

## Improving management at two UC Natural Reserves

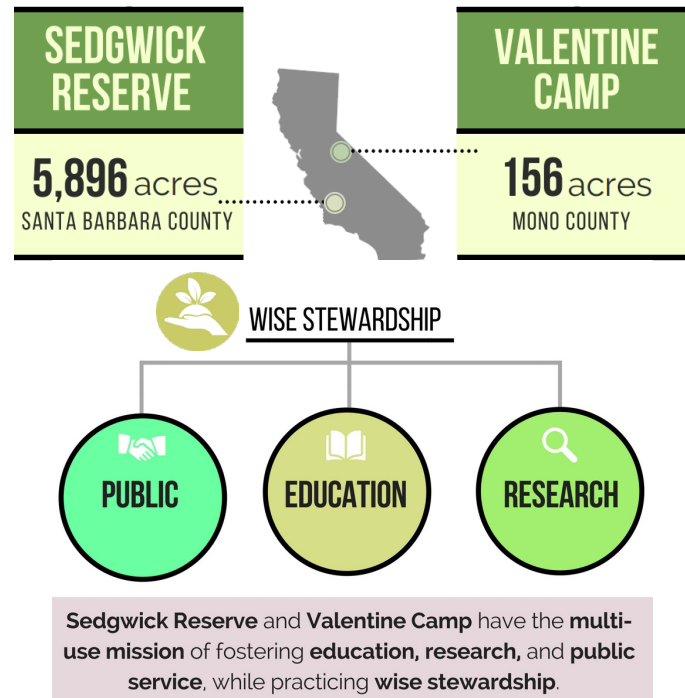
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### BACKGROUND

The University of California Natural Reserve System (UCNRS) is a network of preserved natural areas, created by scientists to protect major California habitat types in a “library of ecosystems.” 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 while contributing to the collective understanding of species and habitats. This project investigates how to improve management at two reserves managed by UCSB, Sedgwick Reserve (Sedgwick), located in the Santa Ynez Valley, and Valentine Camp (Valentine), a portion of the Valentine Eastern Sierra Reserve.



### OBJECTIVES AND SIGNIFICANCE

This project aims to provide Sedgwick and Valentine managers with knowledge and approaches that will help them balance the UCNRS mission pillars of public service, university-level education, research, and wise stewardship.



**Wise Stewardship:** Foster resilient native habitats on-site and reduce risk of wildfires and the impact of invasive species.



**Education:** Identify methods and opportunities for engagement to increase university-level educational use.



**Research:** Identify methods and opportunities for engagement with researchers to increase and target use at the reserves.



**Public Service:** Identify opportunities for approaches to build targeted public uses that support wise stewardship, research, and education.

# APPROACH

## Data Collection and Evaluation

### WISE STEWARDSHIP

We developed management options by reviewing literature, interviewing experts, and creating fire return interval deviation maps, to compare the impact of various methods on the specific habitats on the reserves.

### RESEARCH AND EDUCATION

We developed management strategies by reviewing literature, interviewing experts and faculty members, analyzing UCNRS social media, looking at reserve use data, and distributing surveys to current and potential faculty users.

### PUBLIC SERVICE

We did not develop specific management options for public service. Instead, we made general recommendations based on reserve use data and surveys distributed to community organizations.

## Scorecard Development

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 **Strongly Recommended**.

Score	Color	Level of Impact	Score	Color	Recommendation
4	●	High	6.1 - 8	■	Strongly Recommend
3	●	Medium	4.1 - 6	■	Moderately Recommend
2	●	Low	2.1 - 4	■	Weakly Recommend
1	●	Neutral	1 - 2	■	Neutral
(-)	●	Negative	< 0	■	Do Not Recommend

## WISE STEWARDSHIP

Fire is a natural part of the ecosystems at both Sedgwick and Valentine, though the majority of both reserves are burning less frequently than under natural conditions. Fuel management is needed to reduce future wildfire severity on the reserves and control the risk of wildfires spreading from the reserves to the surrounding communities, however this needs to be balanced with managing for the health of the habitats. Additionally, management efforts are needed at both reserves to control invasive species.

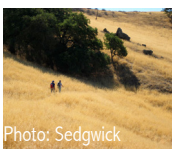
### SEDGWICK RESERVE

#### Coastal Sage Scrub



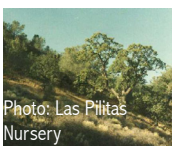
Though the habitat is burning less frequently than natural conditions, the ecosystem is very sensitive to shortened fire return intervals. Using prescribed fire at frequent enough intervals to reduce fire risk may induce habitat type conversion.

#### Grasslands



Grasslands across the reserve are heavily invaded by non-native plants. Fire, combined with restoration efforts, could be used as a treatment to reduce invasive species. Grazing is a potential alternative management technique to using prescribed fire.

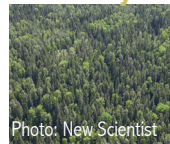
#### Oak Woodlands



Fuel clearing could be used to reduce invasive weeds, particularly Italian thistle, and decrease the potential for fire to spread from ground vegetation to the canopy. Removing dead oaks would reduce the fuel load, however, they provide important habitat for woodland birds.

### VALENTINE CAMP

#### High Forest Density



Currently, Valentine's forest density is at about double natural conditions. Reducing the number of trees per acre would improve the health of the mixed-conifer forest habitat. Overall health would increase and the lower density would help decrease bark beetle infestations.

#### Thinning with Pile Burning



The best treatment method for reducing tree density is mechanically thinning followed by burning the piles of debris. This emulates many benefits provided by natural fire spreading through the reserve without the risk of the fire spreading to nearby communities.

#### Prescribed Fire

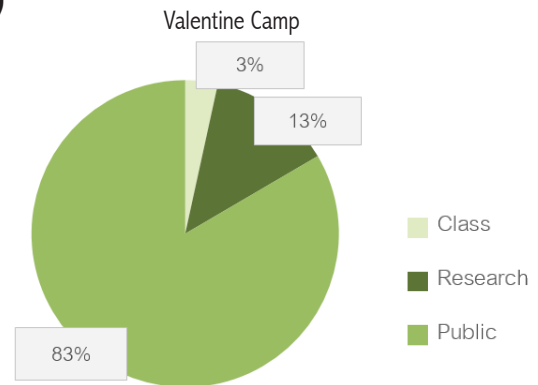
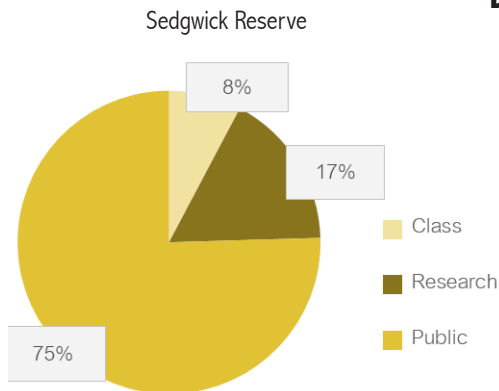


At the current forest density, prescribed fire is not a viable treatment option because there is too high a risk of the fire causing damage and spreading outside the reserve. However, if the forest density decreases, it may be possible to use low intensity, underburns on the site.

## RESEARCH AND EDUCATION

Both research and education are the lowest categories of use on the reserves. To increase and diversify the number of research and education users, the reserves should develop outreach strategies to target these audiences. In particular, the reserves should develop network-based communication strategies which take advantage of sending information to a smaller target audience who can then further distribute the information to a larger audience.

**Average Annual Reserve Use by Number of Days (2012-2017)**



### RESEARCH SURVEYS

60% of Sedgwick and Valentine respondents indicated that distributing more information about the reserve would likely or very likely increase research use. Furthermore, the majority of Sedgwick (69%) and Valentine (100%) researchers indicated that they learned about the reserve from a colleague.

### EDUCATION SURVEYS

Education users predominantly learned about the reserves from colleagues, research publications, web searches, and personal involvement with the reserve system. Additionally, both Sedgwick and Valentine survey respondents indicated that classes cost more when they use the reserves than classes that do not have a field component.

## PUBLIC SERVICE

The highest number of reserve users for both reserves comes from the public. At Sedgwick, these users come from a large variety of different community groups, while public use at Valentine mainly comes from the nearby Mammoth school district. Though many public users at Sedgwick use the reserve for science or nature education, some of the top users include groups using the reserve for recreation, such as horseback riding.

### COMMUNITY GROUP SURVEYS

67% of Sedgwick survey respondents and 71% of Valentine survey respondents indicated that they learned about the reserve from a friend or colleague. Email, local news, friends and colleagues, and web searches were listed as the best forms of communication. Overall survey respondents were satisfied with the reserves' current public service, however, some respondents commented that the reserves could increase public outreach to spread awareness.



Photo: Sedgwick

# RECOMMENDATIONS AND CONCLUSIONS

Both Sedgwick and Valentine face many management challenges. Management options for wise stewardship vary by ecosystem, so specific recommendations are reserve dependent. However, for research, education, and public service, management recommendations are similar for both reserves. Sedgwick and Valentine should both focus on developing an outreach strategy that emphasizes increasing research and educational use of the reserves and shifting public use towards citizen science, walking ecology tours, and nature education.

## WISE STEWARDSHIP

	Recommendation	Wise Stewardship		
		Research	Education	Wise Stewardship
<b>Sedgwick Reserve</b>				
Long-term treatment monitoring	Dark Green	Green	Green	Green
Long-term management experiments	Dark Green	Green	Green	Yellow
Mechanical & chemical weed treatment	Dark Green	Green	Yellow	Yellow
Fuel clearing in oak woodlands	Dark Green	Green	Green	Yellow
Prescribed burns in non-native grassland	Light Green	Green	Green	Yellow
Grazing in non-native grassland	Light Green	Green	Green	Yellow
Pond and marsh management	Light Green	Green	Yellow	Green
Prescribed burns in coastal sage scrub	Dark Red	Red	Green	Yellow
<b>Valentine Camp</b>				
Long-term treatment monitoring	Dark Green	Green	Green	Yellow
Mechanical thinning and pile burning	Dark Green	Green	Green	Yellow
Underburning	Light Green	Green	Green	Yellow
Mastication	Dark Red	Red	Yellow	Yellow
Chemical thinning	Dark Red	Red	Yellow	Yellow

## RESEARCH

	Recommendation	Wise Stewardship		
		Research	Education	Wise Stewardship
<b>Both Reserves</b>				
Administrative Assistant Network	Dark Green	Green	Green	Green
New and Junior Faculty Network	Dark Green	Green	Green	Yellow
Research Ambassador Network	Light Green	Green	Yellow	Yellow
Research webpage	Light Green	Green	Yellow	Yellow
RAMS reconstruction	Light Green	Green	Yellow	Yellow
Social media	Light Green	Yellow	Yellow	Yellow

## EDUCATION

	Recommendation	Wise Stewardship		
		Education	Research	Wise Stewardship
<b>Both Reserves</b>				
Administrative Assistant Network	Dark Green	Green	Green	Yellow
New Faculty Network	Dark Green	Green	Green	Yellow
Faculty Ambassador Network	Light Green	Green	Yellow	Yellow
Department retreats	Light Green	Green	Yellow	Yellow
<b>Sedgwick Reserve</b>				
Class supplies fund	Light Green	Green	Green	Green
Transportation fund	Light Green	Green	Yellow	Yellow

## PUBLIC SERVICE

As current public use at Sedgwick and Valentine is already high, the reserves do not need to focus on increasing public use. Instead, the reserves should shift the public user base towards those whose activity on the reserves also promotes the other three pillars of the UCNRS mission. To do this, the reserves should form partnerships with science and nature education organizations and focus outreach messages on targeting organizations whose mission closely aligns with the UCNRS mission.

# ACKNOWLEDGEMENTS

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Photo: Sedgwick