

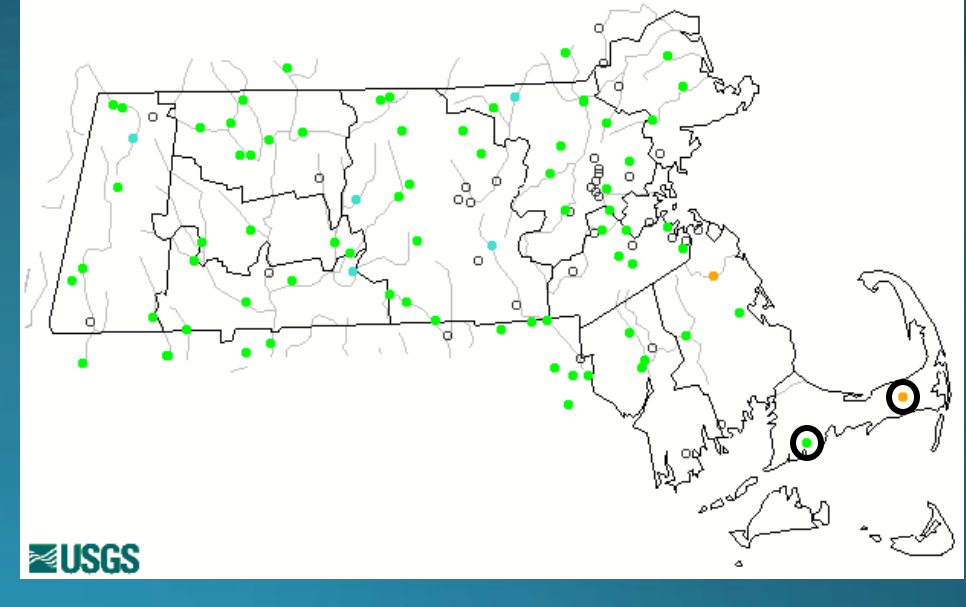
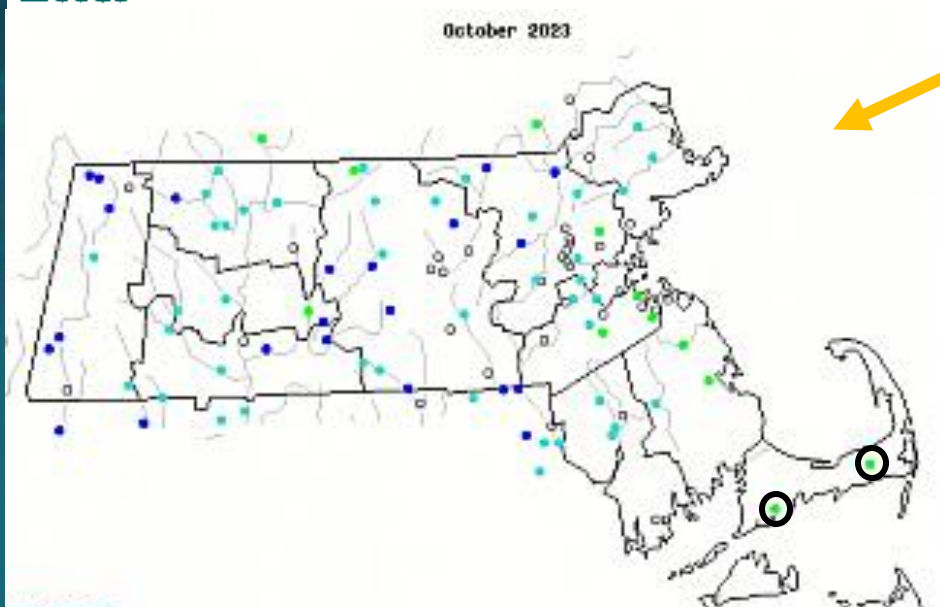
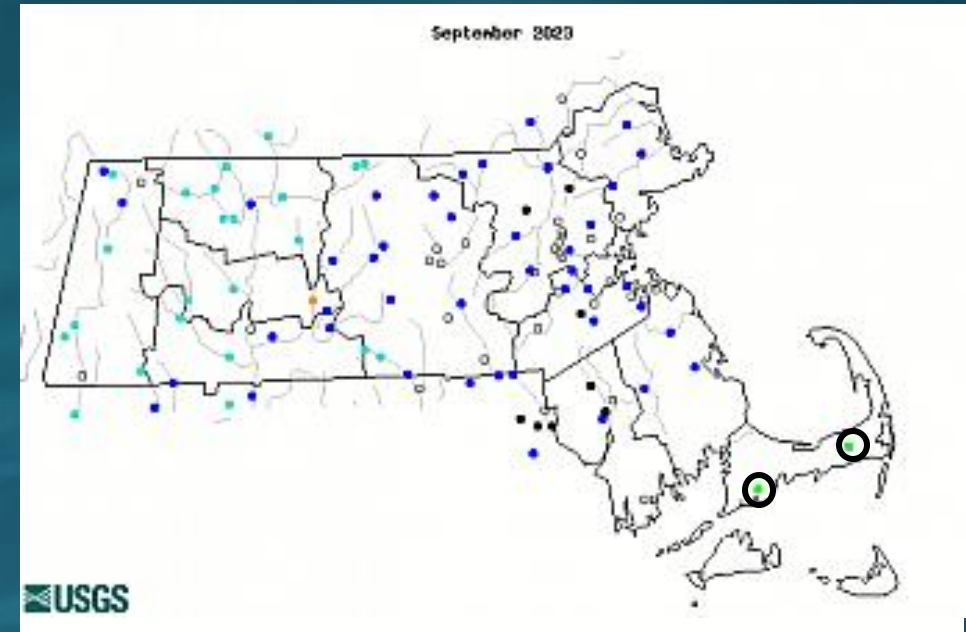
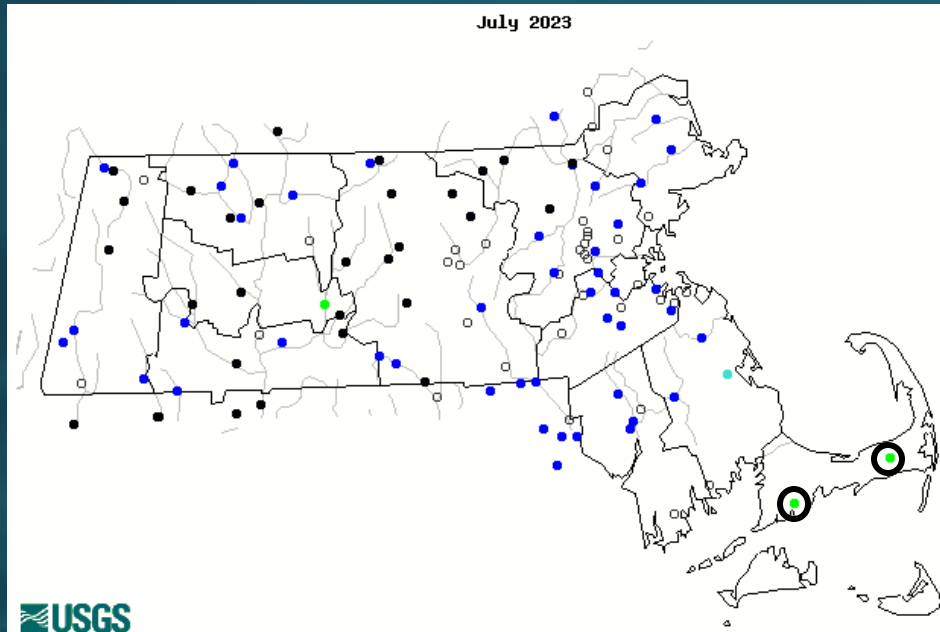
# Streamflow and Groundwater Conditions in Massachusetts

Massachusetts Drought Task Force Meeting  
December 11, 2023

U.S. Geological Survey  
New England Water Science Center  
Gardner Bent, Jason Pollender, and Chris Bruet



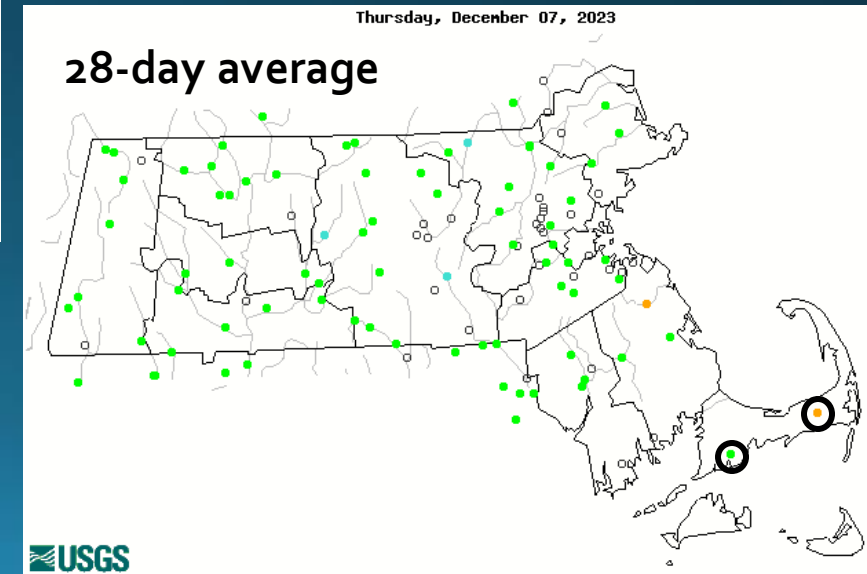
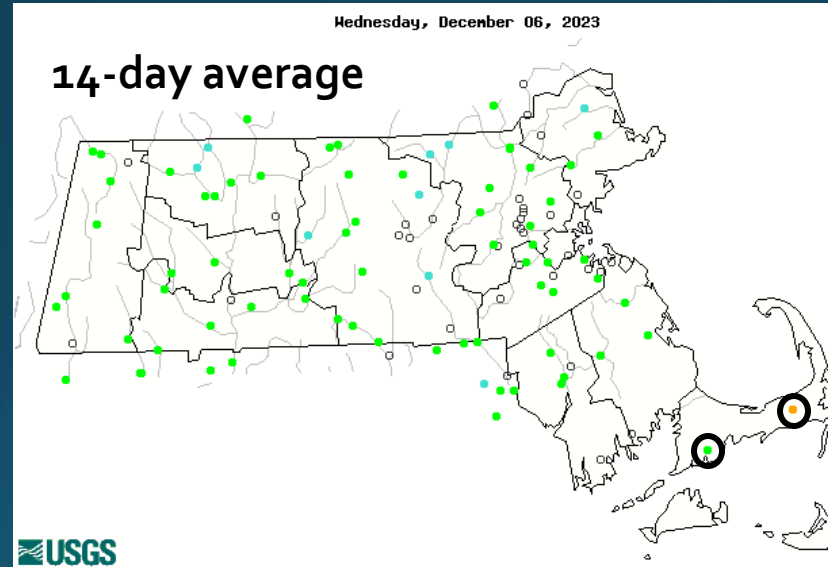
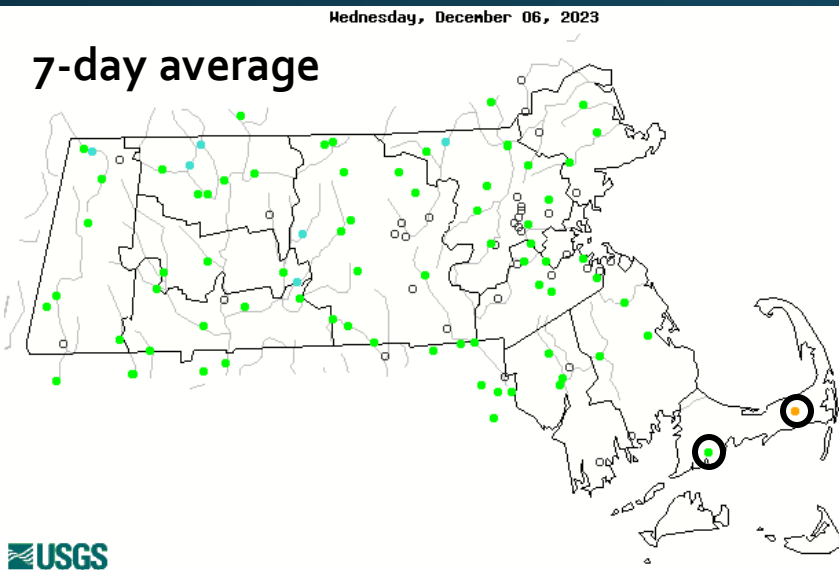
# Streamflow Conditions – Monthly Average



Explanation - Percentile classes

|              |              |        |              |                   |      |            |
|--------------|--------------|--------|--------------|-------------------|------|------------|
|              |              |        |              |                   |      |            |
| 0            | 10-24        | 25-75  | 76-90        | >90               | High | Not-ranked |
| below normal | Below normal | Normal | Above normal | Much above normal |      |            |

# Streamflow Conditions 7-, 14-, and 28-Day Average

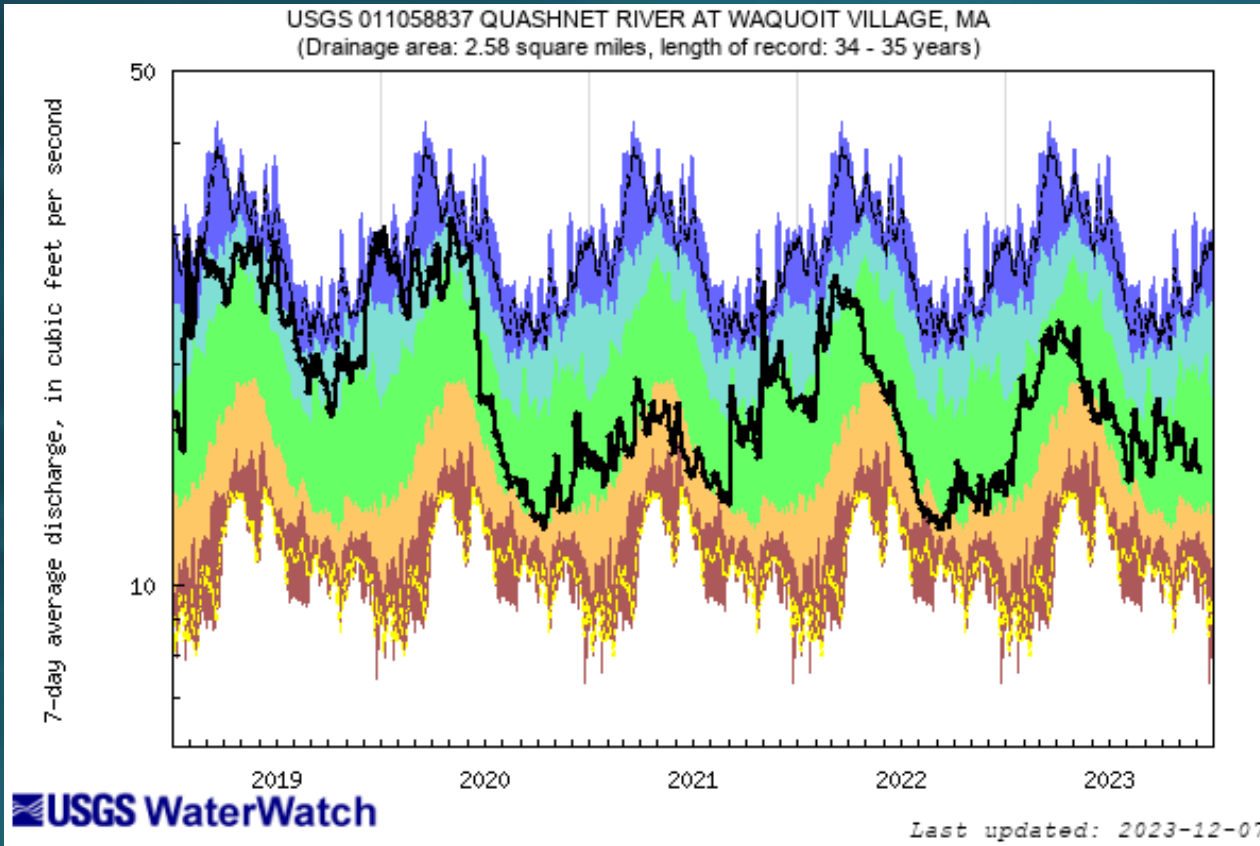


### Explanation - Percentile classes

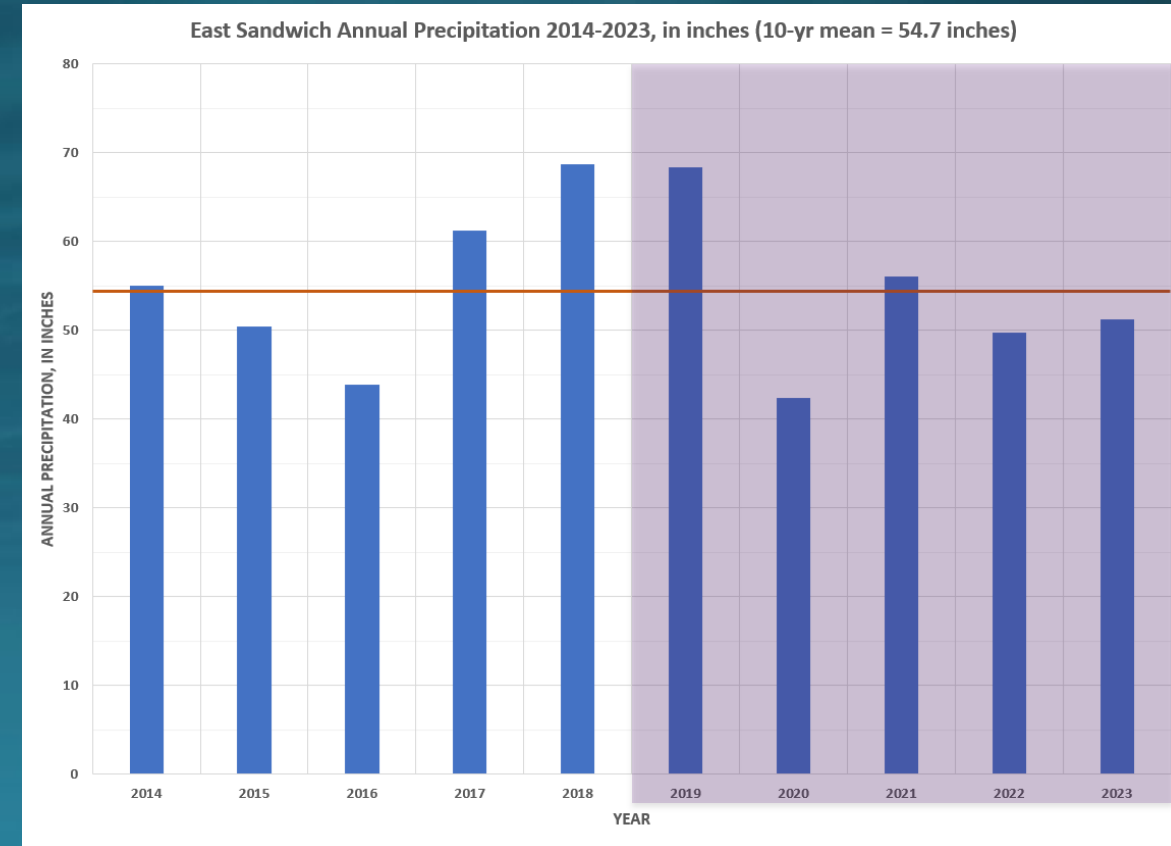
|     |                   |              |        |              |                   |      |            |
|-----|-------------------|--------------|--------|--------------|-------------------|------|------------|
|     |                   |              |        |              |                   |      |            |
| Low | <10               | 10-24        | 25-75  | 76-90        | >90               | High | Not-ranked |
|     | Much below normal | Below normal | Normal | Above normal | Much above normal |      |            |

# Cape Cod Region 7-Day Average

## Western Part of Cape Cod Region

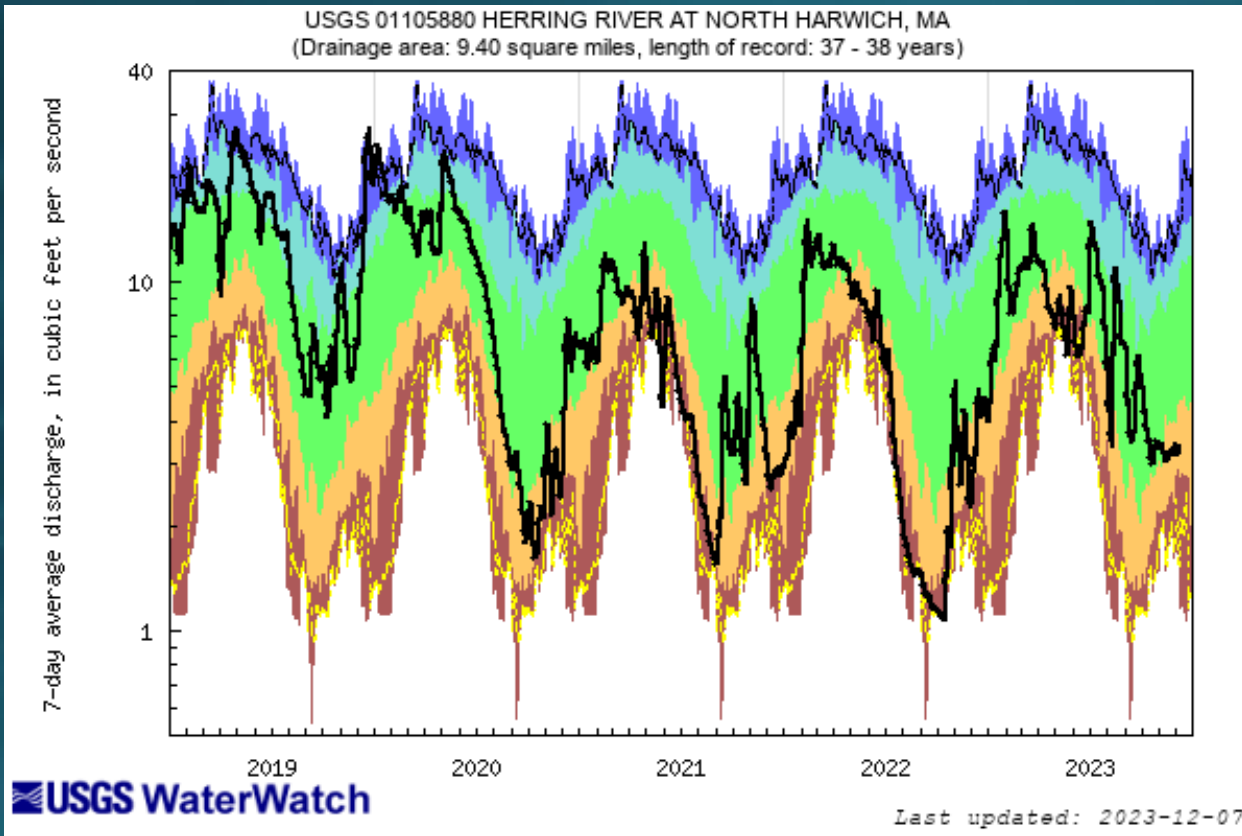


## East Sandwich Annual Precipitation

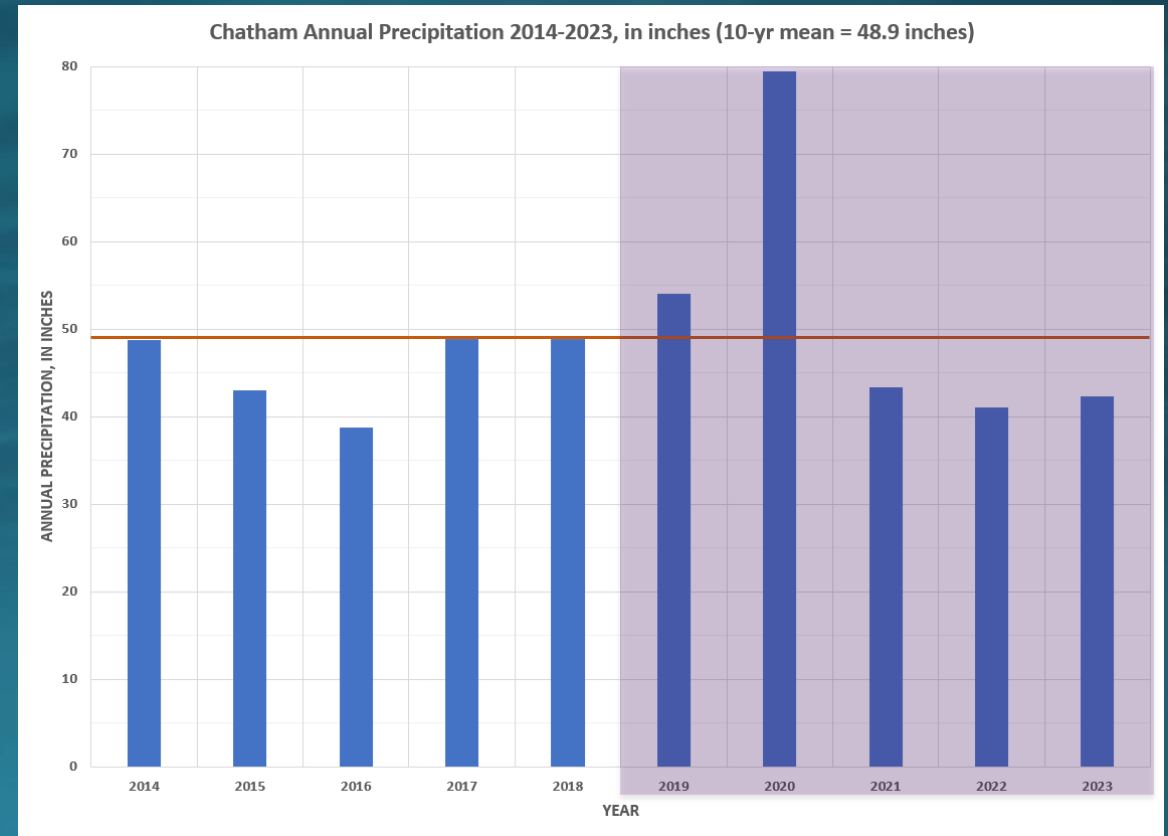


# Cape Cod Region 7-Day Average

## Eastern Part of Cape Cod Region



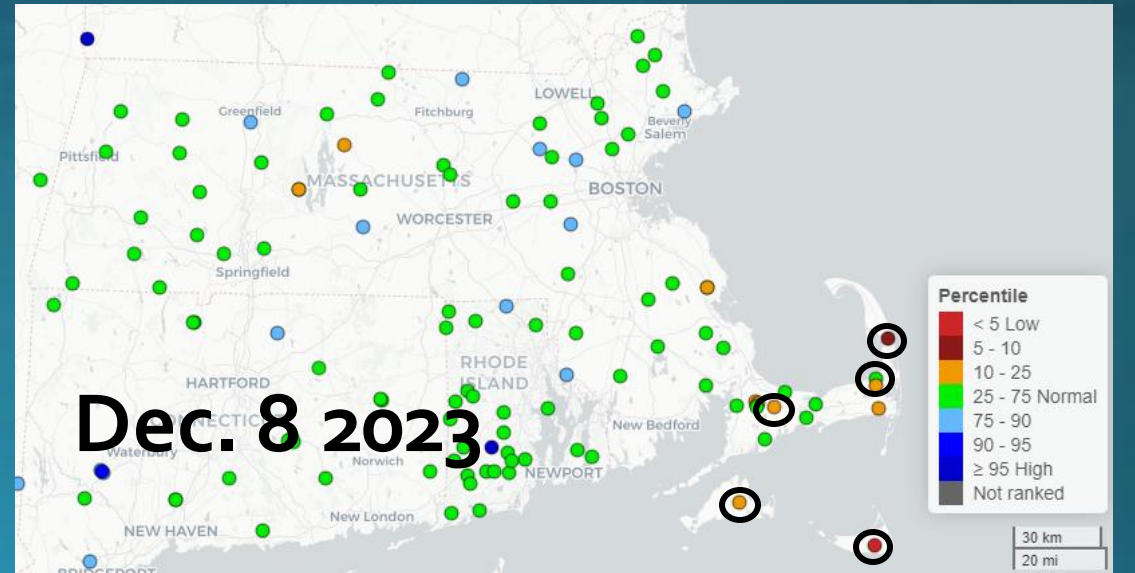
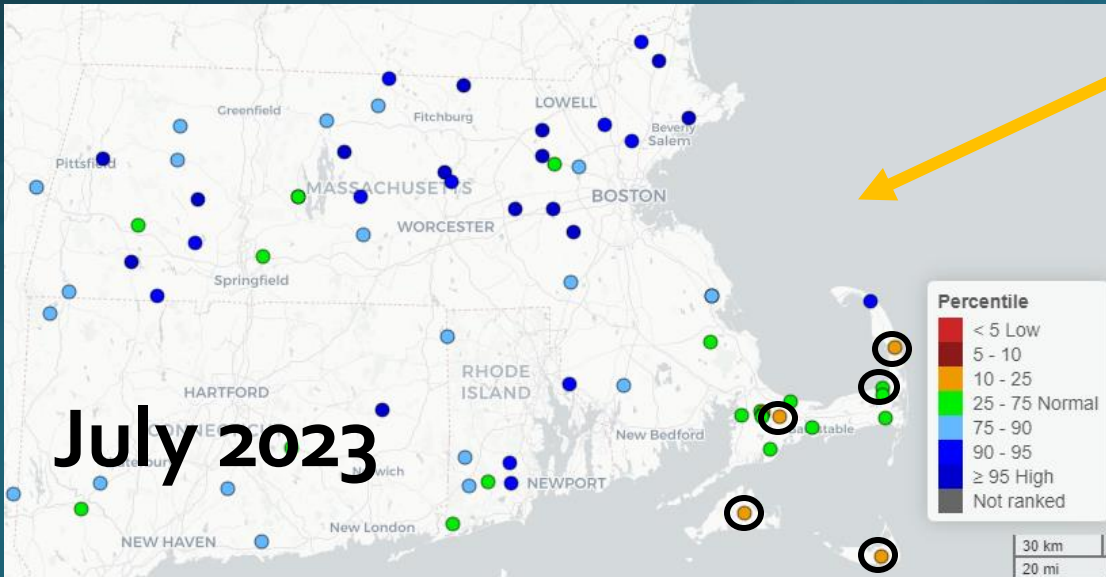
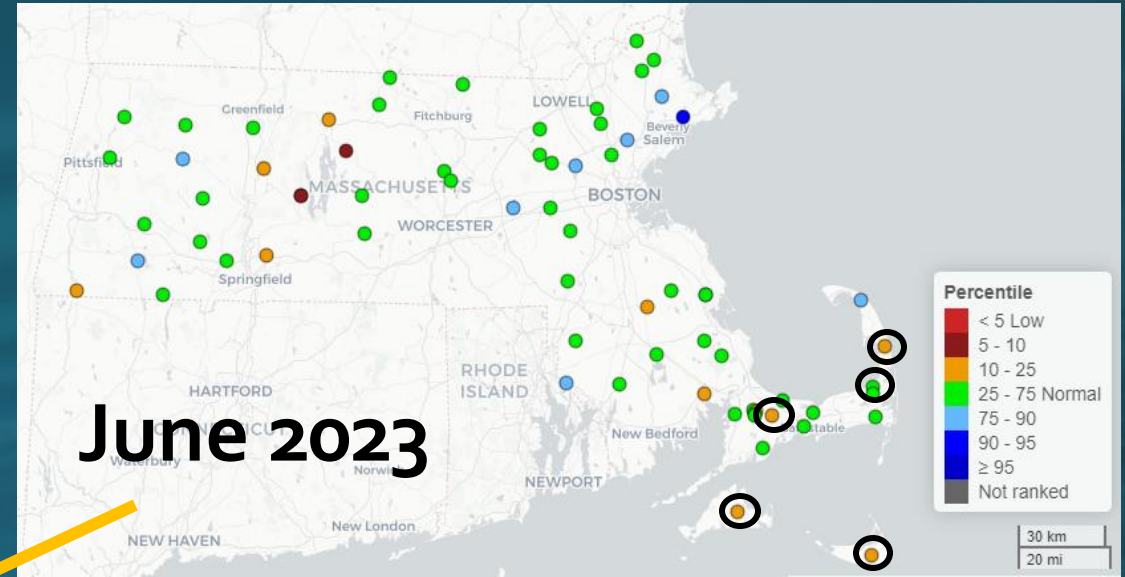
## Chatham Annual Precipitation



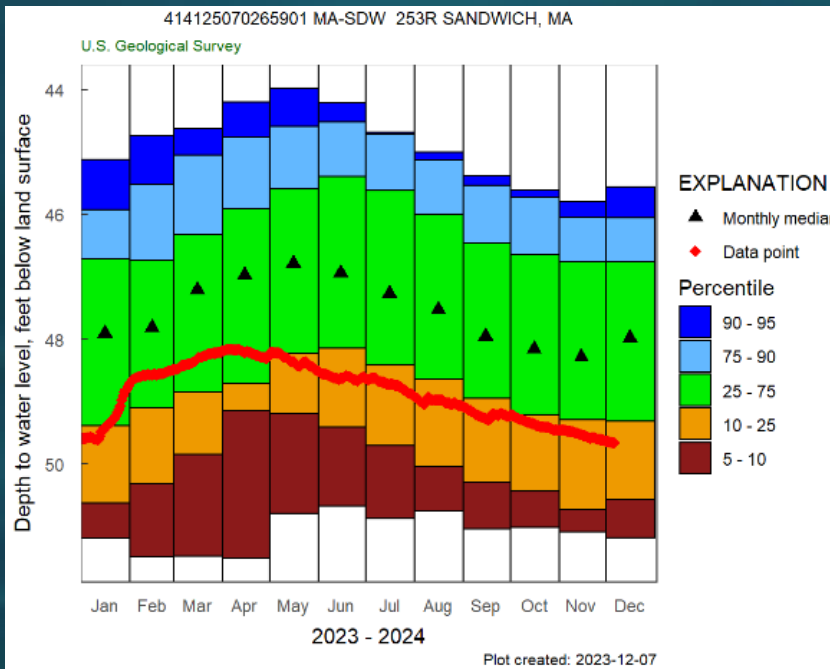
# Summary of Streamflows on the Cape

- Streamflows at Quashnet River at Waquoit Village (western Cape Cod)
  - are currently normal
  - have been lower the last 3 years but have still been mainly normal
  - generally appears to lag about a year (+ or – a few months) behind the previous year's precipitation
- Streamflows at Herring River at North Harwich (eastern Cape Cod)
  - are currently below normal
  - have been below normal for a significant part of the last 3+ yrs (since fall of 2020)
  - potentially appears to lag about a year behind the previous year's precipitation

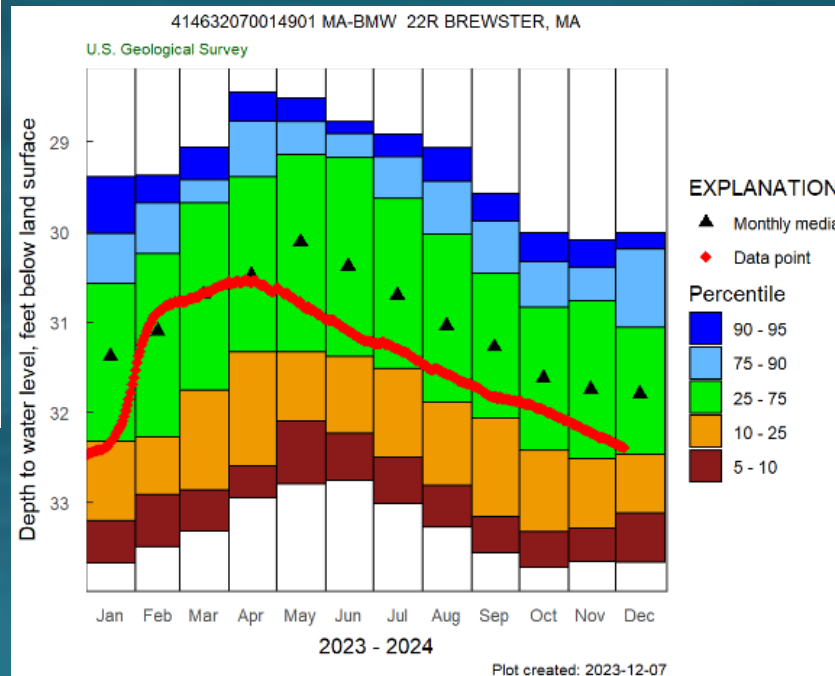
# Groundwater Conditions



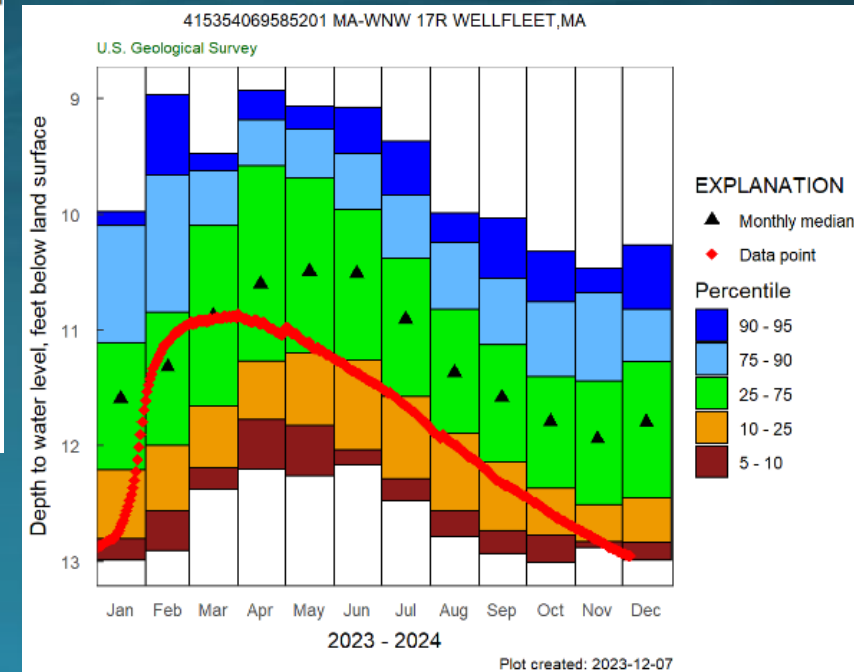
# Cape Cod Region



Period of Record: 61 yrs;  
continuous 11 yrs



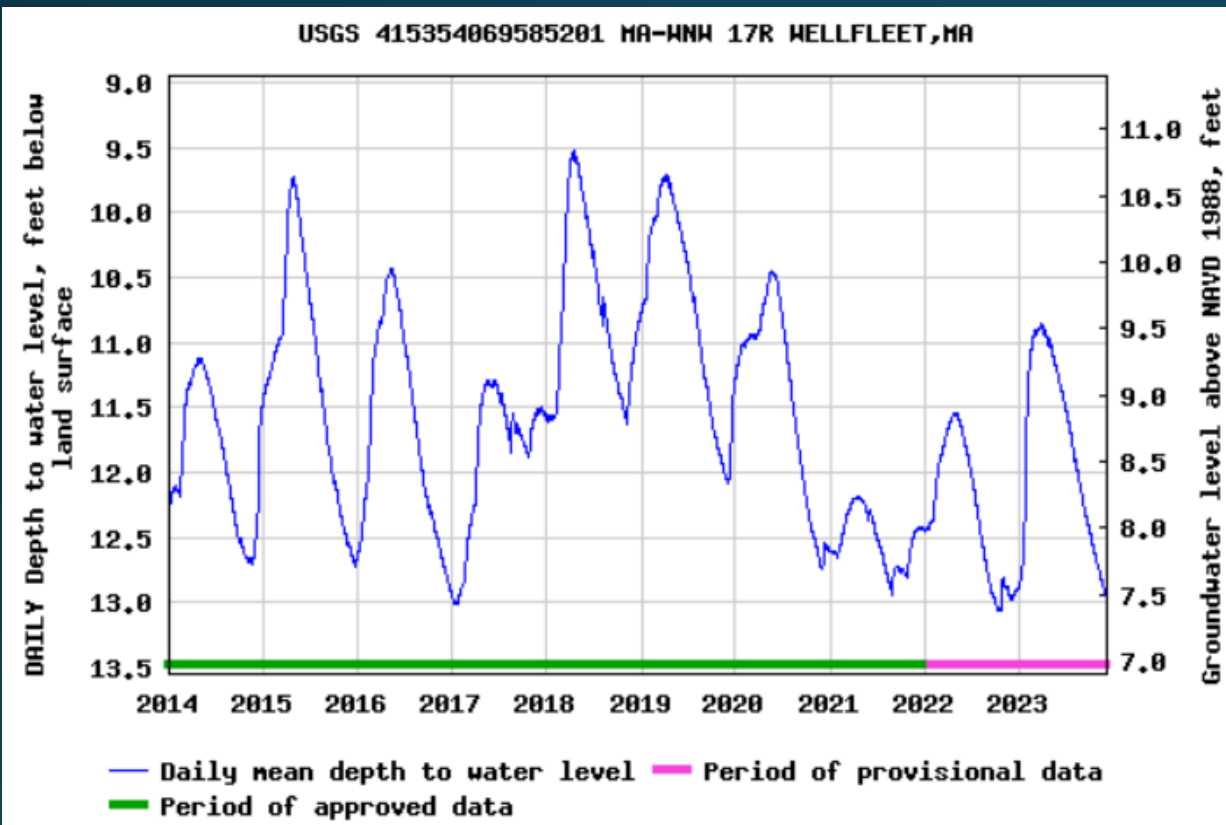
Period of Record: 61 yrs;  
continuous 22 yrs



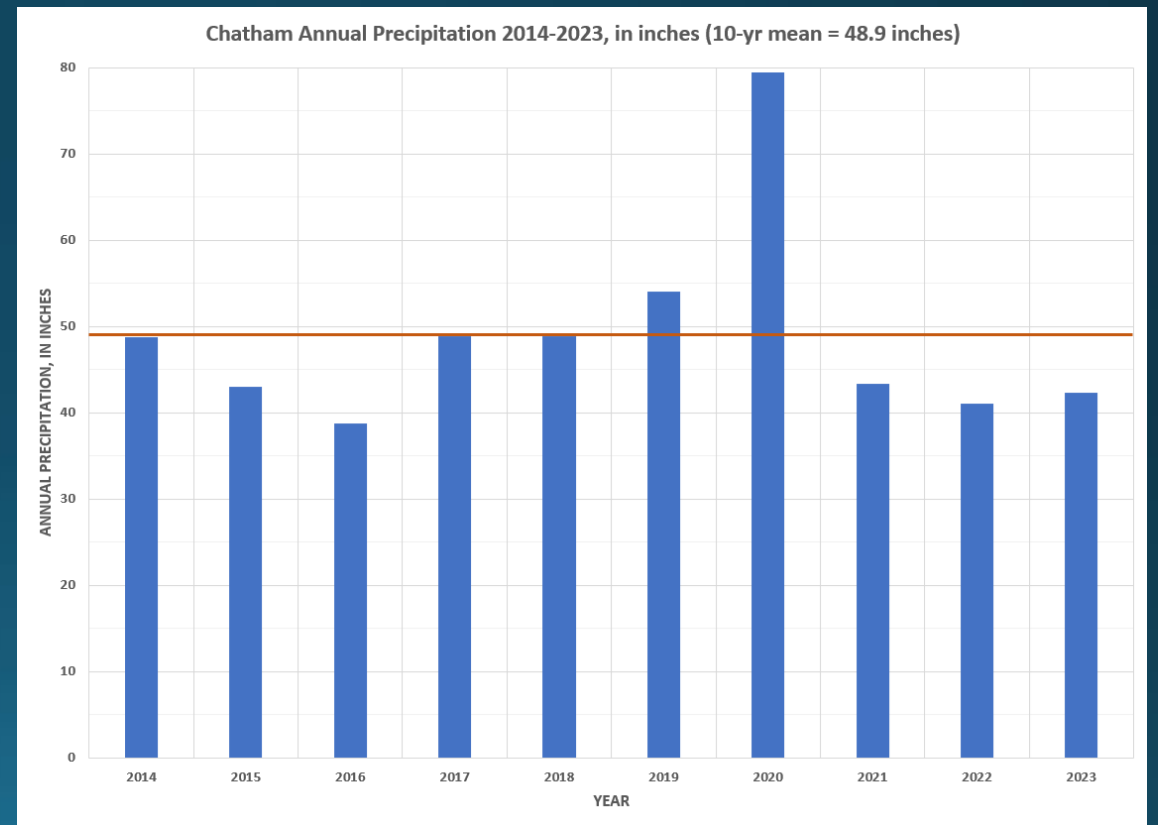
Period of Record: 61 yrs; cont. 11 yrs



# Cape Cod Region – Wellfleet Cont. WL Data Jan. 1, 2014 to Dec. 7, 2023

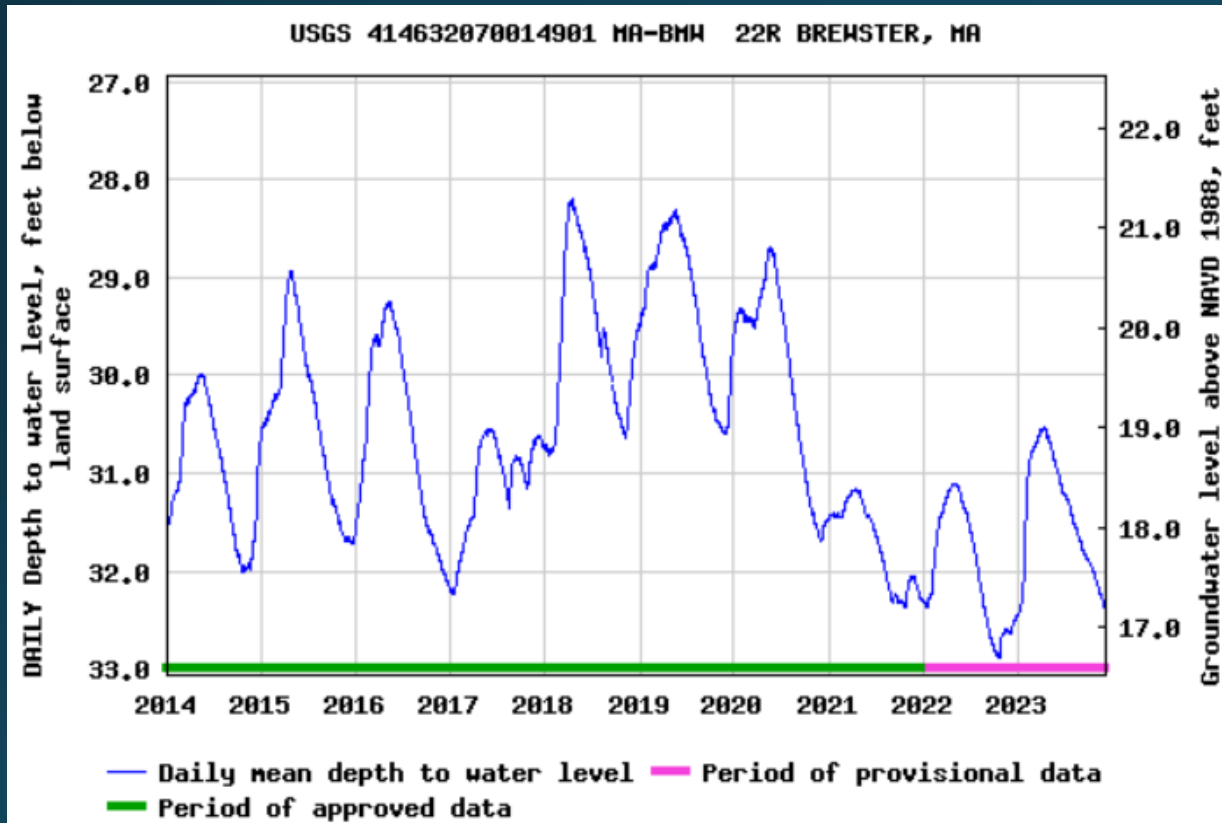


Period of Record: 61 yrs; cont. 11 yrs

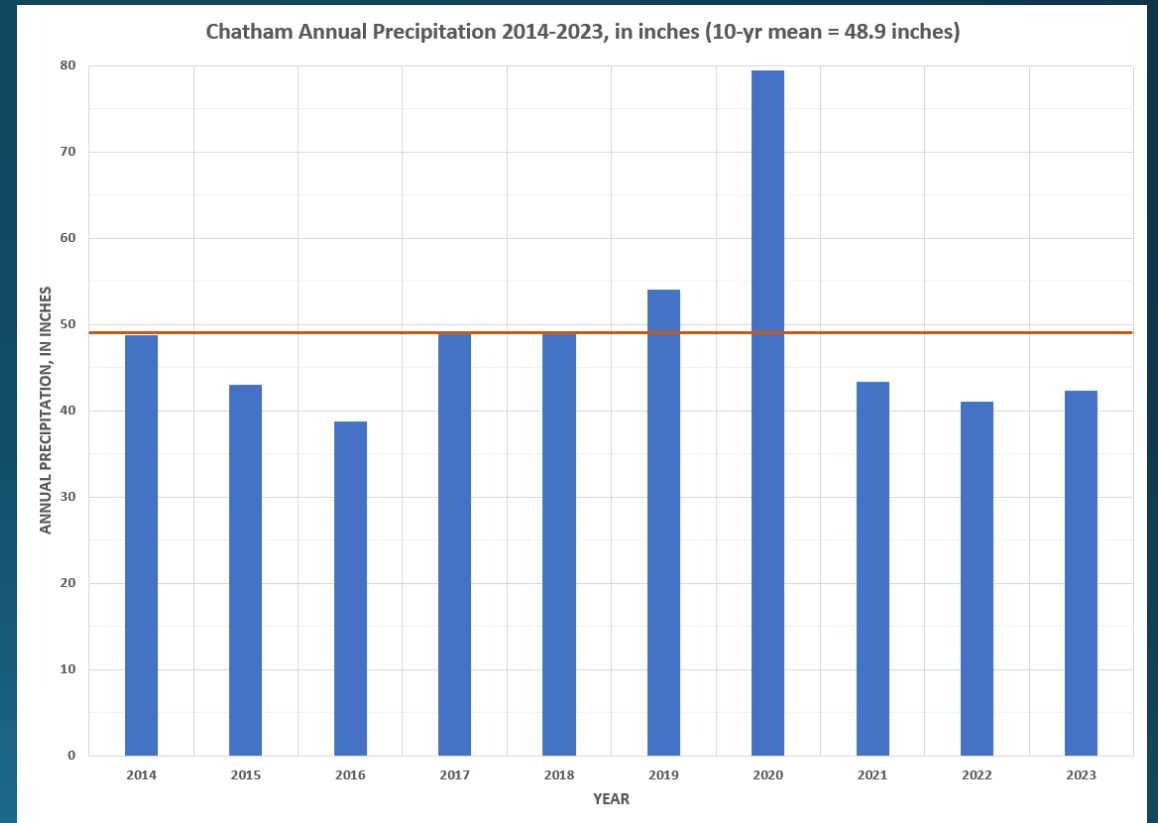


Precipitation – Chatham – 2014-2023

# Cape Cod Region – Brewster Cont. WL Data Jan. 1, 2014 to Dec. 7, 2023



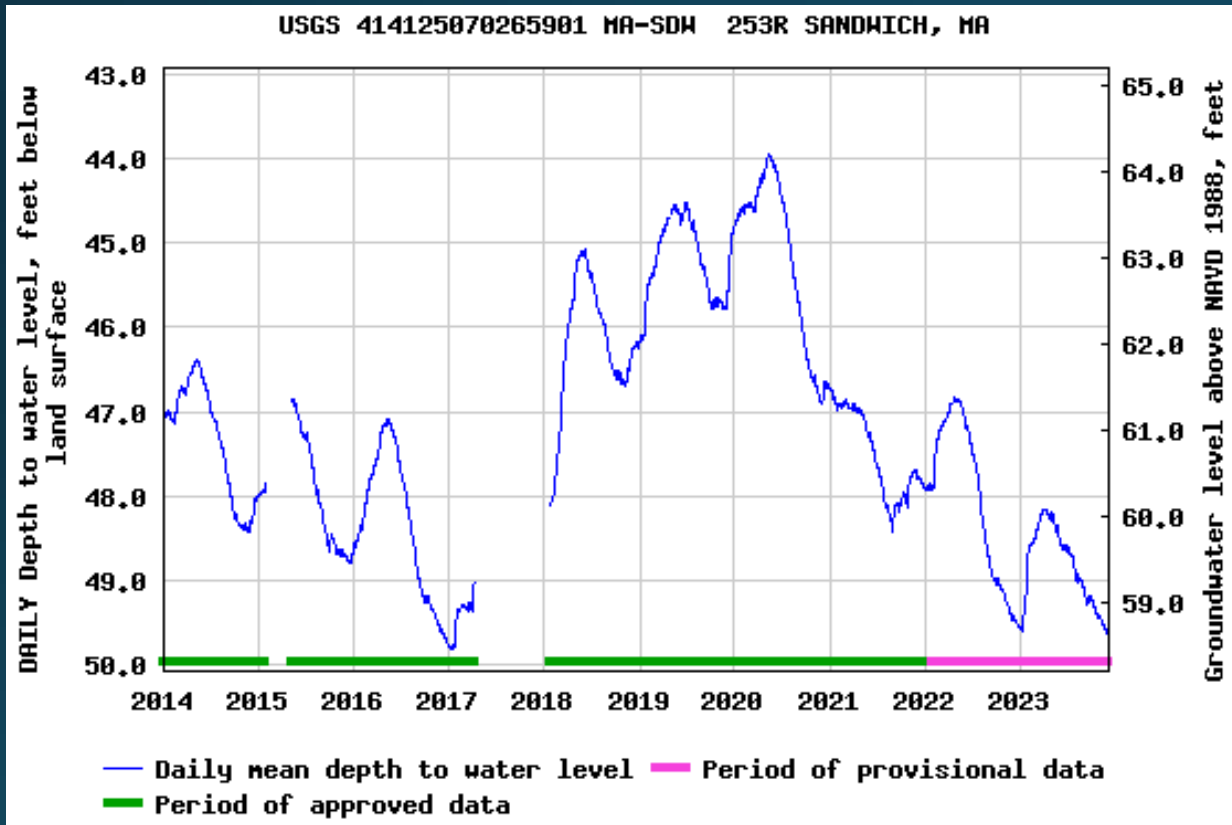
Period of Record: 61 yrs;  
continuous 22 yrs



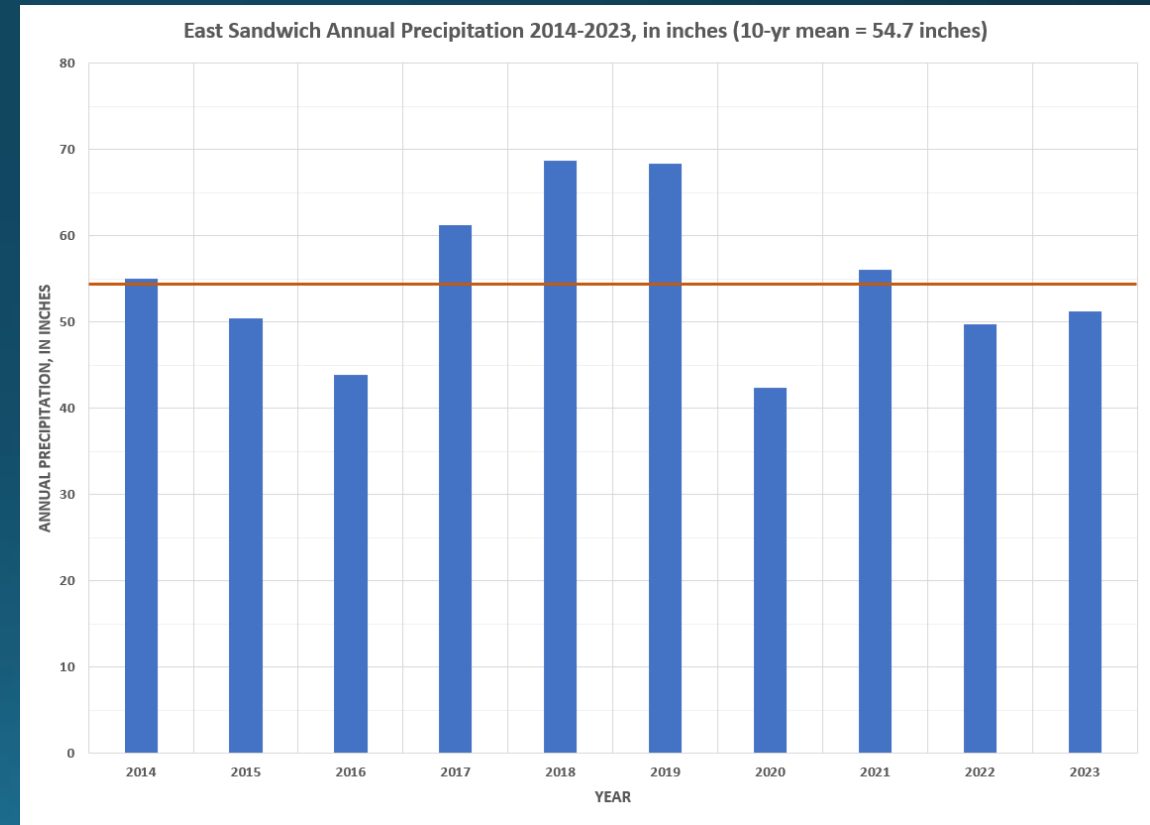
Precipitation – Chatham – 2014-2023

# Cape Cod Region – Sandwich Cont. WL Data

## Jan. 1, 2014 to Dec. 7, 2023

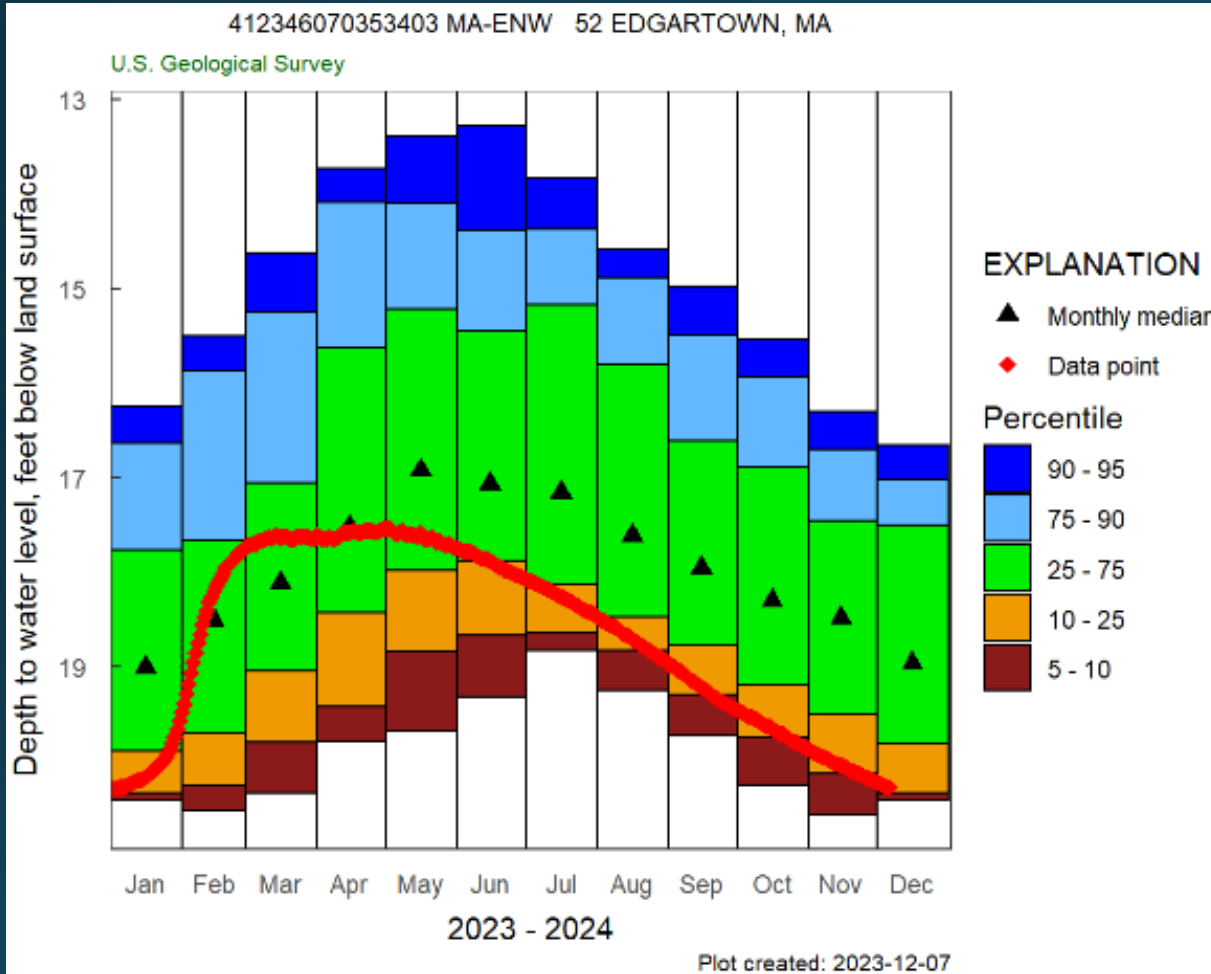


Period of Record: 61 yrs;  
continuous 11 yrs

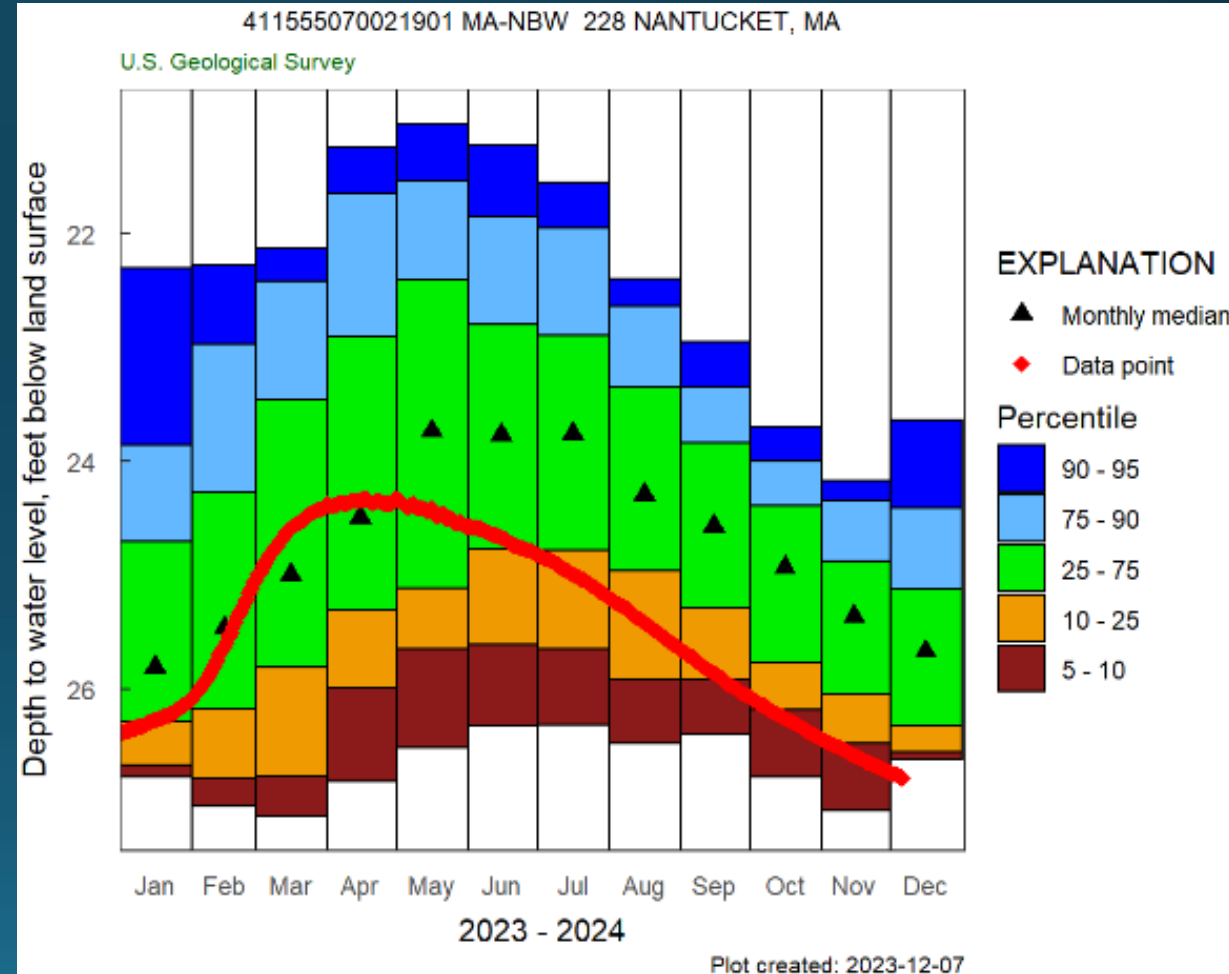


Precipitation – East Sandwich – 2014-2023

# Islands Region

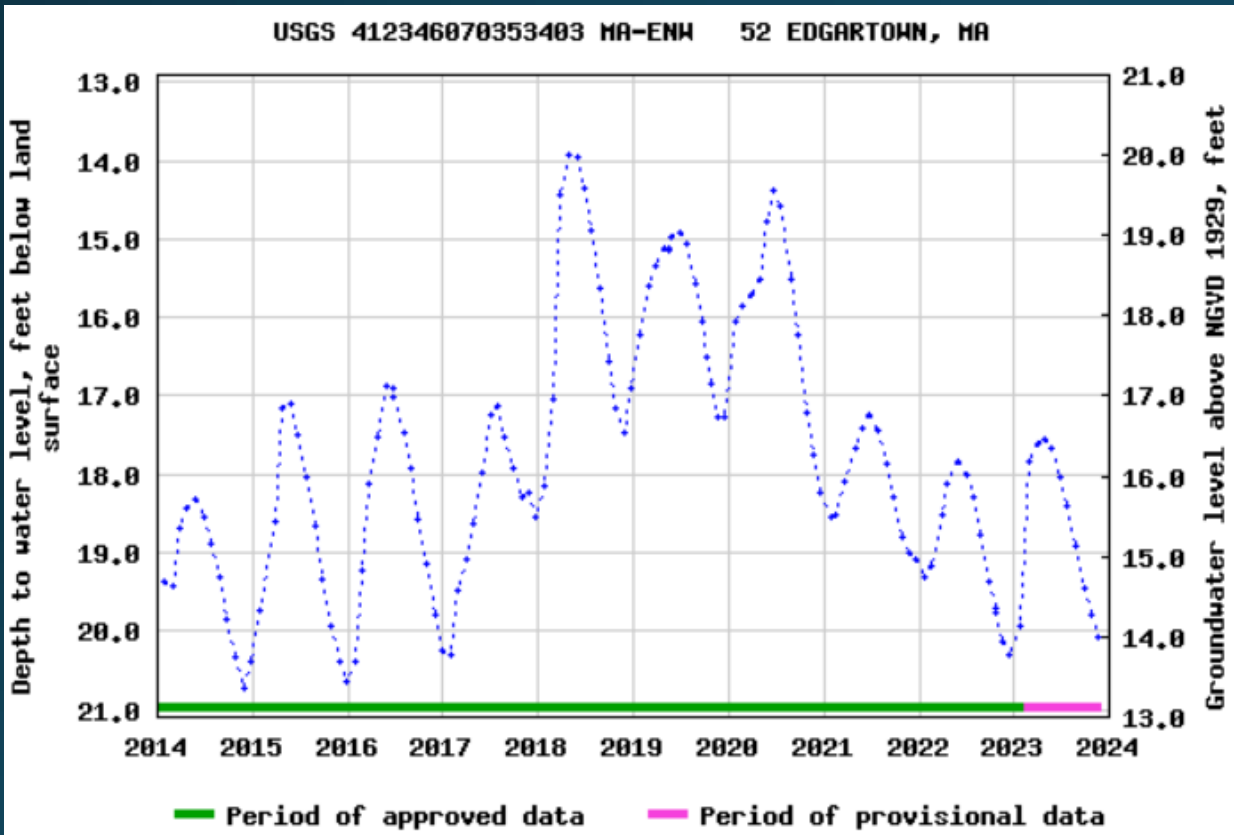


Period of Record: 47 yrs; continuous 4 yrs

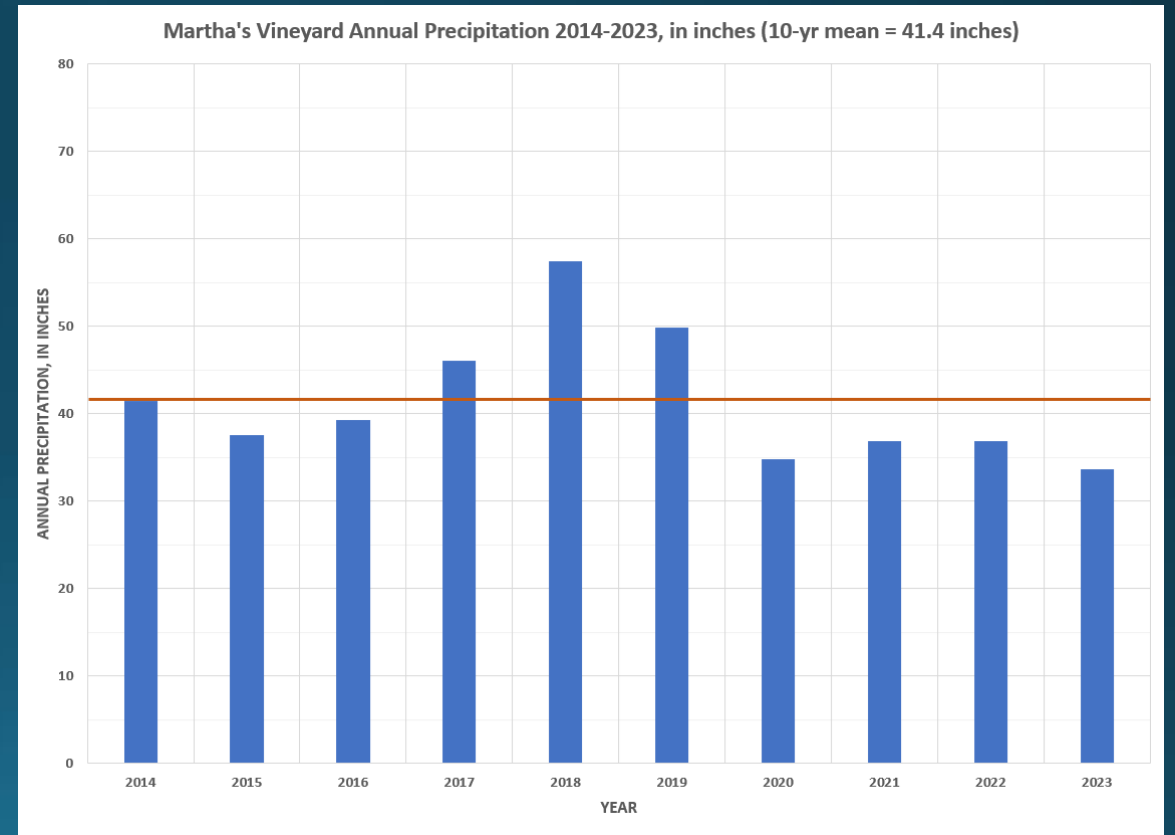


Period of Record: 47 yrs; continuous 1 yr

# Islands Region – Martha's Vineyard WL Meas. Jan. 1, 2014 to Dec. 7, 2023

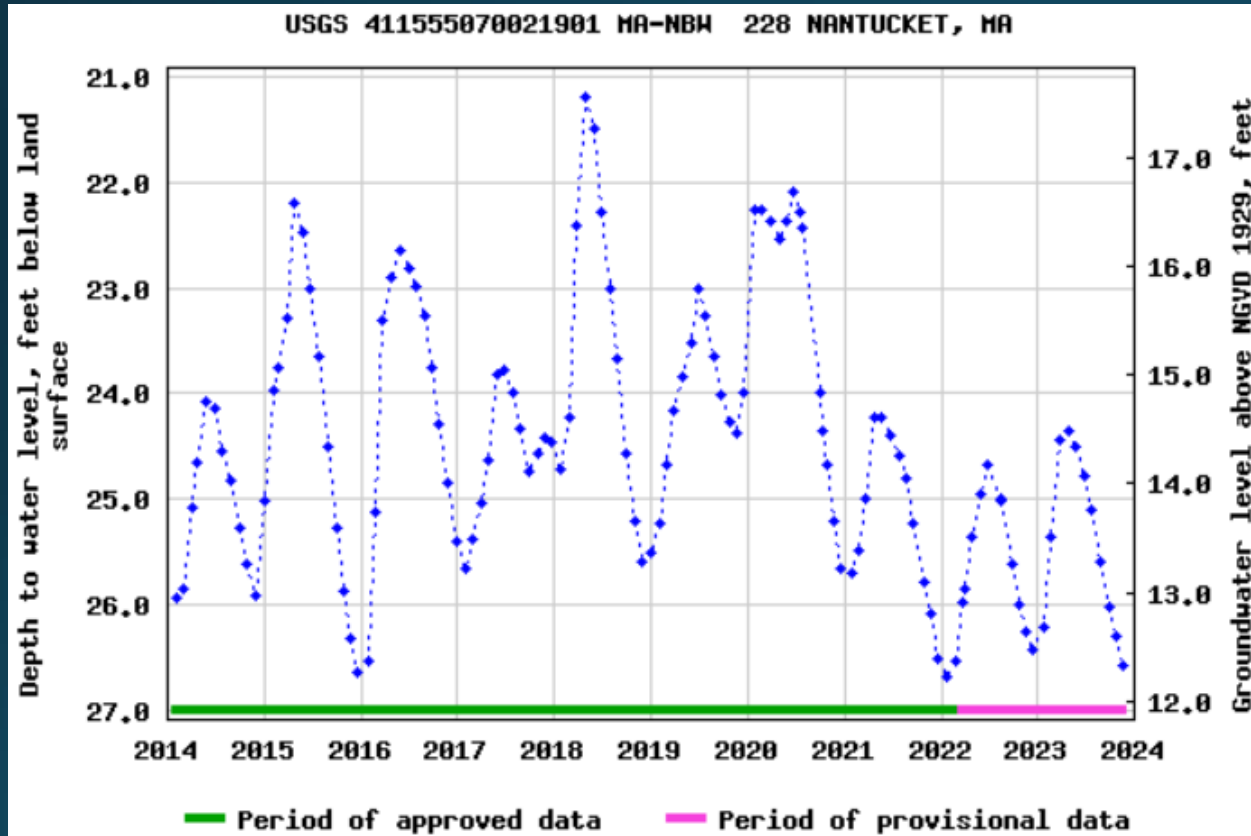


Period of Record: 47 yrs; continuous 4 yrs

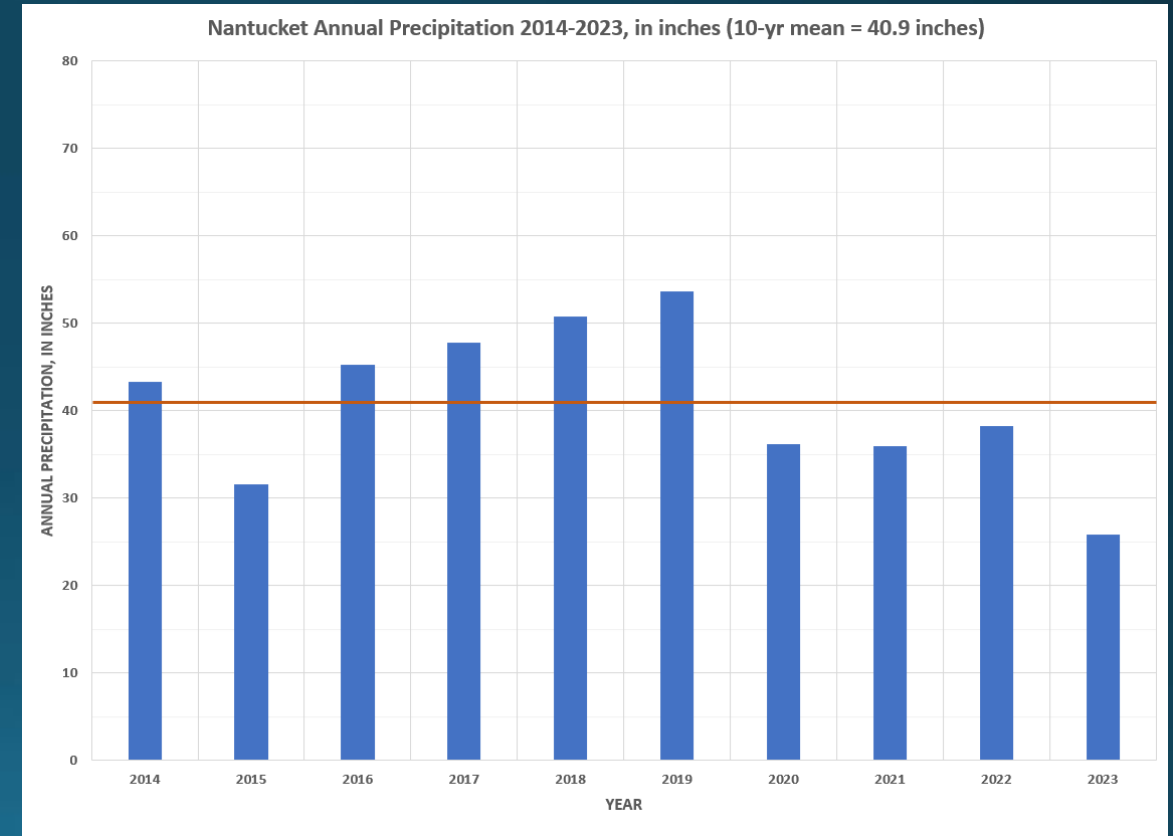


Precipitation – Martha's Vineyard – 2014-2023

# Islands Region – Nantucket WL Meas. Jan. 1, 2014 to Dec. 7, 2023



Period of Record: 47 yrs; continuous 1 yr



Precipitation – Nantucket – 2014-2023

# Summary of GW Levels for Cape and the Islands

- Groundwater levels generally start to rise each year starting in December or January (i.e. aquifer is starting to recharge)
- Groundwater levels generally lag about 1 yr (+ or – a few months) behind the annual precipitation totals (i.e. if precipitation was below normal last year then GW levels will generally be below normal – lower – this year)
- The selected GW wells “graphed” for west, central, and east Cape Cod and Martha’s Vineyard and Nantucket generally are below the 25<sup>th</sup> percentile or close to the 25<sup>th</sup> percentile (Brewster)
- Annual precipitation has been below the 10 yr mean (2014-23) for 3 of the last 4 years on the Cape and the last 4 years on Martha’s Vineyard and Nantucket