Update on the use of the Hydrologic Ensemble Forecast System at the California Nevada River Forecast Center

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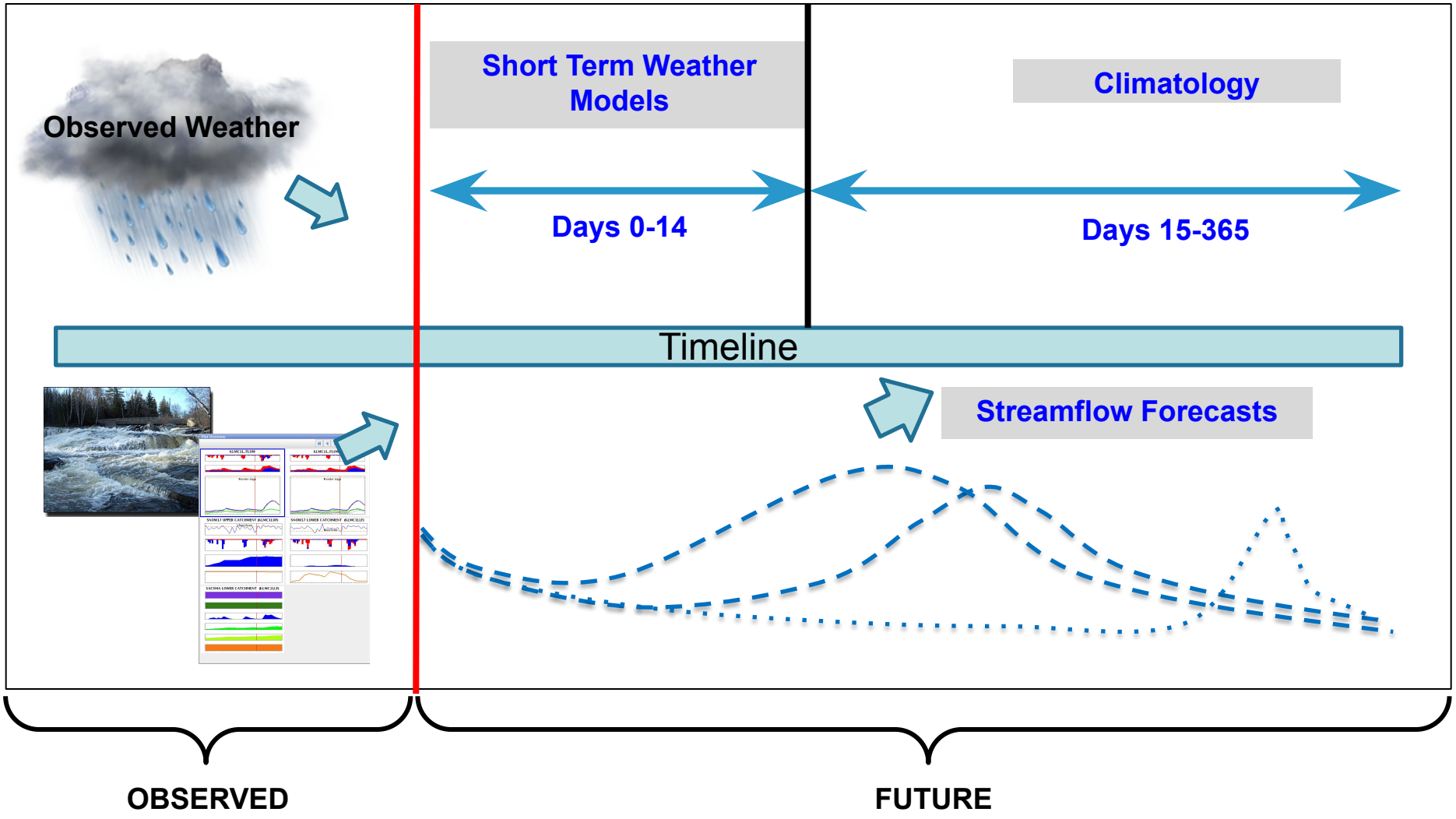
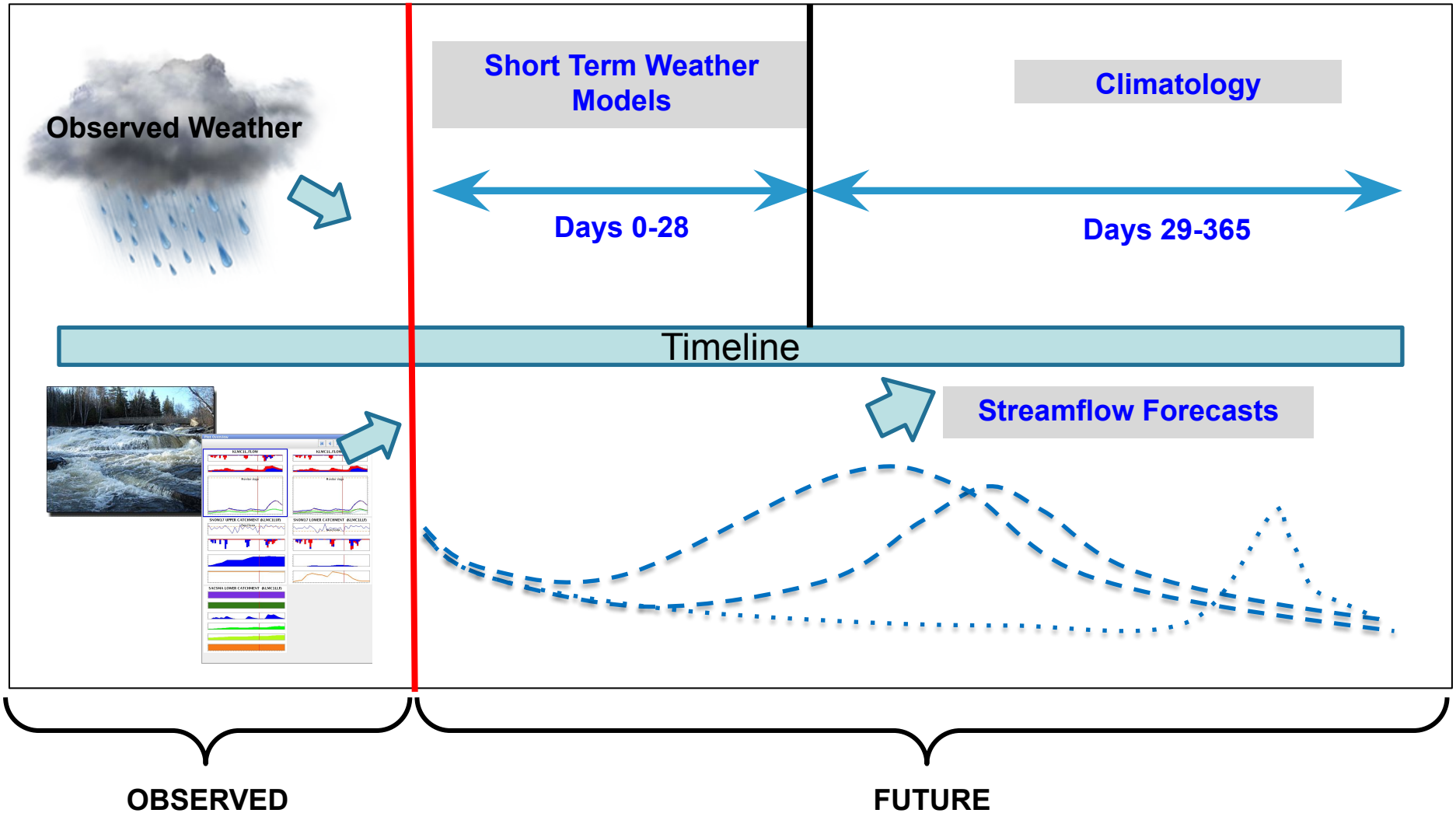
Ensemble Streamflow Forecasting



Expanded use of weather model out to 4 weeks



SANTA ANA RIVER - PRADO RESERVOIR (ADOC1)

Latitude: 33.89° N Longitude: 117.64° W Elevation: 580 Feet
Location: Riverside County in California River Group: Southern California

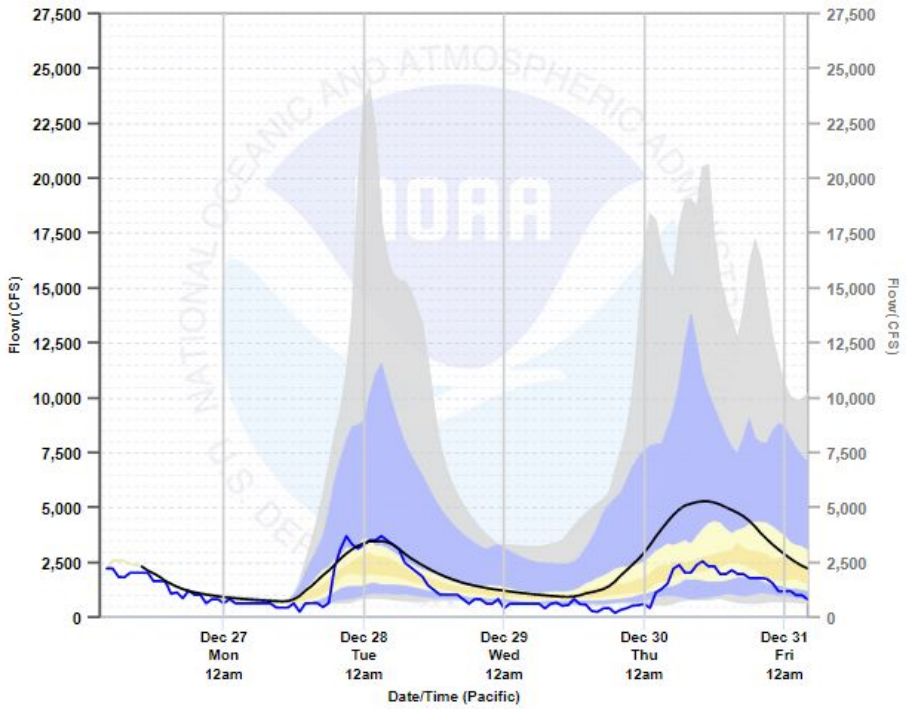
Issuance Time: 12/26/2021 at 9:00 AM Pacific Time

Monitor Stage: N/A *Flood Stage: N/A*

PRODUCT NOTE: Ensemble forecasts produced by CNRFC only consider meteorological uncertainty and do not account for hydrologic uncertainty.

Short-Range Peak Exceedance Plot Product Tutorial Plot Type: Ensemble Forecast CSV Ensemble File Download (Data in kcfs): ADOC1

Please note: This is a verification/historic plot and does not reflect the latest forecast. Click here for the current product.



Chance of Flow Exceedance (CFS)

Forecast Period: 12/26/2021 4 am - 12/31/2021 4 am

Max	24,095
5%	17,192
10%	12,311
25%	7,864
50%	4,031
75%	2,912
90%	2,583
95%	2,583
Min	2,583

Custom Thresholds

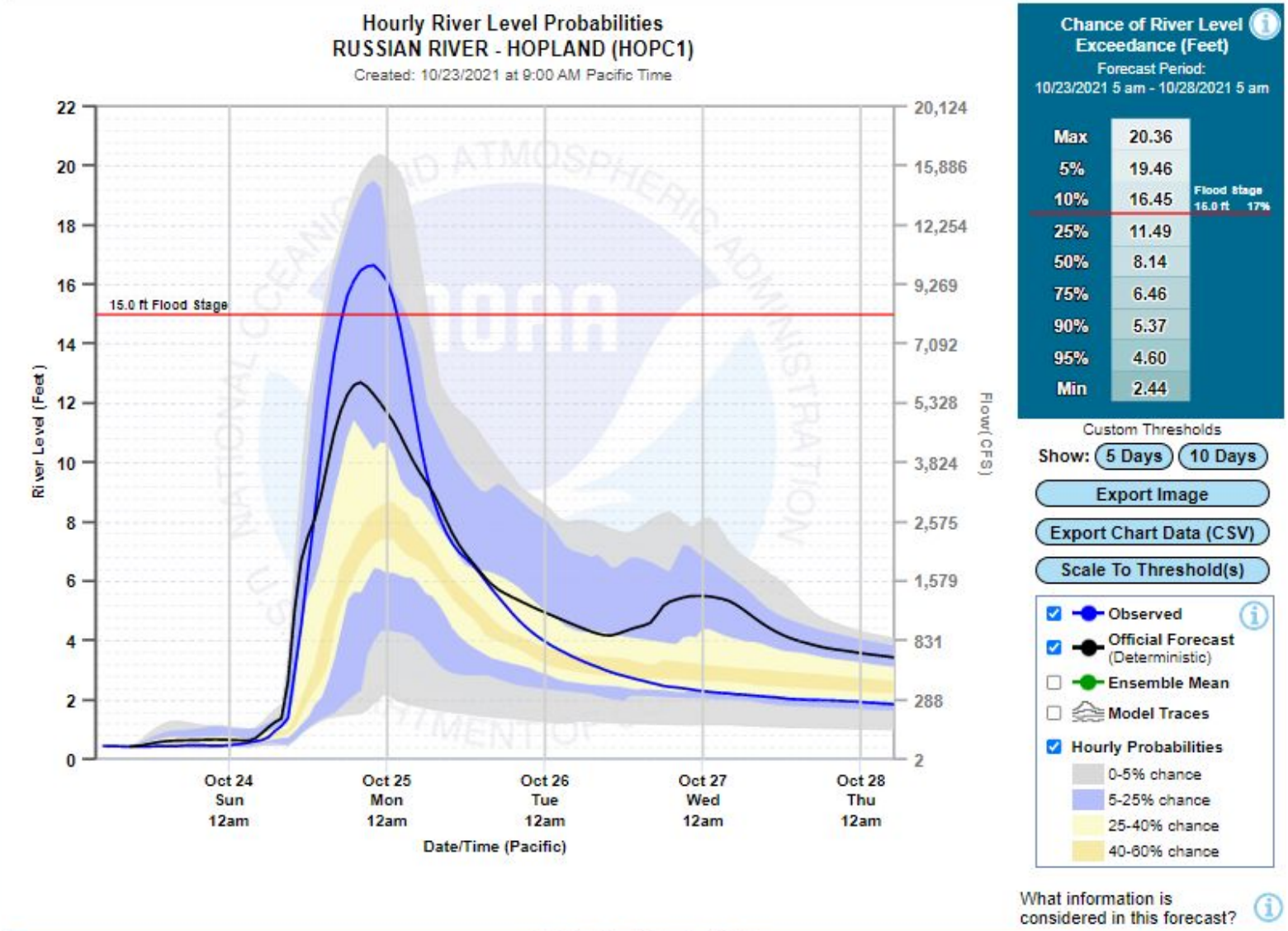
Show: 5 Days | 10 Days

Export Image

Export Chart Data (CSV)

- [x] Observed
- [x] Official Forecast (Deterministic)
- [ ] Ensemble Mean
- [ ] Model Traces
- [x] Hourly Probabilities
  - 0-5% chance
  - 5-25% chance
  - 25-40% chance
  - 40-60% chance

What information is considered in this forecast?


Hourly River Level Probabilities
RUSSIAN RIVER - HOPLAND (HOPC1)
Created: 10/23/2021 at 9:00 AM Pacific Time
15.0 ft Flood Stage
River Level (Feet)
Flow(CFS)
Oct 24 Sun 12am
Oct 25 Mon 12am
Oct 26 Tue 12am
Oct 27 Wed 12am
Oct 28 Thu 12am
Date/Time (Pacific)
Chance of River Level Exceedance (Feet)
Forecast Period:
10/23/2021 5 am - 10/28/2021 5 am
Max 20.36
5% 19.46
10% 16.45
Flood Stage 15.0 ft 17%
25% 11.49
50% 8.14
75% 6.46
90% 5.37
95% 4.60
Min 2.44
Custom Thresholds
Show: 5 Days 10 Days
Export Image
Export Chart Data (CSV)
Scale To Threshold(s)
Observed
Official Forecast (Deterministic)
Ensemble Mean
Model Traces
Hourly Probabilities
0-5% chance
5-25% chance
25-40% chance
40-60% chance
What information is considered in this forecast?

Critical HEFS Gaps

1. Poor performance in large precipitation events
2. Incorrect modeling of temperatures in events with atypical diurnal cycles: potential impacts on snow melt events
3. Inability to explicitly model uncertainty in freezing level
4. HEFS doesn't characterize hydrologic uncertainty

High-Priority HEFS Gaps

1. Inability to leverage information from all available meteorological models (e.g. HRRR, HRRRe, ECMWF, GEPS)
2. Not using the full information content of ensembles in our statistical modeling – only using the ensemble mean
3. Lack of skill in the seasonal and sub-seasonal time frames in many parts of the country (particularly for precipitation forecasts)
4. EnsPost statistical technique too simple to reflect complex error characteristics in regulated rivers
5. Routine verification of operational forecasts is not readily available
6. Improvements to the R20 process

Desired Outcomes

1) Eliminate critical, known limitations of existing HEFS implementations. (short term)
2) Improve support for deep-core partners to produce Forecast Informed Reservoir Operations. (short and long term)
3) Foster a productive collaboration with NOAA Physical Sciences Laboratory and improve R2O overall. (short and long term)
4) Provide the capability to move towards greater consistency between NWS deterministic and probabilistic forecasts. (long term)
5) Produce post-processed gridded ensemble forcings usable by both RFC models and the NWM. (long term)

California Nevada River Forecast Center

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