

Update on the Status of the Snow Survey and Water Supply Forecasting Program – Fall 2008

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Importance of Snow Information in the West

- **Snowpack accounts for 50-80% of the annual surface-water supply in the West**
- **Precipitation distribution and timing**
- **Precipitation form**
- **Timing of snowmelt and delivery for agriculture and reservoir management**
- **What to plant, when to plant, how much to plant**
- **Water management, power generation, recreation, agriculture, and many others - Snow Economics Report**



1906



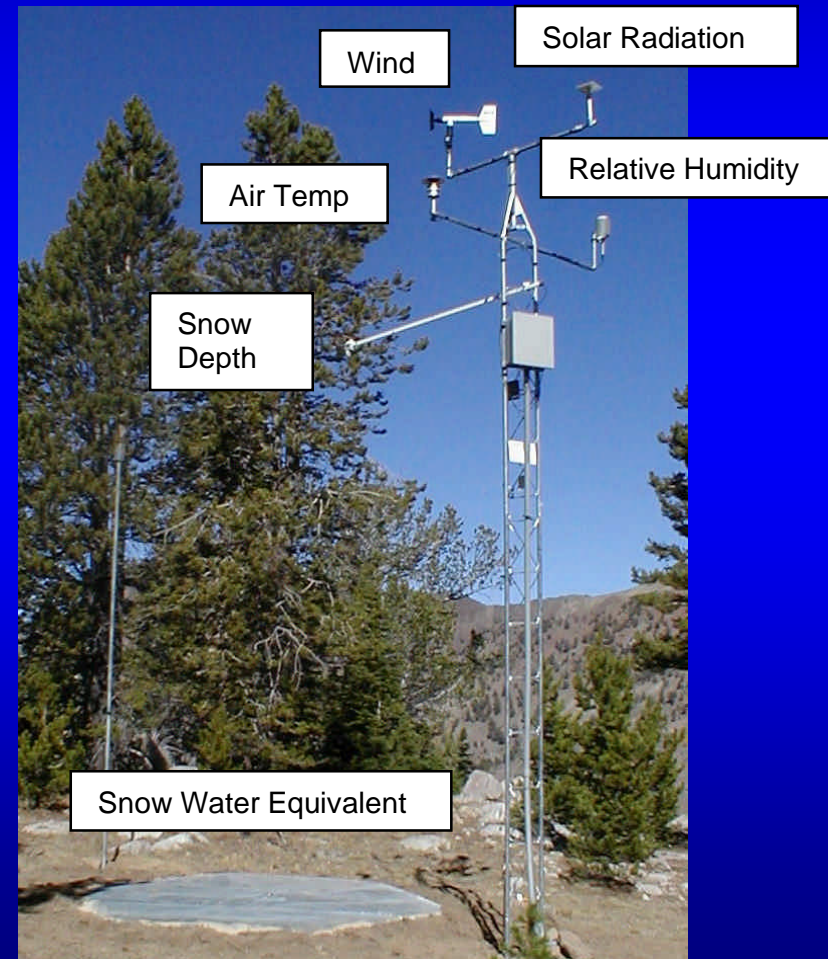
Today

Manual Snow Surveys

Metal tube inserted into snow and weighed to measure water content.
+300,000 snow course measurements as of June 2008

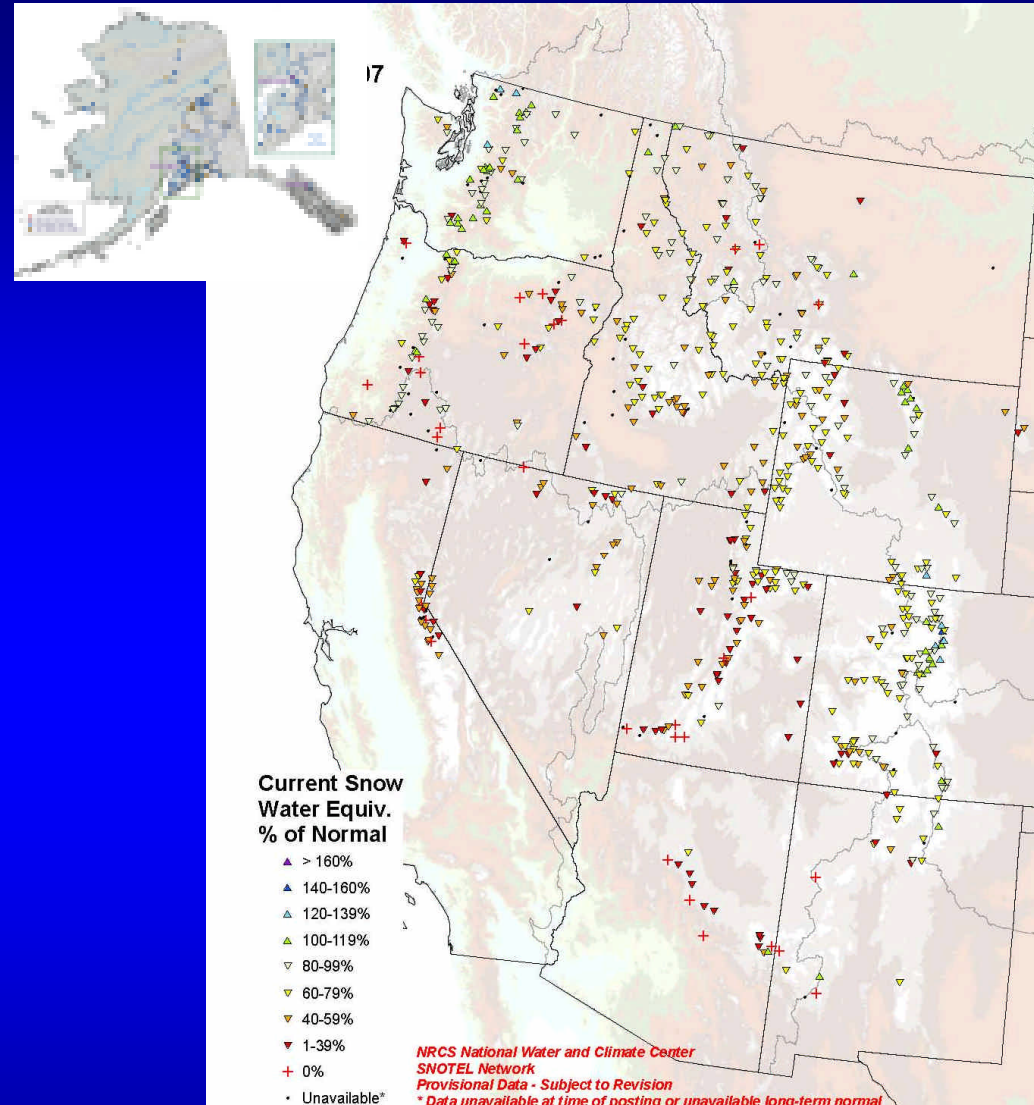
SNOTEL Site - Augmented Data Array

- Snow water content
- Precipitation
- Temperature
- Snow depth
- Relative humidity
- Wind speed/direction
- Solar radiation
- Soil moisture / temperature



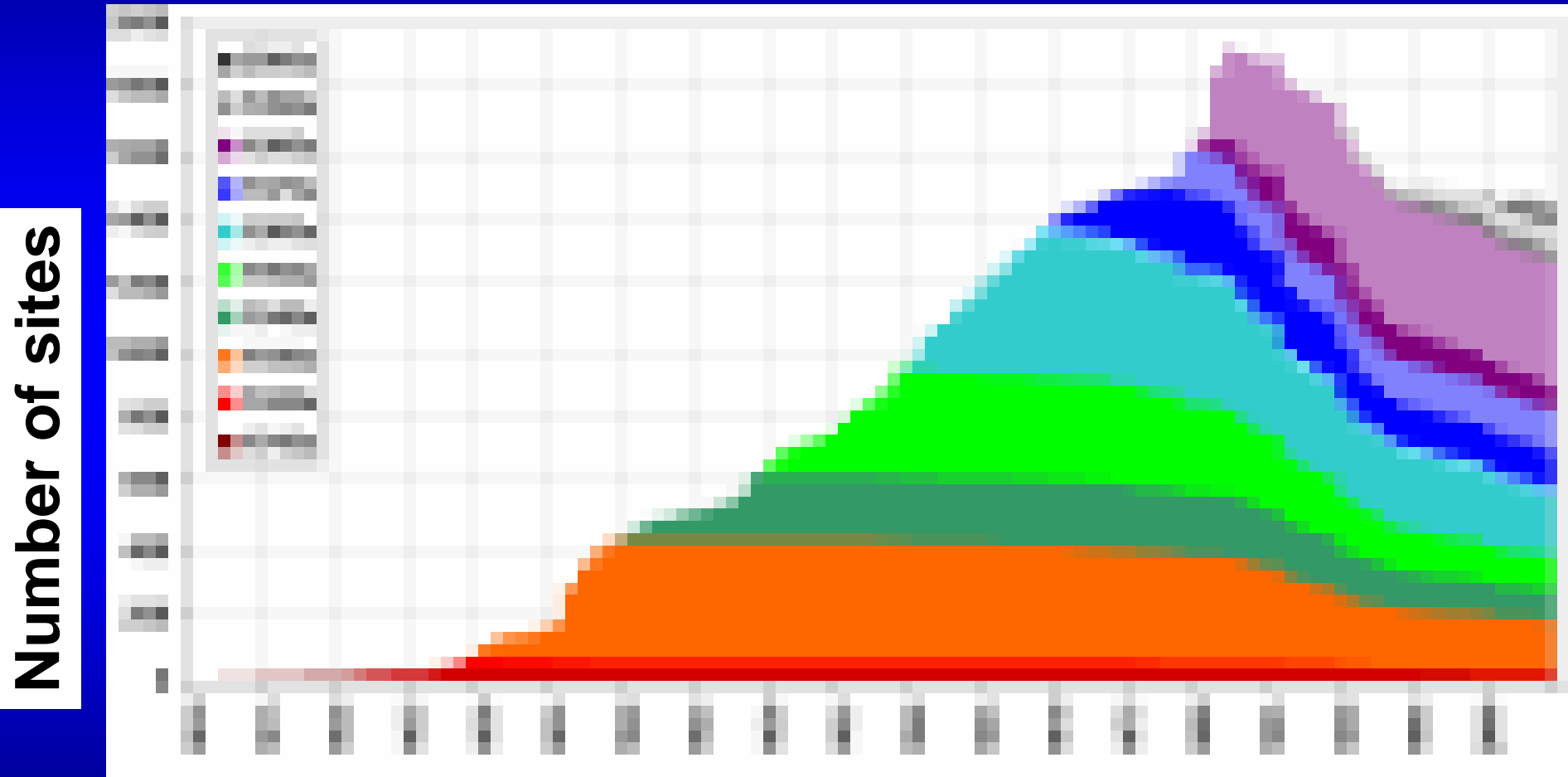
NRCS SNOTEL Network

- SNOTEL network
 - 13 Western States
 - 755 sites
 - 16 million observations/year
 - 16.1 million downloads/year
- 1,100 manual snow courses



<http://www.wcc.nrcs.usda.gov/snow/>

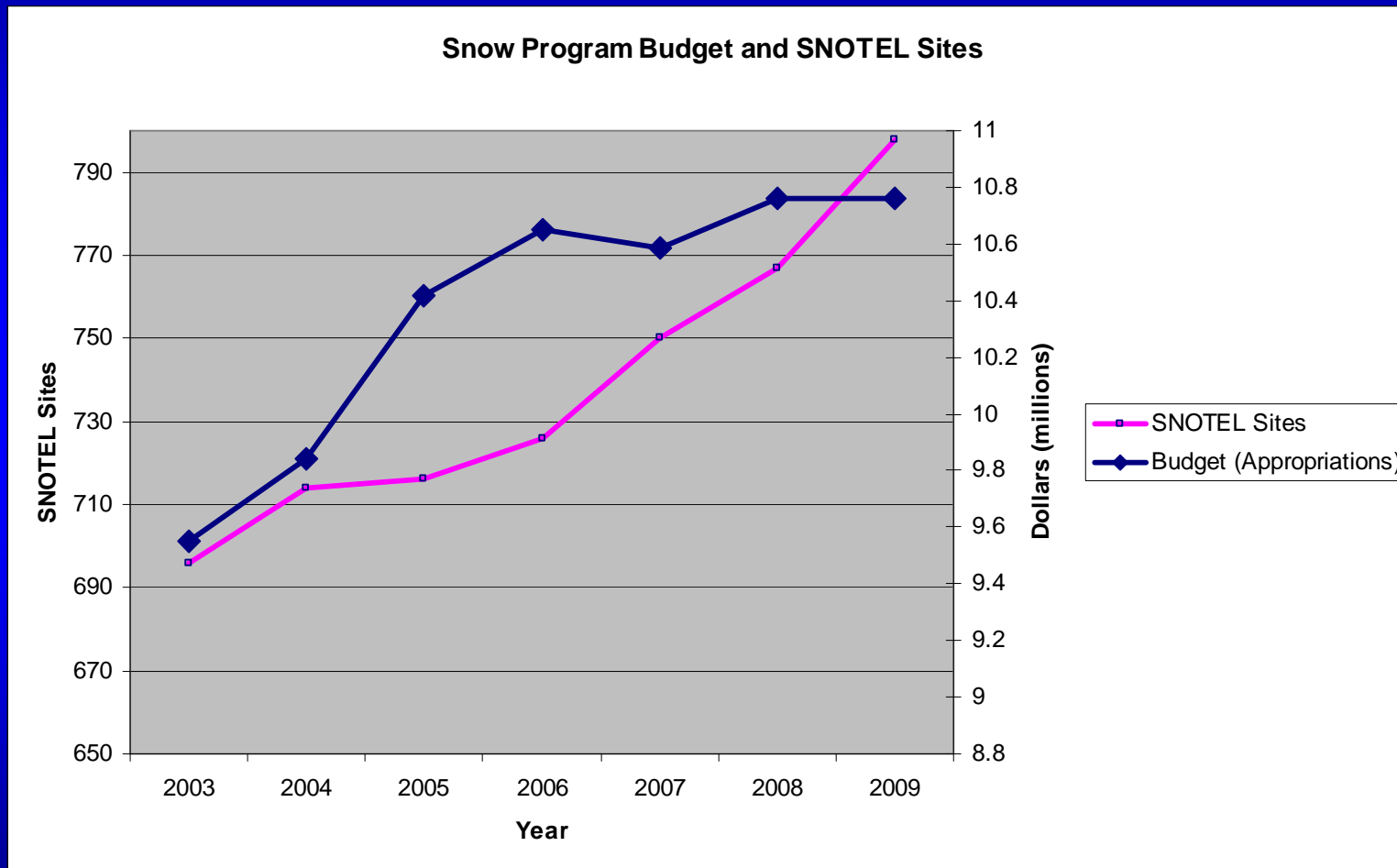
Snow course (solid) and SNOTEL (hashed) active station installation dates



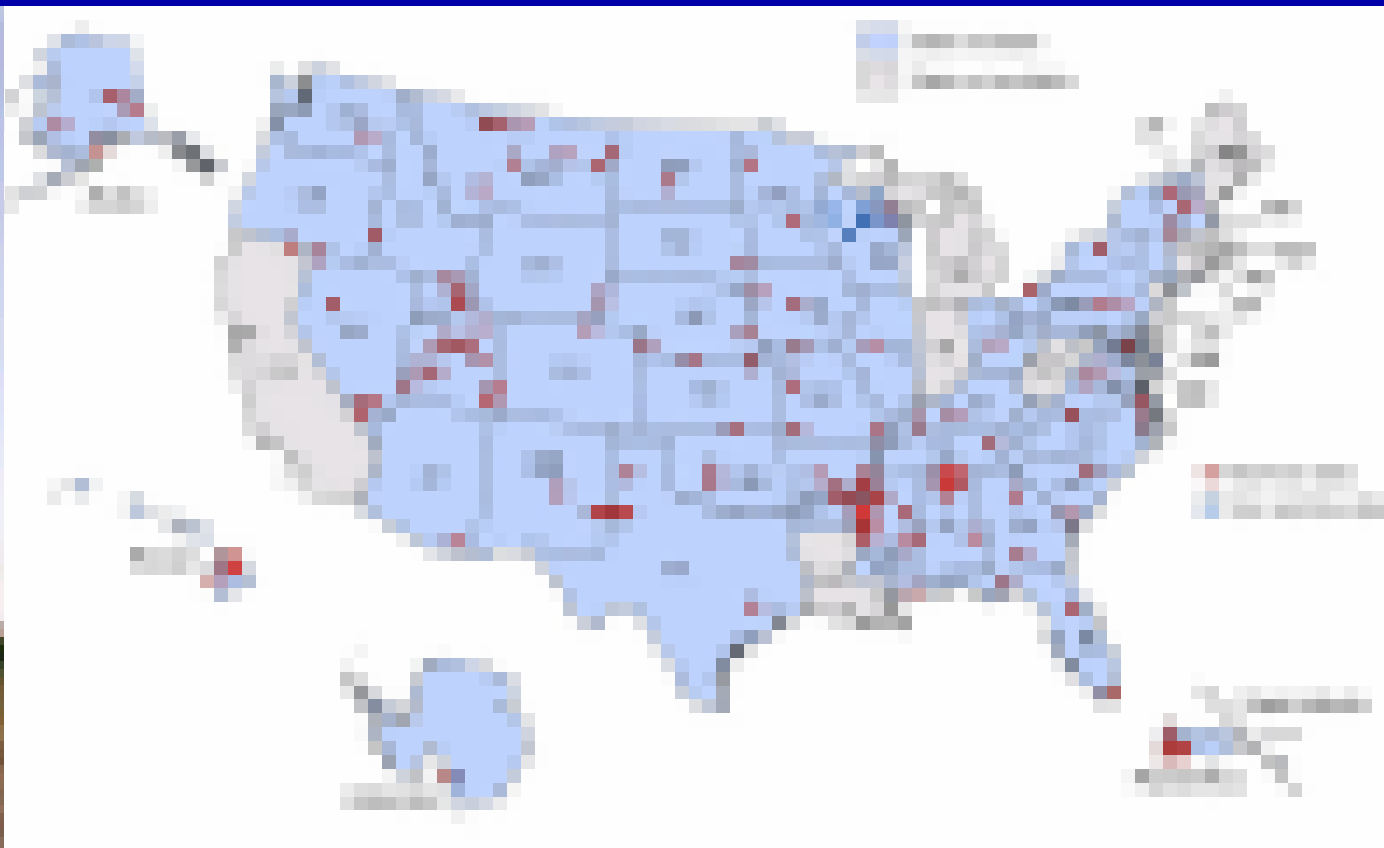
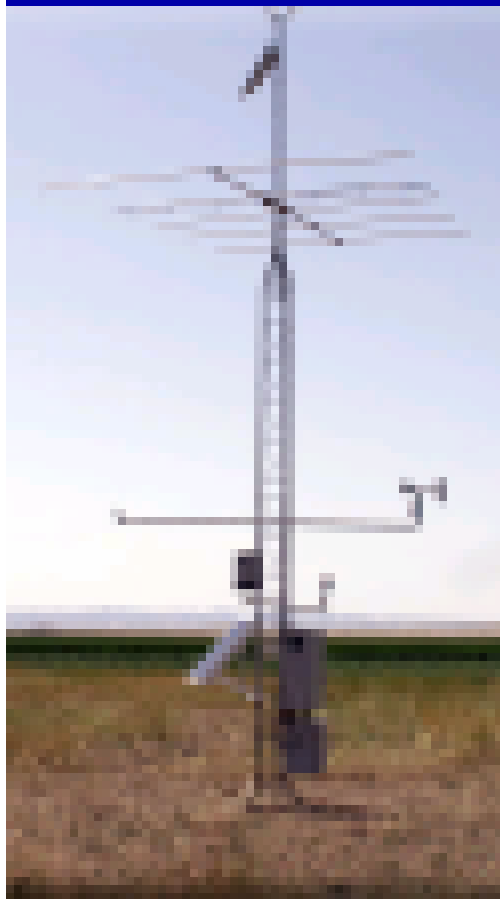
Present Status of SNOTEL

State	SNOTEL	New SNOTEL FY08	New SNOTEL FY09
Alaska	53	0	0
Arizona	18	3	3
California	32	0	0
Colorado	102	3	6
Idaho	79	-1	0
Montana	89	2	1
New Mexico	21	0	4
Nevada	33	3	3
Oregon	78	0	0
South Dakota	2	0	0
Utah	90	3	5
Washington	63	4	3
Wyoming	84	0	6

SS-WSF Funding and SNOTEL Sites

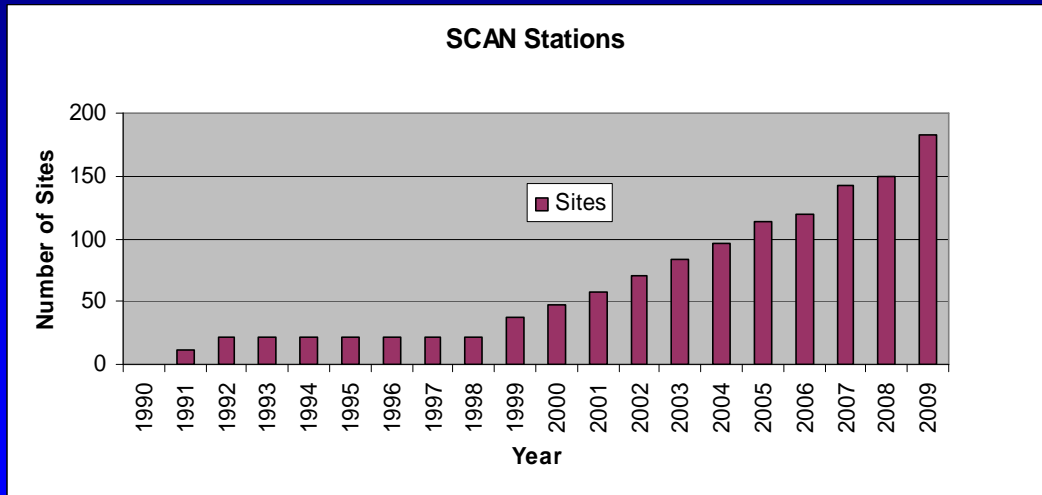


Soil climate analysis network (SCAN) Soil moisture/energy balance emphasis



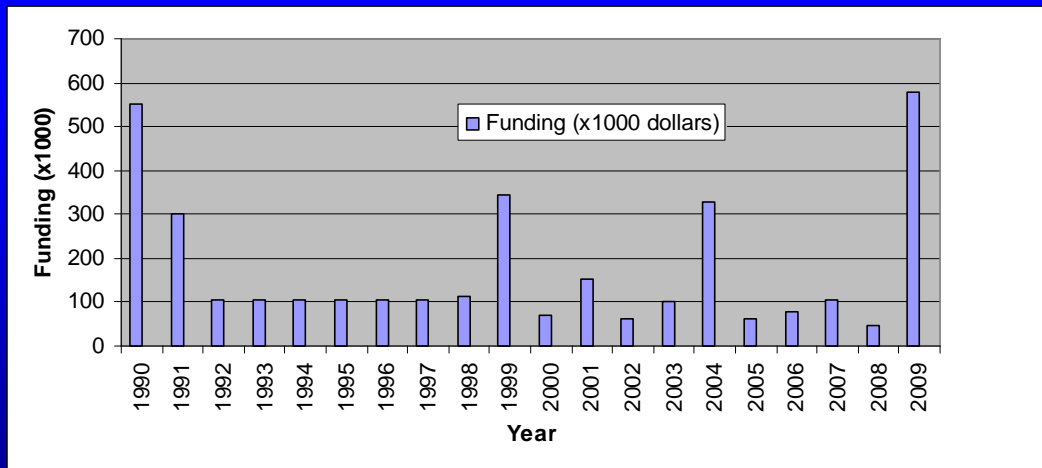
Short period of record (some from 1990s)
Data available but few products

SCAN

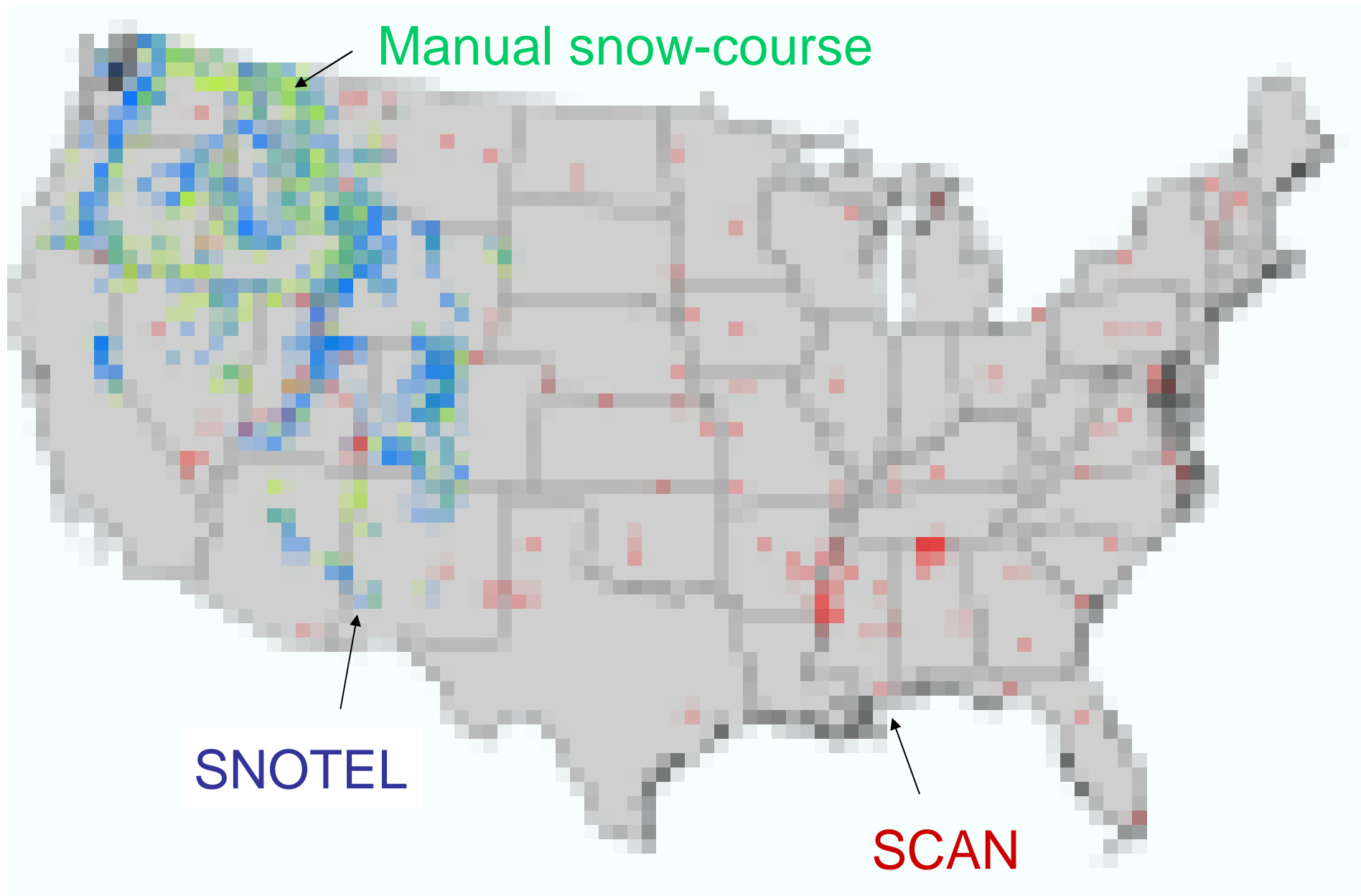


NRCS Pilot Project
1990 – 1999

Starting 1999, most
new stations funded
by cooperators and
outside sources



33 new stations
planned for 2009
(UT – 16, AL – 10,
NV – 3, NM – 4)
bringing total to
183 stations



Master stations in Utah, Idaho, and Alaska.

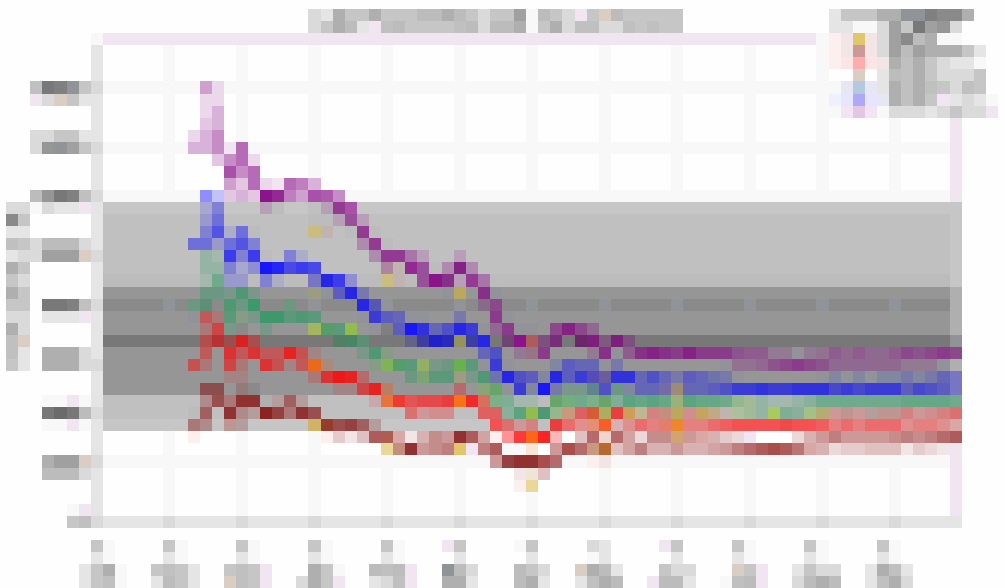
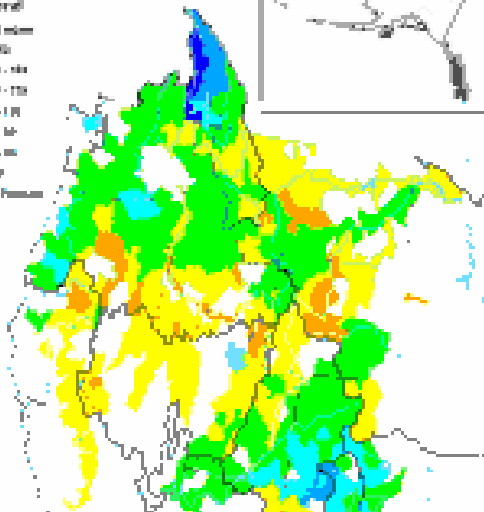
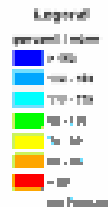
Seasonal water supply volume forecasts (available in a variety of formats) NRCS formats:

Forecast Pt	Forecast Period	Forecast Volume (1000AF)	Forecast Conditions
Platoro Reservoir Inflow	APR-JUL	12.0	19.7
Platoro Reservoir Inflow	APR-SEP	23	27
Conejos River nr Mogote	APR-SEP	57	68

RIO GRANDE BASIN
Streamflow Forecasts - April 1, 2002

Forecast Pt	<=== Drier === Future Conditions === Wetter ===>						30 Yr Avg (1000AF)
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (% AVG.) (1000AF)	10% (1000AF)	Chance of Exceeding *	
Rio Grande nr Del Norte	129	157	177	33	242	339	531
Platoro Reservoir Inflow	12.0	19.7	25	39	30	38	64
Platoro Reservoir Inflow	23	27	29	41	35	43	71
Conejos River nr Mogote	57	68	75	38	95	125	200

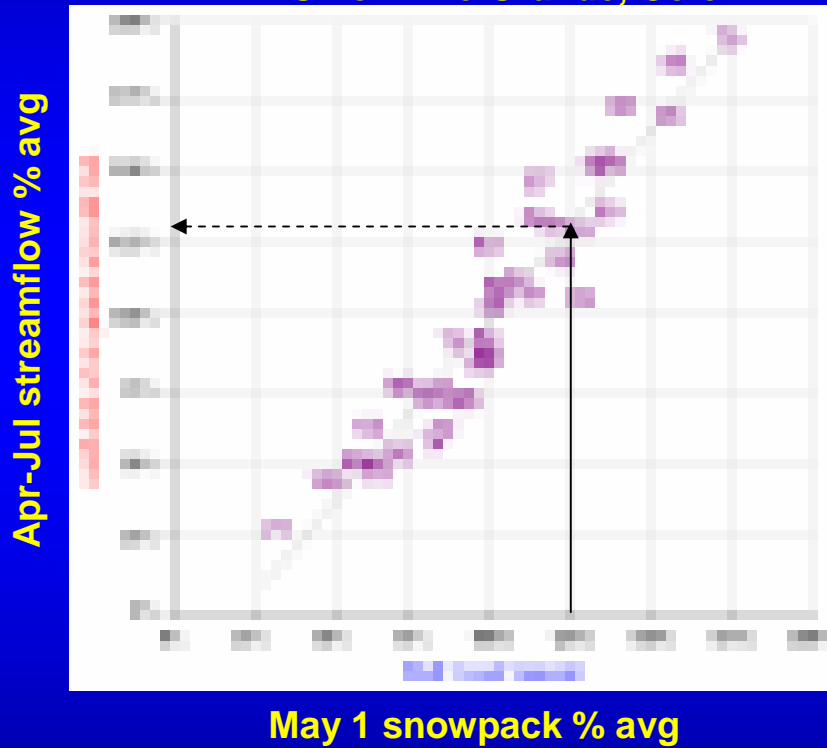
Spring and Summer Streamflow Forecasts as of January 1, 2002



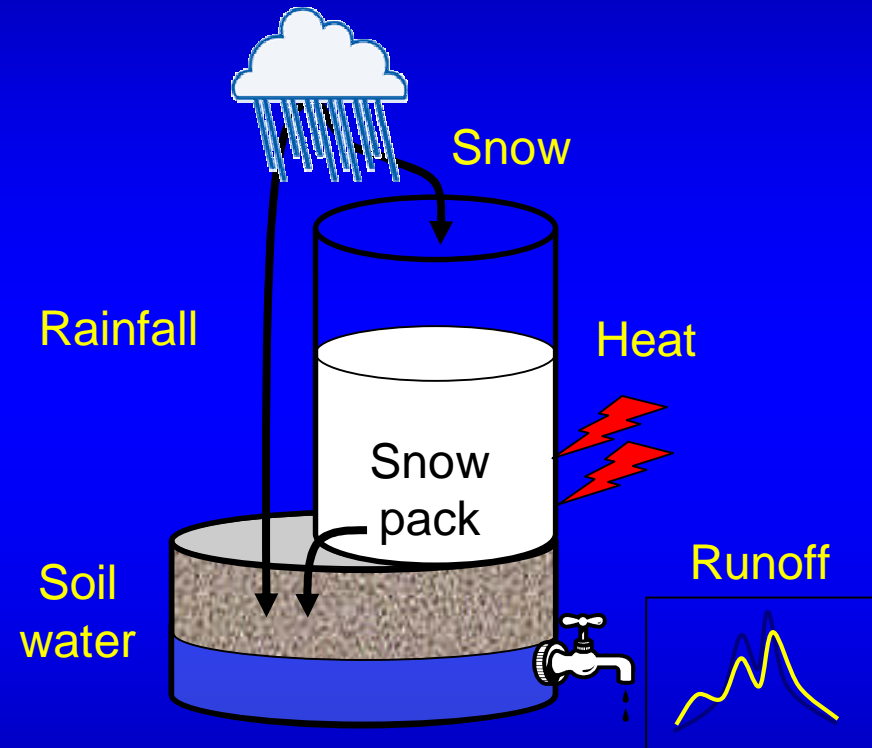
Basic Forecasting Methods

Statistical regression

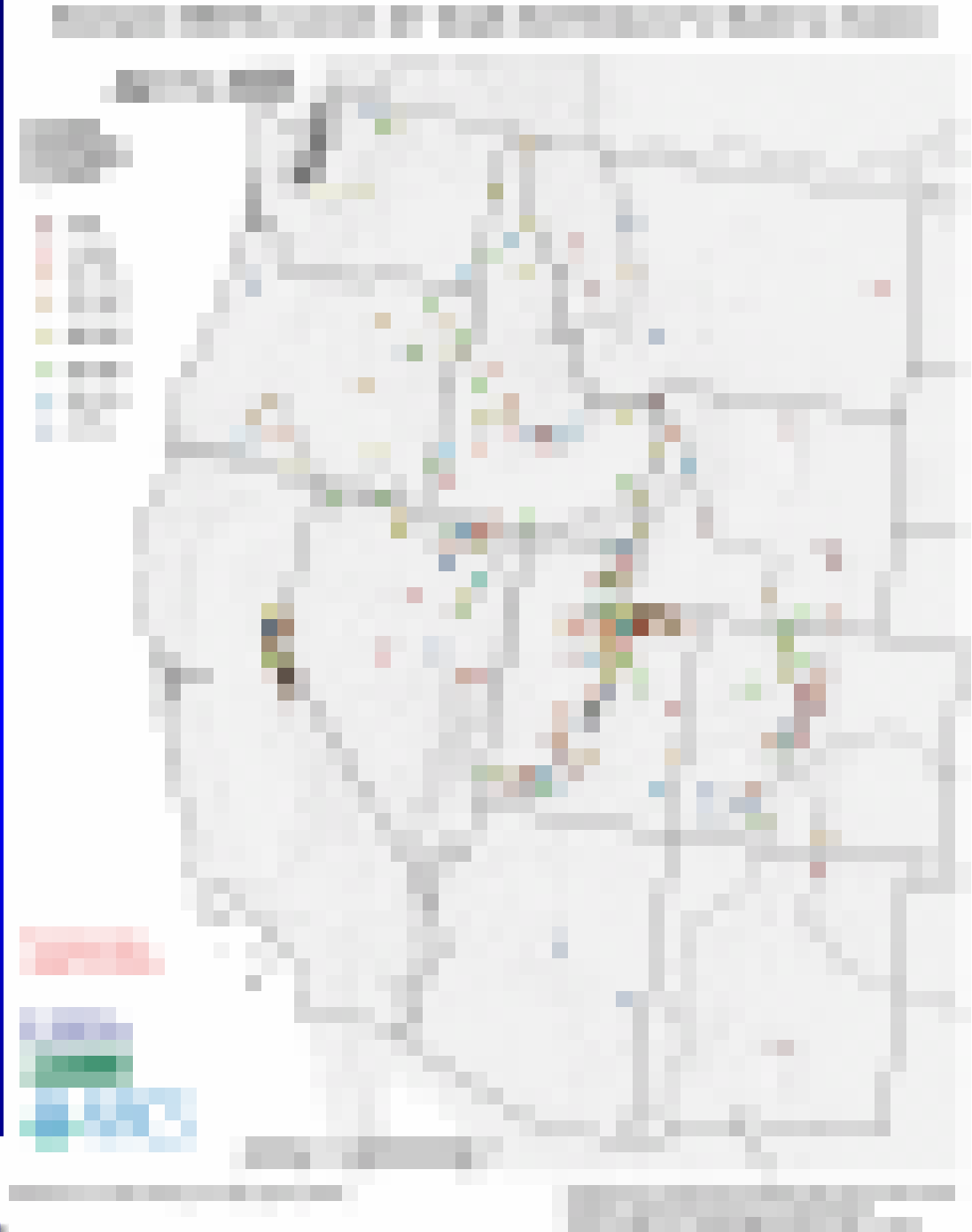
S Fork Rio Grande, Colo



Simulation modeling



**Expansion of
soil moisture to
SNOTEL network
(data starts ~2003)**



Mountain Snowpack as of April 1, 2008

Legend

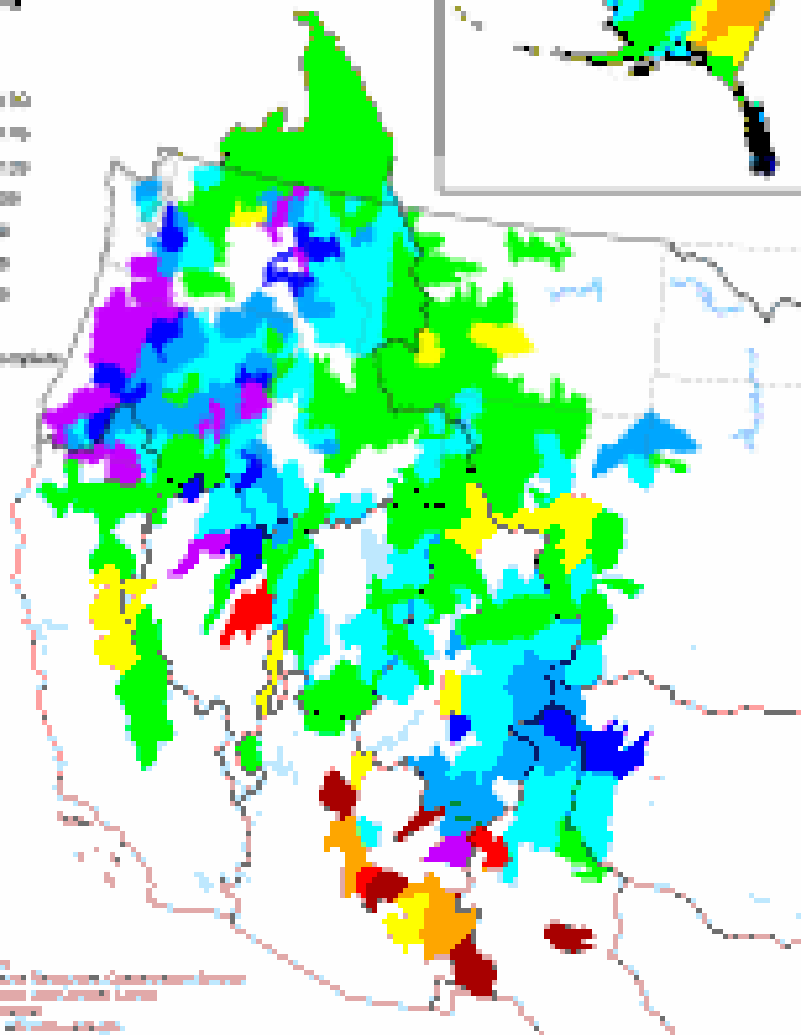
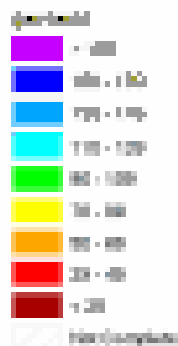
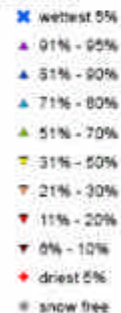


Figure 10
 2008 National Resources Conservation Service
 National Water and Climate Center
 Revised 10/08
<http://www.nrcs.usda.gov>

SNOTEL Current Snow Water Equivalent (SWE) Ranking Percentile Apr 01, 2008

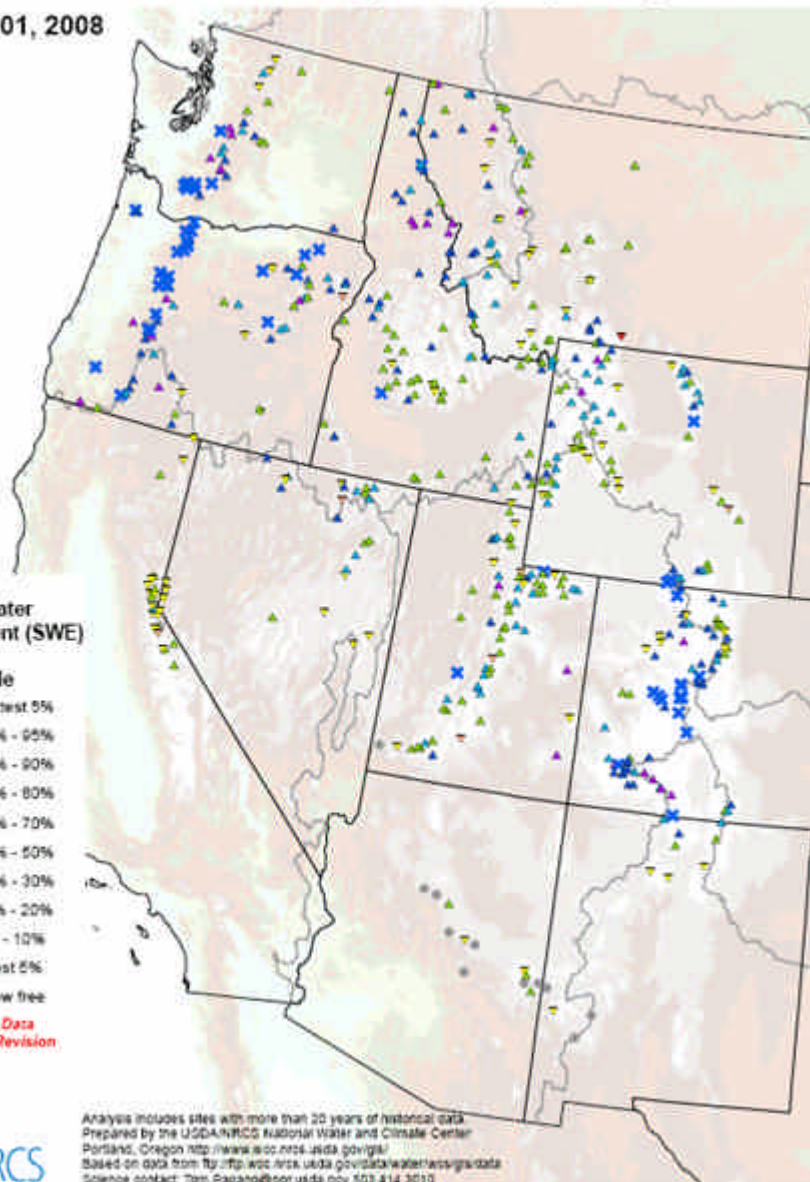
Current
 Snow Water
 Equivalent (SWE)
 Ranking
 Percentile

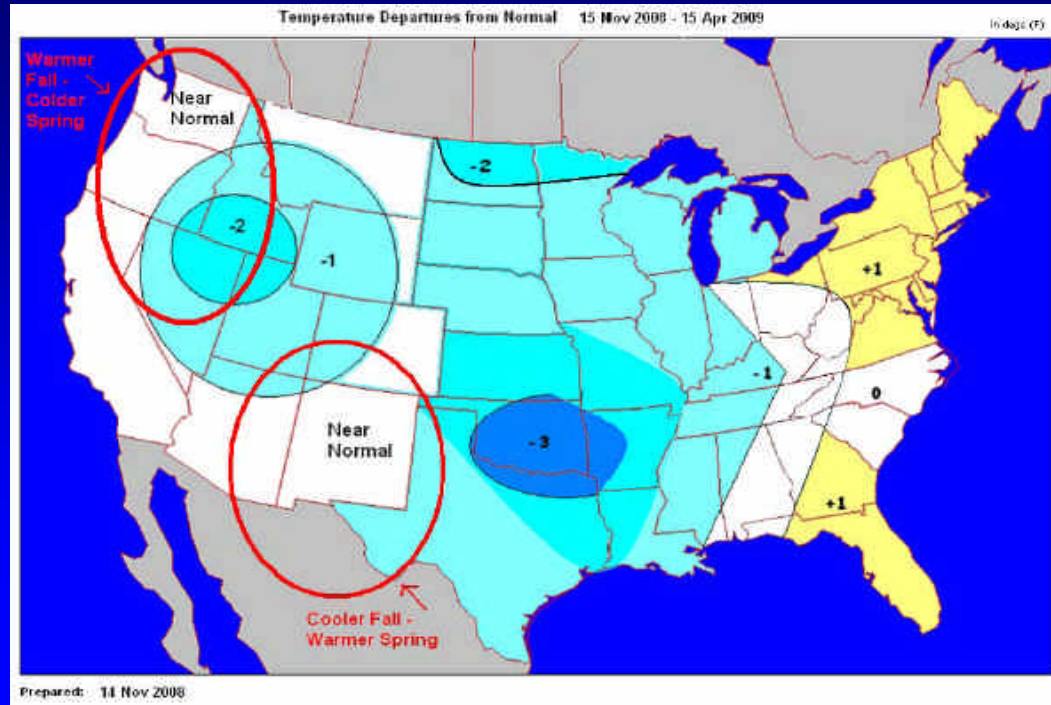


Provisional Data
 Subject to Revision

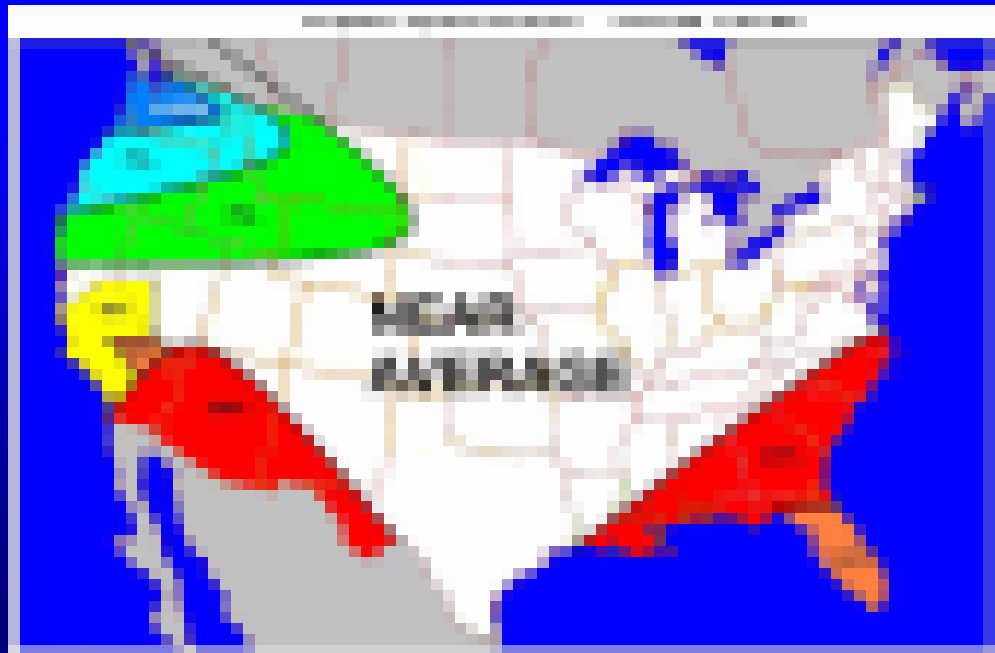


Analysis includes sites with more than 20 years of historical data.
 Prepared by the USDA-NRCS National Water and Climate Center
 Portland, Oregon <http://www.nrcs.usda.gov>
 Based on data from <http://ftp.wcc.nrcs.usda.gov/data/water/sig/data>
 Science contact: Tom Pagano@por.usda.gov 503 414 3010





Outlook for FY2009





Thank you

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