



## 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 Sierra National Forest?

**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.

- About 2.4 million acre-feet of water per year come from the Sierra National Forest<sup>1</sup>
- Or about 804 billion gallons per year

*That equates to:*

- Over 1.2 million Olympic-size swimming pools
- Enough drinking water for California's population for more than 68 years<sup>2</sup>, or
- Enough water for over 6 million households for a year<sup>3</sup>

*How much is 804 billion gallons worth?*

- Estimated wholesale market value: over \$232 million<sup>4</sup>
- Cost to Los Angeles households: over \$26.4 billion<sup>5</sup>

#### SOURCES

<sup>1</sup>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>

<sup>2</sup>Per the National Health and Nutrition Examination Surveys, the average American consumes ~299 gallons/year of water, through both drink and food <sup>3</sup>Assuming 362 gallons/day - <http://www.irwd.com/images/pdf/save-water/CaSingleFamilyWaterUseEfficiencyStudyJune2011.pdf>

<sup>4</sup>Using CA water market prices, appropriated by sector - [https://www.fs.fed.us/rm/value/docs/marginal\\_economic\\_value\\_streamflow\\_forests.pdf](https://www.fs.fed.us/rm/value/docs/marginal_economic_value_streamflow_forests.pdf)

<sup>5</sup>5100 gallons/day + monthly water bill of ~\$100.14 - <http://www.circleofblue.org/waterpricing/>

**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 (CO<sub>2</sub>) from, the atmosphere, which helps reduce the impacts of a warming climate to human, plant and animal habitats.



- The Sierra National Forest stores about 121.28 Million Metric Tons (MMT) of Carbon in its forest<sup>6</sup>
- Sequesters on average 0.13 MMTC annually; this equates to enough to drive around the earth 46,262 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,<sup>7</sup> a critical component of the rural economy of the state.



*The Sierra National Forest supports:*

- About \$95.3 million annually in labor income for wage earners and local businesses<sup>8</sup>
  - Including food and lodging services, arts, entertainment and recreation, real estate, rental and leasing, and retail trade services.
- About 1,770 jobs annually<sup>9</sup>

**Recreation:** The Sierra National Forest 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 610,000 people visit the Sierra National Forest to recreate annually, which represents an economic value of over \$47 million to those visitors<sup>10</sup>
- Visitors to the Sierra National Forest spend about \$33 million during their trips<sup>11</sup>
- Visitors to the Sierra National Forest contribute more than \$10.3 million towards wages and income of local businesses<sup>12</sup>

The Sierra National Forest landscape includes diverse recreation opportunities such as water recreation (fishing, swimming, and rafting) as well as camping, picnicking, and green space for activities that support human wellness and cultural traditions.<sup>13</sup>

- 2,729 lakes and ponds
- 7,891 miles of rivers and streams
- 1,565 miles of trails
- 553,683 acres of wilderness

## SOURCES

<sup>6</sup><https://bofdata.fire.ca.gov/projects-and-programs/ab-1504/>

<sup>7, 8, 9</sup>Job and Income Contributions for 2014-At A Glance-Region, <https://www.fs.fed.us/emc/economics/contributions/at-a-glance.shtml> <sup>10</sup>NVUM, R5 Calculations based on GTR-957 – Rosenburger et al., 2017 - <https://www.fs.usda.gov/treesearch/pubs/54602>

<sup>11</sup>R5 Calculations based on GTR-961 – White, 2017- [https://www.fs.fed.us/pnw/pubs/pnw\\_gtr961.pdf](https://www.fs.fed.us/pnw/pubs/pnw_gtr961.pdf)

<sup>12</sup><https://www.fs.fed.us/emc/economics/contributions/at-a-glance.shtml>

<sup>13</sup>Enterprise Data Warehouse



# Nature's Benefits

Sierra National Forest

(Continued)

- 111 miles of Wild and Scenic Rivers
- 54 developed campgrounds
- 21 developed picnic areas

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

- Over 46,000 people visit the Sierra National Forest annually to view wildlife and natural features as their main activity, which represents an economic value of over \$2.9 million to those visitors.<sup>14</sup>
- Over 66,000 people visit the Sierra National Forest annually to hike and walks as their main activity, which represents an economic value of over \$5.7 million to those visitors.<sup>15</sup>
- Over 99,000 visit the Sierra National Forest annually to engage in snow sports as their main activity, which represent an economic value over \$7.9 million to those visitors.<sup>16</sup>

**Habitat:** 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.

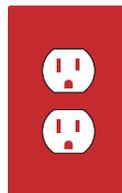


The Sierra National Forest hosts a multitude of key habitats for animals and plants.

- 12 Threatened and Endangered Species can be found on the Sierra National Forest, that include: Paiute cutthroat trout, Central Valley steelhead, mountain yellow-legged frog, Sierra Nevada yellow-legged frog, Yosemite toad, Sierra Nevada bighorn sheep, Mariposa pussypaws, California condor, fisher.<sup>17</sup>

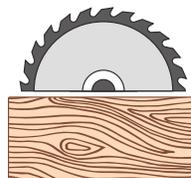
- 4,114 meadows<sup>18</sup>

**Energy:** The Sierra National Forest energy infrastructure provides power generation for public benefit and includes



- Installed hydro plant capacity of approximately 2,679 megawatts, which could meet the power needs of more than 2,000,000 households<sup>19</sup>
- Estimated annual solar electricity output is 6,818 kilowatt hours, enabling greater use of federal taxpayer funds to go towards forest restoration<sup>20</sup>

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



## SOURCES

<sup>14</sup>R5 Calculations based on GTR-957 – Rosenburger et al., 2017 - <https://www.fs.usda.gov/treesearch/pubs/54602>

<sup>15, 16</sup>R5 Calculations based on GTR-957 – Rosenburger et al., 2017 - <https://www.fs.usda.gov/treesearch/pubs/54602>

<sup>17</sup>Master R5 TE Species List 20191016; <https://ecos.fws.gov/ipac/>

<sup>18</sup>UC 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/>

<sup>19</sup>June 2016 R5 Inventory of FERC Licensed Hydropower projects

202015 Forest Service Energy & Sustainability Reporting; Southern California ESPC ENABLE Project Final Proposal; Federal Aggregated Solar Procurement Project

On average for Fiscal Years 2017, 2018 & 2019, the Sierra National Forest:

- Sold about 30,949 thousand board feet (MBF) of Timber,<sup>21</sup> and
- Cut approximately 27,745 MBF of Timber, annually<sup>22</sup>

This cut timber has an estimated value of over \$10.8 million<sup>23</sup> and:

- Produced about 16,000 MBF of lumber, and is
  - Worth about \$6.2 million

- Produced over 40,586 bone dry tons of wood for biomass energy, or
  - Enough to power over 5,798 homes for the year, and is
  - Worth over \$4.5 million
- Produced over 1,163 tons of landscaping material, and is
  - Worth over \$11,627
- In addition, the Sierra National Forest:
  - Sold about 4,545 cords of firewood , worth over \$12,081
  - Sold 872 Christmas trees, worth over \$3,487

#### SOURCES

<sup>21</sup>PTSAR Reports: <https://www.fs.fed.us/forestmanagement/products/ptsar/index.shtml>

<sup>22</sup>Cut/Sold reports: <https://www.fs.fed.us/forestmanagement/products/cut-sold/index.shtml>

<sup>23</sup>R5 analysis based on cut-sold report and Mclver et al., 2015 - [https://www.fs.fed.us/pnw/pubs/pnw\\_gtr908.pdf](https://www.fs.fed.us/pnw/pubs/pnw_gtr908.pdf)