Bridging Mountains Needs Assessment Report

a study of environmental education in the San Juan Mountains region

Mountain Studies Institute

SAN JUAN MOUNTAINS COLORADO

Acknowledgements

Before beginning this report, we would like to thank the following individuals and organizations:

- The National Environmental Education Foundation and the Colorado Alliance for Environmental Education and Serve Colorado for helping fund this project.
- The organizations and researchers who conducted similar community needs assessments that guided our methods, survey questions, and analysis (see references section).
- Nancy Zuercher for providing expert feedback on methods, analysis, and report writing.
- The educators, youth, and parents who completed surveys and interviews---making this whole project possible.

Lastly, thank *you* for reading this report.

Sincerely,

The Bridging Mountains Needs Assessment Advisory Committee

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Cover: Student participant of Lyra's Environment and Climate Institute sets up a transect to study willow restoration techniques. Photo credit: Amanda Kuenzi

High school student interning with Mountain Studies Institute visits a talus slope to look for American pika presence, an indicator of climate change impacts.

Executive Summary

This work was fueled by love of people and place. This place (referred to as the San Juan Mountains region in this report) is the ancestral lands and territories of Nuchu (Ute), Apache, the Pueblos, Hopi, Zuni, and the Diné Nation. Mountain Studies Institute (the executer of this project) strives to serve the San Juan Mountains region and those who call it home through empowering communities to understand and sustainably use our environment. We believe that environmental education can be used as a tool to empower communities through investing in youths' capacity to be leaders in their communities. We believe that community understanding is a prerequisite to effective environmental education programming. The goal of the Bridging Mountains Needs Assessment (BMNA) is to provide insight into the current state and needs of K-12 environmental education (EE) in the communities of the San Juan Mountains region. Here is what we found:

What stakeholders' value:

- Results show that 81% of respondents think there should be more EE in a school setting (Figure 5).
- 67% of parents and 58% of K-12 teachers value integrating STEM into EE (Figure 12).
- K-12 teachers value connecting EE to both science and other core standards (Table 12).

Barriers we currently face:

- Funding, knowledge of EE opportunities, and transportation are significant barriers preventing youth from engaging in extracurricular EE activities (Figure 9).
- Time, funding, and transportation prevent K-12 teachers and informal EE providers from facilitating EE to students in a school setting (Figure 7 & 8)

Opportunities for growth:

- Youth's biggest gap in environmental literacy is their preparedness to address environmental challenges facing their community (Table 4)
- Stakeholders cumulatively identified fifty-six organizations that provide hands on EE opportunities to youth in the San Juan Mountains Region; however, on average individual stakeholders only know of one organization providing hands on EE. This finding suggests a need for increased outreach by existing organizations (Table 5)
- Community organizations can help lower K-12 teachers' barriers to engaging their students in experiential EE (Figure 7 & 8). However, 31% of K-12 teachers identified "knowledge of community organizations" as a significant barrier reinforcing the need for organizational outreach.
- On average, 37% of youth surveyed have a good understanding of local environmental topics (Figure 10).
- Over 80% of K-12 educators would like lesson plans and professional development training. Specifically, 83% request environmental science content training and 69% want training on facilitating fieldwork and data collection (Table 9).
- Stakeholders recognize that students would benefit from investment in more student internships programs and reoccurring environmental data collection activities by informal EE providers (Figure 11).
- Interviewees recommended that EE might be more effective through (1) transcending political and cultural biases and (2) increasing collaboration between environmental organizations.

Introduction

Why assess environmental education in the San Juan Mountains Region?

Communities in the San Juan Mountain region face numerous environmental challenges: drought, wildfire, invasive species, limited water supply, and other climate-driven impacts. Informal environmental education (EE) providers, school districts, foundations, and families desire to collaborate to ensure every student is prepared to understand and address relevant environmental issues. To collaborate successfully, the current gaps and opportunities in EE must be understood.

Objective: The goal of the Bridging Mountains Needs Assessment (BMNA) is to identify current EE needs for K-12 students in the San Juan mountains region so that future programming by Mountain Studies Institute and our network of partners can meet those needs. We seek to address two main questions through surveys and interviews (see Appendices 3 and 4 for all questions):

(1) What is the current state of K-12 EE in the study area?
(2) What K-12 EE needs are not being met?

This report is primarily designed to help informal EE providers better support their communities.

Summary of When, Where, and Who was Involved in the BMNA:

When: The BMNA was completed in March through July 2021. To view a detailed timeline please see Appendix 1.

Where: The assessment was focused on the San Juan Mountains region of southwest Colorado and northern NM. Please see Figure 1 and Table 2 for details. Survey respondents were from the following counties: Archuleta, Delta, Dolores, La Plata, Lake County, Mesa, Montezuma, Montrose, Ouray, San Juan, San Miguel, and Saguache Counties in Colorado; and Rio Arriba and San Juan Counties, New Mexico.

Who:

- Assessment Executer: Mountain Studies Institute is well-positioned to conduct this regional assessment, given our dedication to mountain learning and advancing environmental literacy. Over the past 19 years, we have built a network of environmental educators, partner organizations, and community leaders, with whom we cooperate and collaborate to serve the needs of the San Juan Mountains communities.
- Assessment Advisors: An advisory committee (member list in Appendix 2) was recruited to: (1) Act as advocates for the BMNA process: help reach key stakeholder groups and endorse the assessment results and (2) review the BMNA process and results: provide feedback on assessment questions and data interpretations.
- Assessment Participants: Four primary stakeholder groups in the region were included in this assessment: (1) formal K-12 educators teaching at both public and private schools, (2) informal EE providers, (3) parents/caregivers of K-12 students, and (4) youth (grades 9-12). Electronic surveys were distributed in the San Juan Mountain region and follow up interviews were conducted with a subset of the respondents (Table 1).

Table 1. Number of surveys and interviews completed by each stakeholder group.

Stakeholder Group	Number of surveys	Number of interviews
K-12 Teachers	36	8
Informal EE Providers	24	7
Parents/Caregivers	18	3
Students	46	4
Total	124	22

Figure 1. Geographic distribution of surveys completed by K-12 teachers, parents, and youth.

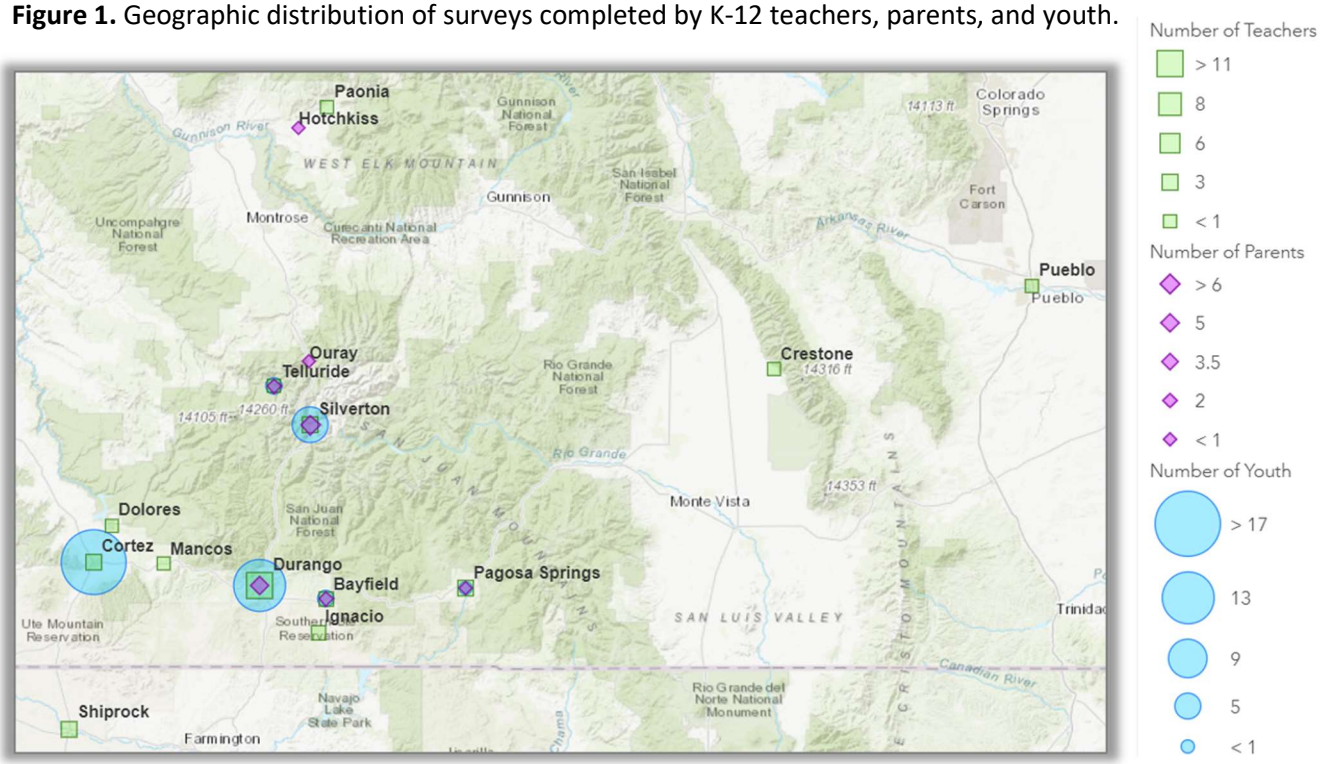
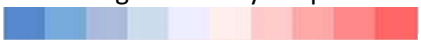


Table 2. Distribution of survey participants based on student grade taught/represented.

	Stakeholder Groups			
Grade(s) of Students	Informal EE-provider	Parent	K-12 Teacher	Youth
Pre-K	8%	10%	6%	0%
Elementary School	46%	49%	41%	0%
Middle School	23%	27%	14%	4%
High School	23%	15%	38%	96%

Percentage of Survey Responses



Low response → High response

Table 3. Counties, cities, and districts served by informal EE providers participating in this assessment.

County	Incorporated Cities	School Districts	# Informal EE providers
Archuleta County	Pagosa Springs	Archuleta County School District No. 50 Jt	5
Delta County	Delta; Hotchkiss; Paonia; Crawford; Orchard City; Cedaredge	Delta, Hotchkiss, Paonia, Montessori School at Crawford, No. 50	3
Dolores County	Dove Creek; Rico	Dolores County School District Re-2j	2
La Plata County	Ignacio; Durango; Bayfield	Ignacio No. 11Jt	5
La Plata County		Durango 9R	8
La Plata County		Bayfield 10JtR	5
Mesa County	Collbran; De Beque; Fruita; Grand Junction; Palisade	Mesa County Valley School District No. 51. De Beque Joint District No. 49.	3
Montezuma County	Cortez	Montezuma Cortez Re-1	5
Montezuma County	Dolores	Dolores Re-4A	5
Montezuma County	Mancos	Mancos Re-6	3
Montrose County	Montrose; Olathe	Montrose, Olathe Re-1J	6
Montrose County	Nucla; Naturita	West End School District No. Re-2 School District (Paradox, Nucla, Naturita)	7
Ouray County	Ridgeway; Ouray	Ridgway School District No. R-2	6
Ouray County		Ouray School District No. R-1	6
San Juan County	Silverton	Silverton School District No. 1	3
San Miguel County	Telluride; Norwood; Mountain Village; Ophir; Sawpit	Telluride School District No. R-1	6
San Miguel County		Norwood School District No. R-2j	6
Rio Arriba County (NM)	Chama; Espanola		1

Youth Environmental Literacy

Regional EE programming that connects youth to their local environment could be improved. Specifically, youth may benefit from place-based lessons and activities that encourage them to use critical thinking and problem solving to engage with local environmental issues.

- Youth have a moderate level of
  - Connection to their local environment (Figure 2)
  - Understanding of major environmental challenges facing their community and the global community (Figure 3)
  - Preparedness to address the major environmental challenges facing their community and the global community (Figure 4)
- All groups surveyed agreed that for youth, connection-to-environment scored strongest followed by understanding-environmental-challenges with preparedness-to-address-the-challenges coming in lowest (Table 4)

Figure 2. Youth connection to their local environment (see Appendix 4: survey question #5).

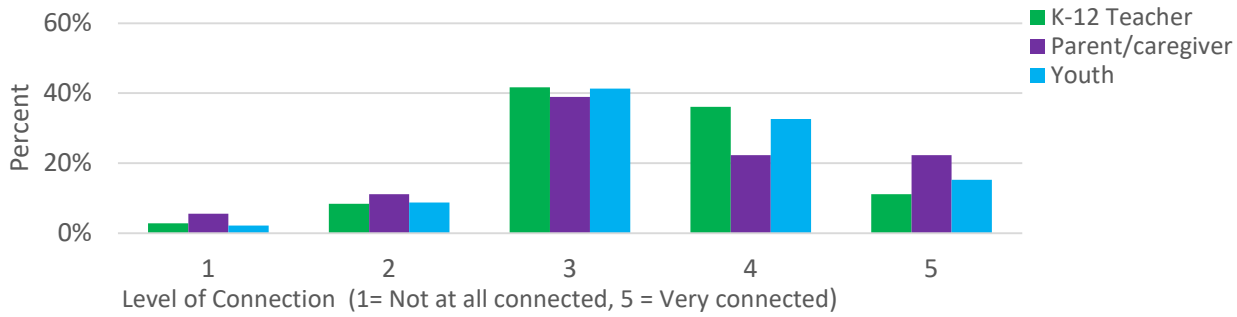
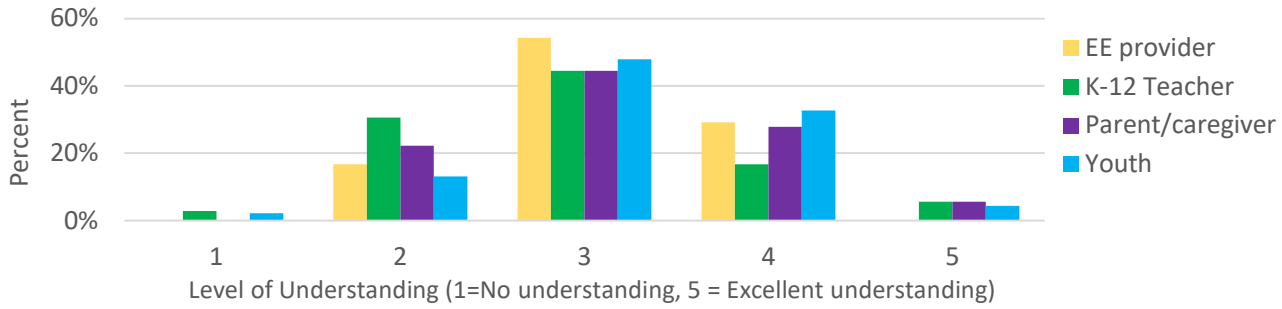
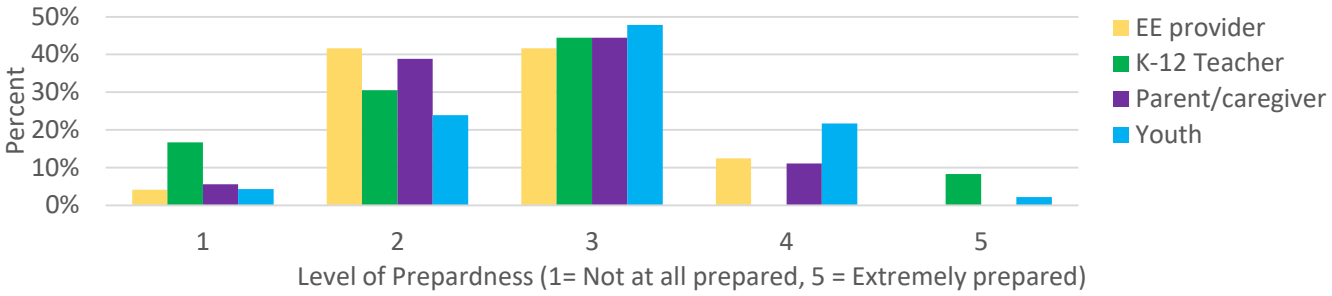


Figure 3. Youth understanding of major environmental challenges facing their community and the global community (survey question #6).



"I'm just not that informed about local issues" –Youth, Telluride

Figure 4. Youth preparedness to address the major environmental challenges facing their community and the global community (survey question #7).



"Raising kids who know how to present data and speak in public...may be the change that we want to see in the world" – Parent/Caregiver, Silverton

Table 4. Stakeholder groups' average score for youths' environmental literacy on a scale of 1-5. All stakeholder groups scored youth's connection to their environment highest followed by their understanding of environmental issues and lastly their preparedness to address those issues.

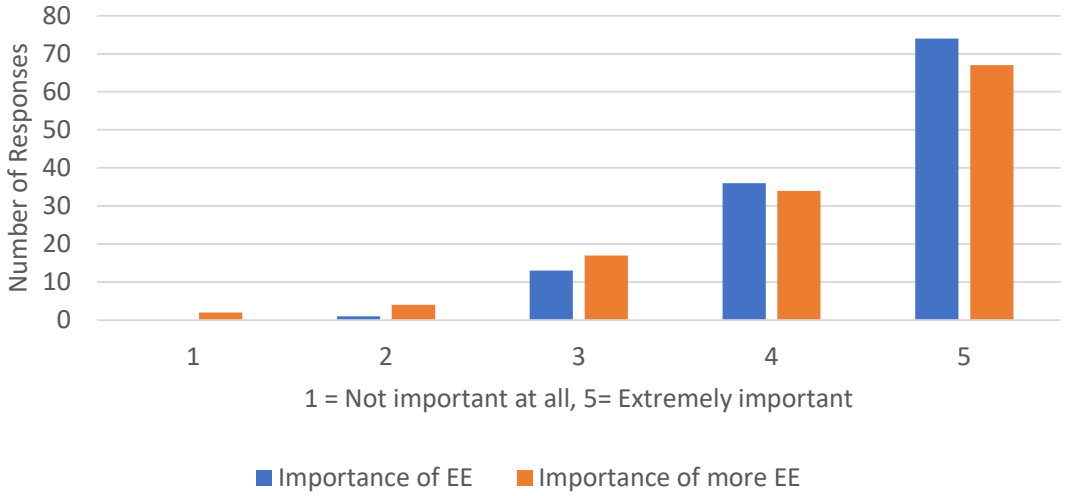
	K-12 teacher	Parent	Youth	Informal EE-provider	All
Connection (Fig. 2)	3.44	3.44	3.50	N/A	3.47
Understanding (Fig. 3)	2.92	3.17	3.24	3.13	3.12
Preparedness (Fig. 4)	2.53	2.61	2.93	2.63	2.71

EE in a School Setting

Stakeholders value current and *increased* EE in a school setting. Results show 89% of respondents value current EE in a school setting and 81% see a need for increased EE. This indicates that the need for EE programming is not being met with current offerings and that a drive exists to increase access to EE in schools.

- The importance of existing and increased EE in a school setting (survey question #9 and #10 respectively) was affirmed by all stakeholder groups (Figure 5).
- The median response for both question #9 and #10 is 5 (extremely important).
- The average of the numeric responses to survey questions #9 and #10 shows a slightly higher importance put on EE in a school setting compared to the need for *more* EE in a school setting (4.5 and 4.3 respectively).

Figure 5. Cumulative importance of current and increased EE in a school setting (survey question #9 & #10). N (sample size) = 124.



Informal EE Providers

Survey results indicate that stakeholders may not be aware of all informal EE opportunities available to their community. Stakeholders cumulatively identified fifty-six organizations that provide hands on EE opportunities to youth in the San Juan Mountains Region; however, on average individual stakeholders only know of one organization providing hands on EE. This finding suggests a need for increased outreach by existing organizations.

- On average, an individual stakeholder knows of one organization providing hands-on EE in their community (Table 5).
- Organizations identified by at least five survey respondents included: Mountain Studies Institute, San Juan Mountain Association, Environment & Climate Institute, Powerhouse Science Center, Colorado Parks and Wildlife, Fort Lewis College, and Future Farmers of America (see Appendix 5 for a full list).

Figure 6. Respondents identified fifty-two organizations that provide hands on EE opportunities for youth in the San Juan Mountains region (survey question #7).

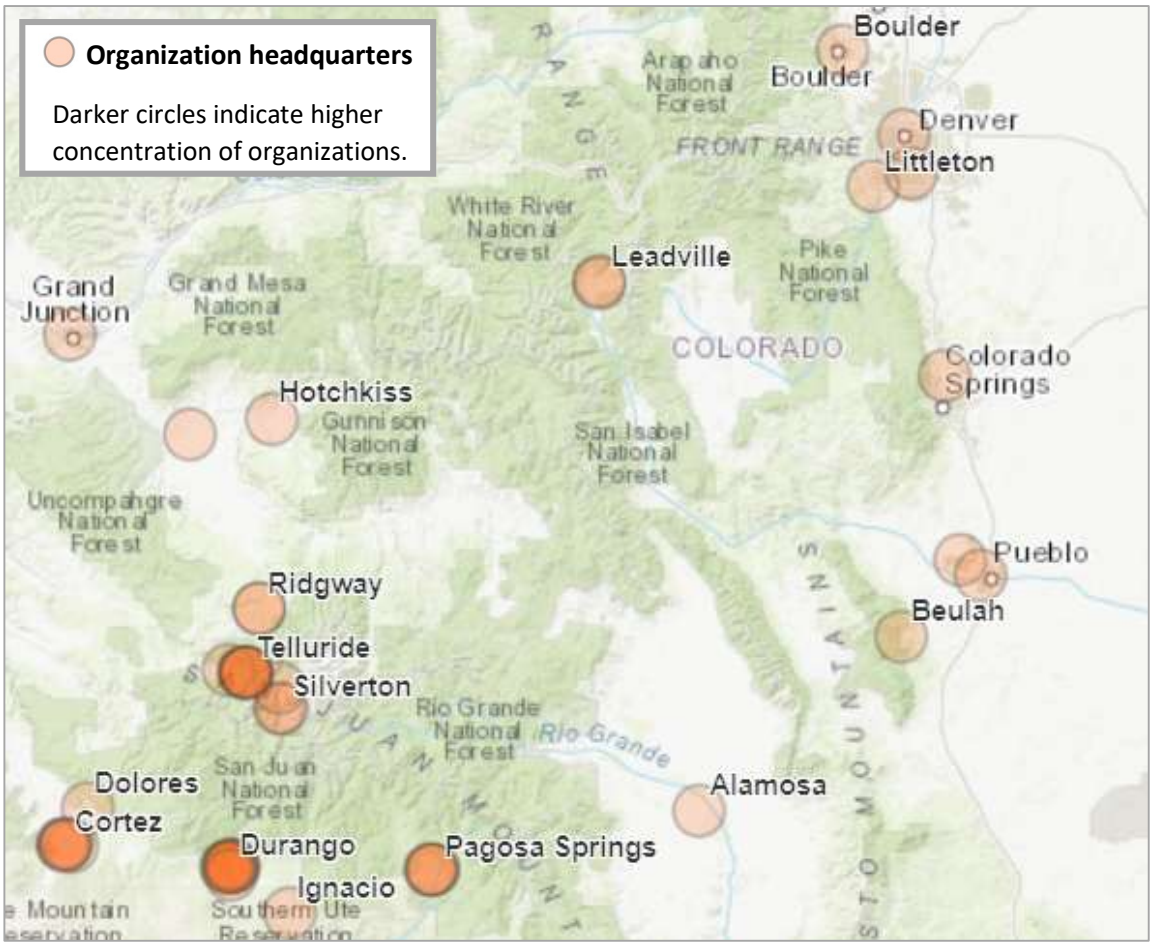


Table 5. On average, individual stakeholders know one organization that provides hands on EE opportunities to youth in their region. Compared to other stakeholder groups, youth have the highest percentage (57%) of respondents that do not know any organizations providing hands-on EE.

Stakeholder group	Average number of organizations identified that provide hands-on EE	Percent of respondents that don't know any organizations that provide hands-on EE
EE-provider	2	13%
K-12 teacher	2	14%
Parent/caregiver	1	9%
Youth	1	57%
All stakeholders	1	27%

Table 6. Eight cities serve as the headquarters for at least two organizations that provide hands on EE opportunities to youth. The percent of stakeholders (youth/parents/k-12 formal educators) that have engaged/partnered with these organizations is listed as well (survey question #7).

City of organization headquarters	Number of organizations providing hands on EE	Percent of stakeholders that have engaged with these organizations
Durango	12	56%
Cortez	7	8%
Telluride	7	5%
Pagosa Springs	3	1%
Denver	2	2%
Leadville	2	1%
Ridgway	2	1%
Silverton	2	0%

San Juan Mountain Association hosts an adventure camp for middle and high school students (photo source https://sjma.org/summercamps/).

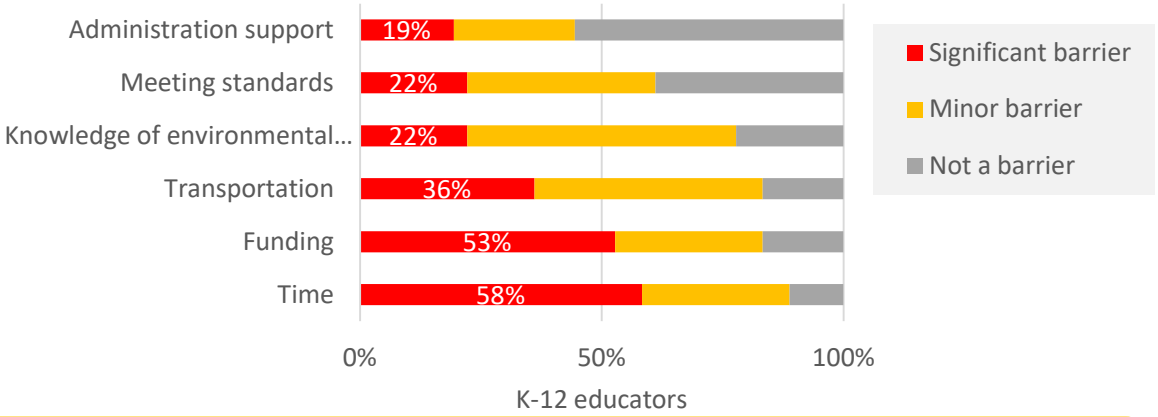
Barriers Limiting EE

Funding, knowledge of EE opportunities, and transportation are significant barriers preventing youth from engaging in extracurricular EE activities. Extracurricular EE opportunities would be more inclusive if they were more affordable. In addition, increased funding and transportation would help K-12 teachers and informal EE providers facilitate EE to students in a school setting. Furthermore, community organizations can lessen these barriers for K-12 teachers through partnership.

- Barriers limiting curricular EE
  - K-12 educators evaluated "funding", "transportation" and "administrative support" as less significant barriers to providing EE when partnering with community organizations compared to without collaboration (Figure 7 and 8).
  - EE-providers see "meeting standards", "knowledge of community organizations", and "time" as less significant barriers to collaboration than formal K-12 educators (Figure 8).
  - 31% of K-12 teachers identified "knowledge of community organizations" as a significant barrier to partnering with community organizations, reinforcing the need for organizational outreach.
- Barriers limiting extracurricular EE
  - Overall, funding was ranked as the most significant barrier to youth engagement in extracurricular EE (Table 6, Figure 9).
  - 44% of all stakeholders (40% of youth) evaluated "knowledge of opportunities" as a significant barrier to youth engagement in extracurricular EE (Table 6).

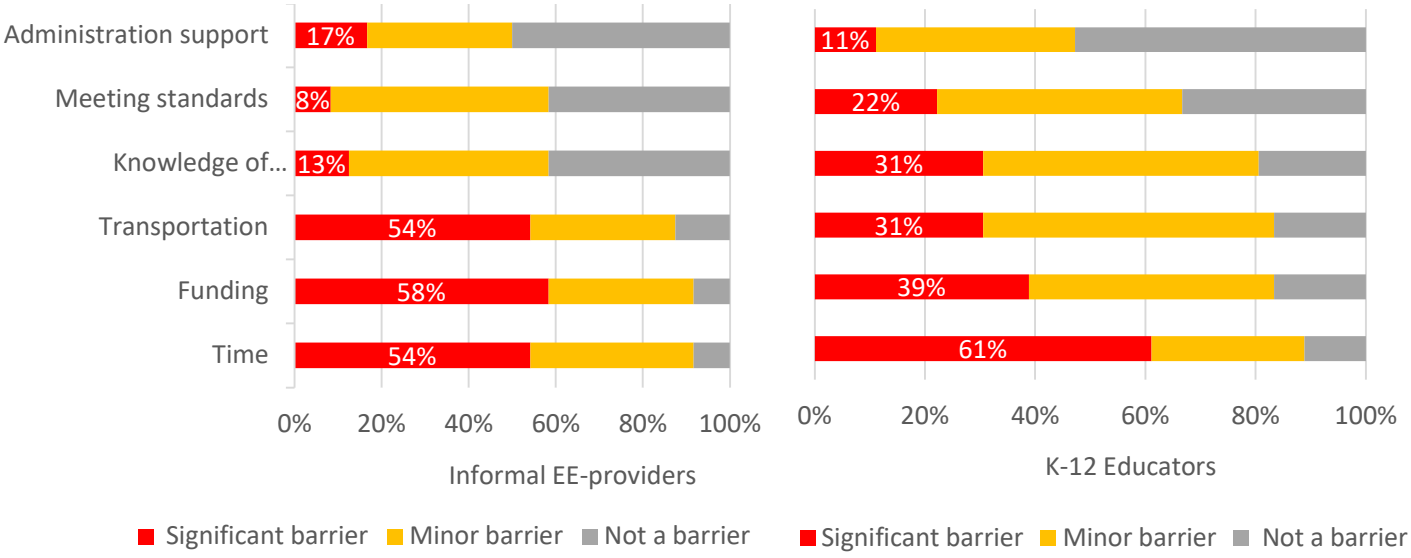
"I did a [professional development training] over the summer and loved it but there are [associated equipment costs] that I don't have the [financial] resources for."– K-12 Teacher, Mancos

Figure 7. Barriers that limit K-12 formal educators from engaging their students in experiential EE opportunities (without the support of outside organizations) (survey question #11).



"You have to have the school bought in…because without it, you have nothing. And that just takes time. It takes educating administrators on what can be offered, what the options could look like, [and] how it will affect test scores." – Informal EE provider, Montezuma County

Figure 8. Barriers that limit K-12 educators and community organizations from partnering to provide EE to students (survey question #12) as evaluated by informal EE-providers (left) and K-12 teachers (right).



"Extra-curricular programs are not as inclusive [as programs that work systematically through the school districts] because of the cost and the transportation" – Informal EE provider, Delta County

Figure 9. Average significance of barriers that limit youth participation in extracurricular EE opportunities on a scale from 0 – 2 (survey question #14).

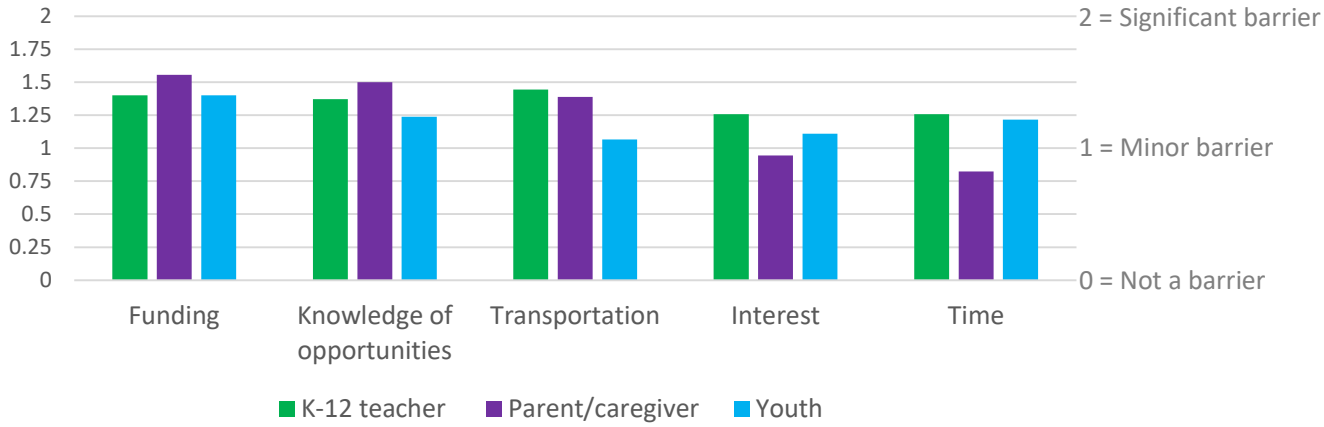


Table 7. Aggregated assessment of barriers limiting youth engagement in extracurricular EE opportunities (N = 100). Red shading emphasizes the severity of the barrier.

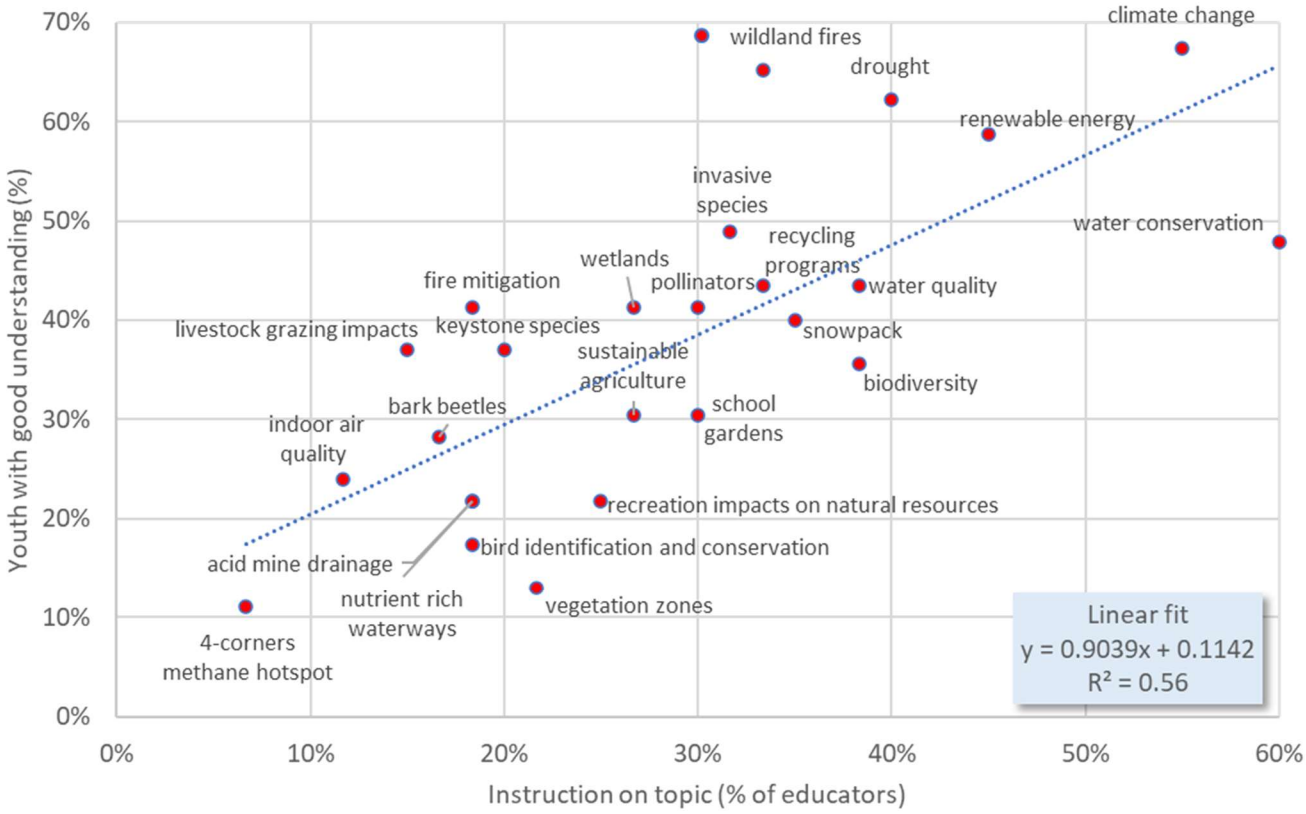
Metric	Funding	Knowledge of opportunities	Transportation	Interest	Time
Average significance of barrier (0=none - 2=significant)	1.52	1.40	1.35	1.11	1.04
% Of participants reporting "Significant barrier"	50%	44%	39%	32%	34%

EE Topics: Current State and Needs

Parents and educators were asked to evaluate the importance of twenty-five environmental topics. Youth were asked to rate their understanding of the topics. On average, the topics valued by >75% of parents and educations are well understood by 44% of youth (22-67% depending on the topic).

- Environmental topics with low student understanding can be mitigated by increased instruction (Figure 10).
- More instruction on fire mitigation and recreation impacts on natural resources would improve youth understanding of the topics (Table 8).
- Although fire mitigation was ranked with the highest overall importance, only 41% of youth report a good understanding of fire mitigation.

Figure 10. There is a positive correlation between instruction and student understanding of environmental topics (survey question #16). As we might expect, this correlation suggests that more instruction leads to increased student understanding. See Table 8 for more details on the topics most valued by parents and educators.



"Our education system is teaching things that are conceptual/distant instead of tangible and present." – K-12 Teacher, Ignacio

Table 8. Environmental topics that > 75% of adult stakeholders thought youth should learn about. For each topic % of youth with a good understanding, % of educators who teach the topics, and % of K-12 teachers wanting additional material is shown (survey question #16). Red shading highlights less understanding/instruction.

Topic	***Adults report this topic is important for students to learn about (N=78)***	***Youth with good understanding of topic (N=46)***	***I currently teach about this topic***		***Teachers want more education materials on this topic (N=36)***
			K-12 Teachers (N=36)	***EE-providers (N=24)***	
fire mitigation	86%	41%	19%	17%	33%
drought	83%	62%	36%	46%	44%
wildland fires	83%	65%	36%	29%	39%
recreation impacts on natural resources	83%	22%	28%	21%	39%
snowpack	82%	40%	25%	50%	31%
climate change	81%	67%	53%	58%	44%
water conservation	79%	48%	56%	67%	42%
water quality	79%	43%	36%	42%	42%
sustainable agriculture	79%	30%	31%	21%	42%
renewable energy	79%	59%	47%	42%	39%
nutrient rich waterways	77%	22%	14%	25%	33%
pollinators	76%	41%	25%	38%	36%
bark beetles	76%	28%	17%	17%	31%

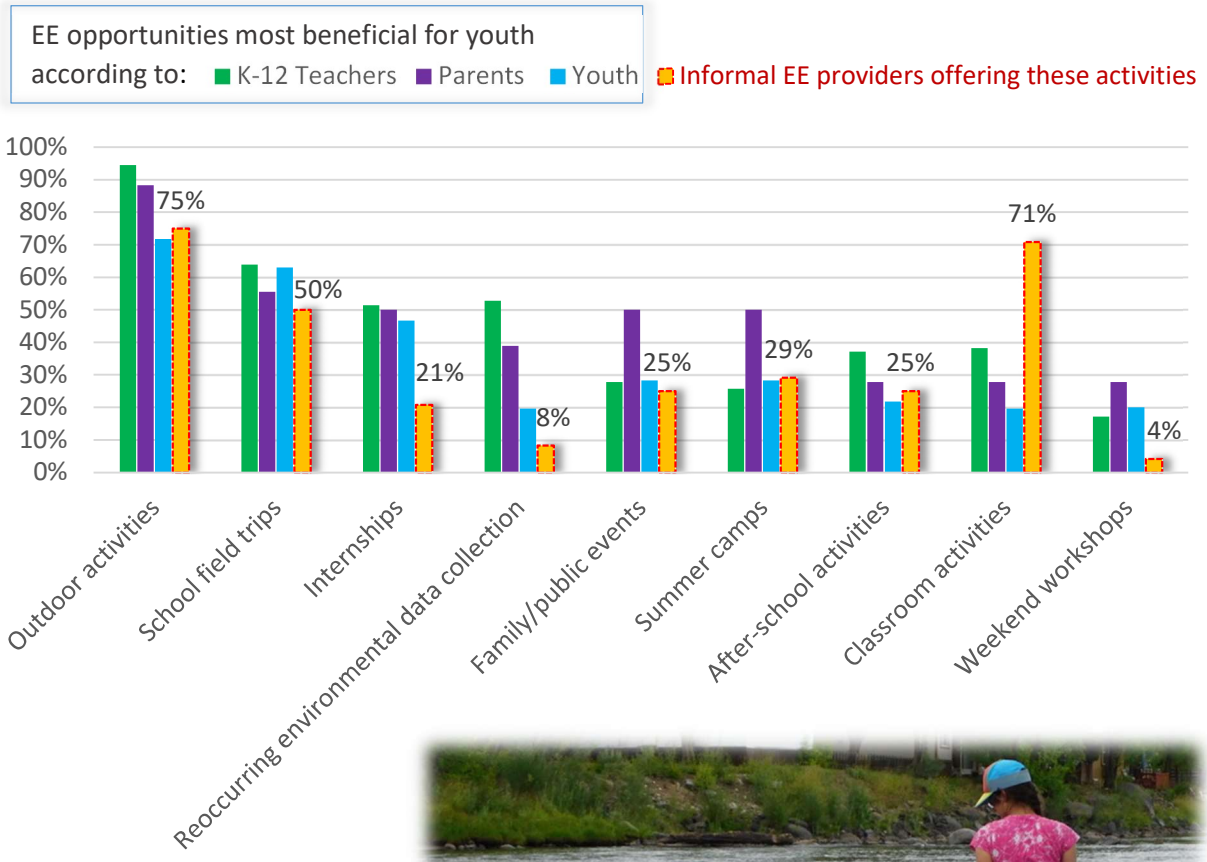
Fire mitigation work using prescribed fire. Photo credit: Mountain Studies Institute.

Supporting Students and K-12 Educators

Youth benefit most from outdoor activities, field trips, and internships. K-12 educators would benefit from EE training and lesson plans.

- Outdoor activities are valued highest by all stakeholder groups (Figure 11).
- EE-providers over-provide classroom activities and under-provide internships (Figure 11).
- K-12 teachers are in high need of lesson plans and professional development training, specifically on the topics of "environmental science content" and "facilitating field work/data collection" (Table 9).

Figure 11. Percent of stakeholders ranking EE opportunities as most beneficial to youth compared to the percent of informal EE-providers who offer those activities (survey question #15).



"[We need] more classes that get you outdoors"

– Youth, Animas High School, Durango

High school students explore benthic macro invertebrates in the Animas River.

Table 9. Resources provided by informal EE-providers and identified by K-12 teachers as helpful to facilitating EE (survey question #17-18).

EE Resources and PD	*EE provider responses (N=24)*	*K-12 Teacher responses (N=36)*
Professional Development training	16.67%	83.33%
Lesson plans	37.50%	80.56%
Other (please specify) *	54.17%	16.67%
None of the above	20.83%	2.78%
Types of professional development		
Environmental science content	29%	83%
Analyzing data	17%	39%
Facilitating field work/data collection	25%	69%
Using real-time or archived data	21%	42%
Criteria-based and democratic decision-making	8%	44%
Identifying stakeholders	8%	39%
Other (please specify)	21%	3%

"Hands on experiential collection of the data [allows for ownership of the data, so students] know it's not fake science." –Informal EE provider, Durango

Table 10. "Other" resources provided by informal EE-providers and/or identified by K-12 teachers as helpful to facilitating EE.

"Other" resources	K-12 teacher requests	Informal EE-provider available resources
Collaboration	2	1
Experts/guest speakers	2	2
Field trips/programs	1	3
Field data labs	1	0
Financial support of teachers	0	2
EE informational resources	0	1
Site to host field trips	0	2
Bus funding	0	1
Student scholarships	0	1

"I am looking for [experts from] institutions [and] non-profits…that can point out things that the kids are not yet sensitive to and then they can become sensitive to it." – K-12 Teacher, Ignacio

Additional Notes:

- The two highest ranked activities (outdoor activities, school fieldtrips) are both offered by at least half of EE-providers surveyed (N=24).
- Internships and reoccurring environmental monitoring are perceived as significantly beneficial by over 50% of K-12 teachers but only 21% of informal EE-providers teach reoccurring environmental monitoring and only 8% offer internships (Figure 11).
- When asked "What additional resources would help you facilitate EE lessons?" (Survey question #17). Only 3% of K-12 teachers (N=36) selected "none of the above" (Table 9).
- K-12 educators valued "environmental science content" and "facilitating field work/data collection" the most (over 50% selection) but these topics are only offered by 29% and 25% of informal EE providers respectively (Table 9).
- One elementary school teacher requested the following resource, "A hub or portal with a list of current projects (issues, events, anything) I could use to have students engage in- to ground our reading, writing, and math curriculum in."

Student participates in a field experience at Silverton High School.
Photo credit: Mountain Studies Institute.

Connecting EE to STEM and Standards

Parents and formal educators value the integration of STEM into EE. In addition, formal educators value connecting EE to both science standards and other core standards.

- 58% of K-12 teachers and 67% parents are more interested in investing in EE if it is linked to STEM learning objectives (Figure 12)
- 50% of informal EE-providers consistently connect their programs to STEM (Table 11).
- The ratio of informal EE-providers focused on different branches of STEM reflects the needs by formal educators (Figure 13).
- The majority of K-12 educators would like external EE programming to reinforce academic standards—citing science and math standards most frequently (Table 12).
- Of the informal EE providers surveyed, 70 % connect their programming academic standards.

Figure 12. Should EE programming be linked to STEM learning objectives (survey question #19)? Parents value integrating STEM into EE slightly more than K-12 teachers.

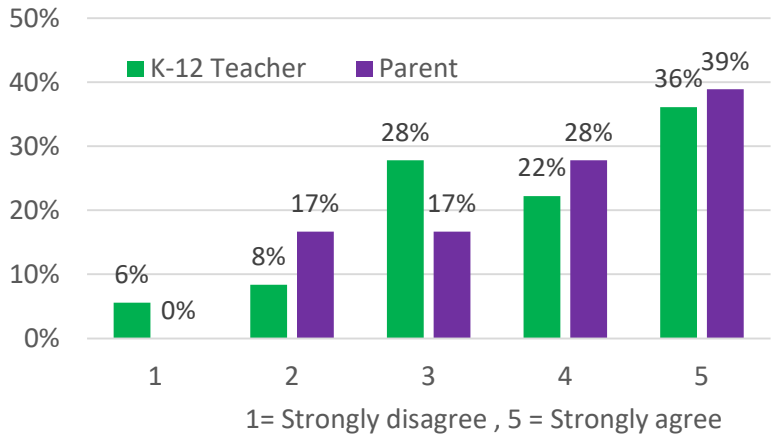


Table 11. Number of informal EE-providers that connect their programming to STEM learning objectives.

Do you connect EE to STEM	
Yes	12
Sometimes	6
Unsure	4
No	2

Figure 13. Branches of STEM that K-12 educators would like more activities focused on (top) and that EE-providers have activities focused on (bottom) (survey question #20).

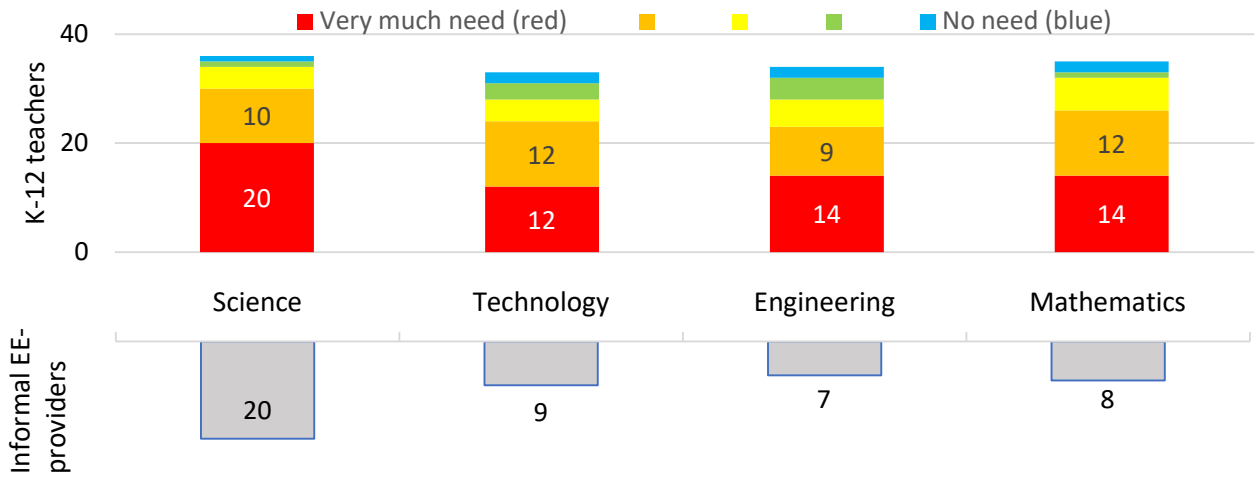


Table 12. Standards that K-12 teachers would like most help teaching/reinforcing through external EE programming (survey question #13). Only three K-12 teachers responded "none" to the question.

Subject	**Science = 15**				
Topic	Climate/ weather	Energy	Earth Science	Biology	Ecosystems
# Of responses	2	2	2	3	6
	Other disciplines = 10			**Other = 14**	
Subject	Social studies	Reading/ Writing	Math	Unknown/ Not sure/NA	None
# Of responses	2	3	5	11	3

"[I]f you can tie in language, arts, and math into what is being done outside...there is a much greater chance that administrators will be on board." – Informal EE provider, Montezuma County

Interview Recommendations

Twenty-two interview respondents elaborated on their survey responses sharing their key recommendations for EE. Two unique key recommendations identified are to (1) transcend political and cultural biases and (2) increase collaboration between environmental organizations.

- **Expand EE to transcend disciplines and political affiliation**
  - "I want to show [my students that] if you are more efficient with your energy and your resources, you will be more profitable [with your farming]." – K-12 Teacher, Cortez
  - "Inclusive to me means being able meet people where they are, in the mindset and thought processes that they have---and I think that EE...needs more of that pragmatic approach." – Informal EE provider, Colorado

- **Increase collaboration between environmental organizations**
  - "Moments of collaboration across organizations are isolated. We are all so busy and have our heads down, that we are not really pausing to communicate with other organizations" – Informal EE provider, Telluride

Table 13. Recommendations shared by at least three interview respondents are listed below. Focus on environmental issues and action was most frequently suggested (68 % of interviewees). See Appendix 6 for quotes related to each recommendation.

Key Recommendations for EE	Percent of interviewees (N=22)
1) Focus on environmental issues and action*	68%
2) Focus on local environmental topics	50%
3) Prioritize student field work, data collection, and research	45%
4) Utilize science and industry experts	32%
5a) Prioritize hands on learning	23%
5b) Increase the interdisciplinary nature of EE	23%
6a) Support transportation for off-campus activities	18%
6b) Transend political and cultural biases	18%
7a) Prioritize collaborating with school administrators	14%
7b) Ensure that teachers have access to necessary equipment	14%
7c) Increase collaboration between environmental organizations	14%

*Other key words used to identify the theme of environmental issues and action: human impact on the environment; empowering students; advocacy; stewardship; community solutions.

Conclusions

Educators, parents, and youth value current and increased environmental education in a school setting. Teachers request lessons, professional development training, and instructional support in the field. Students would benefit from more internships, accessible EE opportunities, and knowledge of local issues. How can informal EE-providers expand to meet these needs? (1) Increase collaboration with formal educators and administrators to ensure that existing programs and resources are available to teachers and students, (2) increase collaboration with other organizations providing EE to reduce duplicating efforts and energy, and (3) prioritize making EE inclusive so that students from different cultural backgrounds feel excited to engage in local environmental issues.

Next Steps

MSI and our partners will continue to use these findings to develop a list of recommendations which will inform an EE implementation plan for southwest Colorado. Our intention is to use this implementation plan to engage regional district administrations and inform them of the stated needs. Our network will also use this report and the forthcoming implementation need to demonstrate to funders how their support can best be utilized to provide informal and formal educators with the tools they need to improve EE at a regional scale

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Appendices

APPENDIX 1: BMNA timeline

March 22, 2021	First Advisory Meeting: review survey tool and methodology
March 29--May 17	Send surveys to stakeholder groups
April 14 – June 7	Conduct follow up interviews
May 17– May 26	Perform preliminary data analysis
May 26	Second Advisory Meeting: data analysis recommendations
May 26 –July 6	Incorporate feedback and draft report
July 6 – July 13	Advisory Task: Individual review of report draft
July 13 – July 20	Incorporate Advisory committee feedback and internal review comments
July 23, 2021	Distribute report and begin implementing results

APPENDIX 2: Advisory Committee Members

Name	Regional affiliation	Title	Organization
Adiana Stimax	Mancos, CO	Education Program Director	San Juan Mountains Association
Alana Romans	SW, CO	Chief of Staff	Lyra Colorado (ECI)
Amanda Kuenzi	Durango, CO	Community Science Director	Mountain Studies Institute
Chloee Sindelar	Ignacio, CO	Student	Ignacio High School
Dana Hayward	Pagosa, CO	Partnership Coordinator	Mountain studies Institute
Dana Hayward	Pagosa, CO	Board Member	Pagosa School District
Dave Mckeever	Durango, CO	Former Science Curriculum & Assessment Specialist	Durango 9-R
Elizabeth Love	SW, CO	Chief Executive Officer	Jacob and Terese Hershey Foundation
Janae Hunderman	Durango, CO	Work-Based Learning Coordinator	Durango 9-R & Animas High School
Jeremy May	Durango, CO	Education Coordinator	Mountain Studies Institute
Katie Nevin	CO	Director	Colorado Alliance for EE
Katie Triest	Telluride, CO	Director of Education	Pinhead Institute
Kay Phelps	Durango, CO	Assistant Professor of Teacher Education	Fort Lewis College
Keith Bruno	Pagosa, CO	Community Naturalist	National Audubon Society
Marcie Bidwell	Durango, CO	Executive Director	Mountain Studies Institute
Melanie Armstrong	Gunnison, CO	Assistant Professor & Public Lands Coordinator	Western Colorado University
Mike Bienkowski	Durango, CO	Curriculum Coordinator	San Juan Mountains Association
Rob Milofsky	Durango, CO	Professor of Chemistry	Fort Lewis College
Royce Hinojosa	Bayfield, CO	Student	Bayfield High School
Sarah Holbrooke	Telluride, CO	Executive Director	Pinhead Institute
Sasha Creeden	Durango, CO	Education Director	The Powerhouse Science Center
Stephanie Weber	Durango, CO	Development Director	San Juan Mountains Association

APPENDIX 3: Follow-up interviews

At the end of each survey all respondents are asked if they will participate in a follow-up interview. Questions 4-5 will be asked to informal EE providers only. Questions 1-3 and 5 were adapted from a similar EE stakeholder survey (Griffin, 2015) and question 4 is based on the survey used by Hintz and Lackey (2017).

(1) What is your vision for EE in your community?
(2) What aspects of EE programming are currently working well?
(3) What are the gaps or opportunities for improvement in EE programming in your community?
(4) How do your programs differ from other organizations in the region?
(5) What functions of the local Southwest CAEE network seem valuable to you?

APPENDIX 4: Stakeholder survey questions broken into categories based on role. The table shows the four versions of the stakeholder survey that were given to the four different audiences. Questions were designed to be as similar as possible across the audiences.

Q	Informal EE provider survey	Primary Caregiver	Youth ages 14-18	K-12 Formal Educator survey
1	What schools and communities do you work with?	What school do(es) your student(s) attend?	What school do you attend?	What school do you currently teach at?
2	What grade levels do you teach? (Select all that apply.)	What grade(s) are your student(s) enrolled in? Select all that apply.	What grade are you in?	What grade levels do you teach? (Select all that apply.)
	Multiple choice options: K 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, Other (please specify)			
3	Approximately how many students do you teach EE to per year? Please share both pre-Covid and during-Covid numbers if they differ.			Approximately how many students do you teach EE to per year?
	Multiple choice options only for EE-providers: Columns: Number of students, Program hours; Rows: Pre-K, Elementary School, Middle School, High School			
4		Where do you see EE integrated into your school? Please list any classes, activities, and programs (indoors and outdoors) that incorporate EE.	Where do you see EE integrated into your school? Please list any classes, activities, and programs (indoors and outdoors) that incorporate EE.	Where do you see EE integrated into your school? Please list any classes, activities, and programs (indoors and outdoors) that incorporate EE.
5		How connected are youth in your community with the local environment? By connected we mean, to what degree are they familiar with, comfortable in, and compassionate towards the environment?	How connected are you and your peers with the local environment? By connected we mean, to what degree are you familiar with, comfortable in, and compassionate towards the environment?	How connected are your students with their local environment? By connected we mean, to what degree are they familiar with, comfortable in, and compassionate towards the environment?
	Please rate on a scale of 1 to 5 where 1=Not at all connected and 5 = Very connected. [1, 2, 3, 4, 5]			

6	To what extent do your students understand the major environmental challenges facing their community and the global community?	To what extent do youth in your community understand the major environmental challenges facing your community and the global community?	To what extent do you and your peers understand the major environmental challenges facing your community and the global community?	To what extent do your students understand the major environmental challenges facing your community and the global community?
	Please rate on a scale of 1 to 5 where 1= no understanding, 5= good understand [1, 2, 3, 4, 5]. Optional Explanation.			
7	How well prepared are your students to address the major environmental challenges facing their community and the global community?	How well prepared are youth in your community to address the major environmental challenges facing your community and the global community?	How well prepared are you and your peers to address the major environmental challenges facing your community and the global community?	How well prepared are your students to address the major environmental challenges facing your community and the global community?
	Please rate on a scale of 1 to 5 where 1= not at all prepared, 5= extremely prepared [1, 2, 3, 4, 5]. Optional Explanation.			
8	What other organizations are providing hands on EE opportunities for youth in your area?	What organizations are providing hands on EE opportunities for youth in your area? Programs my student(s) have participated in: Other programs I know of: "	What organizations are providing hands on EE opportunities for youth in your area? "Programs I have participated in: Other organizations/programs I know of:	What organizations are providing hands on EE opportunities for youth in your area? Organizations I have partnered with: Other organizations I know of:
9	How important do you see EE in a school setting?	How important do you see EE in a school setting?	How important do you see EE in a school setting?	How important do you see EE in a school setting?
	Please rate on a scale of 1 to 5, where 1 = Not important at all, 5 = Extremely important [1, 2, 3, 4, 5]			
10	How important is it that students have more EE opportunities in a school setting?	How important is it that youth have more EE opportunities in the school setting?	How important is it that you and your peers have more EE opportunities in the school setting?	How important is it that your students have more EE opportunities in a school setting?
	Please rate on a scale of 1 to 5, where 1 = Not important at all, 5 = Extremely important [1, 2, 3, 4, 5]			
11				In your school district, what are the barriers that limit educators from engaging their students in experiential EE opportunities (without support of outside organizations) ?

	Multiple choice options: Rows [Time, Funding, Transportation, Administration support, Knowledge of environmental activities, Meeting standards, Other]. Columns [Not a barrier, minor barrier, significant barrier]			
12	In the communities you serve, what are the barriers that limit your organization from partnering with formal educators to provide EE programming to students?			In your school district, what are the barriers that limit educators from partnering with community organizations to provide EE to students?
	Multiple choice options: Rows [Time, Funding, Transportation, Administration support, Knowledge of community organizations (interested formal educators*), Meeting standards, Other] (*option for EE provider survey only) Columns [Not a barrier, minor barrier, significant barrier]			
13	What standards, if any, do you address in your EE programming? Please list.			What standards do you need most help teaching or reinforcing that may be addressed with external EE programming? Please list.
14		In your community, what are the barriers that limit youth participation in extracurricular EE opportunities?	What are the barriers that limit your and your peers' participation in extracurricular EE opportunities?	What are the barriers that limit your students' participation in extracurricular EE opportunities?
	Multiple choice options: [Time, Funding, Transportation, Knowledge of opportunities, Interest, Other]. Column [Not a barrier, minor barrier, significant barrier]			
15	What types of EE opportunities do you provide for K-12 students. Select all that apply.	What types of EE opportunities would be most beneficial for youth in your community? Least valuable | Somewhat valuable | Most valuable	What types of EE opportunities would be most beneficial for you and your peers? Least valuable | Somewhat valuable | Most valuable	What types of EE opportunities would be most beneficial for your students. Select all that apply. Columns: Least valuable | Somewhat valuable | Most valuable
	Multiple choice options: Classroom activities, Outdoor activities, School field trips, After-school activities, Weekend workshops, Reoccurring environmental data collection, Internships, Summer camps, Family/public events, Other, None of these;			

16	Please share your opinion and experience teaching about the following environmental topics and issues. Check all columns that apply. Please leave blank if you do not have an opinion on a topic. Columns: (1) this topic is not important for students to learn about. (2) this topic is important for students to learn about (3) We currently teach about this topic (4) We could develop educational materials on this topic	Please share your opinion on the following environmental topics and issues. Please leave blank if you do not have an opinion on a topic.	Please rate your level of understanding on the following environmental topics and issues:(1) No understanding, (2) some understanding, (3) good understanding.	Please share your opinion and experience teaching about the following environmental topics and issues. Check all columns that apply. Please leave blank if you do not have an opinion on a topic. Columns: (1)this topic is not important for students to learn about. (2) this topic is important for students to learn about (3) I currently teach about this topic. (4) I would like more education materials on this topic
	*Column heading included in question. Rows: climate change, renewable energy, 4 Corners Methane Hotspot, drought, water conservation, Acid Mine Drainage, nutrient rich waterways, water quality, snowpack, wetlands, wildland fires, fire mitigation (e.g. prescribed burns), bark beetles, vegetation zones, invasive species, bird identification and conservation, biodiversity, keystone species, livestock grazing impacts, recreation impacts, sustainable agriculture, school gardens, school recycling programs, pollinators, indoor air quality, Other (please specify)			
17	What resources do you provide to educators? (Select all that apply.)			What additional resources would help you facilitate EE lessons? (Select all that apply.)
	❑Professional Development trainings ❑Lesson plans ❑ Other ❑ None			
18	What types of professional development content do you provide to educators? (Select all that apply.)			What types of professional development content (if any) would you find helpful? (Select all that apply.)
	Multiple choice options: ❑ Environmental science content, ❑Analyzing data, ❑Facilitating field work/data collection, ❑ Using real-time or archived data, ❑Criteria-based and democratic decision-making, ❑ Identifying stakeholders, ❑ None, ❑ Other (please specify).			
19	Do you connect your programming with STEM learning objectives?	I would be more likely to enroll my student(s) in an EE program if it was linked to STEM learning objectives. strongly disagree= 0 to strongly agree=5"		I would invest more time and resources in EE curriculum if it was linked to STEM learning objectives?
	Please rate on a scale of 1 to 5, where 1 = No more likely, 5 = Much more likely [1, 2, 3, 4, 5] (* leave question open ended for informal EE providers)			

20	Which branches of STEM do you have EE activities focused on? (Only include rows) added none of the above			Which of the branches of STEM would you like more EE activities focused on?
	Rows: Science, Technology, Engineering, Mathematics. Columns :1=No need, 5 = Very much need (* only include rows for informal EE providers)			
	Thank you for participating. Would like to be entered into a drawing for a $20 gift card [or some other prize].			
	We appreciate your feedback! Would you be willing to be contacted to have a follow-up 30-minute phone call to elaborate on some of your responses?			
	What is your vision for EE in your community? * This question is optional			
	What are the gaps or opportunities for improvement in EE programming in your community? * This question is optional			

APPENDIX 5: Organizations identified by stakeholders as providing hands on EE to youth.

City	Organization	Link	Organizations that youth/teachers/parents have engaged with (N=100)	Organizations familiar to survey respondents (N=124)
Alamosa	The San Luis Valley Ecosystem Council	https://www.slvec.org/	1	1
Beulah	Mountain Park and Environmental Center,	https://www.colorado.com/hikingwalking/mountain-park-environmental-center	1	1
Boulder	Climate Literacy and Energy Awareness Network	https://cires.colorado.edu/outreach/programs/climate-literacy-and-energy-awareness-network-clean	0	1
Colorado Springs	Mobile Earth and Space Observatory (MESO)	http://www.gomeso.org/	1	1
Cortez	Fozzie's Farm & Montezuma Land Conservancy	https://montezumaland.org/programs_detail/fozzies-farm/	1	3
Cortez	Future Farmers of America (FFA)	http://cortezffa.theaet.com/AETHome.aspx?ID=17706	0	5
Cortez	Montezuma Conservation District	https://montezumacountyconservationdistricts.org/	1	1
Cortez	Montezuma School to Farm Project	http://www.montezumaschooltofarm.org/	2	2
Cortez	Pinon Project	https://www.pinonproject.org/	1	1
Cortez	School Community Youth Collaborative	https://www.scyclistens.org/	1	1
Cortez	Silverton Avalanche School	https://avyschool.com/	2	2
Denver	DNR	https://dnr.colorado.gov/	1	1
Denver	EPA	https://www.epa.gov/	1	1
Dolores	Dolores River Boating Advocates	https://www.doloresriverboating.org/	1	2
Durango	Bear Smart	http://bearsmartdurango.org/about-us/donate/contact-info/	0	1
Durango	City of Durango	https://durangogov.org/	1	1
Durango	CPW (and SOLE)	https://cpw.state.co.us/learn/Pages/SOLE.aspx	3	5
Durango	Durango Botanical Gardens	https://durangobotanicgardens.org/	0	1
Durango	Environment and Climate Institute	https://www.fortlewis.edu/about-flc/initiatives/sustainability/environment-climate-institute	10	10
Durango	Fort Lewis College	https://www.fortlewis.edu/	2	5

Durango	La Plata Electric	https://lpea.coop/	0	1
Durango	Manna (The Garden Project)	https://www.mannasoupkitchen.org/	0	2
Durango	Mountain Studies Institute	http://www.mountainstudies.org/	27	31
Durango	Powerhouse Science Center	https://powsci.org/	1	9
Durango	San Juan Mountain Association	https://sjma.org/	10	18
Durango	Southwest Conservation Corps	https://sccorps.org/	2	4
Grand Junction	Colorado canyons association	https://www.coloradocanyonsassociation.org/	0	1
Greenwood Village	Treeline Education	https://www.treelineeducation.com/	0	2
Hotchkiss	The Nature Connection	https://thenatureconnection.net/	2	4
Ignacio	Southern Ute Water Resources	https://www.southernute-nsn.gov/natural-resources/water-resources/	1	1
Leadville	C4 (Leadville)	https://www.c4leadville.org/	0	1
Leadville	Rockies Rock (Get Outdoors Leadville!)	https://getoutdoorsleadville.org/summer-adventure-camp/	1	1
Littleton	Ken-Caryl Ranch Water and Sanitation District	https://ken-carylwater.org/	1	2
Pagosa Springs	Audubon	https://rockies.audubon.org/	0	1
Pagosa Springs	GGP	https://pagosagreen.org/	1	1
Pagosa Springs	Ruby Sisson Library	https://pagosalibrary.org/	0	1
Pueblo	Black Hills Energy (Pueblo)	http://www.blackhillsenergy.com/	1	1
Pueblo	Colorado Rural Water Assoc	http://www.crwa.net/	1	1
Pueblo	Pueblo Zoo	https://www.pueblozoo.org/	1	1
Ridgway	Uncompahgre Watershed Association	https://www.uncompahgrewatershed.org/	0	1
Ridgway	Voyager Youth Program	https://www.voyageryouthprogram.org/	1	1
Silverton	Kendall Mountain	https://www.skikendall.com/	0	1
Silverton	Silverton Mountain	https://silvertonmountain.com/	0	1
Telluride	Ecoaction partners	https://www.ecoactionpartners.org/	0	1
Telluride	Pinhead	https://www.pinheadinstitute.org/	2	5
Telluride	Sheep Mountain Alliance	https://www.sheepmountainalliance.org/	0	2
Telluride	Telluride Academy	https://www.tellurideacademy.org/	1	1
Telluride	Telluride Institute	https://www.tellurideinstitute.org/	0	1
Telluride	Telluride Watershed Foundation	https://telluridefoundation.org/grants/watershed-education-program-wep-25/	1	1
Telluride	True North Youth Program	https://www.truenorthyouthprogram.org/	1	1

Several Locations	National Forest regional office/ USFS	https://www.fs.usda.gov/about-agency/contact-us/regional-offices	2	4
Other	American Heritage Girls	https://americanheritagegirls.org/	1	1
Other	Griptape	https://griptape.org/	3	3
Other	NPS	https://www.nps.gov/state/co/index.htm	1	1
Other	Scouts		1	1
Other	USDA		1	2

APPENDIX 6: Interview quotes illustrating key recommendations for EE.

1) Focus on environmental issues and action*

- "In a perfect world, I would like to see students to be able to develop their own PBL topics and projects to work on to uncover the curiosities of environmental impacts on our planet." – Informal EE provider, Montezuma County
- "Raising kids who notice laws and know how to present data and speak in public...may be the change that we want to see in the world" – Parent/Caregiver, Silverton
- "[K]ids have a lot to offer, and they have good ideas... having kid lead projects and initiatives with measurable impact in the community is cool." – Parent/Caregiver, Silverton

2) Focus on local environmental topics

- "I'm just not that informed about local issues" –Youth, Telluride
- "In honors chemistry, we went over to the mine and looked at the water treatment system and it was so fascinating it was really cool, I actually enjoyed that... It was just honors, if the teacher opened it up to everybody, I think it would be really cool. I think learning about the valley floor and the projects going on there would be really cool. I wish I learned about it. Once in AP environmental science we went out and took soil samples from the valley floor and measured pH and nitrogen and everything that's in there. But again, it's only for people taking that course." –Youth, Telluride
- "We are not very present. Our education system is teaching things that are conceptual/distant instead of tangible and present. What is it that kids are sensitive to? Our system doesn't serve the kids it serves some idea, outside and actually, what is it that the kids' environment is. Is the way we are going to get them to think about what it is that environments are and how they affect us." – K-12 Teacher, Ignacio

3) Prioritize student field work, data collection, and research

- "As a department we are trying to develop projects that meet standards for science courses but that also bring in either climate change or data collection that we can do on a regular basis….there is a lot of opportunity for a experiential learning, on our campus." – K-12 Teacher, Pagosa Springs
- "[We need] more classes that get you outdoors....[One of my favorite field trips was] in 8th grade [when] we went on a field trip (to the 416-burn area) and got to core trees an incremental tree borer". – Youth, Durango

4) Utilize science and industry experts

- "Sometimes we miss opportunities as science teachers to be a scientist…I had a great experience with a lawyer who was willing to sit down and talk with the group about water law….I am looking for [experts from] institutions [and] non-profits…that can point out things that the kids are not yet sensitive to and then they can become sensitive to it." – K-12 Teacher, Ignacio
- "Having experts that help them do good science [allow] the kids feel like they are doing high quality work" – Parent/Caregiver, Silverton
- "Having other educators help facilitate student learning in the field is more meaningful than parent help to supervise." – K-12 Teacher, Mancos

5a) Prioritize hands on learning

- "Hands on experiential collection of the data would be awesome." It allows for ownership of the data, "they know it's not fake science." –Informal EE provider, Durango

5b) Increase the interdisciplinary nature of EE

- "Teachers are boxed in to teach the standards. Science standards are easy to relate to. What if we can present units that integrate environmental studies…into English, Social Studies, and Mathematics standards." – K-12 Teacher, Ignacio

6a) Support transportation for off-campus activities

- "Extra-curricular programs are not as inclusive [as programs that work systematically through the school districts] because of the cost and the transportation….You are not going to get extra-curricular participation in the neediest population. The biggest huddle for a lot of those kids is transportation." –Informal EE provider, Delta County

6b) Transend political and cultural biases

- "I want to show [my students that] if you are more efficient with your energy and your resources, you will be more profitable. If I can connect with them about their farm being more efficient with energy and resources, they're going to be more profitable with their farming---that's where I can get a lot of these kids. Some of these kids are going straight to the ranch, and that's their career. I want something that they can actually take right now and walk out the door and do something with." – K-12 Teacher, Cortez
- "I find EE programming, and EE in general, to be very self-limiting. I think it will always appeal to 20% of the population but it is still not appealing to 80% of the population, I think that is because EE and the folks that are working in EE have a mindset that I think is hard for them to break out of. [It's important to] speak in a language that appeals to a lot of people...and we try very hard to meet people where they are. Language, terminology, and teaching methods that we use in EE [is limiting]...Inclusive to me means being able meet people where they are in the mindset and thought processes that they have---and I think that EE...needs more of that pragmatic approach." – Informal EE provider, Colorado
- "Students are desensitized to EE. They see EE through a liberal vs. conservative lens. When anyone starts talking about the environment, there is a great majority of the students who see that as a liberal word. They are desensitized to it, and they turn off. A lot of families here depend on oil and so there is a dichotomy set up. That dichotomy has shut down a lot of young people's willingness to hear solutions." – K-12 Teacher, Ignacio

7a) Prioritize collaborating with school administrators

- "You have to have the school bought in, on outdoor ed. because without it, you have nothing. And that just takes time. It takes educating administrators on what can be offered, what the options could look like...how it will affect test scores. And, if you can tie in language, arts, and math into what is being done outside...there is a much greater chance that administrators will be on board." – Informal EE provider, Montezuma County
- [Administrators and teachers] don't understand the benefits of EE. You may reach a struggling kid through an outdoor experience before you'll ever reach them in the classroom." – Informal EE provider, Montezuma County

7b) Ensure that teachers have access to necessary equipment

- "I did forests to faucets program over the summer and loved it but there are little miniature details that I don't have the resources for e.g. jewelers loop, nets, bins to take kids out to look at micro-organisms…I can't spend my art budget on science materials" – K-12 Teacher, Mancos

7c) Increase collaboration between environmental organizations

- "[Examples of successful collaboration?] State affiliates are the best example of successful collaboration (e.g. CAEE, MAEE, USEE). I think it is because they work from a mentality of collaboration vs. mentality of being in a silo. They are also good at partnering with non-traditional partners. For example, the EPA and the Future Farmers of America...are working on a variety of different projects with [together]...and it's been a phenomenal partnership." – Informal EE provider, Colorado
- "Moments of collaboration across organizations are isolated. Organizations often get together to do one class but then not really continuing the collaboration. We are all so busy and have our heads down, that we are not really pausing to communicate with other organizations and so maybe having, I don't know if it is an email group...[or] a google drive of lesson plans that we could share with each other...a place that makes it easily accessible and not such a burden to communicate with everyone about what people are doing could be helpful... there could be a lot of opportunity with that--bigger communication with each other." – Informal EE provider, Telluride