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# Minnesota Firewise In The Classroom: 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. 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 in what ways can 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 Minnesota Firewise in the Classroom Community Assessment Process.

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## MINNESOTA FIREWISE IN THE CLASSROOM

What do you get when you cross Minnesota communities' need for fire planning information with middle school teachers' need for new ways to address state social studies standards and expand the use of technology in the classroom? The Minnesota Firewise in the Classroom Community Assessment Process (MN Firewise in the Classroom). As researchers conducting a national study of wildfire education programs for youth, we talked to individuals involved in the Minnesota program to better understand program characteristics and the local resources that support it and to learn more about the program's direct and indirect impacts on youth, families, and communities—including how the program is contributing to creating fire-adapted communities.<sup>1</sup> In this research note, we share what we learned in Minnesota that can help other communities involve youth in reducing wildfire risk.

In 2001, a Minnesota Department of Natural Resources (DNR) forester heard a middle school teacher discuss her use of geographic information systems (GIS) in the classroom, and recognized an opportunity to work together for their mutual benefit. The DNR was



Pamela Jakes, U.S. Forest Service

Level II assessments produced by students in the Minnesota Firewise in the Classroom program provided homeowners with information they need to reduce their wildfire risk.

awarded funding for the teacher to develop a standards-based curriculum that engaged students in projects that would help communities reduce their wildfire risk. For the DNR, the heart of the curriculum was instruction that prepared students to assess wildfire risk using Firewise<sup>2</sup> principles, first in the classroom using aerial photographs to evaluate the risk of individual homes throughout a community (Level I assessments) and then in the field to conduct more detailed on-site assessments of at-risk homes (Level II assessments).<sup>3</sup> The agency's goals were to (1) train students in Firewise principles, (2) provide communities with information they could use to assess community fire risk, and (3) provide the DNR with comparable fire risk data across the state. For teachers, the core program components were the real-world applications of GIS and

global positioning systems (GPS) technology and introduction of the public land survey system. Educator goals were to expand the use of technology in the classroom and to use

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<sup>1</sup>U.S. policymakers have identified a national goal for at-risk communities to be adapted to fire. Fire-adapted communities consist of “informed and prepared citizens collaboratively planning and taking action to safely co-exist with wildland fire” (Wildland Fire Leadership Council 2011, p. 33).

<sup>2</sup>The use of the term “Firewise” here refers to the Minnesota Department of Natural Resources adaptation ([www.dnr.state.mn.us/firewise/index.html](http://www.dnr.state.mn.us/firewise/index.html)) of the national Firewise Communities program ([www.firewise.org](http://www.firewise.org)).

<sup>3</sup>A two-step process is often used to assess home wildfire risk. Homes are first assessed in an office (or in this case, a classroom) using aerial photographs to rate homes on a scale from one (no risk) to five (extreme risk) based on conditions visible on the photos—referred to as a Level I assessment. Homes with some level of risk (generally, moderate to extreme risk) are then visited so that an onsite evaluation can be conducted, with homeowners receiving a detailed description of conditions putting their property at risk—referred to as a Level II assessment.

experiential, place-based, and service learning to address state social studies education standards.

The first version of the program consisted of 21 lessons that would take a month of daily sessions to complete. As someone involved in the MN Firewise in the Classroom program observed:

“The program was too robust at the beginning and that was the problem. It was a Cadillac and [teachers] really wanted just a Chev. [Teachers] wanted it simple... The desire for the teachers was there but it’s gotta be something that’s in their comfort zone; that they can easily do.”

The program has been revised several times, with most of the changes taking advantage of new technology. The goal of these changes is to move MN Firewise in the Classroom toward a Project Learning Tree<sup>4</sup> model, packaging the program so that teachers can use it on their own with little technical assistance from program providers. The current program consists of five lessons:

- (1) introducing wildfire, including the physics of wildfire
- (2) introducing Firewise principles
- (3) making sense of the public land survey system
- (4) conducting home wildfire risk assessments
- (5) creating and presenting a community report

On average, teachers use two or three of the five lessons plans. The fifth lesson, in which students present their findings to a fire department, city council, or local government department, is currently not taught in Minnesota, and there have been only three community presentations since 2007.

The MN Firewise in the Classroom program has been supported financially by the federal government’s National Fire Plan (NFP). When the program began, funding for the NFP was at its highest level, with millions of dollars being passed through to the states to support hazard mitigation in high-risk communities. For several years, a portion of the Minnesota NFP funding supported MN Firewise in the Classroom at its “Cadillac level,” covering the costs of program development and teacher training (including travel for teachers to attend training). In addition, the grant allowed the DNR to hire a consultant



D. Schuller, Minnesota Department of Natural Resources

The Minnesota Firewise in the Classroom program was revised several times to take advantage of new technology and make the program more accessible to teachers.

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<sup>4</sup>Project Learning Tree is a national program that provides resources that can be integrated into lesson plans for all grades and subjects that build student understanding of and responsibility for the environment ([www.plt.org](http://www.plt.org)).

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*“So there’s that whole technology component [in the program]. This is technology that real people use in the real world, and it’s used in a lot of different occupations now, in businesses, and it’s useful to know something about it.”*  
(Minnesota Firewise in the Classroom teacher)

as program coordinator. The coordinator organized and participated in teacher training and publicized the program at conferences and workshops. Although the current version of the program accesses necessary software and data online, initially program resources had to be located on the computers being used by students, so the coordinator brought a mobile computer laboratory to the classroom so students could access what they needed to participate in the program. The coordinator also provided GPS units, supplied by the Minnesota DNR, for student use. In many cases, the coordinator taught the classroom lessons, minimizing the impact on teachers. If students were conducting Level II assessments, the coordinator did most of the field trip planning and tried to recruit local fire department involvement in the program. Teachers commented that the program worked because the coordinator was in the classroom to make sure it worked—that there was no risk to teachers. The coordinator said that his job was to be the teachers “safety net” so they could work outside their comfort zone.

From the beginning, the MN Firewise in the Classroom program had two endorsements that generated interest among teachers. The Minnesota Alliance for Geographic Education (MAGE) sanctioned the program as a new approach for bringing GIS into the classroom, publicized the program in its communication outlets, and served as fiscal agent for the state grant. MAGE also endorsed and facilitated the program’s training—MAGE saw the program training as a way for teachers to further their professional development, and Firewise in the Classroom training was offered at MAGE’s annual meetings. In addition, the Minnesota Governor’s Council on Geographic Information supported the program through recognition and publicity, spreading the word that the program was a way to integrate GIS and GPS technology in classroom activities.



K. Pekarek, GIS 4 Schools

Field trips to conduct Level II assessments allowed students to apply their new knowledge of Firewise principles to assess wildfire hazards around homes.



The Level II assessment portion of the program was carried out in only a few schools, and the program has produced no Level II assessments since 2009. There were several reasons Level II assessments were not conducted:

- critical local fire department involvement was difficult to obtain
- field trip costs were prohibitive
- homeowners objected to students coming onto their property

Some teachers who were unable to do the Level II assessment field trip required students to do Level II assessments on their own homes, increasing the likelihood that the Firewise message was disseminated to their families:

“When [students are] doing the Level II assessments [on their homes] they’re very engaged in doing the rating, they’re concerned about it, making suggestions to their parents. Parents have commented at conferences, ‘This is a worthwhile program, we’re glad you’re doing it.’ ” (Firewise in the Classroom teacher)

Currently, the DNR is working with counties to develop partnerships to support implementation of Firewise in the Classroom. In counties with established Firewise or other community wildfire planning committees, MN Firewise in the Classroom is seen as a tool to help communities become more adapted to fire. In these situations, the DNR suggests that the local Firewise or other fire planning committee identify a teacher interested in the classroom program and integrate those classroom activities with ongoing efforts in wildfire planning. In addition, DNR staff hope that homeowners in communities that have already begun to address wildfire before implementation of MN Firewise in the Classroom will be more receptive to wildfire information and recommendations from students, but this has yet to be tested.

*“What worked really well in some of the other districts is that the fire chief took a really strong interest... I think that in order for the Level II [assessments] to be successful, the fire department really does need to be out there.”*  
(Minnesota Firewise in the Classroom teacher)



D Schuller, Minnesota Department of Natural Resources

Barriers to carrying out Level II assessments as part of the Minnesota Firewise in the Classroom program included lack of involvement by the local fire department, cost, and homeowners’ hesitancy to allow students on their property.

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*“As a high school teacher, my requirement is GIS and if [MN Firewise in the Classroom] is a vehicle to get them exposure to GIS I’ll use it. I suppose I could find something else, but it’s hands on, it’s their own community, it’s their own region. I don’t see that there are many opportunities that could match this program, to bring those pieces together the way it does.”*

*(Minnesota Firewise in the Classroom teacher)*

## IMPACTS OF MINNESOTA FIREWISE IN THE CLASSROOM

The MN Firewise in the Classroom program benefited teachers by providing new ways to address state social studies standards and to integrate technology into their classrooms. In addition, the program increased the wildfire awareness of teachers and students. When students conducted Level II assessments on their own homes, they increased awareness in their own families, among their neighbors, and in their communities. Teachers heard that the Firewise message was being carried home by students, but not all parents were ready to act. A MN Firewise in the Classroom teacher recalled:

“I remember once at the parent-teacher conference this mom said, ‘Yeah, my son came home and he told me we needed to do this, this, and this. And I told him, ‘That’s not possible son, sorry.’”

But even if the students were not having a significant impact on their parents’ behavior, someday they will be homeowners themselves and they will have an opportunity to practice Firewise principles around their own homes.

More than 300,000 Level I assessments have been completed by MN Firewise in the Classroom students. The Level I assessments enabled the DNR to assess and map wildfire risk in selected areas throughout the state. The Level I assessments conducted by the students also provided information that communities can reference in a fire protection plan.

Following the curriculum through to the end—including Level II assessments and reporting back to the community—gives communities information and data that could contribute to their becoming more adapted to fire, but only three communities have carried the process through to community feedback. For example, the first application of the MN Firewise in the Classroom program was in the Stillwater School District in east-central Minnesota. Students used their Level I assessments in consultation with the local fire department to identify potential high-risk areas in the district and carried out Level II assessments in two townships. The students left door hangers at each house with the results of the Level II assessment and information on where homeowners could go for more information. Students created a detailed written report and presented their findings to the local township governments, fire departments, and the DNR. A teacher involved in

*“[The Minnesota DNR supported the Firewise in the Classroom program] to get the Firewise message out to communities, and [they saw] students as great liaisons to their parents and families and also as the next generation of homeowners. [The DNR] hoped that as students grow up and buy a home or build a home they will take it to heart.”*

*(Minnesota Firewise in the Classroom teacher)*

the program early on said that students enjoyed and learned from the program because it was a hands-on activity and students were helping to solve real-world problems in their own community:

“[What’s valuable about the program for students is] that whole service learning idea, that we’re helping a community, we’re helping the DNR, and we’re helping our local fire department. We are members of the community, we’re not just kids, we’re part of this community and we can make a difference. We can learn some stuff that maybe other people don’t know and we can share it with them.” (Minnesota Firewise in the Classroom teacher)



S. Damon, Stillwater Public Schools

By reporting their findings back to the community, students involved in the Minnesota Firewise in the Classroom program contributed to communities becoming more adapted to fire.

Because few schools conducted Level II assessments (students conducted fewer than 1,200 Level II assessments) or reported findings back to their communities, little wildfire management knowledge was spread beyond the classroom. DNR staff expressed concern that the Level I data were not being used by communities in wildfire protection planning, and that Level II assessments were seldom conducted and therefore were not available for homeowners to use in reducing wildfire hazards. The DNR hopes that, by building support for MN Firewise in the Classroom in county land departments or forestry offices (common in Minnesota county government), the program will play a larger role in local wildfire planning and hazard mitigation efforts.

The MN Firewise in the Classroom program grant called for the program coordinator to assist other states in developing their own Firewise in the Classroom programs. The coordinator was instrumental in developing and implementing the West Virginia Firewise in the Classroom program (Jakes 2012). Individuals involved in the West Virginia program indicated that the program would not have been possible without the Minnesota coordinator’s involvement.

*“[Students] always like stuff that’s hands on, and I think the idea that it’s not just an academic exercise is motivating for them. It’s not just something for school, for points, for a grade. This is something that someone is counting on and they expect us to have a certain level of professionalism and accuracy because decisions are going to be made based on some of this.”*  
(Minnesota Firewise in the Classroom teacher)

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## COMMUNITY CONTRIBUTIONS TO MINNESOTA FIREWISE IN THE CLASSROOM

To date, few communities have been involved with implementing MN Firewise in the Classroom—it has been almost exclusively an individual teacher initiative. Teachers (1) learned about the program through MAGE, at various educational conferences, or from their colleagues, (2) attended the program training, and, (3) with the help of the program coordinator, implemented the program in their classroom. More than 110 teachers have taken the MN Firewise in the Classroom program training, and thousands more have been introduced to the program at workshops and conferences. Program training and implementation were free to teachers and schools, except for teachers' time in and out of the classroom. Where local fire departments have been involved, their knowledge, time, and standing in the community were critical to the program impacting the community and local homeowners; however, local fire departments were involved in less than half of the communities where the program has been offered. If the county land departments and forestry offices become more involved in the program, their staff could make significant contributions to program implementation and enhance program impacts.

The major contributors to the MN Firewise in the Classroom program have been at the state level—MAGE and the DNR. MAGE is no longer actively involved in the promotion of MN Firewise in the Classroom, but its efforts early on created broad program awareness among Minnesota geography educators and made training more readily available. The DNR's financial and technical support provided a strong foundation for the program. One of the most significant DNR actions was hiring a program coordinator. Teachers involved in MN Firewise in the Classroom said that the program's successful implementation rested on the shoulders of the program coordinator. DNR staff believe that the program would not have succeeded without the program coordinator's enthusiasm, dedication, and attention to detail.

*“I’ve had feedback just on the project itself, where a parent has said, ‘My student really enjoyed participating in this’ or ‘My student came home talking about this,’ but I haven’t heard back anything like, ‘Well, as a result of this we’ve changed x, y, z.’”*

*(Minnesota Firewise in the Classroom teacher)*



S. Damon, Stillwater Public Schools

The Minnesota Firewise in the Classroom program employed place-based learning that encouraged students to use what they had learned in the classroom to study the local community.



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## NEXT STEPS FOR MINNESOTA FIREWISE IN THE CLASSROOM

MN Firewise in the Classroom has introduced thousands of Minnesota teachers and students to Firewise principles and GIS and GPS technology, and has provided the DNR with valuable data for analyzing wildfire risk in selected areas of the state. However, this is a program in transition, moving from a relatively costly, classroom-based program with significant technical and implementation support to a more independent, self-contained, community-based, teacher-friendly program. To that end, individuals interviewed identified several next steps:

- The DNR will continue to develop relationships with counties that are engaged in wildfire management planning to identify a role for MN Firewise in the Classroom in that process.
- The DNR will continue to streamline the program so that teachers can implement it with little technical assistance.
- Given the declining involvement by MAGE and the absence of federal funding for a program coordinator, teachers will need to assume a more active role in promoting the program to their peers and providing support to new teachers.



K. Pekarek, GIS 4 Schools

Through detailed training sessions, teachers gained experience so that they were comfortable using the Minnesota Firewise in the Classroom program to enhance learning in their classrooms.

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## LESSONS FOR OTHER YOUTH WILDFIRE EDUCATION PROGRAMS

Analysis of the MN Firewise in the Classroom program suggests several lessons that will help new programs increase their significance:

- Provide program evaluations that address the goals of major supporters

Teachers implemented the Firewise in the Classroom program to (1) build knowledge and skills around real-world applications of GIS and GPS technology and (2) meet state social studies standards, and they evaluated their students to the extent and in a manner that they thought necessary and appropriate. The program coordinator counted the number of teachers trained, students going through the program, and Level I and II assessments completed. Neither the teacher nor program coordinator evaluations directly measured or described the extent to which the DNR goals were accomplished. Although students contributed to the DNR Level I assessment database, there were no standardized measurements or descriptions of the knowledge they gained or documentation of the use of student-generated Level I or Level II assessments in community wildfire planning. This lack of documentation of program impacts on the ground caused one DNR staffer to comment:

“The benefit for [the Minnesota Department of Natural Resources] was going to be that the communities would have this data and be able to incorporate it into their community wildfire protection plan. What I found... is that very few of the communities were using the data. So, I sit back and look and say what good is this?” (Minnesota DNR staff)

Program champions need to be able to respond to this type of comment if they expect continued support for the program. In addition, the DNR needs to require that program implementers provide standardized evaluation data that address DNR goals.

- Seek and maintain a balance between educational goals and wildfire management goals both in planning and practice

Although the DNR initiated the MN Firewise in the Classroom program, and the curriculum as written addressed both education and wildfire management goals, in practice the program focused more on educator goals than agency goals. This focus helped

*“I think the message [students take home is], ‘There are some very simple things we can do at our house to reduce the risk of wildfire loss, and mom and dad, it doesn’t really take that much. We can pick up the sticks and we can trim [trees] and we can keep the firewood away from the house. These are some basic things we can do.’ So, I think that all the kids get that part of it.”*

*(Minnesota Firewise in the Classroom teacher)*

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ensure that teachers would find value in the program, but it kept the program focused on the classroom rather than the community. A classroom focus meant that teachers could drop the more challenging and costly activities that had the potential to improve wildfire management planning in the local community. Involvement by local emergency management professionals in the program would help the program maintain a balance between educational goals and wildfire management goals.

- Involve local emergency managers, including the fire department, and relevant citizen committees early on

For the Firewise in the Classroom program to have the maximum benefit on the ground, local emergency managers must be convinced that the data being collected are valuable for emergency planning and risk mitigation. A major flaw in the Minnesota program was that teachers were driving the program and then had to sell the program to the local emergency managers, which can be a hard sell. This flaw resulted in the data not being used to their full potential. In West Virginia, the adoption of a Firewise in the Classroom program modeled on Minnesota's was initiated and supported by the homeowners' association Firewise Committee, helping guarantee that information generated by the students was used by local homeowners to reduce their wildfire risk (Jakes 2012).

- Involve families in Firewise in the Classroom activities

Evaluations of international hazard education programs for youth point to the potential for these programs to produce benefits in the home and community through intergenerational learning. Teachers can help ensure that this learning takes place if they require students to conduct Level II assessments or complete other activities at home and have parents signoff that they have discussed the activity with their student. Level II home assessments and parent signoffs would document additional program accomplishments.

- Take steps to make the program self-sustaining

A significant amount of public funding was invested in developing and implementing the MN Firewise in the Classroom program, but improvements over the years are creating a more self-contained, teacher-friendly, and community-relevant program. DNR foresters believe that, by the time grant funding is exhausted, it will be possible for the program to continue with minimal DNR involvement or outside funding.

*"I was already doing some GIS stuff with my students, but I really liked the service learning component of it... and getting them the opportunity to work on real world problems and real world issues."  
(Minnesota Firewise in the Classroom teacher)*

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## PROGRAM INFORMATION AND CONTACTS

Minnesota Firewise in the Classroom program, [http://www.dnr.state.mn.us/education/wildfire/firewise\\_communityproject.html](http://www.dnr.state.mn.us/education/wildfire/firewise_communityproject.html)

Ken Pekarek, Minnesota Firewise in the Classroom program coordinator, [kenpekarek@comcast.net](mailto:kenpekarek@comcast.net) or <http://www.gis4schools.org>

Firewise Communities Web site, <http://www.firewise.org/>

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## ABOUT THIS SERIES

This is one in a series of Forest Service publications 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 wildfire education program” 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 Group<sup>5</sup> 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,

<sup>5</sup>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.nwccg.gov/branches/ppm/wuimc/index.htm>

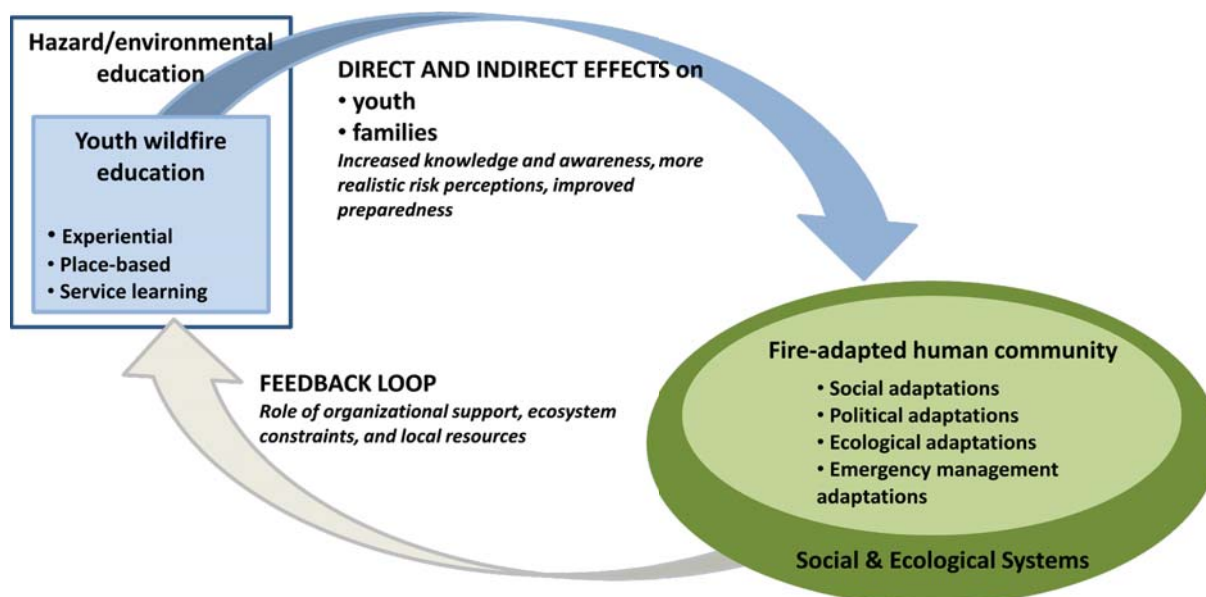


Figure 1.—Research framework for understanding the link between wildfire education programs for youth and fire-adapted human communities, where youth wildfire education programs, using environmental education methods, influence students and families and contribute to communities becoming adapted to fire,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

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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 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 MN Firewise in the Classroom case, we interviewed five individuals, including teachers and DNR staff. Additional data were collected from secondary sources such as the MN Firewise in the Classroom curriculum, presentations or handouts presented at various meetings, and newsletter or newspaper articles.

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