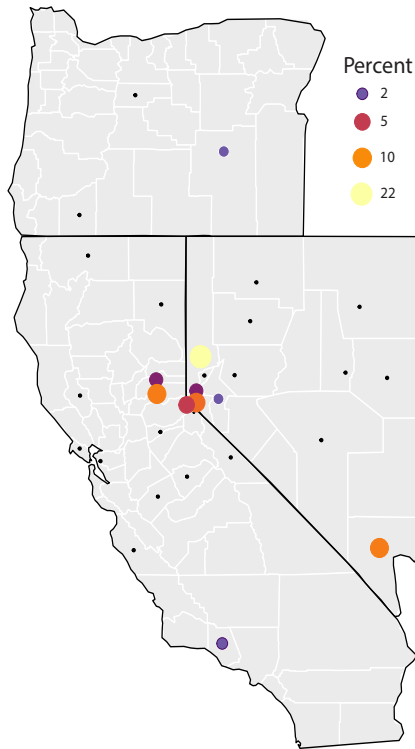


# Living With Fire Program Needs Assessment and Evaluation



EXTENSION  
College of Agriculture,  
Biotechnology & Natural Resources

LWF Survey Respondents by County



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## Key Points

- » A majority of our surveyed audience is new to LWF, having only begun interacting with the program in the last six months to one year.
- » The tribal and ranching communities were underrepresented in the survey, suggesting that LWF needs to increase outreach to these populations.
- » The professional community has a different idea of which resources the public values than the public themselves have. This finding has implications for working with professionals to make sure they have the correct resources.
- » Our professional respondents want more resources for educating the public rather than for their own professional development, suggesting that our traditional professional audience is saturated with resources for their own professional development.

## Background

The Living With Fire (LWF) Program is a 25-year-old public outreach and education program that focuses on teaching communities and key stakeholders about wildfire preparedness. The program was originally conceived in 2007, and quickly became a leader in fire adapted community concepts and wildfire preparedness recommendations across Nevada and ultimately throughout the United States. Since its inception, there has been a massive uprising of

agency and public commitment and contribution to preparing for wildfire and becoming fire adapted. As more partners have embraced and led education efforts in this domain, LWF has been able to consider broadening its education platform, and so we surveyed our public participants and stakeholders to learn where our expertise is most needed.

While LWF is led by University of Nevada, Reno Extension, the program is an interagency collaboration that is supported by the Bureau of Land Management, the Nevada Division of Forestry, the U.S. Forest Service, and the many local fire agencies throughout the region. This interagency presence and cooperation make LWF a very effective communication lever because we are speaking with a unified voice that considers the many different objectives that agencies must negotiate. Because of our very stakeholder-driven approach, our needs assessment and evaluation needed to collect information from our partners *and* our audience. In so doing, this assessment provided a very robust look into our programmatic structure and future considerations.

## Survey Methods

We used a snowball survey distribution method, where we distributed the survey to known sources, but then advised that recipients share the survey link widely. The survey was principally shared via the LWF listserv (N=1,468); LWF social media pages; fire chief meetings throughout Nevada; and other local, state, and federal agency partners. We used the survey platform Qualtrics to implement the survey, which was anonymous and did not collect personal data from any respondents. The survey took approximately 10 minutes to complete. The survey was open from June 8, 2021, until Aug. 1, 2021, and 300 responses were received. Partial survey responses, those with less than 40% answered, were removed for a total of 255 responses that were summarized and analyzed in the statistical software “R.” The results reported in this report are derived from n=255. We received approval from the University’s Institutional Review Board to conduct this survey.

The questions included basic background and demographic questions, followed by assessment and evaluation questions for both public and professional audiences (Appendix A). Each audience was asked questions to evaluate their current use of LWF educational materials, and were also assessed to learn what types of topics and resources they need in the future. More specifically, within the public evaluation, respondents were asked to rate their understanding of wildfire-related topics and their likelihood to perform certain wildfire preparedness actions after interacting with the LWF Program. In the assessment, they were asked to rate their preference in learning about various wildfire-related topics. For the professional evaluation, respondents were asked how LWF had influenced their communication to the public on several wildfire-related topic and in the assessment were asked about resources they need for both educating the public and for their own professional development.

## Survey Demographics

Our survey was answered by participants throughout Nevada and California and other states across the West (Figure 1). All respondents were asked about their affiliation, and participants could select as many options as applied. A total of 87 respondents self-identified as professionals, while 168 respondents did not, and were thus considered members of the public. The highest number of people (52%) identified as community members (i.e., public; Figure 2). Other large categories included other (12%), local fire agency (10%), and land management agency (8%). Notably, tribal member and rancher both had the lowest representation (only 1% each). In the professional respondents, we further delineated categories and had an even distribution of different subfields of fire professionals that included emergency management, local fire districts, community organizers, fire prevention and federal agencies (Figure 2).

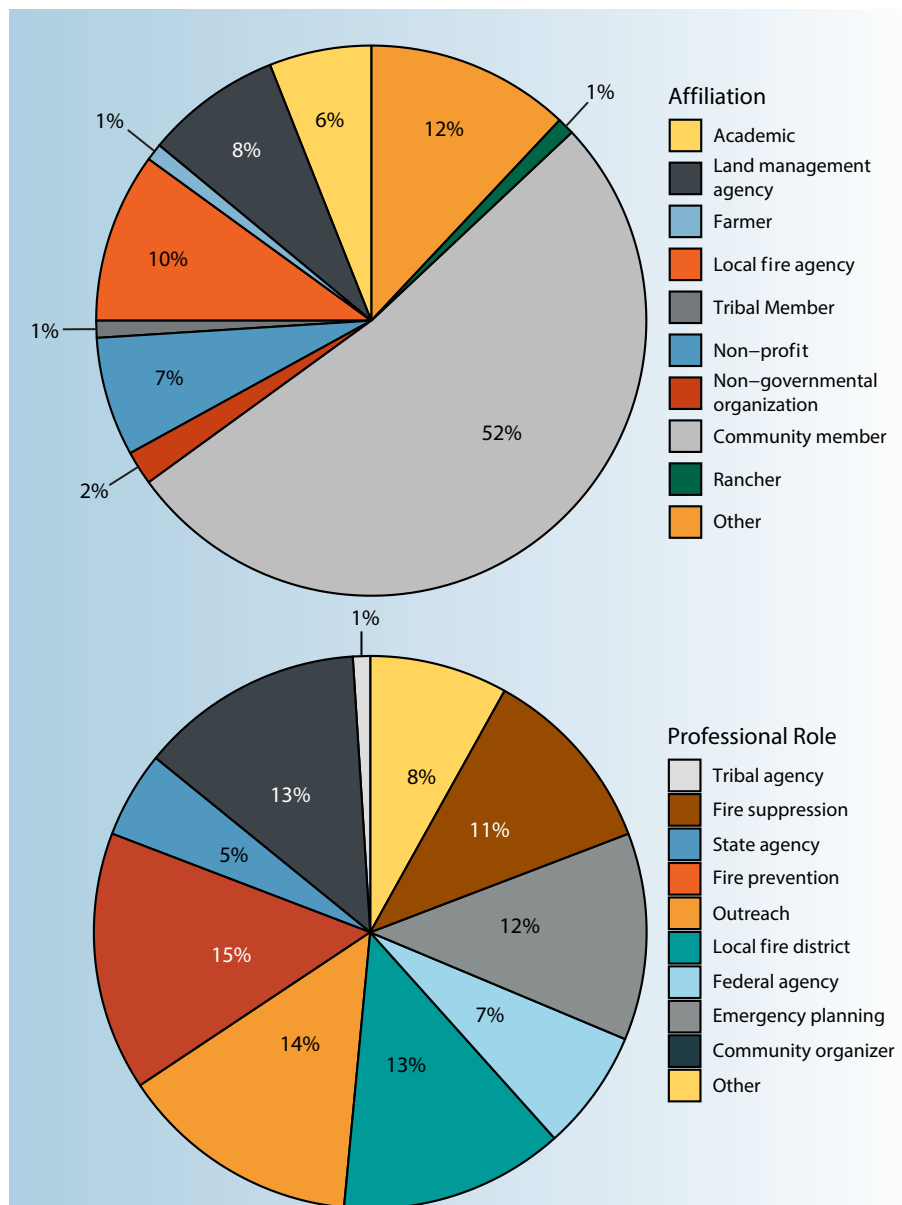


Figure 2. Affiliation and professional role categories.

Most respondents from the public reside in the wildland-urban interface (58%), with the remaining residing in either an urban center or rural area (Figure 3). We asked the public group about their type of residence, and 7% are renters, 51% are homeowners that live on property with less than an acre, and 42% are homeowners with property greater than an acre. The majority of the public group (58%) identifies as living in the wildland-urban interface (WUI). Other respondent demographics, including education, age and income, are included in Appendix B. We also assessed how the public has experienced wildfire impacts, and over 40% have had a wildfire within 5 miles of their house, including 4% on their property (Figure 4). Figure 5 shows how wildfire impacts are felt by all public respondents, even if a fire has not been close to their property. A majority of respondents have seen an increase in smoke impacts from 2016 to 2020 (20% change). Other notable wildfire impacts include insurance increases and an increase in wildfires near communities (Figure 5).

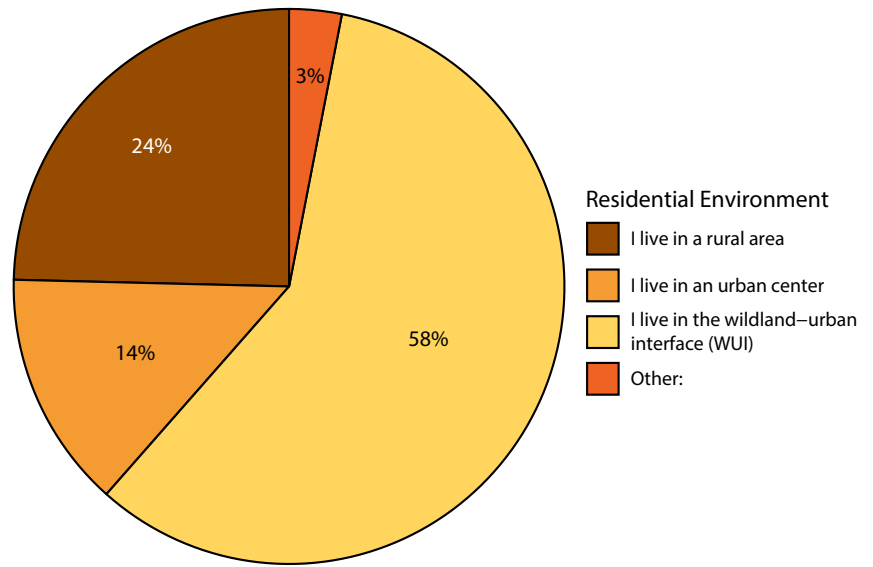


Figure 3. Residential environment of public survey respondents.

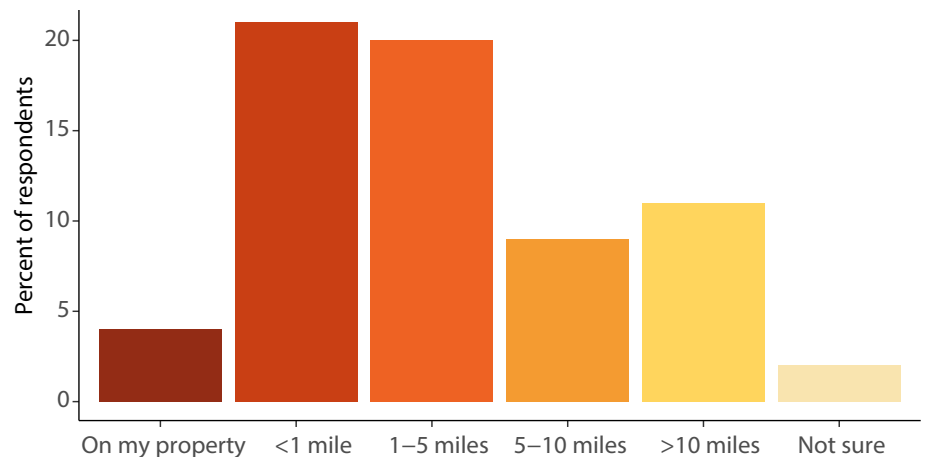


Figure 4. Proximity of wildfire to public respondents' residence.



Plume of smoke rising from the Loyaltan Fire, ignited Aug. 14, 2020. Photo taken from the property of a Washoe County resident.

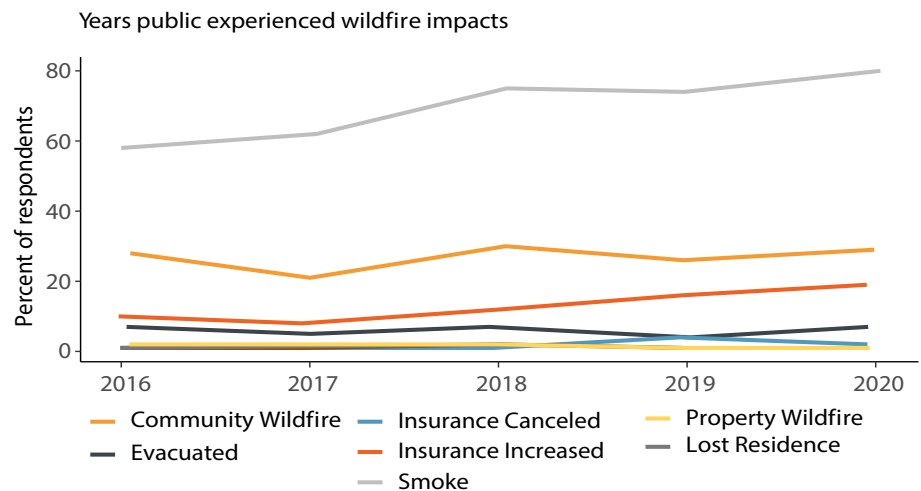


Figure 5. Wildfire impacts to communities from 2016 to 2020 (experienced by public respondents).

## How do audiences engage with LWF?

Both groups (public and professional) were asked about how long they had been engaging with LWF and how useful they find LWF resources. In the public group, 79% of respondents had experienced LWF programming, while 77% of the professional group had experienced LWF materials or events. A key observation here is that over 20% of respondents were actually new to LWF. In fact, a majority of respondents are relatively new to the program (Figure 6), with approximately 60% of both public and professional respondents having engaged with LWF in the past five years. We saw a notable increase in public engagement in just the six months prior to survey distribution. The public responses suggested that LWF events had the greatest influence in exposing them to the program, while professionals learn about the program through colleagues. In broad terms, professionals and the public generally found publications the most informative LWF resource, while social media was the least informative (Figure 7). Of the two groups, 72% of the public and 70% of the professional group were extremely likely to recommend LWF resources (data not shown).

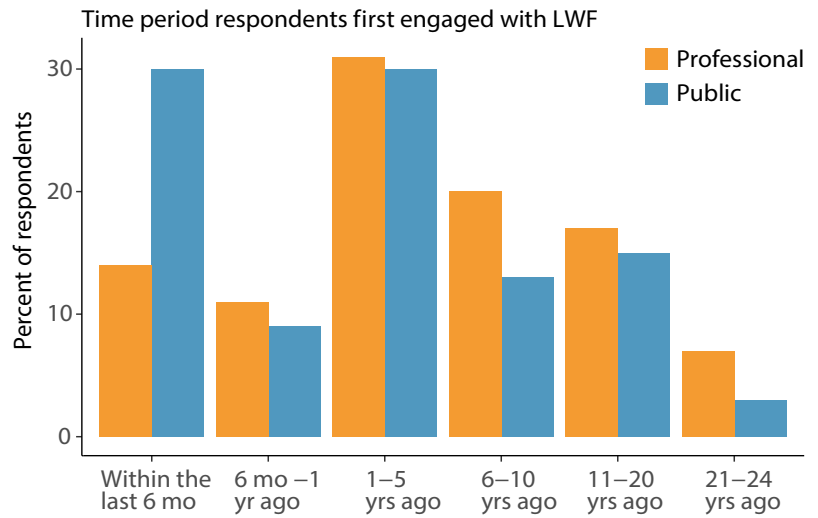


Figure 6. How long survey respondents have been engaged with LWF programming.

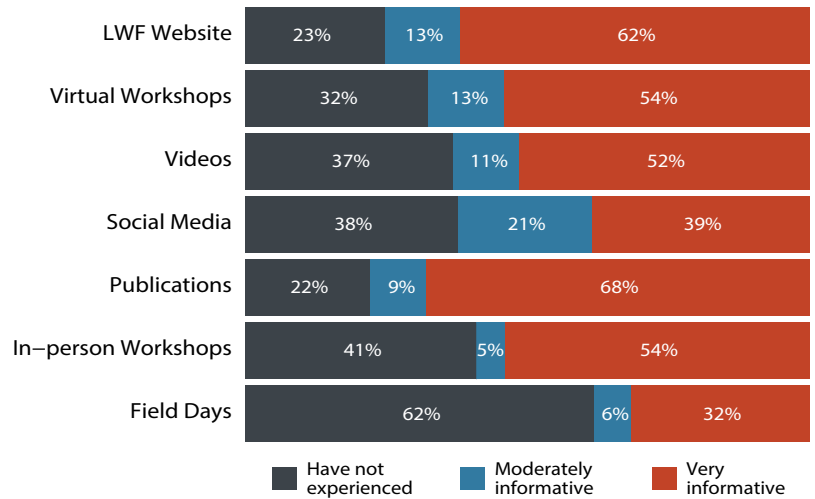


Figure 7. Public and professional perception of how informative they find each type of LWF educational resource.

## Needs Assessment

### Public Needs Assessment

Historically, LWF has provided materials that have focused heavily on wildfire preparedness, which includes defensible space, evacuation, and other fire adapted communities concepts. We wanted to learn if our audience wants more of these resources or if they are seeking information about other topics. We found that wildfire preparedness still ranks first as the most desired topic (Figure 8), with defensible space as the leading subtopic within that category. (See Appendix B for detailed data within each subcategory.) Other high-level topics of interest include fuels mitigation, climate impacts, health impacts and ecological impacts. Specifically within the fuels mitigation category, the public wants to learn more about mastication (a specific fuels management technique used to remove trees and shrubs; see Appendix B).



Figure 8. Ranking of topic preference for LWF programming by both professional and public respondents.

LWF employs a wide variety of communication modalities, including publications, podcasts, in-person and virtual workshops, field days, and social media. Public preference for these different resources was surveyed, and we found that the public greatly prefers podcasts (43%) and social media (44%) over other resources (Figure 9). These results are different compared with those displayed in Figure 7 that included professional audiences and asked which resource was *most informative*. While many of our resources are very informative, they might not be preferred by the public audience.



Members of the Living With Fire team recording an episode of the Living With Fire Podcast. Pictured from left to right: Christina Restaino, assistant professor and director, Megan Kay, outreach coordinator and Jamie Roice-Gomes, manager.

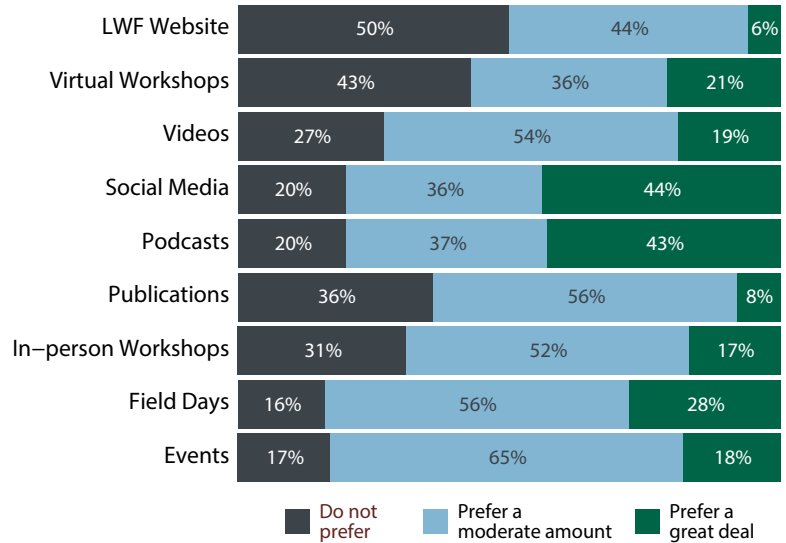


Figure 9. Public preference for type of LWF educational resource.

### Professional Needs Assessment

We asked the professional audience to consider the resources that they need for 1) communicating with the public and 2) their own professional development. The responses followed a similar pattern for both categories. Professionals mostly want to use the website and publications for themselves and the public (Figure 10). Notably, the professionals want to use the same resources that they want for the public, and this does not align with public opinion. For example, podcasts ranked very low in the professional survey but very high in the public results.

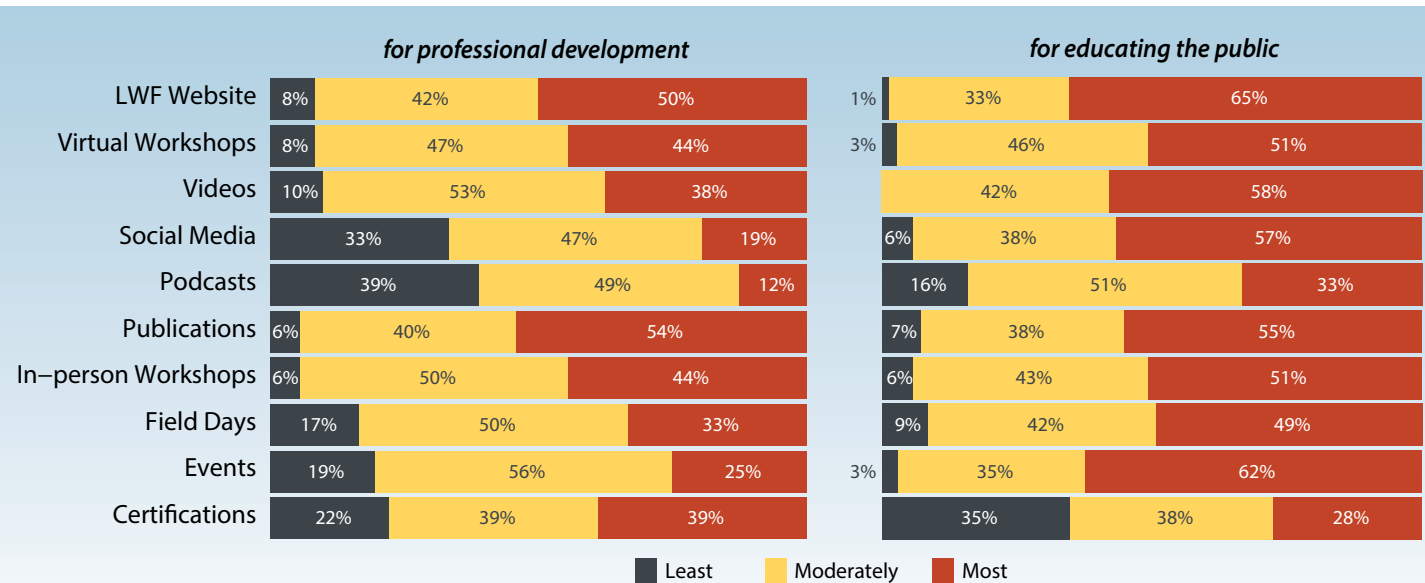
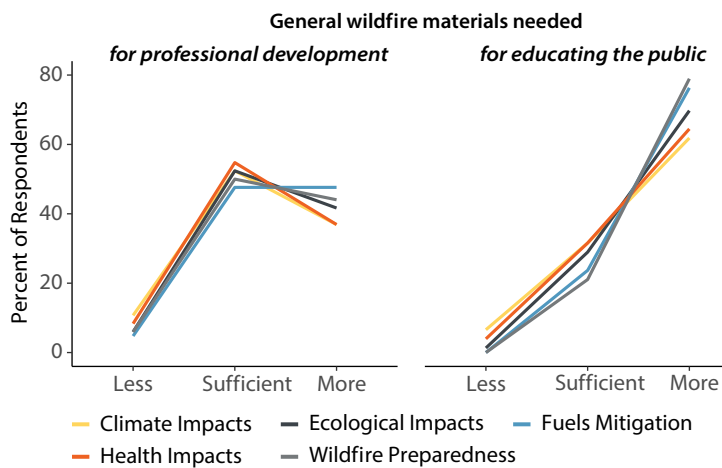
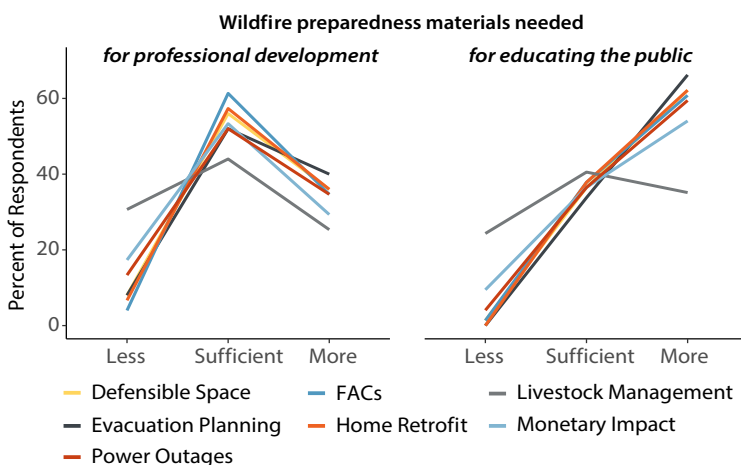


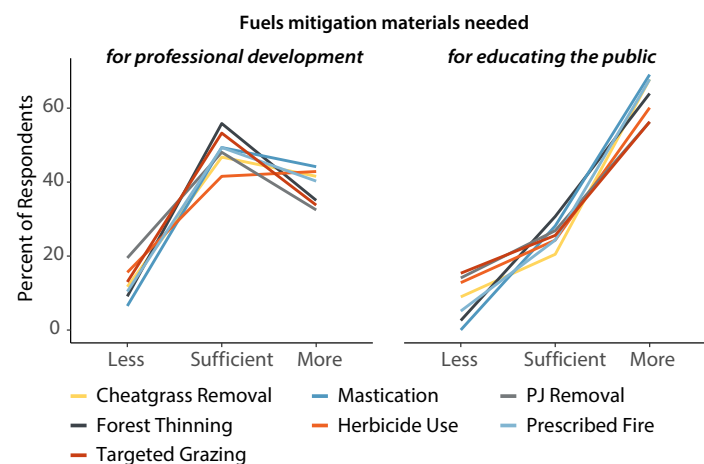
Figure 10. Professional preference for type of LWF resource for their own professional development and to educate the public.



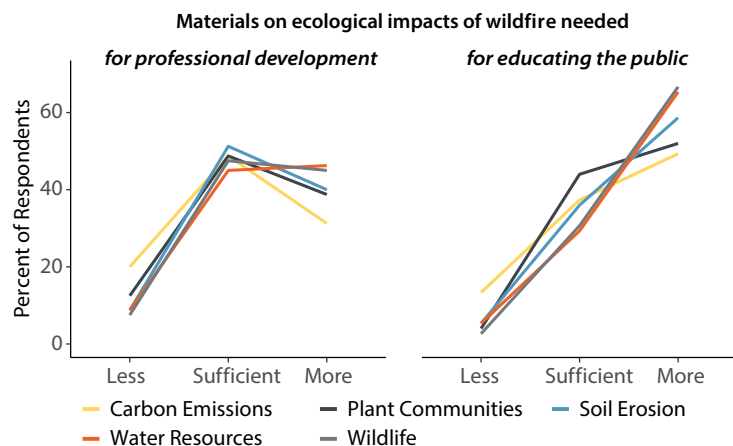
**Figure 11.** Professional results for *general wildfire materials* needed for their own professional development and for educating the public. Professionals have enough *general wildfire* educational materials for their own needs, but need more of everything for educating the public.



**Figure 12.** Professional results for *wildfire preparedness materials* needed for their own professional development and for educating the public. Professionals have enough *wildfire preparedness* materials for their own needs, but need more of everything for educating the public, except livestock management.



**Figure 13.** Professional results for *fuels mitigation materials* needed for their own professional development and for educating the public. Professionals have enough *fuels mitigation* materials for their own needs, but need more of everything for educating the public, especially pertaining to mastication.



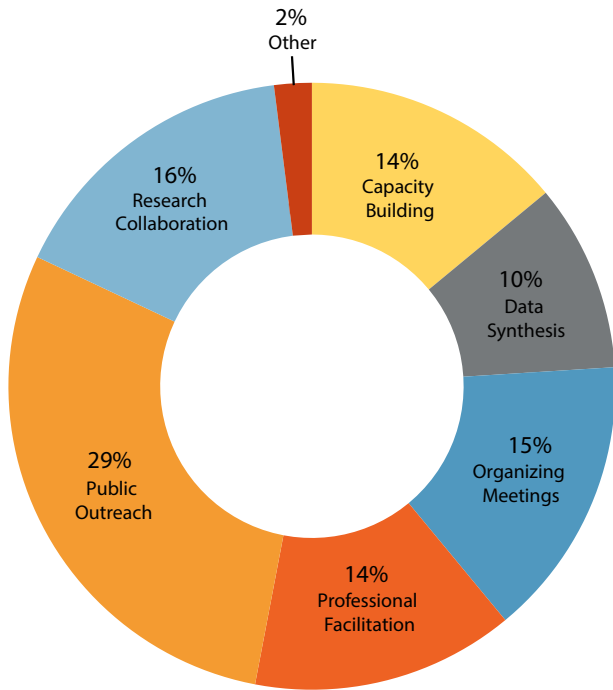
**Figure 14.** Professional results for *ecological impacts of wildfire materials* needed for their own professional development and for educating the public. Professionals have enough *ecological impacts* materials pertaining to their own needs, but need more of everything for educating the public, especially water resources and wildlife.

We also wanted to find out if we should broaden our education topics to include other categories outside of wildfire preparedness. For the five broad categories (climate impacts, ecological impacts, fuels mitigation, health impacts and wildfire preparedness), the results suggest that all areas are sufficiently covered for professional development needs, but that more materials are needed in all categories for educating the public (Figure 11). This suggests that there may be diminishing returns on creating these resources for the professional community.

With more specific questions that referred to sub-categories, we were able to take a deeper dive to try to understand more specifically which topics need more attention. We asked questions about wildfire preparedness, fuels mitigation and ecological impacts of wildfire. The wildfire preparedness topics follow a similar trend as the broad categories, where the professionals have sufficient resources but want more for the public (Figure 12). It was not surprising to see that this professional audience did not want any more resources about livestock management. This is likely because we reached such a small population of the ranching community. The professional group wants more resources for educating the public in all fuels-related topics, which include cheatgrass removal, forest thinning, mastication, pinyon-juniper removal, targeted grazing, herbicide use and prescribed fire (Figure 13). In the ecological impacts categories, the professionals want more resources for educating the public on wildlife and water impacts, whereas carbon and emissions and plant communities are less in demand (Figure 14).

We also asked the professional audience to report on how LWF can help them achieve their professional goals (Figure 15). Public outreach is the highest priority (29%), but research collaboration (16%), meeting organization (15%) and professional facilitation (14%) are all indicated. LWF can provide a critical resource for our partner agencies to increase overall capacity to meet programmatic goals.

How LWF can help professionals achieve their goals

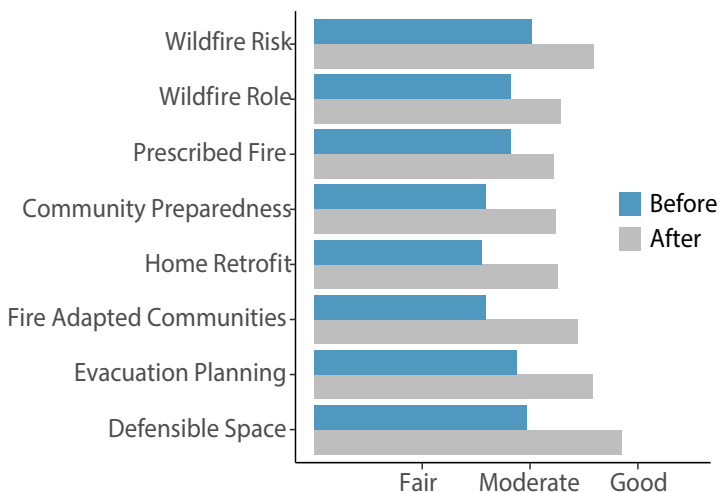


**Figure 15.** Professional respondents responded to ways that LWF can increase professional partner capacity through providing expertise in various types of organizational functions.

## Evaluation

### Public Evaluation

One of the main objectives of Extension programming is to change knowledge and behavior in order to create long-term societal change. LWF strives to teach its audience about wildfire so that Nevada (and beyond) can be more prepared. In order to do this, we provide specific recommendations to prepare your home, property and family for wildfire. We surveyed the public to better understand how likely they are to take actions, or if they already have taken an action, based on LWF recommendations. We assessed public understanding of the following topics: defensible space, evacuation planning, fire adapted communities, home retrofit, community preparedness, prescribed fire, the role of wildfire and wildfire risk. All categories had a significant increase in understanding after exposure to LWF programming. In all categories, the public had a moderate to good understanding after experiencing LWF programming, as opposed to having a fair to moderate understanding before LWF programming. Defensible space had the greatest increase of knowledge compared to other categories (Figure 16).



**Figure 16.** Averaged rating of public understanding of topics prior to and after experiencing LWF programming.



*Megan Kay, outreach coordinator of Living With Fire, talks to community members in Sparks, Nevada about wildfire smoke at a community preparedness event.*

We asked participants about their likeliness to complete wildfire preparedness actions broken down into three main categories – home hardening, defensible space and evacuation planning. Home hardening was the topic that is understood the least but had the third highest increase in knowledge. This is likely because LWF has only recently created materials covering this topic. Many respondents had completed home hardening topics before interacting with LWF, but many were likely to complete actions or had already completed them after interacting with us (Figure 17). The largest percentage of respondents were likely to clear their porch of combustible materials and to have completed this action since experiencing LWF programming. While generally small percentages of respondents were unlikely to perform most of these actions, almost 30% of respondents said that it was unlikely that they would replace the siding on their house (Figure 17). High proportions of respondents were already active in defensible space (over 35%), likely to do the work (27%), or have completed it since engaging with LWF (23-30%; Figure 18). Evacuation planning also showed high willingness to act, with up to 44% of respondents willing to take an evacuation planning action and up to 38% having completed one since engaging with the program (Figure 19).

	<i>Completed prior to LWF</i>	<i>Unlikely</i>	<i>Maybe</i>	<i>Likely</i>	<i>Completed since LWF</i>
<i>Cover Vents</i>	37%	3%	17%	27%	16%
<i>Clear Porch</i>	37%	2%	5%	31%	25%
<i>Move Firewood</i>	52%	4%	3%	21%	21%
<i>Clear Gutters</i>	55%	5%	2%	21%	17%
<i>Replace Siding</i>	33%	29%	23%	9%	6%
<i>Replace Windows</i>	63%	5%	13%	6%	12%

**Figure 17.** The likelihood of the public respondents to perform a selection of *home hardening* actions after interacting with LWF programming.

	<i>Completed prior to LWF</i>	<i>Unlikely</i>	<i>Maybe</i>	<i>Likely</i>	<i>Completed since LWF</i>
<i>Create Noncombustible Zone</i>	45%	1%	3%	27%	24%
<i>Remove Dead Material</i>	48%	0%	1%	27%	23%
<i>Reduce Ladder Fuel</i>	38%	2%	6%	27%	27%
<i>Thin Vegetation</i>	37%	1%	4%	27%	30%

**Figure 18.** The likelihood of the public respondents to perform a selection of *defensible space* actions after interacting with LWF programming.

	<i>Completed prior to LWF</i>	<i>Unlikely</i>	<i>Maybe</i>	<i>Likely</i>	<i>Completed since LWF</i>
<i>Create Checklist</i>	21%	5%	14%	40%	19%
<i>Make Go Bag</i>	22%	5%	9%	40%	25%
<i>Prepare Home and Family</i>	21%	2%	9%	44%	24%
<i>Prepare Vulnerable People</i>	16%	13%	30%	28%	12%
<i>Sign Up for Alerts</i>	38%	1%	5%	19%	38%

**Figure 19.** The likelihood of the public respondents to perform a selection of *evacuation planning* actions after interacting with LWF programming.



## Professional evaluation

Our professional audience uses our resources to educate the public, so we wanted to understand if our materials are helping them achieve their communication goals. In all broad categories (defensible space, evacuation planning, fire adapted communities, home retrofit, community preparedness, prescribed fire, the role of wildfire, and wildfire risk), professionals reported that LWF has helped them communicate a moderate amount or a great deal (Figure 20). Notably, LWF has contributed the most to understanding about defensible space and fire adapted communities.

## LWF influence on professional communication of wildfire preparedness topics

Home  
Retrofit

**52%** report  
a moderate amount  
of help.

Defensible  
Space

**54%** report  
a great deal  
of help.

Community  
Preparedness

**49%** report  
a moderate amount  
of help.

Prescribed  
Fire

**46%** report  
a moderate amount  
of help.

Evacuation  
Planning

**51%** report  
a moderate amount  
of help.

The Role of  
Wildfire

**50%** report  
a moderate amount  
of help.

The Risk of  
Wildfire

**55%** report  
a moderate amount  
of help.

Fire Adapted  
Communities

**43%**  
report a great deal  
of help.

**Figure 20.** Professional respondent responses of how much LWF influences their ability to communicate about wildfire preparedness topics.



*Spencer Eusden, special projects manager of Living With Fire, talks with a Washoe County high school student during a field activity led by Eusden while piloting the Living With Fire Wildfire Science Curriculum.*

## What's next for LWF?

By taking the opportunity to evaluate and assess the LWF Program, we can better focus our efforts on what is needed and what is effective. Wildfire preparedness continues to be a staple of the program, so we will continue to work with our agency partners to deliver the most comprehensive and consistent messaging. To strengthen this part of our portfolio, we have recently created a Home Hardening Guide and a Flood After Fire Guide that can be found on our website, and will soon be releasing a new Defensible Space Guide. We continue to strengthen our information about evacuation planning through our website and community engagement.

Looking forward, we see the need to engage with populations that are outside of our usual audience profile. Our survey respondents were largely comprised of white homeowners above the age of 45, which is a very narrow slice of the demography of Nevada and the greater region. Because of this, our needs assessment evaluation and survey results only provide insights about this small population. With this in mind, we have several initiatives underway to broaden our reach:

- » We have been working to reach the Latinx community through translating resources and engaging directly with communities through events.
- » Working with agency and tribal representatives, we developed an inclusive high-school fire science curriculum that will help us reach younger audiences throughout Nevada.
- » Our podcast and high-school curriculum incorporate stories of current and past tribal fire management.
- » There will continue to be a need to evaluate and refine LWF programming as we bring this program into the future. Just in the past three years, we have been challenged to incorporate more virtual programming and have been successful in increasing our following. There is room for LWF to continue to help our dedicated communities on the path to fire adaptation, but also to think outside the box and bring fire education and preparedness to all Nevadans.



We acknowledge our survey respondents for providing valuable feedback. We would like to thank Malieka Biordigioni for significant feedback regarding our survey instrument and data analysis. We thank the Living With Fire team for valuable feedback on our survey and report, and especially thank Megan Kay for graphic design and document layout. Funding for this project was provided by the Bureau of Land Management - Nevada State Office, the Nevada Division of Forestry and the U.S. Forest Service. For information about this publication, contact Christina Restaino at [restainoc@unr.edu](mailto:restainoc@unr.edu).

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