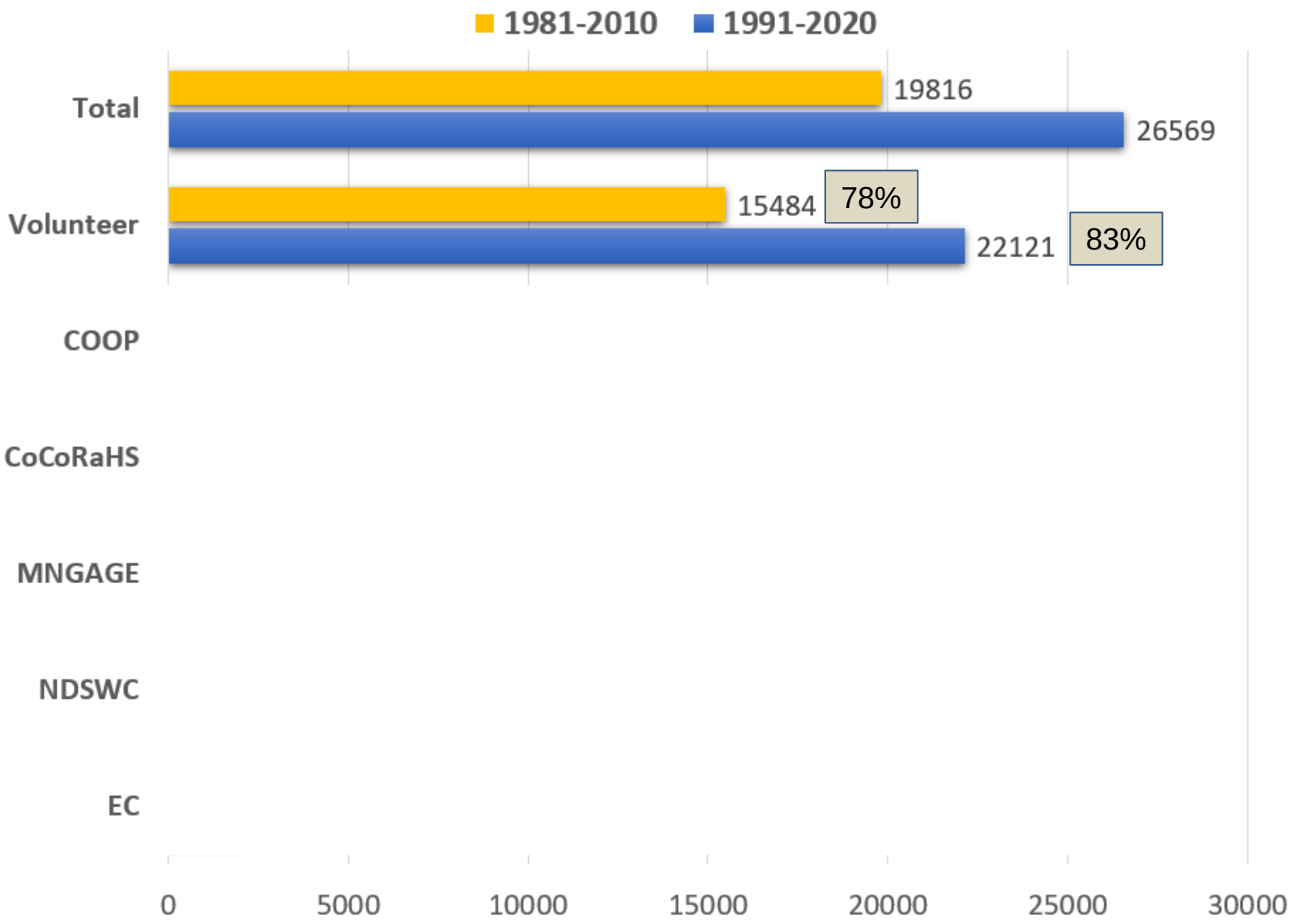

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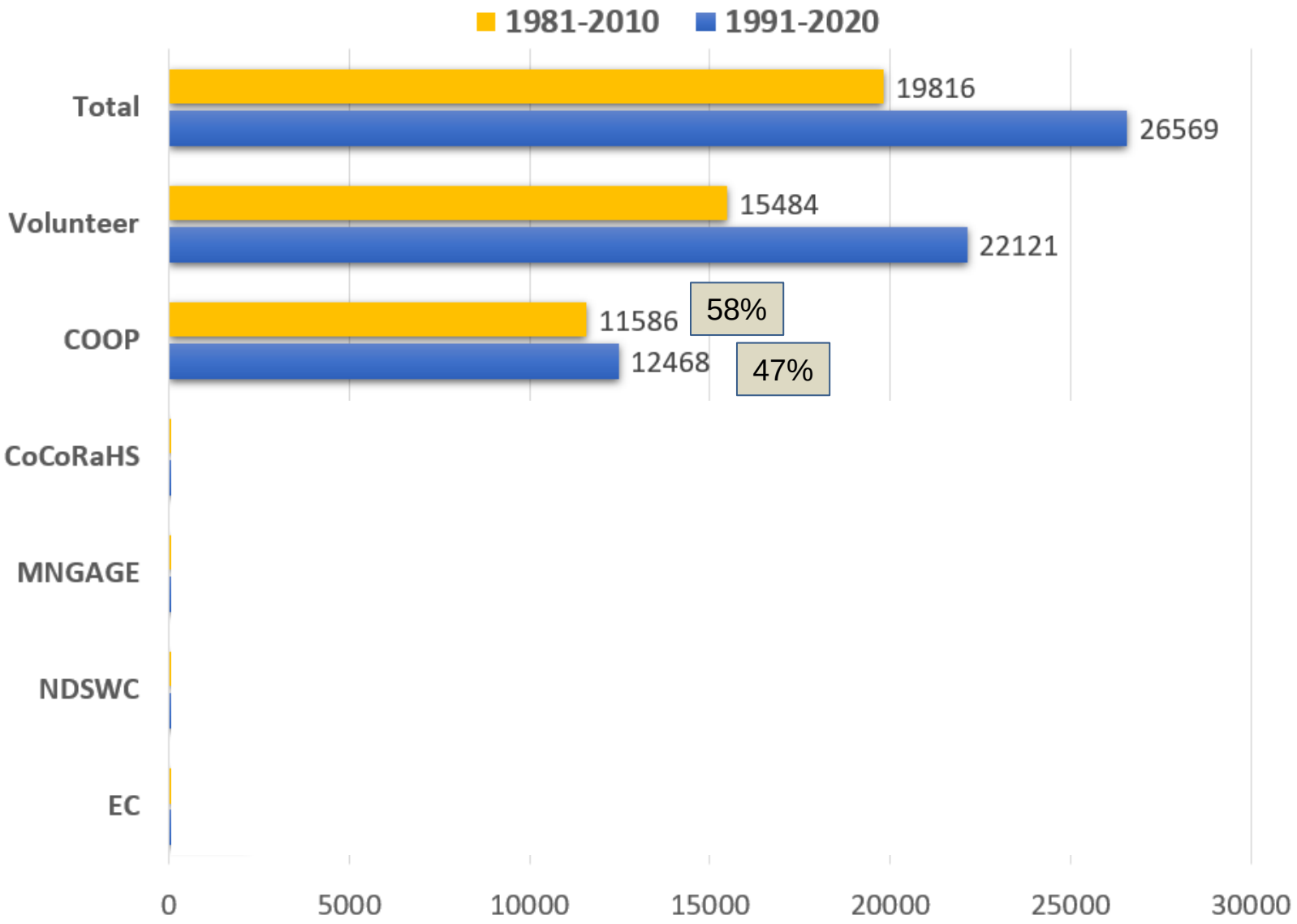

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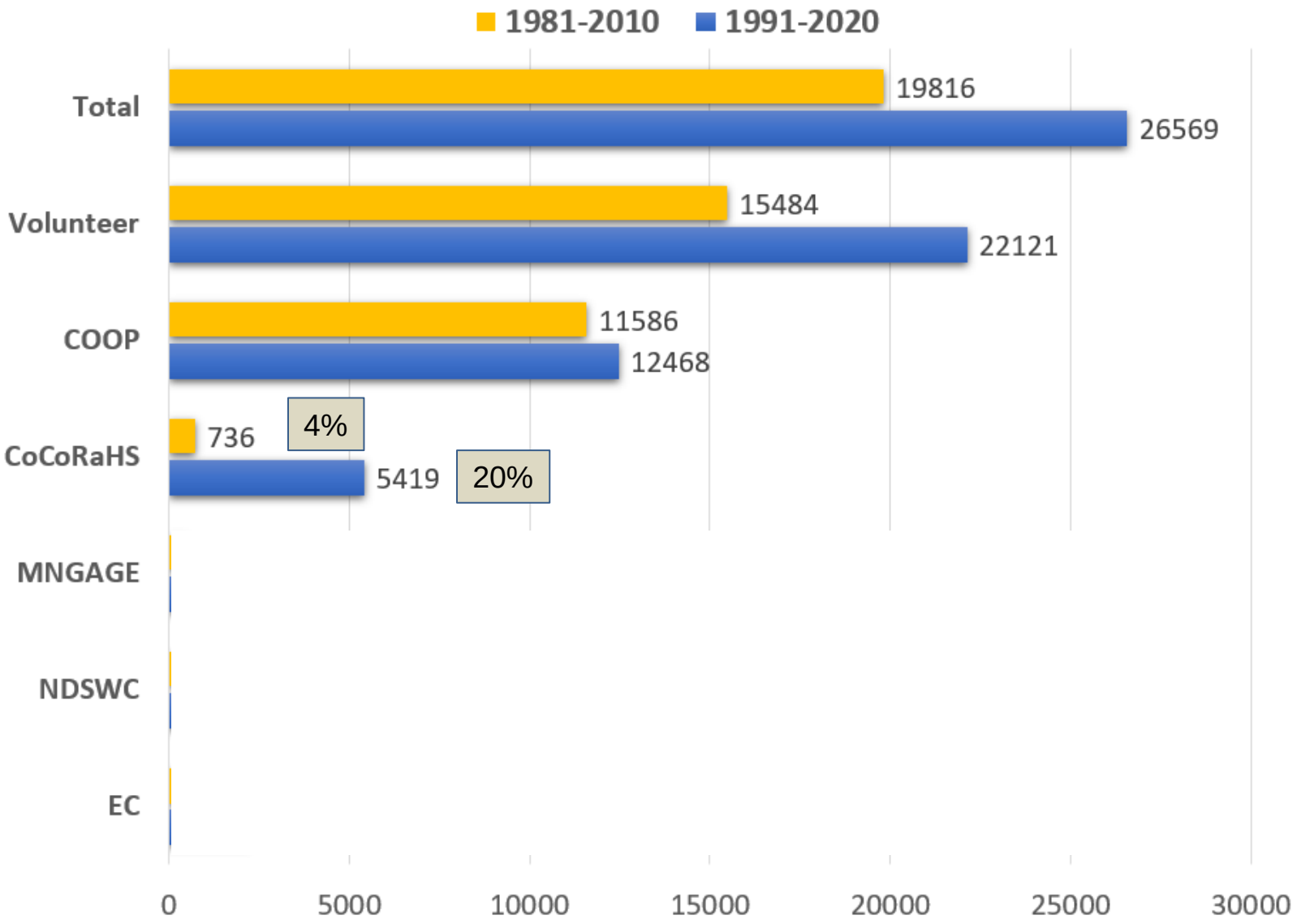

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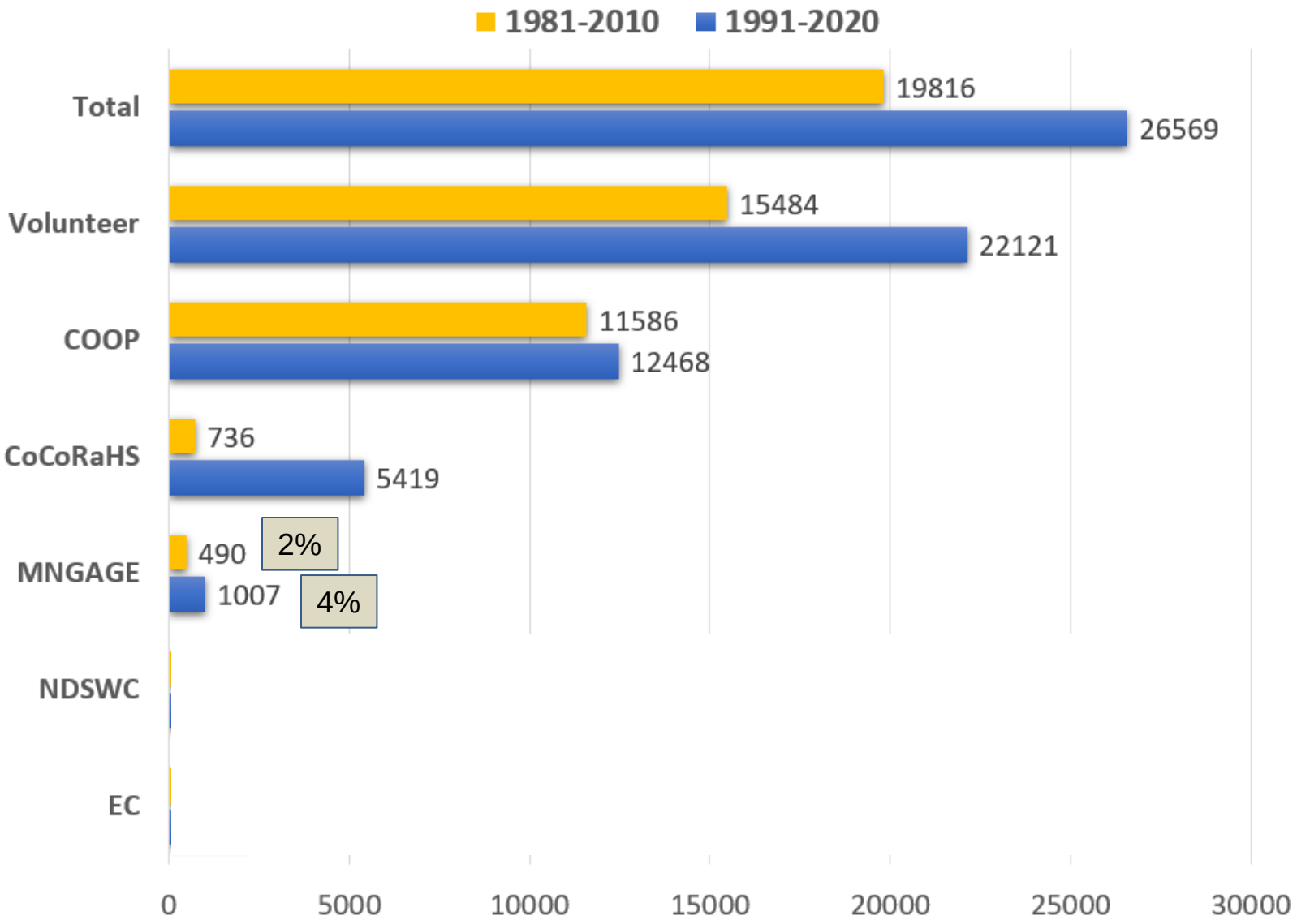

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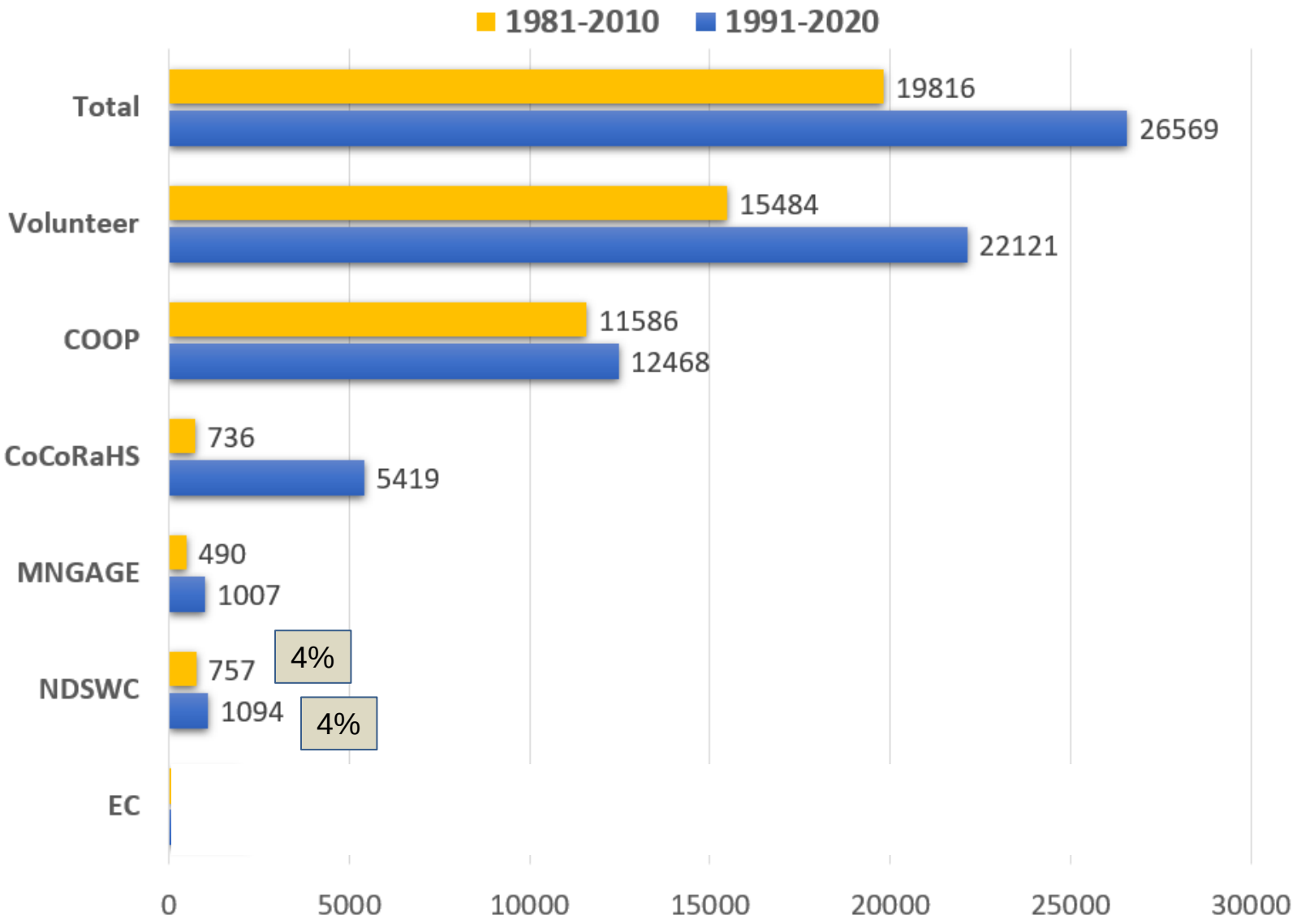

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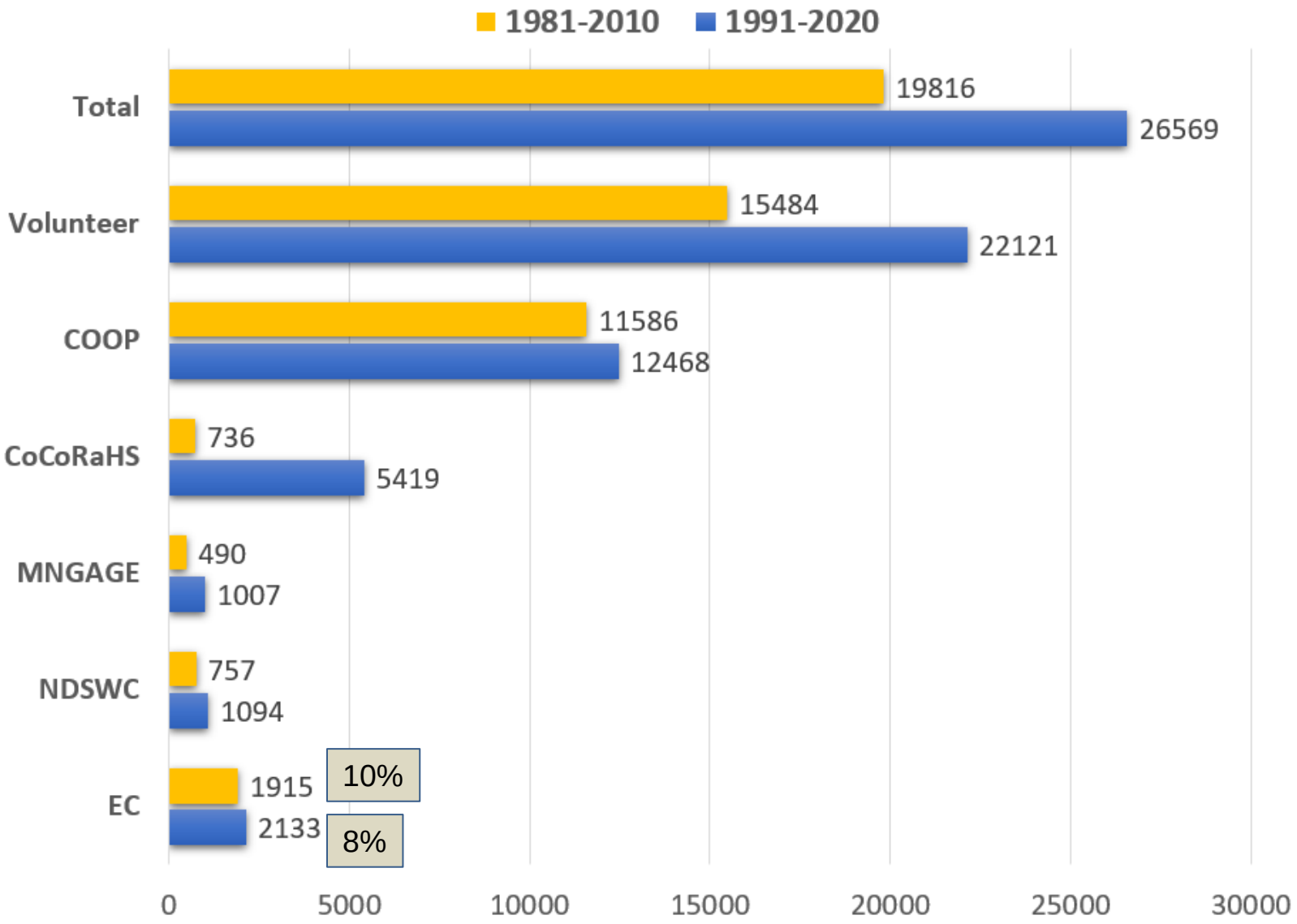
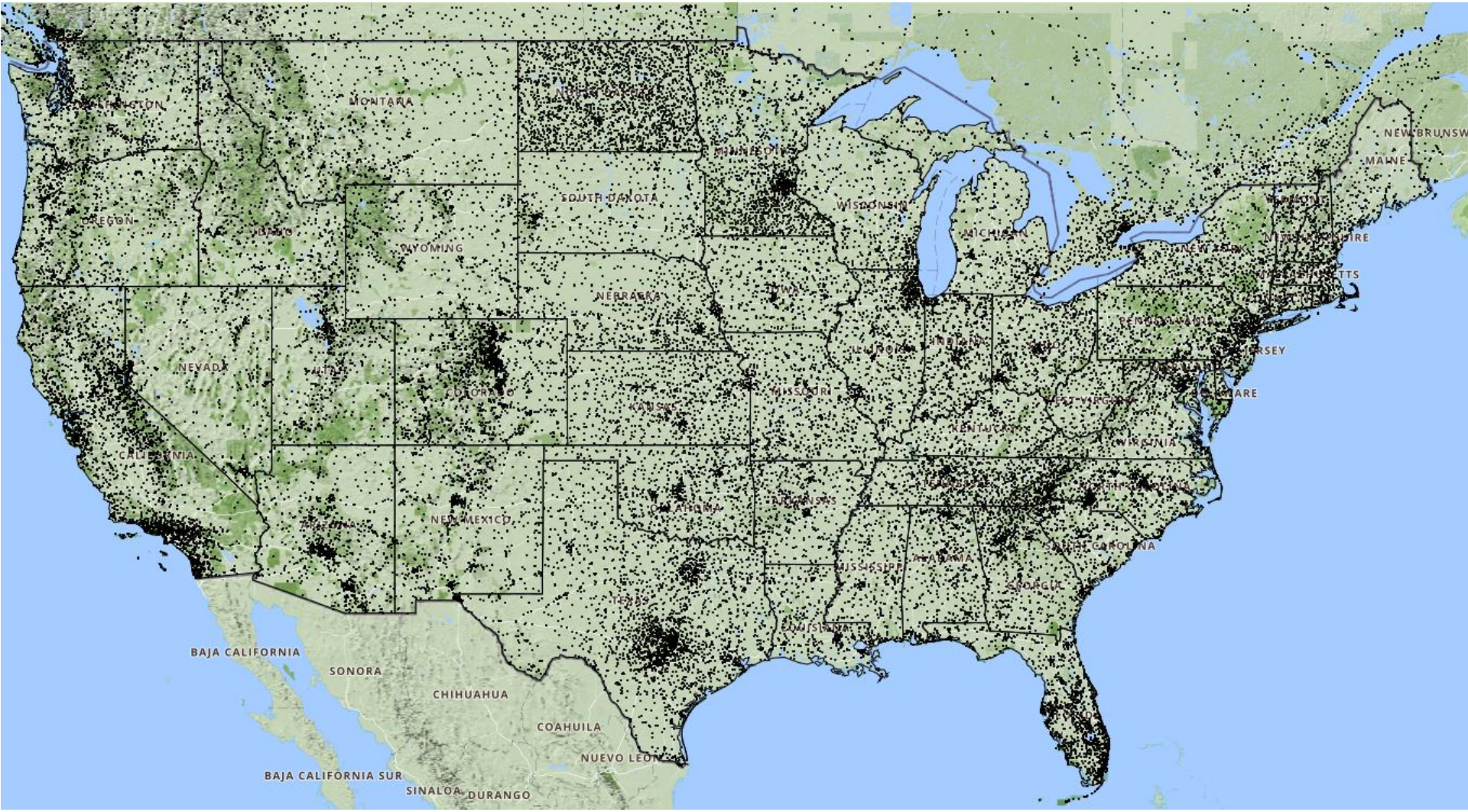
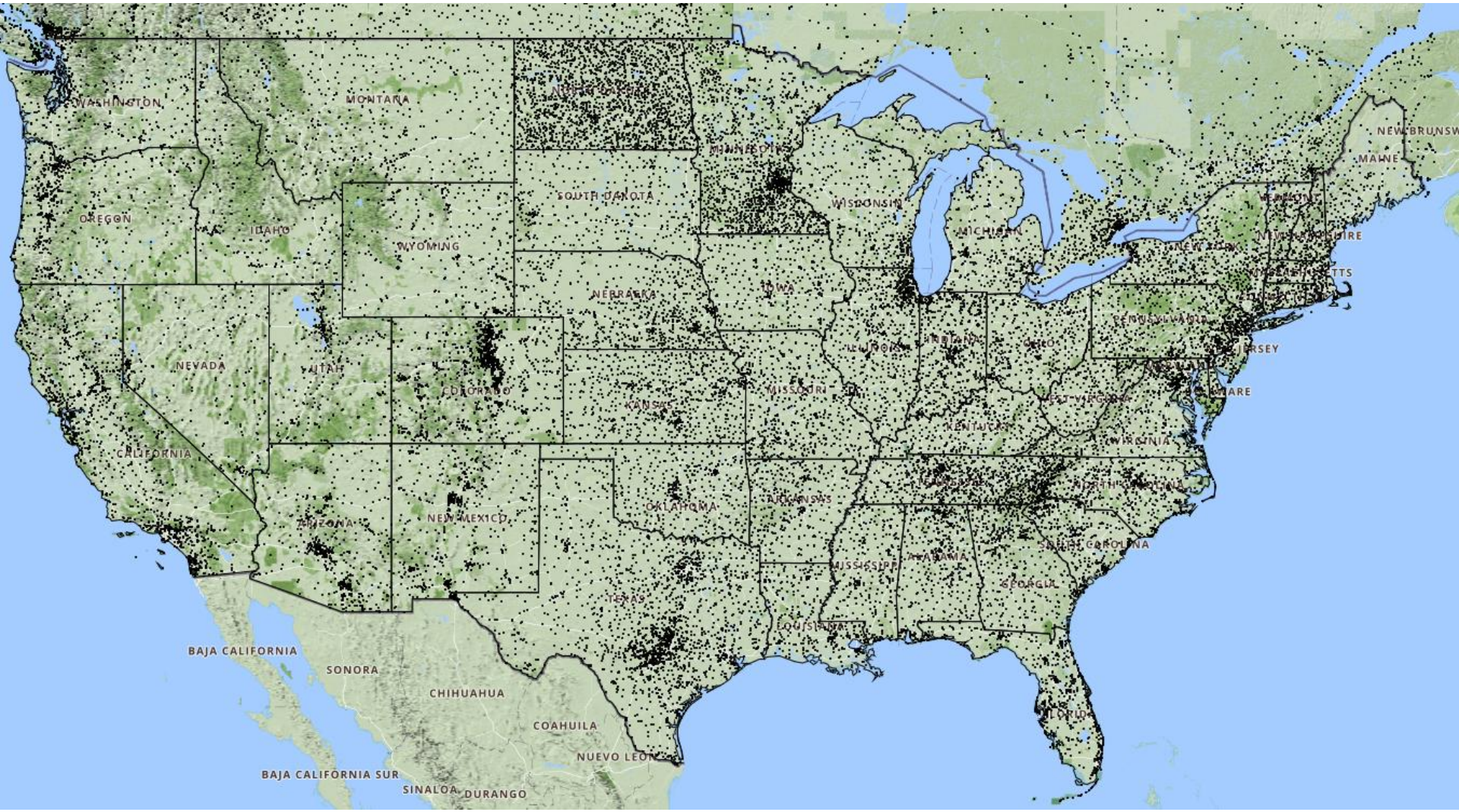


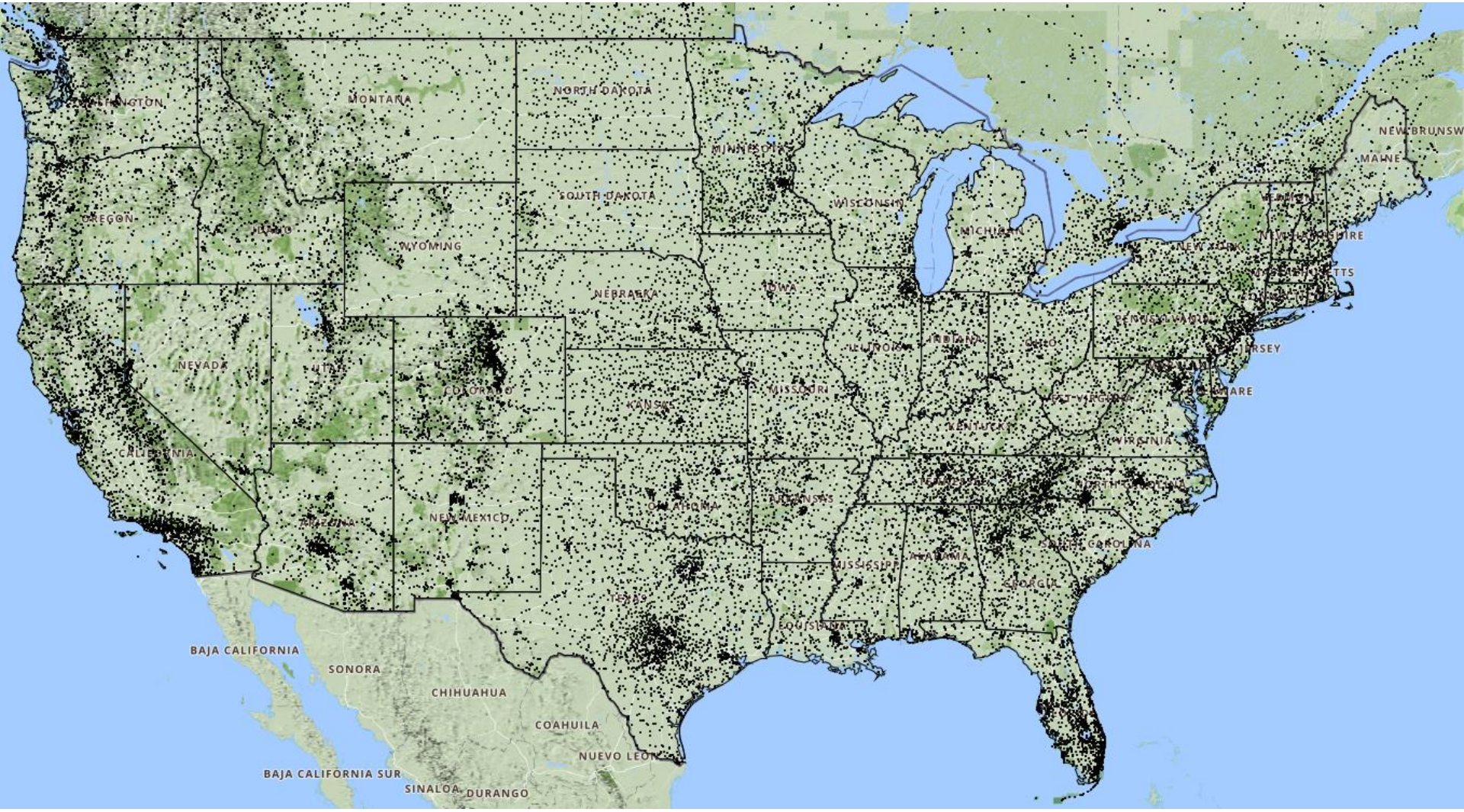
All Stations Meeting >= 5/10 years POR Criteria - July



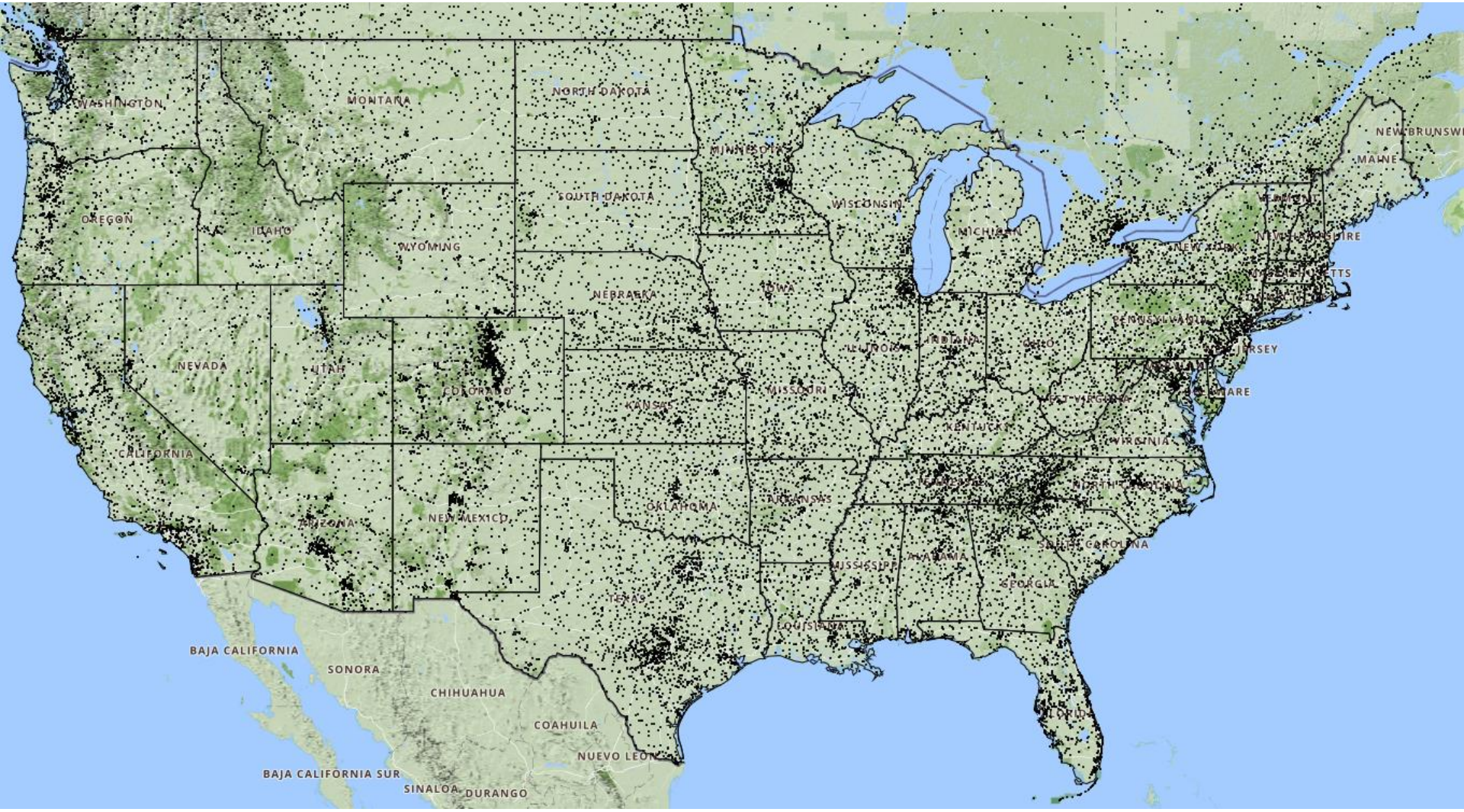
Volunteer Stations Meeting >= 5/10 years POR Criteria - July



All Stations Meeting >= 5/10 years POR Criteria - January

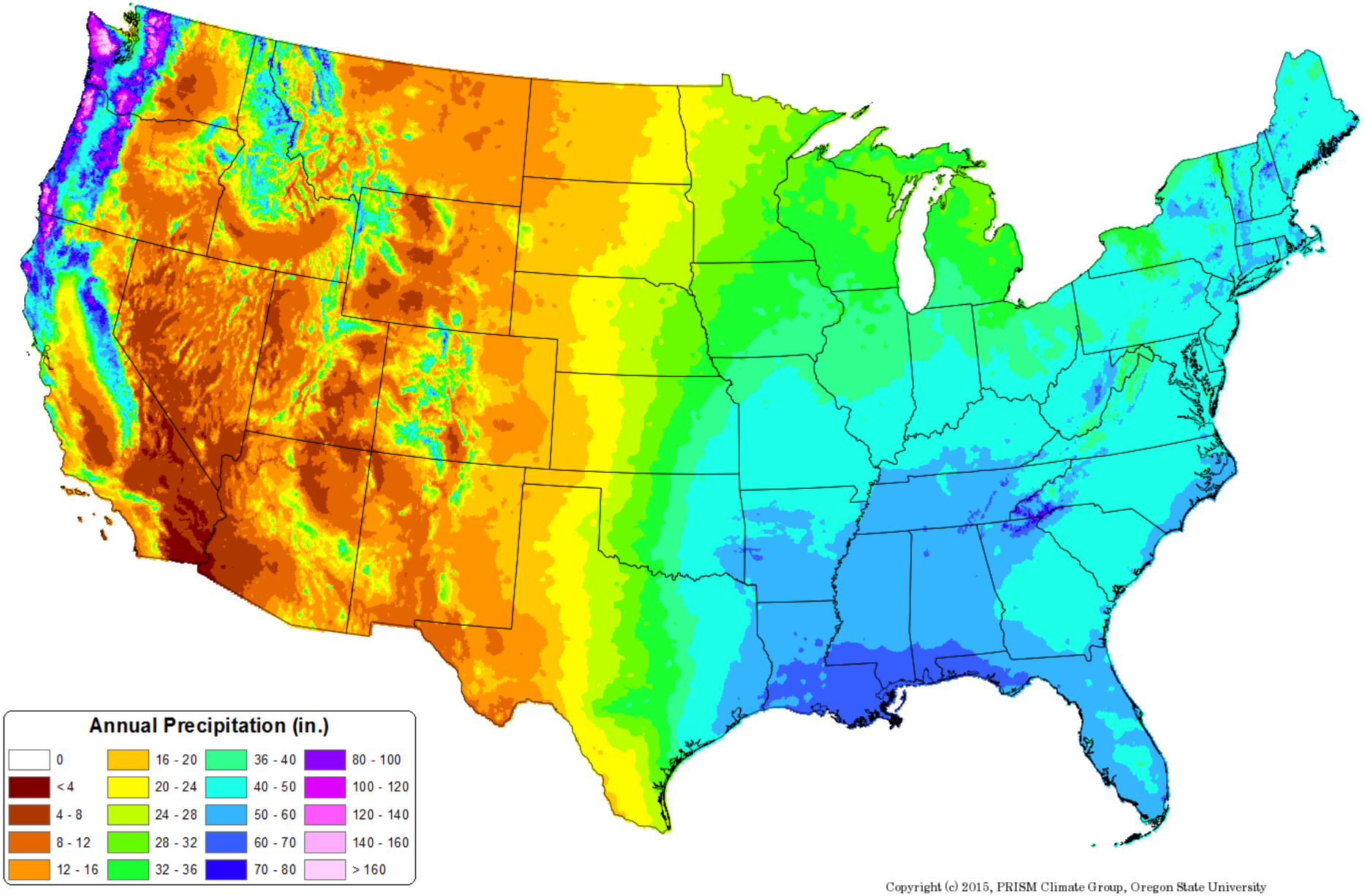


Volunteer Stations Meeting >= 5/10 years POR Criteria - January



30-yr Normal Precipitation: Annual

Period: 1981-2010



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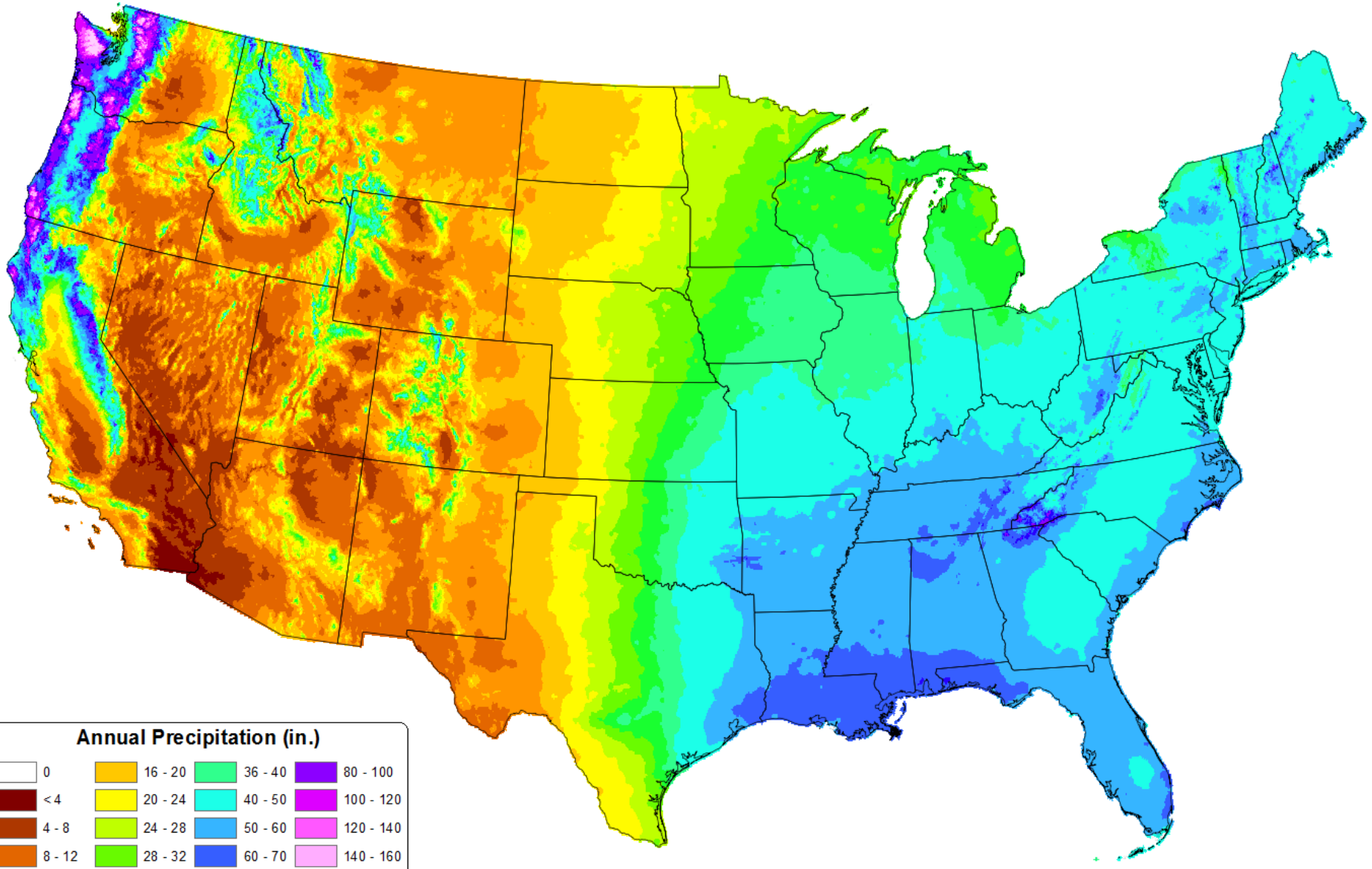


Observer Query About the New Normals

From: Lawrence White <llarrywhite@msn.com>
Sent: Friday, December 3, 2021 1:53 PM
To: Chris.Daly@oregonstate.edu
Cc: Nolan Doesken <nolan@atmos.colostate.edu>; info@cocorahs.org
Subject: Possible glitch in revised PRISM data

Dear Chris Daly,

I have been a CoCoRaHS volunteer in Clear Creek County, Colorado (CO-CC-2) since 2002 and use PRISM data for monthly precipitation articles. This morning I checked out the updated PRISM 1991-2021 datasets. The July normal of **4.24”** on the PRISM chart seemed way too high so I calculated the my 30-year average as **3.06"** and the median of **2.63”**. This probably affected my annual average but I haven’t checked that out yet.

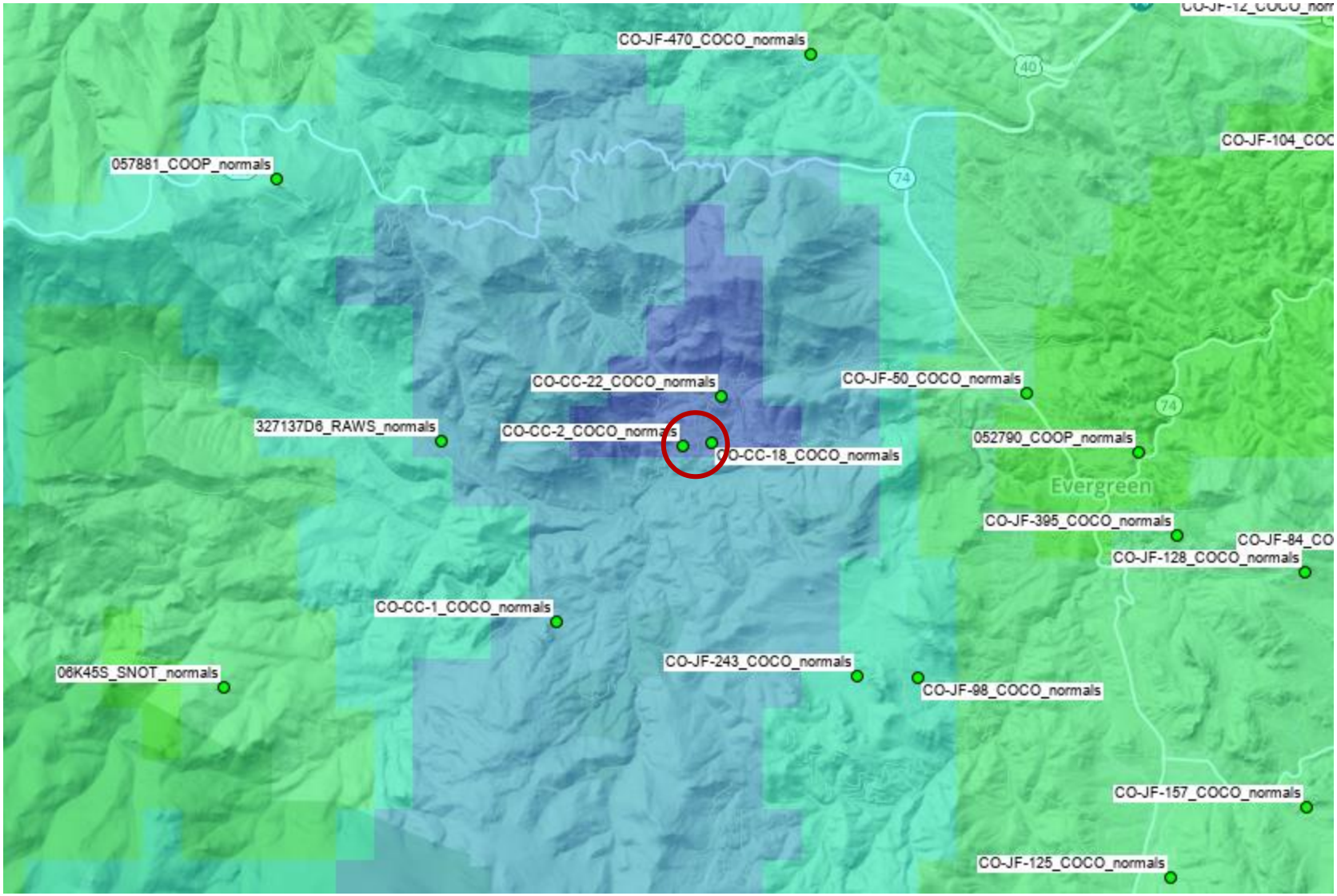
I know the data is preliminary but wanted to bring this to your attention.

Best Regards,

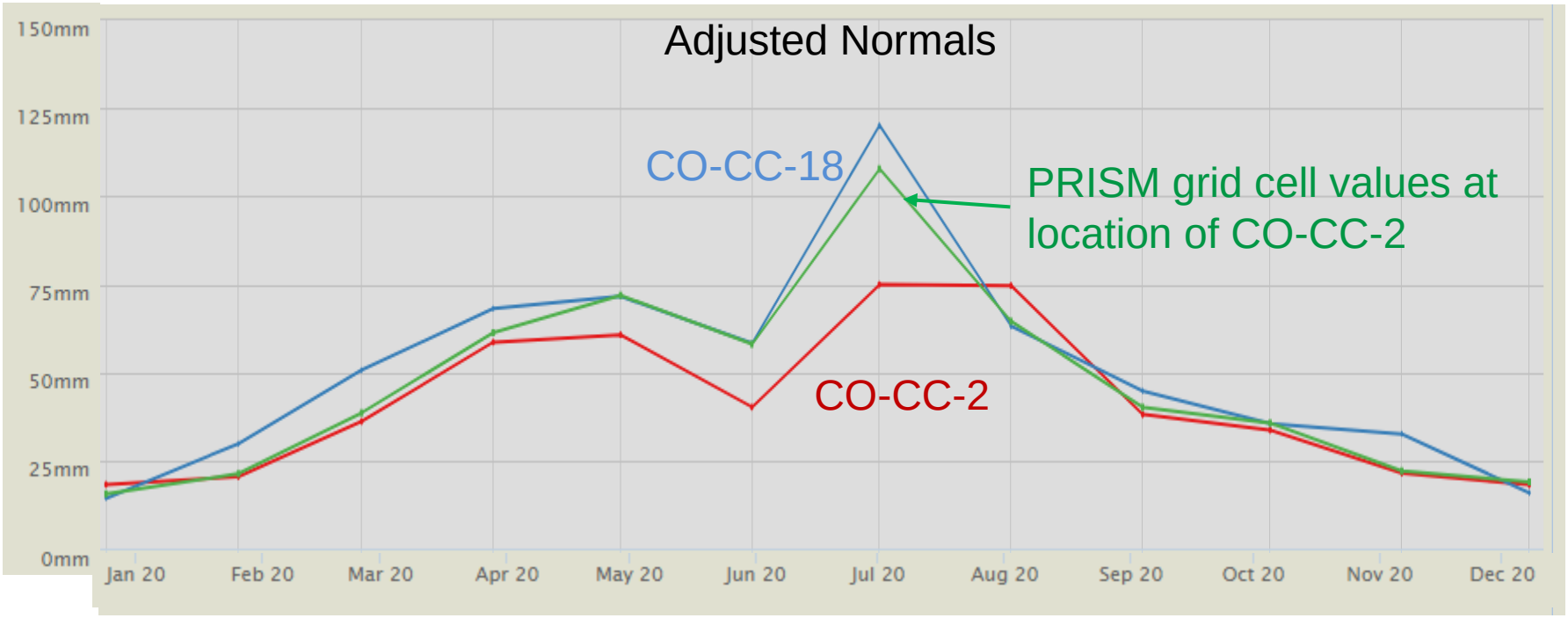
Larry White
CO-CC-2
Evergreen CO

EVERGREEN 3.5 W 2340 -105.4068 39.6397 CO-CC-18

EVERGREEN 5 W 2374 -105.4128 39.6391 CO-CC-2



CO-CC-2 July Gridded Normal Contaminated by Bad Adjustment of Nearby Short Term Station (CO-CC-18)



Station Periods of Record

CO-CC-2: 93.02 average from July 2004, 2006, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2017, 2018, 2019, 2020

CO-CC-18: 99.01 average from July 2012, 2013, 2015, 2016, 2020

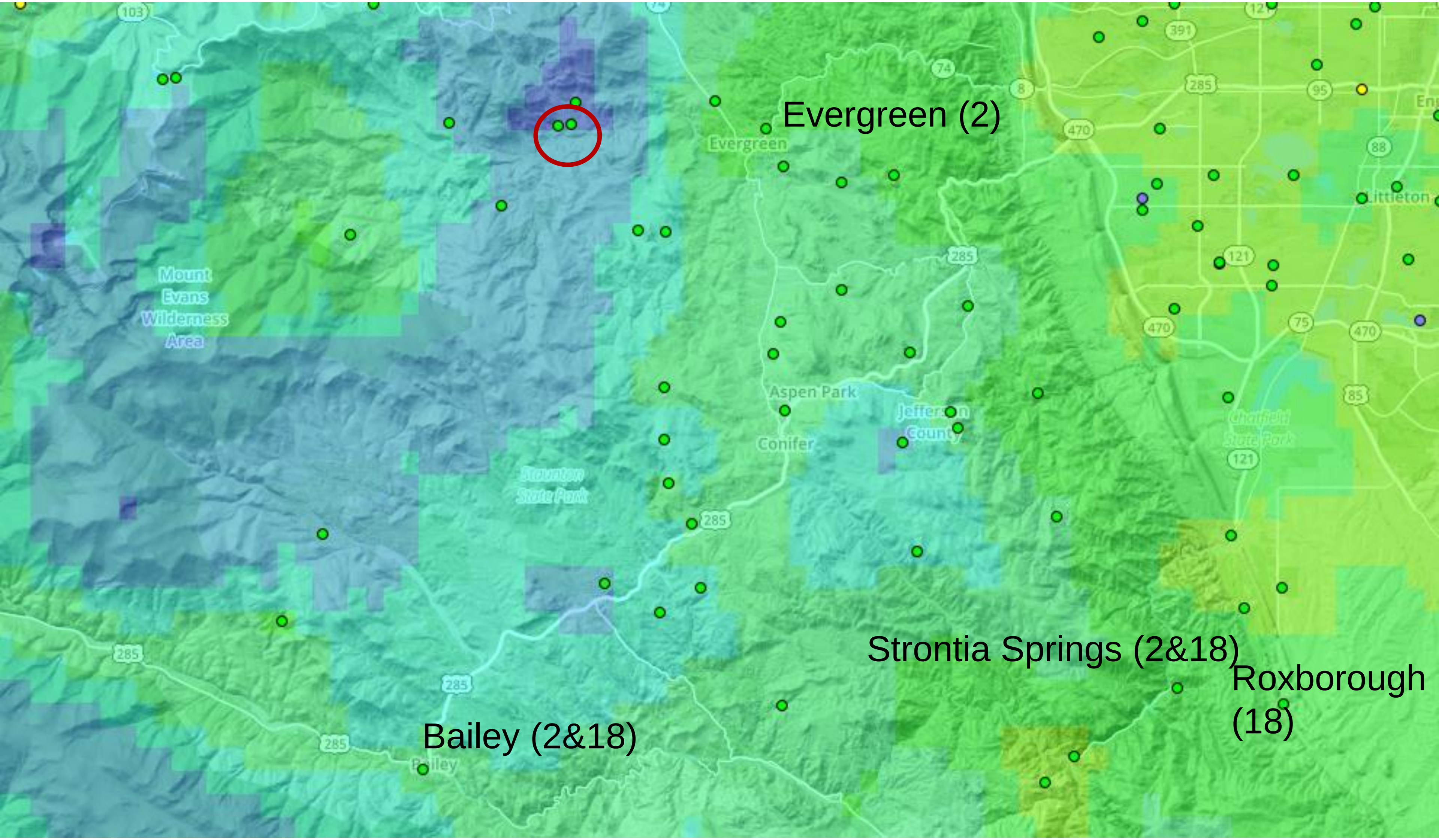
Anchor stations

Selection Criteria

- Must have >= 23 years of record within 1991-2010 period
- Highest PRISM weight
- Most number of overlapping years with short term station

Anchors Chosen

CO-CC-2: Evergreen COOP, Bailey COOP, Strontia Springs COOP
CO-CC-18: Roxborough COOP, Bailey COOP, Strontia Springs COOP



Evergreen (2)
Strontia Springs (2&18)
Roxborough (18)
Bailey (2&18)
Evergreen
Aspen Park
Conifer
Jefferson County
Mount Evans Wilderness Area
Staunton State Park
Chatfield State Park
Littleton

Adjustment Calculations

Target station short term July average
CO-CC-2: 93 mm (13 years)
CO-CC-18: 99 mm (5 years)

Average anchor station 1991-2020 July normal
CO-CC-2: 58 mm
CO-CC-18: 58 mm

Average anchor station short term July average
CO-CC-2: 70 mm (13 overlapping years)
CO-CC-18: 49 mm (5 overlapping years)

Adjustment factor to convert short to long term July normal
CO-CC-2: 0.84
CO-CC-18: 1.21

Short term station July normal adjusted to 1991-2020
CO-CC-2: 78 mm
CO-CC-18: 120 mm

Issues

- Anchor stations may be distant from the target stations and not always represent the same climate variability
- Intermittent periods of record can lead to inconsistent anchor station selection, even for nearby stations
- CoCoRaHS seems to be a special case due to many gaps in the data
- Worst case is when available data represent very dry or very wet periods

Is there a better way to do this?

- Doh! Why don't we use PRISM monthly time series grids to represent the "anchor station" at each short term station's location?

Adjustment Calculations Using New Approach

Target station short term July average
CO-CC-2: 93 mm (13 years)
CO-CC-18: 99 mm (5 years)

PRISM monthly time series 1991-2020 July normal at station locations
CO-CC-2: 78 mm
CO-CC-18: 77 mm

PRISM monthly time series short term July average at station locations
CO-CC-2: 95 mm (13 years)
CO-CC-18: 94 mm (5 years)

Adjustment factor to convert short to long term July normal
CO-CC-2: 0.82
CO-CC-18: 0.81

Short term station July normal adjusted to 1991-2020
CO-CC-2: 76 mm
CO-CC-18: 80 mm

Larry's stated 30-year average is 77 mm. Nice!

Next Steps

- Test new method under nasty conditions (done – good improvement)
- Redo adjustments for all stations and all variables with new method
- Re-map normals with PRISM
- Assess differences in normals maps between old and new method
- If improvements are large in some areas, do we publish updates to our normals?
- There is a lot involved in that...

Consequences of Losing COOP Stations

- Many important COOP stations have long since closed
- Over 1200 COOP stations lost between 1962 and 1969 (TVA stations)
- Each time, we have to reach further back and adjust those older records to reflect the new period