

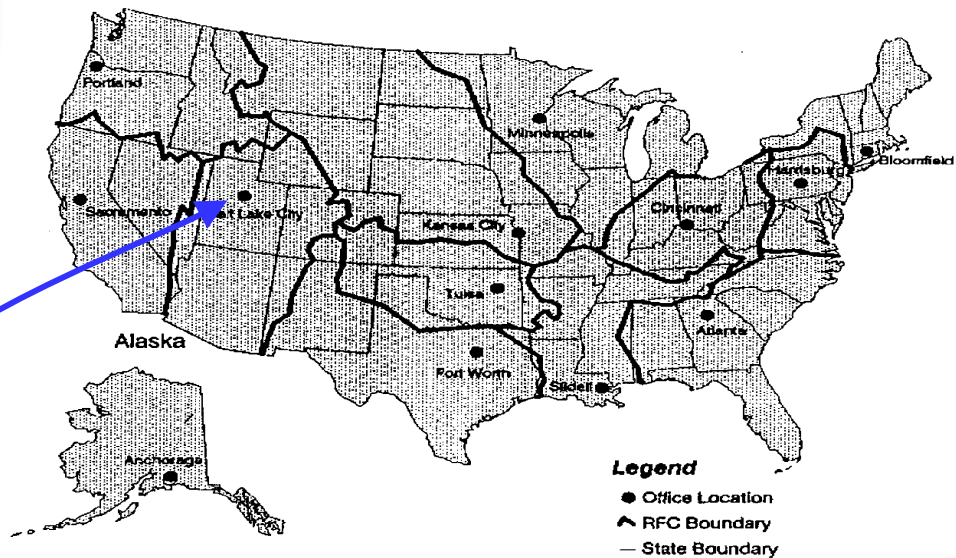


Colorado Basin
River Forecast Center

USBR-NWS Liaison



Previous: Bob Adams, Roland Springer,
Current: **Chris Cutler**



NWS RIVER FORECAST CENTERS

CBRFC AREAL STATISTICS

AREA	= 303,450 SM (RANK 5TH)
COUNTIES	= 558
STATES	= 7
NEXRADS	= 16



Two Basic Models Are Used to Forecast Streamflow

(1) Statistical Regression Models

Relates input variables such as snowpack, precipitation, climate indices to an output variable, volumetric streamflow

(2) Ensemble Streamflow Prediction

Uses historical traces of precipitation and temperature and conditions these based on current soil moisture conditions...traces can be weighted



Statistical Regression

Used since late 40's

Simple Model-Easy to Implement

Good at predicting a single variable

Breaks down in extreme years

Non-Linear capabilities

- Neural Networks

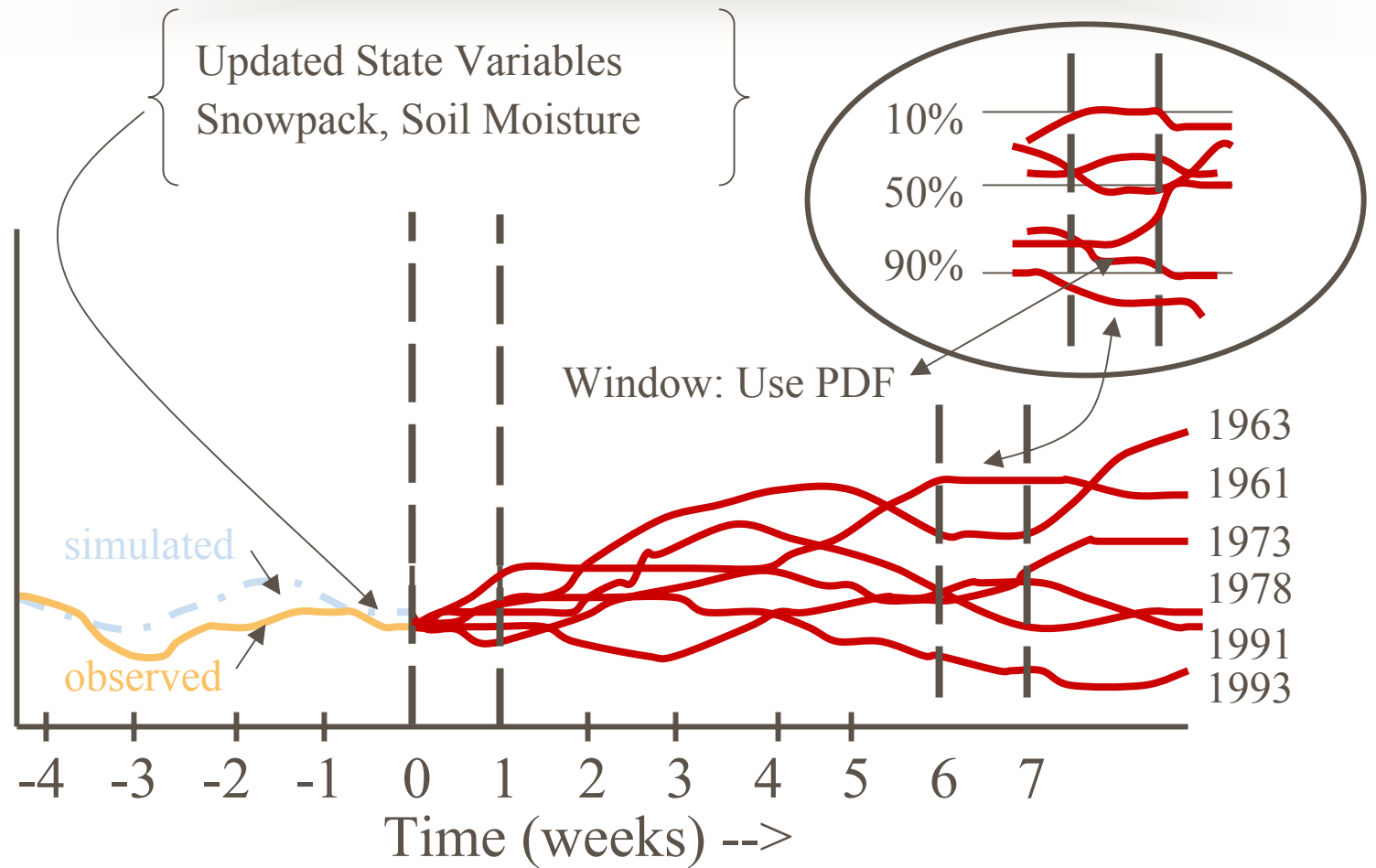
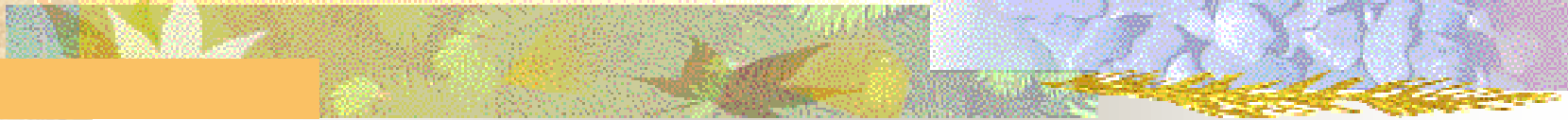
- Power Functions

- Nearest Neighbor Analogs



ESP: A conditional forecast simulation
based on:

1. Current watershed conditions and model states, snow, soil moisture, flow
2. Known historical precipitation, Temperature and streamflow
(can be weighted)



Model
Input

Observations
TA, PP, QC

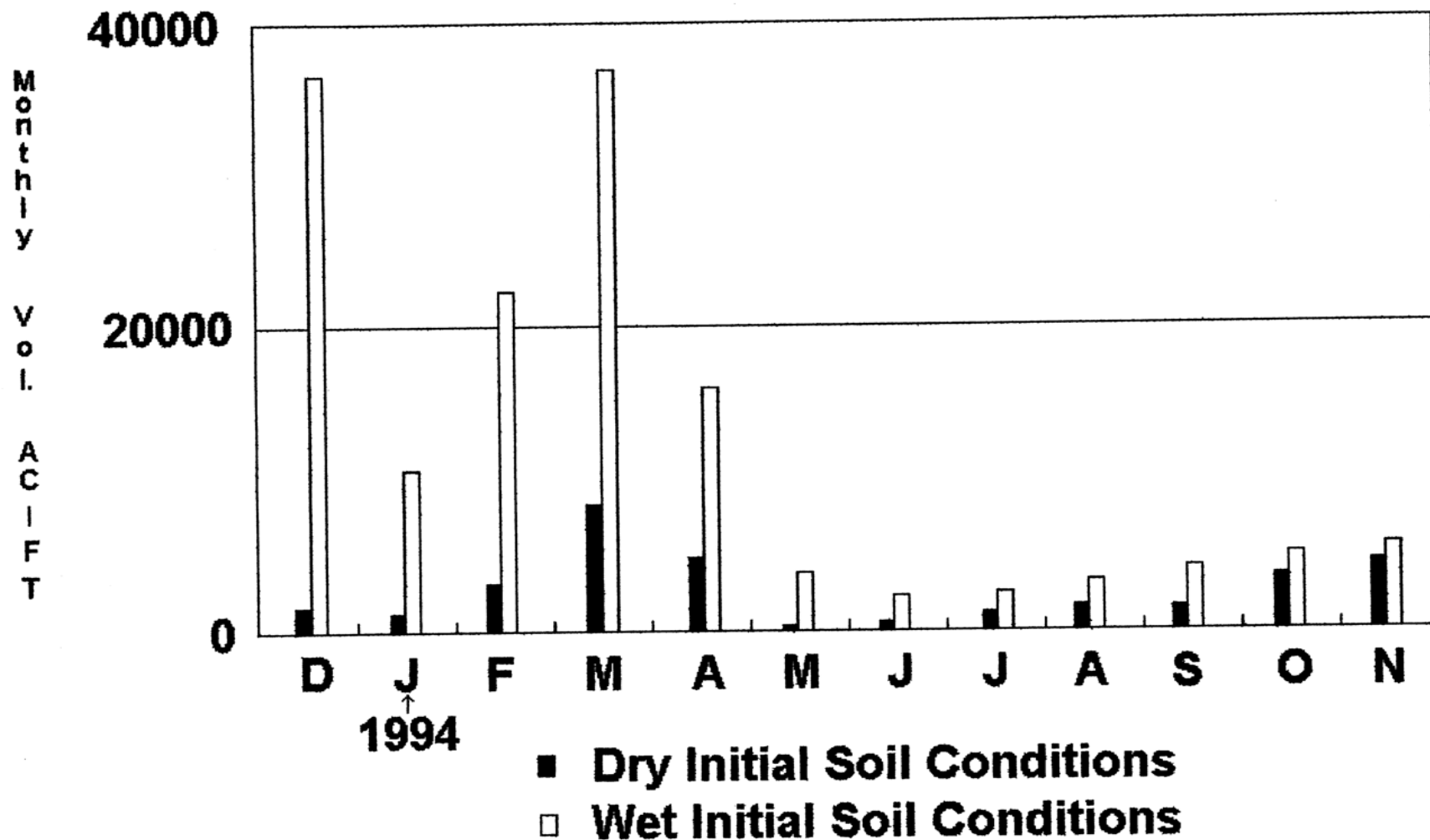
QPF
QTF

Yearly Historical Time Series PP & TA
based on Weighting Schemes

ESP... Forecast

Wet vs. Dry Initial Soil Conditions

(Oak Ck - Sedonia, AZ)





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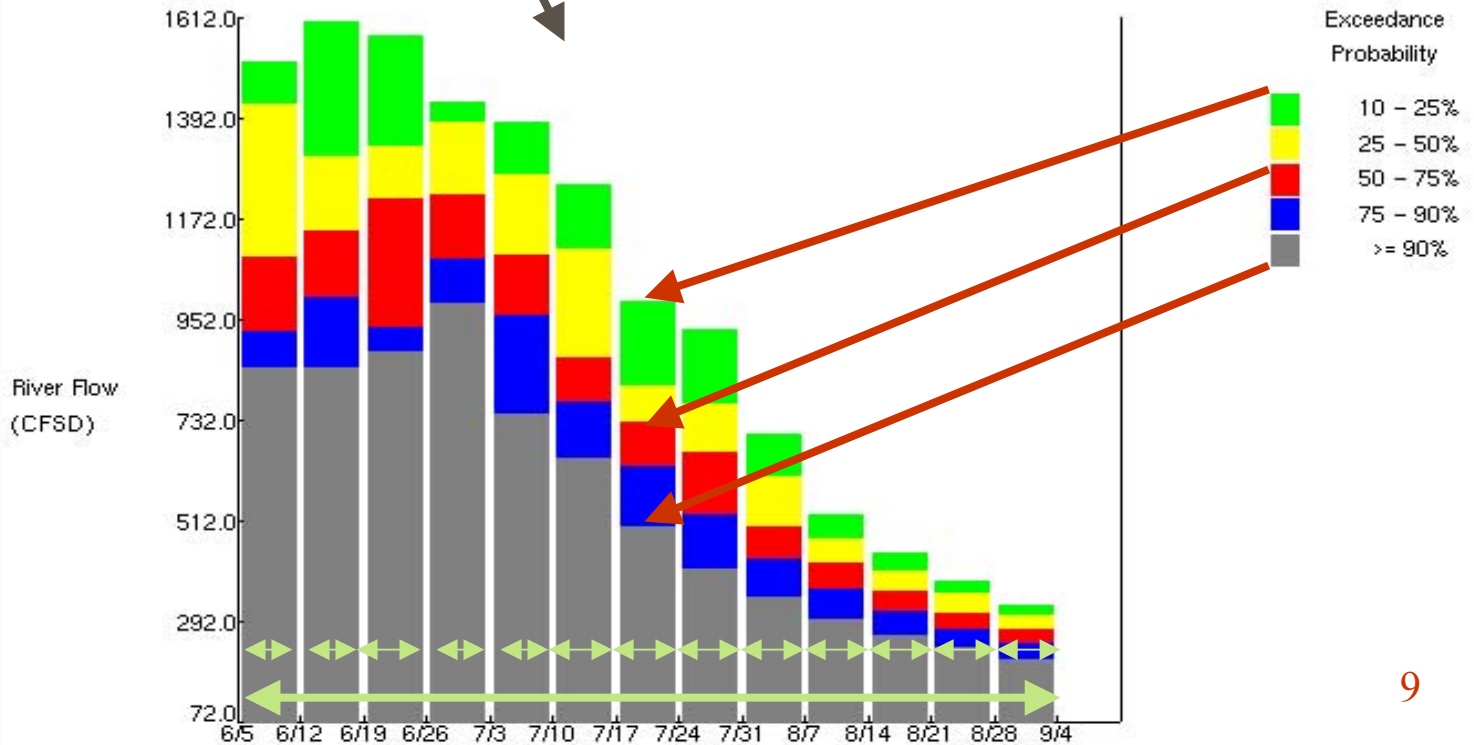
Advanced Hydrologic Prediction Service

- Graphic
- Description
- Operational Prototype
- Concepts

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Hydrograph	Stage	Flow	Volume	Stage	Flow	Build a Product
River Level Forecast Info	Weekly Chance of Exceedance			Chance of Exceedance During Entire Period		Build a Product

→ 1 Week Chances of Exceeding River Levels on the GREEN-WARREN BRIDGE
 Latitude: 43.0 Longitude: 110.1
 Forecast for the period 6/5/2002 - 9/4/2002
 This is a conditional simulation based on the current conditions as of 6/5/2002



1 Week Chances of Exceeding River Levels on the GREEN-WARREN BRIDGE



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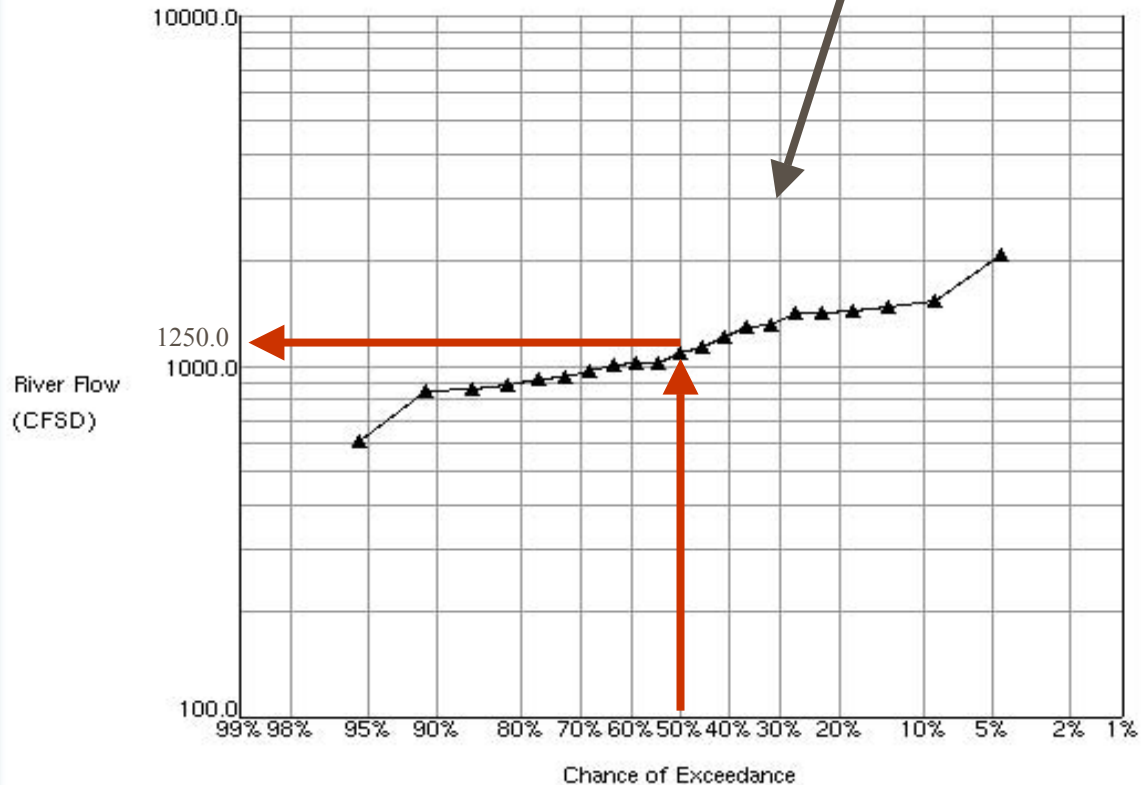
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Chances of Exceeding River Levels on the GREEN-WARREN BRIDGE at
 Latitude: 43.0 Longitude: 110.1
 Forecast for the period 6/5/2002 - 6/12/2002
 This is a conditional simulation based on the current conditions as of 6/5/2002





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AHPS / ESP Trace Analysis

Advanced Hydrologic Prediction Service

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ESP Trace File

Blue Mesa 24hr Conditional.
Dillon 1hr Conditional.
Fontenelle 24hr Conditional.
Flaming Gorge 24hr Conditional.
Navajo 24hr Conditional.
Green - Warren Bridge 24hr Cond.

Year Weighting

Equal Weighting
El Nino Weights (not yet implemented)
La Nina Weights (not yet implemented)

Accumulation Type

Mean
Max
Min
Sum

Interval

Day
Week
Month
Entire Period

Analysis Window

04 Jun 2002
04 Apr 2003

Distribution Type

Empirical
Normal
Lognormal

Plot Options:

Traces Probability Expected Value Exceedance

Show a Plot

Table Options:

Forecastinfo Quantiles Fl Quantiles

Show a Table



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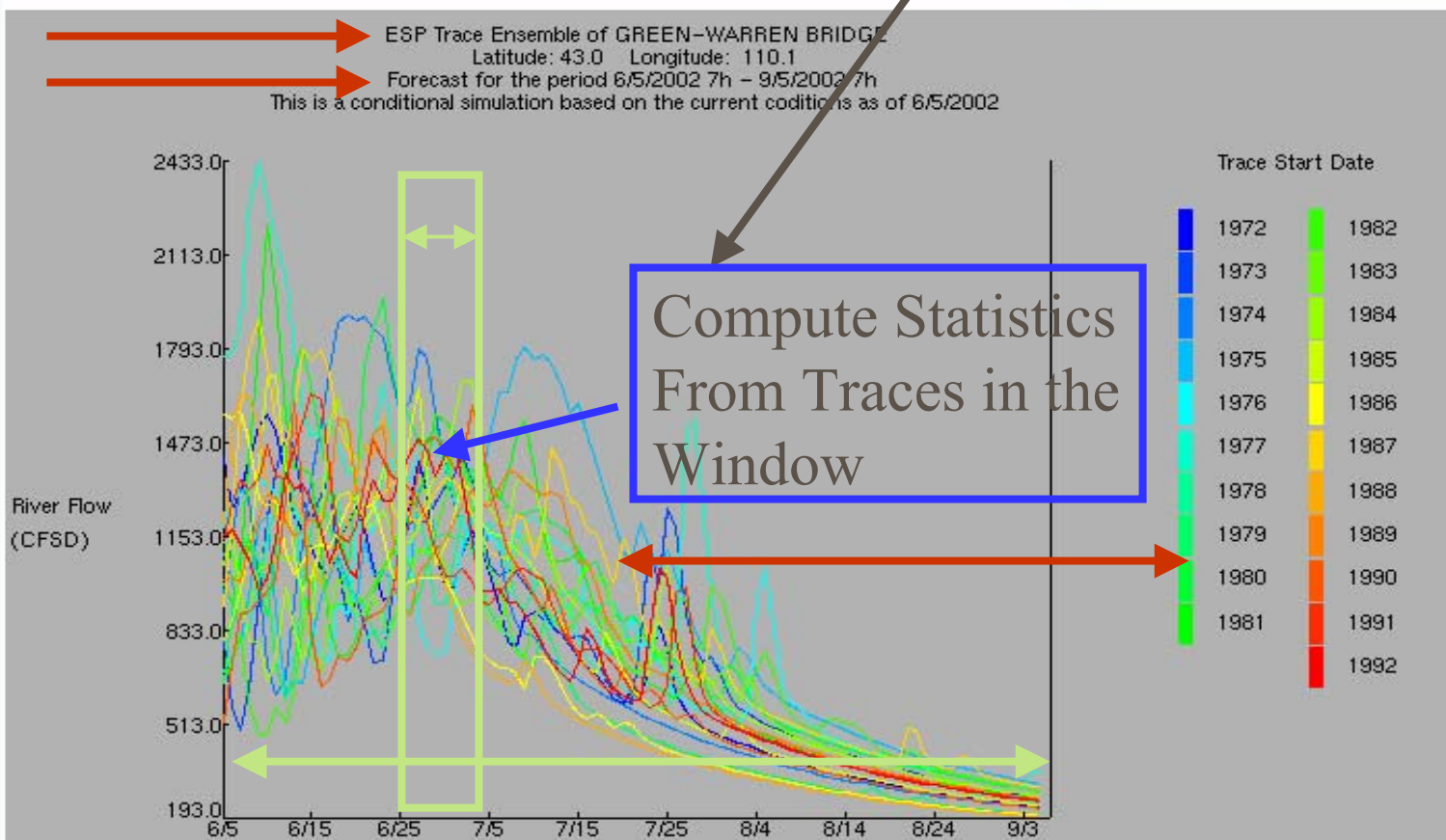
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River Forecasts & Data

Graphic List

APNC2 Data/Forecasts

Hydrograph
Probabalistic
Water Supply

APNC2 Model Data

Precipitation
Temperature
Freezing Level
Snow Information
Soil Moisture
Combination Plot

APNC2 Gage Info

Conditions Map Location
Basin/Location Maps
Aerial Photos/Topo Maps
Photos

Gage Information
Records

Rating Table

APNC2 Verification

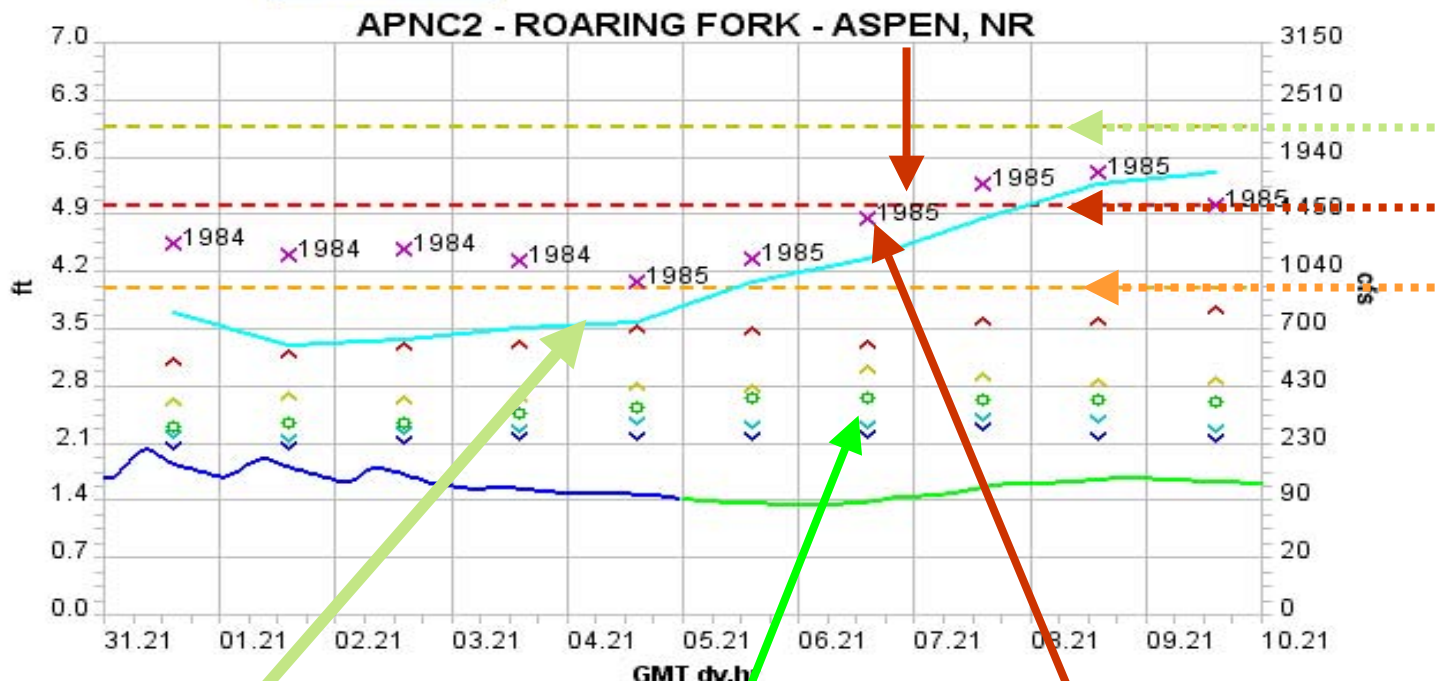
Short Range
Long Range (ESP)
Water Supply
Model Simulation

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Hydrograph	Stage	Flow	Volume	Stage	Flow	Build a Product
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APNC2 Observed/Simulated Hydrograph

The current time is: 06/05.21:47 GMT.



Observed - Forecast - Bankfull 4.0 - Flood 5.0 - Peak (06/09/1985) - Daily Maxima x 1985 -
 Historical Exceedance Probability: 90% v 75% v 50% o 25% ^ 10% ^

Colorado Basin River Forecast Center, NWS/NOAA

[Hide Flood Stage](#) | [Show Simulated](#) | [Linear Flow](#) | [Hide Historical Peak](#) | [Hide Daily Maxima](#) | [Hide Statistics](#) |

Add Year: [84](#) [02](#) [01](#) [00](#) [99](#) [98](#) [97](#) [96](#) [95](#) [94](#) [93](#) [92](#) [91](#) [90](#) [89](#) [88](#) [87](#) [86](#) [84](#) [83](#) [82](#) [81](#) [80](#) [79](#) [78](#) [77](#) [76](#) [75](#) [74](#) [73](#) [72](#) [71](#) [70](#)
 Delete Year: [85](#)



Cooperative Project

CBRFC & CDC (Climate Diagnostics Center)

Objective:

Produce improved river forecasts by utilizing precipitation and temperature derived from the MRF meteorological model as input to the NWS Extended Streamflow Prediction forecast system for the first 14 days in lieu of using historical climatology.



Cooperative Project

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Method:

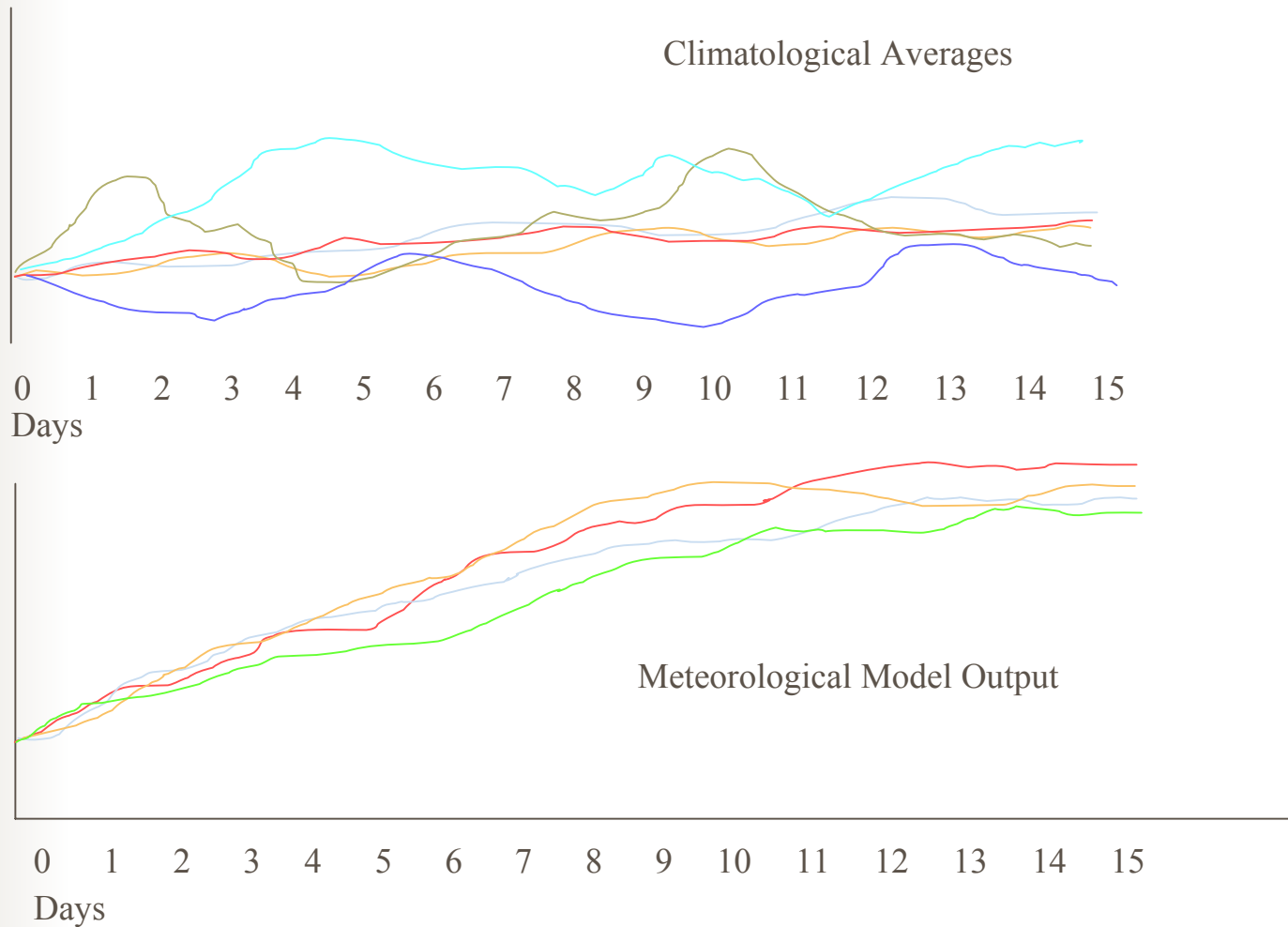
Mean areal precipitation (MAP) and mean areal temperature (MAT) will be calibrated to a frozen version of the MRF by using historical MAPs/MATs and historical output from the MRF model.

Operations:

CDC will provide a daily 16 member ensemble set of MAPs and MATs for all areas within a basin. The ensemble forecasts will be in 6 hour increments and go out for 14 days. They will be used in ESP.

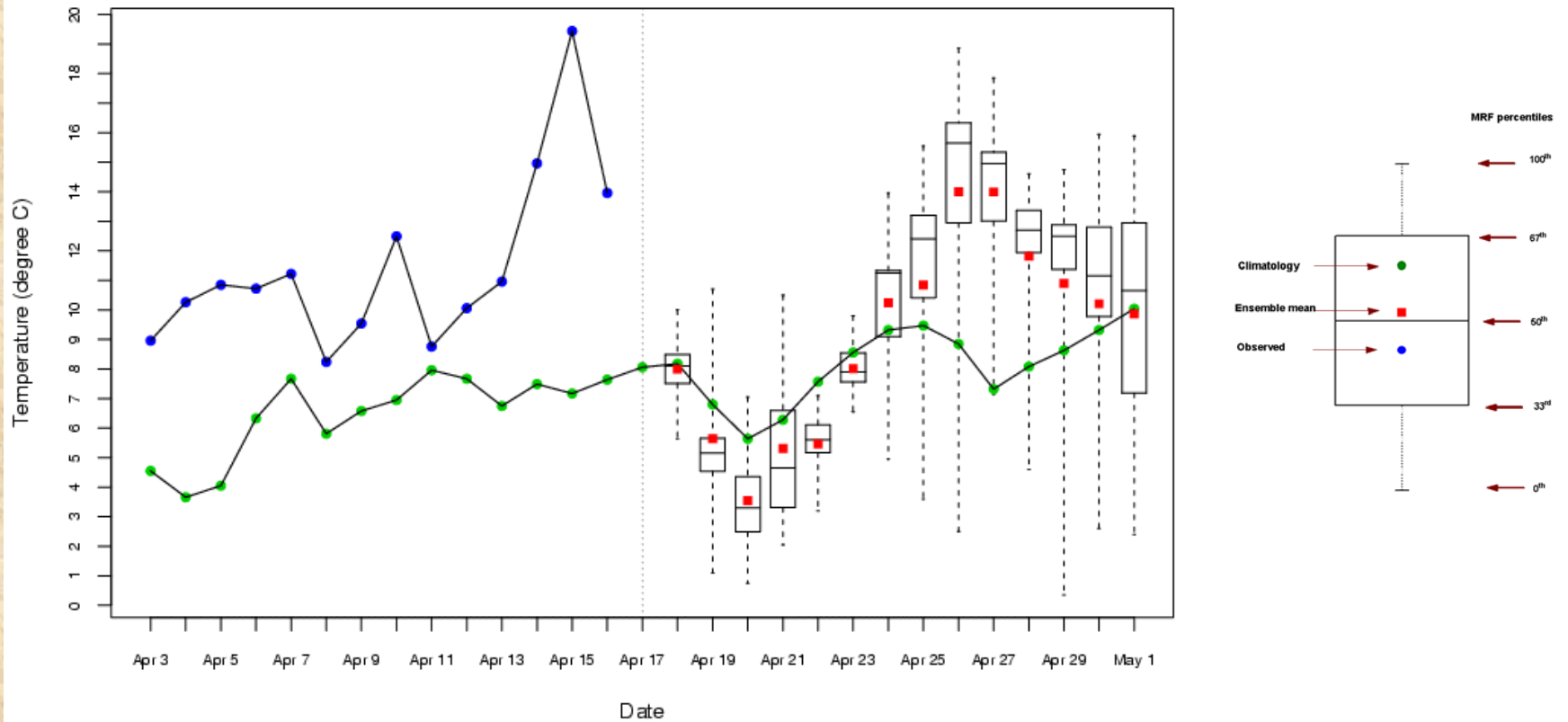
Cooperative Project

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Lake Powell - % Error of the Seasonal Forecast April-July Volume

