

User Needs Requirements

April 2, 2014 • Klamath Falls, OR

*From Fisheries to Family Farmer:
Improved Products for Communicating
Water Supply, Drought, and Climate Change Risk for
Daily Decision-Making Within the Klamath Basin*

This work is funded under a grant from the Sectoral Applications Research Program (SARP) of the National Oceanic and Atmospheric Administration (NOAA) Climate Program Office. The views expressed represent those of the author(s) and do not necessarily reflect the view or policies of NOAA.

Outline for Today

1. Meeting reasons, SARP purpose, vision & feedback
2. Present results from the applied research:
 - How we got here
 - Lessons learned & focus group process
 - Data use challenges
 - Recommended methods to increase data value
 - Managing decision risk through alternative decisions
3. Tools and design considerations (a solution):
 - Robustness
 - Concept application
4. Feedback

Reasons for this meeting

- ❑ Presentation by another “expert” from outside the Basin
- ❑ Somebody else that thinks they can solve our problems
- ❑ Another study to place on the shelf
- ❑ I had nowhere else to go, so I came here
- ❑ Another consultant working on a government grant
- ❑ See if Deutschman got it right



Sectoral Applications Research Program (SARP)

- Focus on how various socioeconomic sectors address climate and water issues (using data)
- Current priorities are water resources management initiatives (e.g., coping with drought)
- Must understand how climate and water data are used for decision-making
- Recognize the need for tools and methodologies for decision-making
- Recognize the need to develop improved tools and methodologies

Our Research Vision

- Better understand reliance on climate and water data delivered by federal agencies as case study for western US
- Identify, describe, and document stakeholder community decisions relying on climate and water data
- Recommend methods and tools to improve data delivery, use, and value
- Streamline resource discussions to make them more efficient
- Implement recommendations



Your Participation

- Are your needs and decisions identified properly?
- Are there really alternative decisions based on data risk?
- Have we correctly connected your decisions to data needs, the criteria for action, and your actions?
- Is there value in the tools, methods, and concept presented?
- Proceed with development?



Research Summary

Providing Recommendations to Improve Tools and Methodologies for Communicating Information and Enhancing Decisions

How Did We Get Here?

Klamath Basin DSS



Home

About the Basin

Tools and Data

Map Viewers

Collaborators

NOAA Grant

Contact

Welcome to Klamath Basin Decision Support System (DSS)

The Klamath Basin Decision Support System (DSS) is the vision of the Klamath County Board of Commissioners, a vision which quite simply, is to allow a broad and diverse audience access to a common base of resource data for the Klamath Basin. The belief and hope is that by providing timely access to a common base of resource data, including information related to water supply and use, future conflicts surrounding water and resource management can be minimized and the social and economic turmoil associated with water management decisions reduced. An ancillary benefit of this project is to save people and organizations time in accessing and making timely decisions by providing seamless data in one portal.

The Klamath County Board of Commissioners initiated the development of this DSS as a pilot project in the fall of 2009, to demonstrate the concept of how resource data and information can be shared using current technologies. Development of the DSS is guided by a formal document which identifies various future tools and applications. The hope is that this pilot project will stimulate the development and funding of future applications focused on the Klamath Basin by other resource agencies in cooperation with the County, using the frame work established by this effort.

Watch video tutorials on how to use the Klamath DSS.

[Intro to Klamath DSS](#)
[Intro to Watershed Map Viewer](#)
[Intro to Klamath Water Supply Tracking Tool](#)

IN THE NEWS

Phase 3 of On Project Plan continues...

Feb 2013 - Klamath County to withdraw from KBRA

Oct 2012 - Progress on On Project Plan being made

Sep 2012 - NOAA awards grant for Klamath Basin

Sep 2012 - On project plan continues

[More News](#)

MAP VIEWER

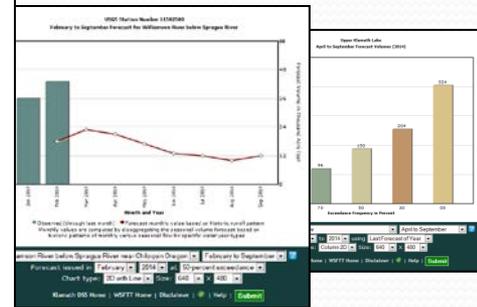
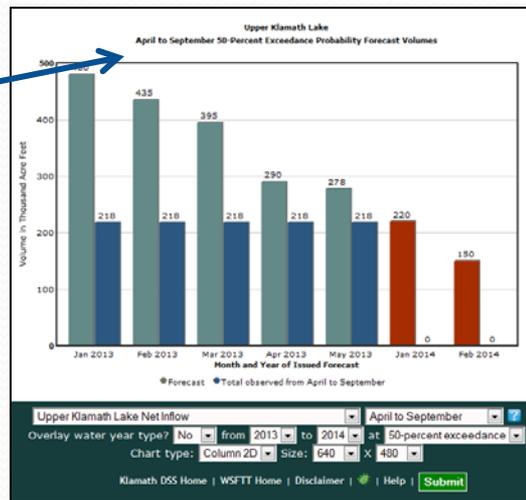
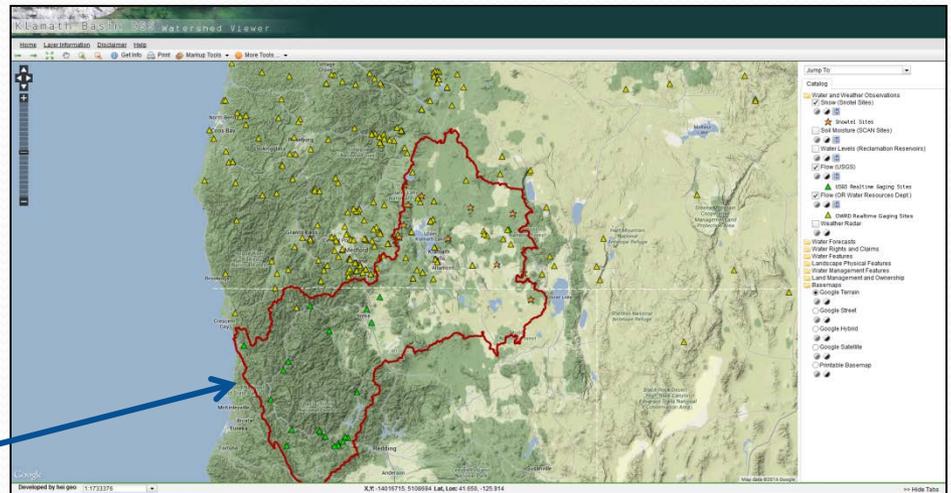


WATER FORECAST

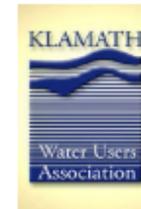


[About the Basin](#) | [Tools and Data](#) | [Map Viewers](#) | [Collaborators](#) | [Disclaimer](#) | [Home](#)

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Participants



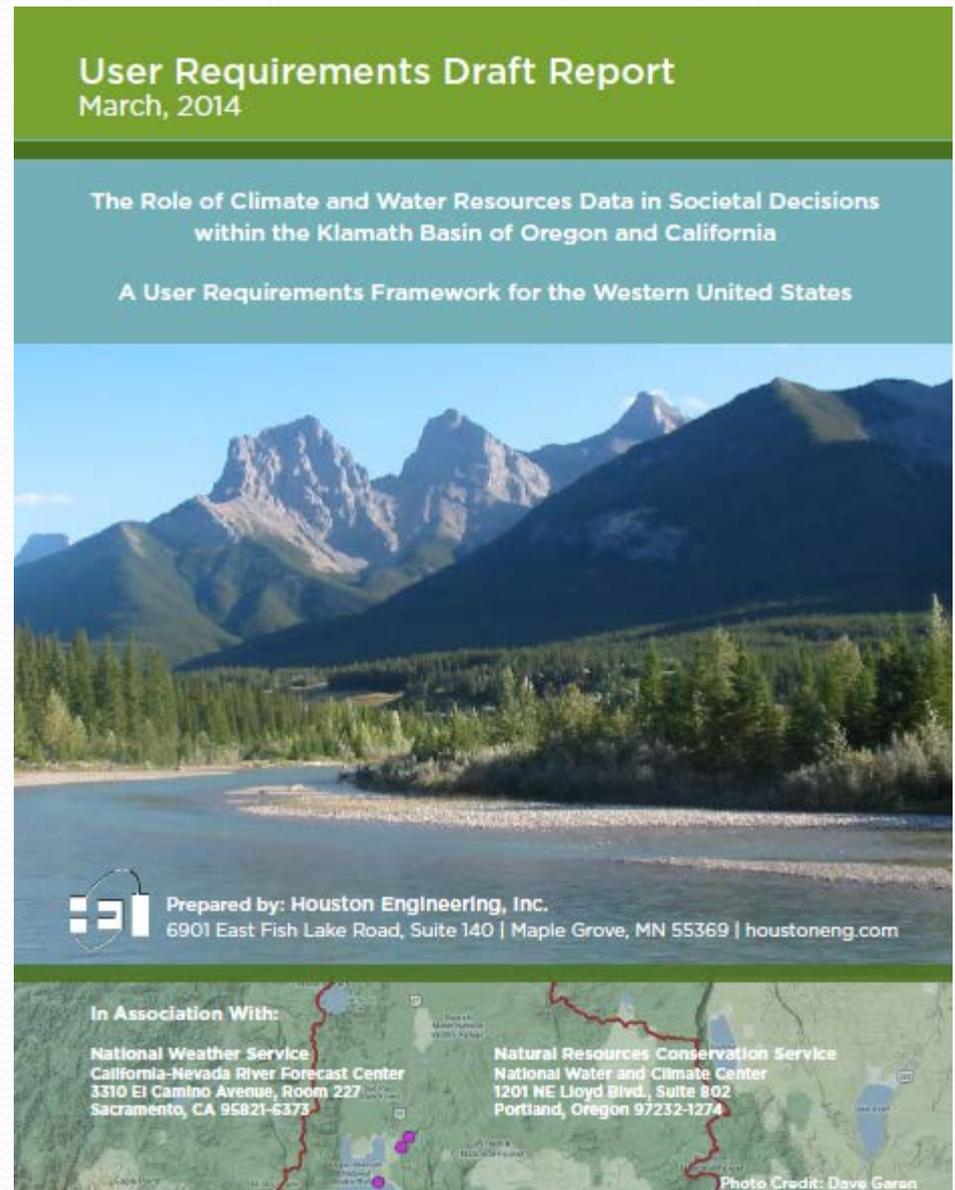
DAN KEPPEL & ASSOCIATES



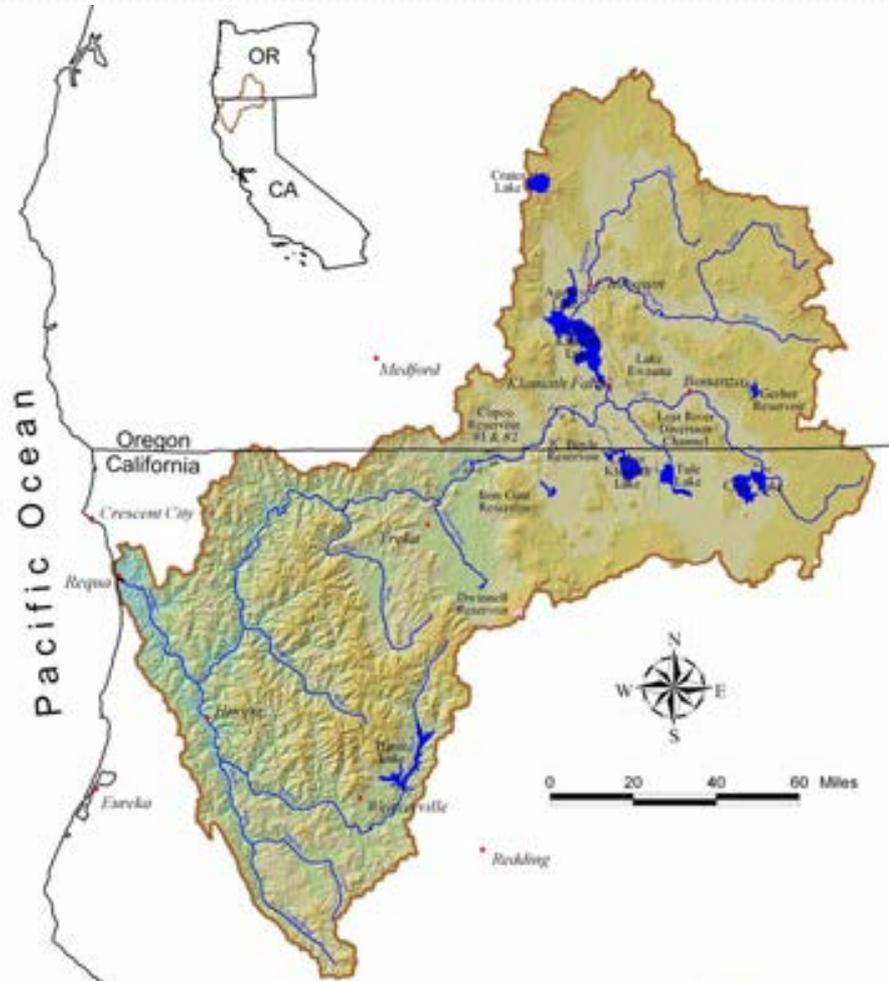
Report

- Draft report
- Finalize after meeting
- Download it:

http://ftp.houstoneng.com:443/main.html?download&weblink=7c4be79fe400fe22b82f5e7f423fd9e3&realfilename=3.10.14_UserRequirementsReport.pdf



Location



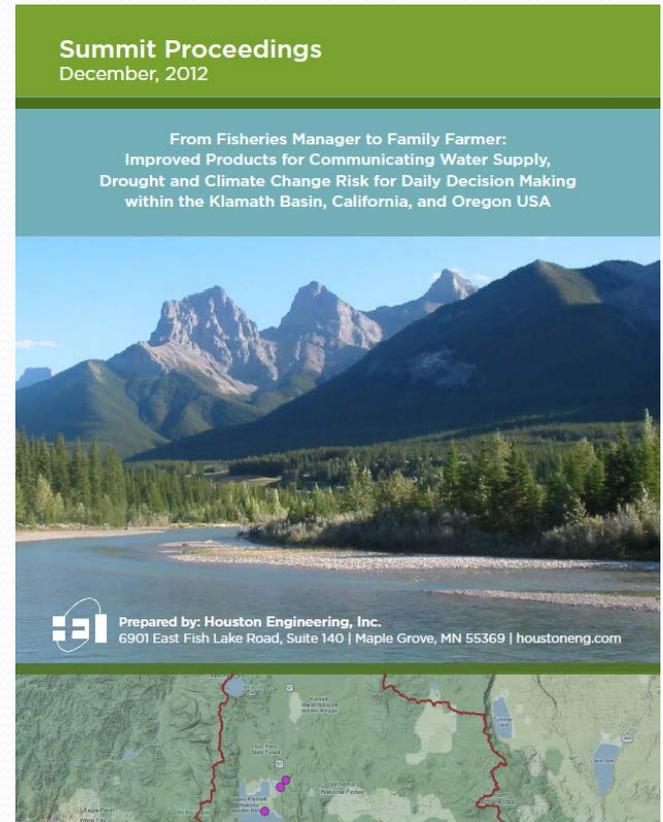
- Using the Klamath Basin as the geographic focus
- Results intended to be generalized to the Western US

Lessons Learned – Use of Climate and Water Data in Decision-Making

Linking the Data, Question, Decision, and Action

Process

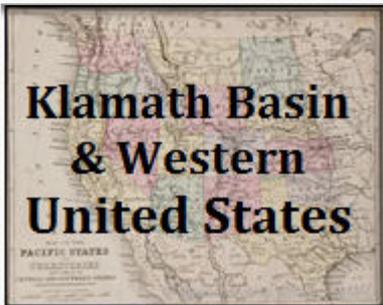
- Focus group approach
- Workshops to frame the issues
- Defined the questions
- Completed research
- Linked questions, decisions, criteria for action, and actions
- Recommend tools and data for decision-making
- **Reality check**
- Develop



Data Users (Focus Group Categories)



Water Supply Forecasts



Water Supply Forecast Accuracy

- From a statistical sense, accuracy of water supply forecasts is good.
- From a practical perspective, the forecast error represents a large volume of water.
- The desired greater accuracy unlikely to be achieved.

Water Supply Forecast Uncertainty

- Generally understand how forecast uncertainty is expressed.
- Alternative decisions to manage risk poorly defined.
- Need to continue improvements in communicating uncertainty.

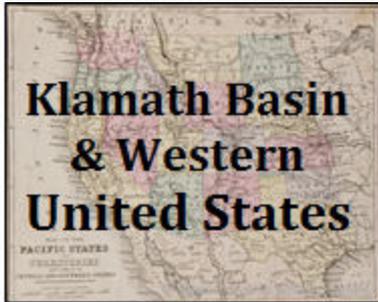
Climate & Water Data Needs



Klamath Basin & Western United States

Temporal and Spatial Scales

- Generally more data are needed at a finer spatial scale.
- Scale is driven by the temporal and spatial scale of issues.
- Generally shorter time periods needed.



Klamath Basin & Western United States

Dependence on Data

- Rely daily on climate and water data for making decisions.
- User expertise varies widely.



Recognizing Data Use Challenges

User Diversity

User Technical Expertise

User Decision Domain

Multidisciplinary Resource Decisions

Communicating Uncertainty

Integrating Data

Decision Linkage



Data Use Challenges

User Diversity

User Technical Expertise

User Decision Domain

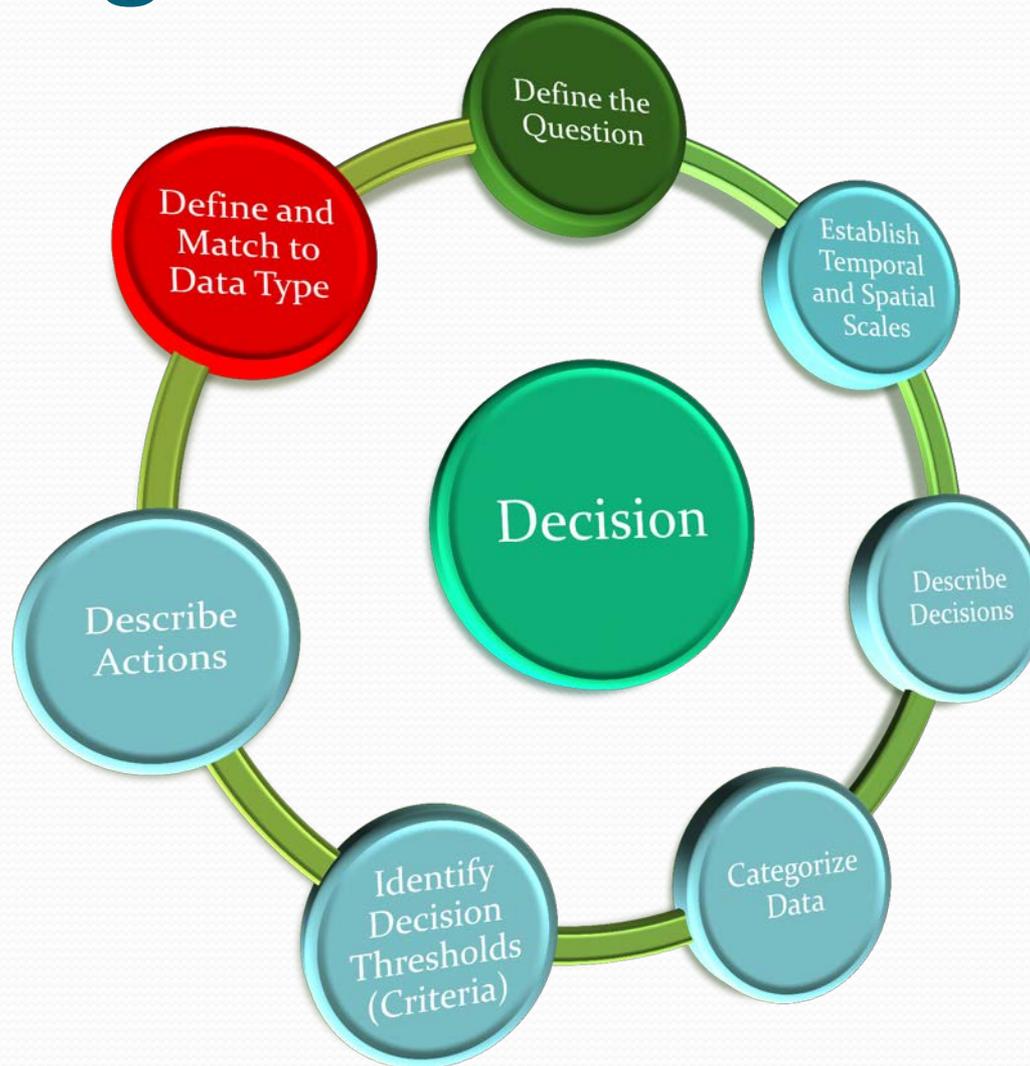
Multidisciplinary Resource Decisions

Communicating Uncertainty

Integrating Data

Decision Linkage

Defining the Decision Linkage





Climate and Water Data

Data Type

- Surface air temperature;
- Precipitation;
- Snowfall (depth);
- Growing degree days;
- Snow water equivalent;
- Streamflow;
- Groundwater elevation;
- Lake/reservoir surface water elevation ;
- Soil Moisture; and
- Evapotranspiration.

Temporal Scale

- Instantaneous (near real-time, generally 15-minute);
- 1-hour;
- Last 1-day;
- Last 7 days;
- Last 14 days;
- Last 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 18, 24, 30, 36, 48, 60, and 72 months, ending on the last day of the latest month;
- Water Year To Date (WYTD); and
- Calendar Year to Date (CYTD).

Decision Timelines

Fisheries & Natural Resource Manager & Klamath Tribe

Purpose: Evaluate current and forecast conditions with regard to the existing biological opinions and the quality of ecosystem services.

User skill level: Intermediate

Decision(s): The decisions for this user are expected to be related to whether current water levels, flows, and volumes are presently sufficient or forecast to be sufficient for providing ecological functions and services, largely expressed by specific criteria identified by the National Marine Fisheries Service and the U.S. Fish and Wildlife Service in their joint Biological Opinion.

- Information needs:
1. Storage volumes in UKL, Clear Lake and Gerber Reservoirs (see current water level pod on p.1)
 2. Current release rate from Link River Dam, A-canal, Gerber Reservoir and Clear Lake
 3. Estimated UKL inflow volume (today, cumulative water year) estimated from Williamson below Sprague gage
 4. Most recent NRCS seasonal water supply 50% forecast (Mar - September, but the months will change)
 5. Flows
 6. Cumulative volumes for points of diversion

Today's Date: 3/1/14
Station Location:



BASIN CONDITION

INTERACTIVE MAP

UPPER KLAMATH LAKE

14 inches

SNOW PACK

DATA CATEGORY: SNOW
DATA FREQUENCY: DAILY

UPPER KLAMATH LAKE

4,142.2 elevation (1988 NAVD)

LAKES & RESERVOIRS

DATA CATEGORY: LAKE
DATA FREQUENCY: DAILY

UPPER KLAMATH LAKE

Value unit

CLIMATE INDICES

DATA CATEGORY: CLIMATE
DATA FREQUENCY: DAILY

UPPER KLAMATH LAKE

100 TAB

STREAMS, RIVERS, DRAINS, CANALS

DATA CATEGORY: STREAMS
DATA FREQUENCY: DAILY

Drill Down Level 2

TIME PERIOD: DAILY

DEPTH (IN.): _____

MAXIMUM INTENSITY (IN./HR.): _____

PERCENT OF NORMAL: _____

DEPARTURE FROM NORMAL (IN.): _____

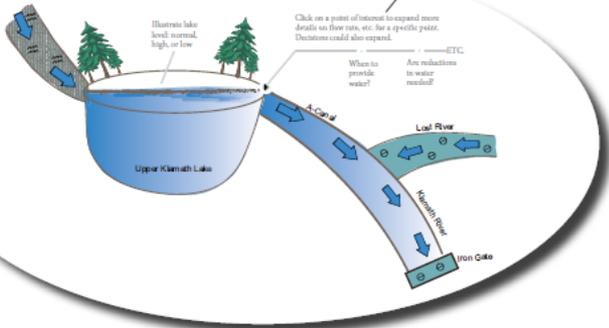
HISTORIC: 1992

DEPTH (IN.): _____

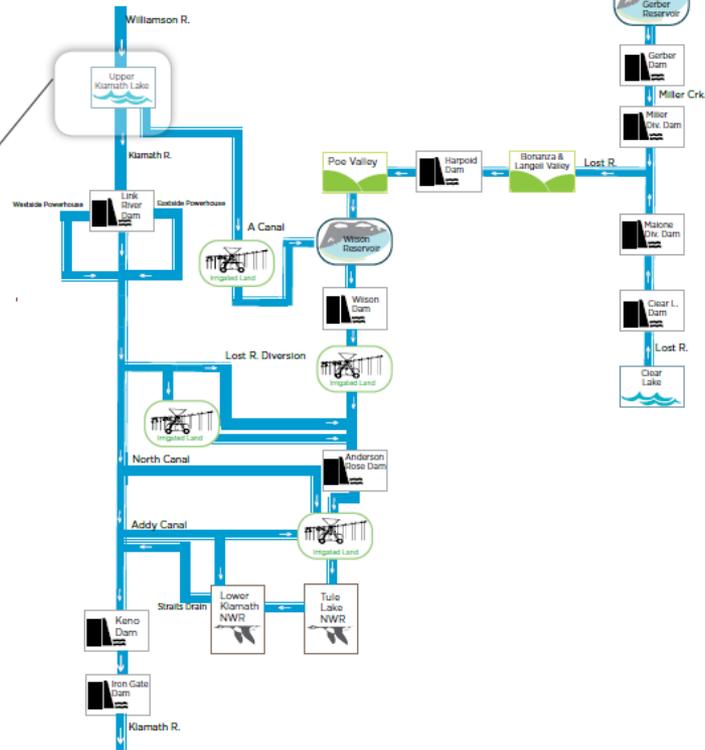
MAXIMUM INTENSITY (IN./HR.): _____

PERCENT OF NORMAL: _____

DEPARTURE FROM NORMAL (IN.): _____



Note: This timeline would graphically illustrate all areas of interest, how they're related, and what is occurring throughout the basin. User can view the "big picture", but also narrow in on more details for their specific area of interest by clicking their point of interest.



Water Supply Demand

AVERAGE MONTHLY PROJECT DEMAND (KAF): _____

AVERAGE WATER YEAR CUMULATIVE PROJECT DEMAND (KAF): _____

CURRENT MONTH KEBA POINTS OF DIVERSION VOLUME (KAF): _____

IRRIGATION SEASON KBRA POINTS OF DIVERSION VOLUME (KAF): _____

WINTER SEASON KBRA POINTS OF DIVERSION VOLUME (KAF): _____

CURRENT MONTH REFUGE VOLUME (KAF): _____

REFUGE IRRIGATION SEASON VOLUME (KAF): _____

REFUGE WINTER SEASON VOLUME (KAF): _____

Pattern in the river graphic would indicate flow trend:

= Flow Rate Increasing
 = Flow Rate Constant
 = Flow Rate Decreasing

Data Inventory

(same data from multiple sources)

	Type of Data	Name of Dataset	Shortest Measured Interval	Source of the Data	Entity Responsible for Data Management	Link
Measured						
Precipitation	Climate	Local Climatological Data Publication	Hourly (from 1945) Daily (from 1930) **Available by state or station	National Climatic Data Center	NOAA (Satellite and Information Service - NESDIS)	http://www.ncdc.noaa.gov/IPS/hpd/hpd.html
Evaporation	Climate	Monthly Average Pan Evaporation	Monthly Average over certain period of years **Only avail. For certain sites	WRCC	NOAA??	http://www.wrcc.dri.edu/htmlfiles/westevap.final.html
Solar Radiation	Climate	Solar Hourly Series for day of - / - / -	Hourly (from 2003) **Only available at certain stations	National Water and Climate Center	USDA – Natural Resources Conservation Service	http://www.wcc.nrcs.usda.gov/nwcc/inventory
Wind Speed	Climate	Local Climatological Data Publication	Every 3 Hours Daily (from 1945) **Available by state or station	National Climatic Data Center	NOAA (NESDIS)	http://www.ncdc.noaa.gov/IPS/lcd/lcd.html
Wind Direction	Climate	Local Climatological Data Publication	Every 3 Hours Daily (from 1945) **Available by state or station	National Climatic Data Center	NOAA (NESDIS)	http://www.ncdc.noaa.gov/IPS/lcd/lcd.html
Sky Cover	Climate	Local Climatological Data Publication	Daily (from 1945) **Available at certain sites	National Climatic Data Center	NOAA (NESDIS)	http://www.ncdc.noaa.gov/IPS/lcd/lcd.html

Documenting Decision Linkage

Category	Description	Type	Data		Criterion			Reference
			Time Scale	Spatial Scale / Locations	Description	Value	Units	
Water Supply Availability								
	Volume allocated to irrigation supply within the Klamath Project	Surface water volume	March through October	Upper Klamath Lake Inflow (Net)	April 1 – September 30 volume forecast by the NRCS-NWCC for their forecast issued on March 1	Forecast volume If <= 287,000 then 387,000 If > 287,000 but less than 569000 then 378 + {42.64 x [(Forecast Volume – 287)/282]*1000 If > 569,000 then 445,000	Acre-feet	
			November through February		Seasonal volume	45,000	Acre-feet	
	Volume allocated to the Lower Klamath Wildlife Refuge	Surface water volume	March through October;	Upper Klamath Lake Inflow (Net)	April 1 – September 30 volume forecast by the NRCS-NWCC for their forecast issued on March 1	If <= 287,000 then 48,000 If > 287,000 but less than 569000 then 48 + {7.64 x [(Forecast Volume – 287)/282]*1000 If > 569,000 then 60,000	Acre-feet	
			November through February		Seasonal volume	35,000	Acre-feet (values given are in 1000 acre-feet)	



Data Use Challenges

User Diversity

User Technical Expertise

User Decision Domain

Multidisciplinary Resource Decisions

Communicating Uncertainty

Integrating Data

Decision Linkage

Managing Uncertainty with Decision-Making

Focus Group	Decision Actions	Range of Options
Agricultural Producer	Acreage Planted	<ul style="list-style-type: none"> All arable land Some portion of arable land Fallow arable land
	Source of Water	<ul style="list-style-type: none"> Use of surface water supply only Use of surface water supply and supplemental supply (e.g., ground water) Use of supplemental supply only Fallow
	Crop Types	<ul style="list-style-type: none"> High water demand crops (e.g., orchards) Mix of high water demand and low water demand Low water demand crop (pasture)
Federal Water Supply Project Operator	Delivery of Water Supply	<ul style="list-style-type: none"> Decrease Rate Maintain current rate Increase rate Stop Delivery
Local Water Supply Administrative Organization	Need for Water User Mitigation Program	<ul style="list-style-type: none"> Volume of supplemental water supply needed Amount of acreage fallowed
Irrigation District	Delivery of Water Supply	<ul style="list-style-type: none"> Proportion of lands served Range of water supply provided (up to full)
Fisheries Manager	Fish Harvest	<ul style="list-style-type: none"> Alter harvest limits in response to anticipated impacts of instream flow allocations
	Challenge Flow Allocations	<ul style="list-style-type: none"> Petition Reclamation File lawsuit



Data Use Challenges

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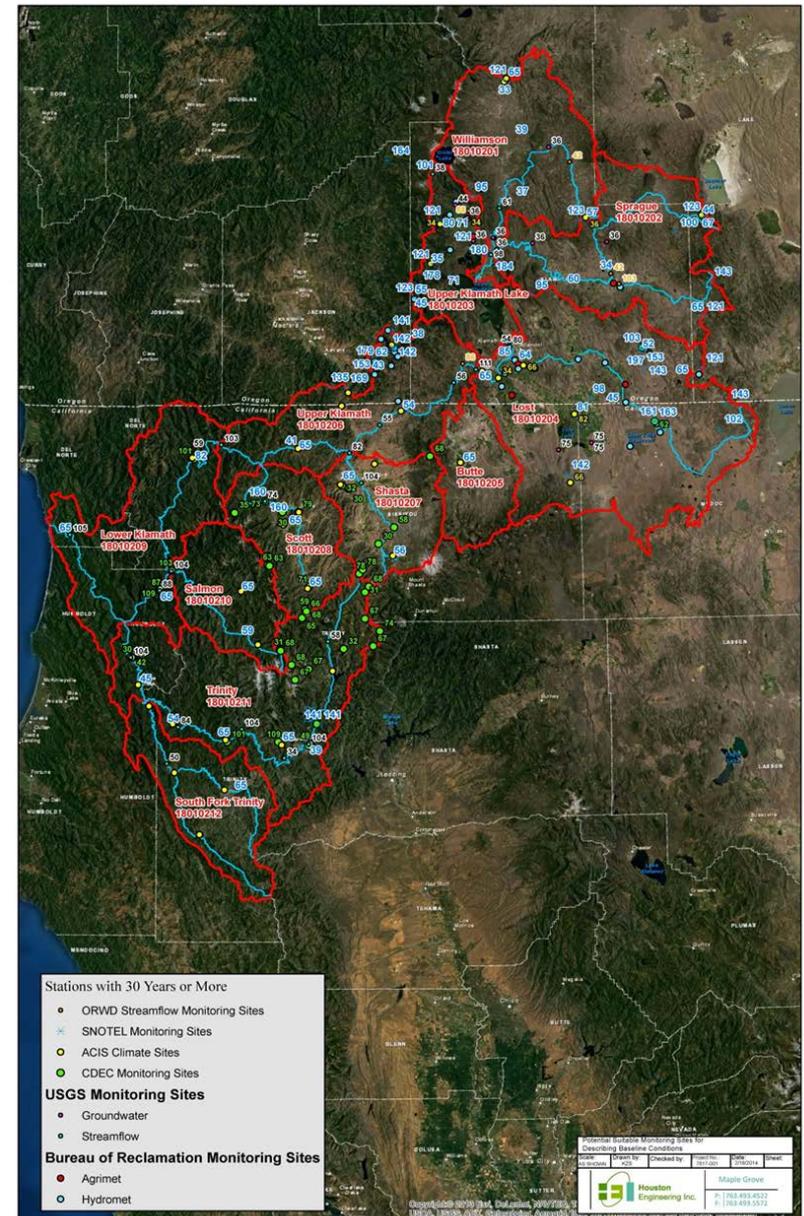
Decision Linkage



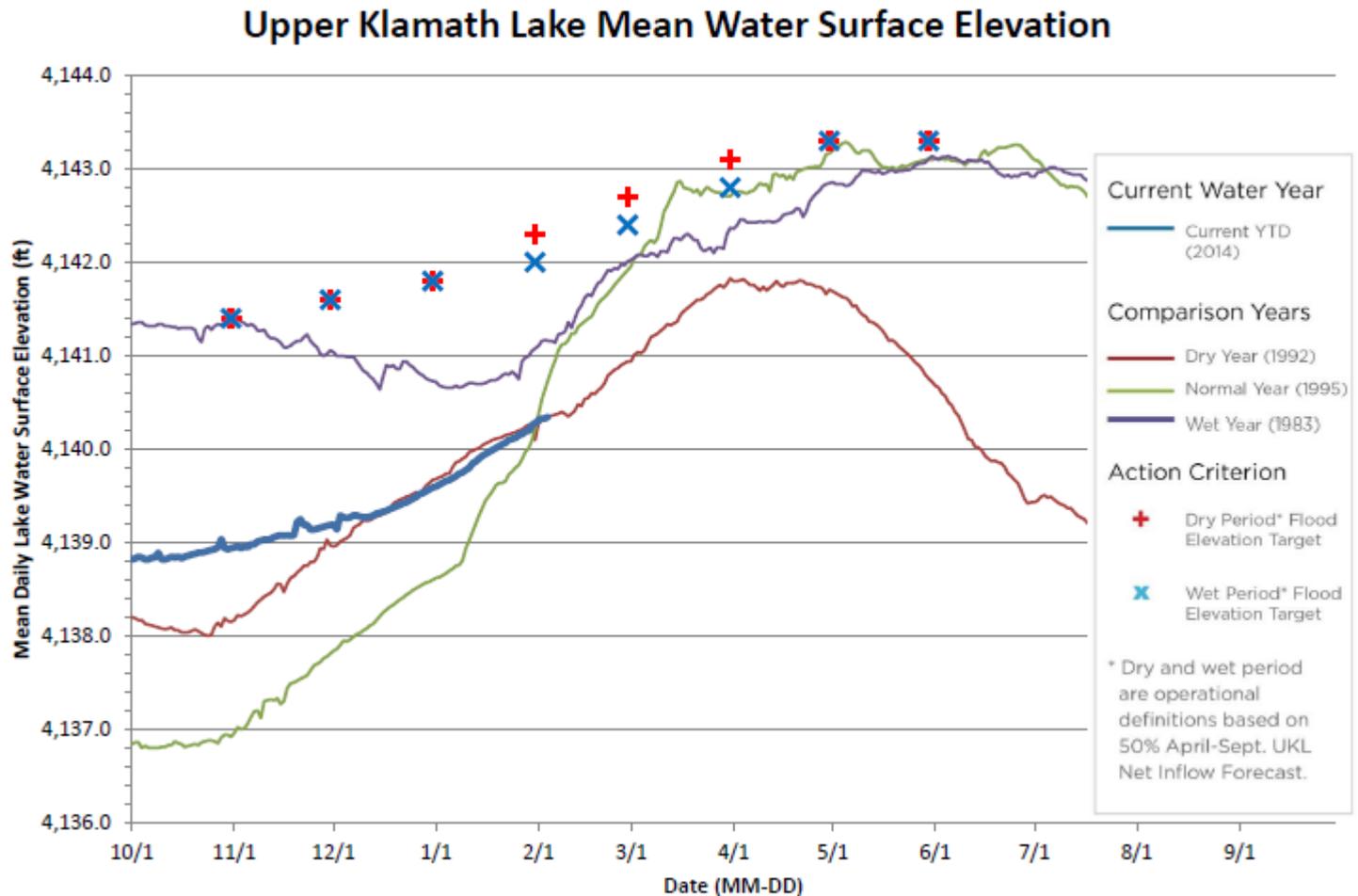
Establishing Context

- Compare current time period to some baseline condition
- Show data in comparison to one or more values where the value(s) result in a decision
- Display information for a specific period of time with which the user has firsthand knowledge or experience
- Display information along with historical ranges and percentiles for the period of record
- Integrate measured and forecast information into a single graph
- Provide the opportunity to compare data for inferential purposes

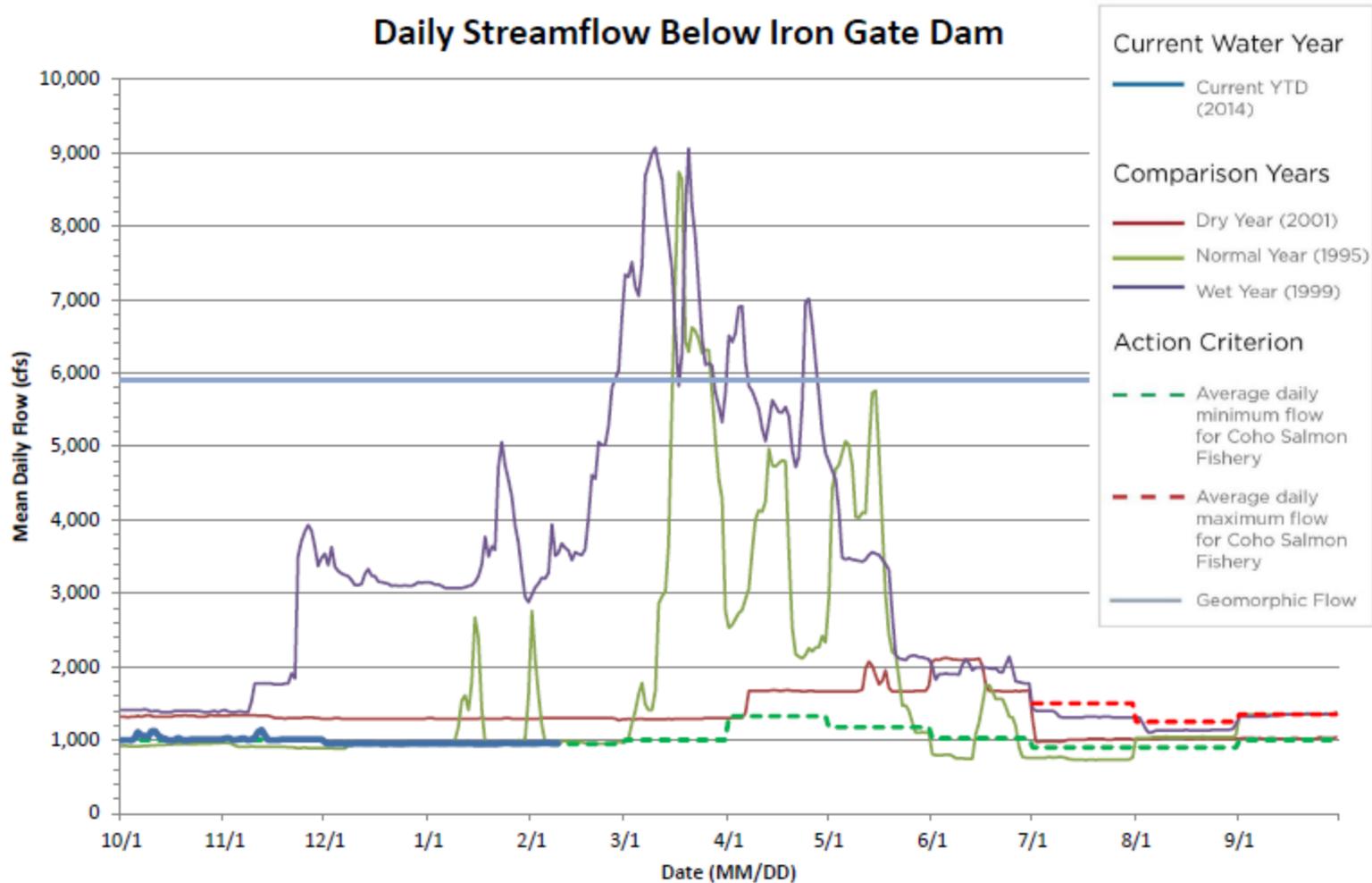
Baseline Conditions for Climate and Water Data



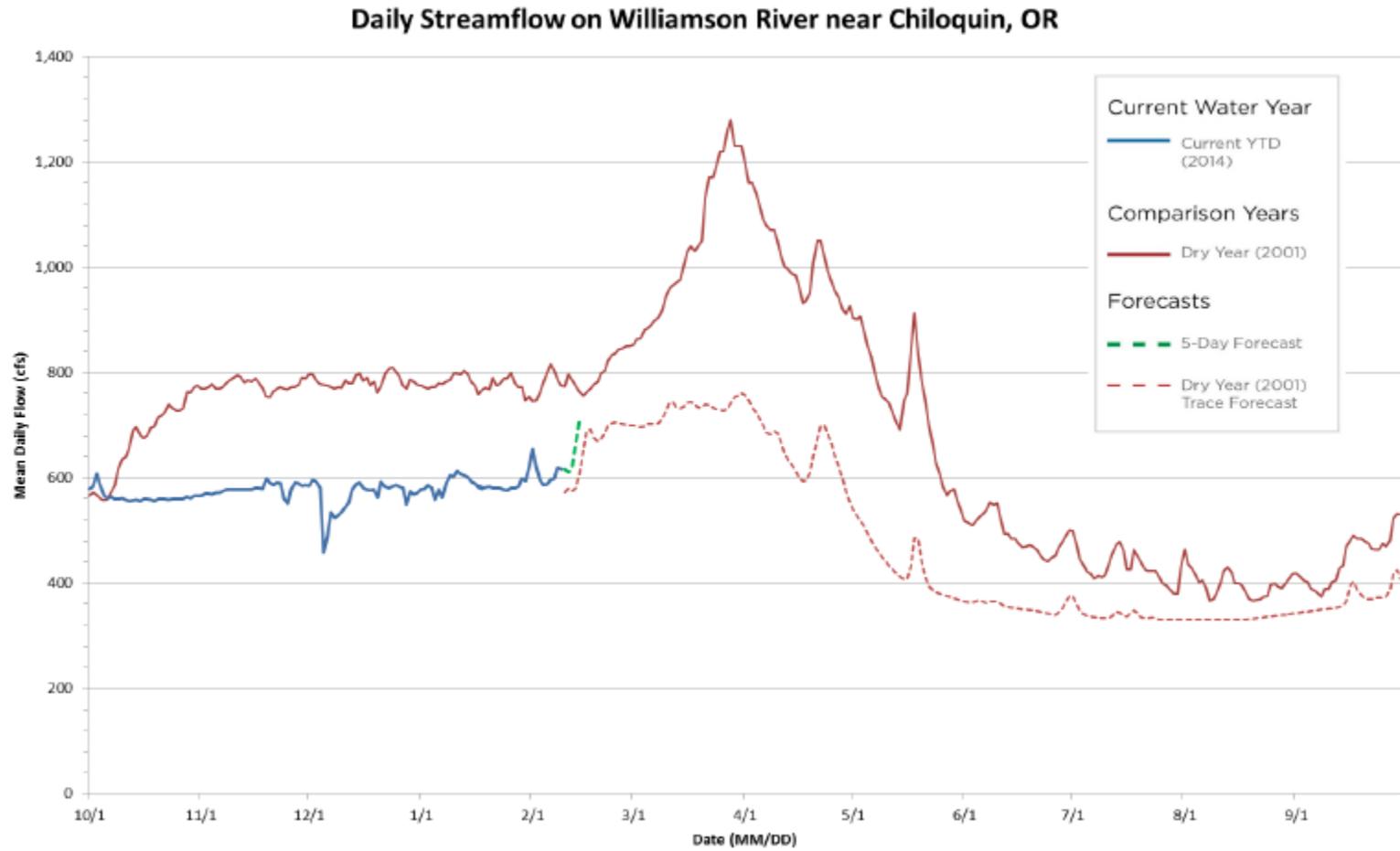
Using Baseline Condition



User Defined Criteria

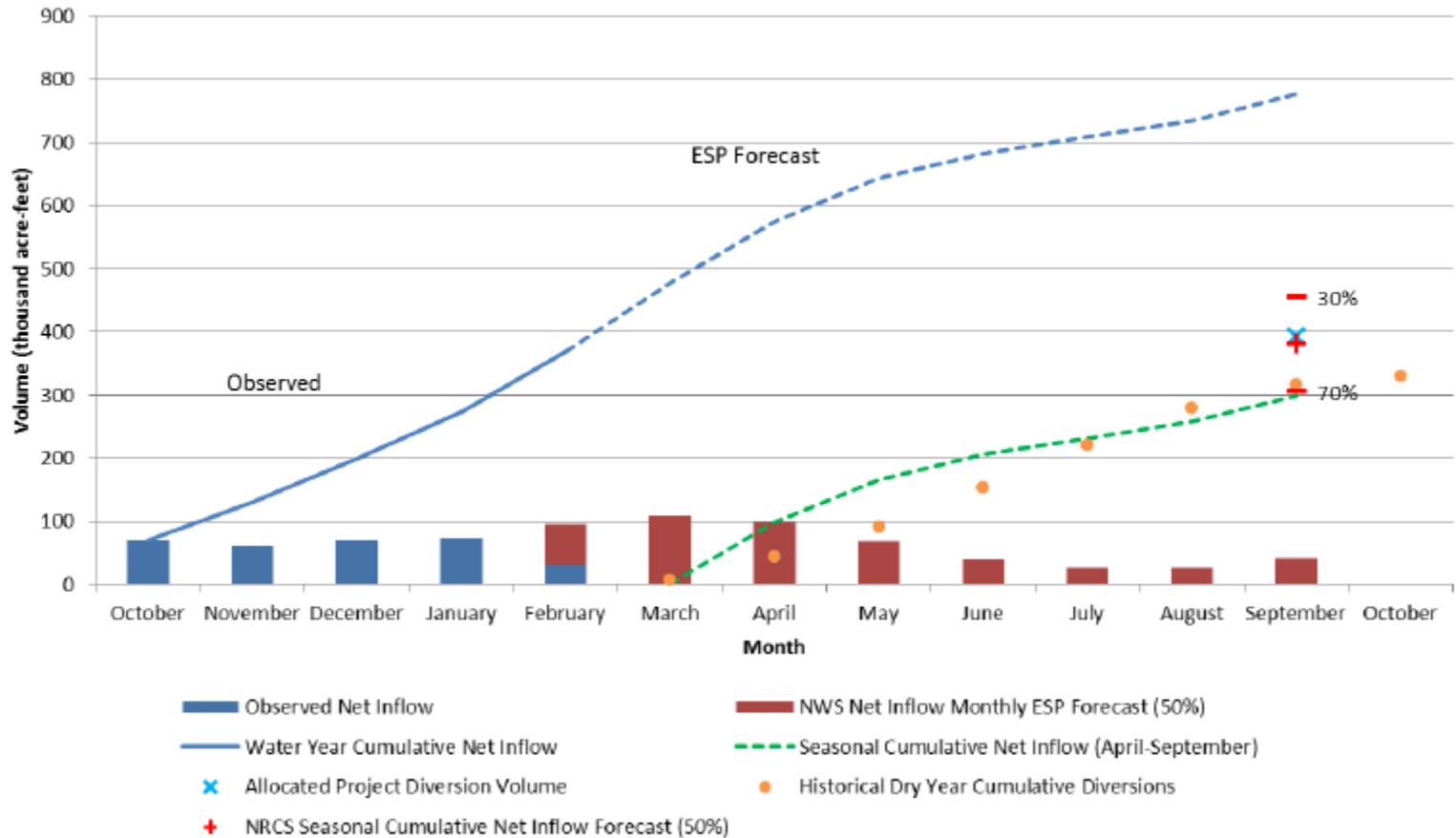


Integrating Forecasts & Real Years



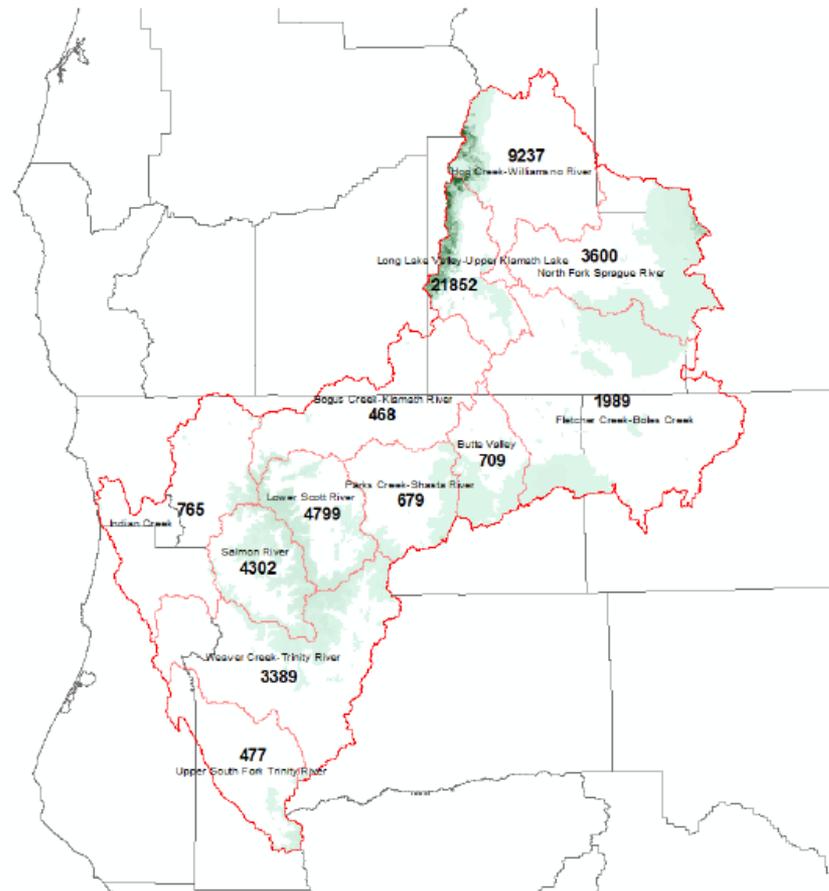
Integrating Forecasts

Upper Klamath Lake Net Inflow and Diversion Volumes



Alternative Presentation Methods

- Intensity of Supplemental Water Program
- Compare estimated water volume in snow pack plus volume in storage to seasonal water supply forecast



SWE in af on January 31, 2014 (from NOHRSC)

Tools and Design Considerations

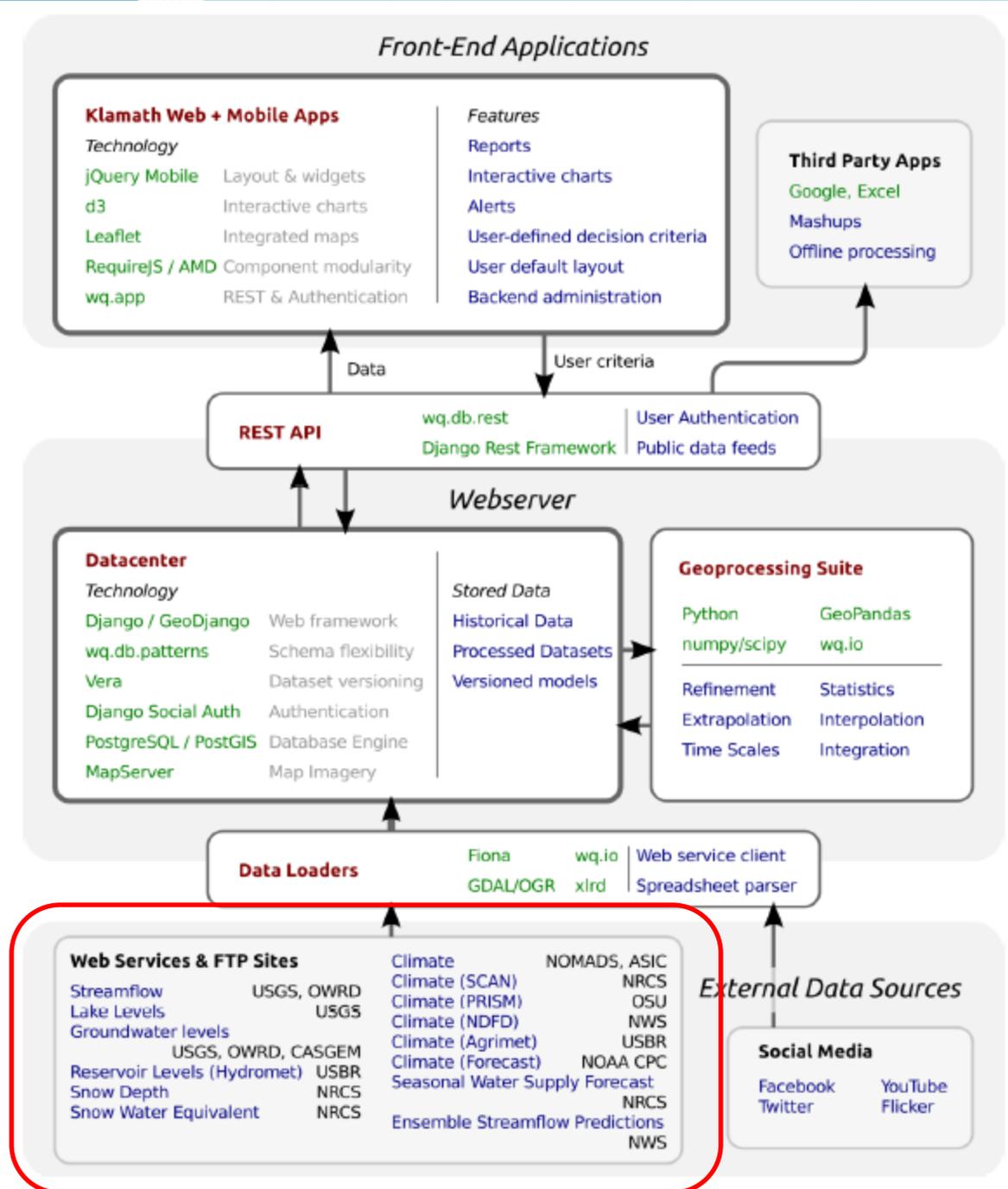
Implementing the Recommendations –
Designing and Building Robust Tools and Applications

1. Robust Tools and Apps
2. Recommended Platform
3. Wireframes

Defining Robust Tools and Apps

- User access to standardized, time invariant, (e.g., SHEP, NWS text product) electronic data (not images, graphs)
- Available through a data Application Interface (API)
- Data must fit within the “normal workflow process”
- Users provide resources to ingest newly created data
- Automatic error checking of web services and web master notification for system failures
- Data categorization for use in standard data charting, analysis, and reporting tools.
- Standard data charting, analysis, and reporting (by data type?)
- Users enter, upload, and evaluate against specific decision criteria
- Understandable method of describing and understanding the data

Recommended Technologies



1.2. Home

1.2.1. User Interface

Wire Framing

Watershed Data Harvester 1 2 3 4 5 6 7 8 9

[This white section is for breadcrumb site history - grayed out on prior to login]

About the Basin Why Should I log In? User Guide Contact

Welcome to the **Watershed Data Harvester (WDH)** . Use of this application allows the harvesting of climate and water data from disparate locations and the integration of this data with user defined criterion for enhanced resource decision making.

There are 3 Alerts!

Log in and learn what the Watershed Data Harvester can do for you!

D Klamath Falls D Taylor Butte D Link River Dam D Upper Klamath Lake M Klamath Falls

0.0 inches PRECIPITATION Not Applicable Depth (inches)

0.3 inches SNOW PACK Snow Water Equivalent Depth (inches)

333 cfs STREAMS, RIVERS, DRAINS, CANALS Discharge Rate(cfs)

4,141.31 elevation reclamation LAKES & RESERVOIRS Level Elevation(reclamation)

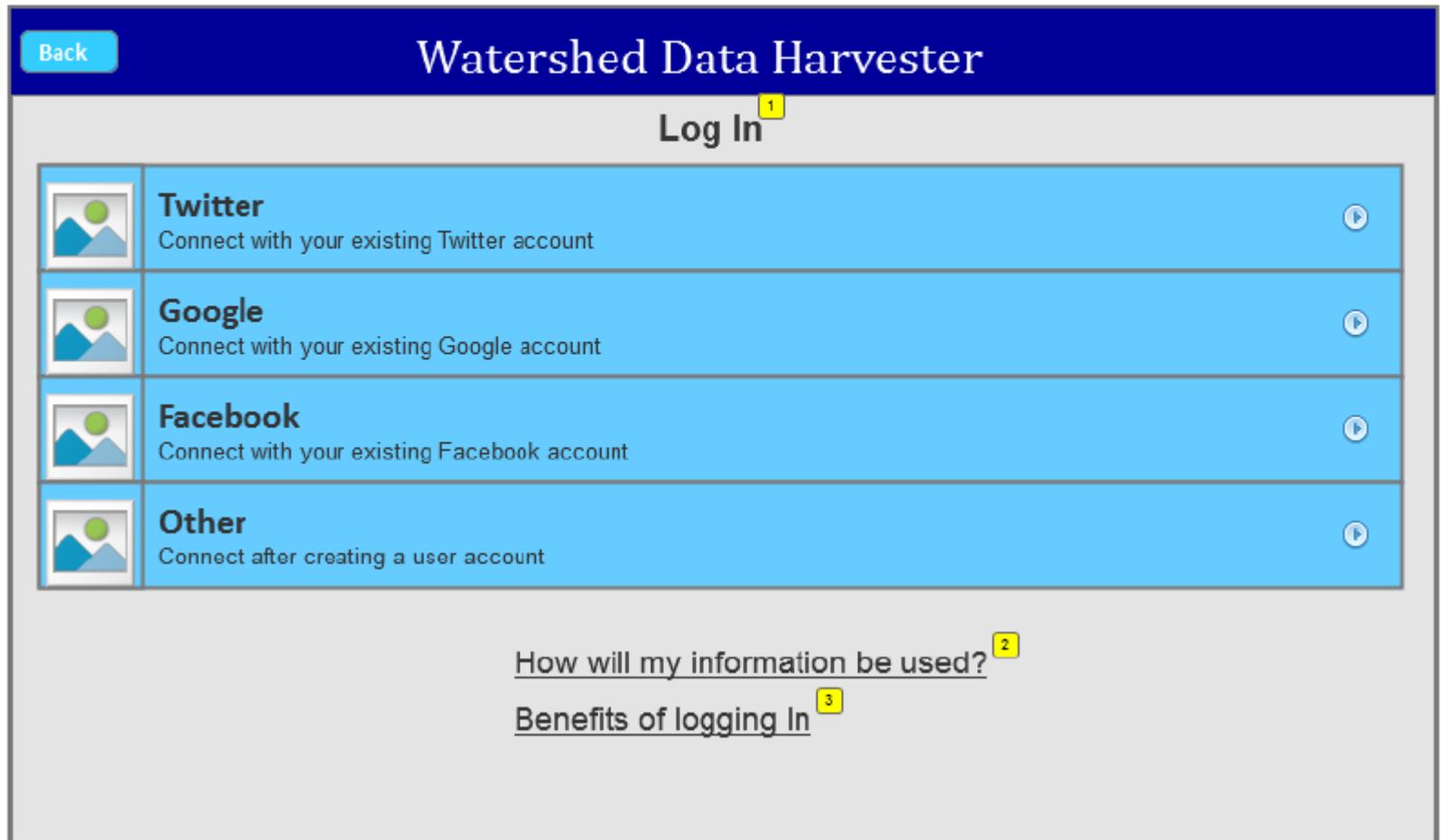
-1.49 spi CLIMATE INDICES Standard. Precip. Index Index

1.2.2. Widget Table

Footnote	Label	Description
1	Log In	A visitor must authenticate himself/herself to access the site. After account information has been obtained, the next visit will take the user to the customizable Dashboard page
2	Site Title	Site title for now
3	Welcome Text	Welcome Text
4	Pod Access Menu	This is not assessible until and the user is authenticated
5	About the Basin	This link takes user to a page that gives information about the basin
6	Why Should I login in?	This link takes user to a page that explains the benefits of logging in and how the information gathered about the user will make their site experience better.
7	User Guide	This link will take a user to a page that will explain different functionality present within the site.
8	Contact	This link will take the user to a page that will display key contact infomation
9	Breadcrumb Trail	This section is not active prior to login

1.3. Social Media Authentication and Login

1.3.1. User Interface



The screenshot displays the user interface for the Watershed Data Harvester. At the top, there is a dark blue header with a "Back" button on the left and the title "Watershed Data Harvester" in the center. Below the header, the text "Log In" is centered, with a small yellow square containing the number "1" next to it. The main content area features a list of four social media login options, each in a light blue box with a white border. Each option includes a small icon of a landscape with a green circle, the platform name in bold, and a description. A right-pointing arrow is visible in the top right corner of each box. The options are: Twitter (Connect with your existing Twitter account), Google (Connect with your existing Google account), Facebook (Connect with your existing Facebook account), and Other (Connect after creating a user account). Below the list, there are two links: "How will my information be used?" with a yellow square containing the number "2" next to it, and "Benefits of logging In" with a yellow square containing the number "3" next to it.

Back

Watershed Data Harvester

Log In ¹

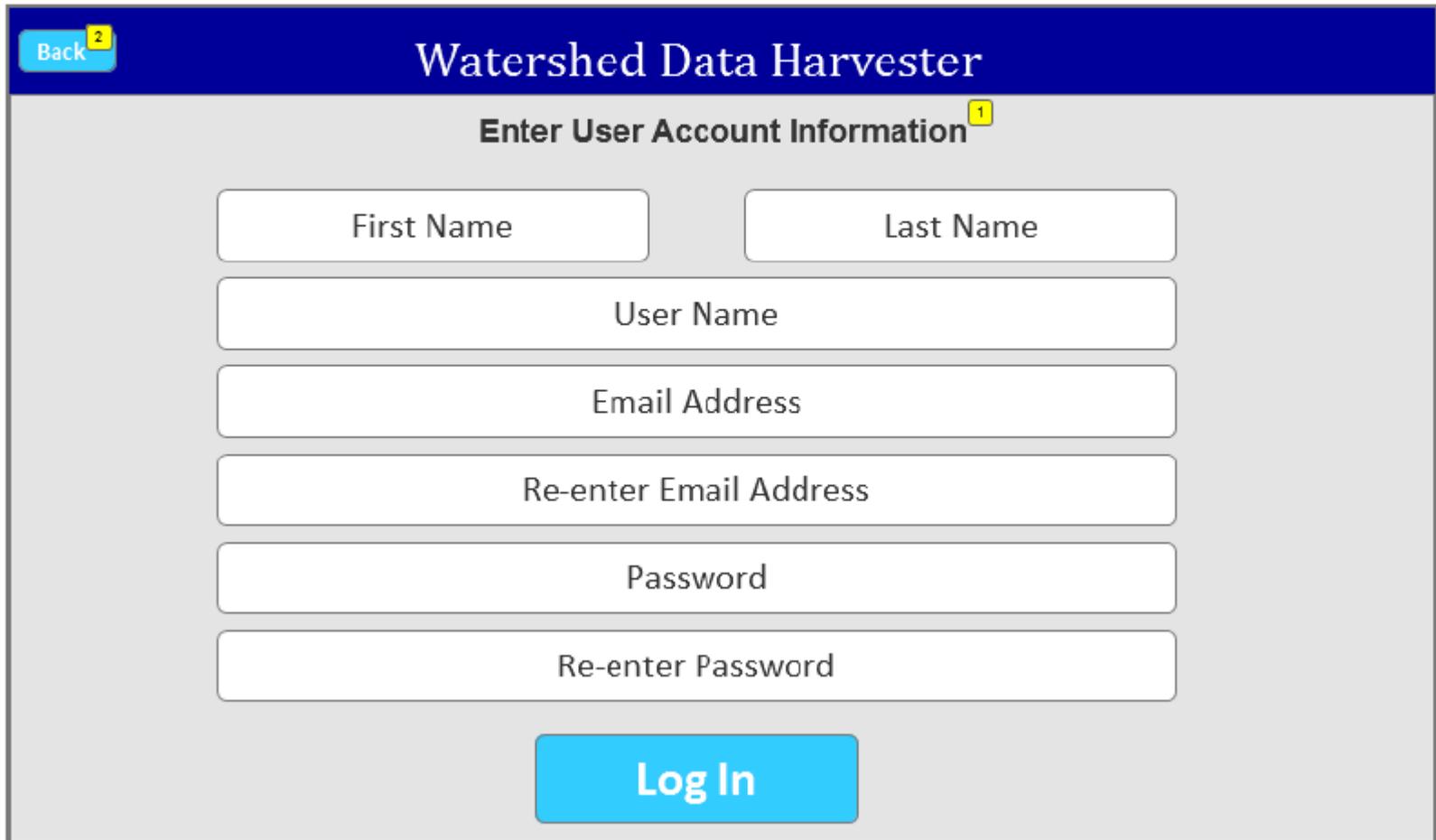
-  **Twitter**
Connect with your existing Twitter account
-  **Google**
Connect with your existing Google account
-  **Facebook**
Connect with your existing Facebook account
-  **Other**
Connect after creating a user account

How will my information be used? ²

Benefits of logging In ³

1.4. Traditional Authentication and Login

1.4.1. User Interface



The screenshot shows a web application interface for 'Watershed Data Harvester'. At the top left, there is a blue 'Back' button with a yellow '2' in a square next to it. The main title 'Watershed Data Harvester' is centered in a dark blue header. Below the header, the text 'Enter User Account Information' is centered, with a yellow '1' in a square next to it. The form consists of several input fields: 'First Name' and 'Last Name' (two side-by-side boxes), 'User Name', 'Email Address', 'Re-enter Email Address', 'Password', and 'Re-enter Password' (all stacked vertically). At the bottom center, there is a large blue 'Log In' button.

Back ²

Watershed Data Harvester

Enter User Account Information ¹

First Name

Last Name

User Name

Email Address

Re-enter Email Address

Password

Re-enter Password

Log In

1.5. Dashboard

1.5.1. User Interface

The screenshot shows the Watershed Data Harvester dashboard. At the top, a dark blue header contains the title "Watershed Data Harvester" and the user name "Howdy Username!". To the right of the user name is a gear icon for settings. Below the header is a white breadcrumb area with a note: "[This white section is for breadcrumb site history]". A navigation bar contains icons for weather, water, and a beaker, along with links for "About the Basin", "User Guide", and "Contact".

1) Sliding triangle along the line updates information displayed in each Pod and data needs

You have 4 Alerts!

Timeline: 1 year ago | (Apr 1) | (Jul 1) | Water Year Begin (Oct 1) | (Jan 1) | (Today)

- General User:** decision 1, decision 2
- Agricultural Producer:** decision 1, decision 2
- Klamath County User:** decision 1, decision 2, decision 3
- Fisheries & Natural Resource Manager:** decision 1, decision 2
- Agricultural Producer:** decision 1, decision 2, decision 3

2) Set the location, time period, and parameter to display in your Data Pods:

Location	Value	Unit	Parameter	Unit
Klamath Falls	0.0	inches	Precipitation	Depth (inches)
Taylor Butte	0.3	inches	Snow Pack	Depth (inches)
Link River Dam	333	cfs	Streams, Rivers, Drains, Canals	Rate (cfs)
Upper Klamath Lake	4,141.31	elevation	Lakes & Reservoirs	Elevation (reclamation)
Klamath Falls	-1.49	spi	Climate Indices	Standard Precip. Index

1.6. Dashboard_Config_Menu

1.6.1. User Interface

Watershed Data Harvester

Howdy Username! 

[This white section is for breadcrumb site history]

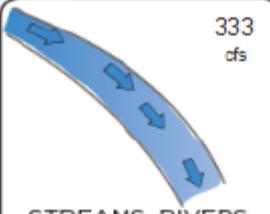
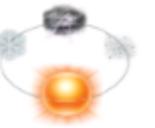
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1 year ago (Apr 1) (Jul 1) Water Year Begin (Oct 1) (Jan 1) (Today)

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- Agricultural Producer:** decision 1, decision 2, decision 3

2) Set the location, time period, and parameter to display in your Data Pods:

<p>D  Klamath Falls </p>  <p>0.0 inches</p> <p>PRECIPITATION</p> <p>Not Applicable </p> <p>Depth (inches) </p>	<p>D  Taylor Butte </p>  <p>0.3 inches</p> <p>SNOW PACK</p> <p>Snow Water Equivalent </p> <p>Depth (inches) </p>	<p>D  Link River Dam </p>  <p>333 cfs</p> <p>STREAMS, RIVERS, DRAINS, CANALS</p> <p>Discharge </p> <p>Rate(cfs) </p>	<p>D  Upper Klamath Lake </p>  <p>4,141.31 elevation reclamation</p> <p>LAKES & RESERVOIRS</p> <p>Level </p> <p>Elevation(reclamation) </p>	<p>M  Klamath Falls </p>  <p>-1.49 spi</p> <p>CLIMATE INDICES</p> <p>Standard. Precip. Index </p> <p>Index </p>
---	--	---	--	--

Default User Type

User Types

Please Select the User Type(s) that will be displayed on the Data Pod Dashboard

<input checked="" type="checkbox"/> General User
<input checked="" type="checkbox"/> Klamath County
<input checked="" type="checkbox"/> Fisheries & Natural Resource Manager & Klamath Tribe
<input type="checkbox"/> Agricultural Producer
<input type="checkbox"/> Water Users & Suppliers

Please select a user type and decisions associated with that user type

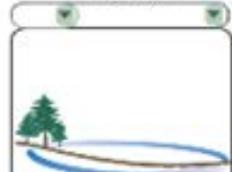
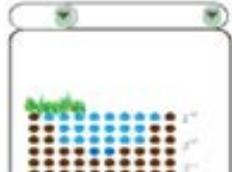
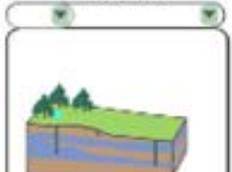
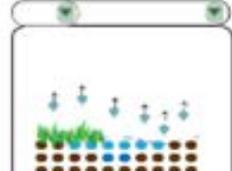
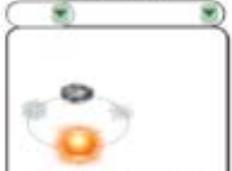
User Type
General User
Klamath County
Fisheries & Natural Resource Manager & Klamath Tribe
Agricultural Producer
Water Users & Suppliers

Decisions
<input checked="" type="checkbox"/> Decision 1
<input type="checkbox"/> Decision 2
<input checked="" type="checkbox"/> Decision 3
<input checked="" type="checkbox"/> Decision 4
<input type="checkbox"/> Decision 5

Configure Dashboard Pods

Home Watershed Data Harvester Howdy Username! 

Data Pods: Add or Remove Data Pods 1 **Site Configuration**

<p>In Use</p>  <p>PRECIPITATION</p> <p>Remove</p>	<p>In Use</p>  <p>SNOW PACK</p> <p>Remove</p>	<p>In Use</p>  <p>LAKES & RESERVOIRS</p> <p>Remove</p>	 <p>STREAMS, RIVERS, DRAINS, CANALS</p> <p>Add</p>	 <p>SOIL MOISTURE</p> <p>Add</p>	<p>In Use</p>  <p>GROUNDWATER</p> <p>Remove</p>
<p>In Use</p>  <p>GROWING DEGREE DAYS</p> <p>Remove</p>	 <p>EVAPOTRANSPIRATION</p> <p>Add</p>	<p>In Use</p>  <p>VEGETATION</p> <p>Remove</p>	 <p>WATER DEMAND</p> <p>Add</p>	 <p>AIR TEMPERATURE</p> <p>Add</p>	<p>In Use</p>  <p>CLIMATE INDICES</p> <p>Remove</p>

[Save Changes](#)

Configure Pod Data

Individual Pod Configuration

Use the pull down menu to select a Data Pod and then customize and save the location, time period, and parameters displayed

Snow Pack 2

Time Location

Value
unit

Data Pod Image

DATA POD NAME

DATA CATEGORY

DATA PARAMETER

Select the time period options for the selected Data Pod

Time Period

Select location options for the selected Data Pod

Locations

Use buffer distance for selected locations unit

Time Location

Value
unit

Data Pod Image

DATA POD NAME

DATA CATEGORY

DATA PARAMETER

Select the data parameter options for each data category for the selected Data Pod

Depth

Snow Water Equivalent

Density (%)

- Density
- Density departure from normal
- Depth percent of average
- Density percentile for period of record
- Density probability of occurrence for period of record
- Change in density (%)

Update

Configure Alerts

Alert Configuration

3

 You have 5 alerts set

Select default alerts by category or subcategory to receive automatic notification by email or text as resource condition approaches pre-set criterion

- + Water Supply Availability
- + Water Supply Demand
- + Lake and Reservoir Levels and Volumes
- + Streamflow
- + Groundwater
- + Agricultural
- Indices
 - Extreme Drought
 - Standardized Precipitation Index
 - Drought Index
 - Palmer (Drought Severity) Index
 - KWAPA Water User Mitigation Program Index

Configurable Alert Options

- Alert Levels (these all have a time and space aspect)
- Water Supply Volume
 - Klamath Project for irrigation
 - Lower Klamath National Wildlife Refuge
- Klamath Project water supply demand
- Lake and Reservoir Levels
 - Maximum temporary flood elevation
 - Maximum operating elevation
 - End of irrigation season minimum operating elevation
 - Current amount of water in storage
 - Remaining useable storage volume
 - Average flow release rate through dam
 - Rate of reservoir filling
 - Carry over volume
 - Ecological elevation
- Streamflow
 - Williamson River streamflow rate
 - William River streamflow threshold
 - Proportion of Upper Klamath Lake inflow from Williamson River
 - Volume accretions to the Klamath River below Link River Dam
 - Iron Gate Dam
 - Minimum flows for Coho Salmon
 - Summer maximum flow targets
 - Rate of discharge target
 - Accumulated volume target
 - Maximum stage alert level (flood)
 - Minimum stage alert level
 - Point of diversion
- Basin water supply index for Water User Mitigation Program
- Amount of accumulated precipitation
- Number of growing degree days
- Soil moisture percentage
- Drought condition
 - Potential for drought
 - Extreme drought
- Groundwater target water elevation in well

1.11. Notification Center

1.11.1. User Interface

The screenshot displays the 'Watershed Data Harvester' user interface. At the top, a dark blue header contains a 'Home' button on the left, the application name 'Watershed Data Harvester' in the center, and the user greeting 'Howdy Username!' with a gear icon on the right. Below the header is a navigation sidebar on the left with five menu items: '[Username]', 'Profile', 'Account Settings', 'Emails', and 'Notification Center'. The 'Notification Center' item is highlighted in blue and has a small yellow square with the number '1' next to it. The main content area is divided into three sections: 'Notification Email', 'Text Alerts', and 'Website Updates'. The 'Notification Email' section has a header and a form with the label 'Primary email address', a dropdown menu showing 'cnunemacher@houstoneng.com', and a 'Save' button. The 'Text Alerts' section has a header and a form with the label 'Please provide your cell phone number', a text input field containing 'xxx-xxx-xxxx', and a 'Save' button. The 'Website Updates' section has a header and a form with the label 'I would like to be notified of changes to the website' and a 'Yes' checkbox.

Home

Watershed Data Harvester

Howdy Username!

[Username]

Profile

Account Settings

Emails

Notification Center ¹

Notification Email

Primary email address

cnunemacher@houstoneng.com

Save

Text Alerts

Please provide your cell phone number

xxx-xxx-xxxx

Save

Website Updates

I would like to be notified of changes to the website Yes

1.12. Streams_overview_page

1.12.1. User Interface

The screenshot displays the 'Watershed Data Harvester' web application interface. The top navigation bar includes a 'Home' button, the title 'Watershed Data Harvester', and a user greeting 'Howdy Username!' with a settings gear icon. Below the navigation bar is a breadcrumb site history section, currently grayed out. The main content area is divided into several sections:

- Left Panel:** Contains text indicating the user is in the 'Streams, Rivers, Drains, and Canals Data Pod' and is a 'General User' in the 'Klamath County Basin'. It also lists activities like 'construction site inspections, weed control, and drought monitoring and declaration'.
- Map:** A central map showing the watershed boundary in red. Key locations include 'Upper Klamath National Wildlife Refuge', 'Mt McLoughlin', 'Klamath Falls', and 'Bear Valley National Wildlife Refuge'. A tooltip over a site marker reads: 'new site within pod is clicked and site information for detailed pods is updated. Pod site drop-down value is also updated'.
- Right Panel:** Features a 'Layers' and 'Basemaps' menu, a 'Pod Sites' dropdown menu, a 'Parameter' dropdown menu, and a 'Parameter Value' section showing a map with a value of '12"'. Below this is a 'Historic' section with another map and value of '12"', and an 'Interactive Map' section with a small map thumbnail.
- Bottom Panel:** A navigation bar with icons and labels for 'Overview', 'Reports', 'Charts', and 'Tables'.

Yellow callout boxes with numbers 1 through 8 are placed around the interface to highlight specific features: 1 (Overview icon), 2 (Left panel text), 3 (Layers/Basemaps menu), 4 (Pod Sites dropdown), 5 (Parameter dropdown), 6 (Parameter Value map), 7 (Historic map), 8 (Interactive Map thumbnail).

1.14. Interactive Map

1.14.1. User Interface

The screenshot displays the 'Watershed Data Harvester' web application interface. At the top, a dark blue header contains a 'Home' button, the title 'Watershed Data Harvester', a user greeting 'Howdy Username!', and a settings gear icon. Below the header is a grayed-out breadcrumb area with the text '[This white section is for breadcrumb site history - grayed out on prior to login]'. A secondary navigation bar features weather icons (cloud, rain, sun, waves, water tower) and links for 'About the Basin', 'User Guide', and 'Contact'. The main content area is dominated by a map of the Upper Klamath region, showing 'Upper Klamath National Wildlife Refuge', 'Winema National Forest', 'Upper Klamath Lake', and 'Bear Valley National Wildlife Refuge'. The map is overlaid with various data points, including yellow triangles, orange stars, and a purple star. A 'Map Layers' panel on the left lists several layers: 'Map Service 1[Name]', 'Map Service 2[Name]', 'Layer 1', 'Layer 2', and 'Layer 3', each with a checked checkbox and a legend symbol. A toolbar above the map includes icons for layers, home, print, search, and refresh. At the bottom, a navigation bar contains buttons for 'Overview', 'Reports', 'Charts', and 'Tables'. Small yellow callout boxes with numbers '1' and '2' are present on the map and toolbar respectively.

1.15. Basemaps

1.15.1. User Interface

The screenshot displays the 'Watershed Data Harvester' web application interface. At the top, a dark blue header contains a 'Home' button, the title 'Watershed Data Harvester', and a user greeting 'Howdy Username!' with a gear icon. Below the header, a white section for breadcrumb site history is noted as grayed out. A navigation bar includes icons for weather and water, and links for 'About the Basin', 'User Guide', and 'Contact'. The main content area features a map of the Upper Klamath Lake region, showing 'Upper Klamath National Wildlife Refuge', 'Winema National Forest', and 'Bear Valley National Wildlife Refuge'. A 'Basemaps' panel on the left offers six map styles: Imagery, Imagery with Labels, Streets, Topographic, Terrain with Labels, and Light Gray Canvas. A toolbar above the map includes icons for layers, pan, zoom, and print. At the bottom, a navigation bar provides buttons for 'Overview', 'Reports', 'Charts', and 'Tables'.

1.21. Reports Page

1.21.1. User Interface

Home
Watershed Data Harvester
Howdy Username!
⚙️

[This white section is for breadcrumb site history - grayed out on prior to login]

☁️ ☔ ☀️ 🌊 🏠
About the Basin | User Guide | Contact

Reports Information Panel

Report Options

Data Time Period

<input type="checkbox"/> 5YTD	<input type="checkbox"/> CYD	<input type="checkbox"/> Year to Date	<input type="checkbox"/> 1 Year	<input type="checkbox"/> Last Day
<input checked="" type="checkbox"/> Last Week	<input type="checkbox"/> Last 2 Weeks	<input type="checkbox"/> Last Month	<input type="checkbox"/> Last 2 Months	<input type="checkbox"/> Last 3 Months
<input type="checkbox"/> Last 4 Months	<input type="checkbox"/> Last 5 Months	<input type="checkbox"/> Last 6 Months	<input type="checkbox"/> Last 7 Months	<input type="checkbox"/> Last 8 Months
<input type="checkbox"/> Last 9 Months	<input type="checkbox"/> Last 10 Months	<input type="checkbox"/> Last 11 Months	<input type="checkbox"/> Last 12 Months	<input type="checkbox"/> Last 13 Months
<input type="checkbox"/> Last 14 Months	<input type="checkbox"/> Last 15 Months	<input type="checkbox"/> Last 16 Months	<input type="checkbox"/> Last 17 Months	<input type="checkbox"/> Last 18 Months
<input type="checkbox"/> Last 19 Months	<input type="checkbox"/> Last 20 Months	<input type="checkbox"/> Last 21 Months	<input type="checkbox"/> Last 22 Months	<input type="checkbox"/> Last 23 Months
<input type="checkbox"/> Last 24 Months	<input type="checkbox"/> Last 25 Months	<input type="checkbox"/> Last 26 Months	<input type="checkbox"/> Last 27 Months	<input type="checkbox"/> Last 28 Months
<input type="checkbox"/> Last 29 Months	<input type="checkbox"/> Last 30 Months	<input type="checkbox"/> Last 31 Months	<input type="checkbox"/> Last 32 Months	<input type="checkbox"/> Last 33 Months
<input type="checkbox"/> Last 34 Months	<input type="checkbox"/> Last 35 Months	<input type="checkbox"/> Last 36 Months	<input type="checkbox"/> Last 37 Months	<input type="checkbox"/> Last 38 Months
<input type="checkbox"/> Last 39 Months	<input type="checkbox"/> Last 40 Months	<input type="checkbox"/> Last 41 Months	<input type="checkbox"/> Last 42 Months	<input type="checkbox"/> Last 43 Months
<input type="checkbox"/> Last 44 Months	<input type="checkbox"/> Last 45 Months	<input type="checkbox"/> Last 46 Months	<input type="checkbox"/> Last 47 Months	<input type="checkbox"/> Last 48 Months
<input type="checkbox"/> Last 49 Months	<input type="checkbox"/> Last 50 Months	<input type="checkbox"/> Last 51 Months	<input type="checkbox"/> Last 52 Months	<input type="checkbox"/> Whole Period of Record

Lakers & Reservoirs
Upper Klamath Lake

Parameter Selection

- Level
- Fluvial (Pre-Construction Future)
- Elevation dip from normal
- Fluvial probability for period of record
- Elevation probability of occurrence for period of record
- change in level
- Volume
- remaining operating volume (acre-feet)
- Remaining operating volume dip from normal (acre-feet)
- Percent of full operating volume
- Percent remaining operating for period of record
- probability of occurrence remaining operating volume for period of record

Report Detail

Generated by: user@water.gov
on: 2/15/2024

Basin/POD: Lakes & Reservoirs

Site Name: Upper Klamath Lake Near Scotts Hill, OR

Site ID: 11500000

Basin: USBR

Location: Lat: 42°15'00", Long: 121°40'00" (referenced to North American Datum of 1983). In NW 1/4 SW 1/4, sec.28, T.88 N., R. 8 E., East in County, OR. Map shows 0111000000. This site has no actual location, as it reflects only a summary of flows. Three USBR sites are used to calculate the gauged record. They are listed below: 11500000 (Gauged Flow), 11500000 (Streamflow from site), and 11500000 (Gauged Flow).

Drainage Area: 3,632 sq. miles (including 26.2 sq. miles basin of Center Lake).

3dps: water stage recorder (part of gage) (14,000,000 above datum of 11500000) (1,000,000 ft above US. Bureau of Reclamation datum. Stage readings have been reduced to elevation above US. Bureau of Reclamation datum. See USBR 1730 for history of changes prior to Nov. 15, 1973. Gauge Elev. 1,074.6 supplementary water stage recorder at a max. 200 above 600 ft. normal water stage datum (water surface) (1,000 ft. above datum).

Remarks: Recorder installed by construction of outlet of Center Lake, completed in 1972. This is a temporary stage recorder. It is not intended for long term use. It is a 3dps. Capacity: 1,000,000 ft³ (Normal elevation 4,100 ft. and 4,140 ft. rated storage: 210,000 cu ft. below elevation 4,100 ft. stored water may be spilled through the "W" Canal by irrigation (12 to 16 inches) (1,000 ft. above datum) or released to the River through gate or screen (at the main Pt. 10). Center gage basin represents those above datum at 4,100 ft. prior to gate. No. 1016, contents gage represents those above datum at 4,100 ft. prior to gate. No. 1016, contents at end of month added by averaging method for 1016 days of month and 1016 days of following month for comparison for full effect. Since Dec. 3, 1973, daily elevations are reported. means of elevation at several rapid stream gauges. 1 contents at end of month are derived from averaged elevations of two to six supplementary gauges.

Observed Data			Forecast Data*		
	Period	Statistic	Agency	Period	Statistic
1016	Last Week	274,740	USBR	6/6/2024	280,000
	Last Month	274,820	USBR	5/6/2024	280,000
	Last 3 Months	294,586	USBR	3/7	276,200
	Last 12 Months	283,170			

*1016-0107-1161-8-011-0000-0000-0000

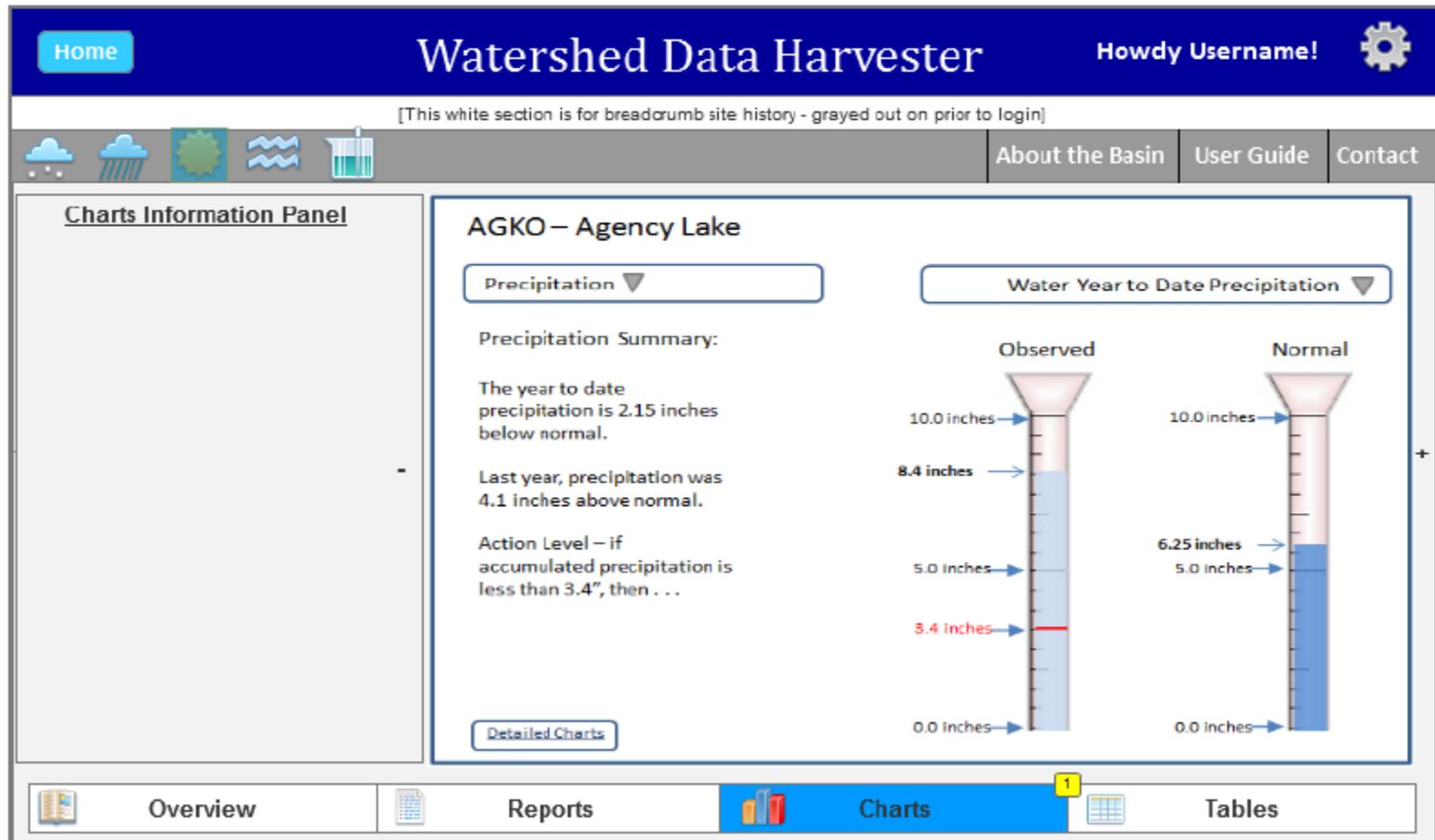
Share Report
Download
Print Report

📄
📊
📑

Overview
Reports
Charts
Tables

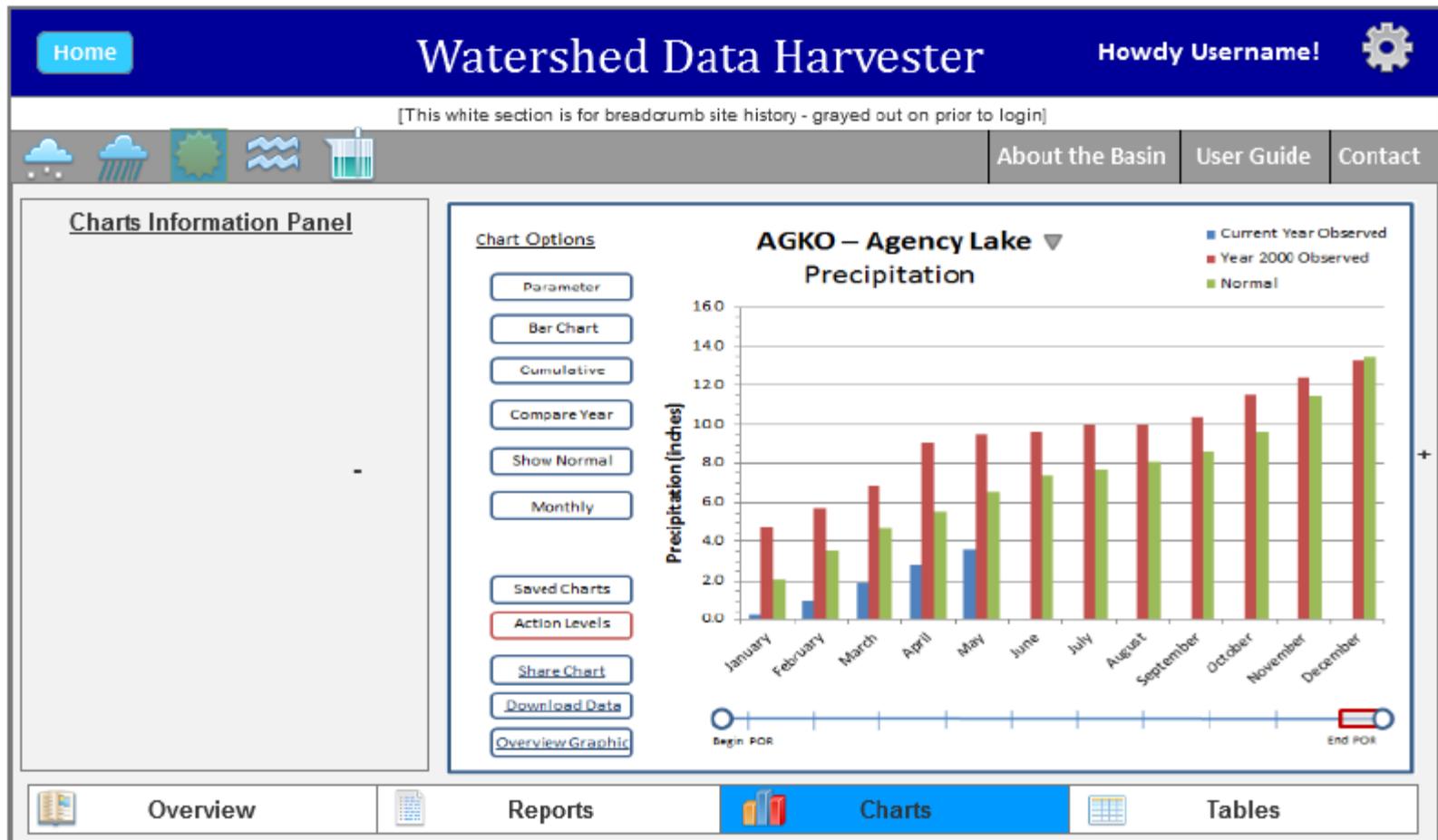
1.22. Charts Page

1.22.1. User Interface



1.23. Detailed Charts Page

1.23.1. User Interface



1.24. Tables Page

1.24.1. User Interface

Home
Watershed Data Harvester
Howdy Username!
⚙️

[This white section is for breadcrumb site history - grayed out on prior to login]

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About the Basin | User Guide | Contact

Tables Information Panel

Table Options

Start Date
10/1/2013
End Date
9/30/2014

Streams, Rivers, Drains and Canals
Williamson River near Chilquin, OR

+ level	index
<input type="checkbox"/> discharge	average
<input type="checkbox"/> Rate (cfs)	average
<input type="checkbox"/> rate (cfs) departure from normal	average
<input type="checkbox"/> percentage for period of record	average
<input type="checkbox"/> probability of occurrence for period of record	average
<input type="checkbox"/> change in discharge (cfs)	average
+ volume	index

+ ADD Data POD/Site

Additional Fields

Forecasts
Compare Year

Daily Time Stamp	Current Daily Average Flow	5-day Forecast	Dry Year ESP Trace Forecast	Normal Year ESP Trace Forecast	Wet Year ESP Trace Forecast
1/15/2014	592				
1/16/2014	600				
1/17/2014	505				
1/18/2014	588				
1/19/2014	602				
1/20/2014	594				
1/21/2014	581				
1/22/2014	581				
1/23/2014	608				
1/24/2014	677				
1/25/2014	576				
1/26/2014	500				
1/27/2014	500				
1/28/2014	606				
1/29/2014	606				
1/30/2014	606				
1/31/2014	610				
2/1/2014	655				
2/2/2014	678				
2/3/2014	696				
2/4/2014	547				
2/5/2014	500				
2/6/2014	280				
2/7/2014	600				
2/8/2014	619				
2/9/2014	636				
2/10/2014	662.6	615.875	572.4	556.4	556.2
2/11/2014	662.6	609.833	590.5	572.5	572.2
2/12/2014	662.6	617.818	676	600	676.6
2/13/2014	662.6	666.708	679.2	606.6	670.4
2/14/2014	662.6	712.8397	687.1	619	686.7
2/15/2014	662.6		693.4	665.4	690.3

Share Table
Download Data
Print Table

Overview

Reports

Charts

Tables 1

Configurable for Flexible Use

- Sum cumulative runoff volumes => points of diversion
- Subtract gage station flows => Klamath accretions
- Drought indices at local scale => sub County declarations
- User defined criterion and alert levels
- Water supply index for WUMP program

Your Participation

- Are your needs and decisions identified properly?
- Are there really alternative decisions based on data risk?
- Have we correctly connected your decisions to data needs, the criteria for action, and your actions?
- Is there value of the tools, methods and concept presented?
- Proceed with development?

Thanks for participating!

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Sacramento, CA 95821-6373

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Alan.Haynes@noaa.gov

The end

And the answer to the reason for being at this meeting is?

- Presentation by another “expert” from outside the Basin
- Somebody else that thinks they can solve our problems
- Another study to place on the shelf
- I had no where else to go, so I came here
- Another consultant working on a government
- See if Deutschman got it right



Forecast Accuracy

Forecast Accuracy								
Based On 1981 - 2011 Reconstructed Forecast								
April - September Seasonal Volumes								
Median (50%) Forecast								
Forecast Date	Williamson River				UKL Net Inflow*			
	Median Forecast Value (KAF)	Jackknife Standard Error (KAF)	Mean Absolute Error (KAF)	Mean Percent Difference	Median Forecast Value (KAF)	Jackknife Standard Error (KAF)	Mean Absolute Error (KAF)	Mean Percent Difference
1 January Forecast	319.3	96.0	71.3	22.7%	426.7	136.2	106.9	27.1%
1 February Forecast	358.2	76.8	52.6	16.1%	482.7	103.8	75.6	18.4%
1 March Forecast	365.9	66.8	48.9	16.0%	493.8	88.8	69.4	17.9%
1 April Forecast	307.5	43.3	32.4	9.6%	511.8	63.2	46.5	10.1%
70% Exceedance Forecast								
Forecast Date	Williamson River				UKL Net Inflow*			
	Median Forecast Value (KAF)	Jackknife Standard Error (KAF)	Mean Absolute Error (KAF)	Mean Percent Difference	Median Forecast Value (KAF)	Jackknife Standard Error (KAF)	Mean Absolute Error (KAF)	Mean Percent Difference
1 January Forecast	268.8	---	80.5	22.0%	354.5	---	114.7	24.2%
1 February Forecast	317.5	---	61.6	17.3%	427.7	---	85.7	18.4%
1 March Forecast	330.4	---	34.5	16.1%	446.7	---	77.8	17.7%
1 April Forecast	284.5	---	35.8	11.2%	478.3	---	52.5	11.6%

* "Known" UKL Net Inflow is an estimated value from BOR MODSUM (water balance) model (not measured).

Mean percent difference computed from absolute values of (forecast volume - measured volume) divided by measured volume.

Observed April through September volumes were 344.8 and 473.03 kaf for the Williamson River and Upper Klamath Lake (UKL) Net Inflow respectively.