Snow Coverage Area for the Sierra Nevada –January 30, 2007

The following analysis of **S**now **C**overed **A**rea (SCA) is derived from MODIS (Moderate Resolution Imaging Spectroradiometer) aboard NASA's Terra and Aquas 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 100% (e.g. 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 and Figure 2 showing the daily SCA in various river basins in January 2005 and 2007. Figures 3 (a-d) focus on the **American, Tuolumne, Merced, and Kaweah** River basins. Additional basin will be added throughout the year.

These data and analysis are made available by the University of California, Merced and University of California, Santa Barbara under *NASA Grant NNG04GC52 (REASoN CAN 'Multi-resolution snow products for the hydrologic sciences').* For further information or comments/suggestions please contact Robert Rice (rrice@ucmerced.edu or (209)228-4397) or Roger Bales at University of California, Merced.

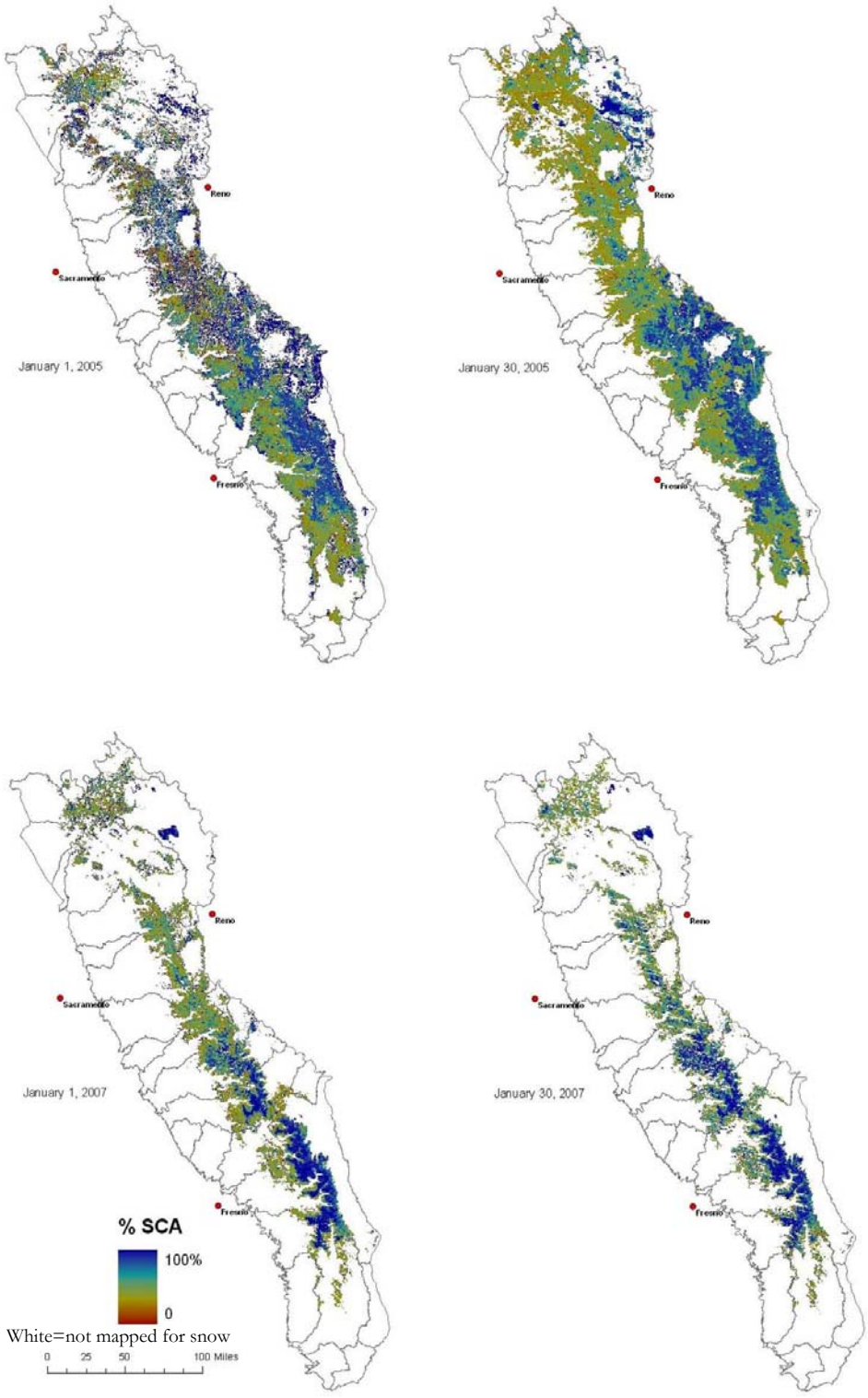


Figure 1. SCA over the **Sierra Nevada** on January 1 and 30, 2005 and January 1 and January 30, 2007 outlined by the individual watersheds. Evident is the extent of snowcover between January 2005 and 2007 in which the statewide snow water equivalent (SWE) on February 1, 2007 was 39% of the historical February 1 average, while the February 1, 2005 was 163% of the February 1 average.

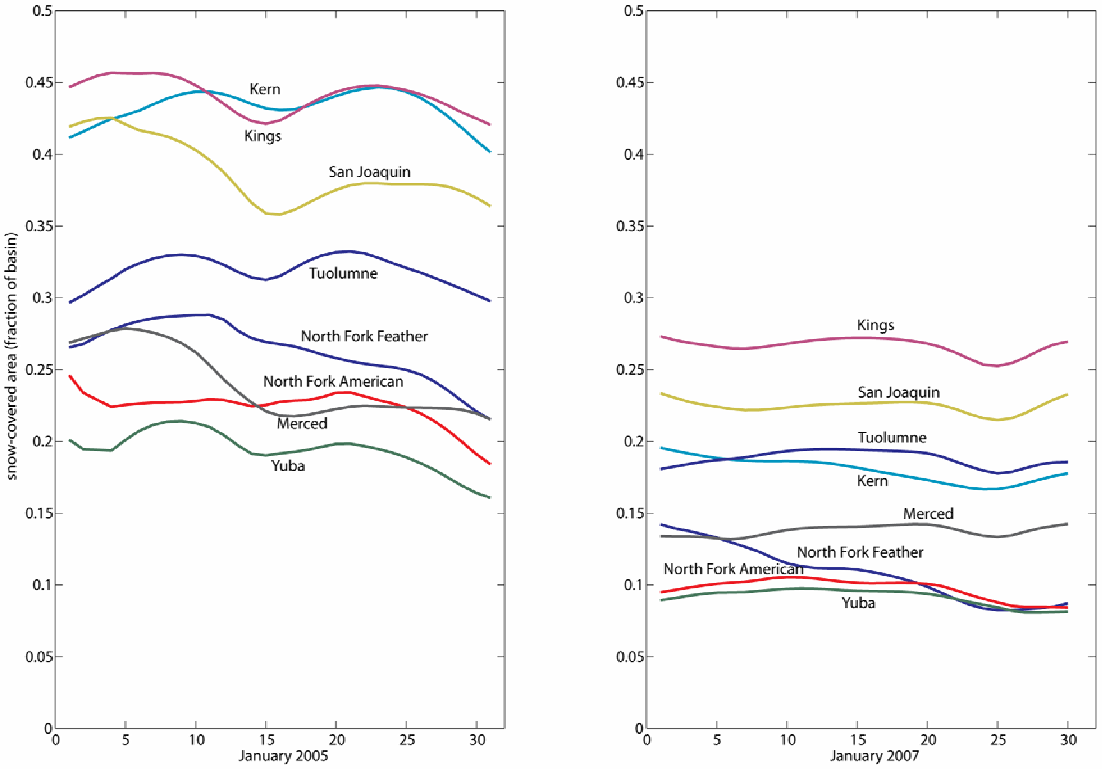
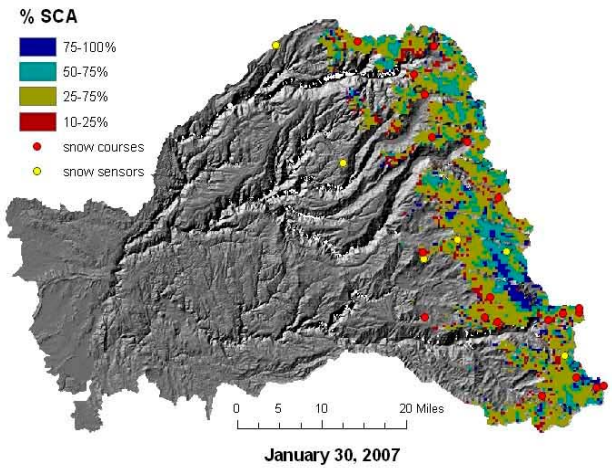
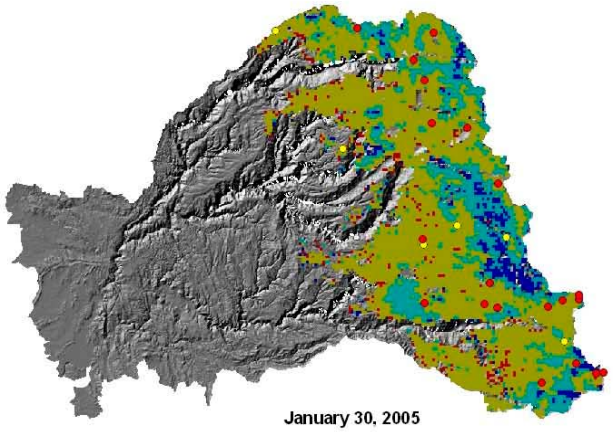
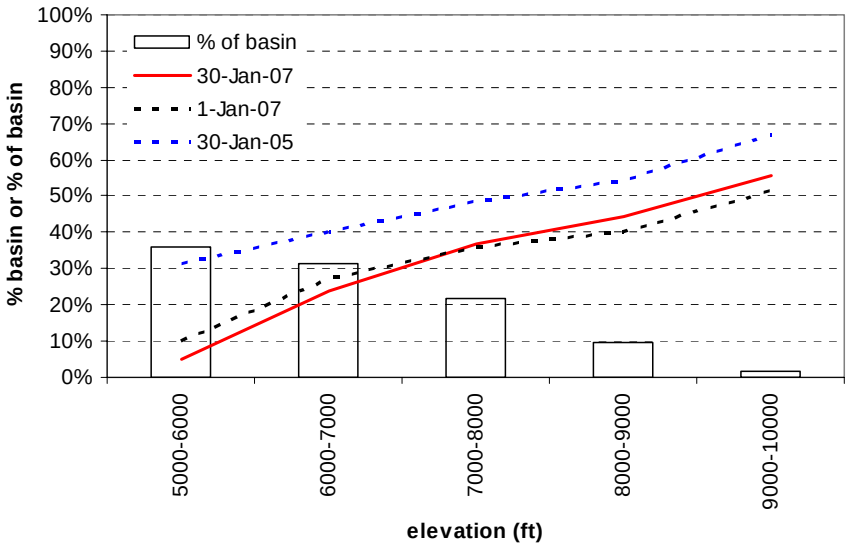


Figure 2. The graphs show the daily January 2005 and 2007 progression of SCA, expressed as a fraction of the basin area (e.g. 0.25 = 25%) in the Sierra Nevada (above the Central Valley) and shows significant differences between the January 2005 and 2007 snowpacks in 8 river basin.

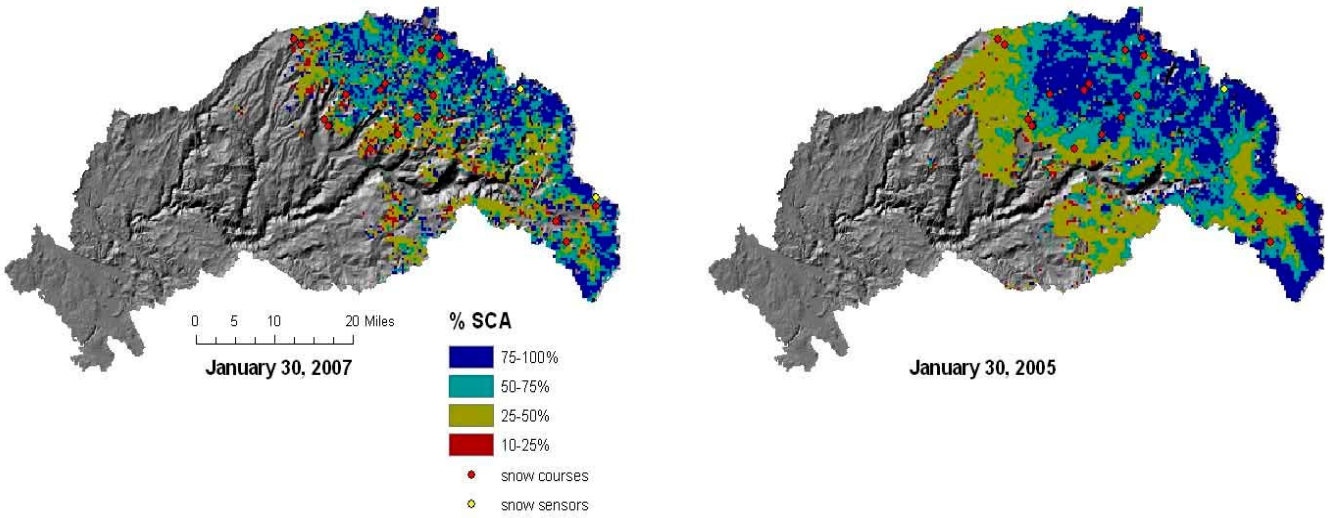


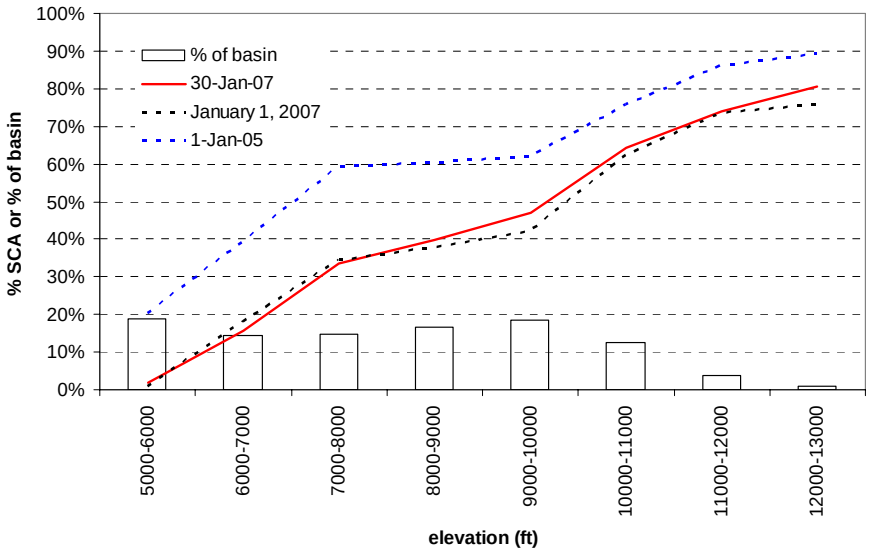




	January 30, 2007	January 1, 2007	January 30, 2005
5000-6000	5%	10%	31%
6000-7000	24%	27%	40%
7000-8000	37%	36%	49%
8000-9000	44%	40%	54%
9000-10000	56%	52%	67%

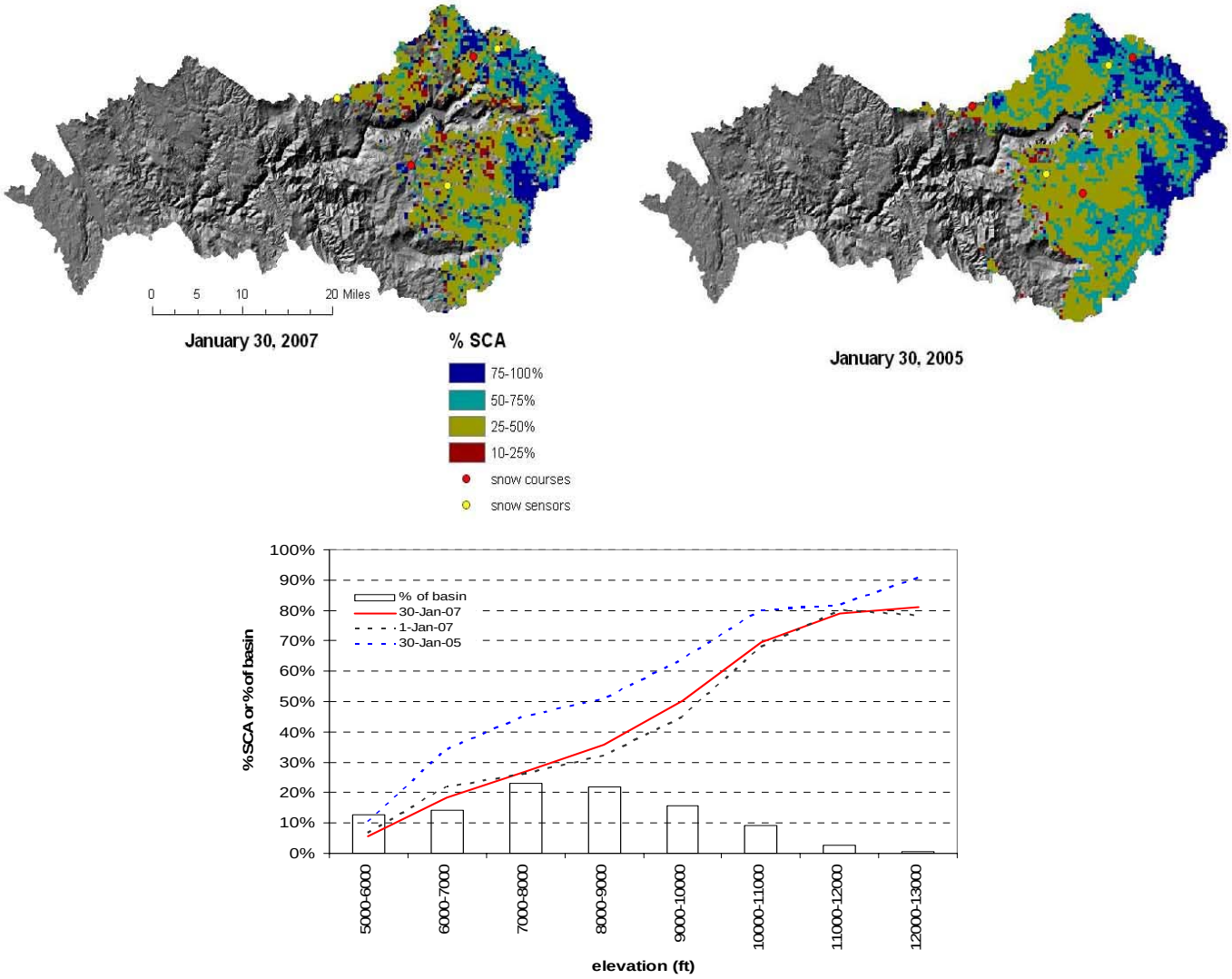
Figure 3 (a). SCA over the **American River** basin on January 30, 2007 and January 30, 2005. On February 1, 2007 basin-wide SWE was 38% of the February 1 historical average (based on basin-wide snow course data), while February 1, 2005 was 174% of the February 1 average. Graphical and tabular data represent average % SCA by 1000 foot elevation bands over the American River Basin for January 1 and 30, 2007 and January 30, 2005.





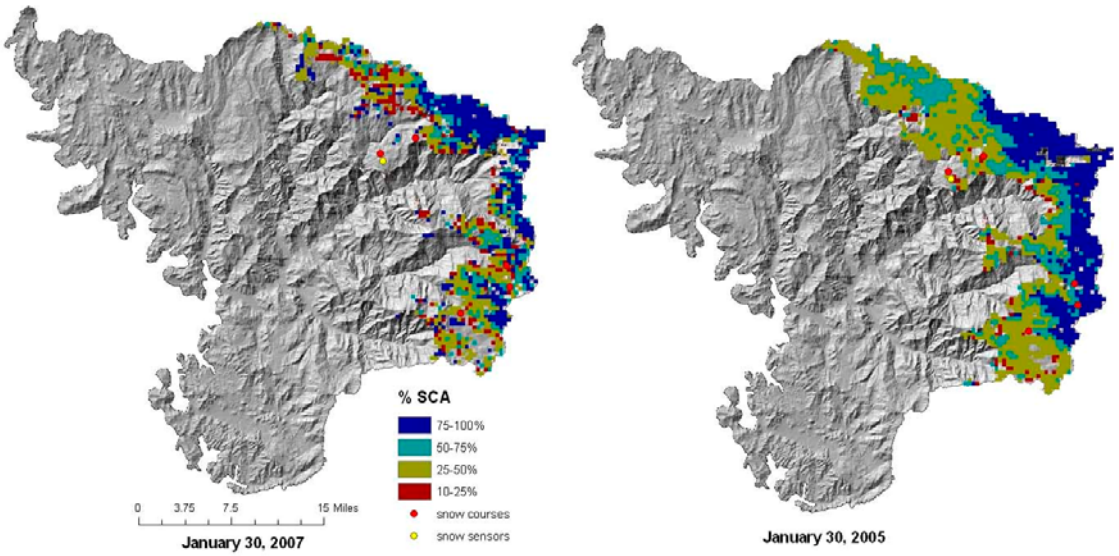
	January 30, 2007	January 1, 2007	January 30, 2005
5000-6000	2%	1%	20%
6000-7000	16%	18%	39%
7000-8000	34%	34%	59%
8000-9000	40%	38%	60%
9000-10000	47%	42%	62%
10000-11000	64%	63%	76%
11000-12000	74%	74%	86%
12000-13000	80%	76%	89%

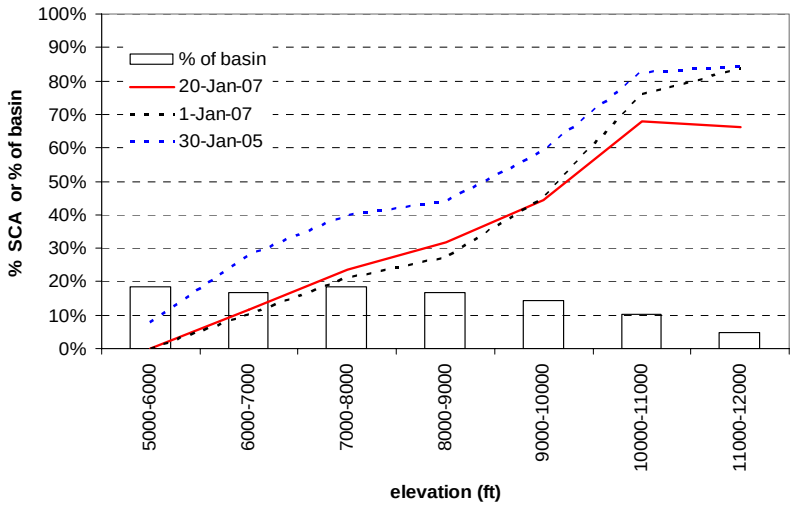
Figure 3 (b). SCA over the **Tuolomne River** basin on January 30, 2007 and January 30, 2005. On February 1, 2007 basin-wide SWE was 43% of the February 1 historical average (based on basin-wide snow course data), while February 1, 2005 was 180% of the February 1 average. Graphical and tabular data represent average % SCA by 1000 foot elevation bands over the **Tuolumne River** basin for January 1 and 30, 2007 and January 30, 2005.



	January 30, 2007	January 1, 2007	January 30, 2005
5000-6000	6%	7%	10%
6000-7000	18%	22%	34%
7000-8000	27%	26%	45%
8000-9000	36%	32%	51%
9000-10000	50%	45%	64%
10000-11000	69%	68%	80%
11000-12000	79%	80%	82%
12000-13000	81%	78%	91%

Figure 3(c). SCA over the **Merced River** basin on January 30, 2007 and January 30, 2005. On February 1, 2007 basin-wide SWE was 41% of the February 1 historical average (based on basin-wide snow course data), while February 1, 2005 was 180% of the February 1 average. Graphical and tabular data represent average % SCA by 1000 foot elevation bands over the **Merced River** basin for January 1 and 30, 2007 and January 30, 2005.





	January 30, 2007	January 1, 2007	January 30, 2005
5000-6000	0%	0%	8%
6000-7000	11%	10%	28%
7000-8000	24%	21%	40%
8000-9000	32%	27%	44%
9000-10000	44%	45%	59%
10000-11000	68%	76%	83%
11000-12000	66%	84%	84%

Figure 3(d). SCA over the **Kaweah River** basin on January 30, 2007 and January 30, 2005. On February 1, 2007 basin-wide SWE was 43% of the February 1 historical average (based on basin-wide snow course data), while February 1, 2005 was 194% of the February 1 average. Graphical and tabular data represent average % SCA by 1000 foot elevation bands over the **Kaweah River** basin for January 1 and 30, 2007 and January 30, 2005.