

Designing a Natural Resource Workshop for Students:

*“Working with Wood: Adventures in Forestry”*

A Senior Project

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## Abstract

There is a need for additional education focused on natural resource related careers and issues. As communities become further removed from these subjects, hands-on workshops and educational trainings are necessary to rekindle interest in these topics, especially in regards to application in fields like agriculture. The goal of this project was to create a logical outline to follow when designing and implementing natural resource workshops. An additional outcome of the project involved the implementation of a forestry workshop through the 26 Hours of Science and Technology program at California Polytechnic State University on March 11, 2015. The outline provided in this report should be used to assist program organizers in conducting a natural resource workshop. Additional written resources included in this report may also be referenced to guide future program coordinators.

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## **Chapter One**

### **Introduction**

Natural resource management, including forestry, is a vital collection of knowledge that applies to numerous fields, especially agriculture. It is important to share information regarding opportunities and challenges in the fields of forestry and natural resource management to help land managers make educated decisions. High school students are a prime group to target for this type of education, especially when they are still exploring career choices. An outdoor field day involving college students and professionals provides an open and conducive environment for learning and hands-on interaction.

#### **Statement of the Problem**

In communities removed from forested landscapes, there can be a lack in education focusing on forestry and specific natural resource topics. Agriculture classes tend to focus on mainstream farming and ranching without addressing the field of forestry, rangeland management, or other professions involving working landscapes besides crop production. In effect, fewer students are entering professions associated with forest and natural resource management. These fields are becoming increasingly important with a growing population and limited resources.

#### **Importance of the Project**

Through the development and implementation of a field day focused on forestry and natural resource management, greater awareness of forestry and natural resource

management fields can be encouraged. High school students still exploring career pathways may find a connection to a field that was previously foreign. The information learned during the field day can be applied to students' experiences with the land. Additionally, the college students and industry professionals involved with the educational aspect of the field day will gain exposure and communication skills. The Natural Resources Management and Environmental Sciences (NRES) Department at California Polytechnic State University (Cal Poly) will also benefit from the positive interaction with local high school students.

### **Purpose of the Project**

By planning and implementing a field day in an outdoor setting for local high school students, the researcher hopes to create a sustainable and long-lasting mechanism to help educate students about the fields of forestry and natural resource management. In addition, this activity can provide another opportunity for university and community collaboration in the San Luis Obispo area.

### **Objectives of the Project**

The objectives to accomplish the purposes of this project include the following:

1. Contact local high schools to gain student participation in the activity
2. Identify and utilize what information, concepts, or skills will be most valuable for high school students to learn at the field day
3. Gather materials and resources necessary to host high school students

- a. Complete all required paperwork through the college, various departments, and high school
  - b. Provide necessary equipment for the presenters/volunteers
4. Recruit 5-10 volunteers from the Cal Poly community to assist with the execution of this event
5. Create and utilize a method to measure high school students' enjoyment and learning from the experience in the form of a survey, quiz, or interview
6. Perform post-activity interviews with high school teachers and Cal Poly faculty to determine the value in a continued program

### **Definitions of Important Terms**

The following terms have been defined to ensure a thorough and universal understanding of the identified word(s):

- **California Polytechnic State University (Cal Poly):** a public university located in San Luis Obispo, California. This is one of 23 colleges in the California State University (CSU) system. Cal Poly promotes the educational philosophy of Learn By Doing, encouraging experiential learning outside of the classroom.
- **Forestry:** the science and practice of managing and studying forests
- **Natural Resource Management:** a deliberate management of natural resources including soil, water, minerals, air, plants, wildlife, and land. *Good* natural resource management focuses on impacts current decisions will have on generations to come.
- **Natural Resources Management and Environmental Sciences (NRES) Department:** one of ten departments within Cal Poly's College of Agriculture, Food,

and Environmental Sciences (CAFES). This department includes students and faculty in the fields of forestry, environmental management, soil science, earth science, and natural resources.

- **Nelson Learning Complex (Logging Unit):** located on Cal Poly's campus, this site is managed by students involved with the Cal Poly Logging Team. It is nestled between Cal Poly vineyards, Stenner Creek, Nelson Reservoir, and Cal Poly avocado orchards.

### **Summary**

There is a vital need for education regarding forestry and natural resource management due to the dependent relationship humankind has with the environment. In communities spatially separated from timber and rich natural resources, there can be fewer teachings about the careers and concepts affiliated with these fields.

An experiential learning activity in the form of a field day for high school students will provide a sharing of knowledge about forestry and natural resources in an engaging way. The goal of this project is to create a lasting tool to promote community-university interaction and learning about important themes associated with forests, water, wildlife, and the land.

## **Chapter Two**

### **Review of Literature**

Forestry and natural resource management are vital areas necessary for economic growth and land stewardship. However, education focused on these activities can be limited, especially for youth spatially separated from working landscapes. An interactive, hands-on field day is a useful means of connecting with students about the opportunities and challenges in the areas of forestry and natural resource management.

#### **Importance of Forestry and Natural Resource Management Education**

With 39.7 million acres of forestland in California, totaling nearly 40 percent of the state's land, the role of sustainable forest management cannot be understated (Laaksonen-Craig, Goldman, & McKillop, 2003). In addition, rangelands in California provide a number of services for society including forage for livestock, water purification, mineral supplies, wildlife habitat, recreation, and natural beauty ("California Rangelands", 2014). The sprawl of urban centers into farms, ranches, forests, and other lands providing ecosystem services is a growing concern for natural resource managers across the globe.

#### ***Careers***

There is obviously a strong need for experts in both forestry and natural resource management professions, but the interest in many of these careers remains low amongst high school students. Young people seem to be aware and interested in environmental issues or programs, but their awareness tends to be developed by the media (Hager, Straka, & Irwin, 2007). "Forestry does not have a high recognition level in terms of professional

career opportunities and is the least popular of the natural resource fields” (Hager, Straka, & Irwin, 2007).

A survey of high school students from across the country found that only 15 percent of the participants had received natural resources career information from guidance counselors (Hager, Straka, & Irwin, 2007). These students appeared to be concerned with environmental and natural resource conservation problems, but interest did not translate into a desire to enter these vital professions (Hager, Straka, & Irwin, 2007). Providing information about the vast opportunities available for natural resource managers - from fire fighting to fish and game warden; from forester to lobbyist – may help bridge the interest gap amongst teenagers still exploring future career pathways.

### ***Connections with Agriculture***

The production of food through farming and ranching cannot be separated from key principles associated with forestry and natural resource management. Soil, water, wildlife, and fire are important natural resource topics that never leave agricultural news headlines. There is tremendous value in educating students interested in agriculture about natural resource management topics.

A report released by the United States Forest Service (USFS) about the future of America’s forests and rangelands estimates that urban and developed land areas will increase 41 to 77 percent by the year 2060 (US Department of Agriculture, Forest Service, 2012). This expansion will come from agricultural land bases, forests, and rangelands. These changes will convert productive carbon stocking areas into drastic carbon emitting regions (US Department of Agriculture, Forest Service, 2012). By helping inform

agriculture students about the valuable services lands offer by not being developed, there is hope that these individuals will fight to keep working landscapes.

Being aware of carbon and organic matter in the soil is key for both effective crop production and ecosystem functions (Powlson et al., 2011). Seemingly minor changes in soil carbon can have drastic effects on soil physical properties, such as structure (Powlson et al., 2011). Good soil management enhances the ability for plants to grow, promotes microbial activity to provide nutrients, decreases soil erosion, and provides other important mechanisms that benefit agriculture, as well as ecosystem processes.

Concepts associated with wildlife and native plant conservation may also provide useful information due to the increasing popularity and necessity for supplementary sources of income for farming and ranching enterprises. Through diversification, agriculturists can tap into additional niche markets and recreational interests to increase income, enhance conservation, and benefit communities (Maczko et al., 2011). Creating or maintaining lands rich with biota can attract bird watchers, hikers, rock collectors, hunters, fishers, botanists, and others nature enthusiasts (Maczko et al., 2011).

Harvesting timber on forested lands with agricultural operations may result in multiple benefits as well. Besides contributing to income, periodic logging reduces fuel density to better prepare lands for wildfire. Logging also provides increased understory sunlight to promote crop and/or grass growth for farming and livestock grazing enterprises. Even the debris left over from timber harvesting enhances soil nitrogen, improves soil water availability, and helps mitigate the sprawl of certain invasive species (Harrington & Kirkland, 2012).

Overall, enhancing natural resources on public and private lands can provide limitless opportunities in terms of economic stability, ecosystem services, and long-term sustainability to benefit land managers and communities, especially those connected to agriculture. Educating students about careers, concepts, and connections in forestry and natural resource management will encourage better decision-making in the future.

### **Organizing a Field Day**

A field day provides a terrific atmosphere for engagement, learning, and relationship building if properly planned. Planning is considered the most important component of ensuring a successful event (Joyce & Appl, 2005). When organizing an event that is intended to be educational and interactive with long-lasting outcomes, the organizer(s) must create a timeline that outlines when and how certain tasks will be accomplished.

#### ***Months Before***

There are several undertakings that need to be tackled three to six (or more) months in advance. Some of the key items include the following:

- Determine which schools should be invited to the event. The Department of Education website can be a good resource to find schools within a specific area (Joyce & Appl, 2005).
- Decide which types of students should be recruited to participate. Depending on the chosen size of the event, it may be best to encourage entire classes to attend, or simply advise teachers to choose their “best” students who would gain the most from the experience.

- Complete forms associated with reserving facilities, risk management procedures, transportation arrangements, high school field trip paperwork, and other logistical details.
- Select a date for the event and ensure that facilities, volunteers, and participants will be available.
- Determine what will be discussed and presented by whom. Start contacting specific groups if necessary (CalFire, Society of American Foresters, etc.). Recruit volunteers that are knowledgeable in the specific fields.
- Estimate the costs involved with hosting the event and establish how expenses will be funded. Institutional support, fundraising, sponsorships, personal funds, or donations may be necessary. Start collecting and/or making arrangements to fund the event as determined by the amount and source(s) of money needed.
- Develop and distribute invitations for the event to participants (schools), volunteers, and faculty. Be sure to include the details of who, what, when, where, and why. A map and/or directions may be necessary.
- Contact organizations and professional resources to request informational brochures, posters, and other educational items.
- If applicable, plan food and beverage accommodations for the attendees. Contact catering services if necessary.

### ***Weeks Before***

- Compose and send correspondence reminding participants and volunteers of their commitment. Inform teachers and volunteers about any changes in the schedule, facilities, or other alterations.

- Contact local media outlets to provide information about the event. Send a press release to local television stations, newspapers, and radio channels.
- Type up the official agenda/schedule for the event.
- Put together informational materials (brochures, stickers, contact information, etc.) to give participants at the event. Providing students with take-home materials encourages additional knowledge transfer (Brooks, Hart, & Church, 2009).

### ***Days Before***

- Confirm with all volunteers, professionals, faculty, and schools the date, times, commitments, and details involved.
- Check the weather and make arrangements for alternative equipment/resources if necessary.
- Organize a survey or other mechanism to be completed by students, teachers, volunteers, and faculty assessing the event.
- Collect nametags, electrical equipment (if needed), food/drinks, or other items to be utilized at the event.
- Tidy-up the site and make any preparations possible at the event area.
- Rest (Joyce & Appl, 2005).

### ***The Day of the Event***

- Set-up stations, posters, activities, electrical equipment, or demonstration items before the students and teachers arrive.
- Communicate with volunteers, faculty, and professionals assisting with the event to ensure everyone is on the same page and knows the plan for the day.

- Be prepared for the students and teachers when they arrive. Distribute nametags and educational materials, welcome everyone, and usher students to where they are supposed to be.
- Enjoy the event! Be an attentive, organized, and prepared facilitator to address any challenges that may arise.
- Distribute surveys, comment cards, interviews, or other methods of assessment to the participants, teachers, and volunteers.

### ***The Week After***

- Write and deliver thank you letters to those who helped make the event possible.
- Analyze the evaluations of the event and determine what parts were particularly successful, and what areas could be improved.
- Discuss the potential for future, ongoing events of a similar nature with volunteers, faculty, and high school teachers.

### **Recruiting Volunteers**

Knowledgeable and genuinely interested volunteers are a necessity for any educational event. A forestry and natural resource focused field day especially requires interactive and engaging individuals who can appropriately connect with a high school aged audience. Finding specialized individuals and convincing them to commit time and energy to this endeavor can be challenging. However, understanding the needs of potential volunteers and using creative methods of recruitment will pay off (Hart, 2005).

Before recruitment even begins, it is essential to know *what* is wanted from the volunteers (Hart, 2005). Prior to recruitment efforts, it is smart to identify the specific

activities, tasks, and roles that need to be filled. This way, suitable individuals will be more likely to donate time if their skills will be utilized in a meaningful and well-planned manner.

When trying to recruit volunteers, there are several points to consider. A study conducted at a hospital near Washington D.C. found that face-to-face contact was the most frequent and influential recruitment strategy (Gree, Aarons, & Cross, 1984). Be sure to actually ask certain individuals for their help and support. Do not simply post requests through media channels like newspapers, Facebook, or the like. This study also discovered that non-altruistic motives (such as personal gain for the future, course credit, recognition, etc.) are stronger than altruistic motives as indicators of overall positive evaluation, future volunteering likelihood, decreased discouragement, and increased probability of recommending the experience to others (Gree, Aarons, & Cross, 1984). With this information in mind, it is best to cater to potential volunteers needs for self-fulfillment through strategies such as extra credit in classes, recognition within the particular institutions, and transparent application of the experience toward volunteers' future goals.

Once volunteers are identified, continuous communication is of the utmost importance. Keeping volunteers informed about responsibilities and/or any changes in the original plan shows respect and appreciation for their commitment (Hart, 2005). It is also in the best interests of all to provide simple training and support for the volunteers to help ensure suitable knowledge, skills, and attitudes for effective action (Hart, 2005).

Recognizing the value and contributions of volunteer efforts will encourage exceptional performance and increase the potential for repeated volunteering (Hart, 2005). Announcing the praise of volunteers through media channels, at the event, and especially

through thank you cards will display positive appreciation for the actions of others. Dr. Scott Vernon, a professor in the Agricultural Education and Communications Department at Cal Poly, emphasizes to students that “the most powerful form of motivation is a genuine and sincere appreciation for a job well done.”

Seeking volunteer input when planning, implementing, and assessing an event can add feelings of personal attachment and pride regarding the experience for volunteers. Incorporating multiple points of view can ultimately enhance the quality of the event as well.

### **Summary**

Designing and executing a successful educational field day focused on forestry and natural resource management involves time, energy, resources, manpower, and commitment. However, these types of educational opportunities are greatly needed as working landscapes continue to become fragmented, many high schools lack learning in these fields, and people become further separated from areas rich in natural resources. The effects of forestry and natural resource focused learning extend far beyond the present circumstances. A well-executed field day can enlighten high school students about future career opportunities, alter land management decisions, and positively impact community interactions.

## **Chapter Three**

### **Materials and Methods**

When designing, organizing and implementing an educational workshop focused on forestry and natural resources for high school students, it is essential to utilize human resources available. There can be significant variety in workshop design, goals and outcomes dependent on the resources available, number of participants, location and budget, among other factors. Elements universally important include clear communication, good organization skills, devote perseverance, flexible willingness to receive help from others and a positive attitude.

The first key step in planning any workshop is to determine the best format for the event. Format considerations include event length, location, date and whether the workshop should be incorporated with existing programs. Consultation with faculty is necessary to determine how the workshop can best be delivered. Faculty and/or expert input is important throughout the workshop planning process. The next vital component of workshop design is to determine what specific content should be presented at the event. This step involves research, communication with professionals, and consideration of potential limiting factors, such as location and length of time.

Once the core design and basic components of the workshop have been identified, it is critical to involve experts and volunteers to partake in the event. Depending on the content chosen, this step may be daunting or very simple. Performing a workshop through Cal Poly affords convenient opportunities to gain student volunteers, as well as knowledgeable faculty. Community resources should be considered as well.

After presenters and volunteers have been secured, specific activities need to be determined. Depending on circumstances, individual presenters may have exercises planned, but some may require assistance with equipment needs, handout creation and other tasks.

Throughout the planning process, it is essential to keep the actual audience in mind. It is best to get in touch with teachers early on, but not before the basic design and intent of the workshop has been determined. The workshop may be planned for local high school students or students across a region. Contact with schools, teachers and even individual students should take place months before the implementation of the event. In the case students have already been selected and contacted because the workshop is incorporated with another program, this step may be unnecessary.

Leading up to the event, constant and persistent communication with all individuals and groups interested in the workshop is vital. Faculty and staff involved in the event in any form should be aware of all plans and changes occurring during the organization of the event. Additionally, even after volunteers, presenters, and participants have been locked in, continual contact and communication is advised.

Finally, in the weeks prior to the workshop collect and prepare any materials needed, including handouts, table space, electronic equipment (PA system), technical equipment, or other related items. Ensure all volunteers and/or presenters are aware of the schedule, rules, guidelines and other important details. It is also useful to create a survey to evaluate student and/or adult feedback regarding the workshop. Lastly, try to procure educational materials that can be given to the individual students and/or teachers to encourage long-term education regarding the topics covered. Many excellent sources

exist offering books, pamphlets, online resources, and other items to further natural resource and forestry education beyond the workshop.

### **Determining Workshop Format**

Setting a date, finding a location, and determining how the workshop will be implemented will form the basis for all other decisions, so the importance of this first step cannot be overemphasized. Consultation with multiple professors and staff will help flesh out the most logical application and design of a forestry and natural resource focused workshop.

For this project, five Cal Poly staff and faculty were consulted to determine the best format for a forestry and natural resource focused workshop at Cal Poly. First, Dr. Robert Flores conveniently advised the workshop be incorporated into the existing “26 Hours of Science and Technology in Agriculture” (26 Hour) program that occurs at the end of each Winter Quarter. This clear yet simple suggestion provided a time and length for the event. Additionally, by incorporating the workshop into this program, participation was secured without extra effort. As a key coordinator of the 26 Hour program, Dr. Flores was utilized as a knowledge source throughout the planning process.

Next, Ms. Megan Silcott, Director of the Brock Center for Agricultural Communication, served as a motivational advisor, especially in regards to contacting specific knowledge resources. Ms. Silcott provided guidance and direction when requested during the design and implementation phases of the project.

Ms. Cortney Newby, an Administrative Support staff member for Cal Poly’s Swanton Pacific Ranch, was consulted for guidance and knowledge regarding particular forestry and

natural resource related themes. Ms. Newby suggested the creation of a handout describing the workshop and the project to clarify and assist future conversations with other faculty regarding the project.

Dr. Richard Thompson, Natural Resources and Environmental Sciences (NRES) Interim Department Head, was contacted to gain permission to implement this workshop at Cal Poly's logging unit. Dr. Thompson also offered advice regarding subjects to be covered within the workshop and suggested researching other resources.

Mr. Jeffrey Reimer, the main technician within the NRES Department, offered excellent advice and direction for content development. He also gave the final clearance to use the logging unit as the workshop setting. Mr. Reimer forewarned of potential challenges in securing volunteers, but offered his assistance in that process as well.

### **Content Creation**

Once the skeletal foundations of time, location and format were set, the next step involved determination of the content to be presented at the workshop. Utilizing the previous year's schedule from the 26 Hour program, it was revealed students would have only 45 minutes at the workshop. To maximize the amount of time given, it was determined three stations with different themes regarding forestry and natural resources should be designed.

A list of important topics and complimentary activities was brainstormed, utilizing the advice from the above-mentioned professionals in mind. From this list, five key subjects were identified, to expedite the content development phase. It was important to have extra

options in case knowledgeable assistance could not be attained for one or more of the subjects.

When narrowing the list of topics to be covered in the workshop, the following considerations were used: ease of applicability of information at the workshop location, availability of experts and/or volunteers for the topic, and ability to implement hands-on learning activities for the topic.

Another consideration for content creation was the potential for risks that would result in liability concerns. For instance, although the idea was intriguing, the activity of allowing students to throw axes at a target was excluded from the workshop, unless liability forms were attained. If any possible risks are present, it is advisable to contact the Risk Management Department and obtain a Release of Liability waiver for participants to fill out prior to the workshop.

### **Procuring Expertise and Man Power**

One of the most challenging aspects of planning a workshop focused on specific, science-based information is to secure knowledgeable and skilled professionals or volunteers to assist with the event. However, a convenient opportunity exists by conducting the workshop through a university.

Cal Poly has a highly creditable program focused on forestry and natural resources; so expert staff, interested student volunteers, and equipment were fairly readily available. When reaching out to specific individuals, it was important to be clear and to the point about the intent of the workshop and what is being asked of the volunteers. The date(s) of the event, the time commitment, the specific subjects to be covered, and the type of

audience were useful facts to share with potential volunteers. An emphasis on the positive outcomes of successful implementation of the workshop was discussed. While professors, specialists, and even students were exceptionally busy, by clearly identifying the value of their contribution, they were more inclined to contribute.

When organizing a natural resource workshop, reaching out to community and/or organizational experts is also beneficial. While universities offer an array of specialists in specific areas, oftentimes academia forms the core of their experience. Therefore, utilizing working professionals in specific fields may offer alternative perspectives. For this project, CalFire was contacted because of the undeniable expertise the individual firefighters have regarding careers involving fire.

The University of California Cooperative Extension (UCCE) also offers a variety of exceptionally well-informed individuals to be utilized in the implementation of an educational workshop. UCCE specialists also have tremendous experience involving educational events, so these individuals could be consulted in the planning process.

Students are excellent resources, especially when their interests align with that of the workshop's focus. In this project, student members of the logging team and the Society of American Foresters (SAF) were contacted. These groups had a clear connection to the content of the workshop. Additionally, the students could find value in volunteering because the experience could be utilized personally for professional development.

It is beneficial to have more individuals committed to assisting with the event than seemingly necessary early on. Oftentimes, unforeseen circumstances arise causing individuals to withdraw their contribution, so developing backup options is worthwhile.

### **Gain Participants**

The key purpose of the entire workshop is centered on the knowledge transfer from “experts” to high school students. Without a critical mass of participants, the workshop would be essentially futile. Thus, securing student participation is vital to the success of the event.

A logical and fairly painless place to start rallying student involvement would be local high schools. Additionally, connections may be present with specific departments and/or teachers at certain schools, so the low hanging fruit should be utilized first. Conducting presentations in front of classes can be a worthwhile action because students can perceive the intent of the workshop firsthand. Various forms of advertising are also beneficial, including but not limited to emails, printed flyers, phone calls, radio ads, and newspaper articles.

Since this project was incorporated into the existing 26 Hour program involving multiple departments, student participation was already secured. However, contact with one of the main event organizers, Dr. Flores, was necessary to guarantee a position in the event.

### **Continual Communication**

Communication is crucial throughout the development of the workshop. Maintaining clear, consistent, and inclusive communication with the main event organizers, department faculty, and others directly or indirectly involved cannot be understated.

Once volunteers have been secured, whether they are students, industry professionals, academics, or specialists, routine check-ins are advised. Events are

constantly being announced, personal circumstances can change, and scheduling issues may arise so keeping a consistent flow of communication can help to buffer against stressful situations.

Furthermore, if participants have been acquired primarily for the workshop, regular contact with teachers or individual students is vital. If participating students don't follow through, the workshop will not only be less impactful, but volunteers may feel less inclined to assist in the future.

### **Organize Materials**

There will invariably be equipment and material needs for the implementation of any workshop. Technical workshops involving hands-on activities especially require specific materials. Depending on the length of the workshop, meal preparations may also be necessary.

With the short length of this particular workshop, only technical and functional equipment was needed. For the hands-on activities, the following materials were gathered:

- Handouts
- Pencils
- Forestry & Natural Resource Related Tools (compasses, GPS devices, soil analysis tables, clinometers, measuring tapes)
- Fold-up Tables
- Blocks of Wood
- PA system

Procurement of the above materials was made possible with the assistance of the NRES Department, the Agricultural Education and Communications Department, the Media Distribution Services, and the Cal Poly Logging Team.

### **Final Details**

A few attributes that add to the impact of the workshop include surveys, take-home materials, and opportunities for continual and/or future pursuit of the topics covered.

Surveys provide feedback and insight into the success of the workshop. Surveys are a mechanism to determine improvements to be made for future workshops. Surveys should be administered not only to the high school student participants, but also to volunteers and teachers. Different perspectives enhance the overall analysis of the event. Multiple surveys were created for this workshop – one for the student participants and one for the volunteers.

Take-home materials allow participants to have a reference about what was discussed at the event. A forestry and natural resource focused workshop offers abundant opportunities for physical items that students may keep including the following: a thin slice of wood (commonly called a “cookie”), handouts with plant and/or animal identification, actual plant sample, soil samples, handouts with information about technical equipment use, pictures taken at the workshop, among other objects.

Additionally, offering teachers resources for continual learning can be greatly appreciated. Many non-profit organizations offer educational books, pamphlets, activity sheets, and other resources that can be obtained for free. Presenting these items to educators may further discussions about forestry and natural resource related subjects

beyond the workshop experience. Students unable to participate in the event could potentially benefit from the materials offered to teachers.

Finally, enabling participants to continue learning about the subjects discussed in the workshop could have the most profound effects. Educating about career opportunities, college majors, local clubs and ways to get involved in forestry and natural resource pursuits could stimulate positive actions. Providing useful brochures, handouts with online resources, announcing related upcoming events and opening the door for mentorship opportunities are just a few options to encourage long-term interest beyond the workshop.

### **Summary**

By utilizing the steps, measures and guidelines described above, an impactful workshop focused on educating high school students about forestry and natural resources related topics can be produced. Key elements instrumental in the success of an educational event include consistent communication, organization, enthusiasm and commitment. The utilization of human resources in the planning and implementation of the workshop is of paramount importance. Establishing a suitable format and logical content will form a solid foundation for the workshop. Adequate participation is critical for the success of the event. Preparing requested and necessary materials is key for ensuring smooth implementation of the workshop. Providing additional resources for continual learning outside of the event can have long-term positive effects. Ultimately, a well-planned and properly executed workshop focused on forestry and natural resources will have lasting effects beyond the discussions presented at the event. Not only will awareness and potential interest grow

regarding the subjects covered, positive outcomes from collaboration between varying groups may bloom and future opportunities for natural resource learning may be created.

## **Chapter Four**

### **Results and Discussion**

#### **Introduction**

Forestry and natural resource educational workshops are undeniably valuable tools to expose students to the importance of these fields. Organizing and implementing a quality workshop involves a series of steps discussed in the previous chapter including good design, faculty involvement, volunteer recruitment, location choice, content creation and finally implementation, all of which should be clearly aligned with intended goals in mind. In the next few pages, documents will be presented which assisted in the final implementation of the workshop titled “Working with Wood: Adventures in Forestry”. This workshop was held on March 12, 2015, through the 26 Hours of Science and Technology Program at the Nelson Learning Complex at California Polytechnic State University. A few of the flyers and informational documents were used to communicate key points about the program and increase interest and participation in the workshop. Educational sheets and activity guides were presented to the high school students who participated in the program. Lastly, photos showcase student participation at the workshop.

### **Workshop Promotion**

The following three pages show the document which was prepared to inform faculty within the Natural Resources and Environmental Sciences (NRES) about the workshop and the 26 Hour Program. Using the information provided in this handout, along with clear and concise verbal and electronic communication, full support from the NRES Department was attained. This approval was necessary because the location of the workshop, equipment being used and expertise manpower involved was associated with the NRES Department.

**Forestry and Natural Resource  
Management: Organizing and Implementing  
an Educational Field Day for High School  
Students**



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**Figure 1: Front page of the handout given to Cal Poly faculty to give them an introduction to the purpose, goals and outcomes of the project.**

## Background

As an Agricultural Science major with a career area pathway in Agricultural Communications and a concentration in Forestry and Natural Resources, my interests and passions are closely related to these topics involving people and working with the land. I wanted to produce a senior project that was not only valuable to the Cal Poly community, but also outside individuals. Ideally, it would be long-term and sustainable as well.

With close ties to the Cal Poly Logging Team, I was motivated to design an educational program that gives youth the opportunity to learn about careers and industries within Forestry and Natural Resources, which are closely related to careers in agriculture. As a high school student, I was highly involved in the agriculture department at Nevada Union High School. I learned about various opportunities within “main stream” agriculture; however, careers in natural resource management were not as widely shared even though I grew up in a community intimately tied to abundant natural resources.

After talking with Dr. Flores within the Agricultural Education and Communications Department, he advised that I design a more specific natural resource workshop to incorporate into the existing “**26 Hours of Science & Technology in Agriculture**” (26 Hour) program that occurs toward the end of each Winter Quarter. He informed me that there used to be a Forestry component to the program, but it was discontinued several years ago. This appears to be a logical and convenient opportunity to (re)introduce a field day/workshop focused on forestry and natural resources for youth, specifically high school students.

The 26 Hour program draws **80-100 high school students** from various parts of California, particularly across the Central Valley and coastal regions. Participating students get to learn about numerous agriculture topics, industries, and even professional skills to widen their horizons regarding potential college program choices, career opportunities, and the like. This year, the 26 Hour program will take place on **March 12<sup>th</sup> (Thursday) and March 13<sup>th</sup> (Friday)**.

## Project Proposal

For my senior project, I am producing the step-by-step procedure used to plan an event focused on forestry and natural resource education, specifically in regards to agriculture, for students. I would really like to implement the design as well if afforded the resources and opportunity.

Specifically, if a brief workshop focused on forestry and natural resources was included in the 26 Hour program this coming year, I would include a few of the following “stations” for students to experience:

- **Hydrology** – a water specialist from Cal Poly or outside of the university could briefly talk about basic hydrologic principles, such as watershed

**Figure 2: The second page of the handout provides some background and key details about the workshop and the 26 Hour Program.**

management and runoff, and careers related to water in the fields of agriculture and natural resource management.

- **Fire** – a Cal Fire or USFS truck and personnel could be present to give students first hand exposure to careers and opportunities related to fire.
- **NRES Programs** – current Cal Poly students and/or faculty could be present to talk with the participants about opportunities offered at Cal Poly (or other colleges) in terms of forestry and natural resource management.
- **Rangeland** – a rangeland specialist affiliated with Cal Poly or outside of the university could present information about the importance of rangelands and the various careers associated with rangeland management. Native plants and/or invasive plants could be identified and discussed.
- **Wildlife Management** – an expert in this area could briefly educate participants about careers and opportunities in this field. With many birds and other wildlife around, identification and basic ecological principles could be shared.
- **Forestry** – students, faculty, or professionals could discuss the importance, value, and opportunities related to forests, especially in CA. Basic information related to forest health, trees /lumber, and careers could be discussed. Hands-on activities may include using a clinometer to estimate height or counting tree rings from a wood cookie.

Having spent a considerable amount of time at the logging unit on campus, I think this would be a terrific location to host a workshop for the subjects listed above.

Obviously, given a limited amount of time for workshops with the 26 Hour program, only 3-4 of the listed topics would be covered. However, having additional options allows for more flexibility to ensure enough presenters can be available.

I have talked with fellow officers on the logging team, and they were very supportive of this project. I also plan on talking with members of the SAF club to see if additional student involvement can be attained.

Ultimately, I am asking for permission and support from the NRES Department to utilize the logging unit on either March 12<sup>th</sup> or March 13<sup>th</sup> to conduct a forestry and natural resource workshop for the “26 Hours of Science & Technology in Agriculture”. Through participation in this event, the NRES department would receive increased exposure to high school students who may not otherwise have much knowledge about forestry and natural resources. Additionally, this workshop promotes additional collaboration between departments within the College of Agriculture, Food, and Environmental Sciences. Lastly, this project could be utilized as a stepping-stone toward more elaborate field days focused on natural resource management. Potentially, other students could enhance this program into a daylong (or multiple day) educational event for high school students in the area, younger youth, or even for the community.

**Figure 3: The third page of the handout sums up what is being requested.**

## **Volunteer Recruitment**

Once there was a green light on the entire workshop implementation and location use, the next major hurdle involved rallying volunteers to help make the event a success. The following two pages show the document created to quickly inform fellow students about the program, display specific details focused on the implementation of the workshop and ask for input regarding particular components of the event. Multiple announcements at several clubs meetings (Cal Poly's Logging Team and Cal Poly's Society of American Forester's Club) generated a list of volunteers with contact information. Verbal and electronic communication was extremely important to remind volunteers of their obligation leading up to the event.

## 26 Hours of Science and Technology in Agriculture

*Head Coordinator:* Dr. Robert Flores, Ag Education Professor

### Forestry & Natural Resources Workshop

*Workshop Coordinator:* Maddison Easley, [measley@calpoly.edu](mailto:measley@calpoly.edu), (530) 205-8207

**What:** A forestry based workshop for high school students with little previous exposure to this field. 80-100 students will cycle through three rotations on Thursday.

**When:** 2:15 pm – 5:00 pm on Thursday, March 12<sup>th</sup> (dead week)

**Where:** Cal Poly Logging Unit (Nelson Learning Center)

**Why:** This is an excellent opportunity to not only promote Cal Poly's NRES Department, but also to share valuable knowledge and skills with students who have little to no background experience in forestry and natural resource topics. Ideally, this workshop can be sustainable long-term (other NRES students continue to contribute to the 26 Hour Program).

#### Workshop Details

Within the Forestry Workshop, there will be 3 distinct rotations focused on:

- Urban Forestry
- Fire
- Traditional Forestry Skills (Timbersports)

Additionally, it would be useful to send students with something tangible from the workshop.

- One idea is a baggy of seeds from various trees species attached to a sheet of paper with pictures and information about those trees.
- Another idea is to give each student their own mini "cookie" with their initials painted/burned in the center.
- Other ideas are welcome!

**Figure 4: This front page of the flyer given to recruit/inform volunteers offers specifics about the workshop and why participation would be useful.**

## Event Schedule

### Thursday, March 12<sup>th</sup> at the logging unit

12:00pm – 2:00pm	Set-up
2:15pm	First group of students arrives – divide into 3
2:15pm – 2:30pm	Rotation 1A
2:30pm – 2:45pm	Rotation 1B
2:45pm – 3:00pm	Rotation 1C
3:15pm	Second group of students arrives – divide into 3
3:15pm – 3:30pm	Rotation 2A
3:30pm – 3:45pm	Rotation 2B
3:45pm – 4:00pm	Rotation 2C
4:15pm	Third group of students arrives – divide into 3
4:15pm – 4:30pm	Rotation 3A
4:30pm – 4:45pm	Rotation 3B
4:45pm – 5:00pm	Rotation 3C
5:00pm – 5:30pm	Clean up / Finished!

### Friday, March 13<sup>th</sup> at BRAE Laboratory 4

12:15pm – 1:00pm	Lunch for volunteers
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**Figure 5: The back of the flyer outlines the schedule for the implementation of the forestry workshop.**

## Educational Materials

In the actual workshop, three activities were planned to engage high school participants and briefly expose them to important areas of forestry. Upon arrival at the site, students were divided into three groups and rotated through the three activities. One component was focused on careers and opportunities in the field of fire science with the help of Cal Fire employees who volunteered to talk with students alongside their fire engine. Another component exposed students to logging related activities, including climbing, axes, sawing, tree age and related subjects. The third activity was run by Cal Poly forestry students and involved a brief discussion about forestry careers, followed by a pacing/ navigation training and exercise. A take-home “prize” for students was a bag of goodies, which included candy, an educational sheet about one of three different native tree species and a bag of cones of that native tree species. The following documents show the instructions given to students for the navigation exercise, as well as the handouts included with the participant prizes at the final destination.

26 Hours of Science and Technology in Agriculture | Forestry Workshop | March 12, 2015

### **Traverse Exercise – Group 1**

- Use the following bearings to point yourselves in the right direction
- Use the pace you just calculated to walk (traverse) the given distance  
*Ex: If your single step pace is 2.1 feet, and the given distance is 85 feet, divide 85 by 2.1 to get ~40.5 single steps.*
- From that point, use the next bearing / distant combination to travel to the next specified point.
- At the final stop, there will be a prize waiting for you!
- Don't hesitate to ask for help!

	<u>Bearing</u>	<u>Distance</u>
Track 1:	N 42 °E	100 feet
Track 2:	N 65 °E	90 feet
Track 3:	S 44 °E	30 feet
Track 4:	N 64 °E	64 feet
Track 5:	N 28 °E	100 feet (Final Destination!)

26 Hours of Science and Technology in Agriculture | Forestry Workshop | March 12, 2015

### **Traverse Exercise – Group 2**

- Use the following bearings to point yourselves in the right direction
- Use the pace you just calculated to walk (traverse) the given distance  
*Ex: If your single step pace is 2.1 feet, and the given distance is 85 feet, divide 85 by 2.1 to get ~40.5 single steps.*
- From that point, use the next bearing / distant combination to travel to the next specified point.
- At the final stop, there will be a prize waiting for you!
- Don't hesitate to ask for help!

	<u>Bearing</u>	<u>Distance</u>
Track 1:	N 69 °E	75 feet
Track 2:	N 74 °E	80 feet
Track 3:	S 8 °E	85 feet
Track 4:	---	---

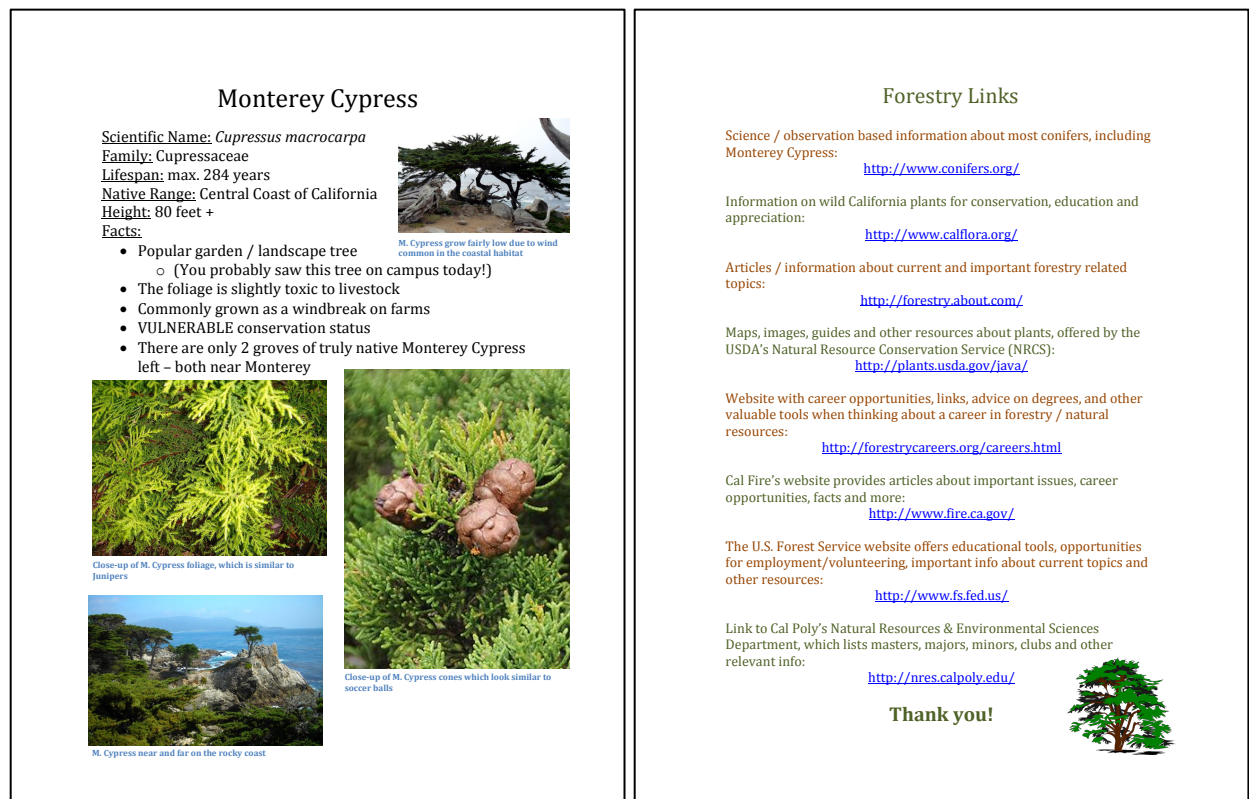
26 Hours of Science and Technology in Agriculture | Forestry Workshop | March 12, 2015

### **Traverse Exercise – Group 3**

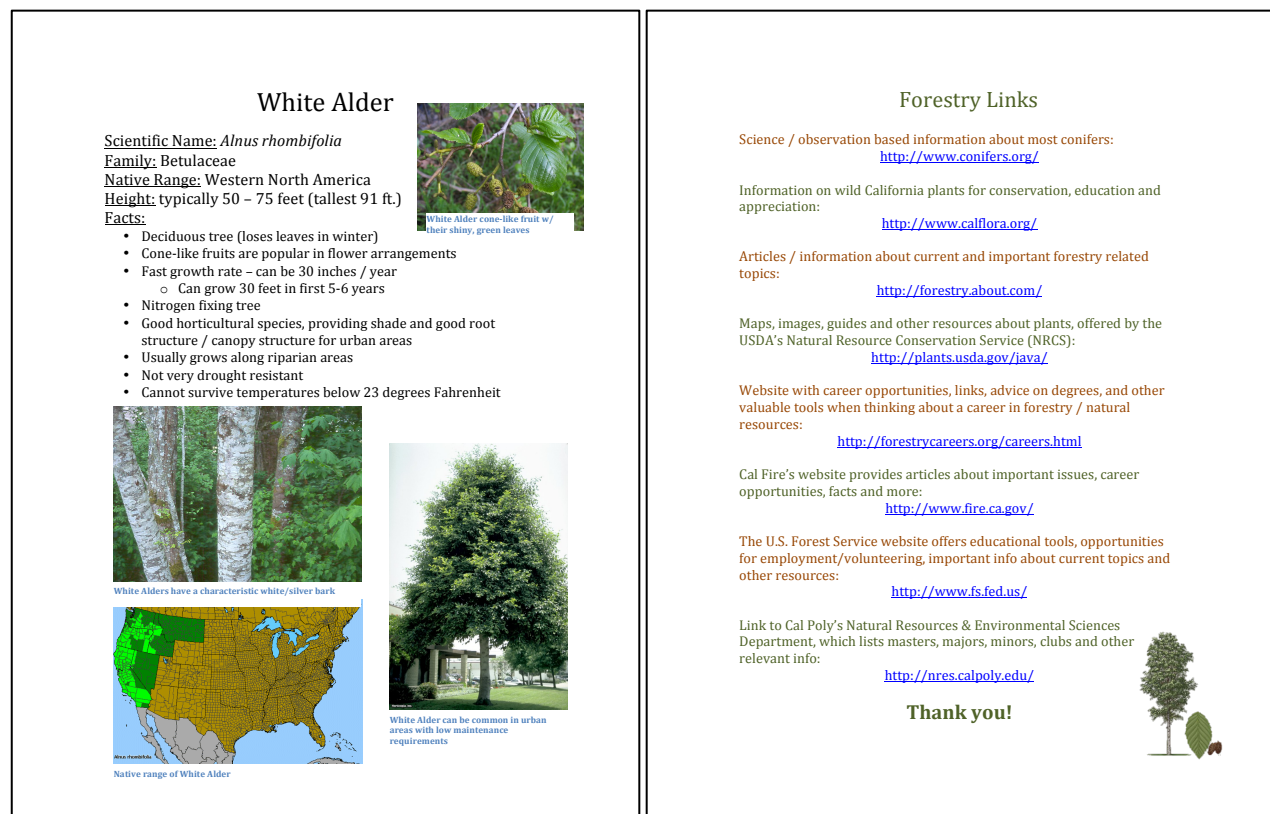
- Use the following bearings to point yourselves in the right direction
- Use the pace you just calculated to walk (traverse) the given distance  
*Ex: If your single step pace is 2.1 feet, and the given distance is 85 feet, divide 85 by 2.1 to get ~40.5 single steps.*
- From that point, use the next bearing / distant combination to travel to the next specified point.
- At the final stop, there will be a prize waiting for you!
- Don't hesitate to ask for help!

	<u>Bearing</u>	<u>Distance</u>
Track 1:	S 26 °E	73 feet
Track 2:	S 10 °W	81 feet
Track 3:	S 10 °E	50 feet
Track 4:	S 55 °W	50 feet
Track 5:	S 38 °W	85 feet (Final Destination!)

**Figure 6: These three Traverse exercise handouts explained how to navigate using known pacing measurements and bearing directions. Three different end points were determined where bags of goodies could be found for those who successfully completed the course.**



**Figure 7: This handout was attached to the prize bags for students. Inside the bags there were also Monterey Cypress cones. Interesting and useful facts and ecological information about Monterey Cypress was provided on the front (left). Relevant websites were given on the back (right).**




**Figure 8: Similar to the last handout, this one was also attached to the bags of prizes the students received. White Alder was the native species discussed (left). White Alder cones were also provided in the bags as well. The same list of websites for additional information was provided on the back (right).**

### Coastal / California Redwood

**Scientific Name:** *Sequoia sempervirens*  
**Family:** Cupressaceae  
**Lifespan:** 1,200 – 1,800 years + (Oldest ~ 2,200 years old)  
**Native Range:** Northern California coast / Southern Oregon  
**Height:** 350 feet +  
**Facts:**

- Tallest tree in the WORLD @ 379 feet (27.4 foot diameter)
- - as tall as 37 story building and as wide as 2 VW beetle cars -
- Found only along coast of northern California/southern Oregon
- Likes lots of water & mild, cool climate
- Redwoods are said to be fire resistant with thick bark providing protection
- ~ 230 albino redwoods are known to exist (many more unknown)
- Fallen redwoods can take hundreds of years to decompose (or become petrified!)
- The Redwood is California's state tree
- Important tree for lumber worldwide



### Forestry Links

Science / observation based information about most conifers:  
<http://www.conifers.org/>

Information on wild California plants for conservation, education and appreciation:  
<http://www.calflora.org/>

Articles / information about current and important forestry related topics:  
<http://forestry.about.com/>

Maps, images, guides and other resources about plants, offered by the USDA's Natural Resource Conservation Service (NRCS):  
<http://plants.usda.gov/java/>


Website with career opportunities, links, advice on degrees, and other valuable tools when thinking about a career in forestry / natural resources:  
<http://forestrycareers.org/careers.html>

Cal Fire's website provides articles about important issues, career opportunities, facts and more:  
<http://www.fire.ca.gov/>

The U.S. Forest Service website offers educational tools, opportunities for employment/volunteering, important info about current topics and other resources:  
<http://www.fs.fed.us/>

Link to Cal Poly's Natural Resources & Environmental Sciences Department, which lists masters, majors, minors, clubs and other relevant info:  
<http://nres.calpoly.edu/>

**Thank you!**



**Figure 9: The final handout supplied along with prize bags focused on the unique native species Pacific Redwood. Valuable facts and ecological specifics were provided on the front of the sheet (left) along with additional websites of interest on the back (right).**



**Figure 10: Volunteers from Cal Poly's Department of Natural Resources and Environmental Sciences are preparing to give a climbing demonstration in the foreground. Behind them to the left, high school student participants can be seen trying to navigate in the traverse exercise.**



**Figure 11: High school students and advisors were very enthusiastic about the entire workshop and enjoyed having pictures taken in front of the Cal Poly Logging Unit sign.**

## **Post Workshop**

Following the workshop, surveys were distributed to both volunteers who helped at the event and the high school student advisors who accompanied the student participants throughout the workshop. Survey results are still being collected, but once enough responses are returned the input will be added.

## **Chapter Five**

### **Summary, Conclusions, and Recommendations**

#### **Summary**

As California's population continues to grow and centralize in more urban areas, there is an obvious need to expose students to natural resource topics, such as forestry. Oftentimes, important issues as well as opportunities available in natural resource management fields are unknown to students. Organizing hands-on activities, educational workshops and collaborative events focused on subjects such as forestry, fire science, environmental management, watershed conservation, wildlife habitat restoration, soil science and many other significant topics will help bridge the growing knowledge gap about natural resource management.

Universities are prime centers where important educational programs can be offered. Implementing natural resource workshops through colleges will help attract participation from surrounding communities, as well as increase the likelihood of having knowledgeable experts involved in the events. Reaching out to include organizations, businesses and groups within the community, such as Cal Fire, is a positive step to encourage collaboration, diversity in ideas and increase stakeholder interest in the event.

This project described the steps necessary to design, organize and implement a meaningful natural resource educational workshop for students. In addition, the project outline was utilized to conduct a forestry workshop in the prestigious 26 Hours of Science and Technology program offered each year at Cal Poly in San Luis Obispo.

## **Recommendations**

Building a step-by-step outline for organizing a natural resource educational event and physically utilizing this outline in conducting a forestry workshop was a very rewarding and positive experience. Multiple lessons were learned throughout the process. The following recommendations have surfaced throughout the project:

1. It is never too early to start planning!
  - a. With the extremely fast-paced quarter system at Cal Poly, it was difficult to find time to ensure all pre-event steps were followed according to the timeline outline. Being proactive and reaching out for help in the organization process will help alleviate stress and ensure a smooth event.
2. It would be wise to have a backup plan for adverse weather.
  - a. Although there was a beautiful, sunny day for the workshop, if it had rained during the workshop, most activities would be difficult to execute. Arranging an alternative location and/or activities would allow for a successful event rain or shine.
3. Recruit volunteers that can be present throughout the event.
  - a. The Cal Fire firefighters brought an engine and were able to speak to one group of student participants, but unfortunately they were called to a fire just after the workshop began. Reaching out to retired or off-duty firefighters would have been a better alternative.
  - b. Additionally, numerous student volunteers signed up to help but backed out right before the event (within two days). Creating a mechanism to ensure follow through (class credit, incentives, etc.) may encourage volunteers to

stick with their obligation. Many students were able to assist for only one to two hours of the event, which provided extra hands but created the need for training as new volunteers arrived.

4. Conduct a dry run of the workshop prior to the real event.
  - a. A rehearsal will expose potential issues and/or additional equipment needs.
  - b. The traverse activity was valuable, but many students were easily lost.

Having fellow college students practice the course several times beforehand could help verify the quality of the activities.
  - c. Volunteers will all be on the same page by running through the event prior to actual implementation.

## **Conclusions**

Being able to walk through the planning process then actually conduct the natural resource workshop was a highly worthwhile endeavor. The primary intent of the workshop was fulfilled through the successful implementation of hands-on, engaging and educational activities exposing high school students to forestry related topics. For many of these students, this workshop was their first experience related to forestry. Hopefully, the participants will continue to pursue research on forestry related subjects through the websites referenced on the handouts provided.

Furthermore, this program allowed for collaboration between departments within Cal Poly's College of Agriculture, Food and Environmental Sciences. Students majoring in Forestry, Animal Science, Food Science, Biology and Agricultural Science all helped in the event. The entire 26 Hour program was led through the Agricultural Education and

Communication Department, but this particular workshop was made possible with the help of the Natural Resources and Environmental Sciences Department. Many of the college students and faculty members involved in the planning process are excited to assist with a similar workshop in the future. This outcome is one of the most powerful and meaningful results since future education focused on forestry and natural resources will be promoted.

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