

CASE STUDY



Tracking Sage Grouse: In the Field and Online

Youth-focused Community and Citizen Science // A project of the UC Davis Center for Community and Citizen Science // education.ucdavis.edu/ccs

Youth Community and Citizen Science (YCCS) can take many forms. In the case study below, drawn from in-depth field research, we highlight important project features and describe how educators and youth have taken up three key practices that promote science learning and environmental science agency—the ability to use experiences in citizen science and environmental science to make positive changes in one’s life and community.

DESCRIPTION

This **sage-grouse monitoring project** engaged Eastern Sierra high school-aged youth to collect and analyze camera trap data documenting greater sage-grouse (*Centrocercus urophasianus*) breeding season behavior. Data collected from this project will be used by both UC Davis researchers and local working groups who aim to improve sage-grouse habitat. Understanding when the grouse are using courtships display areas (known as leks) is an important step towards refining conservation efforts. The project provided youth with the opportunity to interact with their local environment, and with scientists working in the area. Partners include wildlife biologists from UC Davis, the Bureau of Land Management (BLM), and the Sierra Nevada Aquatic Research Laboratory (SNARL). Youth used the online platform, Zooniverse, to analyze camera trap photos, identifying presence/absence of sage-grouse and classifying behavioral data of the birds.



SPECIES OR SYSTEM STUDIED

Greater sage-grouse. Greater sage-grouse (*Centrocercus urophasianus*) are the largest members of the grouse (think chickens) family in North America. Extirpated from much of their historic range, these birds are emblematic of the sage-steppe ecosystem and are considered an umbrella species: meaning conserving these birds will benefit over 350 other species that rely on this ecosystem. Greater sage-grouse in the Eastern Sierra share distinct genetics that separate them from other populations. Youth aid in the collection and classification of camera trap data, which will give managers a better idea of how and when birds are using leks throughout the region.

RESEARCH SITE

Eastern Sierra sage-steppe. Lek monitoring occurs in the Mono basin near Mammoth Lakes, California. This sensitive habitat sits adjacent to one of the most heavily trafficked areas in the Eastern Sierra, yet often goes unnoticed. Youth monitored sage-grouse activity on two leks: one less than 15 minutes from Mammoth Lakes, and the other about 30 miles to the north near Bodie, California. Though both of the leks are part of the sage-steppe ecosystem, they are physically distinct and facilitate very different social environments.

PARTICIPANTS

High school students. Seven students from a local high school volunteered to participate, outside of class, in the project in Spring 2017.

STRUCTURE

In the field and online. Youth were introduced to the sage-steppe ecosystem, sage-grouse, lek breeding, and conservation during an introductory meeting with BLM and UC Davis scientists in the Patricelli lab. After visiting the lek and setting up trail cameras, the youth were then asked to take on the responsibility of data classification on their own via the online platform, Zooniverse. This year, the youth did not return to the cameras. In future iterations, youth will be responsible for returning cameras and conducting lek counts.

DURATION

3 months. As an online project, youth can still participate at any time in data entry. However, cameras remained active only through the breeding season (mid-March until mid-June).

INSTITUTION

University-Public Agency Partnership. UC Davis has a long history of working with government agencies to further scientific research. While the Patricelli lab has collaborated with the BLM in Wyoming, this project marks their first collaboration in California. By sharing data

(behavioral data from the Patricelli lab and survey/land data from the BLM), both entities will benefit in an effort to improve sage-grouse conservation.

OTHER ACTIVITIES

Participants attended two different science discussions during the course of the project. In March, a graduate student talked to the youth about the sage-steppe system, current conservation research, lek mating and sage-grouse biology. In June, the lead scientist traveled to SNARL and talked to youth about sexual selection, animal behavior, how she became a scientist, and discussed past projects in the Patricelli lab. Peppa, a robotic female sage-grouse and loyal lab member, also attended the lesson. Dr. Patricelli showed the participants how Peppa is used to manipulate the social landscape and “conversation” between male and female sage grouse on the lek.

CURRICULA RESOURCES

Presentations with information about sage-grouse, animal behavior, and conservation were all created to engage youth in the application of findings. The project relied heavily on technological resources. In order to train participants in reliable and robust data collection, a Zooniverse training protocol was established. The project is in review for public access and the training protocol will be incorporated into the online platform.



KEY PRACTICES

There are many strategies to get youth involved in community and citizen science. Through in-depth case studies of diverse YCCS projects, we have documented three youth-centered practices that are effective in promoting learning and environmental science agency. These practices are **youth sharing findings with outside audiences, taking ownership of data quality and interacting with complex social ecological systems.**

SHARING FINDINGS WITH OUTSIDE AUDIENCES

While youth did not present findings in this first year, interactions with scientists and managers helped establish that goal for future years.

Findings from this project will be shared with local working groups working to uphold current conservation goals for the BiState population of Greater sage-grouse and identify potential conservation concerns. Wildlife biologists from the Bureau of Land Management who play an active role in the conservation of sage-grouse explained to the youth how results from this study will be incorporated into management plans. As the project evolves and leaders including BLM employees look to make plans for the next season, there will be opportunities for youth to share findings with a variety of stakeholders.

Future iterations of this project will see more interactions between youth and individuals from the local working group, which include members that represent government agencies (i.e. NDOW, BLM, USGS) and volunteers from local NGOs. Findings will be analyzed and presented by youth at stakeholder meetings.

ENSURING HIGH DATA QUALITY

Allowing youth a high degree of freedom in data collection, without sustained engagement with project scientists, may have discouraged youth from trusting themselves to collect reliable data.

Data collection was done remotely; youth were asked to log in to Zooniverse on their own time

to classify photos from the lek. Though youth appeared to be engaged and excited about the project while they interacted with UCD and BLM scientists, this engagement seemed to wane when they were no longer in direct contact with scientists. There was a steep drop off in online classification of photos. One participant did classify a large number of photos and even emailed the lead UCD scientist in order to clarify how date and temperature data would be collected. She went out of her way to ensure high quality data. She was an exception in this case but that is likely due to the fact that youth may have overall felt undirected without continuous engagement with project scientists.

INTERACTING WITH COMPLEX SOCIAL ECOLOGICAL SYSTEMS

Using a field of science usually not taught in high school to explore unknown problems gives youth an insight into how they can engage with and improve the world around them.

Animal behavior is often fraught with esoteric ideas. Why do animals do the things that they do? How does their behavior change in response to the nonconsumptive effects of human impact? Youth (and others) may see the field of animal behavior as a science with no bearing on “real world” conservation issues. But an understanding of how animals react to human impacts can support more applicable conservation plans and goals. This project showed youth an example of how animal behavior can both answer and generate conservation questions. Youth classified photos of birds on leks to get an idea of when birds are using this critical breeding area and what they are doing while they are there. This form of exploratory science that is not hypothesis driven is essential to conservation science. Youth remarked that it was interesting to do science outside the sometimes cut-and-dried structure of high school curricula and many appeared to walk away with ideas about how humans may be impacting local ecological communities through behaviorally mediated effects.

Mammoth Lakes is nestled at the base of the Eastern Sierras and most of the economy is driven by skiers, hikers, and thrillseekers who visit from other parts of the state. The participants had astute observations about how humans impact their surrounding ecological communities. “A lot of people from Los Angeles come up here and just run around the sage and don’t treat it like they live here,” one participant noticed. Most of the youth recognized the ‘usual suspects’ that play a role in conservation efforts: people litter a lot, people drive a lot of cars, people come in and trample the sage brush. However, not many of the participants had thought about conservation as it relates to animal behavior.

YCCS PRODUCTS

In YCCS, the work youth do has a purpose—a “product” that has an audience and impact beyond the classroom walls. These products can vary widely by case.

DATA

Youth participated in the setting of camera traps and thus helped to produce the photos. They also produced photo classifications. Surveying sage-grouse leks around the clock enables scientists to collect data on lek use that would otherwise not be available, either because it is unreasonable to remain on the lek all day and night or because a scientist on the lek would affect bird behavior.

Audience: Conservation working groups. Local working groups and conservation managers will inform conservation plans based on results.

Audience: Large conference of animal behaviorists. Data will be used as primary exploratory evidence for future animal behavior questions.

Impact: This project has gained interest from local working groups as well as other scientists in the area and will be continued in the next field season. Other sage-grouse researchers may adopt a similar project, to engage their local community and answer habitat use questions.

OUTCOMES & EVALUATION

For the first pilot season participants did not present findings, but the project did appear to foster an environment in which some youth were able to approach data as scientists. One participant in particular was able to notice patterns in sage-grouse activity and formulate hypotheses as to why male grouse may be using the lek during “weird hours like 2AM”.

The quick decline in participation after the initial phase of the project may have stemmed from lack of engagement with project scientists. Post interviews revealed that some participants were unsure of their ability to classify photos correctly and thus stopped classifying photos. Had a project scientist been more readily available in-person, it is likely that youth may have felt more comfortable asking questions about their performance as data collectors. Future versions of this project may include more interactions with project scientists and more activity online. Zooniverse provides online “chat rooms” for participants who may be confused about the data collection process.