



Nature's Benefits from Your National Forests

The mission of the USDA Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.

The Agency's 154 national forests and 20 grasslands engage in quality land management that offers multi-use opportunities to meet the diverse needs of people. Forest ecosystems are human, plant, and animal life-support systems that provide a suite of goods and services vital to human health and

livelihood—essentially Nature's Benefits, also called Ecosystem Services. Benefits from healthy forest ecosystems include: water supply, filtration and regulation (flood control); habitat for native wildlife and plants; carbon sequestration; jobs, commerce, and value to local economies; recreational opportunities and open space for communities; increased physical and psychological wellness; cultural heritage; wood and other non-timber forest products; energy; clean air; and pollination.

Do You Know Which Nature's Benefits Come from the Sequoia National Forest/ Giant Sequoia National Monument?

Water: In drought-prone California, the quantity, quality, and timely provision of our water is dependent on the health of our national forests. The forests supply, filter, and regulate water from upper watersheds and meadows, providing clean water throughout the year to communities, homes, and wildland habitats. Water also helps support jobs and industries that are water-dependent. The Sierra Nevada ecosystem produces approximately \$2.2 billion in commodities



and services annually and water accounts for more than 60% of that total value¹.

- About 855,000 acre-feet of water per year come from the Sequoia National Forest²
 - Or over 278 billion gallons per year

That equates to:

- Over 420,000 Olympic-size swimming pools
- Enough drinking water for California's population for more than 23 years³, or
- Enough water for over 2.1 million households for a year⁴

https://www.fs.usda.gov/rds/archive/Product/RDS-2017-0046/FSE_DOCUMENTS/stelprdb5444579.pdf

SOURCES

¹ Hunsaker et al. 2013 https://www.fs.fed.us/psw/publications/documents/psw_gtr247/psw_gtr247.pdf; USDA 2013 Sequoia National Forest Assessment <https://www.fs.usda.gov/Internet/>
² Brown et al., 2016- Mean annual renewable water supply of the Contiguous United States. <https://www.fs.fed.us/rmrs/documents-and-media/really-mean-annual-renewable-water-supply-contiguous-united-states>
³ Per the National Health and Nutrition Examination Surveys, the average American consumes ~299 gallons/year of water, through both drink and food ⁴ Assuming 362 gallons/day - <http://www.irwd.com/images/pdf/save-water/CaSingleFamilyWaterUseEfficiencyStudyJune2011.pdf>



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How much is 278 billion gallons worth?

- Estimated wholesale market value: over \$80 million⁵
- Cost to Los Angeles households: over \$9.1 billion⁶

Note that the South San Joaquin Valley agricultural production value is worth over \$17 billion and is dependent on water from surface and groundwater (including 278 billion gallons from the Sequoia National Forest/Giant Sequoia National Monument), local water supplies, and the Friant-Kern Canal (91% of which all comes from National Forest lands).

Carbon: The National Forests of California play an important role in parts of the climate cycle; acting as carbon storage and sequestration units. Forests retain carbon from being emitted to, and absorb carbon dioxide (CO₂) from, the atmosphere, which helps reduce the impacts of a warming climate to human, plant and animal habitats.



- The Sequoia National Forest/Giant Sequoia National Monument stores about 83.82 Million Metric Tons (MMT) of Carbon in its forest⁷
- Sequesters on average .01 MMTC annually; this equates to enough to drive around the earth 1,870 times.

Local Economies:



The economy of California is fifth largest in the world, and California's National Forests contribute almost \$2.6 billion annually in wages and income to small businesses,⁸ a critical component of the rural economy of the state.

The Sequoia National Forest/Giant Sequoia National Monument supports:

- About \$91.2 million annually in labor income for wage earners and local businesses⁹
 - Including food and lodging services, arts, entertainment and recreation, real estate, rental and leasing, and retail trade services.
- About 1,700 jobs annually¹⁰

Cultural Heritage:



The Sequoia National Forest/Giant Sequoia National Monument has a rich history and culture that is deeply connected to the land and its natural resources. Archaeological data indicate that humans have inhabited the Southern Sierra Nevada and portions of the forest for at least 9,000 years¹¹

- Eight federally recognized Native American tribes, and approximately 21 federally non-recognized tribes claim ancestral territory within or immediately adjacent to forest lands. The South Fork Tule River is the

SOURCES

⁵Using CA water market prices, appropriated by sector - https://www.fs.fed.us/rm/value/docs/marginal_economic_value_streamflow_forests.pdf

⁶100 gallons/day + monthly water bill of ~\$100.14 - <http://www.circleofblue.org/waterpricing/>

⁷<https://bofdata.fire.ca.gov/projects-and-programs/ab-1504/>

^{8, 9, 10}Job and Income Contributions for 2014-At A Glance-Region, <https://www.fs.fed.us/emc/economics/contributions/at-a-glance.shtml>

¹¹U.S. Department of Agriculture Forest Service (USFS). 2013. Sequoia National Forest Assessment; https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5444579.pdf



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sole source for surface water for the Tule River Indian Reservation, which borders the Sequoia National Forest/Giant Sequoia National Monument¹².

Various areas are vital for spiritual and religious activities including ceremonial sites, vision quest areas, burial grounds, sweat lodges, Bear Dance sites, Ghost Dance sites, meadows, granite domes, peaks, rock art, waterfalls, potholes/pools, caves, rock shelters, and trails such as the Mono-Paiute Traditional Sierra Walk.

- The Sequoia National Forest/Giant Sequoia National Monument provides opportunities for people to connect with the history and culture of the region, such as Walker Pass, Pioneer Trail, listed as a National Historic Landmark¹³.
- Government management of the forest stretches back into the earliest history of the American environmental movement, which saw such figures as John Muir who promoted the protection of the “big trees”¹⁴.

Recreation: The Sequoia National Forest/Giant Sequoia National Monument provides a place for people to find open space, experience wildlife, recreate, relax, and otherwise remove themselves from the stressors of everyday life and urban sprawl.

Many methods exist to calculate the benefits from recreation and the value of those

benefits to visitors and local economies. The following provide some estimations of those values:

- Over 777,000 people visit the Sequoia National Forest/Giant Sequoia National Monument to recreate annually, which represents an economic value of over \$63 million to those visitors¹⁵
- Visitors to the Sequoia National Forest/Giant Sequoia National Monument spend about \$31 million during their trips¹⁶
- Visitors to the Sequoia National Forest/Giant Sequoia National Monument contribute more than \$14.6 million towards wages and income of local businesses¹⁷

The Sequoia National Forest / Giant Sequoia National Monument landscape offers the public diverse recreation opportunities to engage in outdoor activities such as hiking, picnicking, camping, fishing, motorized trail riding, boating, rafting, and kayaking and green space for activities that support human wellness and cultural traditions.¹⁸

- 158 ponds and lakes
- 2,617 miles of rivers and streams
- 1,148 miles of trails including 47 miles of the Pacific Crest National Scenic Trail (PCT)
- 314,448 acres of wilderness
- 222 miles of Wild and Scenic Rivers (which includes world-class whitewater and fishing opportunities)
- 52 developed campgrounds
- 8 developed picnic areas

SOURCES

^{12, 13, 14}U.S. Department of Agriculture Forest Service (USFS). 2013. Sequoia National Forest Assessment; https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5444579.

¹⁵NVUM, R5 Calculations based on GTR-957 – Rosenburger et al., 2017 - <https://www.fs.usda.gov/treesearch/pubs/54602>

¹⁶R5 Calculations based on GTR-961 – White, 2017- https://www.fs.fed.us/pnw/pubs/pnw_gtr961.pdf

¹⁷<https://www.fs.fed.us/emc/economics/contributions/at-a-glance.shtml>

¹⁸Enterprise Data Warehouse



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More than 28 million people live within a half day drive of the Sequoia National Forest/Giant Sequoia National Monument, and over 2 million people live within an hour's drive from the forest¹⁹

People visit their National Forests to engage in specific activities that provide value to them from their experiences as shown below:

- Over 153,000 people visit the Sequoia National Forest/Giant Sequoia National Monument annually, mainly for hiking and waking activities, which represents an economic value of over \$13 million to those visitors.²⁰
- Over 107,000 people visit the Sequoia National Forest/Giant Sequoia National Monument annually to hunt and fish as their main activity, which represents an economic value of over \$10 million to those visitors.²¹
- Over 125,000 people visit the Sequoia National Forest/Giant Sequoia National Monument annually to view wildlife and nature as their main activity, which represents an economic value over \$8 million to those visitors.²²

Habitat: The Sequoia National Forest/Giant Sequoia National Monument encompasses a broad range of habitats and elevations, ranging from blue oak woodland at 1,000 feet, to alpine fell fields and granite monoliths at over 12,000 feet providing a multitude of



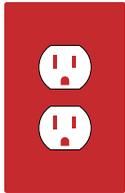
key habitats for animals and plants. Forest Habitats and Biodiversity are key to ecological function; a forest's daily function in turn allows all of Nature's Benefits, from water to recreation, to continue to be provided for humans to enjoy.

- The High Sierra Nevada, Central Valley, Sierra Nevada Foothill, Southern California Mountains, Great Basin Desert, and Mojave Desert all overlap here creating a high density of rare endemic plants and many unique plant communities²³
- 14 Threatened and Endangered Species can be found on the Sequoia National Forest/Giant Sequoia National Monument that include: Little Kern golden trout, mountain yellow-legged frog, Peninsular big-horn sheep, Springville clarkia, Bakersfield cactus, California condor, southwestern willow flycatcher, California gnatcatcher, Bear Valley sandwort.²⁴
- 650 large meadows²⁵, which comprise less than 1 percent of the total area of the Sierra Nevada and Southern Cascade Ranges in California are among the most species-rich vegetation types²⁶
- The Sequoia National Forest/Giant Sequoia National Monument has the greatest concentration of giant sequoia groves in the world. These 33 groves of giant sequoias - the largest trees in the world in terms of volume and among the oldest living up to 3,200 years - grow only on the western slope of the Sierra Nevada in California²⁷

SOURCES

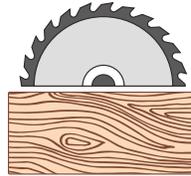
¹⁹U.S. Department of Agriculture Forest Service (USFS). 2012; <https://www.fs.fed.us/r5/sequoia/gsnm/feis/ROD.pdf>
^{20, 21, 22}R5 Calculations based on GTR-957 - Rosenburger et al., 2017 - <https://www.fs.usda.gov/treesearch/pubs/54602>
²³Miles, S.R, and C.B. Goudey. 1997; <https://www.fs.fed.us/r5/rsl/publications/rsmavpping/calveg-paper.html>
²³Miles, S.R, and C.B. Goudey. 1997; <https://www.fs.fed.us/r5/rsl/publications/rsmapping/calveg-paper.html>
²⁴Master R5 TE Species List 20191016; <https://ecos.fws.gov/ipac/>
²⁵UC Davis, Center for Watershed Sciences & USDA Forest Service, Pacific Southwest Region, 2017. Sierra Nevada Multi-Source Meadow Polygons Compilation (v 2.0), Vallejo, CA, Regional Office: USDA Forest Service. 2017. <http://meadows.ucdavis.edu/26>, ²⁷U.S. Department of Agriculture Forest Service (USFS). 2013. Sequoia National Forest Assessment; https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5444579.pdf

Energy: The Sequoia National Forest/Giant Sequoia National Monument energy infrastructure provides power generation for public benefit and includes:



- Installed hydro plant capacity of approximately 99 megawatts, which could meet the power needs of more than 74,000 households²⁸

Timber & Wood Products: Wood harvested from California's National Forests support forest health, jobs, and provide products for everyday use.



On average for Fiscal Years 2017, 2018 & 2019, the Sequoia National Forest/Giant Sequoia National Monument:

- Sold about 14,931 thousand board feet (MBF) of Timber, and²⁹
- Cut approximately 7,055 MBF of Timber, annually³⁰
- In addition, the Sequoia National Forest/Giant Sequoia National Monument:
 - Sold about 1,226 cords of firewood, worth over \$1,182
 - Sold 286 Christmas trees, worth over \$2,857

SOURCES

²⁸June 2016 R5 Inventory of FERC Licensed Hydropower projects

²⁹PTSAR Reports: <https://www.fs.fed.us/forestmanagement/products/ptsar/index.shtml> ³⁰Cut/Sold reports: <https://www.fs.fed.us/forestmanagement/products/cut-sold/index.shtml>