Idaho Department of Water Resources

Climate Impacts Subcommittee Meeting

February 15, 2007

Ron Abramovich

Water Supply Specialist

USDA NRCS

Natural Resources Conservation Service

Snow Survey

Boise, Idaho

NRCS Natural Resources Conservation Service

Based on December 21, 2006 Meeting, three main topics were mentioned:

-Data Collection

-Forecast Activities

-Technical aspect of global climatic change on Idaho, more focus on affects on climatic change on Idaho, interest and desire to move forward

NRCS Natural Resources Conservation Service

NRCS Natural Resources Conservation Service

Lat.	Long.	Site Name	State	Major Basin	Current Agency Network	Detailed Streamflow Forecasting	Streamflow Forecasting	Safety	Access	Economics	Partially Automated Existing Site	Flood Risk Analysis	User Request or Data Void	Average Ranking	
41.870	-115.070	O'neil Creek	**NV/ID**	Salmon Fa	NRCS	1a	1	1	1	1	2	1	1	**1.14**	Twin Falls FO 6/
46.330	-115.070	Fish Lake Airstrip	Idaho	Lochsa	NRCS	1a	1	1	1	1	2	2	1	**1.29**	6/97 COE uses
44.920	-115.950	Lake Fork	Idaho	N Fk Payet	NRCS	1a	1	2	2	1	2	1	1	**1.43**	Good site locati
44.820	-116.700	Placer Creek	Idaho	Weiser	NRCS	1	1	2	2	1	2	1	1	**1.43**	6/97 Tom Yanke
42.380	-112.970	Sublett	Idaho	Raft	NRCS	3b	3	1	1	1	2	1	1	**1.43**	
42.100	-114.170	Badger Gulch	Idaho	Goose	NRCS	1a	1	2	2	1	2	2	1	**1.57**	
48.350	-116.770	Benton Spring	Idaho	Preist	NRCS	1a	1	1	1	2	2	2	2	**1.57**	
47.500	-116.120	Kellogg Peak	Idaho	Coeur d'Al	NRCS	2	2	2	2	2	1	1	1	**1.57**	11/04 Scott Bare
42.130	-114.380	Langford Flat Creek	Idaho	Salmon Fa	NRCS	1a	1	2	2	1	2	2	1	**1.57**	Twin Falls FO 6/
43.570	-113.920	Muldoon	Idaho	Little Woo	NRCS	1a	1	2	1	2	2	2	1	**1.57**	6/97 USBR use
42.770	-112.100	Pebble Creek	Idaho	Portneuf	NRCS	1	1	2	2	1	2	2	1	**1.57**	
42.430	-116.830	Red Canyon AM	Idaho	Owyhee	NRCS	1a	1	1	1	2	2	3	1	**1.57**	
45.150	-116.000	Squaw Meadow	Idaho	N Fk Payet	NRCS	1	1	2	2	1	2	2	1	**1.57**	
43.120	-116.870	Succor Creek AM	Idaho	Owyhee	NRCS	1a	1	1	1	2	2	3	1	**1.57**	
44.280	-116.130	Tripod Summit	Idaho	N Fk Payet	NRCS	1	1	2	2	1	2	1	2	**1.57**	
42.420	-111.230	Upper Home Canyo	Idaho	Montpelier	NRCS	1a	1	1	2	1	2	2	2	**1.57**	
43.470	-111.630	Willow Flat	Idaho	Cub	NRCS	1a	1	2	1	1	1	3	2	**1.57**	
42.180	-111.680	Worm Creek	Idaho	Cub	NRCS	1a	1	2	2	1	2	2	1	**1.57**	6/97 Preston FC
43.300	-111.780	Bone	Idaho	Willow	NRCS	2	2	2	1	3	2	1	1	**1.71**	Agri-met site ne
42.220	-113.670	Boy Scout Camp	Idaho	Raft	NRCS	1a	1	2	2	1	2	2	2	**1.71**	
43.820	-113.920	Copper Basin	Idaho	Big Lost	NRCS	2	2	2	1	2	2	2	1	**1.71**	
43.920	-116.020	Deadman Gulch	Idaho	Boise	NRCS	2	2	2	2	1	2	1	2	**1.71**	
42.270	-111.600	Dry Basin	Idaho	Bear	NRCS	1a	1	2	1	1	2	3	2	**1.71**	
42.100	-114.100	**Goose-Trapper**	**Idaho**	**Goose**	**New**	1a	1	1	1	3	3	2	1	**1.71**	6/97 Burley FO a
44.430	-112.600	Irving Creek	Idaho	Medicine L	NRCS	2d	2	2	2	1	2	2	1	**1.71**	
44.780	-113.350	Jakes Canyon	Idaho	Salmon	NRCS	2d	2	2	1	1	2	3	1	**1.71**	
43.970	-111.070	Mc Renolds Reserv	**WY/ID**	Teton	NRCS	1a	1	2	1	3	2	2	1	**1.71**	

4. SNOTEL Site Maintenance and User Needs - Evaluation Performed by Data Collection and Water Supply Specialist Analysis from State Offices

a. Safety

Some snow courses are more difficult or hazardous to measure than others. Hazards include safety for the snow surveyor, avalanche danger or remoteness.

(1) Higher safety risk.

(2) Medium safety risk.

(3) Low safety risk or not more dangerous than your average site or site is near a town.

b. Access

Site is difficult to measure or hard to access during certain times of year. These are sites may be in low to mid-elevation that melt out early or remote high elevations that are difficult to measure. Some sites may require several modes of transportation to measure in the spring.

(1) Access is difficult.

(2) Medium difficulty to access.

(3) Relative easy to access - site is in or near town.

c. Economics

Cost savings are achieved if site is automated. Savings may include reduced helicopter expenses, snow survey cooperator or contractor payments, oversnow machine or measurement equipment expense.

(1) High - cost savings are very beneficial to NRCS.

(2) Medium - savings to NRCS.

(3) Low - will not result in NRCS cost savings, i.e., cooperator measure site and does not charge NRCS.

d. Site Automation Status

Existing site is partially automated and is a good location for complete automation or additional climatic data has been collected at site by NRCS or another agency.

(1) High - site or snow course is partially automated and is a good location for complete automation or data is currently collected by another agency.

(2) Medium - site is an existing snow course and is a good location for complete automation.

(3) Low - site is new proposed site. Valid location must be found.

e. Flood Risk Information

Site would provide additional needed information for flooding, flood potential, peak streamflows or rain-on-snow events. These sites would benefit the public, health and safety in the local area. These sites may be in low to mid elevation areas or high elevation areas where current sites do not exist but are needed to monitor and predict floods or peak streamflows.

(1) High - site is needed to provide flood or peak streamflow information.

(2) Medium - site would provide some additional about potential flood threat or peak streamflows.

(3) Low - this site may not provide additional or new information about flooding or peak flows that other sites do not already provide.

f. User Request or Data Void

Customers have previously requested additional automated sites in this area, but have not been able to afford them, or are under-served by our existing network. There are no current sites in area and there is a need for automated sites to provide adequate density coverage.

(1) High - users have previously requested this site or sites in this area.

(2) Medium - there is a lack of climatic data collected in this area.

(3) Low - users have not specifically identified this site; need is for other purposes.

g. Average Ranking

This is the average of the ranking criteria for these proposed new sites.

(1) Highest
(2) Medium
(3) Lowest

NRCS Natural Resources Conservation Service

Lat.	Long.	Site Name	State	Major Basin	Current Agency Network	Detailed Streamflow Forecasting	Streamflow Forecasting	Safety	Access	Economics	Partially Automated Existing Site	Flood Risk Analysis	User Request or Data Void	Average Ranking	
41.870	-115.070	O'neil Creek	NV/ID	Salmon Fa	NRCS	1a	1	1	1	1	2	1	1	**1.14**	Twin Falls FO 6/
46.330	-115.070	Fish Lake Airstrip	Idaho	Lochsa	NRCS	1a	1	1	1	1	2	2	1	**1.29**	6/97 COE uses
44.920	-115.950	Lake Fork	Idaho	N Fk Payet	NRCS	1a	1	2	2	1	2	1	1	**1.43**	Good site locati
44.820	-116.700	Placer Creek	Idaho	Weiser	NRCS	1	1	2	2	1	2	1	1	**1.43**	6/97 Tom Yanke
42.380	-112.970	Sublett	Idaho	Raft	NRCS	3b	3	1	1	1	2	1	1	**1.43**	
42.100	-114.170	Badger Gulch	Idaho	Goose	NRCS	1a	1	2	2	1	2	2	1	**1.57**	
48.350	-116.770	Benton Spring	Idaho	Preist	NRCS	1a	1	1	1	2	2	2	2	**1.57**	
47.500	-116.120	Kellogg Peak	Idaho	Coeur d'Al	NRCS	2	2	2	2	2	1	1	1	**1.57**	11/04 Scott Bare
42.130	-114.380	Langford Flat Creek	Idaho	Salmon Fa	NRCS	1a	1	2	2	1	2	2	1	**1.57**	Twin Falls FO 6/
43.570	-113.920	Muldoon	Idaho	Little Woo	NRCS	1a	1	2	1	2	2	2	1	**1.57**	6/97 USBR use
42.770	-112.100	Pebble Creek	Idaho	Portneuf	NRCS	1	1	2	2	1	2	2	1	**1.57**	
42.430	-116.830	Red Canyon AM	Idaho	Owyhee	NRCS	1a	1	1	1	2	2	3	1	**1.57**	
45.150	-116.000	Squaw Meadow	Idaho	N Fk Payet	NRCS	1	1	2	2	1	2	2	1	**1.57**	
43.120	-116.870	Succor Creek AM	Idaho	Owyhee	NRCS	1a	1	1	1	2	2	3	1	**1.57**	
44.280	-116.130	Tripod Summit	Idaho	N Fk Payet	NRCS	1	1	2	2	1	2	1	2	**1.57**	
42.420	-111.230	Upper Home Canyo	Idaho	Montpelier	NRCS	1a	1	1	2	1	2	2	2	**1.57**	
43.470	-111.630	Willow Flat	Idaho	Cub	NRCS	1a	1	2	1	1	1	3	2	**1.57**	
42.180	-111.680	Worm Creek	Idaho	Cub	NRCS	1a	1	2	2	1	2	2	1	**1.57**	6/97 Preston FC
43.300	-111.780	Bone	Idaho	Willow	NRCS	2	2	2	1	3	2	1	1	**1.71**	Agri-met site ne
42.220	-113.670	Boy Scout Camp	Idaho	Raft	NRCS	1a	1	2	2	1	2	2	2	**1.71**	
43.820	-113.920	Copper Basin	Idaho	Big Lost	NRCS	2	2	2	1	2	2	2	1	**1.71**	
43.920	-116.020	Deadman Gulch	Idaho	Boise	NRCS	2	2	2	2	1	2	1	2	**1.71**	
42.270	-111.600	Dry Basin	Idaho	Bear	NRCS	1a	1	2	1	1	2	3	2	**1.71**	
42.100	-114.100	**Goose-Trapper**	**Idaho**	**Goose**	**New**	1a	1	1	1	3	3	2	1	**1.71**	6/97 Burley FO a
44.430	-112.600	Irving Creek	Idaho	Medicine L	NRCS	2d	2	2	2	1	2	2	1	**1.71**	
44.780	-113.350	Jakes Canyon	Idaho	Salmon	NRCS	2d	2	2	1	1	2	3	1	**1.71**	
43.970	-111.070	Mc Renolds Reserv	WY/ID	Teton	NRCS	1a	1	2	1	3	2	2	1	**1.71**	

Top 25 site based on rank

NRCS Natural Resources Conservation Service

1	Lat.	Long.	Site Name	State	Major Basin	Current Agency Network	Detailed Streamflow Forecasting	Streamflow Forecasting	Safety	Access	Economics	Partially Automated Existing Site	Flood Risk Analysis	User Request or Data Void	Average Ranking	
118	44.350	-112.670	Webber Creek	Idaho	Medicine Lodg	NRCS	3	3	2	2	1	2	3	1	**2.00**	
119	43.700	-115.900	Wilderness Ranch	Idaho	Mores	New	2a	2	2	2	3	3	1	1	**2.00**	11/0(
120	43.440	-111.070	Driggs(Grand Targhee)	Idaho	Teton	NWS	1a	1	3	3	3	1	2	1	**2.00**	insta
121	47.900	-117.000	Twin Spirit Divide	Idaho	Coeur d'Alene	NRCS	3	3	2	1	3	2	2	1	**2.00**	insta
122	46.330	-116.550	Big Canyon	Idaho	Clearwater	NRCS	3b	3	2	2	3	3	1	1	**2.14**	
123	44.350	-114.530	Bruno Creek	Idaho	Salmon	NRCS	2c	2	2	2	3	2	2	2	**2.14**	
124	42.320	-113.460	Burley FAA AP	Idaho	Goose	NWS	1a	1	3	3	3	1	3	1	**2.14**	
125	45.080	-114.070	Cougar Point	Idaho	Salmon	NRCS	3	3	2	2	2	2	2	2	**2.14**	
126	44.060	-113.630	Dry Creek	Idaho	Little Lost	New	2a	2	2	2	3	3	2	1	**2.14**	8/94
127	42.370	-111.500	Emigration Canyon	Idaho	Bear	NRCS	2a	2	2	2	2	2	3	2	**2.14**	
128	47.620	-116.520	Fourth of July Smt	Idaho	Coeur d'Alene	NRCS	1a	1	3	3	2	2	2	2	**2.14**	
129	43.420	-113.370	Grouse	Idaho	Big Lost	NWS	1a	1	3	3	3	1	3	1	**2.14**	
130	43.210	-111.470	Idaho Falls 16SE	Idaho	Grays Lake	NWS	1a	1	3	3	3	1	3	1	**2.14**	
131	43.936	-111.005	Jackpine Creek	WY/ID	Teton	NRCS	2	2	2	2	2	2	3	2	**2.14**	
132	42.200	-112.300	Malad City	Idaho	Malad	NWS	1a	1	3	3	3	1	3	1	**2.14**	
133	43.100	-111.300	McCoy Creek	Idaho	Grays Lake	New	2c	2	2	2	3	3	2	1	**2.14**	
134	44.650	-113.770	Morse Creek Sawmill	Idaho	Salmon	NRCS	3	3	2	2	2	2	2	2	**2.14**	
135	42.550	-112.360	Pocatello WSO AP	Idaho	Portneuf	NWS	1a	1	3	3	3	1	3	1	**2.14**	
136	44.300	-115.800	Silver Creek	Idaho	M Fk Payette	NRCS	3b	3	2	2	3	3	1	1	**2.14**	
137	45.867	116.102	Snow Haven	Idaho	Clearwater	NRCS	2a	2	2	2	3	2	3	1	**2.14**	2001
138	43.580	-111.430	St. Anthony 1 WNW	Idaho	Henrys Fork	NWS	1a	1	3	3	3	1	2	2	**2.14**	
139	44.130	-114.560	Stanley	Idaho	Salmon	NWS	1a	1	3	3	3	1	3	1	**2.14**	11/0(
140	43.250	-115.580	Tollgate (ID)	Idaho	Rattlesnake	NRCS	3b	3	2	2	2	2	2	2	**2.14**	
141	44.000	-114.800	Fleck Summit, Williams or Thompson Peaks	Idaho	Sawtooths	New	2a	2	2	2	3	3	3	1	**2.29**	1/20(
142	42.330	-114.210	Twin Falls WSO	Idaho	Rock	NWS	1a	1	3	3	3	1	3	2	**2.29**	
143	43.340	-116.130	Boise above City	Idaho	Boise	NEW	2a	2a	3	3	3	3	1	1	**2.33**	Neec
144																
145																

Bottom of list about 140 total sites – need to evaluate sites

RECENTLY AUTOMATED	State	Major Basin	Elevation
Van Wyck	Idaho	Weiser	low
Myrtle Creek	Idaho	Kootenia	low
Hidden Lake replaced Smith Ck SC??	Idaho	Kootenia	high
Bogus Basin (Bogus Basin)	Idaho	Boise/Payette	mid
Moscow Mtn (Moscow Mtn)	Idaho	Palouse	mid
Long Valley (McCall area)	Idaho	Payette	mid
Smiley Mtn replaced Fishpole Lake SC?	Idaho	Big Lost	high
Grand Targhee	Wyoming	Teton	high
Gunsight Pass	Wyoming	Green River	high
Chocolate Gulch	Idaho	Big Wood	low
Ragged Mountain	Idaho	Hayden	low

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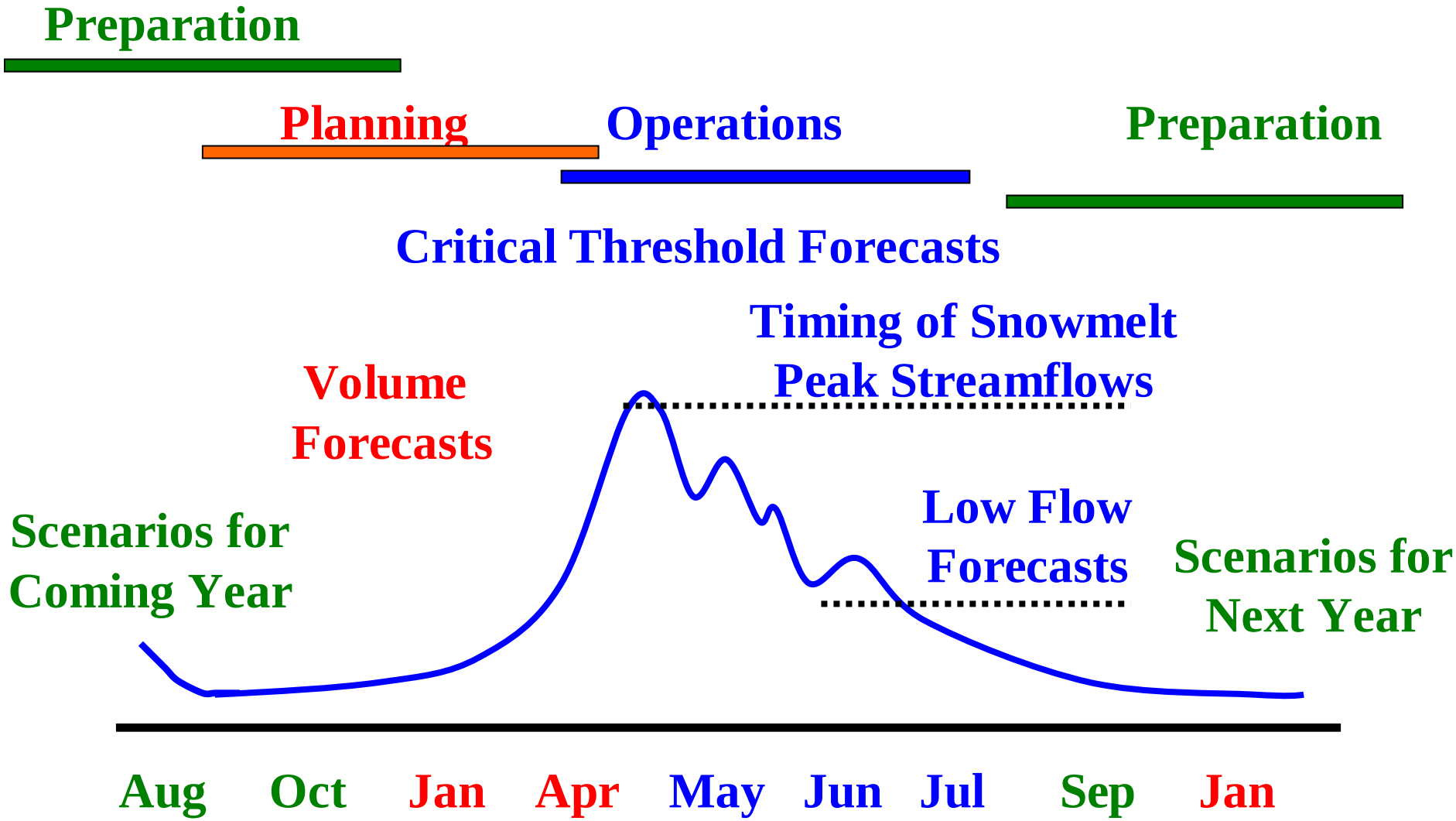
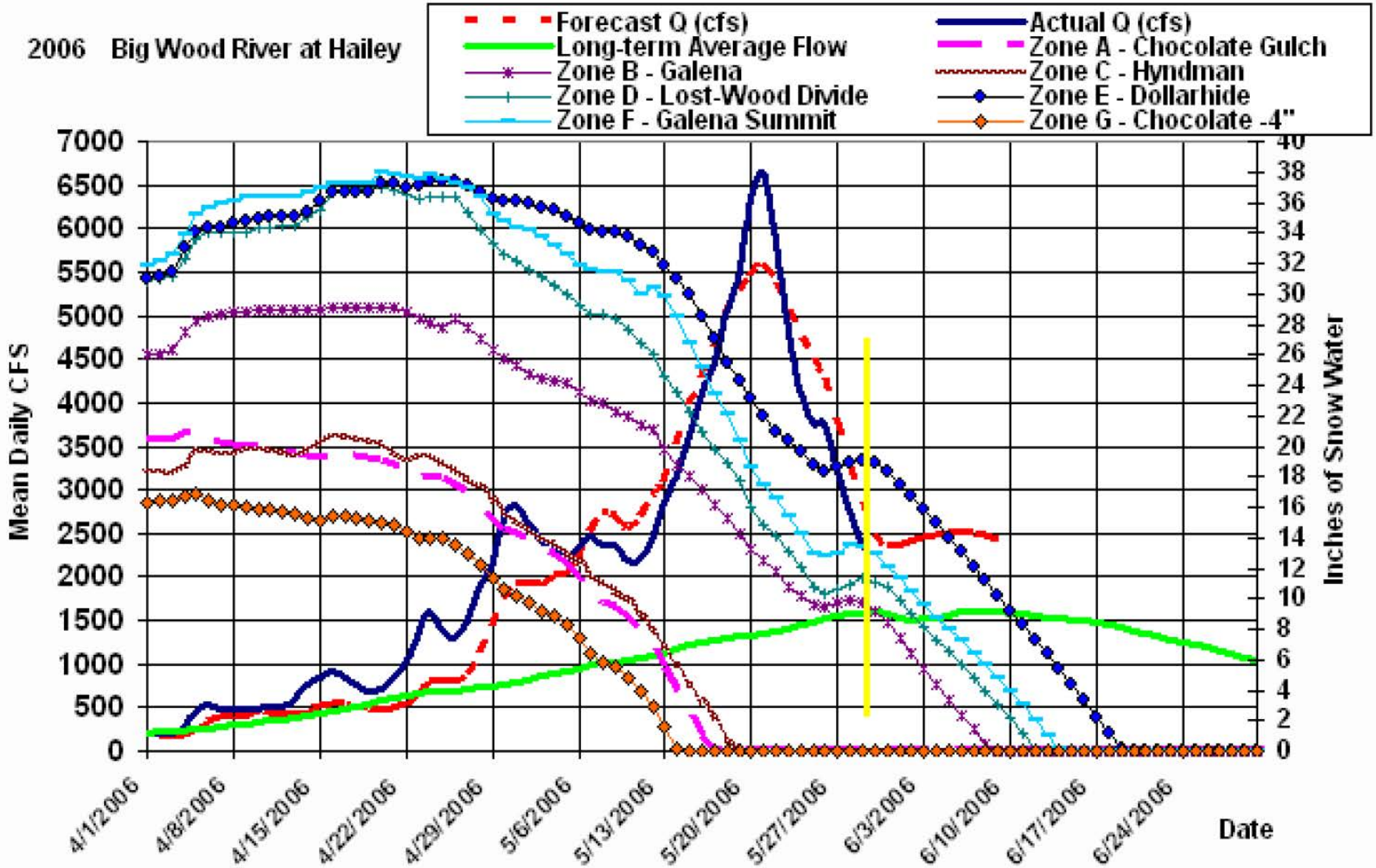
Water User Needs Timeline

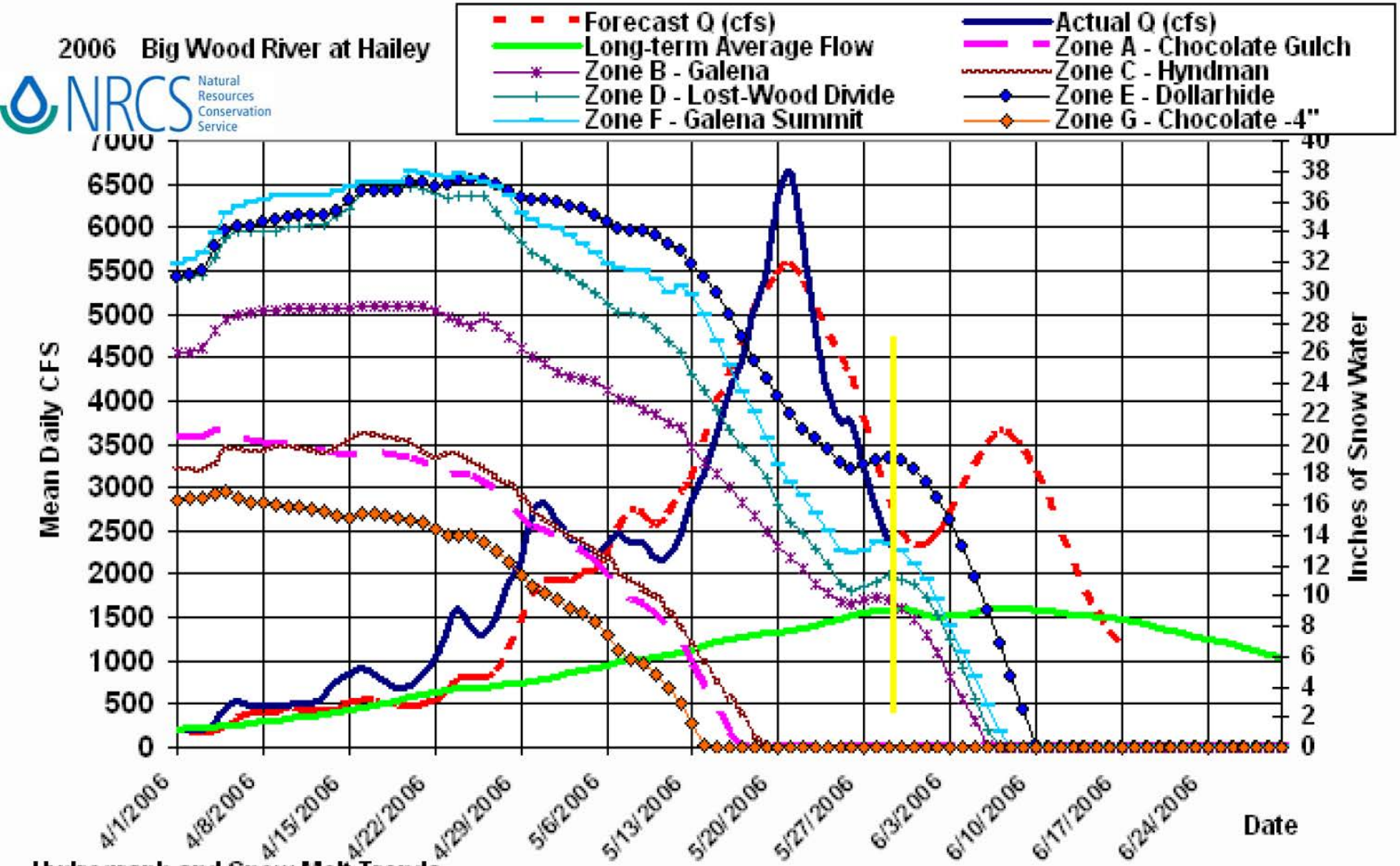




Hydrograph and Snow Melt Trends

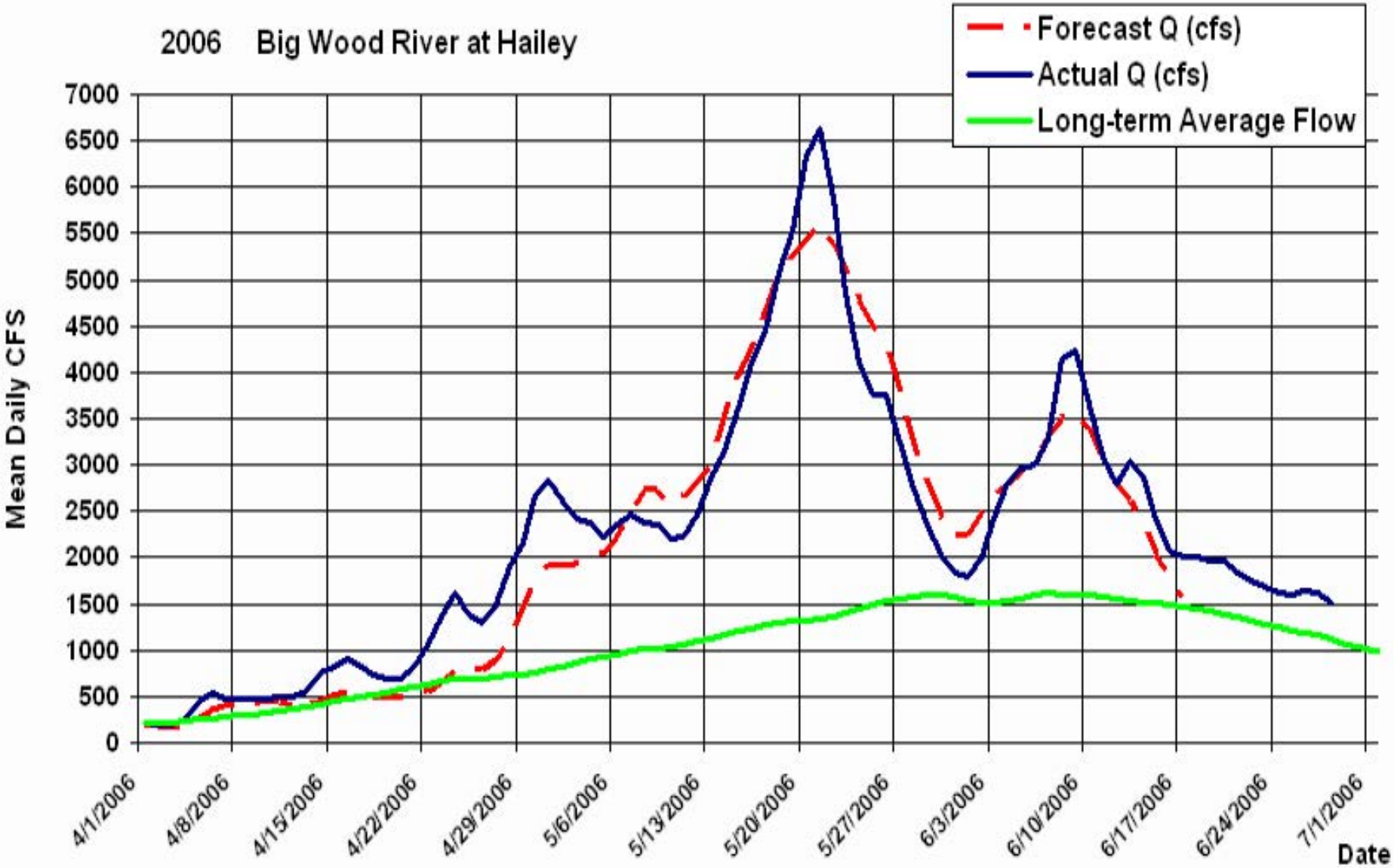
May 30 Update --- Note increase in SWE from precipitation last weekend. Melt rates are increased to reach average melt by June 1 and remain at average until snow melt out.

NRCS Natural Resources Conservation Service



Hydrograph and Snow Melt Trends

May 30 Update With Melt Rates Reaching Near Maximum Levels --- Current melt rates were gradually increased to average melt rates by June 1. The gradual increase continued to NEAR MAXIMUM amounts until the snow melted at each site. This scenario shows another streamflow increase from SNOWMELT ALONE is possible but will not exceed previous peak flow and is dependent upon future temperatures.



SNowmelt Operational Spreadsheet Hydrograph Using SNOTEL (SNOSHUS)
June 29 Update --- --- Final run based on provisional snow, precipitation and streamflow data.

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Enhanced ArcGIS SRM (Snowmelt Runoff Models) for 2007

Selected following basins to model during the coming year:

- **SF Boise nr Featherville**
- **Boise River nr Twin Springs**
- **NF Clearwater nr Canyon Ranger St.**
- **Big Lost River at Howell Ranch**
- **Snohomish River (Washington)**
- **SF Flathead ab Twin C nr Hungry Horse (Montana)**

Briefing meeting is planned with COE in Dec 2006 with Mark Wigmosta and Uofl

Training session using ArcGIS / SRM Feb 21-22

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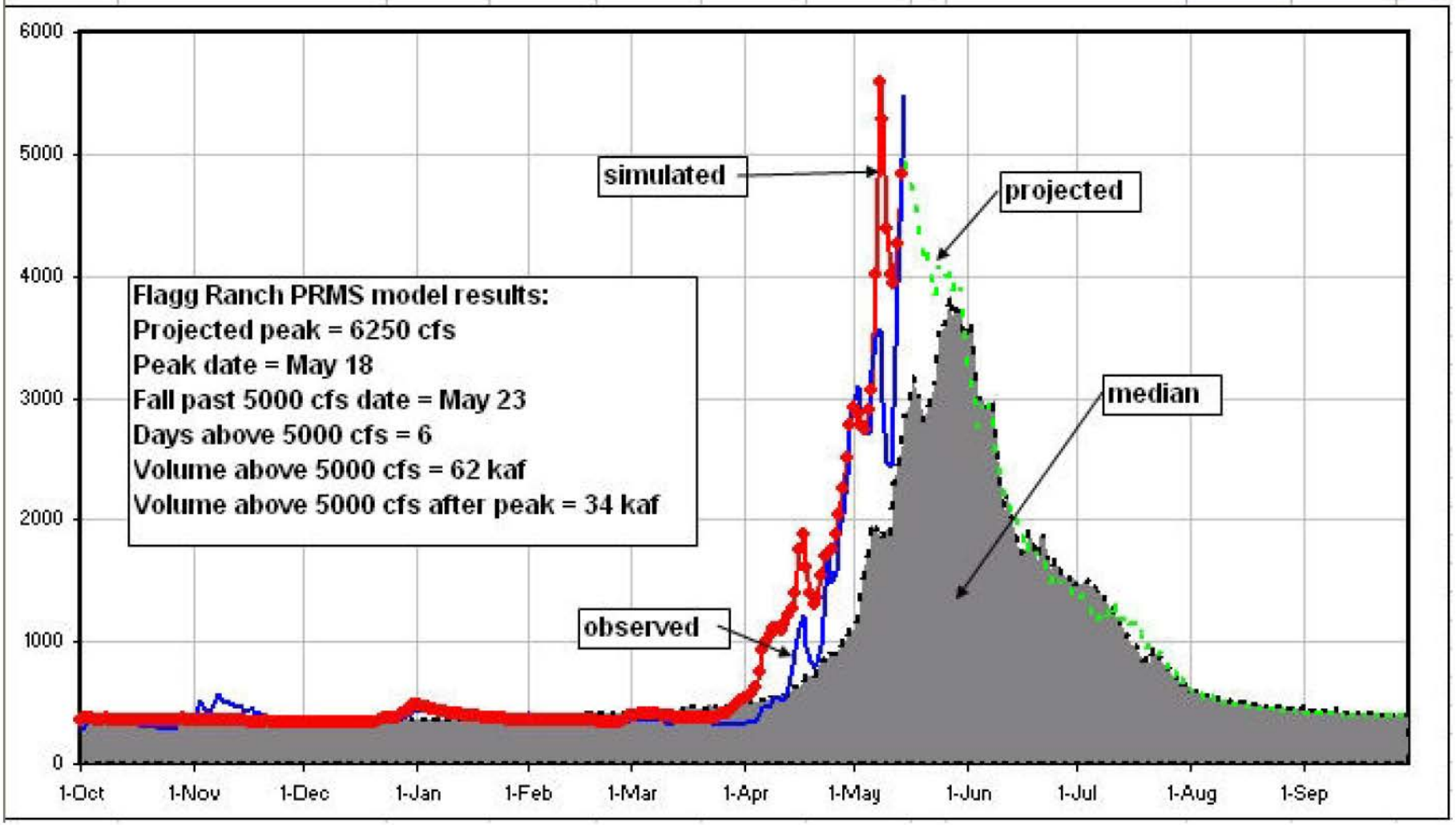
Snake River at Flagg Ranch 2006

ID	parameter set	variable	Startyr	Sitename
13010065	3	1	1986	SNAKE RIVER AB JACKSON LAKE AT FLAGG RANCH WY

Load Data Files



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Another streamflow model NRCS is working with / investigating is PRMS

-Currently used on:

-Snake River at Flagg Ranch

-Salmon Falls Creek near San Jacinto

-Little Wood River above High Five Creek

-And other western basins

NRCS Natural Resources Conservation Service

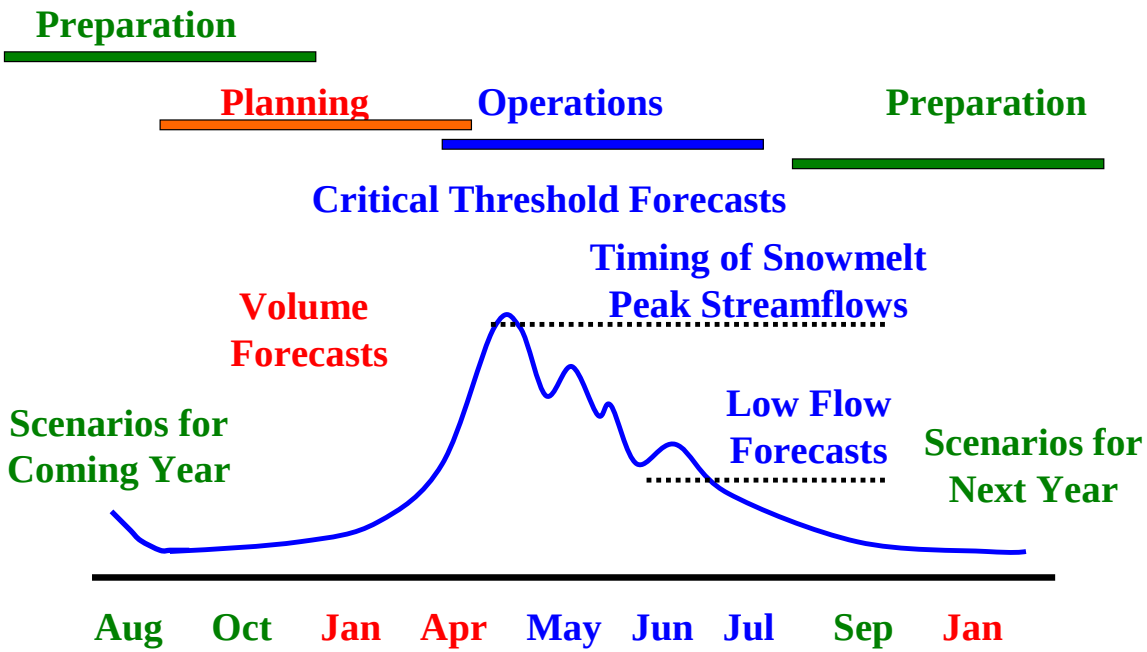
		Current Forecasts		Current / Future Need For:					
2	IDAHO Forecast Point/Basin	Current Forecast Point, Published Jan-Jun or Requested	El Nino / La Nina - SOI Forecast Published in Nov	Mid-month / Earlybird / Ad-hoc Forecasts	Peak Flow Snowmelt Runoff Model	Forecasts of Volume or Total Days above XX CFS	Specific Stream Level Forecast for: Peak Flow, Low Flow, Water Rights, Reservoir Operations, etc.		
3							Peak Flow	Specific Level	Comments
97	Snake River near Murphy	x							
98	Snake River at Weiser	x							
99	Snake River at Hells Canyon	x				x			
100	Snake blw Lower Granite Dam	x				x			for Salmon etc.
101									
102									
103	**BEAR RIVER BASIN**								
104	Bear River near UT-WY State Line	x							
105	Bear River near Woodruff, UT	x							
106	Bear River near Randolph	x							
107	Smith Fork near Border	x							
108	Bear River blw Stewart Dam	x					x		assist in water management
109	Thomas Fork nr Stateline (Disc)	**Categorical forecast in 2003**							
110	Montpelier CK nr Montpelier (Disc)	**Categorical forecast in 2003**							
111	Cub River near Preston (Disc)	**Categorical forecast in 2003**							
112									
113									
114	**Column descriptions:**								
115	**x in columns 1and 2 means we are currently producing this or it was requested.**								
116	**x in column 2-6 is based on percieved needs of users, requested or from internal (NRCS FOs) discussion.**								
117									

NRCS Natural Resources Conservation Service

	A	B	C	D	E	F	G	H	I
		Current Forecasts		Current / Future Need For:					
2	IDAHO Forecast Point/Basin	Current Forecast Point, Published Jan-Jun or Requested	El Nino / La Nina - SOI Forecast Published in Nov	Mid-month / Earlybird / Ad-hoc Forecasts	Peak Flow Snowmelt Runoff Model	Forecasts of Volume or Total Days above XX CFS	Specific Stream Level Forecast for: Peak Flow, Low Flow, Water Rights, Reservoir Operations, etc.		
3							Peak Flow	Specific Level	Comments
4	**PANHANDLE REGION**								
5	Kootenai at Leonia	x							
6	Moyie River	new 2001			x		x		requested 2000 Bob Graham, Emer. Ma
7	Smith Creek	new 2001		x	x	x	x	x	requested by Smith Creek Hydro 2000 a
8	Boundary Creek	new 2001							
9	Clark FK at Whitehorse Rpds	x							
10	Pend Oreille Lake Inflow	x							
11	Priest nr Priest River	x							
12	Coeur d'Alene at Enaville	x	new 1998		x		x	x	requested by USFS 2000
13	St. Joe at Calder	x	new 1998		x		x	x	requested by USFS 2000
14	Spokane near Post Falls	x							
15	Spokane at Long Lake	x	new 1998						
16									
17									
18	**CLEARWATER RIVER BASIN**								
19	Selway River	new 2002			x		1990s	1990s	Peak flows requested in 1980s, and by
20	Lochsa River	new 2002			x		x	x	Requested by Bill Brock 2000 for recrea
21	Dworshak Reservoir Inflow	x	new 1998	x	x	x	x	x	for COE
22	Clearwater at Orofino	x	new 1998				x	x	
23	Clearwater at Spalding	x	new 1998						
24									

NRCS Natural Resources Conservation Service

Water User Needs Timeline



Key points to consider –

- Produce products that meet end users needs, not all products are needed at every point.

- Coordinate installation of new weather stations to ensure data parameters are collected to meet the local resource problem of concern.