



# THE LIVING LABORATORIES

Improving Management at Two University of  
California Natural Reserves

A Group Project submitted in partial satisfaction of the requirements for the degree of Master of Environmental Science and Management for the Bren School of Environmental Science & Management

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April 6, 2018

## Signature Page

### THE LIVING LABORATORIES: Improving Management at Two University of California Natural Reserves

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The Group Project is required of all students in the Master of Environmental Science and Management (MESM) Program. The Project is a year-long activity in which small groups of students conduct focused, interdisciplinary research on the scientific, management, and policy dimensions of a specific environmental issue. This Group Project Final Report is authored by MESM students and has been reviewed and approved by:

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## **Abstract**

Sedgwick Reserve and Valentine Camp are reserves in the University of California Natural Reserve System (UCNRS) with the multi-use mission to foster research and education, practice wise stewardship, and promote public service. Sedgwick and Valentine are both underutilized for research and education, face ecological problems of high fire risk and invasive species, and seek better community relations. By reviewing literature, interviewing experts, analyzing reserve use data, and distributing surveys, we identified and evaluated possible management practices to help each reserve attain their multi-use mission. From this, we developed a scoring method to show the degree to which each management practice would likely help or harm reserves' ability to contribute to wise stewardship, education, and research (public service was excluded due to lack of data.) Based on these scores, we recommended management practices that are likely to have the largest positive effect to the reserves. To help wise stewardship, we recommend that both reserves establish long-term treatment monitoring and reduce weeds and high fuel loads. To foster more research and education, both reserves should systematically distribute reserve opportunities through administrative assistant and faculty networks.

## **Executive Summary**

The University of California Natural Reserve System (UCNRS) is a network of preserved natural areas, created by scientists to preserve major California habitat types in a “library of ecosystems.” The first seven reserves were established in the 1960s, and over the years, the system has grown to include 39 reserves (UCNRS, 2018).

The University of California, Santa Barbara (UCSB) manages seven of the 39 reserves under the UCNRS’ guiding mission, “to contribute to the understanding and wise stewardship of the Earth and its natural systems by supporting university-level teaching, research, and public service at protected natural areas throughout California” (UCNRS, 2018). These reserves provide research sites and valuable educational opportunities for the UC system, and other domestic and international institutions. The reserves also provide educational and nature-based opportunities for the public through K-12 field classes, educational tours, citizen science opportunities, and other services. In addition, the reserves strive to practice wise land stewardship through informed, nature-based management practices and contributions to the collective understanding of species and habitats. These aspects, wise land stewardship, research, university-level education, and public service (henceforth “pillars”), guide the reserve management recommendations provided in this report.

This project investigates two reserves managed by UCSB, Sedgwick Reserve (Sedgwick) and Valentine Eastern Sierra Reserve (VESR). Established in 1996, Sedgwick is a 2422-hectare (5986-acre) property located approximately 55 kilometers (35 miles) inland from UCSB. It contains two distinct watersheds with oak woodlands, native and non-native annual grasslands, chaparral, and coastal sage scrub. Geographical conditions, climate, vegetation type, and invasive species at Sedgwick and in the surrounding areas have resulted in a high potential for fire ignition and spread. The introduction of invasive plants, likely from past grazing activities, increases the risk of wildfire spread into shrub habitats vulnerable to habitat type conversion from fire. Climate change and prolonged drought will likely reduce the available moisture for vegetation, increasing the potential for fire and threatening existing habitats.

Sedgwick is currently utilized for research, university-level education, and public service activities ranging from half-day educational hikes to multi-year research projects. From 2012 to 2017, public service dominated Sedgwick’s use (about 70% of use), with about 20% of use attributed to university-level education research and 10% to university-level education.

VESR consists of two sites, Valentine Camp (Valentine) and the Sierra Nevada Aquatic Research Laboratory (SNARL), located approximately 25 kilometers (15 miles) apart near the Town of Mammoth Lakes in the eastern Sierra Nevada. This report will focus on the Valentine, a 62-hectare (154-acre) reserve adjacent to the town of Mammoth Lakes. Valentine was in private ownership, protected from grazing and timber operations, since the early 1900s. It features sub-alpine habitat with montane forest, montane chaparral, Great Basin sagebrush, high montane riparian vegetation, wet montane meadow, and seeps and springs. Several years of drought, fire suppression and pine bark beetle infestations have led to dense mixed-conifer forests with reduced tree health at Valentine, posing an extreme fire hazard.

Common uses of Valentine include docent lead ecology walks, elementary through high school summer programs, university-level geology courses, and researcher housing. From 2012 to 2017, Valentine's use was dominated by public service (about 80% of user days), with about 20% for university-level education research and 5% for university-level education.

Both reserves face barriers and challenges to supporting all pillars of the UCNRS mission. Fuel loads contribute to high wildfire risk, and ecosystems are degraded by various stressors such as drought, invasive species, and bark beetle infestation. Additionally, the reserves lack monitoring or research of management actions, creating an absence of data to base informed management decisions. Underlying these dilemmas is the need to for strategic, long-term management while maintaining day-to-day operations. We are providing this report to the Sedgwick and Valentine managers with recommendations of site specific, strategic, effective actions to help them uphold the UCNRS mission.

The objectives of this project are threefold: i) assess effectiveness methods to reduce fire risk and improve the health of habitats and species at the reserves; ii) build strategies for reserves to increase research and university-level educational use, and iii) lay a foundation for the reserves to better serve the public. To fulfill these objectives, we have identified and evaluated various management actions based on literature review, expert and faculty member interviews, and surveys. We evaluated and scored each management action based on its potential positive and negative impacts on goals of wise stewardship, research, and education. Using these scores, we developed recommendations for each management action, ranging from Not Recommended, Neutral, Weakly Recommended, Moderately Recommended, and Highly Recommended.

To best contribute to Sedgwick's wise stewardship, we recommend: long-term monitoring, long-term experiments, fuel clearing in oak woodlands,

and the mechanical and chemical control of invasive plants the grasslands and oak woodlands. Implementing these actions will support native habitats, reduce the risk of crown fires in the oak woodlands, and provide needed ecological and management information on the habitats and species found at Sedgwick.

Prescribed burns in coastal sage scrub are not recommended because of introduced risk to native habitats, specifically, the conversion of coastal sage scrub to grasslands from frequent fires. Conducting prescribed burns in coastal sage scrub would reduce fuel loads immediately following the burns; however, the fast-growing plants in this habitat type would require repeating burns too frequently to allow the habitat to reach maturity.

The primary goals for wise stewardship at Valentine are to reduce tree mortality from mountain pine beetle (*Dendroctonus monticolae*, also 'bark beetle') infestation, increase forest resilience to stressors, (e.g., fire and drought), and reduce future fire severity and risk of spreading catastrophic fire. Secondary goals include creating research opportunities and university-level education opportunities.

The mixed conifer forest at Valentine is approximately twice the density found in similarly situated healthy forests. This high density increases the complexity of managing the reserve for wise stewardship by requiring that the reserve take both immediate action to thin the forests while planning for long-term forest management once target densities are met. To thin the forest and reduce future bark beetle impacts, mechanical thinning and pile burning are highly recommended as immediate actions. Once the forest is thinned, prescribed fire treatments such as underburning should be considered to fulfill the ecosystem functions of wildfire.

Sedgwick and Valentine both have the goal of increasing research, especially onsite research and monitoring, which can inform land management decisions. To help the reserves increase research, this report includes a specialized outreach plan with goals, audiences, key messages, barriers, optional management tactics, and methods to measure success. SMART objectives (Specific, Measurable, Attainable, Relevant, and Time-bound) are suggested for setting goals.

Highly recommended tactics to increase research use at both reserves include connecting with departmental administrative assistants and new faculty members. Creating a web page with reserve-based research instructions and resources, connecting with faculty members who have based research at the reserves, and re-evaluating RAMS application requirements are moderately recommended. A research-focused social media strategy is weakly recommended.

The primary university-level education goals for both reserves are to increase the number of university courses taught, while the secondary goals are to facilitate reserve-based research projects, and directly inform or take part in land stewardship management practices. Highly recommended actions to increase education at both reserves include: connecting with new faculty members and with departmental administrative assistants. We moderately recommend that the reserves connect with faculty members who have based research at the reserves and we weakly recommend that the reserves market their ability to host departmental retreats or conferences.

Because faculty must cover transportation costs to Sedgwick for course labs and field trips, we also moderately recommend that Sedgwick creates a transportation fund to offset the cost of rented vehicles for classes. We weakly recommend that Sedgwick creates a camping supplies fund to mitigate the cost of students' camping gear for multi-day classes. Because of Valentine's distance from most universities, we recommend that reserve managers connect with professors who teach established multi-day field courses.

Because the public uses the reserve more than researchers and educators, increasing public use is not a priority for either reserve. However, to better align with the UCNRS mission, public use should shift from recreational use to science, research, and education-based uses. Additionally, both reserves can develop partnerships with government agencies, citizen science groups, or scientific organizations to foster collaborative research that could support the understanding of the natural systems at the reserves.





## **Table of Contents**

1. Significance.....	4
2. Objectives.....	4
3. Background.....	5
3.1. University of California Natural Reserve System .....	5
3.2. Sedgwick Reserve .....	8
3.3. Valentine Camp .....	14
4. Methods.....	19
4.1. Data collection .....	19
4.2. Interviews .....	21
4.3. Social media analysis.....	22
4.4. Literature review .....	24
4.5. FRID analysis .....	24
4.6. Community stakeholder identification .....	25
4.7. Surveys .....	25
4.8. Development and evaluation of management actions.....	26
5. Results .....	30
5.1. RAMS analysis .....	30
5.2. Faculty member interviews.....	36
5.3. UCNRS social media use.....	39
5.4. Community stakeholder groups.....	40
5.5. FRID maps .....	42
5.6. Surveys .....	47
6. Discussion.....	47
6.1. Part 1: Wise stewardship.....	47
6.2. Part 2: Research, Education, and Public Service .....	80
7. References.....	111
8. Appendices .....	122

8.1.	Appendix A- Faculty Member Interview Questions .....	123
8.2.	Appendix B- Interviewee List.....	125
8.3.	Appendix C- Social Media Analysis .....	130
8.4.	Appendix D - Sedgwick and Valentine Community Group Lists.....	142
8.5.	Appendix E – Survey Questions .....	149
8.1.	Appendix F – Survey Results .....	164
8.2.	Appendix G – Wise Stewardship Management Scorecard.....	282
8.3.	Appendix H - Sedgwick Invasive Plant Species Removal Methods.....	285
8.4.	Appendix I – Research Management Scorecard.....	290
8.5.	Appendix J - Research Key Messages .....	292
8.6.	Appendix K - Administrative Assistant Networks .....	298
8.7.	Appendix L - Research Ambassador Network .....	306
8.8.	Appendix M - Research Webpage Content.....	311
8.9.	Appendix N – Education Management Scorecard.....	313
8.10.	Appendix O - Education Key Messages.....	315
8.11.	Appendix P - Education Ambassador List .....	320
8.12.	Appendix Q - Public Service Key Messages .....	323

## Figures

Figure 1.	Map of Sedgwick Reserve .....	9
Figure 2.	Location of Valentine Camp.....	15
Figure 3.	Average annual amount of educational use by use days at Sedgwick between 2012 and 2017 .....	31
Figure 4.	Average annual number of public users and use days by affiliation at Sedgwick from 2012 to 2017 .....	31
Figure 5.	Average annual number of research users and use days by university type at Sedgwick from 2012 to 2017 .....	31
Figure 6.	Average annual number of user and use days over a five-year period at Sedgwick by type of use .....	32
Figure 7.	Average annual amount of research use by use days at Valentine between 2012 and 2017 .....	33
Figure 8.	Average annual amount of educational use by use days at Valentine between 2012 and 2017. ....	34

Figure 9. Average annual number of public users and public use days by affiliation at Valentine from 2012 to 2017 .....	34
Figure 10. Average annual number of user and use days over a five-year period at Valentine by type of use.....	35
Figure 11. FRID map of Sedgwick Reserve.....	44
Figure 12. FRID map of Sedgwick Reserve with habitat types. ....	45
Figure 13. FRID map of Valentine Camp.....	46
Figure 14. Map showing change in vegetation between Sedgwick and the adjacent Woodstock community .....	64
Figure 15. Vegetation types and densities at Valentine Camp.....	67

## **Tables**

Table 1. Community groups with highest use at Sedgwick from 2012-2017 .....	41
Table 2. Community organizations that used Valentine from 2012-2017.....	42

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## 1. Significance

This project aims to provide Sedgwick Reserve (Sedgwick) and Valentine Camp (Valentine) managers with knowledge and approaches that will help them balance the UCNRS mission pillars of public service, university-level education, research, and the overarching wise stewardship. We identify management options and tactics that tackle issues of wise stewardship and public service while boosting the educational and research capacity.

Sedgwick and Valentine differ in ecosystem, geological features, and human history, yet, both reserves face challenges to supporting university-level education, research, and public service. Specifically, both reserves have fuel loads that contribute to a high wildfire risk, and suffer ecosystem degradation from various stressors. Sedgwick and Valentine managers understand the importance of addressing these ecological issues, but are lacking effective ways to do so without detracting from the research and education uses. Additionally, each reserve has identified the opportunity to improve public service, but struggle to target uses that support their core purpose of being an area used to further scientific knowledge. Underlying each of these issues is the need to balance proactive and reactive measures - the capacity to manage strategically while maintaining day-to-day operations.

Although Sedgwick and Valentine face particular management challenges, we expect that our methods and recommendations will help other reserves and protected lands solve management dilemmas.

## 2. Objectives

This project aims to aid Valentine and Sedgwick in addressing ecological issues, while contributing to the overall UCNRS goals of research, education, and public service. To do this, the UC Living Labs team has evaluated each reserve's possible management activities within the context of ecological health and UCNRS goals. The objectives of the UC Living Labs project are to:

1. Suggest methods for vegetation management based on an assessment of possible fuel management methods that

evaluated the impacts on the reserves' ecological, research, education, and public service values.

2. Identify methods and opportunities for engagement with researchers to increase use at the reserves.
3. Identify methods and opportunities for engagement to increase university-level educational use.
4. Identify opportunities and approaches to build targeted public service uses that support wise stewardship, research, and university-level education.

### 3. Background

#### 3.1. University of California Natural Reserve System

From the Sierra Nevada to the Channel Islands, California provides abundant opportunities for scientists and students to observe ecosystems, geological features, and endemic species. However, the increase in development and infrastructure projects across California during the 20th century diminished many natural areas. To ensure researchers and students access to field sites representative of the diversity of California's ecology, a group of University of California scientists initiated the formation of a network of preserved natural areas in the 1950s with the first reserves established in the 1960s. The result is the University of California Natural Reserve System (UCNRS) - a "library of ecosystems" across the state that are dedicated to education, research, and public service (UCNRS, 2018).

Presently, the University of California (UC) manages 306,000 hectares (756,000 acres) across 39 sites within the UCNRS, making it the largest university-administered reserve system in the world. This network of preserved land encompasses most major California habitat types, including deserts, mountain, coastal wetlands, vernal pools, and conifer forests. The reserves are also a gateway to more than 400,000 hectares (1 million acres) of public lands, and many of the reserves are home to federally listed species, sensitive habitats, unique gene pools and other ecological resources. Each reserve in the network is managed under the same guiding mission, "to contribute to the understanding and wise stewardship of the Earth and its natural systems by supporting

university-level teaching, research, and public service at protected natural areas throughout California.” (UCNRS, 2018)

### 3.1.1. University-level education

The reserves in the UCNRS are “classrooms without walls” that provide opportunities for university-level students to learn directly from and in nature. Each year, over 150 UC system undergraduate classes use the reserves. The reserves host a suite of topics - both scientific and non-scientific - including botany, zoology, archeology, visual arts, photography, public health, and environmental planning. While UC system courses incorporate reserves into classwork, other domestic and international institutions often bring students to UCNRS. (UCNRS, 2018)

Evident in the reserves’ widespread educational use, the UCNRS provides valuable tools for learning. By learning at the reserves, university students gain practical skills such as setting up transect, obtaining tissue samples from wildlife, or observing animal behavior. A field component can supplement classroom-based education by allowing students to directly observe natural characteristics that they had learned about in a textbooks or lectures. This immersion in the natural world enriches the educational experience and can also instill the value of experiencing nature and the importance of land stewardship.

### 3.1.2. Research

UC-based, domestic, and international scientists conduct a variety research in the UCNRS “living laboratories.” Because reserves are preserved for the long-term, they have both a record of data from previous research, and a guarantee of access for multi-year studies. Many reserves also provide facilities and amenities that support productive field work.

In order to conduct research at a NRS, researchers submit an application through the NRS Reserve Application Management System (RAMS). This application includes information about the duration of the project as well as its potential impacts on the habitat or species studied and the time it would take for the habitat to revert to pre-experiment conditions (Sedgwick Reserve, 2017).

### 3.1.3. Public service

Public service at the reserves is a multi-faceted pillar that includes supporting citizen science, community leadership, kindergarten - grade 12 (K-12) education, Mediterranean-climate ecosystem collaboratives, public access and events, and acting as a trustee agency under the California Environmental Quality Act (UCNRS, 2018). Public service differs at each reserve based on reserve assets and surrounding communities. Reserves often provide educational or nature-based opportunities for the public to use the reserve, such as the California Phenology Project, Audubon Society bird counts, collaborative management treatment areas, participation in regional conservation planning efforts, participation in international ecosystem and climate cooperatives, and elementary and high school field trips. Reserves also host a variety of public and organizational opportunities like bird-watching tours, botanical illustration courses, and scientific lecture series (UCNRS, 2018).

In addition to onsite opportunities for the public, the UCNRS also serves as an authority and source of knowledge about regional ecosystems. Reserve personnel often inform natural resource planning and management to support the health of surrounding ecosystems. Some reserves are involved in biodiversity and training programs. For example, Sedgwick, Valentine, and several other reserves are involved in the California Phenology Project, an effort to recruit and train researchers and members of the public to identify phenological (i.e., seasonal developmental) status of California flora (California Phenology Project, n.d.).

#### 3.1.4. Wise stewardship

While land stewardship is not identified as a specific course of action in the UCNRS mission, it overlies university-level education, research, and public service. The reserve system was intentionally structured to preserve an array of California habitat types and landscapes for research and education. Because of this, the value of each reserve is fundamentally tied to its ecological health, making wise stewardship a priority to reserve management. Wise stewardship efforts on reserves vary depending on ecological need and management priorities; they include restoration projects, genetic diversity conservation, and protection of rare or endangered species. Recommendations for wise stewardship actions have been developed and evaluated depending on

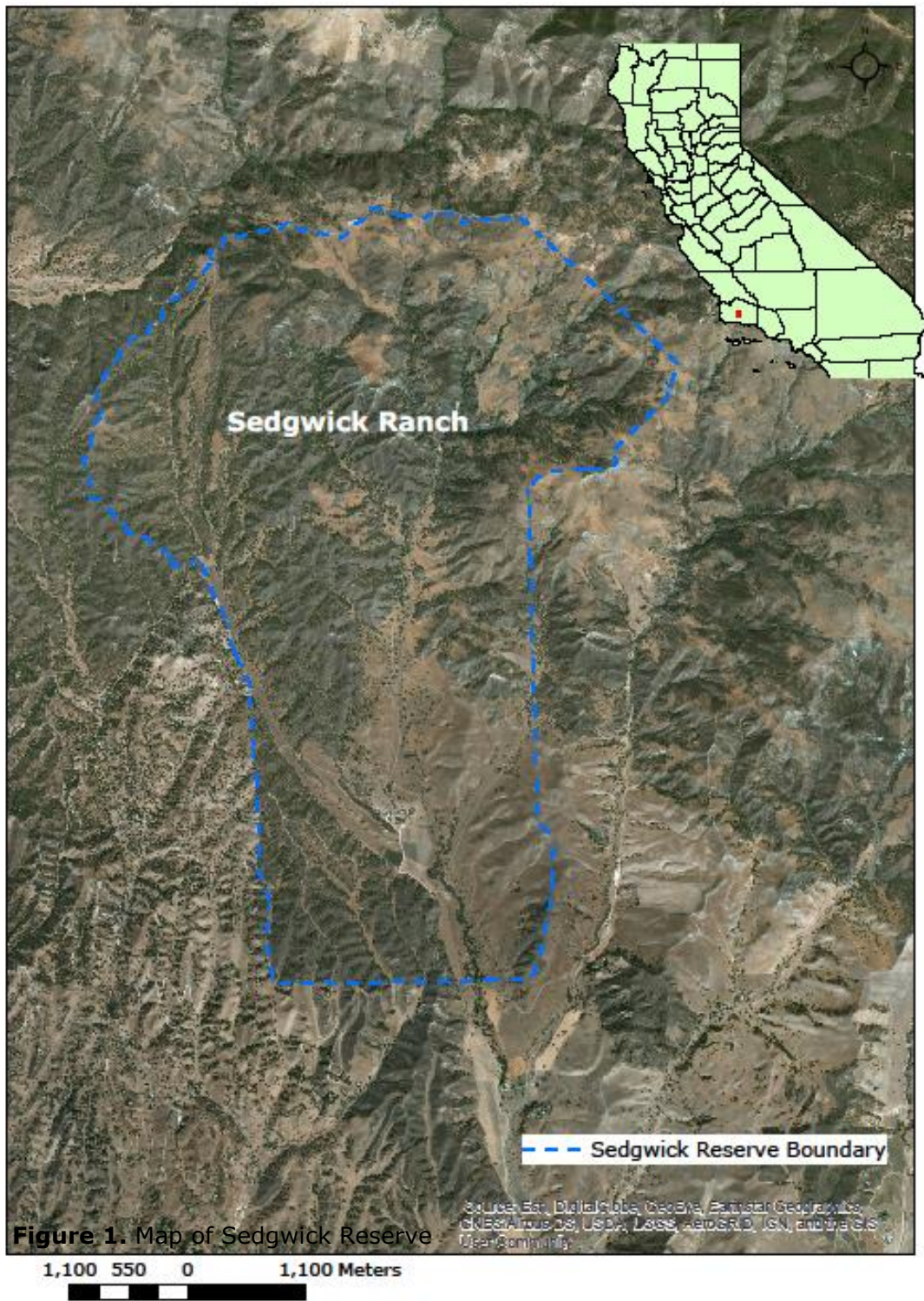
how it would support or detract from the health of the native species and habitats on the reserves.

### 3.2. Sedgwick Reserve

Sedgwick is one of the seven reserves operated by the UCSB section of the UC NRS. It is located in the Santa Ynez Valley, about 58 kilometers (36 miles) northwest of the City of Santa Barbara. Sedgwick is located in the foothills of the San Rafael Mountains and borders the Los Padres National Forest to the northeast, rural residential areas to the south and west, and undeveloped open space and rangelands to the north and east (Figure 1). The reserve was established in 1996 after the Sedgwick family bequeathed 2,069 hectares (5,113 acres) of land to UCSB in 1995 for interdisciplinary teaching and research uses (Sedgwick Reserve, 2014). An additional 316 hectares (782 acres) of adjacent land was purchased by the Land Trust for Santa Barbara County and donated to UCSB in 1997.



Now, Sedgwick comprises a total of 2,386 hectares (5,896 acres)



(Sedgwick, 2017).

Prior to European settlement, the current Sedgwick area was located between Soxtonokmu' and Kalawashaq', the two largest Chumash villages in the Santa Ynez Valley region. After Spanish settlement, the Chumash were removed from the area and in the early 1800s the land was used for agriculture. Crops, such as wheat and corn, were grown and livestock grazed the lands (UCSB, 2003). Today, much of the area surrounding Sedgwick is used for livestock and several small farms spread across the nearby landscape. Additionally, Sedgwick allows for commercial farming and winter cattle grazing within the 81-hectare (200 acre) agricultural easement located in the southeast corner within Heir's Parcel (Sedgwick Reserve, 2014).

### 3.2.1. University-level education

A 4-hectare (10 acre) field station, comprised of four historic buildings and four new buildings, provides offices, meeting spaces, equipment storage, an observatory, and housing for reserve staff and visiting students or researchers. Classes use the reserve every year to study such topics as geomorphology, ecosystem management, and botany through both day and overnight trips. Classes are mainly from UCSB, but also include other UC schools as well as community or state colleges. Out-of-state and even international universities occasionally use the reserve as well (Reserve Application Management System (RAMS), 2018).

Comparing percentage of use from 2012-2017 reveals that about 10% of Sedgwick's current use is for University-level education, or 3,887 user days out of a total of 37,557 (RAMS, 2018).

### 3.2.2. Research

Sedgwick is an important resource for researchers as it provides them access to several different native California ecosystems. Faculty, graduate students, and undergraduates from UCSB and other universities use the reserve for various research projects. From 2012-2017, research comprised 22% of total reserve use. There were 1,275 total research users who completed 8,424 user days during that five-year period. On average, there are about 44 ongoing projects at Sedgwick each year (RAMS, 2018). Currently 300 publications are based on research that conducted at Sedgwick. Areas of study at the reserve include climate, plant competition, oak conservation, geology, and biogeochemistry, as

well as astrophysics and taxonomy. Current research focuses on such projects as regeneration of native oaks, restoration of native grasslands, pollinators, and competition between native and invasive plants (Sedgwick Reserve, 2017). These research projects include both short-term projects and long-term projects.

### 3.2.3. Public service

Most use at the reserve currently falls under public service. From 2012-2017 public service had 15,538 users who totaled 25,246 user days. This translates to 67% of total reserve use (RAMS, 2018). Current public use of the reserve includes staff or docent lead public hikes or equestrian rides, a lecture series, K-12 school field trips, citizen science, and non-Reserve events. The lecture series at Sedgwick is science-focused with topics mainly covering current or past research done at Sedgwick, however, Sedgwick also partners with outside organizations to cover a variety of other topics. Sedgwick partners with the educational organization Nature Track, which organizes field trips for K-12 students to participate in outdoor education. A total of 369 students visited the reserve in 2015 as part of the Nature Track program. Citizen science efforts include the California Phenology Project and a live fuel moisture monitoring station installed in cooperation with the Santa Barbara Botanic Garden. The last part of public use of Sedgwick is for non-reserve events. The public may reserve facilities at Sedgwick for workshops, retreats, talks, or board meetings, though commercial activities are prohibited (Sedgwick Reserve, 2017).

### 3.2.4. Wise stewardship

Across its nearly 2,400 hectares (6,000 acres), Sedgwick is entirely within the Western Transverse Range California Floristic province (UC Berkeley, 2018) and contains a wide diversity of habitats, plant, and animal species. These habitats include blue-oak foothill pine, coastal scrub, mixed chaparral, chamise chaparral, freshwater emergent wetland, non-native annual grasslands, riverine, dry croplands, vineyard, and barren (CDFW, 2014). Introduced and invasive species are common within the grassland portions of the reserve due to past agricultural and grazing activities. Native grasslands are present within Sedgwick, however they are limited in size and location. In addition to the native habitats at Sedgwick, there are areas that support or are dominated by non-native species. The majority of grasslands in Sedgwick are dominated by oat

(*Avena* sp.) and chess (*Bromus* sp.) grasses intermixed with native and non-native forbs. Non-native species can be separated into naturalized species, which are those that were introduced from another region but are able to reproduce and support a population without human aid, while invasive plants are a subset of naturalized plants that are able to quickly spread and disrupt existing plant communities and ecosystems (NRCS, 2018). These plants disrupt ecosystems by shading out native plants and covering the soil early in the season preventing germination of other species (McGinnis and Keeley, 2011). Native plants are more desirable because they are expected to create more physically complex habitats that support more diverse habitat and provide greater ecosystem functions (Stromberg et al., 2007). Invasive grasses specifically also spread fire into shrublands by increasing the density of the understory and increasing the quick burn fuel load, which can act to spread fire faster and further into shrublands than in the absence of these understory grasses (Conlisk et al., 2016).

In total, there have been 385 identified plant species, 176 bird species, 45 mammal species, 22 reptile species, and nine amphibian species that use or are expected to use the reserve. Common animal species that have been found on the reserve include black bears (*Ursus americanus*), bobcats (*Lynx rufus*), golden eagles (*Aquila chrysaetos*), and mountain lions (*Puma concolor*) (Sedgwick, 2017). Within these vegetation communities, there are no Federal or State endangered or threatened species, however, there are five plant species that are considered sensitive by the California Native Plant Society and several amphibian, bird, and mammal species that are listed by the California Department of Fish and Wildlife as being a species of special concern. This includes the tricolored blackbird (*Agelaius tricolor*), which is currently under consideration for listing under the California Endangered Species Act (California Fish and Game Code Section 2050 et. seq.). A full species list of plants and animals of the reserve is provided at [http://sedgwick.nrs.ucsb.edu/about/natural\\_resources](http://sedgwick.nrs.ucsb.edu/about/natural_resources).

Santa Barbara County, where Sedgwick is located, underwent drought conditions from 2012 through 2016, with rainfalls during those years of between five and ten inches less than the average annual rainfall of approximately 18 inches (Santa Barbara County, 2018). This drought appears to have adversely affected many trees within Sedgwick causing mortality of blue oaks and grey pines on the hill slopes. This has led to

increased concern regarding both fire and overall health of the ecosystem. There is further concern that expected increased temperatures from climate change will exacerbate this issue.

The main threats to the health of reserve ecosystems include invasive plants, wildfire, and climate change (Sedgwick Reserve, 2017). Sedgwick's grassland communities have become heavily invaded by non-native species. Sedgwick has 76 non-native plant species that have been identified within the reserve boundaries. Problematic weeds in Sedgwick include jointed goatgrass (*Aegilops cylindrica*), black mustard (*Brassica nigra*), Italian thistle (*Carduus pycnocephalus*), tocalote (*Centaurea melitensis*), and bull thistle (*Cirsium vulgare*) (Sedgwick Reserve, 2013). Invasive plants, especially invasive grasses and forbs in grassland areas, were most likely introduced into Sedgwick Ranch from grazing livestock prior to the establishment of the area as a reserve. The invasive grass species can also add to wildfire risk as they invade the boundary of coastal shrub and chaparral areas, creating a more flammable understory to these shrub habitats.

Sedgwick is located in an area with high wildfire frequency. Historically, chaparral shrublands located in Sedgwick would burn every 36 to 82 years, coastal sage scrub would burn every 50 to 113 years, and oak woodlands every 8 to 45 years (Safford, 2014), grassland fire return intervals are not identified as they are too variable throughout the state and lacking recorded data (Safford, 2011). However, humans have drastically altered the natural fire regime of the area. In the late 18th century, the Chumash would use fire to manage natural resources, preferentially burning grassland and chaparral areas to improve the health of desired species and convert larger areas to grassland. After Spanish settlers colonized the area, fire suppression dominated land management practices (Timbrook, 1982). Despite this history of fire suppression, wildfires have become more common recently, with a large-scale wildfire now occurring every 10 to 20 years (Sedgwick Reserve, 2017). This is largely due to the expansion of development and habitation in the region, leading to more ignitions. Many habitats in Sedgwick are particularly vulnerable to high fire frequency and too frequent burning could result in habitat type conversion (Timbrook, 1982).

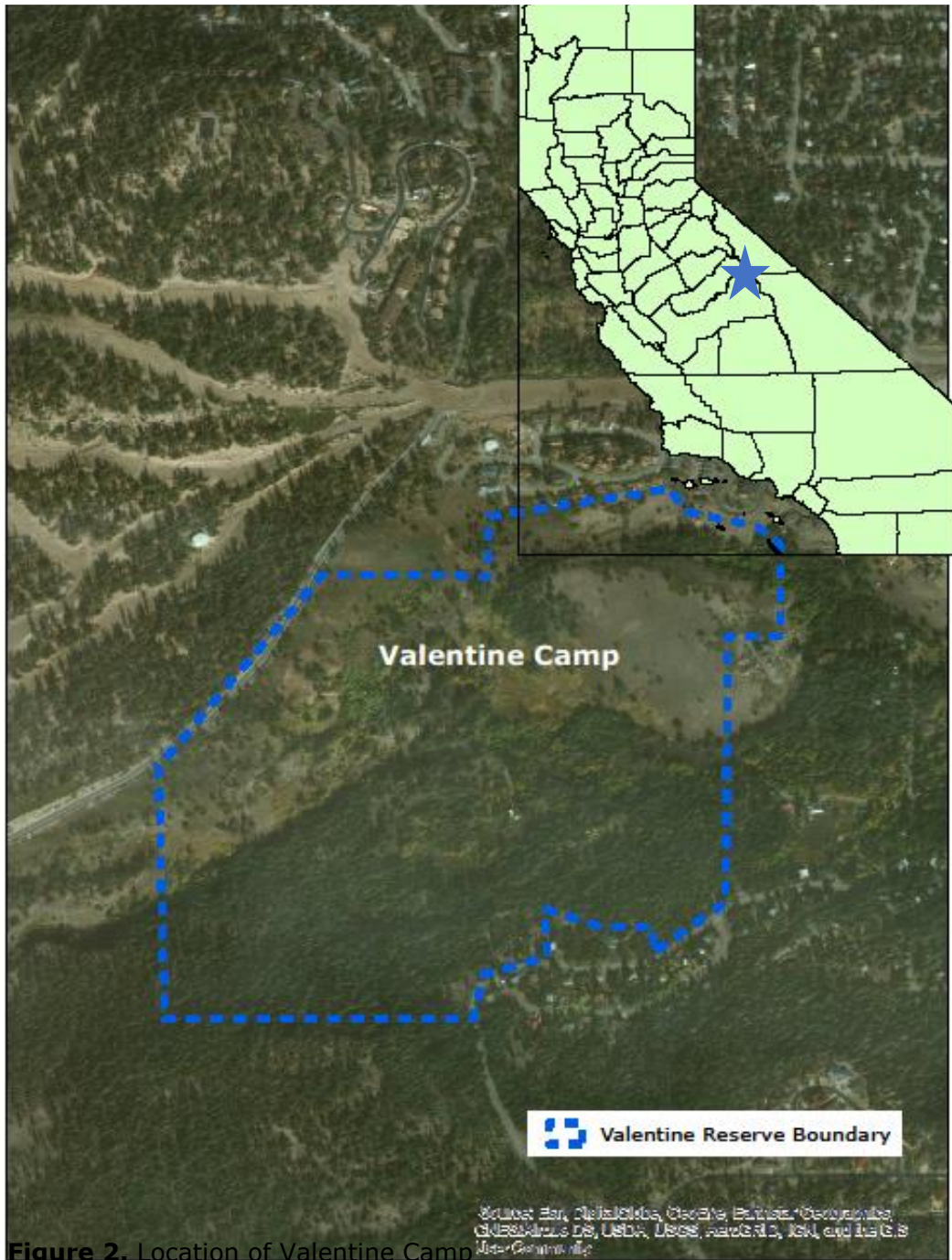
Climate change is a global issue that is expected to affect habitats at Sedgwick. Increasing global temperatures are expected to cause more

extreme events such as storms and wildfires. Arid and semi-arid regions within California are expected to become drier. These conditions, if they do occur, would further exacerbate the wildfire risk and likely pose a threat to existing habitat types and species found on Sedgwick currently as the available moisture and temperature regime changes.

### 3.3. Valentine Camp

The Valentine Eastern Sierra Reserve (VESR) consists of Valentine and the Sierra Nevada Aquatic Research Laboratory (SNARL). This report will solely focus on the Valentine. Valentine is a reserve with an area of 62 hectares (154 acres) in the town of Mammoth Lakes located on the eastern slope of the Sierra Nevada (Figure 2). Valentine borders

residential homes and roads on all sides except the southwest corner, which borders forests in the Inyo National Forest.



**Figure 2.** Location of Valentine Camp

550 275 0 550 Meters

The University's tenure at Valentine began over 40 years ago, but the area's human settlement dates back 4,000 years ago. The region was home to Paiutes and other Native American tribes before the arrival of Europeans in the nineteenth century. While post gold rush mining in the region waned, grazing then increased. The land that became Valentine was first privately purchased in 1897 by Thomas Williams, a rancher, whose son sold it to six businessmen in 1916. They then either built or moved cabins on site and hosted their friends and business associates for fishing and hunting. Among them, Mr. Valentine later passed on his part of the land to his son Edward. Edward and his wife Carol thought that Valentine was beautiful and should not always be kept as a private camp. As the joint ownership faded with time, Carol Valentine donated Valentine to the University of California Natural Land and Water Reserve System (now the UCNRS) in 1972 to ensure the land's continued protection from city growth and provided a generous endowment fund for its support (Farrell, 2015). The property was 55 hectares (136 acres) at the time of donation and has since grown to approximately 62 hectares (154 acres) though other small gifts (Howard and Orr, 2000). It is now administered by University of California, Santa Barbara under UCNRS (Farrell, 2015). Valentine is open for both day and overnight uses, as weather permits, from around the first of June through the middle of October, and on a limited basis for winter day use. A system of foot trails provides access to all of the site's major habitats (Howard and Orr, 2000).

### 3.3.1. University-level education

Indoor facilities available at Valentine are housing for 16 in three renovated log cabins constructed in the 1920s. Each cabin has modern cooking, sleeping, bathroom facilities; limited parking/storage space; electricity, spring water, but no food or custodial service.

The reserve is popular mainly for field courses and both daylong and overnight field trips. Classes use the reserve every year to study such topics as human and physical geography, volcanology, geophysics, and ecosystem management. More classes from colleges in California outside the UC and CSU systems have used Valentine for the last five years than UCSB. Interestingly, class use by international universities is comparable to use by UCSB in the last two years (RAMS, 2018). Comparing percentage of use from 2012-2017 reveals that only about 5% of



Valentine's current use is for University-level education, or 662 user days out of a total of 13,978 (RAMS, 2018).

### 3.3.2. Research

Without spatial proximity to UCSB, Valentine is an equally important research site for use across the UC system. Faculty, graduate students, and undergraduates from UCs can use the reserve for various research projects.

From 2012-2017, 18% of total reserve use was for research. There were 196 total research users completed 2,546 user days. A total of 59 distinct research projects were conducted, lasting up to three years. On average, about 16 projects are conducted at Valentine per year (RAMS, 2018). Currently, 113 publications have incorporated research conducted at Valentine. Common fields of study at Valentine include the ecology of fire, birds, and plants. Despite its small size, Valentine has supported multiple long-term, regional-scale research projects. Valentine is used in regional studies that include wetland mapping in Long Valley and on mammals and amphibians of the eastern Sierra. Current research projects include plant and insect ecology, microbiology, geology, and climate change biology.

### 3.3.3. Public service

Public service dominates the current use of Valentine. From 2012-2017, public service comprised 77% of total reserve use with 5,243 users completing 10,770 user days (RAMS, 2018). The majority of the users are from K-12 schools, with other un-affiliated groups and few from non-profits/NGOs and all colleges. The bulk of K-12 users to Valentine are from the Outdoor Science Education Program (OSEP), which provides local elementary and middle school students with a hands-on, outdoor science experiences. About 2,000 students participate in OSEP each year for field trips and science lessons, and the summer program of OSEP hosts 120 students per session. For adults, small group tours (up to 15 people) are offered in the summer and cover topics such as forest ecology, wildflowers, and black bears. Modest donations from these tours are collected and help support outreach programs to teach science classes to the children of Inyo and Mono County.

#### 3.3.4. Wise stewardship

Valentine is situated in the upper Owens Valley below the Mammoth Lakes basin within a glacier-carved basin on the climatic ecotone between the sagebrush desert of the Great Basin and the coniferous forests of the high Sierra Nevada. The terrain is varied, with elevations ranging from 2,437 to 2,605 m (7,994 to 8,545 ft.) and slopes from shallow to steep with varying aspects (Howard and Orr, 2000). Mammoth Creek flows through the reserve, and several large springs and small seeps add to the diversity of habitats. With its varied topography and soils, the site includes several distinct habitats: Sierran upper-montane forest, Sierran upper-montane chaparral, Great Basin sagebrush, and wet montane meadow.

The flora of Valentine is composed almost entirely of native species with minor intrusion by cheatgrass (*Bromus tectorum*), an invasive species, around the edges of the reserve. While the cheatgrass is not desired within the reserve and its spread should be contained, it is currently very limited in its extent and does not appear to be impacting the overall ecosystem or native species within Valentine. Among the typical flora and fauna of the region at Valentine, no endangered or threatened species have been identified within the reserve. A full flora species list of Valentine is provided available at <http://vesr.nrs.ucsb.edu/natural-resources/flora-vesr>.

Among the diverse habitat matrix at Valentine, the Sierran upper-montane forest habitat dominates the reserve and is of most concern with regard to wise stewardship. Decades of fire suppression and exclusion in and around Valentine has left the mixed conifer forest at an abnormally high stand density (i.e., number of trees per unit area). This density of trees impacts forest and ecosystem health in various ways. To restore the natural stand density, the land stewards have applied thinning and pile burning for the last 14 years and reduced the density in half from an estimated 2000-2200 trees/hectare (800-900 trees/acre). The current stand density of 990-1200 trees/hectare (400-500 trees/acre) is still approximately double the desired density. Risk of catastrophic fires, along with other stressors such as drought, bark beetle, and climate change, threaten the mixed conifer forests at Valentine.

## 4. Methods

### 4.1. Data collection

#### 4.1.1. RAMS analysis

Our group sourced the UCNRS Reserve Application Management System (RAMS) 2.0 for reserve use information, including overall use statistics and specific use application details. The RAMS webpage listed use applications by fiscal year; for example, 2012-13 reflects the time interval between July 1, 2012 and June 30, 2013. Use data from the past five years, 2012-13 to 2016-17, was analyzed. Use data from 2017-18 was not incorporated in this report because it was incomplete at the time of analysis. Data by users and user days (UDs) were analyzed separately for Valentine and Sedgwick. The RAMS webpage listed use applications by four categories: University-level Education, University-level Research, Other, and Housing. To assess how the reserve activities meet the UCNRS mission, use data from RAMS was regrouped into three categories: University-level Education, University-level Research, and Public Service.

Under University-level Education and University-level Research categories, the following classifications were applied to sub-categories of user affiliations: Our group sourced the UCNRS Reserve Application Management System (RAMS) 2.0 for reserve use information, including overall use statistics and specific use application details. The RAMS webpage listed use applications by fiscal year; for example, 2012-13 reflects the time interval between July 1, 2012 and June 30, 2013. Use data from the past five years, 2012-13 to 2016-17, were analyzed. Use data from 2017-18 were not incorporated in this report because it was incomplete at the time of analysis. Data by users and user days (UDs) were analyzed separately for Valentine and Sedgwick. The RAMS webpage listed use applications by four categories: University-level Education, University-level Research, Other, and Housing. To assess how the reserve activities meet the UCNRS mission, use data from RAMS was regrouped into three categories: University-level Education, University-level Research, and Public Service.

Under University-level Education and University-level Research categories, the following classifications were applied to sub-categories of user affiliations:

1. UC Home (UCSB), UC Other (UC campuses other than UCSB), CSU System (California State University campuses), Out of State Colleges (U.S. colleges outside California), and International Universities (non-US universities) were copied from RAMS;
2. CA Comm College (community colleges in California) and Other CA College (colleges in California other than those already specified) were combined into one subcategory of Other CA College (colleges outside UC or CSU Systems);
3. Use data under Government, NGO/Non-Profit, Profit Business, K-12 School, and Other were merged into corresponding subcategories under the Public Service category. Merging during regrouping was done by manual inspection of each application and correction of misplacement where there was clearly-stated affiliation outside the original subcategory.

Data in the Public Service category were combined in several steps:

1. The subcategories of UC Home, UC Other, CSU System, CA Comm College, Other CA College, Out of State College, and International University under Other and Housing categories on RAMS were combined into a single subcategory College;
2. The new K-12 School subcategory sums the same subcategory data from all four RAMS categories, and same for the new NGO/Non-profit subcategory;
3. The new Others subcategory sums all the RAMS data that were left unincorporated in any of the aforementioned new subcategories: Government, Profit Business, and Other under the original four RAMS categories.

For each reserve, use data were plotted by users and user days separately in bar charts with one category per bar chart. For each category, the five years' data were grouped under each subcategory into a clustered bar chart. To obtain an overview of reserve use type in the last five years, the five years' data by user days for each category were summed and presented in a pie chart.

We assessed an additional 13 reserves for research use over a five-year period, six in comparison to Valentine and seven in comparison to Sedgwick. We selected these reserves out of the 39 reserves within the

UCNRS system based on the similarity of assets to Valentine or Sedgwick, however, they vary in size and habitats. We selected Angelo Coast Range, Blue Oak Ranch, Hastings, Kenneth Norris Rancho Marino, Quail Ridge, Santa Cruz Island, and Steele Burnand Anza Borrego Desert reserves to compare to Sedgwick and Boyd Deep Canyon, James Jacinto Mountains, Kenneth Norris Rancho Marino, Sequoia and Kings Canyon, Yosemite Field Station, and Sweeny Granite Mountains Desert Research Center reserves to compare to Valentine. Research use was quantified and divided into short-term projects, lasting one year or less, and long-term projects, lasting more than one year. We minimally processed the data from RAMS for these additional reserves was only minimally processed by removing only entries that were clearly identified as public service or class use.

In addition to the five-year RAMS analysis, we performed a longer-term RAMS analysis. This analysis examined changes in use in terms of users and user days from 2001 to 2016. Due to the longer extent of data used in this analysis, RAMS data were not manipulated as extensively as the five-year analysis. Data were manipulated by adding users or user days data for UC Home, UC Away, CSU System, CA Community Colleges, Other CA Colleges, U.S. Colleges, and International Colleges for research and education. All use data from Government, NGOs, For-Profit Business, K-12 Schools, and Others, were added to public reserve use. We created grouped bar charts of these data to view the change in use trends over time.

## 4.2. Interviews

### 4.2.1. Faculty member interviews

We interviewed five faculty members and lecturers between October 2017 and January 2018. Interviewees varied in home university, department, background, level of involvement with reserves, field of research, and career length (Appendix A). We asked each interviewee a consistent set of questions, categorized by (1) research and (2) university courses. We asked additional questions to gain additional details about individual experiences, recommendations, and knowledge.

### 4.2.2. Outreach expert interviews

We interviewed three outreach experts between October 2017 and February 2018. Through past and current positions, interviewees have

practical knowledge and experience in strategic environmental communication (see Appendix B). Interview questions varied among interviewees, depending on stage of project (i.e. preliminary research vs report feedback) and specific area of outreach expertise.

#### 4.2.3. Fire expert interviews

We interviewed six fire experts individually or in pairs between April and November 2017. We also conferred with a group of fire ecologists and wildland firefighters during a day-long tour of forest fire impacts within the Inyo National Forest. Through current positions, interviewees have practical or practical and analytical knowledge and experience relating to fire ecology, fire behavior, fire response, or modeling of vegetative response to fire (see Appendix B). Interview questions were tailored to the specific knowledge and background and area of research or practice of the interviewee.

### 4.3. Social media analysis

We conducted a social media analysis on Facebook as an outreach tool for the reserves. Other social media platforms, including Instagram, Twitter, and Snapchat, were not included in this analysis because we identified Facebook as the current primary UCNRS social media platform, and researchers often use Facebook to acquire and share scientific information (McClain, 2017). Results of the social media analysis are included in Appendix C.

We evaluated each of the 39 UCNRS reserve's Facebook level of activity, type of activity, and level of engagement. The first step in this evaluation was to determine if an UCNRS reserve operates a Facebook account. To do this, we searched the name of each of the 39 reserves using Facebook's "People" search function. We designated Reserves as having a Facebook page if they had "Official Facebook profiles," or profiles that are owned and operated by the reserves. Reserves with "unmanaged pages," or pages generated by Facebook that are not managed by the business, place, or organization, were not recognized as having Facebook profiles (Kelly, 2018). Because unmanaged profiles are not operated by the reserve, it is not within their outreach strategy and thus were not included in this analysis.

We evaluated reserves' official Facebook pages to determine the level of activity, type of posts, and level of engagement. We observed these metrics by viewing the content posted to each Facebook profile over the six-month to one-year period before January 9, 2018 (hereafter "observed interval"). The month of December, 2017 was not counted in this analysis to exclude posting variability due to the holiday season.

We measured level of activity in post frequency per month, which is the number of times per month each reserve normally posted during the observed interval. To determine the type of posts, we evaluated post content over the observed interval. Post Content refers to the subject of posts, and is important to observe because patterns and themes reflect reserves' identities, priorities, and unique characteristics. We created categories of Post Content to ensure consistency and allow for comparison across Facebook pages. Common Post Content categories include wildlife photography, reserve research, and news coverage. We recorded Facebook pages' overarching themes, interesting content, voice, and media to further help to understand each reserves' Post Type.

We recorded Level of Engagement, or how much reserves' audiences typically interact with posts, over the observed interval. Level of Engagement was recorded with three metrics - Page Followers, Page Likes, and Post Likes. Page Followers refer to Facebook users who click "Follow" on Facebook pages to get each of the pages' posts sent to their personal Facebook feed. Page Likes refer to Facebook users who click "Like" on Facebook pages to both (1) get each of pages' posts sent to their personal Facebook feeds, and (2) to show general support of the pages (Facebook, 2018). Post Likes refer to the number of times Facebook users click "Like" on posts shared by reserves (Facebook, 2018). Because there is some variability in Post Likes during the observed interval, a range of typical likes per post was recorded over the observed interval. "Comments" and "Shares" are other types of Facebook engagement, but they were not included in this analysis due to their wide variability across pages and posts.

We placed Official Facebook pages in descending order according to Page Likes and Followers, which followed the same trends, because they are the most powerful sources of expression of audience engagement. It reflects users who not only view and interact with a post once, but who opt to continually view reserve Facebook posts. Gaining a specific number

of Facebook page likes and followers could be a finite, measurable outreach goal.

#### 4.4. Literature review

We conducted a literature review to determine the impacts of prescribed burning and other management actions would have on reserve habitat communities. In particular, the literature review focused on the effects fire has on coastal sage scrub, grassland, and oak woodland communities for Sedgwick and to determine the effects of various fuel treatment types on mixed conifer forests at Valentine. Since there was not sufficient literature on habitats exactly like those at Valentine, the scope of the review was expanded to include effects of fuel treatments on habitats under similar climates (e.g., Arizona, Spain) or with tree species in common (e.g., lodgepole pine, Jeffrey pine). Apart from the literature, we examined the effects of fuel treatments on mixed conifer forests based on technical reports and meta-analyses in USFS database. We combined information from the literature review with the best available knowledge of forest management experts and practitioners, as identified in expert interviews, to provide recommendations for vegetation management at Valentine.

A literature review was conducted to gather relevant best available information on communication theory and practices. Literature on communication theory and practices, and outreach management plans were used to choose key messages, audiences, tactics, and success measurement methods in research and university-level education outreach plans. Literature on communication theory and practices was also used to evaluate the effectiveness of proposed research and university-level education-related tactics.

#### 4.5. FRID analysis

The impacts of fire on reserve habitats was also evaluated based on US Forest Service Fire Return Interval Data (FRID), which analyzes the time since an area has been burned and compares it to pre-settlement burn conditions. This information was combined with the best available knowledge of fire impacts to determine the impacts prescribed burns would have on the reserve.



#### 4.6. Community stakeholder identification

Local community groups use the reserves for a variety of reasons, including citizen science efforts, retreats, and field trips. The reserves prioritize fostering positive community relations and serving the public in meaningful, science-driven ways. To facilitate this, we created a list of community groups who either currently use the reserve or have a potential to use the reserve (Appendix D). Potential groups were identified based on a search of organizations that were located in communities that surrounded the reserve (i.e., communities of Woodstock, Lompoc, Los Olivos, Santa Ynez, Solvang, Buellton, Los Alamos, and Santa Barbara for Sedgwick and the communities of Mammoth, Bishop, and Lone Pine for Valentine) and whose mission related to that of the reserve. Groups that currently used the reserves were identified using RAMS and the number of applications between 2012 and 2017 for each group was summed. Each current group that used the reserve was subsequently ranked by total applications and the groups with the highest use were considered to be primary community stakeholders for the reserves. These groups were then sorted into four categories: surrounding communities, surrounding parks and agencies, environmental and science organizations, and nature education organizations. These community stakeholder groups were sorted into these categories to simplify outreach strategies.

#### 4.7. Surveys

Seven surveys were distributed to university faculty members and community groups. The goal of these surveys was two-fold: (1) to better understand how audiences learned about the reserves, facilities that were used the most, barriers to use, and perceptions of the potential level of benefit of proposed strategies to increase research, education, and public service, and (2) to run a preliminary test of the Ambassador and Administrative Assistant networks proposed in the Research and Education Sections of this report.

One survey was distributed to faculty members from any university who have served as Principal Investigator (PIs) on at least one research project between July 2016 and March 2018 at Sedgwick (from Research Ambassador Networks – see Tactic 3 in Research Section). A similar

survey was distributed to faculty members who have been the PI between July 2016 and March 2018 on research projects at Valentine. A third survey was distributed to faculty members from any university who have taken at least one university-level course to Sedgwick between July 2016 and February 2018, and a similar survey was distributed to faculty who have taken at least one university-level course to Valentine between July 2014 and February 2018 (from Education Ambassador Networks – see Tactic 3 in Education Section). Two surveys were distributed to community and environmental groups surrounding Sedgwick and Valentine (see Community Stakeholder Identification in the previous section). A final survey was distributed to administrative assistants across departments and universities (from Administrative Assistant Networks – see Tactic 1 in Education and Research Sections). Departments and universities were chosen that (1) house at least one faculty member who has conducted research or university-level teaching at Sedgwick or Valentine, or (2) faculty members within departments and universities could be interested in conducting research or coursework at the reserves. The administrative assistants were instructed to distribute the survey to faculty members within their departments to take. Questions for each survey can be found in Appendix E.

#### 4.8. Development and evaluation of management actions

##### 4.8.1. Management action development

This project identified management options and tactics that could help Sedgwick and Valentine meet the primary and secondary goals for the wise stewardship, research, and university-level education pillars. We developed management options under wise stewardship and tactics under research and development. Each option and tactic was evaluated for its effectiveness meeting goals. Identification and evaluation of options and tactics were based on expert interviews, faculty member interviews, social media analyses, literature, and published and unpublished reserve information. In this way, we make recommendations with management options and tactics can help each reserve make the most progress toward fulfilling UCNRS mission, given identified natural and human-derived barriers and assets.

##### 4.8.2. Measure of value for evaluation

We evaluated each identified management option and tactic for the magnitude of positive and negative impacts they could have on the primary goals of each pillar. Each level was assigned a score, which was used to determine the overall score and recommendation for the option or tactic. Scores were assigned both for the strength of the impact and the relation to reserve conditions to make the determination. The impacts are categorized and defined as follows:

- High impact (4): Specific management options and tactics have resulted in strong, direct outcomes in similar scenarios. Available research and information is directly applicable to the specific situation at the reserve, or there is a preponderance of related information supporting the likelihood of a positive beneficial response.
- Medium impact (3): General and/or related management options and tactics have resulted in moderate or nonspecific outcomes in similar or related scenarios. Available research may show results of management options or tactics that do not directly tie to the specific situations at the reserves.
- Low or little impact (2): General and/or related management options or tactics have resulted in small or non-specific outcome in similar scenarios and /or habitats, or (2) available information shows that the specific management option or tactic has resulted in small or non-specific outcomes in similar scenarios and /or habitats
- No impact (1): Specific management option or tactic has no effect in similar scenarios, or (2) general and/or related management options have no effect in similar scenarios.

Impacts and scores were assigned for the pillar under which the recommendation was developed as well as under the remaining pillars. Subscores were calculated by adding the scores assigned under each pillar, and weighted according to whether they were under the pillar for which the recommendation was developed (0.6), or the other pillars (0.2). We assigned weights to the scores to reflect that each recommendation is primarily based on its primary pillar, while secondary pillars were given lesser value. The values of 0.6 and 0.2 represent that the primary pillar is three times more important in the evaluation scheme. Negative impacts under a pillar were given a negative score of

the appropriate magnitude for both the strength of the impact and the relation to reserve conditions. The final score was determined by adding the subscores.

The public service pillar was not included in this scoring method. Final score categories are discussed below.

#### 4.8.3. Recommendations scorecard

Using literature review, interviews, RAMS analysis, and surveys, we evaluated management tactics and options for their ability to contribute to each reserve's primary and secondary goals. We compiled all of the options and tactics in a scorecard with color-coded levels of recommendation for easy visualization of best practices.

#### 4.8.4. Recommendation definitions

Once we evaluated each management action (e.g., tactics, options) using the above methods, we assigned levels of recommendation according to the following categories, represented in both the scorecards and this report:

**Strongly Recommended (6-8):** Strongly recommended management options and tactics have a high impact in helping the reserve meet the primary goal with little to no introduced risk to either primary goal or secondary goals. Overall, the option or tactic will likely be highly impactful in helping the reserve reach the primary goal - and these gains strongly outweigh impacts of negatively contributing to existing barriers or introducing new barriers.

**Moderately Recommended (4-5.9):** Moderately recommended management options and tactics refer to one of the following:

1. The management option or tactic has a low to medium impact in helping the reserve advance toward the primary goal with little to no introduced risk to either primary or secondary goals.
2. The management option or tactic has high impact in helping the reserve advance toward the primary goal with low to medium risk introduced to either the primary or secondary goals.

Overall, the potential positive impacts of the option or tactic on meeting the primary goal will moderately outweigh impacts of negatively contributing to existing barriers or introducing new barriers.

**Weakly Recommended (2-3.9):** Weakly recommended management options and tactics have medium to high impact in helping the reserve advance toward the primary goal with low to medium risk to either primary or secondary goals. Overall, the potential positive impacts of the option or tactic on meeting the primary goal will weakly outweigh impacts of negatively contributing to existing barriers or introducing new barriers.

**Neutral (1-1.9):** Neutral management options and tactics refer to one of the following:

1. The management option or tactic has a medium to high impact in helping the reserve advance toward the primary goal with medium to high introduced risk to either primary or secondary goals.
2. The management option or tactic has a low to medium impact in helping the reserve advance toward the primary goal with a low to medium introduced risk to either primary or secondary goals.
3. The management option or tactic has little to no impact in helping the reserve advance toward the primary goal with little to no introduced risk to either primary or secondary goals.

Overall, the potential positive impacts of the option or tactic on meeting the primary goal will be close to the magnitude of impacts of negatively contributing to existing barriers or introducing new barriers.

**Not Recommended (<0):** Non-recommended management options and tactics refer to one of the following:

1. The management option or tactic has little to no impact in helping the reserve advance toward the primary goal with low to medium introduced risk to either primary or secondary goals.
2. The management option or tactic has little to no impact in helping the reserve advance toward the primary goal with medium to high introduced risk to either primary or secondary goals.
3. The management option or tactic has a low to medium impact in helping the reserve advance toward the primary goal with medium to high introduced risk to either primary or secondary goals.

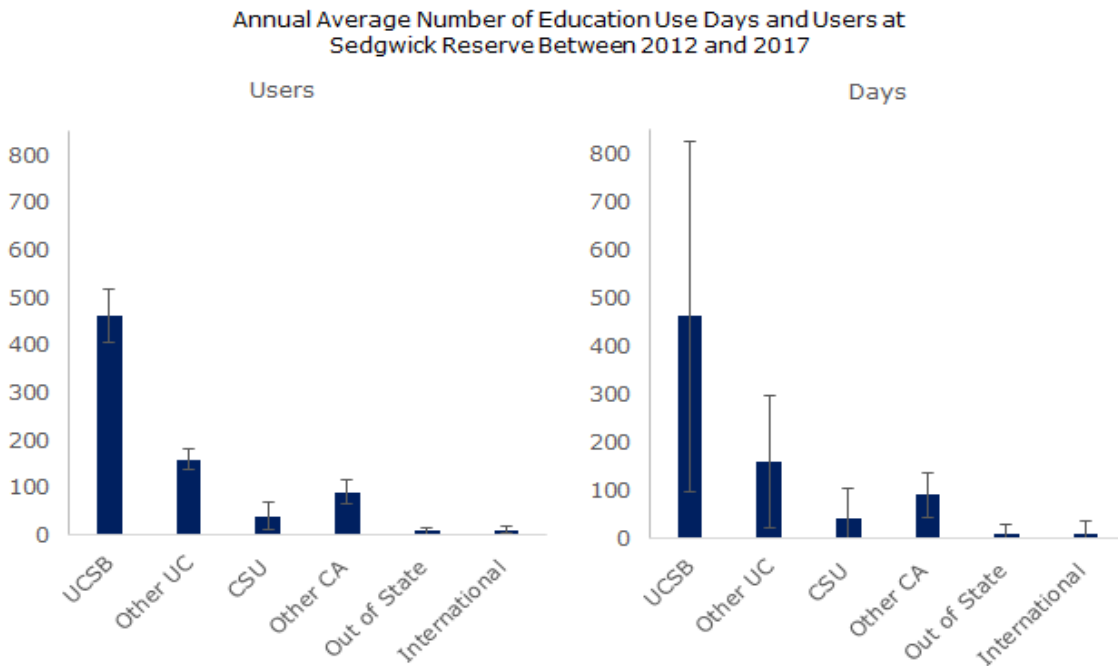
Overall, the potential positive impacts of the option or tactic on meeting the primary goal will not outweigh impacts of negatively contributing to existing barriers or introducing new barriers.

## 5. Results

### 5.1. RAMS analysis

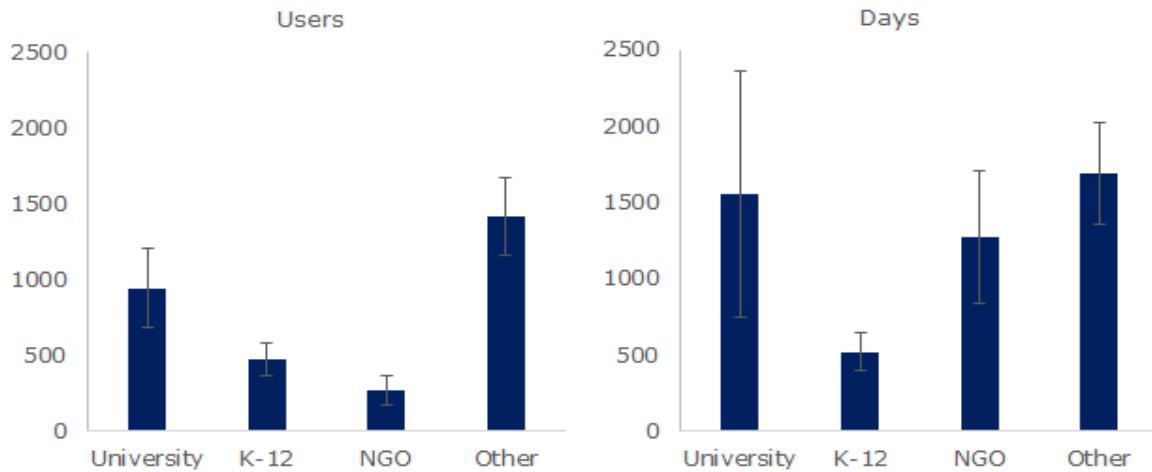
#### 5.1.1. Sedgwick reserve

The number of users at Sedgwick has increased from 2002 to 2016. In 2002, there were a total of 198 users at the reserve (31 for research, 71 for education, and 96 for public use) and in 2016 there were 3,800 users (280 for research, 435 for education, and 3,085 for public use). However, there has been a decrease in user days. There was a total of 11,364 user days (9,735 for research, 77 for education, and 1,552 for public use) in 2002 and only 7,531 user days (1,829 for research, 1,517 for education, and 4,185 for public use) in 2016. Though there was a large decrease in user days between those two years, it does appear as if 2002 and 2003 were two years with unusually high numbers of user days. Aside from 2002, 2003, 2006, and 2007, the highest number of user days were for public use. The same trend is seen for the number of users, as public users outstrip education and research users for all years.



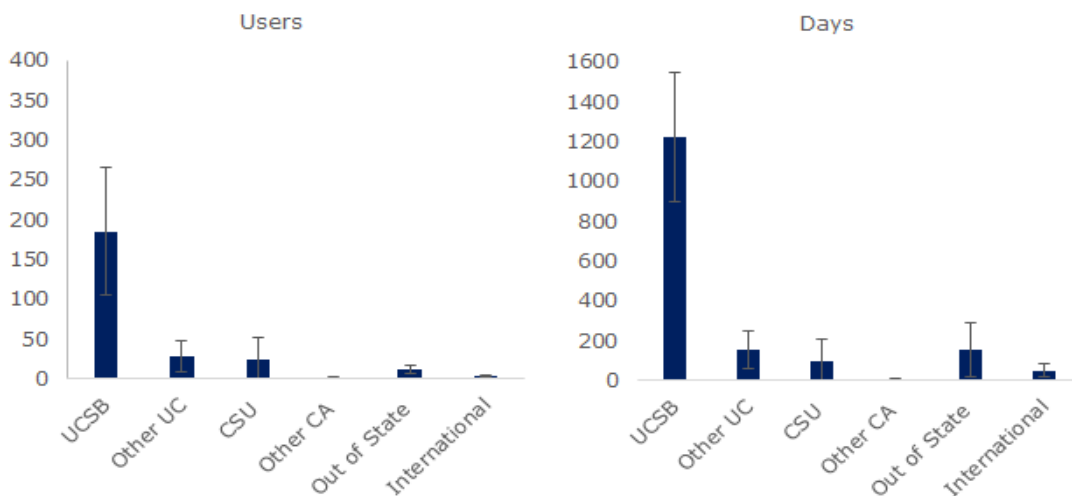
**Figure 3.** Average annual amount of educational use by use days at Sedgwick between 2012 and 2017. This includes university-level teaching only by type of university. Error bars show one standard deviation.

Annual Average Number of Public Use Days and Users at Sedgwick Reserve Between 2012 and 2017



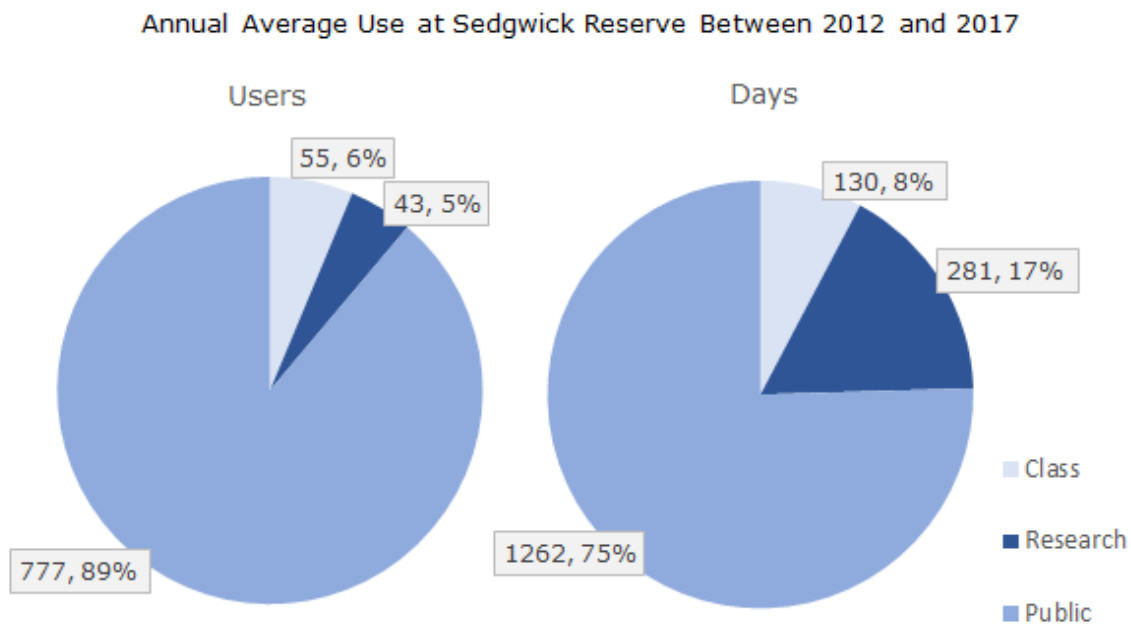
**Figure 4.** Average annual number of public users and use days by affiliation at Sedgwick from 2012 to 2017. "Other" affiliation shows all other user affiliation types including government and profit business. Error bars show one standard deviation.

Annual Average Number of Research Use Days and Users at Sedgwick Reserve Between 2012 and 2017



**Figure 5.** Average annual number of research users and use days by university type at Sedgwick from 2012 to 2017. Error bars show one standard deviation.

From 2012 to 2017, Sedgwick had the highest average use days in public service (75%), then university-level research (17%), and the lowest in university-level teaching (8%) (Figure 6). For public service use, colleges and NGOs used the reserve the most, whereas K-12 schools had the lowest use level (Figure 4). There is no apparent trend in the five years other than UCSB’s increase in teaching use.



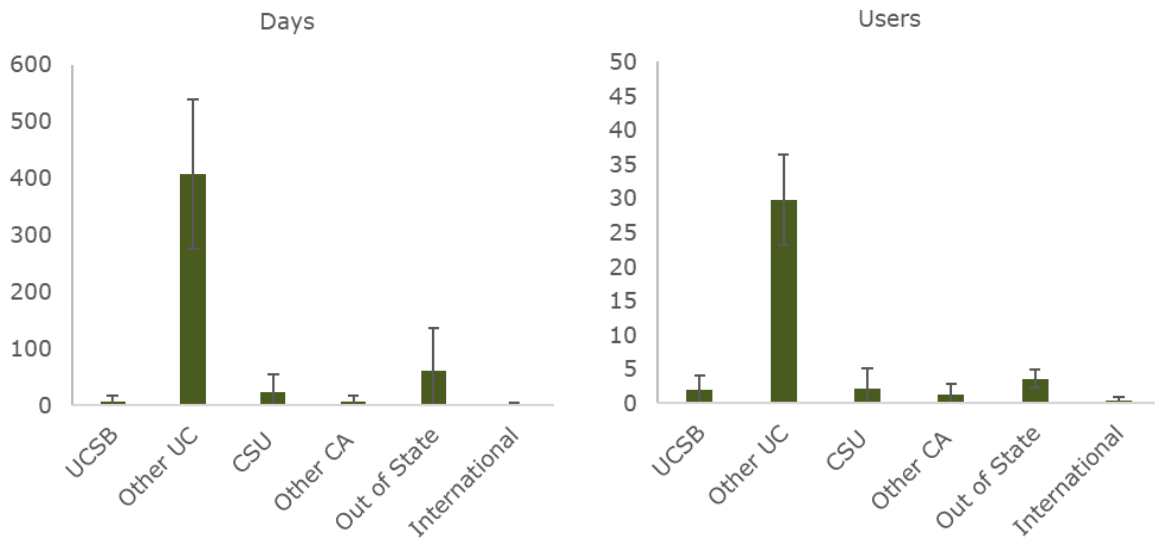
**Figure 6.** Average annual number of user and use days over a five-year period at Sedgwick by type of use. Sedgwick shows more use by the public, compared to research and university-level education.

### 5.1.2.Valentine Camp

Reserve use at Valentine has fluctuated among years analyzed. In general, use has increased from 2001 to 2016. There was a total of 676 users in 2001 (18 research users, 34 educational users, and 624 public users) and total users in 2016 was 1,049 (37 research users, 58 educational users, and 954 public users) (RAMS, 2018). A corresponding increase in total user days was also observed with 2,075 total user days in 2001 (396 for research, 73 for education, and 1,606 for public use)

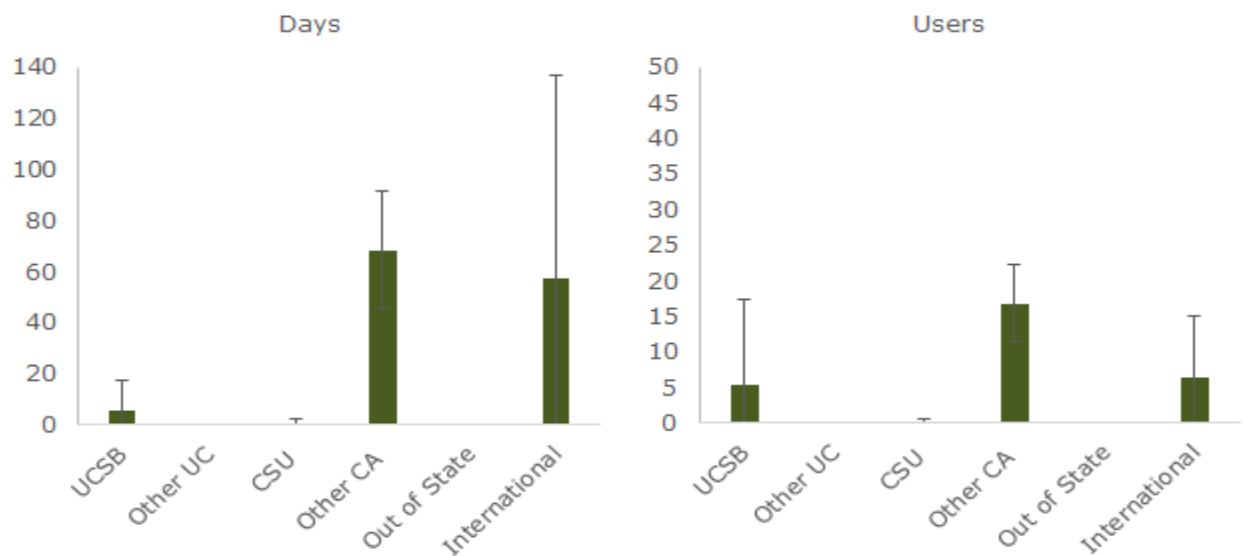


and 2,168 user days in 2016 (562 for research, 196 for education, and 1,410 for public use). The public used Valentine more than any other user type for all years observed (Figure 10).



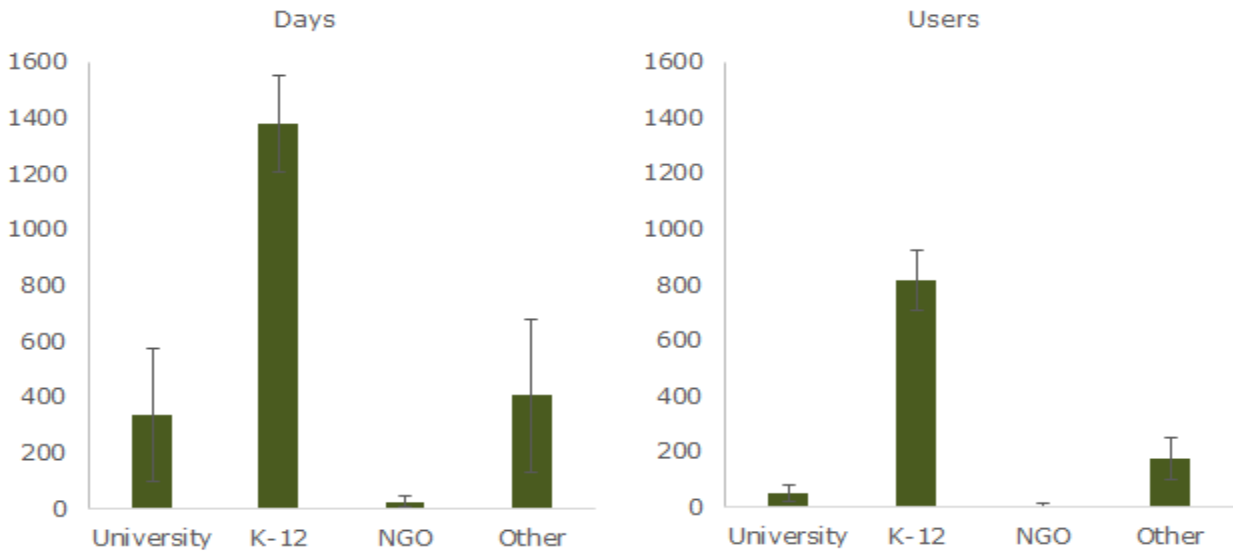
**Figure 7.** Average annual amount of research use by use days at Valentine between 2012 and 2017. Error bars show one standard deviation.

**Annual Average Number of Educational Days and Users at Valentine Camp Between 2012 and 2017**



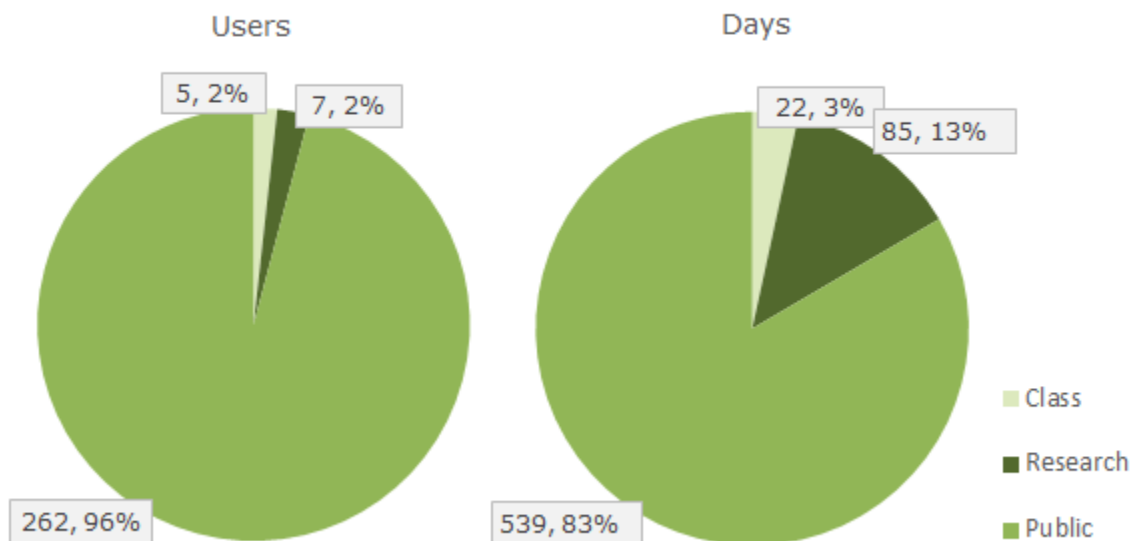
**Figure 8.** Average annual amount of educational use by use days at Valentine between 2012 and 2017. This includes university-level teaching only by type of university. Error bars show one standard deviation.

Annual Average Number of Public Use Days and Users at Valentine Camp Between 2012 and 2017



**Figure 9.** Average annual number of public users and use days by affiliation at Valentine from 2012 to 2017. “Other” affiliation shows all other user affiliation types including government and profit business. Error bars show one standard deviation.

Annual Average Use at Valentine Camp Between 2012 and 2017



**Figure 10.** Average annual number of user and use days over a five-year period Valentine by type of use. Valentine is mostly used by the public, compared to research and university-level education. Error bars show one standard deviation.

From 2012 to 2017, public service comprised the highest amount of use days (83%), then university-level research (13%), and the lowest in university-level teaching (3%) (Figure 10). UC campuses other than UCSB are the main users for research, followed by out-of-state colleges. However, these colleges, along with CSU campuses, rarely use Valentine for teaching. K-12 schools make up a dominant portion of public service use at Valentine, whereas NGO/non-profits have minimally used Valentine in the last five years. There is no clear trend in the five years other than 2016-17, a very large snow year, had lower use than previous years in several use and user types (Weather Trends 360, 2017).

Annual research use from reserves we compared to Sedgwick averaged 43 long-term projects, 35 short-term projects, and 78 total research projects per year. Annual research use from reserves we compared to Valentine averaged 8 long-term projects, 7 short-term projects, and 15 total projects per year.

## 5.2. Faculty member interviews

### 5.2.1. Research

In the five faculty interviews, interviewees indicated several characteristics of field sites that they consider in the decision. Some desirable characteristics are shared across fields of study, while others are specific to one field of research. Shared desirable characteristics include guarantee of long-term access, research-friendly rules (i.e., non-restrictive vehicle use guidelines and equipment installation rules), available workspace, and comfortable accommodations. Desirable characteristics specific to hydrology include historical records of climate factors (e.g., wind speed, precipitation, and solar radiation), weather station, and hydrological features of study (e.g., stream, pond, wetland). Ecology-specific desirable characteristics include available climate data (e.g., precipitation, humidity, soil, and temperature), animals and species lists, and replicated communities.

### 5.2.2. Desirable characteristics and resources for university-level education

During the five faculty interviews, interviewees shared desirable characteristics and resources for university-level course field sites. Regardless of academic field, most researchers share similar desirable characteristics. However, these vary between short-and long-term courses.

Faculty members who teach single and multi-day courses look for sites they are familiar with (e.g., previous research site) that have easy access (e.g., adequate roads), are inexpensive, and have accommodations for teaching (e.g., lab space). Multi-day course instructors seek overnight accommodations and a kitchen, as well. For day-long courses, faculty members heavily consider the proximity to their university. Two faculty members shared that they would drive a maximum of forty-five minutes to an hour and a half to get to a field site.

Although many desired characteristics are shared among academic disciplines, a few depend on the specific course material. For botany courses, a diversity of plant families is needed. For ecology courses, unique or endangered species, access to birding, varied plant communities and habitat types, and undisturbed ecosystems are

favorable characteristics. Additionally, field sites that allow students to connect observations with larger land management and ecological issues can be sought after.

### 5.2.3. Barriers to university-level education

#### *Funding*

Funding was the most frequently articulated barrier among interviewees. No matter the course subject considered, interviewees expressed that there are added costs associated with incorporating a field component in courses or teaching a completely field-based course. Sources of extra costs shared in interviews include faculty salaries (dependent on university salary system and time of year course is offered), teaching assistant compensation, equipment cost, food cost, transportation, lodging. Cost for faculty members who wish to teach field courses. Faculty must fundraise and choose sites and courses that require minimal additional funding.

#### *Faculty member turnover*

When faculty members who create and lead “elective” field courses retire, it is not guaranteed that a new or existing faculty member will continue teaching the course. One interviewee explained that universities do not always hire new faculty members who have the same interests and expertise as the retiree, further decreasing the chance of a new faculty member to take up a previously-taught field course. However, this was explained to be the case for elective courses, not required courses. Therefore, field components of required courses have a higher chance of continuation.

#### *University faculty unawareness*

All faculty member interviewees, regardless of home university, shared the perception that faculty members are generally unaware of the existence and possible uses of Valentine and Sedgwick. UCSB faculty members interviewed shared that other UCSB faculty members generally lack awareness of Sedgwick and Valentine.

#### *Time constraints with students*

Depending on the course, faculty members have little time with students. This is especially true for a typical course with a lab taught during the academic year only provides one weekly two to two-and-a-half hour time interval for field trips. One interviewee who teaches this type of course

shared that he is unable to take his classes to sites more than ten minutes away because of time constraints. Another interviewee shared her time constraints associated with a more intensive field-based ecology course offered at UCSB.

#### *Lack of familiarity with the field site*

Lack of familiarity is a potential barrier that could prevent faculty members from taking students to reserves for field-based courses. Two interviewees shared the need to be familiar with field sites before taking students there for field-based courses. One interviewee expressed that he only uses sites that he or students in his lab have used in research projects. By ensuring his familiarity with a site, he already knows answers to questions he asks students during field courses, which he expressed is vital to build credibility of experiments and field methods.

#### 5.2.4. Fire expert interviews

##### *Sedgwick Reserve*

Depending on the background of the expert interviewed, recommendations regarding fire on the reserve varied. The expert from the Santa Barbara County Fire Department, who is primarily concerned with preserving human lives in case of a fire, felt strongly that creating a mosaic of varying aged coastal sage scrub vegetation would provide fire fighting forces with areas where an unplanned fire would slow and allow them better opportunity to contain the fire. Fire modeling experts felt that the vegetation would return to pre-fire fuel loads within one to three years, reducing the effects of a prescribed burn program. An additional recommendation provided for Sedgwick was the use of prescribed burns within the grasslands as part of an invasive grass removal and native grass restoration plan.

##### *Valentine Camp*

The fire experts interviewed regarding Valentine agreed that tree density should be reduced to approximately 620 trees per hectare (250 trees/acre) with Jeffrey pines (*Pinus jeffreyi*) preferentially selected to remain on the property assuming that they were healthy and without bark beetle infestation. All agreed that this should be completed through removal of smaller trees, leaving trees with larger diameters and that debris from tree removal activities should be piled and burned after snowfall to reduce risk of the fire escaping. There was some discussion as

to whether the structure of the remaining forest should be of more evenly spaced trees or if remaining trees should be left in clumps with more open space left in the canopy between the clumps of trees.

Experts with more specific knowledge of the site recommended that cultural resource areas, wetland, and stream areas should be avoided during tree removal activities. Areas around the buildings are of additional concern as the buildings date back to the early 1900s and are not fire safe. One section of Valentine has not had thinning treatments due to the steep slope in that area, however it is a leeward slope that fire will not spread down quickly (H. Safford, personal communication, July 17, 2017).

No experts viewed Valentine as a primary ignition source, however due to its location at the base of the pass, it is considered as a secondary source of spread for a fire from the west. It is considered a high fire risk for spread of an externally started fire due to the high density of trees.

#### 5.2.5. Community relations interviews

Outreach best practices were shared during communication expert interviews. Before starting outreach efforts, communicators should understand specific reasons for outreach and establish clear, measurable objectives. When identifying audiences, communicators should ensure equal access to information among underrepresented audiences and those with special needs (e.g., address languages, disabilities, and visual impairment). Communicators should use various types of media (e.g., magazines, website, social media), but be aware each medium's abilities and limitations. Although these are broad best practices, they should be considered in reserves' efforts to outreach with research, education, and public service audiences.

### 5.3. UCNRS social media use

Of the 39 reserves in the UCNRS system, 17 reserves operate official Facebook pages. Common themes and post content include birds, unique wildlife and natural characteristics, research, reserve events and announcements, and volunteer restoration efforts. Several reserves repost environmental organizations and labs with related content, share environmental and local media coverage, and post wildlife photography. Reserves also use Facebook events to advertise reserve events.

Four reserves did not shared posts during 2017. The remaining 13 reserves varied widely in post frequency, ranging from one to 45 posts per month ( $\bar{x} = 9$ , median = 6). While post frequency does not seem to be correlated with level of engagement, it is important to note that three of the five reserves with the highest level of engagement post four times per month.

White Mountain Research Center (UCLA) has the highest amount of engagement among UCNRS reserve Facebook pages (1051 Page Likes, 1057 Page Followers). White Mountain Research Center posts about four times a month, with posts about local and environmental news, wildlife photography, reserve events (e.g. lectures, restoration efforts), and reserve announcements. Steele/Burnand Anza-Borrego Desert Research Center (UC Irvine) has the second-highest level of Facebook engagement (833 Page Likes, 901 Page Followers), and Coal Oil Point Reserve (UCSB) has the third-highest level of Facebook engagement (808 Page Likes, 806 Page Followers).

#### Sedgwick Reserve

Of the 17 UCNRS reserve Facebook pages, Sedgwick has the fourth-lowest level of Facebook engagement (112 Page Likes, 111 Page Followers). Sedgwick posts about seven times a month, and Post Content overlaps with more actively-engaged reserve pages (e.g. wildlife photography, natural events, reserve events, and volunteer efforts). Additionally, Sedgwick posts about reserve history and reposts wildlife information.

#### Valentine Camp

VESR - comprised of both SNARL and Valentine - has the lowest level of Facebook engagement (15 Page likes, 16 Page Followers). VESR posts about five times a month, with Post Content spanning research news coverage, research related to the reserve, and reserve opportunities (e.g. grants). (Appendix C)

### 5.4. Community stakeholder groups

#### *Sedgwick Reserve*

Current community groups that use the reserve as well as examples of potential groups were identified. A total of 21 community groups were



identified for Sedgwick. These include organizations such as the Santa Barbara Botanic Gardens, the Land Trust for Santa Barbara Country, the Santa Barbara Audubon, Explore Ecology, the Los Padres Forest Watch, and the US Forest Service (Table 1). A more complete list of identified community groups for Sedgwick can be found in Appendix D.

**Table 1.** Community groups with highest use at Sedgwick from an analysis of public use from 2012-2017. Use determined by number of applications submitted by each organization per year. Colleges and universities excluded from this stakeholder list, though UCSB makes up 32% of public reserve use.

<b>Organization</b>	<b>Total Use (2012-2017)</b>	<b>Percent of Total Use (%)</b>	<b>Description of Use</b>
Woodstock Property Owners Association	20	6.3	Monthly board meetings
Las Cumbres Observatory Global Network	15	4.8	Outreach and star parties using the Byrne observatory
Santa Barbara Botanic Garden	8	2.5	Trail rides and naturalist field trips
Santa Ynez Valley Natural History Society	8	2.5	Birding and ecological lectures
Fillies Riding Group	7	2.2	Equestrian rides for riding club
Fund for Santa Barbara	7	2.2	Retreat for organization
Santa Barbara Museum of Natural History	7	2.2	Birding classes
Santa Barbara Sage Hens	7	2.2	Equestrian rides around the reserve
NatureTrack Foundation	6	1.9	K-12 field trips
Santa Barbara County Search and Rescue	5	1.6	Training scenarios such as conducting open area and

			building searches
Wilderness Youth Project	5	1.6	Staff retreats

Valentine Camp

Community groups that currently use Valentine as well as groups that could potentially use the reserve were identified. A total of 23 community groups were identified for Valentine, including Mammoth Lakes Parks and Recreation, the Eastern Sierra Nevada Land Trust, the Sequoia and Kings Canyon National Park, and the Bishop Paiute Tribe Environmental Management Office. A full list of identified community groups can be found in Appendix D. Over 60% of Valentine public use was for K-12 education and the highest public use of Valentine was by Mammoth Elementary schools (Table 2).

**Table 2.** Community organizations that used Valentine from 2012-2017. UCSB and other UC’s not included, though they also showed public uses of the reserve.

<b>Organization</b>	<b>Description of Use</b>
Mammoth Elementary	Class field trips
California Academy of Sciences	Conservation photography visit
California Native Plant Society	Flora documentation
Sierra Nevada Big Horn Sheep Foundation	Mural painting

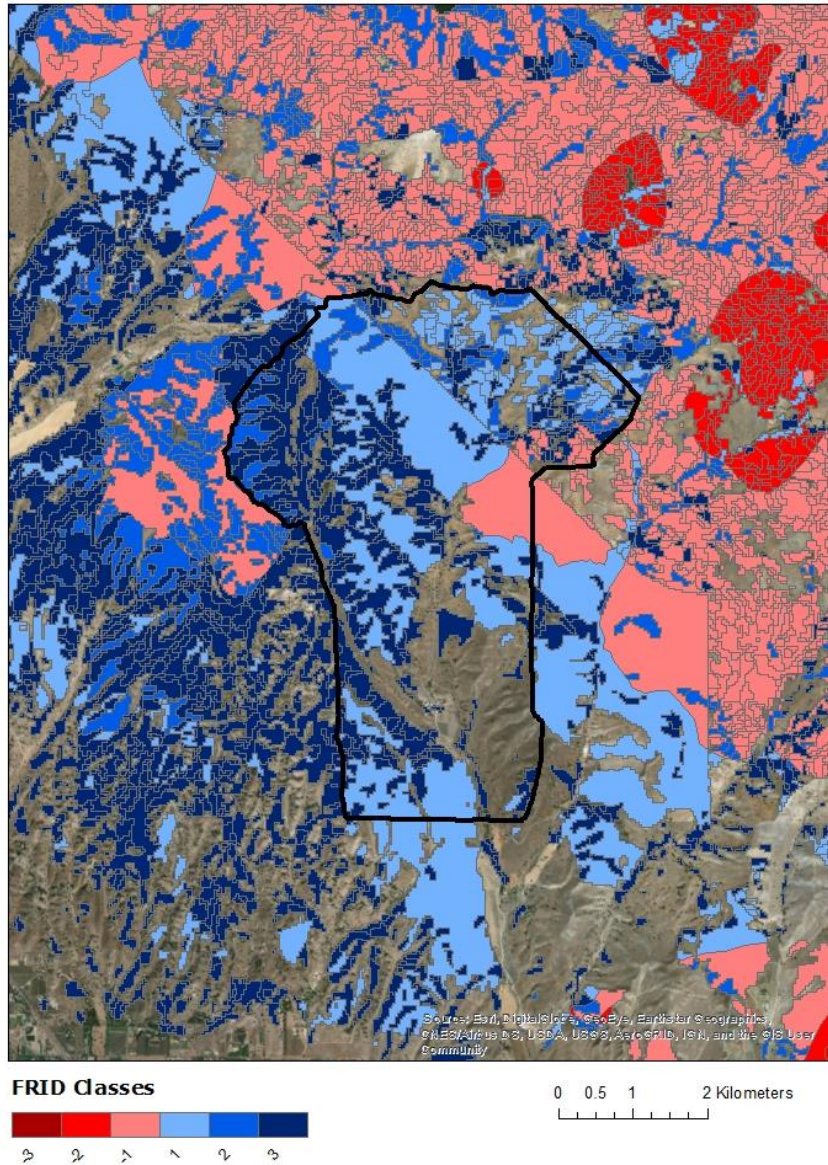
5.5. FRID maps

*Sedgwick Reserve*

The majority of Sedgwick burns less frequently than under pre-settlement conditions, though there is an area on the eastern boundary that has burned more frequently than under pre-settlement conditions (Figure 11). Most of the reserve is under low departure from pre-settlement conditions, though there is a significant portion of the reserve that is currently under high departure from pre-settlement conditions. For the areas that have burned less frequently, most of those habitat types are

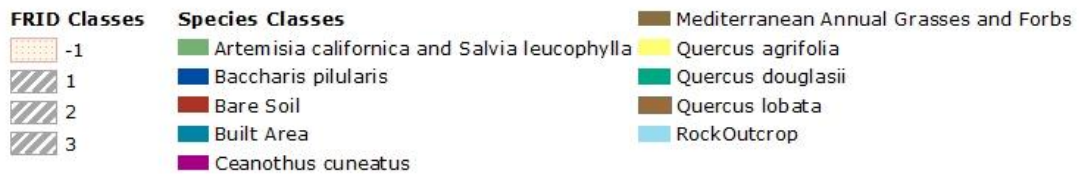
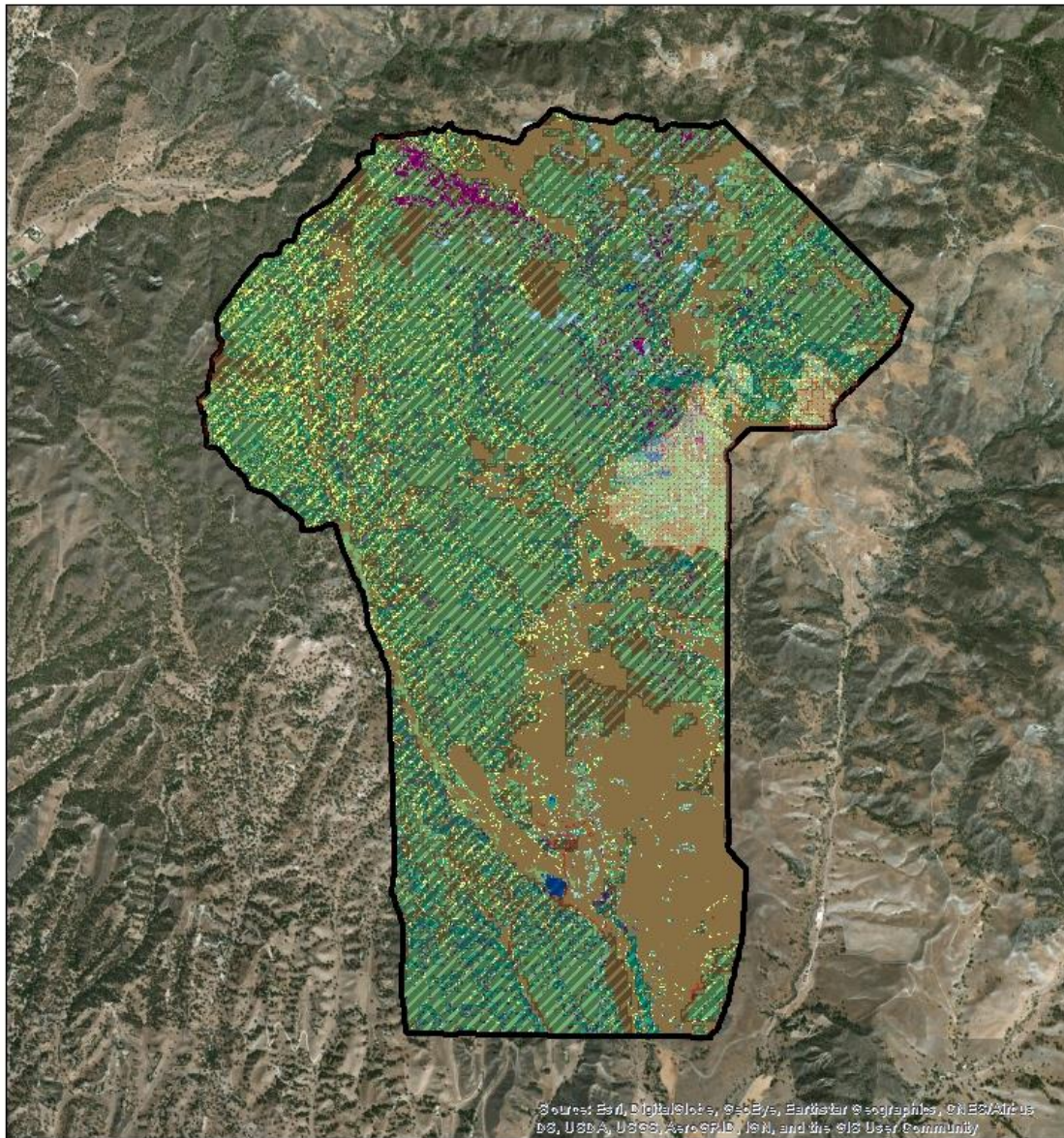
comprised primarily of California sagebrush (*Artemisia californica*) and

Fire Return Interval Deviation (FRID) Map for Sedgwick Reserve



**Figure 11.** FRID map of Sedgwick Reserve. Return interval deviation divided into three percentile categories. 3 indicates a “high departure” or a deviation from pre-settlement conditions of greater than 67%, 2 indicates a “moderate departure” with deviations between 33 and 67%, and 1 indicates “low departure” or deviations between 0 and 33%. Negative values indicate departures where fires are burning more frequently than pre-settlement conditions and positive values indicate areas where fires are burn less frequently than under pre-settlement conditions. FRID data from the US Forest Service.

Fire Return Interval Deviation (FRID) Map for Habitats at Sedgwick Reserve

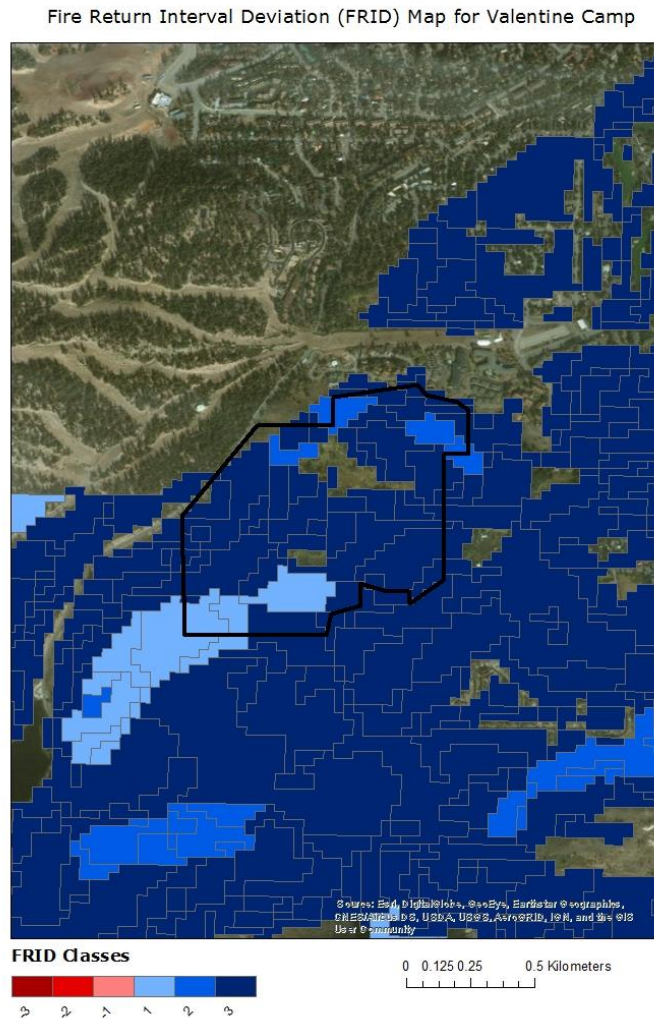


**Figure 12.** FRID map of Sedgwick Reserve with habitat types. FRID intervals divided into two categories, burning less and burning more frequently. Areas burning less frequently are cross-hatched and areas burning more frequently are stippled. FRID data from the US Forest Service and Sedgwick habitat data types were provided by Gabriel Daldegan.

white sage (*Salvia leucophylla*), wedgeleaf ceanothus (*Ceanothus cuneatus*), and coast live oak (*Quercus agrifolia*) (Figure 12).

### Valentine Camp

Most of Valentine is under high departure from pre-settlement conditions,



with two small patches under middle and low departure. All of this

**Figure 13.** FRID map of Valentine Camp. Return interval deviation divided into three percentile categories. 3 indicates a “high departure” or a deviation from pre-settlement conditions of greater than 67%, 2 indicates a “moderate departure” with deviations between 33 and 67%, and 1 indicates “low departure” or deviations between 0 and 33%. Negative values indicate departures where fires are burning more frequently than pre-settlement conditions and positive values indicate areas where fires are burn less frequently than under pre-settlement conditions. FRID data from the US Forest Service.

departure is due to the majority of Valentine (as far as FRID data covers) burning less frequently than under pre-settlement conditions (Figure 13). Specific habitat types of the two small patches that have less deviation from pre-settlement conditions can be confirmed with an updated vegetation map for Valentine.

## 5.6. Surveys

Seven separate surveys were sent out to different audiences. For the Sedgwick Reserve Research Survey, there were a total of 16 responses out of 38 invitations. For the Valentine Camp Research Survey, there were six responses out of 14 invitations. The Sedgwick Reserve Education Survey had seven out of 21 responses. The Valentine Camp Education Survey had five out of nine responses. The Sedgwick Community Use Survey had nine out of 43 responses and the Valentine Camp Community Use survey had eight out of 26 responses. The overall use survey (Sedgwick Reserve and Valentine Camp Use Survey) was sent to 87 administrative assistants (i.e. administrative officers, department managers, executive assistants, administrative coordinators, etc.) who were asked to forward the survey to all faculty in their department. It is unknown the exact number of faculty who received the survey, but there were a total of five responses. A summary of the responses for these surveys can be found in Appendix F.

## 6. Discussion

### 6.1. Part 1: Wise stewardship

This section identifies the specific goals, risks, options, and recommendations under the wise stewardship pillar for each reserve. Risks and recommendation levels are based on the information gathered during literature reviews and expert interviews. This information is provided in detail in the evaluation of each option. We have created a Wise Stewardship Management Scorecard that shows management options and the strength of recommendation for each based on our evaluations (Appendix G).

#### 6.1.1. Sedgwick Reserve

##### **Risks**

Risks were identified based on findings from the literature review and interviews with experts. References and support for these risks are included in the evaluations of the options described below. The following risks have been identified as reducing the current ability of Sedgwick to meet the identified goals:

1. Type conversion of existing native habitats from repeated fires.
2. Invasive plant species and cover threatens native species.
3. Cost of implementing recommended management strategies.
4. External influences such as drought, climate change, and fire that will affect existing plants, animals, and communities.

## **Goals**

To promote the wise stewardship of the land by improving ecosystem health within Sedgwick, the following goals have been developed:

### Primary Goals

1. Support native habitats and species that currently exist onsite or have the potential to occur.
2. Increase understanding of habitats and species and their reaction to management actions and stressors.
3. Reduce invasive plant cover.
4. Improve habitat for native and rare species.

### Secondary Goals

1. Create opportunities for research of habitats and ecosystems.
2. Minimize risk from wildfires to native habitats.
3. Minimize spread of fire to neighboring communities without conflicting with primary goals.

## **Management Actions**

### Option 1: Long-term treatment monitoring

Sedgwick managers could implement long-term treatment monitoring as part of an adaptive management program. Adaptive management, at its



core, is a structured decision making process that uses the results of past management actions to inform future actions (Williams, 2011). Long-term monitoring to support adaptive management would include routine assessment of vegetation or other land management treatments through the development and implementation of a monitoring plan. The goal of the monitoring would be to determine the treatment method's effectiveness to attain management goals, impacts on target habitats and species, and implications on the larger ecosystem (USGS, 2004; Ralph et al., 1993; USDA, 2013). Results of the monitoring efforts would be used to inform future management actions. To be effective, baseline monitoring should be conducted before implementing treatments. Monitoring methods should remain consistent from the baseline monitoring through completion to be able to fully compare results. Post-treatment monitoring should occur on one to five-year intervals depending on the frequency of treatment, target species and habitats, and the expected response time of the flora and fauna within the treated habitat type (USGS, 2004; USDA, 2013).

*Recommendation: Highly Recommended*

Long-term treatment monitoring strongly supports wise stewardship goals by providing additional knowledge on the habitats at Sedgwick and the effects of vegetation management treatments, which will reduce uncertainty in the expected results of future management actions (Williams, 2011).

Long-term treatment monitoring would moderately support research university-level education goals. Monitoring efforts connected to the La Kretz Center could provide additional benefits to university-level education goals. If monitoring reports are available to researchers, this action would provide an additional beneficial effect on research.

*Evaluation*

This option would ensure that any land management methods used at Sedgwick accomplishes the intended results and meet the needs of the reserves. Monitoring the effects of vegetation and land management will allow reserve managers to adjust management actions as needed to meet the overall reserve goals, whether they reduce invasive species, improve habitat for special status or other species, or reduce dry fuel loads. Without monitoring, reserve managers cannot quantify the results of each

management method, ultimately hampering their ability to make efficient management decisions in the future.

Monitoring the effectiveness of management activities provides information to support adaptive management of reserve resources. Adaptive management is described in literature beginning in the 1950s, generally as an iterative decision making process that incorporates the results of past management actions into future decisions (Williams, 2011). It is well described by the United States Geological Survey Cooperative Research Units in 2011 (Williams). If reserve managers require additional resources on adaptive management, this article provides information on the history, components, decision making processes, uncertainties, and implementation scales for reference.

Monitoring could be completed in conjunction with a university-level course on field methods to provide additional benefits to the reserves goals. While it is not necessary to combine efforts with a university-level class, it would reduce the cost and time needed to complete monitoring activities by utilizing student efforts. Additionally, if monitoring reports are made available to researchers, they could aid research efforts related to the effects of management actions, however, monitoring done to inform Sedgwick management may not relate to or be in sufficient detail to meet the needs of the research project.

#### Option 2: Long-term management experiments

Long-term management experiments could be conducted to evaluate the effects of management actions on the habitats and ecosystems at Sedgwick. This differs from long-term monitoring in that it would not directly support adaptive management measures but would be structured to evaluate the effects of one or more land or vegetation management treatments, including lack of treatment. Experiments should be structured to quantify both short and long-term effects of treatment methods.

Sedgwick contains three first-order watersheds and a number of zero-order watersheds feeding into the first order watersheds, which would provide possible demarcation lines for treatment study areas.

Though fire within the coastal sage scrub is not a recommended management technique to reduce fire risk, there is surprisingly little controlled research on the topic (F. Davis, personal communication, April 3, 2018). Long-term management experiments comparing the effects of

fire, grazing, and fire and grazing together would fill an information gap in the response of coastal habitats to these treatments identified in this report. The Konza Prairie LTER can serve as an example of experimental design for long-term experiments at Sedgwick.

*Recommendation: Highly Recommended*

Long-term management experiments would strongly support wise stewardship goals by providing additional knowledge on how vegetation management treatments affect species and habitats at Sedgwick. This would contribute to reserve management and the collective understanding of the earth and its natural systems.

Long-term management experiments are anticipated to strongly support the research goal. This effect will be increased if planned management methods are shared with the research community and faculty allies to promote awareness and interest in ongoing research opportunities. This option is neutral toward university-level education.

*Evaluation*

There is a gap in research on the effects of land and vegetation management actions both in terms of their effectiveness to meet stated goals and their impacts on ecosystem functions and processes. Many natural resource areas such as parks and reserves monitor their habitats and species, but the results of monitoring are not generally publicly available, making accurate interpretations of their effects difficult. Monitoring is also often tied to specific regulatory requirements such as under the Clean Water Act, state or federal Endangered Species Act, or Lake and Streambed Alteration Agreement Program, and is not conducted for a period of more than five to ten years. This knowledge of long-term effects and efficacy of land management is also generally unknown outside of regulatory files.

However, the existing body of research on the effects of land management has large gaps in knowledge that research at Sedgwick could help to fill. Existing studies are often short-term studies showing response of an ecosystem to management, such as Conlisk et al (2016), which provides information comparing the response of native and non-native plants to a fire in coastal sage scrub habitat. However, their research is of limited utility because they only assessed up to two years post-fire. Other research is limited in the species assessed, such as Hatch et al (1999), who assessed the response of native grasses to burning and

grazing. However, they only assessed impacts to three native species. Because each species showed a different response to grazing and burning, even two within the same genus, these results cannot be extrapolated to other native grasses. Finally, there is a gap of research on coastal sage scrub in central California, with the bulk of the research on chaparral or California shrublands focusing on either the northern or southern ends of the state.

Long-term management experiments at Sedgwick could supply the opportunity to fill these gaps for the researchers and land managers by providing publicly available data on the effects of land management methods. Implementing long-term research will also provide information on how effects of management methods sustain or change over time. Because of the robust community of native species at Sedgwick, research can be completed on a larger variety of native plant species and communities than in other locations. Finally, Sedgwick's location within the central coast of California, large size, and the variety of both native and non-native habitats provides ample research opportunities to fill existing gaps in the literature.

Research methods could have negative impacts on Sedgwick. For example, a comparison study of effects on bird populations from prescribed fire or mastication in northern California chaparral sites damaged the sites where mastication was employed (Newman et al., 2017). Reserve management should consider negative implications of a research project before providing approval.

### Option 3: Mechanical and chemical clearing of weeds

Sedgwick has a draft weed management plan devoted to treating the most widespread invasive plant species in the reserve, dated 2012. To control invasive plant species, Sedgwick management would update, expand, and implement this current weed management plan to reflect current weed distribution and treatment priorities. Problematic weeds include jointed goatgrass, black mustard, Italian thistle, tocalote, and bull thistle (Sedgwick Reserve, 2013). The updated weed management plan will need to consider the extent of invasion and potential for success of reducing and eradicating invasive species when setting invasive species removal priorities. Example chemical and mechanical management methods for each species are included in Appendix H.

*Recommendation: Highly Recommended*

Treatment of invasive plants with mechanical or chemical methods will strongly support the goals of wise stewardship of impacted habitats by decreasing invasive species cover with little to no expected damage to native species.

This management option would weakly support research and be neutral toward university-level education.

*Evaluation*

Removing or reducing invasive plants in California grasslands can be challenging since they are a widespread and pervasive problem within the state, not just the reserve. In most parts of California, native grassland species only make up one percent of the standing grassland crop (Barry, Larson & George, 2006). Because of this, it is important to identify feasible objectives when creating an invasive species management plan, and prioritize weed removal in locations where weeds can be eradicated with low chance of recolonization. Some species, such as tocalote and black mustard, are too wide spread in many parts of the reserves to make removal through mechanical or chemical methods feasible (F. Davis, personal communication, April 3, 2017); these species may require additional treatment methods to fully eradicate from the reserve. Clear, measurable objectives are needed to properly evaluate the effectiveness of the management strategy (Barry, Larson & George, 2006). Efforts on the draft Specific Control Plan for High Priority Weed Species appear to have stopped in 2012. Sedgwick should update their current weed management plan to include mapping of both the current extent of target weed species and planned treatment areas, treatment methods with measurable objectives for all target species, and a description of all weed management activities taken since the draft plan. Sedgwick designed and implemented a separate management plan for controlling jointed goatgrass which includes identifying specific goals and recording the time of completion of each management step as well as recording the success or failure of different management efforts (Sedgwick Reserve, 2017), which can serve as an example for the Specific Control Plan for High Priority Weed Species.

Prescribed burning can benefit native species, though it usually requires extensive post-fire management to help native species recover and it can be difficult to implement due to community concerns (see Prescribed

Burning in Grassland section). An alternative management strategy is to mechanically and chemically control invasive plants. In general, mechanical treatments are less effective and more time consuming than using chemical treatments; however, they are less damaging to the surrounding environment. Additionally, timing of treatments is important and can significantly impact the effectiveness of treatments. An overview of mechanical and chemical treatment methods is provided in Appendix H.

#### Option 4: Fuel Clearing in Oak Woodlands

Fuel clearing in oak woodlands would include the removal of invasive and non-native ladder fuels, especially Italian thistle. Italian thistle would be removed according to the Cal-IPC recommended methods; current recommendations are included in Appendix H. Specific locations for fuel clearing activities should be identified as part of the weed management plans recommended in Option 3, which should include special considerations to prevent or reduce impacts to native forbs and grasses present.

Dead oaks can be thinned to 2.5 per hectare (one per acre), if desired, while still providing habitat for native birds (California Audubon, 2004). However, we found no literature on the effects of removing dead wood from oak woodlands on the fire risk or ecosystem outside of bird habitats, so we cannot provide a formal recommendation for this.

#### *Recommendation: Highly Recommended*

Clearing fuel in the understory of oak woodlands, would improve habitat opportunities for native species, and reduce the impact of fire on the oak woodlands by reducing the likelihood of fire moving from the understory to the crown. These expected results would strongly support the goals of wise stewardship at Sedgwick.

This management action would weakly support research goals and be neutral toward university-level education.

#### *Evaluation*

Increased dry matter from both trees dead from the recent drought and non-native understory plants that reach the lower oak branches, specifically Italian thistle, will act as ladder fuels in the case of a fire, increasing fire intensity and allowing the fire to transform from a grass

fire contained in the under story to a crown fire that will cause top-kill and more severe damage to the oaks.

Conversely, dead oaks may provide habitat for species within the reserve, while removing them would cause negative impacts to the overall ecosystem. Dead oaks are an important part of the California oak woodland habitat that provide nesting and foraging habitat for birds (California Audubon, 2004; PRBO, n.d.). Maintaining dead oaks within the woodlands is important, however reducing them to 2.5 per hectare (one per acre) can be done while maintaining this habitat value. We found no research specifically regarding the effects of dead wood within an oak woodland on increased fire severity.

Italian thistle is common in oak woodland understory, growing particularly thick under blue oak woodlands (McGinnis & Keeley, 2011) like those found in Sedgwick. It grows up to two meters (6.5 ft) tall and act as ladder fuels in oak woodlands, increasing intensity of fires (McGinnis & Keeley, 2011). Italian thistle within the understory of oak woodlands increases the risk of crown fires (McGinnis & Keeley, 2011), which can cause tree mortality. While oaks can resprout from the stumps after top-kill, top-killed trees show slightly increased mortality (Holmes et al., 2008). Reducing or eradicating Italian thistle in the oak woodland understory will reduce the intensity of fire, if fire occurs within the oak woodlands at Sedgwick. Additionally, Italian thistle can form a dense understory that reduces native cover by reducing the available light to other understory plants (McGinnis & Keeley, 2011), so reducing the presence of Italian thistle in the oak woodland understory is likely to improve native species cover.

#### Option 5: Prescribed burns in non-native grasslands

Prescribed burns in non-native grasslands could be used to reduce density and cover of invasive grasses in the non-native grassland and oak woodland areas with a grassy understory. Prior to burning grassland areas, we recommend examination of the seed bank to determine if native grass seeds are present, and at what depth. Prescribed burns should be planned for the spring, prior to seed drop of the invasive grasses, or when the target species seeds have just dropped and are on the top of the thatch (Sweet et al., 2008). Schedule burns on a three to four-year rotation (Menke, 1992) until invasive species are reduced to the acceptable level or eradicated. In order to prevent seed germination, fires

should be hot, and burn slowly, preferably providing ten or more seconds of fire exposure to seeds (Sweet et al., 2008).

Because it is unknown whether a remnant native seedbank exists, local native grasses and forbs should be cultivated prior to burns. To be consistent with the NRS Use and Guidelines, non-local seeds cannot be imported into the reserve. The docent-run native seed nursery should be utilized to provide plants cultivated from seeds collected onsite for restoration. Because of the extent of invasive cover over grassland area, replenishing the native grasses with seed stock from the reserve will require a large effort. If additional support for restoration is needed, consult or partner with the Cheadle Center for Biodiversity and Ecological Restoration (CCBER) to help grow seeds collected on the reserve.

Costs for prescribed burns would be eligible for partial funding under the CAL FIRE Vegetation Management Program (VMP). This program establishes a cost sharing agreement for prescribed burns under the VMP between CAL FIRE and the property owner, Sedgwick, and would include implementation of burns by a CAL FIRE Unit (CAL FIRE, 2018). This cost share could be provided through in-kind services such as providing a cultural or natural resources study to support the environmental clearance for the burn (V. LaRocco, personal communication, May 17, 2017). Costs assessed under this program would not include post-fire monitoring efforts, which may be substantial both in terms of monitoring costs and reserve staff time. Fires should also be conducted in coordination with the Santa Barbara County Air Pollution Control District to comply with air quality regulations.

Due to the lack of research on the effects of prescribed burns on many specific plant and animal species, we recommended that prescribed burns be done in conjunction with long-term treatment monitoring or long-term management experiments to identify species-specific reactions to prescribed burns.

*Recommendation: Moderately Recommended*

Prescribed burns in the non-native annual grasslands within Sedgwick are expected to reduce cover of non-native grasses and improve habitat conditions for native grasses, moderately meeting the primary goals of the wise stewardship pillar. Limited information is available on prescribed fire's ability to destroy the seeds of the specific non-native grass species



on Sedgwick, reducing the confidence in the effectiveness of this management option.

This management option weakly supports goals under university-level education and is neutral toward research goals. If implemented with a long-term treatment monitoring or research effort, than this management action would strongly support primary goals for both university-level education and research.

### *Evaluation*

While any use of fire has an inherent increase of risk of escaping outside of the treatment area, prescribed burns in non-native grasslands could control invasive plant cover by reducing viable seeds from the current year's growth. Control of ripgut brome (*Bromus diandrus*), a common invasive species present in the non-native grassland areas within Sedgwick, has been shown to last for four years after a three-year prescribed burn program where burns were conducted in early July (Menke, 1992). While timing and heat for prescribed burns to control all invasive grasses should be planned to increase seed exposure as much as possible to be effective (Sweet et al., 2008), the expected efficacy or duration of control of other invasive grasses on Sedgwick is not described in the literature. Conducting prescribed burns with long-term monitoring or long-term research will enable the reserve manager to more effectively utilize prescribed burns as an invasive species control method.

### Option 6: Grazing in non-native grasslands

Spring grazing in grassland areas could be utilized to reduce cover by non-native and invasive species and create an open vegetation structure that is conducive to native grasses. After grasslands are dominated by natives, late summer grazing can be utilized to increase vegetative re-growth and reduce thatch. Grassland restoration studies show that both cattle and sheep are effective grazers (Stromberg et al., 2007; Hatch et al., 1999). Grazing should be monitored and adjusted to ensure that grasslands are not over grazed and an appropriate amount of residual matter is left behind. Prior to grazing activities, a grazing plan should be developed to identify prioritization of areas, appropriate levels, rotations, and exclusion areas. Grazing activities can be combined with burning and planting activities to create a comprehensive grassland restoration plan (Stromberg et al., 2007).

To reduce the risk of further introduction of invasive species, clean grazing animals before their introduction to Sedgwick to prevent the transmission of weed seeds (Chuong, 2016).

Due to the lack of research on the effects of grazing on many native and non-native plant species, we recommended that spring or late summer grazing is done in conjunction with long-term treatment monitoring or a long-term management experiment to further identify species specific reactions to grazing regimes.

*Recommendation: Moderately Recommended*

We expect this option to moderately support wise stewardship within the reserve by reducing invasive plant cover and improving habitat for native species within the grassland areas. We moderately recommended this because the literature does not provide a full understanding of how grazing will affect the ecosystem and native species at Sedgwick.

This management strategy would weakly support goals under university-level education and be neutral toward research goals. If implemented and included in long-term research, this would provide additional support of research goals for Sedgwick and provide improved information on the effects of this treatment in California coastal grasslands.

*Evaluation*

The major concern for grazing in Sedgwick is the lack of research that directly relates to the variety of species and habitats present onsite. Existing studies on California grassland management and restoration, more specifically coastal California grasslands, generally support low to moderate levels of grazing to reduce invasive species and support native species regrowth (Menke, 1992; Bartolome, 2004; Stromberg et al., 2007). These studies focus on a small number of species and indicate that there are differences in how each species will react to treatments. Grazing is recommended in the spring to reduce invasive species cover, and in the fall to support regrowth of native species (Menke, 1992). However, species such as purple needle grass (*Stipa pulchra*) which is found on Sedgwick, respond differently to grazing in different portions of their range. Furthermore, Jackson and Bartolome (2000) reclassified coastal prairie into two grassland types: coastal prairie and coast range grassland, due mainly to differing climate conditions. This reclassification creates uncertainty regarding the results of prior research, making it is

unclear how much of the research since has perpetuated this classification shift.

Another important consideration to successfully implement a grazing management plan is the amount of time and money required. While a complete cost analysis of grazing is outside the scope of this report, it should be noted that grazing will require improving existing infrastructure. This includes installing or repairing fences to prevent grazing outside of targeted areas, transporting animals to and from the reserve, and monitoring the grazing.

#### Option 7: Pond and marsh management

Management of the pond and marsh area will focus on improving habitat values specifically for tricolored blackbird. Management actions to support the tricolored blackbird could include cutting or burning marsh plants, mainly cattails (*Typha* sp.). Cutting or burning would be completed on a rotation of one third of marsh vegetation each year, or all of the marsh vegetation every three years, to accomplish a complete rejuvenation of the cattails over a three-year period (R. Meese, personal communication, June 29, 2017; Meese & Beedy, 2015). Cutting or burning should be completed in the late summer or fall, preferably October or November, to allow new growth before the return of the migratory tricolored blackbirds (R. Meese, personal communication, June 29, 2017).

#### *Recommendation: Moderately Recommended*

Management of cattails within the pond and marsh area will improve the habitat and further support nesting of the tricolored blackbird above current conditions, weakly meeting the goals of wise stewardship at Sedgwick.

This action is not expected to have widespread effects on the overall Sedgwick ecosystem or habitats due to the small size of the pond and marsh area.

#### *Evaluation*

Tricolored blackbirds are found only in California and small areas of Oregon and Washington (Meese & Beedy, 2015). Breeding populations are greatest in the central valley of California (Meese & Beedy, 2015) however these populations have declined precipitously in recent years (Meese, 2015). The decline in breeding for this species is attributed to conversion of their breeding and foraging habitat to other land uses,

destruction of eggs and nestlings due to normal agricultural activities, and a change to earlier harvesting of grain fields used for nesting by the tricolored blackbirds (Meese & Beedy, 2015). There is a breeding population of tricolored blackbirds in the pond and marsh area at Sedgwick, which, as part of the UCNRS, will be protected from land use changes and agricultural practices that would endanger nesting.

Tricolored blackbirds prefer to nest in dense stands of cattails or bulrushes (*Schoenoplectus californicus*), next to water (Audubon, n.d.). They forage for insects and seeds in open fields and lawns (Audubon, n.d.) making the pond at Sedgwick and adjacent fields good habitat for this species. While tricolored blackbirds will nest in suboptimal habitats, nesting females strongly prefer to nest in continuous sections of marsh habitat at least 15 m (50 ft.) wide, in its first or second year of growth, submerged in shallow water 15-45 cm (6-18 in) deep (Meese & Beedy, 2015). The marsh and pond habitat can provide this preferred habitat with the suggested management practice.

Meese and Beedy (2015) describe breeding habitat management through burning, cutting, grazing, discing, and mastication. While any of these methods may be employed at Sedgwick, Robert Meese from the UC Davis Information Center for the Environment specifically recommended burning or cutting for the size and type of habitat at the reserve (R. Meese, personal communication, June 29, 2017).

This management action meets the overall mission of the UCNRS system, however, it would only affect a small area, since it may only be implemented in the pond area that supports the cattails in which the tricolored blackbirds nest. It will support the continuance of a native species that has been in decline in recent years and is under consideration for listing under the California Endangered Species Act.

#### Option 8: Prescribed burns in coastal sage scrub

Prescribed burns within coastal sage scrub areas are a potential method to reduce plant densities, reducing fuel loads for wildfires (Urban Wildfire Management, 2001). This option proposes conducting burns in a mosaic pattern within coastal sage scrub areas to create sections with varying fuel loads, in collaboration with the Santa Barbara County Fire Department (V. LaRocco, personal communication, May 17, 2017). Burns conducted on a rotation of five to 10 years per area would maintain

vegetation densities below that of a mature stand (Beyers & Wirtz II, 1995), reducing fuel loads. Burns should not be conducted during high-risk fire seasons or conditions, and would be coordinated with the Santa Barbara County Air Pollution Control District.

Costs for prescribed burns would be eligible for partial funding under the CAL FIRE Vegetation Management Program (VMP). This program would establish a cost sharing agreement between CAL FIRE and Sedgwick for prescribed burns (CALFIRE, 2018). A CAL FIRE unit would implement burns under the VMP (CAL FIRE, 2018). This cost share could be provided through in-kind services such as providing a cultural or natural resources study to support the environmental clearance for the burn (V. LaRocco, personal communication, May 17, 2017).

*Recommendation: Not Recommended*

Implementing prescribed burns within coastal sage scrub would strongly negatively affect the goals of the wise stewardship pillar of Sedgwick. Prescribed burns would provide opportunities for research and monitoring, moderately supporting goals of the research and university-level education, but those potential benefits do not outweigh the anticipated damage to coastal sage scrub habitats.

*Evaluation*

Prescribed burns were evaluated both for how they will affect fire risk to other reserve resources and neighboring communities and how fire will affect the coastal sage scrub. The neighboring Woodstock community views the coastal sage scrub habitats of Sedgwick as a high fire risk to their safety and property as evidenced by the Fire/Vegetation Management Plan and Catastrophic Fire Risk Analysis, which was prepared with funding from the Woodstock Community Association (Urban Wildfire Management, 2001). The coastal sage scrub within Sedgwick is denser than vegetation on surrounding properties; likely due to differing management strategies employed by neighboring property owners. Sedgwick's current management focuses on allowing natural processes to occur, preventing vegetation clearing in the coastal sage scrub. This management strategy has prevented vegetation clearing in the coastal sage scrub portions of the reserve. Adjacent landowners have cleared coastal sage scrub vegetation, in some cases to sufficient extent to cause conversion to grasslands (Figure 14). Hence, the dense coastal

sage scrub on Sedgwick has greater vegetation densities, and thus, fuel, than the surrounding areas.

The USFS FRID analysis shows that many areas of coastal sage scrub within Sedgwick have not burned in well over the estimated natural fire return interval timeframes (Figure 11 and Figure 12) (Safford, 2011; Safford, 2014). Analysis of coastal sage scrub recovery after burns in Riverside County show that even areas that have not burned for over 40 years showed 31% lower average cover than was identified in images taken prior to modern developments (Minnich, 1998).

A prescribed burn regime within the coastal sage scrub is predicated on the assumption that reducing plant densities would reduce the progression of fire in those areas, allowing firefighters to position themselves to better prevent further spread of fire (V. La Rocco, personal communication, May 17, 2017).

However, there are major limitations in the ability of prescribed fire to reduce wildfire risk in coastal sage scrub habitats. Shrublands in southern California, such as the coastal sage scrub found in Sedgwick, are expected to have an average fire return interval of 30-40 years (Keeley, 2001). Younger stands may be able to reduce the spread of wildfire under moderate fire conditions, but would have limited ability to reduce the spread under severe weather conditions (Keeley, 2002). Fires, especially those driven by Santa Ana wind events, can burn through varying age classes, showing little to no reduction in spread through stands up to 20 years since the last fire (Keeley & Zedler, 2009; Keeley, 2002). Jointly, this research indicates that prescribed burning will not reduce the spread of catastrophic fire during Santa Ana wind events or other severe fire conditions.

Burning the coastal sage scrub at a sufficient frequency to reduce fire risk is anticipated to cause conversion from coastal sage scrub habitat to non-native annual grassland habitats. Coastal sage scrub develops a structure and density resembling that of mature stands approximately five years after fire (Meyers & Wirtz, 1997). Coastal sage scrub has high 'immaturity risk', or the risk of losing species, when fire return intervals are more frequent than the time required to reach reproductive maturity (Keeley, 2002). Burning coastal sage-scrub ecosystems in 10- to 20-year intervals could be detrimental to the ecosystem itself by reducing the abundance of several native species (Malanson, 2009). Therefore, prescribed burns at a

sufficient interval to reduce fuel loads to a level that would aid firefighting activities would negatively impact the habitat. This means that too frequent of fires in coastal sage scrub can be detrimental to the ecosystem by causing a conversion, likely to grasslands, from burning before plants have reached maturity and would be able to produce seeds or re-sprout from their root crown. This coupled with evidence that 60-year-old stands of coastal sage scrub have not reached senescence



**Figure 14.** Map showing change in vegetation between Sedgwick and the adjacent Woodstock community. Coastal sage scrub is evident on the southwestern corner of Sedgwick while the surrounding areas are grassland with scattered oaks.



more detrimental to the overall ecosystem rather than promoting new growth. Less frequent burn intervals do not show any increased risk to the habitat (Westman, 1982).

Prescribed burning could be used to create buffer zones of younger age class stands, which, especially when combined with strategically placed fuel breaks, could reduce fire risk during moderate weather conditions (Keeley, 2002). However, this would also be unlikely to reduce fire risk during Santa Ana wind events or other severe fire conditions (Keeley & Zedler, 2009; Keeley, 2002). With any prescribed fire, there is also a risk of that the fire may escape and burn more than the intended area, as happened in the 1999 prescribed fire on the nearby Midland School property, which escaped onto Sedgwick (T. Dunne, personal communication, February 20, 2018).

Prescribed burns also have the potential to affect the condition of areas of treated coastal sage scrub. Native plant species in coastal sage scrub habitats in Orange County show increased cover within the first two years after a fire (Conlisk, 2016), however, prescribed burns conducted at a sufficient frequency reduce fire risk will likely reduce native species over time (Malanson, 2009). Evaluation of the effects of fire on bird populations in northern California chaparral habitats have shown that prescribed burns have minimal negative effects, and in some cases positive effects, on bird species diversity and abundance (Newman et al., 2017). While this study took place in a different shrubland type and part of the state, it likely reflects expected results within Sedgwick because the birds included in the study are species common to coastal sage scrub (D. St. George, personal communication, March 16, 2018), and present at Sedgwick. Additionally, fuel breaks could increase invasive species and would have limited applicability during severe or catastrophic fire conditions (Keeley, 2002). If fire risk reduction is the primary concern for management around the reserve borders, more effective fire risk reduction methods include type converting vegetation and mechanically denuding the site. These would have large environmental impacts (Keeley, 2002) that would be contrary to the goals of the reserve.

Overall, the risk of negatively impacting the coastal sage scrub habitat on Sedgwick from a prescribed burn outweighs the potential benefit to reduction of damage from fire. Thus, prescribed burns are not recommended in Sedgwick due to the time required to reach habitat

maturity compared to risk of type conversion and increased invasive species cover occurring at burn intervals of 10-20 years.

#### 6.1.2.Valentine Camp



This section will focus on the mixed conifer trees comprising Sierran Upper Montane Forest, the most widespread vegetation type in Valentine. The mixed conifer forest is represented by three intergrading phases: the Red Fir phase, the Jeffrey Pine phase, and the Lodgepole Pine phase (Howard and Orr, 2000). The latest vegetation map available (Figure 15) is included for an overview of conifer tree distribution and other vegetation types (sagebrush, riparian, and meadow).

Wildlife Habitat Relationship Types









Valentine Reserve

T4SN, R27E, Sec. 4 M.D.M.  
Mono County, California

LEGEND

-  Property Line
-  Habitat Type Boundary

**WHR Type -**

-  JPN Jeffrey pine
-  WFR White fir
-  RFR Red fir
-  LPN Lodgepole pine
-  SGB Sagebrush
-  WTM Wet meadow
-  MRI Montane riparian
-  MCP Montane chaparral

**Tree Size (mean dbh) -**

- 3 Pole tree (6" - 11")
- 4 Small tree (11" - 24")
- 5 Medium/large tree (>24")
- 6 Multi-layered tree (size 5 over 3/4, 60%+ cover)

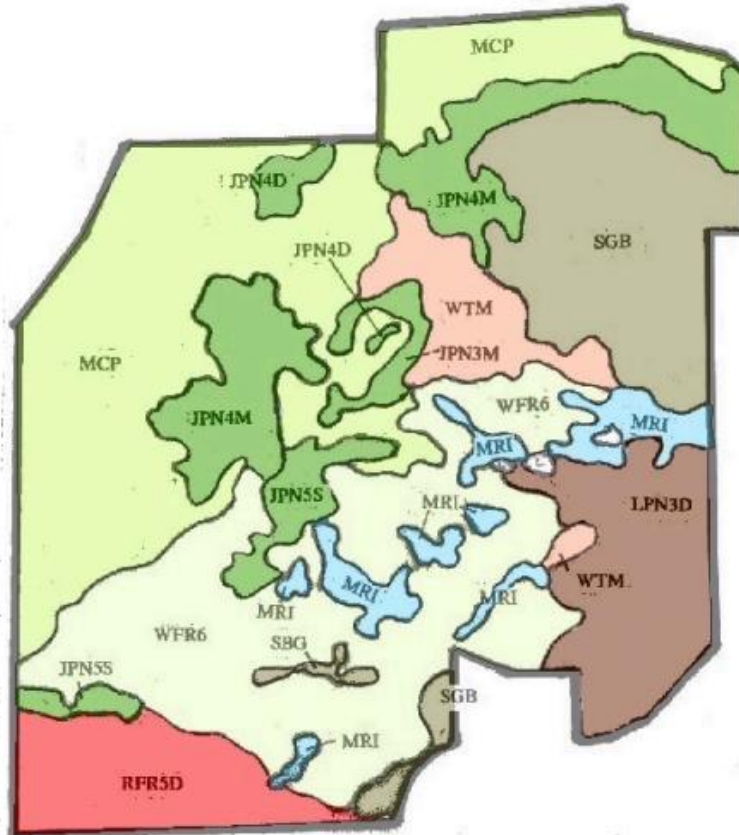
**Canopy Closure -**

- D Dense Cover (60-100%)
- M Moderate Cover (40 - 59%)
- P Open Cover (25 - 39%)
- S Sparse Cover (10 - 24%)

Scale 1" = 528 feet

0  528'

August 2002



**Figure 15.** Vegetation types and densities at Valentine Camp. Map provided by Carol Blanchette.

In the southwest corner lies the only patch of red fir (*Abies magnifica*) as medium and large trees with dense cover (60%-100%). Apart from red fir domination, the Red Fir phase has some western white pine (*Pinus monticola*) and mountain hemlock (*Tsuga mertensiana*) at one high elevation site, occupying the steep northeast-facing slope at elevations generally above other phases. This phase has a heavily shaded understory, and thus sparse ground plant cover.

In the southeast corner lies the only patch of lodgepole pine (*Pinus contorta* ssp. *murrayana*) with mean diameter at breast height (dbh) of 15-28 cm (6-16 in) and dense cover (60%-100%). Lodgepole pine and white fir (*Abies concolor*) dominate the Lodgepole Pine phase, occupying the lower flats west of the entrance road, around the cabins and the big meadow. The Lodgepole Pine phase also supports diverse characteristic shrubs and herbaceous plants in its varied understory from shaded to sunny.

In the middle of the reserve, there are several patches of Jeffrey pine (*Pinus jeffreyi*) with varying tree size (mean dbh 15 to over 60 cm) and canopy closure of 10% to 100%. White fir takes up a large area in the southern part of the reserve with multi-layered trees (over 60% cover). These two species dominate the Jeffrey Pine phase, which occupy the gradual slope at the base of the steep northeast-facing slope. Dry sunny forest openings in this phase support large patches of chaparral or sagebrush vegetation, and shaded or sunny areas of moist soil support wet meadow and montane riparian vegetation.

Natural fire regimes (classified by frequency, intensity, type and size) have played a critical role in the survival and the evolution of many species and forest types in the western United States. However, decades of fire suppression and exclusion has altered the natural fire regime and prevented it from functioning. Based on a study at Valentine in 1994, mean fire intervals for the Jeffrey pine and upper montane mixed conifer forest types are 11 to 37 years before settlement of the area (Stephens, 1994). Therefore, Valentine could have either of the following two types of natural fire regimes:

Type I: Frequent (every 1-25 years) fires of low to moderate intensity in forests of ponderosa pine, lower elevation (relatively warm and dry) mixed conifer, giant sequoia, and southern pine forests etc.

This type of fire regimes could undergo the greatest change following fire exclusion. Under a natural fire regime, frequent fires keep surface fuel loads low and thin out trees so that canopy fuels are secluded vertically and horizontally. Fire exclusion has left surface fuels to accumulate and trees overgrown to provide a fuel ladder to the canopy, with an increasing closure. These changes in fuel structure lead to a shift from light surface fires to intense stand replacement crown fires characteristic of the type two fire regime described below (Covington & Moore, 1994).

Type II: Infrequent (over 25 years) fires of high intensity in boreal and subalpine spruce-fir forests, higher elevation (relatively cool and wet) mixed conifer forests, and temperate rainforests.

Over time, fire exclusion in type two will rescale fire size as more patches in a forest reach the condition to support a crown fire. Suppose a vegetation type needs 100 years to accumulate sufficient fuel to support a crown fire, then after 100 years of fire exclusion, all areas of that vegetation type would be able to support a crown fire. Thus, in type two, fires become larger following fire exclusion (Covington & Moore, 1994).

Prolonged fire suppression in Type I could lead to severe changes as in Type II fire regimes, i.e., patches aggregating into increasingly large areas that can support crown fires (Covington & Moore, 1994).

Suppression of wildfire at Valentine starting in the mid-1800s has caused increase in stand density and high fuel loads (both standing and down) (Valentine, 1999). The abnormally high density of trees not only increases risk of catastrophic fires (Martinson, 2010), but also impacts forest and ecosystem health.

### **Risks**

High stand density intensifies competition and compromises tree growth efficiency (vigor). While there is no formal study or monitoring on tree vigor at Valentine, high tree mortality due to bark beetle infestation has been observed. When trees are weakened, they are easily detectable and colonizable by bark beetle (*Dendroctonus monticolae*) which, under natural conditions, regulate the health of a forest by attacking old or weakened trees and support the development of a younger forest (Mitchell et al., 1983). Lodgepole pines at Valentine have been subject to attack by bark beetles. Significant mortality has been detected in the lodgepole pine forest along the entrance road due to bark beetle infestation, and according to CA Dept. of Forestry and Fire Prevention most of the lodgepole pines would be killed without active measures to halt the infestation (Valentine, 1999). This outbreak could lead to excessive fuel load and elevated future fire severity, posing fire hazard at the urban-wildland interface at Valentine.

## **Goals**

### Primary Goals

1. Reduce tree mortality from bark beetle infestation and increase forest resiliency to stressors such as bark beetle, fire, and drought;
2. Reduce future fire severity and risk of catastrophic fire by restoring the forests to conditions that approximate pre-settlement conditions, or conditions without fire suppression management;
3. Promote species richness and diversity of native flora and fauna within Valentine.

### Secondary Goals

1. Management activities at Valentine will create research opportunities for effects such as fuel treatments on conifer forests, bark beetle infestation and future fire risks and severity.
2. The long-term monitoring efforts and potential research projects that complement each other and provide university-level teaching opportunities as well.

### **Near-term recommendations for vegetation management**

To reduce risks of larger (i.e., catastrophic) fires and even restore natural fire regimes in the future, reducing fuel loads both horizontally and vertically could be the first step (Covington & Moore, 1994). Thinning native forests can reduce fuel loads and help preserve native tree species (Bai et al., 2017). By promoting natural conifer regeneration in the understory, thinning will eventually help achieve the multiple size and age characteristics of old-growth stands, which is a common restoration target for natural, healthy, and resilient forests (Tappeiner et al., 1997). Thinning is regarded as a fire surrogate by USFS, though it does not mimic all effects of fire as an ecological process. Once suitable conditions are met, it would be beneficial to include prescribed fire treatments. Options of thinning methods and prescribed fire treatments are described and analyzed below for management reference. We have created a Wise Stewardship Management Scorecard that shows management options and the strength of recommendation for each based on our evaluations (Appendix G).

#### Option 1: Mechanical thinning and pile burning

A management activity that can commence immediately is the continuation of mechanical thinning followed by pile burning. Based on a review of the USFS database, pertinent literature and professional judgement (H. Safford, personal communication, July 17, 2017), the target density should be approximately 620 trees/hectare (250 trees/acre), mean tree diameter should be between 19 cm and 42 cm (7 in and 16 in), and the height to canopy should be four to nine meters (13 to 39 feet) (Martinson, 2010). These thresholds are set for thinning followed by prescribed fire (i.e., underburning) (Martinson, 2010), so they should suffice for pile burning which is more contained in fire size and extent.

Forest thinning using mechanical methods is widely used and involves less risk than prescribed fire. Since current stand density (around 1200 per hectare, or 500 trees/acre) at Valentine is nearly doubles the target density, the best thinning method would be whole tree removal by machinery and hand tools to reduce stand density. Thinning in this report refers to this mechanical treatment form. The slash generated by thinning has been partially sold as wood chip and other higher value products, which has offset most treatment costs in the past 14 years (C. Thomas, personal communication, July 18, 2017).

Recommended practices for thinning treatments are as follows:

1. Thinning should not be conducted until late summer or fall so that damage in growing season can be avoided to the remaining trees. Thinning in spring has been associated with higher levels of bark beetle colonization probably due to coincidence with peak adult beetle flight periods (Fettig et al., 2007). Thinning in winter may be less optimal as soils are more prone to compaction and erosion in the wet season, which requires careful use of ground-based skidders. However, with the normal deep snowpack on ground at Valentine in winter, thinning can be difficult despite that optimal thinning conditions can be met as snow accumulates or the ground freezes so that soil moisture falls below 10% (Broglia et al., n.d.; Emmingham & Elwood, n.d.). Therefore at Valentine the bulk of thinning should take place before snowfall.
2. Once the target density at Valentine is met, longevity of fuel treatment effectiveness to alter potential fire behavior could last up to 10 years with thinning based on observations in similar forests

(Anon, 2007), whereas fire-only treatments may warrant re-entry at 8 years post treatment (Vaillant et al., 2015). Thinning effects on stand structure remains consistent through eight years post-treatment (Vaillant et al., n.d.).

3. To achieve such benefits of thinning for an eight to ten-year period, thinning to target stand density at Valentine can be broken into several batches. Thinning multiple times can improve the commercial value of small/young trees by making the width of growth rings relatively constant (Emmingham & Elwood, n.d.), which may help offset costs for the reserve. Felling trees in several batches may also protect remaining trees from wind damage as compared to thinning to the target stand density in a single attempt (Safford, personal communication, July 17, 2017).
4. Thinning should consider spatial and structural/age heterogeneity by: i) leaving 'tree clusters' rather than regularly-spaced stands which can have adverse ecological effects (North et al., 2009); ii) retaining large, fire-resistant trees with thick bark, and some small trees to regenerate and replace dead trees after fire (Anon, 2008).
5. The slash should be burned in piles (controlled burns) in cool, wet weather. Pile burns conducted during snowfalls would be less noticeable to reserve neighbors and have lower impact on air quality as precipitation helps settle smoke and ash; and with certain amount of snow on ground (as specified in USFS permits), soil microorganisms would not be affected significantly. Impacts to water quality can be minimized by avoiding streams and channels (e.g. with buffers of 7-15 meters (23-50 feet) from waterways).

*Recommendation: Highly Recommended*

Mechanical thinning with pile burning strongly supports wise stewardship goals by reducing mortality and increasing resiliency of mixed conifer forests at Valentine. Thinning would moderately support research and university-level education goals since it is a well-established vegetation management approach.

Evaluation

Thinning prior to burning treatments is advisable to reduce risk of a crown fire, because thinning can more effectively reduce canopy bulk density and increase canopy base height than prescribed fire (Vaillant et



al., 2015). Canopy bulk density describes the density of available canopy fuel in a stand, defined as the mass of available canopy fuel per canopy volume unit; canopy base height describes the average height from the ground to a forest stand canopy bottom, specifically, the lowest height in a stand at which there is a sufficient amount of forest canopy fuel to propagate fire vertically into the canopy (LANDFIRE, n.d.) By promoting natural conifer regeneration in the understory and leaving behind large diameter trees with well-developed crowns, thinning will help achieve the multiple size and age characteristics of old-growth stands (Lindgren et al., 2006; Tappeiner et al., 1997).

### *Spatial heterogeneity*

The importance of avoiding uniform residual tree spacing to maintain spatial heterogeneity cannot be overstressed. Spatial heterogeneity is a key feature in forest resiliency and may be an important characteristic of frequent fire's effect, as indicated by studies of mixed-conifer forests in Baja, Klamath Mountains, and eastern Washington (North et al., 2009). Based on historical data and reconstruction studies in the Sierra Nevada, mixed-conifer forests were also clustered with groups of trees separated by sparsely treed or open gap conditions. This clustering can be important for regenerating shade-intolerant pine, increasing plant diversity and shrub cover, moderating surface and canopy microclimate conditions within the tree cluster, and providing a variety of microhabitat conditions for birds and small mammals (North et al., 2009).

### *Mortality from bark beetle infestation*

Thinning to low densities can improve tree vigor by reducing canopy closure, which improves the penetration of solar radiation and enhances the photosynthetic efficiency in remaining trees. When the remaining trees have higher growth efficiency, they have higher resistance to bark beetle attack (Waring & Pitman, 1985). Pruning and wide residual inter-tree spacing also optimizes the effects of microclimate and creates stand conditions that are detrimental to beetle survival activity (Fettig et al., 2007). Many studies have confirmed that periodic thinning can reduce the risk of beetle epidemics (Waring & Pitman, 1985). Such methods are supported by the scientific literature despite some studies failing to detect significant effects of thinning treatments and others might use anecdotal evidence. There have been no reports of significant increases in the

amount of bark beetle caused tree mortality in response to thinning treatments (Fettig et al., 2007).

#### Future fire severity

Compared to mastication and herbicide application, thinning with pile burning is more effective since removing surface fuels is the key to success in mitigating tree mortality in future fires (Martinson, 2010). Mechanical treatments without burning to remove fuels from the forest floor will only exacerbate tree mortality in future fires. To minimize tree mortality, both ladder fuels with mechanical methods and surface fuels should be thinned with pile burning (Raymond & Peterson, 2005). Evidence from the 2007 Angora fire in the Lake Tahoe Basin showed that thinning with pile burning reduced tree damage and mortality with evidence in decreased bole (trunk) char height, crown scorching, and torching (Evans et al., 2011).

#### Abundance and diversity of mammal and bird communities

Thinning can improve compositional and structural diversity in stands and generally increase mammal diversity (Sullivan et al., 2001). A study on young lodgepole pine forest in British Columbia, Canada, found that over five years post-treatment, mule deer (*Odocoileus hemionus*), a species also occurring at Valentine, had highest habitat use in mechanically thinned stands, then chemically thinned stands and the least on unthinned stands (Sullivan et al., 2002). Thinning to 500 trees/hectare (202 trees/acre) had the highest abundance of mammals 10 years post-thinning as compared to other densities, about the level in old-growth stands. Thinning to 500 to 1000 trees/hectare (202 to 405 trees/acre) achieved the highest mean species richness and diversity of small mammals, confirming the benefits of a 620 trees/hectare (250 trees/acre) density target at Valentine (Sullivan et al., 2001). Based on a study in the northern Sierra Nevada, thinning has relatively modest impacts on bird community composition and abundance (Stephens et al., 2014).

#### Plant communities

Thinning has been found to enhance the abundance, species diversity, and structural diversity of the plant community in lodgepole pine forests in 10 to 14 years post-thinning (Sullivan et al., 2001; Lindgren et al.,

2006). Studies have found that thinning to 500-1000 trees/hectare (202-405 trees/acre) can increase herbaceous biomass and both species and structural diversity of young lodgepole pine stands about 10 years post-thinning in Canada (Sullivan et al., 2005; Lindgren et al., 2006). Even after canopy closure and understory light conditions returned to control levels, the increased abundance of understory plants, especially herbs, could remain high in the thinned stands. Thinning also seemed to increase the abundance of late-seral species (Lindgren et al., 2006).

In five years post-thinning, there might not be noticeable change in understory vegetation. Thinning, particularly to low densities (500 trees/hectare, 202 trees/acre), may slightly increase the number of introduced species; however, diversity and abundance of native plants did not seem to be affected by these few introduced species (Sullivan et al., 2002). Given the minimal presence of invasive plants (cheatgrass) at Valentine, thinning should not pose a threat by increasing its abundance.

#### Water yield and drought resistance

As thinning reduces stand density, evapotranspiration decreases and thus water demand decreases. Thinning can enhance soil water content, reduce water stress and improve overall resiliency of mixed conifer forests growing in dry environments (Lindgren & Sullivan, 2013; Skubel et al., 2017). Thinning to preserve spatial heterogeneity also enhanced forest resiliency, showed by a study of stressed Jeffrey pine/mixed-conifer forests in Baja struck by 4-year drought and a wildfire after (North et al., 2009).

### **Future options for vegetation management**

#### Option 2: Underburning

After thinning the mixed pine forests at Valentine to the target density, underburning (i.e., creeping fire) may be utilized in lieu of pile burning to treat slash and surface fuels post-thinning. Underburning is a form of prescribed fire ignited under the forest canopy that focuses on the consumption of surface fuels but not the overstory vegetation. Underburning is generally used following a pre-treatment such as thinning and /or pile burning to further reduce the surface fuels, help maintain the desired vegetation conditions and enhance the overall health and resiliency of the stand (BLM, n.d.). In years to a decade, lack of restoration of fire as an ecological process suggest that including

prescribed fire would be beneficial (Vaillant et al., n.d.). Eventually when the risk of a crown fire is minimized by thinning and pile burning, underburning may be applied under suitable conditions (e.g. weather) (Martinson, 2010). Risk assessment and specific methods of underburning may be conducted based on consultation of USFS officials if necessary.

*Recommendation: Moderately Recommended*

Underburning moderately supports wise stewardship goals by fulfilling ecosystem functions of wildfire in mixed conifer forests at Valentine with higher level of risk involved than mechanical thinning with pile burning. Underburning would moderately support research and university-level education goals since it is a well-established vegetation management approach.

*Evaluation*

Underburning has proven more effective than pile burning to reduce tree mortality in future fires, the former will be preferable once Valentine reaches the target stand density (Anon, 2008). The effectiveness of thinning and prescribed fire to reduce wildfire severity was verified by the Cone Fire in 2002, which burned through sites of a long-term project since 1991 in the dry pine forest of northeastern California on Blacks Mountain. Fire went out in thinned and prescribed-burned stands while ravaged outside treatment areas with much greater severity (Anon, 2008).

Across 14 National Forests in California, both thinning and prescribed fire resulted in increased live understory vegetation except mechanical thinning for red fir eight years post-treatment. Of these, 11 of the National Forests showed herbaceous or shrub cover that exceeded pretreatment levels in two-thirds of the measurements (Vaillant et al., n.d.). In the Teakettle National Forest in California, species richness and herbaceous cover increased after combination of burning and thinning treatments, whereas shrub cover was reduced by either thinning or burning or combined treatments and species composition of understory plant communities also changed significantly after overstory-thinning and combination treatments (Bartuszevige & Kennedy, 2009). Moreover, low-severity burning can increase the species richness of native plants (Anon, 2007).

Based on a study in the northern Sierra Nevada, small-diameter removal and burning treatments had positive effects; thinning or burning and

selective harvest treatments had no detectable effect on most small mammals and passerine bird species reported in studies; whereas wildfire resulted in an overall negative response (Stephens et al., 2014). Ground-foraging birds and rodents seemed unaffected in their foraging guild responses to any treatment. Overall, removal of small-diameter trees and low-to-moderate severity burning (more like underburning, with only a few trees killed in the understory) treatments currently being implemented in the Southwest conifer forests do not negatively impact most wildlife species in many studies examined in the past 10 years (Burnett et al., 2012).

#### *Prescribed fire and bark beetle infection*

Prescribed fire may have adverse impacts on tree mortality caused by bark beetle. Fire damaged trees could experience higher mortality under beetle attack, as indicated by logistic regression models of tree mortality developed using measures of fire severity effects and insect activity in northern Arizona. Ponderosa pine mortality rates were low until crown damage exceeded 70–80% for unattacked trees, 40–50% for trees with partial (patch or strip) bark beetle attacks, and 30–40% for trees that were mass attacked. In addition, fire-scarred boles are prone to decay fungi and lodgepole pine infected with decay are more frequently colonized by bark beetle (Fettig et al., 2007).

Crown scorch during the growing season may further increase risk of insect attack than during the dormant season. The probability of bark beetle attack on firs was greater following early season burns than late season burns in the central Sierra Nevada. Even for a late-season, low intensity prescribed fire in Jeffrey pine forests in northern California, a highly significant correlation was found between burning and bark beetle infestation in the short-term: over 24% of trees in prescribed burned plots were attacked, as compared to <1% of trees attacked in control plots (Fettig et al., 2007). Such evidence warns us to use caution if planning prescribed fires in the future.

#### *Soil productivity*

Soil productivity and fungi could also be of concern with prescribed fires. Many tree-friendly fungi are important components of forest ecosystems and have a symbiotic relationship with forest wildlife. A study in Oregon has found that prescribed burning may have negative impacts on soil

productivity unless applied under preferable conditions of a thin or moist duff (needles and organic debris) layer that likely supports a lower severity fire. In contrast, a dry duff layer that has accumulated over many years will likely burn hot and kill the root tips and their associated ectomycorrhizal fungi in the soil below. Prescribed burns in spring barely affect fungal communities, while fall burns significantly reduce fungal productivity, though not suppressing mycorrhizal fungi entirely (Anon, 2009).

### Carbon sequestration and climate change

Vegetation treatments at Valentine should not be a major concern over the long term regarding loss of carbon into the atmosphere. There is a lack of study on carbon loss due to vegetation treatments under similar conditions at Valentine, but evidence in northwestern Spain showed that intense thinning (more than 90% reduction in density) of densely stocked post-fire maritime pine (*Pinus pinaster*) increased foliar efficiency and growth of residual saplings that compensated for much of the carbon storage lost in thinning, at least within five years post-thinning. In British Columbia, Canada, lodgepole pine stand-level volume growth rates returned to control levels just four years post-thinning. Stand-level carbon storage losses after thinning are further mitigated considering the contributions of residues and understory vegetation, though enhanced effects of carbon sequestration by the thinned forests may depend on follow-up fertilization (Lindgren & Sullivan, 2013).

Further evidence shows that combined carbon recovery and reduced wildfire emissions could turn the initial carbon source from wildfire and treatment to a sink within eight years post-treatment relative to pre-treatment if both were to burn in a wildfire. According to carbon stock monitoring across 14 National Forests in California, prescribed fire treatments reduced total carbon by 13%, with the largest reduction in the forest floor (litter and duff) pool and the smallest the live tree pool (N. Vaillant et al., n.d.).

### Soil properties

The overall effects of fuel treatments on soil properties appear to have been modest and transient, according to a meta-analysis on the Fire and Fire Surrogates Network spanning 10 states including California. The soil properties include mineral soil exposure, total inorganic nitrogen (TIN)

concentrations, bulk density, soil organic carbon (SOC) content, and soil C:N ratio. At the individual site scale, the combined thinning and fire treatment produced more significant changes in the soil properties than either treatment alone, though in most cases the statistically significant differences were modest in magnitude (Boerner et al., 2009). These results were confirmed in a variety of U.S. forests using best management practices of thinning and prescribed fire treatments. Mechanical removal of 20 to 45 percent basal area did not substantially alter soil quality across the national network of sites, despite exposing more bare soil and increasing bulk density at a few study locations. Prescribed fire only led to short-term reductions in forest floor mass and a minor surge of available nitrogen that became more pronounced with increasing fire severity (Busse et al., 2014). Similar findings in lodgepole pine forests in southeastern Wyoming suggest the important role of the remaining trees in nutrient immobilization (Knight et al., 1991).

### **Other treatment options**

#### Option 4: Mastication

Mastication reduces fuel load per tree with large machinery usually by rotary motion, generally removing all plant material above the roots.

#### *Recommendation: Not Recommended*

Mastication partially meets the primary goals of wise stewardship with obvious drawbacks by reducing fuel load with large machinery. This management option is neutral toward university-level education and research goals as a relatively developed treatment method.

#### *Evaluation*

Compared to thinning by whole tree removal with pile burning, mastication can create surface fuel beds with suitable conditions for prescribed burns to have positive effects on residual trees, understory vegetation, and soils. Mastication followed by prescribed burns can increase the surface fuel to crown height and thus decrease the probability of a crown fire. Masticating to either coarse or fine level of surface fuels can fulfill such purpose (Anon, 2009).

However, the mastication equipment is more successful at thinning the small trees (non-merchantable trees less than 20 cm (8 in) in diameter), while thinning target for Valentine includes trees with diameter up to 42 cm (16 in). In addition, the cost and duration of mastication depend on

the tree size on the site, and treatment cost at Valentine may well surge over \$183/hectare (\$452 per acre) (Anon, 2009). Roads at Valentine may not support large equipment, which would cause additional impacts such as soil compaction. These factors make mastication less efficient than mechanical thinning followed by pile burning.

#### Option 5: Chemical thinning

Chemical thinning involves application of herbicide. One example is Ezject Selective injection herbicide capsules containing Vision glyphosate herbicide (N-phosphonomethyl glycine in the form of its isopropylamine salt) as the active ingredient. The capsules are injected into each thinned tree with the number of capsules per tree dependent on tree diameter (Sullivan et al., 2002).

#### *Recommendation: Not Recommended*

Chemical thinning partially meets the primary goals of wise stewardship with apparent drawbacks by reducing stand density. This management option is neutral toward university-level education and research goals as a relatively developed treatment method.

#### *Evaluation*

Compared to broadcast and spot applications of glyphosate in temperate zone coniferous forests, there were no apparent negative effects of glyphosate herbicide injection as chemical thinning on plant and mammal components of lodgepole pine forest ecosystems in Canada. There were no significant differences among chemically and mechanically thinned stands. However, there could be potential negative effects on aquatic biota such as insects (*Chironomus xanthus*) (Ferreira-Junior, 2017) and anurans (*Xenopus laevis*) (Bonfanti et al., 2017). While chemical thinning may enhance horizontal stratification (clumping of trees), vertical stratification (structural diversity in the herb, shrub and tree layers) declined compared to stands with mechanical thinning (Sullivan et al., 2002). Most importantly, dead standing trees after chemical thinning will increase fuel load and can pose future fire hazard, making chemical thinning unsuitable for Valentine.

## 6.2. Part 2: Research, Education, and Public Service

To help reserves meet the research, education, and public service pillars of the UCNRS mission, we have created elements of an outreach plan



informed by literature review, communication plans, expert and faculty interviews, and surveys. We have adhered to the common structure of communication plans, with objectives, audiences, key messages, situational analysis, tactics, and methods to measure success (NPS, 2016). Outreach is not a one-time event, instead it requires consistent and systematic communication across a variety of media to engage target audiences (Bausman et al., 2014). Thus, for reserve outreach to research, education, and public service to be most effective, multiple tactics will need to be strategically employed to generate the highest engagement of each target audience.

### **Objectives**

Objectives should be SMART; specific, measurable, attainable, realistic, and time-bound (NPS, 2016 & Smart Strategies, n.d.). Time-bound refers to objectives with finite deadlines; most communication strategies are created to implemented for about 12-18 months (Smart Strategies, n.d.). Objectives should also be understandable to internal staff and consistent with other management objectives (i.e., university-level education, land stewardship) (Seitel, 2010).

### **Audiences**

Defining specific, clear audiences allow outreach to be targeted and strategic (Smart Strategies, n.d.). Audiences can be chosen based on geography, demography, or other relevant categories. In this case, audiences were chosen based on their potential to use the reserves for education and research, and interact with public service-related activities.

### **Key Messages**

According to *The Practice of Public Relations*, outreach strategies should incorporate several strong, mission-based messages to be held consistent across tactics and media. Specifically, outreach plans should create three to five messages per topic that are targeted, meaningful, and memorable to specific audiences (Seitel, 2010). Key messages should allow for customization and serve as guidance (NPS, 2016, p. 4).

### **Situational Analysis**

The situational analysis is presented for research, education, and public service as the barriers to each pillar. These barriers were identified in faculty interviews and surveys.

## **Tactics**

The tactics outlined in this section are specific methods to employ strategies to increase research and education use, and improve public service, and are similar to "options" outlined in Part 1.

## **Methods to Measure Success**

One universal component of effective outreach strategies is the establishment of a method to measure success in order to understand the impact of the outreach plan and adapt the plan if it is not meeting the desired outreach goals (Seitel, 2010). Continuously measuring the success of outreach strategies and obtaining feedback from reserve users would allow the reserves to follow a proactive service model, which is a model that emphasizes adapting to meet the changing needs of its user base. Distributing yearly surveys among stakeholder groups is a recommended method to learn about the effects of outreach efforts and the needs of a user base and has been used in other faculty outreach programs (Basuman et al., 2014). Sedgwick and Valentine can use the surveys created as part of this project as templates for future surveys to be distributed among potential and current reserve users. An additional method to measure success includes adding another field to RAMS applications asking applicants to state how they learned about the reserves. Both surveys and an additional RAMS field could be used to track the impact of the implemented outreach strategies to gauge how effective they are in meeting outreach goals.

## **Modes of Communication**

There are several different modes, or methods, of communication that can be used to distribute information among a target audience. Three modes of specific interest are evaluated below in terms of their effectiveness at communication and the impact they can have on their target audience.

### Email

Email is a common communication method that can efficiently reach a large audience with general information (Chase & Clegg, 2013). However, the impacts of email on their intended audience can be limited. Faculty often ignore email (B. Tiffney, personal communication, November 20, 2017) and email is less effective than personal contact at establishing a

rapport with the target audience. Additionally, though 60% of the Sedgwick and Valentine general use survey respondents indicated that they either somewhat or extensively use email announcements to learn about research and educational opportunities, 40% indicated that they neither use nor do not use email or rarely use email announcements (Appendix F). Generally, outreach is most effective when a relationship is established through direct contact, particularly when it involves more complex topics (Nonaka, 1997; Bausman et al., 2014; Jeffries, 2000). Thus, email is a useful communication method, but outreach will be more effective if it is combined with other modes of communication.

### Direct Contact

Direct contact, or face-to-face communication, is often a more effective outreach method than email as it establishes a stronger relationship with the intended audience. Face-to-face contact can build up stronger rapport with potential reserve users (Bausman et al., 2014; Anthony, 2010; Jeffries, 2000), however, it is a more resource intensive communication method than email. As part of using face-to-face communication, it is common to have a liaison or outreach staff member who can dedicate time to building strong relationships with key faculty members. Many academic libraries have started using liaisons to network and keep in contact with faculty to both communicate the resources available at the library and to learn about faculty needs (Bausman et al., 2014; Anthony, 2010; Jeffries, 2000). Though direct contact with faculty would be more effective than sending out general emails, the increased time needed for face-to-face contact limits the size of the audience that can be reached with this communication method.

### Network-Based Communication

To maximize the efficiency of an outreach plan, it is important to strategically target specific audiences. The flow of information through a population can be modeled as a network, with specific "nodes" or actors having greater or lesser influence on other "nodes" in the network (Rosvall and Bergstrom, 2008; Katz et al., 2004). This means that it is not always necessary to outreach to an entire group, instead it is possible to target outreach to specific high influence group members and let them disseminate information through their network. Using this type of network method of communication has been effective in disseminating knowledge across many audience types, including circulating information about

resources amid university groups (Kibe, 2015). The effectiveness of this type of network-based communication for outreach by the reserves is also supported by the high number of reserve users who learned about the reserve through their colleagues. Almost 70% of Sedgwick research survey respondents, 100% of Valentine research survey respondents, almost 50% of Sedgwick education survey respondents, and 20% of Valentine education survey respondents indicated that they learned about the opportunities at the reserve through a colleague (Appendix F).

### 6.2.1. Research

#### 6.2.1.1. Both reserves

Both reserves are underutilized as research sites. In fact, Sedgwick hosted an average of 42 researchers annually and Valentine hosted an average of six researchers annually between 2012 and 2017 (RAMS, 2018). Additionally, most of the Valentine's research use is attributed to the use of on-site accommodations and facilities to conduct off-site research (RAMS, 2018). Through faculty member surveys and interviews, we have concluded that this underutilization is driven primarily by a lack of awareness of reserve resources and an unfamiliarity with the reserve, though increasing available data and monitoring equipment were also mentioned as potential ways to increase research use (Appendix F). For research, we have established an outreach strategy to increase information flow and accessibility with university faculty. Outreach tactics were evaluated and summarized in a Research Management Scorecard (Appendix I).

#### **Goals**

##### Primary goal

Increase the number of university-level faculty members, graduate students, and undergraduate students to conduct research at Sedgwick and Valentine.

##### Secondary Goals

1. Increase the amount of place-based research that would inform management practices and increase wise stewardship.
2. Increase the amount of university-level research that would directly facilitate more reserve-based university-level classes.

### *Audience*

Currently, faculty members use Sedgwick and Valentine by either directly conducting projects or overseeing student projects (RAMS, 2018). Additionally, faculty members commonly hold long-term research appointments at universities, with a high chance of repeatedly using the same site for multiple years (H. Young, personal communication, November 21, 2017). Because they advise undergraduate, graduate, and doctoral students in research projects, the reserve could capture an increased student research use by targeting faculty members. Faculty are also entrenched in university, departmental, and academic field-related communities, making information flow possible among colleagues. Researchers who are not affiliated with universities are also a potential audience, and were included in the Public Service section of this report.

UC faculty use both Sedgwick and Valentine for research more than faculty from other universities and colleges (RAMS, 2018). Because of this, reserve managers should not only aim to increase UC-led research at the reserve, but research from other universities, as well as there is a higher potential for increase from these non-UC schools.

### *Barriers*

Barriers that faculty members experience to conducting research at Sedgwick and Valentine were identified through faculty member interviews and surveys. One of the primary reason UC and non-UC faculty members do not use Sedgwick and Valentine in their projects is a lack of awareness as 50% of Sedgwick research survey respondents indicated that distributing more information about the reserves among researchers would likely or very likely increase research use. 60% of Valentine research survey respondents indicated that distributing more information would likely increase research use (Appendix F). This can be attributed to the general lack of information distributed to faculty members about Sedgwick's and Valentine's research opportunities. In fact, most faculty members who have used the reserves for research learned about it through a colleague, not from information distributed by the reserves (Appendix F).

Faculty members also cited cumbersome RAMS requirements as a barrier (e.g., detail of research application, repeated application requirement per field season, and lack of a scoping permit for new researchers) (H. Young, personal communication, November 21, 2017).

### *Key messages*

Using information from faculty interviews, we established example key messages using the desired research site characteristics and reserve assets. Additionally, we created key messages about specific research opportunities that could directly inform wise stewardship at the reserves. Specifically, we created 15 example key messages about Sedgwick's accommodations, natural characteristics, available data, access, research-friendly site, research opportunities, and La Kretz Center. Similarly, we created 12 example key messages about Valentine's accommodations, natural characteristics, available data, proximity to other sites, access, research-friendly site, and research opportunities. (Appendix J)

### **Tactic 1: Connect with departmental administrative assistants**

The reserves could establish administrative assistant networks across UCSB, UC System, CSU, and community and city colleges, where faculty members could have an interest in conducting research projects at the reserves. To facilitate the establishment of the administrative assistant network, we have provided lists of departmental administrative assistants for both reserves (Appendix K).

The use of these networks could be two-fold: they could (1) be used to distribute reserve opportunities and information throughout departments and (2) be used to obtain information on new faculty hires. Reserves can email information to the network for further distribution, including reserve-based publications, ongoing research, facility information, examples of potential projects, and contact information. Key messages should be used throughout the correspondence (Appendix J).

Additionally, the administrative assistant network can be used to procure information about newly hired faculty members (e.g., through an annual questionnaire.) From this, a list of newly hired faculty members may be created for separate, targeted correspondence (see Tactic 3).

### Recommendation: Highly Recommended

Regularly distributing information among administrative assistants can have strong benefits for the primary research goal. It could also have strong benefits for the secondary education goal because it will help familiarize faculty members with the reserves. It may weakly contribute to wise stewardship because some added research projects (e.g. studies

of California management methods) could inform reserve management practices.

### Evaluation

The likely success of this network can be attributed to four characteristics of departmental administrative assistants - they are knowledgeable of faculty member hires, are often readily accessible via email, can access and operate department-wide email list serves with faculty members, and have low turnover rates.

Lack of knowledge about the UC Reserve system is one of the highest barriers to reserve-based research (Appendix B, Appendix F). Through this systematic information distribution scheme, new and unaware faculty will be exposed to reserve information through consistent emails. Also, because departmental administrative assistants often answer questions and direct students and faculty to resources, it is wise to equip them with reserve-related information and resources.

While this network will likely result in a higher faculty awareness of reserves, and thus research use, the degree to which it will impact research use is not well known. While administrative assistants and faculty members widely use email, it is not clear how many of these constituents will open and read emails.

This network may also increase the number of university-level courses that use the reserves because it could overturn faculty unawareness of reserves, which is also a barrier to class use (Appendix F).

Because this network is anticipated to increase research use of the reserves, it may indirectly improve wise stewardship. It would have a greater benefit on wise stewardship if new projects to the reserve study effectiveness of land management practices, such as grazing and prescribed fire.

### **Tactic 2: Connect with new faculty members**

Sedgwick and Valentine should distribute information about reserve research opportunities to new faculty members (i.e., one - five years into academic appointments). They can do this by obtaining information through the administrative assistant network (see Tactic 2) on new faculty hires in UCSB, UC System, CSU, and nearby community and city colleges.

Reserves should send emails with research opportunities and information to new faculty members, such as instructions and information on reserve use for research, example reserve-based projects, an invitation to talk to reserve managers about specific projects, and additional sources of reserve information (e.g., faculty ambassador network, administrative assistant network, website). Research-related key messages should be used throughout correspondence to ensure consistent messaging (Appendix J).

#### Recommendation: Highly Recommended

Connecting with new faculty members can strongly help reserves meet primary research goal. It takes advantage of a time period in faculty careers when they actively resources and are looking to establish long-term projects. It can have benefits for education, as well, because new faculty are also generally more enthusiastic in creating new curriculum and field courses (C. Lowry, personal communication, October 27, 2017). It may have a low contribution to wise stewardship.

#### Evaluation

New faculty members actively seek resources necessary for conducting research (Sorcinelli, 1994). Additionally, new science-based faculty members often establish study sites for long term-projects that may last several years (H. Young, personal communication, November 21, 2017). These long-term projects can influence future doctoral, graduate, and undergraduate student advisees to base their projects in the same locations because of installed monitoring equipment, data, familiarity with the site, or the natural characteristics. Therefore, because new faculty members often search for research sites for long-term projects with future student collaboration, the first few years of academic appointments represent an important time period for reserves to engage with them about research opportunities.

Although using the new faculty member network could increase research use, it is not guaranteed that faculty will read reserve-related emails (Chase & Clegg, 2013). However, it is likely still worthwhile to seize this important window of time in faculty members' careers to share reserve resources with them.

Circulating information to new faculty members may also increase education use of the reserves because faculty members who learn about



the reserves may be more likely to use them as field sites in courses (C. Lowry, personal communication, October 27, 2017; C. Lay, personal communication, November 9, 2017). This network may also indirectly increase wise stewardship. New and existing faculty members may conduct projects with data that is useful to reserve management. However, because this has several variables (e.g., specificity of research and findings), it may only weakly affect wise stewardship.

### **Tactic 3: Connect with Research Faculty Ambassador Network**

The reserves could establish a research faculty ambassador network, or a coalition of faculty members who have recently used Sedgwick or Valentine for research. We have created initial Research Faculty Ambassador Network lists for both Sedgwick and Valentine (Appendix L) that include faculty members who have conducted research at Sedgwick or Valentine from the UC System, the CSU System, California City and Community Colleges, other California universities, out-of-state universities, and international universities. These faculty were chosen because of their research experience with the reserves, and thus, their knowledge of reserve resources and features.

The ambassador network could serve several functions. First, the reserves could consistently distribute research-related information across the network, including funding opportunities, reserve management activities, recent publications, highlighted projects, announcements, contact information, and research key messages (Appendix J). Similar to an organization regularly emailing its members, this method can provide a stream of communication with reserve users and allow researchers to have up-to-date information on resources and opportunities.

Second, the ambassador network could create an avenue for new faculty members to learn about reserves from experienced colleagues. The reserves could ask the ambassadors to distribute information to peers who may be interested in reserve-based research. This could include funding information, available data, and instructions for use that are directly relevant to new faculty members looking for research sites, funding, and resources. The reserves could directly ask (e.g., via email survey) ambassadors to be available to connect with prospective researchers who have inquiries about related reserve-based research.

Recommendation: Moderately Recommended

Establishing ambassador networks could help reserves meet the primary research goal by using existing reserve-based researchers to share information to colleagues as needed. It could have a low benefit to education because it may make faculty members aware of the opportunities to teach classes on the reserves as they learn about research opportunities. It would have a low benefit the wise stewardship goal because there is no guarantee that increased research to the reserves would result in data that could inform reserve management.

### Evaluation

Research ambassador networks provide one method of systematic information distribution throughout universities and may help overcome faculty unawareness of reserve resources and opportunities. It would not only encourage current faculty members researchers to share information to colleagues about the reserves (e.g. via email and direct conversation), but it would also strengthen ties with current researchers. Networks and knowledge ambassador programs have been effective in disseminating knowledge across many audience types and have been especially successful in circulating information about resources amid university groups (Kibe, 2015).

While email is a useful tool for information dissemination (Chase & Clegg, 2013), more complex discussion, such as evaluating reserve fit for new faculty member research, is likely to be more effective through direct interactions with community members (Nonaka, 1997). Because of this, it may be more effective for new or unaware faculty members to talk with their colleagues (i.e. reserve ambassadors) about the added value of reserves to specific projects than correspond through email with reserve personnel.

However, this tactic is only moderately recommended for research because it is not clear if email communication with current researchers will directly lead to discussions with their colleagues about reserve opportunities or directly influence more reserve-based research.

In addition to increasing research use, the ambassador network may also increase university-level education at the reserves. Faculty members who learn about the reserves may be more likely to use it as field sites for undergraduate courses (C. Lowry, personal communication, October 27, 2017).

The ambassador network may indirectly improve wise stewardship. By circulating research topic suggestions, new and existing faculty members may conduct projects with data that is useful to reserve management.

#### **Tactic 4: Re-evaluate RAMS application requirements**

Faculty members share a general frustration with RAMS. Almost 20% of Sedgwick research survey respondents indicated that streamlining RAMS or providing separate scoping permits for research would likely increase research use of the reserve. Furthermore, the majority of Valentine research survey respondents indicated that streamlining RAMS (60%) or providing scoping permits (75%) would either likely or very likely increase research use (Appendix F). For example, some questions request redundant information, such as requested use of unmanned aircrafts in both the Federal Permits and Additional Question(s) sections of the application.

Additionally, some questions request specific information about proposed reserve activities that new researchers may have trouble answering. For example, one question asks applicants to do the following:

“Please describe the area on the reserve you will be working. This information helps the reserve manager manage the different research on the reserve. Also a general description of the geographic area in which the data is being collected for the entire project. It can be a simple place name or a more detailed [detailed] description.”

Another question requests the following:

“The transfer of animals, plants, and/or micro-organisms from outside the reserve to within the reserve, or between different parts of the reserve?”

These questions may discourage researchers who have not yet seen the site or who are in the first stages of their projects. Researchers may contact reserve staff about application questions, but communication method of email or phone is situational and may be time consuming. While this may not be a direct barrier for new faculty members, it may compound other barriers to research use.

The reserves may be better positioned to receive researchers if these RAMS-related frustrations were addressed in two ways. First, the UCNRS should re-evaluate the importance of each application question and remove those that are unnecessary. To reduce redundancy,

administrators should consider merging similar questions or removing repeated questions. Second, because researchers can have difficulty designing field experiments and filling out RAMS applications without first seeing the site, the UCNRS could create a scoping permit. A scoping permit, in this context, would be a less-detailed application designed for new researchers to visit the reserve and assess the fit of the site for their specific project (H.Young, personal communication, November 21, 2017).

Recommendation: Weakly Recommended

Addressing RAMS may have a low research benefit, with a low effect on university-level education and will have little to no effect on the wise stewardship.

Evaluation

Because it is not well known if RAMS intricacy and redundancy directly blocks researchers from conducting research on the reserve, it is not clear if correcting the intricate detail and redundancy of RAMS questions will illicit more research use. However, it would provide general benefits to reserve users by making the reservation process easier and less time consuming.

**Tactic 5: Create a complete research web page**

The lack of central, complete online information and instructions necessary for scoping research projects can pose an impediment to reserve-based research (H, Young, personal communication, November 21, 2017). To solve this issue, reserves could create a single webpage on their websites with detailed information and instructions for researchers. Based on desirable characteristics shared in interviews, we have created a list of resources and information that should be incorporated in this webpage (Appendix M). This webpage should also incorporate key messages whenever possible (see Appendix J).

Recommendation: Moderately Recommended

Building a research-centered webpage with information, opportunities, and instructions could directly help reserves fulfill primary research goal by providing more accessible information to prospective researchers. It could have a low benefit for education because it may allow faculty members to get a better idea of the facilities and resources available to

them for both education and research. It may also weakly contribute to wise stewardship.

### Evaluation

A detailed research webpage could help reserves overcome barriers related to reserve unawareness and RAMS confusion. 100% of Sedgwick and Valentine general use survey respondents indicated that they either somewhat or extensively use web searches to learn about research and educational opportunities, though no researchers first heard about either reserve from a web search (Appendix F). Additionally, it can be difficult for potential researchers to understand exactly how to do research at the reserve and fill out RAMS applications (H. Young, personal communication, November 21, 2017). One central list of information could help overturn these issues and aid prospective researchers in assessing the fit of the reserve for their specific project(s). Part of this website could also include easily accessible data about the reserve, as 75% of Sedgwick research survey respondents indicated that having more readily accessible data (such as climate data, species data, etc.) would likely or very likely increase research use and 80% of Valentine research survey respondents indicated that it would likely increase research use (Appendix F).

This may have a weak positive benefit on education because it could boost familiarity with the reserve. It could also have a weak positive effect on wise stewardship, especially if the online resources provide example projects whose findings would directly inform management actions.

### **Tactic 6: Create a social media strategy to engage researchers**

Sedgwick and VESR have very little audience engagement on their Facebook pages. Of the 17 UCNRS reserves with Facebook pages, Valentine has the lowest following, and Sedgwick has the fifth-lowest following (Appendix C). While each reserve differs in many ways (e.g., resources, location, size), this comparison shows that there is potential for Sedgwick and Valentine to cultivate their Facebook pages. Although there are several reserve objectives that can be fulfilled through an expanded social media effort, this tactic only addresses the potential for reserves to use social media to increase reserve-based research by

faculty members. Additionally, while there are several social media channels, this tactic only addresses Twitter and Facebook.

When developing a social media strategy, reserves should adhere to several best practices:

**Perform initial research:** Reserves should investigate social media efforts from similarly positioned organizations to learn potential strategies, pitfalls, and successes. Valentine and Sedgwick can easily see themes and patterns of other UCNRS reserves who have larger audience engagement through our social media analysis (Appendix C).

**Leverage unique characteristics and value:** Other reserves leverage special characteristics to build their online brands. For example, Hastings Natural History Reservation often creates Facebook posts about acorn woodpecker research and news because the reserve houses active acorn woodpecker research. (Appendix C)

**Voice:** The voice, or tone, of the posts is important in building online brands. Reinforcing the organizational mission, outlining the ideal voice and tone, and monitoring the engagement with different posts are all ways to build voice (York, 2018). For example, EarthScope, a geology research program operated by University of Alaska, Fairbanks, surveyed their social media followers and found that the most successful posts used humor, were science-oriented, and communicated their specific research mission (Bohon et al., 2013).

**Establish mission-related themes:** Sedgwick and Valentine should establish several general themes for their posts to adhere to. These can be related to the reserve's mission and unique natural characteristics. Several UCNRS reserve Facebook pages share posts within the categories of reserve-specific photography, events, research, and volunteer opportunities (Appendix C).

Recommendation: Weakly Recommended (for research recruitment)

Developing a research-focused Facebook and Twitter strategy may have an indirect research benefit. It may have little to no effect on university-level education and some effect on land stewardship.

Evaluation

Developing a research-focused Facebook and Twitter strategy may have an indirect research benefit, with little to no effect on university-level education and some effect on land stewardship for the following reasons:

#### *Facebook*

UCNRS reserves operate Facebook more than any other social media channel. Additionally, about 2.2 billion people use Facebook as of 2017 (Statista, 2017) and scientists who use Facebook seem to be well-connected (McClain, 2017). However, they seldom use the channel for professional and academic development, and mostly for personal use (McClain, 2017 & Van Noorden, 2014). Therefore, reserves should consider using Facebook to foster general conversation about science and build their online brands, rather than actively recruit researchers to the reserves.

#### *Twitter*

Although some studies have shown that a small scientist community uses Twitter, they are more interactive about research and science. One study found that only 13 percent of scientists surveyed use Twitter, but a higher percentage of Twitter users follow discussions on research-related issues, and research related to their field in comparison to Facebook and ResearchScape (Van Noorden, 2014). In a separate survey, respondents shared that Twitter is used for exchanging information about research, whereas most scientists use Facebook more often for personal use (McClain, 2017).

Social media-related literature and experiments question how much social media engagement translates to direct action and how much is passing curiosity (Van Noorden, 2014). Because of this, it is not clear if developing a research-focused social media plan would directly attract researchers to the reserves. It is likely that social media will not affect education and wise stewardship.

#### 6.2.1.2. University-level education

Education use of the reserve makes up the smallest percentage of use for both Sedgwick and Valentine (RAMS, 2018). From 2012-2017, university-level education made up only 6% of average annual users at Sedgwick and 2% of average annual users at Valentine (Figure 6 and Figure 10). Through faculty member surveys and interviews, we determined that one of the main causes of this underutilization is a lack of awareness about

reserve resources. We developed an outreach strategy to increase information flow and access to university faculty who teach single- and multi-day university-level field courses taught at the reserves. We evaluated tactics for their potential impact on primary education goals and secondary wise stewardship and research goals, and summarized these findings in an Education Management Scorecard (Appendix N).

## **Goals**

### Primary goal

The primary goal for university-level education is to increase the number of university courses taught at each reserve. This includes both single- and multi-day courses as well as courses in both the sciences and humanities.

### Secondary goals

Secondary goals for university-level education include (1) increasing the amount of university-level education at Sedgwick that would directly inform and/or help Sedgwick's ability to contribute to wise stewardship and (2) increasing the amount of university-level education at Sedgwick that would support research at the reserve.

## **Objectives**

Determining specific objectives for outreach depends on Sedgwick's desired outcome from its outreach plan and the amount of resources the reserve is interested in investing in outreach. Examples of clear, measurable objectives include increasing the number of classes using the reserve by 5 in the next year, or increasing percent use of the reserve for education by 15% in the next five years.

## **Audience**

### Sedgwick

UCSB should be a main audience because of its high use of the reserve (Figure 3). High current users of the reserve will have a lower barrier to entry for increased use of the reserve as they are more likely to have institutional familiarity with the reserve and the reserve system. Faculty often learn about field opportunities from their colleagues (C. Tyler, personal communication, February 15, 2018), universities with high



amounts of current users will have greater familiarity with the reserves and the resources available on them because the current users are able to disseminate knowledge among their colleagues. Interested faculty would also have the ability to ask their colleagues for more information about the reserves and their experiences taking classes to the reserves, which would make it easier for other faculty at these high use universities to use the reserves. However, other colleges and universities that have lower current use have a higher potential for increase, if they can surpass the barriers to access the reserves. These barriers include higher amounts of unawareness and lack of familiarity with the reserves and they stem from not having a strong current user base to spread information about the reserves among faculty. Examples of these other universities with higher barriers to outreach include UCLA, SBCC, UC Berkeley, California Polytechnic State University, Claremont colleges, Occidental, the University of Redlands, and the Pacifica Graduate Institute.

### Valentine

At Valentine, the majority of education users are from other California colleges, then international universities, and then UCSB (Figure 8). Hence, Valentine should emphasize other California colleges and international universities in their education outreach strategy. These colleges will have a lower barrier to entry because there is already an established, or partially established, outreach network to these colleges and universities. UCSB, other UCs, and CSUs are potential sources of reserve education users and have a high potential for increase. However, there is a higher barrier to entry for these other universities as they have less established current outreach networks due to having fewer reserve users.

Specific high use colleges and universities at Valentine include: Stanford University, Cosumnes River College, Cuesta College, the University of Exeter, and UCSB (RAMS, 2018).

### *Target Fields of Study*

Fields of interest include life sciences, physical sciences (such as hydrology, earth science, and geomorphology), social sciences (such as anthropology and archaeology), and the humanities (such as art and writing). Though current class use of the reserves focuses on science, technology, engineering, and math (STEM) courses, there is the potential

for transdisciplinary courses, or science, technology, engineering, art, and math (STEAM) courses to utilize the reserves. There has been a growing movement to incorporate art into the traditional STEM fields as there has been an increasing need for transdisciplinary solutions to global problems (Guyotte et al., 2015; Guyotte et al., 2014; Immerman, 2011; Land, 2013; Madden et al., 2013). These types of courses that combine art and science would be able to benefit from using reserve resources. Hence it is important to target these transdisciplinary courses in addition to more traditional STEM fields when designing outreach strategies for the reserves (Van Noorden, 2014).

### **Barriers**

Faculty interviews and surveys indicated that there are five main barriers to university-level education use on the reserves. These include funding, faculty member turnover, lack of awareness of the reserves, lack of familiarity with the field site, and time constraints with students. Increasing the distribution of information to educators was the only option chosen in the Valentine education survey as being very likely to increase education use of the reserve (Appendix F), which supports faculty interviews that indicated that lack of awareness is one of the primary barriers to education use of the reserves.

In addition to a general lack of awareness about the reserves, lack of familiarity with the sites is also a barrier to educational reserve use. Based on interviews, faculty mentioned that being familiar with a field site was important when considering where to take classes as they wanted to ensure that they knew the site well enough to effectively teach courses at that location.

### **Key messages**

Using information gathered from interviews and surveys, we developed example key messages for Sedgwick and Valentine that focused on the specific assets and site characteristics most used by education users of the reserves. For Sedgwick, we developed nine key messages that focused on Sedgwick's accommodations, variety of native ecosystems, diversity of flora and fauna, accessibility, and proximity to UCSB (Appendix O). Similar to Sedgwick, we also developed key messages for Valentine. We developed five key messages that focused on Valentine's accommodations, subalpine ecosystems, and diverse flora and fauna

(Appendix O). Accommodation key messages at Valentine specifically emphasized extended stays at the reserve as most class use is for longer-term field courses because of Valentine's distance from colleges and universities.

Tactics: Both reserves

### **Tactic 1: Conduct outreach to new and junior faculty members**

Although the resources offered by academic libraries are different from the reserves, libraries face similar outreach challenges. Libraries need to outreach to faculty to promote their resources for research and education use because many faculty lack awareness about the resources available at the library (Bausman et al., 2014). In particular, junior faculty have been found to lack awareness about resources available at the library and have recommended libraries support greater outreach efforts to inform them about what resources are available (Bausman et al., 2014; Jeffries, 2000). As with libraries, there will be a similar lack of awareness among new and junior faculty about resources available on the reserves because these faculty are less established at their university. In order to increase awareness of the reserves by new and junior faculty members, Sedgwick and Valentine should target outreach to them. By reaching out to these faculty members early, it increases the chances that they will develop classes that use the reserve in the future as it overcomes the barrier of lack of awareness about the reserves.

To do this, reserves should compile lists of new faculty members at relevant universities and add new faculty members to the list on an annual basis. Relevant universities include those with the highest education use of the reserve (from UCSB, the UC System, and CSUs) in addition to surrounding community colleges and universities. To obtain information about the new faculty members, reserve staff can ask for the contact information of new faculty hires from the administrative assistant network (see Tactic 3).

Sedgwick and Valentine should regularly send new faculty members information and resources that be used for classes. These resources would include instructions on how to set up bringing a class to the reserve, examples of classes that use the reserve, an invitation to talk to reserve managers about specific class use, and additional sources of information about the reserve (e.g., faculty ambassador network,

administrative assistant network, website). Education-related key messages should be incorporated into these emails to ensure consistent messaging about the reserve (Appendix O).

Outreach to new and junior faculty members can also come in the form of personalized contact, through new faculty luncheons or mixers. Successful outreach strategies for connecting with faculty generally use face-to-face contact to establish rapport (Bausman et al., 2014; Anthony, 2010; Jeffries, 2000). For example, new library outreach initiatives include hosting new faculty lunches or mixers (Bausman et al., 2014; Anthony, 2010).

#### Recommendation: Highly Recommended

Developing a specific outreach strategy to reach new and junior faculty could strongly help the reserves meet both the primary education goal and the secondary education goals. New faculty are often enthusiastic about creating new curriculum and field courses (C. Lowry, personal communication, October 27, 2017), though they may have less knowledge about the resources available to them at the reserves. Therefore, connecting to these new faculty can help overcome the lack of awareness barrier. In addition, connecting to new faculty could strongly promote research use of the reserves because new faculty are trying to establish field sites for long- and short-term projects (H. Young, personal communication, November 21, 2017). Furthermore, as the new faculty are establishing their research sites, they could be concurrently designing courses that help support their research, which could be contributing to improving wise stewardship of the land.

#### Evaluation

New and junior faculty often lack awareness of university resources (Bausman et al., 2014; Jeffries, 2000). Because of this, this represents an important audience to connect with. Targeting new faculty members could create a relationship with the reserve early on and can then help build future support networks (Anthony, 2010) of faculty who are aware of and wish to support the reserve. Furthermore, this will help to overcome the lack of awareness barrier which is particularly prevalent among new and junior faculty.

Email can be effective in reaching a large audience with general information (Chase & Clegg, 2013). However, because of the limited

effectiveness of email, combining email communication with direct contact through new faculty events would establish a stronger connection to these new faculty members.

Additionally, it could benefit research as new faculty are working to establish field sites, and establishing field sites at the reserves early in their career will likely mean that the faculty will continue to use that field site in the future (H. Young, personal communication, November 21, 2017).

### **Tactic 2: Connect with administrative assistants**

As with research, Sedgwick and Valentine should connect with administrative assistants at UCSB, other UCs, CSUs, and community and city colleges to systematically distribute information about reserves. To assist in this effort, we have created administrative assistant lists (Appendix K). Key messages should be used throughout the correspondence (Appendix O).

Additionally, the administrative assistant network can be used to procure information about newly hired faculty members in the department (e.g., through an annual questionnaire.) From this, a list of newly hired faculty members may be created for separate, targeted correspondence (see Tactic 1).

### Recommendation: Highly Recommended

Distributing information through administrative assistant networks can help reserves meet the primary education goal. Additionally, the administrative assistant network would benefit research use of the reserves as information disseminated through the network would also reach potential research users.

### Evaluation

Connecting with administrative assistants is an efficient method to maintain contact with entire departments and easily disperse information through a large audience. As lack of awareness about the reserves was the primary barrier preventing education use of the reserve, dispersing information about the reserves to a large audience will help increase awareness.

### **Tactic 3: Connect with education ambassador network**

The Education Ambassador Network is comprised of faculty who have brought at least one class to Valentine or Sedgwick between July 2016 and February 2018 (see Appendix P). These faculty span across the UC System, the CSU System, California City and Community Colleges, other California universities, out-of-state universities, and international universities.

As with the Research Faculty Ambassador Network, the Education Faculty Ambassador Network can be used to disseminate information, announcements, and opportunities for education among faculty members. Information disseminated through this network should be targeted toward encouraging class use on Sedgwick or Valentine and should contain detailed information about education resources available on the reserves and focus on key messages regarding reserve assets and natural characteristics for education (See Appendix O). This ambassador network would provide a method of consistent, targeted communication with reserve-based educators and create an avenue for new faculty members to learn about reserves from experienced colleagues.

#### Recommendation: Moderately Recommended

An Ambassador Network could help meet the primary education goal and the secondary education goals by creating a coalition of faculty on various campuses who will be up to date with information about education opportunities on the reserves. These ambassadors would then be able to share this information with their colleagues, which would help overcome the barriers of lack of awareness and lack of familiarity with the reserves. There could also be a moderate benefit to research as there is overlap between faculty researchers and educators using the reserves. Additionally, faculty could be designing courses that are supporting their research on the reserve or they could be designing courses that encourage students to support monitoring or other management activities on the reserve that contribute to wise stewardship.

#### Evaluation

Many faculty learn about the reserves from talking with their peers (C. Tyler, personal communication, February 15, 2018). Distributing information about the reserves to an Education Ambassador Network could encourage greater communication (either through direct contact or email) between the ambassadors and their peers. Reserve Ambassadors

can speak directly to both their class teaching experiences, as well as possible class opportunities for other faculty. Networks and knowledge ambassador programs have been used as effective forms of knowledge dissemination in many circuits, including circulating information about resources amid university groups (Kibe, 2015).

Email is a useful tool for general information dissemination (Chase & Clegg, 2013), but direct contact is more effective, particularly when it involves more complex topics (Nonaka, 1997; Bausman et al., 2014; Jeffries, 2000). It may be more effective for new or unaware faculty members to communicate directly with the reserve ambassadors to learn about the resources available on the reserves rather than receiving a generic email as the reserve ambassadors would be better able to answer more specific questions.

However, this is only moderately recommended for education because it is not clear if email communication with current educators will directly lead to discussions with their colleagues about reserve opportunities.

The Education Ambassador Network may indirectly increase research use of the reserves as it would be increasing awareness about the reserves among faculty in departments of interest to the reserves.

#### **Tactic 4: Increase department retreats at the reserves**

Increasing department retreats at the reserves would allow faculty members to become better acquainted with reserve resources. At the retreat, reserve staff can introduce department faculty to the resources and facilities available onsite. This includes giving a tour of the natural communities at the reserve as well showing the different rooms and accommodations that could be used by classes. These retreats could increase awareness of the reserve as well as help faculty become more familiar with the resources available for class use. Furthermore, this could be an opportunity for reserve staff to explain how previous classes have used the reserve.

#### Recommendation: Weakly Recommended

Increasing department retreats at the reserves would support the primary education goal as it would increase awareness and familiarity with the reserve amongst various departments. Additionally, there could be a

benefit to research as the retreats would spread awareness through the entire department, including to research faculty.

### Evaluation

Encouraging department retreats at the reserves would help with addressing three barriers to class use of the reserve, faculty member turnover, lack of awareness, and lack of familiarity with the reserve. Additionally, face-to-face interactions between reserve staff and faculty would increase rapport and help establish stronger relationships between these two groups (Bausman et al., 2014; Anthony, 2010; Jeffries, 2000).

However, despite addressing education barriers, hosting department retreats is a resource intensive process as it requires a time and resource commitment from the reserve. These retreats would only be relevant if they were being conducted by a department that had faculty who were interested in using the reserve. Additionally, having departments not related to the reserve's mission could detract from other user's experience and is seen as not being beneficial to the reserves (C. Tyler, personal communication, February 15, 2018).

### **Tactics: Sedgwick Reserve**

#### **Tactic 1: Create class supplies fund**

Creating a class supplies fund could increase student and class access to the reserve. Interviewees mentioned the expense of paying for camping supplies as a potential barrier to students participating in field courses, particularly for lower-income students. 100% of Sedgwick education survey respondents and 80% of Valentine education survey respondents indicated that taking classes to the reserve increased the cost of teaching the course. Additionally, one survey respondent indicated that having basic equipment, such as binoculars or microscopes, to loan would be useful for classes using the reserve (Appendix F). Camping supplies can be expensive and there is concern that the cost of camping supplies prohibits students from participating in field courses that have a camping component, especially for students from lower income backgrounds (C. Lay, personal communication, November 9, 2017). Additionally, purchasing food for overnight classes can be expensive. For example, it can cost \$300-\$400 to supply food for the Landscape Painting class, which is expensive when the class only has 15 students (B. Tiffney, personal communication, November 20, 2017). This added expense for



food would either need to be covered by the class budget or would be passed on to the students. The added cost of a course to students is a concern when faculty decide where to take their classes (H. Young, personal communication, November 21, 2017). Creating a fund to purchase class supplies, including camping gear, equipment, and food, could increase student participation in field classes and increase class use on the reserve.

### Recommendation: Moderately Recommended

Developing a class supplies fund would support the primary education goal as it would help overcome the funding barrier which prevents courses from using the reserve.

### Evaluation

Providing a class supplies fund for students would help increase the number of education user days at the reserve because it could potentially increase the number of students participating in a particular field course. It could also increase access of lower-income students to field courses. However, the cost of class supplies, in most cases, is not the primary barrier to educational use of the reserve. Survey respondents did not indicate that the cost of the class prevented them from bringing students to the reserve, the most explicitly stated barrier to Sedgwick education use was from one respondent who expressed their feeling that education was not a priority to the reserve and that they felt discouraged from bringing undergraduates to the reserve (Appendix F). Thus, creating a class supplies fund would benefit educational use of the reserve but only to a moderate extent.

### **Tactic 2: Provide transportation funding**

Course instructors rent vehicles from the university and commercial car rental agencies to transport students to Sedgwick. For example, 12-passenger vans from UCSB cost \$44 plus an additional \$0.49 per mile to rent (TPS, 2018). This equals about \$82 to rent one van to take students to Sedgwick and back from UCSB. However, depending on class size, multiple vans may be needed.

Cost is a concern when deciding where to take courses out in the field (C. Tyler, personal communication, February 15, 2018) as courses have limited budgets to support renting vehicles. This makes the cost of

transportation a potential barrier that could prevent classes from using the reserve (K. McCurdy, personal communication, November 8, 2017). This was also supported by all Sedgwick education survey respondents indicating that bringing students to the reserve increases the cost of teaching the course (Appendix F).

To reduce the cost of field courses, Sedgwick could provide a transportation fund. If creating a transportation fund directly is not within Sedgwick's current operating budget, the reserve has the option to request money from donors to set up this transportation fund (K. McCurdy, personal communication, November 8, 2017).

#### Recommendation: Moderately Recommended

Providing a transportation fund would help the reserve overcome the barrier of funding for a class, which would help achieve the primary goal of increasing class use of the reserve.

#### Evaluation

By creating a transportation fund, classes would not have to cover the cost associated with traveling to the reserve. Though this is beneficial and can increase class use, cost of transportation is only one barrier that could be preventing class use of the reserve. Thus, this tactic only provides a moderate benefit to the reserve.

#### 6.2.1.3. Public Service

For both Sedgwick and Valentine, public use of the reserve is the highest category of use. Over 80% of users for both reserves are classified as being for public use (Figure 6 and Figure 10). However, both reserves have the opportunity for form more strategic partnerships with community groups, science and environmental-based NGOs, and public agencies to contribute to public service, while also supporting wise stewardship, university-level education, and research at the reserves. In this section, we lay a foundation for each reserve to address their unique public service-related concerns, and avenues to concentrate future information gathering for beneficial partnerships. When analyzing public stakeholders, reserves should focus on the organizations that best support the components of public service of citizen science, community leadership, K-12 environmental education, ecosystem collaborations, and public access and events.

## Sedgwick Reserve

About one third of public use in terms of both users and user days is from colleges (Figure 4), with most being from UCSB. Non-Profits and K-12 education make up another 24% of users and 36% of user days (Figure 4). Within the non-profits that use the reserve, most use the reserve for multiple years, though almost half have only used the reserve for one year between 2012 and 2017 (Table 1).

### **Goals**

1. Encourage use of the reserves for citizen science, especially science that would increase knowledge of Mediterranean-climate ecosystems
2. Increase knowledge sharing of scientific expertise to local community initiatives
3. Encourage use of the reserve for K-12 schoolchildren to experience and learn about the environment
4. Participate in Mediterranean-climate ecosystem collaboration efforts
5. Continue to allow public access and event use, especially as it supports the other goals

### **Audience**

Organizations that currently use the reserve were grouped into four categories (Appendix D). Sedgwick has the opportunity to work with other community organizations, NGOs, environmental agencies, and indigenous tribes that do not currently use the reserve. We have created a list of 43 organizations that could provide beneficial partnerships with the reserve (Appendix D).

### **Key Messages**

Example key messages for Sedgwick's public outreach were based on three categories: being an important community member, having the potential for research collaboration, and having a diversity of natural resources (Appendix Q). Example audiences for each message were also included. Intended audiences would include both current and potential users of the reserves, specifically focusing on organizations whose missions closely align with Sedgwick's.

## **Next Steps**

Based on public group surveys, most groups who are currently using Sedgwick find the reserve resources satisfactory. 86% of Sedgwick community group survey respondents found the quality of available facilities and equipment either good or very good, 100% of respondents rated the helpfulness of reserve employees as good or very good, and 71% of respondents found the accessibility of the reserve to community groups as being good or very good (Appendix F). However, website clarity, availability of reserve information, and clarity of the application process were not rated as highly. 14% of respondents rated website clarity and availability of information as only acceptable and 14% rated the clarity of the application process as poor (Appendix F). Additionally, in response to the question about how Sedgwick could better serve the surrounding community, two of the seven responses indicated that Sedgwick is currently doing a good job while three responses indicated a need to increase public outreach (Appendix F). Sedgwick could increase website clarity and conduct greater outreach to community groups to increase awareness of the reserve and its resources. In particular, Sedgwick should focus on conducting outreach to organizations whose mission closely aligns with Sedgwick's.

Most groups (67%) learned about the reserves from friends or colleagues (Appendix F). In general, 86% of survey respondents indicated that their organization often or very often uses friends or colleagues to learn about opportunities for their organization, 71% often or very often use web searches, 71% often or very often use local news sources, 57% often or very often use social media, and 71% often or very often use email announcements (Appendix F). This indicates that improving website clarity, using network-based communication, and sending out email announcements would likely have the greatest impact on increasing community use of the reserve. Sedgwick should specifically use messages in these outreach strategies that would most appeal to science, nature, and education organizations. Connecting with more science and nature organizations could increase their use of the reserve, as well as contribute to wise stewardship, education, and research related goals.

### Valentine Camp

At Valentine, the main public service use is by K-12 education and its highest users are UCSB and Mammoth elementary schools (RAMS, 2018).

Valentine holds a public lecture series that attracts community members from the surrounding area and leads classes for K-12 students. Because of this, the main community stakeholder groups are the Mammoth Elementary School District and members of nearby communities. However, there is an opportunity for Valentine to increase engagement with community groups.

### **Goals**

1. Encourage the surrounding communities' knowledge and understanding of reserve activities, and
2. Instill community members with a higher appreciation of the reserve's science-based purpose.
3. Encourage collaboration between Valentine and science agencies.

### **Audience**

Valentine has the potential to partner with science and nature organizations and distribute information about science and subalpine habitats to the broader public through these groups. We have identified 30 community stakeholder groups that could be interested in using the reserve for science and environmental-based activities (Appendix D).

### **Key Messages**

Key messages for Valentine were divided into the three categories that focused on the benefits Valentine brings to the surrounding community, the diversity of resources available on the reserve, as well as the many educational opportunities for school-aged children (Appendix Q).

### **Next Steps**

Based on public group surveys, most users were satisfied with their experience on the reserve. 50% of Valentine community group survey responses rated the quality of available facilities and equipment as very good, 100% of responses rated the helpfulness of reserve employees as very good, and 50% of responses indicated that the availability of reserve information, clarity of the application process, and accessibility of the reserve to community groups were very good (Appendix F). Overall, community groups appreciate and understand how Valentine benefits the community. Several Valentine community group survey respondents commented on their appreciation of the reserve and how the reserve is

an important resource for the community, though two respondents did mention the lack of awareness of the reserve among many locals and the need to increase public outreach (Appendix F). This implies that there is potential for Valentine to increase outreach to community groups and local residents.

63% of survey respondents indicated that their organization very often uses friends or colleagues to learn about potential opportunities for their organization, 63% often or very often use web searches (though 13% only rarely use web searches), 63% use local news sources (though 13% very rarely or never use local news sources), 38% very often use social media (though 38% only rarely use social media), 75% often or very often use email announcements (Appendix F). This indicates that to conduct outreach to Valentine community groups, sending out email announcements, improving website clarity, and using network-based communication would likely be the most effective. While this is valuable information, Valentine should seek further information on specific values and needs of community stakeholder groups to form specific ways to partner with each. In particular, Valentine should focus on partnering with organizations whose mission most closely aligns with the reserve's. This would include organizations focused on science, nature, and education. These partnerships may not only help Valentine fulfill its mission of public service, but also contribute to its research, educational, and wise stewardship missions, as well, through actions like citizen science and volunteer restoration efforts.

## 7. References

- A Sense of Place: A Place-Based Approach to Science for Land Management | Fort Collins Science Center. (n.d.). Retrieved February 11, 2018, from <https://www.fort.usgs.gov/sites/sense-place-place-based-approach-science-land-management/sense-place-place-based-approach>
- Anhold, J. A., Jenkins, M. J., & Long, J. N. (n.d.). Management of Lodgepole Pine Stand Density to Reduce Susceptibility to Mountain Pine Beetle Attack. Retrieved from [http://cmapspublic3.ihmc.us/rid=1N4TT6VH8-5MCQ5F-14VT/Management of Lodgepole Pine Stand Density to Reduce Susceptibility to Mountain Pine Beetle Attack.pdf](http://cmapspublic3.ihmc.us/rid=1N4TT6VH8-5MCQ5F-14VT/Management%20of%20Lodgepole%20Pine%20Stand%20Density%20to%20Reduce%20Susceptibility%20to%20Mountain%20Pine%20Beetle%20Attack.pdf)
- Anthony, K. (2010). Reconnecting the disconnects: Library outreach to faculty as addressed in the literature. *College and Undergraduate Libraries*, 17(1), 79–92.
- Audubon Society (n.d.). Tricolored blackbird. Retrieved March 25, 2018, from <http://www.audubon.org/field-guide/bird/tricolored-blackbird>
- Bai, S. H., Dempsey, R., Reverchon, F., Blumfield, T. J., Ryan, S., & Cernusak, L. A. (2017). Effects of forest thinning on soil-plant carbon and nitrogen dynamics. *Plant and Soil*, 411(1–2), 437–449.
- Bartolome, J. W., Fehmi, J. S., Jackson, R. D., & Allen-diaz, B. (2004). Bartolome et al. - 2004 - Response of a Native Perennial Grass Stand to Disturbance in California 's Coast Range Grassland.pdf, 12(2), 279–289.
- Bartuszevige, A. M., & Kennedy, P. L. (2009). Synthesis of Knowledge on the Effects of Fire and Thinning Treatments on Understory Vegetation in U.S. Dry Forests. Retrieved from [https://www.firescience.gov/projects/07-S-11/project/07-S-11\\_07\\_s\\_11\\_fire\\_thinning\\_effects\\_understory\\_vegetation.pdf](https://www.firescience.gov/projects/07-S-11/project/07-S-11_07_s_11_fire_thinning_effects_understory_vegetation.pdf)
- Bausman, M., Ward, S. L., & Pell, J. (2014). Beyond Satisfaction: Understanding and Promoting the Instructor-Librarian Relationship. *New Review of Academic Librarianship*, 20(2), 117–136.
- Beyers, J. L., & Wirtz II, W. O. (1995). Vegetative Characteristics of Coastal Sage Scrub Sites Used by California Gnatcatchers: Implications for Management in a Fire-Prone Ecosystem. *Coeur D Alene*, 13–16.
- Boerner, R. E. J., Huang, J., & Hart, S. C. (2009). Impacts of fire and fire surrogate treatments on forest soil properties: a meta-analytical

- approach. *Ecological Applications: A Publication of the Ecological Society of America*, 19(2), 338–58. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/19323194>
- Bohon, W., Robinson, S., Arrowsmith, R., & Semken, S. (2013). Building an Effective Social Media Strategy for Science Programs. *Eos, Transactions American Geophysical Union*, 94(27), 237–238.
- Bonfanti, P., Saibene, M., Bacchetta, R., Mantecca, P., & Colombo, A. (2017). A glyphosate micro-emulsion formulation displays teratogenicity in *Xenopus laevis*. *Aquatic Toxicology*.
- Broglio, J., Knopp, C. M., Stine, P. A., McCarthy, M. I., Fitzgerald, K., & Clack, C. (n.d.). SCIENCE SYNTHESIS REPORT. Retrieved from <http://www.dri.edu>
- Bromus tectorum* Profile – California Invasive Plant Council. (n.d.). Retrieved February 21, 2018, from [http://www.cal-ipc.org/plants/profile/bromus\\_tectorum-profile/](http://www.cal-ipc.org/plants/profile/bromus_tectorum-profile/)
- Bureau of Land Management (n.d.). Prescribed Burn Terminology. Retrieved from [https://www.blm.gov/or/resources/fire/prescribedburns/burn\\_terminology.php](https://www.blm.gov/or/resources/fire/prescribedburns/burn_terminology.php)
- Burnett, R. D., Seavy, N. E., Salas, L., & Humple, D. L. (n.d.). Avian Community Response to Mechanical Fuel Treatment in the Sierra Nevada, USA. Retrieved from [https://www.fs.fed.us/r5/hfqlg/monitoring/resource\\_reports/wildlife/Landbirds\\_in\\_Fuel\\_Treatments\\_HFQLG\\_Final\\_Report\\_2012.pdf](https://www.fs.fed.us/r5/hfqlg/monitoring/resource_reports/wildlife/Landbirds_in_Fuel_Treatments_HFQLG_Final_Report_2012.pdf)
- Busse, M. D., Hubbert, K. R., & Moghaddas, E. E. Y. (2014). Fuel Reduction Practices and Their Effects on Soil Quality. Retrieved from <http://www.ascr.usda.gov/>
- California Department of Fish and Wildlife. California Interagency Wildlife Task Group. 2014. CWHR version 9.0 personal computer program. Sacramento, CA.
- California Fire Return Interval Departure (FRID) map metadata: description of purpose, data sources, database fields, and their calculations. (2011). Retrieved from <http://www.fs.fed.us/r5/rsl/clearinghouse/r5gis/frid/>
- Chase, N. M., & Becky, C. (2013). Effects of Email Utilization on Higher Education Professionals. In *User Perception and Influencing Factors of Technology in Everyday Life* - Google Books. 16. Retrieved from <https://books.google.com/books?hl=en&lr=&id=zbCeBQAAQBAJ&oi=fnd&pg=PA233&dq=faculty+member+emails+vs+hard+mail+pref>



- erence+internal+communication&ots=dZGS8Mr82p&sig=w9fhyjQT  
HMnB81Pxi0-xaYYsmFU#v=onepage&q&f=false
- Conlisk, E., Swab, R., Martínez-Berdeja, A., & Daugherty, M. P. (2016). Post-fire recovery in Coastal Sage Scrub: Seed rain and community trajectory. *PLoS ONE*, 11(9), 1–14.
- Converse, S. J., Block, W. M., & White, G. C. (2006). Small mammal population and habitat responses to forest thinning and prescribed fire. *Forest Ecology and Management*, 228(1–3), 263–273.
- Coons, C. (2018). Email Marketing Best Practices for 2018 [The Do's and Don'ts]. Retrieved February 18, 2018, from <https://ninjaoutreach.com/email-marketing-best-practices/>
- Covington, W. W., & Moore, M. M. (1994). Postsettlement Changes in Natural Fire Regimes and Forest Structure. *Journal of Sustainable Forestry*, 2(1–2), 153–181.
- Dalkir Elsevier, K. (n.d.). Knowledge Management in Theory and Practice. Retrieved from <https://dianabarbosa.files.wordpress.com/2009/03/knowledge-management-kimiz-dalkir.pdf>
- Droessler, T. D., & Ph, D. (2002). Forest Management Plan Valentine Reserve.
- Dundar, H., & Lewis, D. R. (1998). Determinants of Research Productivity in Higher Education. Source: *Research in Higher Education*, 39(6), 607–631. Retrieved from <http://www.jstor.org/stable/40196313>
- Emmingham, W. H., & Elwood, N. E. (n.d.). Thinning An Important Timber Management Tool. Retrieved from <http://knowyourforest.org/sites/default/files/documents/pnw184.pdf>
- Evaluating Bark Beetle and Wildfire Dynamics in the Greater Yellowstone Ecosystem. (2011). *Fire Science Brief*, (139). Retrieved from [https://www.firescience.gov/projects/briefs/06-2-1-20\\_FSBrief139.pdf](https://www.firescience.gov/projects/briefs/06-2-1-20_FSBrief139.pdf)
- Evans, A. (2011). Fuels Treatment for Mixed Conifer Forests. Forest Guild. Retrieved from [https://www.firescience.gov/projects/09-2-01-7/project/09-2-01-7\\_final\\_report.pdf](https://www.firescience.gov/projects/09-2-01-7/project/09-2-01-7_final_report.pdf)
- Facebook Help Center. (2018a). Liking & Reacting | Facebook Help Center. Retrieved February 10, 2018, from <https://www.facebook.com/help/452446998120360/>

- Facebook Help Center. (2018b). What does it mean when someone likes or follows a Page? | Facebook Help Center. Retrieved February 10, 2018, from <https://www.facebook.com/help/171378103323792>
- Ferreira-Junior, D. F., Sarmiento, R. A., de Souza Saraiva, A., Pereira, R. R., Picanço, M. C., Pestana, J. L., & Soares, A. M. (2017). Low Concentrations of Glyphosate-Based Herbicide Affects the Development of *Chironomus xanthus*. *Water, Air, & Soil Pollution*, 228(10), 390.
- Fettig, C. J., Klepzig, K. D., Billings, R. F., Munson, A. S., Nebeker, T. E., Negrón, J. F., & Nowak, J. T. (2007). The effectiveness of vegetation management practices for prevention and control of bark beetle infestations in coniferous forests of the western and southern United States. *Forest Ecology and Management*, 238(24–53).
- US Forest Service (2013). Fire Management today Fuels Management, 73(2). Retrieved from [https://www.fs.fed.us/fire/fmt/fmt\\_pdfs/FMT73-2.pdf](https://www.fs.fed.us/fire/fmt/fmt_pdfs/FMT73-2.pdf)
- Frederick, J. M. (1998). Overview of wild pig damage in California. *Proceedings Vertebrate Pest Conference*, 45, 82–86. Retrieved from <http://digitalcommons.unl.edu/vpc18>
- Guyotte, K. W., Sochacka, N. W., Costantino, T. E., Kellam, N. N., & Walther, J. (2015). Collaborative Creativity in STEAM: Narratives of Art Education Students' Experiences in Transdisciplinary Spaces, 16.
- Guyotte, K. W., Sochacka, N. W., Costantino, T. E., Walther, Joach., & Kellam, N. N. (2014). STEAM as social practice: Cultivating Creativity in Transdisciplinary Spaces. *Art Education*, 67(6), 12–19.
- Hanes, T. L. (1971). Succession after Fire in the Chaparral of Southern California. *Ecological Monographs*, 41(1), 27–52.
- Hatch, D. A., Bartolome, J. W., Fehmi, J. S., & Hillyard, D. S. (1999). Effects of Burning and Grazing on a Coastal California Grassland. *Restoration Ecology*, 7(4), 376–381.
- Immerman, S. D. (2011). Letting off "STEAM" at Montserrat College of Art. *New England Journal of Higher Education*, 0. Retrieved from <http://search.proquest.com/docview/964182621?accountid=152665%5Cnhttp://nationalacademies.on.worldcat.org/atoztitles/link?sid=ProQ:&issn=19385978&volume=&issue=&title=New+England+Journal+of+Higher+Education&page=&date=2011-12-05&atitle=Letting+off+%2522S>

- Jackson, R. D., & Bartolome, J. W. (2002). A state-transition approach to understanding nonequilibrium plant community dynamics in Californian grasslands. *Plant Ecology*, 162(1), 49–65.
- Jeffries, S. (2000). The librarian as networker: Setting the standard for higher education. *The collaborative imperative: Librarians and faculty working together in the information universe*, 114-29.
- Jepson Flora Project (eds.) (2018). Jepson eFlora. Retrieved February 10, 2018, from <http://ucjeps.berkeley.edu/IJM.html>
- Jepson Herbarium: Jepson Flora Project: Jepson eFlora: Filter Keys. (n.d.). Retrieved February 21, 2018, from [http://ucjeps.berkeley.edu/eflora/filter\\_keys.html](http://ucjeps.berkeley.edu/eflora/filter_keys.html)
- Katz, N., & Lazer, D. (2004). Network theory and small groups. *Network Theory*.
- Kaye, J. P., Hart, S. C., Fulé, P. Z., Covington, W. W., Moore, M. M., & Kaye, M. W. (2005). Initial Carbon, Nitrogen, and Phosphorus Fluxes Following Ponderosa Pine Restoration. *Source: Ecological Applications*, 15(5), 1581–1593. Retrieved from <http://www.jstor.org/stable/4543465>
- Keeley, J. E., & Fotheringham, C. J. (2001). Historic fire regime in southern California shrublands. *Conservation Biology*.
- Keeley, J. E., & Zedler, P. H. (1978). Reproduction of Chaparral Shrubs After Fire: A Comparison of Sprouting and Seeding Strategies. *American Midland Naturalist*.
- Kibe, L., & Kwanya, T. (2015). Knowledge Ambassadors: Enhancing Tacit Knowledge Transfer in Kenyan Universities (pp. 794–805). Springer, Cham.
- Knapp, B. O., Stephan, K., & Hubbart, J. A. (2015). Structure and composition of an oak-hickory forest after over 60 years of repeated prescribed burning in Missouri, U.S.A. *Forest Ecology and Management*, 344, 95–109.
- Knight, D. H., Yavitt, J. B., & Joyce, G. D. (1991). Water and nitrogen outflow from lodgepole pine forest after two levels of tree mortality. *Forest Ecology and Management*, 46(3–4), 215–225.
- Kocher, S., Lombardo, A., & Sweitzer, R. (2013). Using Social Media to Involve the Public in Wildlife Research—the SNAMP Fisher Sock Collection Drive. *Journal of Extension*, 51(1). Retrieved from <https://www.joe.org/joe/2013february/iw3.php>
- Land, M. H. (2013). Full STEAM ahead: The benefits of integrating the arts into STEM. *Procedia Computer Science*, 20, 547–552.

- LANDFIRE Program (n.d.). Forest Canopy Base Height. Retrieved from <https://www.landfire.gov/cbh.php>
- LANDFIRE Program (n.d.). Forest Canopy Bulk Density. Retrieved from <https://www.landfire.gov/cbd.php>
- Larsson, S., Oren, R., Waring, R. H., & Barrett, J. W. (n.d.). Attacks of Mountain Pine Beetle as Related to Tree Vigor of Ponderosa Pine. Retrieved from <http://www.ingentaconnect.com/content/saf/fs/1983/00000029/0000002/art00029>
- Lindgren, P. M., Ransome, D. B., Sullivan, D. S., & Sullivan, T. P. (2006). Plant community attributes 12 to 14 years following precommercial thinning in a young lodgepole pine forest. *Canadian Journal of Forest Research*, 36(1), 48–61.
- Long-term responses of tree and stand growth of young lodgepole pine to pre-commercial thinning and repeated fertilization. (2013). *Forest Ecology and Management*, 307, 155–164.
- Madden, M. E., Baxter, M., Beauchamp, H., Bouchard, K., Habermas, D., Huff, M., ... Plague, G. (2013). Rethinking STEM education: An interdisciplinary STEAM curriculum. *Procedia Computer Science*, 20, 541–546.
- Martinson, E. J. (n.d.). Final Report JFSP Project Number 08-2-1-09 Effectiveness of Fuel Treatments for Mitigating Wildfire Severity: A Manager-Focused Review and Synthesis. Retrieved from [https://www.firescience.gov/projects/08-2-1-09/project/08-2-1-09\\_finalreport08-2-1-09.pdf](https://www.firescience.gov/projects/08-2-1-09/project/08-2-1-09_finalreport08-2-1-09.pdf)
- Martinson, E. J., & Omi, P. N. (2003). Performance of Fuel Treatments Subjected to Wildfires. Retrieved from [https://www.fs.fed.us/rm/pubs/rmrs\\_p029/rmrs\\_p029\\_007\\_014.pdf](https://www.fs.fed.us/rm/pubs/rmrs_p029/rmrs_p029_007_014.pdf)
- Masticating Fuels: Effects on Prescribed Fire Behavior and Subsequent Vegetation Effects. (2009). Retrieved from [https://www.firescience.gov/projects/briefs/03-3-2-06\\_FSBrief47.pdf](https://www.firescience.gov/projects/briefs/03-3-2-06_FSBrief47.pdf)
- McClain, C. R. (2017). Practices and promises of Facebook for science outreach: Becoming a “Nerd of Trust.” *PLOS Biology*, 15(6), e2002020.
- Mciver, J. D., Stephens, S. L., Agee, J. K., Barbour, J., Boerner, R. E. J., Edminster, C. B., ... Zack, S. (2013). Ecological effects of alternative fuel-reduction treatments: highlights of the National Fire and Fire

- Surrogate study (FFS). *International Journal of Wildland Fire*, 22, 63–82.
- Meese, R. J. (2015). Efforts to Assess the Status of the Tricolored Blackbird. *Central Valley Bird Club Bulletin*, 17(2–4), 37–50.
- Meese, R. J., & Beedy, E. C. (2015). Managing Nesting and Foraging Habitats to Benefit Breeding Tricolored Blackbirds. *Central Valley Bird Club Bulletin*, 17(2–4), 79–96.
- Menke, J. W. C. N.-4193. (1992). Grazing and fire management for native perennial grass restoration in California grasslands. *Fremontia*, 20(2), 22–25.
- Minnich, R. A., & Dezzani, R. J. (1998). RIVERSIDE-PERRIS PLAIN, CALIFORNIA Western Birds, 366–391.
- Mitchell, R. G., Waring, R. H., & Pitman, G. B. (1983). Thinning Lodgepole Pine Increases Tree Vigor and Resistance to Mountain Pine Beetle. Retrieved from <http://www.ingentaconnect.com/content/saf/fs/1983/00000029/0000001/art00031>
- Nonaka, I., & Konno, N. (1998). The Concept of “Ba”. *California Management Review*, 40(3), 40–54. Retrieved from [http://home.business.utah.edu/actme/7410/Nonaka 1998.pdf](http://home.business.utah.edu/actme/7410/Nonaka%201998.pdf)
- North, M., Stine, P., O’hara, K., Zielinski, W., & Stephens, S. (2009). An Ecosystem Management Strategy for Sierran Mixed- Conifer Forests. Retrieved from [https://www.fs.fed.us/psw/publications/documents/psw\\_gtr220/psw\\_gtr220.pdf](https://www.fs.fed.us/psw/publications/documents/psw_gtr220/psw_gtr220.pdf)
- Number of Facebook users worldwide 2008-2017 | Statistic. (2018). Retrieved February 22, 2018, from <https://www.statista.com/statistics/264810/number-of-monthly-active-facebook-users-worldwide/>
- Orbell, J. M. (1970). An Information-Flow Theory of Community Influence. *The Journal of Politics*, 32(2), 322–338.
- Pamela Kan-Rice. (2016). Got wild pigs? UC Cooperative Extension wants to hear from you - ANR news releases - ANR Blogs. Retrieved February 21, 2018, from <http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=21846>
- Peterson, C. L., & Vaske, J. J. (2017). Colorado Residents’ Familiarity, Aesthetic Evaluations, and Approval of Forest Management Practices. *Journal of Forestry*, 115(1), 10–15.

- Preisler, H. K., & Mitchell, R. G. (n.d.). Colonization Patterns of the Mountain Pine Beetle in Thinned and Unthinned Lodgepole Pine Stands. Retrieved from <http://www.ingentaconnect.com/content/saf/fs/1993/00000039/0000003/art00010>
- Prescribed Burn Terminology Oregon/Washington BLM. (n.d.). Retrieved February 21, 2018, from [https://www.blm.gov/or/resources/fire/prescribedburns/burn\\_terminology.php](https://www.blm.gov/or/resources/fire/prescribedburns/burn_terminology.php)
- Prince, M. J., Felder, R. M., & Brent, R. (2007). Does Faculty Research Improve Undergraduate Teaching? An Analysis of Existing and Potential Synergies. *Journal of Engineering Education*, 96(4), 283–294.
- Raffa, K. F., Powell, E. N., & Townsend, P. A. (2013). Temperature-driven range expansion of an irruptive insect heightened by weakly coevolved plant defenses. *Proceedings of the National Academy of Sciences*, 110(6), 2193–2198.
- Raymond, C. L., & Peterson, D. L. (2005). Fuel treatments alter the effects of wildfire in a mixed-evergreen forest, Oregon, USA.
- Rodriguez Consulting Inc. (2004). Sedgwick Reserve Infrastructure Plan Project Final Environmental Impact Report, (2003041096).
- Rosvall, M., & Bergstrom, C. T. (2007). Maps of Information Flow Reveal Community Structure In Complex Networks. Retrieved from <https://pdfs.semanticscholar.org/e709/1780e023abed66a14eda7b977991ceb98ff3.pdf>
- Safford, H. D., & Van de Water, K. M. (2014). Using fire return interval departure (FRID) analysis to map spatial and temporal changes in fire frequency on national forest lands in California. Res. Pap. PSW-RP-266. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 59 p (Vol. 266).
- Scripps, J., Tan, P.-N., & Esfahanian, A.-H. (2007). Exploration of Link Structure and Community-Based Node Roles in Network Analysis. In *Seventh IEEE International Conference on Data Mining (ICDM 2007)* (pp. 649–654). IEEE.
- Searing the Rhizosphere: Belowground Impacts Of Prescribed Fires I N S I D E. (n.d.). Retrieved from <https://www.fs.fed.us/pnw/sciencef/scifi82.pdf>
- Skog, K. E., & Barbour, R. J. (2006). Fuels Management-How to Measure Success: Conference Proceedings. Retrieved from

- [https://www.fs.fed.us/rm/pubs/rmrs\\_p041/rmrs\\_p041\\_657\\_672.pdf](https://www.fs.fed.us/rm/pubs/rmrs_p041/rmrs_p041_657_672.pdf)
- Skubel, R. A., Khomik, M., Brodeur, J. J., Thorne, R., & Arain, M. A. (2017). Short-term selective thinning effects on hydraulic functionality of a temperate pine forest in eastern Canada. *Ecohydrology*, 10(1), e1780.
- Society, C. B. (2018). Future of California floristics and systematics: Wildfire threats to the California flora. Author ( s ): Jon E . Keeley  
Source: Madroño , Vol . 42 , No . 2 , Special Issue: The future of California floristics and systematics: Research, education, con, 42(2).
- Sorcinelli, M. D. (1994). Effective Approaches to New Faculty Development. *Journal of Counseling & Development*, 72, 474–479.
- Stark, D. T., Wood, D. L., Storer, A. J., & Stephens, S. L. (2013). Prescribed fire and mechanical thinning effects on bark beetle caused tree mortality in a mid-elevation Sierran mixed-conifer forest. *Forest Ecology and Management*, 306, 61–67.
- Stephens, S. L., Bigelow, S. W., Burnett, R. D., Collins, B. M., Gallagher, C. V, Keane, J., ... Van Vuren, D. H. (2014). California Spotted Owl, Songbird, and Small Mammal Responses to Landscape Fuel Treatments. *BioScience*, 64(893).
- Stromberg, M. R., D'Antonio, C. M., Young, T. P., Wirka, J. L., & Kephart, P. R. (2007). California Grassland Restoration. *California Grasslands Ecology and Management*, (MARCH 2007), 254–280.
- Sullivan, T. P., Sullivan, D. S., & Lindgren, P. M. F. (2001). STAND STRUCTURE AND SMALL MAMMALS IN YOUNG LODGEPOLE PINE FOREST: 10-YEAR RESULTS AFTER THINNING. *Ecological Applications*, 11(4), 1151–1173.
- Sullivan, T. P., Sullivan, D. S., Lindgren, P. M. F., & Boateng, J. O. (2002). Influence of conventional and chemical thinning on stand structure and diversity of plant and mammal communities in young lodgepole pine forest. *Forest Ecology and Management*, 170(1–3), 173–187.
- Sullivan, T. P., Sullivan, D. S., Lindgren, P. M. F., & Ransome, D. B. (2005). Long-term responses of ecosystem components to stand thinning in young lodgepole pine forest. *Forest Ecology and Management*, 205(1–3), 1–14.

- Sweet, S. B., Kyser, G. B., & DiTomaso, J. M. (2008). Susceptibility of Exotic Annual Grass Seeds to Fire. *Invasive Plant Science and Management*, 1(2), 158–167.
- Tachibana, C. (2014). A scientist's guide to social media | Science | AAAS. Retrieved February 22, 2018, from <http://www.sciencemag.org/features/2014/02/scientists-guide-social-media>
- Tang, J., Qi, Y., Xu, M., Misson, L., & Goldstein, A. H. (2005). Forest thinning and soil respiration in a ponderosa pine plantation in the Sierra Nevada. *Tree Physiology*, 25(1), 57–66.
- Tappeiner, J. C., Huffman, D., Marshall, D., Spies, T. A., & Bailey, J. D. (n.d.). Density, ages, and growth rates in old-growth and young-growth forests in coastal Oregon 1. Retrieved from <http://www.nrcresearchpress.com/doi/pdf/10.1139/x97-015>
- Tested by Fire: What Happens When Wildfires Meet Fuel Treatments? (2007). *Fire Science Brief*, (1). Retrieved from [https://www.firescience.gov/projects/briefs/03-2-1-07\\_FSBrief1.pdf](https://www.firescience.gov/projects/briefs/03-2-1-07_FSBrief1.pdf)
- The Cone Fire: A Chance Reckoning for Fuel Treatments. (2008). Retrieved from [https://www.firescience.gov/projects/briefs/03-2-3-20\\_FSBrief4.pdf](https://www.firescience.gov/projects/briefs/03-2-3-20_FSBrief4.pdf)
- The Forest, the Fire and the Fungi: Studying the Effects of Prescribed Burning on Mycorrhizal Fungi in Crater Lake National Park. (2009). Retrieved from [https://www.firescience.gov/projects/briefs/03-3-2-05\\_FSBrief38.pdf](https://www.firescience.gov/projects/briefs/03-3-2-05_FSBrief38.pdf)
- The Regents of the University of California. (n.d.). About Valentine Camp. Retrieved February 16, 2018, from <http://vesr.nrs.ucsb.edu/valentine/about-valentine-camp>
- University of California Natural Reserve System. (n.d.). About. Retrieved February 11, 2018, from <http://nrs.ucsb.edu/about>
- University of California Natural Reserve System. (2018a). Finances. Retrieved February 11, 2018, from <https://ucnrs.org/teaching/finances/>
- University of California Natural Reserve System. (2018b). The nature of UC. Retrieved February 11, 2018, from <https://ucnrs.org/>
- University of California Natural Reserve System. (2018c). University-level Teaching. Retrieved February 11, 2018, from <https://ucnrs.org/teaching/>
- Vaillant, N. M., Noonan-Wright, E. K., Reiner, A. L., Ewell, C. M., Rau, B. M., Fites-Kaufman, J. A., & Dailey, S. N. (n.d.). Fuel accumulation



- and forest structure change following hazardous fuel reduction treatments throughout California.
- Vaillant, N., Noonan-Wright, E., Dailey, S., Ewell, C., & Reiner, A. (n.d.). Effectiveness and longevity of fuel treatments in coniferous forests across California. Retrieved from [https://www.fs.fed.us/adaptivemanagement/reports/JFSP\\_Final\\_Report\\_130408\\_508Compliant\\_Final.pdf](https://www.fs.fed.us/adaptivemanagement/reports/JFSP_Final_Report_130408_508Compliant_Final.pdf)
- Van Noorden, R. (2014). Online collaboration: Scientists and the social network. *Nature*, 512(7513), 126–129.
- Virkus, S. (2014). Theoretical Models of Information and Knowledge Management. Retrieved February 16, 2018, from [http://www.tlu.ee/~sirvir/IKM/Theoretical\\_models\\_of\\_Information\\_and\\_Knowledge\\_Management/index.html](http://www.tlu.ee/~sirvir/IKM/Theoretical_models_of_Information_and_Knowledge_Management/index.html)
- Waring, R. H., & Pitman, G. B. (1985). Modifying Lodgepole Pine Stands to Change Susceptibility to Mountain Pine Beetle Attack. *Ecology*, 66(3), 889–897.
- Weather Trends 360 (2017). 2016-2017 Season Snow Totals [Blog post]. Retrieved March 12, 2018, from <http://www.weather-trends360.com/Blog/Post/2016-2017-Season-Snow-Totals-4055>
- Westman, W. (1982). Coastal Sage Scrub Succession. USDA Forest Service, Pacific Southwest Forest and, (1978), 91–99. Retrieved from <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Coastal+Sage+Scrub+Succession+1#2>
- Williams, B. K. (2011). Adaptive management of natural resources—framework and issues. *Journal of Environmental Management*, 92(5), 1346–1353.

## 8. Appendices

- A - Faculty Member Interview Questions
- B - Interviewee List
- C - Social Media Analysis
- D - Sedgwick and Valentine Community Group Lists
- E - Survey Questions
- F - Survey Results
- G - Wise Stewardship Management Scorecard
- H - Sedgwick Invasive Plant Species Removal Methods
- I - Research Management Scorecard
- J - Research Key Messages
- K - Administrative Assistant Networks
- L - Research Ambassador Network
- M - Research Webpage Content
- N- Education Management Scorecard
- O - Education Key Messages
- P - Education Ambassador List
- Q - Public Service Key Messages

## 8.1. Appendix A- Faculty Member Interview Questions

## **Faculty member interview questions**

1. Name, position, affiliated university

## **Research questions**

2. Field of research (specifically)
  - a. What temporal scale is your research?
3. Is there a field component to your research? If so:
  - a. When looking for a field site:
    - i. What do you look for in a field site?
    - ii. How do you make a decision what field site to choose?
    - iii. In an ideal situation, what resources would a field site have (natural and facilities)?
4. Do you ever use existing datasets in your research? If so:
  - a. When looking for data:
    - i. Where do you look for data?
    - ii. What data do you look for (ie spatial, vegetation, watershed, etc)?
    - iii. What temporal scale of data are you looking for?

## **Class questions**

1. Classes he/she teaches
2. Is there a field component in any of your courses?
  - a. If yes:
    - i. Explain the nature of the course.
    - ii. How was the course designed?
    - iii. How do you find a field site and what do you look for?
    - iv. How often do you go out in the field?
  - b. If no:
    - i. Would you incorporate a field component in any of your courses?
    - ii. If so, is there a specific barrier to incorporating a field component in your existing courses, or creating a new field course?

- iii. What resources would a field site have to make it possible for you to use it for a course?

## 8.2. Appendix B- Interviewee List

<b>Faculty Member Interviews</b>						
<i>Name</i>	<i>Position</i>	<i>Field of Research</i>	<i>University</i>	<i>Department</i>	<i>Reason for Interview</i>	<i>Interview Date</i>
<b>Bruce Tiffney</b>	Professor	Paleobotany	University of California, Santa Barbara	Earth Science; College of Creative Studies	Bruce was interviewed because of his multi-year experience teaching a field art course at Sedgwick Reserve. Bruce has taught a botanical illustration field course at Sedgwick Reserve with UCSB art professor Hank Pitcher for several years.	November 20, 2017
<b>Hillary Young</b>	Professor	Community ecology	University of California, Santa Barbara	Ecology, Evolution, and Environmental Biology	Hillary was interviewed because she teaches a field based course at UCSB and has experience with conducting research at UCNRS reserves. Hillary teaches an ecology and evolution undergraduate course that incorporates a weekly eight-hour lab section, which is often field-based. Hillary also studies plant community structure and human disturbance, and she has worked with the reserve system to conduct research projects.	November 21, 2017
<b>Chris Lowry</b>	Associate Professor	Physical hydrogeology	State University of New York (SUNY) at Buffalo	Geology	Chris was interviewed because of his field-based geological and hydrological research. He also teaches field-based hydrology courses at SUNY Buffalo. Chris offers a perspective of a hydrology professor faculty member at a university outside of California with little prior knowledge of research opportunities associated with the UCNRS.	October 27, 2017
<b>Chris Lay</b>	Museum Curator; Manager, Kenneth Norris Center for Natural History; Lecturer	NA	University of California, Santa Cruz	Ecology & Evolutionary Biolog Environmental Studies	Chris was interviewed because he teaches the Natural History Field Quarter, an annual quarter-long undergraduate course. The long-standing course teaches students about California ecosystems and land management practices. The course typically takes 24 to 28 students on four or five longer term trips to various locations throughout California - often incorporating UC reserves.	November 9, 2017

<b>Claudia Tyler</b>	Professor	Plant ecology	University of California, Santa Barbara	Environmental Studies; College of Creative Studies	Claudia was interviewed because of her long-term research use of Sedgwick Reserve, where she studies direct and indirect effect of grazing on oak recruitment. She also teaches a walking field biology course and taught an ecology field studies course at UCSB.	February 15, 2018
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<b>Fire Expert Interviews</b>						
<i>Name</i>	<i>Position</i>	<i>Field of Research</i>	<i>University/Organization</i>	<i>Department</i>	<i>Reason for Interview</i>	<i>Interview Date</i>
<b>Vince LaRocco</b>	Fire Captain/Vegetation Management Coordinator	Fire and fuel management		Santa Barbara County Fire	Discuss fuels management from a firefighting perspective.	5/25/2017
<b>Nicole Molinari, PhD</b>	Southern Province Ecologist		Forest Service	Los Padres National Forest	Discuss fire and fuels management at Los Padres and Ms. Molinari's grassland research at Sedgwick.	11/7/2017
<b>Christina (Naomi) Tague</b>	Professor	Ecological Modeling	UC Santa Barbara	Bren School	Discuss fire modeling work and SERI fire project.	5/4/2017
<b>Andrew Plantinga</b>	Professor	Economist	UC Santa Barbara	Bren School	Discuss fire modeling work and SERI fire project.	5/5/2017
<b>Frank Frievalt</b>	Fire Chief		Mammoth Lakes Fire Protection District		Discuss fire and fuel reduction strategies in the greater Mammoth area, concerns regarding Valentine within the Mammoth Basin, and recommendations for managing fire risk at Valentine.	7/19/2017
<b>Thom Heller</b>	Fire Marshall		Mammoth Lakes Fire Protection District		Discuss fire and fuel reduction strategies in the greater Mammoth area, concerns regarding Valentine within the Mammoth Basin, and recommendations for managing fire risk at Valentine.	7/20/2017
<b>Malcolm North</b>	Research Forest Ecologist	Forest Ecology	UC Davis	John Muir Institute of the Environment	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017

<b>Svetlana Yegorova</b>	Environmental Scientist	Forest Management	California State Parks	Sierra District	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017
<b>Jens Stevens</b>	Post-Doc	Plant Ecology	UC Berkeley	Stephens Lab- Research and Education in Wildland Fire Science	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017
<b>Pamela Flick</b>	Senior California Representative	Sierra Nevada natural history and ecology	Defenders of Wildlife		Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017
<b>Eugenie Montblanc</b>	Great Basin Fire Science Exchange Coordinator	Fire Science	University of Nevada Reno	Natural Resource and Environmental Science	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017
<b>Jeff Holmquist</b>	Researcher	Plant and animal interactions	UC Los Angeles	White Mountain Research Center	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017
<b>Marc Meyer</b>	Southern Sierra Nevada Province Ecologist	Fire Science	USFS	Region 5	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017
<b>Blake Engelhardt</b>	Forest Manager	Fire Science	USFS	Inyo	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017

<b>Michele Slaton</b>	Forest Ecologist	Fire and Climate Science	USFS	Inyo	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017
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<b>Scott Kusumoto</b>	Forest Manager	Fire Science	USFS	Inyo	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017
<b>Alan Taylor</b>	Forest Manager	Fire Science	USFS	Inyo	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017
<b>Dr. Chris Dicus</b>	Professor	Wildland Fire and Fuels Management	Cal Poly	Natural Resource Management and Environmental Science	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017
<b>Hugh Safford</b>	Forest Ecologist/Affiliate Faculty	Fire Ecology	Forest Service/ UC Davis	Region 5/ Safford Lab	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017
<b>Christina Restiano</b>	Forest Ecologist	Drought, fire and climate change on forests	UC Davis	Safford Lab	Indiana Summit- Field trip reviewing post fire impacts of various fire treatments within the Indiana Summit Natural Resource Area (USFS).	7/17/2017

<b>Outreach Expert Interviews</b>				
<i>Name</i>	<i>Position</i>	<i>Organization</i>	<i>Reason for Interview</i>	<i>Interview Date</i>
<b>Mike Theune</b>	Fire Information Officer	National Park Service	Mike was interviewed because he has developed the National Forest Wildlife Fire Communication Plan for Sequoian and Kings Canyon National Parks. Through his outreach position and his work on the Communication Plan, he has confronted similar issues that Sedgwick and Valentine managers face in maintaining community relations while practicing wise land stewardship and minimizing wildfire risk.	October 24, 2017

<b>Virginia Boucher</b>	Associate Director, UC Davis NRS; previous Director, Sedgwick Reserve	UCNRS	Virginia was interviewed because she has extensive knowledge and experiences navigating community relations as a director at multiple UCNRS reserves - including Sedgwick Reserve.	November 16, 2017
<b>Lisa Leombruni</b>	Strategic Communication Focus Program Manager; Lecturer	Bren School of Environmental Science and Management, UCSB	Lisa was interviewed because of her knowledge and experience building strategic communication plans. Because of her communications expertise, she reviewed the research, university-level education, and community relations sections.	February 20, 2018

### 8.3. Appendix C- Social Media Analysis

<b>Reserve</b>	<b>Facebook (Y/N)</b>	<b>Number of Page Likes</b>	<b>Number of Followers</b>	<b>Post Content</b>	<b>Level of Interaction per post (likes, shares, comments)</b>	<b>Post Frequency</b>	<b>Notes</b>
Año Nuevo Island Reserve (Ano Nuevo Research)	Y	638	647	Research on reserve, reserve and research pubs, captivating wildlife photos	v. interactive audience	About 2 times a week	
Angelo Coast Range Reserve	Y	335	324	Reserve events and activities, local nature-based events (Wildfire)	good amount on existing posts	Inactive	
Blue Oak Ranch Reserve	Y	60	61	Ongoing research, presentations, and events at the reserve.	0 to 9 likes per post, occasional share	Sporadic: One year lag between the last two posts.	Note: Sharing research could be a 'win-win' to researchers - especially graduate students.
Coal Oil Point Natural Reserve	Y	808	806	Reserve events (FB events). Photos of people and wildlife on reserve. Related videos and content from local chapters and offices of wildlife agencies and organizations (i.e. NOAA Channel Islands, The Wildlife Society)	Typically 10 - 20 likes per post	At least one time a week	(1) Very engaged audience (2) Model after COPR (3) Uses FB events
Fort Ord Natural Reserve	Y	56	60	Reserve opportunities (internships, jobs). Repost from other reserves. Research at	Typical 2-3 likes per post.	Twice a week to once a month	

				reserve. Some wildlife photos from cams. Repost from their Instagram.			
Hastings Natural History Reservation	Y	625	620	<p>Most posts are reposts from researchers, the Walters Lab (which does Acorn woodpecker research at the reserve). Content includes: reserve events (i.e. it's plenary lectures), research, coming and going of researchers and staff, job postings, general reserve activities, links to information related to reserve-centric research (i.e. latest about acorn woodpeckers, related research at other reserves (i.e. Florida's Biological Research Station)).</p>	Typically about 5 - 20 likes per post. Occasional comment and share.	Ranges from once a week to once a month.	<p>Note: (1) Jan. 5 post featured the "Frances Simes Hastings Natural Reservation: A History of Biological Field Station in Carmel Valley" - a book available on Amazon for \$26 about the reserve. Link: <a href="https://www.amazon.com/Frances-Hastings-Natural-History-Reservation/dp/197937466X/">https://www.amazon.com/Frances-Hastings-Natural-History-Reservation/dp/197937466X/</a> (2) The page "likes" similar pages that they could potentially pull content from; for example, the Organization of Biological Field Stations, Walters Lab, etc. It may be beneficial to VESR and Sedgwick to identify similar groups and researchers in their networks to build out a similar list for Facebook and other outreach</p>

							purposes. (3) Bird-centric
Kendall-Frost Mission Bay Marsh Reserve (under Kendall Frost Reserve)	Y	188	188	Reserve events, research, reserve photos (wildlife, birds, scenery), reserve "work parties", alerts about a local project that would interfere with Rewild efforts	1-10 likes, occasional share	1-2 times a week	(1) Bird-centric (2) partner with Audobon Rewild project (3) use Facebook events (4) Share details about "work parties" (seem like volunteer opportunities) (5) More casual, first person voice
McLaughlin Natural Reserve (Donald and Sylvia McLaughlin Natural Reserve)	Y	253	252	Reserve wildlife (wildflower blooms), research projects, monitoring device installations, "natural" events (blooms, rainbows), job/internship postings, volunteer opportunities (i.e. tree plantings)	10-40 likes per post, frequent shares (one post had 55 shares)	Semi-sporadic, Once a month to once every two or three months	(1) very high engagement for number of followers (2) Namesake/main benefactor also founder of Save the Bay (3) Offer volunteer restoration opportunities (ie. tree plantings) for single days or weekend with free meals and lodging (4) Use Facebook events (5) Use videos
Merced Vernal Pools and Grassland Reserve (University of)	Y	297	294	Reserve classes, research, events, wildlife	1-2 likes per post	Inactive (not posted in over a year)	Use video

California, Merced V							
Sagehen Creek Field Station	Y	499	495	Bird and wildlife-related research, reserve opportunities (i.e. job, internship, lecture opportunities with CA Phenology Network), FB live conversation talk, share labs' organizations', and researchers posts	1-10 likes per post, occasional comment and share	1-2 times a week	(1) Shared opportunities, partner with California Phenology Network (2) Bird-centric
Santa Cruz Island Reserve	Y	558	562	Share NOAA, Channel Islands, and other related and local organizations, use video, related research and articles about local environmental events/observations/questions, share Pirate Lab research, share TNC and Audobon activities and job postings	1-5 likes per post	Daily	(1) Share Pirate Lab research (CSU lab and researcher) that studies fire in SB, LA, and Ventura Counties (2) Non-compelling post voice, shares links without explanation = high activity, low engagement
Scripps Coastal Reserve	Y	355	358	Reserve activities (volunteer restoration efforts, classes), local legislation and hearing	1-5 likes per post, occasional comment and share	1 time per month	(1) Shared info about volunteer restoration efforts (participants from Newman Center and Kyrie Elieson)

				opportunities that would affect local environment, in fo, resources and PSAs about local environmental issues (i.e. spread of invasives), on-site and local research and findings			(2) Post in first person (as if giving testimonial) with photo credit to volunteer or researcher (3) Use video
Sedgwick Reserve	Y	112	111	Wildlife photos on reserve, share others' reserve and wildlife posts, historical photos of reserve, new facility openings, volunteer efforts, reserve happenings and events (barn dance, lightning strikes), Walking Ecology Hikes information	1-10 likes per post, occasional comment and share	1 time per week or 2 times per month	(1) use hashtags on FB (2) designated as "farm"
Steele/Burnand Anza-Borrego Desert Research Center	Y	833	901				
Stunt Ranch Santa Monica Mountains Reserve	Y	182	174				
Valentine Eastern Sierra	Y	15	16	Research articles and	0-5, occasional share	Sporadic to 2-3 times per week	

Reserve - Valentine Camp and SNARL (Valentine East				studies interest	of		
White Mountain Research Center	Y	1051	1057				
Bodega Marine Reserve	N						

<b>Reserve</b>	<b>Facebook (Y/N)</b>	<b>Number of Likes</b>	<b>Page of Follower</b>	<b>Post Content</b>	<b>Level of Interaction per post (likes, shares, comments)</b>	<b>Post Frequency</b>	<b>Notes</b>
Burns Piñon Ridge Reserve	N						
Carpinteria Salt Marsh Reserve	N						
Chickering American River Reserve	N						
Box Springs Reserve	N						
Boyd Deep Canyon Desert Research Center	N						
Dawson Los Monos Canyon Reserve	N						
Elliott Chaparral Reserve	N						
Emerson Oaks Reserve	N						



James San Jacinto Mountains Reserve	N						
Jenny Pygmy Forest Reserve	N						
Jepson Prairie Reserve	N						
Landels-Hill Big Creek Reserve	N						
Motte Rimrock Reserve	N						
Kenneth S. Norris Rancho Marino Reserve	N						
Quail Ridge Reserve	N						
San Joaquin Marsh Reserve	N						
Sierra Nevada Research Station - Yosemite Field Station	N						
Stebbins Cold Canyon Reserve	N						
Sweeney Granite Mountains Desert Research Center	N						

Younger Lagoon Reserve	N						
Number of reserves with Facebook	16						

	Reserve	Page Likes	Followers	Post Content	Likes per post		Post Frequency (Approx. per month)	Notes
					Lower range	Upper range		
1	<b>White Mountain Research Center</b>	1051	1057	News coverage - local and environmental; Wildlife photography; Reserve events (lectures, restoration efforts); Reserve announcements	3	70	4	(1) Common themes, Bristlecone pine, mountains, wildfires, drought, flora (2) Many shares and comments (3) Post lecture series agendas (4) Partner with Earth to Sky Calculus club (balloon launch)
2	<b>Steele/Burnand Anza-Borrego Desert Research Center</b>	833	901	Wildlife photography; Reserve events - hosted (lectures and courses, scouting trips); Reserve events - natural (i.e. supermoon)	5	30	20	(1) Common theme: Birds, flora, wildlife photography (2) CalFlora group State Park CDD Weed Warriors (3) Hold annual Colorado Desert Cultural Heritage Symposium held at the Research Center in conjunction with California State Parks, Colorado Desert Archaeology Society, and UC Irvine (4) Scouting trip (5) Research from California Environmental DNA Program
3	<b>Coal Oil Point Natural Reserve</b>	808	806	Reserve events; Volunteer opportunities; Wildlife photography; Visitor photos; News coverage - local, environmental (hazards - beach closures); Reposts - local organizations, agencies (i.e. NOAA Channel Islands, The Wildlife Society); Job postings - external	10	20	4	(1) Common themes: Wildlife and scenic photography, birds, sustainability, classes (2) Use FB events

<b>4</b>	<b>Año Nuevo Island Reserve (Año Nuevo Research)</b>	638	647	Reserve research; Research updates; Wildlife photography; Research media coverage; Wildlife tracking; News coverage - environmental	10	40	8	(1) Common theme(s): sea lions, shore birds, elephant seals, research (2) Live sea lions web cam: <a href="http://www.parks.ca.gov/live/anonuevoisland">http://www.parks.ca.gov/live/anonuevoisland</a> (3) Partner with CA State Parks (4) Shared amount of publications that came out of reserve
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<b>5</b>	<b>Hastings Natural History Reservation</b>	625	620	Reposts - research (researchers, Walters Lab); Reserve events (i.e. plenary lectures); Reserve research; Job postings; News coverage - wildlife (i.e. latest about acorn woodpeckers); Research -other reserves (i.e. Florida's Biological Research Station))	5	20	4	(1) Common theme: birds (2) Featured the "Frances Simes Hastings Natural Reservation: A History of Biological Field Station in Carmel Valley" Link: <a href="https://www.amazon.com/Frances-Hastings-Natural-History-Reservation/dp/197937466X/">https://www.amazon.com/Frances-Hastings-Natural-History-Reservation/dp/197937466X/</a> (3) The page "likes" similar pages that they could pull content from ( i.e. the Organization of Biological Field Stations, Walters Lab)
<b>6</b>	<b>Santa Cruz Island Reserve</b>	558	562	Reposts - environmental opportunities, information (i.e. NOAA, Channel Islands, Pirate Lab, and other related and local organizations); News coverage - local, environmental; Research - related to reserve; Media coverage	1	5	45	(1) Share Pirate Lab research (CSU lab and researcher) that studies fire in SB, LA, and Ventura Counties
<b>7</b>	<b>Sagehen Creek Field Station</b>	499	495	Reserve research; Job postings; Reserve announcements - lectures, opportunities (lecture opportunities with CA Phenology Network); Reposts - research, environmental opportunities and information (labs, organizations, and researchers)	1	10	8	(1) Common theme: birds (2) Partner with California Phenology Network
<b>8</b>	<b>Scripps Coastal Reserve</b>	355	358	Reserve events (volunteer restoration efforts, classes); Local environmental legislation; Information source on local environmental issues	1	5	1	(1) Volunteer restoration efforts (participants from Newman Center and Kyrie Elieson) (2) Some posts: post in first person (as if giving testimonial) with photo credit to volunteer or researcher

				(i.e. spread of invasives); Reserve research; Reserve - wildlife, related to reserve				
9	<b>Angelo Coast Range Reserve</b>	335	324	Reserve events; Reserve classes; News coverage - environmental, local (hazards - wildfire)	1	50	0	
10	<b>Merced Vernal Pools and Grassland Reserve (University of California, Merced Vernal Pools Reserve)</b>	297	294	Reserve events (i.e. classes); Reserve research; Wildlife photography	1	2	0	

11	<b>McLaughlin Natural Reserve (Donald and Sylvia McLaughlin Natural Reserve)</b>	253	252	Wildlife photography; Reserve research; Reserve announcements (i.e. monitoring device installations); Reserve events - natural (blooms, rainbows); Job postings; Volunteer opportunities (i.e. tree plantings)	10	40	1	(1) High engagement for number of followers (2) Offer volunteer restoration opportunities (i.e.e. tree plantings) for single days or weekend with free meals and lodging (3) Use Facebook events (4) Frequent shares, one post had 55 shares
12	<b>Kendall-Frost Mission Bay Marsh Reserve (Kendall Frost Reserve)</b>	188	188	Reserve events; Reserve research; Wildlife photography; Volunteer opportunities (i.e. reserve "work parties"); Local environmental legislation	1	10	7	(1) Common theme: Birds (2) Partner with Audobon Rewild project (3) use Facebook events (4) Share details about "work parties" (volunteer opportunities) (5) Casual, first person voice
13	<b>Stunt Ranch Santa Monica Mountains Reserve</b>	182	174	Reserve events; News coverage - local, environmental	1	2	0	
14	<b>Sedgwick Reserve</b>	112	111	Wildlife photography; Reposts - Reserve (wildlife); Reserve history; Reserve events (i.e. new facility opening, barn dance); Volunteer	1	10	7	(1) Themes: reserve events, birds, flora (2) Reserve culture (e.g. history, reserve users) (3) Uses hashtags (4) Designated as "farm"

				efforts, Reserve events - natural (lightning strike, bird flocks)				
15	<b>Blue Oak Ranch Reserve</b>	60	61	Reserve research; Reserve lectures; Reserve events	0	9	0	
16	<b>Fort Ord Natural Reserve</b>	56	60	Jon postings - internal (internships, jobs); Reposts (other reserves); Reserve research; Wildlife camera photography; Instagram reposts	2	3	6	
17	<b>Valentine Eastern Sierra Reserve - Valentine Camp and SNARL (Valentine Eastern Sierra Reserve)</b>	15	16	News coverage - research; Research - related, environmental; Research opportunities - internal (grants and tours)	0	5	5	

#### 8.4. Appendix D - Sedgwick and Valentine Community Group Lists

## Sedgwick Community Stakeholder Groups

<b>Surrounding Community Groups</b>
Woodstock Property Owners Association
Fillies Riding Group
Fund for Santa Barbara
Santa Barbara Sage Hens
<b>Surrounding Parks and Agencies</b>
Santa Barbara County Search and Rescue
<b>Environmental and Science Organizations</b>
Las Cumbres Observatory Global Network
Santa Barbara Botanic Garden
Santa Ynez Valley Natural History Society
Santa Barbara Museum of Natural History
<b>Nature Education Organizations</b>
NatureTrack Foundation
Wilderness Youth Project

## Sedgwick: Potential Community Group Users

Organization	Description	Potential Use
Chumash Environmental Office	Foundation dedicated to serving the Chumash community by expanding their opportunities and protecting the environment.	Host youth classes at Sedgwick, coordinate volunteer activities, disseminate research about the environment.

California Regional Environmental Education Community(CREEC) Network	Program designed to support environmental literacy for California students.	Encourage greater K-12 class use of the reserve.
Explore Ecology	Nonprofit dedicated to inspiring children to interact with the natural world and encouraging them to value environmental stewardship.	Bring K-12 students to the reserve to learn about nature and land stewardship.
Los Padres Forest Watch	Nonprofit which protects wildlife, wilderness, and water throughout Los Padres Forest and other public lands along California's central coast.	Disseminate information about research on the reserve and the importance of science.
WE Watch	Organization in the Santa Ynez Valley focused on maintaining the beauty, sustainability, and integrity of the land.	Disseminate information about research on the reserve and the importance of science.

**Sedgwick: Community Group Survey List**

<b>Sedgwick List of Community Groups Surveyed</b>
Woodstock Property Owners Association
Santa Barbara Botanic Garden
Santa Ynez Valley Natural History Society
NatureTrack Foundation
Las Cumbres Observatory Global Network
Santa Barbara Museum of Natural History
Santa Barbara County Search and Rescue
California Phenology Project
Santa Ynez Chumash Environmental Office
California Regional Environmental Education Community (CREEC) Network (Region 8)
Los Padres National Forest
USA National Phenology Network
WE Watch
Explore Ecology
Santa Barbara Audubon
Los Padres Forest Watch



Sierra Club Los Padres Chapter
California Native Plant Society
California Wildlife Foundation
Ventana Wildlife Society
Wilderness Youth Project
California Academy of Sciences
USA National Phenology Network
WE Watch
Explore Ecology
Santa Barbara Audubon
Los Padres Forest Watch
Sierra Club Los Padres Chapter
California Native Plant Society
California Wildlife Foundation
Ventana Wildlife Society
Wilderness Youth Project
The Fund for Santa Barbara
Refugio High School
Santa Ynez Valley Union High School
The Santa Ynez Valley Family School
Los Olivos Elementary
San Marcos High School
Dos Pueblos High School
Santa Barbara High School
Goleta Valley Junior High School
Santa Barbara Junior High School
Adelante Charter School
Roosevelt Elementary School
Washington Elementary School
Santa Barbara Zoo
Oak Group
Buellton Union School District
CreekSpirit Wildlife Foundation
Wildling Museum of Art and Nature
County of Santa Barbara

**Valentine: Potential Community Group Users**

Organization	Description	Potential Use
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Bishop Paiute Tribe Environmental Management Office	EMO promotes environmental stewardship by sustaining natural resources, protecting public safety, and providing public awareness through education, collaboration and policy.	Encourage collaboration between the Paiute Tribe and Valentine, including using traditional practices to care for trees on the reserve.
Eastern Sierra Council of Governments (ESCOG)	ESCOG consists of two representatives from each of the following: Mammoth Lakes Town Council, City of Bishop City Council, Inyo County Board of Supervisors, and the Mono County Board of Supervisors. Items of mutual interest are discussed.	Participate in community discussions, connect with neighboring communities through one outreach group.
Eastern Sierra Nevada Land Trust	Organization focused on protecting the environment in the Sierra Nevada.	Eastern Sierra Nevada Land Trust could be interested in using the reserve for nature education trips. Additionally, potentially interested in the public lectures held at the reserve and to receive updates about research on the reserve.
Sierra Club Toiyabe Chapter/ Range of Light Group	NGO which focuses on taking trips out into nature and connecting kids to their environment.	Potentially be interested in taking trips to the reserve. Additionally, potential audience for receiving science and research updates from the reserve.

Sequoia and Kings Canyon National Park	National park near Valentine. The park hosts a science symposium every other year and conducts research in the area.	Potential research partner. Valentine could also attend the science symposium or encourage researchers to collaborate with the reserve
Mammoth Lakes Trails and Public Access Foundation	MLTPA advocates for protecting and using the trail system in the Mammoth Lakes and Eastern Sierra area.	Group potentially interested in nature hikes through the reserve. Potential audience to disseminate information about the importance of science being conducted on the reserve.

**Valentine: Community Group Survey List**

<b>Valentine List of Community Groups Surveyed</b>
Mammoth Elementary
Bishop Paiute Tribe Environmental Management Office (CREEC, Region 10)
Sequoia and Kings Canyon National Park
Sierra Club Range of Light Group
California Phenology Project
USA National Phenology Network
California Native Plant Society
California Wildlife Foundation
USA National Phenology Network
California Native Plant Society
California Wildlife Foundation
California Academy of Sciences
White Mountain Research Center
Bishop Elementary School
Home Street Middle School
Palisade Glacier High School
Bishop Union High School
Lone Pine High School
Lo-Inyo Elementary School
Mammoth Middle School
Mammoth High School

Sierra High School
Eastern Sierra Audubon Society
Eastern Sierra Watershed Project
Sierra Nevada Bighorn Sheep Foundation

## 8.5. Appendix E – Survey Questions

## **Sedgwick Reserve Research Survey**

1. Consent form: I am over the age of 18, and read and agree to the terms outlined here.
2. Your Academic Field:
  - a. Biology
  - b. Geology
  - c. Ecology
  - d. Hydrology
  - e. Environmental Studies
  - f. Geography
  - g. Humanities and social sciences
  - h. Engineering
  - i. Mathematics
  - j. Other (please specify)
3. How did you hear about research opportunities at Sedgwick Reserve?
  - a. Colleague
  - b. Research publication or project
  - c. Web search
  - d. University administration
  - e. Local or university media sources
  - f. Other (please specify)
4. What reserve equipment and/or facilities have you used? Check all that apply.
  - a. Tipton House meeting Area
  - b. Tipton House kitchen
  - c. Tent cabins
  - d. Byrne Observatory
  - e. Studio apartment
  - f. Ranch house
  - g. Storage shed
  - h. Garage
  - i. Reserve vehicle
  - j. Storage lockers
  - k. Linens or towels
  - l. Garmin GPS device
  - m. Color printer
  - n. Other (please specify)

5. What natural aspects have you used at Sedgwick Reserve (e.g. types of habitats, species, geological resources)?
6. How long have you been using Sedgwick Reserve?
  - a. Less than six months
  - b. Six months to a year
  - c. Between one and five years
  - d. Between five and ten years
  - e. More than ten years
  - f. Unsure
  - g. Other (please specify)
7. Typically, how long do your project(s) last at Sedgwick Reserve?
  - a. One day
  - b. Between one day and one week
  - c. Between one week and one month
  - d. One to six months
  - e. Six months to a year
  - f. One to five years
  - g. Unsure
  - h. Other (please specify)
8. Typically, how long do you use or stay at Sedgwick Reserve for a single project?
  - a. One day
  - b. Between one day and one week
  - c. Between one week and one month
  - d. One to six months
  - e. Unsure
  - f. Other (please specify)
9. Have you been involved with other researchers at Sedgwick Reserve?  
Check all that apply.
  - a. I have collaborated with other faculty from my university.
  - b. I have collaborated with other faculty from at least one other university.
  - c. I have collaborated with researchers unaffiliated with a university.
  - d. I have overseen undergraduate student research at the site.
  - e. I have overseen master's student research at the site.
  - f. I have overseen doctoral student research at the site.
  - g. I have overseen post-doc research at the site.
  - h. I have encouraged students or post-docs to join an existing project at the site.
  - i. None of these apply to me.

- j. Other (please specify)
10. Why did you choose to use Sedgwick Reserve? Check all that apply.
- a. Overnight accommodations
  - b. Low price
  - c. Proximity to your university
  - d. Proximity to your home
  - e. Existing monitoring equipment
  - f. Ability to install monitoring equipment
  - g. Reserve guidelines that allow you to conduct your specific research
  - h. Specific species, habitat, or other natural characteristics of interest
  - i. Please specify
11. To what extent do you think each of the following changes would attract researchers to incorporate Sedgwick Reserve in their projects? [Very unlikely, Not likely, Neutral, Likely, Very likely]
- a. Distribute opportunities and information to more researchers
  - b. Provide research grants
  - c. Provide additional facilities
  - d. Have more accessible monitoring equipment (e.g. weather station)
  - e. Have data (e.g. climate data, species data) more readily available
  - f. Have more research-friendly rules on reserve
  - g. Streamline application process on RAMS (e.g. reduce detailed information requirements)
  - h. Provide separate scoping permits for researchers who are starting projects

12. Additional comments about Sedgwick Reserve

### **Valentine Reserve Research Survey**

1. Consent form: I am over the age of 18, and read and agree to the terms outlined here.
2. Your Academic Field:
  - a. Biology
  - b. Geology
  - c. Ecology
  - d. Hydrology
  - e. Environmental Studies
  - f. Geography
  - g. Humanities and social sciences
  - h. Engineering



- i. Mathematics
  - j. Other (please specify)
3. How have you used Valentine Camp?
- a. I have conducted research at Valentine Camp.
  - b. I have used Valentine Camp's resources (e.g. facilities) to perform research outside of the reserve.
  - c. All of the above.
4. How did you hear about research opportunities at Valentine Camp?
- a. Colleague
  - b. Research publication or project
  - c. Web search
  - d. University administration
  - e. Local or university media sources
  - f. Other (please specify)
5. What reserve equipment and/or facilities have you used? Check all that apply.
- a. Cabin
  - b. WIFI
  - c. Outdoor instruction area
  - d. Storage shed
  - e. Garage
  - f. Other (please specify)
6. What natural aspects have you used at Valentine Camp (e.g. types of habitats, species, geological resources)?
7. How long have you been using Valentine Camp?
- a. Less than six months
  - b. Six months to a year
  - c. Between one and five years
  - d. Between five and ten years
  - e. More than ten years
  - f. Unsure
  - g. Other (please specify)
8. Typically, how long do your project(s) last at Valentine Camp?
- a. One day
  - b. Between one day and one week
  - c. Between one week and one month
  - d. One to six months
  - e. Six months to a year

- f. One to five years
  - g. Unsure
  - h. Other (please specify)
9. Typically, how long do you use or stay at Valentine Camp for a single project?
- a. One day
  - b. Between one day and one week
  - c. Between one week and one month
  - d. One to six months
  - e. Unsure
  - f. Other (please specify)
10. Have you been involved with other researchers at Valentine Camp? Check all that apply.
- a. I have collaborated with other faculty from my university.
  - b. I have collaborated with other faculty from at least one other university.
  - c. I have collaborated with researchers unaffiliated with a university.
  - d. I have overseen undergraduate student research at the site.
  - e. I have overseen master's student research at the site.
  - f. I have overseen doctoral student research at the site.
  - g. I have overseen post-doc research at the site.
  - h. I have encouraged students or post-docs to join an existing project at the site.
  - i. None of these apply to me.
  - j. Other (please specify)
11. Why did you choose to use Valentine Camp? Check all that apply.
- a. Overnight accommodations
  - b. Low price
  - c. Proximity to your university
  - d. Proximity to your home
  - e. Existing monitoring equipment
  - f. Ability to install monitoring equipment
  - g. Reserve guidelines that allow you to conduct your specific research
  - h. Specific species, habitat, or other natural characteristics of interest
  - i. Please specify
12. To what extent do you think each of the following changes would attract researchers to incorporate Valentine Camp in their projects? [Very unlikely, Not likely, Neutral, Likely, Very likely]
- a. Distribute opportunities and information to more researchers
  - b. Provide research grants

- c. Provide additional facilities
- d. Have more accessible monitoring equipment (e.g. weather station)
- e. Have data (e.g. climate data, species data) more readily available
- f. Have more research-friendly rules on reserve
- g. Streamline application process on RAMS (e.g. reduce detailed information requirements)
- h. Provide separate scoping permits for researchers who are starting projects

13. Additional comments about Valentine Camp

### **Sedgwick and Valentine Community Surveys**

*Two separate surveys were administered to Sedgwick community and environmental groups and Valentines community and environmental groups. The Sedgwick community survey asked about experiences and perspectives of Sedgwick, while Valentine community survey asked about experiences and perspectives of Valentine.*

1. Consent form: I am over the age of 18, and read and agree to the terms outlined here.
2. Have you heard of Sedgwick Reserve/Valentine Camp?
  - a. Yes
  - b. No
  - c. Unsure
3. How did you hear about Sedgwick Reserve/Valentine Camp?
  - a. Friend or colleague
  - b. Web search
  - c. Social media
  - d. Local news source
  - e. Other (please specify)
4. To your knowledge, has your organization ever used Sedgwick Reserve/Valentine Camp?
  - a. Yes
  - b. No
  - c. Unsure
5. To your knowledge, how has your organization used Sedgwick Reserve/Valentine Camp? Check all that apply.
  - a. Research partnership
  - b. Citizen science
  - c. Bird watching

- d. K-12 class field trip
  - e. Organization retreat
  - f. Public hike
  - g. Public lecture
  - h. Other (please specify)
6. How long has your organization been using Sedgwick Reserve/Valentine Camp?
- a. Less than six months
  - b. Six months to a year
  - c. Between one and five years
  - d. Between five and ten years
  - e. More than ten years
  - f. Unsure
7. On average, how often does your organization use Sedgwick Reserve/Valentine Camp?
- a. Once a year
  - b. Once every six months
  - c. Once a month
  - d. More than once a month
  - e. Other (please specify)
8. What reserve equipment and/or facilities has your organization used?  
Check all that apply.
- Sedgwick community survey:*
- a. Tipton House meeting Area
  - b. Tipton House kitchen
  - c. Tent cabins
  - d. Byrne Observatory
  - e. Studio apartment
  - f. Ranch house
  - g. Storage shed
  - h. Garage
  - i. Reserve vehicle
  - j. Storage lockers
  - k. Linens or towels
  - l. Garmin GPS device
  - m. Color printer
  - n. Other (please specify)
- Valentine Community survey:*
- Cabin
  - a. WIFI

- b. Outdoor instruction area
  - c. Storage shed
  - d. Garage
  - o. Other (please specify)
9. What natural aspects of Sedgwick Reserve/Valentine Camp has your organization used (e.g. types of habitats, species)?
10. Based on your experience, please rate each of the following aspects of Sedgwick Reserve/Valentine Camp.
- a. Quality and availability of facilities and equipment
  - b. Helpfulness of reserve employees
  - c. Website clarity and quality
  - d. Availability of reserve information for community groups
  - e. Clarity of the application process obtain a permit to use the reserve
  - f. Accessibility of reserve to community groups
  - g. Additional comments:
11. Has your organization wanted to use Sedgwick Reserve/Valentine Camp but were unable to?
- a. Yes
  - b. No
  - c. Unsure
  - d. Other (please specify)
12. What has prevented you from using Sedgwick Reserve/Valentine Camp? Check all that apply.
- a. Unsure about resources available on the reserve
  - b. Unfamiliar with the reserve
  - c. Too expensive
  - d. Unhelpful reserve staff
  - e. Complicated permit process
  - f. Unclear website
  - g. Other (please specify)
13. In your opinion, how can Sedgwick Reserve better serve the surrounding communities and community groups?
14. How often do you use the following media to learn about opportunities for your organization?
- a. Friends or colleagues
  - b. Web searches
  - c. Local news sources
  - d. Social media
  - e. Email announcements
  - f. Other (please specify)

15. Please share any additional comments about Sedgwick Reserve/Valentine Camp:

### **Sedgwick Reserve and Valentine Camp Education Survey**

*Two separate surveys were administered to Sedgwick educators and Valentine educators (See Education Ambassador Network, Appendix N). The Sedgwick education survey asked about experiences and perspectives of Sedgwick, while Valentine education survey asked about experiences and perspectives of Valentine.*

1. Consent form: I have read this description, am over the age of 18, and agree to the terms outlined here.
2. Your Academic Field:
  - a. Biology
  - b. Geology
  - c. Ecology
  - d. Hydrology
  - e. Environmental Studies
  - f. Geography
  - g. Humanities and social sciences
  - h. Engineering
  - i. Mathematics
  - j. Other (please specify)
3. How did you hear about teaching opportunities at Sedgwick Reserve/Valentine Camp?
  - a. Colleague
  - b. Research publication or project
  - c. Web search
  - d. University administration
  - e. Local or university media sources
  - f. Other (please specify)
4. What reserve equipment and/or facilities have you used? Check all that apply.
5. What natural aspects have you used to teach a course at Sedgwick Reserve/Valentine Camp (e.g. types of habitats, species, geological resources)?
6. How long have you been using Sedgwick Reserve/Valentine Camp?
  - a. Less than six months
  - b. Six months to a year
  - c. Between one and five years

- d. Between five and ten years
  - e. More than ten years
  - f. Unsure
  - g. Other (please specify)
7. Typically, how long are the classes that you teach at Sedgwick Reserve/Valentine Camp?
- a. One day
  - b. Between one day and one week
  - c. Between one week and one month
  - d. More than one month
  - e. Unsure
  - f. Other (please specify)
8. Do classes taught at Sedgwick Reserve/Valentine Camp cost more to teach (e.g., additional fees, transportation) than coursework without a field component
- a. Yes
  - b. No
  - c. Unsure
9. What are the sources of the additional costs for coursework taught at Sedgwick/Valentine? Please rank the relative expense of each item.
- a. Transportation
  - b. University-related course fees
  - c. Supplies
  - d. Food
  - e. Additional instructor salary
  - f. Teaching assistant salary
  - g. Accommodations
  - h. Other (please specify)
10. How do you fund the field component of your course(s) taught at Sedgwick Reserve/Valentine Camp? Check all that apply:
- a. University
  - b. Grant
  - c. You (personal funds)
  - d. Student
  - e. Unsure
  - f. Other (please specify)
11. How much do students typically pay for a course?
- a. Less than \$10
  - b. \$10 - \$20
  - c. \$20 - \$50

- d. \$50-\$100
  - e. More than \$100
  - f. Other (please specify)
12. Do students need specialized gear for the course (e.g. hiking books, sleeping bag)?
- a. Yes
  - b. No
  - c. Unsure
  - d. Other (please specify)
13. Why did you choose to use Sedgwick Reserve/Valentine Camp? Check all that apply.
- a. Overnight accommodations
  - b. Low price
  - c. Proximity to your university
  - d. Existing monitoring equipment
  - e. Specific species, habitat, or other natural characteristics of interest
  - f. Familiarity with the site
  - g. Please specify
14. To what extent do you think each of the following changes would attract faculty members to teach courses at Sedgwick Reserve/Valentine Camp?
- a. Distribute opportunities and information to more educators
  - b. Provide a general fund for educators to offset costs
  - c. Provide a transportation fund to offset costs
  - d. Provide additional facilities
  - e. Have more accessible monitoring equipment (e.g. weather station)
  - f. Have data (e.g. climate data, species data) more readily available
  - g. Streamline application process on RAMS (e.g. reduce detailed information requirements)
15. Additional comments about Sedgwick Reserve/Valentine Camp

### **Sedgwick Reserve and Valentine Camp Use Survey**

1. Consent form: I have read this description, am over the age of 18, and agree to the terms outlined here.
2. What type of university or college are you affiliated with?
  - a. Community or city college
  - b. UC
  - c. CSU
  - d. Other CA (non CSU, UC, or community/city college)
  - e. Out of state



- f. International
  - g. Other (please specify)
3. What is your academic field?
    - a. Humanities and social sciences
    - b. Biological science
    - c. Mathematics
    - d. Engineering
    - e. Environmental studies
    - f. Arts
    - g. Physical sciences
    - h. Other (please specify)
  4. Have you heard of the University of California Natural Reserve System (UCNRS)?
    - a. Yes
    - b. No
    - c. Unsure
  5. How did you hear about the UCNRS?
    - a. Colleague
    - b. Research publication or project
    - c. Web search
    - d. University administration
    - e. Local or college media sources
    - f. Other (please specify)
  6. Have you heard of Sedgwick Reserve/Valentine Camp?
    - a. Yes
    - b. No
    - c. Unsure
  7. How did you hear about Sedgwick Reserve/Valentine Camp?
    - a. Colleague
    - b. Research publication or project
    - c. Web search
    - d. University administration
    - e. Local or college media sources
    - f. Other (please specify)
  8. Have you used Sedgwick Reserve/Valentine Camp?
    - a. Yes
    - b. No
    - c. Unsure
  9. Which of the following have you used Sedgwick Reserve/Valentine Camp for?

- a. Conducted onsite research
  - b. Stayed on the reserve and conducted research offsite
  - c. Oversaw student research
  - d. Brought a university-level class to the reserve
  - e. Led a public event on the reserve
  - f. Other (please specify)
10. On a scale of 1 to 5, how satisfied were you with your experience at Sedgwick Reserve/Valentine Camp?
11. Please add any additional comments about your experience at Sedgwick Reserve/Valentine Camp:
12. Have you wanted to conduct research on Sedgwick Reserve/Valentine Camp but were unable to due to a barrier? Barriers could include lack of data, prohibitive research rules, etc.
- a. Yes
  - b. No
  - c. Unsure
  - d. Other (please specify)
13. Were you prevented from conducting research on Sedgwick Reserve/Valentine Camp due to one or more of the following reasons?
- a. Unsure about resources available on the reserve
  - b. Unfamiliar with the reserve
  - c. Reserve rules prohibited conducting research of interest
  - d. Lack of data needed for research
  - e. Other (please specify)
14. Please add any additional comments about barriers preventing your research use of Sedgwick Reserve/Valentine Camp:
15. Have you wanted to bring a class to Sedgwick Reserve/Valentine Camp but were unable to due to a barrier? Barriers could include cost, unfamiliarity with reserve resources, etc.
- a. Yes
  - b. No
  - c. Unsure
  - d. Other (please specify)
16. Were you prevented from bringing a class to Sedgwick Reserve/Valentine Camp due to one or more of the following reasons?
- a. Too expensive to travel to the reserve
  - b. Too much additional cost to students
  - c. Not enough time during the class
  - d. Unsure about resources available on the reserve
  - e. Unfamiliar with the reserve

- f. Did not know how to schedule a trip to the reserve
  - g. Other (please specify)
17. Please add any additional comments about barriers preventing your education use of Sedgwick Reserve/Valentine Camp
18. To what extent do you use the following as sources of information in regard to learning about resources available for research and educational opportunities [Extensive, Somewhat, Neither, Rarely, Never]?
- a. Colleagues
  - b. Research publications or projects
  - c. Web searches
  - d. University administration
  - e. Local or college media sources
  - f. Social media
  - g. Email announcements
  - h. Attending conferences
  - i. Other (please specify)

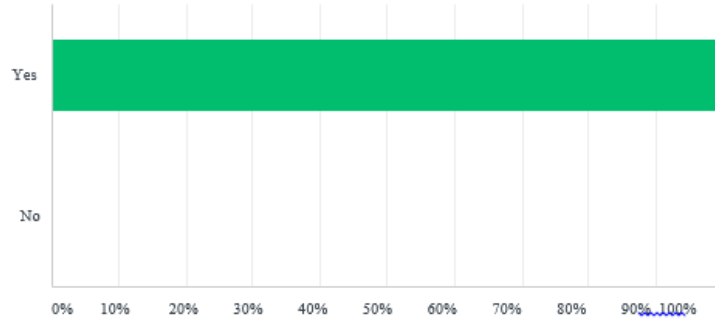
Please share any additional comments you may have about Sedgwick Reserve or Valentine Camp:

## 8.1. Appendix F – Survey Results

## Sedgwick Reserve and Valentine Camp Use Survey

Q1 I have read this description, am over the age of 18, and agree to the terms outlined here.

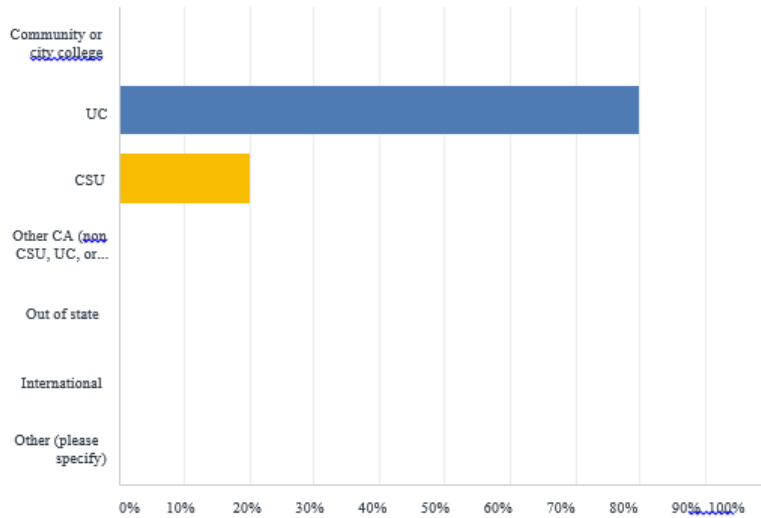
Answered: 5 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	5
No	0.00%	0
TOTAL		5

## Q2 What type of university or college are you affiliated with?

Answered: 5 Skipped: 0

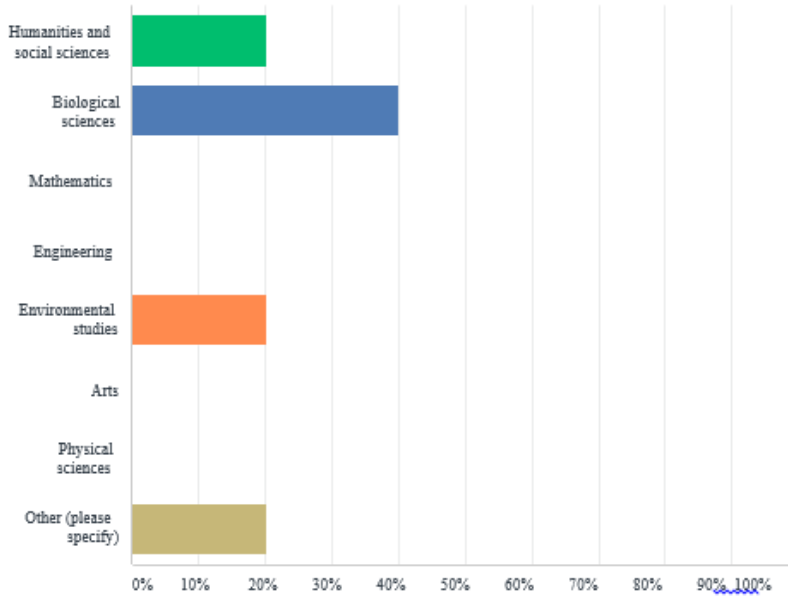


ANSWER CHOICES	RESPONSES
Community or city college	0.00% 0
UC	80.00% 4
CSU	20.00% 1
Other CA (non CSU, UC, or community/city college)	0.00% 0
Out of state	0.00% 0
International	0.00% 0
Other (please specify)	0.00% 0
<b>TOTAL</b>	<b>5</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

### Q3 What is your academic field?

Answered: 5 Skipped: 0

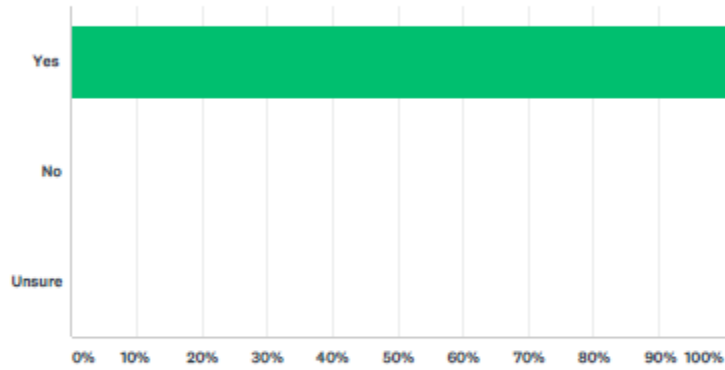


ANSWER CHOICES	RESPONSES	
Humanities and social sciences	20.00%	1
Biological sciences	40.00%	2
Mathematics	0.00%	0
Engineering	0.00%	0
Environmental studies	20.00%	1
Arts	0.00%	0
Physical sciences	0.00%	0
Other (please specify)	20.00%	1
<b>TOTAL</b>		<b>5</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	Geography & Sustainability	NaN/NaN/NaN NaN:NaN:PM

### Q4 Have you heard of the University of California Natural Reserve System (UCNRS)?

Answered: 5 Skipped: 0

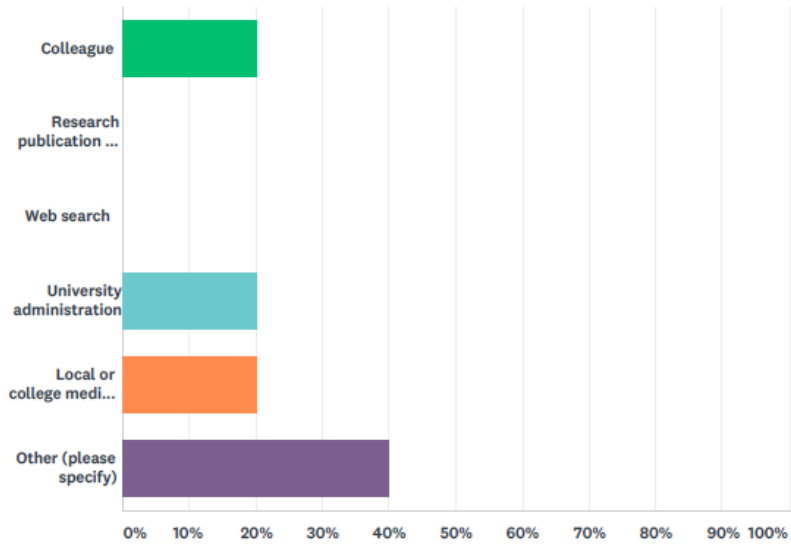


ANSWER CHOICES	RESPONSES	
Yes	100.00%	5
No	0.00%	0
Unsure	0.00%	0
TOTAL		5



## Q5 How did you hear about the UCNRS?

Answered: 5 Skipped: 0

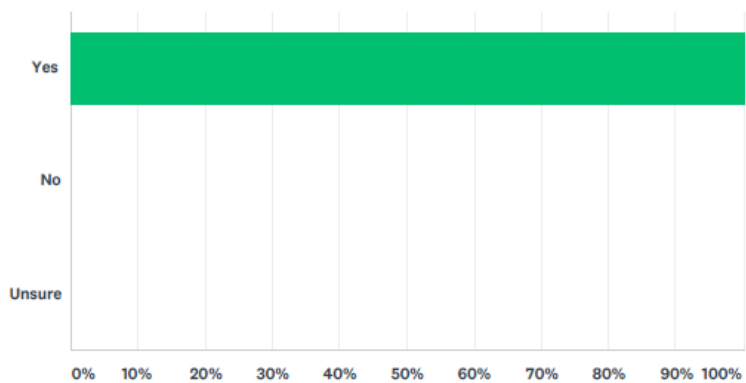


ANSWER CHOICES	RESPONSES	
Colleague	20.00%	1
Research publication or project	0.00%	0
Web search	0.00%	0
University administration	20.00%	1
Local or college media sources	20.00%	1
Other (please specify)	40.00%	2
<b>TOTAL</b>		<b>5</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	I worked at various units while an undergrad at UCSB	NaN/NaN/0NaN NaN:NaN PM
2	Used to work at MSI where we managed some of the reserves	NaN/NaN/0NaN NaN:NaN PM

### Q6 Have you heard of Sedgwick Reserve?

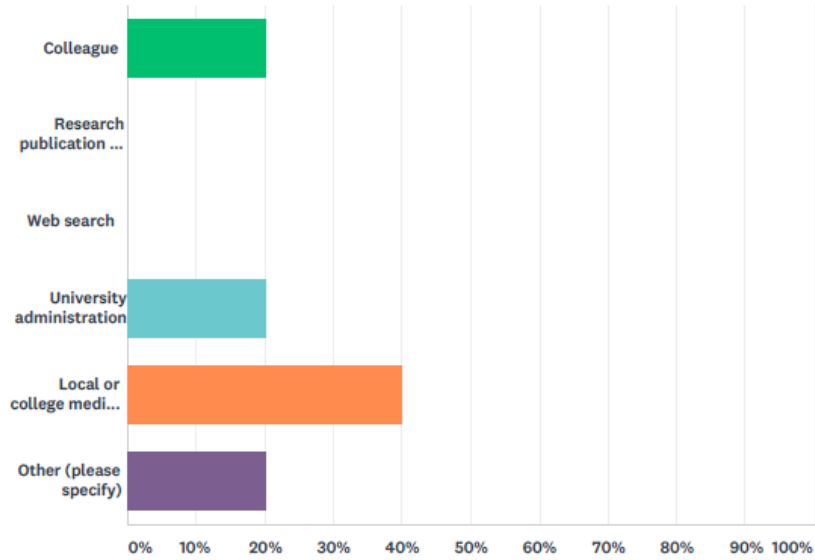
Answered: 5 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	5
No	0.00%	0
Unsure	0.00%	0
<b>TOTAL</b>		<b>5</b>

## Q7 How did you hear about Sedgwick Reserve?

Answered: 5 Skipped: 0

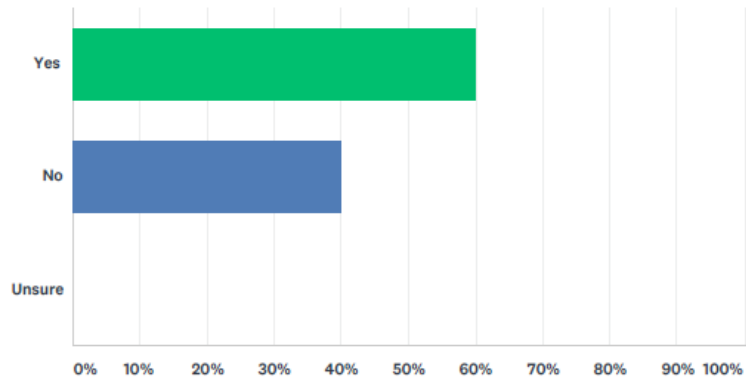


ANSWER CHOICES	RESPONSES	
Colleague	20.00%	1
Research publication or project	0.00%	0
Web search	0.00%	0
University administration	20.00%	1
Local or college media sources	40.00%	2
Other (please specify)	20.00%	1
<b>TOTAL</b>		<b>5</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	UCNRS	NaN/NaN/0NaN NaN:NaN PM

### Q8 Have you used Sedgwick Reserve?

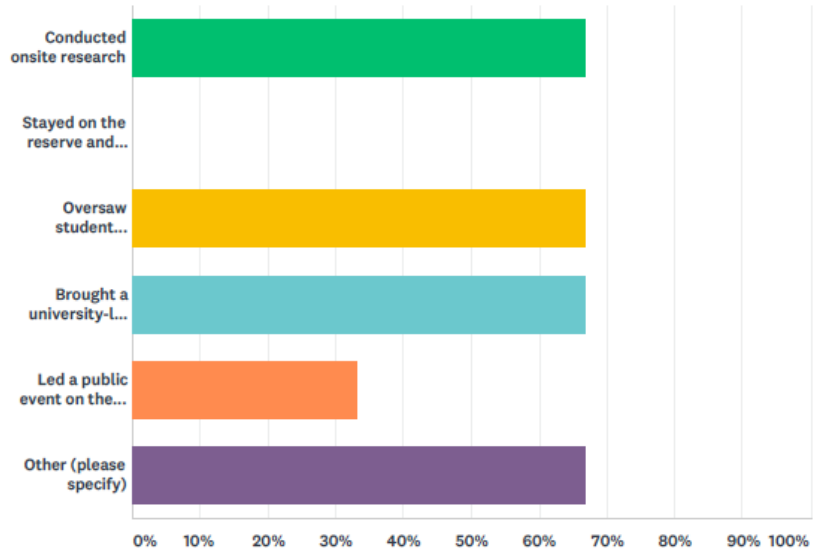
Answered: 5 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	60.00%	3
No	40.00%	2
Unsure	0.00%	0
<b>TOTAL</b>		<b>5</b>

## Q9 Which of the following have you used Sedgwick Reserve for?

Answered: 3 Skipped: 2

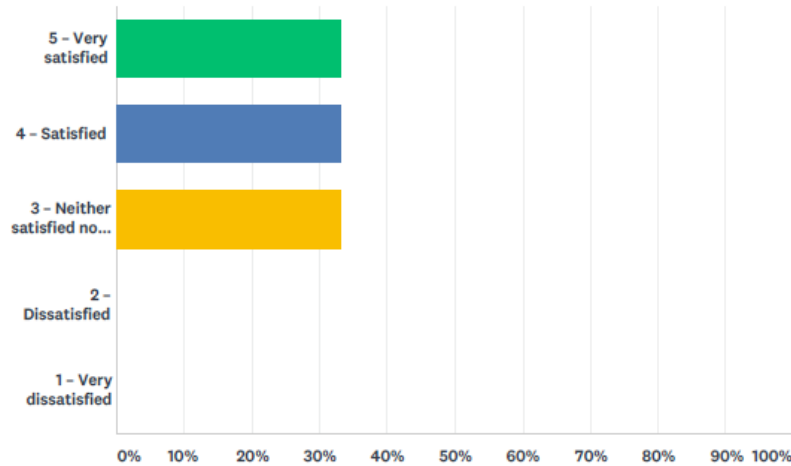


ANSWER CHOICES	RESPONSES
Conducted onsite research	66.67% 2
Stayed on the reserve and conducted research offsite	0.00% 0
Oversaw student research	66.67% 2
Brought a university-level class to the reserve	66.67% 2
Led a public event on the reserve	33.33% 1
Other (please specify)	66.67% 2
Total Respondents: 3	

#	OTHER (PLEASE SPECIFY)	DATE
1	student and faculty retreat	NaN/NaN/0NaN NaN:NaN PM
2	I am answering this for the Department of Geography as well as campus sustainability	NaN/NaN/0NaN NaN:NaN PM

### Q10 On a scale of 1 to 5, how satisfied were you with your experience at Sedgwick Reserve?

Answered: 3 Skipped: 2



ANSWER CHOICES	RESPONSES	
5 - Very satisfied	33.33%	1
4 - Satisfied	33.33%	1
3 - Neither satisfied nor dissatisfied	33.33%	1
2 - Dissatisfied	0.00%	0
1 - Very dissatisfied	0.00%	0
<b>TOTAL</b>		<b>3</b>

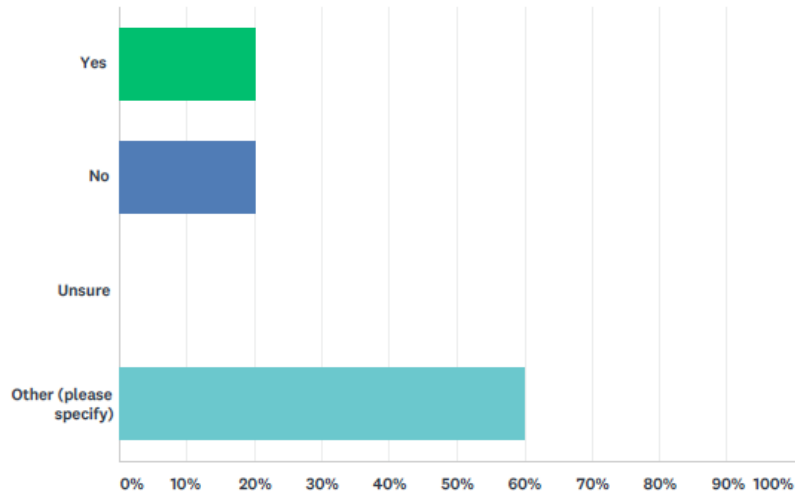
### Q11 Please add any additional comments about your experience at Sedgwick Reserve:

Answered: 3 Skipped: 2

#	RESPONSES	DATE
1	Great place to have students bond! More bathrooms would be nice for larger groups, but I think that is in the works? It would be great to have some ongoing research projects that students can contribute to while visiting.	NaN/NaN/0NaN NaN:NaN PM
2	Not very welcoming to efforts with an educational focus, liked education as an add on to research, but viewed their main priority as research. Education was not opposed, but clearly takes a back seat to PhD- and Professor-directed research	NaN/NaN/0NaN NaN:NaN PM
3	It is always great to be at Sedgwick. Tipton house has been an excellent addition and made it much easier for larger meetings.	NaN/NaN/0NaN NaN:NaN PM

Q12 Have you wanted to conduct research on Sedgwick Reserve but were unable to due to a barrier? Barriers could include lack of data, prohibitive research rules, etc.

Answered: 5 Skipped: 0

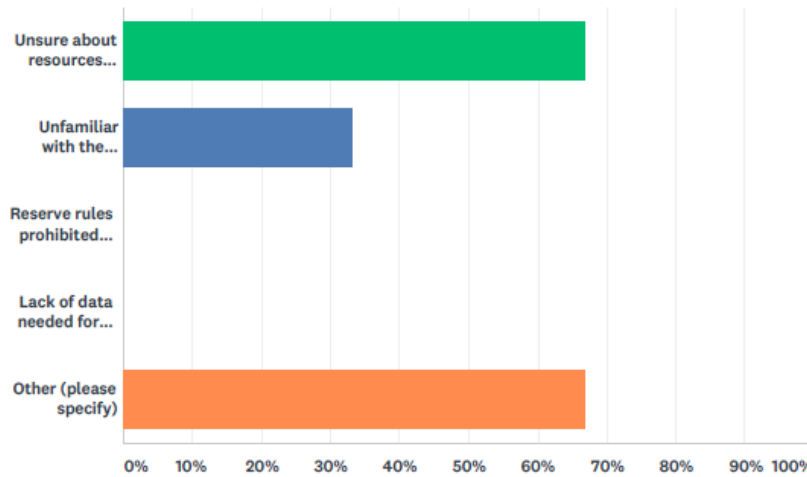


ANSWER CHOICES	RESPONSES	
Yes	20.00%	1
No	20.00%	1
Unsure	0.00%	0
Other (please specify)	60.00%	3
<b>TOTAL</b>		<b>5</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	We were hoping for a way for our students to contribute to some ongoing field research or monitoring as a way to get some experience. We could do our own project, but we'd rather contribute to something important to Sedgwick. It would also be helpful to have some basic equipment to loan such as binoculars, microscopes, etc.	NaN/NaN/0NaN NaN:NaN PM
2	Much of my work involves large numbers of undergraduates and (as a non UC researcher) the impression I received during my initial inquiries was that the director preferred PhD/grad student and/or UC Faculty-run projects.	NaN/NaN/0NaN NaN:NaN PM
3	we have instrumentation installed at Sedgwick that continues to proved great data.	NaN/NaN/0NaN NaN:NaN PM

### Q13 Were you prevented from conducting research on Sedgwick Reserve due to one or more of the following reasons?

Answered: 3 Skipped: 2



ANSWER CHOICES	RESPONSES
Unsure about resources available on the reserve	66.67% 2
Unfamiliar with the reserve	33.33% 1
Reserve rules prohibited conducting research of interest	0.00% 0
Lack of data needed for research	0.00% 0
Other (please specify)	66.67% 2
Total Respondents: 3	

#	OTHER (PLEASE SPECIFY)	DATE
1	N/A	NaN/NaN/0NaN NaN:NaN PM
2	Unsure of support from Director.	NaN/NaN/0NaN NaN:NaN PM

### Q14 Please add any additional comments about barriers preventing your research use of Sedgwick Reserve:

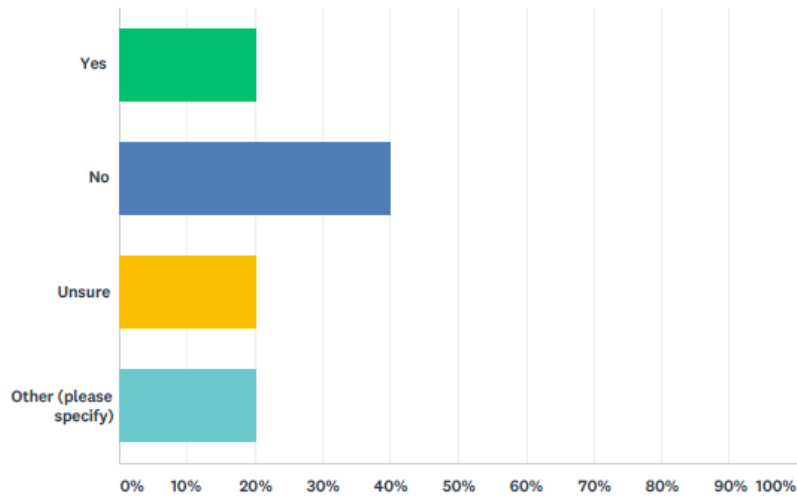
Answered: 1 Skipped: 4

#	RESPONSES	DATE
1	none	NaN/NaN/0NaN NaN:NaN PM



Q15 Have you wanted to bring a class to Sedgwick Reserve but were unable to due to a barrier? Barriers could include cost, unfamiliarity with reserve resources, etc.

Answered: 5 Skipped: 0



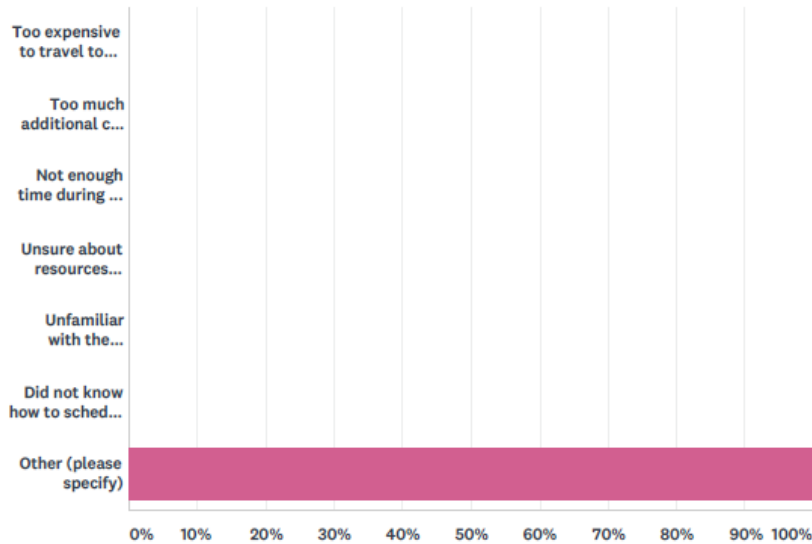
ANSWER CHOICES		RESPONSES	
Yes		20.00%	1
No		40.00%	2
Unsure		20.00%	1
Other (please specify)		20.00%	1
TOTAL			5

#	OTHER (PLEASE SPECIFY)	DATE
1	No, we've had good experiences bringing classes up to Sedgwick.	NaN/NaN/0NaN NaN:NaN PM

## Q16 Were you prevented from bringing a class to Sedgwick Reserve due to one or more of the following reasons?

Answered: 1 Skipped: 4



ANSWER CHOICES	RESPONSES
Too expensive to travel to the reserve	0.00% 0
Too much additional cost to students	0.00% 0
Not enough time during the class	0.00% 0
Unsure about resources available on the reserve	0.00% 0
Unfamiliar with the reserve	0.00% 0
Did not know how to schedule a trip to the reserve	0.00% 0
Other (please specify)	100.00% 1
Total Respondents: 1	

#	OTHER (PLEASE SPECIFY)	DATE
1	Discouraged from bringing undergrads	NaN/NaN/0NaN NaN:NaN PM

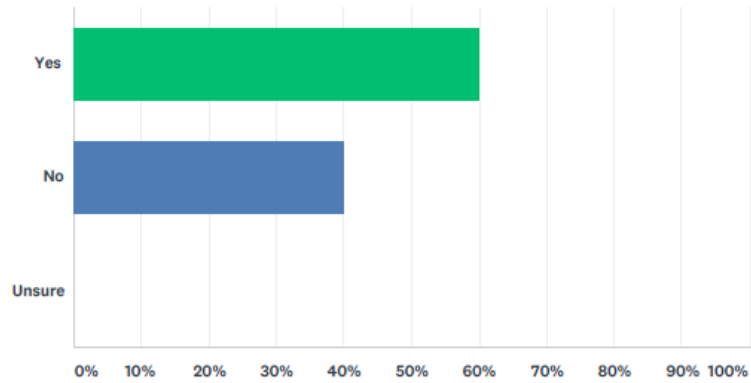
### Q17 Please add any additional comments about barriers preventing your education use of Sedgwick Reserve:

Answered: 1 Skipped: 4

#	RESPONSES	DATE
1	I have an excellent working relationship with other reserves and a good history of engagement in both research and class field trips (Rancho Mariño, Big Creek, etc.); Sedgwick has always given the impression that they would prefer my students/program not to use their facility.	NaN/NaN/0NaN NaN:NaN PM

### Q18 Have you heard of Valentine Camp?

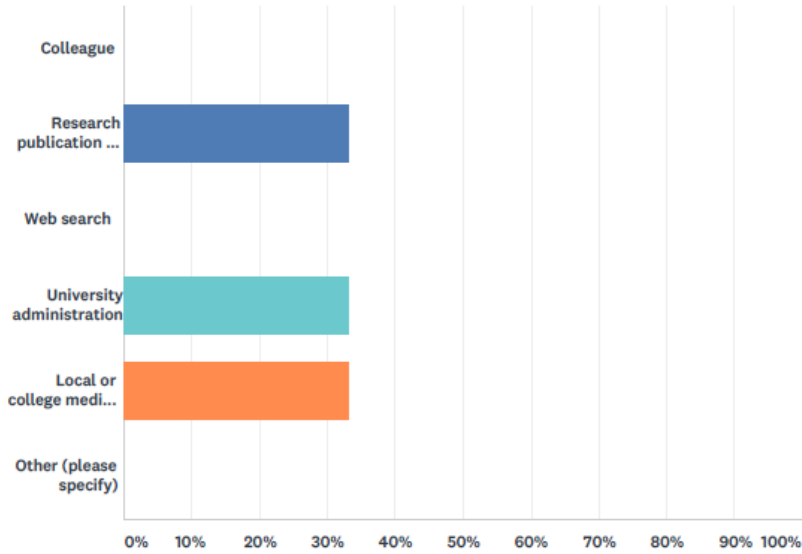
Answered: 5 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	60.00%	3
No	40.00%	2
Unsure	0.00%	0
<b>TOTAL</b>		<b>5</b>

## Q19 How did you hear about Valentine Camp?

Answered: 3 Skipped: 2

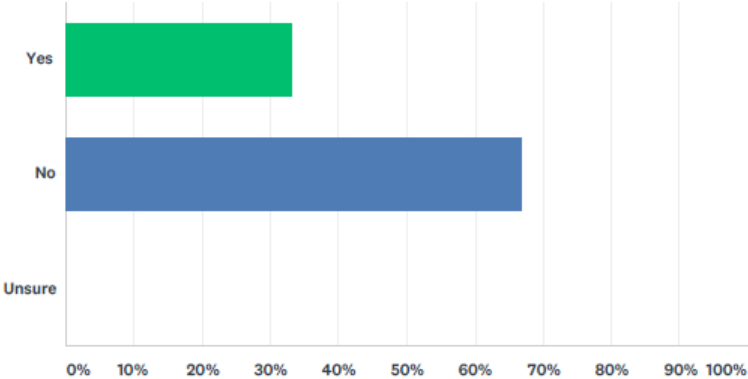


ANSWER CHOICES	RESPONSES	
Colleague	0.00%	0
Research publication or project	33.33%	1
Web search	0.00%	0
University administration	33.33%	1
Local or college media sources	33.33%	1
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>3</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

### Q20 Have you used Valentine Camp?

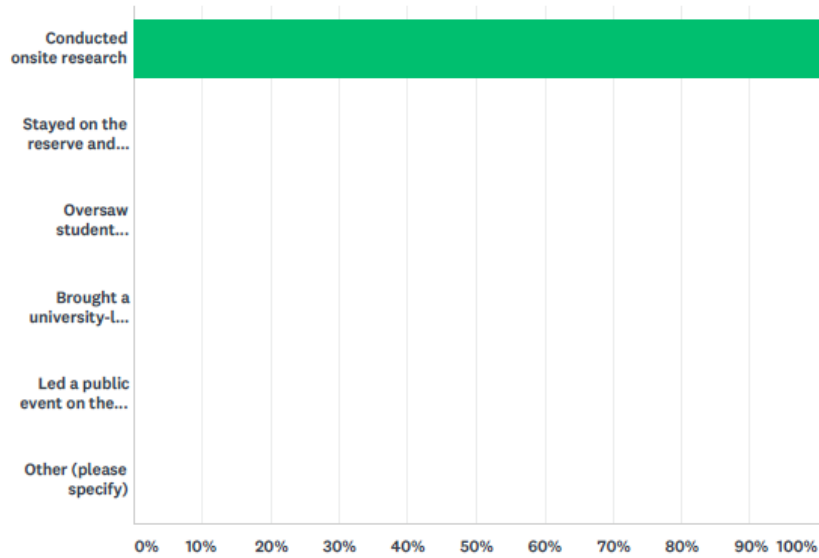
Answered: 3 Skipped: 2



ANSWER CHOICES	RESPONSES	
Yes	33.33%	1
No	66.67%	2
Unsure	0.00%	0
TOTAL		3

## Q21 Which of the following have you used Valentine Camp for?

Answered: 1 Skipped: 4

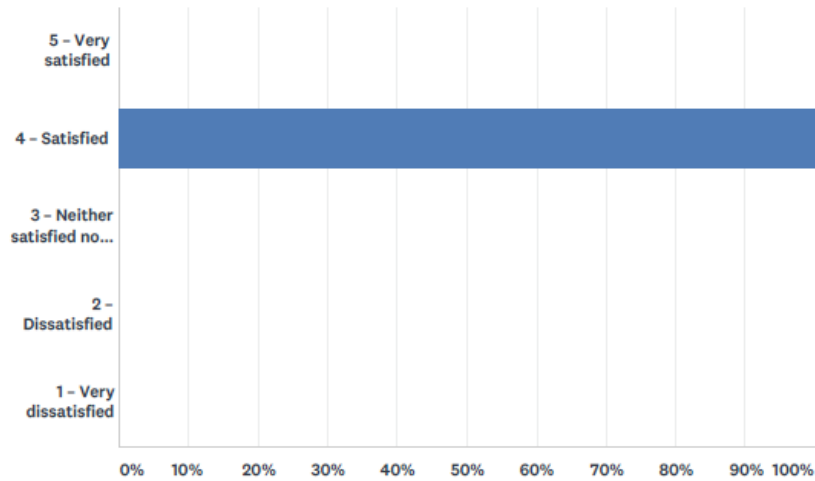


ANSWER CHOICES	RESPONSES	
Conducted onsite research	100.00%	1
Stayed on the reserve and conducted research offsite	0.00%	0
Oversaw student research	0.00%	0
Brought a university-level class to the reserve	0.00%	0
Led a public event on the reserve	0.00%	0
Other (please specify)	0.00%	0
Total Respondents: 1		

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q22 On a scale of 1 to 5, how satisfied were you with your experience at Valentine Camp?

Answered: 1 Skipped: 4



ANSWER CHOICES	RESPONSES	
5 - Very satisfied	0.00%	0
4 - Satisfied	100.00%	1
3 - Neither satisfied nor dissatisfied	0.00%	0
2 - Dissatisfied	0.00%	0
1 - Very dissatisfied	0.00%	0
<b>TOTAL</b>		<b>1</b>

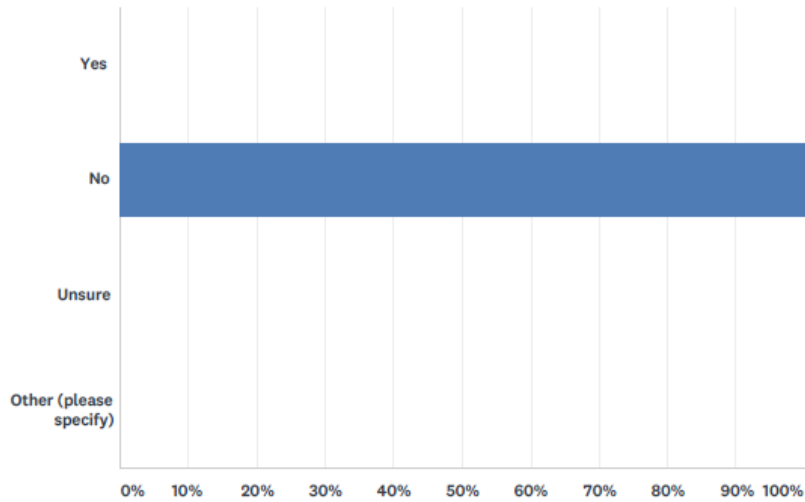
## Q23 Please add any additional comments about your experience at Valentine Camp:

Answered: 0 Skipped: 5

#	RESPONSES	DATE
	There are no responses.	

Q24 Have you wanted to conduct research on Valentine Camp but were unable to due to a barrier? Barriers could include lack of data, prohibitive research rules, etc.

Answered: 3 Skipped: 2



ANSWER CHOICES	RESPONSES	
Yes	0.00%	0
No	100.00%	3
Unsure	0.00%	0
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>3</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	



## Q25 Were you prevented from conducting research on Valentine Camp due to one or more of the following reasons?

Answered: 0 Skipped: 5

 No matching responses.

ANSWER CHOICES	RESPONSES
Unsure about resources available on the reserve	0.00% 0
Unfamiliar with the reserve	0.00% 0
Reserve rules prohibited conducting research of interest	0.00% 0
Lack of data needed for research	0.00% 0
Other (please specify)	0.00% 0
Total Respondents: 0	

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

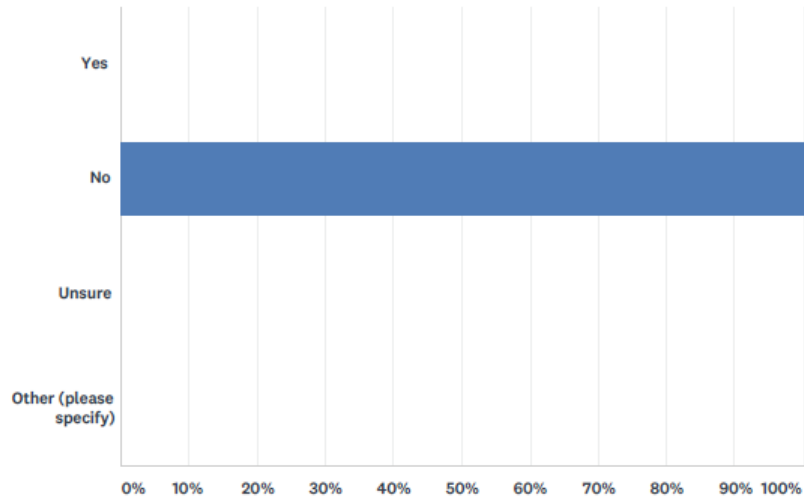
## Q26 Please add any additional comments about barriers preventing your research use of Valentine Camp:

Answered: 0 Skipped: 5

#	RESPONSES	DATE
	There are no responses.	

**Q27 Have you wanted to bring a class to Valentine Camp but were unable to due to a barrier? Barriers could include cost, unfamiliarity with reserve resources, etc.**

Answered: 3 Skipped: 2



ANSWER CHOICES	RESPONSES	
Yes	0.00%	0
No	100.00%	3
Unsure	0.00%	0
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>3</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

**Q28 Were you prevented from bringing a class to Valentine Camp due to one or more of the following reasons?**

Answered: 0 Skipped: 5

▲ No matching responses.

ANSWER CHOICES	RESPONSES
Too expensive to travel to the reserve	0.00% 0
Too much additional cost to students	0.00% 0
Not enough time during the class	0.00% 0
Unsure about resources available on the reserve	0.00% 0
Unfamiliar with the reserve	0.00% 0
Did not know how to schedule a trip to the reserve	0.00% 0
Other (please specify)	0.00% 0
Total Respondents: 0	

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

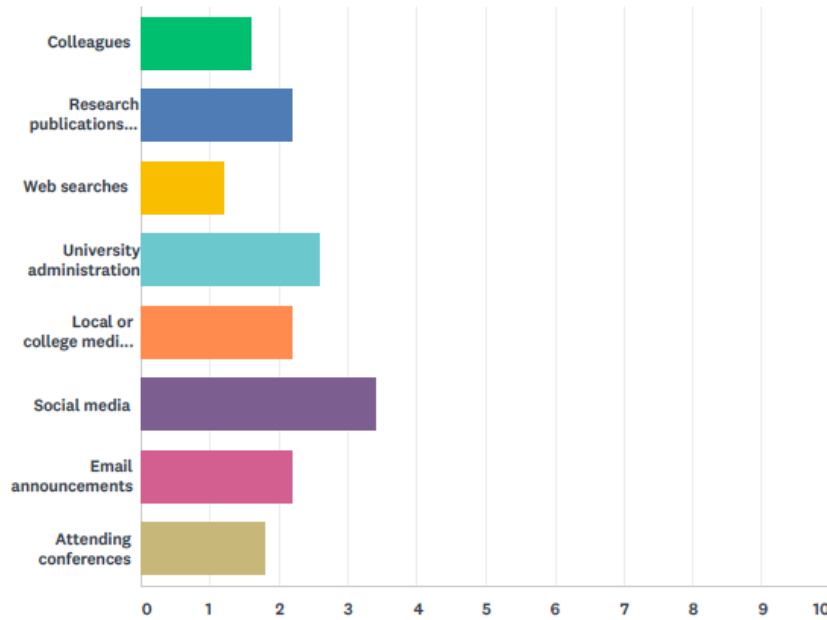
**Q29 Please add any additional comments about barriers preventing your education use of Valentine Camp:**

Answered: 0 Skipped: 5

#	RESPONSES	DATE
	There are no responses.	

**Q30 To what extent do you use the following as sources of information in regards to learning about resources available for research and educational opportunities [scale of 1-5]?**

Answered: 5 Skipped: 0



	5 - EXTENSIVELY USE	4 - SOMEWHAT USE	3 - NEITHER USE NOR DO NOT USE	2 - RARELY USE	1 - NEVER OR ALMOST NEVER USE	TOTAL	WEIGHTED AVERAGE
Colleagues	40.00% 2	60.00% 3	0.00% 0	0.00% 0	0.00% 0	5	1.60
Research publications or projects	40.00% 2	20.00% 1	20.00% 1	20.00% 1	0.00% 0	5	2.20
Web searches	80.00% 4	20.00% 1	0.00% 0	0.00% 0	0.00% 0	5	1.20
University administration	40.00% 2	20.00% 1	0.00% 0	20.00% 1	20.00% 1	5	2.60
Local or college media sources	20.00% 1	40.00% 2	40.00% 2	0.00% 0	0.00% 0	5	2.20
Social media	20.00% 1	20.00% 1	0.00% 0	20.00% 1	40.00% 2	5	3.40
Email announcements	40.00% 2	20.00% 1	20.00% 1	20.00% 1	0.00% 0	5	2.20
Attending conferences	60.00% 3	20.00% 1	0.00% 0	20.00% 1	0.00% 0	5	1.80

**Q31 Please share any additional comments you may have about Sedgwick Reserve or Valentine Camp:**

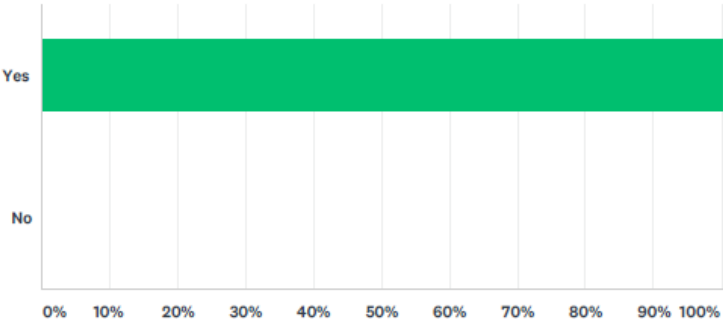
Answered: 0 Skipped: 5

#	RESPONSES	DATE
	There are no responses.	

**Sedgwick Reserve Community Use Survey**

**Q1 I have read this description, am over the age of 18, and agree to the terms outlined here.**

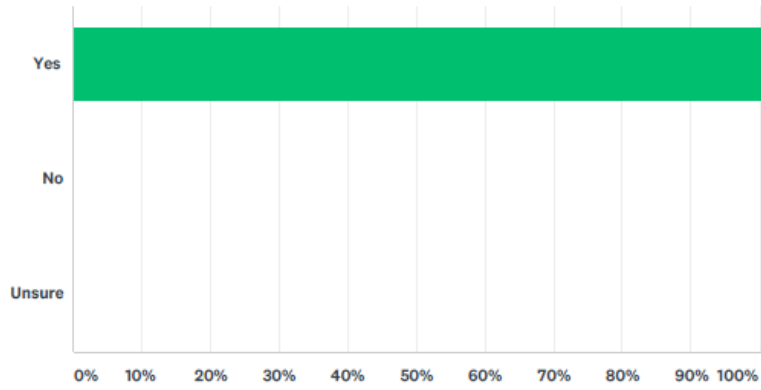
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	9
No	0.00%	0
<b>TOTAL</b>		<b>9</b>

## Q2 Have you heard of Sedgwick Reserve?

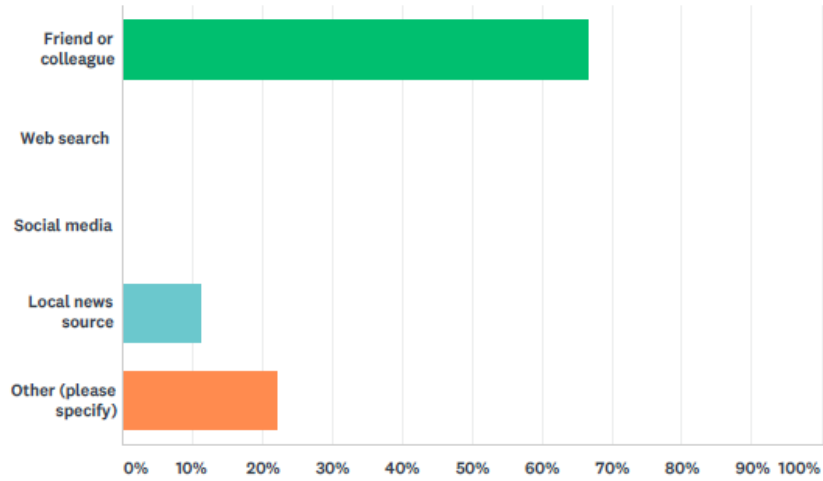
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	9
No	0.00%	0
Unsure	0.00%	0
TOTAL		9

### Q3 How did you hear about Sedgwick Reserve?

Answered: 9 Skipped: 0

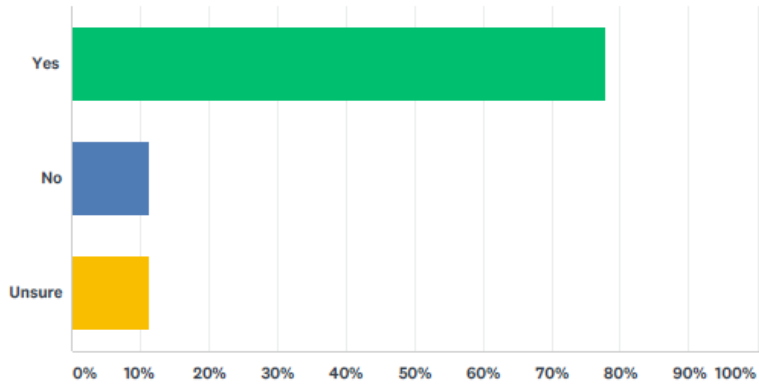


ANSWER CHOICES	RESPONSES	
Friend or colleague	66.67%	6
Web search	0.00%	0
Social media	0.00%	0
Local news source	11.11%	1
Other (please specify)	22.22%	2
<b>TOTAL</b>		<b>9</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	Founders of our organization were also involved in the original efforts to "save" Sedgwick by raising funds to purchase the "heirs parcel"	NaN/NaN/0NaN NaN:NaN PM
2	I went there years ago to interview a UCSB researcher for a documentary film I was making.	NaN/NaN/0NaN NaN:NaN PM

### Q4 To your knowledge, has your organization ever used Sedgwick Reserve?

Answered: 9 Skipped: 0

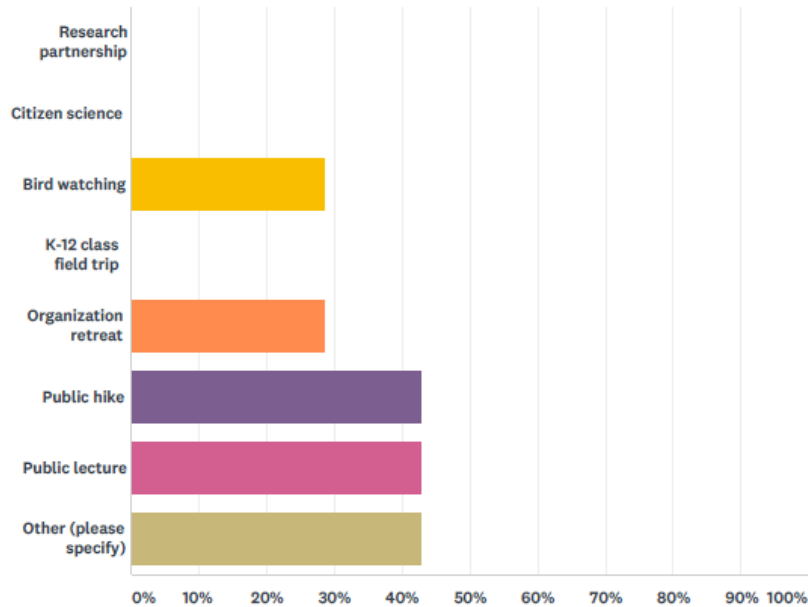


ANSWER CHOICES	RESPONSES	
Yes	77.78%	7
No	11.11%	1
Unsure	11.11%	1
TOTAL		9



## Q5 To your knowledge, how has your organization used Sedgwick Reserve? Check all that apply.

Answered: 7 Skipped: 2



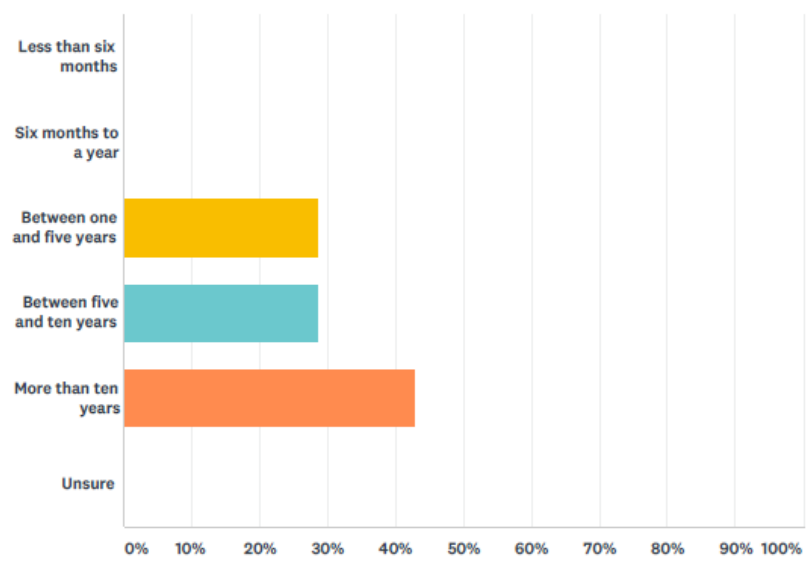
ANSWER CHOICES	RESPONSES
Research partnership	0.00% 0
Citizen science	0.00% 0
Bird watching	28.57% 2
K-12 class field trip	0.00% 0
Organization retreat	28.57% 2
Public hike	42.86% 3
Public lecture	42.86% 3
Other (please specify)	42.86% 3
Total Respondents: 7	

#	OTHER (PLEASE SPECIFY)	DATE
1	Star gazing parties at the Byrne Observatory.	NaN/NaN/0NaN NaN:NaN PM

2	Our organization's Fifth Anniversary celebration was held at Sedgwick in 2005. We have also put together several oak tree planting workshops at the Reserve. Our members participated in creek restoration at the Reserve. We have screened movies and sponsored poetry readings at the Tipton House. We have also sponsored a lecture and workshop at the Reserve on how to set up trail cameras for capturing wildlife images.	NaN/NaN/0NaN NaN:NaN PM
3	landscape painting on location	NaN/NaN/0NaN NaN:NaN PM

### Q6 How long has your organization been using Sedgwick Reserve?

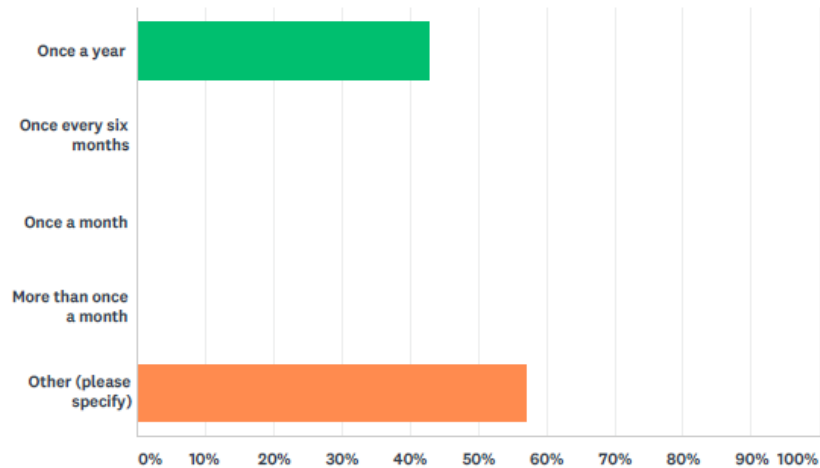
Answered: 7 Skipped: 2



ANSWER CHOICES	RESPONSES	
Less than six months	0.00%	0
Six months to a year	0.00%	0
Between one and five years	28.57%	2
Between five and ten years	28.57%	2
More than ten years	42.86%	3
Unsure	0.00%	0
<b>TOTAL</b>		<b>7</b>

## Q7 On average, how often does your organization use Sedgwick Reserve?

Answered: 7 Skipped: 2

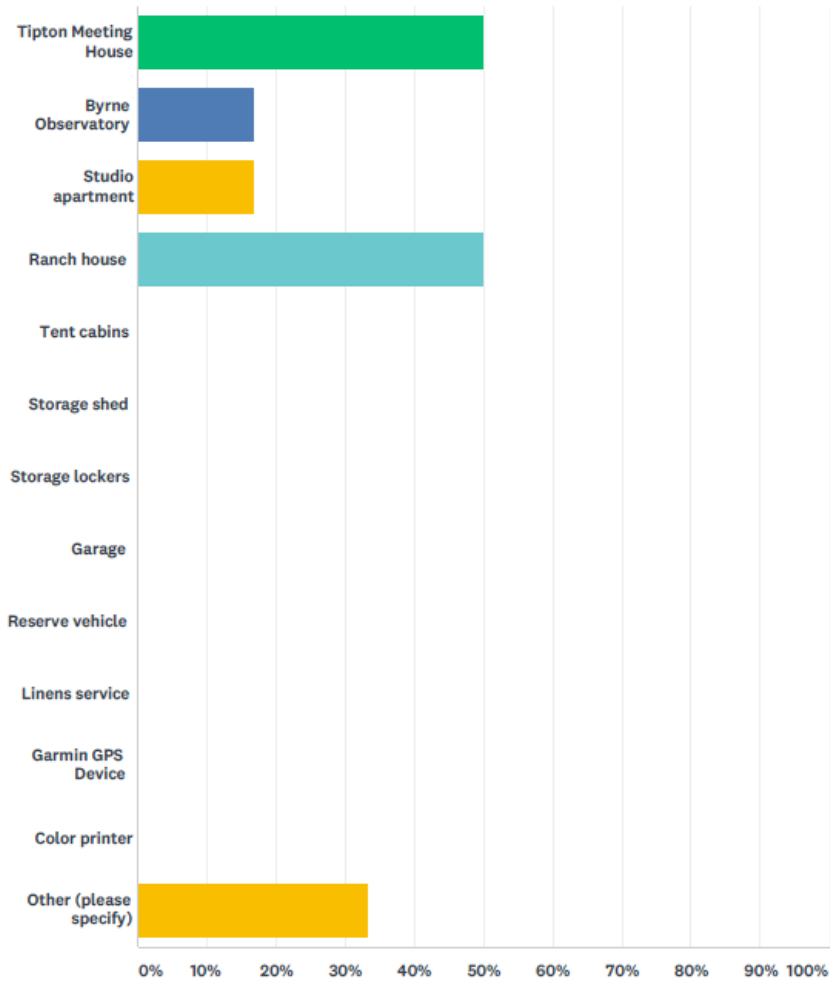


ANSWER CHOICES	RESPONSES	
Once a year	42.86%	3
Once every six months	0.00%	0
Once a month	0.00%	0
More than once a month	0.00%	0
Other (please specify)	57.14%	4
<b>TOTAL</b>		<b>7</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	3-4 times a year.	NaN/NaN/0NaN NaN:NaN PM
2	Varies per year, but averages two to four times per year.	NaN/NaN/0NaN NaN:NaN PM
3	once every 3-4 months	NaN/NaN/0NaN NaN:NaN PM
4	probably twice in 5 years	NaN/NaN/0NaN NaN:NaN PM

Q8 What reserve equipment and/or facilities has your organization used?  
Check all that apply.

Answered: 6 Skipped: 3



ANSWER CHOICES	RESPONSES	
Tipton Meeting House	50.00%	3
Byrne Observatory	16.67%	1
Studio apartment	16.67%	1
Ranch house	50.00%	3
Tent cabins	0.00%	0

Storage shed	0.00%	0
Storage lockers	0.00%	0
Garage	0.00%	0
Reserve vehicle	0.00%	0
Linens service	0.00%	0
Garmin GPS Device	0.00%	0
Color printer	0.00%	0
Other (please specify)	33.33%	2
Total Respondents: 6		

#	OTHER (PLEASE SPECIFY)	DATE
1	Picnic area.	NaN/NaN/0NaN NaN:NaN PM
2	None	NaN/NaN/0NaN NaN:NaN PM

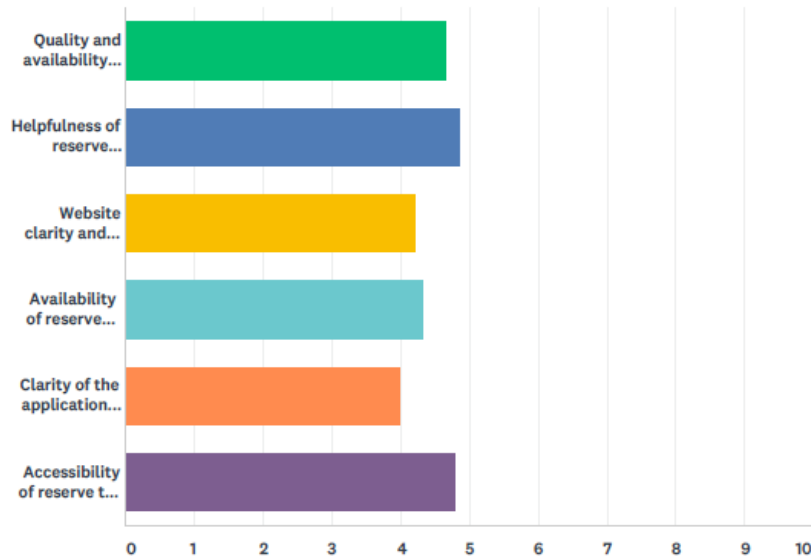
### Q9 What natural aspects of Sedgwick Reserve has your organization used (e.g. types of habitats, species)?

Answered: 7 Skipped: 2

#	RESPONSES	DATE
1	The Observatory for viewing the night sky.	NaN/NaN/0NaN NaN:NaN PM
2	Our field trips have taken advantage of Sedgwick's varied habitats from oak woodland and oak savannah to serpentine outcrops and chaparral. On the many field trips we have conducted on the Reserve we have examined the Little Pine fault, identified wildflowers, searched for and studied plants important to the Chumash, learned about the effects of wildfire on the landscape, hunted for butterflies, dragonflies, spiders and birds, and much more!	NaN/NaN/0NaN NaN:NaN PM
3	local and migrating bird species	NaN/NaN/0NaN NaN:NaN PM
4	Nothing specific, only as backdrop for public programs generally about conservation and ecological management and research	NaN/NaN/0NaN NaN:NaN PM
5	outdoors and environment	NaN/NaN/0NaN NaN:NaN PM
6	oaks and grasslands. rolling hills	NaN/NaN/0NaN NaN:NaN PM
7	The beautiful scenery and centrally-located location.	NaN/NaN/0NaN NaN:NaN PM

## Q10 Based on your experience, please rate each of the following aspects of Sedgwick Reserve.

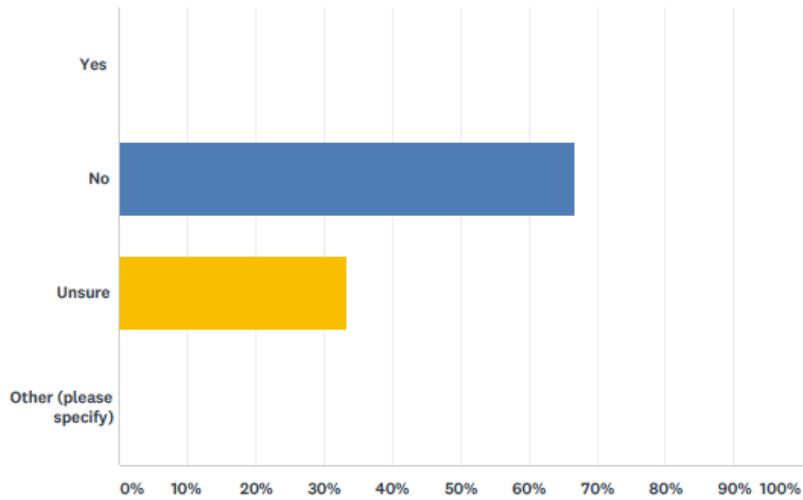
Answered: 7 Skipped: 2



	VERY POOR	POOR	ACCEPTABLE	GOOD	VERY GOOD	N/A	TOTAL	WEIGHTED AVERAGE
Quality and availability of facilities and equipment	0.00% 0	0.00% 0	0.00% 0	28.57% 2	57.14% 4	14.29% 1	7	4.67
Helpfulness of reserve employees	0.00% 0	0.00% 0	0.00% 0	14.29% 1	85.71% 6	0.00% 0	7	4.86
Website clarity and quality	0.00% 0	0.00% 0	14.29% 1	28.57% 2	28.57% 2	28.57% 2	7	4.20
Availability of reserve information for community groups	0.00% 0	0.00% 0	14.29% 1	28.57% 2	42.86% 3	14.29% 1	7	4.33
Clarity of the application process obtain a permit to use the reserve	0.00% 0	14.29% 1	0.00% 0	28.57% 2	28.57% 2	28.57% 2	7	4.00
Accessibility of reserve to community groups	0.00% 0	0.00% 0	0.00% 0	14.29% 1	57.14% 4	28.57% 2	7	4.80

## Q11 Has your organization wanted to use Sedgwick Reserve but were unable to?

Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	0.00%	0
No	66.67%	6
Unsure	33.33%	3
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>9</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q12 What has prevented you from using Sedgwick Reserve? Check all that apply.

Answered: 0 Skipped: 9

⚠ No matching responses.

ANSWER CHOICES	RESPONSES	
Unsure about resources available on the reserve	0.00%	0
Unfamiliar with the reserve	0.00%	0
Too expensive	0.00%	0
Unhelpful reserve staff	0.00%	0
Complicated permit process	0.00%	0
Unclear website	0.00%	0
Other (please specify)	0.00%	0
Total Respondents: 0		

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q13 In your opinion, how can Sedgwick Reserve better serve the surrounding communities and community groups?

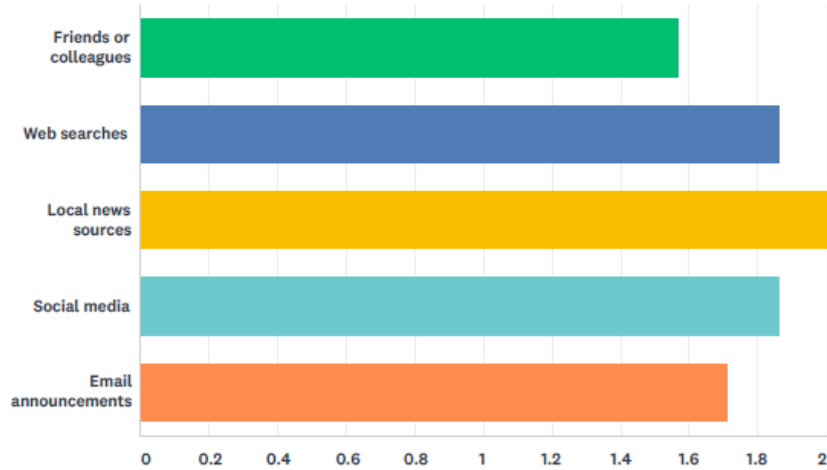
Answered: 7 Skipped: 2

#	RESPONSES	DATE
1	I think it's fine the way it is.	NaN/NaN/0NaN NaN:NaN PM
2	Expand outreach for Sedgwick newsletter	NaN/NaN/0NaN NaN:NaN PM
3	I'm not sure, maybe have more advertising about it uses and availability to the public.	NaN/NaN/0NaN NaN:NaN PM
4	I don't know- open it for field trips? Have open days where students and staff give talks?	NaN/NaN/0NaN NaN:NaN PM
5	Perhaps improve the guided hikes to better tailor to the knowledge/interest level just as they do for hiking ability level.	NaN/NaN/0NaN NaN:NaN PM
6	Doing a good job now	NaN/NaN/0NaN NaN:NaN PM
7	better advertising of open events	NaN/NaN/0NaN NaN:NaN PM



## Q14 How often do you use the following media to learn about opportunities for your organization?

Answered: 7 Skipped: 2



	VERY OFTEN	OFTEN	SOMETIMES	RARELY	VERY RARELY OR NEVER	UNSURE	TOTAL	WEIGHTED AVERAGE
Friends or colleagues	14.29% 1	71.43% 5	0.00% 0	0.00% 0	0.00% 0	14.29% 1	7	1.57
Web searches	42.86% 3	28.57% 2	28.57% 2	0.00% 0	0.00% 0	0.00% 0	7	1.86
Local news sources	28.57% 2	42.86% 3	28.57% 2	0.00% 0	0.00% 0	0.00% 0	7	2.00
Social media	28.57% 2	28.57% 2	14.29% 1	14.29% 1	0.00% 0	14.29% 1	7	1.86
Email announcements	57.14% 4	14.29% 1	28.57% 2	0.00% 0	0.00% 0	0.00% 0	7	1.71

#	OTHER (PLEASE SPECIFY)	DATE
1	We have an MOU with UC and the Sedgwick reserve that outlines our use of the Byrne Observatory. This agreement is excellent and is working perfectly.	NaN/NaN/0NaN NaN:NaN PM

## Q15 Please share any additional comments about Sedgwick Reserve:

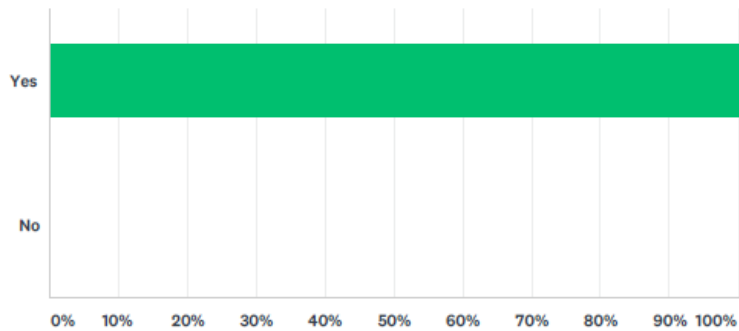
Answered: 3 Skipped: 6

#	RESPONSES	DATE
1	Continue to foster local community involvement	NaN/NaN/0NaN NaN:NaN PM
2	It was beautiful. I'd love to go back!	NaN/NaN/0NaN NaN:NaN PM
3	It is unclear if the Reserve's priority is to better engage the community or the academic research community.	NaN/NaN/0NaN NaN:NaN PM

## Sedgwick Reserve Education Survey

### Q1 I have read this description, am over the age of 18, and agree to the terms outlined here.

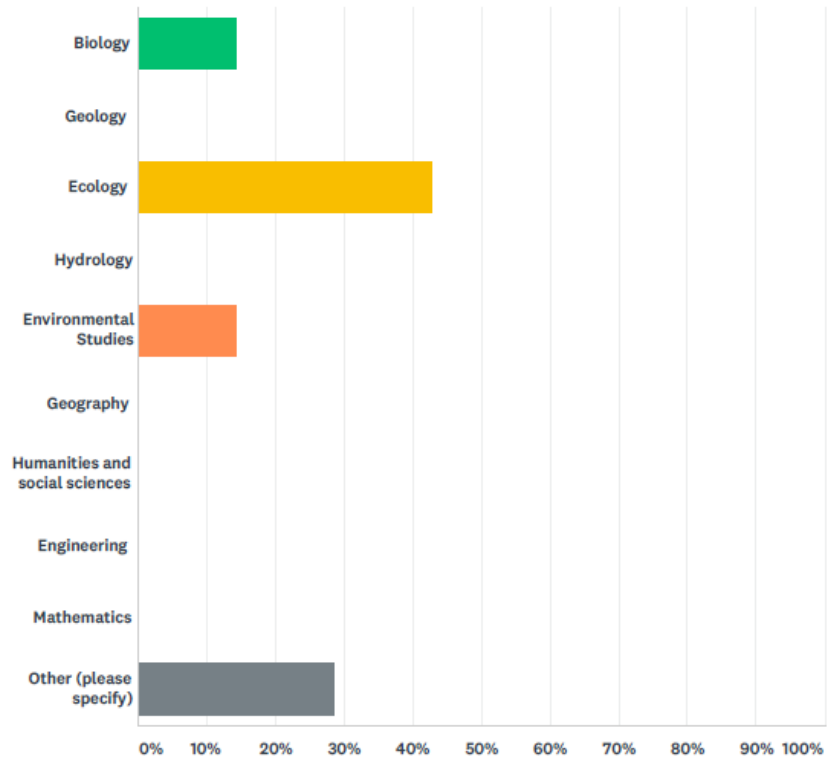
Answered: 7 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	7
No	0.00%	0
TOTAL		7

## Q2 Your Academic Field:

Answered: 7 Skipped: 0

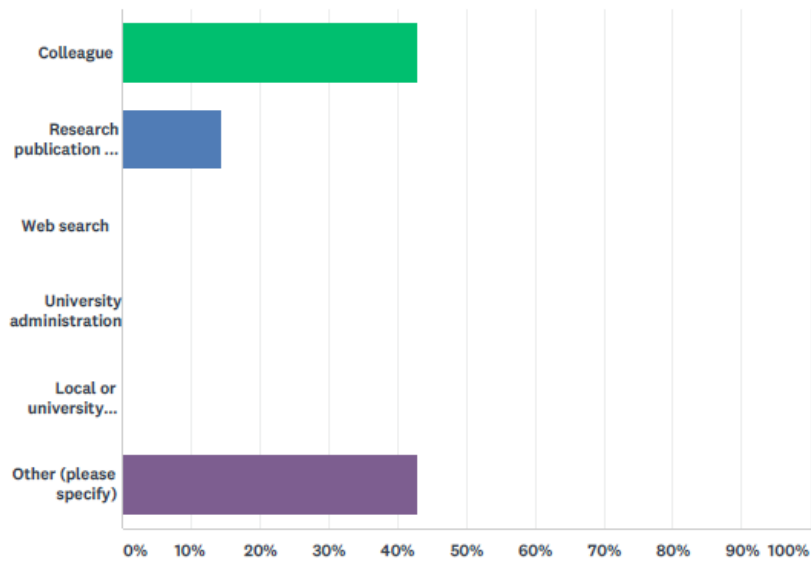


ANSWER CHOICES	RESPONSES	
Biology	14.29%	1
Geology	0.00%	0
Ecology	42.86%	3
Hydrology	0.00%	0
Environmental Studies	14.29%	1
Geography	0.00%	0
Humanities and social sciences	0.00%	0
Engineering	0.00%	0
Mathematics	0.00%	0
Other (please specify)	28.57%	2
<b>TOTAL</b>		<b>7</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	Biology & Geology	NaN/NaN/0NaN NaN:NaN PM
2	Geology/Ecology/Geography/Soils	NaN/NaN/0NaN NaN:NaN PM

### Q3 How did you hear about teaching opportunities at Sedgwick Reserve?

Answered: 7 Skipped: 0

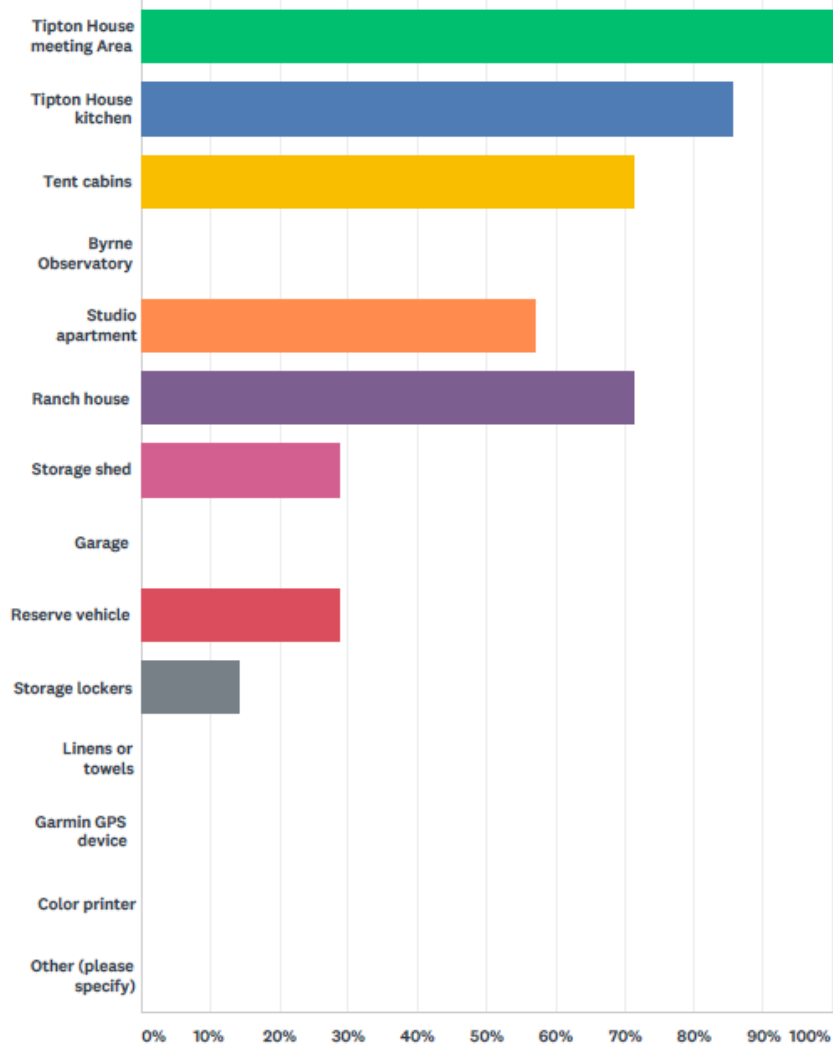


ANSWER CHOICES	RESPONSES	
Colleague	42.86%	3
Research publication or project	14.29%	1
Web search	0.00%	0
University administration	0.00%	0
Local or university media sources	0.00%	0
Other (please specify)	42.86%	3
<b>TOTAL</b>		<b>7</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	Involvement in the Reserves	NaN/NaN/0NaN NaN:NaN PM
2	Visits during graduate school with Sedgwick researcher	NaN/NaN/0NaN NaN:NaN PM
3	I have heard of it for years	NaN/NaN/0NaN NaN:NaN PM

**Q4 What reserve equipment and/or facilities have you used? Check all that apply.**

Answered: 7 Skipped: 0



ANSWER CHOICES	RESPONSES	
Tipton House meeting Area	100.00%	7
Tipton House kitchen	85.71%	6
Tent cabins	71.43%	5
Byrne Observatory	0.00%	0

Studio apartment	57.14%	4
Ranch house	71.43%	5
Storage shed	28.57%	2
Garage	0.00%	0
Reserve vehicle	28.57%	2
Storage lockers	14.29%	1
Linens or towels	0.00%	0
Garmin GPS device	0.00%	0
Color printer	0.00%	0
Other (please specify)	0.00%	0
Total Respondents: 7		

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

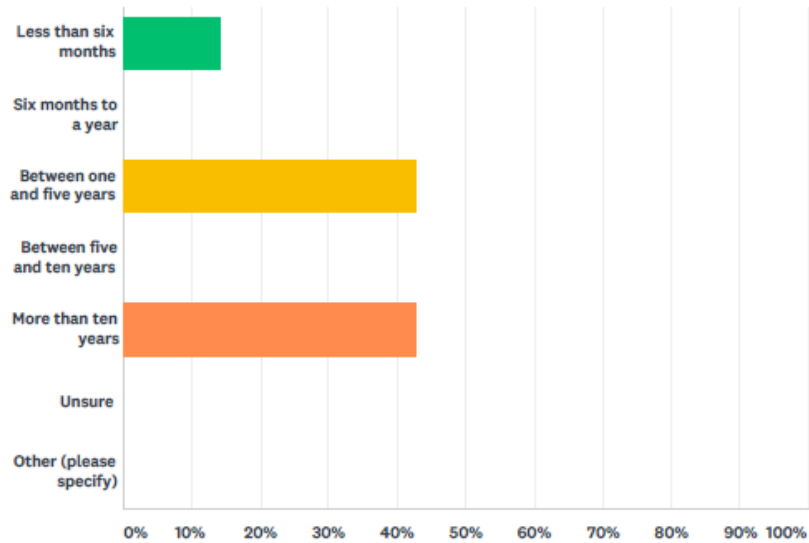
### Q5 What natural aspects have you used to teach a course at Sedgwick Reserve (e.g. types of habitats, species, geological resources)?

Answered: 7 Skipped: 0

#	RESPONSES	DATE
1	Vegetation and Geology in he context of providing "scientific" insight into landscape painting	NaN/NaN/0NaN NaN:NaN PM
2	Lower Reserve on Paso Robles Formation, Upper Reserve on Franciscan Formation and Serpentine Rocks	NaN/NaN/0NaN NaN:NaN PM
3	Types of habitats, oak stands, insect species, etc.	NaN/NaN/0NaN NaN:NaN PM
4	oak woodland, grassland, serpentine	NaN/NaN/0NaN NaN:NaN PM
5	We have worked all over the reserve: all habitats, all boundaries.	NaN/NaN/0NaN NaN:NaN PM
6	ecology, species interactions	NaN/NaN/0NaN NaN:NaN PM
7	habitats, species	NaN/NaN/0NaN NaN:NaN PM

## Q6 How long have you been using Sedgwick Reserve?

Answered: 7 Skipped: 0

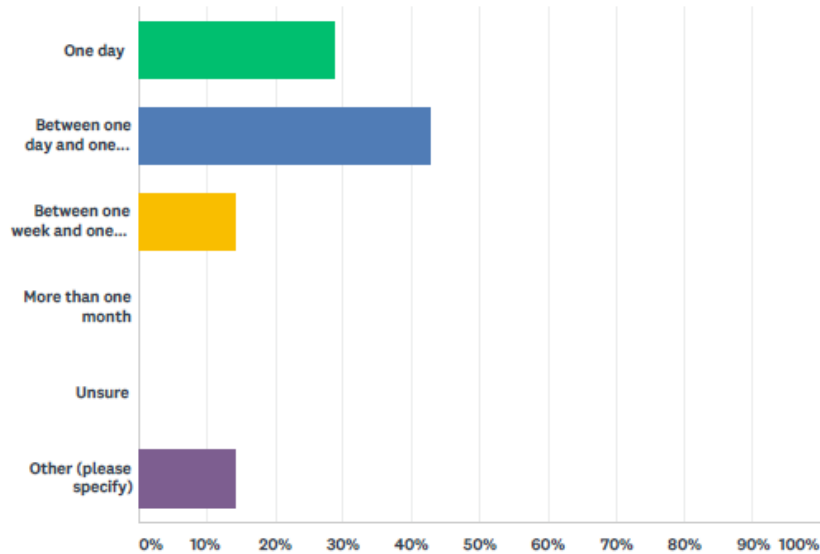


ANSWER CHOICES	RESPONSES	
Less than six months	14.29%	1
Six months to a year	0.00%	0
Between one and five years	42.86%	3
Between five and ten years	0.00%	0
More than ten years	42.86%	3
Unsure	0.00%	0
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>7</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q7 Typically, how long are the classes that you teach at Sedgwick Reserve?

Answered: 7 Skipped: 0



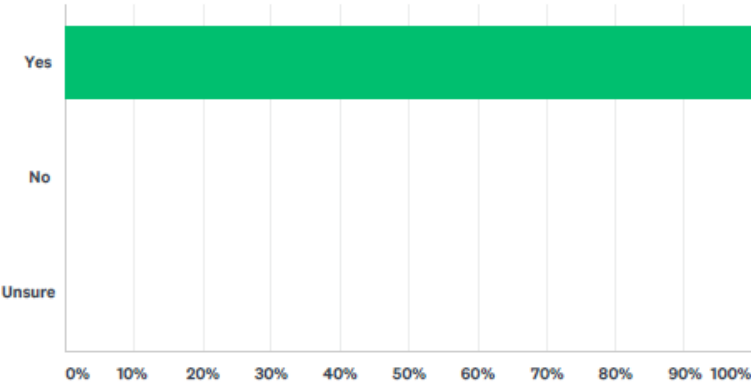
ANSWER CHOICES	RESPONSES
One day	28.57% 2
Between one day and one week	42.86% 3
Between one week and one month	14.29% 1
More than one month	0.00% 0
Unsure	0.00% 0
Other (please specify)	14.29% 1
<b>TOTAL</b>	<b>7</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	two three day (Fri-Sun) weekends a year	NaN/NaN/0NaN NaN:NaN PM



Q8 Do classes taught at Sedgwick Reserve cost more to teach (e.g., additional fees, transportation) than coursework without a field component?

Answered: 7 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	7
No	0.00%	0
Unsure	0.00%	0
<b>TOTAL</b>		<b>7</b>

**Q9 What are the sources of the additional costs for coursework taught at Sedgwick? Please rank the relative expense of each item.**

Answered: 0 Skipped: 7

▲ No matching responses.

	NOT AN EXPENSE FOR MY COURSEWORK	LOW EXPENSE	MODERATE EXPENSE	HIGH EXPENSE	N/A	TOTAL	WEIGHTED AVERAGE
Transportation	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
University-related course fees	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Supplies	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Food	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Additional instructor salary	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Teaching assistant salary	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Accommodations	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00

Q10 How do you fund the field component of your course(s) taught at Sedgwick Reserve? Check all that apply:

Answered: 0 Skipped: 7

▲ No matching responses.

ANSWER CHOICES	RESPONSES
University	0.00% 0
Grant	0.00% 0
You (personal funds)	0.00% 0
Student	0.00% 0
Unsure	0.00% 0
Other (please specify)	0.00% 0
Total Respondents: 0	

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q11 How much do students typically pay for a course?

Answered: 0 Skipped: 7

▲ No matching responses.

ANSWER CHOICES	RESPONSES
Less than \$10	0.00% 0
\$10 - \$20	0.00% 0
\$20 - \$50	0.00% 0
\$50-\$100	0.00% 0
More than \$100	0.00% 0
Other (please specify)	0.00% 0
TOTAL	0

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q12 Do students need specialized gear for the course (e.g. hiking boots, sleeping bag)?

Answered: 0 Skipped: 7

▲ No matching responses.

ANSWER CHOICES	RESPONSES
Yes	0.00% 0
No	0.00% 0
Unsure	0.00% 0
Other (please specify)	0.00% 0
<b>TOTAL</b>	<b>0</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q13 Why did you choose to use Sedgwick Reserve? Check all that apply.

Answered: 0 Skipped: 7

▲ No matching responses.

ANSWER CHOICES	RESPONSES
Overnight accommodations	0.00% 0
Low price	0.00% 0
Proximity to your university	0.00% 0
Existing monitoring equipment	0.00% 0
Specific species, habitat, or other natural characteristics of interest	0.00% 0
Familiarity with the site	0.00% 0
Please specify	0.00% 0
<b>Total Respondents: 0</b>	

#	PLEASE SPECIFY	DATE
	There are no responses.	

## Q14 To what extent do you think each of the following changes would attract faculty members to teach courses at Sedgwick Reserve?

Answered: 0 Skipped: 7

▲ No matching responses.

	VERY UNLIKELY	NOT LIKELY	NEUTRAL	LIKELY	VERY LIKELY	TOTAL	WEIGHTED AVERAGE
Disitribute opportunities and information to more educators	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Provide a general fund for educators to offset costs	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Provide a transportation fund to offset costs	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Provide additional facilities	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Have more accessible monitoring equipment (e.g. weather station)	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Have data (e.g. climate data, species data) more readily available	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Streamline application process on RAMS (e.g. reduce detailed information requirements)	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00

## Q15 Additional comments about Sedgwick Reserve

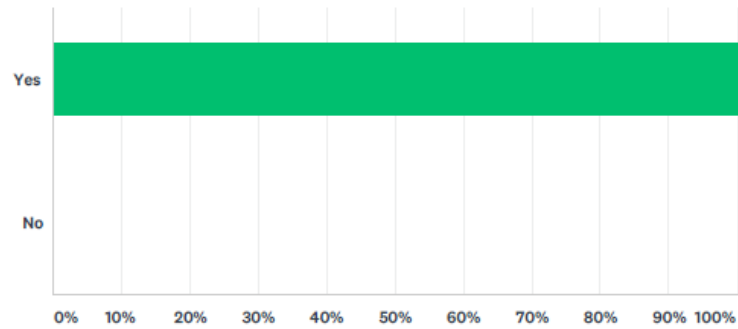
Answered: 0 Skipped: 7

#	RESPONSES	DATE
	There are no responses.	

## Sedgwick Reserve Research Survey

Q1 I am over the age of 18, and read and agree to the terms outlined here.

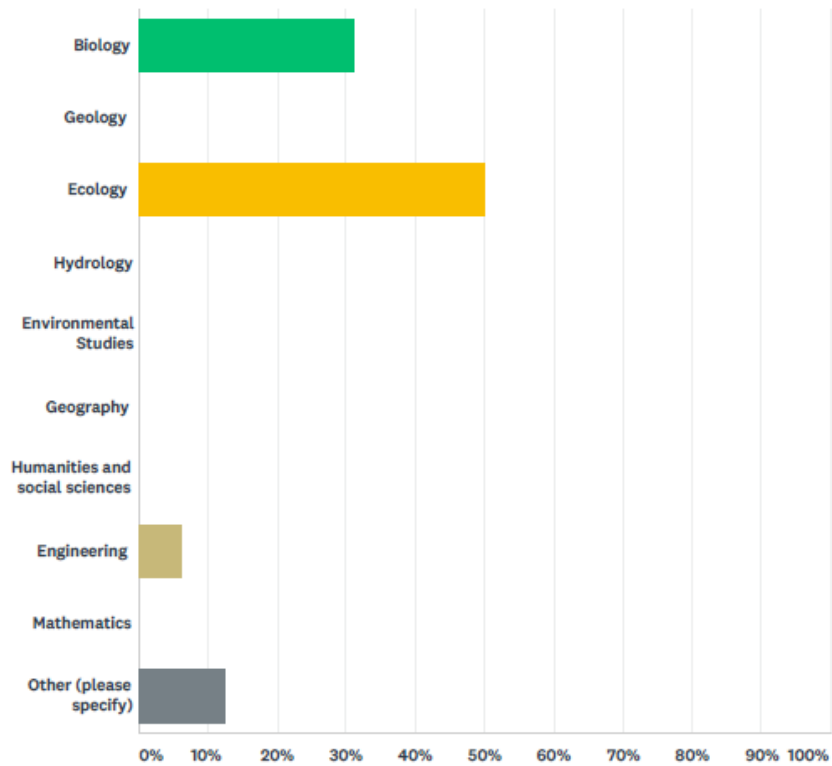
Answered: 16 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	16
No	0.00%	0
TOTAL		16

## Q2 Your Academic Field:

Answered: 16 Skipped: 0

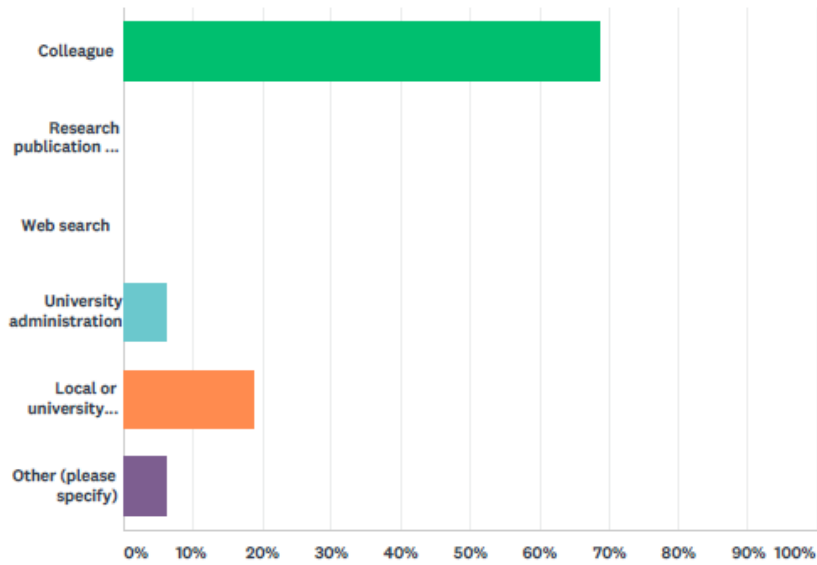


ANSWER CHOICES	RESPONSES	
Biology	31.25%	5
Geology	0.00%	0
Ecology	50.00%	8
Hydrology	0.00%	0
Environmental Studies	0.00%	0
Geography	0.00%	0
Humanities and social sciences	0.00%	0
Engineering	6.25%	1
Mathematics	0.00%	0
Other (please specify)	12.50%	2
<b>TOTAL</b>		<b>16</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	Environmental Sciences	NaN/NaN/0NaN NaN:NaN PM
2	Astronomy	NaN/NaN/0NaN NaN:NaN PM

### Q3 How did you hear about research opportunities at Sedgwick Reserve?

Answered: 16 Skipped: 0



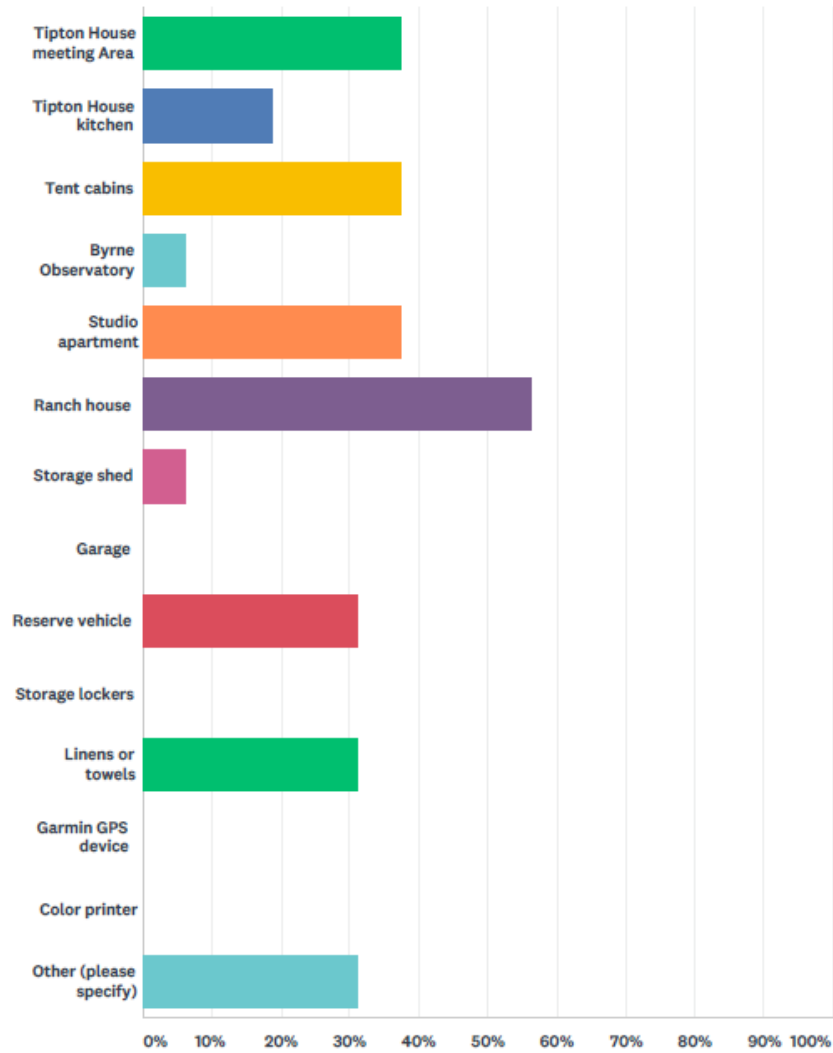
ANSWER CHOICES	RESPONSES
Colleague	68.75% 11
Research publication or project	0.00% 0
Web search	0.00% 0
University administration	6.25% 1
Local or university media sources	18.75% 3
Other (please specify)	6.25% 1
<b>TOTAL</b>	<b>16</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	My organization established a research station there before I joined.	NaN/NaN/0NaN NaN:NaN PM



### Q4 What reserve equipment and/or facilities have you used? Check all that apply.

Answered: 16 Skipped: 0



ANSWER CHOICES	RESPONSES	
Tipton House meeting Area	37.50%	6
Tipton House kitchen	18.75%	3
Tent cabins	37.50%	6
Byrne Observatory	6.25%	1

Studio apartment	37.50%	6
Ranch house	56.25%	9
Storage shed	6.25%	1
Garage	0.00%	0
Reserve vehicle	31.25%	5
Storage lockers	0.00%	0
Linens or towels	31.25%	5
Garmin GPS device	0.00%	0
Color printer	0.00%	0
Other (please specify)	31.25%	5
Total Respondents: 16		

#	OTHER (PLEASE SPECIFY)	DATE
1	I have not used the facilities, but my students have.	NaN/NaN/0NaN NaN:NaN PM
2	agricultural fields	NaN/NaN/0NaN NaN:NaN PM
3	steward assistance	NaN/NaN/0NaN NaN:NaN PM
4	Classroom	NaN/NaN/0NaN NaN:NaN PM
5	grounds only	NaN/NaN/0NaN NaN:NaN PM

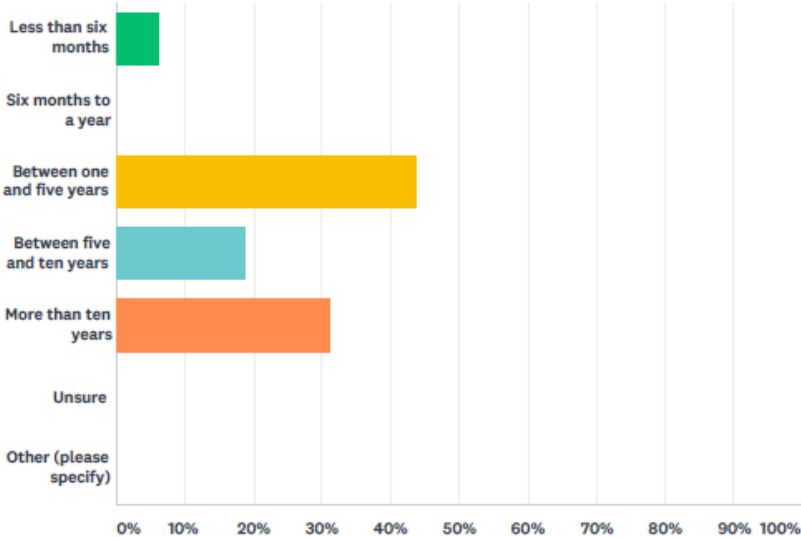
## Q5 What natural aspects have you used at Sedgwick Reserve (e.g. types of habitats, species, geological resources)?

Answered: 16 Skipped: 0

#	RESPONSES	DATE
1	Grasslands	NaN/NaN/0NaN NaN:NaN PM
2	I have been studying the birds at the reserve	NaN/NaN/0NaN NaN:NaN PM
3	Grasslands: specifically populations of milkweed (Asclepias spp.)	NaN/NaN/0NaN NaN:NaN PM
4	Trees, oak and pine	NaN/NaN/0NaN NaN:NaN PM
5	Blue oak woodlands, pond	NaN/NaN/0NaN NaN:NaN PM
6	General survey across the reserve	NaN/NaN/0NaN NaN:NaN PM
7	grassland, soils	NaN/NaN/0NaN NaN:NaN PM
8	Soil mostly, but grassland plots	NaN/NaN/0NaN NaN:NaN PM
9	grassland	NaN/NaN/0NaN NaN:NaN PM
10	oaks	NaN/NaN/0NaN NaN:NaN PM
11	annual plant communities across the reserve	NaN/NaN/0NaN NaN:NaN PM
12	Oak savannah and oak woodland; small mammals, reptiles, ticks and fleas	NaN/NaN/0NaN NaN:NaN PM
13	Oak woodland, open fields, paddock near classroom, Gryllus lineaticeps crickets	NaN/NaN/0NaN NaN:NaN PM
14	annual grasslands	NaN/NaN/0NaN NaN:NaN PM
15	none	NaN/NaN/0NaN NaN:NaN PM
16	grassland	NaN/NaN/0NaN NaN:NaN PM

### Q6 How long have you been using Sedgwick Reserve?

Answered: 16 Skipped: 0

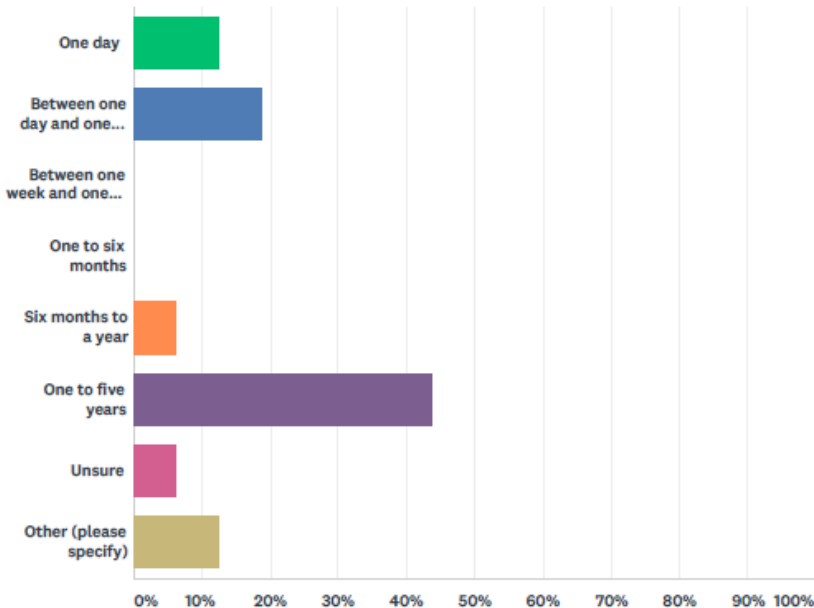


ANSWER CHOICES	RESPONSES
Less than six months	6.25% 1
Six months to a year	0.00% 0
Between one and five years	43.75% 7
Between five and ten years	18.75% 3
More than ten years	31.25% 5
Unsure	0.00% 0
Other (please specify)	0.00% 0
<b>TOTAL</b>	<b>16</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

### Q7 Typically, how long do your project(s) last at Sedgwick Reserve?

Answered: 16 Skipped: 0

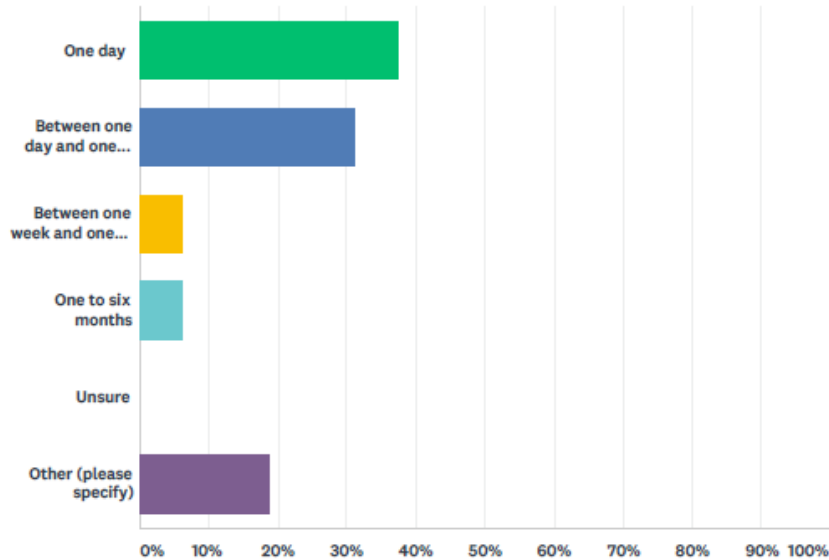


ANSWER CHOICES	RESPONSES
One day	12.50% 2
Between one day and one week	18.75% 3
Between one week and one month	0.00% 0
One to six months	0.00% 0
Six months to a year	6.25% 1
One to five years	43.75% 7
Unsure	6.25% 1
Other (please specify)	12.50% 2
<b>TOTAL</b>	<b>16</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	Project started in 1994 and is continuing	NaN/NaN/0NaN NaN:NaN PM
2	continuous - we operate Byrne Observatory	NaN/NaN/0NaN NaN:NaN PM

## Q8 Typically, how long do you use or stay at Sedgwick Reserve for a single project?

Answered: 16 Skipped: 0

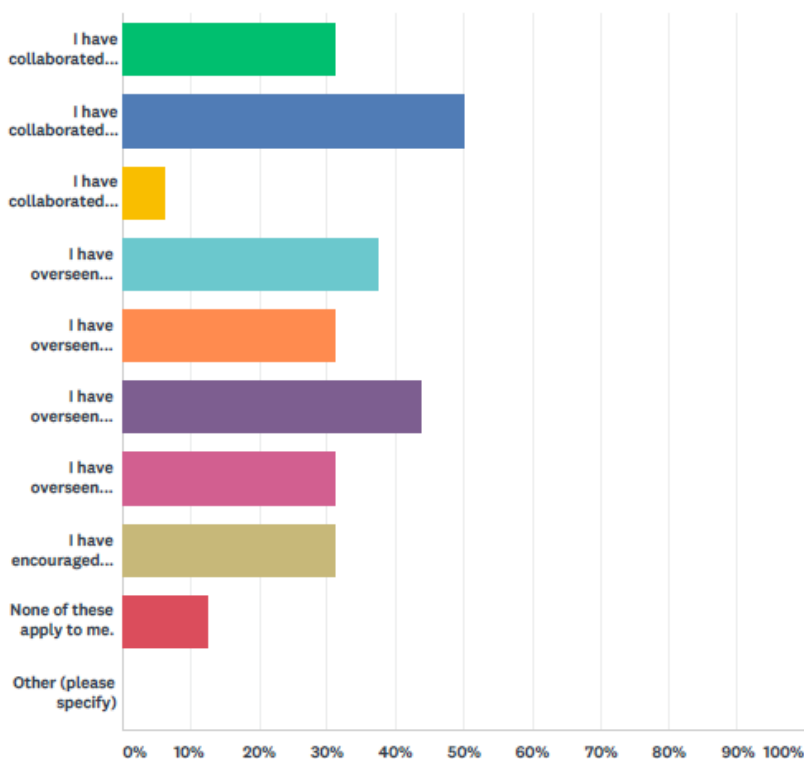


ANSWER CHOICES	RESPONSES
One day	37.50% 6
Between one day and one week	31.25% 5
Between one week and one month	6.25% 1
One to six months	6.25% 1
Unsure	0.00% 0
Other (please specify)	18.75% 3
<b>TOTAL</b>	<b>16</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	unclear question: 1 day at a time, for years	NaN/NaN/NaN NaN:NaN PM
2	biweekly to monthly day trips, with occasional overnight stays	NaN/NaN/NaN NaN:NaN PM
3	We operate our facility robotically, though we have occasional one-day maintenance trips there.	NaN/NaN/NaN NaN:NaN PM

## Q9 Have you been involved with other researchers at Sedgwick Reserve? Check all that apply.

Answered: 16 Skipped: 0



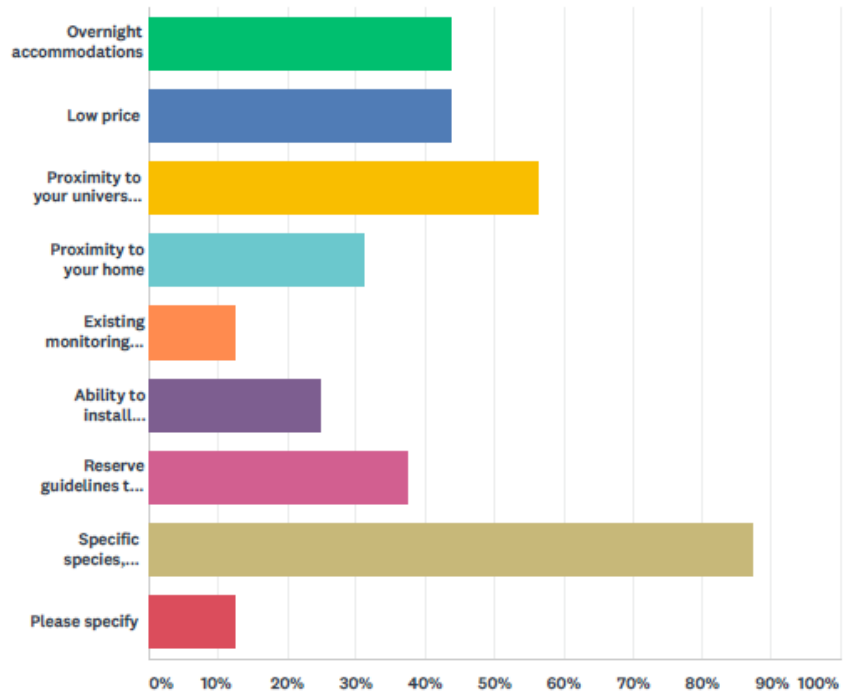
ANSWER CHOICES	RESPONSES	
I have collaborated with other faculty from my university.	31.25%	5
I have collaborated with other faculty from at least one other university.	50.00%	8
I have collaborated with researchers unaffiliated with a university.	6.25%	1
I have overseen undergraduate student research at the site.	37.50%	6
I have overseen master's student research at the site.	31.25%	5
I have overseen doctoral student research at the site.	43.75%	7
I have overseen post-doc research at the site.	31.25%	5
I have encouraged students or post-docs to join an existing project at the site.	31.25%	5
None of these apply to me.	12.50%	2
Other (please specify)	0.00%	0

Total Respondents: 16		
#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	



### Q10 Why did you choose to use Sedgwick Reserve? Check all that apply.

Answered: 16 Skipped: 0

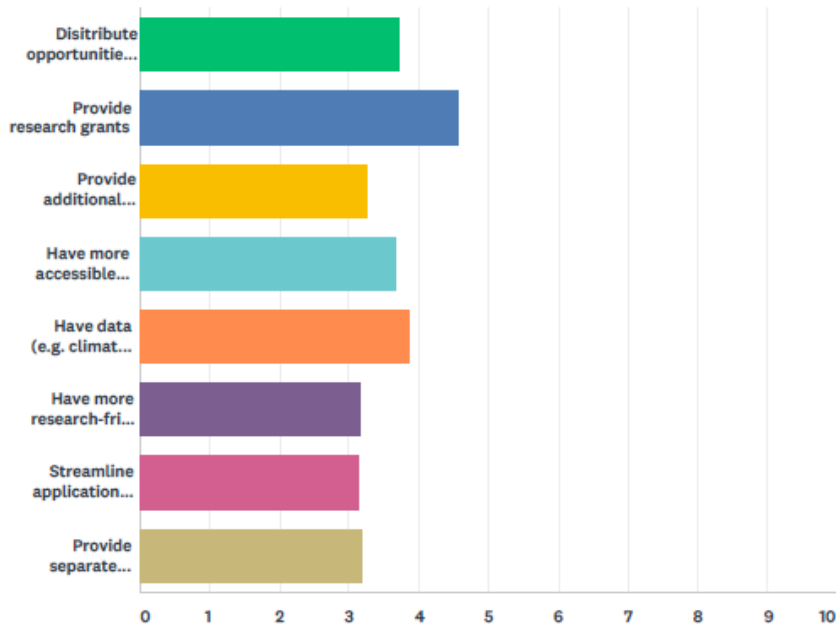


ANSWER CHOICES	RESPONSES
Overnight accommodations	43.75% 7
Low price	43.75% 7
Proximity to your university	56.25% 9
Proximity to your home	31.25% 5
Existing monitoring equipment	12.50% 2
Ability to install monitoring equipment	25.00% 4
Reserve guidelines that allow you to conduct your specific research	37.50% 6
Specific species, habitat, or other natural characteristics of interest	87.50% 14
Please specify	12.50% 2
Total Respondents: 16	

#	PLEASE SPECIFY	DATE
1	staff who are capable in a range of needs assistance	NaN/NaN/0NaN NaN:NaN PM

## Q11 To what extent do you think each of the following changes would attract researchers to incorporate Sedgwick Reserve in their projects?

Answered: 16 Skipped: 0



	VERY UNLIKELY	NOT LIKELY	NEUTRAL	LIKELY	VERY LIKELY	TOTAL	WEIGHTED AVERAGE
Distribute opportunities and information to more researchers	0.00% 0	0.00% 0	40.00% 6	46.67% 7	13.33% 2	15	3.73
Provide research grants	0.00% 0	0.00% 0	18.75% 3	6.25% 1	75.00% 12	16	4.56
Provide additional facilities	0.00% 0	6.67% 1	60.00% 9	33.33% 5	0.00% 0	15	3.27
Have more accessible monitoring equipment (e.g. weather station)	0.00% 0	0.00% 0	37.50% 6	56.25% 9	6.25% 1	16	3.69
Have data (e.g. climate data, species data) more readily available	0.00% 0	6.25% 1	18.75% 3	56.25% 9	18.75% 3	16	3.88
Have more research-friendly rules on reserve	0.00% 0	18.75% 3	50.00% 8	25.00% 4	6.25% 1	16	3.19
Streamline application process on RAMS (e.g. reduce detailed information requirements)	0.00% 0	6.25% 1	75.00% 12	18.75% 3	0.00% 0	16	3.13
Provide separate scoping permits for researchers who are starting projects	0.00% 0	0.00% 0	80.00% 12	20.00% 3	0.00% 0	15	3.20

## Q12 Additional comments about Sedgwick Reserve

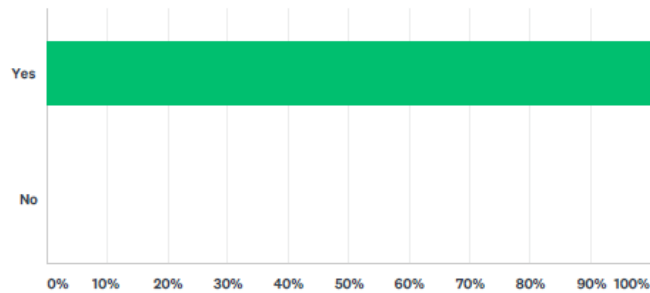
Answered: 6 Skipped: 10

#	RESPONSES	DATE
1	The staff and accommodations were great! I had a great time during my stay.	NaN/NaN/0NaN NaN:NaN PM
2	Sedgwick Reserve is a beautiful place to do research, the staff and resources are excellent and the ecosystems support a diverse array of flora and fauna. I hope to base future studies there.	NaN/NaN/0NaN NaN:NaN PM
3	Beautiful place! Happy to have it part of our work.	NaN/NaN/0NaN NaN:NaN PM
4	It's a fantastic place to work- we're grateful for all the support from the reserve staff over the years.	NaN/NaN/0NaN NaN:NaN PM
5	Very well managed and research-friendly reserve. Some additional laboratory facilities (e.g. -20 and ultracold freezers, lab benches, basic lab equipment) would be very useful.	NaN/NaN/0NaN NaN:NaN PM
6	We don't use the Sedgwick resources in a traditional sense. We are pleased to be able to operate our facility there, and I have met with the management several times to ensure that we maintain a good relationship.	NaN/NaN/0NaN NaN:NaN PM

## Valentine Camp Research Survey

Q1 I have read this description, am over the age of 18, and agree to the terms outlined here.

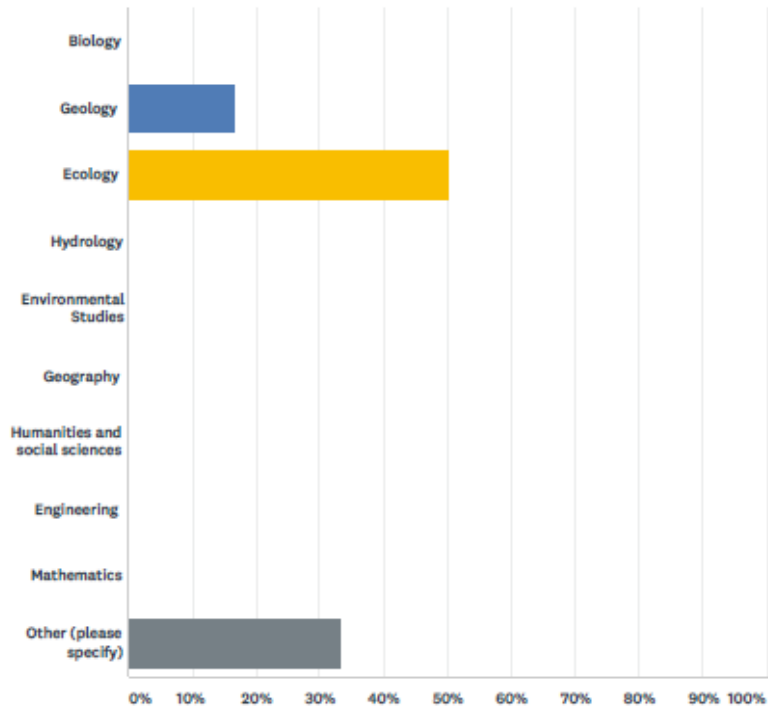
Answered: 6 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	6
No	0.00%	0
TOTAL		6

## Q2 Your Academic Field:

Answered: 6 Skipped: 0

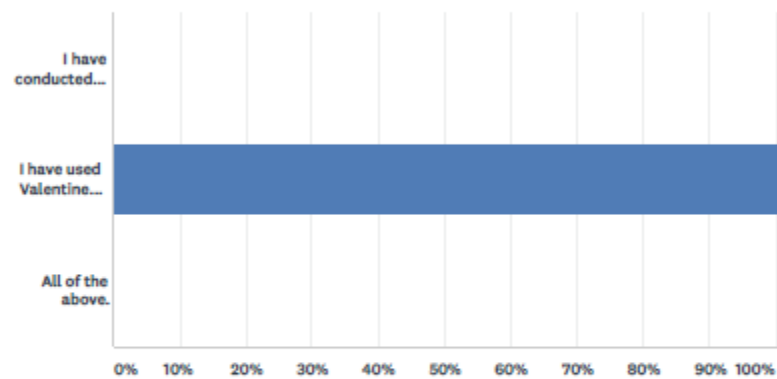


ANSWER CHOICES	RESPONSES	
Biology	0.00%	0
Geology	16.67%	1
Ecology	50.00%	3
Hydrology	0.00%	0
Environmental Studies	0.00%	0
Geography	0.00%	0
Humanities and social sciences	0.00%	0
Engineering	0.00%	0
Mathematics	0.00%	0
Other (please specify)	33.33%	2
<b>TOTAL</b>		<b>6</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	environmental chemistry	NaN/NaN/NaN NaN:NaN PM
2	NRS	NaN/NaN/NaN NaN:NaN PM

### Q3 How have you used Valentine Camp?

Answered: 6 Skipped: 0



ANSWER CHOICES	RESPONSES
I have conducted research at Valentine Camp.	0.00% 0
I have used Valentine Camp's resources (e.g. facilities) to perform research outside of the reserve.	100.00% 6
All of the above.	0.00% 0
<b>TOTAL</b>	<b>6</b>

## Q4 How did you hear about research opportunities at Valentine Camp?

Answered: 0 Skipped: 6

▲ No matching responses.

ANSWER CHOICES	RESPONSES
Colleague	0.00% 0
Research publication or project	0.00% 0
Web search	0.00% 0
University administration	0.00% 0
Local or university media sources	0.00% 0
Other (please specify)	0.00% 0
TOTAL	0

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

**Q5 What reserve equipment and/or facilities have you used? Check all that apply.**

Answered: 0 Skipped: 6

▲ No matching responses.

ANSWER CHOICES	RESPONSES
Cabin	0.00% 0
WIFI	0.00% 0
Outdoor instruction area	0.00% 0
Storage shed	0.00% 0
Garage	0.00% 0
Other (please specify)	0.00% 0
Total Respondents: 0	

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

**Q6 What natural aspects of Valentine Camp have you used (e.g. types of habitats, species, geological resources)?**

Answered: 0 Skipped: 6

#	RESPONSES	DATE
	There are no responses.	

## Q7 How long have you been using Valentine Camp?

Answered: 0 Skipped: 6

▲ No matching responses.

ANSWER CHOICES	RESPONSES	
Less than six months	0.00%	0
Six months to a year	0.00%	0
Between one and five years	0.00%	0
Between five and ten years	0.00%	0
More than ten years	0.00%	0
Unsure	0.00%	0
Other (please specify)	0.00%	0
TOTAL		0

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	



## Q8 Typically, how long do your project(s) last at Valentine Camp?

Answered: 0 Skipped: 6

▲ No matching responses.

ANSWER CHOICES	RESPONSES
One day	0.00% 0
Between one day and one week	0.00% 0
Between one week and one month	0.00% 0
One to six months	0.00% 0
Six months to a year	0.00% 0
One to five years	0.00% 0
Unsure	0.00% 0
Other (please specify)	0.00% 0
<b>TOTAL</b>	<b>0</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

### Q9 Typically, how long do you use or stay at Valentine Camp for a single project per year?

Answered: 0 Skipped: 6


▲ No matching responses.

ANSWER CHOICES	RESPONSES
One day	0.00% 0
Between one day and one week	0.00% 0
Between one week and one month	0.00% 0
One to six months	0.00% 0
Six months to a year	0.00% 0
Unsure	0.00% 0
Other (please specify)	0.00% 0
<b>TOTAL</b>	<b>0</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

**Q10 Have you been involved with other researchers at Valentine Camp?  
Check all that apply.**

Answered: 0 Skipped: 6

 No matching responses.

ANSWER CHOICES		RESPONSES	
I have collaborated with other faculty from my university.		0.00%	0
I have collaborated with other faculty from at least one other university.		0.00%	0
I have collaborated with researcher unaffiliated with a university.		0.00%	0
I have overseen undergraduate student research at the site.		0.00%	0
I have overseen master's student research at the site.		0.00%	0
I have overseen doctoral student research at the site.		0.00%	0
I have overseen post-doc research at the site.		0.00%	0
I have encouraged students or post-docs to join an existing project at the site.		0.00%	0
None of these apply to me.		0.00%	0
Other (please specify)		0.00%	0
Total Respondents: 0			
#	OTHER (PLEASE SPECIFY)	DATE	
	There are no responses.		

### Q11 Why did you choose to use Valentine Camp? Check all that apply.

Answered: 0 Skipped: 6

▲ No matching responses.

ANSWER CHOICES		RESPONSES	
Overnight accommodations (e.g., cabins)		0.00%	0
Low price		0.00%	0
Proximity to your university		0.00%	0
Proximity to your home		0.00%	0
Existing monitoring equipment		0.00%	0
Ability to install monitoring equipment		0.00%	0
Reserve guidelines that allows you to conduct your specific research		0.00%	0
Specific species, habitat, or other natural characteristics of interest		0.00%	0
Other (please specify)		0.00%	0
Total Respondents: 0			
#	OTHER (PLEASE SPECIFY)	DATE	
	There are no responses.		

## Q12 To what extent do you think each of the following changes would attract researchers to incorporate Valentine Camp in their projects?

Answered: 0 Skipped: 6

▲ No matching responses.

	VERY UNLIKELY	NOT LIKELY	NEUTRAL	LIKELY	VERY LIKELY	UNSURE	TOTAL	WEIGHTED AVERAGE
Disitribute opportunities and information to more researchers	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Provide research grants	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Provide additional facilities	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Have more accessible monitoring equipment (e.g. weather station)	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Have data (e.g. climate data, species data) more readily available	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Have more research-friendly rules on reserve	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Streamline application process on RAMS (e.g. reduce detailed information requirements)	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Provide separate scoping permits for researchers who are starting projects	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00

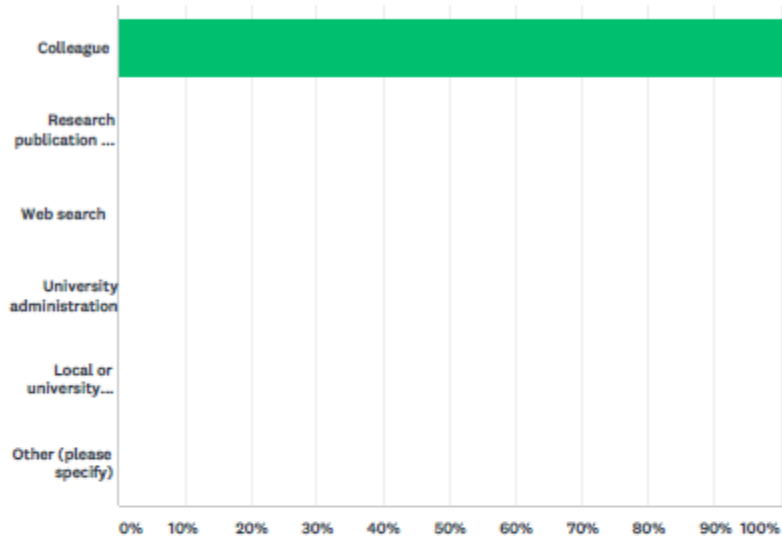
## Q13 Additional comments about Valentine Camp

Answered: 0 Skipped: 6

#	RESPONSES	DATE
	There are no responses.	

## Q14 How did you hear about the opportunities at Valentine Camp?

Answered: 5 Skipped: 1

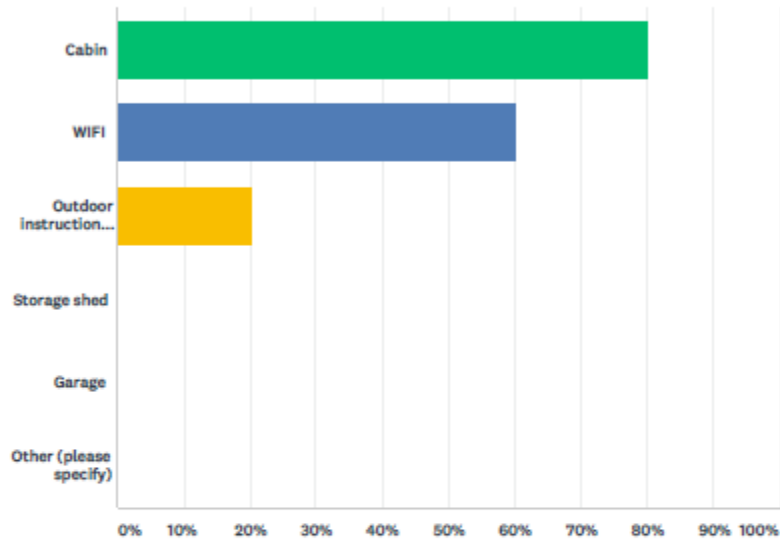


ANSWER CHOICES	RESPONSES	
Colleague	100.00%	5
Research publication or project	0.00%	0
Web search	0.00%	0
University administration	0.00%	0
Local or university media sources	0.00%	0
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>5</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

**Q15 What reserve equipment and/or facilities have you used? Check all that apply.**

Answered: 5 Skipped: 1

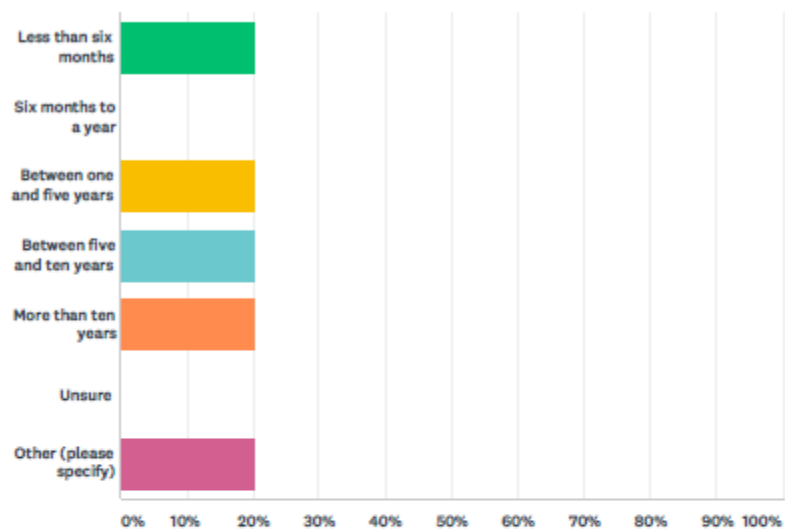


ANSWER CHOICES	RESPONSES	
Cabin	80.00%	4
WIFI	60.00%	3
Outdoor instruction area	20.00%	1
Storage shed	0.00%	0
Garage	0.00%	0
Other (please specify)	0.00%	0
Total Respondents: 5		

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q16 How long have you been using Valentine Camp?

Answered: 5 Skipped: 1



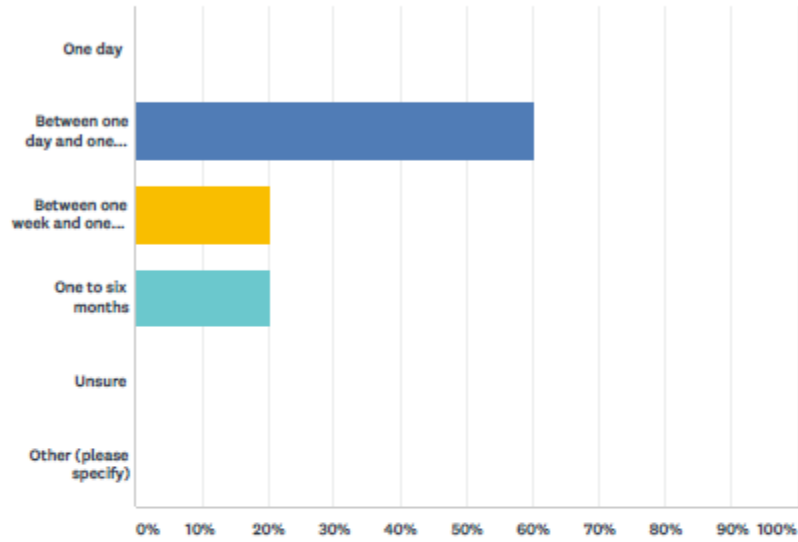
ANSWER CHOICES	RESPONSES	
Less than six months	20.00%	1
Six months to a year	0.00%	0
Between one and five years	20.00%	1
Between five and ten years	20.00%	1
More than ten years	20.00%	1
Unsure	0.00%	0
Other (please specify)	20.00%	1
<b>TOTAL</b>		<b>5</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	Have not been yet - planning to go this summer (2018)	NaN/NaN/0NaN NaN:NaN PM



### Q17 Typically, how long do you use or stay at Valentine Camp during a single project per year?

Answered: 5 Skipped: 1

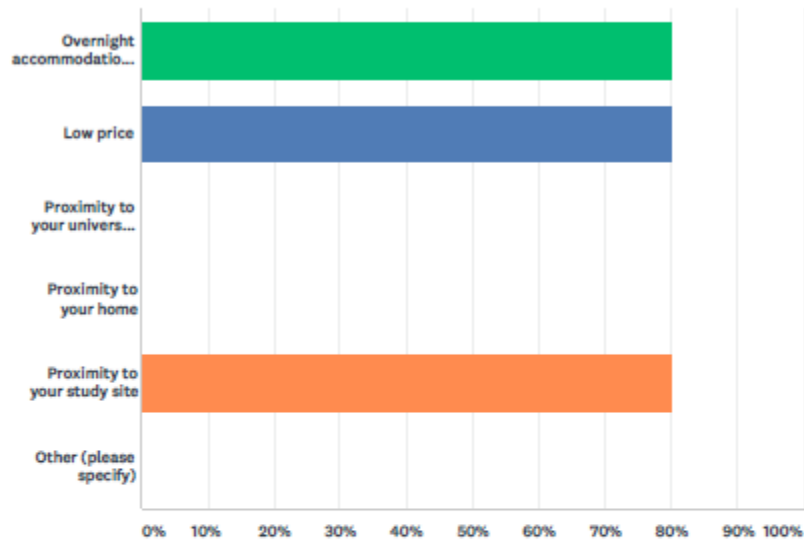


ANSWER CHOICES	RESPONSES
One day	0.00% 0
Between one day and one week	60.00% 3
Between one week and one month	20.00% 1
One to six months	20.00% 1
Unsure	0.00% 0
Other (please specify)	0.00% 0
<b>TOTAL</b>	<b>5</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q18 Why did you choose to use Valentine Camp? Check all that apply.

Answered: 5 Skipped: 1

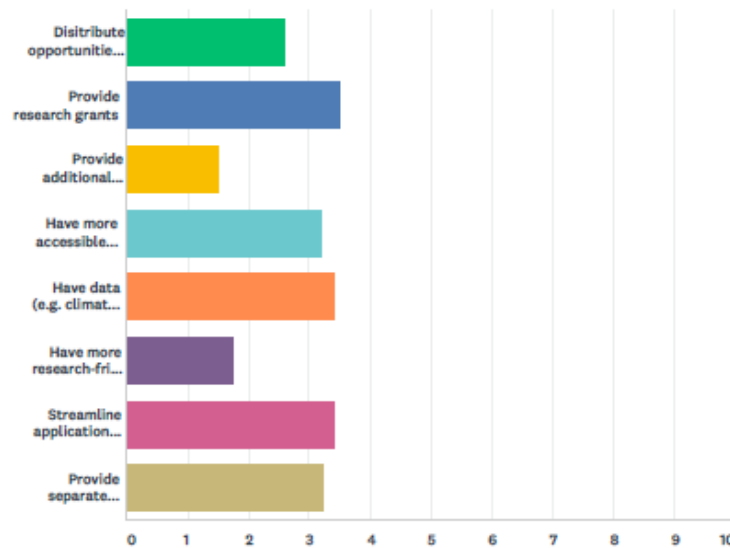


ANSWER CHOICES	RESPONSES	
Overnight accommodations (e.g., cabins)	80.00%	4
Low price	80.00%	4
Proximity to your university	0.00%	0
Proximity to your home	0.00%	0
Proximity to your study site	80.00%	4
Other (please specify)	0.00%	0
Total Respondents: 5		

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q19 To what extent do you think each of the following changes would attract you or other researchers to conduct research projects at Valentine Camp?

Answered: 5 Skipped: 1



	VERY UNLIKELY	NOT LIKELY	NEUTRAL	LIKELY	VERY LIKELY	UNSURE	TOTAL	WEIGHTED AVERAGE
Distribute opportunities and information to more researchers	20.00% 1	0.00% 0	0.00% 0	60.00% 3	0.00% 0	20.00% 1	5	2.60
Provide research grants	0.00% 0	0.00% 0	0.00% 0	25.00% 1	50.00% 2	25.00% 1	4	3.50
Provide additional facilities	0.00% 0	0.00% 0	50.00% 2	0.00% 0	0.00% 0	50.00% 2	4	1.50
Have more accessible monitoring equipment (e.g. weather station)	20.00% 1	0.00% 0	20.00% 1	60.00% 3	0.00% 0	0.00% 0	5	3.20
Have data (e.g. climate data, species data) more readily available	20.00% 1	0.00% 0	0.00% 0	80.00% 4	0.00% 0	0.00% 0	5	3.40
Have more research-friendly rules on reserve	0.00% 0	0.00% 0	25.00% 1	25.00% 1	0.00% 0	50.00% 2	4	1.75
Streamline application process on RAMS (e.g. reduce detailed information requirements)	0.00% 0	0.00% 0	20.00% 1	20.00% 1	40.00% 2	20.00% 1	5	3.40
Provide separate scoping permits for researchers who are starting projects	0.00% 0	0.00% 0	0.00% 0	50.00% 2	25.00% 1	25.00% 1	4	3.25

## Q20 Additional comments about Valentine Camp

Answered: 2 Skipped: 4

#	RESPONSES	DATE
1	I generally use SNARL because of the lab space available there. Valentine is sort of a second choice if there is no space available.	NaN/NaN/0NaN NaN:NaN PM
2	As someone who stayed for accommodations only, I'd put a plug in for a cleaner cabin. It's rustic, so bug free is not possible, but minimal rodent poop and dusting away spider webs would be appreciated.	NaN/NaN/0NaN NaN:NaN PM

## Q21 How did you hear about research opportunities at Valentine Camp?

Answered: 0 Skipped: 6

▲ No matching responses.

ANSWER CHOICES	RESPONSES
Colleague	0.00% 0
Research publication or project	0.00% 0
Web search	0.00% 0
University administration	0.00% 0
Local or university media sources	0.00% 0
Other (please specify)	0.00% 0
<b>TOTAL</b>	<b>0</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

**Q22 What reserve equipment and/or facilities have you used? Check all that apply.**

Answered: 0 Skipped: 6

▲ No matching responses.

ANSWER CHOICES	RESPONSES	
Cabin	0.00%	0
WIFI	0.00%	0
Outdoor instruction area	0.00%	0
Storage shed	0.00%	0
Garage	0.00%	0
Other (please specify)	0.00%	0
Total Respondents: 0		

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

**Q23 What natural aspects of Valentine Camp have you used (e.g. types of habitats, species, geological resources)?**

Answered: 0 Skipped: 6

#	RESPONSES	DATE
	There are no responses.	

## Q24 How long have you been using Valentine Camp?

Answered: 0 Skipped: 6

▲ No matching responses.

ANSWER CHOICES	RESPONSES	
Less than six months	0.00%	0
Six months to a year	0.00%	0
Between one and five years	0.00%	0
Between five and ten years	0.00%	0
More than ten years	0.00%	0
Unsure	0.00%	0
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>0</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q25 Typically, how long do your project(s) last at Valentine Camp?

Answered: 0 Skipped: 6

▲ No matching responses.

ANSWER CHOICES	RESPONSES
One day	0.00% 0
Between one day and one week	0.00% 0
Between one week and one month	0.00% 0
One to six months	0.00% 0
Six months to a year	0.00% 0
One to five years	0.00% 0
Unsure	0.00% 0
Other (please specify)	0.00% 0
<b>TOTAL</b>	<b>0</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q26 Typically, how long do you stay or use at Valentine Camp per project per year?

Answered: 0 Skipped: 6

▲ No matching responses.

ANSWER CHOICES	RESPONSES
One day	0.00% 0
Between one day and one week	0.00% 0
Between one week and one month	0.00% 0
One to six months	0.00% 0
Six months to a year	0.00% 0
Unsure	0.00% 0
Other (please specify)	0.00% 0
TOTAL	0

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	



**Q27 Have you been involved with other researchers at Valentine Camp?  
Check all that apply.**

Answered: 0 Skipped: 6

▲ No matching responses.

ANSWER CHOICES		RESPONSES	
I have collaborated with other faculty from my university.		0.00%	0
I have collaborated with other faculty from at least one other university.		0.00%	0
I have collaborated with researcher unaffiliated with a university.		0.00%	0
I have overseen undergraduate student research at the site.		0.00%	0
I have overseen master's student research at the site.		0.00%	0
I have overseen doctoral student research at the site.		0.00%	0
I have overseen post-doc research at the site.		0.00%	0
I have encouraged students or post-docs to join an existing project at the site.		0.00%	0
None of these apply to me.		0.00%	0
Other (please specify)		0.00%	0
Total Respondents: 0			
#	OTHER (PLEASE SPECIFY)	DATE	
	There are no responses.		

Q28 Why did you choose to use Valentine Camp? Check all that apply.

Answered: 0 Skipped: 6

▲ No matching responses.

ANSWER CHOICES		RESPONSES	
Overnight accommodations (e.g., cabins)		0.00%	0
Low price		0.00%	0
Proximity to your university		0.00%	0
Proximity to your home		0.00%	0
Existing monitoring equipment		0.00%	0
Ability to install monitoring equipment		0.00%	0
Reserve guidelines that allows you to conduct your specific research		0.00%	0
Specific species, habitat, or other natural characteristics of interest		0.00%	0
Other (please specify)		0.00%	0
Total Respondents: 0			
#	OTHER (PLEASE SPECIFY)	DATE	
	There are no responses.		

## Q29 To what extent do you think each of the following changes would attract researchers to incorporate Valentine Camp in their projects?

Answered: 0 Skipped: 6

▲ No matching responses.

	VERY UNLIKELY	NOT LIKELY	NEUTRAL	LIKELY	VERY LIKELY	UNSURE	TOTAL	WEIGHTED AVERAGE
Disitribute opportunities and information to more researchers	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Provide research grants	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Provide additional facilities	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Have more accessible monitoring equipment (e.g. weather station)	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Have data (e.g. climate data, species data) more readily available	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Have more research-friendly rules on reserve	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Streamline application process on RAMS (e.g. reduce detailed information requirements)	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Provide separate scoping permits for researchers who are starting projects	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00

## Q30 Additional comments about Valentine Camp

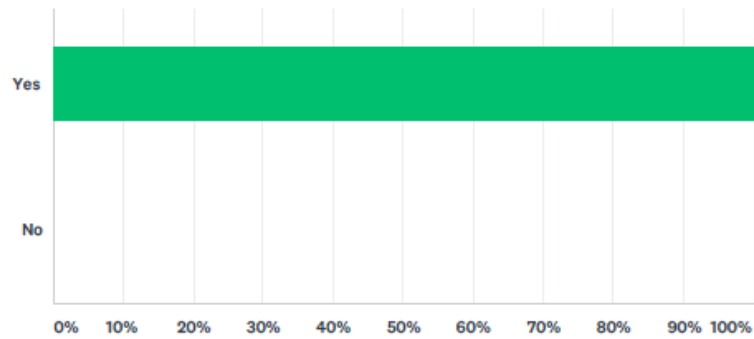
Answered: 0 Skipped: 6

#	RESPONSES	DATE
	There are no responses.	

## Valentine Camp Education Survey Results

Q1 I have read this description, am over the age of 18, and agree to the terms outlined here.

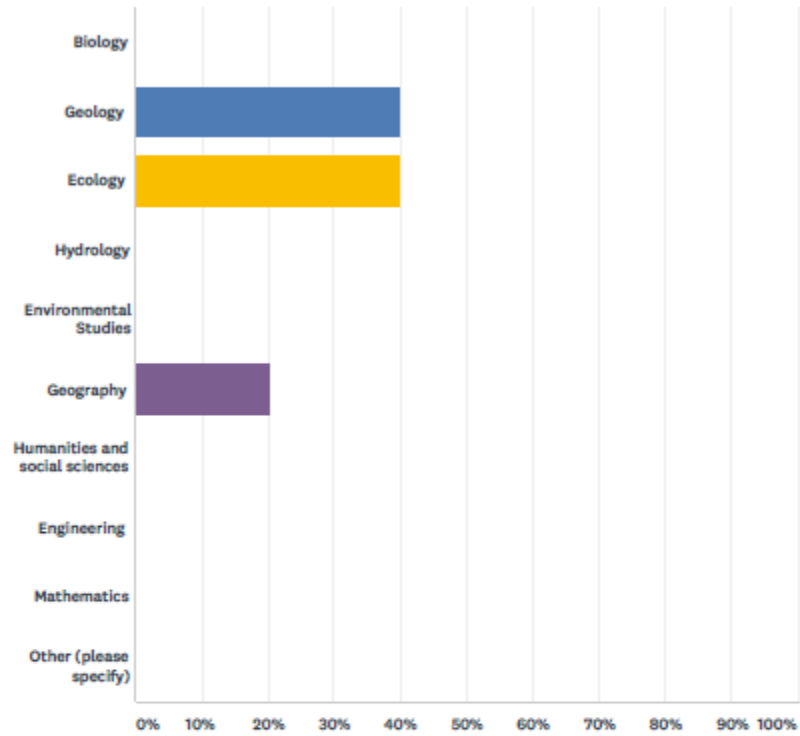
Answered: 5 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	5
No	0.00%	0
TOTAL		5

## Q2 Your Academic Field:

Answered: 5 Skipped: 0

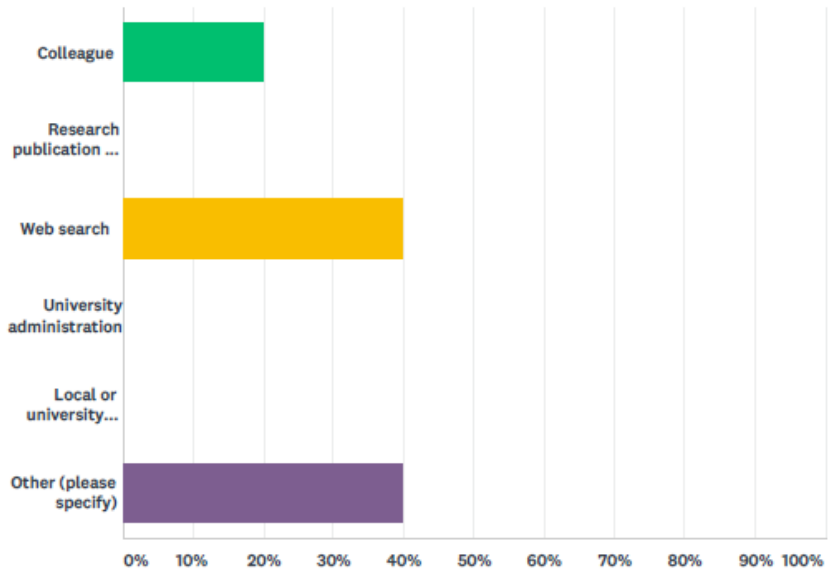


ANSWER CHOICES	RESPONSES	
Biology	0.00%	0
Geology	40.00%	2
Ecology	40.00%	2
Hydrology	0.00%	0
Environmental Studies	0.00%	0
Geography	20.00%	1
Humanities and social sciences	0.00%	0
Engineering	0.00%	0
Mathematics	0.00%	0
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>5</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

### Q3 How did you hear about teaching opportunities at Valentine Camp?

Answered: 5 Skipped: 0

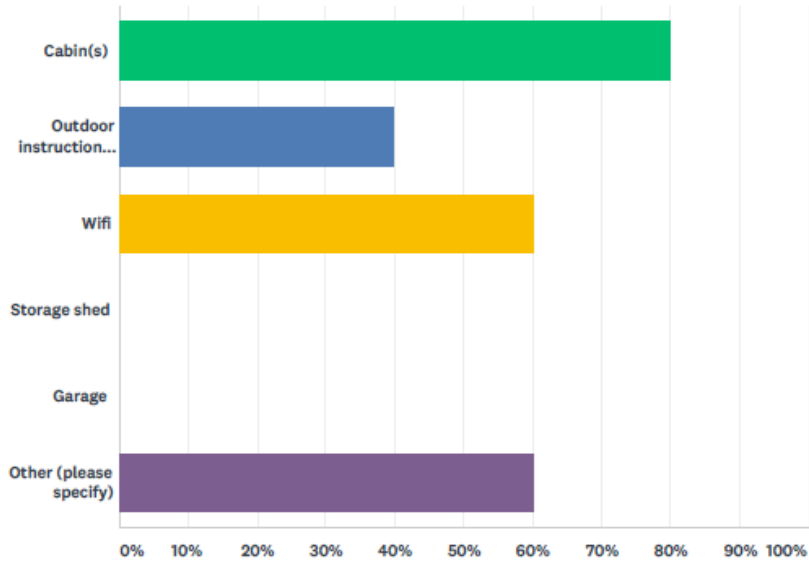


ANSWER CHOICES	RESPONSES	
Colleague	20.00%	1
Research publication or project	0.00%	0
Web search	40.00%	2
University administration	0.00%	0
Local or university media sources	0.00%	0
Other (please specify)	40.00%	2
<b>TOTAL</b>		<b>5</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	Don't remember--it was a long time ago	NaN/NaN/0NaN NaN:NaN PM
2	SNARL - where we've stayed before. It wasn't available so Kim shifted us to Valentine.	NaN/NaN/0NaN NaN:NaN PM

### Q4 What reserve equipment and/or facilities have you used? Check all that apply.

Answered: 5 Skipped: 0



ANSWER CHOICES	RESPONSES
Cabin(s)	80.00% 4
Outdoor instruction area	40.00% 2
Wifi	60.00% 3
Storage shed	0.00% 0
Garage	0.00% 0
Other (please specify)	60.00% 3
Total Respondents: 5	

#	OTHER (PLEASE SPECIFY)	DATE
1	None	NaN/NaN/0NaN NaN:NaN PM
2	Classroom Building (this was a godsend)	NaN/NaN/0NaN NaN:NaN PM
3	Classroom	NaN/NaN/0NaN NaN:NaN PM



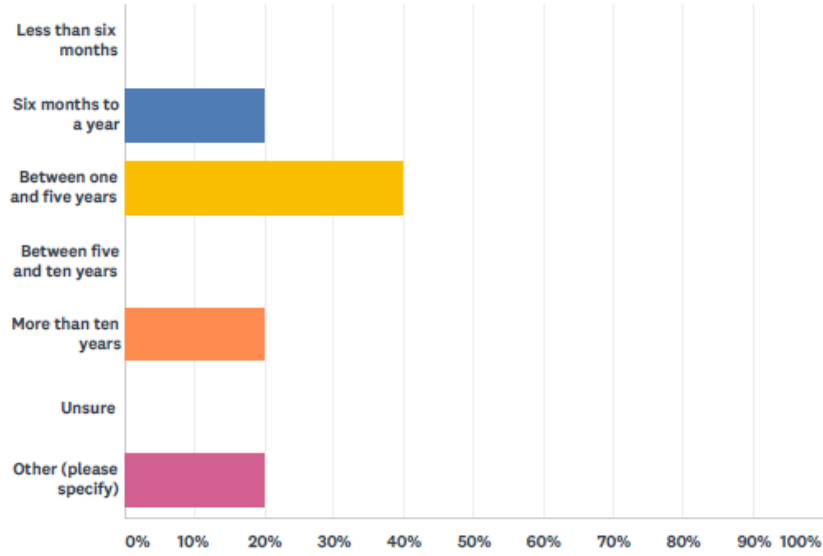
## Q5 What natural aspects have you used to teach a course at Valentine Camp (e.g. types of habitats, species, geological resources)?

Answered: 5 Skipped: 0

#	RESPONSES	DATE
1	Pine forest, meadow area, birds, invertebrates, trees, mammals	NaN/NaN/0NaN NaN:NaN PM
2	none; use it for proximity to geologic features of interest	NaN/NaN/0NaN NaN:NaN PM
3	None	NaN/NaN/0NaN NaN:NaN PM
4	Most of our field course took place elsewhere but I did walk students around the grounds and helped them identify trees and rocks. They also took self-guided nature hikes in their leisure time which allowed for personal nature observation (e.g. bear tracks!) and quiet time.	NaN/NaN/0NaN NaN:NaN PM
5	I did not use these resources as we were teaching a course on science communication. We used this site primarily because it was a cabin/wilderness setting with few distractions.	NaN/NaN/0NaN NaN:NaN PM

## Q6 How long have you been using Valentine Camp?

Answered: 5 Skipped: 0

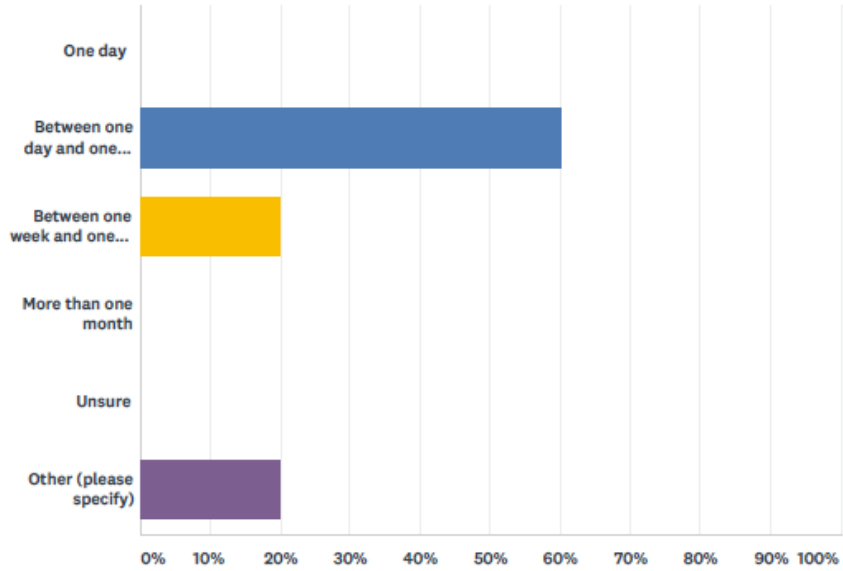


ANSWER CHOICES	RESPONSES	
Less than six months	0.00%	0
Six months to a year	20.00%	1
Between one and five years	40.00%	2
Between five and ten years	0.00%	0
More than ten years	20.00%	1
Unsure	0.00%	0
Other (please specify)	20.00%	1
<b>TOTAL</b>		<b>5</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	Not used	NaN/NaN/0NaN NaN:NaN PM

## Q7 Typically, how long are the classes that you teach at Valentine Camp?

Answered: 5 Skipped: 0

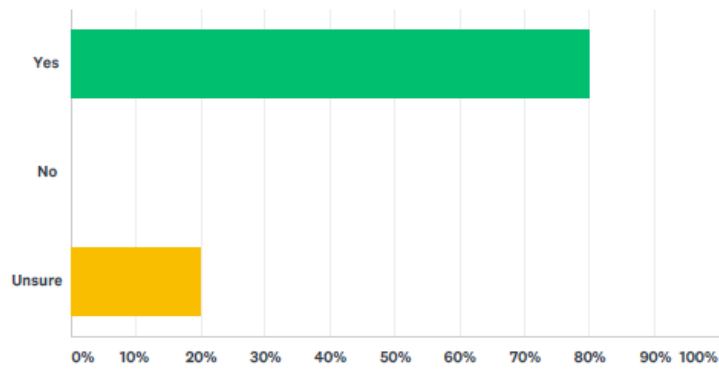


ANSWER CHOICES	RESPONSES
One day	0.00% 0
Between one day and one week	60.00% 3
Between one week and one month	20.00% 1
More than one month	0.00% 0
Unsure	0.00% 0
Other (please specify)	20.00% 1
<b>TOTAL</b>	<b>5</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	Not used	NaN/NaN/0NaN NaN:NaN PM

Q8 Do classes taught at Valentine Camp cost more to teach (e.g., additional fees, transportation) than coursework without a field component?


Answered: 5 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	80.00%	4
No	0.00%	0
Unsure	20.00%	1
TOTAL		5

**Q9 What are the sources of the additional costs for coursework taught at Valentine Camp? Please rank the relative expense of each item.**

Answered: 0 Skipped: 5

 No matching responses.

	NOT AN EXPENSE FOR MY COURSEWORK	LOW EXPENSE	MODERATE EXPENSE	HIGH EXPENSE	N/A	TOTAL	WEIGHTED AVERAGE
Transportation	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
University-related course fees	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Supplies	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Food	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Additional instructor salary	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Teaching assistant salary	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Accommodations	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00

**Q10 How do you fund the field component of your course(s) taught at Valentine Camp? Check all that apply:**

Answered: 0 Skipped: 5

 No matching responses.

ANSWER CHOICES	RESPONSES
University	0.00% 0
Grant	0.00% 0
You (personal funds)	0.00% 0
Student	0.00% 0
Unsure	0.00% 0
Other (please specify)	0.00% 0
Total Respondents: 0	

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q11 How much do students typically pay for a course?

Answered: 0 Skipped: 5

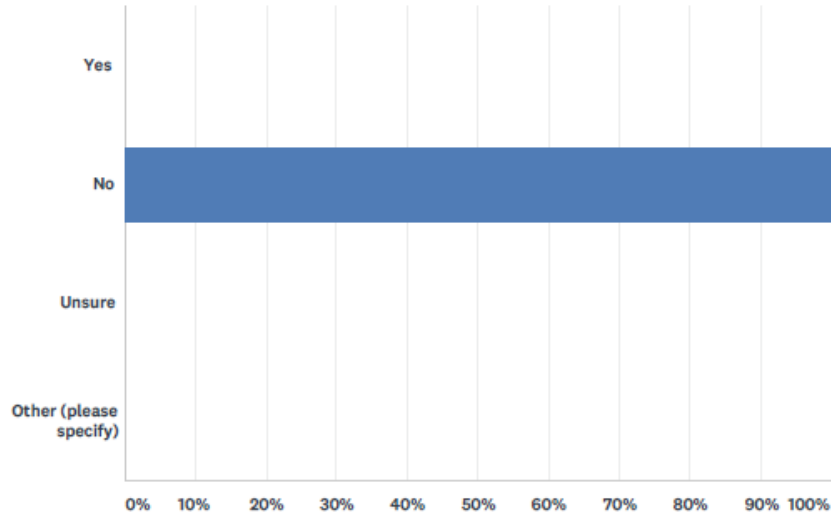
⚠ No matching responses.

ANSWER CHOICES	RESPONSES	
Less than \$10	0.00%	0
\$10 - \$20	0.00%	0
\$20 - \$50	0.00%	0
\$50-\$100	0.00%	0
More than \$100	0.00%	0
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>0</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q12 Do students need specialized gear for the course (e.g. hiking books, sleeping bag)?

Answered: 1 Skipped: 4



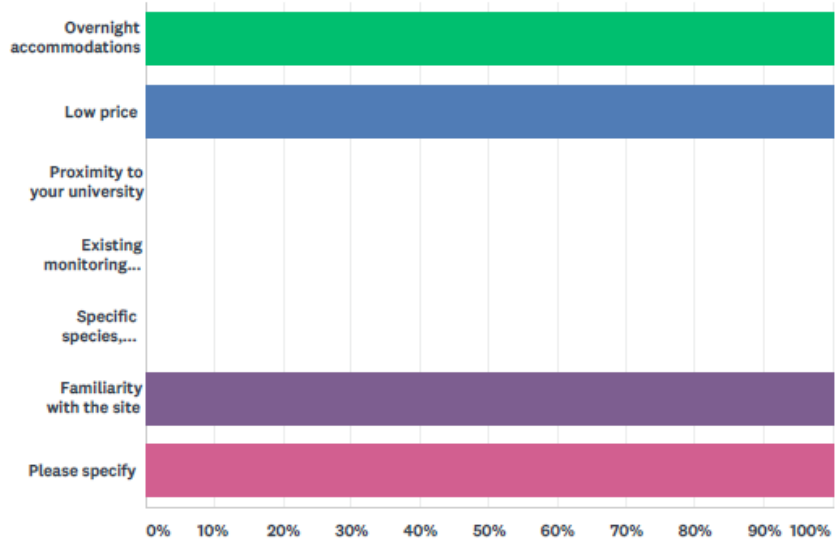
ANSWER CHOICES	RESPONSES	
Yes	0.00%	0
No	100.00%	1
Unsure	0.00%	0
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>1</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	



### Q13 Why did you choose to use Valentine Camp? Check all that apply.

Answered: 1 Skipped: 4

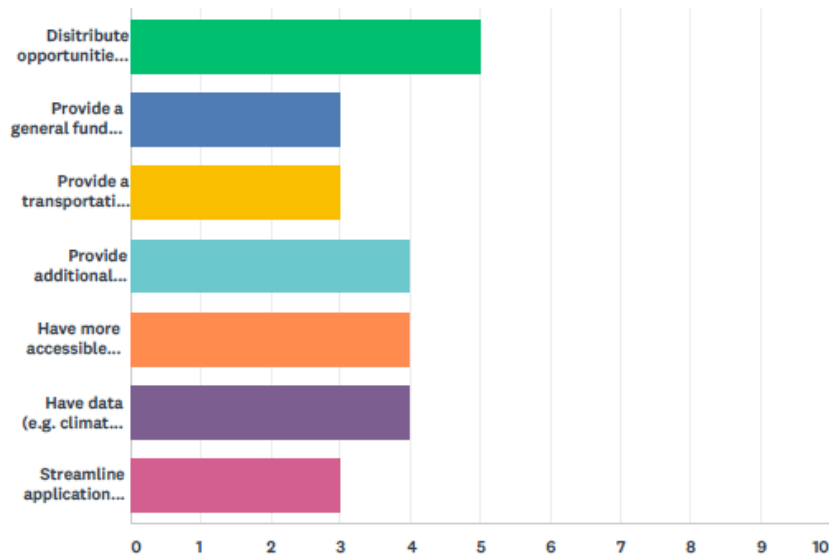


ANSWER CHOICES	RESPONSES
Overnight accommodations	100.00% 1
Low price	100.00% 1
Proximity to your university	0.00% 0
Existing monitoring equipment	0.00% 0
Specific species, habitat, or other natural characteristics of interest	0.00% 0
Familiarity with the site	100.00% 1
Please specify	100.00% 1
Total Respondents: 1	

#	PLEASE SPECIFY	DATE
1	Classroom	NaN/NaN/0NaN NaN:NaN PM

## Q14 To what extent do you think each of the following changes would attract faculty members to teach courses at Valentine Camp?

Answered: 1 Skipped: 4



	VERY UNLIKELY	NOT LIKELY	NEUTRAL	LIKELY	VERY LIKELY	TOTAL	WEIGHTED AVERAGE
Distribute opportunities and information to more educators	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1	5.00
Provide a general fund for educators to offset costs	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1	3.00
Provide a transportation fund to offset costs	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1	3.00
Provide additional facilities	0.00% 0	0.00% 0	0.00% 0	100.00% 1	0.00% 0	1	4.00
Have more accessible monitoring equipment (e.g. weather station)	0.00% 0	0.00% 0	0.00% 0	100.00% 1	0.00% 0	1	4.00
Have data (e.g. climate data, species data) more readily available	0.00% 0	0.00% 0	0.00% 0	100.00% 1	0.00% 0	1	4.00
Streamline application process on RAMS (e.g. reduce detailed information requirements)	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1	3.00

## Q15 Additional comments about Valentine Camp

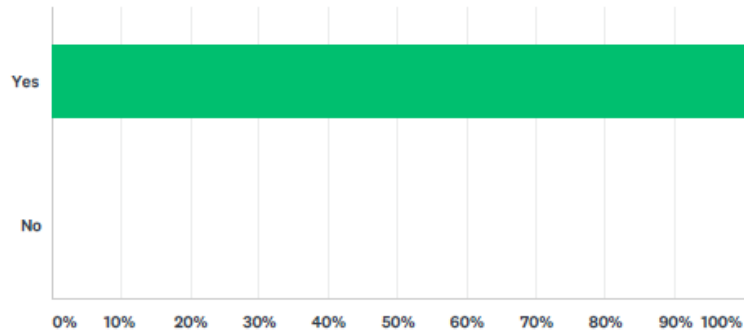
Answered: 1 Skipped: 4

#	RESPONSES	DATE
1	We loved our stay at Valentine. It is a treasure. I will add that availability of the classroom is a MUST for college field courses. This enabled us to gather for group discussions, short lectures, student study time, quiz/exams, documentary viewing, etc. It also gave us a place to store our field guides, samples, and other equipment. I was extremely thankful to Kim and Cabot for allowing us to use this vital space without charge. I hope you continue to do this for educational groups.	NaN/NaN/0NaN NaN:NaN PM

## Valentine Camp Community Use Survey

Q1 I have read this description, am over the age of 18, and agree to the terms outlined here.

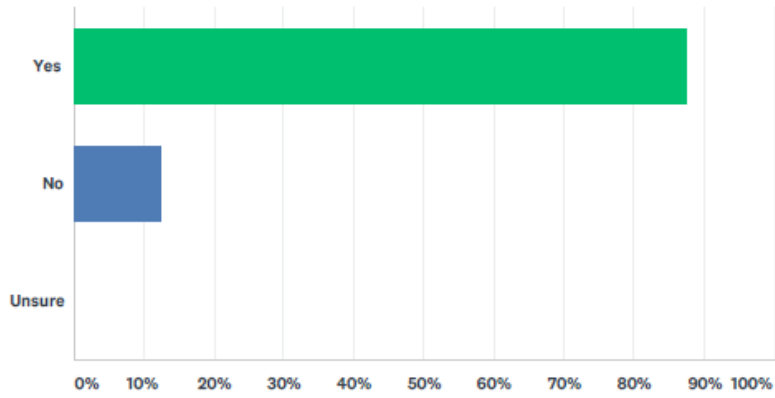
Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	8
No	0.00%	0
TOTAL		8

## Q2 Have you heard of Valentine Camp?

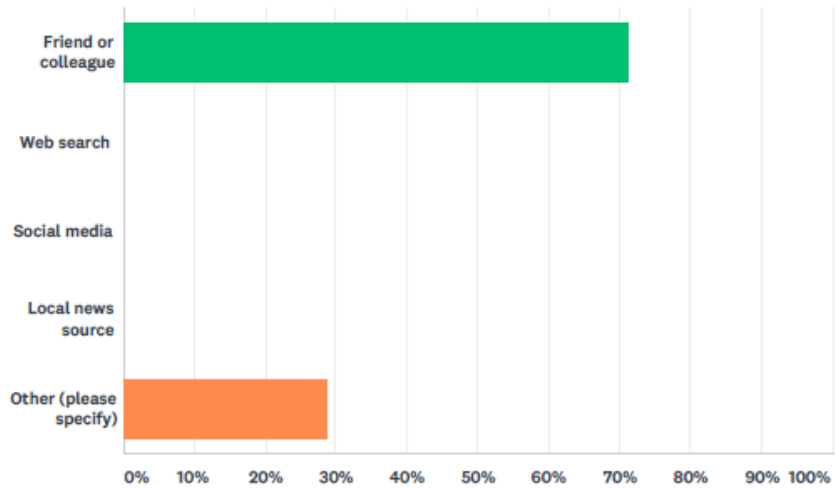
Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	87.50%	7
No	12.50%	1
Unsure	0.00%	0
TOTAL		8

### Q3 How did you hear about Valentine Camp?

Answered: 7 Skipped: 1

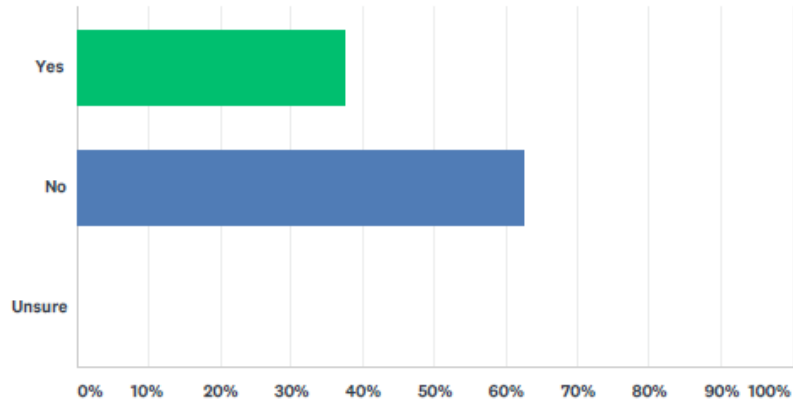


ANSWER CHOICES	RESPONSES
Friend or colleague	71.43% 5
Web search	0.00% 0
Social media	0.00% 0
Local news source	0.00% 0
Other (please specify)	28.57% 2
<b>TOTAL</b>	<b>7</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	Elementary School Teacher. Contacted by Valentine Staff regarding field trips with students. Also, have taken walks, having seen ad in paper.	NaN/NaN/0NaN NaN:NaN PM
2	School	NaN/NaN/0NaN NaN:NaN PM

## Q4 To your knowledge, has your organization ever used Valentine Camp?

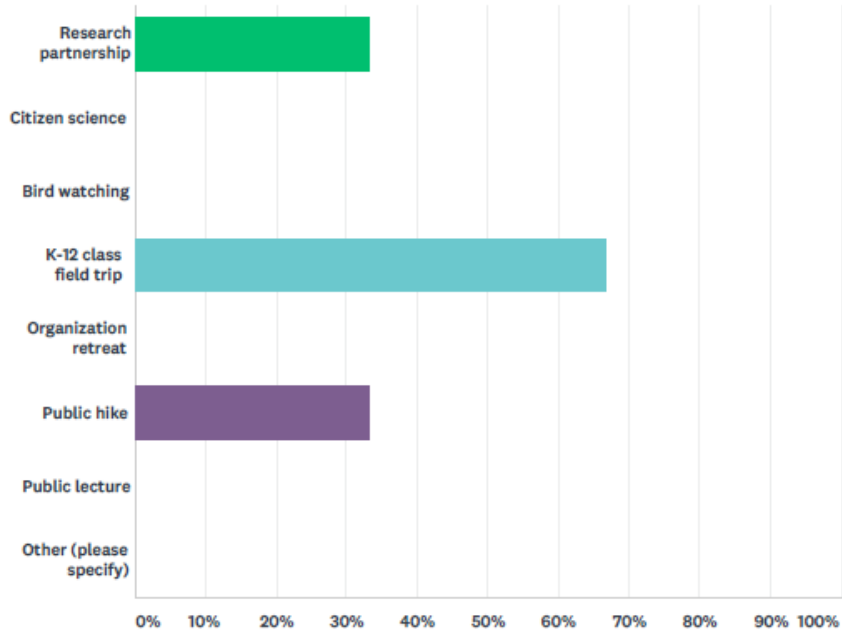
Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	37.50%	3
No	62.50%	5
Unsure	0.00%	0
<b>TOTAL</b>		<b>8</b>

## Q5 To your knowledge, how has your organization used Valentine Camp? Check all that apply.

Answered: 3 Skipped: 5

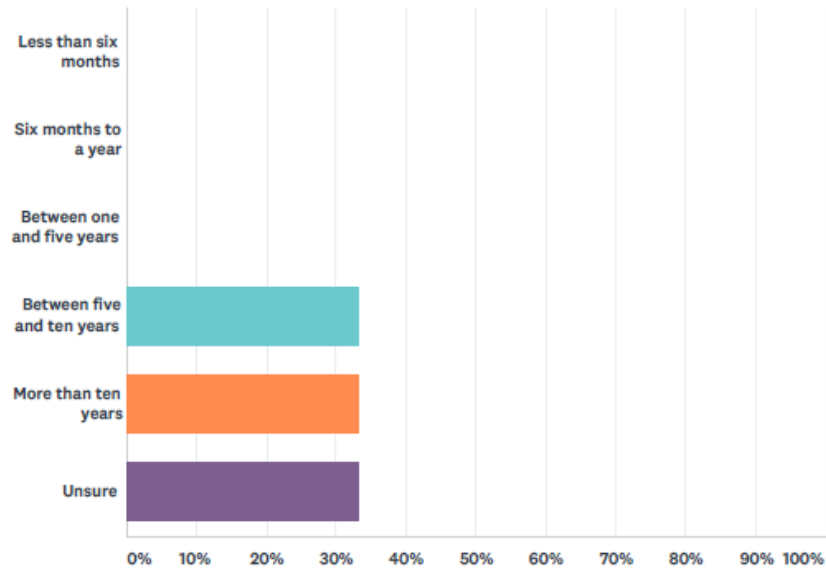


ANSWER CHOICES	RESPONSES
Research partnership	33.33% 1
Citizen science	0.00% 0
Bird watching	0.00% 0
K-12 class field trip	66.67% 2
Organization retreat	0.00% 0
Public hike	33.33% 1
Public lecture	0.00% 0
Other (please specify)	0.00% 0
Total Respondents: 3	

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q6 How long has your organization been using Valentine Camp?

Answered: 3 Skipped: 5

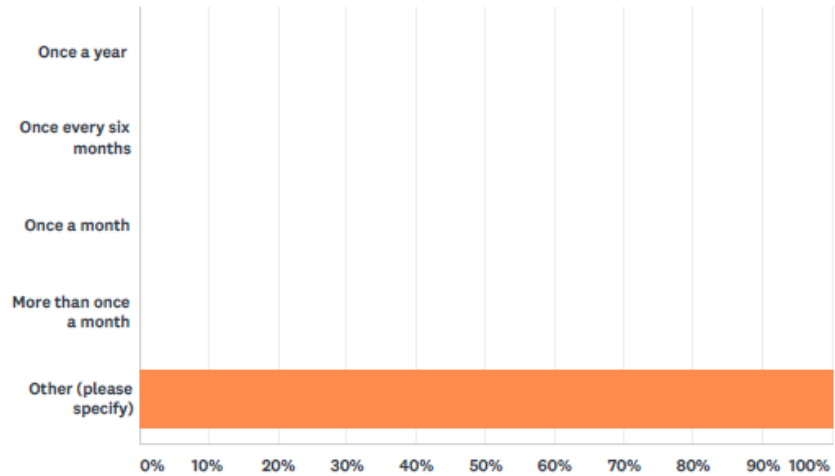


ANSWER CHOICES	RESPONSES	
Less than six months	0.00%	0
Six months to a year	0.00%	0
Between one and five years	0.00%	0
Between five and ten years	33.33%	1
More than ten years	33.33%	1
Unsure	33.33%	1
<b>TOTAL</b>		<b>3</b>



## Q7 On average, how often does your organization use Sedgwick Reserve?

Answered: 3 Skipped: 5

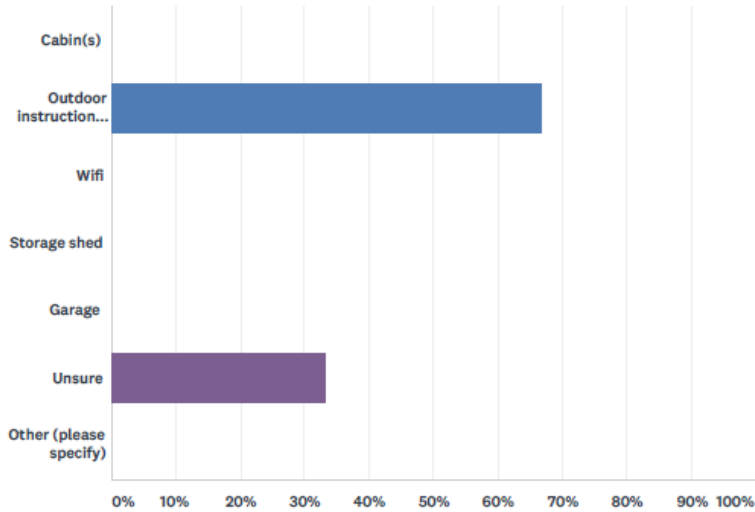


ANSWER CHOICES	RESPONSES	
Once a year	0.00%	0
Once every six months	0.00%	0
Once a month	0.00%	0
More than once a month	0.00%	0
Other (please specify)	100.00%	3
<b>TOTAL</b>		<b>3</b>

#	OTHER (PLEASE SPECIFY)	DATE
1	Not familiar with Sedgwick Reserve.	NaN/NaN/0NaN NaN:NaN PM
2	Not sure what Sedwick is	NaN/NaN/0NaN NaN:NaN PM
3	We do not use Sedgewick Reserve. If you mean Valentine Camp, it is very infrequent.	NaN/NaN/0NaN NaN:NaN PM

**Q8 What reserve equipment and/or facilities has your organization used?  
Check all that apply.**

Answered: 3 Skipped: 5



ANSWER CHOICES	RESPONSES
Cabin(s)	0.00% 0
Outdoor instruction area	66.67% 2
Wifi	0.00% 0
Storage shed	0.00% 0
Garage	0.00% 0
Unsure	33.33% 1
Other (please specify)	0.00% 0
<b>Total Respondents: 3</b>	

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

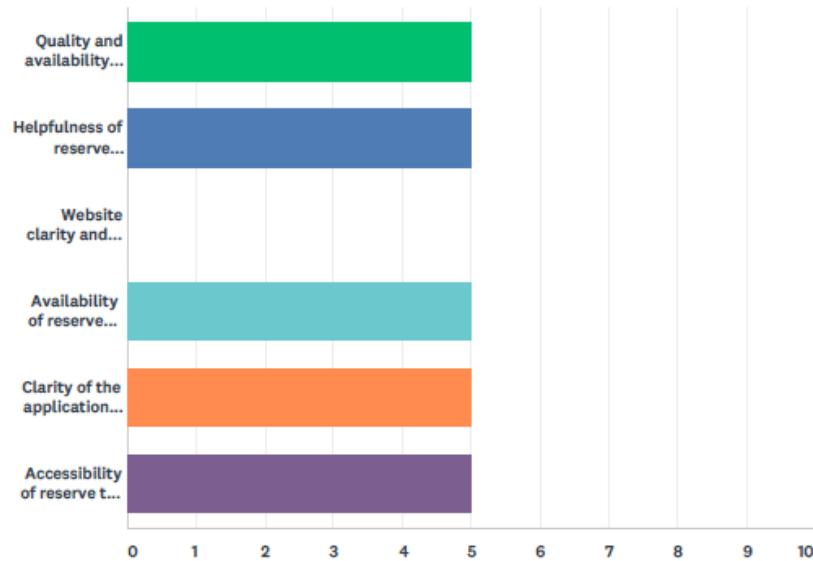
Q9 What natural aspects of Valentine Camp has your organization used (e.g. types of habitats, species)?

Answered: 3 Skipped: 5

#	RESPONSES	DATE
1	Outside, habitat of reserve overall.	NaN/NaN/0NaN NaN:NaN PM
2	Native plants and how Native Americans use them	NaN/NaN/0NaN NaN:NaN PM
3	Unknown	NaN/NaN/0NaN NaN:NaN PM

## Q10 Based on your experience, please rate each of the following aspects of Valentine Camp:

Answered: 2 Skipped: 6

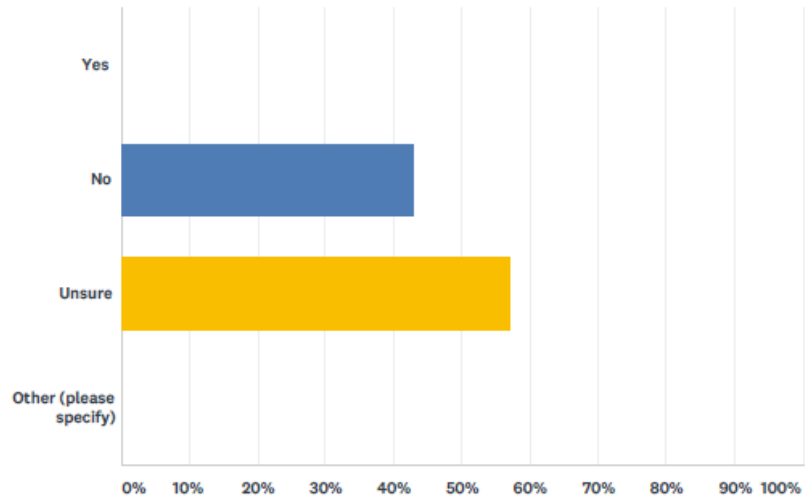


	VERY POOR	POOR	ACCEPTABLE	GOOD	VERY GOOD	N/A	TOTAL	WEIGHTED AVERAGE
Quality and availability of facilities and equipment	0.00% 0	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2	5.00
Helpfulness of reserve employees	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2	5.00
Website clarity and quality	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 2	2	0.00
Availability of reserve information for community groups	0.00% 0	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2	5.00
Clarity of the application process to obtain a permit to use the reserve	0.00% 0	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2	5.00
Accessibility of reserve to community groups	0.00% 0	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2	5.00

#	ADDITIONAL COMMENTS:	DATE
1	I have not been involved in using Valentine Reserve in many years.	NaN/NaN/0NaN NaN:NaN PM
2	I've not used the camp personally and so am unable to answer these questions.	NaN/NaN/0NaN NaN:NaN PM

## Q11 Has your organization wanted to use Valentine Camp but were unable to?

Answered: 7 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	0.00%	0
No	42.86%	3
Unsure	57.14%	4
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>7</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

## Q12 What has prevented you from using Valentine Camp? Check all that apply.

Answered: 0 Skipped: 8

⚠ No matching responses.

ANSWER CHOICES	RESPONSES
Unsure about resources available on the reserve	0.00% 0
Unfamiliar with the reserve	0.00% 0
Too expensive	0.00% 0
Unhelpful reserve staff	0.00% 0
Complicated permit process	0.00% 0
Unclear website	0.00% 0
Other (please specify)	0.00% 0
Total Respondents: 0	

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

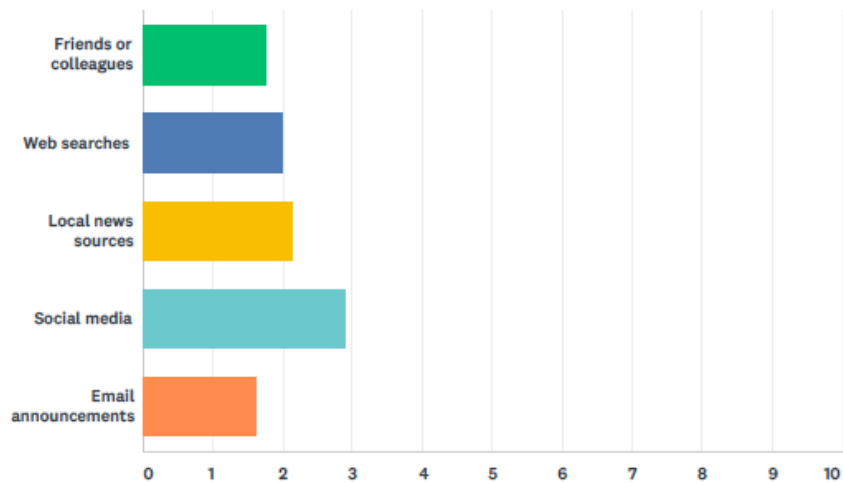
### Q13 In your opinion, how can Valentine Camp better serve the surrounding communities and community groups?

Answered: 8 Skipped: 0

#	RESPONSES	DATE
1	Have more dates available for tours	NaN/NaN/0NaN NaN:NaN PM
2	Not sure.	NaN/NaN/0NaN NaN:NaN PM
3	I don't know	NaN/NaN/0NaN NaN:NaN PM
4	Increasing access	NaN/NaN/0NaN NaN:NaN PM
5	I think they do a good job	NaN/NaN/0NaN NaN:NaN PM
6	Help with transportation	NaN/NaN/0NaN NaN:NaN PM
7	Unknown	NaN/NaN/0NaN NaN:NaN PM
8	more information/advertising of events open to the public	NaN/NaN/0NaN NaN:NaN PM

## Q14 How often do you use the following media to learn about opportunities for your organization?

Answered: 8 Skipped: 0



	VERY OFTEN	OFTEN	SOMETIMES	RARELY	VERY RARELY OR NEVER	UNSURE	TOTAL	WEIGHTED AVERAGE
Friends or colleagues	62.50% 5	0.00% 0	37.50% 3	0.00% 0	0.00% 0	0.00% 0	8	1.75
Web searches	50.00% 4	12.50% 1	25.00% 2	12.50% 1	0.00% 0	0.00% 0	8	2.00
Local news sources	50.00% 4	12.50% 1	25.00% 2	0.00% 0	12.50% 1	0.00% 0	8	2.13
Social media	37.50% 3	0.00% 0	12.50% 1	37.50% 3	12.50% 1	0.00% 0	8	2.88
Email announcements	62.50% 5	12.50% 1	25.00% 2	0.00% 0	0.00% 0	0.00% 0	8	1.63



## Q15 Please share any additional comments about Valentine Camp.

Answered: 5 Skipped: 3

#	RESPONSES	DATE
1	As a volunteer with school groups, I much appreciate this resource and the need to protect it from unlawful entry	NaN/NaN/0NaN NaN:NaN PM
2	Valentine Camp is an important resource for our community. I appreciate all the work volunteers and employees do to keep the area pristine.	NaN/NaN/0NaN NaN:NaN PM
3	Many locals don't even know it exists. There is a need for more public outreach.	NaN/NaN/0NaN NaN:NaN PM
4	It is a great place and i enjoy taking my class there. Thank you to all the volunteers	NaN/NaN/0NaN NaN:NaN PM
5	I really never even thought that having my organization utilize the camp was an option.	NaN/NaN/0NaN NaN:NaN PM






## 8.2. Appendix G – Wise Stewardship Management Scorecard






## Recommendation

Wise Stewardship

Research Education


<b><i>Sedgwick Reserve</i></b>				
Long-term treatment monitoring	Dark Green	Dark Green	Dark Green	Dark Green
Long-term management experiments	Dark Green	Dark Green	Dark Green	Light Green
Mechanical & chemical weed treatment	Dark Green	Dark Green	Light Green	Light Green
Fuel clearing in oak woodlands	Dark Green	Dark Green	Light Green	Yellow
Prescribed burns in non-native grassland	Light Green	Light Green	Light Green	Yellow
Grazing in non-native grassland	Light Green	Light Green	Light Green	Yellow
Pond and marsh management	Light Green	Light Green	Light Green	Light Green
Prescribed burns in coastal sage scrub	Dark Red	Dark Red	Dark Green	Yellow
<b><i>Valentine Camp</i></b>				
Long-term treatment monitoring	Dark Green	Dark Green	Dark Green	Light Green
Mechanical thinning and pile burning	Dark Green	Dark Green	Light Green	Yellow
Underburning	Light Green	Light Green	Light Green	Yellow
Broadcast burning	Dark Red	Dark Red	Light Green	Yellow
Mastication	Dark Red	Dark Red	Light Green	Yellow
Chemical thinning	Dark Red	Dark Red	Light Green	Yellow

Score	Color	Recommendation
6.1 - 8		Strongly Recommend
4.1 - 6		Moderately Recommend
2.1 - 4		Weakly Recommend
1 - 2		Neutral
< 0		Do Not Recommend

Score	Color	Level of Impact
4		High
3		Medium
2		Low
1		Neutral
(-)		Negative

### 8.3. Appendix H - Sedgwick Invasive Plant Species Removal Methods

Overview of mechanical and chemical weed treatments based on species. Summaries of mechanical and chemical treatment methods for each of the main weed species within Sedgwick are identified. Data summarized from the California Invasive Plant Council (Cal-IPC, 2018).

Species	Description	Treatment
<p>Jointed goatgrass (<i>Aegilops cylindrical</i>)</p> 	<p>Jointed goatgrass is an annual grass and is listed as a noxious weed that commonly invades disturbed areas and rangelands after being dispersed by livestock or human activities.</p>	<p><b>Mechanical:</b> Hand pulling or hoeing small areas can be effective, as can mowing after flowering but before seeds reach the soft boot stage.</p> <p><b>Chemical:</b> Herbicides such as glyphosate (i.e. Roundup) and sulfometuron (i.e. Oust) can be effective but glyphosate is nonselective and can harm desirable species while sulfometuron has mixed selectivity and is fairly safe for native perennial grasses, but has long soil residual activity and can move large distances in light windblown soils.</p>



Black Mustard  
(*Brassica nigra*)




Black mustard is a winter annual herb/forb that produces chemicals that inhibit the growth of native plants and is toxic to livestock. Additionally, black mustard can increase the frequency of fires, which not only increases the risk of type conversion in chaparral and coastal sage scrub habitats, but also increases the risk of wildfires to the surrounding community.

Mechanical: Black mustard can be hand pulled before producing seeds

Chemical: Several herbicides can be used to control black mustard including 2,4-D, Dicamba, Fluroxypyr, triclopyr, and chlorsulfuron. Other herbicides, such as glyphosate, have limited ability to control black mustard. These herbicides are also likely to damage native plants as well.

<p>Italian Thistle (<i>Carduus pycnocephalus</i> )</p> 	<p>Italian thistle is an annual winter forb that can increase fire frequency and intensity by carrying fire from the ground to the overstory. Seeds are dispersed through by wind and human activities.</p>	<p><u>Mechanical:</u> Thistles can be manually removed when small or removed using a grubbing hoe. Larger plants can also be cut or mowed, multiple mowings would be necessary to control the population.</p> <p><u>Chemical:</u> Aminopyralid is one of the most effective herbicides for thistles. Other potential herbicides includes clopyralid, dicamba, fluroxypyr, triclopyr, and glyphosate.</p>
<p>Tocalote (<i>Centaurea melitensis</i> )</p> 	<p>Tocalote is a winter annual that can displace native vegetation. Seeds can be transported by wind as well as by humans and animals.</p>	<p><u>Mechanical:</u> Mechanical treatments such as hand pulling, mowing, and cultivation can be successfully used to control tocalote.</p> <p><u>Chemical:</u> Aminopyralid and clopyralid are effective herbicides to treat tocalote. Other potential herbicides include chlorsulfuron, triclopyr, and glyphosate.</p>



<p>Bull Thistle (<i>Cirsium vulgare</i> )</p> 	<p>Bull thistle is a biennial or perennial forb that outcompetes native species and decreases feeding value of rangelands as it is not palatable to livestock.</p>	<p><u>Mechanical:</u> If done before bull thistle flowers, tillage, hoeing, and hand pulling can be effective removal strategies. The plant must be cut off below the soil surface in order to be effective. In order for mowing to be effective, it has to be done just before flowering. Additionally, multiple mowings are necessary to control the population as it will generally have varying age classes at one time.</p> <p><u>Chemical:</u> Aminopyralid, clopyralid, dicamba, triclopyr, and chlorsulfuron can be used as herbicides on bull thistle. 2,4-D can be used but it is not the most effective, though it is a low cost herbicide.</p>
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## 8.4. Appendix I – Research Management Scorecard

<b>Recommendation</b>				
		Research	Education	Wise Stewardship
<b>Both Reserves</b>				
Administrative Assistant Network				
New and Junior Faculty Network				
Research Ambassador Network				
Research webpage				
RAMS reconstruction				
Social media				

Score	Color	Recommendation
6.1 - 8		Strongly Recommend
4.1 - 6		Moderately Recommend
2.1 - 4		Weakly Recommend
1 - 2		Neutral
< 0		Do Not Recommend

Score	Color	Level of Impact
4		High
3		Medium
2		Low
1		Neutral
(-)		Negative

## 8.5. Appendix J - Research Key Messages

## **Sedgwick Reserve: Research Key Messages**

### Accommodations

#### Message 1: Accommodations

Sedgwick Reserve is equipped with brand-new housing facilities, a LEED Platinum certified building with meetings spaces and WiFi, and lab space.

### Natural Characteristics

#### Message 2: Bird populations

Sedgwick Reserve welcomes ornithologists to observe and research the site's populations of the tri-colored blackbird, acorn woodpecker, burrowing owls, and other interesting bird species.

#### Message 3: Diverse plant communities

As part of the University of California Natural Reserve System, Sedgwick Reserve is home to a diversity of plant communities, including coastal sage scrub, chaparral, coast live and blue oak woodland, valley oak savannah, riparian habitat, gray pine forest, serpentine vegetation, and vernal habitat.

### Available data

#### Message 4: Available Data

Researchers can find datasets on Sedgwick Reserve's mammals, birds, reptiles, amphibians, beetles, moths, and plants on its reserve website.

### Access

#### Message 5: Accessible to community and city colleges

Researchers from any college or university can use Sedgwick Reserve in short- and long-term studies across a variety of disciplines.

## Research-friendly site

### Message 6: Access to reserve steward guidance

The Sedgwick Reserve land steward is readily available to help researchers set up short- and long-term projects at the reserve.

### Message 7: Research-friendly reserve rules

Sedgwick Reserve maintains research-friendly rules to foster the expansion of knowledge about the site's natural systems.

### Message 8: New researcher visits

Sedgwick Reserve welcomes new researchers to scope out the site and talk with reserve managers to understand projects that are possible at the reserve.

## Research opportunities

### Message 9: General research opportunities

Sedgwick Reserve is a living laboratory, and welcomes faculty members and students to use its facilities and natural characteristics for archaeology, botany, microbiology, geology, environmental science and zoology research.

### Message 10: General research opportunities

Sedgwick Reserve provides an ideal location for short and long term research projects in fire ecology, hydrology, and climate science research.

### Message 11: Fire management research opportunities

Researchers have the opportunity to study fire management in Sedgwick Reserve's coastal sage scrub, chaparral, grassland, and oak savannah plant communities.

### Message 12: California ecosystems

At Sedgwick Reserve, researchers from around the world can study pressing issues facing plant and animal communities in California ecosystems.

#### Message 13: Archeological research opportunities

Sedgwick Reserve's archeological sites are available for anthropological and cultural history research.

#### Message 14: Example projects

Sedgwick Reserve can host research projects on the regeneration of native oak trees, invasive plant species, native grassland restoration, microbial activity in soils, and Central California cultural history.

## La Kretz Center

#### Message 15: Research opportunities

The La Kretz Research Center at Sedgwick Reserve fosters collaborative research to address pressing issues of high fire risk, climate change, and invasive species that threaten California's natural systems.

### **Valentine Camp: Research Key Messages**

## Accommodations

#### Message 1: Accommodations close to other research sites

Valentine Camp provides inexpensive comfortable personal cabins with access to Mammoth Mountain, Sierra Nevada Aquatic Research Laboratory (SNARL), White Mountain Research Station, Yosemite National Park, and many more research sites.

#### Message 2: Family-friendly accommodations

Valentine Camp is a family-friendly research site with inexpensive personal cabins in the beautiful eastern Sierras.

## Natural characteristics

### Message 3: Mammoth Creek

Valentine Camp offers opportunities to study Mammoth Creek amid mixed conifer forest in the eastern Sierras.

## Available data

### Message 4: Available data

Researchers can find datasets on Valentine Camp's birds, plants, mammals, fish, amphibians, reptiles, macroinvertebrates, and ants on the reserve website.

## Proximity to other research sites

### Message 5: Proximity to other research sites

Valentine Reserve is an excellent jumping off point for research at Sierra Nevada Aquatic Research Lab, Mammoth Mountain, and White Mountain Research Center, and other sites in the eastern Sierras.

## Access

### Message 6: Accessible to all universities

Researchers from all universities can access Valentine Camp's unique forest and riparian system for many types of research projects, including those in ecology, climate, plant biology, and hydrology.

## Research-friendly site

### Message 7: Access to reserve steward guidance

Valentine Camp's land steward is readily available to help researchers set up and maintain their projects on the site.

### Message 8: Research-friendly reserve rules



Valentine Camp maintains research-friendly rules to foster the expansion of knowledge about the site's natural systems.

Message 9: New researcher visits

Valentine Camp welcomes new researchers to scope out the site and talk with reserve managers to understand the projects that are possible at the reserve.

## Research opportunities

Message 10: Fire management research opportunities

Valentine Camp offers opportunities to research fire management in Lodgepole pine, red fir, and Jeffrey pine forests.

Message 11: Invasive species research opportunities

Valentine Camp's mixed conifer forest and bark beetle populations can provide valuable study sites for researchers to fill gaps in knowledge about invasive species and California land management.

Message 12: General research opportunities

Valentine Camp's environmental characteristics and archeological sites offer research opportunities across many fields, including climate science, hydrology, plant biology, geology, ecology, and anthropology.

## 8.6. Appendix K - Administrative Assistant Networks

## Administrative Ambassador Networks

Name	Position	Department	Institution Name	Email
University of California, Santa Barbara				
Robin Rene Roe	Business Officer	Anthropology	UCSB	roe@anth.ucsb.edu
Juliana Bruno	Academic Services Manager	Art	UCSB	jbruno@hfa.ucsb.edu
Nate Angeles-Molina	Departmental Assistant	EEMB	UCSB	nathaniel.angeles-molina@lifesci.ucsb.edu
Paula Higginson	Department Assistant	MCDB	UCSB	paula.higginson@lifesci.ucsb.edu
Celia Wrathall	Clerical Assistant	Chemistry and Biochemistry	UCSB	wrathall@chem.ucsb.edu
Kate Lima	Department Manager	Earth Science	UCSB	klima@geol.ucsb.edu
Alex Garcia	Program Manager / Business Officer	Environmental Studies	UCSB	agarcia@es.ucsb.edu
Mo Lovegreen	Executive Officer, Geography/Director, Campus Sustainability	Geography	UCSB	mo@geog.ucsb.edu
Lisa Hajjar	Vice Chair	Sociology	UCSB	lhajjar@soc.ucsb.edu
Linda Lafond	Front Desk Administrative Assistant	History	UCSB	lafond@hfa.ucsb.edu
Yasmin Gutierrez	Instructional Program Assistant	Writing Program	UCSB	ygutierrez@hfa.ucsb.edu
Jen Johansen	Assistant to the Dean, Academic Personnel Analyst	CCS	UCSB	jen.johansen@ccs.ucsb.edu
Dee White	Resource Coordinator	Bren School	UCSB	dee@bren.ucsb.edu
University of California				
Monica Díaz	Department Manager	Anthropology	UCLA	monica.diaz@anthro.ucla.edu
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## 8.7. Appendix L - Research Ambassador Network

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## 8.8. Appendix M - Research Webpage Content

## **Example content for the research webpage**

- Explanations of overnight accommodations and links to housing facilities webpage and room rates webpage.
- Explanations of all reserve facilities (e.g., labs, teaching spaces with links to the facilities web page.
- Lists of on-site equipment (e.g., vehicles, tools, and storage lockers) with links to the web page with complete information and rates
- Lists of habitats and species in the reserve with links to full lists and datasets.
- Lists of climate, geological, and hydrological data with links to full datasets.
- Lists of example projects, with a focus on projects that could provide insight and/or reserve data that could directly inform management practices.
- Explanations and lists of all of the monitoring devices available to researchers.
- Detailed RAMS Instructions for both new and returning users.
- Description of research-related guidelines, with links to complete rules.
- List and provide links to notable publications of reserve-based research.



## 8.9. Appendix N – Education Management Scorecard

		Recommendation		
		Education	Research	Wise Stewardship
<b>Both Reserves</b>				
Administrative Assistant Network				
New Faculty Network				
Faculty Ambassador Network				
Department retreats				
<b>Sedgwick Reserve</b>				
Class supplies fund				
Transportation fund				

Score	Color	Recommendation
6.1 - 8		Strongly Recommend
4.1 - 6		Moderately Recommend
2.1 - 4		Weakly Recommend
1 - 2		Neutral
< 0		Do Not Recommend

Score	Color	Level of Impact
4		High
3		Medium
2		Low
1		Neutral
(-)		Negative

## 8.10. Appendix O - Education Key Messages

## **Sedgwick Reserve: Education Key Messages**

### Accommodations

#### Message 1: Comfortable accommodations

Extended field courses that are taught at Sedgwick Reserve can easily reserve the ranch house, studio apartments, and tent camping sites.

#### Message 2: Inexpensive accommodations

Sedgwick Reserve provides a free space for university classes to observe and learn about nature. For longer field courses, the reserve provides inexpensive overnight accommodations, as little as five dollars per student.

### Access

#### Message 7: Close to campus

Sedgwick Reserve is only a 45-minute drive from UCSB, making it accessible to both lab sections and long-term field courses.

#### Message 8: Easy to traverse

Sedgwick Reserve has roads and trails that allow for easy, fast access to habitats and species of interest within the large space.

### Natural Resources

#### Message 3: Variety of native California habitats

Sedgwick Reserve is home to a variety of native California habitats, such as coastal sage scrub, oak woodlands, and chaparral, for use in field-based university-level courses.

#### Message 4: Flora

Field courses can observe and learn about Sedgwick Reserve's diverse native and non-native flora, such as coast live oaks, gray pines, and sagebrush.

#### Message 5: Fauna

Sedgwick is home to many animal species including coyotes, foxes, and bats. Ecology, zoology, and wildlife biology classes can enjoy observing and learning about these native animals.

#### Message 6: Birds

Ornithology and wildlife biology students can observe and learn about unique, charismatic California bird species, such as the tri-colored blackbird, golden eagle, and acorn woodpecker.

#### Message 7: Fire

Fire is a natural part of habitats at Sedgwick. Classes can learn about the importance of fire for these ecosystems.

## Cultural Resources

#### Message 8: Cultural resources

Prior to European settlement, the current Sedgwick area was located between Soxtonokmu' and Kalawashaq', the two largest Chumash villages in the Santa Ynez Valley region. Archaeology, anthropology, and other social science courses can come to Sedgwick to learn about the cultural history of the area.

## Example Courses and Coursework

#### Message 9: Interdisciplinary opportunities

Artists and writers are welcome to find inspiration by experiencing Sedgwick's beautiful native ecosystems. Sedgwick is also a great location for courses designed to combine science with the arts.

#### Message 10: Science courses

Ecology, botany, wildlife, biology, hydrology, geology, and other science courses can take advantage of Sedgwick's diverse ecosystems. There is plenty of space for students to design and implement their own short or long-term experiments on Sedgwick.

#### Message 11: California ecological issues and land management techniques

As Sedgwick is actively managed to promote native habitats, there is an opportunity for students to learn about pressing ecological issues and current land management techniques by observing them in action at Sedgwick Reserve.

## **Valentine Camp: Education Key Messages**

### **Accommodations**

#### Message 1: Comfortable accommodations

Valentine Camp offers comfortable overnight lodging in fully-equipped log cabins for classes of up to 16 people.

#### Message 2: Inexpensive accommodations

Valentine Camp offers affordable lodging in log cabins for small classes, as little as 12 dollars a night.

### **Natural Resources**

#### Message 3: Native California subalpine habitats

Field courses taught at Valentine Camp can learn about valuable, diverse California habitat types, such as montane forest, montane chaparral, Great Basin sagebrush, high montane riparian vegetation, wet montane meadow, and seep and spring vegetation.

#### Message 4: Diversity of fauna

Field courses in ecology, zoology, and wildlife biology can observe porcupines, ermines, bobcats, mountain quails, and great-horned owls at Valentine Camp.

#### Message 5: Diversity of plant species

Classes can come experience remarkably pristine sub-alpine habitat and learn about such plant species as Jeffrey pine, red fir, and mountain sagebrush.

### **Example Courses and Coursework**

#### Message 6: Available space for student research sites

Valentine has plenty of space for research projects. Field courses are welcome to have their students design and implement their own short experiments on Valentine.

#### Message 7: Long-term courses

With Valentine's comfortable accommodations, classes are welcome to spend the night or longer. Students can become truly immersed in Valentine's scenic beauty.

## 8.11. Appendix P - Education Ambassador List



# Sedgwick Reserve Education Email List

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## 8.12. Appendix Q - Public Service Key Messages

## **Sedgwick Reserve: Public Service Key Messages**

### **Community Member**

#### Message 1: Sedgwick is an important part of the community

Sedgwick Reserve welcomes community groups to use its diverse, native habitats to observe and learn about the unique ecosystems of their neighborhood.

#### Message 2: Science-based mission

Sedgwick Reserve is an important part of the community. Community groups can use Sedgwick, and Sedgwick provides a valuable area for research, which improves land stewardship in the area.

#### Message 3: Important to researchers

Researchers from all over the world come to Sedgwick Reserve to find important environmental solutions related to water shortage, catastrophic wildfire, and invasive species.

#### Message 4: Learn about pressing environmental problems

By observing Sedgwick Reserve's landscape, community groups, governmental agencies, and universities build practical knowledge that informs solutions to California's public health and environmental problems.

### **Research Collaboration**

#### Message 5: Potential to collaborate on research projects

Sedgwick Reserve contains a rare collection of some of the region's most prized plant communities, including coastal sage scrub, oak woodlands, and chaparral, and could serve as a field site for regional ecosystem research projects that need multiple field locations. Science organizations that conduct regional ecosystem could collaborate with Sedgwick to study these extraordinary ecosystems.

### **Natural Resources**

#### Message 6: Diversity of native habitats

Environmental and science organizations can use Sedgwick Reserve's native habitat types, including coastal sage scrub, oak woodlands, grasslands, and marshland, to teach the public about California ecosystems. Sedgwick is a great

location for citizen science efforts, walking ecology tours, and other educational outings.

#### Message 7: Variety of flora and fauna

Sedgwick Reserve has diverse plant and animal species that could be attractive for environmental organization field trips. Participants can immerse themselves in scenic oak woodlands, coastal sage scrub, and chaparral, and may even see some of the many animal residents of the reserve including coyotes, grey foxes, mule deer, and badgers.

#### Message 8: Diversity of birds

Home to diverse bird populations, including the tri-colored blackbird, acorn woodpecker, and golden eagle, Sedgwick Reserve provides an ideal location for birding, citizen science efforts, and educational outings.

#### Message 9: Diversity of native habitats

Sedgwick Reserve has a variety of native habitat types that could attract various environmental and science organizations to use the reserve for citizen science efforts, walking ecology tours, and other educational outings.

#### Message 10: Nature education opportunities

Sedgwick Reserve hosts a diversity of interesting plants, such as the coast live oak and the grey pine, and animals, such as the golden eagle, acorn woodpecker, and tri-colored blackbird, that are perfect for K-12 nature classes to observe and learn about.

#### Message 11: Large meeting spaces for classes

Sedgwick Reserve can accommodate large class sizes with large, comfortable meeting spaces, a public kitchen, accessible lab equipment, and WiFi.

### **Valentine Camp: Public Service Key Messages**

#### **Community Member**

##### Message 1: Valentine is an important part of the community

Though closed to general public use, Valentine is an important part of the community. Many school groups use Valentine and the reserve provides a valuable area for research which improves land stewardship in the area.

##### Message 2: Research conducted on Valentine is important

Research conducted on Valentine increases society's knowledge of natural communities and improves land stewardship in California. Improving ecosystem health benefits natural communities and helps people.

### **Research Collaboration**

#### Message 3: Potential to collaborate on research projects

Valentine Camp contains remarkable sub-alpine habitat and could serve as a potential field site for ecosystem studies that need multiple field locations. Government organizations that conduct research could collaborate with Valentine.

### **Natural Resources**

#### Message 4: Potential to collaborate on research projects

Home to a variety of California habitat types, Valentine Camp can be used as a field site in collaborative, regional, system-based research studies by non-profits, agencies, and other organizations.

#### Message 5: Diversity of native subalpine habitats

Valentine Camp has a variety of native habitat types including montane forest, Great Basin sagebrush, and montane chaparral, that could attract various environmental and science organizations to use the reserve for citizen science, walking ecology tours, and other educational outings.

#### Message 6: Variety of flora and fauna

Many environmental groups want to see exciting plants and animals in nature. Valentine is full of diverse plant and animal species, including Jeffrey pines, red firs, bobcats, and great-horned owls, that could be attractive for environmental organization field trips.

#### Message 7: Valentine is an excellent field site for classes

Valentine Camp is an "outdoor classroom" for K-12 students to learn about the natural world, with unique, diverse California sub-alpine habitats.

#### Message 8: Overnight accommodations

Valentine Camp's personal log cabins provide comfortable lodging for individuals and small groups during research, retreats, and other events.