

Hydrologic Processes Outstandingly Remarkable Value

On both the Merced River and South Fork Merced River, dramatic changes in the rivers' speed and volume are the result of major changes in elevation. The rivers start in high alpine settings, drop down sheer cliffs and steep gradients at high speeds with large springtime volumes, and then become calm and meandering before tumbling down another steep gradient. This hydrologic variability caused by abrupt elevation changes of the two branches of the Merced River is unique.



Adrienne Freeman

Nevada and Vernal Falls form the "Giant Staircase" and illustrate both stairstep river morphology and the variability of the Merced's hydrology due to abrupt elevation changes



Ken Watson

Rushing cascades on the upper Merced above Washburn Lake



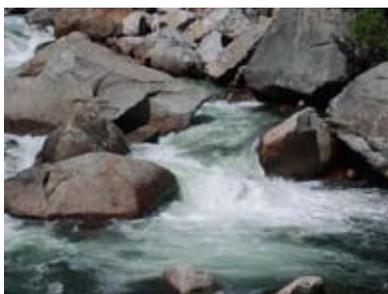
Mark Fincher

A gentle stretch of the upper South Fork of the Merced River



Ken Watson

The high alpine Red Devil Lake feeds into the Red Peak Fork of the Merced River



NPS photo

Large boulders shape the character of the river near El Portal

Supporting evidence and examples of the Hydrologic Processes ORV include, but are not limited to:

- Dramatic changes in the rivers' energy that result from variations in their gradients first produce downcutting, then depositional, and again downcutting conditions. The rivers descend steeply from their headwaters at elevations of more than 11,000 feet. When the Merced River encounters the flat gradient of Yosemite Valley at 4,000 feet, it meanders gently over 7 Valley miles, and then tumbles nearly 2,000 feet through the Merced River Gorge. The descent of the South Fork Merced River is similarly slowed by the low gradient of the Wawona area. It then resumes as nearly continuous, white-water cascades in a deep, narrow canyon through a wild environment
- Rapid snowmelt in upper elevations produces powerful, high-volume spring flows that create sensational white water that visitors can experience as sights, sounds, vibrations, and water spray.
- The large-scale, rockfall-driven morphology in such areas as the Merced River Gorge and the valley west of Wawona results in the deposition of enormous boulders. In both rivers, the force of the water moves massive rocks and large woody debris.
- On the Merced River, glacial action removed the slopes across which tributaries had formed, which created hanging valleys with world-renowned waterfalls. These include Yosemite Falls, which is the tallest waterfall in North America.