

Snow Coverage Area for the Sierra Nevada –May 1, 2011

The following analysis of **Snow Covered Area (SCA)** is derived from MODIS (Moderate Resolution Imaging Spectroradiometer) aboard NASA's Terra and Aqua satellites. Data from MODIS are processed to provide a resolution of 500 meters and a fractional SCA product where each pixel can range in value between 0 and 1 (e.g. 0.50=50% of the 500 meter pixel is covered by snow) as opposed to the operational binary product that defines a pixel as either snow or snow free. The MODIS SCA product is available on a daily basis, but viewable areas are subject to cloud cover. In addition, tree canopies mask a portion of the SCA and should be viewed accordingly based on the vegetation characteristics of each hydrologic unit and watershed.

This analysis covers the Sierra Nevada and various river basins, with Figure 1 highlighting the SCA over the Sierra Nevada for April 30, 2011 and April 30, 2010, and Figure 2 showing the monthly change in SCA between April 1 and April 30, 2011. Figures 3 (a-e) focuses on the **Feather, American, Tuolumne, Merced, and Kaweah** River basins. The historical April 1 and May 1 SCA represent the average observable SCA across each 300 m (1000 foot) elevation band over the MODIS period 2001-2010. Additional basins will be added throughout the year and upon request.

This data and analysis are made available by the University of California, Merced, University of California, Santa Barbara, and NASA's Jet Propulsion Lab under *NASA Grant NNG04GC52 (REASoN CAN 'Multi-resolution snow products for the hydrologic sciences')* and *California Department of Water Resources Agreement 4600008548*.

For further information or comments/suggestions please contact Robert Rice (rrice@ucmerced.edu) or (209)228-4397.

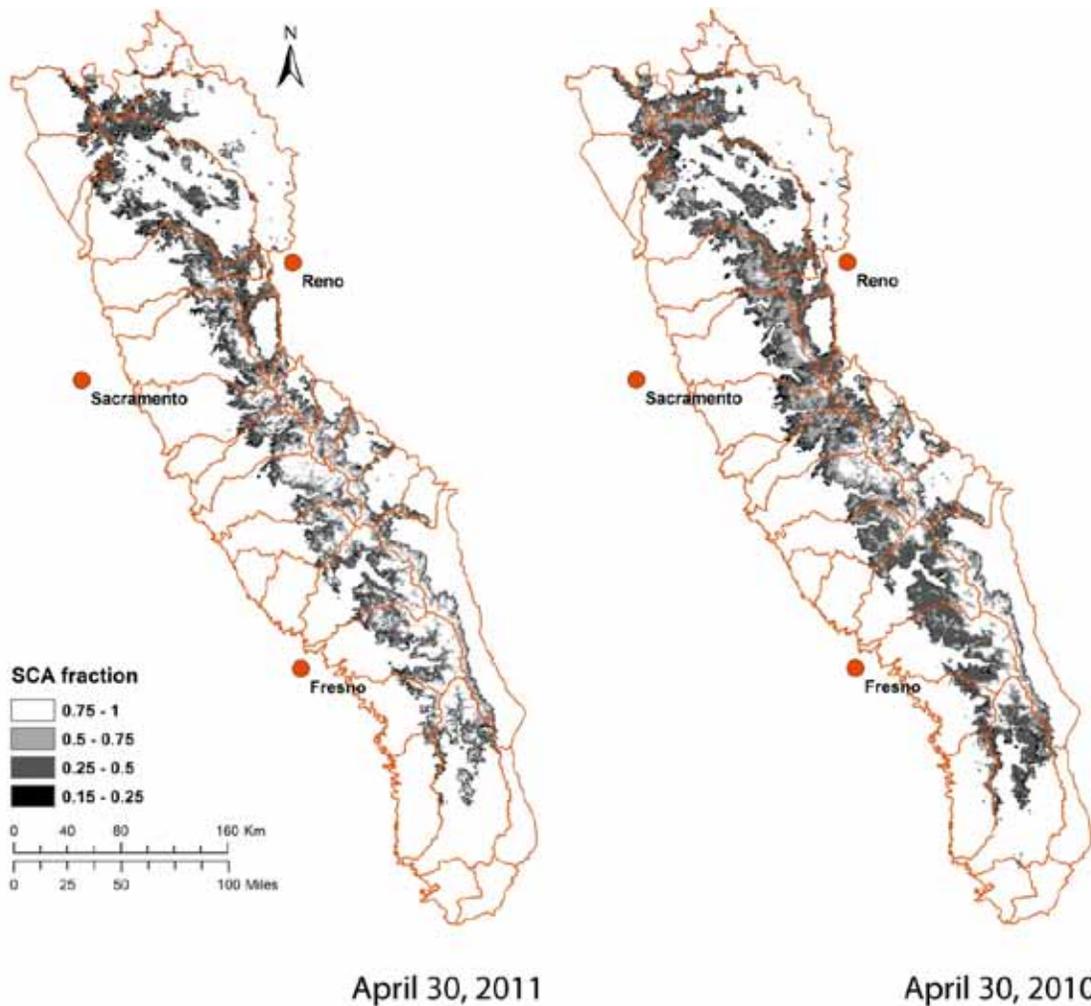


Figure 1. SCA over the **Sierra Nevada** on April 30, 2011 and 2010 outlined by the individual watersheds. Evident is the similar snow cover extent between April 30, 2011 and 2010, in which the statewide snow water equivalent (SWE) on May 1, 2011 was 144% of the historical April 1 average, and May 1, 2010 was 109% of the historical April 1 average. May 1, 2011 was 187% of the historical May 1 average, and May 1, 2010 was 142% of the historical May 1 average.

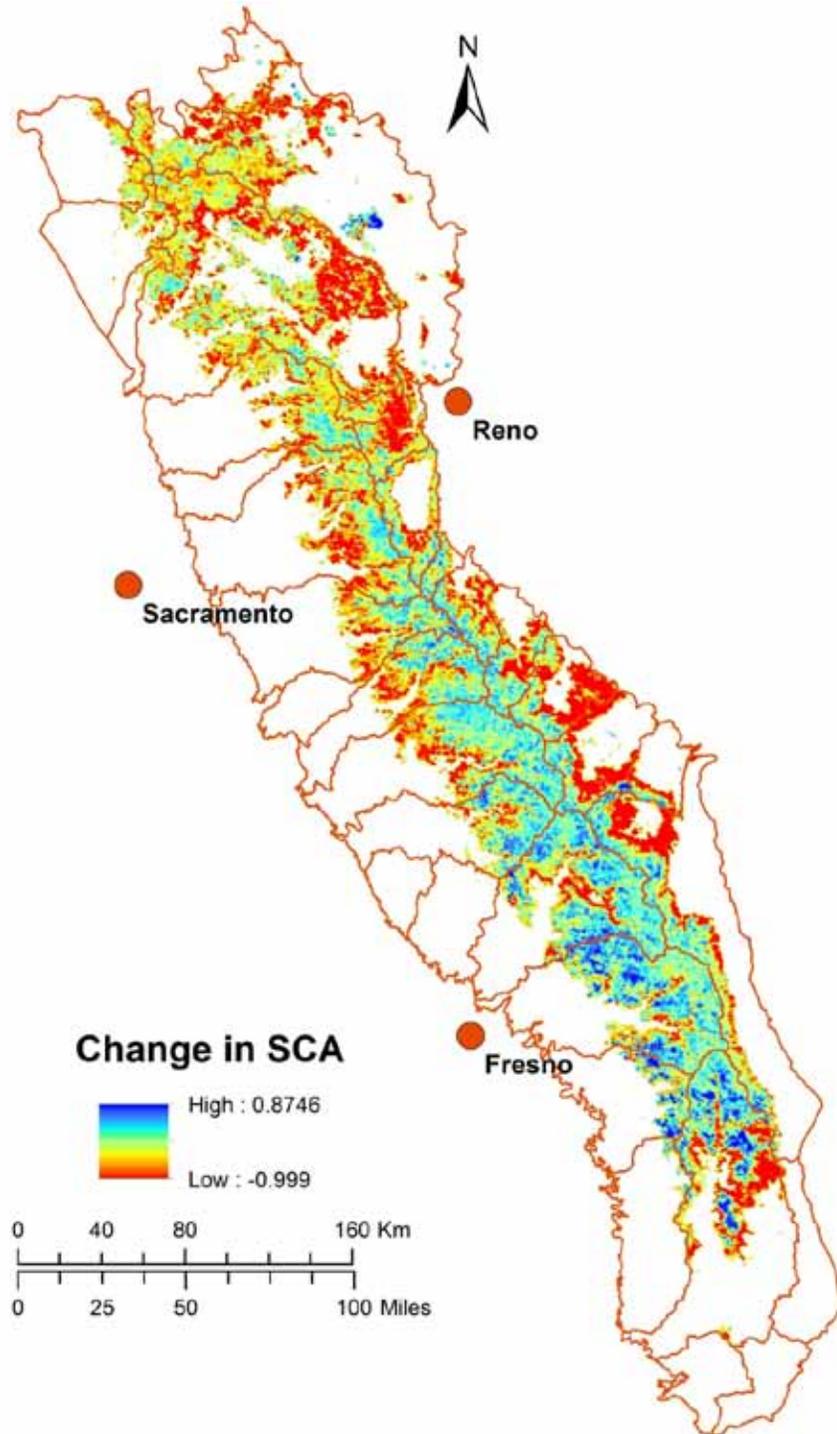


Figure 2. The graph shows the % change of SCA from April 1–April 30, 2011. Of interest was a net increase in snow cover area in the Sierra Nevada at the mid- to upper- elevations, as wet conditions and cool temperatures contributed to the increase.

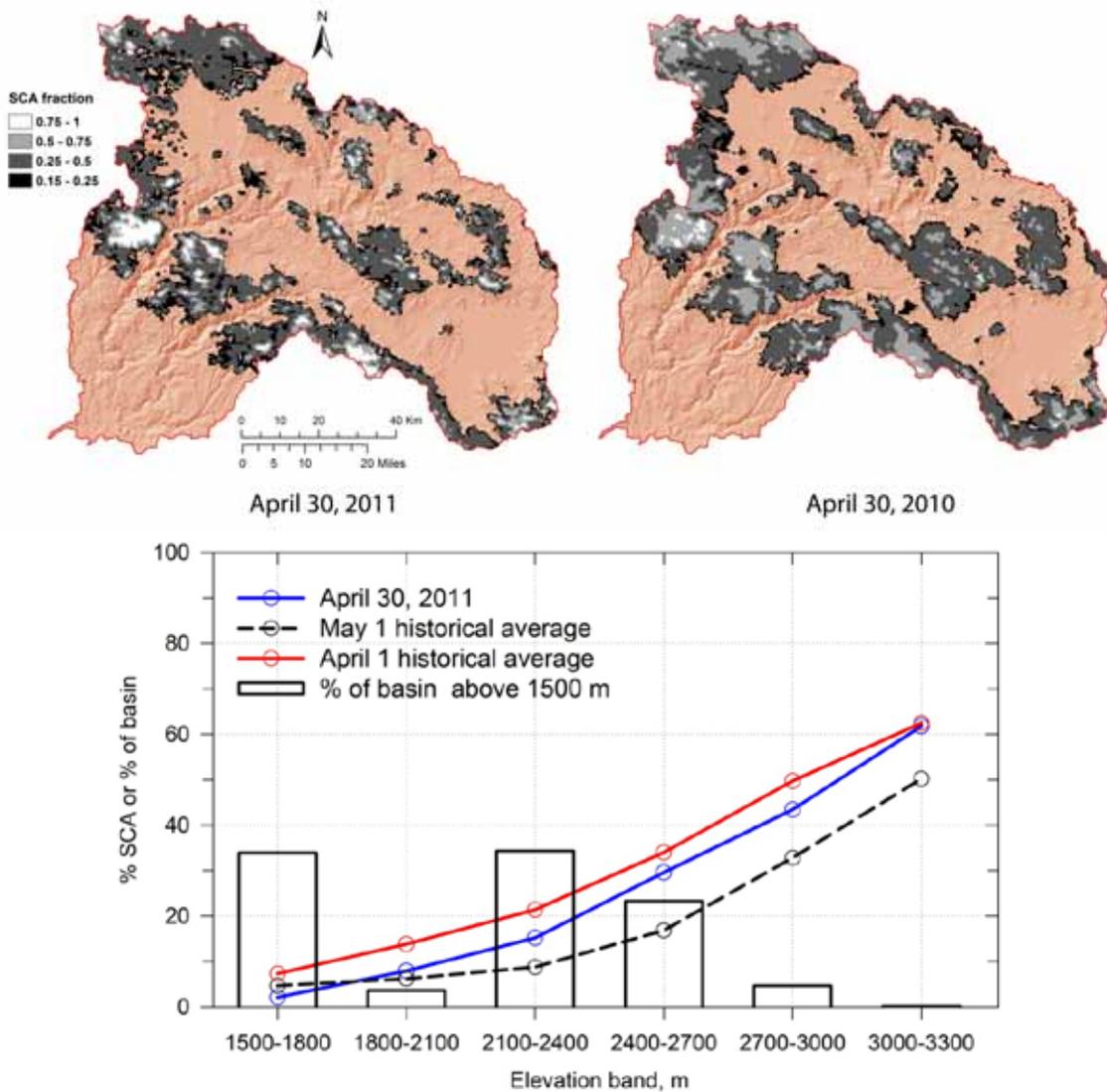
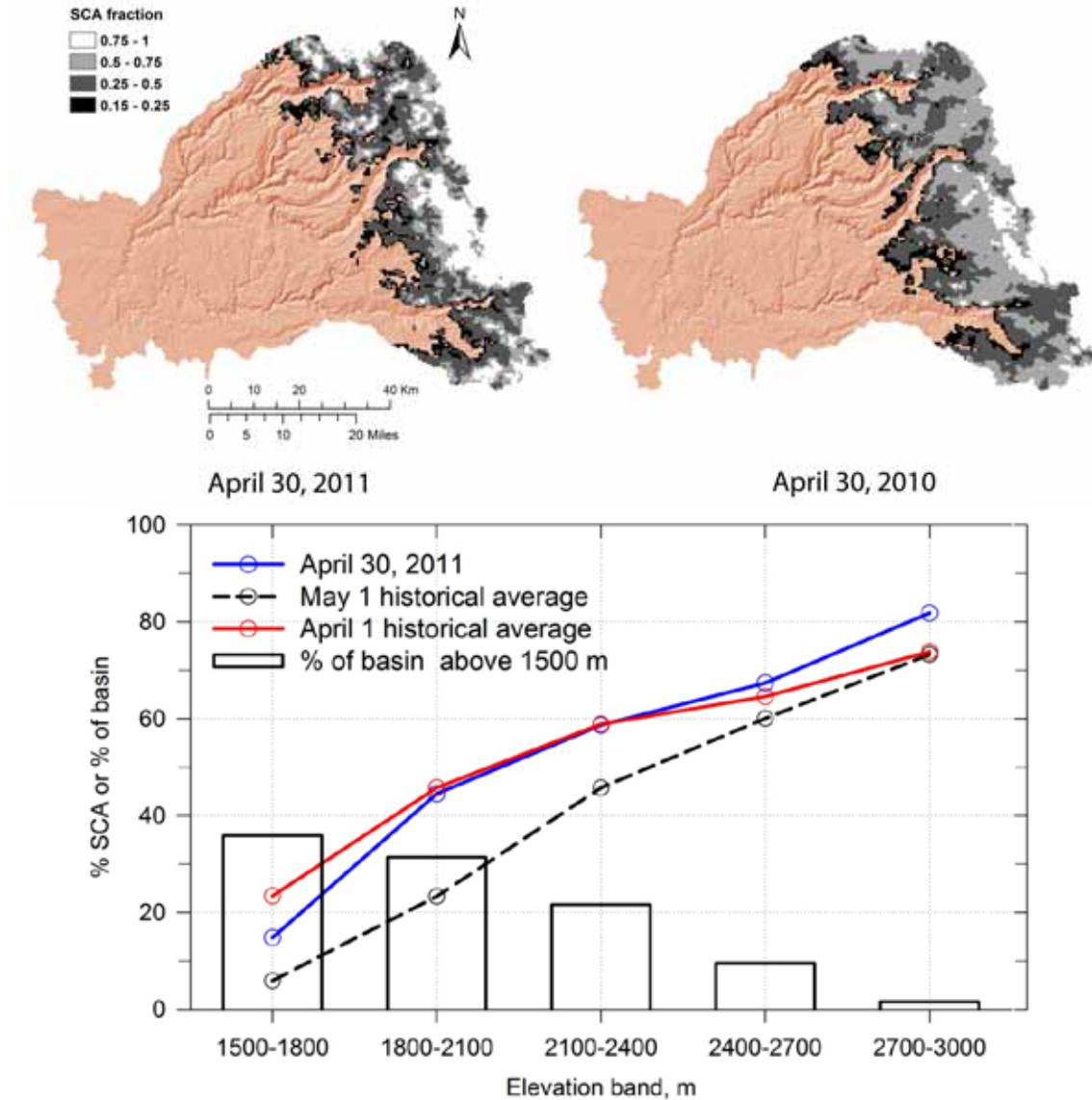
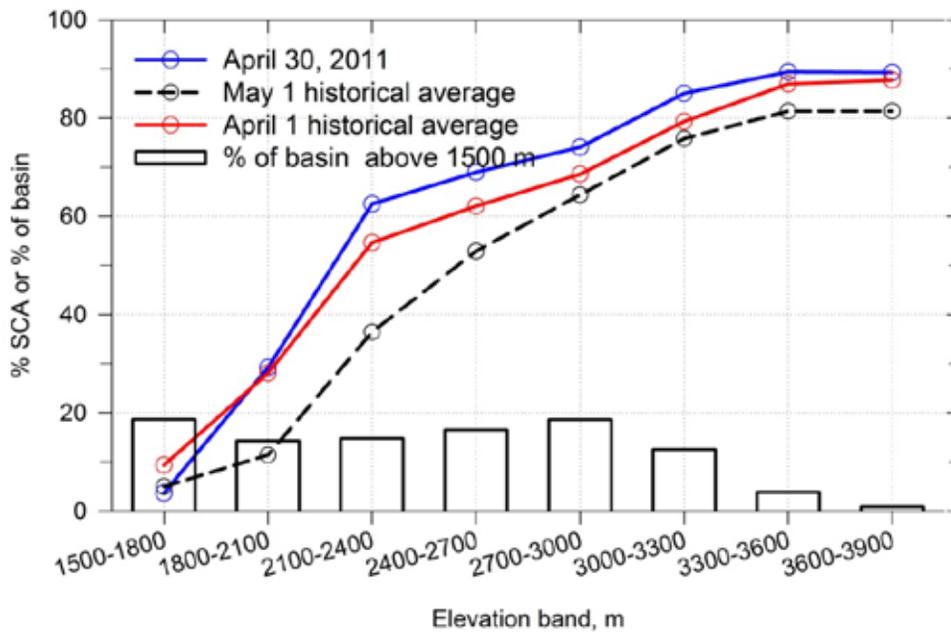
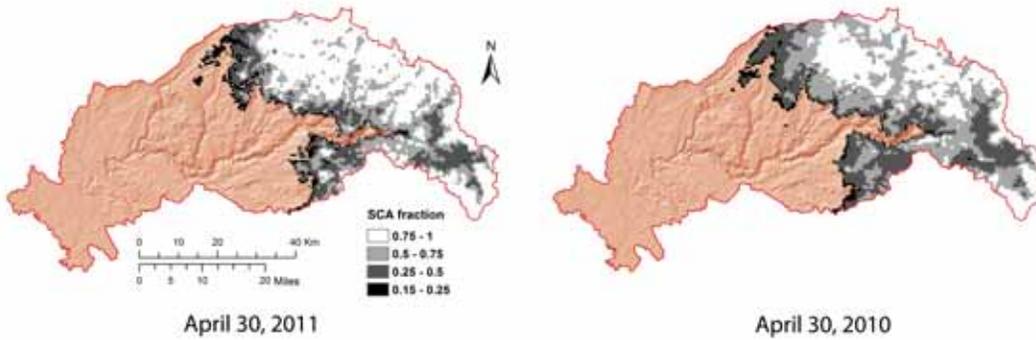


Figure 3(a). SCA over the **Feather River** basin on April 30, 2011 and 2010. On May 1, 2011 basin-wide SWE was 145% of the April 1 historical average (based on basin-wide snow course data). May 1, 2010 was 103% of the April 1 historical average. Graphical and tabular data represent average % SCA by 300 m (1000 foot) elevation bands over the **Feather River** basin for April 30, 2011 and the April 1 and May 1 historical averages based over the MODIS period 2001-2010.



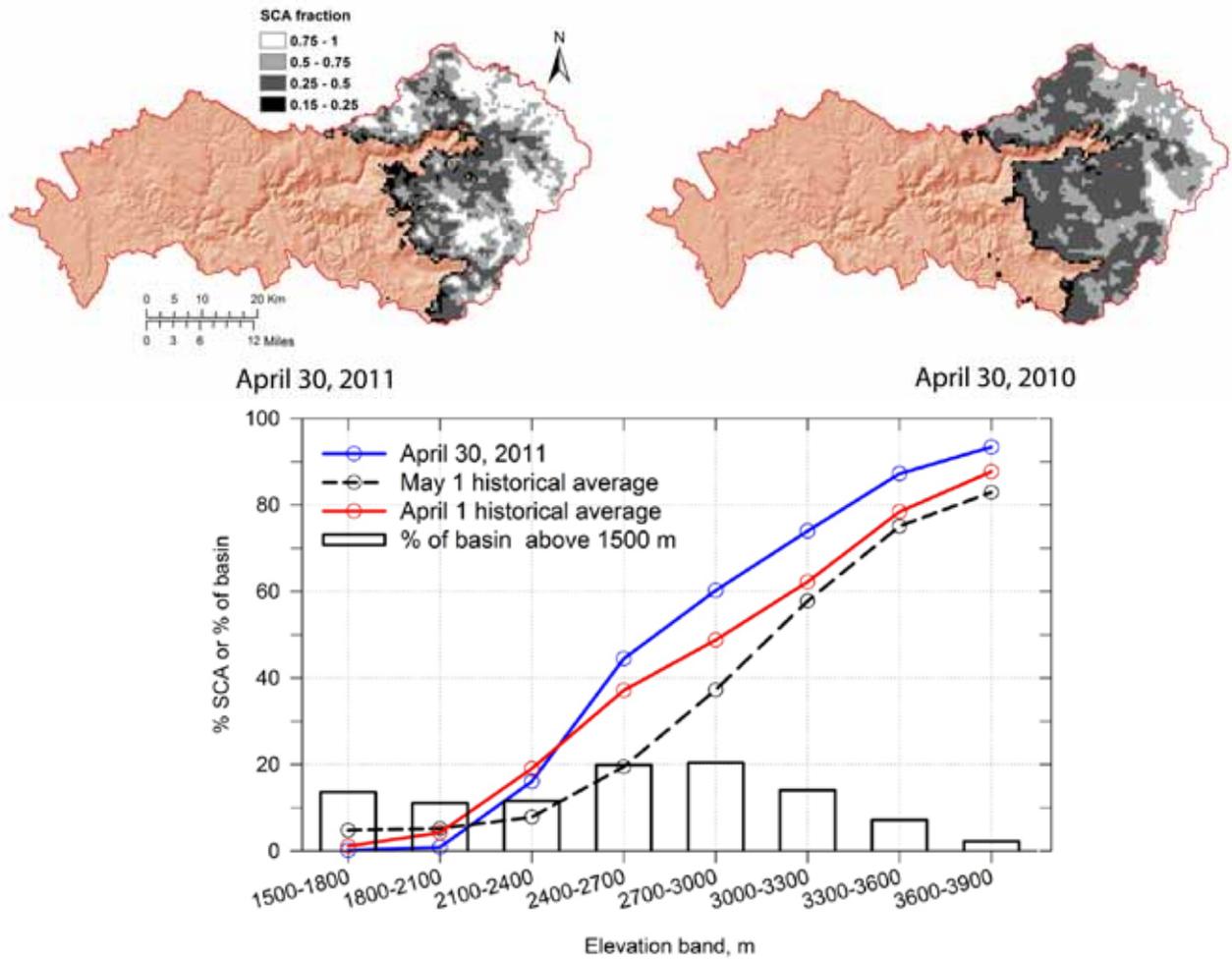
	April 30, 2011	May 1	April 1
1500-1800	15%	6%	23%
1800-2100	45%	23%	46%
2100-2400	59%	46%	59%
2400-2700	67%	60%	65%
2700-3000	82%	73%	74%

Figure 3(b). SCA over the **American River** basin on April 30, 2011 and 2010. On May 1, 2011 basin-wide SWE was 145% of the April 1 historical average (based on basin-wide snow course data). May 1, 2010 was 96% of the April 1 historical average. Graphical and tabular data represent average % SCA by 300 m (1000 foot) elevation bands over the **American River** basin for April 30, 2011 and the April 1 and May 1 historical averages based over the MODIS period 2001-2010.



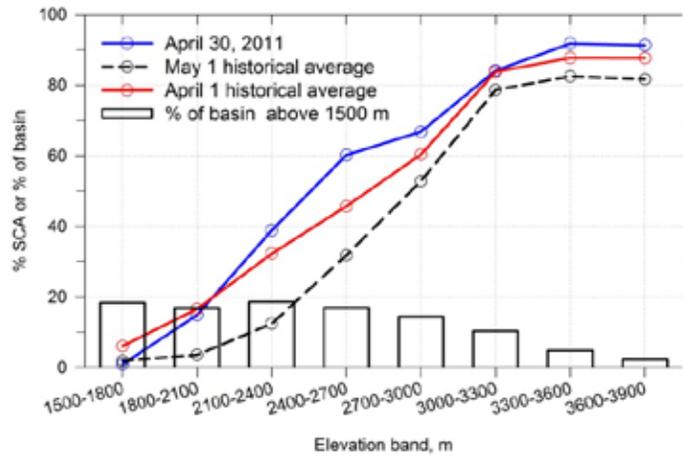
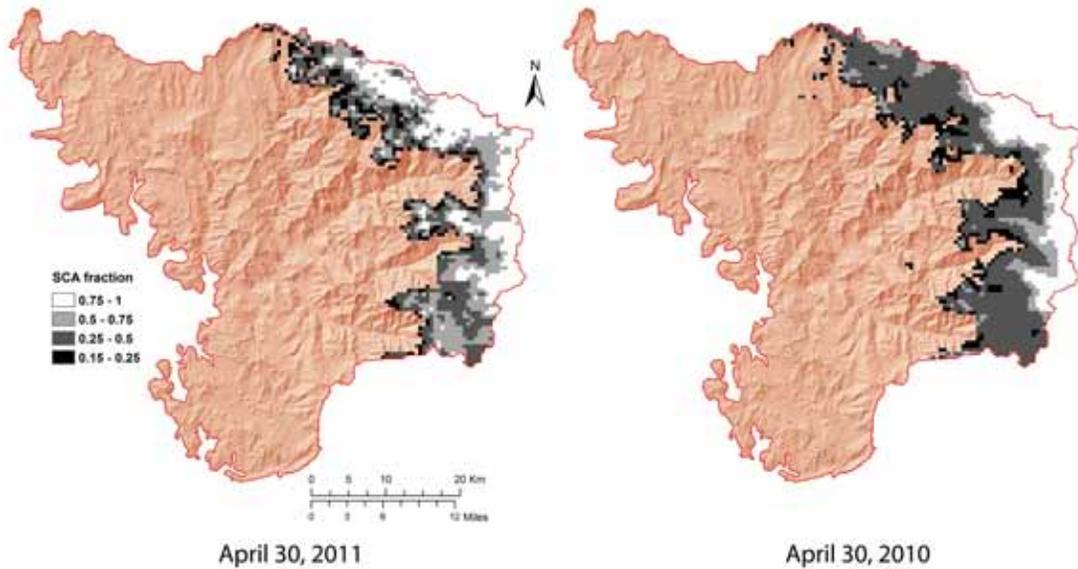
	April 30, 2011	May 1	April 1
1500-1800	4%	5%	9%
1800-2100	29%	11%	28%
2100-2400	62%	36%	55%
2400-2700	68%	53%	62%
2700-3000	74%	64%	69%
3000-3300	85%	76%	79%
3300-3600	89%	81%	87%
3600-3900	89%	81%	88%

Figure 3(c). SCA over the **Tuolumne River** basin on April 30, 2011 and 2010. On May 1, 2011 basin-wide SWE was 151% of the April 1 historical average (based on basin-wide snow course data). May 1, 2010 was 116% of the April 1 historical average. Graphical and tabular data represent average % SCA by 300 m (1000 foot) elevation bands over the **Tuolumne River** basin for April 30, 2011 and the April 1 and May 1 historical averages based over the MODIS period 2001-2010.



	April 30, 2011	May 1	April 1,
1500-1800	0%	5%	1%
1800-2100	1%	5%	4%
2100-2400	16%	8%	19%
2400-2700	44%	19%	37%
2700-3000	60%	37%	49%
3000-3300	74%	58%	62%
3300-3600	87%	75%	78%
3600-3900	93%	83%	88%

Figure 3(d). SCA over the **Merced River** basin on April 30, 2011 and 2010. On May 1, 2011 basin-wide SWE was 163% of the April 1 historical average (based on basin-wide snow course data). May 1, 2010 was 110% of the April 1 historical average. Graphical and tabular data represent average % SCA by 300 m (1000 foot) elevation bands over the **Merced River** basin for April 30, 2011 and the April 1 and May 1 historical averages based over the MODIS period 2001-2010.



	April 30, 2011	May 1	April 1
1500-1800	1%	2%	6%
1800-2100	15%	4%	17%
2100-2400	39%	12%	32%
2400-2700	60%	32%	46%
2700-3000	67%	53%	60%
3000-3300	84%	79%	84%
3300-3600	92%	83%	88%
3600-3900	91%	82%	86%

Figure 3(e). SCA over the **Kaweah River** basin on April 30, 2011 and 2010. On May 1, 2011 basin-wide SWE was 164% of the April 1 historical average (based on basin-wide snow course data). May 1, 2010 was 149% of the April 1 historical average. Graphical and tabular data represent average % SCA by 300 m (1000 foot) elevation bands over the **Kaweah River** basin for April 30, 2011 and the April 1 and May 1 historical averages based over the MODIS period 2001-2010.