

HydroForecast Long-term



Evaluating future climate scenarios for water supply risk planning

Organizations that rely on water will be profoundly affected as water supply conditions change over the coming decades. Historical patterns are unlikely to provide sufficient information about how much water will be available in the future and how flow patterns may shift. Moreover, most existing hydrologic models were built for more stable conditions and are not well suited for a volatile water future.

HydroForecast Long-term applies its best-in-class hydrologic model – which is specifically built to perform during dynamic and extreme conditions – to understand how flows may change under various future climate scenarios. This analysis can inform predictions for hydropower generation at existing and potential sites; flood control planning; and water supply for cities, agriculture, and ecosystems.

HydroForecast Long-term estimates future precipitation, temperature, and streamflow to help answer questions like:

- ❖ How will overall and annual water availability change?
- ❖ How might flow patterns shift? Will precipitation that currently falls as snow shift to rain, meaning higher flows in late winter and lower flows in the summer?
- ❖ How often will flows reach dangerously high rates or flood stage?
- ❖ How might drought patterns change in frequency and severity?
- ❖ How often could temperatures exceed or fall below critical values?

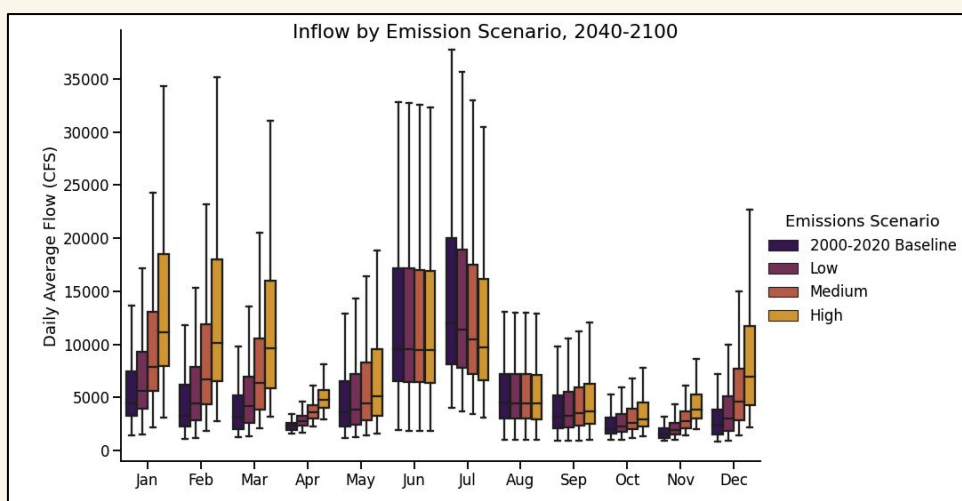
What's included:

- ❖ Streamflow rate and volume estimates under multiple scenarios out to 2100
- ❖ Downscaled future temperature & precipitation predictions
- ❖ Report summarizing and visualizing key potential future patterns for the basin
- ❖ All time series data available by CSV file
- ❖ Simulations can be updated using the latest data and methods in line with your planning needs or on a regular cadence

Scenario-driven analysis

HydroForecast Long-term highlights how flows might change across discrete scenarios.

This analysis can illuminate opportunities to take advantage of, shared vulnerabilities across scenarios, and low-likelihood, high-risk potentials to mitigate.



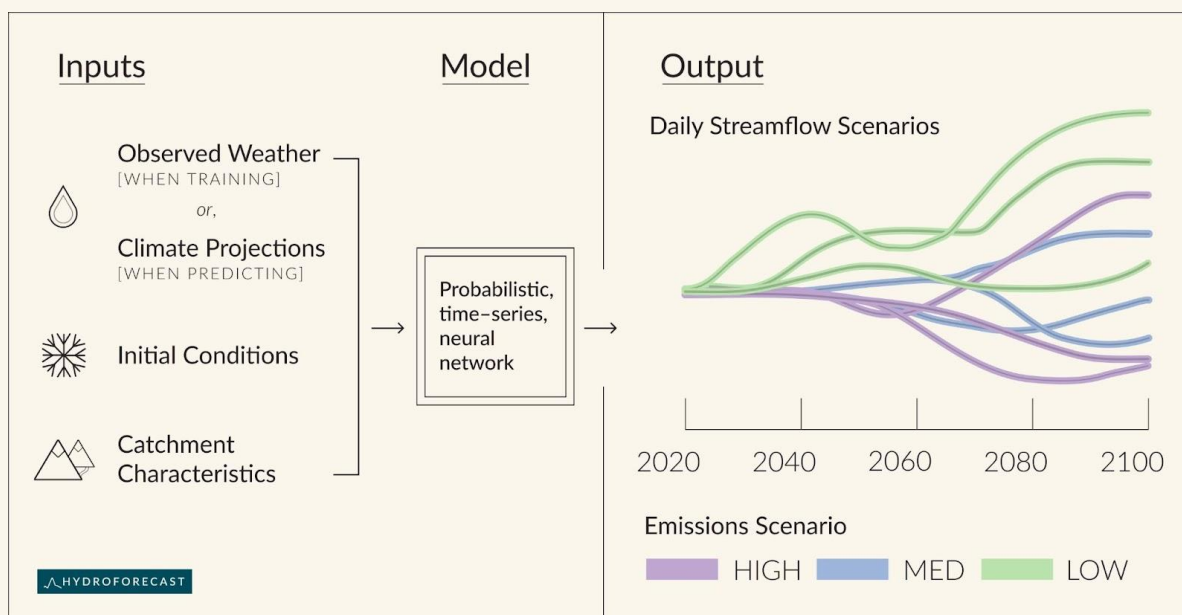
Higher emissions might increase winter flows in this basin by 2-4x

How it Works

HydroForecast Long-term applies Upstream Tech's award-winning theory-guided machine learning hydrologic model to translate inputs like precipitation and temperature into future streamflow. The hydrologic model is based on peer-reviewed research and has been trained on hundreds of basins to learn how meteorological inputs and basin conditions affect streamflow across widely ranging conditions, including extreme events in diverse hydrologies.¹

Since future climate conditions will depend on human choices, HydroForecast Long-term defines a range of future scenarios that are driven by the world's most trusted long-term climate models, the CMIP6 global climate model predictions. In short, it takes a range of plausible emissions scenarios and provides the best possible prediction of water availability in each of those scenarios.

HydroForecast Long-term pulls projections from up to three emission scenarios and six modeling groups to create a potential 18 scenarios of temperature and precipitation time series out to 2100, which are then applied to the HydroForecast hydrologic model to predict streamflow scenarios.



The Team Behind HydroForecast

Upstream Tech is a team of 30+ water resource experts, software engineers, and machine learning experts trusted by dozens of leading hydropower producers, water utilities, government agencies, and conservation organizations across the globe. The company is backed by leading investors, including the Bill Gates-led Breakthrough Energy Ventures. Partners include:



1. <https://www.upstream.tech/hydroforecast/explore#research>