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FIRE Up: Youth Working with Communities to Adapt to Wildfire

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Abstract

Around the world, youth are recognized as playing an important role in reducing the risk of disasters and promoting community resilience. Youth are participating in disaster education programs and carrying home what they learn; their families, in turn, are disseminating knowledge into the community. Youth are also collecting data and doing actual mitigation work that furthers the ability of homeowners and organizations to take appropriate action to address wildfire risk. In addition to making a difference today, youth disaster education programs train the adults of tomorrow to be more prepared citizens. As social scientists and education researchers working in wildfire risk mitigation, we asked: How do wildfire education programs for youth help develop and support fire-adapted human communities? To begin to answer this question, we studied seven wildfire education programs for youth across the U.S. Programs were based in schools, public agencies, and nongovernmental organizations (NGOs). In a series of interviews, we sought information that would enable us to describe and analyze (1) the program's characteristics and the local resources to support it, (2) ways in which the program increased knowledge and awareness of wildfire, promoted more realistic risk perceptions, and improved wildfire preparedness for youth and their families, and (3) ways in which the program contributed to the local community becoming more adapted to fire. We found that the extent to which the programs were integrated into local wildfire planning and management efforts varied, as did their effectiveness in reaching community members and homeowners. In this report we present findings from one case study-the Field Inquiry Research Experience (FIRE Up) program currently taking place in Idaho.

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Students participating in the FIRE Up program evaluate the wildfire risk for lands in the wildland urban interface. Photo by Gwyneth Myer.

THE FIRE UP PROGRAM

Students pile out of vans, sporting gray "Boise Boundary Project" t-shirts, and toting Global Positioning System (GPS) units, tape measures, surveyor flags, and clipboards. They fan out in teams of two over a steep hillside within view of newly constructed large homes and mountain bike trails. The students are nearing the end of a long day, begun by walking through neighborhoods to assess homes for fire risk, attending a television media event, eating lunch with the Rotary Club, and conducting invasive flammable weed surveys guided by a Bureau of Land Management (BLM) fire ecologist. Their reward will be a Dutch-oven dinner, and time around the campfire sharing with teachers and agency partners their field experiences and discussing independent projects they might pursue.

FIRE Up (Field Inquiry Research Experience), a BLM-sponsored summer course for high school students in the Boise area of Idaho, provides classroom instruction and field experience to develop research skills needed to explore ecological questions, particularly those related to impacts of wildfire on ecosystems. During the first week of the 3-week program, students are taught how to gather data and use tools including GPS units, digital cameras, and software for recording landscape data. Students also learn skills, such as plant identification and home wildfire assessment procedures, relevant to their particular summer project. In the second week, students move to the field where they conduct hands-on research and collect data in small independent teams guided by teachers and project partners, gathering at camp in the evening for eating, focused discussion, and fun. During the third week, the students return to the classroom to collectively collate and analyze data to answer questions posed by project partners and to independently address research hypotheses developed during their field work. Throughout the project, students are taught by local specialists and a cadre of high school teachers. The culminating event is

"This is a program that allows [students] to experience, to apply the learning in a real world situation. Their comments I've gotten over the years show that they feel that what they are doing makes a difference." (School superintendent)



During the second week of the FIRE Up program, students move from the classroom to the field with their camp serving as classroom as well as home away from home. Photo by Gwyneth Myer.

a showcase where students present their independent research projects to partners, parents, interested members of the community, and school district representatives. Partners receive final reports that include data, analysis, and recommendations for management if appropriate. These reports have included comprehensive post-burn ecological assessments, invasive species inventories, and risk assessments of homes and wildlands in the urban foothills.

The program's objectives are to:

- 1. Develop science literacy in students through the process of collecting information, analyzing data, and documenting outdoor research projects that are valued and used
- 2. Impact career choices by increasing participants' awareness of land and water management issues
- 3. Illustrate the application of science and technology through an outdoor research experience
- 4. Create partnerships with organizations to improve science education throughout local communities
- 5. Provide avenues through which participants can research and address science and societal issues
- 6. Parallel the national objectives of STEM¹

¹STEM is an educational coalition led by the State Department of Education and National Science Foundation that integrates science, technology, engineering, and mathematics and encourages discovery, exploration, inquiry, problem solving, and project-based and interdisciplinary learning. Through STEM, students work both independently and collaboratively, develop communication skills, use technology, and work actively with their local community.



A Bureau of Land Management fire ecologist is one of many local specialists who offer their expertise to the FIRE Up program. Photo by Victoria Sturtevant.

FIRE Up focuses on developing applied science literacy through classroom learning and a field project. Field projects have addressed diverse concerns, with some projects involving students in activities that contribute to creating fire-adapted communities. In this case study, we focus on the benefits of FIRE Up wildfire management-related projects conducted over several years.

The program's learning objectives are guided by what FIRE Up developers term the "value and use" principle: each year community partners devise research questions for driving the curriculum that guides students in the process of data collection, analysis, and presentation in reports that are valued and used by the program sponsors and community partners. As described by one of the program's teachers:

"We demonstrate to students what professionals do—they replicate it. They understand their work will be valued and used. That's huge for them. There's no text book or test in the course, it's how you analyze data and present it."

The curriculum framework was developed in 2002, and the first field program was conducted in 2004. Projects have generally related to wildfire management, producing data and answering questions that could help a community become more adapted to wildfire. For the first field program, students gathered data on a post-prescribed burn site on BLM land in Pixley Basin, south of Grand View, ID. Students collected data following agency protocols and used fire behavior software to address questions related to the effectiveness of the burn in reducing wildfire risk. In 2010, the summer after a Table 1.—Projects undertaken by the Idaho FIRE Up program that contribute to wildland fire management, including year the project was undertaken and project location and partners

Year	Site location	Projects	Partners
2004	Pixley Basin	Post prescribed burn analysis	Bureau of Land Management (BLM)
2005	Silver City	RedZone home assessments FIREMON survey of public land	Silver City Home Owners Association (HOA) BLM
2006	Garden Valley	RedZone home assessments FIREMON survey	U.S. Forest Service BLM Garden Valley HOA Terrace Lake Resorts
2007	Pine and Featherville	Home fire risk assessments Fuels and fire risk assessments on public land	Resource Conservation and Development Council BLM Gem County Commissioners
2008	Homestead Owyhee West Antelope Tipanuk and Oasis	Post prescribed burn analysis Bitterbrush (invasive species) survey Creek erosion analysis RedZone home asssessments	BLM Resource Conservation & Development Council
2009	Boise Foothills	Occluded spaces survey RedZone home assessments	BLM City of Boise Boise Heights HOA
2010	Eagle Foothills	RedZone home assessments Fuels analysis and base-line data collection for restoration work	Eagle Fire Department BLM Healthy Hills Initiative Group (citizens group) Ada County Sanitary Land Fill Ada County Commissioners
2011	Boise Foothills	Home fire risk assessments Fuels and fire risk assessments Warm Springs Invasive Weed Survey	City of Boise BLM

wildfire in the foothills of Eagle, students again collected data for the BLM, this time on ecological impacts of the fire including the increase in invasive weeds, soil erosion, and plant recovery. In 2011, two projects were undertaken related to wildfire management: (1) the BLM requested a survey of invasive species for a cooperative project with the Warm Springs Firewise Community, and (2) the City of Boise requested a wildfire hazard assessment of nearly 600 homes in the Foothills East neighborhood and nearby open space in the wildland urban interface (WUI). Over the years, students have conducted wildfire risk assessments in a number of rural communities and in the Boise foothills (Table 1).

"We receive a project from our community partner and we assess the area per their recommendations. We showcase the data in a booklet form, and the community, whomever it may be—a homeowner association, BLM or the City of Boise fire department—they take our data and try and implement different programs or write grants to mitigate risk to their land." (FIRE Up teacher)

COMMUNITY PARTNERS AND CONTRIBUTORS

The success of the FIRE Up program is due to a dynamic partnership between committed teachers, local community leaders, organizations, and agencies. The Idaho State Office of the BLM provides the bulk of funds, projects, and specialists to direct the student field research. Seed money for program development came from the agency's fuels program, and FIRE Up projects follow guidelines on the use of federal funds and requirement for environmental review. FIRE Up fits into the educational mission of the agency,

and the partnership is part of the "Hands on the Land" network, a national interagency network of field classrooms connecting students, teachers, and parents to their public lands (http://www.handsontheland.org). BLM Idaho staff and collaborators identify two primary benefits from the program: data that support BLM fire mitigation projects, and homeowners' increased awareness of wildfire risk. A BLM fire ecologist explains the agency's interest in wildfire

"[The FIRE Up director/ teacher] works hard looking for projects and funding—pounding the pavement." (City planner)

management on private land, "BLM's interest and reason for funding the program is that 80 percent of wildfires start on private land and spread to public (BLM) lands and this program helps reduce that risk." FIRE Up is a "white hat" program for the agency managers enjoy positive feedback from the community in contrast to the less favorable press they receive for some of their other management decisions.

Northwest Nazarene University (NNU) is FIRE Up's academic and administrative partner. As the academic partner, NNU provides college credit to interested high school



Students inventory invasive species in a new subdivision in the wildland urban interface near Boise, ID, as part of the FIRE Up program. Photo by Victoria Sturtevant.

students (a major incentive), as well as credit to teacher interns for on-the-job training. In its administrative role, NNU is the fiscal and legal partner—writing, receiving, and distributing grants and contracts, and ensuring all funder requirements and rules have been met.

The City of Boise has been a crucial partner during the past few years, suggesting wildfire management projects in neighborhoods at risk and the surrounding foothills. As "I summarized by the fire chief:

"Many Boise neighborhoods face a unique and serious threat from wildfire. Finding out just where the risk is highest, then educating those homeowners on what they can do to help us protect them is going to be very valuable."

State Farm has been a FIRE Up partner since 2008, providing funding and participating in media events. FIRE Up home risk assessments are shared with insurance company agents. Local executives at State Farm support FIRE Up activities because they believe that the students' work helps reduce wildfire risk, protect company profits, maintain low insurance premiums, and potentially save lives. As explained by a State Farm field executive:

"It's just a small, little thing but bits and pieces of what we do come together and have a big impact. This alone wouldn't be enough, but with everything else—the City, State Farm and everyone else—it helps."

Being involved in Fire Up gives State Farm favorable publicity and supports the company's community outreach and educational activities.

Support of the Meridian School District (serving the communities of Boise, Eagle, Meridian, and Star) has been critical to FIRE Up's success. Budget cuts have eliminated the potential for financial support, but the district makes other contributions to the program. The district helps find partnerships in the community. It covers the costs of release time for teachers, provides community service credit for students, and contributes old laptops and classroom space for the summer program. The cadre of FIRE Up teachers consists of four science and technology teachers from the Meridian School District, who have been with the program since its inception, a retired biology teacher who leads the group, and two program interns who provide assistance. The commitment of teachers is essential; FIRE Up's seasoned teachers are highly motivated, with a vision and aptitude for this kind of field work and a talent for working with kids to build the skills they can take on to college and careers. The school district compensates teachers for release time during the year for program planning and student recruitment, but FIRE Up covers the costs of the teacher cadre during the 3 weeks the program is in session. Recently credentialed teachers serve as interns, providing support services such as van driving and data compiling. As the superintendent remarked, "[Teachers have] stepped up and done

"I work with homeowner associations, fire departments, anyone who deals with the threat of wildfire—we've used FIRE Up to get our message out. Students do things to benefit [homeowners] that we don't have time to do. People get personalized assessment from Fire Up. We can provide info to HOA, but these personalized messages are more valuable." (BLM fire mitigation specialist)



A Bureau of Land Management botanist leads a tour through the fire-resistant plant demonstration garden at the Idaho Botanical Garden. Photo by Gwyneth Myer.

whatever it took to keep the program going. They absolutely are key to the success of this." Finally, the school district promotes the program so that FIRE Up's class of 24 students, chosen from a pool of applicants often twice that size, is available to provide labor and inspiration.

Additional partners, over the years, have included the Southwest Idaho Resource Conservation and Development Council, homeowners associations, fire departments, and city offices. Community organizations provide in-kind contributions, such as the Rotary Club inviting students to its weekly lunch meeting and the Idaho Botanical Garden giving students a special tour of fire-resistant plants with the BLM botanist.

The annual budget for the summer program is about \$35,000. In past years most of the funding came from the BLM and the City of Boise. The City funding and staff time come from planning, fire, and recreation departments. As one of the involved City staff said, "Holy Moly, if we had to pay a consultant it would be 4-5 times that, easily. And you get a lot of other side benefits." State Farm has recently increased its annual funding from \$5,000 to \$10,000.

"I bet some of these kids will go on to do this as a career, either with BLM or... starting their own company or something. I could definitely see a kid starting a company with a bunch of friends, going around to wildland interface areas all over the country... Something's going to happen because these kids are taking a sincere interest in what they're doing." (Boise fire captain)

IMPACTS OF FIRE UP

The FIRE Up benefits to students are perhaps easiest to document. Students participate in the program because the education occurs outdoors during the summer, they receive college credit, and they meet their high school requirement for community service (120 volunteer hours). Many were interested in studying science or communication in college and learned from college recruiters that this kind of experience will position them well for the future. Students told us that they had not expected to gain such a fundamental understanding of wildfire, including fire behavior and the challenges of managing wildfire. They also learned about the difficulties of planning for residential development in the WUI, reducing fire risk on public lands, and addressing ecological processes such as wildfire that cross ownership boundaries.

FIRE Up research focuses on neighborhoods and communities at risk of wildfire, not necessarily the places where students live; however, some students "take a little [of the responsibility] upon themselves and say 'what could I do?'" (BLM education coordinator). The program has created an opportunity for students to educate family and friends about wildfire risk. Some students said they wanted to evaluate their own home's vulnerability to wildfire; one said that as soon as the program was over, she would be employed by her parents to work to reduce their risk. Another planned to reduce wildfire risk at his parents' lakeside cabin north of Boise. Students shared their new knowledge on where they might build a home, what materials they should use, and how they would landscape and maintain their property to minimize wildfire risk. One student expressed her new mindset, "Shake roofs, they creep me out."

The impact of the program on partners is apparent. FIRE Up students collect data that helps the BLM manage public lands and address the threat of wildfire from adjoining private lands:

"In Silver City, it was helpful because the kids put together [recommendations as to] what homeowners can do. We're trying to reduce fire risk for the community—when they put a nice presentation together with graphs and stuff like that, it's an added way to show what we're doing." (BLM fire mitigation specialist)

Student work supports BLM's outreach to homeowners by increasing community awareness of the threat of wildfire, not only by conducting home assessments but sometimes also by speaking directly to homeowners. "When [the students] were out looking at the homes and a homeowner would come out and talk to them, all the interactions I saw were very nice." (BLM fire mitigation specialist) For instance, in 2010, FIRE Up involvement with the Healthy Hills Demonstration project brought together BLM, students, and local homeowners to develop fuels management and watershed restoration demonstration sites, conduct scientific research, perform outreach activities, and provide education opportunities.

"There are direct benefits—those [BLM specialists] who ask for surveys get the data they need in order to make decisions. They can actually use the data. It's helpful for them to work fairly closely with high school students and see what is going on in education and what students are capable of." (BLM staffer)



FIRE Up students inventory invasive species and assess wildfire risk on undeveloped lands owned by the City of Boise. Photo by Gwyneth Myer.

For the City of Boise, the political gamble of investing taxpayers' money in student work has paid off; City staff have worked closely with the program to make it work. FIRE Up prepares wildfire risk assessments on large tracts of land the City has purchased, suggesting how they might protect that investment. FIRE Up reports designate "the good, the bad, and the ugly" – places where the City might want to target work or lands they may not want to acquire. The open space assessment helped the city draw its WUI boundary, and data collected by the students will help in proposals for acquiring outside resources to complete mitigation work. According to the City staff responsible for open space: "[Without the FIRE Up program] we wouldn't have some of the interdepartmental communication or be applying for these grants through Emergency Management. We wouldn't know what to even think about or to put down on paper …we would have nothing to back up why we thought it was the project that should be undertaken."

> "This is the only way we'd be able to do this, as far as budgets are concerned. We don't have the money to hire a consultant to go out there and do this and there's so much land out there that has to be done and [the students] can cover so much ground in such a short period of time. It's really an asset for us." (City planner)

CREATING FIRE-ADAPTED COMMUNITIES

The effects of the program on communities and neighbors are more diffuse and indirect—creating fire-adapted communities is a process that does not happen overnight. As a whole, interviewees reported that community education was the most important contribution of the program—raising homeowner awareness of the threat of wildfire and the actions they can take to address it. Boise, like many communities and cities in the mountain west, has experienced a tremendous influx of residents who are not aware of wildfire risk or do not know how to reduce that risk. "[Newcomers] want the lush yard they left; [the students] have done a terrific job of educating those people" (State Farm executive). City and agency personnel felt that the maps produced using student-collected FIRE Up data were useful not only for planning, but also for public outreach and education. Staff felt maps produced from FIRE Up data demonstrated that areas not maintained, or even just kept in a natural state, could catch fire quite easily, and students had helped residents understand this was a serious concern for the city.

In past years, homeowners received personalized property wildfire risk assessments from FIRE Up students, including photos and recommendations for increasing fire safety. Many homeowners have met students enthusiastically, making sure their concerns about neighboring properties were also noted. Communities such as Silver City and Featherville/ Pine used student reports to support applications for funding to complete recommended treatments on private property judged to be at risk of wildfire. During the summer of 2011, 581 home assessments were completed and compiled by students, mapped by the City of Boise, and posted on its Web site (http://www.cityofboise.org/Departments/PDS/ NewsReleases/page65906.aspx).



"When [students] give their presentations they're very passionate. They want to go in there and fix those homes. Then they learn that there's a process involved they have to work with homeowners and agencies. Things can't just happen overnight like they think it should. That's valuable [to learn], part of becoming educated and a citizen." (University partner)

FIRE Up students produce data that can be used to map home wildfire risk, such as this example available on the City of Boise Web site (http://www.cityofboise.org/ Departments/PDS/NewsReleases/ page65906.aspx) "If you get neighbors to recognize they have a responsibility to neighbors, that would help certainly would help." (Homeowner association president) However, because the class is only 3 weeks long, students have not been able to follow up with homeowners; it is up to the associations, neighborhoods, and cities to initiate and support this long-term homeowner engagement, to write grant proposals for funding fuel reduction, and to provide incentives for action. The president of the Boise Heights Homeowner Association was disappointed that homeowners who received customized risk assessments did not do more to follow students' recommendations. The dilemma, he believed, was that people did not want to remove vegetation that provides privacy, shade, and aesthetics. He felt that it would improve compliance with the recommendations if there were incentives to encourage homeowners to use the information provided by the students.

State Farm uses students' home assessments and recommendations as informal talking points between agents and homeowners. An executive distributes the final home assessment reports (literally tearing the books apart) to their agents, saying, "Contact your policy holders and go over this with them. Ask them whether they are planning on having this done, and have someone come out and look at it [their property]." The company appreciates having this independent source of information and official documentation.

Partners such as the City of Boise and BLM indicated that the students can convey the message about wildfire effectively and in ways that differ from those of professionals. One fireman suggested that, because the students have nothing to gain, and nothing vested in whether residents make changes to their property, students might be more credible than other sources of information. One homeowner who greeted students assessing her neighborhood commented that neighbors might respond positively to their work because it would be seen as coming from an informed and neutral position. One of the teachers noted:

"It really makes a difference having a kid do a survey instead of a fire guy or BLM person. There's a lot of anti- government people, but when it's kids, people



Students collect vegetation data to use in home wildfire risk assessments that are made available to homeowners. Photo by Gwyneth Myer.

come outside and talk to kids. [Residents are] interested in what [students are] doing, and they're not as unfriendly. I don't know that I've ever had a negative reaction from any homeowner the entire time I've been involved with the program."

Perhaps FIRE Up's greatest contribution to communities is bringing partners together to build mutual understanding of partners' different goals and roles and to facilitate wildland fire management across land ownerships and boundaries. For example, one FIRE Up project called for prioritizing where to locate different fuels treatments, but this required a collaborative effort to design a method for prioritization involving the BLM; the Boise fire marshal, open space coordinator, and planning director; and the FIRE Up director. The team developed a method to map wildfire risk on occluded lands or areas where the city limits adjoin wildlands, modeled after a Web site maintained by the City of Colorado Springs, CO (http://csfd.springsgov.com/) (see example map on page 11). The maps address risk on private and public lands and, as observed by a BLM fuels specialist:

"It gives our cooperators at the city a tool to address their problem which can become our problem—burn up to BLM land, cause flooding issues the following spring. It addresses problems we have, too."

NEXT STEPS FOR FIRE UP

The FIRE Up program works under a number of constraints, including time, money, and partners' involvement, which can generate concerns for data quality. Time refers to the number of weeks students are involved in the classroom and in the field. Partners also have limited time for designing projects, providing necessary supporting materials, and negotiating researchable questions. The crunch of time also leads to questions on the accuracy of student work and their proficiency in using necessary tools such as compasses and in identifying plants; in some years there was limited time for the demonstrating or checking techniques in the field.

Program leaders have to balance some competing priorities:

• Quality vs. quantity of work: Every year, FIRE Up produces reports that synthesize huge amounts of data; we observed (and were told) that kids feel pressured by the amount of work they need to finish: the number of homes being assessed, number of data points that need to be surveyed or inventoried, and acres they need to cover. During our visit, students appeared rushed, worrying about efficiency and finishing the list; at times they seemed robotic, going through the motions of the data collection rather than thinking about the methodology and purpose. Some partners did not expect that students would be able to cover all the areas mapped out and were surprised when the teachers required them all.

"Long term—we know we don't always see the results immediately from things like this. It's long term and it may be intangible, almost; but we believe it's going to have an impact, in the long run. If it saves one home in Idaho from being burned, saves one life, it's been worth it. But it's so hard to know-how do you know it's saved because a homeowner made it defensible? You don't know." (State Farm employee)

nd "In 2009 I went with students when they did their potluck, camped out on the river for a couple of nights, and hearing their feedback was so cool. That they could do work like this, use some of this technology. This is what many would love to do in their regular environmental or tech classes in the high school, but it's not happening." (City program director)

- Advanced planning vs. last-minute problem solving: The program director is a master at multi-tasking and problem solving. Unexpected logistical and methodological questions come up throughout the day, challenging/upsetting careful organization and planning. Program logistics such as transportation and camping are finely tuned; field work raises a different set of issues with each partner and research problem. Partners suggested students could use more training in research protocol; their methodology could use more standardization to increase reliability. Interns could use more clearly defined roles; they wanted to know better what to expect in the field.
- Program priorities vs. partner goals: Teachers trying to work with public entities find there can be a disconnect between program priorities vs. partner objectives. As stated by a high school science teacher who helps recruit students for the program, "For some reason, they can't couple together. Agencies can't define precisely what they want or there is apprehension about relying on the data set that's going to be produced." An agency fuels specialist stated that it's difficult to get on the same page, but they always try. Although the BLM tries to use FIRE Up data to monitor its projects, "we haven't always hit there." FIRE Up reaches out to multiple potential community partners, but they find it useful to go back to previous clients with whom they have gone through the difficult process of aligning goals. As explained by one program leader:

"From a citizen or city government point of view, with their own set of complicated issues, it's hard for them, especially the first time through the



FIRE Up projects have helped protect areas that are valuable for recreation. Photo by Victoria Sturtevant.

process, to find out exactly what it [the researchable question] is. Sometimes a group will come and say, 'that's not the data we want.' Communication is a huge challenge, all the way around...."

The following suggestions for next steps will begin to address some of these inherent tensions and challenges mentioned by interviewees:

- Select projects earlier to provide more lead time for planning and organizing, even though political realities and budget uncertainties make this difficult. It is crucial to repeatedly communicate with partners about what their needs and appropriate methodologies are and how to arrive at the best product. One partner suggested that there be a "critique" or evaluation form to fill out at the end of the program to suggest areas of improvement. A partner program exit interview could also provide valuable feedback to program developers.
- Collaborate with partners both before and during the field session. Before the session, specialists could demonstrate their expected use of tools and protocol to partners, who could give their approval of the process, and to teachers, who could then

demonstrate for the students. This might provide consistency, decrease errors, save time in the long run, and create more usable products. For instance, the Boise fire captain could have completed some home assessments with teachers, the BLM invasive weed project leader could have taken teachers to the site and gone over the inventory methods, and the Boise planner could have gone over the WUI plot data protocol. Teachers could then repeat this at the same site with

all the students. Although this requires upfront time from partners and teachers, ultimately, it may be more efficient. Having more interaction between partners and teachers onsite might enhance communication and help specialists clarify the research questions, methodology, and objectives.

- Discuss how data will address partners' needs and how the data will meet students' learning objectives. Explore with partners, teachers, and students how the methodology or assessment protocol will answer questions and contribute to risk mitigation or potential changes in management or policy. If specialists demonstrate how they want things done, teachers and students can ask questions and explore rationales; partners assume that teachers share a common understanding, but it may not be so.
- Follow through with homeowners who take action in response to fire risk assessments. Although individual visits with homeowners may not be possible, students could share their information at a homeowners' association meeting. Students could see the homeowners' response; group pressure might create a shared expectation or collective identity for the neighborhood to address their wildfire risk. Presentations could also be made to city commissions, such as a report on the WUI plot assessments to the Foothills Advisory Committee.
- Take advantage of students' senior projects and other community service requirements to give the program more time to follow through with community partners. Students could benefit from more time for further inquiry



One challenge of developing FIRE Up projects is ensuring that they are of value to the partner and students. Conducting home risk assessments introduces students to data collection methodologies, new technologies, and firewise principles, while coming up with a product homeowners and communities can use. Photo by Gwyneth Myer.

or application of the work begun during the short, intensive summer course. The community could benefit from more communication with students, even if only through more venues and possibly a Web site or computer disc with top student projects and group reports.

LESSONS FOR OTHER YOUTH WILDFIRE EDUCATION PROGRAMS

Analysis of the FIRE Up program suggests several lessons that will help other programs increase their significance:

"This is biology right here. This is what school should be like. You can't always get kids out and do what you should be doing so this is good because it gets them out, doing field work, showing them what science is about. They are actually doing stuff and that's what it's all about." (FIRE Up teacher)

- Cultivate partners. Community partners help get the program message out, lend credibility, and give meaning to community service and place-based learning.
 Partners not only support a given year's program, but the program can also serve as a catalyst for partners to share data, methodology, and objectives around other projects. Diverse partners and projects advertise your program more widely.
- Work within the local educational system, but find ways to move beyond boundaries imposed by curriculum and state academic standards. FIRE Up helps students meet some graduation requirements, such as community service, but students also appreciate the college credits and field experience.
- Recruit teachers who recognize the value of teaching outside the confines of class schedules. Find ways to support or reward participating teachers for their innovation.
- Deliver the program during the summer or extended vacation period to skirt institutional barriers such as scheduling, state education standards, and other restrictions faced by teachers during the school year.
- Find (and nurture) a leader who is highly organized, can juggle multiple expectations, change course quickly, and serve as a role model, cheerleader, and engaged citizen. It is helpful if this person is willing to devote far more hours to the project than will be compensated.
- Supervise students carefully, cultivate their enthusiasm, and allow them to explore how their work fits into larger community and regional concerns. Make sure they see the value and importance of their work.
- Create a program that is well defined and structured, but flexible and responsive to the needs of partners and students.
- Share your product and demonstrate that students can produce a valuable and high quality report. A diversity of partners and projects advertises your program more widely.
- Have fun, eat together, and enjoy the differences in people, partners and ideas.

"It really affects the students not being locked up in a classroom. Working in the field makes a more comfortable environment and it's special for the students' relationships with teachers; they are calling them by their first name and working closely with them. That type of learning environment helps students' confidence and information retention." (FIRE Up student)

WHERE TO GO FOR MORE INFORMATION ABOUT FIRE UP

http://www.handsontheland.org/sitedata/fire-up/

http://www.blm.gov/id/st/en/res/environmental_education/fire_up_program.html

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ABOUT THIS SERIES

This is one in a series of Forest Service research notes presenting descriptions of individual case studies included in the National Fire Plan study "Promoting fire adapted human communities through youth wildfire education programs." Other research notes in the series can be found by searching the title "Youth Working with Communities" at Treesearch, http://treesearch.fs.fed.us or by contacting a member of the research team.

METHODS

This report is part of a larger investigation of how youth wildfire education programs contribute to the development of fire-adapted human communities. The National Cohesive Wildland Fire Management Strategy defines a fire-adapted community as consisting of "informed and prepared citizens collaboratively planning and taking action to safely co-exist with wildland fire" (Wildland Fire Leadership Council 2011, p. 33). A working group of the Wildland Urban Interface (WUI) Mitigation Committee of the National Wildfire Coordinating Group² has identified four types of adaptations a community must make to become adapted to fire: (1) social adaptations, (2) political adaptations, (3) ecological adaptations, and (4) emergency management adaptations. In studying wildfire education programs for youth, we looked for ways in which the program contributed to adaptations in these four areas.

We explored the environmental education and community wildfire management literature and developed a model to explain how education programs and fire-adapted human communities interact (Fig. 1). The case study reported here is helping us further define and characterize the model. Our first step was to describe the program, focusing on program content and the extent to which the program employed experiential, place-based, and service learning activities (blue box in Fig. 1). Next, we collected data on whether and how the program increased knowledge and awareness of the physical, ecological, and social aspects of wildfire, promoted more realistic risk perceptions, and improved wildfire preparedness for youth and their families (down arrow in Fig. 1). We then looked for ways the program may be contributing to the local community being more adapted to fire (green oval in Fig. 1). Finally, we identified community resources that supported the program (up arrow in Fig. 1).

The case study approach is a common research method applied when scientists want to study "who, what, how and why" for a contemporary event within a real-life context (Yin 2003). We selected programs for case studies that would represent (1) programs that are contributing (even in a small way) to the development of a fire-adapted human community or have the potential to do so in the near future, (2) a range of program

² The WUI Mitigation Committee provides coordinated leadership, input, and recommendations to public wildfire management agencies for the achievement of fire-adapted communities in the wildland urban interface. http://www.nwcg.gov/branches/ppm/wuimc/index.htm



Figure 1.—Research framework for understanding the link between wildfire education programs for youth and fire-adapted human communities, where youth wildfire education programs, using environmental education methods, influence students and families and contribute to communities becoming adapted to fire, with local community resources supporting the wildfire education program.

types (based in schools, clubs or organizations, and NGOs), and (3) different regions of the country. We used purposive sampling to select interviewees (Lindlof and Taylor 2002). This selection process is appropriate when scientists need to identify people who have specialized knowledge about the program being studied. Data were gathered using semi-structured, face-to-face interviews following an analytic induction approach (Glaser and Strauss 1999). Analytic induction is ideally suited for this study because it allows us to identify patterns and themes surrounding concepts that have received little empirical study. For the FIRE Up case, we interviewed 19 individuals, including program designers and teachers, program partners, agency specialists, community members, city employees, school officials, and funders. We also talked informally with students. Although this report discusses the history of the program and multiple years of accomplishments, field work and interviews are focused on the 2011 projects and field program. Additional data for all years were collected from secondary sources such as program, agency, and city Web sites; reports prepared by teachers and students; powerpoints prepared for recruiting and awards nominations; and newspaper articles.

LITERATURE CITED

- Glaser, B.G.; Strauss, A.L. 1999. The discovery of grounded theory: strategies for qualitative research. New York: Aldine de Gryuter. 271 p.
- Lindlof, T.R.; Taylor, B.C. 2002. **Qualitative communication research methods. 2nd** ed. Thousand Oaks, CA: Sage Publications. 357 p.
- Wildland Fire Leadership Council. 2011. A national cohesive wildland fire management strategy. http://www.forestsandrangelands.gov/strategy/national.shtml. (Accessed August 12, 2011).
- Yin R. 2003. Case study research: design and methods. Thousand Oaks, CA: Sage Publications. 181 p.

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KEY WORDS: fire-adapted community, youth environmental education, youth disaster education, service learning, place-based learning, experiential learning

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