

James San Jacinto Mountains and Oasis de los Osos Reserves

Report period: July 1, 2016 – June 30, 2017

OVERVIEW

During the 2016-17 fiscal year, there were 413 unique visits to the James Reserve for a total of 1,233 visitor days. These numbers represent a small decrease compared to the previous year and the 5-year average (Fig.1).

When we analyzed the use of the Reserve by activity type, we noted that although research use and public use were below the previous year levels and the 5-year average, class use more than doubled from the previous year and almost matched the peak of 2012-13 (Fig.2).

Figure 3 shows that in 2016-17 teaching was the predominant form of use at the reserve with 58.7% of the total time, followed by research (26.8%) and public use (14.5%). For Oasis de los Osos, there were 18 unique visits, totaling 29 user days. This represents a slight increase from the previous year (7 and 26 respectively).

RESEARCH

The number of research projects supported by the James Reserve did not show significant changes from previous year. Twenty research projects were conducted at the Reserve and they include 1) Automated-

minirhizotron and arrayed rhizosphere-soil sensors (AMARSS), 2) Analyzing patterns of acorn production by California oaks (Cornell University), 3) Mountain yellow-legged frog recovery surveys (USGS), 4) Social networks and behavioral reproductive isolation in the California/Gambel's quail (UCR/CU), 5) Spotted owl surveys (US Forest Service), 6) Environmental causes and demographic consequences of intraspecific variation of *Plantago lanceolata* (UCI), 7) Climate change on microbial communities (UCI), 8) Assessing the Flora of the San Jacintos (CSU), 9) Patterns of foliar fungal endophyte diversity (UCSB), 10) Nashville warbler surveys (MSHCP), 11) Amphibian environmental DNA (UCSB), 12) Eucharitid and Chalcidoid wasp parasitoids(UCR), 13) Patterns in genetic diversity of manzanitas (UCR), 14) Forest dynamics plot (UCR), 15) Microclimate dynamics on an elevation gradient (UCR), 16) Collaborative field art research, 17) UC conservation genomics eDNA sampling (UCLA), 18) Junco's rural population data collection and banding (UCLA), 19) Project Baseline seed banks

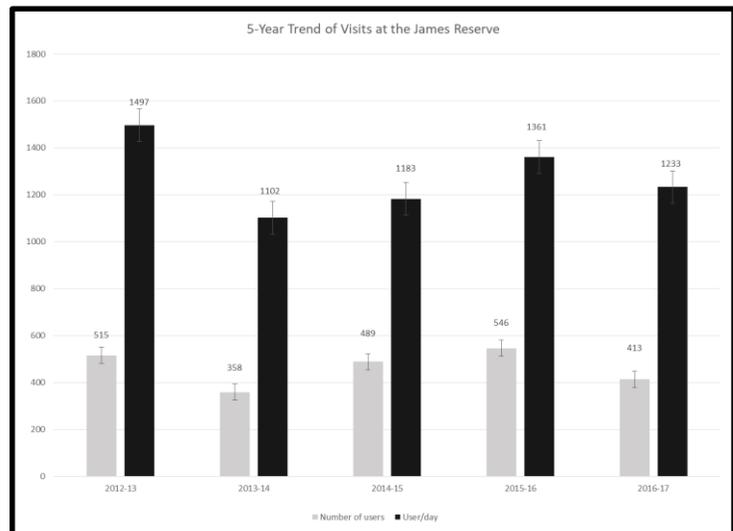


Figure 1. Five years of use at the James Reserve

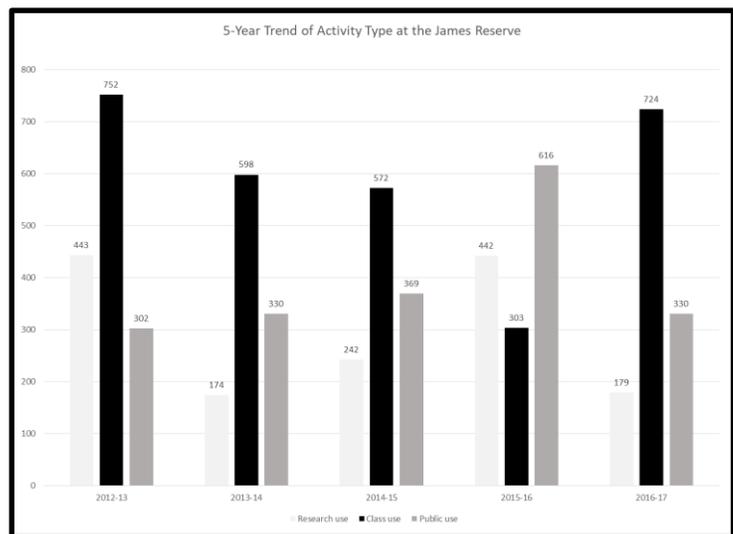


Figure 2. Five years of use by type at the James Reserve

(University of Minnesota), 20) Variation of breeding system and genetic diversity in *Triodanis* (SMSU).

The research was conducted by personnel from 19 different institutions, including 5 University of California campuses, 3 campuses from other university systems in California, 6 out of state universities, 3 government entities, and 2 consulting firms.

Of the 20 applications for research, only 10 reported some level of grant funding. The total amount of funding for these projects was \$9,485,770, with an average of \$948,577 per project. A number of projects related to the James Reserve had high levels of funding. Among them there is a project focused on understanding environmental causes and demographic consequences of intraspecific variation of *Plantago lanceolata* (\$2,100,000), a \$2,000,000 project using Automated-Minirhizotron and Arrayed Rhizosphere-Soil Sensors, a project studying California biodiversity, conservation genomics and eDNA sampling (\$1,750,000), a project about seed banks (\$1,313,480), a project investigating microclimate dynamics on an elevation gradient (\$998,000), and a project investigating microbial response to changing climate and the constraints of local adaptation (839,807).

At Oasis de los Osos, continuing projects include 1) Identification of dust-associated aeolian microbial communities in southern California (UCR), 2) Assessment of the Flora of the San Jacinto Mountains (CSU), 3) Taxonomic revision of the genus, *Washingtonia*, through morphometric analysis UCR/CSU), and 4) Seed Banks through the Project Baseline (UM)..

CLASSROOM INSTRUCTION

One of the most popular uses of the James Reserve is as an outdoor classroom for university level instruction. Amount of university teaching (58.7%, Fig.3) increased significantly compared to the previous year (22.3%). Ten different classes visited the James in 2016-17. The number of students (171) was about 1.5 times higher than the previous year (113) and the student user days (666) was almost 2.5 times higher than in 2015-16 (269). This suggests that the increase in students was also accompanied by a slightly longer stay of the groups (3.89 days vs 2.38 of the previous year). Besides the two classes from our parent institution (the UCR campus), there were three classes from other UC campuses in the LA and Santa Barbara areas, one class from California State University in Northridge, two from California community colleges in the LA area and two from Pepperdine University. Classes included biology, botany, mammalogy, ecology, entomology, and reading and composition (English).

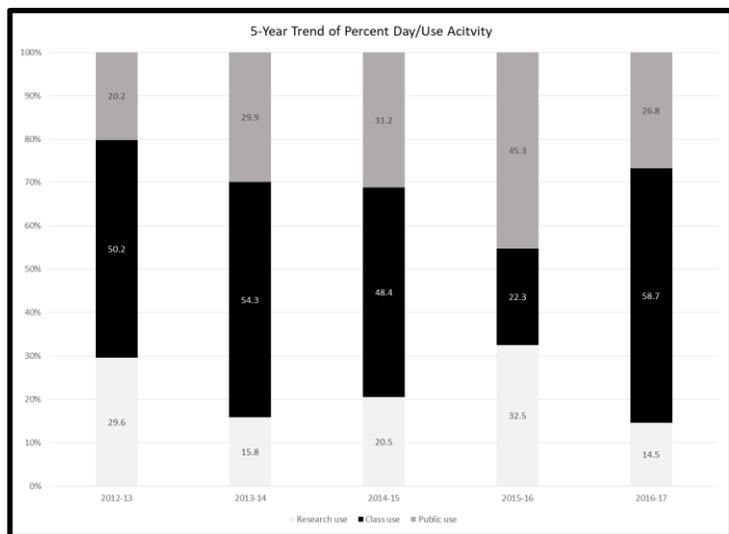


Figure 3. Five years of percent use by type at the James Reserve

No class visited Oasis de los Osos during this fiscal year.

PUBLIC OUTREACH

Public service is part of the mission of the University of California Natural Reserve System (<http://nrs.ucop.edu/mission.htm>). Our outreach efforts includes offering the facilities at the James for k-12 education and meetings of various university and public groups. Outreach efforts occur both at the Reserve and offsite. Offsite visits and activities are aimed at increasing the public's awareness of the activities at the James Reserve as well as the scientific knowledge generated by research efforts at the James.

Regarding onsite outreach efforts, the James Reserve hosted several public groups. Among them: The Art Alliance of Idyllwild, Idyllwild Nature Center, The Southern California Chapter of the Wildlife Society, and the Trailfinders organization established by the founders of the James Reserve, Harry and Grace James.

Other visits from guests of honor included: Dr. Mike Hamilton, (former director of the James Reserve), and the dean of natural sciences with her godson.

Some significant offsite outreach activities included the following:

- 1) a discussion panel called *The Value of a Tree*, held on Feb 21-23 at UC Riverside, Idyllwild, and UCR Palm Springs. The events were sponsored by: Center for Ideas & Society, UCGFI, CAFE, UCR Palm Desert, & James Reserve.
- 2) The Coachella Valley Wildflower Festival hosted by Friends of the Desert Mountains, at the Santa Rosa and San Jacinto Mountains National Monument Visitor Center in Palm Desert on March 4th where the Reserve staff held a booth handing information about the reserves, and showing a movie of the James Reserve.
- 3) The James Reserve and Bears in the San Jacintos a public talk held at the Idyllwild Fire Station for the Hilltop Horsemen local group.

PUBLICATIONS

A number of non-peer reviewed and peer-reviewed articles have been published during the 2016-17 fiscal year about the research conducted in the James Reserve. Here are some peer-reviewed examples:

Baker, N. R. Climate drivers of microbial decomposition in southern California. (University of California, Irvine, 2016).

Koenig, W. D., Knops, J. M. H., Carmen, W. J. and Pesendorfer, M. B. Testing the Terminal Investment Hypothesis in California Oaks. *The American Naturalist* 189, 564-569 (2017).

Ahn, J., Paek, J. and Ko, J. Machine Learning-Based Image Classification for Wireless Camera Sensor Networks. in 2016 IEEE 22nd International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA) 103-103 (2016). doi:10.1109/RTCSA.2016.29

Knudsen, K., Lendemer, J.C., Schultz, M., Kocourková, J. and Sheard, J.W., 2017. Lichen biodiversity and ecology in the San Bernardino and San Jacinto Mountains in southern California (USA). *Opuscula Philolichenum*, 16, pp.15-138.

Baker, N.R., and S.D. Allison. "Extracellular enzyme kinetics and thermodynamics along a climate gradient in southern California. *Soil Biology and Biochemistry* 114 (2017): 82-92.

STEWARDSHIP AND FACILITIES

In fiscal year 2016-17 there were minor improvements made to the stewardship and facilities at the James.

Regarding our maintenance of the Reserve grounds, a major improvement was represented by the purchase of 2 used four-wheel vehicles, which enabled us to better address the necessary tasks to keep the Reserve going.

The most significant improvements to the facilities included:

- 1- The installation of 2 new wall heaters in the Trailfinders Lodge (TFL). The units replaced were in bad conditions and small propane leaks were observed.
- 2- The reorganization of the space in the Trailfinders Lodge and Classroom.
- 3- The installation of a new, more efficient water heater after the old one finally failed.

SUMMARY

During this fiscal year, we have increased our capacity for research, teaching, and public outreach activities which is reflected in the patterns of use in the last year, most notably research. We are delighted that field biology courses appear to be gaining in popularity. In addition to increased support for traditional uses, Reserve personnel have continued to branch out programs to reach out to the public and communicate science for a general audience. These efforts will continue and expand in this coming fiscal year, namely with a local citizen science project that is focused on monitoring of the San Bernardino Flying Squirrel (*Glaucomys sabrinus californicus*) in Idyllwild, where the last voucher specimen from the San Jacinto Mountains was collected nearly a century ago.