

UC SANTA BARBARA

**VALENTINE EASTERN SIERRA RESERVES
STRATEGIC PLAN | 2019-2029 | APPENDICES 1-6**



**RESEARCH
EDUCATION
PUBLIC SERVICE**

Table of Contents

TABLE OF CONTENTS..... 2

APPENDIX 1. ORGANIZATIONAL STRUCTURE 3

 UC NRS ADMINISTRATION..... 3

 UCSB NRS ADVISORY COMMITTEE..... 3

 RESERVE MANAGEMENT..... 3

 VESR ADMINISTRATION 3

APPENDIX 2. FACILITIES AND RESOURCES..... 5

 UNIQUE ASPECTS 7

APPENDIX 3. RESERVE USE..... 8

 RESERVE USE – UCSB NATURAL RESERVE SYSTEM 8

 RESERVE USE - SNARL 9

 RESERVE USE – VALENTINE CAMP 9

APPENDIX 4. VESR PARTNERSHIPS..... 11

APPENDIX 5. STRATEGIC PLANNING WORKSHOPS 13

 PLANNING PROCESS 13

 STRUCTURE..... 15

 OUTREACH AND PUBLIC SERVICE WORKSHOP | MAY 31, 2018 16

 STEERING COMMITTEE MEETING | JUNE 1, 2018..... 16

 KEY QUESTIONS..... 17

 WORKSHOP STAFF AND STEERING COMMITTEE 18

 WORKSHOP PARTICIPANTS..... 19

 IDEAS AND INPUT 20

APPENDIX 6. THE VALENTINE RESERVE FUND 24

Appendix 1. Organizational Structure

UC NRS Administration

The UC Natural Reserve System operates under the general leadership of the UC NRS Director, Dr. Peggy Fiedler. The UC NRS Systemwide office is located at the UC Office of the President in Oakland. The UCSB NRS is led by the UCSB NRS Director, Dr. Patricia Holden. The Executive Director, Dr. Marion Wittmann, is responsible for the day-to-day operation and management of the 7 Reserves. The UCSB NRS is managed under the supervision of the UCSB Office of Research.

The UCSB NRS Campus Office is responsible for the management of the financial resources of the UCSB NRS and assists Reserves with administrative functions. The Office acts as the link between the remote reserves and UCSB campus departments. In addition to the UCSB NRS Director, the Office staff includes the Executive Director, Business Officer, and Financial Analyst. The UCSB Office of Development's Directorship of Ecological and Environmental Sciences includes the NRS in its portfolio. The UCSB NRS administrative office is operated under the Earth Research Institute at UCSB.

UCSB NRS Advisory Committee

The UCSB Natural Reserve System is guided by an Advisory Committee comprised of UCSB faculty, undergraduate and graduate student representatives, and external advisors from non-UCSB organizations. The UCSB NRS Advisory Committee meets three times during the academic year. Prior to each meeting, quarterly summary reports from UCSB's seven Reserves are circulated to the committee, and these provide background on progress and activities at each Reserve, as well as a foundation for committee discussions.

Reserve Management

Each reserve is managed by a Reserve Director associated support staff (although the VESR Director manages both SNARL and Valentine Camp). The Reserve Directors live onsite (with the exception of the Carpinteria Salt Marsh, which has no overnight accommodations or residential facilities) and manage the day to day operations, with the goal to facilitate the Research, University-Level teaching and public service goals of the UC NRS. The tasks of the Reserve Directors are wide ranging, and include, but are not limited to: grant writing, fundraising, land management, budget management, employee supervision, database management, land stewardship, outreach and education, facilities maintenance, managing research use of the facilities, and stakeholder engagement. The Reserve Directors are supported centrally by the UCSB Administrative office. Organizational details are shown in Figure 1.

VESR Administration

The Valentine Eastern Sierra Reserves is currently staffed by 6 people. The Reserve Director, Dr. Carol Blanchette, is responsible for leadership and day-to-day operations at VESR which includes all aspects of the administration, organization, planning, programming, managing, operating, maintaining and developing the Reserve as part of the UCSB Natural Reserve System. Dr. Blanchette oversees five, part-time staff, including an Assistant Reserve Director (80%-time appointment), a Reserve Steward (40%-time appointment), an Education and Outreach Coordinator (35%-time appointment), a Laboratory Manager (20%-time appointment), and an Administration and Education Coordinator (50%-time appointment).

UCSB Natural Reserve System Organizational Chart 2018-2019

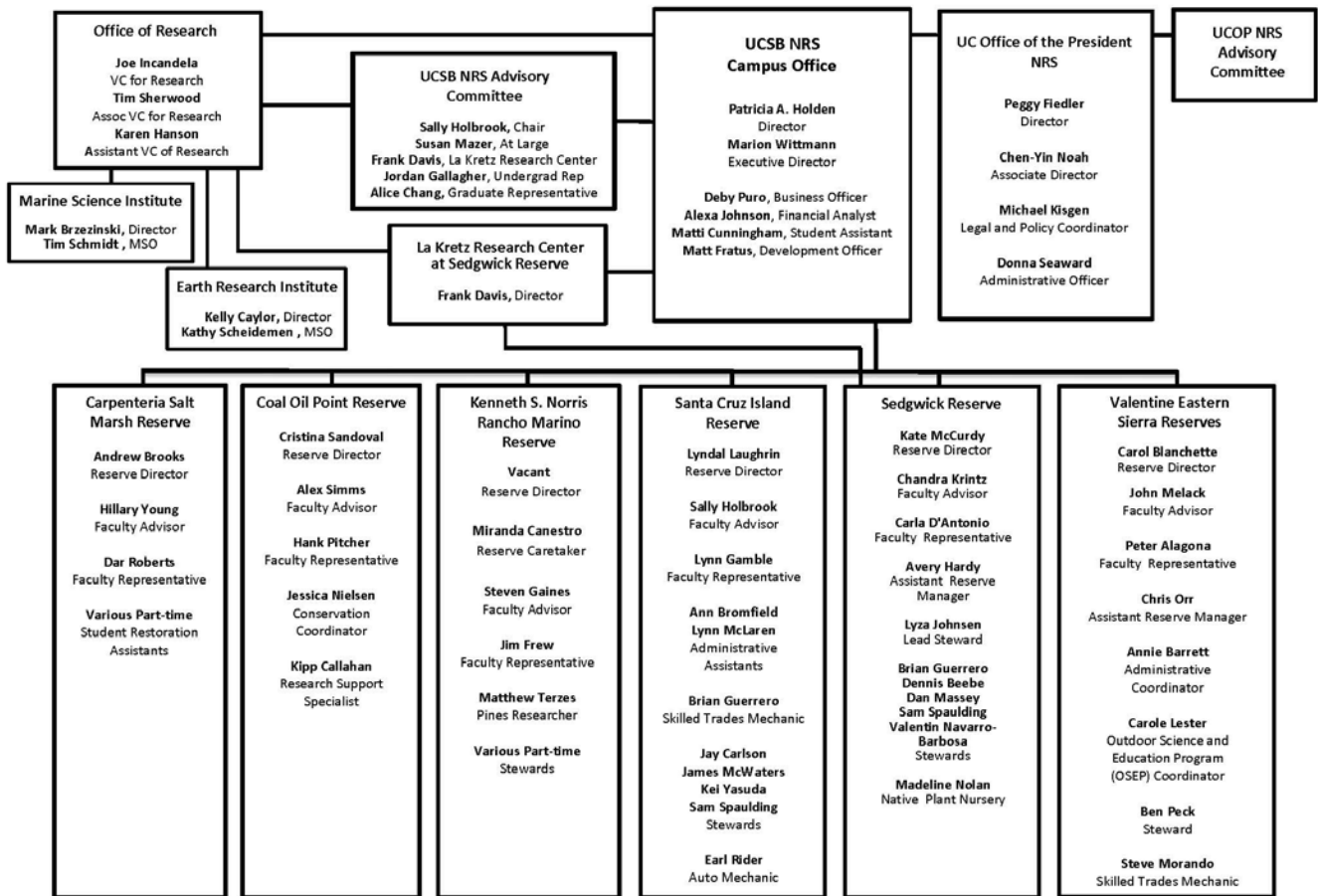


Figure 1. Organizational Chart for the UCSB Natural Reserve System

Appendix 2. Facilities and Resources

VESR has extensive facilities for research and teaching at both Valentine Camp and SNARL. Valentine Camp has housing for 20 in three renovated log cabins constructed in the 1920's, a small wet lab, and a classroom building that can hold classes of up to 30 students. SNARL is home to a more extensive array of field and laboratory facilities. One of the most unique features of SNARL is the experimental stream channel system. The original channels were established by US Fish and Wildlife researchers in the 1940's and divided Convict creek into four sections up to 400 meters in length, with individual water-control structures and moveable fish barriers. An array of new experimental stream channels was built in the 1990's, and consisted of nine identical stream sections, with identical patterns of riffles, pools, and meanders (Figure 2). Each channel is one meter wide and 50 meters long, with natural sediments and cobbles laid over a rigid concrete base. The new channels provide researchers with statistically meaningful replicates for controlled comparative studies. In addition to the experimental channels and divided stream sections, researchers have access to stretches of Convict Creek above and below the reserve, and to small channels flowing through the aquatic laboratory.

An additional SNARL field facility, the Cold Regions Research and Engineering Laboratory – UCSB (CUES) Snow Study Site, is located on the flanks of Mammoth Mountain at an elevation of 9,600 feet. This laboratory is managed and permitted through SNARL with cooperation from the US Forest Service and the Mammoth Mountain Ski Area. The lab is buried partially underground with a tower and platform reaching up 25 feet. Stretching from the platform, a cable suspends a cart full of instruments above the undisturbed snowpack. Inside the lab, lysimeters collect snow meltwater at ground level, and data loggers record meteorological, electromagnetic, and physical (i.e. snow depth) parameters.



Figure 2. The experimental stream channels at SNARL

In 1995 a two-story building was moved to SNARL and fully refurbished to serve as the reserve's database center. It provides several offices, a collection room, a conference room, and serves as the center of operations for SNARL's growing data management and research coordination efforts. Offices and laboratories have dedicated Internet services, computers and peripherals available for researchers' use.

SNARL also is home to a recently updated and modernized laboratory which houses six wet labs, a chemistry lab, radioisotope lab, additional offices, and a library. The laboratory also has a state of the art molecular diagnostics facility including a new quantitative PCR laboratory, tissue homogenizer, micro centrifuge and -80° Celsius freezer. Additional research facilities include: lab equipment such as an analytical balance and high purity water system walk-in cold room, spectrophotometer, meteorological station, woodshop, assorted boats and motors, snowmobiles, backpack electrofisher, incubator, plant dryer, and other field equipment.

Eight storage units make it possible for researchers to store their equipment for long-term research use. An animal care facility, built to USDA standards, is available for holding and caring for wild terrestrial vertebrates. An additional facility for holding aquatic organisms provides tanks and water tables with flow-through stream water. SNARL's commitment to teaching and outreach is reflected in its accommodations for visiting classes and community events. Large visiting groups can stay in the dormitory, which has bunk beds for 25 people, bathrooms, showers, a large kitchen and meeting room. Researchers accommodations also include several small houses at SNARL, each with a kitchen, bathroom, and one or two bedrooms. A new state-of-the-art classroom and meeting space (The Page Center) is the newest addition to SNARL (Figure 3). The Page Center can accommodate 200 people and is equipped with modular meeting and classroom furniture, high tech audio and video capabilities, as well as high-speed wireless internet.



Figure 3. The Page Center at SNARL

Unique Aspects

Both Valentine Camp and SNARL enjoy unique aspects that provide valuable research opportunities. Valentine Camp is a small, pristine site that preserves a remnant of the diverse natural vegetation found in the immediate vicinity of the town of Mammoth Lakes, Mono County, California. For the past 25 years, this area has undergone rapid change as a result of the expansion of ski facilities on and near Mammoth Mountain and of commercial and residential development of the town. As a



result, virtually all native vegetation within town limits and in adjacent areas has been removed, or has lost much of its native biological diversity as a result of development-related disturbances and the spread of introduced species. These losses highlight the fact that, as a preserve for native biological diversity, Valentine Camp is even more important today than when the Valentine Eastern Sierra Reserve was established in 1973.

SNARL is located at the foot of the eastern escarpment of the Sierra Nevada and serves as a unique base from which to access a broad range of habitats for research and teaching. This includes the nearby Convict Creek, which traverses SNARL from west to east and drains a watershed containing alpine lakes and peaks rising to over 3,900 m. Three national parks (Sequoia, Kings Canyon, and Yosemite) protect large portions of the adjacent Sierra Nevada, and immediately surrounding SNARL are additional extensive public lands managed by the US Forest Service (USFS) and Bureau of Land Management (BLM). Ecosystems



managed by the National Park Service (NPS), USFS, and BLM are the focus of many ongoing research efforts at SNARL. To the east lie the mountains and valleys of the Great Basin. In addition, SNARL is located on the flank of the Long Valley Caldera, and much younger volcanic formations lie a short distance to the north. Fifty kilometers north of SNARL lies Mono Lake, a large saline water body that has been the subject of intensive study by SNARL-based researchers for the last thirty years.

Appendix 3. Reserve Use

Reserve Use – UCSB Natural Reserve System

The UCSB Natural Reserve System's seven sites offer a unique assemblage of protected wildland sites throughout Central and Eastern California. UCSB's Reserves encompass many of the State's major ecosystems preserved in as undisturbed a condition as possible to support University-level research and teaching programs. The ecosystems and facilities offered by each Reserve are available to faculty, researchers and students from all University of California campuses, and to users from other institutions, public or private, throughout the world. The UCSB NRS is among the most utilized of the 39-site system across the University of California. Annually at UCSB's 7 Reserves, there are approximately 31,000 user days at all 7 of the UCSB NRS sites with the highest use category being Research (30%).

- **Number of Users:** Each year, thousands of users from around the world conduct field research in the protected landscapes of UCSB's Reserves. Over the period FY2011-2012 through FY 2015-16, the 7 sites of the UCSB NRS averaged 12,738 users per year, which comprises 22% of the overall UC NRS use (59,228 users per year).
- **Number of User days:** User days, defined as the sum of the number of days spent on Reserves across all users, is another metric of Reserve use that is reported by UC NRS to UCOP. The UCSB NRS averages 33,178 user days per year, which comprises 24% of the overall UC NRS system use (137,650 user days per year).
- **Faculty Use:** In FY 2015-2016, faculty research use at UCSB Reserves totaled 121 unique individuals, or 17.3 faculty members per Reserve which is greater than the UC NRS overall average at 9.3 faculty members per Reserve. Faculty members utilizing UCSB Reserves have originated from multiple institutions, including UCSB (n=25), non-UCSB UC campuses (n=33), California State University (n=11), Community Colleges (n=3), other California university level institutions (n=10), U.S. University Level institutions outside of California (n=32), International (n=2), and other = 4.
- **Research Projects:** The UCSB NRS Reserves host a wide variety of research projects carried out by individuals originating from a variety of global regions, i.e. ranging from UCSB to international institutions. In FY2015-2016 there were a total of 205 research projects carried out at UCSB NRS Reserves, which represents an increase of 7% from the previous year. In FY2015-2016, 72% of research at UCSB NRS sites was externally funded. Of the researchers utilizing UCSB NRS sites, 31% were from UCSB, 65% were from the UC system, and 35% were from other universities and agencies.
- **Publications:** Each year, a number of publications are based on use or access amenities and natural resources associated with UCSB Reserves. In 2015-2016, there were a total of 103 publications. The represented disciplines included: biology, ecology, physiology, evolution, hydrology, anthropology, archeology, atmospheric science, toxicology, geology, geography, geophysics, endocrinology, microbiology, history, earth science and others.

Reserve Use - SNARL

SNARL is open to all groups and individuals that wish to pursue research, university level education or public outreach and education purposes that are relevant to the Reserve's mission and environment. Despite a highly seasonal climate that reduces use during winter months, use of SNARL is significant and has averaged more than 8,100 person-days per year. Housing and laboratory space are nearly fully occupied from approximately April to October of each year. Research accounts for approximately half (41%) of VESR use with 3,295 user days per year, university level education sees 2,576 user days per year, or 32%, and public service comprises the remaining use with 2,232 user days (27%) (Figure 4).

Use by University of California (UC) researchers predominates, but non-UC researchers also represent an important user group. Non-UC users include those from other California universities and colleges, out-of-state and foreign universities and colleges, state and federal government agencies, and non-governmental organizations. The majority of research use of SNARL is by biologists, although use by researchers from other disciplines, including geology and hydrology, is also significant. Over the last five years there have been an average of 40 extramurally supported research projects per year and this use has been approximately evenly distributed across faculty, research scientists, and graduate students.

There are a number of venues by which the Reserves share outcomes of science and university level teaching activities with the public. At SNARL, this is most notably through the Spring Lecture Series held at SNARL. This series is widely advertised in local communities, free to the public, and very popular, with an average attendance of approximately 75 people per lecture. Videos of these lectures are available online through the SNARL Vimeo channel. A recently built classroom and meeting space, "the Page Center" has served to increase the room capacity to 120 seats per lecture and dramatically improved audio and video capabilities. Other venues that VESR research results are shared include social media, on-campus news reporting at UC Santa Barbara and to K-12 students through the Outdoor Science Education Program.

Reserve Use – Valentine Camp

Because Valentine Camp was protected from entry and grazing for most of the 1900s as a private camp, its subalpine habitat is remarkably pristine. It features montane forest, montane chaparral, Great Basin sagebrush, high montane riparian vegetation, and wet montane meadow. Mammoth Creek flows through the Reserve, and several large springs and small seeps add to the diversity of habitats.

Valentine Camp serves a vital "base camp" for researchers who are conducting studies throughout the region - offering seasonal accessibility and comfortable, personal overnight accommodations. Important research topics include the impacts of climate change on species ranges and ecosystem dynamics, forest ecology and management, watershed monitoring, and avian ecology. A grant program for graduate students supports career-long work at both Valentine Camp and SNARL to facilitate the training and development opportunities.

Valentine Camp also serves as an "outdoor classroom" to approximately 2,000 elementary and junior high school children each year who participate in the Outdoor Science Education program and other environmental education programs. The Outdoor Science Education Program (which takes place at both SNARL and Valentine Camp) provides hands-on, age and curriculum-appropriate science lessons for under-served students from Inyo and Mono County schools as well as some remote Nevada schools. In addition, during the summer months, one and two-week science day camps for students are offered on a fee basis. Adults and families also have the opportunity to observe and learn about local environment at Valentine Camp through interpretive hikes and an annual lecture series.

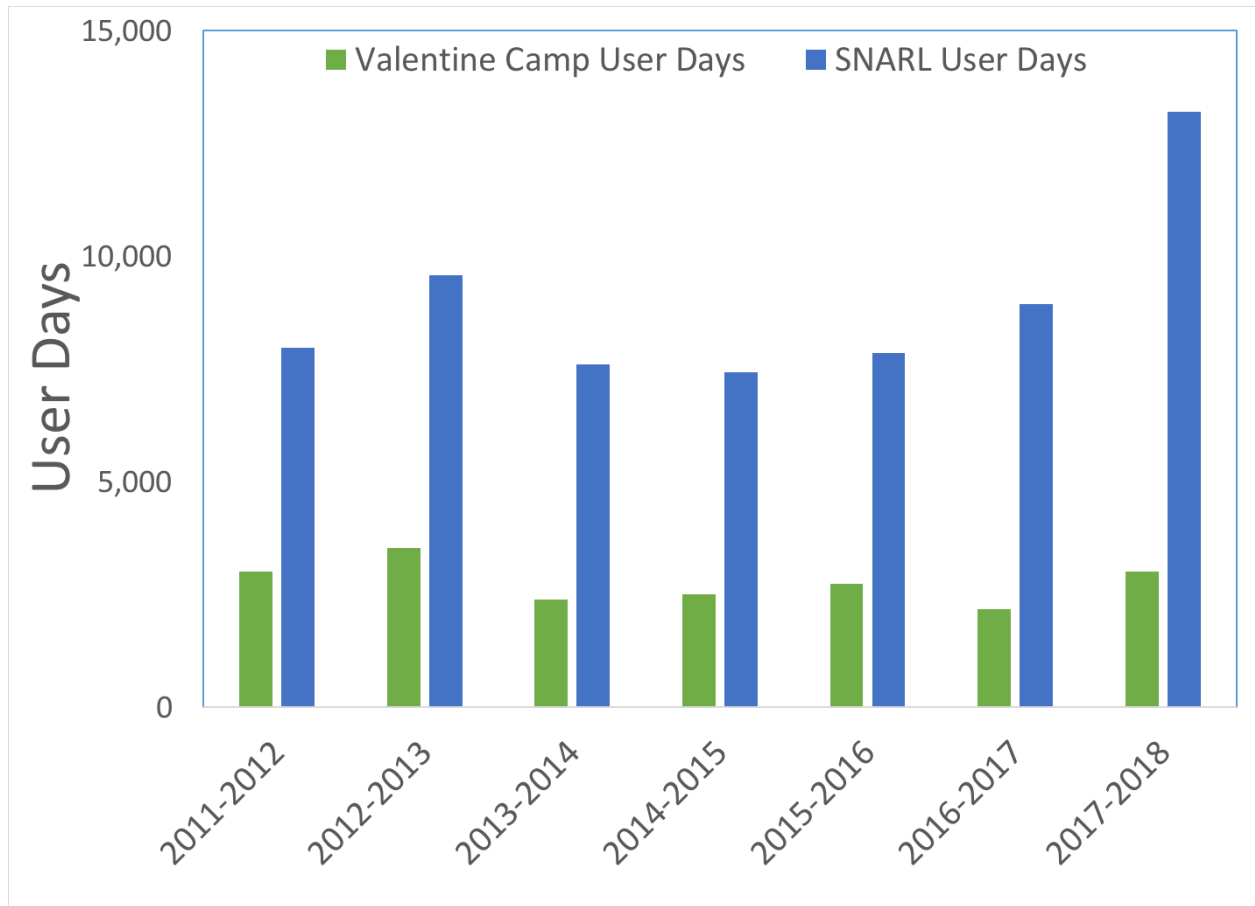


Figure 4. Number of User Days (number of days each user spends at the Reserve) for SNARL and Valentine Camp, 2011 - 2018

Appendix 4. VESR Partnerships

Current and Potential Partners for VESR activities in Research, Education and Outreach

- Audubon Society
- Alterra Mountain Company
- Bishop Paiute Tribe
- Bodie Hills Conservancy
- Bureau of Land Management (Bishop)
- California Department of Fish and Wildlife - North Central Region
- California Naturalist Program
- California Phenology Project
- California State Water Resources Control Board
- Cerro Coso Community College
- CIRMOUNT- The Consortium for Integrated Climate Research in Western Mountains
- Desert Fishes Council
- DRI - Desert Research Institute
- Eastern Sierra Interpretive Association
- Eastern Sierra Nevada Land Trust
- Ecological Society of America - Strategies for Ecology Education, Diversity and Sustainability
- Friends of Mono Lake
- Friends of the Inyo
- GLEON – The Global Lake Ecological Observatory Network
- GNOMO- The Global Network of Mountain Observatories
- Lone Pine Paiute-Shoshone Reservation
- Los Angeles Department of Water and Power
- Long Term Ecological Research Network Communications Office
- Mammoth Lakes Recreation
- Mammoth Lakes Tourism
- Mammoth Mountain Resorts
- Mammoth Unified School District
- NASA Jet Propulsion Lab
- National Phenology Network
- NEON - National Ecological Observation Network
- NCEAS – National Center for Ecological Analysis and Synthesis
- NPS Inventory & Monitoring: Sierra Nevada Network (SIEN)
- SACNAS - Society for Advancement of Chicanos/Hispanics and Native Americans in Science
- Sequoia and Kings Canyon National Park
- Town of Mammoth Lakes

- U.S. Forest Service
- UC Davis TERC – Tahoe Environmental Research Center
- UC Merced Yosemite Field Station
- UC Office of Education Partnerships
- UCLA White Mountain Research Station
- UCSB Bren School of Environmental Science and Management
- UCSB Earth Research Institute
- UCSB Ecology, Evolution, and Marine Biology
- UCSB Marine Science Institute
- UCSB The Green Initiative Fund
- U.S. Forest Service
- Valentine Reserve Fund
- Yosemite Conservancy
- Yosemite National Park

Appendix 5. Strategic Planning Workshops

PLANNING PROCESS

We hosted two full-day facilitated strategic planning workshops on May 30 and 31, 2018. We invited key stakeholders to these workshops representing the research, education and public service as well as members of our local community. The workshop participants are listed in Tables 1 & 2. The workshops were designed to solicit input from stakeholders on several key topics and questions. Dr. Bill Michener, UNM faculty member and DataONE Principal Investigator, facilitated both workshops, and assisted us with the strategic planning process. The May 30 workshop focused on research and higher education, and participants shared ideas on defining a research agenda for the reserves. The May 31 workshop focused on outreach and public service, and participants shared ways to cultivate effective outreach and provide public service to the community. During both workshops, stakeholders discussed options to promote education at VESR and ways the reserves are best suited to train the next generation of scientists.

Steering Committee

On the day following the workshops, June 1, 2018, we hosted the first meeting of our VESR Strategic Planning Steering Committee. The members of the Steering Committee bring a diversity of expertise and skills to this planning project. As a collective group, their expertise covers Sierra Nevada ecosystems, ecology, policy and human impacts, education, snow hydrology, informatics, business planning and community relations.

1. Dr. Carol Blanchette, PI – is the Director of the Valentine Eastern Sierra Reserve. Her background is in aquatic and community ecology and she has expertise in leading large interdisciplinary projects, ecological informatics and science education.
2. Dr. Marion Wittmann, co-PI – is the Executive Director of the UCSB Natural Reserve System. Her background is in aquatic ecology and she has expertise in natural resource management, expert elicitation, and linking science to policy.
3. Dr. John Melack – is the UCSB Faculty Advisor to VESR and a professor in the UCSB Department of Ecology, Evolution and Marine Biology. His research expertise is in the areas of ecology, limnology and remote sensing.
4. Dr. Roland Knapp – is a research scientist at UCSB, and based at SNARL. His research interests include aquatic ecology, conservation and wildlife disease and he has been working in the alpine lakes and labs at SNARL for over 20 years.
5. Dr. David Herbst - is a research scientist at UCSB, and based at SNARL. His research interests include stream ecology, conservation and invertebrate ecology and he has been working in the stream systems and labs at SNARL for over 20 years.
6. Dr. Peter Alagona – is the UCSB Faculty Representative to VESR and a professor in the UCSB History and Environmental Studies Program. His research interests include historical ecology and Peter has been an active participant at SNARL for many years.
7. Dr. Hillary Young – is a faculty member in Ecology, Evolution and Marine Biology at UCSB. Her research interests include community and aquatic ecology and she and her graduate students have been working at VESR for the last two years.

8. Dr. Jeff Dozier – is a UCSB faculty member in the Bren School of Environmental Science and Management. His research expertise is in remote sensing and snow science. He has been affiliated with SNARL for many years and oversees the CUES Study Site on Mammoth Mountain.
9. Dr. Eric Berlow – is a research ecologist, TED Fellow and the founder of Vibrant Data Labs. His research interests include network science, climate change and data visualization. He is also the former director of the UC NRS Yosemite Field Station in Wawona, CA.
10. Dr. Thomas Painter – is a Research Scientist at the NASA Jet Propulsion Laboratory, and an Adjunct Professor of Geography at UCLA. Dr. Painter recently relocated to Mammoth Lakes and his Airborne Snow Observatory program is based at SNARL. His research interests include remote sensing, snow hydrology and water resources.
11. Mr. Rusty Gregory – is the CEO of Mammoth Mountain Resorts, and has an extensive background in business planning. Mr. Gregory serves as the Chairman of the Valentine Reserve Fund.
12. Mr. and Mrs. Paul and Kate Page – The Pages chair the executive committee of the Valentine Reserve Fund, and are active in the Mammoth community, and have been involved at VESR as volunteers and supporters for over 15 years.

STRUCTURE

Research and Education Workshop | May 30, 2018

- **Introduction with Marion, Carol and Bill:** Carol Blanchette welcomed the workshop participants and introduced SNARL and Valentine Camp’s history, uses, and ecological features. Following Carol’s presentation, Marion Wittmann shared the rationale behind the strategic planning process and the connection between VESR and the University of California Natural Reserve System. Marion introduced Dr. Bill Michener, the strategic planning facilitator, who led both workshops.
- **Exercise 1, Brainstorming and nominal group exercise:** Identification and discussion on science and research challenges and opportunities that VESR is uniquely positioned to support.
- **Exercise 2, Brainstorming and breakout logic model exercise:** Small-group logic model development for research/science topics or opportunities discussed in the previous activity. Logic models are tools designed to help plan and assess potential programs within an organization. They have five components; Resources, Activities, Outputs, Outcomes, and Impact (See Figure 5). Logic models can directly inform strategic plans and research proposals.

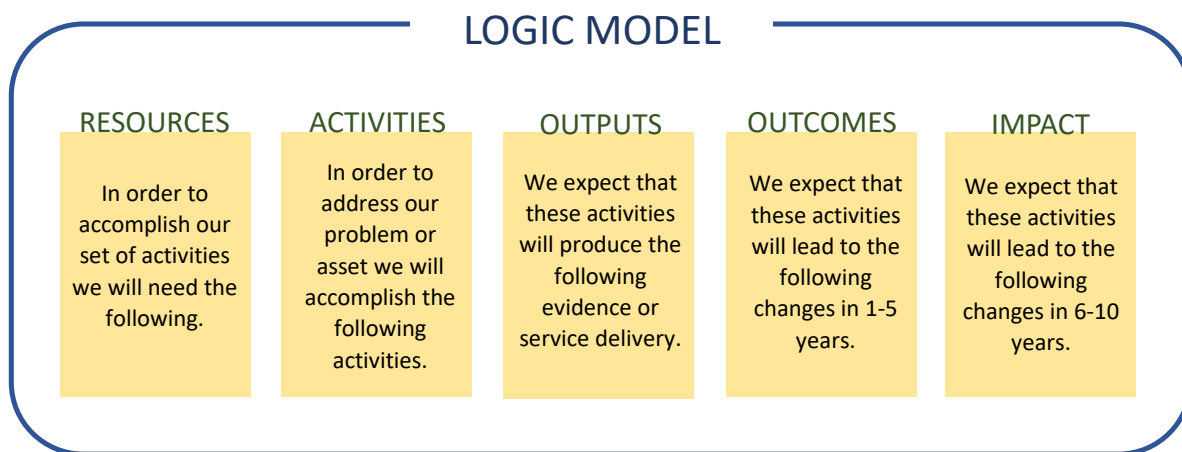


Figure 5. Logic model structure.

- **Exercise 3, Brainstorming exercise:** Identification of key areas or disciplines in which VESR can make substantial contributions to higher education and training.
- **Exercise 4, Nominal group exercise:** Group discussion on ideas for new courses that would be most impactful.
- **Exercise 5:** Separate, concurrent activities by self-identified participants:
 - **Idea writing exercise:** Identification of programs or activities that could be employed to make VESR class resources available to a broader array of educational institutions.
 - **Idea writing exercise:** Identification of programs or activities that could be employed by VESR to increase diversity in the earth and environmental sciences.
- **Exercise 6, Idea writing exercise:** Responses to the prompt, “If you had a million dollars how would you spend it?”

Outreach and Public Service Workshop | May 31, 2018

- **Introduction with Marion, Carol and Bill:** Carol Blanchette welcomed the workshop participants and introduced SNARL and Valentine Camp's history, uses, and ecological features. Following Carol's presentation, Marion Wittmann shared the rationale behind the strategic planning process and the connection between VESR and the University of California Natural Reserve System. Marion introduced Dr. Bill Michener, the strategic planning facilitator, who led both workshops.
- **Exercise 1, Brainstorming and nominal group exercise:** Identification of one approach to community outreach that works well and why (e.g., to K-12, public, decision-makers).
- **Exercise 2, Criteria and prioritization exercise:** Design and rank new outreach/education programs/activities for sharing VESR research activities and discoveries with local and regional communities.
- **Exercise 3, Brainstorming and breakout logic model exercise:** Brief review of a subset of the logic models by participants. Small-group logic model development for outreach/education programs/activities discussed in the previous activity (see Figure 6 for Logic Model template).
- **Exercise 4, Brainstorming exercise:** Identification of potential partners and funders to support the new high priority outreach/education programs/activities.
- **Exercise 5:** Separate activities by self-identified participants:
 - **Idea writing exercise:** Identification of programs or activities that could be employed to make VESR class/outreach resources available to a broader array of stakeholders;
 - **Idea writing exercise:** Identification of programs or activities that could be employed by VESR to increase diversity in the earth and environmental sciences.
- **Exercise 6, Brainstorming exercise:** Identification of key areas or disciplines in which VESR can make substantial contributions to higher education and training.
- **Exercise 7, Nominal group exercise:** Prioritization of new courses that would be most impactful.
- **Exercise 8, Idea writing exercise:** Responses to the prompt, "If you had a million dollars how would you spend it?"

Steering Committee Meeting | June 1, 2018

Bill Michener led several discussions at the Steering Committee meeting to get input on the workshop results, key questions, and strategic planning process. The discussions were as follows:

- How strategic plans translate into implementation
- Review and prioritize proposed new research programs
- Review and prioritize proposed new education and outreach activities
- Identify members of implementation team and follow-up actions
- Input on draft vision, mission and goals statements for VESR
- Feedback from the committee and identification of future directions

KEY QUESTIONS

The workshops were designed to gain input from stakeholders on key questions, that, if answered, would help VESR align with the UC NRS mission to support education, research, and public service.

1. DEFINING AND PRIORITIZING A RESEARCH AGENDA FOR THE NEXT DECADE

- What are the key research areas and questions that VESR is uniquely positioned to support?
- How can we support future research in these areas?
- What are the key infrastructure or data needs to support research in these areas?
- What have been important research areas at VESR over time, and what datasets and legacy resources exist that can provide baseline information for new research?

2. PROMOTING EDUCATION AND TRAINING FOR THE NEXT GENERATION OF SCIENTISTS

- What are the key areas or disciplines in which VESR can contribute to education and student training?
- How might VESR resources be more readily available to a broader array of educational institutions?
- Is there a need or are there opportunities to develop new courses or student training activities at VESR?
- How can VESR be used to increase diversity in the earth and environmental sciences?

3. PROVIDING EFFECTIVE OUTREACH AND PUBLIC SERVICE TO THE COMMUNITY

- What are the most important and effective forms of outreach to the community?
- How can we better share the scientific research activities at VESR with local and regional communities?
- How can we better serve as a regional resource on environmental and scientific issues?

WORKSHOP STAFF AND STEERING COMMITTEE

Table 1: Workshop facilitator, workshop organizers, and steering committee members during the VESR Strategic Planning process. Workshop facilitator and organizers assisted in operating the two one-day workshops and the steering committee meeting.

Name	Affiliation	Role
Bill Michener	University of New Mexico	Workshop Facilitator
Carol Blanchette	UCSB VESR	Workshop Organizer
Colleen McCamy	UCSB	Workshop Organizer
Marion Wittmann	UCSB NRS	Workshop Organizer
Tia Kordell	UCSB Bren School	Workshop Organizer
David Herbst	UCSC SNARL	Steering Committee
Eric Berlow	Vibrant Data	Steering Committee
Hillary Young	UCSB EEMB	Steering Committee
Jeff Dozier	UCSB Bren School	Steering Committee
John Melack	UCSB EEMB and Bren School	Steering Committee
Kate Page	Valentine Reserve Fund	Steering Committee
Paul Page	Valentine Reserve Fund	Steering Committee
Peter Alagona	UCSB History and Environmental Studies	Steering Committee
Roland Knapp	UCSB SNARL	Steering Committee
Rusty Gregory	Alterra Mountain Company	Steering Committee
Tom Painter	NASA JPL	Steering Committee

WORKSHOP PARTICIPANTS

Table 2: Workshop participants who attended the Research and Education Workshop on May 30, 2018 and/or the Public Service and Outreach Workshop on May 31, 2018 to provide input for the VESR Strategic Plan.

Name	Affiliation	Role
Anne Kelly	Yosemite Field Station	Workshop Participant
April Sall	Bodie Hills Conservancy	Workshop Participant
Celia Symons	UC Santa Cruz	Workshop Participant
Chris Jerde	UCSB MSI	Workshop Participant
Connie Millar	US Forest Service	Workshop Participant
Dan Berisford	NASA JPL	Workshop Participant
Danny Boiano	Sequoia Kings Canyon National Park	Workshop Participant
David Lyons	UC Riverside	Workshop Participant
Don Caskey	Valentine Reserve Fund	Workshop Participant
Gail Patricelli	UC Davis	Workshop Participant
Heather Segale	UC Davis TERC	Workshop Participant
Jeff Gabriel	Eastern Sierra Interpretive Association	Workshop Participant
Jeff Holmquist	UCLA White Mountain Research Station	Workshop Participant
Jenna Rolle	Santa Barbara Museum of Natural History	Workshop Participant
Lois Klein	Mammoth Unified School District	Workshop Participant
Lynda Salcido	Town of Mammoth Lakes	Workshop Participant
Lyndal Laughrin	UCSB SCIR	Workshop Participant
Lynn McLaren	UCSB SCIR	Workshop Participant
Malcolm North	UC Davis	Workshop Participant
Matt McClain	Mammoth Lakes Recreation	Workshop Participant
McKenzie Skiles	University of Utah	Workshop Participant
Mike Colee	UCSB ERI	Workshop Participant
Ned Bair	UCSB ERI	Workshop Participant
Pam Bartley	Valentine Reserve Fund	Workshop Participant
Rebecca Lyons	University of Redlands	Workshop Participant
Sandi Roll	Mammoth Unified School District	Workshop Participant
Sarah Oktay	UC Davis	Workshop Participant
Stacy Corless	Mono County	Workshop Participant
Susie Caskey	Valentine Reserve Fund	Workshop Participant
Tim Bartley	Valentine Reserve Fund	Workshop Participant
Tom Schroeder	Valentine Reserve Fund	Workshop Participant
Tom Smith	UCSB ERI	Workshop Participant
Wendy Schneider	Friends of the Inyo	Workshop Participant

IDEAS AND INPUT

Research Opportunities and Challenges

The Research and Education Workshop participants brainstormed and discussed challenges and opportunities for VESR to contribute to science and research. Repetitive ideas were condensed into 10 unique challenges and opportunities that participants ranked in a silent voting process.

**TOP RESEARCH
TOPICS AND
OPPORTUNITIES
VESR IS UNIQUELY
POSITIONED TO
SUPPORT**

1. *Research topic:* Montane ecosystem responses to climate change, rising CO₂ concentrations, and water resource exploitation. These include changing snow resources, sublimation, water quality, water quantity, evapotranspiration, organisms, and pH changes in high alpine lakes.
2. *Opportunity:* Build and implement technology infrastructure (e.g. mesh network) of environmental, atmospheric, and meteorological sensors to build GIS feedback/long-term foundational baseline datasets and measurements; Integrate sensor and environmental measurements with big data at university; ASO; Establish a data center for all NRS reserves
3. *Opportunity:* Create a publicly accessible museum archive of collected specimens and data, including molecular data and long-term datasets.
4. *Research topic:* Interdisciplinary research that engages and incubates disciplines such as health, economics, mathematics, and the arts. Example: Conduct research to understand the effects of VESR's elementary-level education programs on students' attitudes toward the environment.
5. *Opportunity:* Cultivate science and management partnerships to connect research outcomes to decision making and policy.
6. *Research topic:* Leverage VESR's steep gradients to examine flora and fauna range shifts with climate change.
7. *Opportunity:* Establish an Eastern Sierra Regional Research Center and develop a strategic plan to develop relationships with research groups in the region.
8. *Opportunity:* Obtain "hard" money for senior staff, post docs, graduate students, and visit scientists.
9. *Opportunity:* Build on the snow science research that exists to create a Center of expertise for snow science.
10. *Opportunity:* Establish a shoestring science forum to form a network of funding ideas for beginning researchers, postdocs, and graduate students.

University-level Courses and Disciplines

The Public Service and Outreach Workshop participants identified and discussed university-level disciplines in which VESR can make substantial contributions to higher education and training. They brainstormed and discussed titles of courses that VESR is positioned well to support. Repetitive course titles were condensed during discussion into 18 ideas and ranked during a silent voting process.

TOP COURSES AND WORKSHOPS VESR IS UNIQUELY POSITIONED TO SUPPORT

1. Sierra Nevada Natural History
2. Snow Hydrology
3. Mountaineering Skills and Mountain Science
4. Field Science Skills - Live Long Enough to File Dissertation
5. Reconstructing Past Environments of the Eastern Sierra Nevada
6. Aquatic Life of the Sierra Nevada: field usage for everyone
7. Tectonic History and Metamorphism of the Eastern Sierra
8. GPS and Drones: Geospatial Field Methods
9. Environmental DNA Methods
10. Reintroducing Endangered Species to the Natural Habitats
11. Water Resource Management: Viewpoints from ecologist, historian, and policy
12. Where Will the Water Come From? Climate Change Impacts of Sierra Watershed
13. Climate Change Impacts of the Eastern Sierra
14. Introduction of Geothermal Energy Production
15. Who Eats Whom: Food Webs of the Eastern Sierra Nevada
16. Field and Lab Techniques for analysis of aquatic ecosystems
17. Using Historic Specimens and Records in Research
18. Climate Change Impacts on Great Basin Vegetation

Key Areas Or Disciplines VESR Can Contribute To Education And Training: Climate Ecology || Application of new field methods || Naturalist training || Engagement in existing chemical monitoring || Outdoor education || Great Basin ecology || Endangered species recovery techniques || Multidisciplinary field studies || Terrestrial community ecology || Geomorphology || Freshwater hydrology and ecology || Field work || Snow science || Geology || Environmental stewardship || Design of experimental systems || Analysis of environmental data at high altitude of mountains and deserts || Natural history of Sierra Nevada || Water resources management || Expanded research platform and public outreach

Outreach and Public Service Programs

The Public Service and Outreach Workshop participants identified and discussed public outreach programs that VESR is uniquely positioned to support. Repetitive programs were condensed during discussion then individually ranked. The top 16 public outreach ideas are as follows:

TOP OUTREACH PROGRAMS VESR IS UNIQUELY POSITIONED TO SUPPORT

1. NERD Night and Science Cafe events
2. "Digital VESR": Build social media and online video channel
3. Lecture series expansion: More locations, seasons, and diversity
4. VESR Science Open House (e.g. for researchers, students)
5. Partnership with Cerro Coso Community College
6. Bioblitz and iNaturalist projects
7. Researcher-led field trips
8. After-school program (high school), incl. mentor and counselor-in-training
9. Public mini-courses: Collaboration with local artisans and Mono Lake
10. Artist in residence program
11. High school summer internship program, incl. community outreach component
12. Student Scientist: Elementary-aged students engaged with researchers
13. Citizen science programs (e.g. wildlife corridors, streams)
14. VESR user conference/ "party"
15. Outreach to university administrators and policy makers
16. #VESR: geotags, hashtags, online activity

Other Outreach Program Ideas: Education and outreach advisory group || Workshops to connect managers with researchers || Multidisciplinary symposium in three-five year intervals || State of the Eastern Sierra Report (outreach publication online) || Tribal Knowledge Exchange; Indigenous place names and history || Re-envision facilities to accommodate more activities || Researcher and educator-led family walks along the stream || Expansion of the existing Naturalist Programs || Press releases when VESR-based publications || Speaker series Spanish translation and Spanish speakers || Middle school field trip programs with "field trip buddies" for elementary students || Local middle school and high school science fair || Publicity director to promote all outreach programs || Interpretative education program for regional tourists || Online newsletter || High school-level SNARL field trips || Local road show (take researchers to communities) || Expand the "service area" to outside areas to state and beyond || Start a merchandise program || Nature healing program for at risk youth

Facilitating Diversity and Inclusion

Participants during both of the workshops elected to independently write their ideas about incorporating more diversity and inclusion at VESR, or their ideas about increasing public service and outreach. These written responses were compiled and submitted to the Steering Committee for discussion and feedback.

SWOT Analysis

During the Public Service and Outreach Workshop, participants formed four groups to help define VESR’s Strengths, Weaknesses, Opportunities, and Threats (SWOT). Each group discussed and wrote responses for one of the sections of analysis (e.g. Strengths, Weaknesses). From this, a member of each group condensed input into categories, resulting in the following:

STRENGTHS	High-speed Internet, UCSB support and credibility, Mammoth Mountain support, Expertise in Research and Researchers, Unique Location, Functional Facilities, History, Carol and staff
WEAKNESSES	Over-burdened Staff, Lack of Funding, Remote location, Limited Visibility, Under-used facilities, Large regional political and science education issues
OPPORTUNITIES	Potential Partnerships and community collaboration, Increased need for science outreach, Location with many science and policy relevant challenges, NGSS and Educational program expansion, Regional Growth, Community education, Fresh ideas, Money
THREATS	Uncertain UC future, Values and perception of science, Money, Natural disaster and climate

Appendix 6. The Valentine Reserve Fund

The Valentine Reserve Fund (VRF) was created in late summer 2004 with the approval of the Associate Vice Chancellor for Development at UCSB. The VRF is a “donor group”; a group of donors working on behalf of one unit or project. The original concept proposed an executive committee and three donor levels with various benefit levels:

- The Council of Directors annual gifts of \$2,500 - \$10,000
- The Valentine Associates annual gifts of \$1,000 - \$2,499
- Friends of the Reserve annual gifts up to \$999

The Fund has been operating successfully ever since but only with the Council of Directors level. VESR lacks the staff support to adequately fulfill these other levels. The VRF started with 24 families and is currently at 22. Rusty Gregory (CEO of Alterra Mountain Company – the parent company of Mammoth Mountain Ski Area (MMSA)) serves as the VRF Chairman. Kate and Paul Page serve on the executive committee of the VRF.

The Fund is part philanthropic, part educational, and part social. Participants provide VESR with an annual unrestricted gift and in turn VESR provides them with access to the reserve sites for events, two larger events (summer and winter) each year, some smaller focused events (dinners, walks, tours, etc.), field trips to other reserves, and a bit of insider status at MMSA. Mammoth Mountain underwrites the expenses of the two big events per year, which can be considerable. We provide newsletters to keep the donors up to date and well as advance notice of events and advance enrollment in our Outdoor Science education programs.