

Collaboration to Develop the Content, Context, and Resources for Natural Resource
Education Programming for Youth

A Thesis

Presented in Partial Fulfillment of the Requirements for the

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by

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Authorization to Submit Thesis

This thesis of Meagan Hash, submitted for the degree of Master of Science with a Major in Natural Resources and titled "Collaboration to Develop the Content, Context, and Resources for Natural Resource Education Programming for Youth," has been reviewed in final form. Permission, as indicated by the signatures and dates below, is now granted to submit final copies to the College of Graduate Studies for approval.

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Abstract

Northern Idaho's youth are at a disadvantage when it comes to access and resources for natural resource education. The lack of a place-based science learning center in North Idaho leaves a gap in natural resource education for youth and puts more of an emphasis on the importance of afterschool and informal education programming. This research aimed to improve the effectiveness and sustainability of youth natural resource programming through the collaboration between relevant educators and University of Idaho extension staff. The Delphi technique was utilized to initiate communication from panel members to identify the content, context, and resources needed for environmental education programming for youth. This research provides the University of Idaho Extension, 4-H Programs, afterschool programs, summer camps, and any informal science program the foundational information they need to design, implement, and provide a sustainable north Idaho natural resource youth program.

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I would like to acknowledge the University of Idaho Extension educators, 4-H staff, teachers, and the AmeriCorps program for the initial opportunity to work with youth and natural resource education. Thank you for all of your patience and sharing of experiences with me.

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I would also like to thank my family for their support, and to recognize my fiancé for the constant reassurance, praise, and the many dinners during late school nights. Thank you to all.

Dedication

I dedicate this work to my grandfather and his dedication to conservation, higher learning
and always looking to do the greater good.

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Chapter 1: Introduction

The development of a North Idaho-specific natural resource education program could greatly impact youth, their families, and communities. With many different programs that are used to teach science, there is an obvious need for an integrated holistic approach to environmental education that takes into account various perspectives and ways of knowing (Wahlstrom, 1998). The theoretical basis that argues for natural resource education is based on the concept of the creation of an environmentally responsible citizen, where such an individual understands that he or she is only one of the organisms in the complex and vulnerable ecosystem. An aim of a natural resource education is to help humans recognize, realize, and respect their positions as part of the greater Earth system (Wahlstrom, 1998). A holistic environmental education program should promote pro-environmental values and attitudes, sensitivity to nature, in-depth knowledge of environmental issues, critical reflection, empowerment, commitment and responsibility, action competence, and pro-environmental actions (Wahlstrom, 1998). A program that acknowledges the benefits that youth receive from natural resource education while incorporating the most effective components from the national 4-H curriculum, Project WET, Project WILD, and Project Learning Tree, has the potential to reach youth in a whole new way. By encompassing place based learning, indigenous knowledge, area specific science knowledge, and experimental learning, our communities can come together in learning and growing towards a better understanding and sense of stewardship towards natural resources.

Curriculum is a broad term, but it can be generally confined to “a course of study, a textbook series, a guide and a set of teacher plans” (Shawer, 2010). Curriculum adaption where adjustments in a curriculum are made by curriculum developers and those who use it

in the school or classroom context needs to be a collaboration between teachers and external developers (Shawer, 2010). Teachers play a pivotal role because teachers' knowledge, experience, and skills affect the interactions of students and materials in ways that neither students nor materials can, and the outcome is the actual curriculum (Shawer, 2010).

A National Institute of Environmental Health Sciences (NIEHS) sponsored program at Baylor University models curriculum development and adaptation to bring science curriculum to youth. They offer the Environment as a Context for Opportunities in Schools (ECOS) project; a teacher professional development and curriculum implementation project that strengthens science teaching and learning at the elementary school level (Tillett, 2006). The ECOS project is an example of how scientific research institutions can collaborate effectively with local schools to improve science teaching and learning. Curriculum materials for schools included interactive class lessons, engaging storybooks, sequential lessons, and an accompanying teachers guide to hands-on activities stressing inquiry-based lessons (Tillet, 2006). Each unit included a storybook, a mini-magazine for each student to share with family members, an activity guide for teachers, and supplements related to the storybook (Tillet, 2006). The program also provided support and training for teachers to help maximize the effectiveness of the curriculum (Tillet, 2006). The ECOS project is similar to that of 4-H, Project WET, WILD, and Learning Tree, however, it has been integrated into both charter and public schools and can be a goal to strive for after integrating into the afterschool setting.

Outdoor science education in the K-12 setting is a unique opportunity to open the world to children through hands-on learning, as well as help address the "nature –deficiency" syndrome (Spalding et al., 2010; Louv, 2008). Science is more effectively taught through a

hands-on, learning-by-doing experience, where the “doing” of the activity is more important than the traditional lecture-based classes (Spalding et al., 2010). This allows children to participate in the planning, design, monitoring, and management of projects (Hart, 2013). “In nature, a child finds freedom, fantasy, and privacy: a place distant from the adult world, a separate peace” (Louv, 2008, p.7). It is only through this sense of freedom and wonder that youth can be encouraged to continue to care for the environment and that they will desire to learn about the world around them (Hart, 2013). Having a northern Idaho specific program will encourage youth to explore their backyard nature and promote environmentally conscience decisions in the future (Cullen & Mony, 2003).

The future vision for environmental education was acknowledged in the creation of contemporary curriculum as in Project WET (Water Education for Teachers), Project Learning Tree, and Project WILD (Wildlife in Learning Design). All of these programs were organized in such a way to encourage curiosity, exploration, community and family involvement, with development of the whole child while in a place-based learning setting (Wardle, 1995). Projects WET, Learning Tree, and WILD encourage curiosity and exploration from the students in water resources, environmental education, and wildlife, and focus on the educator training and instruction of natural resource information (D’Agostino et al., 2007; Ghent et al., 2013; Nelson, 2010).

The 4-H program offers opportunities for many youth to develop into confident, capable citizens. However, attracting youth from high-risk environments can present challenges (Ferrari & Sweeny, 2005). Without a family history of 4-H participation, young people do not readily come forward to enroll in 4-H clubs (Ferrari & Sweeny, 2005). Additionally, 4-H clubs are not routinely offered during the time when the need for positive

youth development programming is greatest (e.g., during after-school hours) (Ferrari & Sweeny, 2005). The 4-H program and University of Idaho Extension has an opportunity to increase access to programs by facilitating cooperative efforts either between different youth based organizations or between curriculum in the an afterschool setting.

4-H extension educators have promoted the use of 4-H curriculum to be coupled with the curriculum from other informal science programs. In 2008, 4th and 5th graders in a school in Minnesota were part of a 4-H and Forestry afterschool program to engage youth in outdoor forestry education as a means to fostering positive attitudes towards the environment, and promote stewardship related behaviors (Gupta et al., 2012). Curriculum drew from a variety of environmental education sources, including Project Learning Tree and National 4-H Forestry curriculum. This program established an “innovative pairing of subject experts with youth audiences to foster positive change” (Gupta et al., 2012).

Utilizing both curriculum could help to overcome some of the challenges in working with existing 4-H project materials in an afterschool setting. Most project materials are written for individual use with the assumption that follow-up activities would take place in the family setting (Ferrari & Sweeny, 2005). However, in a group format such as an afterschool setting without parent participation, adaptations were made to include self-contained activities along with long-term projects that lead to success. (Ferrari & Sweeney, 2005). Several aspects of success that Ferrari & Sweeny (2005) found included communication, shared vision, compatible missions, sense of commitment, and quality programming.

Idaho schools, and youth in particular, are in need of strong natural resource programs and educators. In a study (Bierle & Singletary, 2010) concerning environmental

education, of the school principals interviewed, only 131 out of 268 (48.8%) individuals were able to identify environmental educators. Of the less than half of Idaho's secondary schools represented in this study, only 59% offered a course that focused on environmental issues. Even more surprising, only 30% of school principal respondents said that their school had an active organization that was focused on ecological or environmental issues. Even though many Idaho schools lack environmental programs, the goals of environmental programs were ranked as important or very important. 33 of 52 environmental educator respondents (63.5%) in the survey deemed environmental education as very important, and that direct, hands-on, and sensory rich experiences were very important to 32 respondents from the total 52 surveyed (61.5%). However, the environmental programs that are present in Idaho secondary schools do not adhere to the key characteristics of the topic according to current teachers. Students were not engaged primarily with environmental issues and problems; only 26% of environmental educator respondents indicated that students worked on issues on a daily or weekly basis. Natural resource education should be interdisciplinary; yet only 18 respondents of 52 environmental educators (35%) said that they worked collaboratively with other teachers at their school to provide environmental instruction (Bierle & Singletary, 2010).

Creating a curriculum or program that is specific to and based in northern Idaho is a crucial element to youth development in the region. Placed-based learning helps to promote youth to learn about their own backyards, immediate surroundings and gain a sense of investment and environmental responsibility in their own community that can translate into future environmentally conscience behavior (Cullen & Mony, 2003). While working in a community based conservation framework, students can gain environmental awareness and opportunities, as well as create linkages between themselves and their community (Xiongzhi

et al., 2006). Including indigenous knowledge in education programs ensure that the information is dispersed and encourages environmental science diversity (Harrington & Pavel, 2013; Lowan, 2012). Scheuerman et al. (2010) argue that place-based learning emphasizes four core aspects including consideration of community life, indigenous knowledge, and local ecosystems, active, inquiry-based interdisciplinary learning experiences, preparation for citizenships and technological literacy in the informational age, and an overall reflection about these experiences.

Northern Idaho is both in need of an overall natural resource curriculum and has the ability to deliver programs to a wide range of youth. MOSS, the University of Idaho's McCall Outdoor Science School is a great opportunity for youth to be outdoors and have a place-based science learning experience. However, it is located in McCall, ID and does not typically enroll students from the northern Idaho school districts. This leaves a gap in natural resource education for youth and puts more of an emphasis on the importance of afterschool, and informal educational programming. The northern district in Idaho is home to many different programs, including ones affiliated with the Coeur d'Alene Tribe that would be able to deliver natural resource curriculum. For example, STS: Strengthening the Spirit, the Success Center, BTTE: Back to the Earth Outreach, Rock 'n' the Rez, Community Water resource Center, Project SOS, Idaho Water Awareness Week, and many others are all programs that could utilize and benefit from using a natural resource program that pulls from different curriculum to educate youth.

University of Idaho Extension should be at the forefront of the movement towards more informal science youth education, and be a facilitator between organizations to bring communities and resource experts together. Several studies have shown the importance of

non-traditional youth settings for science education. The Sixth Grade Forestry Tour through University of Idaho Extension in Clearwater County has shown positive results from their use of a conceptual construct to organize the curriculum for the summer camp to suggest continued development and use in the future (Warren, 2015). Extension educators in camps such as the one in Clearwater County would have the ability to not only use 4-H materials, but could complement the curriculum with additional relevant materials to make a more well rounded experiential learning program. The University of Idaho Extension program has the potential to be the host for similar programs in northern Idaho and specifically Kootenai/Shoshone counties to reach otherwise uninvolved youth. With a variety of natural resources from Lake Coeur d'Alene, forested areas, multiple rivers, and the indigenous knowledge of the Coeur d'Alene Tribe, northern Idaho makes for an ideal location for a place-based, integrated, natural resource curriculum.

Statement of Problem

Teachers and informal educators are finding it difficult to use some of these resources if they are not connected to the common core or other state standards, lack a sense of cohesiveness, or if the teachers do not have enough background information on topic. Each curriculum (4-H natural resources, Project WET, Project WILD, Project Learning Tree) has great information and activities, but are not being used to their full potential. Some curricula lack what others excel in, making it more difficult for teachers to use one program in either traditional or informal science settings. We have yet to understand why environmental education programming is not sustainable and what topics should be taught using known and accessible curriculum. Therefore, there is a need for collaboration among area educators to identify local issues of importance that should be part of the environmental education to

youth in the area so that existing curriculum can be used in the most effective way. Much of the informal education is delivered in afterschool programs or summer camps, and this research will be an opportunity as well for educators and after school facilitators to pinpoint key barriers and facilitation issues, and to come to consensus about possible solutions to create the most effective and sustainable program possible.

Research Questions

This research is intended to have UI extension staff and relevant area educators in northern Idaho to come to consensus on the content, context, and resources for natural resource education using both 4-H natural resource curriculum and other informal science sources. My specific research questions include:

1. What are important topics in northern Idaho that should be included in K-12 informal environmental science education?
2. What are the limitations, overlap, or gaps in both geographical and content context of 4-H natural resource, Project WET, Project WILD, or Project Learning Tree curriculum?
3. What are current barriers for implementation of natural resource education programs in afterschool and informal educational settings?
4. What are feasible solutions to overcoming barrier issues?

Chapter 2: Methodology

This research utilized the Delphi technique to initiate group communication to allow a group of individuals, as a whole, to deal with complex problems (Dalkey and Helmer, 1963). The Delphi technique (Delbecq et al. 1975) was designed to create a reliable consensus of opinion from a group of experts to then be applied to a particular topic. The group of experts shares their opinions through a series of sequential questionnaires where the first asks individuals to respond to a broad question, and each subsequent survey is built upon the responses and ratings of the previous round/s. The process stops when consensus has been reached between participants, or enough information has been exchanged (Delbecq et al. 1975; Rowe & Wright 1999).

The Delphi technique can be utilized to establish facts, create new ideas, prioritize objectives, or make unified decisions (Gupta & Clarke, 1996); Stewart, 2001). Its success lies on the convergence of expert opinions (Jairath & Weinstein 1994; Powell 2003). The size of the respondent panel is variable, ranging from 10-15 participants to several hundred people (Delbecq et al. 1975). The numbers of panel members has been recommended to be no fewer than ten, and while reliability is shown to be correlated with an increase in the numbers on a panel “few new ideas are generated within a homogenous group once the size exceeds 30 well-chosen participants” (Delbecq, Van de Ven, & Gustagson, 1975, p.89). Therefore, the size of the panel is less critical than are the members’ qualifications (Wilhelm, 2001, p.14).

The panel was selected on the basis of having knowledge of the subject area, as it is necessary for the proper operation of the Delphi process (Reeves & Jauch, 1978). Target participants, those who could speak to the content of natural resource education, were

selected using general criteria adapted from Powell (2003), who specified that a panel of experts, should include individuals who:

- i. Reflect current knowledge
- ii. Have recognition and credibility based on their knowledge of the topic
- iii. Represent diverse perspectives to include a wide range of view points

Taking Powell (2003) into consideration, the specific criteria for inclusion for this study were

- i. Recognized and active 4-H Extension agents and users of Project WET, WILD, and Learning Tree

OR

- ii. Have some type of management, supervisory, or coordination efforts in regards to natural resource education

OR

- iii. By recommendation or association of others involved in environmental science education

Panelists were e-mailed an initial contact letter inviting them to participate in a five-round Delphi process involving four rounds of short online questionnaires and a final feedback report (Appendix A-F). Round one sought responses to broad general background questions about panelists concerning appropriate relevant, and important youth natural resource curriculum content. Responses were edited, combined and summarized for round two, where participants were asked to rank responses on a quantitative scale (Reeves & Jauch, 1978). This format was followed for round three where panelists were asked to provide insights about barriers and facilitation issues and potential realistic solutions for

program implementation and success. In round four the panelists were asked to rank their peers' solutions as to what would be most likely to be effective and contribute to the programs. Round five is a final report to panelists.

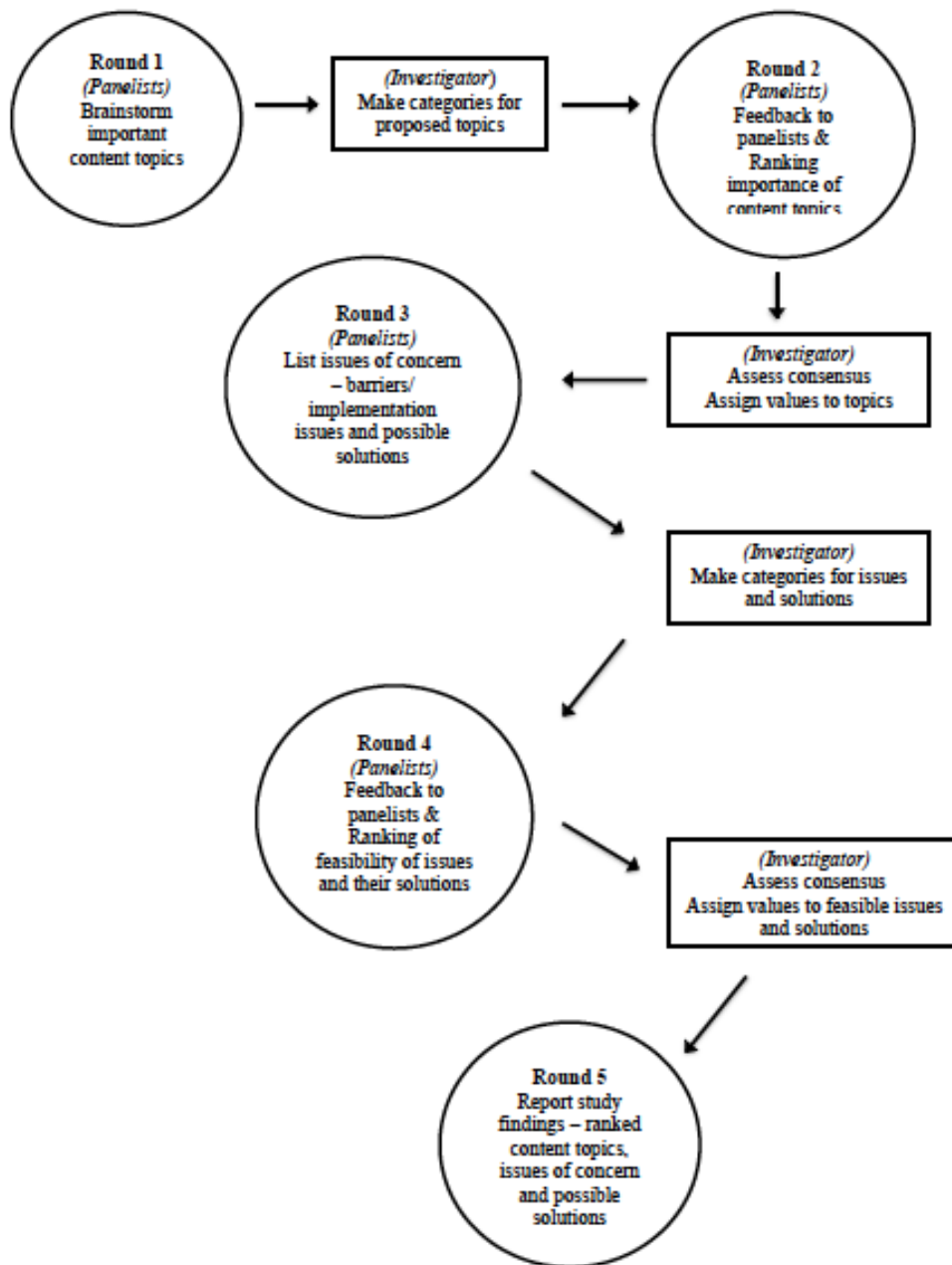


Figure 1. Delphi survey outline

Panelists' information will remain confidential throughout this study. Names will not be shared among panel members at any point during the survey rounds. As recommended by McKenna (1994), the opinions and specific ratings of an individual will remain anonymous to other panel members to protect all participants.

Chapter 3: Results

Round 1

Round 1 of the Delphi survey was aimed to describe the general background and context understanding of the panelists. Table 1 shows the background of panel members, and Figures 1 and 2 depict the different organizations and counties that the panel members work in.

Table 1. Panelists' Background

Organization	Type of Organization	County
University of Idaho	Academic	Kootenai
Bonner Soil and Water Conservation District	State Government	Bonner
UI Extension 4-H	Non-profit	Benewah
Monastery of St. Gertrude	Other	Boundary
University of Idaho Extension	State Agency	Shoshone
Idaho Department of Fish and Game	State Agency	State of Idaho
Coeur d'Alene Tribe	Native American Tribe	Cd'A Tribe
University of Idaho AmeriCorps	National Organization	State Wide
Kootenai Environmental Alliance	Regional Special interest group	Regional interests
Lakeland School District	Public School	School District 272
Homeschool Institute of Science	Private School	North Idaho/Eastern WA.

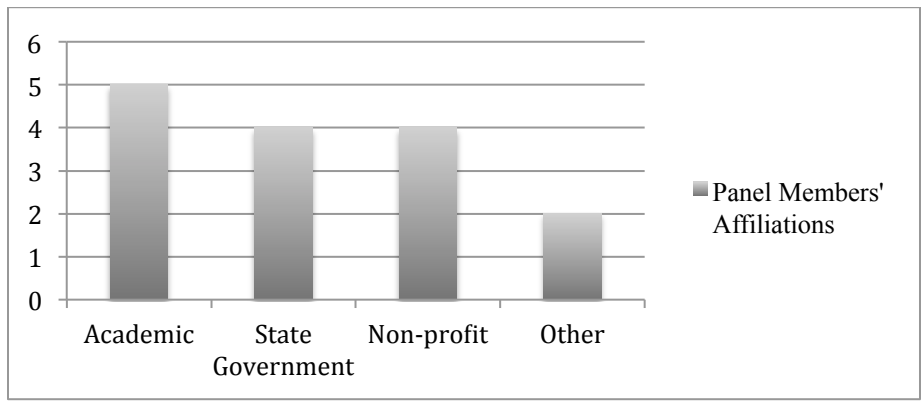


Figure 2. Panelists' Organization Affiliation

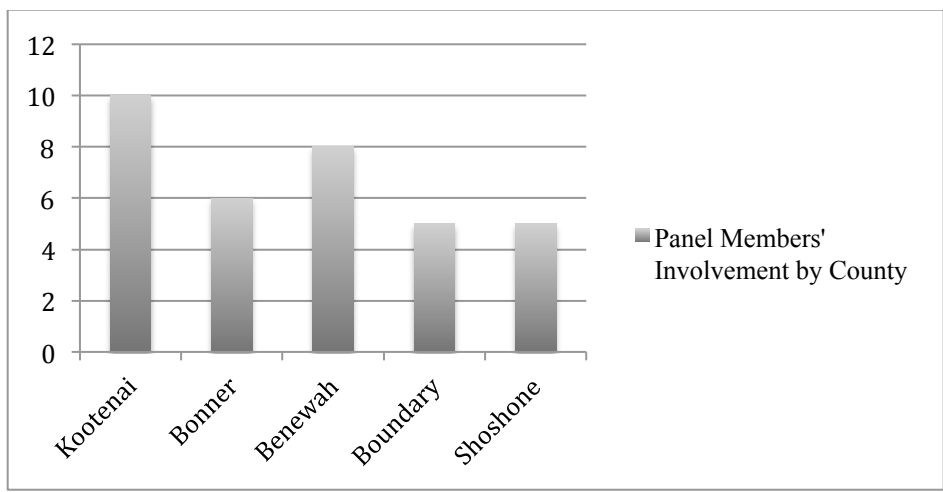


Figure 3. Panelists' Involvement in North Idaho Counties

The backgrounds of the panel members spanned a wide spectrum of interests: the University of Idaho, volunteer services, public schools, and federal agencies across the North Idaho counties of Kootenai, Bonner, Benewah, Boundary, and Shoshone. Most of the participants were in academic, state, or non-profit organizations. The panelists had a variety of prior experience ranging from two to 30 or more years with an average of 17 years, providing a sum of 254 years of experience in natural resource education and involvement in youth science including 4-H programming, county wide science education, watershed

education, STEM afterschool programming, developing and implementing science education programs for homeschooling families, Coeur d'Alene Tribe community and youth natural resource education, and general outreach with summer camps and schools regarding water and natural resource science. Project WET, WILD, PLT, and 4-H curriculum were discussed for limitations or gaps between the programs.

The main issue panelists reported as a limitation of existing curriculums, particularly Project WET and 4-H programs, was that they lacked locally and geographically specific information. However, many panelists were not familiar enough and with all of the programs and felt they lacked experience to adequately answer the question. Panelists identified five broad natural resource topics (Figure 4) as forming the basis of any North Idaho environmental education program for youth:

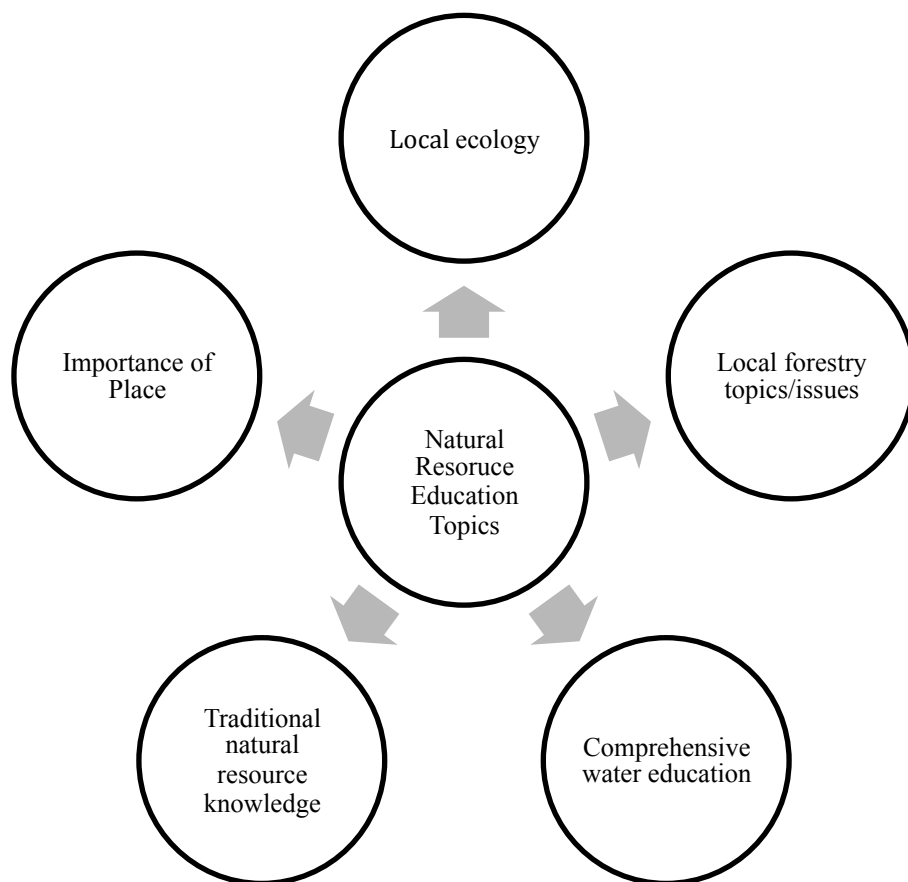


Figure 4. Important Natural Resource Topics

Round 2

Round 2 of survey was directed at identifying the key content and topics that should be a part of any natural resource education program, using the topics illustrated in Figure 4, (above) as a starting point.

Table 2. Local Ecology Topics

Natural Resource Topic	Key Ideas from Panelists
Local Ecology	Predator/Prey relationships
	Population and management
	Social ecological resilience
	Bird identification
	Local ecology exploration

Table 3. Forestry Knowledge/Issues and Topics

Natural Resource Topic	Key Ideas from Panelists
Forest Ecology	Insects/disease
	Reforestation
	Native/invasive plants identification
	Tree identification
	Fire ecology
	Shade tolerance
	Stand regeneration systems
	Thinning/pruning
Forest Management	Connections to area economics
	Management of healthy ecosystems for long term uses and public interaction
	Forest measurements
	Respect/understanding for forestry jobs and roles
	Private vs. public land management
	Local land management practices
	Wilderness vs. resource extraction
	North Idaho land uses and importance

Table 4. Comprehensive Water Education Topics

Natural Resource Topic	Key Ideas from Panelists
Water Ecology	Pollution education and impacts/prevention (point vs. non-point)
	Hydrological cycle
	Understanding of individual impacts
	Importance of watersheds tying eco regions together
	Riparian ecology/restoration
	Mechanics of forestry and hydrology
	Groundwater vs. surface water management and local issues
	Water quantity knowledge (snow pack, aquifers, reservoirs)
	Macro and Micro Invertebrates
	How to measure stream health
	Macro and Micro Invertebrates
	How to measure stream health
	Physical properties of water
Water Management/Education	
	Land uses that impact water quality
	Groundwater vs. surface water management and local issues
	Historical Idaho practices (mining) and impacts on water and fish
	Urban water use/treatment
	Agricultural water uses
	Water Law
	Organized water education for multiple grade bands/levels
	Water conservation
	Local water service learning activities

Table 5. Traditional Natural Resource Knowledge Topics

Natural Resource Topic	Key Ideas from Panelists
Traditional Natural Resource Knowledge	
	Native foods
	Traditional uses of natural resources
	Traditional annual calendar and natural uses (local tribe specific)
	Traditional ecological knowledge
	Important native American species
	Native land use
	Changes in fishing/logging/land conversion
	Reductionist "science" vs. indigenous "science"
	Ethno botany

Table 6. Importance of Place Topics

Natural Resource Topic	Key Ideas from Panelists
Importance of Place	Hands on activities in local areas
	Local community natural resource projects
	Local communities vs. native people's connection
	Place based investigative education natural resource issues
	Encourage youth to find their own special place
	Local history of natural resources and demographics

Rounds 3 and 4

Rounds three and four were directed towards identifying and understanding any issues and problems associated with implementing and sustaining youth natural resource programs, as well identifying any realistic solutions to alleviate the difficulties. Among the panelists' stated issues, four themes emerged as main categories of complications and potential solutions that could be used for creating or implementing natural resource programs (Table 7).

Table 7. Panelists' Natural Resource Programming Problems and Solutions

Problem	Solutions
<i>Staff and leaders within natural resource education are part of the barrier/implementation problem</i>	<ul style="list-style-type: none"> • Incentives for educators to engage communities in natural resource programs • A resource list of individuals involved in natural resources should be provide to educators • Accountability within programs for lack of implementation of new curriculum
<i>Funding in general is part of the barrier/implementation problem</i>	<ul style="list-style-type: none"> • The Department of Education should be responsible for funding educational natural resource activities • Greater advocacy efforts from local non-profits and science professionals for natural resource education to be part of the curricula and budgets
<i>Simply engaging youth and communities in natural resource topics is part of the barrier/implementation problem</i>	<ul style="list-style-type: none"> • Focus on local topics and issues to promote interest • Focus on impacts on the community and future careers to promote interest
<i>Lack of community outreach to rural areas and families for natural resource education is part of the barrier/implementation problem</i>	<ul style="list-style-type: none"> • Grow relationship between natural resource professionals and the homeschooling community • Develop mobile natural resource labs • Utilize social media to inform of events and opportunities • Collaborate with homeschooling programs to develop curriculum

Panelists ranked these solutions based on how feasible and realistic each was in helping promote and sustain natural resource education. The highest ranked solution to the problem of staff and leaders within natural resource education was that incentives are needed for educators to engage communities in natural resource programs.

The issue of funding found that the highest ranked solution was that greater advocacy efforts were needed from local non-profits and science professionals for natural resource education to be part of curricula and the budget.

The problem of engaging youth in natural resource topics found that focusing on local topics would have the most successful impact. The solution to the lack of community outreach to rural areas and families for natural resource education was voted on to be improved by utilizing social media to inform of events and programs, and using mobile science labs to reach those students. Figure 3, and the following figures below depict the average ranking of solutions to problems, as well the first choice ranking percentage of solutions.

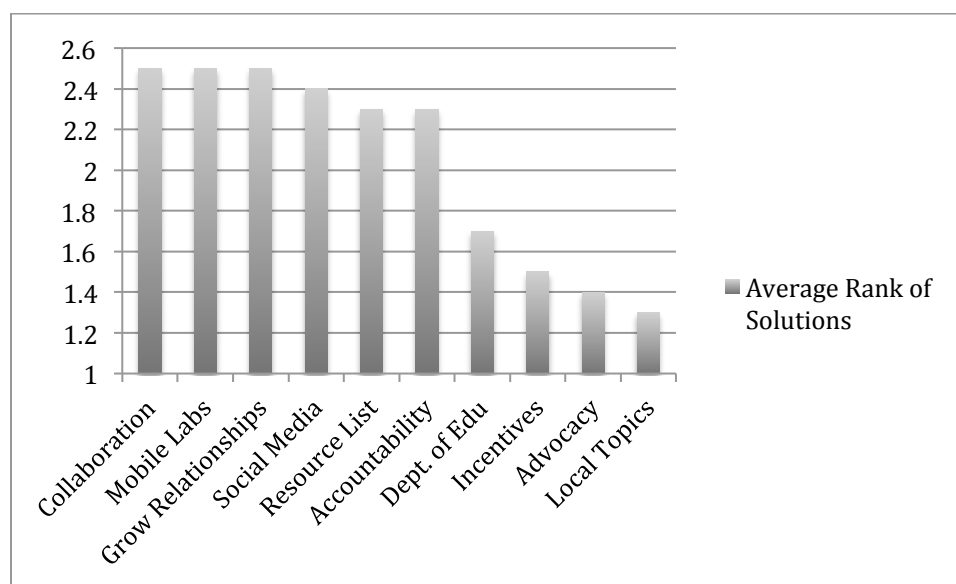


Figure 5. Average Rank of Solutions

The problems and solutions are further depicted below in two ways. For each peer-voted problem and corresponding solutions, the mean rank and percentage of first choice votes are shown.

Problem:

Staff and leaders within natural resource education are part of the barrier/implementation problem

Solutions:

- Incentives for educators to engage communities in natural resource programs
 - Average Rank of 1.5
- A resource list of individuals involved in natural resources should be provide to educators
 - Average Rank of 2.3
- Accountability within programs for lack of implementation of new curriculum
 - Average Rank of 2.3

Out of the three suggested solutions to the specific problem relating to staff and leaders within natural resource education, incentives for educators to engage communities was ranked the highest at 1.5 and was the first choice of panelists 50% of the time. While providing a resource list to educators and having accountability within programs may also be helpful, the panelists voted that incentives would be the most effective and sustainable way to improve program implementation and sustainability.

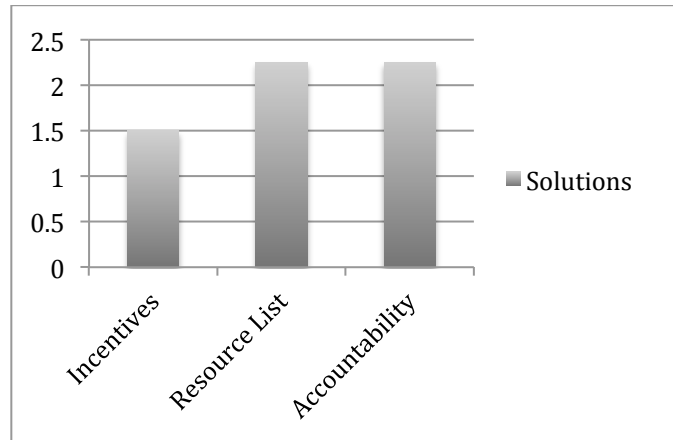


Figure 6. Average Ranking of Solutions to Staff/Leader Problems



Figure 7. First Choice Ranking Percentage

Problem:

Funding in general is part of the barrier/implementation problem

Solutions:

- The Department of Education should be responsible for funding educational natural resource activities
 - Average rank of 1.6
- Greater advocacy efforts from local non-profits and science professionals for natural resource education to be part of the curricula and budget
 - Average rank of 1.4

Greater advocacy efforts to include natural resource education as panelists than placing responsibility on the Department of Education ranked part of curricula and budget higher. 62% of the time advocacy on behalf of natural resource professionals and local non-profits was the first choice solution of panelists.

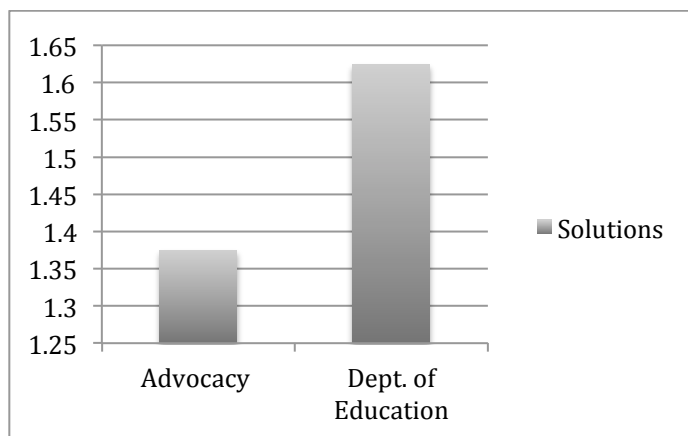


Figure 8. Solutions to Funding Problems Average Rank

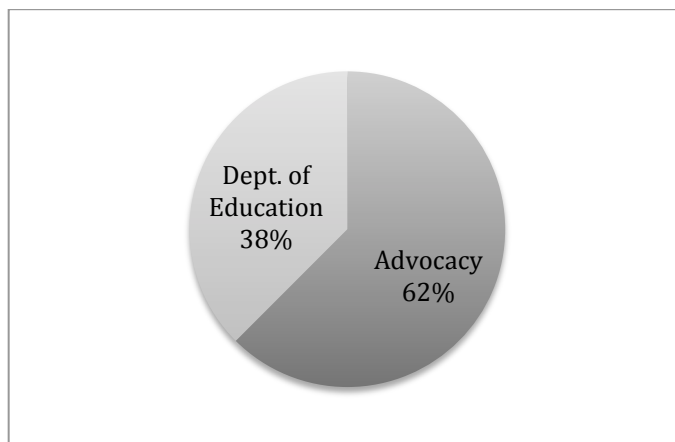


Figure 9. First Choice Ranking Percentage

Problem:

Simply engaging youth and communities in natural resource topics is part of the barrier/implementation problem

Solution:

- Focus on local topics and issues to promote interest
 - Average rank of 1.2
- Focus on impacts on the community and future careers to promote interest
 - Average rank of 2

Focusing on local topics and issues in natural resource programming was ranked slightly higher than focusing on community impacts and future careers to promote interest. While these average rankings are similar, it was found that 75% of the time, focusing on local topics and issues specifically was the first choice solution of panelists.

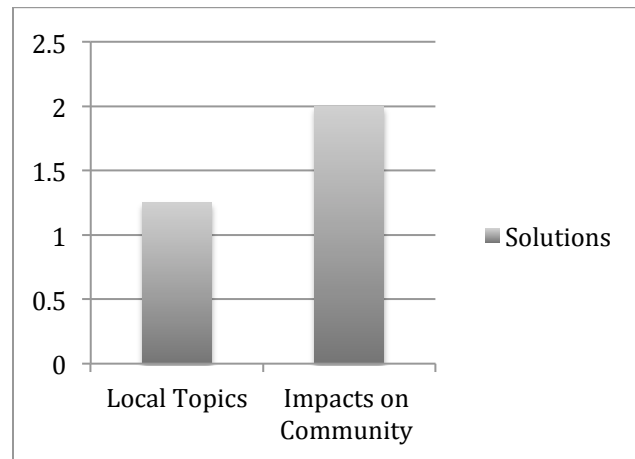


Figure 10. Solutions to Engaging Problems Average Rank

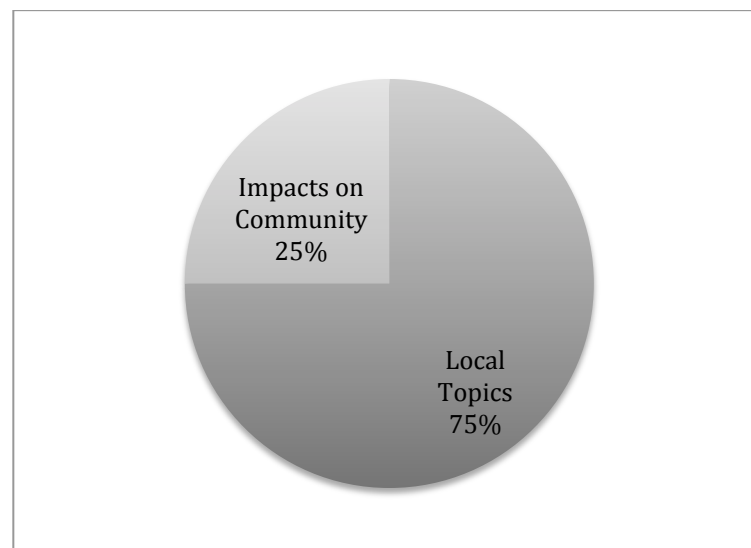


Figure 11. First Choice Ranking Percentage

Problem:

Lack of community outreach to rural areas and families for natural resource education

Solution:

- Grow relationship between natural resource professionals and the homeschooling community

- Average rank of 2.5
- Develop mobile natural resource labs
 - Average rank of 2.5
- Utilize social media to inform of events and opportunities
 - Average rank of 2.4
- Collaborate with homeschooling programs to develop curriculum
 - Average rank of 2.5

Solutions to the issue of the lack of community outreach to rural areas and families were all ranked similarly; however utilizing social media to inform of possible opportunities average rank was slightly higher as a more effective solution. When it came to the overall first choice preference of panelists however, a mobile natural resource lab as a tool to reach rural communities was chosen 37% of the time.

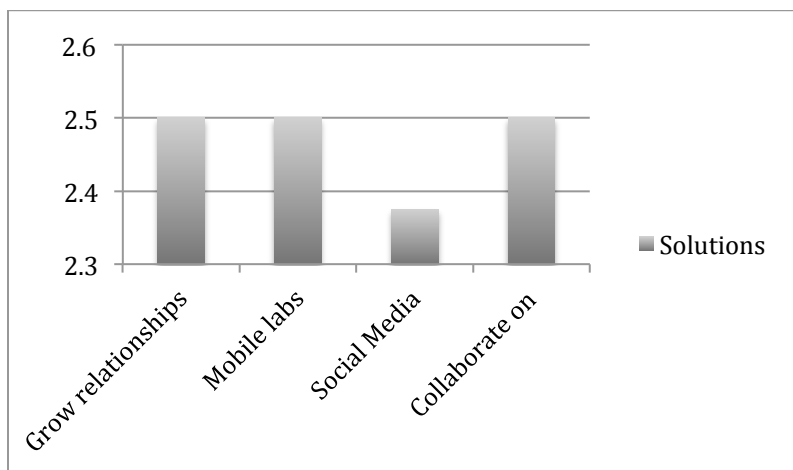


Figure 12. Solutions to Lack of Community Outreach Average Ranking

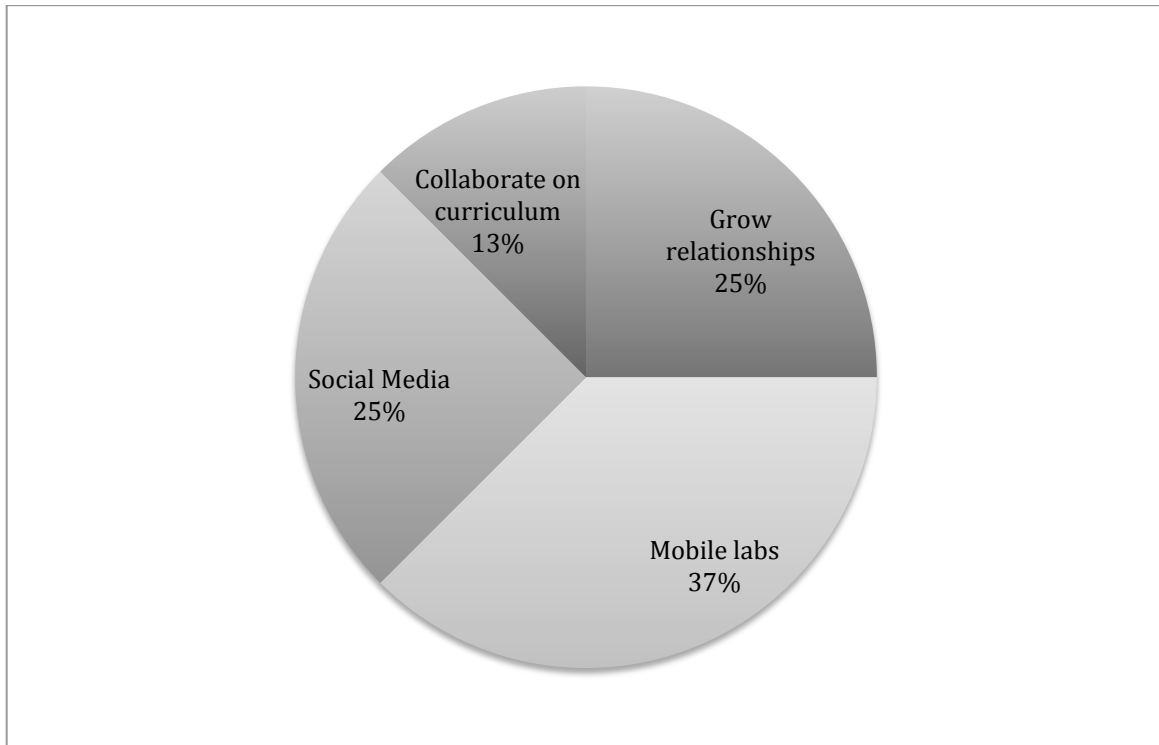


Figure 13. First Choice Ranking Percentage

Chapter 4: Discussion

Through suggestions and irreplaceable perspectives from 16 natural resource professional panelists with a combined experience of over 254 years of how to improve Idaho's natural resource youth programming, we found that the key solutions to common problems that would most effectively make a positive impact on programs include:

- Incentives for educators to engage communities in natural resource programs
- Greater advocacy efforts from local non-profits and science professionals for natural resource education to be part of the curricula and budget
- Focus on local topics and issues to promote interest
- Development of mobile natural resource labs to reach rural families

We are hopeful that current youth natural resource programs and program managers utilize these highest ranked reasonable solutions that their peers have uncovered. Each county and each program may have their own specific issues and boundaries to overcome, but these feasible solutions may be tools to reach successful and sustainable natural resource educational programming.

Idaho State Standards with the exception of “Standard 3: Biology, Goal 3.2: Understand the Relationship between Matter and Energy in Living Systems” have little focus on environmental and natural resource sciences (Idaho State Department of Education, 2016). The closest objectives to the previously suggested content by the panelist are given in 2nd and 3rd grade, as “Objective 2: 2.S.3.3.3 - Discuss how animals are suited to live in different habitats (547.01.b)” (Idaho State Department of Education, 2016). Objective 3: 3.S.3.2.3 – Label a food chain that shows how organisms cooperate and compete in an ecosystem (578.01b)”, and Objective 3: 3.S.3.2.4 – Diagram the food web and explain how

organisms both cooperate and compete in ecosystems (593.01.b) (Idaho State Department of Education, 2016). None of the Idaho Science Standards mention topics that the panelist's suggested; water education, traditional natural resource education, sense of place, or forestry knowledge. While the Biology Standard may overlap with some of the needed ecology content, the Standards do not specify local ecology or local biology knowledge.

Given that the Idaho Content Standards do not specify or require the need to focus on local natural resource ecology, water education, traditional natural resource or forestry knowledge, it is clear that north Idaho youth are not receiving and do not have easy and regular access to these topics that natural resource and education professionals felt were vital to youth education. This further exemplifies the need for a north Idaho specific natural resource program and integration of important topics into schools.

A north Idaho focused natural resource program based off of the solutions to the common problems and issues that come with implementing natural resource programs, as well as focusing on the important topics that were suggested by panelists, could have an important impact on Idaho's youth. Such a program would focus on local ecology, forestry, traditional tribal natural resource knowledge, and importance of place; all centered around north Idaho issues and topics. These could range from wolf population and management, forestry jobs and role in sustainable forests, Coeur d'Alene tribal knowledge of plants and land uses, impacts of mining on Lake Coeur d'Alene and local rivers and fish, and community based natural resource volunteer projects. While afterschool or summer camps may use elements of these topics in their programming, it would be a great benefit to Idaho's youth to have comprehensive knowledge of their local natural resources.

North Idaho's 4-H Program and the University of Idaho extension have an opportunity to play a vital role in the dissemination of these topics and knowledge to north Idaho's youth. Because they are not tied to the same responsibly, state standards and guidelines that public teachers are, they have the chance to provide this education through their own programs. Program and education coordinators have access to the topics that are valued as important, as well as what the main barriers to expect, and the most realistic solution to over come them. This research provides the University of Idaho Extension, 4-H Programs, afterschool programs, summer camps, and any informal natural resource science program the information they need to design, implement, and provide a sustainable north Idaho natural resource youth program.

References

- Atkinson R., and J. Flint. (2001). Accessing hidden and hard-to-reach populations: Snowball research strategies. *Social Research Update*. (33) 1-4.
- Bierle S. and T. Singletary. (2010). Environmental education and related fields in Idaho secondary schools. *The Journal of Environmental Education*, 39(3), 19-29.
- Biernacki P. and D. Waldorf. (1981). Snowball sampling: Problems and techniques of chain referral sampling. *Sociological Methods & Research*. (10). 141-163.
- Culen, G.R., and P.S. Mony. (2003). Assessing environmental literacy in a nonformal youth program. *Journal of Environmental Education*. 34(4), 26-28.
- D'Agostino, J.V., K.L. Schwartz, A.D. Cimetta, and M.E. Welsh. (2007). Using a partitioned treatment design to examine the effect of Project WET. *The Journal of Environmental Education*. 38(4), 43-50.
- Dalkey, N., and O. Helmer. (1963). An experimental application of the Delphi method to the use of experts. *Management Science*. 9(3), 458-467.
- D'Amato, L.G. and M.E. Krasny. (2011). Outdoor adventure education: Applying transformative learning theory to understanding instrumental learning and personal growth in environmental education. *Journal of Environmental Education*, 42(4), 237-254.
- Delbecq, L., A.H. Van de Ven and D.H. Gustafson. (1975). Group techniques for program planning: A guide to nominal group and Delphi process. Glenview, IL: Scott, Foresman and Company.
- Ferrari, M.T. and L. Sweeny. (2005). Building a collaboration for youth development: The "club-within-a-club". *Journal of Extension* (Online), 43(1). Available at: <http://www.joe.org/joe/2005february/a4.php>
- Ghent, C., G. Parmer, and S. Haines. (2013). An evaluation of "forests of the world", a Project Learning Tree secondary module. *Research in Higher Education Journal*. 19(4), 1-15.
- Gupta, S.A., S. Grant, S., and A. Strauss. (2012). 4-H and forestry afterschool clubs: A collaboration to foster stewardship attitudes and behaviors in youth. *Journal of Extension* (Online), 50 (3). Available at: <http://www.joe.org/joe/2012june/iw4.php>
- Gupta, U.G. and R.E. Clarke. (1996). Theory and applications of the Delphi technique A bibliography (1975–1994). *Technological Forecasting and Social Change*. 53(2), 185–211.

- Harrington, B.G. and D.M. Pavel, (2013). Using indigenous educational research to transform mainstream education: A guide for P-12 school leaders. *American Journal of Education*, 119(4), 487-511.
- Hart, R.A. (2003). Children's participation: The theory and practice of involving young citizens in community development and environmental care. Routledge. NY.
- Hsu, C. and B. Sandford. (2007). The Delphi technique: Making sense of consensus. *Practical Assessment, Research, & Evaluation*, 12(10), 1-8.
- Idaho State Department of Education (2016). Idaho content standards. (Online). Available at: <http://sde.idaho.gov/academic/standards/>
- Jairath, N. and J. Weinstein. (1994). The Delphi methodology (Part one): A useful administrative approach. *Canadian Journal of Nursing Administration*, 7(3), 29-40.
- Landeta, J. (2005). Current validity of the Delphi method in social sciences. *Technological Forecasting and Social Change* 73(5) 467-482.
- Lowan, G. (2012). Expanding the conversation: Further explorations into indigenous environmental science education theory, research and practice. *Cultural Studies of Science Education*, 7(1), 71-81.
- Louv, R. (2008). Last child in the woods: Saving our children from nature-deficit disorder. Algonquin Books, Chapel Hill, N.C.
- McKenna, H.P. (1994). The Delphi technique: A worthwhile research approach for nursing? *Journal of Advanced Nursing*, 19(6), 1221-1225.
- Nelson, A. (2010). Environmental education & ecology in a life science course for preservice K-8 teachers using Project Wildlife in learning design. *The American Biology Teacher*. 72(3), 156-160.
- Penrod J., Preston D., R. Cain, and M. Starks. (2003). A discussion of chain referral as a method of sampling hard-to-reach populations. *Journal of Transcultural Nursing*. 14 (2), 100-107.
- Pollard C., R. Pollard. (2004). Research priorities in educational technology: A Delphi study. *Journal of Research on Technology in Education*. 37(2), 145-160
- Powell, C. (2003). The Delphi technique: Myths and realities. *Journal of Advanced Nursing*, 41(4), 376-82.
- Reeves, G. and R.L. Jauch. (1978). Curriculum development through Delphi. *Research in Higher Education*, 8(2) 157-168.

- Rowe, G. and G. Wright. (1999). The Delphi technique as a forecasting tool: Issues and analysis. *International Journal of Forecasting*. (15), 353–75.
- Scheuerman R., K. Gritter, J. Schuster, and G. Fisher. (2010). Sharing the fire: Place based learning with Columbia Plateau legends. *The English Journal* 99(5), 47-54.
- Sharkey, S. (2001). An Approach to consensus building the Delphi technique: Developing a learning resource in mental health. *Nurse Education Today*, 21(5), 398–408.
- Shawer, F.S. (2010). Classroom-level curriculum development: EFL teachers as curriculum developers, curriculum-makers and curriculum-transmitters. *Teaching and Teacher Education*. 26(2), 173-184
- Stewart, J. (2001). Is the Delphi technique a qualitative method? *Medical Education*, 35, 922–923.
- Spalding, H.L., A. Gupta, D.J. Barshis, M.L. Knope, K.A. Tice, R. Dirzo, and C. Wilber. (2010). K-12 science education and “broader impacts”. *Frontiers in Ecology and the Environment*, 8(4), 217-118.
- Tillett, T. (2006). Beyond the bench: An integrative curriculum: Science by design. *Environmental Health Perspectives*, 114 (9), 525-526
- Wahlstrom, R. (1998). A holistic approach to environmental education. *Peace Research* 30(1), 64-82.
- Wardle, F. (1995). Alternatives- Bruderhof education: Outdoor school. *Young Children*. 50(3), 68-73.
- Warren, A. W. (2015). The carbon cycle: Teaching youth about natural resource sustainability. *Journal of Extension* (Online). 53(1). Available at: <http://www.joe.org/joe/2015february/iw7.php>
- Wilhelm, W.J. (2001). Alchemy of the oracle: The Delphi technique. *Delta Pi Epsilon Journal*. 43 (1), 6-26
- Williams, P.L. and C. Webb. (1994). The Delphi technique: A methodological discussion. *Journal of Advanced Nursing*, 19(7), 180–186.

Appendix A: Initial Key Participants in Panel

County	Position	Organization
Benewah	Extension Educator/Lake Management	Coeur d'Alene Tribe/University of Idaho Extension
Benewah	Extension Educator/4-H Programming	University of Idaho Extension
Benewah	Success Center Director	Plummer/Worely School District/CdA Tribe
Benewah	CdA Reservation Program Assistant/4-H Programs	University of Idaho Extension
Kootenai	Area 4-H Youth Extension Educator	University of Idaho Extension
Kootenai	4-H Program Coordinator	University of Idaho Extension
Kootenai	Area Extension Forestry Educator	University of Idaho Extension
Kootenai	Earth Science Teacher/Idaho Science Teacher Representative	Coeur d'Alene Charter Academy
Kootenai	Senior Hydrologist	Idaho DEQ
Kootenai	Lakeland School ISTEM Director	Lakeland School District
Kootenai	Afterschool Program Director	CdA4 Kids
Kootenai	Community Resource Coordinator	CdA4Kids
Kootenai	Afterschool Program Facilitator	Atlas Academy Afterschool Program
Kootenai	Area Water Educator	University of Idaho Extension
Kootenai	Community Outreach Specialist	UI Water Research Center
Latah	4-H State Director	4-H Youth Development/UI Extension

Appendix B: Invitation to Panel Letter

Dear ,

Northern Idaho is at a disadvantage for natural resource education for youth. Without a residential facility, such as MOSS (McCall Outdoor Science School) fully serving our northern district schools, a greater emphasis is placed on the importance of science education in afterschool and other informal educational programming. Teachers and informal environmental educators are finding it difficult to use some of the available science education resources if they are not connected to state requirements, feel they lack background knowledge on topic, or they may struggle to effectively use multiple curriculums that cover different topics to give a well-rounded program. Northern Idaho is home to many different programs for youth year-round, making it an ideal location to utilize and benefit from using a natural resource program that uses the most effective portions of available curriculum.

Project WET, Project WILD, Project Learning Tree, and National 4-H natural resource curriculum are already being used throughout the state, but a northern Idaho specific program that acknowledges the benefits that youth receive from natural resource education while incorporating the most effective parts from the curriculum, has the potential to reach youth in a whole new way. By encompassing place based learning, indigenous knowledge, area specific science knowledge, and experimental learning, our communities can come together in learning and growing towards a better understanding and sense of stewardship towards natural resources.

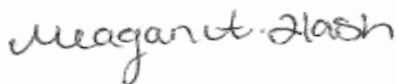
We invite you to participate in a series of 4 or 5 short surveys that have the goal to develop an implementation plan for northern Idaho natural resource education for afterschool and informal education programs. Over the next 4 months we plan to identify important topics that you think should be included in curriculum, what you see as the limitations, overlap, or gaps in current natural resource curriculum, what the current barriers for implementation for programs, and what are potential feasible solutions. We will share the findings from these surveys with you and hope they will better inform managers and education programmers to achieve effective and sustainable youth natural resource programs.

We encourage you to participate in this collaboration effort to develop effective and sustainable natural resource youth programming. It is only through your insight that this effort can be successful.

The first survey is at this link: [\[www.www.www\]](http://www.www.www) We hope you can respond at your earliest convenience.

Looking forward to working with you in the future.

Sincerely,



Meagan Hash
University of Idaho M.S. Natural Resources Candidate
AmeriCorps Natural Resource 4-H Facilitator

Dr. Nick Sanyal
Department of Conservation Social Sciences
University of Idaho

Dr. Randy Brooks
Department of Natural Resources
University of Idaho

Dr. Tim Ewers
Extension 4-H Youth Development Specialist
University of Idaho

Appendix C: Round 1 Delphi Survey: Background Information and Important Content



Collaboration to develop the content, context, and resources for natural resource youth education

Northern Idaho's youth are at a disadvantage for natural resource education. With a lack of natural resource programs, teachers, and no northern Idaho residential facility, a greater reliance is placed on science education in afterschool and other informal education programming.

The purpose of this study is to explore and identify important topics in natural resource youth curriculum, current limitations, gaps, or overlap in current curricula, barriers for implementation of programs, and potential solutions. We hope to ultimately develop the content, context, and resources for an effective and successful youth program, as well as develop recommendations for managers and education programs for sustainable youth natural resource programs.

Your opinions will help us further natural resource education. We need your help responding to 4 simple rounds of questions in a web-based survey over the next 2-3 months.

Round 1: This survey: You will *identify* important content to be included in K-12 natural resource education

Round 2: *Ranking* the elements you told us were important

Round 3: *Identifying* barriers and facilitation issues and possible solutions

Round 4: *Ranking* barrier and facilitation solutions

Round 5: Distribution of findings from the survey

Round 1:

We will begin with a few questions about you. You can be guaranteed complete confidentiality. The data you submit will be summarized and your name will never be associated with any of your answers.

The University of Idaho Institutional Review Board has Certified this project as Exempt.

What agency, institution or organization do you work for? (Enter name of your organization below:)

What type of agency do you work for? Please select the most appropriate one.

In which of these north Idaho counties do you typically work? Please check all that apply.

- Kootenai
- Benewah
- Bonner
- Boundary
- Shoshone

Do you use any of the following specific programs during your teaching experience or in any other capacity? Please check all that apply.

- Project WET
- Project WILD
- Project Learning Tree
- 4-H
- Other (Please describe)

If you have used any specific natural resource programs, have you found any limitations or gaps in program either in terms of the geographical coverage or content, for use in north Idaho? Please describe.

	4-H	Project WET	Project WILD	Project Learning Tree	Other - from Q above	Other - from Q above	Other
Limitations	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Gaps	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

In general, how strongly do you agree or disagree with this statement: "There is much overlap in content between 4-H, Project WET, Project WILD, and Project Learning Tree".

- Strongly agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Please explain why you feel this way.

Please rank the four programs by dragging them into order of their effectiveness in informal education settings in north Idaho. (1=most effective, 4=least effective)

4-H

Project WET

2

Project WILD

Project Learning Tree

Considering your responses to the questions above, what do you believe should be included in effective K-12 natural resource education for north Idaho? Please list topics and relevant reasons for their importance in natural resource education.


Considering your responses to the questions above, what do you believe should be included in effective K-12 natural resource education for north Idaho? Please list topics and relevant reasons for their importance in natural resource education.

Thank you for participating in this process. Please feel free to contact us with any concerns or questions.

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Appendix D: Round 2 Delphi Survey: Key Elements of Topics



Collaboration to develop the content, context, and resources for natural resource youth education

Northern Idaho's youth is at a disadvantage for natural resource education. With a lack of natural resource programs, teachers, and a northern Idaho residential facility, a greater emphasis is placed on the importance of science education in afterschool and other informal educational programming. The purpose of this study is to explore and identify important topics in natural resource youth curriculum, current limitations, overlap, or gaps in current curricula, barriers for implementation of programs, and potential solutions. We hope to ultimately develop an effective and successful implementation plan for youth natural resource education, as well as develop recommendations for managers and education programs for sustainable youth natural resource programs

Your opinions will help us further natural resource education. We need your help responding to 4 simple rounds of questions in a web-based survey over the next 2-3 months:

- Round 1: You will *identify* important content to be included in K-12 natural resource education
- Round 2: This survey: *Expand* on the elements you told us were important
- Round 3: *Identifying* barriers and facilitation issues and possible solutions
- Round 4: *Ranking* of barrier and facilitation solutions
- Round 5: Distribution of findings from the survey

Round 2

In the first round your peers identified 4 key elements of natural resource education for north Idaho's youth including:

1. Local ecology and forestry knowledge and issues
2. Comprehensive water education
3. Traditional tribal knowledge of natural resources
4. Importance of place

In this next survey, we ask you to explain specific topics within these 4 domains that would be important for youth education. If you believe other broad subjects should be included, please add your suggestions.

What specifics can you give us in regards to **local ecology and forestry knowledge and issues** for youth natural resource education?

What specifics can you give us in regards to **comprehensive water education** for youth natural resource education?

What specifics can you give us in regards to *traditional knowledge of natural resources* for youth natural resource education?

What specifics can you give us in regards to *importance of place* for youth natural resource education?

What other broad subjects do you believe should be included in youth natural resource education?

Appendix E: Round 3 Delphi Survey: Barrier and Implementation Issues



University of Idaho
College of Natural Resources

Collaboration to develop the content, context, and resources for natural resource youth education

Northern Idaho's youth are at a disadvantage for natural resource education. With a lack of natural resource programs, teachers, and no northern Idaho residential facility, a greater reliance is placed on science education in afterschool and other informal education programming.

The purpose of this study is to explore and identify important topics in natural resource youth curriculum, current limitations, gaps, or overlap in current curricula, barriers for implementation of programs, and potential solutions. We hope to ultimately develop the content, context, and resources for an effective and successful youth program, as well as develop recommendations for managers and education programs for sustainable youth natural resource programs.

Your opinions will help us further natural resource education. We need your help responding to 4 simple rounds of questions in a web-based survey over the next 2-3 months.

Round 1: This survey: You will *identify* important content to be included in K-12 natural resource education
Round 2: *Ranking* the elements you told us were important
Round 3: *Identifying* barriers and facilitation issues and possible solutions
Round 4: *Ranking* barrier and facilitation solutions
Round 5: Distribution of findings from the survey

Please list and explain any barriers or implementation issues you may have faced when either designing, teaching, observing, or any other engagement you may have had with informal natural resource education in north Idaho.

What would be specific and realistic solutions that you believe would alleviate these issues within your specific county or program?

Thank you for participating in this process. Please feel free to contact us with any concerns or questions.

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Appendix F: Round 4 Delphi Survey: Solutions



University of Idaho
College of Natural Resources

Collaboration to develop the content, context, and resources for natural resource youth education

Northern Idaho's youth are at a disadvantage for natural resource education. With a lack of natural resource programs, teachers, and no northern Idaho residential facility, a greater reliance is placed on science education in afterschool and other informal education programming.

The purpose of this study is to explore and identify important topics in natural resource youth curriculum, current limitations, gaps, or overlap in current curricula, barriers for implementation of programs, and potential solutions. We hope to ultimately develop the content, context, and resources for an effective and successful youth program, as well as develop recommendations for managers and education programs for sustainable youth natural resource programs

Your opinions will help us further natural resource education. We need your help responding to 4 simple rounds of questions in a web-based survey over the next 2-3 months.

Round 1: This survey: You will *identify* important content to be included in K-12 natural resource education
Round 2: *Ranking* the elements you told us were important
Round 3: *Identifying* barriers and facilitation issues and possible solutions
Round 4: *Ranking* barrier and facilitation solutions
Round 5: Distribution of findings from the survey

The last survey round between yourself and your peers identified some important barrier and facilitation issues when it comes to teaching and implementing informal natural resource education in north Idaho. The following questions have put these issues into categories with the suggested solutions to help alleviate the problem.

As the last part of this survey series, we ask you to **rank these solutions** by selecting the appropriate ranking of each solution based on your opinion in terms of feasibility and potential for success.

Staff and leaders within natural resource education are part of the barrier/implementation problem

	1	2	3
Incentives for educators to engage communities in natural resource programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A resource list of individuals involved in natural resources should be provide to educators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accountability within programs for lack of implementation of new curriculum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Funding in general is part of the barrier/implementation problem

	1	2
The Department of Education should be responsible for funding educational natural resource activities	<input type="radio"/>	<input type="radio"/>
Greater advocacy efforts from local non-profits and science professionals for natural resource education to be part of the curricula and budgets	<input type="radio"/>	<input type="radio"/>

Simply engaging youth and communities in natural resource topics is part of the barrier/implementation problem

	1	2
Focus on local topics and issues to promote interest	<input type="radio"/>	<input type="radio"/>
Focus on impacts on the community and future careers to promote interest	<input type="radio"/>	<input type="radio"/>

Lack of community outreach to rural areas and families for natural resource education is part of the barrier/implementation problem

	1	2	3	4
Grow relationship between natural resource professionals and the homeschooling community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop mobile natural resource labs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Utilize social media to inform of events and opportunities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Collaborate with homeschooling programs to develop curriculum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thank you for participating in this process. Please feel free to contact us with any concerns or questions.

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Appendix G: Exempt Certification for IRB Project 15-755**University of Idaho**

Office of Research Assurances

Institutional Review Board

875 Perimeter Drive, MS 3010

Moscow ID 83844-3010

Phone: 208-885-6162

Fax: 208-885-5752

irb@uidaho.edu

To: Nick Sanyal
From: Jennifer Walker
Chair, University of Idaho Institutional Review Board
University Research Office
Moscow, ID 83844-3010
Date: 4/27/2015 10:44:14 AM
Title: North Idaho Environmental Education Delphi Survey
Project: 15-755
Certified: Certified as exempt under category 2 at 45 CFR 46.101(b)(2).

On behalf of the Institutional Review Board at the University of Idaho, I am pleased to inform you that the protocol for the above-named research project has been certified as exempt under category 2 at 45 CFR 46.101(b)(2).

This study may be conducted according to the protocol described in the Application without further review by the IRB. As specific instruments are developed, modify the protocol and upload the instruments in the portal. Every effort should be made to ensure that the project is conducted in a manner consistent with the three fundamental principles identified in the Belmont Report: respect for persons; beneficence; and justice.

It is important to note that certification of exemption is NOT approval by the IRB. Do not include the statement that the UI IRB has reviewed and approved the study for human subject participation. Remove all statements of IRB Approval and IRB contact information from study materials that will be disseminated to participants. Instead please indicate, 'The University of Idaho Institutional Review Board has Certified this project as Exempt.'

Certification of exemption is not to be construed as authorization to recruit participants or conduct research in schools or other institutions, including on Native Reserved lands or within Native Institutions, which have their own policies that require approvals before Human Subjects Research Projects can begin. This authorization must be obtained from the appropriate Tribal Government (or equivalent) and/or Institutional Administration. This may include independent review by a tribal or institutional IRB or equivalent. It is the investigator's responsibility to obtain all such necessary approvals and provide copies of these approvals to ORA, in order to allow the IRB to maintain current records.

As Principal Investigator, you are responsible for ensuring compliance with all applicable FERPA regulations, University of Idaho policies, state and federal regulations.

This certification is valid only for the study protocol as it was submitted to the ORA. Studies certified as Exempt are not subject to continuing review (this Certification does not expire). If any changes are made to the study protocol, you must submit the changes to the ORA for determination that the study remains Exempt before implementing the changes. Should there be significant changes in the protocol for this project, it will be necessary for you to submit an amendment to this protocol for review by the Committee using the Portal. If you have any additional questions about this process, please contact me through the portal's messaging system by clicking the 'Reply' button at either the top or bottom of this message.