# Flathead Watershed Educators' Guide Phase I: Delphi Survey

## Project Report (June 13, 2014)


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## Introduction

The Flathead Watershed Educators' Guide - Delphi Study determines the foundational science concepts, skills and dispositions in watershed education that are essential for effective interdisciplinary Science, Technology, Engineering and Mathematics education teaching, learning and curriculum development. The results of the research in this planning grant will be used in Phase II of the project to develop effective interdisciplinary STEM lessons focusing on the Flathead Watershed. It is our belief that place-based, watershed education activities in educational settings are an underutilized, but highly promising context for teaching interdisciplinary STEM concepts, skills and dispositions in socially relevant and cultural contexts.

## Evolution from Sourcebook to Educators' Guide

The concept of the Flathead Watershed Educator's Guide was inspired by the Flathead Watershed Sourcebook, an informational volume created through the efforts of the Flathead Community of Resource Educators (CORE). The members of CORE are conservation-oriented educators and resource professionals active throughout the Flathead Watershed. The Sourcebook, compiled through the efforts of Lori Curtis, contains a wealth of information concerning the Flathead Watershed in the areas of natural science, cultural history and current economic and environmental concerns. With the completion of the Sourcebook, the CORE Watershed Education Committee conceived the idea of generating curriculum materials based on the information in the Sourcebook. The curriculum would be geared to middle school grades, while being adaptable to a wider age range, and adhere to recognized and applicable Montana educational standards.

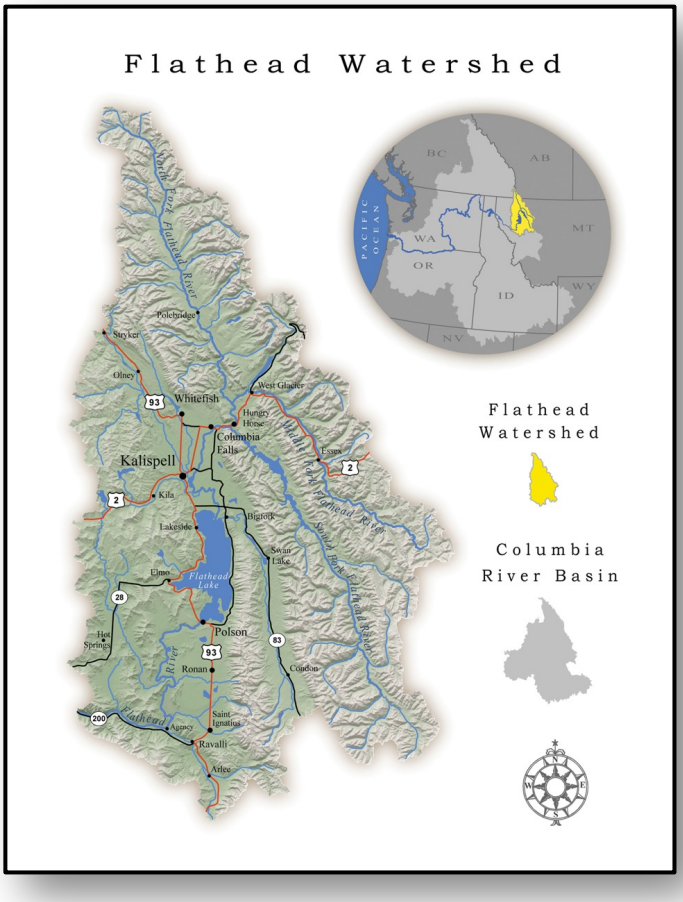
The WEC generated funding through grants and contributions from participating organizations, and contacted Dr. Michael Brody, professor of environmental science education at Montana State University. Dr. Brody met with members of the advisory committee in an initial visit to the Flathead valley. After discussion with the committee about their aims for the curriculum guide, Dr. Brody recommended that he and Dr. Kimberly Yates, also at Montana State University, use a Delphi survey for the generation of the curriculum foundation, which would become the basis for the Flathead Watershed Educator's Guide.

Enactment of a Delphi survey requires the engagement of individuals with specialized knowledge and skills in the area in which information is going to be collected. In the case of the Flathead Watershed, the individuals identified would be people who were knowledgeable about the Flathead area in a wide range of fields such as natural science, economics, culture and history and would include resource managers, scientists and technically skilled individuals. Local educators would be important contributors to the process. The CORE group identified the individuals they felt would bring the needed experience to the survey, and the proposed participants were asked to join the Delphi survey by invitation. Several members of CORE also

participated in the survey. In total, 33 people were invited to participate in the survey, including four Montana State University project team members.

## Geography and Culture of the Flathead Watershed

The headwaters of the Flathead Watershed have their start in the forested and pristine regions of Glacier National Park, the Great Bear Wilderness Area and the Bob Marshall Wilderness Area. The Flathead Watershed extends throughout a significant portion of northwestern Montana, with one of its tributaries, the North Fork of the Flathead River, originating in the Canadian province of British Columbia. The North, Middle and South Forks of the Flathead River join with the Stillwater, Swan and Whitefish Rivers to feed Flathead Lake, one of the largest freshwater lakes in the western United States. Flowing out of Flathead Lake, the lower Flathead River joins the Clark Fork River, after which its waters flow west into the Columbia River and eventually into the Pacific Ocean, forming the boundary between the states of Washington and Oregon (Curtis, 2012).




Topography within the watershed ranges from glaciated peaks towering above timberline through moderately steep and rolling forested slopes to wide, flat valley bottoms. The landscape has been sculpted through the power of water, from the carving of creek and river corridors to the filling of valley bottoms with alluvium. Glaciers have left their strongly noticeable footprint on the land in the form of high elevation u-shaped valleys, ice-rounded lower mountain ranges, and outwash plains, moraines and pothole lakes in the valleys.

The climate of the Flathead Watershed is a major influence determining ecosystem composition. The Flathead Watershed is located just west of the Continental Divide. Pacific maritime air masses moving east often meet up with southerly trending arctic continental conditions, creating the opportunity for wide weather fluctuations. The northern latitude of the watershed assures that much of the year precipitation in the higher elevations will fall as snow. Flathead Lake has a strong moderating effect locally, so that areas near the water, such as the town of Polson, remain warmer throughout the winter and cooler in the summer. Drier landscapes exist in the southern areas of the watershed around the town of Camas Prairie, due to rain shadows created through the

blocking of moist airflows by the high Cabinet Mountains to the west. The varied conditions created by the wide range of climatic influences lead to highly diverse ecosystems within the watershed.

The Flathead Watershed is one of the largest, most biologically intact ecosystems in North America with over 400 terrestrial wildlife species, including 11 amphibians, 11 reptiles, 319 birds, and 71 mammals (Curtis, 2012). The Montana portion of the Flathead Watershed is part of the Northern Rocky Mountain Forest-Steppe-Coniferous Forest-Alpine Meadow Province and can be found on the Ecoregions of Montana map. Habitats in the watershed range from grasslands through a variety of forest ecotypes to alpine tundra. Highly diverse wetlands play a significant role in the Flathead Watershed, enhancing the region's biodiversity and the watershed's functionality. The Flathead Watershed is a major stopping point on migratory bird routes. Threatened, endangered and at risk species are present in the watershed, as are a large number of Species of Concern.

Rich natural resources located in the dramatic natural beauty of the Flathead Watershed have created strong draws for people to move to and stay in the Flathead area. Kalispell, at the northern end of Flathead Lake, is the largest population center with 93,068 people in the greater Kalispell area (Kalispell, Montana, 2014). Economic endeavors in the watershed include forestry, farming, orchards, and manufacturing. Education and medical resources are important in the Flathead region. Recreation plays a significant role in the economy, with water sports on Flathead Lake and several other lakes and their tributaries, hiking in Glacier Park and nearby wilderness areas, and winter snow sports at Big Mountain and Blacktail Mountain Ski Areas, and Izaak Walton Inn in Glacier Park and on other Flathead National Forest lands.

The Flathead Reservation, home of the Confederated Salish and Kootenai Tribes, occupies the southern portion of the Flathead Watershed below Flathead Lake. The Tribes, through the CSKT natural resource department, have worked to maintain and improve water quality and fish and wildlife habitat, manage wildfires, and sustain forestry practices throughout their reservation (CSKT, 2004).

**Why Delphi Research Methodology?**

The Delphi research methodology is a systematic approach to the collection of informed opinion on a specific topic. It is based on the premise that pooled intelligence enhances professional judgment and captures the collective knowledge of experts. For the Flathead Watershed Educator's Guide, the project team members proposed a traditional Delphi research approach focusing on the prioritization of facts regarding knowledge, skills and dispositions that are essential to effective watershed education in both formal and informal settings.

The Delphi research methodology is appropriate in the case of research oriented towards eliciting informed judgment and expert consensus on a specific issue (Beretta 1996, Green et al 1999, Linstone & Turhoff 2002). Originally developed by the Rand Corporation for technological forecasting, Delphi research has been reported in business (Kaynak et al 1994, Addison 2003 Ilbery et al 2004), military defense (Roberts 1969, Gilbride 2002), education (Dailey & Homberg 1990, Brody 1995,Volk 1993, Brody et al 2010) and has become an increasingly popular research approach in nursing and medicine (Lofmark & Thorell-Ekstrand

2004). In terms of science education, an innovative application of Delphi methodology investigating ecology and social practice appeared in *BioScience*, reporting on multiple ways of relating theory to reality and science as a social activity informing our understanding of how the public may view scientific objectivity (Wallington & Moore 2005).

Applicable to the current state of place-based education and specifically the Flathead Watershed Educators' Guide project, Brody (1995) reported the use of Delphi research to determine the foundational environmental concepts, skills and dispositions related to water education and National Project WET (Water Education for Teachers). Studies by Brody provided the direction for the development of water and archaeology education curriculum materials that are now popular throughout the United States and several other countries.

The Delphi research methodology is a structured process that uses a series of questions or rounds to gather information that is continued until group consensus is reached. The popularity of Delphi research approaches is based on the fact that the process allows the anonymous inclusion of a large number of individuals across diverse locations and expertise and avoids the situation where a specific expert might be anticipated to dominate the consensus process. Due to the flexible and emergent nature of this research methodology, there have been many modified forms of the strategy reported in the literature. This has led to an informative critique of methodological rigor and the necessity for a high degree of methodological precision. In particular, issues related to problem identification, sample selection and consensus must be addressed. Fortunately authors have recently addressed these issues in terms of what makes an expert (Baker et al 2006), stability of expert opinion (Yang 2003), reliability and generalizability (Hsu & Sandford 2007), stability of response characteristics (Akins et al 2005) anonymity and computer mediated data acquisition (Turoff & Hiltz 1996). The combined critiques lead to important innovation and subsequent increased methodological rigor of the proposed Delphi research.

## Development of the Delphi Survey

### Problem Identification and Questions

The Problem Statement for the Flathead Watershed Delphi survey is: What are the foundational science concepts, skills and dispositions in watershed education that are essential for effective interdisciplinary teaching, learning and curriculum development? Problem identification occurred through the deliberations of the MSU project team in consultation with the Flathead Community of Resource Educators (CORE), during the process of developing this survey. Watershed education activities have the potential to be effective, culturally contextual and promote science learning. However, in informal learning environments (outside of the constructs of a traditional classroom), there is no agreement or well-defined paradigm that delineates the essential concepts, skills and dispositions that can be addressed in informal watershed education activities. This leads to three questions:

- What are the essential science concepts, skills and dispositions for effective watershed education activities in informal learning environments?
- What are the specific social and cultural connections with watersheds that can help promote knowledge acquisition, process skills and development of positive dispositions in science?

- How can informal science learning settings effectively incorporate watershed education activities?

The Delphi survey methodology was used to address these questions and address the problem statement above by establishing regional consensus among individuals that live and/or work in the Flathead Watershed.

**Methodology**

**Step One: Sample Selection**

This study made use of individuals who have knowledge of the topic and problems being addressed. Individuals who contributed to the Flathead Watershed Sourcebook (Curtis, 2010) were invited to participate in the study. In addition to contributors of the Sourcebook, an invitation was extended to other professionals in the Flathead region that were identified as being able to make meaningful and valuable contributions. This type of sample is purposeful and is sometimes referred to as a 'panel of informed individuals' or 'experts.' Like the Project WET (1995) and Project Archaeology (2010) Delphi studies, this project identified experts in science, education and watershed resource management to participate in the study. These people were distributed throughout the Flathead Watershed and represented expertise in the areas of natural science (technical person) (N=7), education (educator) (N=12) and watershed management (resource manager) (N=10). Educators represented a range of formal and informal settings. Some participants played a dual role; in these cases their primary professional affiliation was used to categorize the individual. Within consensus research and especially Delphi methodology, the use of experts is fundamental to reliability. Several of the key characteristics considered in sample selection were: knowledge as represented by professional achievements, experience as represented in years of experience and recognition of practical contributions to formal and informal education and policy influence as represented by administrators or curriculum directors in learning environments (Baker et al 2006, Yousef 2007). A total of 33 people participated in the Delphi survey, 4 of which were members of the project team from Montana State University.

**Step Two: Design Delphi Web Platform**

Historically the Delphi process is linked to pencil and paper survey type data acquisition methods. In this study, we advance the knowledge and practice of the Delphi research methodology by using computer, web-based, asynchronous data acquisition methods. Desire 2 Learn (D2L), the integrated learning platform used at Montana State University, was selected as the web-based delivery system for Phase 1 of this project. Both the university and investigator Michael Brody have a long and outstanding record of on-line projects including teaching, learning, and curriculum activities. Based on this experience and knowledge, the project was designed using D2L for the implementation of the Delphi survey. This type of platform enables the following innovations:

- project leaders and advisory committee have continuous access to online communication and oversight of entire Delphi process,
- participation in asynchronous group communication on demand,
- continuous facilitation of the process by the project leaders helping to insure effective response rates and detail of contributions,
- selection of those areas which are more or less within participants' field of expertise,

- anonymous contributions with random identification of individual contributions allowing participants to identify a set of contributions with specific members of the group,
- ability to respond to others' contributions and discuss details or explanations of contributions and
- embedded collection and statistical analysis of quantitative data.

**Step Three: Delphi Rounds**

Theoretically, the Delphi research process can be continually iterated until consensus is achieved. However, typically three iterations are adequate to collect sufficient data and reach consensus (Custer, Scarcella & Stewart 1999).

Round I: In the first round, the research began with open-ended questions in the areas of knowledge, skills and dispositions. Round I began with three open-ended questions:

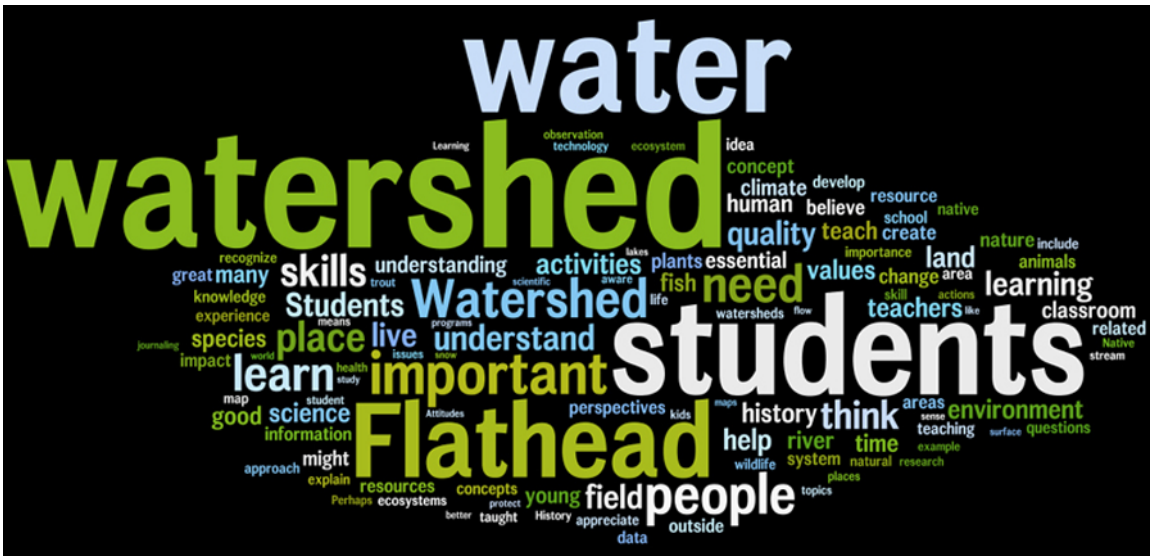
1. What are the essential concepts/issues that students should learn related to the Flathead Watershed? (For example; water quality or fish species)
2. What skills should students develop that would help them learn about and live in the Flathead Watershed? (For example; reading maps or writing a letter to city council)
3. What attitudes and values should students develop related to the Flathead Watershed? (For example; appreciating Indigenous perspectives or valuing diverse opinions about resource management)

The open-ended format served to solicit information about the main areas of importance from the perspective of the experts and allowed them the opportunity to share ideas and opinions. Participants were given individual login names and passwords for anonymity during the Delphi process. Using the discussion feature in D2L, participants were asked to log in and post responses to the three open-ended questions. They were also encouraged to have an open dialogue by posting statements and responding to others (see Appendix B). During this process the MSU project team was actively engaged as anonymous participants to help facilitate the discussion. Note: the project team did not participate in any subsequent rounds of the Delphi survey and did not attempt to challenge or change the opinion of the participants. Round I was open for participation from February 17- March 2, 2014. The raw data from the discussion posts was analyzed and grouped into common themes, key phrases, and ideas. During the analysis it was also determined that a fourth area should be added, due to the large number of posts focused on teaching strategies and methodologies. The responses from Round I were then transformed into definitive, positive statements for Round II in the four categories of knowledge, skills, disposition, and teaching methods. In creating the survey statements, similar ideas were combined to minimize repetition; however the wording of the posts was not changed to maintain the integrity of the original post.

Round II: In Round II of the Delphi survey, participants were asked once again to log in to D2L and complete four surveys located under the Quiz feature. The participants then rated each statement using a Likert scale from 1-5; 1=very unimportant, 2=unimportant, 3=neutral, 4=important, 5=very important. In addition to rating each statement, the

participants were given an option of adding a written response that supported their score. Round II was available to participants from April 7-April 20, 2014. The purpose of Round II was to establish priorities among topics and reach further consensus. As a result of Round II, areas of agreement and disagreement are identified. Mean scores were calculated for each survey item. Survey items were eliminated between Round II and Round III based on their level of importance, as indicated by a low mean score.

Round III: In Round III, the list of remaining statements was presented as the final survey. Participants were asked once again to rank the statements using the same Likert scale as Round II. Participants were also encouraged to be more critical of each ranking in order to take full advantage of their last opportunity to identify items of great importance. In this round no comments or explanations were permitted. Round III was open from May 19-May 23, 2014. The results of Round III will be used to begin discussions with the CORE group and to move forward in the development of lessons and activities for the Watershed Educators' Guide in Phase II of the project.



**Wordle generated from participant statements in Round I (http://www.wordle.net)**

**Step Four: Data Analysis**

In this research project there was both qualitative and quantitative data analysis. In rounds one and two the investigators dealt with the open-ended questions, narrative contributions, on-line discussions and descriptive opinions that were subject to multiple analyses looking for underlying themes, essential concepts and principles.

Statistical analyses of round two and three provided a summary of the groups' view on each item. Mean scores for each statement were calculated to provide an indication of the level of agreement amongst participants. The mean score for each item was used for numerical indication of support for the statement ranging from 1 – 5.

**Step Five: Report Generation**

In the final stage of the project, the project leaders and advisory committee (CORE) met via a conference call to discuss the outcomes of the Delphi study. The anticipated outcome of the meeting was the continued progression of the Flathead Watershed Educators' Guide and to begin the planning process for curriculum development. A final report was distributed via a pdf download from the Flathead Watershed Sourcebook website, http://www.flatheadwatershed.org and the Informal Science website at http://informalscience.net.

**Results: Delphi Survey Response Rate**

The first round of the Delphi survey includes a total of 33 participants. The 33 participants included the sample selected by the advisory committee, as well as the team of investigators conducting the survey. Round two had 28 participants and round three had 27 participants, neither included responses from the investigators. The overall rate of participation was high in both the first and second round. The third round shows a drop in participant responses, which is typical of a Delphi survey with repeated rounds (Table 1). It is also important to note that the first and second rounds were open to participants for a period of two weeks, while round three was limited to only one workweek (5 days). The participation percentages for each survey round by professional association are shown in Table 2.

**Table 1 Number of participants and percentages for each Delphi survey round**

| Delphi Survey Categories | Round I | Round II | Round III |
|---|---|---|---|
| **Knowledge** | 28/33 (85%) | 22/28 (79%) | 16/27 (59%) |
| **Skills** | 23/33 (70%) | 20/28 (71%) | 16/27 (59%) |
| **Dispositions** | 24/33 (73%) | 19/28 (68%) | 16/27 (59%) |
| **Teaching Methods*** | NA | 20/28 (71%) | 16/27 (59%) |

*Teaching methods was not included in Round I and was added as a category after analyzing the participant responses in the first round.

**Table 2 Participation in each Delphi survey round by professional association represented numerically and by percentage**

Round I

| Professional Association | Total Number of Participants | Participants who Responded | Participants who Did Not Respond | Participants who Dropped Out |
|---|---|---|---|---|
| **Educators** | 12 | 11 (90%) | 1 (10%) | 0 (0%) |
| **Resource Managers** | 10 | 9 (91%) | 0 (0%) | 1 (9%) |
| **Technical Persons** | 7 | 5 (71%) | 2 (29%) | 0 (0%) |
| **Investigators** | 4 | 4 (100%) | 0 (0%) | 0 (0%) |
| **Total Number of Participants** | 33 | 29 (88%) | 3 (9%) | 1 (3%) |

Round II

| Professional Association | Total Number of Participants | Participants who Responded | Participants who Did Not Respond | Participants who Dropped Out |
|---|---|---|---|---|
| **Educators** | 12 | 10 (83%) | 2 (17%) | 0 (0%) |
| **Resource Managers** | 9 | 9 (100%) | 0 (0%) | 0 (0%) |
| **Technical Persons** | 7 | 5 (72%) | 1 (14%) | 1 (14%) |
| **Total Number of Participants** | 28 | 24 (85%) | 3 (11%) | 1 (4%) |

Note: Investigators did not participate in round two or three

Round III

| Professional Association | Total Number of Participants | Participants who Responded | Participants who Did Not Respond | Participants who Dropped Out |
|---|---|---|---|---|
| **Educators** | 12 | 6 (50%) | 6 (50%) | 0 (0%) |
| **Resource Managers** | 9 | 6 (67%) | 3 (33%) | 0 (0%) |
| **Technical Persons** | 6 | 4 (67%) | 2 (33%) | 0 (0%) |
| **Total Number of Participants** | 27 | 16 (59%) | 11 (41%) | 0 (0%) |

**Results: Delphi Survey**

The results of Round II and Round III of the Delphi survey are located in Appendix C & D. Statements from Round II are ranked from highest to lowest mean score. After arranging statements in descending order by mean score, the investigative team regarded any natural breaks in the scores to determine which items should be removed for the next round. The low scoring items were removed from Round II surveys to continue consensus building for Round III. Each survey category; knowledge, skills, dispositions, and teaching methods, was evaluated independently. The range of mean scores from Round II for statements that comprise Round III is shown below.

- Knowledge: 4.52-3.74
- Skills: 4.75-3.70
- Dispositions: 4.68-3.79
- Teaching Methods: 4.35-3.35

In the third round, mean scores of less than 4.00 were considered low scoring and possibly less critical for inclusion in the lessons and activities to be developed in Phase II of the Flathead Watershed Educator's Guide. Those items are still under consideration and will be discussed by the WEC during a conference call.

## Implications

The results of Phase I, the consensus of foundational environmental concepts (Delphi Survey), will lead to Phase II of this project, development of curriculum for teaching and learning about the Flathead Watershed. We hypothesize that lessons developed based on the results of the Delphi survey will be interesting, motivating, and relate to prior experience and knowledge. We are optimistic that the Educators' Guide contributes significantly to the science knowledge, process skills and dispositions of children in the Flathead Watershed.

## Conclusion

The online delivery of the Delphi survey was a success and has provided information critical to moving forward with curriculum development. The contributions made by persons with expert knowledge of education, science, and resource management in the Flathead Watershed will ensure that the next stages of this project are meaningful and relevant.

A final meeting between the WEC and the MSU investigative team took place via conference call on June 17, 2014 at which time decisions were made about the remaining topics identified as important in Round III of the Delphi survey. The objective of the meeting was to engage in a productive discussion about the Delphi results and their alignment with the Flathead Watershed Sourcebook. Discussion included plans for moving forward with Phase II of the project. Detailed notes were kept during the conference call in order to incorporate comments and feedback from the participating members of the advisory committee (WEC) and the MSU investigative team in future development of the project.

The recommendation by the MSU investigative team was to remove any items with a mean score of 4.00 or below (see Appendix D). After discussing individual items with the WEC it was agreed that some items should be given special consideration in order to better align with the Flathead Watershed Sourcebook. The following statements will remain as topics to be included in the lessons and activities developed for the Flathead Educators' Guide:

Knowledge: all statements with a mean score of 4.69-4.06 and statement number K12
Skills: all statements with a mean score of 4.88-4.06 and statements number S13 and S5
Dispositions: keep all statements
Teaching Methods: keep all statements

In addition to determining which statements would remain and influence the lessons and activities developed for the guide, general guidelines were established for all curriculum development. Lessons and activities should be interdisciplinary and included subjects such as art and literature in addition to science, technology, engineering and math. Field journaling and writing were also determined to be fundamental skills and should be incorporated when possible. The inclusion of Native American perspectives and Indian Education For All Montana teaching standards were also considered a necessary and important component to incorporate in the curriculum for the educators' guide.

**Next Steps**

Phase II of the Flathead Watershed Educators' Guide will focus on the development of lessons and activities for a target audience of middle school students in the Flathead Watershed. The lessons will incorporate the important knowledge, skills and dispositions that emerged as a result of the Delphi survey and final collaboration of the Watershed Education Committee.

Before lesson development begins a framework will be developed based on the Delphi survey results and major topics in the Flathead Watershed Sourcebook. The framework will be presented to the WEC for consideration and approval.

**References**


Addison T. (2003) E-commerce project development risks: evidence from a survey. *International Journal of Information Management,* 23:1, 25–40.

Akins, R., Tolson H., & Cole, B (2005) Stability of response characteristics of a Delphi panel: application of bootstrap data expansion, *BMC Medical Research*, 5:37 retrieved from http://www.biocentral.com/147-2288/5/37.

Baker, J., Lovell, K., Harris, N., (2006) How expert are the experts? An exploration of the concept of 'expert' within Delphi panel techniques. *Nurse Researcher*, 14:1, 59-70.

Beretta R. (1996) A critical review of the Delphi technique. *Nurse Researcher* 3:4, 79–89.

Brody, M., (1995) Development of a curriculum framework for water education: educators, scientists and resource managers, *Journal of Environmental Education*, 26:4, 18-29.

Brody, M., Fisher Jr., J., Moe, J., Keremedjiev, H. (2010).*Archaeological Science for All Phase I: National Delphi Survey*. last updated: 2010-12-31 13:35:09 found at http://archive.informalscience.org/research/show/5149.

Curtis, L., (2012). Flathead Watershed Sourcebook: A Guide to an Extraordinary Place (2nd ed.).

Custer, R. L., Scarcella, J. A., & Stewart, B. R. (1999). The modified Delphi technique: A rotational modification. *Journal of Vocational and Technical Education*, 15:2, 1-10.

Dailey A.L. & Holmberg J.C. (1990) Delphi: a catalytic strategy for motivating curriculum revision by faculty. *Community/Junior College Quarterly of Research and Practice* 14:2, 129–136.

Day, J. & M. Bobeva, (2005) A generic toolkit for the successful management of Delphi Studies, *Electronic Journal of Business Research Methods*, 3:2. 103-116.

Gilbride J.T. (2002) An Empirical Investigation of Critical Factors Affecting the Ability of Public Entities to Compete in Public Private Companies. Thesis, Department of the Air Force Air University, Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio. Available at: http://research.maxwell.af.mil/papers/ay2002/afit/afit-gaq-env-02m-09.pdf.

Green B., Jones M., Hughes D. & Willimas A. (1999) Applying the Delphi technique in a study of GP's information requirements. *Health and Social Gare in the Gommunity* 7:3, 198-205.

Hsu, Chia-Chien & Sandford B., (2007) The Delphi technique: making sense of consensus, *Practical Assessment, Research and Evaluation*, 12:10. Available online: http://pareonline.net/getvn.asp?v=12&m=10.

Ilbery B., Maye D., Kneafsey M., Jenkins T. & Walkley C. (2004) Forecasting food supply chain developments in lagging rural regions: evidence from the UK. *Journal of Rural Studies* 20:3, 331–344.

Linstone, H.A. and Turoff, M. (Eds.) (2002), *The Delphi Method: Techniques and Applications,* Addison-Wesley Publishing Company Inc, Reading, M.A. Available at: http://www.is.njit.edu/pubs/delphibook/ [25 June 2004]

Kalispell, Montana. (2014). Retrieved from http://en.wikipedia.org/wiki/Kalispell,_Montana

Kaynak E., Bloom J. & Leibold M. (1994) Using the Delphi technique to predict future tourism potential. 12:7, 18–29.

Lofmark A. & Thorell-Ekstrand I. (2004) An assessment form for clinical nursing education: a Delphi study. *Journal of Advanced Nursing* 48:3, 291–298.

Nikoleris, D., Anas, A. & M O'Connor, (2002) Delphi Analysis of Process Internsification,

Heriot-Watt University, PI Technology Future. Edinburgh, Scotland,
Roberts E. (1969) Exploratory and normative technological forecasting: a critical appraisal. *Technological Forecasting* 1:2, 113–127.
Tribal Resources, (2004), retrieved from Confederated Salish and Kootenai Tribes (CSKT) website: http://www.cskt.org/tr/index.htm
Turoff, M., & Hiltz, S. R. (1996). Computer based Delphi process. In M. Adler, & E. Ziglio (Eds.). *Gazing into the oracle: The Delphi method and its application to social policy and public health* (pp. 56-88). London, UK: Jessica Kingsley Publishers.
Volk K. (1993) Curriculum development using the Delphi technique. *Technology Research*, 52:4, 35–36.
Wallington, T.J. & Moore, S.A. 2005. Ecology, values, and objectivity: Advancing the debate. BioScience 55: 873-878.

# Appendices

# Appendix A

## Round I:
## Sample Responses

## Appendix A: Sample Responses From Participants in Round I of the Delphi Survey

| Round I: Knowledge | | |
|---|---|---|
| **Discussion Thread** | **Participant No.** | **Response** |
| What are the essential concepts/issues that students should learn related to the Flathead Watershed? (For example; water quality or fish species) | Participant 003 | I believe in the four C's clear, connected, complex and cold. Those four things are essential for the bull trout, an essential animal of the Flathead Watershed. The program I taught focused on water quality. We tested turbidity, temperature and dissolved oxygen at each site we visited. We discussed each body of water's quality. We also focused on the plants and animals of the watershed. We discussed invasive species and their impact on the watershed. Geography is also another important concept. Landforms, water connections streams to rivers to lakes are essential for students to connect what they learning about. Fire can be an essential topic too for our area. |
| | Participant 029 | I love this idea. What grade-level do think this type of investigations appropriate for? Do you think classroom teachers would be able to conduct something similar to this on their own or would it require some training? |
| | Participant 026 | I agree that geography is another key concept...so students learn and understand the water cycle and the 4C's and are able to put it together for their 'place', the waters in the Flathead....like the connection to Big Creek that was mentioned. Having students know the location of key rivers, lakes, naming them, knowing where the headwaters are, the unique features, know there is a shallow aquifer and its location...making a connection to these places where they may fish, swim or boat, or drink the water, then how to take care of these places... |
| **Round I: Skills** | | |
| **Discussion Thread** | **Participant No.** | **Response** |
| What skills should students develop that would help them learn about and live in the Flathead Watershed? (For example; reading maps or writing a letter to city council) | Participant 027 | A student should be able to:<br>- create, read and interpret a map, from the schoolyard map to the watershed<br>- read literature related to the landscape/ecology and write about where they live<br>- interpret data and graphs, see page 7 in the Sourcebook… |
| | Participant 020 | I agree, this study should be done across the curriculum with the coordination of activities planned with teachers from all areas of study, not just science, but math, history and language arts. |

| Round I: Dispositions | | |
|---|---|---|
| **Discussion Thread** | **Participant No.** | **Response** |
| What attitudes and values should students develop related to the Flathead Watershed? (For example; appreciating Indigenous perspectives or valuing diverse opinions about resource management) | Participant 006 | Students need to develop an appreciation for the importance of the Flathead Watershed ecosystem and a desire to maintain it in good condition. Knowing the Native American perspectives and understanding how the ecosystem has changed over the years would be valuable as well and could lead to a greater appreciation for the Flathead Watershed. |
| | Participant 010 | All points of view should be treated with equal respect and value, using careful listening skills and asking questions. |

## Appendix B

## Round II:
## Statements Ranked by Mean Scores

| Round II: Knowledge | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| K33 | Students need to know the basic premise of a watershed, that it is where they hunt and fish and recreate, and work, and live, and eat and grow food and consume food, and that as a result; they are also influencing the watershed with all their everyday actions. | 0 | 0 | 1 | 4 | 17 | 4.52 |
| K1 | Students should be aware why the watershed is important to the species of fish and wildlife that utilize the watershed. | 1 | 0 | 0 | 8 | 14 | 4.48 |
| K43 | Students should know the effects on the watershed of our actions; examples are: when we flush, put things down the drain, fertilize our lawns, have oil leaks. | 0 | 0 | 1 | 5 | 16 | 4.48 |
| K2 | Students should be knowledgeable about the plants and animals of the watershed, including invasive species and their impact on the watershed. | 0 | 1 | 1 | 8 | 13 | 4.43 |
| K39 | Students need to have an understanding of the human impact, both positive and negative on the watershed. | 0 | 0 | 0 | 8 | 14 | 4.43 |
| K47 | It is important for students to engage in fieldwork because it is more effective in building enthusiasm, helping with future career choices and fostering stewardship. | 0 | 0 | 0 | 8 | 14 | 4.43 |
| K48 | How the watershed impacts their lives and why they should care about it is essential information for students. | 0 | 0 | 0 | 8 | 14 | 4.43 |
| K54 | It is important for students to understand that we all live in a watershed and cannot separate ourselves from it, and that our actions can have effects on downstream users, water quality, and aquatic ecosystems. | 0 | 0 | 0 | 8 | 14 | 4.43 |
| K4 | Students should be aware that a major threat to the Flathead watershed is water quality degradation, predominantly nutrient and sediment additions caused by human activities. | 0 | 0 | 0 | 9 | 13 | 4.39 |
| K55 | Students should understand the characteristics of a healthy watershed. | 0 | 0 | 0 | 9 | 13 | 4.39 |
| K52 | It is important for students to know how humans impact the watershed. | 0 | 0 | 0 | 10 | 12 | 4.35 |

| Round II: Knowledge | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Statement Number** | **Statement** | **Likert Scale Response** | | | | | **Mean Score** |
| | | **1** | **2** | **3** | **4** | **5** | |
| K14 | Students should learn that the underground aspects of the watershed are important and that the underground reaches of the Flathead River can be more than a mile from its banks with water flowing in the underground soils and gravels, therefore pollutants entering the watershed in the upper reaches will potentially make their way into the underground river as well. | 0 | 0 | 1 | 9 | 12 | 4.30 |
| K56 | Understanding what a watershed is and what bodies of water contribute to our watershed is essential knowledge for students. | 0 | 0 | 1 | 10 | 11 | 4.26 |
| K44 | Students should be aware of the aspects of water - water cycle, bioregions, watersheds, water bodies (headwaters, streams, rivers, tributaries, marshes, sloughs, lakes, oceans), alluvium, surface water, ground water, downstream, upstream, water pollution (point source, nonpoint source) nutrient load. | 0 | 0 | 3 | 8 | 11 | 4.17 |
| K15 | Students should be knowledgeable about the cycles in a watershed. | 0 | 1 | 2 | 8 | 11 | 4.13 |
| K23 | It is important that students study the relationship of water quality and economic vitality in the Flathead. | 0 | 0 | 3 | 9 | 10 | 4.13 |
| K42 | Where the water comes from when the faucet is turned on and how it is treated to be drinkable is important information for students. | 0 | 1 | 2 | 8 | 11 | 4.13 |
| K21 | Students should be aware of the stormwater conveyance system and that storm drains flow directly into our water bodies without treatment. | 1 | 1 | 0 | 9 | 11 | 4.09 |
| K24 | Students should be exposed to the biology and chemistry that relate to the Flathead Watershed, specifically water quality, organisms, ecosystems and diversity within the watershed. | 0 | 0 | 3 | 10 | 9 | 4.09 |
| K13 | Students should learn about "indicator" species such as bull trout and about its health and continued persistence as indicators of the health of the watershed. | 0 | 0 | 3 | 11 | 8 | 4.04 |
| K45 | It is important for students to recognize the difference between "belief systems" and "facts". | 0 | 1 | 3 | 8 | 10 | 4.04 |

| Round II: Knowledge | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Statement Number** | **Statement** | **Likert Scale Response** | | | | | **Mean Score** |
| | | **1** | **2** | **3** | **4** | **5** | |
| K40 | Students should be aware of the international aspects of the Flathead watershed and its reach into Canada, including human impacts, since a watershed does not recognize international borders. | 0 | 0 | 4 | 10 | 8 | 4.00 |
| K49 | Knowledge gained through what is referred to as "STEM" (science, technology, engineering and math) courses is important to being able to make informed decisions about our watershed ecology and water quality. | 0 | 0 | 3 | 12 | 7 | 4.00 |
| K51 | The history of the Flathead Watershed is important information for students. | 0 | 0 | 2 | 14 | 6 | 4.00 |
| K18 | Fire is an essential topic for students. | 0 | 0 | 6 | 7 | 9 | 3.96 |
| K34 | Knowledge of resources - natural, historical, cultural, land and water use (agriculture, mining, roads, residential, commercial), recreation, conservation, dams, and irrigation is essential information for students. | 0 | 0 | 2 | 10 | 9 | 3.96 |
| K38 | Learning about the influences of man through building communities, agriculture, recreation, and industry is relevant knowledge. | 0 | 0 | 3 | 13 | 6 | 3.96 |
| K3 | Nonnative species (mostly introduced intentionally by managers) are major threats that are important for students to learn about in the Flathead watershed. | 2 | 0 | 0 | 12 | 8 | 3.91 |
| K9 | It is important to teach about natural environmental change in general. | 0 | 1 | 3 | 11 | 7 | 3.91 |
| K17 | Understanding the needs of competing users of water in the Flathead watershed is relevant information, especially with the challenges of climate change in the future. | 0 | 1 | 5 | 7 | 9 | 3.91 |
| K16 | It is important that students learn that a river system affects the whole watershed not only by flowing partially below the surface, but also by how wildlife transfers nutrients from the stream to the upland. | 0 | 0 | 6 | 9 | 7 | 3.87 |

| Round II: Knowledge | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| K35 | Management of the watershed for ecological, social, and economic values is important information for students to be aware of. | 0 | 2 | 2 | 11 | 7 | 3.87 |
| K6 | Mitigation and restoration methods are important information for students to learn and know. | 0 | 2 | 1 | 14 | 5 | 3.83 |
| K10 | A key concept for students would be an understanding of the nature and need for biodiversity. | 1 | 0 | 3 | 7 | 10 | 3.83 |
| K12 | The four C's (clear, connected, complex and cold) are an essential concept for understanding of the Flathead watershed, particularly for animals such as the bull trout, an essential animal of the Flathead Watershed. | 1 | 0 | 2 | 14 | 5 | 3.83 |
| K29 | Learning, how has this watershed changed over time, geologic, historic, present, is important information for students to be informed about. | 0 | 0 | 3 | 11 | 7 | 3.83 |
| K31 | Students should understand that the stream system is the lifeblood of the watershed; it feeds it and is fed by it. | 0 | 0 | 5 | 12 | 5 | 3.83 |
| K36 | Students should be aware of the storm water conveyance system and that storm drains flow directly into our water bodies without treatment. | 1 | 1 | 1 | 8 | 10 | 3.83 |
| K37 | Students should be aware that there is a finite supply of clean water. | 2 | 0 | 4 | 6 | 10 | 3.83 |
| K46 | Students should understand how systems function, including biotic and abiotic sub-systems and how they are inextricably linked. | 0 | 0 | 5 | 12 | 5 | 3.83 |
| K53 | The concept of international cooperation in protecting a watershed is an important piece for students to learn. | 0 | 1 | 4 | 11 | 6 | 3.83 |
| K57 | Students should know the unique natural and cultural features of the Flathead watershed. | 0 | 0 | 3 | 11 | 7 | 3.83 |
| K20 | Learning to test water quality by testing turbidity, temperature and dissolved oxygen at sites along water bodies throughout the watershed is relevant knowledge for students. | 0 | 0 | 6 | 11 | 5 | 3.78 |

| Round II: Knowledge | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Statement Number** | **Statement** | **Likert Scale Response** | | | | | **Mean Score** |
| | | **1** | **2** | **3** | **4** | **5** | |
| K28 | The concept that there is one environment, not a "human environment" and a "natural environment". | 0 | 2 | 5 | 7 | 8 | 3.78 |
| K50 | It is important that students know about watershed communities. | 0 | 0 | 7 | 9 | 6 | 3.78 |
| K7 | An essential concept for students to know is how water was used to establish the Flathead basin. | 1 | 0 | 3 | 14 | 4 | 3.74 |
| K19 | Indian Education for All is knowledge that students should have. | 1 | 1 | 6 | 5 | 9 | 3.74 |
| K25 | Understanding the history of how water has been managed is important. | 0 | 2 | 3 | 12 | 5 | 3.74 |
| K41 | Have students know the names and location of key rivers and lakes, where the headwaters are, the location of the shallow aquifer, and other unique features within the watershed. | 0 | 1 | 5 | 11 | 5 | 3.74 |
| K32 | Students should know the species composition of the watershed. | 0 | 1 | 3 | 12 | 5 | 3.65 |
| K5 | Knowledge of the agencies and groups that are there to help and nurture the watershed is important information for students to know. | 0 | 1 | 9 | 8 | 4 | 3.52 |
| K22 | Water is a natural connector, both physically and conceptually. | 0 | 4 | 7 | 4 | 6 | 3.26 |
| K30 | Students should understand that essential concepts and issues in the Flathead watershed would start with the essential nature of water. | 0 | 1 | 11 | 5 | 4 | 3.26 |
| K8 | Politics is not important to include in the education guide. | 3 | 3 | 7 | 4 | 4 | 2.87 |
| K11 | It is important to teach about water quality, organisms, ecosystems and diversity within the watershed without discussing the issue of climate change. | 5 | 1 | 6 | 4 | 5 | 2.87 |

| Round II: Skills | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| S20 | Basic scientific inquiry and critical thinking are important skills for students. | 0 | 0 | 0 | 5 | 15 | 4.75 |
| S28 | Listening and observing is an important skill. | 0 | 0 | 0 | 6 | 14 | 4.7 |
| S16 | Critical thinking is important. Students should be taught how to ask the tough questions and then learn how to look for answers through research. | 0 | 0 | 0 | 7 | 13 | 4.65 |
| S26 | Students, when looking to the Internet for information, need to always evaluate the source of information. | 0 | 0 | 1 | 5 | 14 | 4.65 |
| S21 | Students should be able to make observations, identify problems, formulate relevant questions, use appropriate tools and technology to collect and analyze data, make inferences, draw conclusions, communicate and defend findings. | 0 | 0 | 0 | 8 | 12 | 4.6 |
| S10 | A student should be able to interpret data and graphs. | 0 | 0 | 1 | 7 | 12 | 4.55 |
| S25 | It is important to teach students to look beyond the rhetoric/popular opinion and ask their own questions, as well as how to search for their own answers or solutions provides a life skill. | 0 | 0 | 1 | 8 | 11 | 4.5 |
| S27 | Imagination is important to encourage as students think of possible solutions. | 0 | 0 | 1 | 10 | 9 | 4.4 |
| S22 | The ability to create tables, picture graphs, bar graphs and picture maps to record and organize information and to be able to read, interpret, and use tables and graphs to identify patterns and trends, draw conclusions, and make predictions are important skills for students to have. | 0 | 1 | 0 | 10 | 9 | 4.35 |
| S8 | A student should be able to create, read, and interpret a map, from the schoolyard map to the watershed. | 0 | 0 | 3 | 10 | 7 | 4.2 |
| S7 | Field studies are great. | 0 | 0 | 2 | 13 | 5 | 4.15 |
| S23 | Describing and explaining how biodiversity in animal and plant life affects a watershed. | 0 | 0 | 3 | 11 | 6 | 4.15 |

| Round II: Skills | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| S24 | Recognize and propose explanations for patterns of change in a watershed over time, including but not limited to changes in climate, animal and plant life, human activities and interactions. | 0 | 2 | 3 | 5 | 10 | 4.15 |
| S29 | Learning skills such as how to fish, hunt, hike, raft, etc. takes you to places that gives you a real appreciation for the area, and helps people to come to their own conclusions about the importance of conservation of our resources. | 0 | 1 | 3 | 9 | 7 | 4.1 |
| S35 | Observation skills are essential so that students can sit quietly and observe the world around them. | 0 | 0 | 4 | 10 | 6 | 4.1 |
| S33 | Students should be able to read maps and landmarks and know the reservation watersheds. | 0 | 0 | 6 | 7 | 7 | 4.05 |
| S37 | Practicing observation skills through participation in a variety of observation exercises using a variety of senses can start in the classroom, then move to the school yard, and finally students can implement their newly developed skills out in the field in the Flathead Watershed. | 0 | 0 | 4 | 11 | 5 | 4.05 |
| S1 | Scientific investigations involving developing questions, collecting data, analyzing data, and comparing data are skills students should have. | 3 | 1 | 0 | 5 | 11 | 4 |
| S19 | Teach students skills to help them explore new places, like how to use a GPS. | 0 | 0 | 6 | 8 | 6 | 4 |
| S40 | Students should begin to conduct "research". | 0 | 1 | 4 | 9 | 6 | 4 |
| S17 | Learning how to use a compass is an important and engaging outdoor skill. | 0 | 1 | 3 | 12 | 4 | 3.95 |
| S18 | Students can learn about and appreciate the Flathead Watershed through skills such as canoeing, rafting, kayaking, swimming, fishing, bird watching, boating etc. | 0 | 1 | 4 | 10 | 5 | 3.95 |

| Round II: Skills | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| S39 | Students should be able to know how to delineate a watershed; this means being able to read a map and decide where the ridges are and where the valleys are, and where a droplet of water would flow were it to drop at any point on that map. | 0 | 1 | 5 | 8 | 6 | 3.95 |
| S9 | A student should be able to read literature related to the landscape/ecology and write about where they live. | 0 | 2 | 3 | 10 | 5 | 3.9 |
| S3 | Conducting stream surveys, including water quality tests, stream flow, water depth, and sampling for macro invertebrates, is an essential skill. | 0 | 0 | 7 | 9 | 4 | 3.85 |
| S30 | Format the curriculum to make information available, but do not build perceptions. | 0 | 0 | 8 | 7 | 5 | 3.85 |
| S34 | Create homework assignments that require students to investigate their environment. | 0 | 0 | 9 | 6 | 5 | 3.8 |
| S38 | Nature journaling" or "field journaling" gives young students the tools they need to quietly observe what is going on around them. | 0 | 1 | 7 | 9 | 3 | 3.7 |
| S6 | Nature journaling, poetry, art, and similar activities help with connection to caring for the watersheds we live in. | 1 | 0 | 6 | 11 | 2 | 3.65 |
| S21 | Identification skills using keys are important. | 1 | 0 | 8 | 8 | 3 | 3.6 |
| S31 | Students should learn technical skills; analyzing aerial imagery, utilizing information resources such as USGS flow data websites and getting in the field to take measurements at sites such as a gaging station and a snowtel site, so the data is understood. | 0 | 2 | 6 | 10 | 2 | 3.6 |
| S4 | Activities that are important in watershed education are planting trees, digging up invasive weeds, soil sampling, native and non-native id, restoration projects, bird watching, and tracking. | 1 | 1 | 4 | 14 | 0 | 3.55 |
| S15 | Take a picture of nature and then describe it to friends using words. | 0 | 3 | 8 | 7 | 2 | 3.4 |
| S36 | Skills should include mapping an area, knowing the lentic and lotic habitats in the region and collecting data about species diversity. | 0 | 3 | 9 | 5 | 3 | 3.4 |

| Round II: Skills | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Statement Number** | **Statement** | **Likert Scale Response** | | | | | **Mean Score** |
| | | **1** | **2** | **3** | **4** | **5** | |
| S14 | Diverse learners can be engaged through learning visually and then communicating what they have learned in more than one format, such as through art and photography. | 0 | 5 | 6 | 6 | 3 | 3.35 |
| S12 | A student should be able to take a picture of nature and share it with friends. | 1 | 3 | 9 | 3 | 4 | 3.3 |
| S11 | Students should be able to understand and apply mathematical algorithms to tasks such as calculating sediment load. | 0 | 7 | 4 | 6 | 3 | 3.25 |
| S32 | Having students go through the permitting process at least in a conceptual manner. | 1 | 5 | 8 | 5 | 1 | 3 |
| S13 | A student should be able to express their relationship with the watershed through art. | 2 | 3 | 9 | 6 | 0 | 2.95 |
| S5 | Designing filters for cleaning water is an important skill. | 1 | 6 | 11 | 1 | 1 | 2.75 |

| Round II: Dispositions | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| D23 | It is important for students to know what they can do to help protect our local watersheds. | 0 | 0 | 0 | 6 | 13 | 4.68 |
| D25 | Raising student awareness of watershed issues will hopefully influence their future actions in addressing the issues as adults. | 0 | 0 | 1 | 8 | 10 | 4.47 |
| D27 | It is important that students in the Flathead watershed understand that this ecosystem is one of the most intact, with exceptional water quality, and that rivers, floodplains, and aquatic habitats are well connected and functional; and that many simil | 0 | 0 | 2 | 8 | 9 | 4.37 |
| D15 | It is important to understand the balance between using the land and abusing the land. | 0 | 0 | 1 | 11 | 7 | 4.32 |
| D26 | Learning about the local ecosystem will create a sense of stewardship. | 0 | 0 | 1 | 11 | 7 | 4.32 |
| D32 | It is important that teachers be committed to getting kids outside, for several reasons; first, the lesson takes on life. Second, being at that place establishes a relationship between the student and that site. | 0 | 0 | 2 | 9 | 8 | 4.32 |
| D16 | Nurturing a balance of use and protection within the watershed, of providing for our needs while caring for the watershed's health, is valuable to instill and develop in students. | 0 | 1 | 2 | 7 | 9 | 4.26 |
| D30 | Teaching students about multiple perspectives is necessary; there are issues such as management of lake trout in Flathead Lake in which not all the stakeholders agree with the tribal point of view. | 0 | 0 | 3 | 8 | 8 | 4.26 |
| D33 | Creating the next generation of "stewards" is a priceless goal that can be reached through establishing a relationship between the student and the outdoors when students are on the land and by the water. | 0 | 0 | 4 | 6 | 9 | 4.26 |
| D4 | An appreciation for the natural and cultural history of the Flathead Watershed is an essential attribution for students. | 0 | 0 | 3 | 9 | 7 | 4.21 |

| Round II: Dispositions | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| D9 | Explicitly create learning opportunities that develop real awareness of this remarkable place so that the Flathead environment is not taken for granted. | 1 | 0 | 1 | 9 | 8 | 4.21 |
| D11 | Students should understand indigenous perspectives, but also understand more recent ties to the land, including early homesteaders, farmers, loggers, and industrial. | 0 | 0 | 5 | 5 | 9 | 4.21 |
| D22 | The major issues affecting watersheds today, such as water rights, toxic spills from rail or truck, toxic cleanup, industrial pollution, are important issues for students to learn about. | 0 | 1 | 3 | 6 | 9 | 4.21 |
| D3 | It is important that students engage in life styles (choices and decisions) that protect and sustain a healthy Flathead watershed. | 0 | 0 | 4 | 8 | 7 | 4.16 |
| D5 | For students to develop a strong 'sense of place', they should understand the unique social and environmental history of the Flathead Valley. | 0 | 0 | 4 | 8 | 7 | 4.16 |
| D20 | History is important to learn about because it shows what human influence has done to the watershed and how it left it today. | 0 | 0 | 5 | 6 | 8 | 4.16 |
| D24 | Learning about amounts and types of water consumption is relevant for students. | 0 | 0 | 3 | 10 | 6 | 4.16 |
| D28 | Students should realize that all points of view should be treated with equal respect and value, using careful listening skills and asking questions. | 0 | 1 | 4 | 5 | 9 | 4.16 |
| D2 | Show students how the watershed impacts their lives and how they impact the watershed to create and share a proper attitude of caring. | 1 | 0 | 1 | 11 | 6 | 4.11 |
| D6 | Students should see and feel the need to protect and sustain a healthy Flathead watershed. | 0 | 1 | 3 | 8 | 7 | 4.11 |
| D8 | For students, developing a sense of appreciation for the Flathead watershed is paramount to instilling a desire to take care of their environment. | 0 | 1 | 3 | 8 | 7 | 4.11 |

| Round II: Dispositions | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| D1 | It is important that students understand the profound wisdom and far reaching implications of the statement: "Whatever happens to the water happens to the people." | 0 | 1 | 4 | 7 | 7 | 4.05 |
| D12 | It is important that students develop the concept of conservation and understand the difference between conservation and preservation. | 0 | 1 | 4 | 8 | 6 | 4.00 |
| D17 | It is important to create a value for stewardship to leave a lasting legacy and a history of protective use, but not abuse. | 0 | 0 | 3 | 8 | 7 | 4.00 |
| D18 | It is valuable to know the Native American perspectives and to understand how the ecosystem has changed; such knowing could lead to a greater appreciation for the Flathead watershed. | 0 | 0 | 5 | 9 | 5 | 4.00 |
| D21 | Legacy is a great concept to teach and discuss; let students define what they want their legacy of stewardship to be. | 0 | 1 | 5 | 6 | 7 | 4.00 |
| D14 | Learning from the pioneers who are still living in the Flathead Valley is important, as they are able to provide historical perspective. | 0 | 0 | 6 | 8 | 5 | 3.95 |
| D29 | Students need to learn to recognize and appreciate their own and other people's values about the same things, like the Flathead watershed; for instance the values of Native/Indigenous people who have lived here for 12,000 years, families who have live here for generations, and people who have moved here last week. | 0 | 2 | 5 | 4 | 8 | 3.95 |
| D34 | Salish, Kootenai and Pend d'Oreille history and cultural resources, such as films and books, have a tribal perspective and are important sources of information on science, history and contemporary information, including topics such as Indian Water Rights and native place names, which should be used in classrooms in the Flathead watershed. | 1 | 1 | 5 | 6 | 6 | 3.79 |

| Round II: Dispositions | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| D31 | Students should recognize their own and all people's relationship to place and should be helped to share the feelings, attitudes, values and beliefs that have developed because of their relationships to their environment. | 0 | 1 | 6 | 9 | 3 | 3.74 |
| D19 | Flathead watershed students have a significant opportunity to learn about Native opinions and actions, historical and current day, because native peoples have lived there continuously. | 0 | 1 | 5 | 8 | 4 | 3.63 |
| D13 | Understanding the history of wise use in the Flathead Valley, especially in the past 120 years, is an essential understanding for students. | 1 | 0 | 7 | 10 | 1 | 3.53 |
| D10 | Appreciation for the environment is a hard thing to develop in a young person when the land they have grown up in is all they have ever known, but it is worth trying. | 2 | 0 | 7 | 4 | 5 | 3.37 |
| D7 | Students should advocate for and support organizations, programs and initiatives that protect and sustain a healthy Flathead watershed. | 3 | 0 | 7 | 6 | 3 | 3.32 |

| Round II: Teaching Methods | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| T11 | Bringing resource people in as guest speakers is a way to get students interested and engaged. | 0 | 0 | 1 | 11 | 8 | 4.35 |
| T6 | It would be a science learning experience as well as fun for students to tour the players in our watershed, such as the Forest Service, wastewater treatment plants, storm water programs (the City of Kalispell has such a program), the County Landfill, etc. | 0 | 1 | 1 | 9 | 9 | 4.3 |
| T3 | A project-based approach would be a way to get students involved in learning the connections between the past and the present. | 0 | 0 | 2 | 13 | 5 | 4.15 |
| T1 | A great Socratic Seminar topic for students could be the statement: "Whatever happens to the water happens to the people." | 0 | 1 | 4 | 7 | 8 | 4.1 |
| T8 | Appropriate guides should be used for students to learn about the plants and animals in the Flathead watershed, instead of memorizing. | 0 | 1 | 3 | 10 | 6 | 4.05 |
| T9 | Reading about non-fiction topics is a good way to learn about animals and the watershed and satisfy common core standards requirements for young students. | 0 | 1 | 5 | 8 | 6 | 3.95 |
| T10 | It is possible to address climate change in a neutral way through water and the interconnected nature of surface and groundwater. Precipitation decreases can affect surface flows and groundwater recharge/discharge. If temperature changes the storage of water through decreased snowpack, that to can effect groundwater availability as well as surface water flows. | 0 | 1 | 5 | 10 | 4 | 3.85 |
| T4 | Teaching about diversity can be accomplished through expression in subject matter teaching. An example is the multiple ways water quality can be introduced: explaining what scientists look for in their work, explaining the cultural importance of native fish and their waterways to indigenous people, or discussing various approaches to resource management of the same water body and why each manager might choose this approach. | 0 | 1 | 4 | 13 | 2 | 3.8 |

| Round II: Teaching Methods | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| T12 | Resource education events can and should be conducted outside on the lawns of schools or in neighborhood parks that may be in walking distance. | 0 | 0 | 7 | 11 | 2 | 3.75 |
| T2 | Integration of some of the traditional ecological knowledge that has been passed down through generations of native people might best be incorporated into any learning process by directly engaging the native people in the development of educational and informational programs. | 0 | 1 | 7 | 9 | 3 | 3.7 |
| T7 | Students can discover 'snow towers' and the progression of snow melt through field trips and via visual presentations. | 0 | 1 | 6 | 11 | 2 | 3.7 |
| T5 | Teaching the 'crumple a watershed' activity is a good way to communicate the watershed concept and develop vocabulary. | 0 | 0 | 15 | 3 | 2 | 3.35 |

# Appendix C

## Round III:
## Statements Ranked by Mean Scores

| Round III: Knowledge | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Statement Number** | **Statement** | **Likert Scale Response** | | | | | **Mean Score** |
| | | **1** | **2** | **3** | **4** | **5** | |
| K2 | Students should be knowledgeable about the plants and animals of the watershed, including invasive species and their impact on the watershed. | 0 | 0 | 0 | 5 | 11 | 4.69 |
| K1 | Students should be aware why the watershed is important to the species of fish and wildlife that utilize the watershed. | 0 | 0 | 0 | 6 | 10 | 4.63 |
| K30 | It is important for students to know how humans impact the watershed. | 0 | 0 | 0 | 6 | 10 | 4.63 |
| K32 | Students should understand the characteristics of a healthy watershed. | 0 | 0 | 0 | 6 | 10 | 4.63 |
| K11 | Students need to know the basic premise of a watershed, that it is where they hunt and fish and recreate, and work, and live, and eat and grow food and consume food, and that as a result; they are also influencing the watershed with all their everyday actions. | 0 | 0 | 2 | 4 | 10 | 4.50 |
| K15 | Students should be knowledgeable about the cycles in a watershed. | 0 | 0 | 0 | 8 | 8 | 4.50 |
| K27 | Geography, landforms, water connections- streams to rivers to lakes are essential concepts for students. | 0 | 0 | 0 | 8 | 8 | 4.50 |
| K33 | It is important for students to understand that we all live in a watershed and cannot separate ourselves from it, and that our actions can have effects on downstream users, water quality, and aquatic ecosystems. | 0 | 0 | 1 | 6 | 9 | 4.50 |
| K39 | Students need to have an understanding of the human impact, both positive and negative on the watershed. | 0 | 0 | 0 | 8 | 8 | 4.50 |
| K4 | Students should be aware that a major threat to the Flathead watershed is water quality degradation, predominantly nutrient and sediment additions caused by human activities. | 0 | 1 | 1 | 4 | 10 | 4.44 |

| Round III: Knowledge | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| K14 | Students should learn that the underground aspects of the watershed are important and that the underground reaches of the Flathead River can be more than a mile from its banks with water flowing in the underground soils and gravels, therefore pollutants entering the watershed in the upper reaches will potentially make their way into the underground river as well. | 0 | 0 | 1 | 7 | 8 | 4.44 |
| K20 | Understanding what a watershed is and what bodies of water contribute to our watershed is essential knowledge for students. | 0 | 0 | 0 | 9 | 7 | 4.44 |
| K43 | Students should know the effects on the watershed of our actions; examples are: when we flush, put things down the drain, fertilize our lawns, have oil leaks. | 0 | 0 | 1 | 7 | 8 | 4.44 |
| K8 | Students should know the unique natural and cultural features of the Flathead watershed. | 0 | 0 | 1 | 8 | 7 | 4.38 |
| K23 | It is important that students study the relationship of water quality and economic vitality in the Flathead. | 0 | 0 | 0 | 10 | 6 | 4.38 |
| K24 | Students should be exposed to the biology and chemistry that relate to the Flathead Watershed, specifically water quality, organisms, ecosystems and diversity within the watershed. | 0 | 0 | 0 | 10 | 6 | 4.38 |
| K26 | Knowing about the land and landmasses - soil, rock, sediment, mountains, valleys, plains, flood plains, and wetlands- is important for students. | 0 | 0 | 1 | 8 | 7 | 4.38 |
| K28 | The concept that there is one environment, not a "human environment" and a "natural environment". | 0 | 0 | 2 | 6 | 8 | 4.38 |
| K35 | Management of the watershed for ecological, social, and economic values is important information for students to be aware of. | 0 | 0 | 0 | 10 | 6 | 4.38 |
| K37 | Students should be aware that there is a finite supply of clean water. | 0 | 1 | 0 | 7 | 8 | 4.38 |

| Round III: Knowledge | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| K42 | Where the water comes from when the faucet is turned on and how it is treated to be drinkable is important information for students. | 0 | 0 | 0 | 10 | 6 | 4.38 |
| K44 | Students should be aware of the aspects of water - water cycle, bioregions, watersheds, water bodies (headwaters, streams, rivers, tributaries, marshes, sloughs, lakes, oceans), alluvium, surface water, ground water, downstream, upstream, water pollution (point source, nonpoint source) nutrient load. | 0 | 0 | 2 | 6 | 8 | 4.38 |
| K10 | A key concept for students would be an understanding of the nature and need for biodiversity. | 0 | 0 | 2 | 7 | 7 | 4.31 |
| K47 | It is important for students to engage in fieldwork because it is more effective in building enthusiasm, helping with future career choices and fostering stewardship. | 0 | 0 | 1 | 9 | 6 | 4.31 |
| K17 | Understanding the needs of competing users of water in the Flathead watershed is relevant information, especially with the challenges of climate change in the future. | 0 | 1 | 1 | 7 | 7 | 4.25 |
| K31 | Students should understand that the stream system is the lifeblood of the watershed; it feeds it and is fed by it. | 0 | 0 | 2 | 8 | 6 | 4.25 |
| K51 | The history of the Flathead Watershed is important information for students. | 0 | 0 | 2 | 8 | 6 | 4.25 |
| K3 | Nonnative species (mostly introduced intentionally by managers) are major threats that are important for students to learn about in the Flathead watershed. | 0 | 0 | 3 | 7 | 6 | 4.19 |
| K9 | It is important to teach about natural environmental change in general. | 0 | 0 | 3 | 7 | 6 | 4.19 |
| K21 | Students should be aware of the stormwater conveyance system and that storm drains flow directly into our water bodies without treatment. | 1 | 0 | 1 | 7 | 7 | 4.19 |

| Round III: Knowledge | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| K34 | Knowledge of resources - natural, historical, cultural, land and water use (agriculture, mining, roads, residential, commercial), recreation, conservation, dams, and irrigation is essential information for students. | 0 | 0 | 2 | 9 | 5 | 4.19 |
| K48 | How the watershed impacts their lives and why they should care about it is essential information for students. | 0 | 0 | 2 | 9 | 5 | 4.19 |
| K16 | It is important that students learn that a river system affects the whole watershed not only by flowing partially below the surface, but also by how wildlife transfers nutrients from the stream to the upland. | 0 | 0 | 3 | 9 | 4 | 4.06 |
| K29 | Learning, how has this watershed changed over time, geologic, historic, present, is important information for students to be informed about. | 0 | 0 | 3 | 9 | 4 | 4.06 |
| K40 | Students should be aware of the international aspects of the Flathead watershed and its reach into Canada, including human impacts, since a watershed does not recognize international borders. | 0 | 1 | 2 | 8 | 5 | 4.06 |
| K49 | Knowledge gained through what is referred to as "STEM" (science, technology, engineering and math) courses is important to being able to make informed decisions about our watershed ecology and water quality. | 0 | 1 | 3 | 6 | 6 | 4.06 |
| K13 | Students should learn about "indicator" species such as bull trout and about its health and continued persistence as indicators of the health of the watershed. | 0 | 1 | 2 | 9 | 4 | 4.00 |
| K18 | Fire is an essential topic for students. | 0 | 1 | 3 | 7 | 5 | 4.00 |
| K36 | Students should be aware of the storm water conveyance system and that storm drains flow directly into our water bodies without treatment. | 1 | 1 | 0 | 9 | 5 | 4.00 |

| Round III: Knowledge | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| K38 | Learning about the influences of man through building communities, agriculture, recreation, and industry is relevant knowledge. | 0 | 0 | 4 | 8 | 4 | 4.00 |
| K41 | Have students know the names and location of key rivers and lakes, where the headwaters are, the location of the shallow aquifer, and other unique features within the watershed. | 0 | 1 | 3 | 7 | 5 | 4.00 |
| K5 | The concept of international cooperation in protecting a watershed is an important piece for students to learn. | 0 | 1 | 4 | 6 | 5 | 3.94 |
| K22 | Learning to test water quality by testing turbidity, temperature and dissolved oxygen at sites along water bodies throughout the watershed is relevant knowledge for students. | 0 | 0 | 4 | 9 | 3 | 3.94 |
| K25 | Understanding the history of how water has been managed is important. | 0 | 0 | 5 | 7 | 4 | 3.94 |
| K45 | It is important for students to recognize the difference between "belief systems" and "facts". | 0 | 1 | 4 | 6 | 5 | 3.94 |
| K12 | The four C's (clear, connected, complex and cold) are an essential concept for understanding of the Flathead watershed, particularly for animals such as the bull trout, an essential animal of the Flathead Watershed. | 0 | 0 | 5 | 8 | 3 | 3.88 |
| K46 | Students should understand how systems function, including biotic and abiotic sub-systems and how they are inextricably linked. | 0 | 0 | 4 | 10 | 2 | 3.88 |
| K50 | It is important that students know about watershed communities. | 0 | 0 | 6 | 6 | 4 | 3.88 |
| K6 | Mitigation and restoration methods are important information for students to learn and know. | 0 | 1 | 6 | 6 | 3 | 3.69 |
| K19 | Indian Education for All is knowledge that students should have. | 0 | 2 | 6 | 4 | 4 | 3.63 |
| K7 | An essential concept for students to know is how water was used to establish the Flathead basin. | 0 | 1 | 4 | 9 | 1 | 3.44 |

| Round III: Skills | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| S20 | Basic scientific inquiry and critical thinking are important skills for students. | 0 | 0 | 0 | 5 | 11 | 4.88 |
| S26 | Students, when looking to the Internet for information, need to always evaluate the source of information. | 0 | 0 | 0 | 6 | 10 | 4.75 |
| S16 | Critical thinking is important. Students should be taught how to ask the tough questions and then learn how to look for answers through research. | 0 | 0 | 0 | 6 | 10 | 4.69 |
| S1 | Scientific investigations involving developing questions, collecting data, analyzing data, and comparing data are skills students should have. | 0 | 0 | 0 | 6 | 10 | 4.63 |
| S21 | Students should be able to make observations, identify problems, formulate relevant questions, use appropriate tools and technology to collect and analyze data, make inferences, draw conclusions, communicate and defend findings. | 0 | 0 | 2 | 4 | 10 | 4.63 |
| S10 | A student should be able to interpret data and graphs. | 0 | 0 | 0 | 8 | 8 | 4.50 |
| S22 | The ability to create tables, picture graphs, bar graphs and picture maps to record and organize information and to be able to read, interpret, and use tables and graphs to identify patterns and trends, draw conclusions, and make predictions are important skills for students to have. | 0 | 0 | 0 | 8 | 8 | 4.44 |
| S25 | It is important to teach students to look beyond the rhetoric/popular opinion and ask their own questions, as well as how to search for their own answers or solutions provides a life skill. | 0 | 0 | 1 | 6 | 9 | 4.38 |
| S28 | Listening and observing is an important skill. | 0 | 0 | 0 | 8 | 8 | 4.38 |
| S7 | Field studies are great. | 0 | 1 | 1 | 4 | 10 | 4.25 |
| S8 | A student should be able to create, read, and interpret a map, from the schoolyard map to the watershed. | 0 | 0 | 1 | 7 | 8 | 4.25 |

| Round III: Skills | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| S27 | Imagination is important to encourage as students think of possible solutions. | 0 | 0 | 0 | 9 | 7 | 4.25 |
| S4 | Students should be able to know how to delineate a watershed; this means being able to read a map and decide where the ridges are and where the valleys are, and where a droplet of water would flow were it to drop at any point on that map. | 0 | 0 | 1 | 7 | 8 | 4.19 |
| S2 | Students should begin to conduct "research". | 0 | 0 | 1 | 8 | 7 | 4.13 |
| S12 | Create homework assignments that require students to investigate their environment. | 0 | 0 | 0 | 10 | 6 | 4.13 |
| S11 | Observation skills are essential so that students can sit quietly and observe the world around them. | 0 | 0 | 0 | 10 | 6 | 4.06 |
| S23 | Describing and explaining how biodiversity in animal and plant life affects a watershed. | 0 | 0 | 1 | 8 | 7 | 4.06 |
| S13 | Students should be able to read maps and landmarks and know the reservation watersheds. | 0 | 0 | 2 | 6 | 8 | 3.94 |
| S14 | Format the curriculum to make information available, but do not build perceptions. | 0 | 0 | 0 | 10 | 6 | 3.94 |
| S17 | Learning how to use a compass is an important and engaging outdoor skill. | 0 | 1 | 0 | 7 | 8 | 3.94 |
| S18 | Students can learn about and appreciate the Flathead Watershed through skills such as canoeing, rafting, kayaking, swimming, fishing, bird watching, boating etc. | 0 | 0 | 0 | 10 | 6 | 3.94 |
| S6 | Practicing observation skills through participation in a variety of observation exercises using a variety of senses can start in the classroom, then move to the school yard, and finally students can implement their newly developed skills out in the field in the Flathead Watershed. | 0 | 0 | 2 | 6 | 8 | 3.88 |
| S9 | A student should be able to read literature related to the landscape/ecology and write about where they live. | 0 | 0 | 2 | 7 | 7 | 3.88 |

| Round III: Skills | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Statement Number** | **Statement** | **Likert Scale Response** | | | | | **Mean Score** |
| | | **1** | **2** | **3** | **4** | **5** | |
| S3 | Conducting stream surveys, including water quality tests, stream flow, water depth, and sampling for macro invertebrates, is an essential skill. | 0 | 0 | 2 | 8 | 6 | 3.75 |
| S5 | "Nature journaling" or "field journaling" gives young students the tools they need to quietly observe what is going on around them. | 0 | 0 | 2 | 8 | 6 | 3.69 |
| S15 | Learning skills such as how to fish, hunt, hike, raft, etc. takes you to places that gives you a real appreciation for the area, and helps people to come to their own conclusions about the importance of conservation of our resources. | 0 | 0 | 3 | 7 | 6 | 3.56 |

| Round III: Dispositions | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| D23 | It is important for students to know what they can do to help protect our local watersheds. | 0 | 0 | 0 | 7 | 9 | 4.56 |
| D28 | Students should realize that all points of view should be treated with equal respect and value, using careful listening skills and asking questions. | 0 | 0 | 1 | 8 | 7 | 4.38 |
| D2 | Show students how the watershed impacts their lives and how they impact the watershed to create and share a proper attitude of caring. | 0 | 0 | 1 | 9 | 6 | 4.31 |
| D4 | An appreciation for the natural and cultural history of the Flathead Watershed is an essential attribution for students. | 0 | 0 | 2 | 7 | 7 | 4.31 |
| D6 | Students should see and feel the need to protect and sustain a healthy Flathead watershed. | 0 | 0 | 2 | 7 | 7 | 4.31 |
| D13 | It is important that teachers be committed to getting kids outside, for several reasons; first, the lesson takes on life. Second, being at that place establishes a relationship between the student and that site. | 0 | 0 | 2 | 7 | 7 | 4.31 |
| D15 | It is important to understand the balance between using the land and abusing the land. | 0 | 0 | 1 | 9 | 6 | 4.31 |
| D8 | For students, developing a sense of appreciation for the Flathead watershed is paramount to instilling a desire to take care of their environment. | 0 | 0 | 3 | 6 | 7 | 4.25 |
| D11 | Students should understand indigenous perspectives, but also understand more recent ties to the land, including early homesteaders, farmers, loggers, and industrial. | 0 | 0 | 1 | 10 | 5 | 4.25 |
| D12 | It is important that students develop the concept of conservation and understand the difference between conservation and preservation. | 0 | 0 | 2 | 8 | 6 | 4.25 |
| D17 | It is important to create a value for stewardship to leave a lasting legacy and a history of protective use, but not abuse. | 0 | 0 | 2 | 8 | 6 | 4.25 |

| Round III: Dispositions | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| D27 | It is important that students in the Flathead watershed understand that this ecosystem is one of the most intact, with exceptional water quality, and that rivers, floodplains, and aquatic habitats are well connected and functional; and that many similar ecosystems in the lower 48 have been degraded. | 0 | 0 | 3 | 6 | 7 | 4.25 |
| D5 | For students to develop a strong 'sense of place', they should understand the unique social and environmental history of the Flathead Valley. | 0 | 0 | 3 | 7 | 6 | 4.19 |
| D9 | Explicitly create learning opportunities that develop real awareness of this remarkable place so that the Flathead environment is not taken for granted. | 0 | 0 | 3 | 7 | 6 | 4.19 |
| D10 | Creating the next generation of "stewards" is a priceless goal that can be reached through establishing a relationship between the student and the outdoors when students are on the land and by the water. | 0 | 0 | 3 | 7 | 6 | 4.19 |
| D19 | Teaching students about multiple perspectives is necessary; there are issues such as management of lake trout in Flathead Lake in which not all the stakeholders agree with the tribal point of view. | 0 | 1 | 0 | 10 | 5 | 4.19 |
| D1 | It is important that students understand the profound wisdom and far reaching implications of the statement: "Whatever happens to the water happens to the people." | 0 | 0 | 4 | 6 | 6 | 4.13 |
| D16 | Nurturing a balance of use and protection within the watershed, of providing for our needs while caring for the watershed's health, is valuable to instill and develop in students. | 0 | 0 | 2 | 10 | 4 | 4.13 |
| D20 | History is important to learn about because it shows what human influence has done to the watershed and how it left it today. | 0 | 1 | 1 | 9 | 5 | 4.13 |
| D24 | Learning about amounts and types of water consumption is relevant for students. | 0 | 0 | 2 | 10 | 4 | 4.13 |

| Round III: Dispositions | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| D3 | It is important that students engage in life styles (choices and decisions) that protect and sustain a healthy Flathead watershed. | 1 | 0 | 3 | 5 | 7 | 4.06 |
| D26 | Learning about the local ecosystem will create a sense of stewardship. | 0 | 0 | 3 | 9 | 4 | 4.06 |
| D25 | Raising student awareness of watershed issues will hopefully influence their future actions in addressing the issues as adults. | 0 | 0 | 4 | 8 | 4 | 4.00 |
| D29 | Students need to learn to recognize and appreciate their own and other people's values about the same things, like the Flathead watershed; for instance the values of Native/Indigenous people who have lived here for 12,000 years, families who have lived here for generations, and people who have moved here last week. | 0 | 0 | 3 | 10 | 3 | 4.00 |
| D14 | Learning from the pioneers who are still living in the Flathead Valley is important, as they are able to provide historical perspective. | 0 | 0 | 4 | 9 | 3 | 3.94 |
| D21 | Legacy is a great concept to teach and discuss; let students define what they want their legacy of stewardship to be. | 0 | 0 | 4 | 9 | 3 | 3.94 |
| D7 | Salish, Kootenai and Pend d'Oreille history and cultural resources, such as films and books, have a tribal perspective and are important sources of information on science, history and contemporary information, including topics such as Indian Water Rights and native place names, which should be used in classrooms in the Flathead watershed. | 0 | 1 | 4 | 7 | 4 | 3.88 |
| D22 | The major issues affecting watersheds today, such as water rights, toxic spills from rail or truck, toxic cleanup, industrial pollution, are important issues for students to learn about. | 1 | 0 | 3 | 8 | 4 | 3.88 |
| D18 | It is valuable to know the Native American perspectives and to understand how the ecosystem has changed; such knowing could lead to a greater appreciation for the Flathead watershed. | 0 | 2 | 3 | 7 | 4 | 3.81 |

| Round III: Teaching Methods | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| T10 | Bringing resource people in as guest speakers is a way to get students interested and engaged. | 0 | 0 | 0 | 9 | 7 | 4.44 |
| T5 | It would be a science learning experience as well as fun for students to tour the players in our watershed, such as the Forest Service, wastewater treatment plants, storm water programs (the City of Kalispell has such a program), the County Landfill, etc. | 0 | 0 | 2 | 6 | 8 | 4.38 |
| T3 | A project-based approach would be a way to get students involved in learning the connections between the past and the present. | 0 | 0 | 1 | 9 | 6 | 4.31 |
| T7 | Appropriate guides should be used for students to learn about the plants and animals in the Flathead watershed, instead of memorizing. | 0 | 0 | 3 | 7 | 6 | 4.19 |
| T2 | Integration of some of the traditional ecological knowledge that has been passed down through generations of native people might best be incorporated into any learning process by directly engaging the native people in the development of educational and informational programs. | 0 | 1 | 4 | 5 | 6 | 4.00 |
| T1 | A great Socratic Seminar topic for students could be the statement: "Whatever happens to the water happens to the people." | 1 | 0 | 5 | 3 | 7 | 3.94 |
| T4 | Teaching about diversity can be accomplished through expression in subject matter teaching. An example is the multiple ways water quality can be introduced: explaining what scientists look for in their work, explaining the cultural importance of native fish and their waterways to indigenous people, or discussing various approaches to resource management of the same water body and why each manager might choose this approach. | 0 | 2 | 3 | 5 | 6 | 3.94 |
| T11 | Resource education events can and should be conducted outside on the lawns of schools or in neighborhood parks that may be in walking distance. | 0 | 0 | 7 | 6 | 3 | 3.75 |

| Round III: Teaching Methods | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statement Number | Statement | Likert Scale Response | | | | | Mean Score |
| | | 1 | 2 | 3 | 4 | 5 | |
| T8 | Reading about non-fiction topics is a good way to learn about animals and the watershed and satisfy common core standards requirements for young students. | 0 | 1 | 7 | 4 | 4 | 3.69 |
| T9 | It is possible to address climate change in a neutral way through water and the interconnected nature of surface and groundwater. Precipitation decreases can affect surface flows and groundwater recharge/discharge. If temperature changes the storage of water through decreased snowpack, that too can effect groundwater availability as well as surface water flows. | 1 | 1 | 3 | 8 | 3 | 3.69 |
| T6 | Students can discover 'snow towers' and the progression of snow melt through field trips and via visual presentations. | 0 | 0 | 8 | 7 | 1 | 3.56 |