This PDF file is a digital version of a chapter in the 2005 GWS Conference Proceedings. Please cite as follows:

Harmon, David, ed. 2006. *People, Places, and Parks: Proceedings of the 2005 George Wright Society Conference on Parks, Protected Areas, and Cultural Sites.* Hancock, Michigan: The George Wright Society.

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Controlling Pests, Preserving History, and Using Video as an Integrated Pest Management Information Tool

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This presentation showcases a project funded by the National Park Service Rocky Mountains Cooperative Ecosystem Studies Unit (NPS-RM-CESU). The project, which was carried out by Grant-Kohrs Ranch National Historic Site working in cooperation with Montana State University, resulted in an integrated pest management (IPM) plan for the historic furnishings and collections of the national historic site. Also as part of this project, a smaller, local museum received an introduction to the concept of IPM and specific recommendations during an on-site visit by project members. An additional product was an education video on IPM that was distributed to small museums throughout Montana and Wyoming. Following is a brief description of the project including a discussion of the added values of working with a university on this sort of technical assistance.

Grant-Kohrs Ranch National Historic Site, often referred to as the "nation's ranch," is in Deer Lodge, Montana, midway between Glacier and Yellowstone National Parks. It was established by Congress in 1972 to provide an understanding of the frontier cattle era, preserve the ranch itself, and interpret its nationally significant values for this and future generations. This site's ranching history began when Johnny Grant established the ranch in 1862. Grant traded cattle with westward-bound immigrants. He gave one healthy animal in exchange for two or more trail-worn ones, which he fattened and healed up over winter, and traded one for another couple the next summer. Grant's tenure at the ranch, however, was relatively short-lived. Unhappy with what the Gold Rush was doing to Montana, Grant sold out to Conrad Kohrs after just five years, and returned to his original home in Canada. Kohrs, a German immigrant, arrived during the Gold Rush and owned several butcher shops in the various mining camps of southwest Montana. He bought the ranch in 1867 to supply the beef for his shops. Mining played out, but the East was desperate for cattle after its ability to produce beef was destroyed in the Civil War. The open range, where animals roamed year-around on unfenced public lands at no charge, allowed huge profits to be made. Kohrs became the recognized cattle baron of Montana—grazing over 10 million acres and selling up to 10,000 steers a year at the Chicago Stockyards. Eventually, his grandson and namesake, Conrad Kohrs Warren, took over the home ranch. A significant rancher in his own right, Warren and his wife preserved the family ranch and made it available for purchase by the National Park Service (NPS) in 1972.

Back in the 1970s, Congress was enchanted by the idea of living history, and clearly indicated that this new historic site was to be a working cattle ranch, incorporating living history as the best way to tell the story of ranching. Today, the 1,500-acre ranch hosts around 50 head of cattle. Most ranching chores are done through modern practices with numerous demonstrations on historic haying, branding, blacksmithing, and other ranch activities.

As curator, I am charged with the care of collections made up of 27,000 objects and 75

linear feet of historic archives. They represent the entire time line of the Grant-Kohrs Ranch as well as the many functions of a family and ranch. Objects include textiles from wedding dresses to horse blankets and equipment from wagons to butter churns. The archives date from Kohrs' 1860s butcher shop account books up to the day his grandson died in 1993—over 120 years of ranch and family records. Around 90% of the collection is original to the ranch. With no visitor center or formal exhibit areas, 90% of the collection is in storage. Just three years ago a state-of-the-art storage facility was constructed for its long-term care.

About 10% of the collection is on exhibit. Most items are displayed in an authentic representation of the turn-of-the century family mansion or 1930s bunkhouse. Other exhibits include the tack room and blacksmith shop of the 1930s and a display of horse-drawn wagons and equipment. It is in these permanent exhibits areas in historic structures where perpetual pest problems exist—the reason for this project.

Grant-Kohrs Ranch was using an IPM approach in controlling unwanted guests in the museum. However, the existing plan was drafted in large part by authors with background in collection management and without benefit of expertise in science and entomology. Even after the Grant-Kohrs Ranch staff's best efforts at an IPM approach, cluster flies remained a significant problem, coming into the house by the tens of thousands each fall. These flies breed in the turf outside and, on that first cool day, try to get inside where it is warm. As soon as they are inside, they go toward a source of light to escape. The impact to cultural resources was considerable, particularly fly specks on turn-of-the-century wallpaper. The other persistent problem was dermestid beetles whose larva liked to graze on the 19th-century wool carpets. Damage to carpet took place over the years, mostly before it was under NPS care. However, monitoring showed dermestid larva were continually active and still feasted on the wool fibers.

During this time, I also was learning about the NPS-RM-CESU. One of its goals was to coordinate research, education, and technical assistance projects among member agencies and academic institutions. NPS-RM-CESU was somewhat unique among fellow CESUs in that it provided funding for projects. I also learned that the NPS-RM-CESU was interested in opening up its doors to projects with a cultural resource component.

I also happened to know that the Montana State University–State Extension Office entomologist, Will Lanier, had a background in museum IPM plans. He seemed the perfect individual to look at our stubborn pest problems. After we contacted with Lanier, he proceeded to take the project idea to a whole new level.

First, Lanier asked if there was another small, local museum that could also benefit from an on-site visit when he came to see Grant-Kohrs Ranch—getting more "bang for the buck" for his time and expenses. The Powell County Museum and Arts Foundation, just a mile from the Grant-Kohrs Ranch, fit the bill. It is a small, nonprofit organization with few or no professionally trained museum staff. The organization has several small museum components, the major one being the state's territorial and then state prison, which was in use until the early 1980s. They were contacted and very interested in getting some help with their pest problems, particularly pigeons.

Lanier also thought we could reach a very wide audience if we produced a training video for museums, using Grant-Kohrs Ranch as a real-life case study. Montana has over 200

museums, with the vast majority run by all-volunteer staff or perhaps one paid employee with no museum training. To make this happen, the entomologist offered to use his salary as a match for the grant, freeing up money for video production.

Montana State University had recently created a new one-of-a-kind degree program—a Master of Fine Arts, Science, and Natural History Filmmaking—that seemed a perfect fit for the training video. Working with the Montana State University graduate film school on various projects, the project entomologist knew of a recent graduate who might be interested in the project. Zach Gildersleeve had recently graduated with honors and, with a fellow graduate, formed the Aver Ingenuity film company. Gildersleeve helped us work up a budget that was within the funding limits of the potential NPS-RM-CESU grant.

The grant request emphasized the natural, cultural, and educational components of the project. The high percentage of match from Montana State University also showed a high level of partnership commitment. Coordinators at NPS-RM-CESU reviewed the grant and their recommendations were incorporated before the final submittal.

Grant-Kohrs Ranch received the grant. The project was formalized through a basic NPS-RM-CESU task agreement and scope of work. They included more details than required—responsibilities, budget, time line, products, and formats—to avoid confusion and discrepancies. Material associated with the project—video footage, files, photographs, etc.—were sent to Grant-Kohrs Ranch at the conclusion of the project for park archives. The NPS retained full copyright of the training video. With these agreements in place, the project began.

Use of modern technology saved travel money and helped meet deadlines. Video conferencing was available at the local courthouse and allowed same-time interaction in reviewing outlines and story boards. Microsoft PowerPoint was used as the storyboard format. Versions were traded back and forth through email or, if large, uploaded to the Extensive Service web site.

Since the ranch staff had never been involved in production of a film or video, Gildersleeve guided the process. A fairly detailed script was written and matched to slides in PowerPoint. This script and story board were reviewed many times to produce a somewhat final format. Gildersleeve then produced a "shot list" of images that he would need to video once on site. We reviewed the list and brainstormed where these images could be shot. With the "shot list" in hand, Gildersleeve was able to do all the filming at Grant-Kohrs Ranch in a day. The next step was a Microsoft Word table matching up the actual text with the video image. Gildersleeve was invaluable at this point in condensing previous versions down to a script that was within the budget and scope of the project. Also, if the script made sense to him—someone without an insect or museum background—then it probably would make sense to our target audience. A VCR tape was produced, reviewed, and resulted in the final educational training DVD.

Grant-Kohrs Ranch received very specific recommendations on the revised museum IPM plan—the original goal of the project. Perhaps the most important suggestion was the use of degree-days to determine pest management and control actions. The existing museum IPM plan had extensive schedules for pest management activities, all based in the calendar. However, insects do not seem to pay much attention to the calendar, but they do respond

to changes in weather. Now pest management activities are based on pest activity, as predicted by watching degree-days. A web site helps determine the degree-days, based on several weather factors gathered from local weather stations.

A common goal Lanier has when reviewing a museum's pest management plan is finding ways to spend the same amount of resources on pest management but targeting it on the most important activities. At Grant-Kohrs Ranch, monitoring traps consistently caught around the same number and types of pests, religiously recorded in the computer database. Lanier suggested that instead of documenting the same data over and over, the park should use that time and money for an activity that provided better prevention or control. Among the creative time-saving methods that we looked at was taking digital images of pest traps and recording the catches directly into the computer database, cutting out the hard-copy stage.

It was determined the site's dermestid beetle problem was tied closely to the huge number of flies that get into the structures and eventually die, providing a ready and plentiful food source for larva. Controlling flies would largely control the dermestid larva. Monitoring and staff observations showed flies were particularly bad on the south brick wall of the main ranch house. Even after maintenance work on these windows, flies could get through. With resources saved from more efficient monitoring, the park could afford a targeted application of low-toxicity chemicals around the windows and doors on the wall, timed just before a particular degree-day level was reached.

Another low-tech fly control method was incorporated into the IPM plan: the use of light. Flies will go toward a source of light and buzz around until their very limited amount of energy is exhausted and they die. Lanier designed a light mounted on a stand (also available in hardware stores) near but not in a collection area. It sits on top of newspapers where flies fall, making clean-up easy.

As planned, the Powell County Museum and Arts Foundation also was introduced to the concept of IPM. Prior to his visit, Lanier had them make a floor plan. This floor plan was a tool to show the optimum trap locations (besides being handy for future planning projects). An on-site visit, done the same day as the video shoot at Grant-Kohrs Ranch, helped the museum determine a few specific actions to control their pest problems.

At the end of the project, the budget allowed Gildersleeve to produce over 100 copies of the training video. These have been informally distributed around the state to museums and to cultural resource staff in NPS. The Extension Service is working on a formal distribution process to all Montana county extension agents. Finally, an on-line version was produced and now appears on the Montana State University Extension Service web site.

What started as one person's wish to get an entomologist's opinion on Grant-Kohrs Ranch's persistent pest problems ended up meeting a grander goal—having the greatest possible number of people benefit from our modest budget.

As with most projects, there were lessons learned along with some unplanned benefits. It was satisfying to see the network of partnerships that developed. NPS-RM-CESU provided a format for an NPS historic site, a state university, and a young professional to work together to produce an educational product for a very wide audience and meet the specific needs of pest management at Grant-Kohrs Ranch.

The diversity of people and their backgrounds benefited the project. For example,

Lanier had worked only with a large, well-funded university museum with resources to implement a sophisticated museum IPM program. However, as a board member of the Museums Association of Montana, I knew that the vast majority of our collecting institutions had no such resources. The final training video reflects an effort to make the process as efficient and low-cost as possible.

The 100 copies of the training video were produced in a DVD format. This proved to be too advanced a technology for most of our audiences. At best, museum staff could take it home if they happened to own a DVD player. The majority of copies should have been in a VCR or CD format for easy viewing in the museums.

Finally, the CESU agreement is very easy to use. Formal contract and bidding process has already taken place. CESU coordinators help locate university programs and staff that fit the project. The university overhead charge is a modest 17.5%, allowing the majority of the funds to go directly to the project. The required task agreement and scope of work are basic and simple to complete. Perhaps the success of this project will encourage other CESU member agencies and universities to take advantage of this service.