

# Roadside Heritage® Best Practices

A Guide to Informal Science Education for the  
Traveling Public and Rural Communities



Paula Brown-Williams & Janice Rhoades  
Eastern Sierra Institute for Collaborative Education  
July 2010

## **An Introduction to Roadside Heritage®**

Conjure up in your mind, if you will, the last road trip you took through an unfamiliar landscape. Stately Saguaro cactus—twice as tall as you had imagined—accompanied you mile after mile. Or, perhaps it was tiny buildings, scattered over the countryside, surely too small to live in, but housing what? Such trips are filled with imagery that evokes curiosity and present pathways to discovery

Roadside Heritage® is designed to capture the interest of scenic byway travelers and rural communities by revealing the wealth of science, technology, engineering, and mathematics (STEM) content inherent in rural landscapes. While creating this unique opportunity for travelers, RH also extends its benefits to a rural population that is underserved by informal science education. In particular, residents and youth from the byway communities contribute to the project as they play a central role in the interpretation of the region's contributions to scientific achievement.

These interpretive programs guide the traveler beyond the scenery toward making deeper connections with the landscape.

Roadside Heritage multi-media productions include audio tour programming developed primarily through out-of-school youth enrichment classes and portable hands-on science festivals integrated with the audio tour lessons from the landscape. The festivals and the audio programs are accompanied by an interactive web site, which provides another access point to the program and takes the visitor ever deeper into compelling stories hidden in the scenery. The program's educational components follow National Science Foundation guidelines for informal science education and draw on the expertise of collaborators and partners which include academic institutions, public science and K-12 education centers, tourism and hospitality industry organizations, transportation and public resource agencies, agricultural programs, recreation businesses, and historic preservation associations.

The origins of the program can be traced back to a relatively simple beginning. Roadside Heritage took root in the rural, isolated, and visually dramatic region known as the Eastern Sierra. The region lies to the east of California's Sierra Nevada Mountains, an immense wall of granite, hundreds of miles long. The vast Mojave Desert skirts the Eastern Sierra to the southeast and, to the northeast, the high, cold Great Basin Desert stretches all the way to Utah. These impressive geographic barriers effectively separate the Eastern Sierra from the more populous regions of both Nevada and California. It was through the act of evaluating the region's potential for a major informal science education initiative that Roadside Heritage came to life.

Assessment of the potential for an informal science project in the Eastern Sierra required identifying regional assets that might be leveraged, acknowledging the setting's limitations, and responding with creative force. From assessment, imagination, and a deep connection to the countryside came a place-based program that strives to leverage these assets and turn constraints into strengths.

The local scenic byway offered a novel form of engagement. Well known for its beauty and recreational abundance, the Eastern Sierra has also been endowed with a colorful history inextricably linked to its natural features. The regional economy relies greatly upon the seasonal influx of visitors bent on leisure time pursuits. Roadside Heritage began with a hypothesis that held: When travelers are engaged in the multi-sensory travel experience, they will be receptive to novel forms of learning.

Research probing factors that influence self-directed learning suggest that both large-scale and small-scale environments affect the learner's experience. The motorist's learning experience, while traveling through a rural region, will be mediated by both the landscape and, more often than not, by the automobile.

In his book, *Windshield Wilderness*, author David Louter, a historian with the National Park Service, asserts,

“Early in the twentieth century, automobiles provided Americans with the authentic experience they desired from the natural world. Automobiles supplied not only the vehicle by which middle-class Americans got back to nature, but also the vehicle by which they knew nature itself.”

He goes on to explain,

“To many traveling Americans ...their expectations about and experiences with a wild landscape; “wilderness” ... is something they encounter while driving.”

A large regional project could not happen without a pool of contributors every bit as expansive, but every program depends on a core group of collaborators. The University of Nevada, Reno (UNR), Academy for the Environment (UNAE); UNR's Reggio Research Center (RRC); the Lawrence Hall of Science (LHS) at the University of California, Berkeley; and the community based nonprofit Eastern Sierra Institute for Collaborative Education (ESICE) comprised the group that founded the program. The project planners reasoned that an integral part of exploring the natural and cultural history should include the region's unique contributions to scientific discovery.

Institutions, communities, and individuals came together and supported a multifaceted program that provided unprecedented access to academic resources, celebrated—*through informal science education*-- the strength and values of local communities, and did so while entertaining and educating the traveling public about a the region's contributions to STEM discovery. Through Roadside Heritage visitors enjoy the opportunity to share with locals an intimate sense of place and recognize the stewardship values that go along with this relationship.

After five years of phased program deployment, we now look back and ask ourselves “Were we successful meeting our goals? Were the local population, youth and adults alike, drawn into the program? Did Roadside Heritage provide motorists with memorable informal science learning experiences?” We do know from their comments that many participants came to see their surroundings in exciting new ways. Some began to view the scientific significance of the region as one of its assets. We also know that underserved rural youth became uniquely engaged in informal science education,

as they played a central role in the discovery and interpretation of Eastern Sierra's rich history.

If we are truly successful, other communities will be inspired to undertake similar projects. This handbook was created as a guide. In it will be found the goals, challenges and lessons learned as Roadside Heritage collaborators built the program. These pages should serve well as a springboard to any group with similar aspirations.

## **Building the Foundation**

Roadside Heritage serves two audiences: the traveling public and the region's rural communities. The support and contributions of a diverse array of individuals and organizations helped us to meet our dual objectives. At the center, however, was a core collaborative group, who brought together the resources necessary to support the development of high quality programs featuring scientifically sound information expressly about the region's heritage. This collaboration produced an articulated program that delivered an Audio CD with 13 episodes, an 11-station portable hands-on science festival, and an interactive STEM-rich web site.

Establishing the core collaborative represented only half the partnership equation. In order for Roadside Heritage to serve the rural communities, a broad base of community alliances was needed to build a strong foundation. Some of the partnerships were entirely informal; some took place through the more structured advisory committee. All the grassroots supporters lent an irreplaceable local authenticity to the program.

### **Collaboration**

#### **Goals**

The founders of Roadside Heritage envisioned establishing a team with the breadth of expertise needed to develop and implement a regional informal science education initiative that marshaled academic resources to support and empower rural communities in the interpretation of their natural, cultural and scientific heritage. This We anticipated that the collaborators would forge links across regional boundaries with community-based groups to build capacity for Informal Science Education projects to continue in the region beyond the scope of the project.

#### **Challenges**

Building a robust collaboration spanning multiple areas of specialization was essential to the success of a multi-faceted program that encompassed all of the Roadside Heritage deliverables. The need for academic leadership and guardianship of the scientific integrity of the project was paramount. Yet specialists can be scarce in a rural area. Owing to the relative isolation of the Eastern Sierra, university-based collaborators would be located—at a minimum—200 miles away.

Experts who could provide skills and experience in informal education also had a pivotal role in guiding the project, but these collaborators would be based even farther away. The distances between collaborators and the rural communities became an issue because, with the exception of ESICE, none of the groups had experience working with

each other. Developing a rapport between the regional collaborators and the rural community was essential. Bringing everyone together was an expensive but necessary step.

In addition, both of the university-based collaborators had to consider whether their institution should allocate resources to serve a community that was not part of their constituency. For UNAE the program crossed state lines, making the partnership even less straight forward.

### **Lessons Learned**

Establishing core collaboration among regional and community-based organizations requires that each organization evaluate the benefits of entering in to a program that serves distant communities. However, it can be argued that the Roadside Heritage approach offered the collaborators a chance to experiment with new technology and build capacity for new informal science education.

Time must be set aside for developing trust and a working rapport among the collaborators and with the community. The University of Nevada, Reno's Academy for the Environment (UNAE) took the lead in management and administration of Roadside Heritage. An initial face to face meeting of the collaborators brought them together as a team. With an interdisciplinary approach to developing, enhancing and coordinating "environmental teaching, research and service," UNAE brought a wealth of experience including the administration of large and complex programs. Although hundreds of miles separated the Eastern Sierra from Reno, UNR was the closest university to the rural communities and many local youth attend college there. In addition, UNAE and RRC have a great deal of familiarity with similar rural constituencies in Nevada.

Enticing an organization such as a public science center renowned for K-12 education innovation not only elevated the expertise at hand, it also created good will and enthusiasm among rural K-12 educators. As a rationale for their participation in Roadside Heritage, the collaboration provided LHS with an opportunity to explore new technologies.

Securing the participation of RRC brought in a collaborator versed in the theory and practice of advancing STEM education for underrepresented groups, matching especially well with our planned Youth Enrichment Program.

ESICE, a community-based non-profit organization, brought its experience and extensive connections to the local communities to the collaboration. This included local Native American communities. ESICE had experience designing and implementing collaborative community science education programs with a proven track record at the local level. Familiarity with ESICE eased some of the apprehension rural citizens expressed.

## **Partnerships**

### **Goals**

In addition to the core collaborative group, wide-ranging partnerships were essential to the goal of genuinely engaging the local rural communities in the discovery and interpretation of their natural, cultural, and scientific history. By creating a wide variety of opportunities for numerous people with diverse interests, skills and availability to join the program, a bridge between rural residents and urban institutes of higher education would be built. In our proposal to the National Science Foundation, we planned to create several teams, including a STEM team, a technology team, and a marketing committee that would include local and regional affiliations. Our goal was to cultivate local ownership in the program by including as partners many local organizations with interests served by the program. The intention was to demonstrate how program objectives could support and add to the objectives of rural organizations and initiatives, ultimately strengthening the sustainability of all.

### **Challenges**

The sheer number of partnerships that needed to be built or affirmed posed challenges. Partners were needed to facilitate after school youth groups, integrate Roadside Heritage products with tourism initiatives, reach the local media, act as liaisons to knowledgeable local experts that would agree to be interviewed, and identify scientists conducting research in the region. In short, the program was partnership intensive.

Recruiting members of teams and committees can be difficult in rural settings where a limited pool of potential candidates exist. Requiring people to commit to a long term, formalized partnership that entailed attending meetings was an impediment. Many invitations to participate were declined because individuals felt they could not fit one more meeting into their schedule. The results suggest the original Roadside Heritage program design may have placed too great an emphasis on process. In contrast, it has been a good deal easier engage partners in the process of producing tangible products.

Some anticipated partnerships that never materialized forced modification to the Roadside Heritage design. The original design envisioned a program integrated with the regional scenic byway. Low power radio transmitters, located at byway pull outs, would transmit Roadside Heritage audio programs over a short distance. Entering into a partnership with the local byway's founding organization was fundamental to the program design, as their goals and objectives aligned well with those of Roadside Heritage. But the organization was undergoing a change in leadership and direction. Despite persistent attempts to cultivate these partners, they were unable, as a group, to engage in the project.

Other partnerships, including the Roadside Heritage relationship with 4-H programs and Audio Landscapes will be discussed in the Youth Enrichment and Audio Production sections respectively.

### **Lessons learned**

The need to formalize partnerships with other organizations was minimal. As mentioned, it was a good deal easier to generate enthusiasm about the deliverables instead of focusing on process-laden relationships. Informal associations characterized many of the partnerships that formed around Roadside Heritage.

If key partnerships do not materialize, as with the byway group, the program can be restructured and members of the group may be able to participate as individuals rather than as an organization. In the case of the scenic byway, Roadside Heritage was redesigned. Compounded by additional technology considerations, the Roadside Heritage was developed to align with the byway without extensive integration or a formal partnership agreement.

Instead of developing STEM teams and Technology teams, we were able to consult with the same individuals on an informal basis. The greatest degree of partnership structure was provided through the establishment of an advisory committee which is described in more detail in the next section.

Providing potential partners with a written description of Roadside Heritage and detail about their role in the project helped them to understand the project's overall goals and objectives, and the specifics of their involvement. The creation of a periodic newsletter kept informal partners aware of the program's progress.

A community-based organization is best positioned to lead in establishing community relationships, but all collaborators need to allocate time and resources to building trust with community partners. Simple interactions go a long way toward establishing confidence that rural constituents' interests will not be overlooked.

Exploring and engaging a wide variety of partnerships helps to realize the goal of empowering local communities in the interpretation of their regional science heritage. Every partnership formed and nurtured helps to realize the goal of empowering local communities in the interpretation of their region and its heritage.

### **Advisory Committee**

## **Goals**

Establishment of the Roadside Heritage Advisory Committee was undertaken to meet multiple goals. Foremost was the intent to develop a structure and process enabling the local citizens to retain substantial control over the development of Roadside Heritage. Our goal was to respond to members of the rural communities who expressed uneasiness with the interpretation of local history and development of the scenic byway being put into the hands of organizations perceived as powerful outsiders, disinterested in the concerns of rural communities. The advisory committee strategy called for simultaneously involving the local community in Roadside Heritage and providing them with the assurance that their knowledge and interests would be respected.

In terms of recruitment, the goal was to attract a cross section of the local population that would reflect multiple perspectives. A diverse and inclusive Advisory Committee would assist with making certain that diverse cultures and perspectives were included in the project.

Committee members could connect the program implementation team from ESICE, LHS, RRC and UNAE with members of the community and other local resources. Optimally, committee members would act as ambassadors, representing the project to other groups and organizations. The Committee would also help to develop the local ownership needed to sustain the program.

## **Challenges**

Recruitment of diverse committee members is a goal likely to be achieved to varying degrees, but is also one that is never fully accomplished. Plans to recruit the committee members through the local scenic byway group were partially successful, as many of the group's representatives independently joined the committee. But the group had no American Indian or Hispanic members. The reality of representing a diverse cross section of community members on the Advisory Committee meant that recruitment was never truly over.

The challenges of diversity also extended to such seemingly innocuous activities as imposing timelines and deadlines on people. Cross cultural activities require meticulous attention to awareness of cultural constructs. All too often misunderstandings develop unless an adequate amount of effort is put into on-going relationship building and mutual understanding.

It was desirable for the local Committee members represent the far flung localities and towns within the region, which meant they hailed from locations as much as 200 miles apart. Meeting in person was not likely to be successful because of the travel distances, costs and varying schedules of a diverse group of collaborators.

The scope of the Committee's responsibilities also posed challenges. In an effort to be inclusive, community involvement expanded. Once the program implementation began,

it became apparent that convening the committee to oversee multiple tasks, such as graphic design decisions, created entirely too much activity for the project to proceed efficiently. When the committee's role was scaled back, the inconsistency led to some confusion. Committee members were no longer clear about the extent of their involvement.

Other difficulties included sustaining Committee members' interest in the program. In addition, adhering to timelines and meeting schedules was not always possible, in spite of agreed upon lists and agendas.

### **Lessons Learned**

Recruitment is an ongoing task. We asked members to recommend other people that would be good to have as participants. At outreach presentations, we approached key individuals who showed enthusiasm for the program and invited them to consider joining the committee.

The Committee was vested with the authority to veto any unacceptable content in the scripts for the audio programs. This went a long way toward assuaging distrust and the underlying fear that powerful outside organizations would not respect the local community's knowledge and interests.

The Advisory Committee brought together collaborators from regional universities and rural constituents. In this setting, the different advisors worked cooperatively taking on such activities as developing themes and subjects, providing input on the development of scripts, and discussing what experts might be called upon for interviews. It was a pleasure to watch the committee's confidence in each other, and in the program, grow. The use of web-based and telephone conferencing made it possible for the STEM-expert collaborators to participate in the Advisory Committee meetings and solved the challenge of holding committee meetings despite the distances between communities.

In addition to addressing travel concerns, the use of media based conferencing made it possible to record meetings. All members of the Committee, including those unable to participate in real time, received emails with a link to the web site where recordings could be accessed, complete with instructions to make it user friendly.

A job description for committee members was created, setting forth the advisors' roles and duties, and included a roster of committee members. The document also included the collaborators' commitment that a clear explanation would be given to advisors as to why suggestions were or were not incorporated in to the program. Input on such issues as graphic design was welcomed, but this level of involvement was no longer formally sought.

Meetings were initially held twice a week, but as time went on, it was obvious that the number of meetings became excessive. Monthly meetings continued as members

wanted to stay informed about the program. Newsletters were another way of keeping members apprised of program developments and served to reinforce other forms of communication, such as meetings and meeting recordings.

Throughout the project, the advisory committee continued to convene on an as needed basis to review the development of scripts for the audio tour. They continued to find new experts for interviews and served as liaisons to the community. Their comments on the programs ranged from proofreading scripts and questioning the accuracy of information included in them, to feedback about new scriptwriting approaches.

## **Choosing Theme and Subjects**

### **Goals**

One of our most important goals was to define an overarching theme to guide the selection of cohesive individual subjects for our audio programs. The theme and subjects needed to readily draw travelers beyond the passive experience of driving through the region and taking in the scenery. The right theme supported by compelling subjects were viewed as essential tools for capturing the traveler's attention and revealing to them interesting facts about the Eastern Sierra's intertwined natural, cultural, and science heritage. We hoped to articulate, through the choice of theme, an essential quality of the landscape that gave rise to these unique attributes.

Through the selection of a theme and subjects revealing the region's exceptionally rich heritage and that the traveling public would find intrinsically interesting, we could meet our goal of providing travelers a springboard for further inquiry and exploration.

We also hoped that the Roadside Heritage Programs would inspire a sense of stewardship for the landscape.

### **Challenges**

Some of the challenges we encountered in this quest involved the process of selecting the theme and subjects. Part of the difficulty in this process stemmed from having to make selections that would be appropriate for the primary mediums, audio CD or MP3 player downloads, the expansive 220-mile setting, and the interests of traveling public audience.

With regard to process, one challenge arose because of how we went about generating themes and subjects. We chose to hold a group discussion with participants at all levels of involvement. The importance of being inclusive cannot be overstated, but it soon became clear that all of the suggestions could not be chosen. Group discussion, conducted as part of a "Breakfast and Brainstorming" kickoff event was effective for generating ideas, but a process to review the suggestions and make a final decision had not been decided until the group discussion was imminent. There was then a risk involved in choosing some of brainstormed ideas and not others. If certain ones were selected and others were not, there was a good chance that the person making the suggestions would feel ignored or left out.

With regard to sifting through the ideas to pick out the strongest, one challenge was to come up with a theme and subjects that would relate to the surrounding landscape at virtually any point along the highway. It was determined that the points of interest and key features were located too far apart to work as a waypoint tour. Should the subjects

be features clearly seen from the highway? Was this too limiting, forcing us to leave out some of the most inherently interesting subjects? Should the theme and subjects be specific or more loosely defined, allowing the scriptwriter flexibility so that the best of the interview materials could be used? Could we find experts on the subject in short order?

The full extent of the consequences of our theme and subject choices became apparent as time went on. The broad theme and topics posed challenges for organizing the classes and creating scripts. Narrowing the subject of Alpine Flora, for example, to a seven or eight minute program is extremely challenging given the parameters of introducing the subject, defining the environment and incorporating interview material. This must then be put together in an engaging style in order to convey the information to travelers representing a wide variety of demographics.

A related challenge in handling time constraints was whether scripts should try to touch on the whole of a subject or hone in on an interesting aspect of the subject, anticipating that the listener would be interested in seeking out more information. This challenge is addressed further in the audio production section of the guide.

Presenting an already chosen topic to our classes for youth was another challenge. Students, in general, and middle school students, in particular, are more accustomed to choosing their areas of interest and activities. So, creating buy in to the subject area was not always easy – especially for subjects like alpine flora and desert flora.

### **Lessons Learned**

The theme “Exploring Extreme Environments” easily encompassed the depth and breadth of natural and cultural history that is found in this region. It might have been helpful, however, to refine the theme to subjects with a sharper focus.

Conducting a survey prior to selecting the theme and supporting subjects was a tremendous asset. Geology, Vulcanology, Mineralogy, Botany, Wildlife Biology, Meteorology, and Archaeology, were subjects that rated highly on a traveler interest survey, conducted as part of a planning grant. The chosen subjects also fit well with the idea of how the region’s extreme topography was created and its influence on everything from climate to the physiology of animals.

One of the lessons learned was that by choosing a theme and individual episodes that related more broadly to the features of the surrounding landscape, the audio tour could produce an experience that felt as though a geologist, archeologist, botanist, and other experts accompanied travelers on their journey. Conversely, a related lesson learned was that when people hear the term audio tour, they expect point of interest styled tours. Explicitly stating that the tours are intended to be experienced as having a traveling companion can alleviate some of those expectations.

Inevitably, in spite of well chosen themes and subjects, unanticipated interview gems will present themselves and last minute cancellations will occur. Coping with the inevitable “detours” with a roadmap in hand makes the journey easier. And, a lesson learned, to this end, is that the value of detailed organization and careful front-end planning cannot be denied, especially given a project of this magnitude.

## **Setting up Classes**

### **Goals**

The design of the program and its stated goal of empowering local communities to interpret their science heritage were largely met through the Youth Enrichment and community docent programs. This strategy allowed both youth and adults to play an active and vital role in producing the audio programs.

Our goal in setting up classes was to offer after school digital recording and production classes to middle school students in all the schools in Inyo and Mono Counties – as they represent the Eastern Sierra Region. Classes would be offered in each of the towns along the scenic byway. This opportunity would provide area youths with a chance to learn audio and video production skills, to meet scientists and talk with them about their work, and to experience their regional home in a new and exciting way.

Another goal was to provide rural youth with greater access to informal science education. In particular, Roadside Heritage was designed to provide information that included diverse perspectives, making the science more accessible for rural and Native American youth. Roadside Heritage sought to collaborate with the local 4-H program to develop and implement out of school classes in almost every byway community that had a 4-H program. The underlying intention was to integrate our activities with existing organizations, making it possible to share resources such as school site agreements and insurance coverage offered under the 4-H program.

Guiding the design of the Youth Enrichment classes was the desire to offer small youth groups a novel and meaningful experience. Class sessions would be adapted to each community's particular needs. The Youth Enrichment Program aimed to offer an exciting experience, distinctly different from a classroom learning situation, in which youth participated in fieldtrips to experience "on location" reporting and enjoyed an opportunity to learn STEM content as a media reporter would. The intent was to have youth collect material to be used by a professional audio production company to create high quality, virtually professional audio programs.

### **Challenges**

The program was launched in a rather hurried fashion, and the staff was challenged to research subjects, find appropriate scientists and local experts to be interviewed, schedule the interviews and write scripts while the youth enrichment and docent programs were implemented. This created a rather breathless pace.

Producing high quality audio recordings is challenging under the best circumstances. The expectation of obtaining professional quality recordings through a youth program was a source of anxiety that persisted throughout the program.

The classes and festivals were to be supported by docents who would be trained in STEM content, media technology, and classroom outreach methods through a local adult education program, however the adult education program closed as Roadside Heritage was being launched, necessitating a change in these plans.

Deciding on the format (hours and days) of the class presented a challenge, especially when the classes were offered in the more remote locations of our region. We made an effort to maintain a class structure of eight classes (1 and ½ hours in length), two field trips (6 hours in length) and at least 4 interviews. In some cases, we held class once or twice a week, with field trips on the weekend (Afterschool Program Style). In some cases, we held class daily, with field trips on Friday (Summer School Style). In some cases, we had class and field trips over a Friday night and all day Saturday. (Workshop Style)

Arranging for fieldtrips was another logistical challenge. Many phone calls and emails were made as we searched for an appropriate place to meet, as well as the right combination of times when an expert was available and when youth were able to travel,. In relation to field trip planning, the challenge of transporting students to and from the desired location was another logistical consideration. Would we use private cars? Purchase a van?

Many of the interviews took place outdoors and these “on location” recordings presented many challenges. The equipment had to be durable. Background noise and wind were perpetual worries that could make the best interviews unusable. Of course, all of the youth participants wanted to operate the video camera, in spite of the foremost importance of the audio recordings.

### **Lessons Learned**

The importance of including youth in the program cannot be overstated, in spite of the challenges it presented. Persons that might not have wanted to be interviewed, made time for us, local elected officials pitched in to help find additional funding, and any number of outreach groups that might not have been excited about the project initially, helped us to succeed because the program involved youth.

The hurried implementation of the Youth classes was not desirable. Staff worked heroic schedules to make it all happen. A Youth Program Coordinator was hired to address the concerns of the Youth Enrichment Program. However, this staff member inevitably took on other important pieces of the project, such as script research and writing. More meticulous planning would have saved time and effort, in the long run.

Setting up the youth program worked best when there was good communication with the schools and coordination with other activities such as testing and after school sports

programs. These challenges could be met if an onsite teacher was willing to act as class docent as well as a liaison between the school and the program, the challenge became finding someone willing to take this on. This was important in order to accomplish such necessities as obtaining permission to use a room at the school, securing building use permits, and providing the youth with computers to create their own short multi-media compositions reflecting what they found of interest in the class, which came to be known as “student-casts.” This said, in a couple of instances, we found that, in spite of excellent communication and epic efforts to plan programs alongside school officials, our efforts were not reciprocated necessitating creative and hurried restructuring of our plans. It is well to remember that each small rural community has its unique character, and that these kinds of “glitches” should not be taken personally or as an affront to the project.

Having an enthusiastic, “on board” teacher-docent is essential to ensure that classes run well. It is well worth offering a stipend or honorarium to have an interested and capable teacher to help out with the program. A teacher-docent who knows the students and the school helps to make the program and curriculum proceed smoothly as they can anticipate problems that might arise, and can suggest local community resources. In general, the teacher-docent is an extremely valuable liaison and spokesperson for the program visavis the school and community.

A few “mover and shaker” parents can also help the program get off the ground. Inquiring at the school or in the community via clubs, organizations and special groups to find out who might help out in this way can contribute greatly the success of the program.

Letting the schools know well in advance that the program is coming and getting the principal or superintendent on board is very helpful. Asking to be scheduled at a teacher’s meeting to present the program and to invite teachers to participate as docents is well worth the time spent.

Summer school style classes (daily meetings) went very well, since the class was completed in two weeks, students attended regularly and enjoyed the quick “taste” of something new. The Workshop Style was effective in terms of setting up speakers and field trips. It was an exhausting pace, however, and we found that the students were quite fatigued at the end and creating their student-casts was a huge effort. The workshop format did not allow for any reflection (guided or individual) on information taken in. Some adjustment this style would be worth considering. After school style classes (two meetings a week for two months) worked well, although there was some student attrition over time due to the length of the class.

For transportation to and from field trips, we decided that renting a large capacity vehicle was the most cost effective solution to this need. And, while there is a nationally known company available in our area, we had better luck with a local

automobile dealership that also provides this service. This decision alleviated insurance worries and negated wear and tear on personal vehicles.

## **Student Recruitment**

### **Goals**

Our sights were set on recruiting young persons from the community who would be open to learning about our chosen subjects, enjoy going on fieldtrips and meeting scientists. We hoped to recruit six to eight students for each class. The recruitment targeted middle school youth and 4-H members. We were determined to offer classes in every byway community.

### **Challenges**

The local 4-H program was very receptive to our project and provided some help in publicizing classes. Ensuring that participants would have insurance coverage through their program necessitated completing lengthy paperwork and collecting a small membership fee. Often this led to the need for follow-up phone calls to parents.

Youth needed to be mature enough to take on a complex team project and yet still of an age where they are open to the experience. Classes were up to 120 miles away from the program base and travel costs had to be kept within reason. In most communities it was challenging to recruit students for classes. Especially in small, rural schools and during summer vacation, it was not always easy or apparent how to attract students to our program. Some locations in the region have populations as small as 400 and each community has its own special character.

Attracting six to eight students was, at times, too many to be reasonably expected given student population of the small rural schools we were targeting, but we also experienced having too many interested youth. In some towns, youth had after school jobs at their parents' business. Working around school holiday and testing schedules and sports programs was an ongoing challenge.

### **Lessons Learned**

It seems that, for this project, middle school students are most attracted to and most able to enjoy this program. Class sign-ups were most successful as a personal invitation or if their friends were signing up. We also had good luck in recruiting students when we arranged to bring a DVD presentation into classrooms so potential students could get a feel for the program.

We did not find that being affiliated with 4-H enhanced our sign-ups, though it did provide some free advertising, in addition to insurance coverage.

Posters and fliers did not provide much impetus for class sign ups, unless they were in the hands of enthusiastic teachers or parents.

Once recruited, Teacher-docents also encouraged students to sign up. When sign up lists were generated, having students include their phone contact information provided a way for the Youth Program Coordinator to make a phone call to prospective youth to ascertain their interest and personally invite them to participate in the project.

The final result of this active recruitment was an ethnically diverse group of youth that enthusiastically participated in the program.

## **Curriculum**

### **Goals**

Our goal was to provide a unique and interesting after school program that included instruction in the use of audio and video equipment to collect oral history style interviews with scientists and local experts, as well as to document field trip experiences.

We hoped to teach the students fundamental recording and interviewing skills, to provide them with the chance to meet scientists working in the region and to help them develop some web publishing skills.

As a result of this class structure, we ultimately hoped to provide a novel informal science learning experience intimately related to the local environment, both for the youth participants and for the adult docents attending our classes.

We also hoped to create and refine a useable curriculum with supporting materials that could be accessed by similar programs. These would take the form of a Teacher Notebook, a Student Workbook, and this Handbook of Best Practices.

### **Class design for the eight week program:**

Week 1 – Introduction of Project and Topic – overview of class, media examples, paperwork

Week 2 – Equipment Rodeo

Week 3 – Interview Techniques and practice

Week 4 – First expert speaker and first Saturday field trip

Week 5 – Review of technique, second speaker

Week 6 – Third speaker and second Saturday field trip

Week 7 – Fourth speaker and begin student

Week 8 – Completion of student

### **Challenges**

Originally students were going to participate in script creation. It was immediately apparent that there was simply not enough class time to include this. As an alternative, the curriculum included the creation of short slideshow compilations with audio clips posted on our web site that became the youth “student casts.” Scheduling time for this activity was also challenging.

There were challenges related to creating a high quality professional product through a youth enrichment program, as well as other challenges that related to creating a high quality experience for the youth. There is an extreme tension between collecting material for a professional, sophisticated product and keeping the class kid- friendly and fun, as well as instructionally sound.

In short, our challenges included how to make the class content interesting to the students (and fun), to help them to learn something new and different in the world of technology (not easy), to keep them interested in the topic chosen as the focus for the interviews, and to train the youth well enough that the interviews (both in the classroom and on location) would have useable material, and, finally, to help the students synthesize their experiences and learning into a student cast that has a satisfying look and feel to it.

### **Lessons Learned**

The youth enjoyed the student cast activity and many created wonderful programs. It also became apparent that more time was needed to create a good quality program, and, even with adjustments in the schedule, some students were still unable to finish in the time allotted. To this end, Microsoft’s free software download, Photo Story 3, was a happy find, and very user-friendly. However, two of the schools we visited were Mac based and so we were forced to use Voice Thread – another free download that we found to be not as user-friendly. It is also necessary to have a classroom with enough computers so that students can work independently and that students can save their work on. Communication with the school site technology person is necessary for loading Photo Story software on school computers, an important activity to line up before the class starts. Additionally, most public school computers are heavily restricted and do not allow access to the Photo Story student-casts posted on our web site, so students cannot access these for critique or emulation purposes. In order to create a good Photo Story, students needed lots of scaffolding.

Finding the most kid friendly way to create a student cast was a big hurdle. It had to be quick and easy to learn (for both kids and teachers) and useable for our purposes. It had to look good and sound pleasing. Although we used podcasting products, the student compilations were not podcasts as defined as strictly audio programs that are subscribed to via RSS feeds. But the student casts had to give youth a venue for interpreting what they found interesting in the class. The student casts offered youth a place to learn about their own voice, how to insert sound bites and a place to post their photos. It had to be a true culminating activity. We found that podcasting on

Garageband was fairly simple – but some schools did not have Mac’s. We found that using podcast software on Voicethread was good because it is web based, but it is not as user friendly as Photo Story 3. We liked Photo Story 3 best because it has music embedded in the program and it is easy to add sound bites, pictures and narration, as well as text. The only drawback to this program is that it uses Microsoft software, so the computers must be compatible. The biggest effort in all these programs is the need to load photos on all the computers that the kids will be using and to edit and prepare sound bites to load on. It takes time, effort and skill to do this, and the kids need to have some planning time to block out their program and to say which sound bite they want to use. So, particularly, in a weekend workshop style program, it would be helpful to have an evening or a morning to put this together so it is ready to load when the kids are ready to produce their podcasts.

Communication with the site tech person is extremely important. Finding students in the class who have lots of computer savvy and who can help other students is wonderful. Having a teacher who can sit with students who need lots of help with editing and navigating the program is helpful. Giving kids ample time to put together a program is essential. To this end, good preparation for student cast production includes sifting through the digital photos taken by the class participants so that there are a limited number of good choices. Preparing sound bites for youth to use, and making sure that the proper microphones are available for student narration are additional considerations. Finally, close supervision of the process helps to ensure that projects are saved correctly. Making copies to a CD or thumb drive is another good idea. When youth stories were posted on the web site, the youth enrichment coordinator sent a postcard along with instructions on how to view the program, so that youth and their families could easily enjoy these projects.

An ongoing part of the curriculum was constant evaluation of the design, including research and refinement of class structure and materials. To this end, Internet searches provided a wealth of useful information.

Classes, especially ones where we had planned to conduct interviews, often did not afford time for student reflection or preparation for upcoming interviews. It is important to make sure that interviews end in a timely fashion so that equipment can be properly stored and a bit of time can be devoted to wrap-up.

Students often labor over their student casts and need more than the allotted time to complete their project. Be prepared to add a class session or stay late to allow for this need.

One unexpected lesson learned came from observing the students rise to the occasion during important interviews. During the recording sessions, youth showed an impressive ability to work as a team, troubleshoot, ask great questions and maintain quiet when necessary.

## **Recording Skills and Equipment**

### **Goals**

Our intentions included giving youth an opportunity to experience what it was like to be a reporter, to help them gain insight into the relationship between an interviewer and interviewee, to give them a hands on experience that also introduced them to STEM subjects related to the region they live in, and to provide an opportunity to use multimedia tools to share what they were learning with others.

We wanted to teach youth how to collect oral history interviews with digital audio and video recording equipment with enough precision that their recordings could be used to create professional audio programs in which the sound quality would not become a distraction for the listener. In our classes, students learned the entire process: how to set up, use, troubleshoot, break down, and store all of the equipment. In addition, they learned to use this equipment in real interviews, both indoors and outside “on location”.

As most classes attracted participants with a range of experience, we wanted to provide more experienced youth with an opportunity to learn more advanced computer skills as we prepared to produce our Photo Story studentcasts. This included downloading photos from digital cameras, downloading sound from the Marantz audio recorder, writing and recording their own narrations, using digital tools to manipulate photos, and adding graphic elements, including text overlays.

The youth program was to be offered with access to a traveling mobile lab (a minivan) for the collection of recordings. This idea represented the desire to bypass anticipated equipment inequities at the various schools in which classes would be held. Additionally, it would contribute to a novel, exciting experience that didn't feel so much like school. The resources at hand, however, were not sufficient to realize this goal.

### **Challenges**

The equipment challenges were many and varied. We needed to purchase equipment that was capable of collecting high quality digital audio files to be sent to a professional studio for incorporation into our CD. The equipment we used included a video camera and tripod, digital audio recorders, professional grade microphones, headphones, boom pole, cables and consumer grade digital cameras. In addition, we needed to be prepared with tapes, batteries, memory cards and cases to complete the equipment list. The equipment had to withstand heavy use and occasionally rough handling, so it had to be durable, suitable for indoor and outdoor recording, high quality and kid-friendly. As we planned to work with many different classes over several years, we needed to keep this equipment in good working condition.

Despite our best efforts and assistance from audio professionals, equipment occasionally has its quirks. The Marantz recorder was, and at this writing still is, the standard for high quality audio recording. Yet, the first Marantz recorders had manufacturer defects that created a hiss. For entry level equipment operators it was difficult to identify where the problem was coming from—operator or equipment. Marantz corrected the problem with their latest version of this recorder.

Another consideration is whether to record indoors or outdoors or, to mix recordings. Different surroundings create different sounds. For example, interviews that take place in a big empty room will sound different than interviews that take place in a recording studio or at an outdoor site. Mixing indoor and outdoor recordings is slightly distracting, though most listeners would not know why.

Audio editing software can correct many shortcomings, however recording levels are critical. In particular, over modulated interviews sound distorted and not much can be done to remedy the bad sound. Recording at very low levels can be amplified but, in doing this, background hum is generated.

Field recording is not as straightforward as are indoor interviews. On one occasion, an interview had to take place inside a minivan because of gusty winds blowing across the microphones. Other common audio problems include street noise and traffic sounds during outdoor interview sessions or something as seemingly simple as a ticking clock or a squeaking chair in an indoor location.

Encouraging students who only want to use only one type of equipment was also challenging, especially when it came to using the boom pole, an important but laborious job. As with any equipment laden endeavor, the emphasis on careful handling and safety was an ever-present challenge. Also, lugging all this equipment on a field trip (where there is plenty of dirt) was tedious, especially packing it all up, breaking it out and then putting it away.

### **Lessons Learned**

One of the most important lessons learned was that redundancy is a good thing in recording situations. Several recordings were collected during each interview, including having a docent or staff member operate one of the recorders. This strategy paid off when one of the staff interviews failed, but the youth recording was problem-free.

Our approach was to take students through an equipment “rodeo” so that they learned how to use and care for each piece of equipment. Some students have had more experience with this type of equipment and/or are more adept than others, so we tried to match them up with students that needed to gain confidence. The Marantz is the most complex and unfamiliar piece of equipment and, therefore, takes the most time to learn.

Working with an audio production company to provide expert assistance deciding what equipment to buy can be extremely helpful and timesaving. The audio production company we worked with made equipment purchase recommendations. In addition to choosing equipment that would result in a high quality professional recording, other factors for selection included cost and durability. We used a Marantz PMD660 Digital Recorder and a Panasonic PV-GSP series camcorder video camera. It is quite possible that equipment initially purchased will be replaced with upgrades, as we did with the Marantz PMD661 recorder. With these devices we used professional quality shotgun condenser microphones, which compress foreground and background sound, much like a telephoto lens compresses visuals. We also used lavalier, or lapel, microphones. The shotgun mics were used with the boom pole to keep microphones out of sight in video recordings. Students also learned about microphone wind socks and other useful accessories. Additional equipment included XLR cables for use with professional microphones and Nikon Cool Pix digital point and shoot cameras to collect photos for our Photo Story student casts.

An important consideration for any project would be to purchase the most upto-date, tried and true, “bomb-proof” equipment available (within the budget). Ours has stood the test of time and multiple users. All of these recording devices require batteries when they cannot be plugged in, so it is well to anticipate lots of battery usage, and to be sure to charge up rechargeable batteries before every use. It is also important to explain the whys and wherefores of each piece of equipment to the class, so that they understand the rationale for winding up cords a certain way (which turned out to be a surprisingly challenging task for them) and other such details. One resource worth considering is the use of videos showing how to use equipment, for instance, we found a You Tube video with a demonstration of how to wrap a recording cable.

It worked well to present the equipment “rodeo” as a logical thinking and discovery exercise, so that students got lots of hands on activity as well as a chance to see how things work and how they might think through problems with them in order to trouble shoot. Another successful technique was to model good, patient, methodical workmanlike approaches to using the equipment and to provide plenty of time to practice setting up, recording and putting equipment away. There are many temptations to take shortcuts such as not using a tripod, not wearing headphones, and labeling tapes after recording, but they compromise the quality of the recordings. The youth naturally want to rewind and view their video recordings, but this can easily result in recording over parts of a previous interview.

Finally, mastery of the technical side of interviewing is also important. The format of the audio recording is critically important and a formal sound check must be conducted on video cameras as well as audio recorders. Although WAV files are larger than MP3 and MP4 files, they retain more data. It is always possible to compress, or change files, but once the audio is converted to the lower level there is no turning back. Archiving high

quality WAV form recordings is worth the effort if you are aiming for high quality programs.

Good class management also included double checking everything, especially on field trips, and emphasizing the teamwork aspect of getting a good interview. We created a chart and drew cards for jobs so that kids felt interview assignments were made in an equitable way and that everyone was given a chance to rotate and try each piece of equipment. Checking all the equipment before and after each use is time consuming and tedious, but well worth the effort.

It is more cost effective to repair equipment than to replace it, and, we have found, it is not difficult to find this service through an Internet search.

## **Interviewing Skills**

### **Goals**

The RH Design Team held the belief that the most authentic and engaging programs would result from empowering rural communities to discover and interpret the subjects that made up the final audio program. Youth from the local communities were given the role as key agents for the collection of interview content for the CD. Our goal was to teach students how to conduct an oral history interview that would result in interesting, useable material. Though we had some prior agenda items slated for each interview as it related to the production of the CD, we felt it was important for the students to formulate their own questions.

### **Challenges**

Entrusting inexperienced youth participants with the critical role of interviewer, and with the expectation that this will result in a high quality professional sounding product, was risky and fraught with complications, not the least of which was mastering the art of the successful interview.

It takes many hours of practice to develop good interviewing skills and to develop a sense of how questions are formulated, sometimes “on the fly”, with appropriate follow up questions, as the interview progresses. Students needed information about the subject matter of the interview and background information about the interviewee. When it came to actually conducting the interview, many youth found the interviewer “job” intimidating and required some bolstering to get through it. That said, other students were naturals, having observed “Oprah” and other such interview programs on television and had an intuitive sense of what to ask and how to ask it. Finally, some youth discovered that they enjoyed this job in spite of their initial trepidation.

Once interviews had been recorded, they had to be downloaded, transcribed and properly archived for future use. During this process, listening to the quality of the

sound was also important, to ascertain that the interview material could be used by the professional audio production company. The challenge here was taking the time to properly accomplish these time consuming activities in the midst of an already busy schedule.

### **Lessons Learned**

Kids need direct lessons on oral history interviewing techniques. Having an expert, with oral history interviewing experience, visit the class to talk with the students about this process makes this lesson more interesting. One such expert described the importance of formulating follow up questions and then had students interview each other asking at least one follow up question. Lots of practice interviewing each other and conducting “mock” interviews, in which the teacher takes on the personality of an expert interviewee, are required to develop this skill. The first real interview with an expert should be one that is not of critical importance or done on location, just in case the interview doesn’t go well or the equipment presents technical difficulties...in spite of the best teaching and the most comprehensive planning. We have found the staff and docents can and should interject questions during the interview and, at its conclusion, all are invited to ask questions that have come up for them. This helps to fill in details that make the subject more comprehensible and accessible to the lay public.

Youth displayed a high level of engagement when they interviewed local legendary skier and ski resort operator, Dave McCoy. It was difficult to convince Mr. McCoy that he should set aside time to be interviewed by our students. The solution we came up with was to record a short video to send to him, in which each of the students said hello to him and told him one thing they would like to ask him. It took some effort, but ultimately he agreed to the interview and the students hung on his every word.

Youth must be involved in the interviewing process in order to have a sense of ownership and to truly engage in the project. In the few instances where the youth were not involved in conducting the interview, the team was less cohesive and more easily distracted.

Each class member should have the chance to assume the role of interviewer, just for the experience. However, the entire group can help formulate the questions to be asked and can be given a chance to ask questions when the prepared list is exhausted. The interviewer also was tasked with the job of making sure the interviewee signed the talent release, was apprised of the questions that were going to be asked, and was offered a small gift as a token of our appreciation (in this case, a refrigerator magnet handmade for Roadside Heritage by a local potter). The interviewer also assumed the role of point person for the team – asking for a sound check and initiating pauses in the recording when needed.

Every effort should be made to spend some class time reviewing basic background information about the topic being focused on in the interview. It is a good idea to

include some pages in the student notebook with this information. Also, before each interview, it works well to brief the students about the speaker's expertise and background. This kind of information helps students formulate good questions.

Some participants truly enjoyed this role and some were quite reluctant. As each class member took their turn in this capacity, it was a chance to experience leadership of the team throughout the interview. For most young people, this was an experience that they found a bit anxiety producing, but worthwhile and certainly self-esteem producing.

We found that purchasing a transcribing machine for our office staff made transcription easier. Also, it helped to note times on the transcription so that important pieces of the interview could easily be found. Proper transcription is tedious, as is proper notation and archiving of interviews; however this procedure is of utmost importance for ease in using these interviews. More information on how to proceed with these tasks can be found by researching oral history manuals and web sites.

Much of the interview material collected could not be incorporated in the audio programs due to the volume of interviews and brevity of the programs. A solution for including more of the compelling interviews was to post this information on the web site as "web extras".

## **Audio Production**

### **Working with Audio Experts**

#### **Goals**

As previously stated, the goal of Roadside Heritage was to engage local scenic byway communities and, in particular, rural youth, in collecting the interviews and information to use as the raw material from which an appealing, high quality, professional audio program would be created. Our intention was to contract with an audio production company with the technical skills, equipment and resources necessary to make that possible.

#### **Challenges**

Interviews were conducted with several nationally recognized audio tour production companies. Clearly, Roadside Heritage did not fit the business model of most audio production companies, which typically conducted the research and interviews, then produced a script, recorded the approved program, and retained ownership of the final program. In order to be successful, this type of operation is necessarily conducted as quickly and efficiently as possible. Roadside Heritage represented a three-year project and a long term relationship. In addition, none of these companies were located close to the project area and site visits would be expensive propositions.

Ultimately, the project found a good fit with a company based in Portland, Oregon. However, this presented another challenge as the subject of the program was the Eastern Sierra of California, – a huge regional difference. And, though the professionals visited our region, they did not truly have a “feel” for it.

One of the important contributions to Roadside Heritage made by the production company was expertise in creating scripts suitable to an audio medium that engaged the listener. They also gave us helpful strategies for interviewing and recording, access to resources such as music libraries, narrators and character voice dramatists, skill in mixing audio tracks and cleaning up less than perfect audio files. Everyone involved in the project did not always appreciate the special contributions the production company brought to the project, nor did the audio production people always appreciate the need for scrupulous attention to scientific and cultural accuracy. For example, the need to use authentic and appropriate Native American music representative of the people in this region was not well understood.

Everyone struggled with striking a balance between presenting STEM information in accurate scientific detail and creating colorful, entertaining audio programs. For example, including fun, comical material sometimes verged on trivializing the subject. And, in one conversation, the audio production specialists likened creating an audio tour with the involvement of youth, “like swimming with a ball and chain on your foot.” The audio specialists also expressed some discomfort with script approval coming from an advisory committee. With layers of approvals necessary, creating a workable process to production protocol was difficult and the project timeline was difficult to maintain.

It became apparent that script writing and working on a local project long distance was fraught with problems. Relying on outsiders to interpret the landscape resulted in generic scripts which included information gleaned from unreliable online resources. As a result, the lion’s share of the scriptwriting workload shifted to the already very busy Youth Enrichment Coordinator and Program Director. One idea that came up around this was to create a template for producing our audio stories. While the idea has merit, it would take some time to develop and has limitations. It is extremely difficult to reconcile the aspiration of creating a script that evokes an authentic, heartfelt portrait of a landscape with the drive to reduce this process to a seemingly efficient formulaic approach. Each subject and supporting interview materials require a unique perspective.

Logistics were also a challenge. It was necessary to share large audio files and transferring them was a time consuming process. Frequently errors were not caught the first time a script was read or an audio file was listened to. Requests for last minute changes were an ongoing and expensive proposition. The length of the recordings exceeded what was allowed for in the contract.

### **Lessons Learned**

We chose a company that is well known for its work in audio tours. The advice they gave ranged from technical issues to tutorials on choosing character voices. They were able to accommodate a long term relationship, did not demand rights to the audio programs, periodically participated in team meetings, had vast, high quality music and sound effects library, and a network of narrators to fill the role of character voices.

Collaborative scriptwriting did work, especially when we worked out a sensible order of operations in terms of script review and revision. To this end, a Design Team, composed of representatives for ESICE, LHS, UNR and the audio production company, was created to take the lead in reviewing story scripts for content, literacy, interest and scientific accuracy. This team determined the primary content objective for each episode, edited scripts, conducted research and identified experts from the scientific community who might be interviewed. Scientists who provided expert commentary also reviewed the scripts for accuracy. Once the Design Team and researchers finished their reviews, the drafted script was passed to the Advisory Committee for comment and approval.

In working with the experts, it soon became clear that the scripts should be written collaboratively in order to truly represent the Eastern Sierra region. While the task inevitably robbed time from other important activities, scriptwriting taken on by ESICE staff, with editing and embellishment done by the professionals resulted in a production very highly rated by the public, according to an independent survey. This worked well and made it easier to include the advisory committee and design team in the process by seeking their input before sending a final draft to the experts.

Sharing Roadside Heritage files, especially large audio files, necessitated setting up an FTP, or File Transfer Protocol site. This solved many of the problems of handling huge files and making data compatible for end users. It added to the learning curve but, once everyone learned how to use it, problems were no more serious than a forgotten password. The system made it possible to share unwieldy files with LHS web site designers and served as an online archive.

In order to send clean audio files to the experts, a back-up recording of each interview was collected at the same time the students were recording. This was accomplished by having an extra digital audio recorder operated by an experienced adult. In downloading multiple audio files to the hard drive, interviews were labeled with a note regarding who recorded the interview.

Working with a professional audio production company is the only way to ensure a professionally produced product. Shopping around for a good fit was worth the effort.

### **Speakers and Interviewees**

#### **Goals**

Our goal was to find experts to interview for each of the 13 topics chosen for the audio program episodes. These experts were to include scientists working in the field that were available to visit the youth program to be interviewed by the participants during class or on a field trip. We also intended to interview knowledgeable local experts on the topics to make the programs more accessible to the general public. Our goal was to find knowledgeable interviewees, who were comfortable being recorded and were engaging speakers. The intent was to be as inclusive as possible, recording interviews with a full range of experts who could present diverse perspectives.

#### **Challenges**

The challenge was to find suitable experts, primarily scientists and researchers who were willing and able to be interviewed for the project, particularly on the days and at the times that would work for our classes. While experts on most of the topics chosen for the programs abound, many are not willing to be interviewed or are unable to be interviewed due to time, date or location constraints. It was also tricky at times to find a

local expert that could add the engaging and colorful anecdotal information essential to making the audio programs appealing to the general public.

As our closest university partners, UNAE and RRC had been tasked with finding scientific experts. However they were not always able to find expert interviewees that were willing to travel to our class from Reno, or that were willing to be interviewed on the dates we needed them. In all cases, and for all topics, the great challenge was in finding interviewees who were current in their field, interested in explaining their field to the general public – especially to young people -- and who were willing to be interviewed. In some cases, it was difficult to explain to potential interviewees that we were most interested in interviewing them and that they did not need to prepare a detailed presentation or PowerPoint. Some insisted on bringing PowerPoint presentations, and their interviews are not as “friendly” or conversational as ones that are typical interviews. One quirky problem we encountered when interviewing scientists is that often they are accustomed to speaking with other scientists, so making concepts more accessible to non experts carries a stigma in the scientific community.

### **Lessons Learned**

While expert in their scientific discipline and field of study, researchers may not necessarily be comfortable being interviewed and recorded nor able to speak to a public audience, while the groundskeeper at the local museum, who has pored over its history, can be a lively and compelling speaker. Generally, persons actively involved in educating others about the region – from National Park interpreters to lecturers to mountain guides – can often convey natural history information to both youth participants and to the general public in a way that is easily understood and captures their imagination.

Although we tried to discourage PowerPoint presentations, it was enjoyable to have interviewees bring photos or objects to talk about with the classes.

We did manage to interview a few experts from UNR and one interview for the project was accomplished as an adjunct interview, done at the UNR campus without class participants.

The most expeditious way to find interviewees for the youth program, and for each topic, was to brainstorm with the Design Team and the Advisory Committee to come up with names of local scientists, researchers and experts that might be willing to be interviewed. It was also helpful to utilize local governmental agencies such as the U.S. Forest Service, Bureau of Land Management, California Department of Fish and Game, California Department of Transportation (Caltrans), a local university research station and other resources agencies. The Internet also provided invaluable resource for locating experts. Field trips to state and national parks and monuments were also excellent sources for interviews with ranger interpreters, most of whom are accustomed to giving engaging talks to the public and interpreting subjects.

In a few cases, it was important to get a particular interview to round out the audio program, so some interviews were done outside of class in a variety of ways. A few were completed at professional audio recording studios for a minimal fee. Others were done by an interviewer who was able to travel to the institution or site where the interviewee could be interviewed. Still others were completed at ESICE or by RH staff on site. The project team also briefly considered recording interviews over the telephone, a common practice in radio. However, the team quickly determined that the poor sound quality would ultimately detract from the final product.

One of the most important payoffs of having kids interview the scientists (besides using it as an enticement to agree to be interviewed), was that it helped to encourage vernacular explanation of phenomena and research. Teaching kids to ask deeper questions about how things looked or felt to get a good “radio” description was also important for collecting useable material.

## **Diversity and American Indian inclusion**

### **Goals**

Roadside Heritage by its very name was obliged to present an inclusive portrait of the cultural history of the region and diverse perspectives. The goal was to include Native American perspectives in all 13 of the audio programs and to make science accessible to under-represented youth with diverse cultural backgrounds. To this end, we contracted with a Native American liaison to lead the development of audio content documenting local Paiute Shoshone oral histories. Appropriate traditional Native American stories would be integrated with STEM content. Under the direction of the Native American liaison, youth would conduct research, interview elders, and record their own narratives.

### **Challenges**

As program implementation got underway, the liaison felt that the Native program component and content should be integrated with the rest of the program. We found that, although the liaison knew of traditional stories and knowledge pertinent to the individual episodes, he had difficulty finding elders willing to share this knowledge. Youth participants were then invited to conduct interviews with the liaison.

The liaison ultimately left the project, so alternate resources for contacting Native American interviewees for the programs had to be found.

Local Tribal Historic Records Officers, Tribal Education Centers, Tribal School Liaisons and the local Indian health project were helpful in providing contacts. In many cases, it took a great deal of perseverance and effort to develop a relationship with potential interviewees from this community. A sensitive, respectful and patient approach to cultural differences is extremely important.

### **Lessons Learned**

This element of the project vested much responsibility in one individual. When that team member left the partnership, it was a considerable setback for the overall program. In addition, the question of Intellectual property rights became an issue that diverted energies away from the project. We have found that having so much of the project dependent on the relationship of one or two individuals proved problematic. Long before implementation, at the very early stages of program design, we find it is important that multiple Native American project partners (as well as other representative cultural groups that might be included) be invited to take an active role. For any program seeking to engage Native American communities, issues of intellectual property rights must be planned for, in particular addressing ownership of deliverables that might be construed to belong exclusively to an award recipient. Whereas RH developed talent releases for all youth and persons interviewed, a Native American interview release should be carefully constructed. We found that the Oral History Association has examples several such releases that address these very issues available on their web site. One of the key considerations is whether the release stipulates in what context the interviews can be used. One of the issues to be addressed in this context is whether or not the deliverables will be sold. It is important to note that individuals seeing a product available for sale may conclude that a profit is being made. ESICE staff worked with Native American partners to develop an agreement stipulating that any profit made for the sales of the CDs would be re-invested in the RH program.

We also learned that paying a Native American person to work on a program should be understood as paying the individual for their time and should not be construed as paying for information. In seeking advice to resolve the intellectual property rights dispute, it was recommended that interview material be confined to information that has already been widely published and shared with the general public.

We found that personal acquaintances with individuals from Native American communities or working for tribal governments were the most promising places to begin constructing relationships. In initiating conversations with potential Native American partners, the dispute with the one key individual was openly acknowledged. In most cases, we found that the people we approached already knew of the dispute or knew of other instances in which such disputes arose.

We found that we were not alone in our struggles and that numerous cross cultural programs with similar goals and objectives also had similar difficulties. Among the many lessons learned, we found that developing sensitivity for other cultural constructs can help teams anticipate issues and avoid unwittingly antagonizing cross cultural partners. The corollary to this finding is that members of the dominant culture must accept that they will make cultural blunders if they are to make meaningful progress in this realm. Two sensitive issues with the Native American community we found were 1) do not go into a dialogue or begin designing a program with the mindset that Native Americans are human artifacts. Relegating Native American culture to the past denies that the cultures have adapted and not only persist but also are relevant in the 21<sup>st</sup> Century. 2)

Do not assume there is a “Native American community”. These are multiple communities. If at all possible, it would be advantageous for implementation team partners to sit in on a cultural training session. A good deal can be learned by being privy to information provided in the formal education setting by Native American liaisons.

We also found that the cultural constructs of the dominant culture paradigms cannot be superimposed on non-dominant groups without becoming problematic. As an example, Roadside Heritage partners built a program design that imposed dominant cultural timelines and deliverables. We learned that attempting to get a Native American elder to speak about a certain subject was generally unsuccessful. We also learned that scheduling when information would be shared also led to disappointments. It was not necessarily that information was withheld; it was that the information was on a different topic or shared when the individual felt it was right and did not conform to a program timeline. In order to address this issue, we included Native American perspectives in the audio program content wherever there was an opportunity. Other Native American audio content was developed into a “Native Voices” section on the Roadside Heritage web site.

We found that working within the context of Tribal Education Centers put forward a positive step toward building relationships. In this kind of setting, individuals or programs from the non-dominant culture with similar aims have a place in which to begin to understand the objectives.

Through our interaction with Native American partners, we have also learned that inclusive program evaluation takes into consideration the perspectives of non-dominant communities about the success of program outcomes.

## **Festival**

### **Goals**

The creation of a hands-on science festival centered around and reinforcing the themes addressed in the audio programs would allow for Roadside Heritage to further expand its impact due to the wide demographics present at the festival's proposed venues. This STEM-rich science festival was to be composed of portable kits enabling the festival to travel to local events, particularly those that are a major draw for tourists, providing access to nontraditional informal science education audiences. The festival was to be created by project collaborators from LHS, an institution with a wealth of experience in K-12 Education and the production of such portable hands on science exhibit kits. In addition, local community docents would be trained through a locally supported adult education program to support the festival activities and to effectively lead STEM content discussions.

### **Challenges**

Though the festival is meant to provide a stimulating experience for the whole family, some of the festival stations are more attractive than others. As a result, some stations draw a crowd, and some are very quiet.

Some of the festival stations rely more heavily on consumables. This requires checking the stations and stocking the consumables before the festival goes out.

Stations that are very print-laden are less attractive or less accessible to some festival participants. Other stations require a certain amount of creativity, background knowledge and /or ability to charm the public on the part of the docent or volunteer. As an example, the 3D Archaeology Puzzle is small and can be easily overlooked unless the docent at that station enthusiastically guides the engaging critical thinking activity that can occur with it.

Each station has different infrastructure requirements, ranging from simple and stand-alone, to battery driven, needs an electrical outlet, or needs a water source. Each station requires a table top, and the entire festival, when set up, occupies a rather large space. Finally, a docent or volunteer is needed to run each station.

Transporting the festival kits to the chosen venue requires a large van, several sizable vehicles or several trips, which presents a challenge when the event is distant.

Setting up and breaking down the festival requires extra time and care on the part of the docents and volunteers. An extremely well written and thoroughly tested festival manual was included in the creation of the festival. Each station comes with detailed instructions for these procedures; however, these activities still need to be supervised given the fragile nature of some of the equipment and the propensity of the docents and volunteers to rush through these tasks at the end of the event.

The festival needs to be well publicized prior to the event to insure good attendance. Good publicity requires a thoughtful and enthusiastic explanation of the nature and value of the festival. While offering this festival as a part of the myriad of events that draw tourists to the Eastern Sierra is an exciting way to introduce non-traditional participants to informal science education activities, the cost of bringing the festival to these venues can be quite high.

### **Lessons Learned**

The creation and production of the hands on kits, which included a docent training manual, went through several trial periods and iterations. With each public staging of the festival, there was rigorous evaluation of public reaction to the stations as well as the effectiveness of docent training and use of the manual. The result of these evaluations was the production of a fun and engaging festival complete with instructions to make it fairly easy to set up and run with team of trained docents and volunteers.

Organizing the manpower to put on the festival is also labor and cost intensive. ESICE is fortunate to have a pool of docents to draw from, and providing a stipend for their work appears to be the best way to entice them to work at the festivals, ensuring a high quality experience for the public. As a courtesy, snacks and beverages were also made available to docents and volunteers during festival events. It goes without saying that there needs to be a head docent or staff member in charge of coordinating the festival – checking kits before they go out, purchasing consumables if necessary, publicizing the festival, making arrangements with the festival venue, organizing the docents, transporting the kits, and supervising the set up and breakdown, as well as keeping things running smoothly during the event.

At some events, particularly at local public schools, a mix of docents and volunteer teacher or parents works well. Docent training is best accomplished on site, as part of the setting up process just prior to the festival. Adult education classes for training docents might be a good way to complement background knowledge and program delivery, however, logistically it presents some difficulties.

To offset festival costs, it may be possible to offer the festival to public schools for a nominal fee. Another way to sustain the festival may be to seek corporate or private sponsorship to cover costs associated with event fees, transportation, docents and consumables.

The festival provides an excellent adjunct to the audio programs produced by Roadside Heritage, as well as a captivating public interface with the STEM-rich themes addressed in these programs. Connecting the festival and the audio programs is still a challenge. One approach might be to have a listening station at each festival activity, where participants can listen to the audio program that is showcased at that activity. Another approach might be to have a download station as part of the festival.

Posters and brochures advertising the audio programs and web site should be prominently displayed.

## **Docent Recruitment and Training**

### **Goal**

The Roadside Heritage docent program was conceived as an additional way to engage the local community in informal science education specifically created for the unique Eastern Sierra setting. The intention was to use a docent program developed for another outdoor science education program, the Eastern Sierra Watershed Project (ESWP), to engage these veteran volunteers and new recruits in the youth enrichment program and portable science festivals.

The original plan called for development of continuing education classes (2 to 3 weekends in length) designed to address Roadside Heritage themes. These classes, co-sponsored by the University of California White Mountain Research Station were going to be offered through the local adult education program.

Docents, specifically trained for festival kit activities and youth programs, would receive training in specific STEM content mirroring the youth enrichment program and festival kit development.

### **Challenges**

The challenge presented by expanding the current pool of docents associated with ESWP is directly related to the size of the local community. While the ESWP docent program does attract new volunteers, some also leave, resulting in a sizeable (for this community) but steady number of excellent, enthusiastic volunteers. However, this docent program works because docents are offered a modest stipend for the “volunteer” work that they do. Given today’s economy and the demographics of the docents (retired teachers, young job seekers and those who have recently moved here), expecting well trained and educated people to volunteer is unrealistic.

Just as Roadside Heritage was about to be implemented, the local adult education program was discontinued. With the program already underway, a decision was made to offer docents the same training as the youth received through the Youth Enrichment

Program. Requiring docents to attend a seminar would put additional demands on their time and would make the program more complex and expensive to replicate.

### **Lessons Learned**

Docents working at science festivals and as part of youth enrichment classes contributed greatly to the success of the project. Their enthusiastic love of science, learning and sharing new knowledge with others was apparent as they worked with the public and with class participants. Their feedback invariably included commentary about the value of this project as a place for them to learn about and share with others the amazing scientific heritage of this region.

For Youth Enrichment Program Classes, it worked best to find a teacher already working at the school where the class was to be held. This expedited arrangements for classroom and computer use, as well as student recruitment and communication, including paperwork distribution and collection. On site teachers also acted as school/project liaisons and ambassadors, often spreading positive words about Roadside Heritage.

For the Science Festival, it worked well to recruit docents from the existing ESWP pool of docents. When the festival was held at local public schools, it worked well to request that the host school provide six to eight volunteer teachers or parents to work alongside trained docents. The thorough and well-written festival manual makes it easy for volunteers to understand how to set up, run and break down festival stations. However, a mix of trained docents and volunteers, along with a lead docent greatly contributes to successful running of the festival.

Offering a stipend also helped to acknowledge the value of the docents' contribution and offset the cost of travel, childcare, and taking time off work.

## **Dissemination of Deliverables**

### **Goals**

The project's outreach and dissemination activities were many and varied. Efforts in this regard outlined a four-tiered approach that began with collaborating with the local community, next engaging professional tourism entities, then connecting with the traveling public. In support of those objectives the fourth element was to develop materials for public outreach and joint tourism promotion. One of our goals in this area was to broaden the local tourism organizations' assessment of regional assets. We hoped they would consider scientific achievement among the cultural attributes to promote in support of their mission to attract visitors.

The Roadside Heritage plan anticipated the development of strong community partnerships and integration of Roadside Heritage products with the marketing activities of local tourism groups. If the strategy was effective, the costs of promoting and popularizing Roadside Heritage products would be shared and the sustainability of the program improved. In addition, tourism promoters would have a unique and novel offering to take to outdoor recreation shows, link to on their web sites, and put in the hands of visitors wanting to know what there was to do.

The local media covered the program providing time and ink to announce our activities to Eastern Sierra communities. Presentations to spread the word were delivered to chambers of commerce, service groups, tourism councils, and government divisions from transportation and parks and recreation departments to economic development councils.

### **Challenges**

ESICE as an organization was not well known by some members of the community and was a new entrant in the tourism sector. A hint of territoriality existed and the program did not match the communities' expectations about who should be engaged in tourism activities.

Developing awareness with larger tourism and travel entities has taken considerably more time and effort than at the local level. It is difficult to reach key individuals and there is a general apprehensiveness that seems to stem from the fear of a request for funding.

High profile organizations, such as *Sunset* magazine, the American Automobile Association, and the California Travel and Tourism Commission are approached relentlessly by myriad promoters. Returned phone calls are infrequent and email replies are slow to arrive, if they are forthcoming at all. Sending out expensive press packets without making follow up phone calls proved ineffective. There is also intense competition to get a mention in major newspapers, such as the *Los Angeles Times*.

Two open house celebrations recognizing the contributions of partners, including students who participated in the Youth Enrichment Program, were wonderful gatherings, yet not well attended.

Roadside Heritage had envisioned working with the National Scenic Byway program to disseminate the program and to support reaching a wider audience. The local scenic byway had not applied for a national designation, however, and the agency staff has restricted their interactions to representatives of existing national byways or those applying for designation.

### **Lessons Learned**

Fierce competition for tourism dollars can turn allies into competitors and fan the flames of territorialism. Rural tourism organizations may be at odds over issues such as the distribution of transient occupancy taxes or rankled over government agency regulatory decisions. In this frequently contentious atmosphere, an effort was made to differentiate Roadside Heritage framing it as a value added enhancement for the campaigns led by tourism partners. Joining the local chamber of commerce, building relationships with recreation providers, and offering support for government agency personnel was largely successful in strengthening existing ties and establishing new ones.

The first Roadside Heritage cultural history CD release was extremely well received and built anticipation of the next releases. The staffs of the chambers of commerce and visitor centers have been strong supporters of Roadside Heritage. People who have picked up CD's and listened to the program have written to say they learned much from the program and that their plans include spending time on a return visit at places they learned about through the program.

Developing in kind support from local tourism organizations has been one of our biggest successes. Articles have appeared in numerous visitor guides and vacation planners, motor touring brochures, extending the program's reach to geographic target markets

and niche audiences such as heritage tourism travelers. Written articles have run verbatim both in these publications and local media.

Given the place-based nature of the project, efforts have received the most attention at the local level. We have, however, been successful in getting announcements in an American Automobile Association publication and the *Los Angeles Times*. UNR public relations specialists succeeded in promoting a Roadside Heritage road trip and multi-part series on a televised nightly news program in Reno. After three years of persistence, the California Travel and Tourism Commission will run an article on Roadside Heritage in its Fall 2010 publication. One of our future strategies is to work with freelance writers who have been successful writing for travel and outdoor recreation publications.

Phone calls and emails have resulted in 30 organizations providing links to the Roadside Heritage web site, most notably the nationally-known Lonely Planet and Trip Advisor web sites, and the home page of the Caltrans District 9 web site.

Roadside Heritage was an exhibitor at the 2009 National Scenic Byway and actively supports a local initiative to designate the U.S. 395 Eastern Sierra Scenic Byway as a national scenic byway. In an effort to connect with existing nationally-recognized byways, we have conducted outreach to both Yosemite and Death Valley National Parks, where motoring routes have achieved national byway designations. This level of outreach led to Yosemite interpretive ranger interviews and an invitation to join the Yosemite Gateway Partners -- a coalition of government agencies, non-profit organizations, individuals and companies with vested interests in Yosemite National Park. The result of this concerted effort has been much broader awareness of the program.

Other outreach successes include participating in community events with a booth featuring selected Roadside Heritage hands on festival activities. The events held by ESICE, such as our open house, have been important gestures of appreciation to the local tourism groups and partners, and have generated goodwill for the program. ESICE has included information about Roadside Heritage in its fundraising campaigns and sponsorship initiatives. An email newsletter has also been well received and kept our network of partners and collaborators and interested supporters informed about program activities.

A Business Plan outlining activities, including sponsorship campaigns, to support Roadside Heritage projects, is available by sending a request to [info@esice.org](mailto:info@esice.org).

## **Web site**

### **Goals**

Our goal was to create a visually appealing interactive companion to our audio programs. The web site would also serve as a place where programs could be freely accessed and downloaded, and as a venue for youth program student casts. It also features web extras such as “Native Voices”, where interviews that could not be incorporated into the audio programs are available.

### **Challenges**

While the site is beautiful and extremely well executed, it was created by a team of experts and then handed off to our organization to maintain. This presented a challenge on two levels: expertise and cost.

### **Lessons Learned**

Having a wonderful web site is a source of great pride. However, a simpler, more manageable web site might have been a better choice for the long run.

Having the web site built by an “outside” entity does not mean that there will be no work involved for the “commissioning” organization. We found that appropriate photos had to be found, text had to be written and many conversations were had concerning the organization and inclusion of materials.

### **In Retrospect...**

Most certainly, it would have been easier for a small project team to independently make decisions, interview experts, write scripts and produce a professional audio program and web site without engaging multiple community partners. However, community participation and partnership in the project were guiding principle for RH and that approach opened doors and enriched the final products. Whether it was a researcher who took time out of a busy day or a member of the Native American community who had children or grandchildren participating in the program, the results of this project's welcoming and diverse community participation were positive and worthwhile.

## **Resources**

### **Oral History Resources**

These sites are helpful in searching for oral history publications, scholarly articles, ideas for talent release and other oral history forms.

American Association for State and Local History

[.aaslh.org/publicat.htm](http://.aaslh.org/publicat.htm)

American Folklife Center

[lcweb.loc.gov/folklife](http://lcweb.loc.gov/folklife)

American Folklore Society

[afsnet.org/index.html](http://afsnet.org/index.html)

International Oral History Association

[www.filo.uba.ar/Institutos/ravigni/historal/loha.htm](http://www.filo.uba.ar/Institutos/ravigni/historal/loha.htm)

Oral History Association

[.baylor.edu/~OHA/Othersites.html](http://.baylor.edu/~OHA/Othersites.html)

### **Oral History and Curriculum Resources**

These sites have oral history information, audio story examples, curriculum ideas, and technical and equipment information.

Storycorps

[.storycorps.org](http://.storycorps.org)

Generation PRX (The Youth Radio Producers' Hub)

[.prx.org](http://.prx.org)

This American Life

[.thisamericanlife.org](http://.thisamericanlife.org)

Vermont Folklife Center

[.vermontfolklifecenter.org](http://.vermontfolklifecenter.org)

Youth Media International – Youth Radio

[.youthradio.org](http://.youthradio.org)

Transom – A Showcase and Workshop for New Public Radio

[.transom.org](http://.transom.org)

Veterans Oral History Project (Library of Congress)

[.loc.gov/vets](http://.loc.gov/vets)

### **Informal Science Education Resources**

These sites have information about informal science education – links, curriculum, conferences, scholarly articles and other resources.

Center for the Advancement of Informal Science Education (CAISE)

[.caise.insci.org](http://.caise.insci.org)

National Research Council

[.nationalacademies.org/nrc](http://.nationalacademies.org/nrc)

On this site you can access two print resources of interest:

- *Surrounded by Science*
- *Learning in Informal Environments*

### **Student Cast Resources**

Microsoft Photo Story 3 for Windows

[.microsoft.com](http://.microsoft.com)

Microsoft Photo Story Tutorial

[.jakesonline.org](http://.jakesonline.org)

Photo Story Tutorial

[.millie.furman.edu](http://.millie.furman.edu)

Voicethread

[.voicethread.com](http://.voicethread.com)

### **Audio Story Resources**

This site has great examples of all kinds of audio stories.

Third Coast International Audio Festival

[.thirdcoastfestival.org](http://.thirdcoastfestival.org)