

Onion Creek Experimental Forest & Central Sierra Snow Lab (OCR)

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Location: 39.280 -120.354

Elevation: 1830 - 2590 m

Vegetation: mixed conifer and Sierra meadow including western white pine, white and red fir, incense cedar, mountain hemlock, lodgepole pine

Onion Creek Experimental Forest (OCR), within the headwaters of the North Fork of the American River that flows to Sacramento, was established in 1958 to develop techniques for increasing water yields from forested lands in the Sierra Nevada snow zone. It includes five sub-basins and harvest disturbance has been minimal (<20%). OCR is bounded on the north by the Sierra Nevada crest, including the peaks of Crows Nest, Mt. Disney, and Mt. Lincoln (accessible by ski lifts at Sugar Bowl). The Central Sierra Snow Laboratory (CSS) is set among conifer dominated slopes, just west of the Sierra Nevada crest, and presents a superior setting for meteorological study. It has climatic records dating back to the 1940s and is one of the main meteorological observation stations on the western slope of the Sierra Nevada.

The Pacific Southwest Research Station signed a conservation and research agreement in September 2006, to reserve about 19,670 acres of public and private land for research and conservation purposes adjacent to the Onion Creek Experimental Forest and the Central Sierra Snow Laboratory. The public/private partnership is a consortium of land owners and managers including the Station, the North Fork Association, Chickering Partnership, Tahoe National Forest/USDA Forest Service, and the Regents of the University of California. Private land owners retain ownership of their land, but allow entry and use rights to scientists to perform research. The agreement creates a common management vision for the headwaters of a unique watershed that contains many remarkable features, including a population of mountain yellow-legged frogs, diverse botany, and the largest stand of California old growth forest outside of the National Park System. Both OCR and CSS have been managed by the University of California, Berkeley since 1996 through an agreement with the USFS PSW Station.

The main plant communities in OCR are red fir, white fir, Jeffrey pine, and dry meadow. Major tree species include red and white firs, sugar, Jeffrey, western white, and lodgepole pines, incense cedar, mountain hemlock, and western juniper. The CSS has lodgepole pine, red fir, and whitebark pine.

OCR climate is Mediterranean, with moist, relatively mild winters and dry, warm summers. Annual precipitation is about 1,060 mm with 85 to 90 percent falling as snow during the winter. Mean monthly air temperatures range from -1°C in January to 15°C in July. Monthly minimum temperatures range from a low of -14°C in January to 1°C in July, whereas monthly maximum temperatures range from about 13°C in January to 30°C in July. At CSS persistent maritime influence results in a climate with an average annual precipitation of 1.3 m; average snowfall is 10.4m; average maximum snow depth is 2.4m. Average maximum and minimum air temperatures are 26 and -10°C. The snow pack is warm maritime.

Fauna typical of the higher zones of red fir vegetation communities of the Sierra Nevada include northern flying squirrel, spotted owls, mountain lions, mule deer, and American marten.

Past research has dealt with relationship of Sierra Nevada rain-snow dynamics to the red fir-white fir ecotone and also involved the use of meteorological and streamflow data to develop and calibrate rain-snow models. Tests were conducted to determine ways that forests could be cut and managed while maintaining or improving California's water supply. At OCR there are climatic databases on air temperature, relative humidity, and precipitation. There are continuous stream discharge records available from five sub-basins with areas ranging from 0.5 to 2.1 km². A sixth gauging station monitors the entire 9.3-km² basin. In Onion Creek, snowpack depth and its water equivalent have been monitored monthly at a snow course since 1937. At CSS there are fairly complete and consistent records of precipitation, snowfall, snow depth, and air temperature since 1946. The site also has long term data sets on wind speed and direction, solar radiation, snow temperature, relative humidity, and soil moisture. Lidar will be done in the spring 2007 for OCR, CSS and the North Fork American River Headwaters Basin. (more detailed info is provided below)