

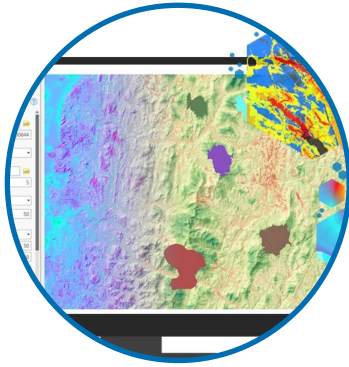


*2022 ESRI USER CONFERENCE*

# Living Atlas Update

Gonzalo Espinoza

# Esri Water Resources and Hydro Meeting

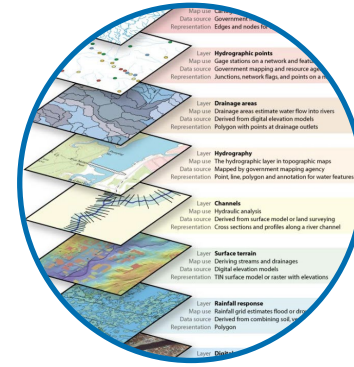


Spatial Analyst



Living Atlas

<https://livingatlas.arcgis.com/>



Arc Hydro

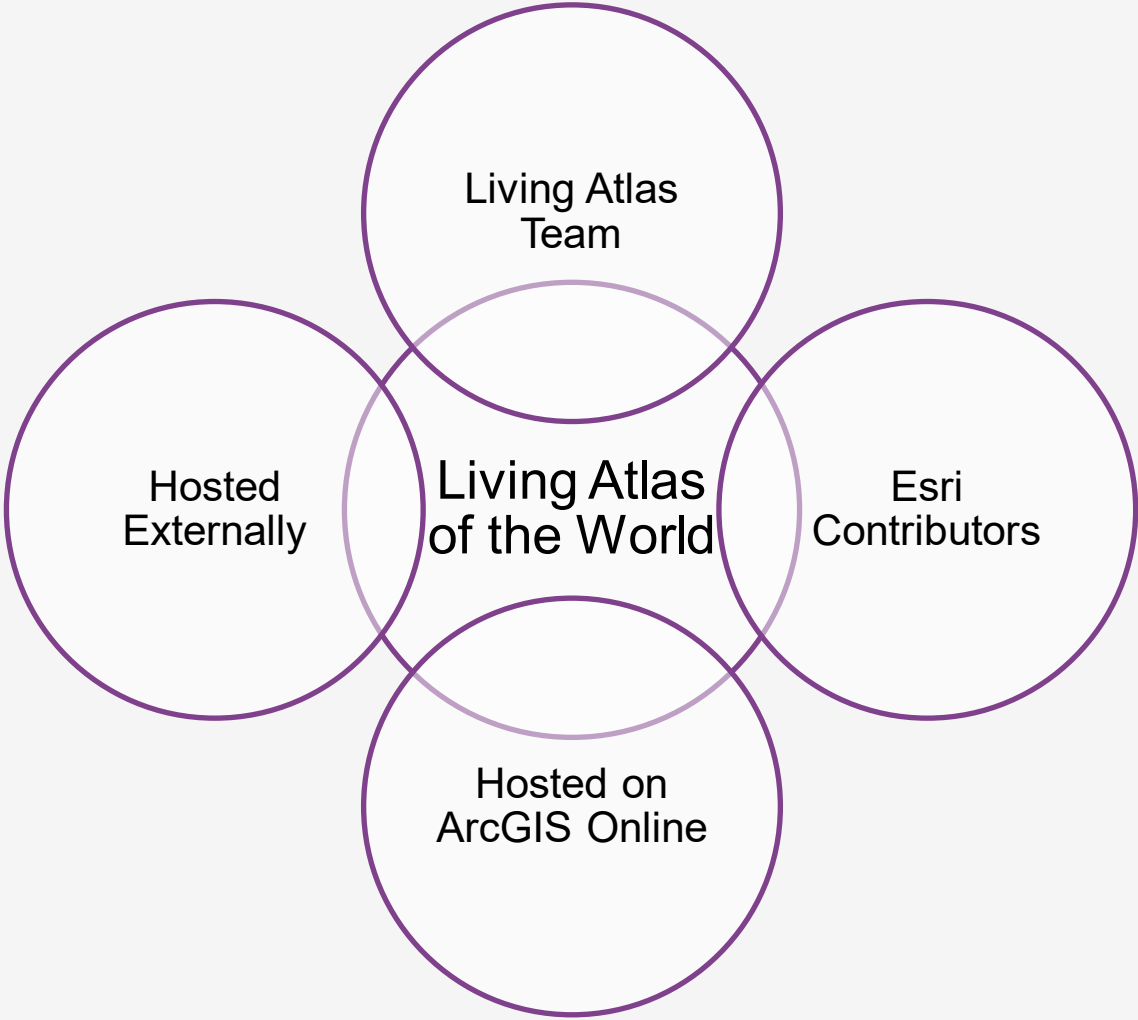
# The Living Atlas of the World

Authoritative  
Curated  
Interoperable  
Updated  
Growing



# Living Atlas Content

Source



# Water Resources Layers in Living Atlas

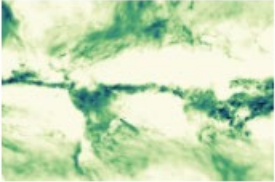
## Blog



<https://www.esri.com/arcgis-blog/products/arcgis-desktop/water/arcgis-living-atlas-of-the-world-layers-for-water-resources/>

# Precipitation & Evapotranspiration Image Services

- Monthly Satellite Precipitation Estimates (IMERG)



Monthly Satellite Precipitation Estimates ...

Imagery Layer By [esri](#)

Monthly precipitation from the Integrated Multi-satellitE Retrievals for GPM (IMERG).

Subscriber  Authoritative

[Share](#) [Star](#) [More](#)




Precipitation  
**78 mm**  
September 2021

Source: [NASA/IMERG](#)

[Zoom to](#) [Get Directions](#)

- Monthly Actual Evapotranspiration (SSEBop)



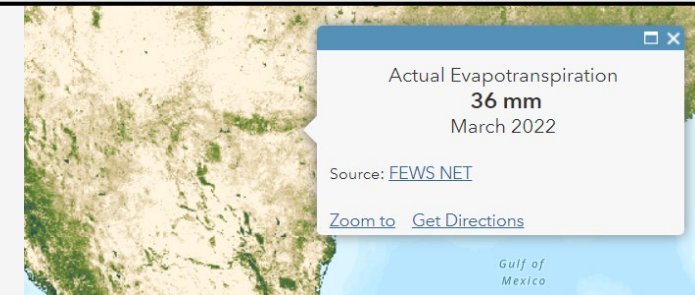
Monthly Actual Evapotranspiration (SSE...)

Imagery Layer By [esri](#)

Monthly actual evapotranspiration from the Operational Simplified Surface Energy Balance (SSEBop).

Subscriber  Authoritative

[Share](#) [Star](#) [More](#)



Actual Evapotranspiration  
**36 mm**  
March 2022

Source: [FEWS.NET](#)

[Zoom to](#) [Get Directions](#)

Gulf of Mexico

# Precipitation Lessons in Learn ArcGIS



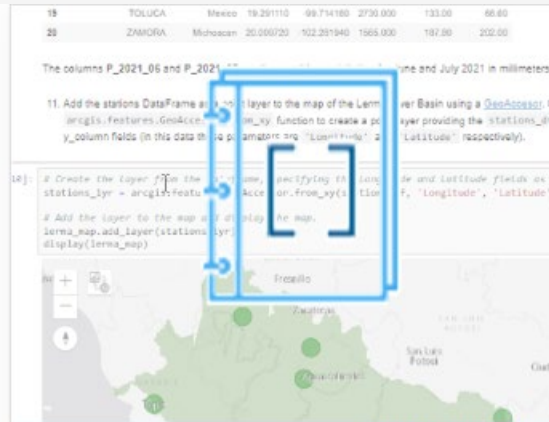
Next you'll create and configure a pop-up for the WorldClim layer in the web map.  
5. Create a list of the months of the year.

NOTEBOOK

## Analyzing interannual precipitation using ArcGIS Notebooks

Use ArcGIS Notebooks to create a mean annual precipitation map, configure its pop-up, extract and chart precipitation values at different locations, and export a raster.

🕒 45 min



NOTEBOOK

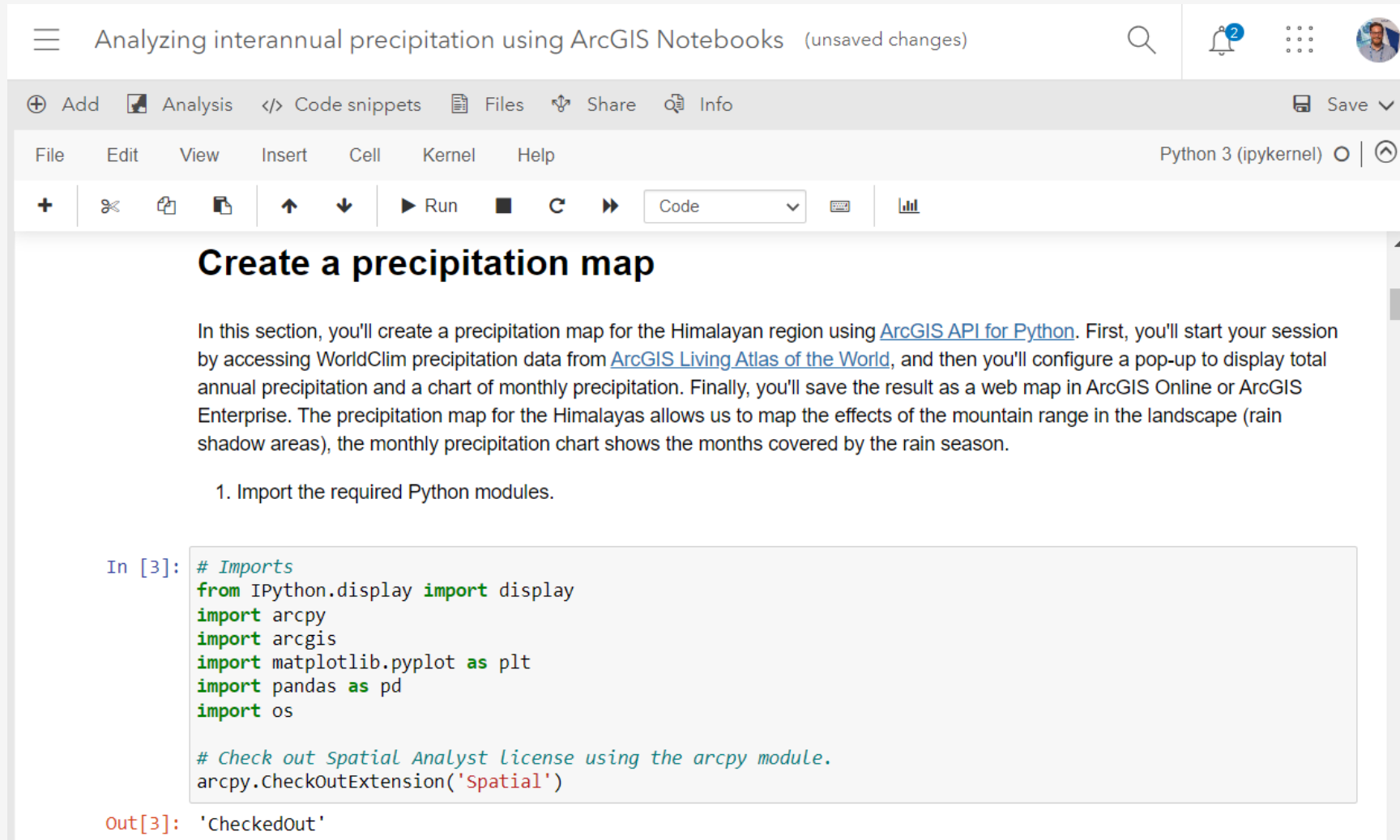
## Extract precipitation data and create an annual precipitation map using ArcGIS Notebooks

In this lesson, you will learn how to extract precipitation data from a CSV file and create an annual precipitation map using Python and ArcGIS Notebooks.

🕒 45 min

<https://learn.arcgis.com/en/gallery/#?q=precipitation&r=datascientist>

# Hosted Notebooks in AGOL



The screenshot shows the ArcGIS Notebook interface. The title bar reads "Analyzing interannual precipitation using ArcGIS Notebooks (unsaved changes)". The top navigation bar includes "Add", "Analysis", "Code snippets", "Files", "Share", and "Info". The main menu includes "File", "Edit", "View", "Insert", "Cell", "Kernel", and "Help". The kernel is set to "Python 3 (ipykernel)". The notebook content is titled "Create a precipitation map" and includes a paragraph of text and a code cell.

Analyzing interannual precipitation using ArcGIS Notebooks (unsaved changes)

Add Analysis Code snippets Files Share Info Save

File Edit View Insert Cell Kernel Help Python 3 (ipykernel)

## Create a precipitation map

In this section, you'll create a precipitation map for the Himalayan region using [ArcGIS API for Python](#). First, you'll start your session by accessing WorldClim precipitation data from [ArcGIS Living Atlas of the World](#), and then you'll configure a pop-up to display total annual precipitation and a chart of monthly precipitation. Finally, you'll save the result as a web map in ArcGIS Online or ArcGIS Enterprise. The precipitation map for the Himalayas allows us to map the effects of the mountain range in the landscape (rain shadow areas), the monthly precipitation chart shows the months covered by the rain season.

1. Import the required Python modules.

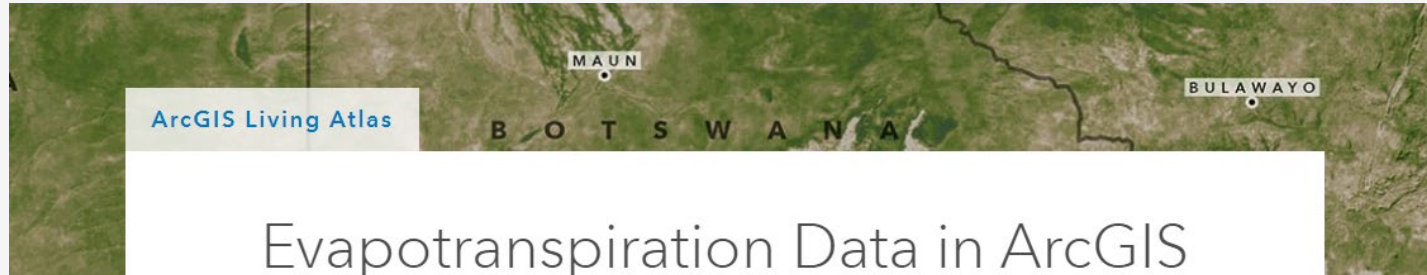
```
In [3]: # Imports
from IPython.display import display
import arcpy
import arcgis
import matplotlib.pyplot as plt
import pandas as pd
import os

# Check out Spatial Analyst license using the arcpy module.
arcpy.CheckOutExtension('Spatial')
```

Out[3]: 'CheckedOut'



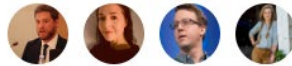
# Evapotranspiration Blog



## Evapotranspiration Data in ArcGIS Living Atlas of the World

Water

March 31, 2022



Gonzalo Espinoza  
Emily Meriam  
Craig McCabe  
Abigail Fitzgibbon

Evapotranspiration (ET) is a key component of the water cycle and is useful for many analysis and mapping applications. A new time-enabled imagery layer with [monthly ET measurements](#) is now available in Living Atlas.

### Understanding Evapotranspiration

Evapotranspiration represents the water that flows from the landscape into the atmosphere. ET combines the water fluxes from (1) direct soil evaporation, (2) evaporation from intercepted precipitation on trees, branches, and leaves, and (3) transpiration from plants.



<https://www.esri.com/arcgis-blog/products/arcgis-living-atlas/water/evapotranspiration-data-in-arcgis-living-atlas-of-the-world/>

# GPM IMERG Early Precipitation Rate

NASA

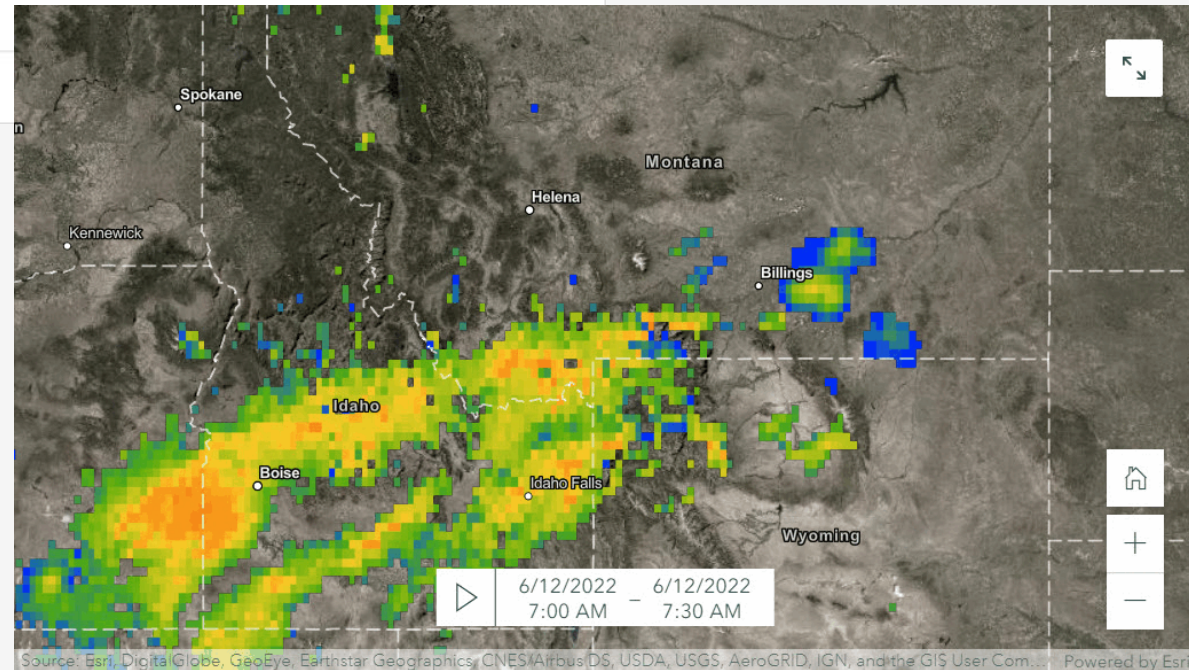


GPM IMERG Early Precipitation Rate (GPM\_3IMERGHHE preci...

Imagery Layer By [NASA\\_Earthdata](#)

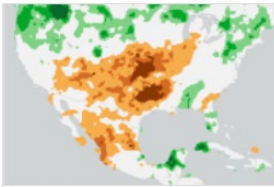
Image service of IMERG Early product displaying precipitation rate in mm/hr at 30 minute intervals. Information on map configuration, color bar, and data, is available in Item Details.

✓ Authoritative



# Precipitation Indices – SPI & SPEI

## Standardized Precipitation Index (SPI) Recent Conditions



☆ Add to Favorites

Standardized Precipitation Index (SPI) calculated from CHIRPS. Current month: April 2022.

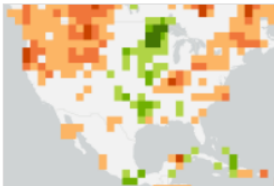
📍 Feature Layer from Esri  
Managed by [esri\\_livefeeds2](#)

Created: Jul 7, 2020 Updated: Jun 1, 2022  
View Count: 154,759

✔ Authoritative

📍 Living Atlas

## Standardized Precipitation-Evapotranspiration Index (SPEI) Recent



☆ Add to Favorites

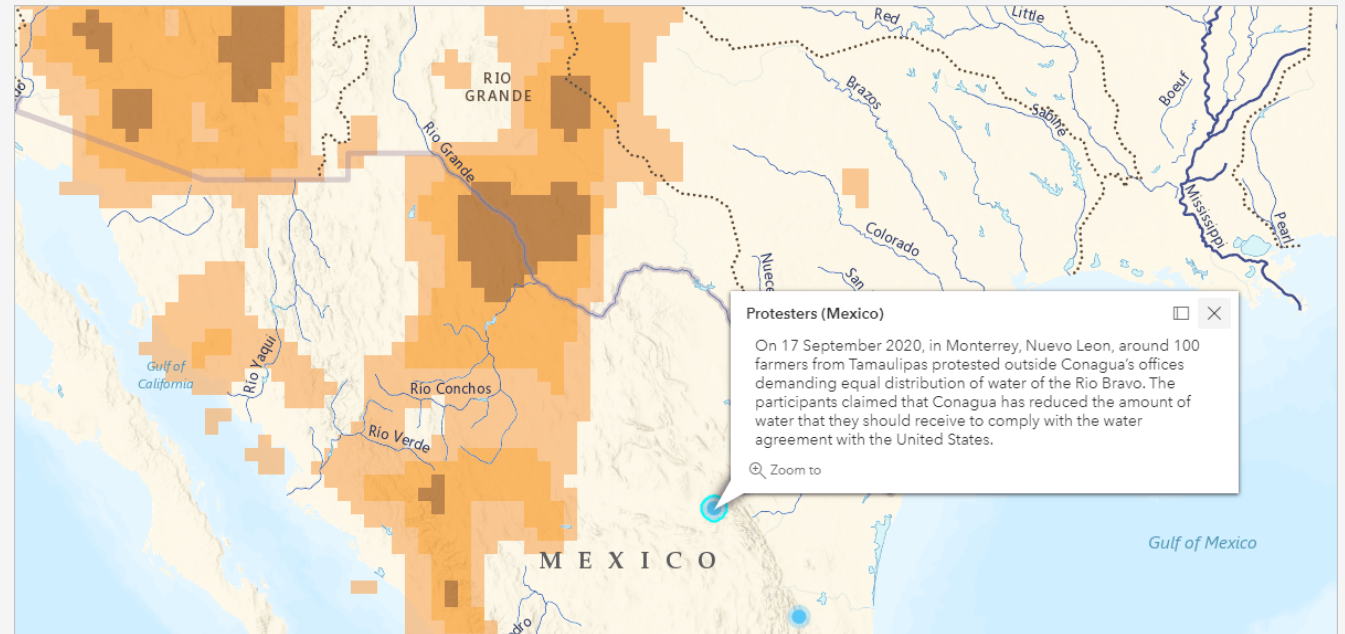
Standardized Precipitation-Evapotranspiration Index from the SPEI Global Drought Monitor. Current month: May 2022.

📍 Feature Layer from Esri  
Managed by [esri\\_livefeeds2](#)

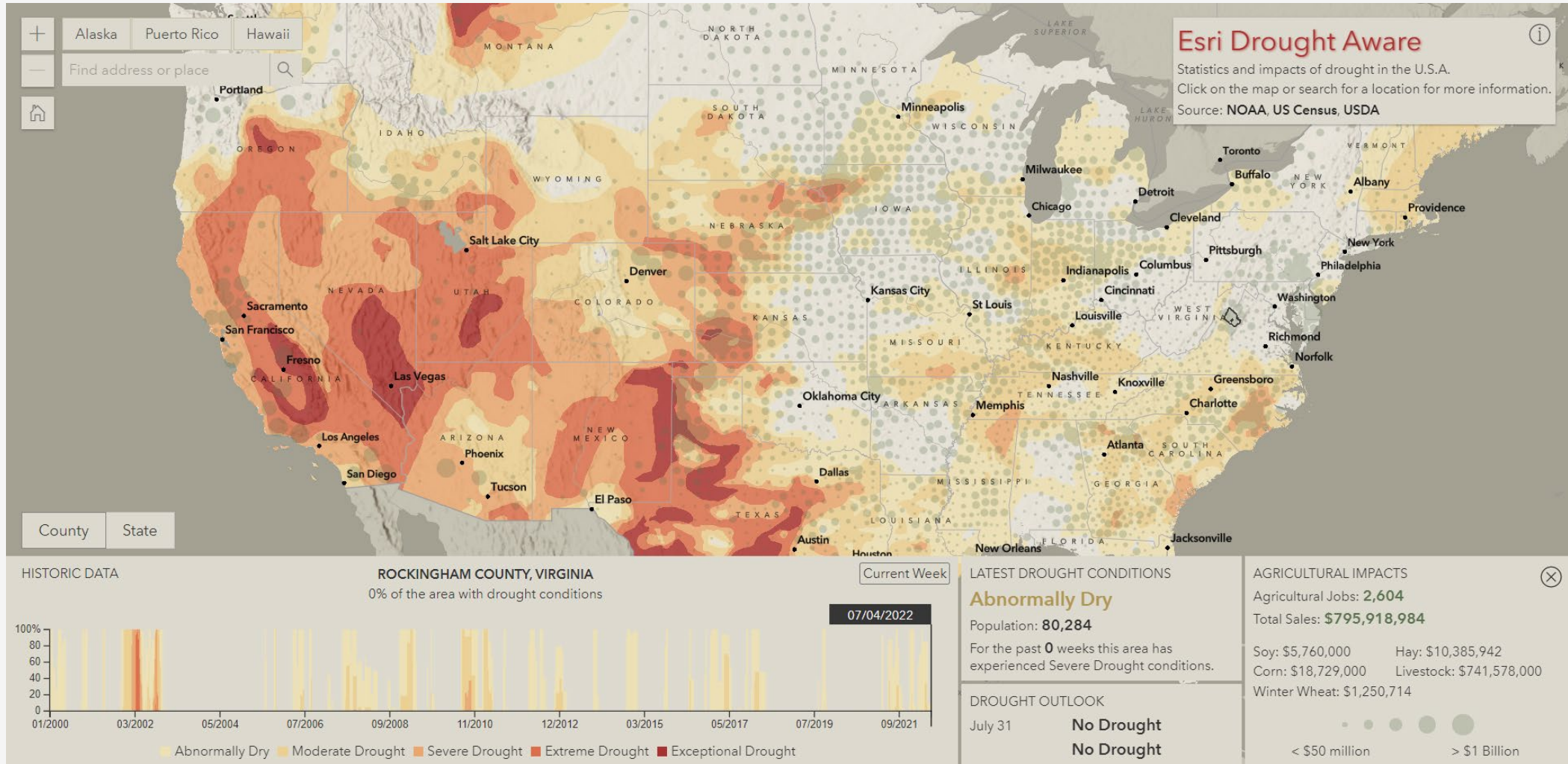
Created: Feb 18, 2022 Updated: Jun 11, 2022  
View Count: 2,227

✔ Authoritative

📍 Living Atlas



# Esri Drought Aware App



# Live Stream Gauges


## Live Stream Gauges

### Status

- Major Flood
- Moderate Flood
- Minor Flood
- Action Stage
- Low Flow
- Unknown
- No Flooding



# National Water Model



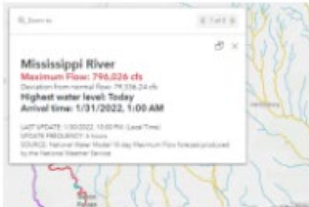
**Columbia River**  
Highest water level is 2 hours from now  
Arrival time: 1/31/2022, 10:00 AM  
Maximum flow: 131,379 cfs  
Deviation from normal flow: 93,048 cfs

LAST UPDATE: 1/31/2022, 4:30 AM (Local Time)  
UPDATE FREQUENCY: 1 hour  
SOURCE: National Water Model 10-day Maximum Flow Forecast produced by the National Weather Service

National Water Model Maximum Flow (Hourly ...)  
Feature Layer By [esri\\_livefeeds2](#)

This layer provides a summarization of the National Water Model Hourly Forecast, including maximum flow per river segment and time of maximum flow.

Authoritative



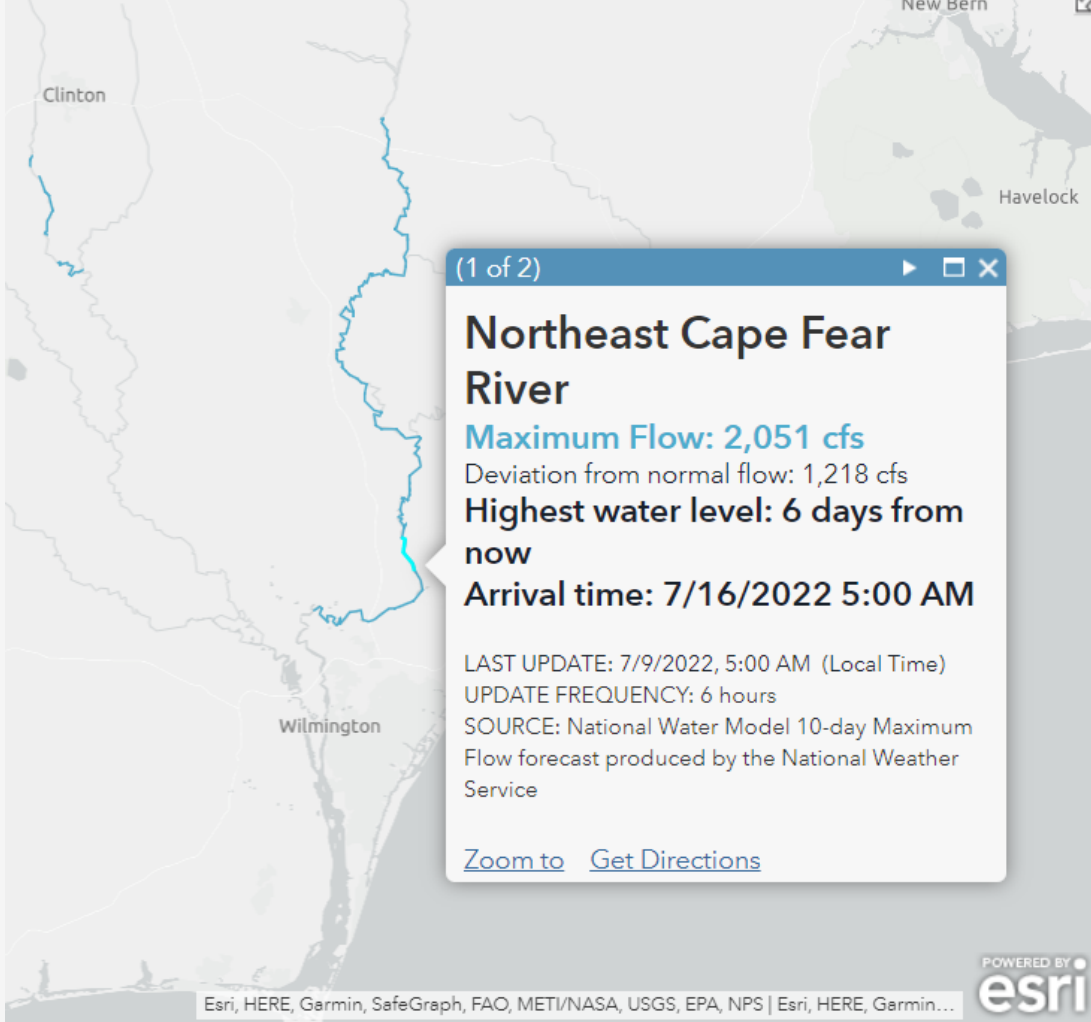
**Mississippi River**  
Maximum Flow: 795,020 cfs  
Deviation from normal flow: 79,020 cfs  
Highest water level Today  
Arrival time: 1/31/2022, 1:00 AM

LAST UPDATE: 1/31/2022, 10:00 AM (Local Time)  
UPDATE FREQUENCY: 6 hours  
SOURCE: National Water Model 10-day Maximum Flow Forecast produced by the National Weather Service

National Water Model Maximum Flow (10 Day ...)  
Feature Layer By [esri\\_livefeeds2](#)

This layer provides a summarization of the National Water Model 10-Day forecast, including maximum flow per river segment and time of maximum flow.

Authoritative



(1 of 2)

**Northeast Cape Fear River**  
Maximum Flow: 2,051 cfs  
Deviation from normal flow: 1,218 cfs  
Highest water level: 6 days from now  
Arrival time: 7/16/2022 5:00 AM

LAST UPDATE: 7/9/2022, 5:00 AM (Local Time)  
UPDATE FREQUENCY: 6 hours  
SOURCE: National Water Model 10-day Maximum Flow forecast produced by the National Weather Service

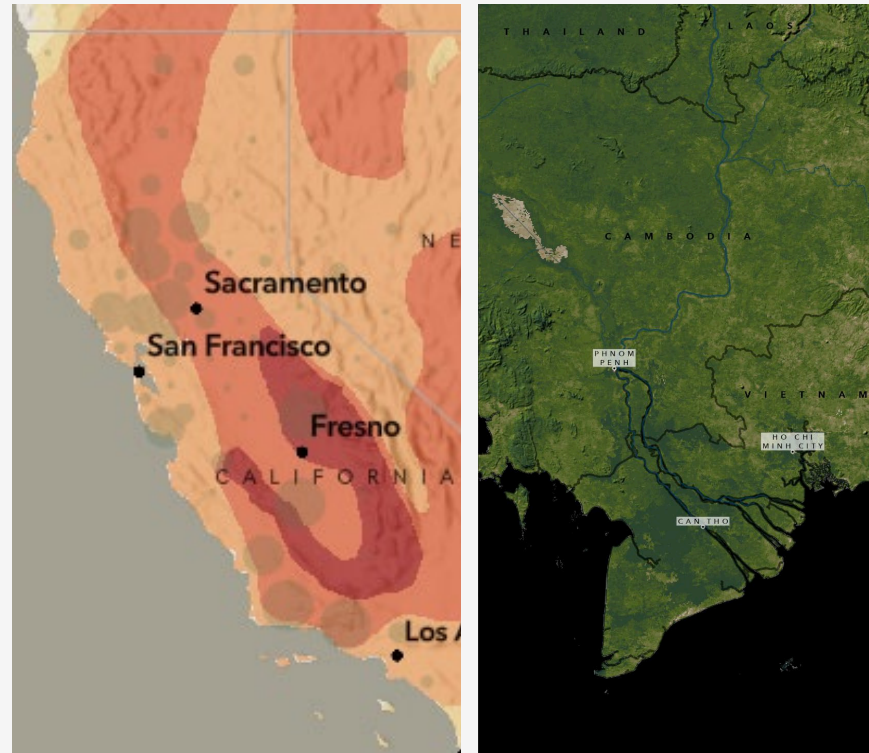
[Zoom to](#) [Get Directions](#)

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# Summary

Living Atlas includes a collection of water resources layers that are ready-to-use in your maps, apps, & analysis.





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OF  
WHERE<sup>®</sup>