



Department of
Environmental
Conservation



Northeast
Regional
Climate
Center

NY Drought Forecast Tool & Dashboard

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Northeast Regional Climate Center

October 29th, 2026

Background

- Direct collaboration with NY Department of Environmental Conservation (DEC)

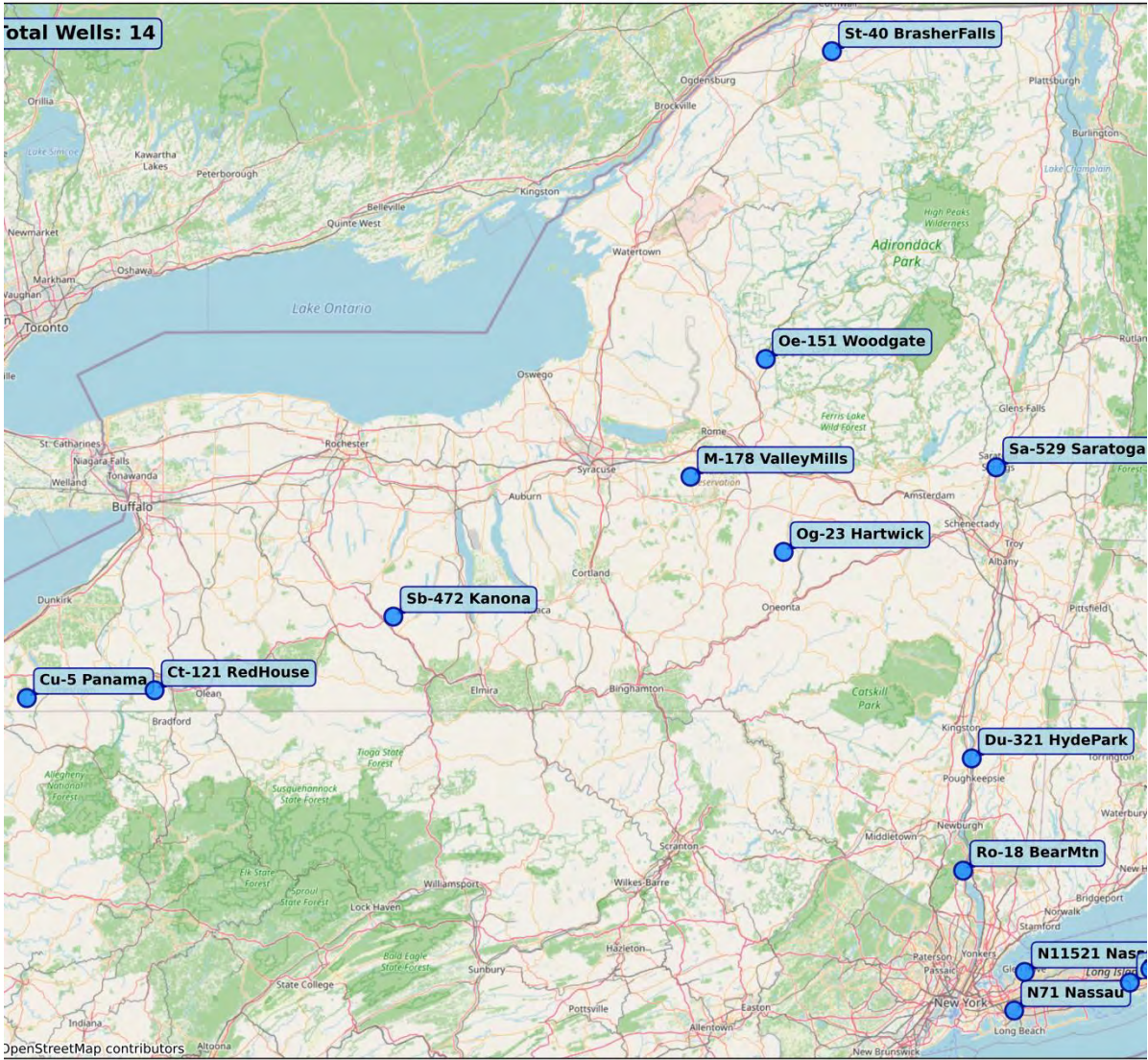
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- Direct collaboration with NY Department of Environmental Conservation (DEC)
- Includes input from an Expert Advisory Panel and a User Experience Committee covering multiple sectors
 - NY Department of Agriculture, NYC DEC, NY Department of Health, Central NYC's Water Authority (OCWA)

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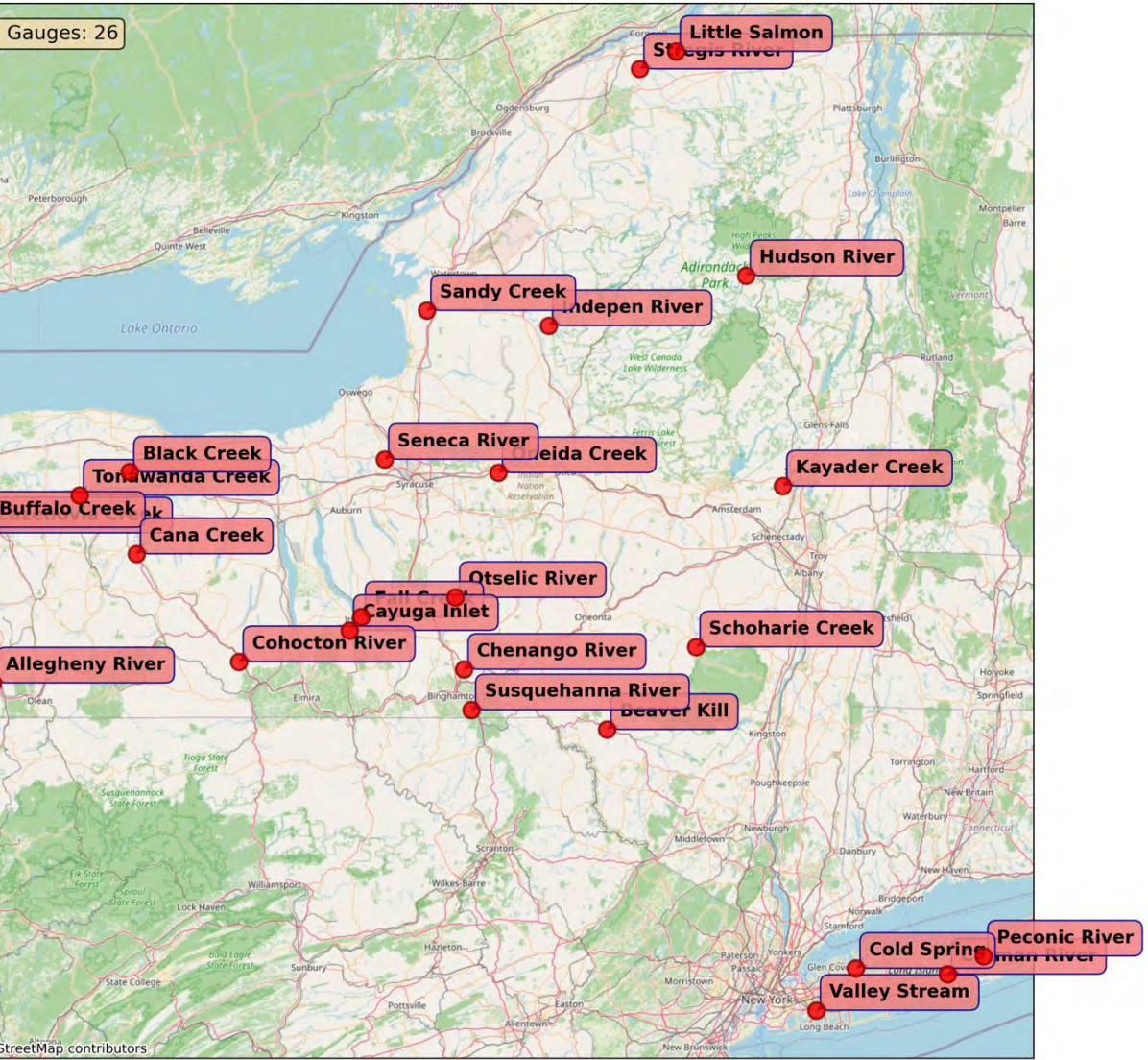
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- Goal of the project: create an interactive drought forecast tool and dashboard to meet users needs
 - Develop sub-seasonal forecasts for streamflow and groundwater levels
 - Utilize machine learning

USGS Groundwater Well Locations in New York State



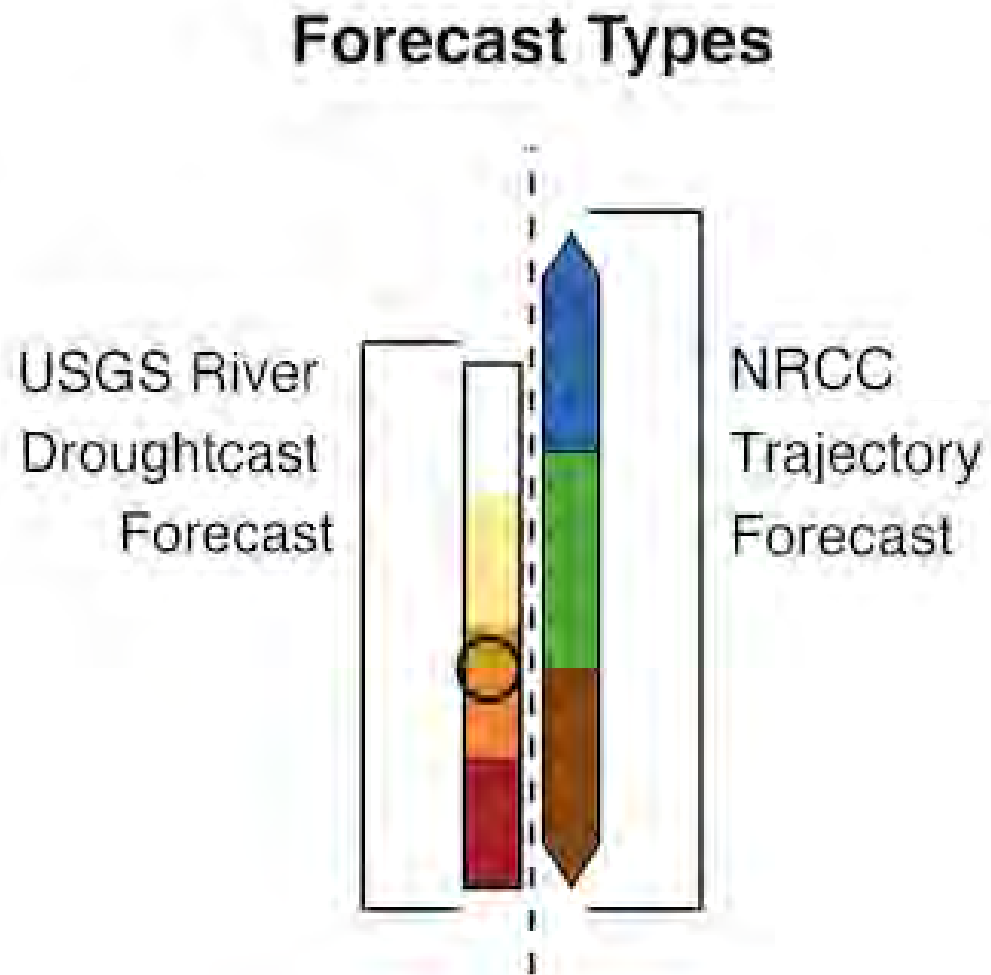
Longitude

USGS Stream Gauge Locations in New York State



Longitude

Two Forecasts Presented



NRCC Streamflow/Water level Trajectory Forecast

- Categorical model: **predicting the change in streamflow/water level** from current conditions to forecast days (7 days and 14 days out)
 - Increase, persist, decrease

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- AI/ML LightGBM Classifier Model
 - Single model for each stream/well
 - Is driven by features:
 - Discharge/Water level: current and change over time
 - Seasonality: annual sine and cosine
 - Weather metrics: temperature (min, max, mean) and precipitation (past and future)

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 - The model gives a probabilistic forecast
 - E.g, 25% confident the streamflow will increase in 7 days, 25% confident it will persist, and 50% confident it will decrease
 - Mean skill score increase $\sim .25$ over persistence

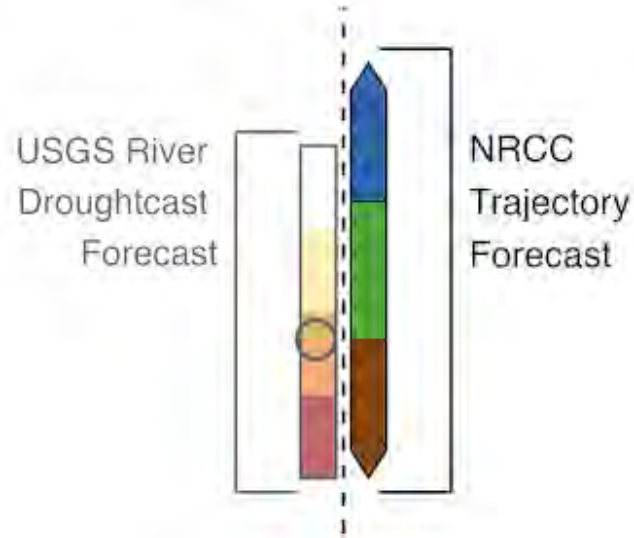
Precipitation forecasts

- Future precipitation amounts are key features for the stream forecasts (less so for groundwater)
- To meet users' needs, we take an ensemble approach to precipitation forecasts

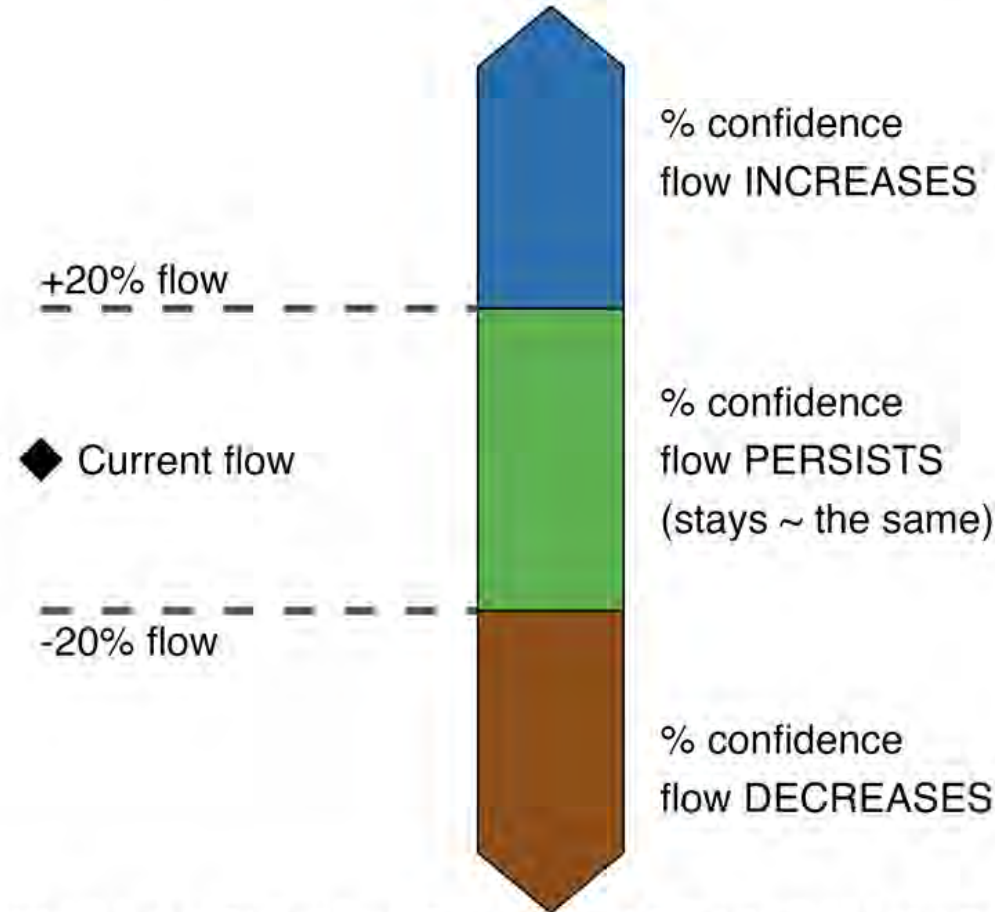
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- To meet users' needs, we take an ensemble approach to precipitation forecasts:
 - Weather Prediction Center 7-day forecast and Climate Forecast System Version 2 14-day forecast
 - European Centre for Medium-Range Weather Forecasts (ECMWF)
 - Control forecast
 - Ensemble mean
 - Ensemble 10th percentile (p10, low end)
 - Ensemble 90th percentile (p90, high end)

Forecast Types

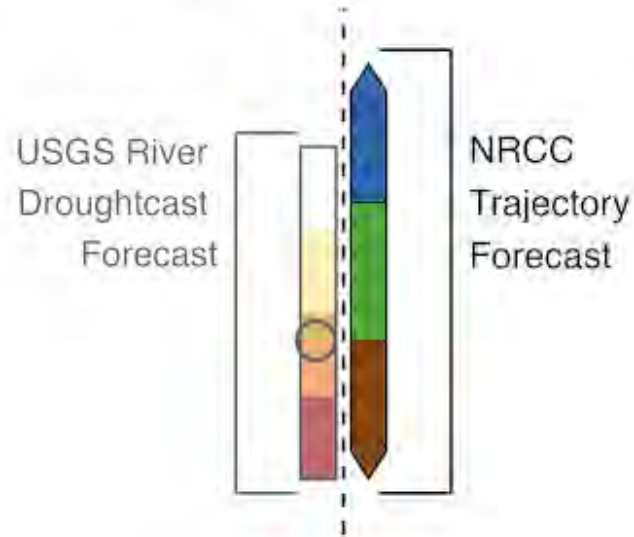


NRCC Streamflow Trajectory Forecast

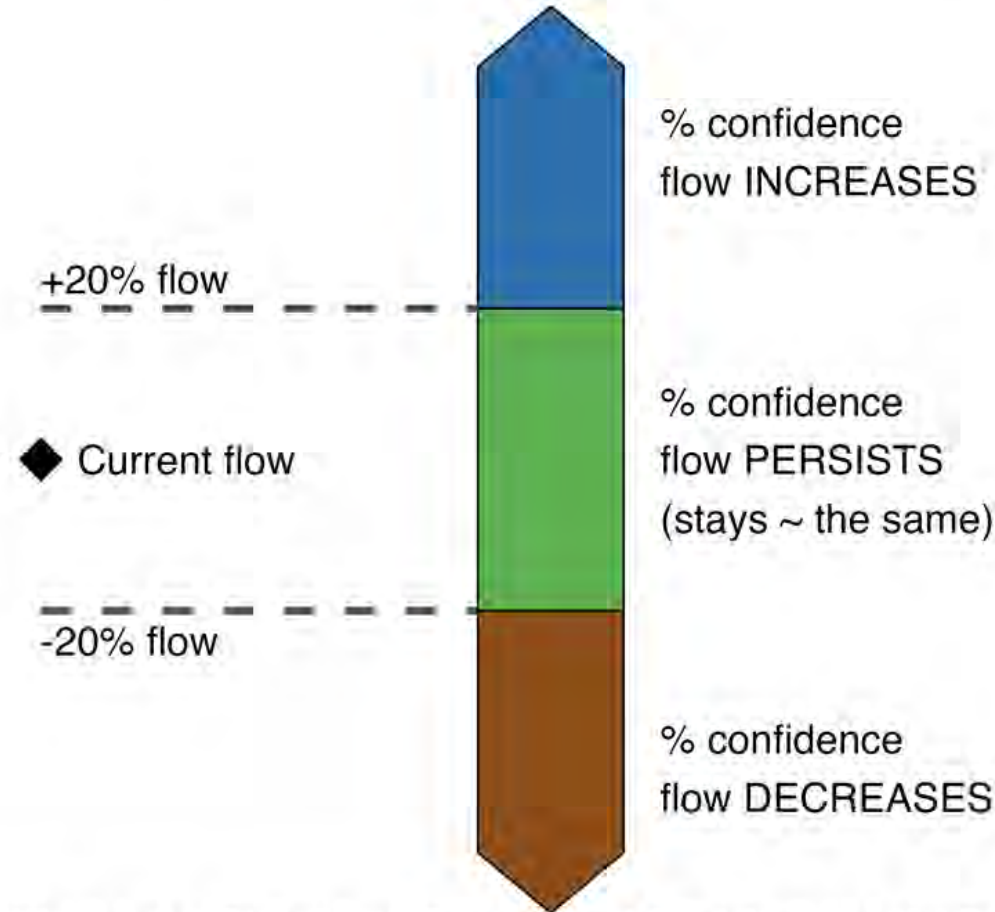


NRCC site specific Light Gradient Boosting Machine (LightGBM) Classifier models predict categorical changes in streamflow (i.e., increase, decrease, persist) from current conditions to target forecast days.

Forecast Types



NRCC Streamflow Trajectory Forecast



For groundwater, the forecast is for changes in water level and the bounds are +/- 5 percentiles as wells did not see as much variation week to week as streams did.

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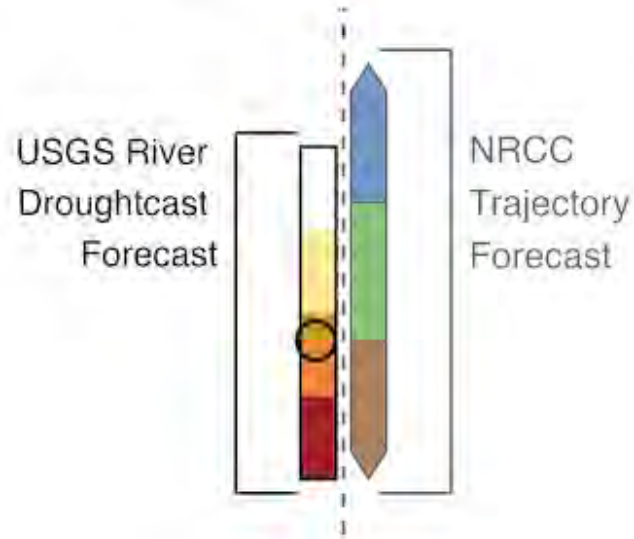
USGS River DroughtCast Forecast

- USGS scientists built an AI/ML model (a long short-term memory, or LSTM, recurrent neural network) that **predicts streamflow percentiles**

USGS River DroughtCast Forecast

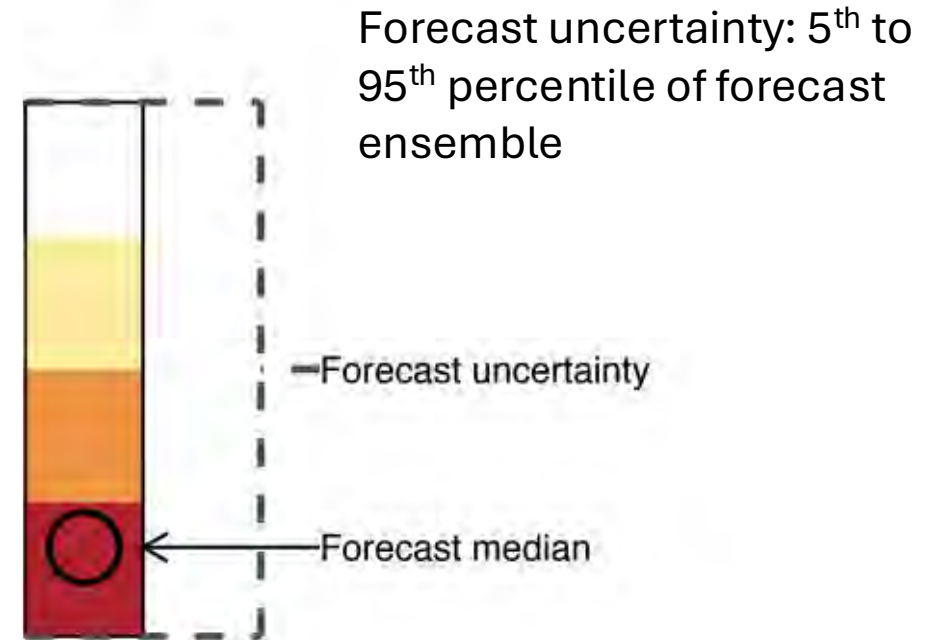
- USGS scientists built an AI/ML model (a long short-term memory, or LSTM, recurrent neural network) that **predicts streamflow percentiles**
- Uses watershed characteristics, recent precipitation and streamflow conditions, and upcoming weather forecasts
- Model built to prioritize predicting drought conditions not overall accuracy
- One model for all streams

Forecast Types



USGS River Droughtcast Forecast

Streamflow Drought Categories



The USGS long short-term memory (LSTM) recurrent neural network model predicts the percentile the future streamflow will fall into (relative to the historical record for that calendar date) with uncertainty bounds.

Alpha version development website

- Please note that the website is still in its alpha stage and therefore is not as polished as it will be when released
- There are inconsistencies between pages because we want to get feedback from the User Experience Committee before applying widespread changes
- [DEC/NRCC website](#)