



NWS

Arizona Flood Warning Group

April 28, 2005
SRP – Phoenix AZ

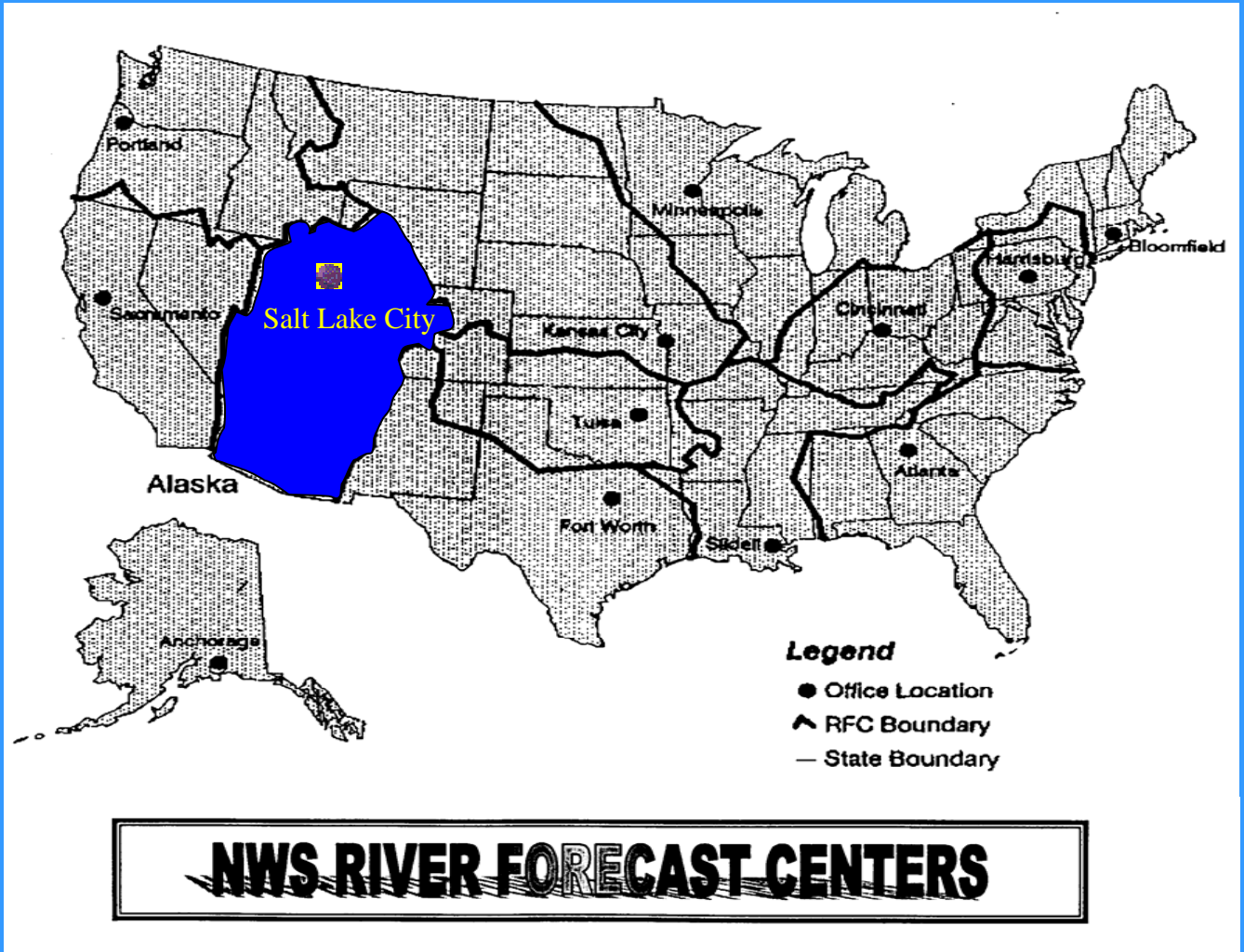
Dave Brandon
Hydrologist In Charge
Colorado Basin River Forecast Center



NWS

Colorado Basin River Forecast Center

National Oceanic Atmospheric Administration

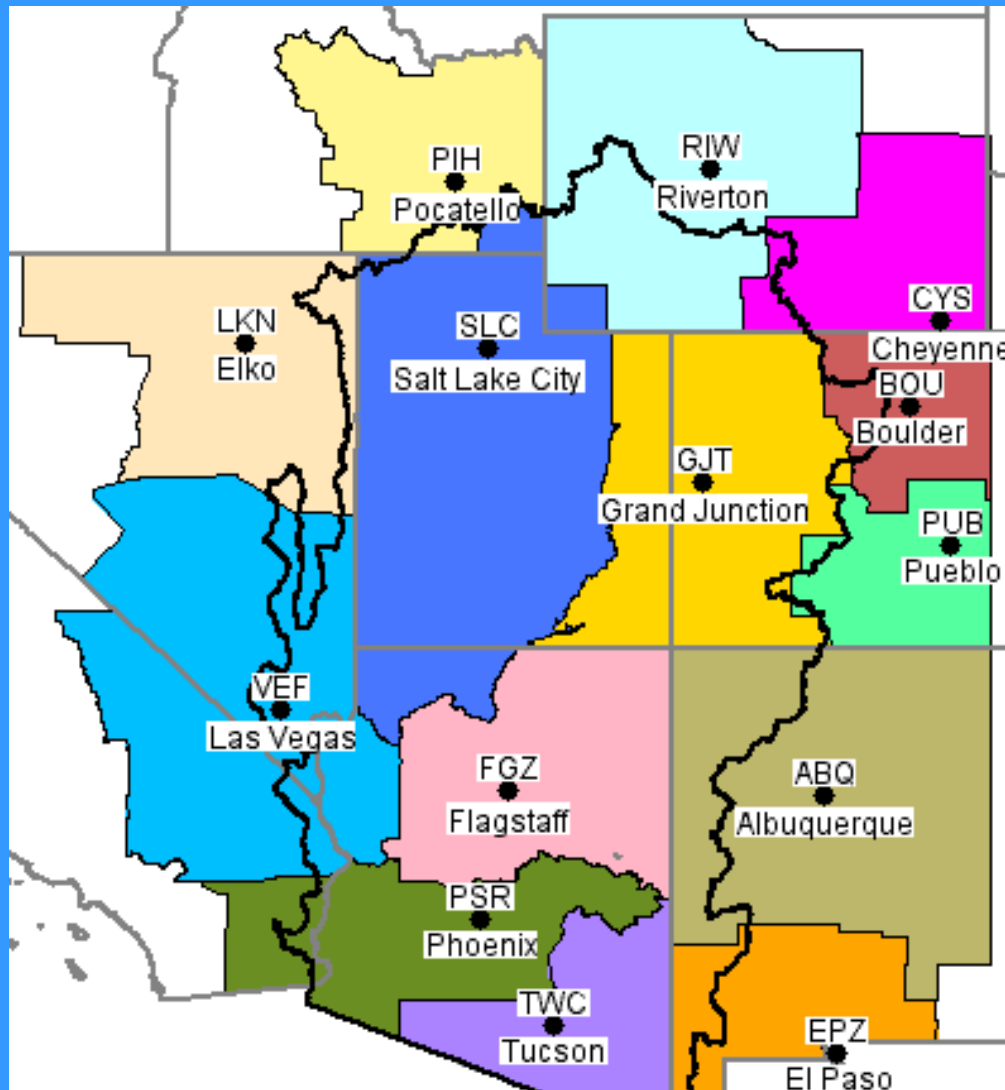




NOAA

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Weather Forecast Offices Hydrologic Service Areas





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Outline of Presentation

Forecast Process

A Little Bit About our Models

Future Precipitation - QPF

Web Page



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Mission: Protection Lives/Property-Enhance National Economy
Joint Effort Between WFO and RFC

Event Driven (rain, snowmelt) River Forecasts

Flash Flood Guidance

Recreational Forecasts (River trends – Peak Flows)

Water Supply => Reservoir Management (Drought?)



Last Year 2004



This Year 2005

Pictures: Courtesy of Kelly Redmond



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Forecasting: What goes into the forecast?

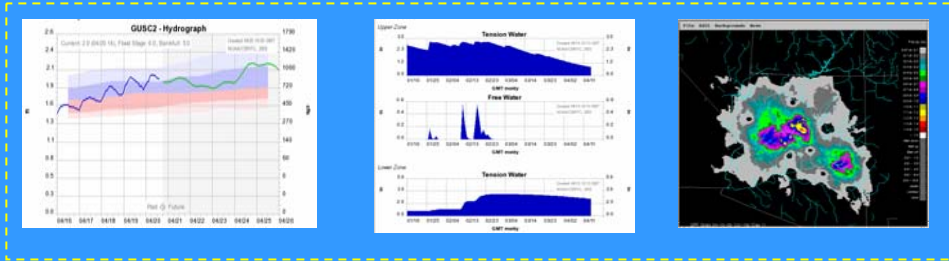
Flow

Soil Moisture

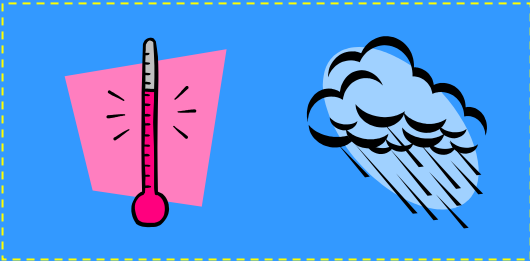
Precipitation

Temperature

Precipitation



Present Conditions



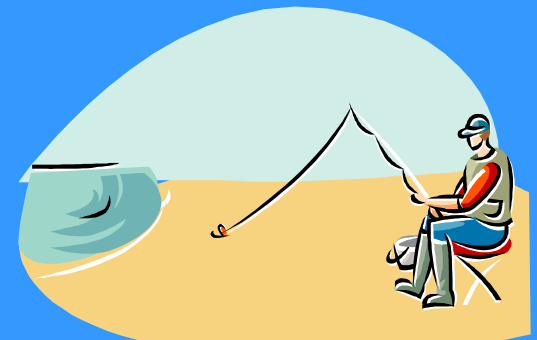
Future Conditions

What goes wrong when?

Expected Forecast

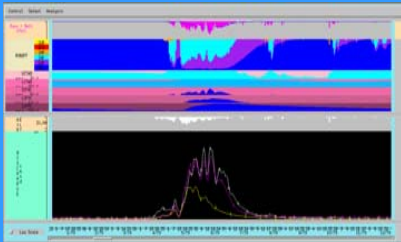
Result: Too Much

Result: Too Little

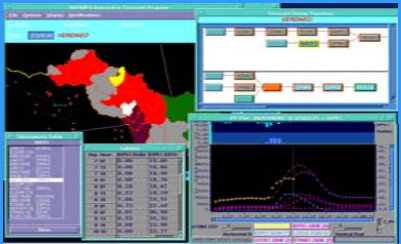


National Weather Service River Forecast System

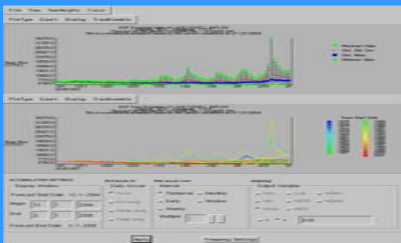
Three Interconnected Components
Forecasts For Hours To Seasons



1 Calibration System
Interactive Calibration Program



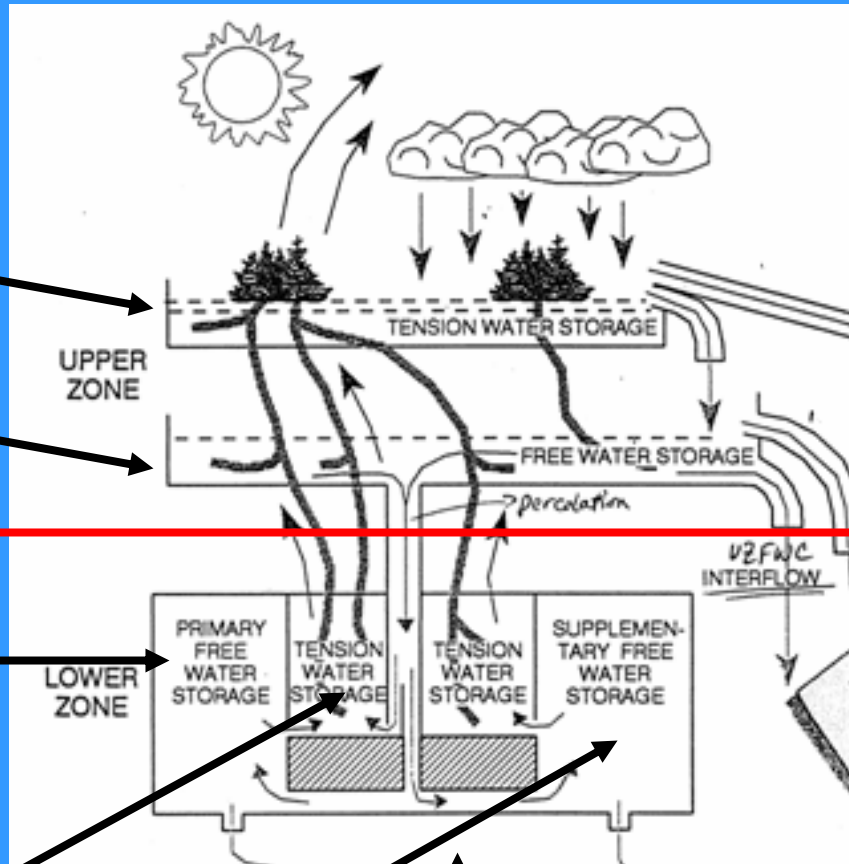
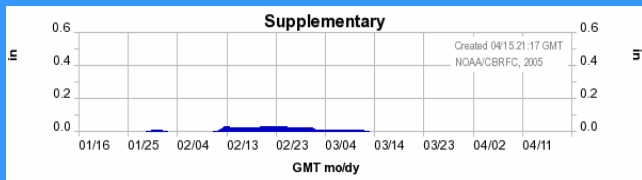
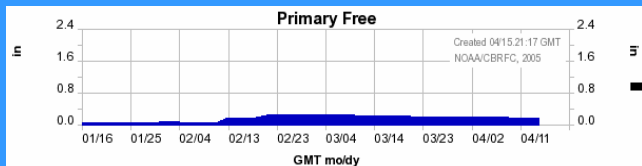
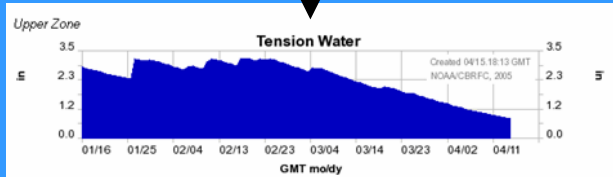
2 Operational Forecast System
Interactive Forecast Program



3 Ensemble Streamflow Prediction System
ESP Analysis/Display Program

Soil Moisture Accounting

Example of Soil Moisture In Each 'Tank'



RUNOFF

INTERFLOW

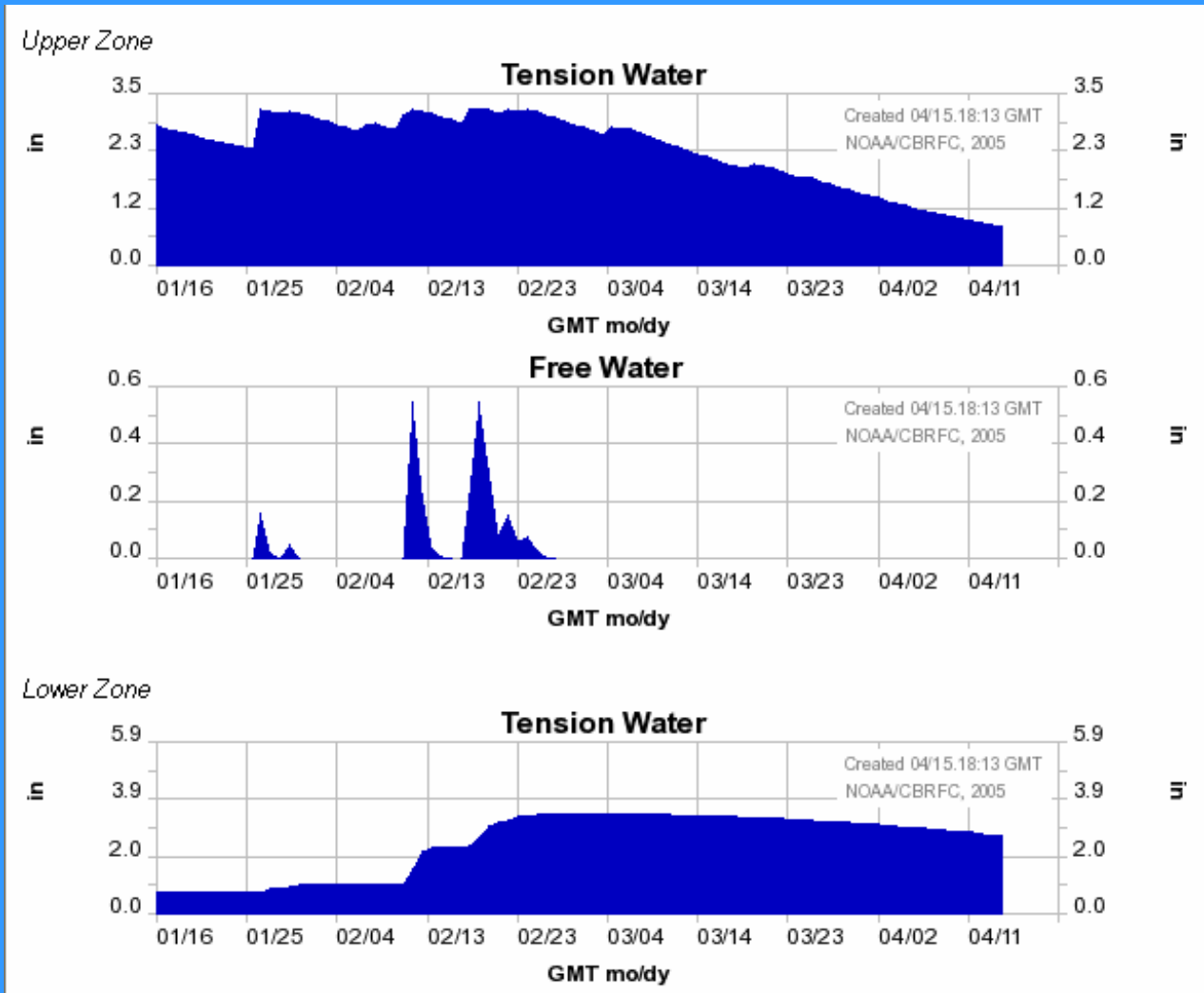
BASEFLOW

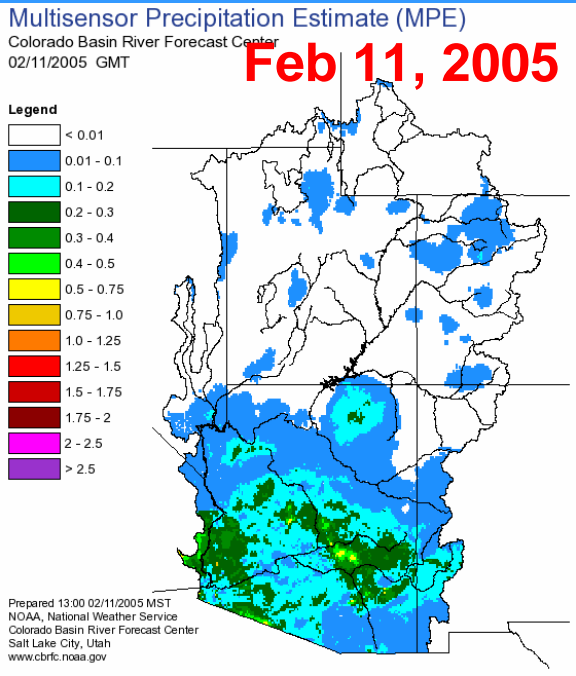
Generalized Sacramento
Soil Moisture Accounting
Model



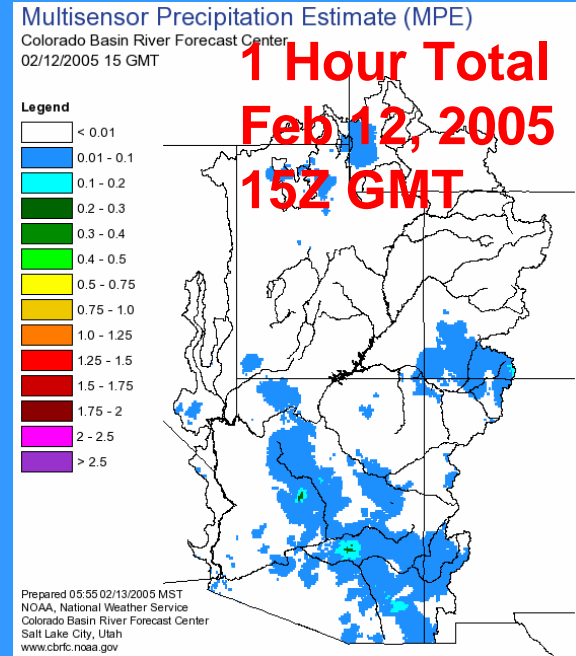
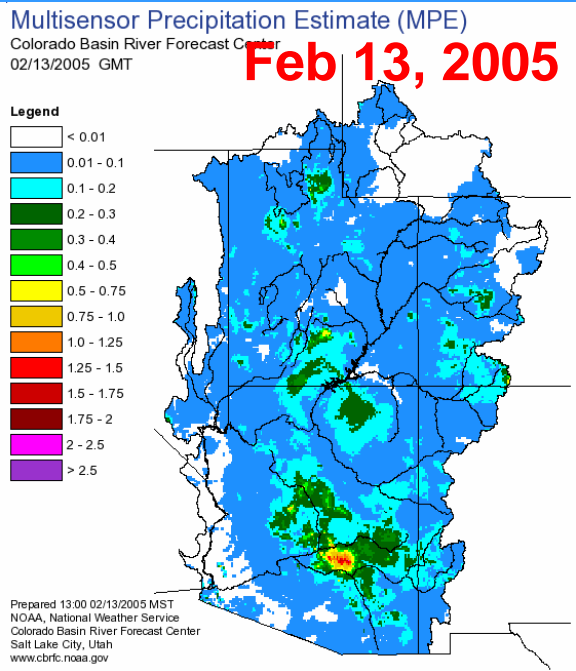
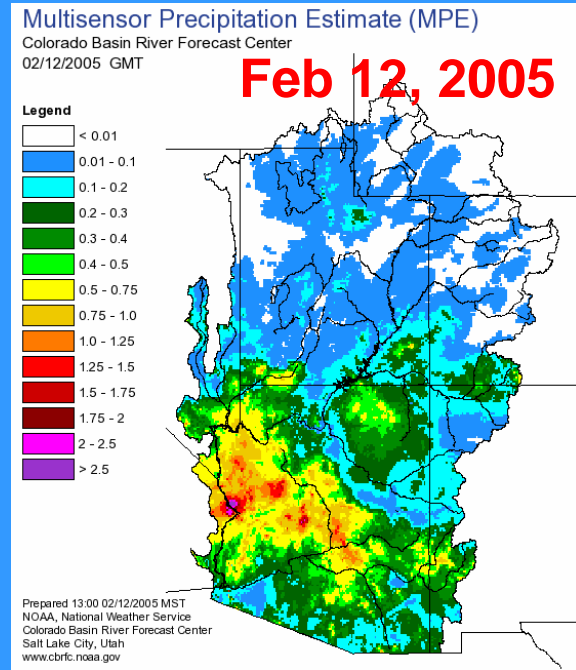
CAVE CK - CAVE CK, NR, COTTONWOOD WASH, BLO (CAVA3)

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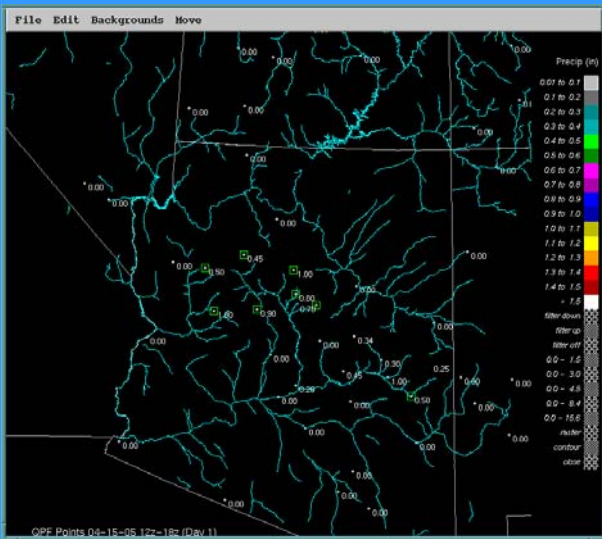




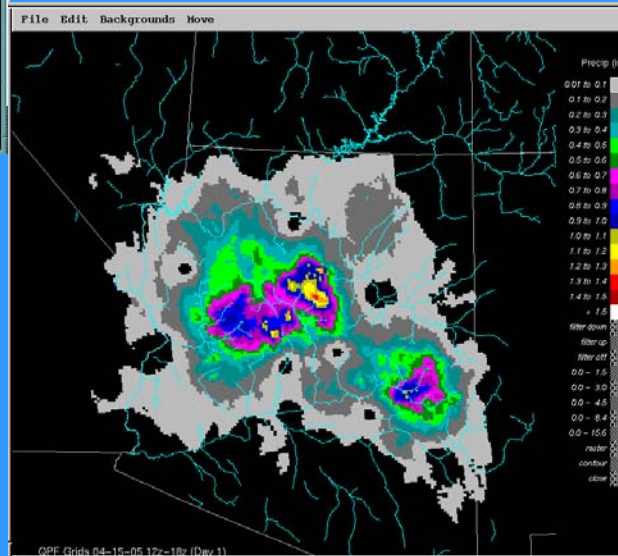
Observed Precipitation



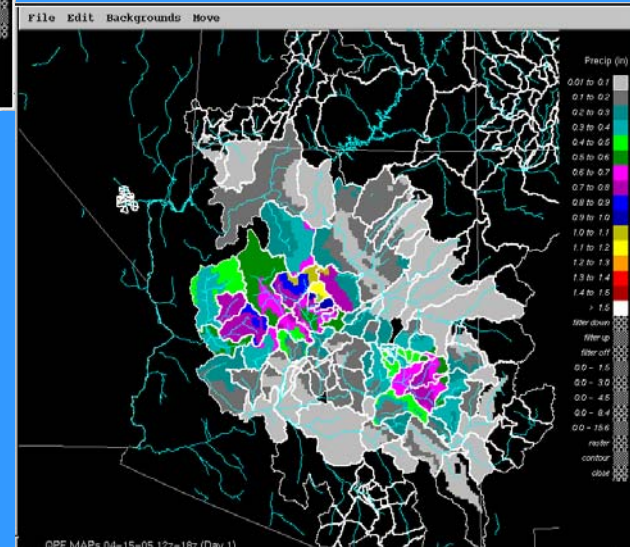
Future Precipitation & Temperature & Freezing Level



Point Values
(Hydrologic
Prediction
Center)



Grid Values
(Prism
Scaling)



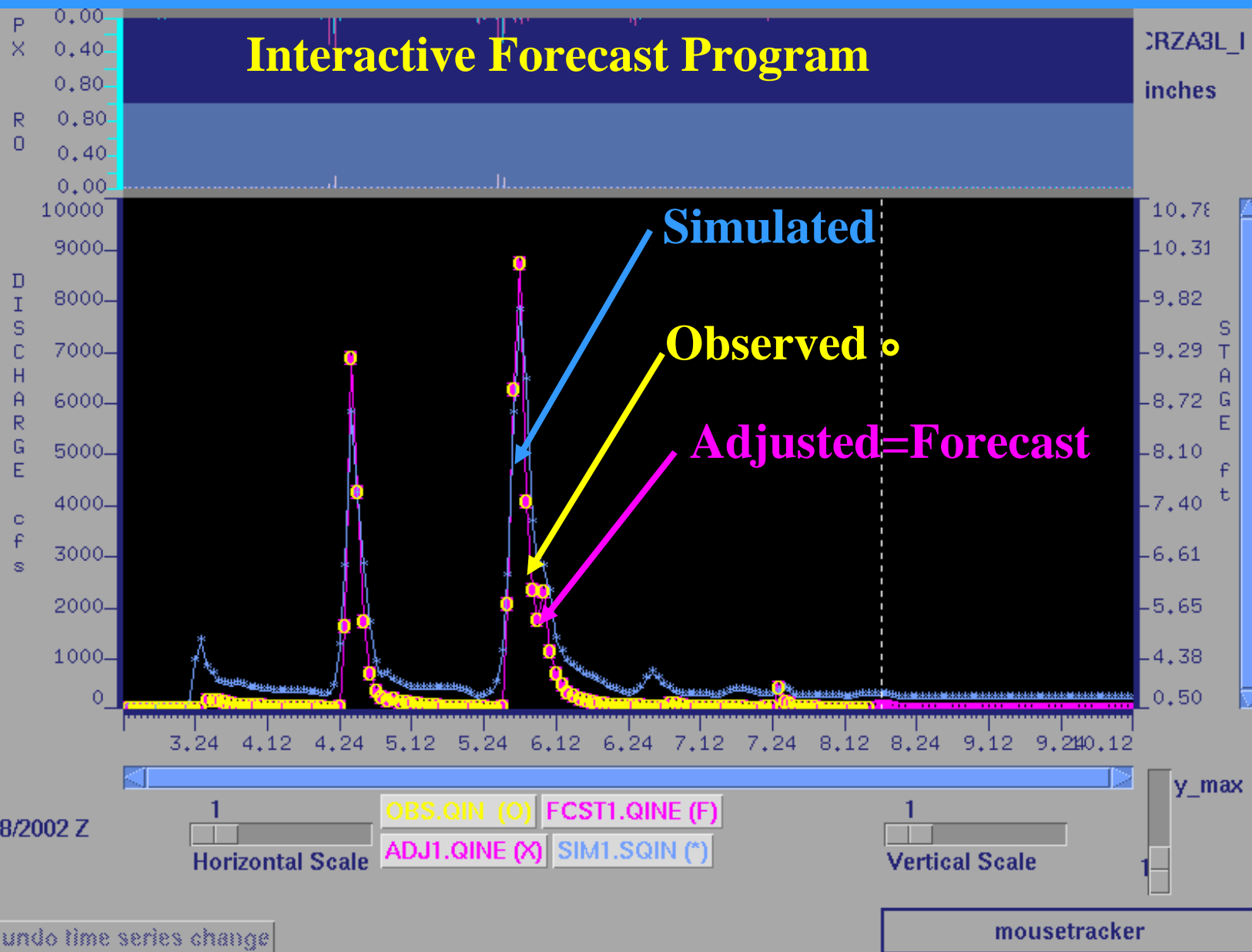
Basin Values

Example Display From NWSRFS-

Interactive Forecast Program

CRZA3L_I

inches

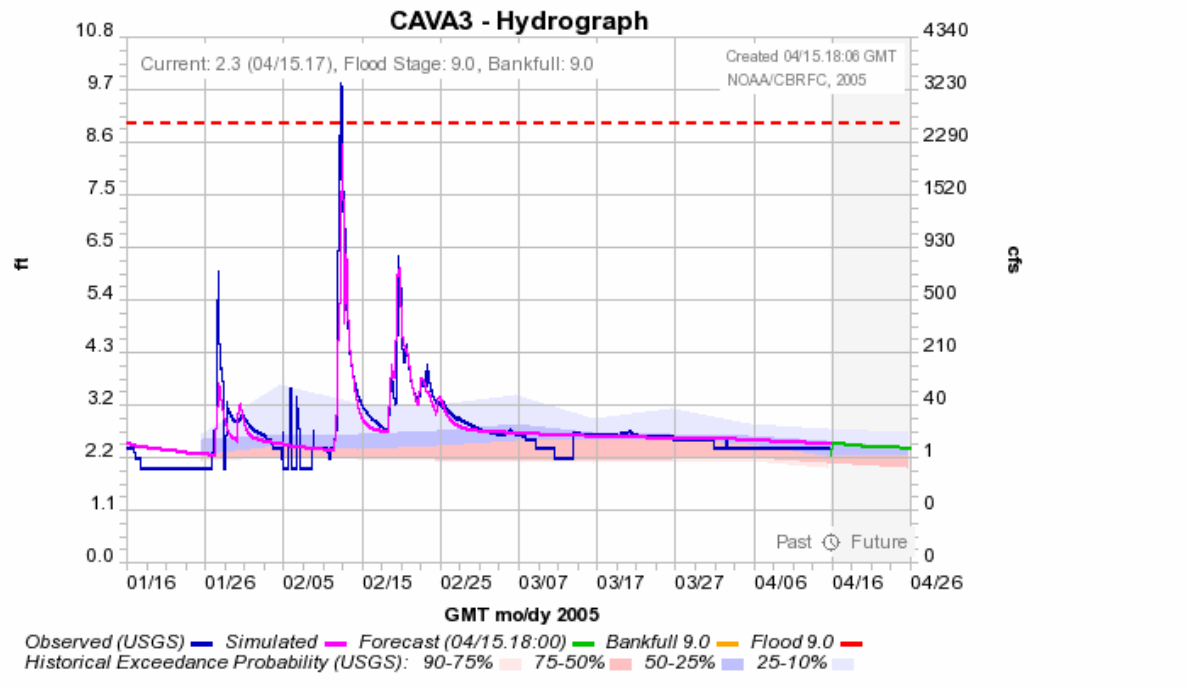


Example:
Hydrograph Plot
CBRFC Web Site

CAVE CK - CAVE CK, NR, COTTONWOOD WASH, BLO (CAVA3)

Forecasts on this web page are not official and should be used only as guidance.

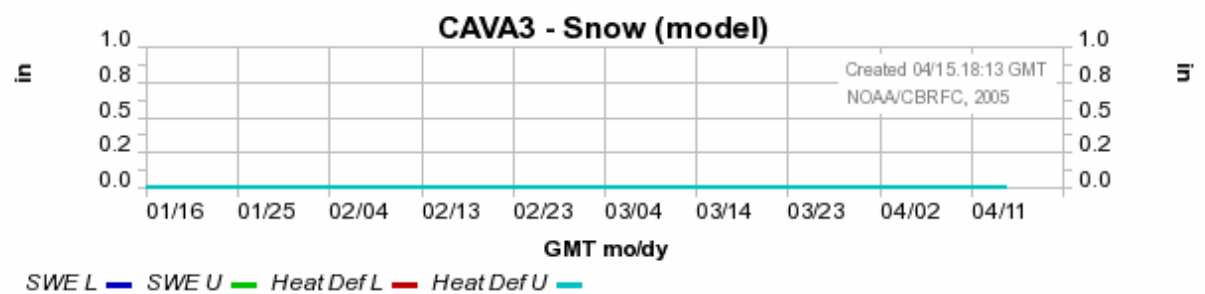
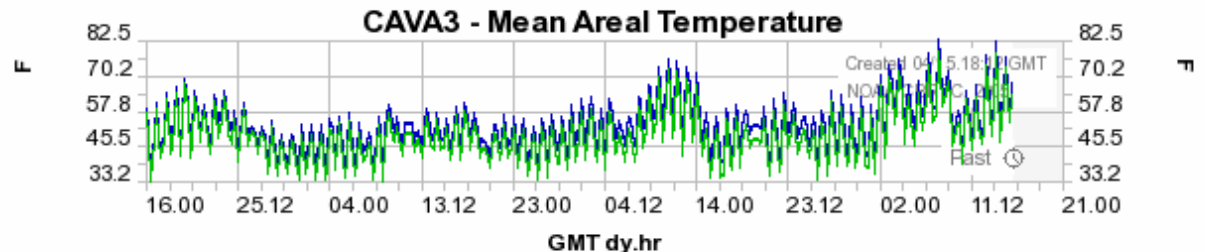
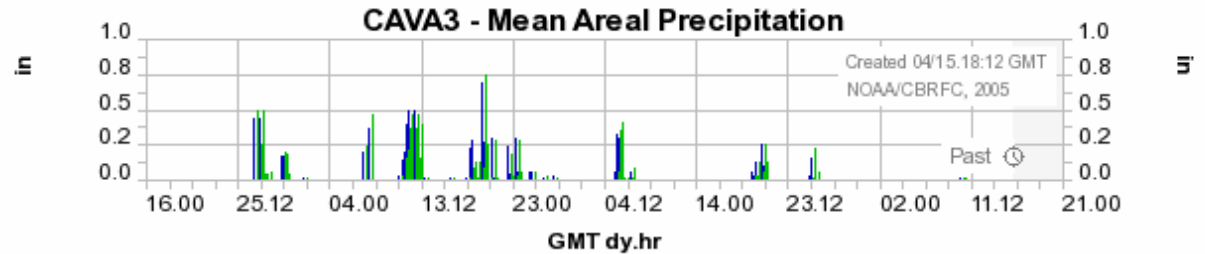
Official warnings and forecasts can be found [here](#).



Hydrograph Options		Graphs	Tabular Data	Information
<input type="checkbox"/> Critical Stages	Years	<input checked="" type="checkbox"/> Precipitation	<input type="checkbox"/> Precipitation	<input type="checkbox"/> Gage Info
<input checked="" type="checkbox"/> Simulated	Date	<input type="checkbox"/> Temperature	<input type="checkbox"/> Temperature	<input type="checkbox"/> Basin/Location Maps
<input type="checkbox"/> Raw Data	1981	<input type="checkbox"/> Freezing Level	<input checked="" type="checkbox"/> Freezing Level	<input type="checkbox"/> Aerial/Topo 16 mpp
<input checked="" type="checkbox"/> Linear Flow	1982	<input type="checkbox"/> Snow	<input type="checkbox"/> Snow	<input type="checkbox"/> Photos
<input type="checkbox"/> Historical Peak	1983	<input type="checkbox"/> Soil Moisture	<input type="checkbox"/> Soil Moisture	
<input type="checkbox"/> Yearly Peaks	1984	<input type="checkbox"/> Rating Table	<input type="checkbox"/> Rating Table	
<input type="checkbox"/> Daily Maxima	1985	<input checked="" type="checkbox"/> Hydrograph	<input type="checkbox"/> Critical Stages	
<input checked="" type="checkbox"/> Statistics	1986		<input type="checkbox"/> Peaks	
<input type="checkbox"/> Contingency	1987		<input type="checkbox"/> Flows	
<input type="checkbox"/> Adjust	1988			
<input type="checkbox"/> Requery	1989			
<input type="checkbox"/> Forecasts				
	Apply			

Example:
Model Inputs
CBRFC Web Site

CAVE CK - CAVE CK, NR, COTTONWOOD WASH, BLO (CAVA3)
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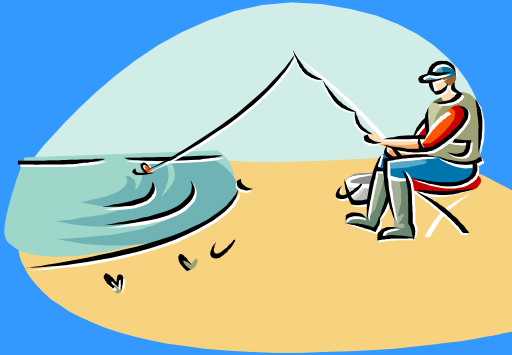


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Lack of Data – Future Uncertainty

OKAY!

So Why ???!!!



Inputs:

Conditions in the river basin

Future Precipitation ??

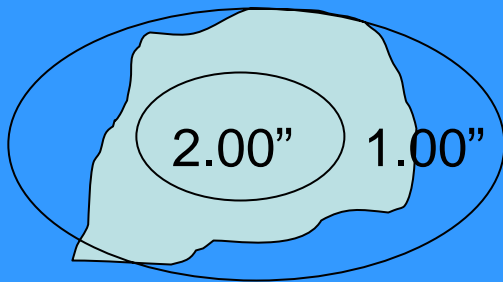


Future Uncertainty - Precipitation

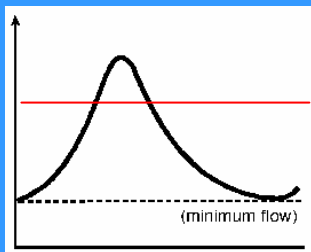
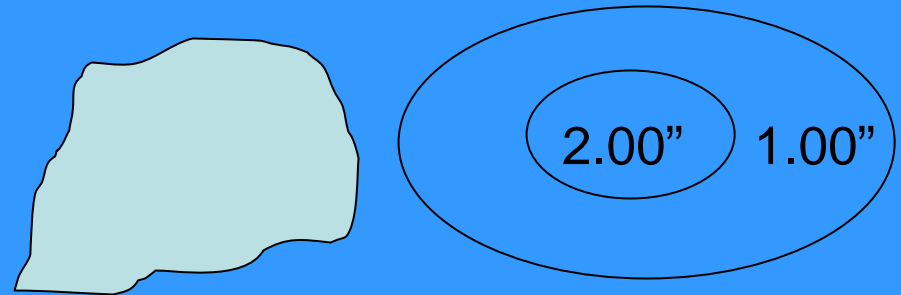
NWS

Amounts & Timing Are Perfect: BUT Wrong Basin

Forecast



Result



Flood Stage



No Rise

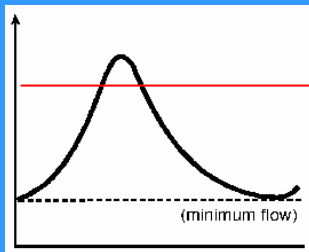
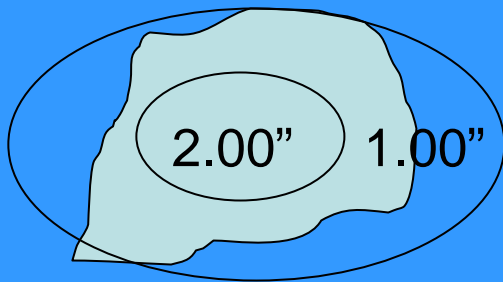


Future Uncertainty - Precipitation

NWS

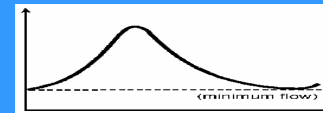
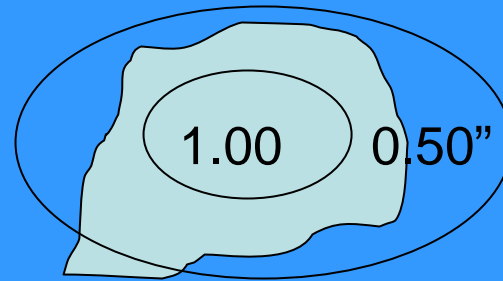
Basin Is Right: BUT Forecast Amounts Too High

Forecast



Flood Stage

Result



Peaks Lower

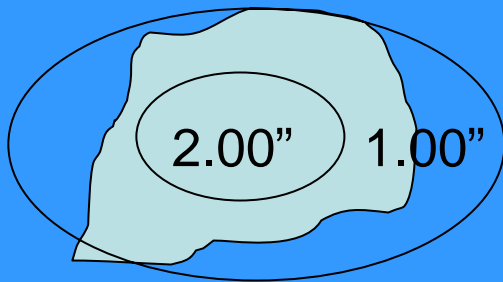


Future Uncertainty - Precipitation

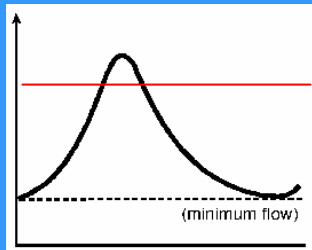
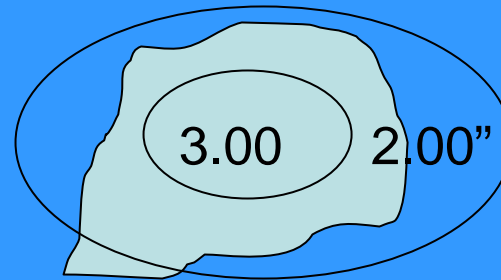
NWS

Basin Is Right: BUT Forecast Amounts Too Low

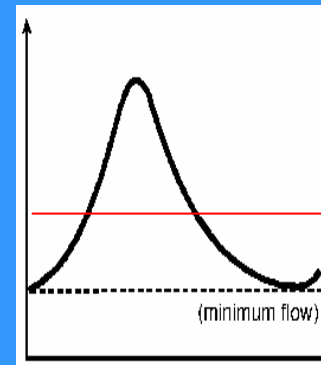
Forecast



Result



Flood Stage



Peaks Higher



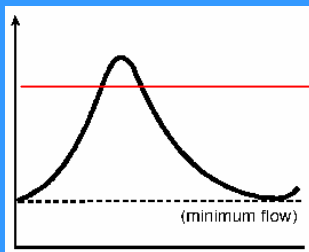
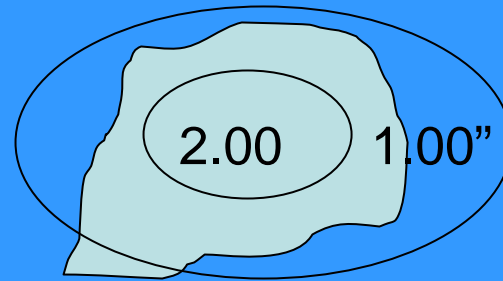
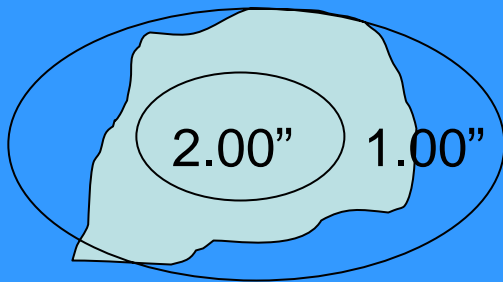
Future Uncertainty - Precipitation

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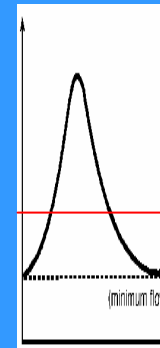
Basin Is Right-Amounts are Right: wrong intensity

Forecast For 24 Hours

Result: Packed Into 6 hours



Flood Stage



Peaks Faster & Higher



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Sometime It Just Seems Hopeless



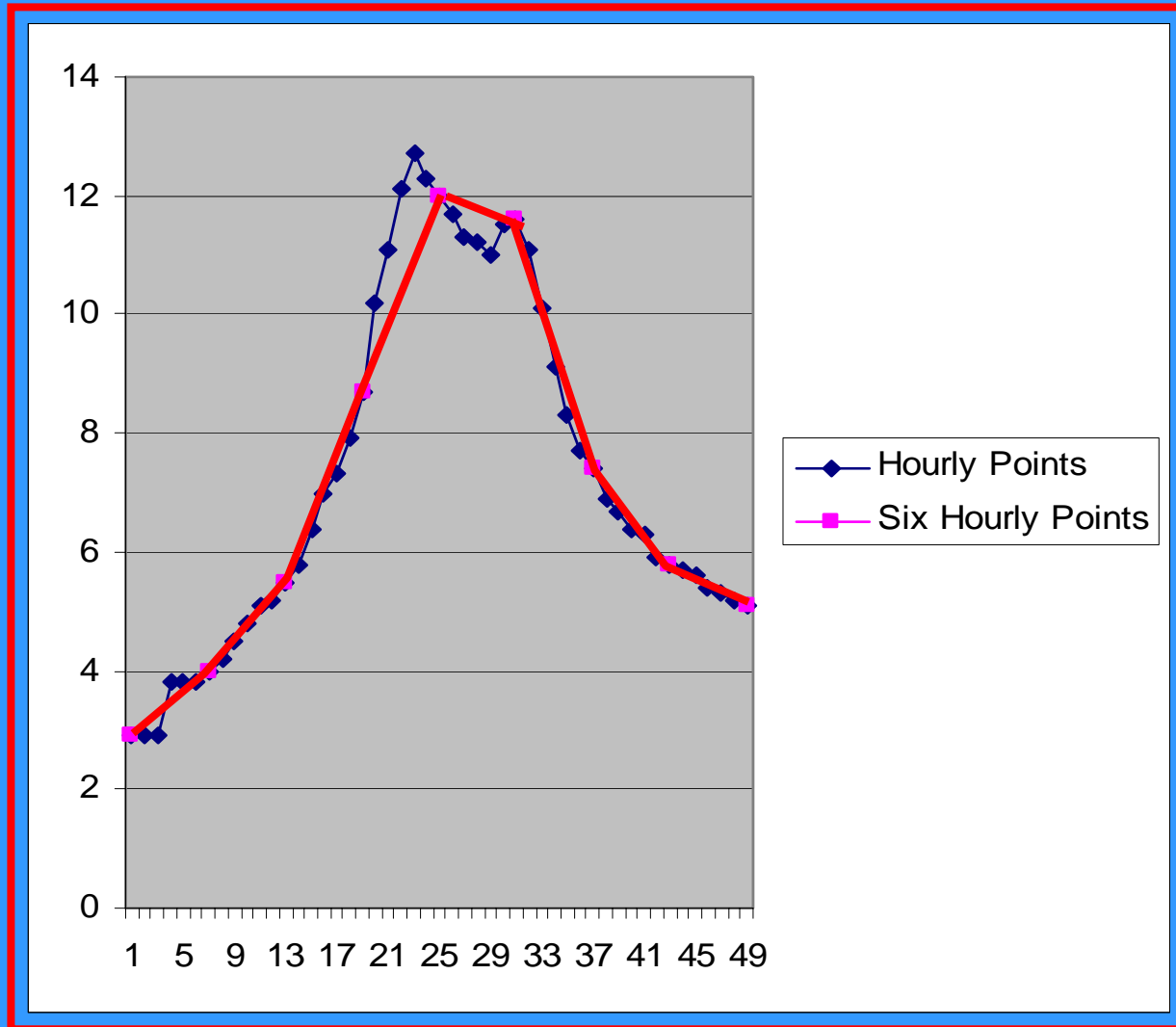
Tony Haffer



NOAA

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We Now Use 1-Hour Unitgraphs





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New Basins We Will Calibrate

<i>adba3</i>	<i>adobe dam inflow</i>
<i>avoa3</i>	<i>agua fria - buckeye</i>
<i>blla3</i>	<i>bullard wash</i>
<i>cava3</i>	<i>cave creek - cave creek</i>
<i>cbta3</i>	<i>cave buttes dam inflow</i>
<i>cspa3</i>	<i>centennial wash - nr arlington</i>
<i>cwwa3</i>	<i>centennial wash at wenden</i>
<i>hama3</i>	<i>hassayampa - nr morristown</i>
<i>hsta3</i>	<i>hassayampa - nr arlington</i>
<i>hwga3</i>	<i>hassayampa - box canyon</i>
<i>ibsa3</i>	<i>indian bend wash - shea blvd</i>
<i>ibwa3</i>	<i>indian bend wash - indian bend rd</i>
<i>idxa3</i>	<i>indian bend wash - curry rd</i>
<i>maoa3</i>	<i>acdc - 14th street</i>
<i>mbla3</i>	<i>new - bell road</i>
<i>mcma3</i>	<i>mcmicken dam inflow</i>
<i>mcva3</i>	<i>cave ck - cactus rd</i>
<i>mcza3</i>	<i>cave ck - nr cave creek rd</i>
<i>mdea3</i>	<i>dysart drain - el mirage</i>
<i>mhfa3</i>	<i>acdc - 43rd ave</i>
<i>mhua3</i>	<i>hassayampa - us60</i>
<i>msxa3</i>	<i>acdc - 67th ave</i>
<i>nrda3</i>	<i>new river dam inflow</i>
<i>nwga3</i>	<i>new - glendale</i>
<i>tgwa3</i>	<i>tiger wash</i>
<i>wgna3</i>	<i>hassayampa - wagoner rd</i>
<i>wnba3</i>	<i>jackrabbit wash - nr tonopah</i>
<i>wtla3</i>	<i>whitlow ranch dam inflow</i>
<i>zmca3</i>	<i>martinez creek</i>
<i>zqra3</i>	<i>queen ck - rittenhouse</i>
<i>zsma3</i>	<i>sols wash - matthie</i>



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River Forecast Centers: Provides technical expertise and forecast guidance to the local Weather Forecast Offices.

Weather Forecast Office: Prepare and issue official flood Watches, Warnings and Statements to local officials and media outlets.

Most of the Time the River Forecast Center and Weather Forecast Offices are in sync with forecast and products. Because of dynamic updating at the RFC, there are times when differences could occur



NWS

Thank You

Colorado Basin River Forecast Center

WWW.CBRFC.NOAA.GOV