

THE FLATHEAD WILD AND SCENIC RIVER SYSTEM: RESULTS FROM PUBLIC ENGAGEMENT ASKING ABOUT HUMAN-NATURE RELATIONSHIPS, THREATS AND CONTRIBUTORS TO SUCH RELATIONSHIPS, AND OPINIONS ABOUT PLANNING AND MANAGEMENT



Authors: Chris Armatas¹, Alan Watson, and Bill Borrie



Primary funding provided by the Western Wildland Environmental Threat Assessment Center,
United States Department of Agriculture, Forest Service Research and Development

JULY 2020

¹ Corresponding author: Christopher.armatas@usda.gov; (406) 542-4192

RECOMMENDED CITATION

Armatas, C.A., A.E. Watson, W.T. Borrie. (2020). *The Flathead Wild and Scenic River system: results from public engagement asking about human-nature relationships, threats and contributors to such relationships, and opinions about planning and management*. Prepared for the Flathead River Wild and Scenic Comprehensive River Management Planning Team. Missoula, MT: The Aldo Leopold Wilderness Research Institute, 121 pp.

ACKNOWLEDGEMENTS

We acknowledge support for this report from the Western Wildland Environmental Threat Assessment Center, the University of Montana, Aldo Leopold Wilderness Research Institute, and the Comprehensive River Management Planning Team on the Flathead National Forest and Glacier National Park. We also acknowledge the members of the interested public who participated in this research, whether within public meetings or out in the field. A special thanks to those who participated in the in-depth interviews, who invited me into their homes as gracious hosts, met me at public meeting spaces, or otherwise took valuable time to contribute to our understanding of how the Flathead Wild and Scenic River System is important to them.

All information collection was donated to the Forest Service through a Fellowship sponsored by the Oak Ridge Institute of Science and Education, not by employees of the USDA Forest Service.

EXECUTIVE SUMMARY

Between August 2019 and January 2020, social science research was completed in support of the comprehensive river management plan (CRMP) revision on the Flathead Wild and Scenic River system (Flathead WSR system). This report provides full analysis and results of this research, which includes multiple different perspectives about how people relate to the Flathead WSR system (i.e., ‘human-nature relationships’), those things (e.g., management actions, environmental change) that threaten or potentially benefit such human-nature relationships (i.e., ‘drivers of change’), and opinions about potential planning and management actions and goals for the future. Presentation and discussion of the results and the implications for CRMP revision and implementation are the primary purpose of this report.

Additionally, we strengthen the findings with an overview and integration of relevant social science research that has taken place within the context of the Flathead WSR system, which dates back to the development of the original plan shortly after designation in 1976. The methods applied for this social science are established within the context of National Forest and River planning, based upon a published protocol for understanding human-nature relationships and the threats and contributors to such relationships. This protocol is based upon multiple applications, pilot testing, and multiple peer-reviewed science publications. For this application, the methods include: (1) a fun, interactive exercise (Q-sort) that requires participants to prioritize elements (e.g., water quality, catch and release fishing, solitude) of their individual human-nature relationship; (2) a selection of drivers of change (e.g., river-user behavior, crowding, facilities, invasive species) most relevant to their prioritization; (3) a mapping exercise and; (4) in-depth interviews reflecting on human-nature relationships, drivers of change, and opinions on the CRMP and its implementation. Both quantitative and qualitative analysis are used. In sum, this report provides a comprehensive discussion of the varied human-nature relationships that people have with the Flathead WSR system.

Six archetypes

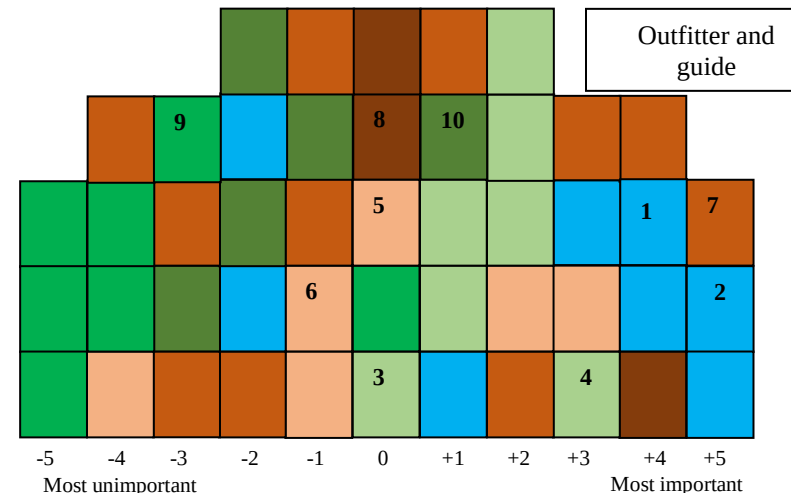
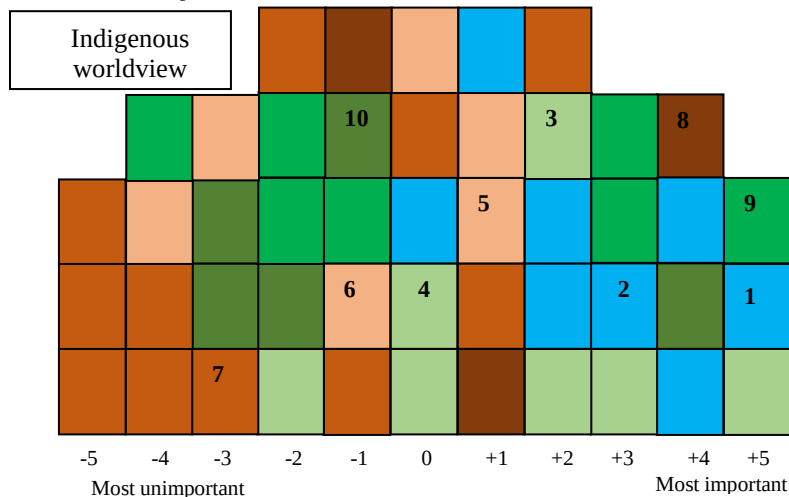
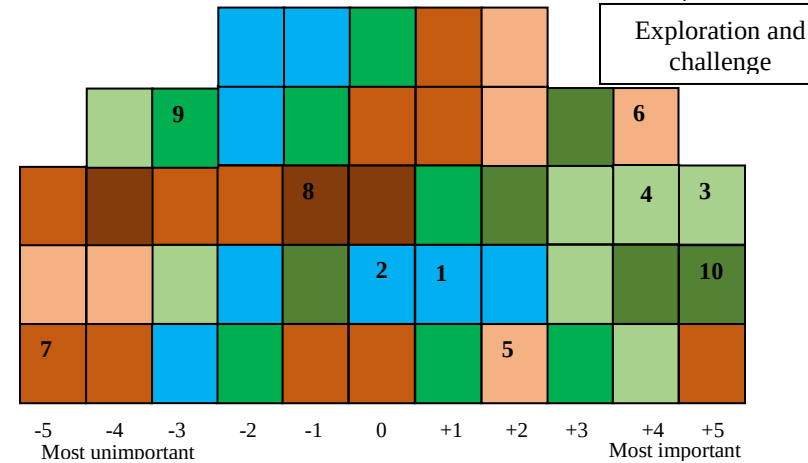
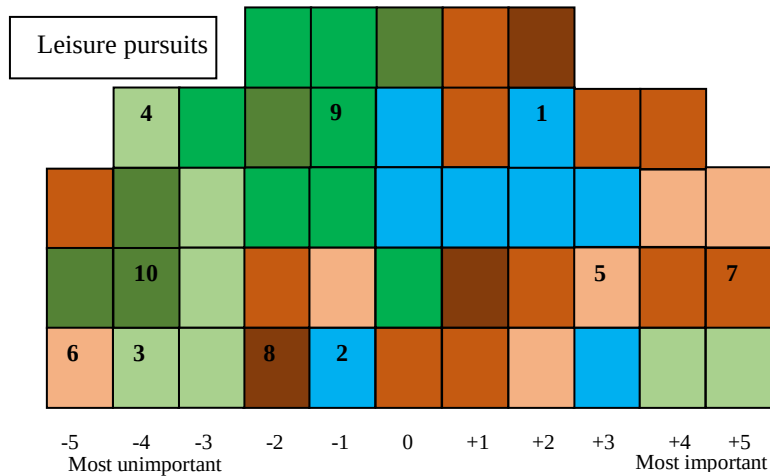
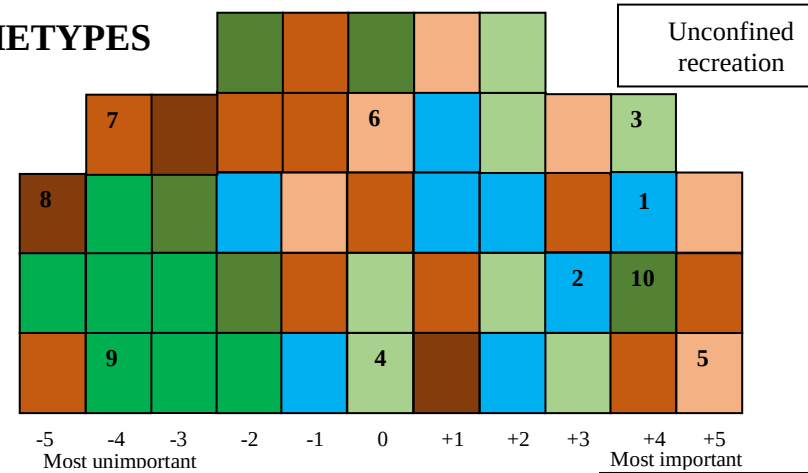
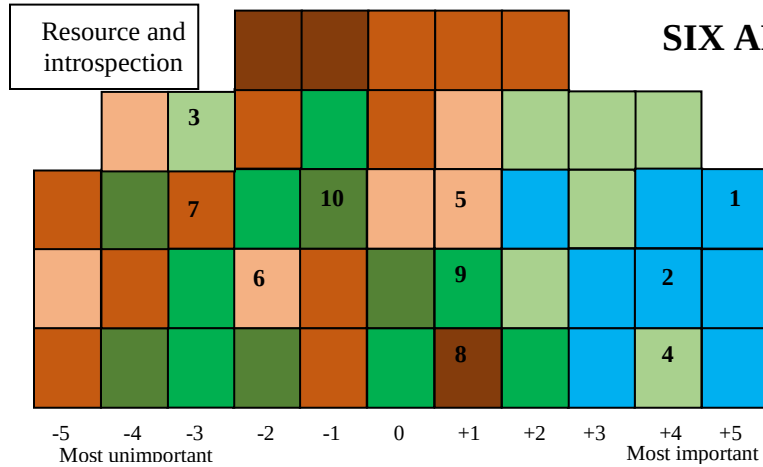
A primary component of the findings of this research are six typified human-nature relationships, or archetypes. These archetypes were developed through statistical analysis of Q-

sorts completed by 165 members of the interested public, whereby 47 human and ecological meanings and services (HEMS) were prioritized from ‘most important’ to ‘most unimportant’. All participants were provided with a set of 47 cards, each of which has a different HEMS on it (e.g., water quality, biodiversity, non-motorized river recreation, solitude, subsistence activities, experiences with limited planning). The HEMS were primarily derived from the outstandingly remarkable values descriptions by Flathead National Forest and Glacier National Park; according to the Wild and Scenic Rivers Act, these values are to be protected and enhanced.

The six archetypes are conveyed through illustrations known as ‘factor arrays,’ and they provide a visually stimulating way to understanding not only each individual archetype, but also the similarities and differences across the six archetypes. **The figure on the next page provides just a few highlights of the nuance and detail provided by the factor arrays (see Figures 4-9 in the full report for a thorough discussion of each archetype).** The figure below provides the following for each of the six archetypes:

- **Name:** given to each archetype based upon the HEMS prioritized as highly important (columns denote different values, rows do not – for instance, participants had to choose three HEMS for the +5 column). For example, the ‘resource and introspection’ archetype (illustrated in Figure 4) is referred to as such partially because the highest level of importance was given to *water quality* [+5], *biodiversity and abundance of wildlife* [+5], and *wildlife habitat and connectivity* [+5], as well as several social connection HEMS.
- **Prioritization of select HEMS:** these ten HEMS (e.g., aquatic habitat, being free from society and its regulations) were strategically chosen examples; the reader is encouraged to spend time with the fully populated factor arrays and associated discussion.
- **HEMS categorizations:** In order to support both the discussion of each archetype and the comparison of the archetypes, the HEMS are categorized (and color coded) based upon a rough differentiation between ‘human services’, ‘human meanings’, and ‘ecological meanings and services’. To be clear, the categorization scheme was done for the presentation of results only (i.e., respondents did not see the categorization during the sorting exercise). See Table 14 in full report for an elaboration on the categories.
- **Overstimulation?** Take your time, we think the figure can effectively convey knowledge and the potential of the factor arrays in five minutes; but we also recognize its complexity.

SIX ARCHETYPES



SELECT HEMS

- 1 = water quality
- 2 = aquatic habitat
- 3 = being free from society and its regulations
- 4 = solitude
- 5 = experiences with limited planning (ability to go whenever)
- 6 = Personal achievement from testing skills
- 7 = Guided recreation
- 8 = Native American use of River system
- 9 = Native American history and knowledge
- 10 = Social time with friends/family

HEMS CATEGORIES

Ecological meanings and services
Human meanings
History, culture, and ethnography
Social connection
Wilderness and reflection
Human services
Recreation and leisure activities
Recreation and leisure opportunities
Cultural and personal provisions

Facets of individual archetypes, and comparisons among them, become evident through inspection of this figure. The importance of water quality across perspectives and the polarizing nature of guided recreation are clear, as is the shared prioritization of ecological meanings and services by the ‘resource and introspection’ archetype, the ‘Indigenous worldview’ archetype, and the ‘outfitter and guide’ archetype. Regarding individual archetypes, the prioritization of ecological meanings and services, and the tradeoff in favor of wilderness and reflection over social connection justifies the naming of the ‘resource and introspection’ archetype. The ‘indigenous worldview’ archetype prioritizes Native American use of the Flathead WSR system (e.g., exercising treaty rights), as well as Native American history and knowledge. The ‘unconfined recreation’ archetype prioritizes the ability to access the Flathead WSR system and move unimpeded within that system; this is something that is shared with two other archetypes (i.e., ‘Indigenous worldview’ and ‘exploration and challenge’). The ‘leisure pursuits’ archetype prioritizes guided recreation and, other HEMS not numbered in the above figure, *shore-based recreation* [+4], *comfort, safety, and convenience* [+4], and *easy access to the river (e.g., paved sites, accessible trailheads)* [+5].

To enhance our understanding of the archetypes, the conversations with 19 peoples during in-depth interviews are integrated. The interviews, in part, asked respondents to consider and discuss their potential alignment with the full factor arrays (Figures 4-9). This qualitative research adds depth to the archetypes, such as the sentiments underpinning the prioritization of ecological meanings and services along with guided recreation and a related HEMS not featured (i.e., *local economic support (jobs/visitor spending)* [+4]). As Participant 13 stated in reference to the ‘outfitter and guide’ archetype:

Guided recreation...is important because that’s what I do for my business, but, I think as an ultimate user it is not the most important thing, for me. Water quality is, but I see myself as a mix in here of water quality, and solitude, aquatic habitat, non-motorized, you know catch and release is important. I think the quality of the water and the resource is the most important thing to me, personally, that’s where I see the longevity in the resource.

This comment highlights the multifaceted characteristic of human-nature relationships as people may view the importance of the Flathead WSR system from multiple perspectives (in this case, both professionally and non-professionally). It also underscores that people may identify with more than one archetype; indeed, in some instances, interview participants identified very

strongly with a single archetype, whereas others saw themselves represented partially by several different archetypes.

While the factor arrays and in-depth interviews provide a nuanced understanding of the six archetypes, the drivers of change exercise and subsequent statistical analysis can identify those factors or influences that may threaten or enhance human-nature relationships. For instance, there was a strong statistical and practical significance between people who selected a ‘permit system’ as a negative driver of change and the ‘unconfined recreation’ archetype. The in-depth interviews provide understanding as to why this may be the case, as explained by Participant 2:

With the permit system being the number one negative driver, because all of the other plus three, or four, or five most important categories are all impacted...by a permit system, you know, extended self-sustained experiences would be impacted, experiences with limited planning to go wherever would be impacted, dispersed camping without services may or may not be impacted, social times with friends and family would be impacted. Because now you are trying to schedule different people to go on a river trip with you, around your permitted time. And so people get excluded by holidays or their vacation time, or their work schedules. And so they can't go, you know. Instead of us trying to find a time that works with friends and family that we can all go, now everyone has to change their plans around whenever we got the permit, and you may or may not be able to go. I mean, I hear people going down the Smith all the time, with people they don't know. Because, you know, they happen to get lucky and get included in someone's trip where they had an extra space in the boat, and you know so much for going with friends or family. Now it's all about the river, instead of about the friends and family.

This comment draws a direct connection between how restricting access might influence one's human-nature relationship, particularly as it relates to the social connection element of spending time in the Flathead WSR system. This comment also captures, in part, a concern about an erosion of access to the system, which was highlighted as an issue for other archetypes as well, including ‘indigenous worldview’ and ‘exploration and challenge.’

Other results related to the drivers of change include a concern, particularly on the part of the ‘resource and introspection’ archetype, that human use of the Flathead WSR system will degrade the natural resource. The drivers of change that threaten the ‘Indigenous worldview’ archetype included anything that would impede the ability to pursue cultural practices and/or use

the Flathead WSR system for fostering and revitalizing cultural identities. This includes anything that may restrict access to the resource, as well as overarching environmental threats such as invasive species and climate change. Additionally, there are potential concerns related to the loss of cultural resources stemming from increased recreational use (e.g., impacts from vandalism to pictograph sites) as well as a lack of fire on the landscape. Regarding the latter point, Participant 15 stated: “the scarred trees and stuff like that too, if we are not managing by fire, they are going to disappear, you know so we do some hand clearing and other things are mimicking maybe a fire, part of that.” For the ‘outfitter and guide’ archetype, drivers of change that were mentioned were often related to the strained relationship between commercial users and private users. Often, it was noted that better education of outfitted clients with regard to proper etiquette as well as better education of the general public about the positive contributions of outfitters and guides could help to build a better relationship. Finally, the ‘leisure pursuits’ archetype has a generally positive view of the outfitting and guiding industry, as it was found that those who chose “commercial outfitter behavior” as a positive driver of change were more likely to align with this archetype; a fee system, where users have to pay to access the resource, was seen as threatening to this archetype.

The primary reason that the mapping exercise was implemented was to understand if there was an association between different archetypes (and relevant drivers of change), and specific river stretches or classifications within the Flathead WSR system. Nearly half of people did not highlight a specific stretch of river when completing their Q-sorts. However, factor analysis of participants’ Q-sorts based upon their responses to the mapping exercise indicated a relationship between the ‘Outfitter and guide’ archetype and the South Fork of the Flathead River. This finding is consistent with the importance assigned to several of the wilderness and reflection HEMS, as well as the high importance assigned to *catch and release fishing* [+4], as much of the outfitting and guiding on this Fork is focused on angling. This finding is notable as it stresses that future changes that may influence the ‘outfitter and guide’ archetype would be increasingly important if such changes took place within the context of the South Fork.

Additionally, the in-depth interviews yielded some insight into how different human-nature relationships varied across segments of the Flathead WSR system. One example worth noting is that several respondents noted how the wilderness trips (i.e., upper South Fork and

upper Middle Fork) remain as bastions of wildness and challenge. Participant 12 considered these areas the only two that have not wasted away, and Participant 13 noted they were the “last great wilderness” trips in the lower 48 States. Given these comments, we would expect those that are particularly interested in challenge and personal achievement, such as the ‘exploration and challenge’ archetype, to be sensitive to any changes taking place on these stretches of river running through designated Wilderness.

Human-nature relationships and drivers of change: focus on in-depth interviews

In addition to a thorough investigation of the archetypes, in terms of prioritized HEMS, tradeoffs among HEMS, relevant drivers of change, and different perceptions of specific river stretches, the results include a full qualitative analysis (i.e., coding and analysis to reveal underlying patterns of response) of the in-depth interviews. Through this analysis, it becomes evident that, irrespective of the archetype one aligns with, certain ideas, issues, and beliefs are shared by many. These ‘themes’ and associated ‘sub-themes’ are listed in the table below (along with the number of people commenting on the issue). In the full report, the themes are discussed in great detail, but the findings that emerge through this discussion include:

- the necessity of the Flathead WSR system for getting away from daily life;
- a desire to see unimpeded access to the system maintained.
- a general lack of support for restricting use (if use is to be restricted, protecting the natural resource appears to be the most accepted rationale)
- a belief that a primary issue is behavior of river users and others in the corridor;
- a sentiment that numbers of people on the river, in general, is not the biggest issue; instead, concerns were more nuanced and included issues related to large groups, commercial traffic, trains of pack rafts on the South Fork, and a regional-scale tourism force that lacks foresight and restraint and;
- an understanding that management and planning resources are generally lacking.

Also, irrespective of the archetype one may have identified with, it was clear that connecting with nature, or being immersed in nature was integral to peoples’ human-nature relationship. As with important relationships with other people, participants exhibited a high

level of intensity and investment in their connection to the Flathead WSR system. This was shown both by the language used and the emotions conveyed through earnest conversation, occasional laughter and, at one time, some tears. Of course, there are a variety of reasons that this connection is important for people (as explored in the sub-themes), but 16 participants made more general comments about the connection itself. For instance, Participant 1 noted that it is important to “feel connected with my surroundings,” and Participant 18 noted that, “literally, everything that is in my life is centered around my connection with nature.” In many cases, it was important for individual identity, and the language used went to a cellular level. As Participant 8 noted with regard to their human-nature relationship, “it means everything to me. It’s my church, if you will. The river, or the woods, being in the mountains, that is what I am about...so, it’s in my blood.” Similarly, Participant 16 stated that their human-nature relationship is “my lifeblood, that’s everything for me.”

Theme	Sub-themes	People commenting on issue (out of 19)
<i>Themes and sub-themes related to human-nature relationships</i>		
Connecting to nature	Unplugging and escaping	10
	Challenge and wildness	8
	Social connection	7
	Spirituality	4
Flathead WSR system across time, space, and society	Generational and cultural continuity	16
	Montana and its special natural resources	11
	Water quality	7
<i>Themes and sub-themes related to drivers of change</i>		
Impacts to the social experience	Conflict in the river corridor	14
	Erosion of unconfined recreation	13
	Crowding	9
	Access	9
	Technology	8
Impacts to the biophysical resource	Recreation impacts	11
	Invasive species	9
	Climate change	4
	Train spills and forest use externalities	3
Administrative capacity	Lack of on-the-ground presence	9
	Funding	6

Opinions on the CRMP and its implementation

During the in-depth interviews, participants were asked to ‘wear their planning and management hats’ for a moment to articulate what they would like to see in the CRMP and its subsequent implementation. These questions were asked both to obtain public input on the

CRMP, and perhaps foster empathy among the public with regard to the complex and challenging task facing the Planning Team. It appeared empathy was engaged or fostered, as the vast majority of respondents acknowledged the challenge. As Participant 16 stated: “It is easy to complain, it is easy to point out problems, the solutions, finding the solutions, it’s tough.” The table below lists the themes, sub-themes, and number of people commenting on each issue for this section of results.

Themes	Sub-themes	People commenting on issue (out of 19)
Process elements	Concerted effort and holistic approach	15
	Communication and transparency	13
	Community engagement	8
Management actions	Education of river users	15
	Facilities	11
	Human waste regulation	7

Again, these themes are discussed in full detail in the report, but what is clear is that participants are interested in seeing a concerted effort for the future management of the Flathead WSR system, which not only includes federal land management agencies but the communities of interest more broadly (e.g., NGOs, tourism entities). This call for cooperation flows from the drivers of change discussion, which noted frustrations such as a perceived lack of cooperation between the Forest Service and the National Park Service, particularly on the North Fork. Specifically, some participants expressed interest in seeing uniformity of management along both sides of the North Fork with more camping options on the National Park side. Additionally, there was an interest in a more concerted effort to address invasive species, as well as a desire to see efforts to promote tourism lessened. Other findings include the nearly widespread call for communication and transparency, both in terms of public outreach methods (meetings are preferred over press releases) and in terms of data presented (e.g., exact details related to monitoring of indicators such as encounters). The findings detailed with relation to the process elements theme is consistent with the level of investment and the intensity of connection to the Flathead WSR system that participants generally conveyed.

With regard to management actions specifically, there was a widespread belief that education would be positive; this was reinforced by the drivers of change activity, where education of river users was the most popular choice as a positive driver of change. Many

acknowledged that education is challenging, because it is difficult to effectively educate a broad range of experience levels with a single message, education has the potential to negatively influence peoples' experience, and it requires a lot of resources. Nonetheless, there appears to be acceptance for an education campaign. Specific needs for education mentioned include: leave no trace, on-river interaction etiquette, human waste management, fish identification and handling, river-access etiquette, awareness of inherent dangers of river, invasive species, and laws and policies (fishing regulations, high water rules with regard to trespass, the difference between public participation and government to government consultation with Tribes).

Generally, people did not request a high level of facilities at campgrounds, and focus was mostly on the river access points (e.g., hardening launch sites to prevent erosion) and creating or maintaining facilities that helped with waste management, both trash and human waste. As Participant 7 noted: "One of the things that I think would really be helpful would be requiring, on multiday trips, that people pack out their human waste. To me, it is just not acceptable to me anymore, on any river, to dig a hole."

So what? Potential benefits and implications of this research

This report can potentially support the CRMP Planning Team and the general public in three ways: public relations, decision-making, and framing the Flathead WSR system as being comprised of several niches.

A critical component of successful large-scale planning, either in the river or national forest context, is to both clearly communicate with the general public about decisions, and create an atmosphere where there is potential for relationship and trust building. The broad range of perspectives gathered, which are represented by a limited number of archetypes, can serve as communication tools to engage both the Planning Team and the general public. The archetypes may facilitate continued learning and discussion about how the Flathead WSR system supports the interested public and, consequently, they may help to align the Planning Team perceptions about what HEMS are important, what drivers of change are most relevant, and desired management actions going forward. For the general public, understanding the different archetypes may foster empathy and encourage productive conversation.

Improved communication between the Forest and the general public may be facilitated by this work, in part, because the disparate archetypes presented above illustrate how difficult Forest Planning is, as the inherent goal is to protect and enhance *all* the ORVs. Social science is among the knowledge sources that require consideration, also included are natural science (e.g., wildlife biology, botany), economic impact analyses, monitoring of human use (e.g., numbers of people floating the river on a given day, frequency of parking lots being full, rating of a float experience on a survey), monitoring of nature (e.g., eroded river accesses, bare vegetation at campsites, fish scars), and policy mandates and considerations (both legal and administrative). It is important to stress that all of this knowledge is important within the context of the CRMP revision. While this report and the social science presented can help meet the public call for clear and transparent communication as it relates to decisions related to the CRMP revision and its future implementation, it is also worth noting that the complexity of the task and diversity of perspectives involved generally mean that no single piece of information trumps all else.

The reality of river planning and management is that decisions made (e.g., improved river accesses, education campaigns, use-allocation measures) will affect those who have human-nature relationships with the Flathead WSR system. One potential benefit of the public input gathered is the ability to understand perceived tradeoffs regarding the importance of HEMS among the six archetypes. An implication of understanding such situations is that planners and managers can better understand perceptions of how increasing the provision of some HEMS may influence the provision of another. This can help the CRMP team understand if a planning decision is likely to affect the archetypes in different ways, and if such decisions may create backlash from the public. Lastly, the entire body of knowledge presented, ranging from the common themes in the in-depth interviews to the river user surveys dating back to 1980-1981, identify particular issues or beliefs that have endured over time and are still highly relevant. For instance, the general opposition to restricting use for reasons other than protecting the biophysical resource is evident in all three river user surveys dating back to 1980-1981, the in-depth interviews, and the public comments collected during the scoping period in August-September 2019.

In some ways, the Flathead WSR system is already considered to include different niches or, in other words, different sections of the River system are perceived to provide different

conditions and HEMS. For instance, the different Wild and Scenic River classifications (i.e., recreational, scenic, and wild) are dictated by the level of shoreline development and the history of water impoundment. The results presented in this report show that, to some extent, the various publics also view the Flathead WSR system in terms of different niches. This may be relevant, because the managers and planners for this river system are required, for instance, to maintain a diverse range of recreational activities (as per the recreation ORV), but they are not required to ensure that all facets of the recreation experience are available on every segment of river within the Flathead WSR system. For instance, ‘solitude’ is an important element of recreation on the Flathead WSR system, but its inclusion as part of the recreation ORV does not mean that ‘solitude’ (however defined) will be experienced on all stretches of river at all times. But, what it does mean is that within the Flathead WSR system at large, one may be able to experience solitude in some portions of the river system some of the time. As the CRMP team develops and rolls out a new river plan, it may be helpful to think about how the various archetypes, the shared and differing themes critical to human-nature relationships, and the relevant drivers of change align or do not align with different niches of the Flathead WSR system. In communicating these niches to the public, it will hopefully become apparent that one’s human-nature relationship is being accommodated within some portion of the system.

Being integrated within public meetings and field visits has allowed this public engagement approach to gain legitimacy and access to a diverse range of publics. These engaged citizens are vocal and attentive to issues of Wild and Scenic River management and planning, and this approach has successfully tapped their expertise and desire to be meaningfully involved. With a data-driven approach and subsequent analytical opportunities, the public recognizes this activity has scientific legitimacy and independence. While building on existing planning documents, the insights and results of this activity are neither obvious nor pre-determined. The public engagement research yields insights and documentation of the relationships the public has with the Flathead WSR system not previously available.

TABLE OF CONTENTS

1. INTRODUCTION.....	1
2. OVERVIEW OF EXISTING SOCIAL SCIENCE RESEARCH ON THE FLATHEAD WILD AND SCENIC RIVER SYSTEM	3
2.1. Two early studies: ‘way of life’ in the Flathead Valley (1975), and the impacts on North Fork residents of proposed coal mining (1977)	6
2.2. Survey of river floaters: 1980-1981.....	7
2.3. Survey of river corridor users: 1997-1999	9
2.4. Survey of river users on Upper South Fork in 2011	11
2.5. Survey of river users: 2012-2014.....	12
3. SOCIAL SCIENCE METHODS: A DESCRIPTION OF HOW PUBLIC INPUT WAS GATHERED AND ANALYZED IN TWO PHASES.....	14
3.1. Phase one: social vulnerability protocol.....	14
3.1.1. Step one: prioritize human and ecological meanings and services (Q-sort).....	14
3.1.2. Step two: select most relevant drivers of change.....	18
3.1.3. Step three: demographic information and mapping exercise	21
3.1.4. Analysis of Q-sorts and drivers of change exercise.....	23
3.2. Phase two: In-depth interviews	26
3.2.1. Interview methods	26
3.2.2. Analysis methods.....	29
4. RESULTS: SUMMARY STATISTICS OF SAMPLE AND GENERAL SORTING OF HEMS AND DRIVERS OF CHANGE	30
4.1. Who participated?.....	30
4.2. Summary of the importance and unimportance assigned to human and ecological meanings and services (HEMS)	33
4.3. Summary of positive drivers of change selected by respondents.....	37
4.4. Summary of negative drivers of change selected by respondents.....	40
4.5. Summary of mapping exercise: where did the general public focus spatially?	43
5. RESULTS: HUMAN-NATURE RELATIONSHIPS, DRIVERS OF CHANGE, AND OPINIONS ABOUT THE CRMP REVISION	44
5.1. Six human-nature relationships: HEMS prioritized, relevant drivers of change, and connections to specific areas on the map.....	45
5.1.1. Resource and introspection archetype.....	47
5.1.2. Unconfined recreation archetype	52

5.1.3.	<i>Leisure pursuits archetype</i>	55
5.1.4.	<i>Exploration and challenge archetype</i>	58
5.1.5.	<i>Indigenous worldview archetype</i>	61
5.1.6.	<i>Outfitter and guide archetype</i>	64
5.2.	Are human-nature relationships and drivers of change tied to specific river stretches or classifications?	66
5.2.1.	<i>The South Fork and the ‘Outfitter and guide’ archetype</i>	67
5.2.2.	<i>Specific locations and the in-depth interviews</i>	67
5.3.	What did the publics say about their human-nature relationships?	69
5.3.1.	<i>Connecting to nature at the individual level</i>	70
5.3.2.	<i>Flathead WSR system across time, space, and society</i>	74
5.4.	What did people say about relevant drivers of change? A focus on threats	78
5.4.1.	<i>Impacts to the social experience</i>	79
5.4.2.	<i>Impacts to the biophysical resource</i>	85
5.4.3.	<i>Administrative capacity</i>	87
5.5.	Wearing their planning and management hats: The publics’ opinions on the CRMP and its implementation	88
6.	SO WHAT? A DISCUSSION OF POTENTIAL BENEFITS AND IMPLICATIONS OF THIS PUBLIC INPUT	95
6.1.	Public relations: providing support for enhanced transparency, communication, and relationship building	95
6.2.	Understanding how CRMP decision-making may impact the public	98
6.3.	Thinking of the Flathead WSR system in terms of difference niches	100
7.	CONCLUSION	102
	REFERENCES	103

LIST OF FIGURES

Figure 1. (A) Board that participants used to prioritize 47 HEMS; (B) Completed Q-sort	17
Figure 2. (A) Visual guide for the drivers of change exercise; (B) example of completed drivers of change exercise with Q-sort and demographic information visible	20
Figure 3. Mapping exercise completed by participants	22
Figure 4. Resource and introspection factor array	49
Figure 5. Unconfined recreation factor array	53
Figure 6. Leisure pursuits factor array	57
Figure 7. Exploration and challenge factor array	59
Figure 8. Indigenous worldview factor array	62
Figure 9. Outfitter and guide factor array	65

LIST OF TABLES

Table 1. Social science research focused on the Flathead WSR System and surrounding communities	4
Table 2. Results from experiential questions (1997-1999 survey)	10
Table 3. Results related to support for management actions focused on restricting use (1997-1999 survey)	10
Table 4. Encounters impact rating including no encounters (2012-2014 survey)	13
Table 5. Encounters impact rating conditional on a positive or negative response (2012-2014 survey)	13
Table 6. List of human and ecological meanings and services prioritized by the interested public	16
Table 7. List of drivers of change (provided on separate cards) that participants considered after Q-sort	19
Table 8. Summary of sample for public engagement exercise	31
Table 9. Primary residences listed by respondents (n=159)	32
Table 10. Summary of how HEMS were generally sorted by respondents (min, max, and median values) (n=157)	35
Table 11. Counts and sample percentage of positive drivers of change selected by respondents (n=157)	38
Table 12. Counts and sample percentage of <u>negative</u> drivers of change selected by respondents (n=157)	41
Table 13. Summary of responses to the mapping exercise (n=159)	43
Table 14. Illustration and brief explanation of HEMS categorization	46
Table 15. Association between drivers of change selected and resource and introspection archetype	51
Table 16. Association between drivers of change selected and unconfined recreation archetype	54
Table 17. Association between drivers of change selected and leisure pursuits archetype	58
Table 18. Themes and sub-themes related to the human-nature relationship	69
Table 19. Themes and sub-themes related to relevant drivers of change	78
Table 20. Themes and sub-themes related to publics' opinions about CRMP revision and its implementation	89

1. INTRODUCTION

Between August 2019 and January 2020, social science research was completed in support of the revision of the comprehensive river management plan (CRMP) on the Flathead Wild and Scenic River system (Flathead WSR system). This report provides full analysis and results of this research, which includes multiple different perspectives about how people relate and connect with the Flathead WSR system (i.e., ‘human-nature relationships’), those things (e.g., management actions, environmental change) that are considered threatening or potentially beneficial to such human-nature relationships (i.e., ‘drivers of change’), and public opinions about potential planning and management actions and goals for the future.

At public meetings, as well as at various locations in the field (e.g., Polebridge, Spotted Bear campground, raft company in West Glacier), 165 members of the general public contributed input in the initial phase of research, which was quantitative in nature (i.e., analyzed statistically, input was provided in around 30 minutes using, in large part, a prioritization exercise). A secondary phase of research gathered input from 19 people, most of which also participated in phase one. This phase of research was qualitative, which consisted of in-depth conversations typically lasting 60-90 minutes, and analysis includes a systematic coding of interview transcripts. The purpose of the secondary phase of research was to add depth and validity to the initial phase of research and, additionally, it allowed a relatively unimpeded exploration of the issues important to members of the interested public, and it allows for a conveyance of the ‘voice’ of the interested public through direct quotes.

The research methodology is derived from an established science protocol focused on supporting National Forest planning and management with a structured public engagement process ([Armatas et al., 2019](#)). This report is comprised of six additional sections, each of which are briefly summarized in the following bullet points:

- **Section 2** reviews six social science research projects completed between 1975 and 2014 that focused on the Flathead WSR system and/or its surrounding communities. Three of these research projects were river user surveys; an initial survey (1981-1982) and two replications (1997-1999, 2012-2014). These social science data allow for trends analysis in relation to specific issues (e.g., important river experience attributes, perceived issues and preferences for management) within the context of the same targeted population of Flathead WSR system

users. When the 2019-2020 social science research is included, a robust foundation of knowledge is apparent based both on spatially-broad survey methodology and in-depth qualitative methods.

- **Section 3** provides a summary of social science methods and analysis used for the public engagement process that is of primary focus in this report (i.e., the research completed between August 2019 and January 2020).
- **Section 4** details the summary results of the public engagement social science.
- **Section 5** describes the different human-nature relationships and drivers of change.
- **Section 6** discusses the implications of the social science knowledge surrounding the Flathead WSR system for the purpose of the CRMP and its future implementation.
- **Section 7** concludes with a very brief recap of the main messages.

It should be made clear that ‘social science’ is defined as formal and structured efforts focused on how humans perceive, connect, interact, and/or value the Flathead WSR system, which can be *roughly* distinguished from other critical efforts focused on understanding the system, including natural science (e.g., wildlife biology, botany), economic impact analyses, monitoring of humans (e.g., numbers of people floating the river on a given day, frequency of parking lots being full, rating of a float experience on a survey), and monitoring of nature (e.g., eroded river accesses, bare vegetation at campsites, fish scars). It is important to stress that all of this knowledge is important within the context of the CRMP revision, which is a complex and multifaceted process. Indeed, the recent in-depth interviews were full of such acknowledgements about the challenging and complicated task facing the CRMP planning team. Which is to say, this report focuses primarily on the social science, a critical contributor to the process that requires clear communication, and acknowledgement and consideration of the ideas, beliefs, preferences, and values embedded in peoples’ relationship with the Flathead WSR system.

The intended audience of this report are members of the general public and the CRMP team. Therefore, the focus of this report is on current and past research results and implications of such results for the future planning and management of the Flathead WSR system. There is limited information on scientific methods and methodology; however, if the reader is unsatisfied with the level of detail on scientific methodology included in this report, the corresponding author (contact details on title page) is available for discussion.

2. OVERVIEW OF EXISTING SOCIAL SCIENCE RESEARCH ON THE FLATHEAD WILD AND SCENIC RIVER SYSTEM

In 1957, almost twenty years prior to the Flathead River system being designated as Wild and Scenic, Dr. John Craighead discussed the potential impact of damming of the Middle Fork of the Flathead River. In part, it was noted that “the scenery is superb, fish and wildlife are abundant and in every direction the outdoorsman meets the challenge of primeval country” ([Craighead, 1957:16](#)). While this opinion piece in ‘Montana Wildlife’ is not based upon social science, or a systematic view of peoples’ perceptions and/or connections to the Flathead River system, it does represent an expression of concern that highlights issues that would become subject to social science. The issues are: (1) the unique characteristics of the resource and the associated human values (e.g., wild places, recreation, educational opportunities, important native fish populations); (2) the potential for the Flathead area (i.e., not only the River system but also its surrounding communities) to grow as a recreational hotspot and; (3) the need to understand the public interest as it relates to economic growth, environmental protection, and the various values flowing from the Flathead River system. Notable social science focused on these issues within the context of the Flathead WSR system (both its designation and subsequent management) is chronologically listed in Table 1.

Prior to reviewing the basic findings of the research listed in Table 1, it is worth discussing, at a basic level, how the different research methods are interpreted. For the purposes of this report, two major distinction between the research methods listed in Table 1 are made. First is the ability to generalize findings to the population of interest. For those studies applying a ‘survey methodology’, there is a fundamental aim to project the findings of the research (usually based upon a sample of participants) to a ‘population of interest’. Or, in other words, to assert that findings in a social science survey (e.g., opinions about management, important elements of the recreation experience, demographic characteristics) represent those sentiments and characteristics of the population of interest.

For instance, the three Flathead River user surveys (i.e., 1981-1982, 1997-1999, 2012-2014) aimed to understand the *river corridor user* (e.g., floaters, hikers within river corridor) population across the Flathead WSR system, and so findings of those surveys aim to be representative of the population of river users (e.g., hikers, stock users, boaters) in those years

across the entire river system. For example, in the 2012-2014 River user survey, respondents were asked what an acceptable wait time would be to launch their watercraft, and about 30 percent of respondents stated a time within the range of 6-10 minutes ([Dalenberg et al., 2018](#)). Given the survey methodology, it can *cautiously* be asserted that 30 percent of river users across the Flathead WSR system consider 6-10 minutes to be an acceptable wait time for launching their boat. Slightly differently, the study by [Moulton \(2012\)](#) focused on the river user population in the Upper South Fork, and the study by [Espeseth \(1979\)](#) had a ‘population of interest’ of residents in the North Fork Valley. The conclusions of these studies, therefore, are only intended to apply to the respective populations of interest; it is important to stress that results from a survey of ‘river users’ cannot be extended to other populations, such as the general population of Flathead County or any other general population. Research methods that aim for generalizable results typically aim for ‘representative samples’ that are procured through randomized sampling methods; or in the case of [Espeseth \(1979\)](#), a goal to census all residents in the North Fork.

Table 1. Social science research focused on the Flathead WSR System and surrounding communities

Year(s) of research	Title of research project	Research method	Reference for work
1975	Lifestyles of Western Montana: A comparative study	Content analysis of newspaper articles in the Flathead Region	(Drummond et al., 1975)
1979	The proposed Cabin Creek coal development: The social impact for the North Fork of the Flathead River	Survey methodology and individual interviews	(Espeseth, 1979)
1981-1982	The Flathead River Study: Management Unit Analysis	Survey methodology	(McLaughlin et al., 1984)
1997-1999	Flathead River User Survey	Survey methodology	Unpublished – analysis provided in this report
2011	Upper South Fork of the Flathead users: What social setting attributes are the most important?	Survey methodology	(Moulton, 2012)
2012-2014	Flathead Wild and Scenic River Visitor Survey	Survey methodology	(Dalenberg et al., 2018)
2019-2020	Understanding human-nature relationships and relevant threats and contributors	Q-methodology and individual interviews	Full results and analysis provided in this report

On the other hand, those research projects employing content analysis, individual interviews, and Q-methodology, while having a population of interest, are not typically interpreted in a way that is generalizable. For instance, if 60 percent of people participating in individual interviews or the Q-methodology data collection exercise (described more fully below) hold some perspective, the research methodology is *not* designed to assert that 60 percent of the population of interest holds such a perspective. Often, these research methods focus on understanding both the breadth and depth surrounding some research topic (e.g., human-nature relationships with the Flathead WSR system) without any intent to understand how particular viewpoints are distributed across a population.

The second distinction related to the research methods listed in Table 1 is that in the case of the quantitative research (i.e., survey methodology, Q-methodology), the findings are limited only to the things the researchers thought to include. That is, items or questions included in a survey or Q-methodology study are, ultimately, finalized by a researcher (though good practice aims for input from, in the context of this report, the interested publics and natural resource professionals alike). On the other hand, the qualitative research (i.e., individual interviews) places fewer bounds on what the findings might entail, as the conversational and transactive nature of an interview can wander.

These differences between research methods highlight the potential benefit of considering all the existing social science in aggregate, particularly when discussing the recent public engagement research. Because while many of the points raised in the 2019-2020 work is not accompanied by some estimate as to how such sentiments are distributed across the population, consultation with previous social science may provide insight into how opinions are spread across a population. Also, the findings from the individual interviews allow for potentially new issues and ideas to arise without the constraints inherent to quantitative social science, which is important given the constant evolution of the Flathead WSR system, its surrounding communities, and peoples' human-nature relationships. This brief overview of research methods is generally lacking nuance, but the basic distinctions are important. As a final note, the power and ability of particular research methods are, of course, subject to limitations based upon the execution of individual studies, but these methodological discussions are mostly omitted in this report in the interest of space.

2.1. Two early studies: ‘way of life’ in the Flathead Valley (1975), and the impacts on North Fork residents of proposed coal mining (1977)

Early research within the context of the Flathead WSR system was not focused on the specifics of river use and recreation, but on the on the larger social-ecological system, which includes the surrounding communities and the various viewpoints related to overarching topics such as economic development, and the balance between nature protection and visitor use. These studies are notable, in part, because some of the issues raised in the 1970s emerged in the 2019/2020 public input discussed below.

For instance, the research by [Drummond et al. \(1975\)](#) outlined the ‘way of life’ of those people of the Flathead area. The study was completed by the Department of Anthropology and the Institute for Social Research at the University of Montana, and it was cited within the original ‘study report’ of the Flathead River system *prior* to designation ([Flathead National Forest, 1975:11-14](#)). The study was also cited in the final environmental impact statement released closely following designation ([Flathead National Forest, 1977:25-28](#)). The publication for this study was not available but, methodologically, it was said to include an assessment of various newspaper outlets in the area ([Espeseth, 1979](#)). According to the three-page citation of [Drummond et al. \(1975\)](#) from the Flathead National Forest documents ([Flathead National Forest, 1975, 1977](#)), the study focused on differences and similarities between ‘lifestyles’ in Whitefish, Columbia Falls, and Kalispell. Among the conclusions were a general interest for recreational activities and the beauty and appreciation of the natural environment; as well as the struggle for residents to reconcile the desire for natural amenities and the utilization of natural resources for commerce and economic prosperity.

Much of the description of the three main population centers in the Flathead Valley highlighted the connection to resource utilization (timber, hydropower, mining, and oil leasing), the recognition and increasing interest in “the environment as an attraction for tourism”, and the high value and priority placed on “preserving the recreational and aesthetic surroundings” of the area. The specific issues facing the communities of interest in the area have evolved with the River system and Flathead Valley; for instance, coal mines up the North Fork were more concerning than the effects of levels of tourism. Nonetheless, the following general observation made by [Drummond et al. \(1975\)](#) appears to hold today: “residents are accustomed to new issues

and can be expected to actively participate in making decisions that in their view will alter their habitat or ways of life.”

The study by [Drummond et al. \(1975\)](#) focused at a broad spatial scale compared to [Espeseth \(1979\)](#), who studied the potential impacts of proposed mining operations on residents in the North Fork drainage using surveys and community observation. For the North Fork residents at the time, the focus was on “unspoiled surroundings, the river, the mountains, air, wildlife, which is equated with privacy, peace and quiet”, and “freedom of movement and access” to Forest Service lands and waters ([Espeseth, 1979:136-137](#)). Additionally, respondents viewed the North Fork as a place that should be relatively free from development; as one individual noted “wilderness itself has some value that should be respected and preserved” ([Espeseth, 1979:137](#)).

Within the context of the social science recently completed, these early studies reflect a continuity in types and fundamentals of human-nature relationships despite changing times and specific issues. While these studies are not necessarily directly relevant to the contents of the CRMP revision, they do provide important and potentially valuable context about the history of the area and peoples’ connection to the landscape. On the other hand, the history of research focused on users within the Flathead WSR corridor may support CRMP decision-making, and communication of those decisions, more directly. Each of these research efforts is briefly discussed in turn.

2.2. Survey of river floaters: 1980-1981

During the float seasons of 1980 and 1981, a survey of floaters was completed. [McLaughlin et al. \(1984\)](#) is the source document for this extensive and rigorous study, which included the collection of 5418 ‘front-end’ surveys in the field, and the collection of 1831 mailback surveys. The 5418 ‘front-end’ surveys included a relatively limited amount of information, when compared the more extensive mailback surveys. These data constitute the baseline social science data for river user characteristics (e.g., group size, type of crafts used), experiential preferences, perceived quality of the experience, and opinions about management for the original CRMP. This study analyzed the survey responses by Flathead WSR system section (e.g., upper North Fork, lower Middle Fork). The survey itself (e.g., questions asked, issues focused upon) was a cooperative effort between a research team, Flathead National Forest,

Glacier National Park, and Montana Department of Fish, Wildlife, and Parks. According to [McLaughlin et al. \(1984:1\)](#), “a 30-member steering committee including representatives from these agencies as well as representatives of the outfitters, recreation researchers, private land owners having lands adjacent to the river, and recreation users was formed. This committee insured that interested publics have had input throughout the term of the project.” The exact details of how this steering committee provided input on this floater survey is unclear.

One facet of this study was to understand survey participants’ ‘desired recreation experience’, which were defined through a limited set of 11 researcher generated study components including ‘achievement’, ‘escaping physical pressure’, ‘escaping personal-social pressure’, ‘general learning’, ‘risk taking’, ‘relationships with nature’, ‘being with people’, ‘nostalgia’, ‘family togetherness’, ‘exercise and physical fitness’, and ‘meeting and observing other people.’ For desired recreation experiences, ‘relationships with nature’ was the most important component of the recreation experience across all but two segments of the sample and, generally, ‘meeting and observing other people’ was among the least important components.

Another facet of the study was to understand preferences for floaters with regard to guidelines for distributing use. To that end, respondents were asked to indicate approval, disapproval, or ‘no opinion’ to twelve guidelines. Examples of the guidelines include:

- impacts to vegetation, wildlife and other resources should be considered above all else;
- should be the same for all users regardless of whether they float the river on their own or with outfitters;
- avoid encouraging use by limiting Park or Forest Service advertising and promotion;
- provide for trips on a first-come, first-served basis;
- give local users better opportunities to participate;
- allow greater access to those owning land along or near the river;
- give priority to individuals who have river running skills;
- give all users who value the experience highly better opportunities to participate;
- provide an opportunity for business stability for outfitters.

According to [McLaughlin et al. \(1984:226\)](#), “floater preferences for guidelines to distribute use on the river generally *approved* of giving priority to reducing physical impacts, reducing advertising, and providing few restrictions for the public. Guidelines that were disapproved generally were those that would have favored specific publics (e.g., experienced users, local users, first-time floaters, or local land owners).” These findings were generally unchanged when

different types of users were compared (e.g., first time versus experiences, local versus non-local).

The final facet of this study to be summarized are the findings related to floater preferences for facilities. Twenty-seven percent of participants did not want any facilities added to the Flathead WSR system. The following facilities were the top six among those who did want facilities and/or services: toilet facilities, garbage containers, launch sites, information displays, and water faucets.

2.3. Survey of river corridor users: 1997-1999

This report provides a very basic analysis of these data for the first time. This effort to engage users primarily included floaters, but also captured hikers, shore-based anglers, and others. At a variety of river accesses, surveys were distributed both face-to-face and left on cars; additionally, river outfitter and guiding companies were given surveys to distribute to clients (a request for one survey per customer per day). The surveys were distributed partly as a research effort and partly as a monitoring effort², and the resources contributed to this survey effort was relatively limited when compared to the other survey efforts discussed in this section. In the end, 385 people were surveyed over the course of three years, the sampling plan appeared rigorous, and the execution of that plan was earnest. Furthermore, some of the research questions asked, such as the importance of solitude or family togetherness for one's river experience, were asked in over 30 years in three separate efforts (i.e., 1980-1981, 1997-1999, 2012-2014). And so, analyzing trends over time is possible.

Over the three primary use seasons, four different survey forms were used. However, there were several questions that were asked on all four different surveys, including the

² We can distinguish research, in part, as formal efforts aimed at better understanding what to monitor. That is, choosing what to monitor (e.g., water quality, fish numbers and health, solitude, behavior, satisfaction, wildness) is partly a task of research but, once an indicator is chosen, then there is the task of monitoring that chosen indicator. For instance, the river surveys distributed from 1997-1999 asked people to rate several items on *importance of item to quality of experience* (e.g., solitude, rapids, building skills) and then, subsequently, to rate the same several items on *how the visit actually was as an experience* (e.g., how was your solitude, how were the rapids, was the river stretch a good one for building skills?). The aim is to monitor what is important to peoples' experience, but the actual monitoring is influenced by a variety of considerations such as feasibility, practicality, affordability, and intrusiveness to the river user. It should be noted that this distinction between research and monitoring is a simple one, as the 'threats approach' in recreation research has guided us mostly in understanding what experiences we want to protect and then determine the things that threaten them. Therefore, monitoring 'threats' as opposed to 'experiences' is perhaps more common. For instance, solitude is one component assumed to be desired, and monitoring encounters (i.e., a 'threat' to solitude) is common practice.

importance one assigns to ‘river rapids’, ‘experiencing solitude’, ‘experiencing wildness’, and ‘fishing’; on one survey form (completed by 100 people), participants were asked the importance one assigns to ‘experiencing a natural environment’ (Table 2).

Table 2. Results from experiential questions (1997-1999 survey)

Importance assigned to component of respondents experience*	Mean**	Std. Dev.
Experiencing the natural environment (n=93)	4.30	0.92
Experiencing wildness (n=362)	4.12	1.01
Experiencing solitude (n=364)	3.84	1.07
River rapids (n=360)	3.78	1.21
Fishing (n=360)	2.85	1.49

Notes: *Experience components are based upon only a single item.

**Mean scores are based on a five point scale where: 1=Very Unimportant; 2=Unimportant; 3=Indifferent; 4=Important; 5=Very Important

As shown, ‘experiencing the natural environment’ was considered the most important to one’s experience, though the small sample asked this question suggest that the result should be considered with caution. For the experiential components asked of all 387 people, ‘wildness’ was the most important.

Table 3 presents the results of the 100 people asked about approval or disapproval for six guidelines for distributing use that could be applied in the event that “increased use becomes a problem”.

Table 3. Results related to support for management actions focused on restricting use (1997-1999 survey)

Guideline	Approve (%)	Disapprove (%)	No Opinion (%)
Impacts to vegetation, wildlife and other resources should be considered above all else (n=92)	76%	11%	13%
Should be the same for all users regardless of whether they float the river on their own or with an outfitter (n=91)	63%	19%	19%
Provide for trips by advanced registration so that people would be assured of getting a trip before they left home (n=89)	56%	35%	9%
Provide an opportunity for business stability for outfitters (n=91)	38%	27%	34%
Provide for trips on a first-come, first-served basis (n=89)	36%	46%	18%
Let everyone go who wants to go (n=93)	35%	47%	17%

Note: Percentages may not sum to 100% due to rounding errors.

Again, this is a small sample, and so results should be interpreted with caution. But, the results are consistent with what was heard in the 1980-1981 survey, as well as what was heard in more recent social science research and public input, including the 2012-2014 river user survey and the official public comments collected during the scoping period in August 2019. The results seen over time in different studies are, namely, that if use is going to be restricted, there is support for rationale based upon limiting impact to the natural resource and, additionally, there is a belief that restrictions should be felt equally across all user groups (private, commercial).

2.4. Survey of river users on Upper South Fork in 2011

In 2011, a survey of 207 river users on the Upper South Fork, from the headwaters of the South Fork to the wilderness boundary near Meadow Creek Gorge was completed ([Moulton, 2012](#)). The respondents were a near-even mix of stock users, backpackers, and floaters, with about 45% of respondents being Montana residents and 55% being non-residents. The survey focused on understanding respondents' perceptions of those 'social setting attributes' that were most important to their river user experience, as well as support for potential management actions.

On a scale from -3 (detracted a lot from the experience) to +3 (added a lot to the experience), with a neutral point at 0, survey respondents were asked to assess a variety of setting attributes, including encounters with other user groups, encountering groups with poor wilderness ethics, seeing improperly disposed human waste, and having to expend added effort to find a suitable camp. According to [Moulton \(2012:73\)](#), the results of the entire sample in aggregate suggested that conditions experience related to visitors adhering to wilderness ethics, campsite availability, and campsite condition added a "fair amount to experience". Whereas, floater encounters was rated as "having one of the lowest potentials to influence experience." As for support for management actions, the highest level of opposition was with regard to "permits so visitors can only camp in the area assigned to them" and "fees charged for land-based river recreation." [Moulton \(2012:72\)](#) found consistency between perceived impact of encountering different types of groups and support for particular management actions: "for example, large groups were rated as having a relatively high ability to negatively affect experience (-1.50 mean

effect for encounters in general) and respondents were also somewhat willing to support a group size limit of 10 people (+0.72 mean support).”

Generally, the research by [Moulton \(2012\)](#) provides a robust body of knowledge related to river users on the Upper South Fork, particularly when considering the thorough study and high level of analysis. As will be made evident below, several of the issues discussed by Moulton, such as opinions on group size, are evident in the recent public engagement research.

2.5. Survey of river users: 2012-2014

In the summers of 2012, 2013, and 2014, surveys were administered across the Flathead WSR system to users including floaters, campers, backpackers and stock groups. The surveys were distributed at river access sites, dispersed recreation sites, Forest Service rental cabins, on the trail, at river stops and were given to outfitters to provide to clients at the end of their trip. An analysis of the 329 surveys collected was completed by [Dalenberg et al. \(2018\)](#). According to [Dalenberg et al. \(2018:2\)](#):

The three most serious problems noted by respondents were invasive species, weather conditions, and the condition of the environment. However, none of these problems appeared to be significant: only 9% considered invasive species a moderate or severe problem, 8% rated weather conditions as a moderate to severe problem, and 6% rated the condition of the environment as a moderate or severe problem. The possible management action receiving the most support was the provision of more information to visitors about appropriate behaviors (65% favor or strongly favor), while the three management actions receiving the most opposition were a permit system (52% oppose or strongly oppose), charging user fees (56% oppose or strongly oppose), and increasing the number of outfitters and guides (62% oppose or strongly oppose).

Additionally, increased requirements for packing out human waste, particularly waste created by float groups, is generally supported. And if limits were to be applied to boating, a prospect that is generally unsupported, there is greater agreement for such an action when reasoning is to protect fisheries (as opposed to protecting against feelings of crowding).

Also of note, particularly within the context of the results of the public engagement research presented below, is the finding that encounters with other user groups generally do not detract from users’ experience. The majority of respondents reported a neutral response (or indicated they had no encounters), as shown in Table 4.

Table 4. Encounters impact rating including no encounters (2012-2014 survey)

Group	Detracted	Neutral or no encounter	Added
Encounters with Rangers	2%	41%	57%
Encounters with backpackers	3%	83%	14%
Encounters with stock/horse groups	9%	77%	14%
Encounters with other groups at day use sites, etc.	10%	67%	23%
Encounters with fishing groups	12%	54%	34%
Encounters with outfitted/commercial groups	13%	75%	12%
Encounters with other float groups	18%	46%	57%

Source: ([Dalenberg et al., 2018:19](#))

In most cases, when removing the respondents who reported neutrality or no encounters, all encounter experiences with the exception of encounters with outfitted/commercial groups added to the user experience of the river corridor (Table 5). Generally, users reported a “very good experience” and viewed problems as small or non-existent ([Dalenberg et al., 2018:29](#)). While the above review of existing social science on the Flathead WSR system is brief, it will serve as valuable context for the remainder of this report focused on the results and discussion of the recent public engagement.

Table 5. Encounters impact rating conditional on a positive or negative response (2012-2014 survey)

Group	Detracted	Added	Number reporting
Encounters with Rangers	3%	97%	183
Encounters with backpackers	16%	84%	50
Encounters with fishing groups	25%	75%	138
Encounters with other groups at day use sites, etc.	31%	69%	101
Encounters with other float groups	33%	67%	168
Encounters with stock/horse groups	39%	61%	71
Encounters with outfitted/commercial groups	53%	47%	75

Source: ([Dalenberg et al., 2018:19](#))

3. SOCIAL SCIENCE METHODS: A DESCRIPTION OF HOW PUBLIC INPUT WAS GATHERED AND ANALYZED IN TWO PHASES

The research of focus in this report aimed to understand the varied human-nature relationships that people have with the Flathead WSR system, as well as those things perceived to threaten or contribute to such relationships. The research applied the established methodology described by [Armatas et al. \(2019\)](#) which, within the context of the Flathead CRMP process, included two primary phases of public engagement: (1) a 30-minute, multi-faceted exercise completed by a diverse range of the interested public (165 people participated in this phase, including public meeting attendees and people visiting the Flathead WSR system) and; (2) in-depth interviews with a smaller group of people (19 participants) to elaborate and reflect on what was learned in phase one. For each phase, this section describes both the methods of public engagement, and the methods of scientific analysis of the public input.

3.1. Phase one: social vulnerability protocol

The first phase of public engagement took place between late summer and early fall of 2019, within two public meetings in Kalispell as well as in the field at various locations throughout the Flathead WSR system. In total, 165 people participated in the first phase of research, which included three primary steps: (1) Q-sorting of human and ecological meanings and services; (2) drivers of change exercise and; (3) demographic information and a mapping exercise. Each of these steps are discussed in turn.

3.1.1. Step one: prioritize human and ecological meanings and services (Q-sort)

For the first step, or the ‘Q-sort’ step, a diverse range of the public was engaged with a fun, thought-provoking exercise where human and ecological services and meanings related to the Flathead WSR system were prioritized in a structured way. Human and ecological meanings and services (HEMS) can be thought of as elements of people’s connection to the Flathead WSR system ([Williams & Watson, 2007](#)). Ecosystem services is another way to think of such elements ([de Groot et al., 2002](#)), though it is a concept that has been largely framed through an economic and anthropocentric lens. The use of the ‘meanings’ language may make more sense when

thinking of particular outstandingly remarkable values (ORVs) needing protection and enhancement. For instance, ‘wildlife’ is an ORV needing protection and enhancement, and there are elements of protecting that wildlife that go beyond the human use of that wildlife for, say, viewing and photography. Valuing wildlife in and of itself (i.e., for its intrinsic value) or for some yet unknown benefit (i.e., for its option value) may be part of the goal. Ethnography includes elements that represent Native American culture and identity, which may be best framed as a human ‘meaning’, as opposed to a ‘service’. Therefore, we suggest that HEMS is a suitable framing, which is more specific than the broad ORV categories and potentially not as constraining as the ecosystem services framing.

The HEMS were derived primarily from the Flathead WSR system outstandingly remarkable values, as described by [Flathead National Forest and Glacier National Park \(2013\)](#). The list of HEMS sorted by members of the public are listed in Table 6, and it is recognized that all of them contribute to human and environmental well-being of the interested public and beyond. The HEMS were finalized through discussions with the Flathead CRMP team as well as through pilot testing with people both from within and outside federal land management agencies. The goal for creating the HEMS in Table 6 was to ensure that, in aggregate, the broad range of human-nature relationship elements derived from the Flathead WSR system were represented. It is recognized that the HEMS in Table 6 are not mutually exclusive (e.g., ‘water quality’ supports other elements such as ‘catch and release fishing’), but it is also recognized that people may view elements such as water quality as important on their own (as opposed to valuing water quality for some purpose).

The purpose of the Q-sort is to have people prioritize the various HEMS in Table 6, from their perspective. The Q-sorts illustrate the relationships identifiable between people and the river system and, for the exercise, each of the HEMS in Table 6 was listed on a separate white card, and participants were asked to indicate the importance of each HEMS from “most important” to “most unimportant”. It was stressed that this ranking was an individual exercise with no right or wrong answers. It was suggested to participants to first sort the HEMS into three piles: a definitely important pile, a definitely unimportant pile, and a pile of those benefits that evoke a more neutral feeling.

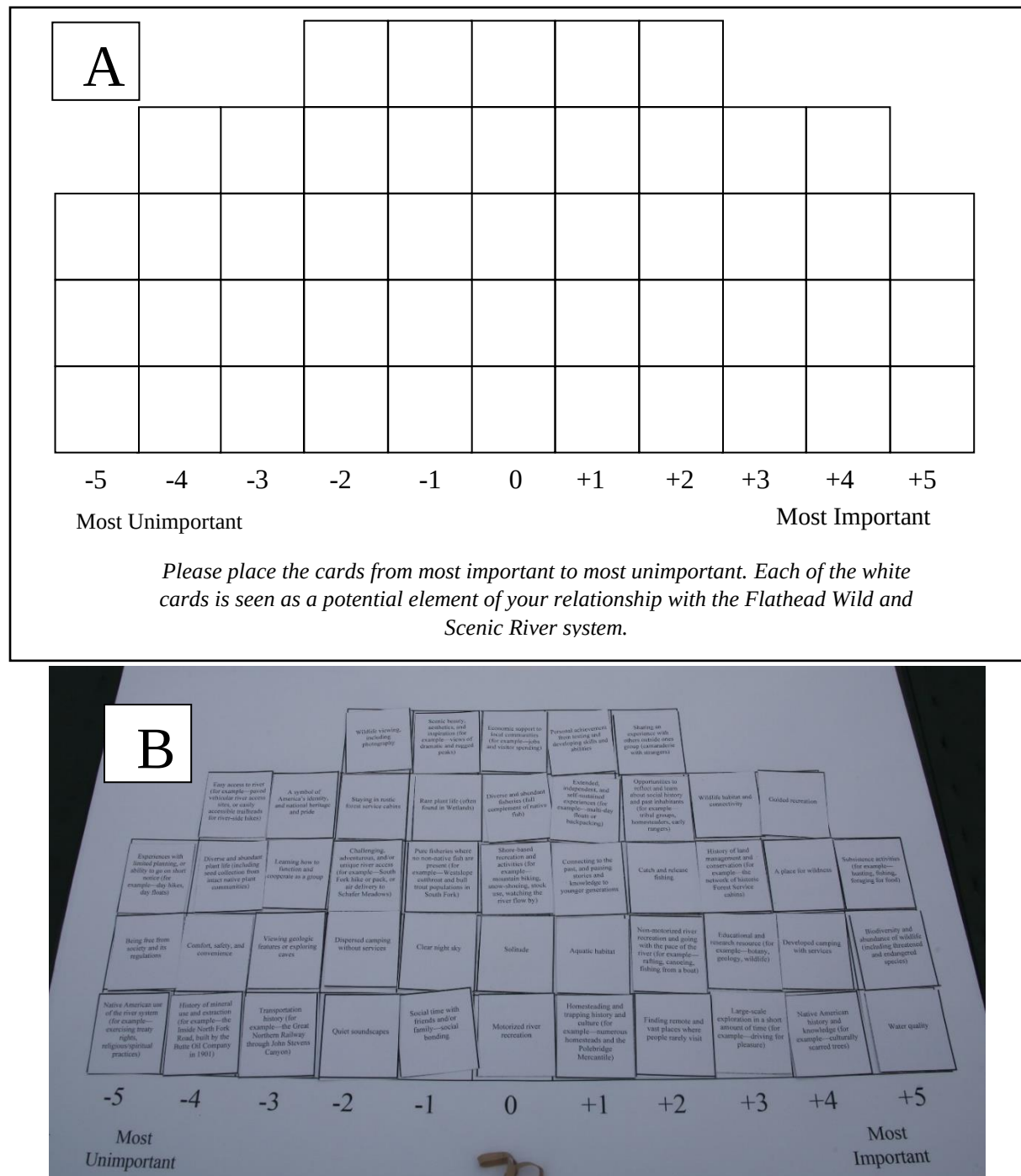
Table 6. List of human and ecological meanings and services prioritized by the interested public

Human and ecological meanings and services (HEMS)	
<i>Ecological meanings and services</i>	
1. Water quality	
2. Wildlife habitat and connectivity	
3. Aquatic habitat	
4. Biodiversity and abundance of wildlife (including threatened and endangered species)	
5. Pure fisheries where no non-native fish are present (for example—Westslope cutthroat and bull trout populations in South Fork)	
6. Diverse and abundant fisheries (full complement of native fish)	
7. Rare plant life (often found in Wetlands)	
8. Diverse and abundant plant life (including seed collection from intact native plant communities)	
<i>Human services</i>	
9. Non-motorized river recreation and going with the pace of the river (for example—rafting, canoeing, fishing from a boat)	22. Subsistence activities (for example—hunting, fishing, foraging for food)
10. Motorized river recreation	23. Native American use of the river system (for example—exercising treaty rights, religious/spiritual practices)
11. Shore-based recreation and activities (for example—mountain biking, snow-shoeing, stock use, watching the river flow by)	24. Easy access to river (for example—paved vehicular river access sites, or easily accessible trailheads for river-side hikes)
12. Large-scale exploration in a short amount of time (for example—driving for pleasure)	25. Challenging, adventurous, and/or unique river access (e.g., South Fork hike or pack, or air delivery to Schafer Meadows)
13. Wildlife viewing, including photography	26. Experiences with limited planning, or ability to go on short notice (for example—day hikes, day floats)
14. Viewing geologic features or exploring caves	27. Extended, independent, and self-sustained experiences (for example—multi-day floats or backpacking)
15. Guided recreation	28. Personal achievement from testing and developing skills and abilities
16. Catch and release fishing	
17. Dispersed camping without services	
18. Developed camping with services	
19. Staying in rustic forest service cabins	
20. Economic support to local communities (for example—jobs and visitor spending)	
21. Comfort, safety, and convenience	
<i>Human meanings</i>	
29. A place for wildness	41. Opportunities to reflect and learn about social history and past inhabitants (e.g., tribal groups, homesteaders, early rangers)
30. Solitude	42. Educational and research resource (for example—botany, geology, wildlife)
31. Quiet soundscapes	43. Native American history and knowledge (for example—culturally scarred trees)
32. Clear night sky	44. History of land management and conservation (for example—the network of historic Forest Service cabins)
33. Scenic beauty, aesthetics, and inspiration (for example—views of dramatic and rugged peaks)	45. Homesteading and trapping history and culture (for example—numerous homesteads and the Polebridge Mercantile)
34. Finding remote and vast places where people rarely visit	46. Transportation history (for example—the Great Northern Railway through John Stevens Canyon)
35. Being free from society and its regulations	47. History of mineral use and extraction (for example—the Inside North Fork Road, built by the Butte Oil Company in 1901)
36. Learning how to function and cooperate as a group	
37. Social time with friends and/or family—social bonding	
38. Sharing an experience with others outside ones group (camaraderie with strangers)	
39. Connecting to the past, and passing stories and knowledge to younger generations	
40. A symbol of America's identity, and national heritage and pride	

*Note: Italicized categories of HEMS, and numbers associated with HEMS were not given to participants. In other words, each card had an HEMS only (e.g., “water quality”)

Participants were instructed to use the ranking board (Figure 1A) as a guide to further sort the ecosystem services from “more important” to “less important”. The participants were asked to place each of the thirty ecosystem services onto the thirty ranking-board squares. Figure 1B illustrates a completed ranking exercise done.

Figure 1. (A) Board that participants used to prioritize 47 HEMS; **(B)** Completed Q-sort



Regarding the ranking board, it was stressed that the rows are not different from one another, only the columns. So, each participant was required to choose their three ‘most important’ benefits, then their next four ‘most important’, and so on all the way until the three ‘most unimportant’ benefits were filled in. Following the Q-sort, participants were asked to move on to the ‘drivers of change’ component, or step 2 in the public engagement process related to how human-nature relationships may be threatened or enhanced by a variety of factors.

3.1.2. Step two: select most relevant drivers of change

Following the Q-sorting step, participants were asked how their individual human-nature relationships, as represented by their Q-sort, may be influenced by relevant ‘drivers of change’. Drivers of change are those factors (e.g., climate change impacts, management actions, facilities, user density, land-use change, visitor behavior) that could negatively or positively influence the ability of a person to realize those benefits important to them. We use the term ‘drivers of change’ because some factors may be perceived positively by some and negatively by others. For instance, encounters with other users might negatively or positively influence peoples’ relationship with the river. This is reflected by two different comments provided during the 2012-2014 river user survey: “came looking for solitude and fishing, only got fishing” and; “we are not looking for solitude on this stretch. We hope to see others” ([Dalenberg et al., 2018:38-40](#)). In this case, encounters with other people are clearly perceived differently.

Through consultation with the outstandingly remarkable values document ([Flathead National Forest and Glacier National Park, 2013](#)), the public comments at the pre-scoping meetings focused on the ORVs, and the comments provided by respondents to the 2012-2014 river user survey ([Dalenberg et al., 2018](#)), a list of 42 drivers of change to be considered by participants was developed (Table 7). Once the prioritization of HEMS was complete (a task that typically took 15-20 minutes), the participants were instructed to focus on the drivers of change (printed on a yellow deck of cards). At this stage, the participants reviewed the list of drivers of change shown in Table 7, and were asked to choose the five most relevant negative drivers of change and the five most relevant positive drivers of change within the context of one’s Q-sort.

Table 7. List of drivers of change (provided on separate cards) that participants considered after Q-sort

-
1. Commercial float traffic (including group size and numbers of groups)
 2. Commercial outfitter behavior (for example—educating the public, providing access to those without experience/ability, sending rafts to secure campsites, elitist attitudes)
 3. Decreasing party/group size limits
 4. Expansion and/or hardening of river access sites (e.g., more trailer parking, paving of sites)
 5. Increase of facilities (with maintenance) at river accesses and campgrounds (for example—outhouses, bear storage, stock areas)
 6. Party scene and alcohol (river used as a party site)
 7. Wildfire and its associated effects
 8. More education about river etiquette, fish handling practices, how to reduce impacts, and rules and regulations at river access points (for example—increased signs and/or outreach)
 9. A change in social values and how people relate to nature
 10. Unmaintained roads
 11. Unmaintained river accesses and trails
 12. Smelling or seeing manure from stock on trails or at campsite
 13. Increase in budgets and financial support of management agencies
 14. Encountering other types of users different from oneself
 15. Amount and enforcement of rules, restrictions, and regulations
 16. Increased regulation and enforcement of human waste practices
 17. Lack of presence of non-native fish (for example—rainbow trout, brook trout)
 18. Presence of administrative personnel (for example—rangers, game wardens)
 19. Permit system for float use
 20. Fee system for float use
 21. Increase in cell phone coverage
 22. Increase in commercial services (for example—shuttle services, professional photography)
 23. Increase in Wild and Scenic River designation
 24. Technology advancements (for example—use of drones, more detailed satellite images, pack rafts)
 25. Land-use change toward more human development (for example—timber production, golf course operations, residential development)
 26. Land-use change toward less development (for example—conservation easements)
 27. Transboundary agreements (for example, agreements with Canada, tribal agreements)
 28. Partnerships and volunteers (for example—citizen science, relationships with NGOs)
 29. Busy river corridor (encountering people on shore or on the river)
 30. Busy river accesses
 31. An increase or trend toward more river users
 32. Competition for campsites
 33. Undesirable campsite conditions (for example—deadfall, dusty)
 34. A lack of river etiquette and respect for other users (for example—poor leave no trace ethics, glass bottles, loud music, dogs off leash)
 35. Changes in fish (for example—hook scars, changes in size and numbers)
 36. Biophysical impacts of increasing use
 37. Invasive and/or noxious weeds (for example—Spotted knapweed)
 38. Invasive aquatic species (for example—zebra and quagga mussels)
 39. A lack of trust in managers and planners (for example—lack of beliefs that private and commercial interests are considered equitably, and that resource and experience is actively protected)
 40. Railroad traffic and potential spills
 41. Loss of cultural resources (for example, through natural decay or human removal)
 42. Climate change and its associated impacts (for example, rising stream temperature, timing of river runoff)
-

*Note: Numbers associated with drivers of change were not provided to participants. In other words, each card had a driver of change only (e.g., “permit system for float use”)

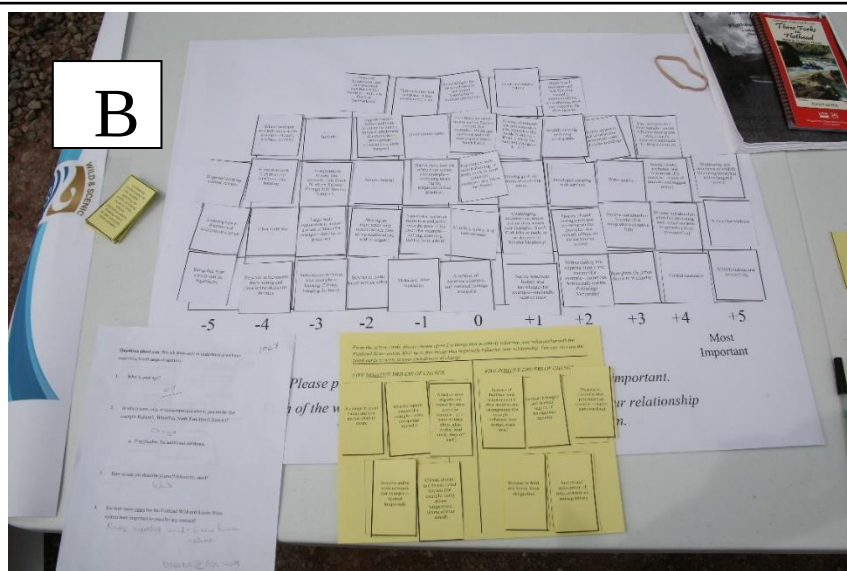
In other words, from Table 7, which five things are potentially most concerning or threatening to one's human-nature relationship, and which five things could potentially enhance or contribute to one's human-nature relationship? The participants were also given blank cards so they could write in relevant drivers of change that were not included in Table 7, if they desired³.

Figure 2A illustrates the directions presented to participants to guide the completion of the drivers of change exercise, which was printed on yellow cardstock to match the drivers of change cards (Figure 2B shows a completed drivers of change exercise).

Figure 2. (A) Visual guide for the drivers of change exercise; **(B)** example of completed drivers of change exercise with Q-sort and demographic information visible

From the yellow cards, please choose up to five things that positively influence your relationship with the Flathead River system AND up to five things that negatively influence your relationship. You can use the blank cards to write in your own drivers of change.

FIVE <u>NEGATIVE</u> DRIVERS OF CHANGE		FIVE <u>POSITIVE</u> DRIVERS OF CHANGE	
A			



³ This component of the research method aims to integrate qualitative research elements into the mostly quantitative research process whereby a finite response set is provided.

3.1.3. *Step three: demographic information and mapping exercise*

Following the completion of both the Q-sort and the drivers of change exercise, participants provided a brief summary of demographic information to allow understanding of who participated. The questions included in this demographic description were ones most critical to understanding representation of results, and were as follows:

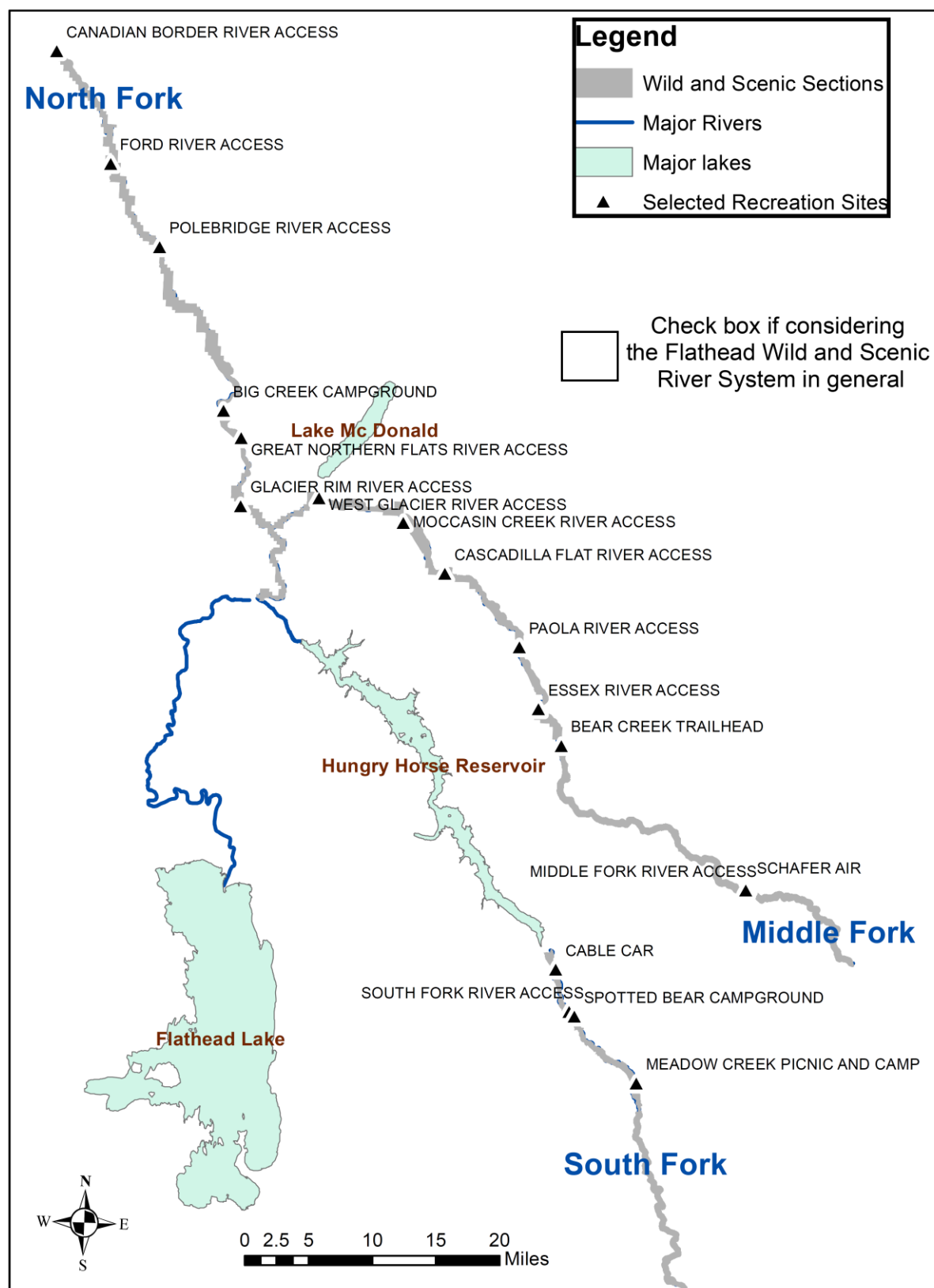
1. What is your age?
2. In which town, city, or unincorporated area do you reside (for example-Kalispell, Whitefish, North Fork Road, Denver)?
 - a. If applicable, list additional residence.
3. How would you describe yourself (ethnicity, race)?
4. For how many years has the Flathead Wild and Scenic River system been important to you (for any reason)?

It was made clear that these questions were only to be used to understand the range of people who participated, and not as a means to connect the participant to their answers nor to categorize their responses by age, ethnicity/race, or residence. It was made clear on multiple occasions that the tasks were confidential, and that no attempt would be made to connect an individual to their answers.

In addition to the demographic information, participants were also asked to complete a mapping exercise, where they could highlight a specific portion of the Flathead WSR system that is particularly relevant within the context of their individual human-nature relationship and the threats and contributors to that relationship. Figure 3 illustrates the mapping exercise and, as shown, participants were also provided with the opportunity to select the entire WSR system, if they did not have a specific area in mind. This mapping component was implemented primarily to understand if there was a difference in human-nature relationships across the different stretches of the Flathead WSR system. More specifically, there was some interest in understanding if the ‘recreational’, ‘scenic’, and ‘wild’ classifications within the Flathead WSR system were associated with differing human-nature relationships and threats and contributors.

Once the participants finished all three tasks (i.e. prioritization of HEMS, selection of relevant drivers of change, and the demographic description and mapping exercise), their answers were recorded by collecting the demographic sheets and taking a photo of the remaining information.

Figure 3. Mapping exercise completed by participants



3.1.4. *Analysis of Q-sorts and drivers of change exercise*

In total, 165 people completed the tasks described above, and each participant completed their ranking of HEMS, selection of corresponding drivers of change, and mapping exercise in a unique way (no two ranking exercises, drivers of change selection, and mapping exercise were identical). However, inspection and discussion of each unique relationship, though interesting, is not practical for the purposes of CRMP plan revision and communication with the public. Decision-makers in most contexts would have difficulty incorporating 165 unique opinions on the topic of interest, and in the context of river planning, where tradeoffs among HEMS are inherent in the decision-making process, it is perhaps impossible. Therefore, it is necessary to provide decision-makers with an understanding of the diverse and typical range of relationships that people have with the Flathead WSR system that is conducive to integration into the CRMP planning process.

To provide a tractable number of relationships for integration into the process, the 165 individual viewpoints of participants are distilled into a limited number of viewpoints that captures, to the greatest extent practicable, the diversity of opinion about the importance of the Flathead WSR system, as well as the most influential drivers of change. The process of distilling 165 unique relationships into a manageable number is completed in two steps: (1) factor analysis of the 165 ranking exercises and; (2) regression analysis of the selected drivers of change and mapping exercise to understand if there is a relationship between human-nature relationships and drivers of change and/or specific stretches of river. This section *briefly* discusses the analytic methods applied to complete these two steps.

3.1.4.1. Factor analysis: distilling the ecosystem services ranking exercises

Factor analysis is a statistical approach designed (in this instance) to find similar patterns of response among people who completed the ranking exercise. In other words commonly used in statistics, factor analysis is a method of simplifying a complex set of data, whereby a group of observed variables (165 participant Q-sorts in this case) are represented by a much smaller number of unobserved dimensions (i.e. factors) which account for the correlations, or similarity, between the observed variables ([Kline, 1994](#)). By applying factor analysis to the 165 HEMS prioritizations, it is possible to find a limited number of typified relationships (archetypes) that

generally represents how different people feel about the importance of HEMS derived from the Flathead WSR system.

We only provide a very basic discussion of this application of factor analysis due to the desire to only present information most relevant to the river planning process. For the reader more interested in the statistical method applied in this systematic approach to understanding peoples' opinions, we recommend: (1) general information about the method and associated statistical analysis used herein ([Brown, 1980](#); [Stephenson, 1954](#); [Watts & Stenner, 2012](#)) and; (2) information about the method and associated statistical analysis that is specific to Federal land management and planning ([Armatas et al., 2017a](#); [Armatas et al., 2014](#); [Armatas et al., 2019](#); [Steelman & Maguire, 1999](#)). These references will provide further detail, understanding and credence to the analytic decisions made.

Factor analysis of the HEMS ranking exercises was completed using the free software program *PQMethod* ([Schmolck, 2014](#)), which is designed to analyze Q-sorts. This user-friendly program provides an interface for the entire analytic process, from data entry to the export of results. Data entry is facilitated by safeguards against data-entry errors and, upon its completion, the analyst is primarily concerned with deciding on the number of factors to extract and rotate. This process requires the analyst to decide on the most appropriate factor solution, which is facilitated by a variety of statistical considerations common to factor analysis. For the 165 participants being analyzed herein, a five-factor solution was chosen based upon statistical criteria, including consideration of factor loadings and the Scree test of eigenvalues. Additionally, when sub-samples of participants were analyzed based upon their answers to the mapping exercise, an additional factor emerged that is worth discussion. Therefore, a total of six viewpoints will be discussed.

3.1.4.2. Linear regression analysis: associations between relationships and other variables

It may be helpful for planners and managers to understand not only what HEMS are important to a broad range of people, but also to understand if there are particular drivers of change (or river stretches) that the public consider as relevant to their human-nature relationships. To understand this, linear regression analysis was performed to explore for associations between the archetypes discovered with factor analysis and the way participants completed the drivers of change and mapping exercises.

Linear regression analysis is a commonly used statistical technique that aims to model the relationship between a dependent variable (in this case, the archetypes) and one or more independent variables (in this case, the drivers of change selected, sections of river highlighted). Although relatively straightforward in a statistical sense, an in-depth discussion of regression analysis is beyond the scope of this report. Such discussions are widely available, and [DeVeaux et al. \(2012\)](#) present one which is accessible to readers who may not be familiar with the approach.

Instead of discussing the mechanics of the approach, a brief discussion of the purpose of regression analysis, and the possible conclusions that can be drawn from it, are provided. Regression analysis is often used for the purposes of prediction, or the identification of variables that explain the most variance. For example, one could use regression analysis to predict whether it will rain on a given day based upon information such as temperature, humidity, season, and any other variables found to be relevant (e.g., altitude, proximity to a mountain). For the purposes of identifying relevant variables, regression analysis could be used to understand the influential factors that lead someone to graduate from college. For example, are gender, household income, race, and state residence influential to the probability that someone graduates from college? In order to answer these questions, one needs information related to both the dependent and independent variables.

In the case of the public engagement discussed herein, there is interest in understanding if the selection of particular drivers of change or stretches of river can identify what archetype one may align with. Therefore, separate regression analyses were completed for each archetype. The dependent variables in the regression analyses are the ‘scores’ that each person (165 people total) had with relation to the archetypes presented below, and the independent variables are selected drivers of change/river stretches (using a value of ‘1’ if a driver or stretch of river selected, otherwise a value of ‘0’).

Prior to discussing the results of phase one of this public engagement research, there is a need to briefly review the research methods and analysis for the second, in-depth interview phase.

3.2. Phase two: In-depth interviews

The understanding of the things that define or influence the human-nature relationships with the Flathead WSR system yielded by the initial phase of research is beneficial, as it highlights different perspectives related to what HEMS are most important and unimportant and, as shown below, the results allow for an understanding of potential tradeoffs among HEMS within and across perspectives. However, the quantitative and fairly quick collection (i.e., 30 minutes interactions) of public input did not allow for any free-flowing conversations that would allow us to understand, primarily: (1) what one's connection to the Flathead WSR system means to them (e.g., escape from work life, connection to friends and family, identity fostering and formation, fun, economic advancement, an opportunity to preserve a special resource for future generations); (2) how particular drivers of change may or may not influence one's human-nature relationship and; (3) opinions how managers and planners may proceed with CRMP revision and implementation in a way that is acceptable or, at the very least, understandable.

Given these methodological limitations of phase one research, an additional in-depth interview phase was implemented. This approach not only allowed for an understanding of the three issues just mentioned (e.g., human-nature relationship meanings), but it also allowed for a presentation and validity check of the results yielded from the first phase of research. That is, a complete analysis of phase one was completed prior to the in-depth interviews, and the results from phase one were presented to interview participants in phase two. The results, in part, guided the semi-structured interviews.

3.2.1. Interview methods

Nineteen people participated in semi-structured interviews between mid-November 2019 and late January 2020. The interviews generally lasted between 60-90 minutes, which included a 15 minute presentation of the phase one results by the researcher; all interviews were tape recorded and transcribed verbatim by the researcher for analysis. The majority of the 19 participants were also participants in phase one (i.e., they completed Q-sorts, drivers of change, etc.), and their commitment to participate in an in-depth interview was gained at the time that they participated in phase one; when people were asked if they would be willing to have a

follow-up discussion about the Flathead WSR system. Two of the interview participants did not provide input through the phase one research: one individual signed up for a follow-up interview despite not having completed the Q-sort, and another individual was targeted because of their experience as an outfitter working within the Flathead WSR system. Generally, like phase one, the goal of this phase of research was to collect input from people with a variety of perspectives (e.g., private recreationists, outfitters and guides, landowners, non-local residents).

For each interview, the first 15-20 minutes consisted of the researcher providing an overview of results from phase one, which included: (1) the six different perspectives yielded from factor analysis (Figures 4 – 9 below); (2) a summary of how the 165 people generally sorted the HEMS (Table 10); (3) a summary of how the 165 people generally sorted the positive and negative drivers of change (Table 11 and 12, respectively) and; (4) the relationships between the different archetypes and the driver of change selected. Following this review of the results, the tape recorder was started and the interview commenced using eight questions to guide, though not constrain, the conversation. The eight questions can roughly be categorized in three groups, to be briefly discussed in turn.

The first two questions asked can be thought of as methods and validity check questions. The first question was interested in gaining insight into whether the public engagement exercise applied in phase one of the research was helpful for not only articulating and thinking about one's own human-nature relationship, but also for understanding if the presentation of the perspectives (e.g., Figure X) was helpful. The second question was meant to check if any of the archetypes resonated with the respondent, as phase one of the research is theoretically meant to do.

Question 1. Did you find there to be value in the exercise of grappling with all these different HEMS related to the human-nature relationship? Is there value in seeing the relationship laid out as a whole?

Question 2. Do you feel that any of these archetypes capture, at least in some significant way, your perspective on the importance of the Flathead WSR system? (If yes, proceed to question 3a; if no, proceed to question 3b).

The next five questions pertained to the individual's human-nature relationship, and the questions focused on a cursory understanding of which HEMS in a particular archetype were ranked in a way that was agreeable to the person (Question 3a), the deeper meanings associated with one's human-nature relationship (Question 4), viewpoints on how human-nature relationships change over time (Question 5), and a more in-depth understanding of how particular drivers of change influence one's human-nature relationship (Question 6).

Question 3a. What about this archetype is representative of your human-nature relationship? Is there anything about this archetype that you feel does not apply to you?

Question 3b. What about your human-nature relationship is not captured by these archetypes?

Question 4. What does your human-nature relationship mean to you? Important for your health? A cultural/community connection? Part of your identity? Does your connection to the river system depend on river experiences for your own benefit? Does it depend on existence values, regardless of your enjoyment?

Question 5. How is your relationship different than your parents, or someone close to you?

Question 6. (Pull up respondents answers to drivers of change component) I would like you to elaborate on why you selected the particular drivers of change that you did. How might the negative ones influence your relationship? How might the positive ones enhance it?

The final two questions were about process and, as stated to the respondents, they were about “walking a few miles in management and planning shoes”. That is, these two questions were about getting the respondents to try and think like managers and planners, and these questions were asked for two reasons. First, it may foster some empathy as to how challenging the CRMP revision task is (i.e., it is a ‘wicked’ problem that is about finding common ground and clearly communicating why decisions are made in a particular way). Second, understanding what people would like to see take place within the context of planning and management moving into the future can help the CRMP planning team both develop management actions that may be

accepted by the general publics, and clearly communicate in situations where particular management actions may not be feasible or warranted.

Question 7. What can planners and managers in charge of developing the CRMP provide that would increase the chances that you are satisfied with the plan? Is it specific management actions or inactions? Clear rationale for decisions made?

Question 8. In light of the varying human-nature relationships with the Flathead WSR system (i.e., the different factor arrays and drivers of change concerning people), what is the first thing you would do as a manager or planner? What is the second?

3.2.2. *Analysis methods*

All interviews were tape recorded and transcribed verbatim, which yielded a 92 page document (77,000 words). The transcribed interviews were imported into qualitative data analysis software (QSR *Nvivo*). This software facilitated the analysis, which is frequently referred to as qualitative ‘coding’, which is an iterative process. For this work, the process included an initial reading of the data during transcription, which provided some insight into the patterns in the data. By patterns, we mean ideas or concepts that were discussed in multiple interviews. A second close reading of the data following transcription consisted of creating ‘shallow’ codes and themes: “that is, they were not intended to reflect all the complexities of the data. Instead, they served mainly as markers that provided a framework for subsequent deeper analysis” ([Watson & Armatas, 2018:6](#)). For instance, all mentions of ‘permit system’ were grouped under a ‘permit system’ code. This process, sometimes called indexing, preceded the final iterations of coding whereby a limited number of major themes and associated sub-themes were developed based upon patterns in responses.

4. RESULTS: SUMMARY STATISTICS OF SAMPLE AND GENERAL SORTING OF HEMS AND DRIVERS OF CHANGE

This section of results focuses on ‘summary statistics’, including a discussion of who participated in both phases of research, an overview of the HEMS were sorted by 165 people, an overview of selected drivers of change, and the results of the mapping exercise.

4.1. Who participated?

In total, 165 members of the interested public participated in the social science exercise focused on human-nature relationships with the Flathead Wild and Scenic River system. The vast majority participated during the scoping period of the Flathead CRMP process and, more specifically, provided input during the two public engagement meetings that took place in August 2019. Table 8 below highlights the location of where participants were engaged, number of participants at each location, and basic description of the participants.

The age of respondents ranged from 9 to 77 years old, with a mean age of 45 years and a median age of 44 years. It should be noted that minors were permitted and encouraged to engage in the activity, because the public engagement exercise serves as a suitable time for learning about the Flathead Wild and Scenic River system. Indeed, on several occasions, minors and an accompanying adult were witnessed discussing the activity and the variety of elements that comprise the human-nature relationship with the Flathead system. However, for the purposes of analysis, based on the concern that the activity may not be fully grasped by minors, the remainder of the results (including demographics) do not include any individuals under the age of 17.

Table 8. Summary of sample for public engagement exercise

Location	Date	Number of participants	Basic description of participants
Lodge near Polebridge, MT – North Fork corridor	8/12/19	12	Paying clients, guides, and an American Rivers (a river NGO) representative on a river oriented experience along the North Fork River. The experience was oriented toward the Perseid meteor shower.
Polebridge, MT – outside Mercantile	8/13/19	4	Members of the general public near the Polebridge Mercantile, including residents of the Polebridge area and non-residents (e.g., a Whitefish resident).
Glacier Rim River Access – North Fork	8/13/19	3	Floaters putting in at Glacier Rim River Access.
Public Meeting – Kalispell, MT	8/13/19	51	A portion of those who attended the first public meeting for scoping.
Bear Creek River Access – Middle Fork	8/14/19	2	Two visitors from Chicago making a brief stop at Bear Creek River Access.
West Glacier outside Glacier Raft Company	8/14/19	5	Paying clients on a half-day river trip on the Middle Fork.
Glacier Raft Company operations outside West Glacier	8/14/19	14	Employees of the Glacier Raft Company, including guides and office workers.
Spotted Bear Ranch – South Fork	8/15/19	5	Outfitters, guides, and paying clients at the Spotted Bear Ranch.
Spotted Bear Campground – South Fork	8/15/19 & 8/16/19	16	Members of the general public staying at the Spotted Bear Campground.
Public Meeting – Kalispell, MT	8/20/19	49	A portion of those who attended the second public meeting for scoping.
Confederated Salish and Kootenai Tribal Cultural Preservation Office – Pablo, MT	11/19/2019	4	Four people who were not necessarily affiliated with the Tribal Preservation Office.

The majority of respondents listed a primary residence in near proximity to the Flathead Wild and Scenic River system (e.g., Kalispell, Whitefish, West Glacier), though there were a number of participants from outside the general area. A full listing of residences listed as primary are included in Table 9; additionally, the proportion of each primary residence in relation to the sample as a whole is provided. In response to the question about additional residences, 27 respondents listed another residence, though it was clear that some of those additional residences listed were for seasonal workers such as raft guides or temporary employees working on the Flathead National Forest. The majority of additional residences listed were in close proximity to the Flathead WSR system (e.g., Columbia Falls, North Fork Road); only five additional residences listed were out of the state of Montana.

Table 9. Primary residences listed by respondents (n=159)

Primary residence*	Number of participants	Percent of sample
Kalispell, MT	36	23%
Whitefish, MT	33	21%
West Glacier, MT	13	8%
Columbia Falls, MT	12	8%
North Fork Road, MT	11	7%
Polebridge, MT	6	4%
Spokane, WA	4	3%
Coram, MT	3	2%
Hungry Horse, MT	3	2%
Minneapolis, MN	3	2%
Polson, MT	2	1%
Lakeside, MT	2	1%
Bigfork, MT	2	1%
Kila, MT	2	1%
Chicago, IL	2	1%
Delano, MN	2	1%

Notes: *The following locations were listed by a single participant as their primary residence: Dayton (MT), Corvallis (MT), Victor (MT), Missoula (MT), Somers (MT), Creston (MT), Bozeman (MT), Flathead National Forest (MT), Helena (MT), Essex (MT), East Glacier (MT), Ronan (MT), Arlee (MT), Pittsburgh (PA), San Diego (CA), Phoenix (AZ), Vergas (MN), Denver (CO), Birmingham (AL), Edina (MN), Youghiogheny River (PA), Cheyenne (WY).

In response to the question about peoples' race or ethnicity, the vast majority of respondents listed "white" or "Caucasian" (120 people, or 76% of the sample). Four people identified as "Native American", and two people identified as "Hispanic/white". Several other self-descriptions were provided with regard to race and ethnicity, but there were no other descriptions that occurred more than once. The following responses were provided by a single respondent: bi-racial (black and white), Korean, Swiss/German, Asian American, European descent, Hispanic, Norwegian Danish Scots American, Scott/English, and Native American. While this question asking one to 'describe themselves' explicitly referenced race and ethnicity, a number of respondents provided additional descriptors that did not pertain to race and ethnicity. Several respondents referenced their general status as an American or Native Montanan ("American citizen" (6 respondents), "Montanan" (5 respondents), "Native" (3 respondents)), while others referenced their gender (male (13 respondents), female (15

respondents)), and others yet referenced their profession or general interests (“outdoorsy” (1 respondent), “raft guide” (3 respondents), conservationist (1 respondent)).

The final demographic question focused on the length of time that participants considered the Flathead WSR system to be important to them, and the responses ranged from less than a year to an entire lifetime of 77 years. On average, respondents have been connected to the Flathead WSR system for 24 years, with a median response of 20 years.

It is important to stress that the purpose of this public engagement exercise is not to obtain a sample representative of the population interested in the Flathead WSR plan (i.e., surrounding communities and the American public at large). Unlike a general population survey, as discussed above, the method used in phase one is not designed to understand how opinions or characteristics of distributed across the population. Instead the approach is meant to obtain a broad range of perspectives through purposeful (not random) sampling. While challenging to definitely state that the sample of participants described above has provided a diverse range of opinions, it is reasonable to consider the sample diverse as a result of the geographic variation (i.e., the input collected from both local and out of town respondents), age (the sample includes a range of ages from young to old), and length of connection to the Flathead WSR system. Furthermore, it can be assumed that a diverse range of interests attended the two public meetings, which collected input from 100 members of the interested public. Finally, around 60 people were heard from in the field, which included people along all three forks of the Flathead and from the Confederated Salish and Kootenai Tribes.

Additionally, there was variation in opinion and demographics within the 19 people who participated in in-depth interviews. While formal demographics were not gathered, there was a mix of gender, ethnicity, age, and profession, including an outfitter, tourism operator, local farm owner, three teachers, and an outdoor educator.

4.2. Summary of the importance and unimportance assigned to human and ecological meanings and services (HEMS)

Table 10 provides the minimum value, maximum value, and median value assigned to the human and ecological meanings and services sorted by all the participants on a scale from most

important (+5) to most unimportant (-5). The summary provided in Table 10 is based upon basic analysis of 157 rank ordering exercises completed by the general public (all those Q-sorts collected minus those under the age of 17). The minimum (and maximum) value illustrates the lowest (and highest) value assigned to the corresponding HEMS by at least one participant. For instance, at least one person placed the card for ‘catch and release fishing’ in the column for negative five, and at least one person placed the same card in the column for positive five. The median value is the middle value assigned to the corresponding HEMS across all respondents. For instance, the card for ‘non-motorized river recreation and going with the pace of the river’ has a median value of +3, which means that the card for this HEMS was assigned an importance of +3 or more by at least half of the 157 respondents. In other words, this HEMS was generally placed toward the right side of the ranking board (Figure 1A).

There are a couple of general points to be made with regard to Table 10. First, there is a high level of variation across all HEMS, as represented by a minimum and maximum value of -5 and +5, respectively, for 29 of 47 HEMS. Even among those 18 HEMS that did not span the entire ranking board (i.e., had a maximum or minimum value below the extreme values), there were no HEMS that were not ranked both positively and negatively. For instance, ‘motorized river recreation’ had a median value of -5 (i.e., it was ranked as -5 by at least half of the 157 respondents), but it still was ranked as +4 by at least one person in the sample. This highlights that all of the HEMS listed in Table 10 are highly important relative to the other HEMS to at least one person in the sample. This reflects a major challenge of developing a revised CRMP, because all of the HEMS listed are meant to be protected and enhanced within the context of the Flathead WSR system. And yet, as shown in Table 10, any change within the Flathead WSR system that negatively influences the HEMS, whether due to management action or another driver of change (e.g., climate change), will have a meaningful impact on at least one person in the sample of 157 and, it stands to reason, additional people in the population at large.

Table 10. Summary of how HEMS were generally sorted by respondents (min, max, and median values) (n=157)

Human and ecological meanings and services (HEMS) sorted on a scale from most important (+5) to most unimportant (-5)	Min. value	Max value	Median value
Water quality	-2	5	4
Non-motorized river recreation and going with the pace of the river (for example—rafting, canoeing, fishing from a boat)	-4	5	3
A place for wildness	-5	5	3
Wildlife habitat and connectivity	-5	5	3
Experiences with limited planning, or ability to go on short notice (for example—day hikes, day floats)	-5	5	2
Extended, independent, and self-sustained experiences (for example—multi-day floats or backpacking)	-4	5	2
Solitude	-5	5	2
Finding remote and vast places where people rarely visit	-5	5	2
Scenic beauty, aesthetics, and inspiration (for example—views of dramatic and rugged peaks)	-4	5	2
Quiet soundscapes	-4	5	2
Clear night sky	-5	5	2
Aquatic habitat	-4	5	2
Catch and release fishing	-5	5	2
Biodiversity and abundance of wildlife (including threatened and endangered species)	-4	5	2
Challenging, adventurous, and/or unique river access (e.g., South Fork hike or pack, or air delivery to Schafer Meadows)	-5	5	1
Subsistence activities (for example—hunting, fishing, foraging for food)	-5	5	1
Dispersed camping without services	-5	5	1
Wildlife viewing, including photography	-5	5	1
Being free from society and its regulations	-5	5	1
Social time with friends and/or family—social bonding	-5	5	1
Pure fisheries where no non-native fish are present (for example—Westslope cutthroat and bull trout populations in South Fork)	-5	5	1
Diverse and abundant fisheries (full complement of native fish)	-5	5	1
Shore-based recreation and activities (for example—mountain biking, snow-shoeing, stock use, watching the river flow by)	-5	5	0
Connecting to the past, and passing stories and knowledge to younger generations	-5	5	0
Viewing geologic features or exploring caves	-5	4	0
Rare plant life (often found in Wetlands)	-5	5	0
Diverse and abundant plant life (including seed collection from intact native plant communities)	-5	4	0
Easy access to river (for example—paved vehicular river access sites, or easily accessible trailheads for river-side hikes)	-5	5	-1

Native American history and knowledge (for example—culturally scarred trees)	-5	5	-1
Opportunities to reflect and learn about social history and past inhabitants (e.g., tribal groups, homesteaders, early rangers)	-5	5	-1
Educational and research resource (for example—botany, geology, wildlife)	-5	5	-1
Personal achievement from testing and developing skills and abilities	-5	5	-1
History of land management and conservation (for example—the network of historic Forest Service cabins)	-5	5	-1
Economic support to local communities (for example—jobs and visitor spending)	-5	5	-1
Native American use of the river system (for example—exercising treaty rights, religious/spiritual practices)	-5	5	-1
Large-scale exploration in a short amount of time (for example—driving for pleasure)	-5	4	-2
Staying in rustic forest service cabins	-5	4	-2
Sharing an experience with others outside ones group (camaraderie with strangers)	-5	5	-2
Homesteading and trapping history and culture (for example—numerous homesteads and the Polebridge Mercantile)	-5	5	-2
A symbol of America’s identity, and national heritage and pride	-5	4	-2
Comfort, safety, and convenience	-5	4	-2
Guided recreation	-5	5	-3
Developed camping with services	-5	4	-3
Transportation history (for example—the Great Northern Railway through John Stevens Canyon)	-5	2	-3
History of mineral use and extraction (for example—the Inside North Fork Road, built by the Butte Oil Company in 1901)	-5	4	-3
Learning how to function and cooperate as a group	-5	3	-3
Motorized river recreation	-5	4	-5

4.3. Summary of positive drivers of change selected by respondents

Table 11 summarizes the positive drivers of change selected or written in by 157 people. Positive drivers of change can be interpreted as those things that contribute to one's human-nature relationship. More education about river etiquette was the most common choice, by a significant margin. People also commonly selected increased budgets for the management agencies, land-use change toward less development, and increased regulation and enforcement of human-waste practices. Table 11 is organized in descending order of times that a particular driver of change was selected, and it includes all 42 drivers of change even if they were not chosen. Three drivers of change were never selected as positive, including 'party scene and alcohol'. Those drivers of change in the shaded portion of Table 11 represent 'written in' drivers, or those positive things that people had on their mind, but were not included in the pre-selected list of 42. Some issues raised are fairly specific, such as the request to rotate the camp host site at Spotted Bear Campground, while others represent more general issues such as the desire for spontaneous trips.

Some positive drivers of change are surprising, such as climate change (6 selections) and busy river accesses (5 selections); however, it is likely that these instances highlight a misunderstood drivers of change exercise. Indeed, during one in-depth interview it was discovered that climate change was listed as positive, and the respondent noted that *mitigating* climate change would be positive.

Table 11. Counts and sample percentage of positive drivers of change selected by respondents (n=157)

Driver Name	Total counts	Percent of sample
More education about river etiquette, fish handling practices, how to reduce impacts, and rules and regulations at river access points (for example—increased signs and/or outreach)	97	61.8%
Increase in budgets and financial support of management agencies	66	42.0%
Land-use change toward less development (for example—conservation easements)	65	41.4%
Increase in Wild and Scenic River designation	64	40.8%
Increased regulation and enforcement of human waste practices	51	32.5%
Increase of facilities (with maintenance) at river accesses and campgrounds (for example—outhouses, bear storage, stock areas)	45	28.7%
Partnerships and volunteers (for example—citizen science, relationships with NGOs)	39	24.8%
Presence of administrative personnel (for example—rangers, game wardens)	32	20.4%
A change in social values and how people relate to nature	31	19.7%
Decreasing party/group size limits	30	19.1%
Transboundary agreements (for example, agreements with Canada, tribal agreements)	23	14.6%
Permit system for float use	22	14.0%
Expansion and/or hardening of river access sites (e.g., more trailer parking, paving of sites)	21	13.4%
Wildfire and its associated effects	20	12.7%
Amount and enforcement of rules, restrictions, and regulations	20	12.7%
Lack of presence of non-native fish (for example—rainbow trout, brook trout)	18	11.5%
Unmaintained roads	17	10.8%
Fee system for float use	14	8.9%
Commercial outfitter behavior (for example—educating the public, providing access to those without experience/ability, sending rafts to secure campsites, elitist attitudes)	11	7.0%
Technology advancements (for example—use of drones, more detailed satellite images, pack rafts)	10	6.4%
Unmaintained river accesses and trails	9	5.7%
Encountering other types of users different from oneself	9	5.7%
An increase or trend toward more river users	8	5.1%
A lack of river etiquette and respect for other users (for example—poor leave no trace ethics, glass bottles, loud music, dogs off leash)	7	4.5%
Climate change and its associated impacts (for example, rising stream temperature, timing of river runoff)	6	3.8%
Commercial float traffic (including group size and numbers of groups)	5	3.2%
Busy river accesses	5	3.2%

A lack of trust in managers and planners (for example—lack of beliefs that private and commercial interests are considered equitably, and that resource and experience is actively protected)	4	2.5%
Increase in commercial services (for example—shuttle services, professional photography)	4	2.5%
Increase in cell phone coverage	3	1.9%
Invasive aquatic species (for example—zebra and quagga mussels)	2	1.3%
Biophysical impacts of increasing use	2	1.3%
Competition for campsites	1	0.6%
Invasive and/or noxious weeds (for example—Spotted knapweed)	1	0.6%
Undesirable campsite conditions (for example—deadfall, dusty)	1	0.6%
Busy river corridor (encountering people on shore or on the river)	1	0.6%
Changes in fish (for example—hook scars, changes in size and numbers)	1	0.6%
Smelling or seeing manure from stock on trails or at campsite	1	0.6%
Land-use change toward more human development (for example—timber production, golf course operations, residential development)	1	0.6%
Party scene and alcohol (river used as a party site)	0	0.0%
Railroad traffic and potential spills	0	0.0%
Loss of cultural resources (for example, through natural decay or human removal)	0	0.0%
lack of oversight	1	0.6%
no paved roads	1	0.6%
river front owners stewardship ethic	1	0.6%
rotate camp host site to a different site other than #2	1	0.6%
Enforced fees for people found littering and disrespecting our river system	1	0.6%
Protecting the use of local residents	1	0.6%
Protecting land ownership and locals and tax payers	1	0.6%
tribal consultation	1	0.6%
a good ole fashioned winter! That'll chase em out	1	0.6%
The ability to hit the water at the drop of a hat on any given day/being able to float by raft, SUP, kayak, tube without advanced planning	2	1.3%
Protecting land owners rights	1	0.6%

4.4. Summary of negative drivers of change selected by respondents

The most popular negative driver of change selected was a lack of river etiquette and respect for other users, which is consistent with the call for more education of river users as a positive driver (Table 12). Three other commonly selected threats to peoples' human-nature relationships include land-use change toward more development, invasive aquatic species, and a permit system for float use on the Flathead WSR system. The threat of impacts related to a changing climate was also acknowledged by several participants, as was commercial float traffic. Busy river accesses and busy river corridor, which are related to crowding indicators were selected by 17% and 14% of the sample, respectively.

The shaded portion of Table 12 include those negative things written in by respondents, which included a concern about commercial groups snagging campsites and the ability to keep bull trout on the South Fork.

Table 12. Counts and sample percentage of negative drivers of change selected by respondents (n=157)

Driver name	Total Counts	Percent of sample
A lack of river etiquette and respect for other users (for example—poor leave no trace ethics, glass bottles, loud music, dogs off leash)	73	46.5%
Land-use change toward more human development (for example—timber production, golf course operations, residential development)	60	38.2%
Invasive aquatic species (for example—zebra and quagga mussels)	48	30.6%
Permit system for float use	47	29.9%
Climate change and its associated impacts (for example, rising stream temperature, timing of river runoff)	40	25.5%
Commercial float traffic (including group size and numbers of groups)	37	23.6%
Fee system for float use	35	22.3%
Party scene and alcohol (river used as a party site)	33	21.0%
Busy river accesses	27	17.2%
A lack of trust in managers and planners (for example—lack of beliefs that private and commercial interests are considered equitably, and that resource and experience is actively protected)	25	15.9%
Biophysical impacts of increasing use	25	15.9%
An increase or trend toward more river users	24	15.3%
Railroad traffic and potential spills	24	15.3%
Busy river corridor (encountering people on shore or on the river)	23	14.6%
Commercial outfitter behavior (for example—educating the public, providing access to those without experience/ability, sending rafts to secure campsites, elitist attitudes)	22	14.0%
Technology advancements (for example—use of drones, more detailed satellite images, pack rafts)	21	13.4%
Invasive and/or noxious weeds (for example—Spotted knapweed)	20	12.7%
Loss of cultural resources (for example, through natural decay or human removal)	19	12.1%
Increase in cell phone coverage	18	11.5%
Changes in fish (for example—hook scars, changes in size and numbers)	18	11.5%
Competition for campsites	17	10.8%
Expansion and/or hardening of river access sites (e.g., more trailer parking, paving of sites)	16	10.2%
Increase in commercial services (for example—shuttle services, professional photography)	16	10.2%
Amount and enforcement of rules, restrictions, and regulations	16	10.2%
A change in social values and how people relate to nature	10	6.4%
Lack of presence of non-native fish (for example—rainbow trout, brook trout)	9	5.7%
Unmaintained river accesses and trails	7	4.5%
Smelling or seeing manure from stock on trails or at campsite	7	4.5%

Wildfire and its associated effects	6	3.8%
Land-use change toward less development (for example—conservation easements)	5	3.2%
Increase in Wild and Scenic River designation	5	3.2%
Undesirable campsite conditions (for example—deadfall, dusty)	5	3.2%
Decreasing party/group size limits	5	3.2%
Increase of facilities (with maintenance) at river accesses and campgrounds (for example—outhouses, bear storage, stock areas)	4	2.5%
Increased regulation and enforcement of human waste practices	4	2.5%
Presence of administrative personnel (for example—rangers, game wardens)	4	2.5%
Increase in budgets and financial support of management agencies	4	2.5%
Encountering other types of users different from oneself	2	1.3%
Transboundary agreements (for example, agreements with Canada, tribal agreements)	2	1.3%
Unmaintained roads	1	0.6%
More education about river etiquette, fish handling practices, how to reduce impacts, and rules and regulations at river access points (for example—increased signs and/or outreach)	1	0.6%
Partnerships and volunteers (for example—citizen science, relationships with NGOs)	0	0.0%
Lack of river etiquette in combination with lack of knowledge	1	0.6%
Out of state river users and their lack of knowledge	1	0.6%
Impact of increased dog use on public lands. Dogs out of control and dogs as carriers of disease transmission to wildlife	1	0.6%
Being able to keep two bull trout a year	1	0.6%
Commercial outfitter behavior - they provide great experiences. However, they're the capacity issue sending rafts to secure campsite.	1	0.6%
Too much promotion for economic development and tourism	1	0.6%

4.5. Summary of mapping exercise: where did the general public focus spatially?

This section does not provide any discussion of how particular human-nature relationships may pertain to particular stretches of river, but instead it simply summarizes how people completed the mapping exercise (Table 13). That is, did respondents generally associate their Q-sorting and drivers of change exercise with a particular stretch of river? Generally, people did not, with sixty percent of the sample either selecting the entire Flathead WSR system, or not completing the exercise. However, as will be discussed below, the ‘guided angling’ perspective and the in-depth interviews yielded spatially specific information.

Table 13. Summary of responses to the mapping exercise (n=159)

Response to mapping exercise	Number of participants	Percent of sample*
Did NOT distinguish a particular area on the map (i.e., checked the box for the river system in general, or highlighted all stretches of river)	68	43%
Did NOT complete mapping exercise	27	17%
Selected all or some portion of the North Fork	46	29%
Selected all or some portion of the North Fork ONLY	17	11%
Selected all or some portion of the Middle Fork	34	22%
Selected all or some portion of the Middle Fork ONLY	1	< 1%
Selected all or some portion of the South Fork	25	16%
Selected all or some portion of the South Fork ONLY	7	4%

*Note: Categories are not necessarily mutually exclusive. For instance, the same respondent could select a portion of the North Fork *and* a portion of the South Fork during the mapping exercise. Therefore, the sample percentages sum to more than 100.

5. RESULTS: HUMAN-NATURE RELATIONSHIPS, DRIVERS OF CHANGE, AND OPINIONS ABOUT THE CRMP REVISION

This section of results presents full analysis from both phases of research that pertain to human-nature relationships with the Flathead WSR system. That is, this section includes the results of statistical analysis of the Q-sorts/drivers of change exercise of 157 people, and results of qualitative coding of the in-depth interviews.

For phase one, results are presented in large part through six ‘typified relationships’, or ‘archetypes’; these interchangeable terms are used to stress the point that each perspective represents, *in general*, how different participants feel about the importance of the sorted human ecological meanings and services (HEMS). In other words, none of the six perspectives presented below are exactly how any of the 157 participants feel; however, we would expect that if all of the 157 participants assessed the six relationships below, many would reply that *one or more* of the relationships is *close* to their sentiments. Indeed, assessment of the six relationships by the 19 people who participated in the in-depth interviews did yield such conclusions. In some instances, interview participants identified very strongly with a single archetype, whereas others saw themselves represented partially by several different archetypes.

For phase two, the major themes (and subthemes) discovered through the in-depth interviews are presented. The in-depth interview results are also presented, where appropriate, within the context of one (or multiple) human-nature relationships as defined by the six archetypes; however, we are careful to not ‘force’ everything heard during the in-depth interviews into one of the six archetypes as a mutually exclusive element. Indeed, there are insights learned during the interviews that span all six human-nature relationships illustrated below. Finally, after a thorough discussion of the varied human-nature relationships people have with the Flathead WSR system, we present some of the publics’ opinions about the CRMP revision and its implementation.

5.1. Six human-nature relationships: HEMS prioritized, relevant drivers of change, and connections to specific areas on the map

In aggregate, the six typified human-nature relationships (or archetypes) represent the different shared perspectives held by the interested public that attended the river planning meetings or were queried within the field (e.g., at Polebridge, Bear Creek River Access). Given the analysis applied to the 157 Q-sorts, there is confidence that all six relationships do indeed exist among the population of people interested in management and planning of the Flathead WSR system. However, it is not possible to assign a magnitude to any of the typified relationships. It is not possible to assert, for example, that one archetype is represented by 25 percent of the population, while another is 15 percent of the population. In order to draw such conclusions, as briefly discussed in Section 2 above, there is a need for a random sample of the population of a particular size, which would provide what is commonly referred to as a ‘representative’ sample. In this case, the sample of participants who provided their opinions about the importance of HEMS derived from the Flathead WSR system is not representative of the population of river users, or the county, state, or national population (as normally defined with basic demographic characteristics of the type asked on the United States Census). Because we observed that people with a diverse range of opinions attended the public meetings and were engaged in the field, it is appropriate to conclude that the six relationships presented below represent the general perspectives existing in the population of people interested in the Flathead WSR system. It is worth noting that this population was mostly local, though there was input gathered from some people residing further away.

The six archetypes presented below are given names (e.g., ‘unconfined recreation’), which overly simplify the relationships observed but are perhaps better than generic descriptors (e.g., archetype 1). The names are based upon the HEMS that were prioritized as most important within each perspective, as illustrated with ‘factor arrays’, which represent the relationships through a typified Q-sort (Figures 4-9). A general interpretation of these Figures, like the Q-sorts, is that those HEMS placed in the right side of the board are positively salient, those on the left side are negatively salient, and those in the middle may be more neutral. When discussing the archetypes below, specific HEMS will appear in *italics*, and the corresponding ranking value in brackets. For example, the ‘resource and introspection’ archetype (illustrated in Figure 4) is

referred to as such partially because the highest level of importance was given to *water quality* [+5], *biodiversity and abundance of wildlife* [+5], and *wildlife habitat and connectivity* [+5]. In order to support both the discussion of each archetype and the comparison of the archetypes, the HEMS are categorized (and color coded) based upon a rough differentiation between ‘human services’, ‘human meanings’, and ‘ecological meanings and services’ (Table 14). To be clear, the categorization scheme was done for the presentation of results only (i.e., respondents did not see the categorization during the sorting exercise).

Table 14. Illustration and brief explanation of HEMS categorization

<i>Ecological meanings and services</i>
These elements of the human-nature relationship pertain to those elements of the biophysical resource of the Flathead WSR system.
<i>Human Services – shades of brown</i>
Recreation and leisure <i>activities</i> : these human services pertain to different types of general activities (e.g., guided recreation, non-motorized river recreation, wildlife viewing).
Recreation and leisure <i>opportunities</i> : these human services pertain to different general attributes related to recreation and leisure on the Flathead WSR system (e.g., day trips, trips with easy access, trips with challenging access).
Cultural and personal provisioning: these human services pertain, at least in part, to specific goals or benefits derived from the Flathead WSR system (e.g., local economic productivity, foraging for food).
<i>Human meanings – shades of green</i>
History, culture, and ethnography: these human meanings pertain to the understanding of the Flathead WSR system history (e.g., its use as a transportation corridor), culture (e.g., homesteading along the North Fork), and ethnography (e.g., the system as traditional territory of local Native American populations).
Social connection: these human meanings pertain to the social connections fostered through the Flathead WSR system (e.g., spending time with others on a river trip, connecting to the fellow citizenry through shared belief in public lands).
Wilderness and reflection: these human meanings pertain to Wilderness meanings (e.g., solitude) and those elements that may foster personal reflection (e.g., scenic views of grandiose landscapes).

In addition to presenting the six archetypes via Figures 4-9, we draw upon the in-depth interviews to add depth to the Figures when appropriate, especially when a respondent strongly identified with a particular archetype. As a reminder, each of the 19 in-depth interview participants was presented with the results from the initial phase of research, which in large part included Figures 4-9 below; however, the archetypes were not labeled with a name, but instead

with a generic label (i.e., A, B, C, D, E, F). The reason for this was to not influence what archetypes people might identify with. Generally, people were able to identify with one or more of the archetypes presented below. That is, none of those people interviewed in the second phase of research were unable to relate to any of the archetypes. However, there was variation with regard to the numbers of archetypes that individuals identified with. That is, some people identified with a single archetype and, often in this case, that identification was quite strong. For instance, Participant 19 noted, “I associate myself quite heavily with A”. Other participants identified with multiple archetypes, such as Participant 1, who noted there were elements of all archetypes that he could relate to.

Prior to discussing each archetype, it is worth quickly clarifying how this particular research methodology would, in general, conceptualize these different archetypes. These six archetypes are not discrete groupings of people within the sample of the general public. It is not expected that people should or would identify only with a single archetype. There may be elements of multiple archetypes that resonate with someone, or one may identify with a single archetype fairly strongly. The statistical analysis allows for this (i.e., it is factor analysis, not cluster analysis); indeed, all participants receive ‘scores’ that highlight the level of commonality with each archetype. Human-nature relationships are complex and constantly evolving and, as a result, it is perhaps not prudent to view the archetypes too rigidly. For instance, the results of this research suggest that the ‘resource and introspection’ archetype may be the most supportive of restricting recreation use, but it would be a mistake to suggest that every person who identified with this particular archetype is supportive of such a management action. Indeed, some of the respondents in the in-depth interviews expressed an alignment with the ‘resource and introspection’ archetype, while also strongly opposing any approach to management that would restrict access to the Flathead WSR system.

5.1.1. *Resource and introspection archetype*

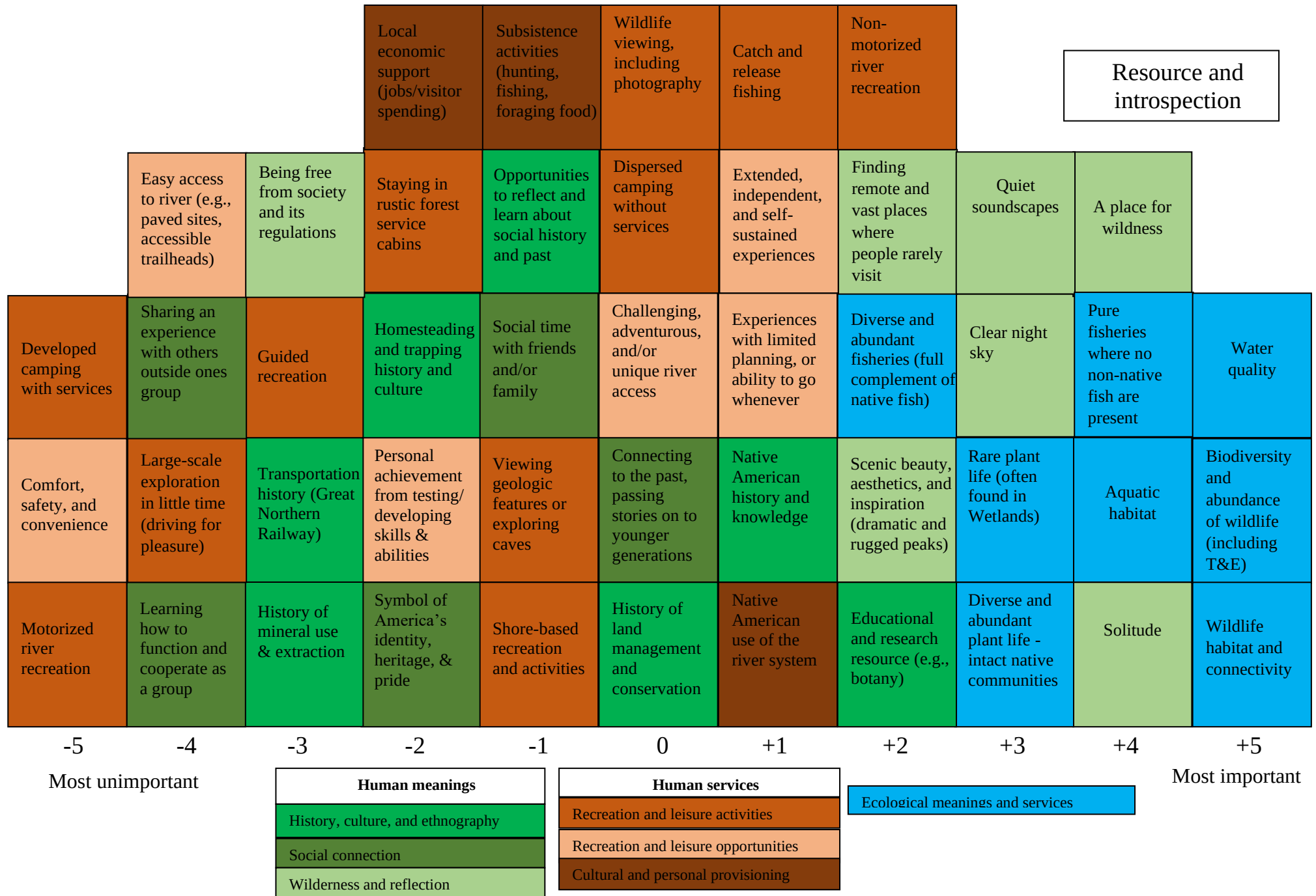
The ‘resource and introspection’ archetype (Figure 4) prioritizes, in general, ecological meanings and services (e.g., *water quality* [+5], *wildlife habitat and connectivity* [+5]), and those human meanings related to wilderness and reflection (e.g., *solitude* [+4], *clear night sky* [+4]). This archetype got its name partially due to the high level of importance assigned to the

ecological meanings and services, and in several instances those who identified with this archetype during the interviews stressed this prioritization. For instance, Participant 18, who did not identify a ‘pure’ alignment with this archetype (due to the importance of challenging and wild recreation), stated that the biophysical elements of the Flathead WSR system are “what matter”, and that it is challenging to reverse decisions that result in a degraded natural resource:

You cannot go back, so, with that in mind, I guess, I just think that you should put the resource first, you should put the resource first before opinions of people, even my own opinion, about where I should be able to paddle, and how many people should paddle. Put the resource first, and base it on the data, base it on what actually matters for that resource, in that case, you know, water quality, and the canaries that are already within our river, bull trout, and Westslope Cutthroat.

This point that the resource should be prioritized was also evident in the statistical analysis of the drivers of change selection (i.e., regression analysis) for this archetype. Table 15 highlights the associations between drivers of change selected and the ‘resource and introspection’ archetype.

Prior to discussing the results in Table 15, it is worth briefly explaining three aspects of the table: (1) the positive and negative signs corresponding to each driver of change; (2) the asterisk denoting statistical significance; and (3) the concept of ‘all else constant’. The positive and negative signs can be interpreted as the associated change in the factor score for the archetype if a particular driver of change is selected. For example, selecting “increased regulation and enforcement of human waste practices” as a *positive* driver of change is associated with an *increase* (as indicated by the plus sign) in the factor score on the ‘resource and introspection’ archetype. In other words, if a person selected “increased regulation and enforcement of human waste practices” as one of their five positive drivers of change, then we would expect them to be more associated with the ‘resource and introspection’ archetype than those who did not select this driver of change (holding all other drivers of change constant). We use single, double, and triple plus/minus signs to indicate the size of this association, as a minor, intermediate, and major association, respectively. In statistical parlance, this size of association amounts to ‘practical significance’. The asterisks, on the other hand, represent the level of statistical significance. Only those statistically significant associations are presented; more asterisks indicate more confidence for such a relationship.

Figure 4. Resource and introspection factor array

Lastly, the ‘all else constant’ aspect of interpreting the Table is that each of the associations represents a partial rate of change in the factor scores. That is, the plus or minus signs represent the changes in the factor scores corresponding with selecting a particular driver, *holding all other drivers of change constant*.

Being cognizant of these interpretation-related details, Table 15 shows an association between selecting several drivers of change related to protecting the natural resource (e.g., “biophysical impacts of increasing use”, “Invasive and/or noxious weeds (for example—Spotted knapweed)”) and the ‘resource and introspection’ archetype. This suggests that this archetype may be most concerned with human use of the Flathead WSR system as it relates to the potential impact that it can have on the natural resource, as opposed to the potential impact that it may have on one’s recreation experience. In other words, selecting “an increase or trend toward more river users” as a negative driver of change, for instance, may reflect a concern that such use will negatively affect the natural resource. Indeed, while the majority of respondents, both in the drivers of change exercise and in the in-depth interviews, generally opposed a permit system that restricted use, there were some respondents that were open to use restriction. However, it appears to be an openness based upon natural resource protection and not a protection for the recreation experience. For instance, Participant 18, who identified with this archetype, responded with the following when asked if he would support a permit system:

Well, I don’t know, it depends on what it looks like. The land use change and the biophysical impacts, for me, that’s what we should be thinking about...I would like the plan to be very specific about the biophysical indicators, and have those be the triggers, versus the number of people out there, because like I’ve said before, those are what matter. That’s why we care about how many people are out there, but if done properly you can increase capacity, if you have the proper funding and the proper policies in place, you can protect those biophysical indicators, while having increased capacity, so why not let those be the triggers versus the number of people?

This sentiment appears to be partly what is motivating an openness to restricting use. Of course, the ‘resource and introspection’ archetype placed a high level of importance on *solitude* [+4] and *quiet soundscapes* [+3], which generally indicates a human-nature relationship that is partly dependent on perhaps being alone or away from people.

Table 15. Association between drivers of change selected and resource and introspection archetype

Association with POSITIVE drivers of change	
More education about river etiquette, fish handling practices, how to reduce impacts, and rules and regulations at river access points (for example—increased signs and/or outreach)	++**
Land-use change toward less development (for example—conservation easements)	++***
Increase in budgets and financial support of management agencies	++***
Increase in Wild and Scenic River designation	++***
Increased regulation and enforcement of human waste practices	++*
Partnerships and volunteers (for example—citizen science, relationships with NGOs)	++***
Decreasing party/group size limits	++*
Permit system for float use	++*
Transboundary agreements (for example, agreements with Canada, tribal agreements)	++*
Amount and enforcement of rules, restrictions, and regulations	++*
Association with NEGATIVE drivers of change	
Land-use change toward more human development (for example—timber production, golf course operations, residential development)	++**
Permit system for float use	--*
Commercial float traffic (including group size and numbers of groups)	++**
Biophysical impacts of increasing use	+++***
Busy river corridor (encountering people on shore or on the river)	++**
Invasive and/or noxious weeds (for example—Spotted knapweed)	++**
Increase in cell phone coverage	++**
An increase or trend toward more river users	++**

Note: Levels of statistical significance denoted as: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The general importance assigned to wilderness and reflection HEMS (i.e., light green) over those social connection HEMS (i.e., dark green) is why ‘introspection’ was used in the naming of this archetype. However, again, people stressed the importance of the resource, and the ability to find the opportunities for introspection even when confronted with busy situations. Whether that is adjusting one’s pace on the river:

Busy river corridor, encountering people, you know we’ve heard a lot of people say, ‘oh, I saw three boats ahead of me.’ Well, all I have to do is pull over for five minutes, and just stop and let those people go by, and they will have the whole rest of their trip, unless they are paddling like crazy and catch up with them. You know, they need to learn that. You know, don’t complain about it, just pull over. But I think that goes back to the education. (Participant 8)

Somewhat differently, Participant 7 noted that he generally tries to avoid busy weekends: “But the boat traffic, at least on certain weekends through the summer is pretty awful. You know, and it’s fine, I think that everybody has the right to use it, but etiquette comes to mind...I try to avoid those very busy days now. I mean we don’t head up the North Fork on holiday weekends

anymore.” A human-nature relationship that prioritizes the resource, with a de-emphasis of the social element of recreating in the Flathead WSR system, is quite different than the second archetype to be discussed.

5.1.2. *Unconfined recreation archetype*

Even though we assert that the ‘unconfined recreation’ archetype (Figure 5) is quite different than the ‘resource and introspection’ archetype, it is worth first pointing out the common priorities assigned to *water quality* [+5] and *aquatic habitat* [+3]. To suggest that those aligned with this archetype have a lack of concern or care about ecological meanings and services (blue HEMS) would be a misrepresentation. Indeed, there were several respondents that related to both the ‘resource and introspection’ archetype and the ‘unconfined recreation’ archetype. Among those was Participant 3, who commented: “We haven’t spent much [time] talking about the environment in this discussion, and it is not for lack of being important to us, but I think it is more fear of having something taken away from us and that’s what we are really focusing on and that’s our access.” This fear of losing access to the Flathead WSR system was prevalent throughout the in-depth interviews (as thoroughly detailed below) and, in particular, it was stressed by those who identified with this archetype.

This sentiment is reinforced by the statistical analysis of the drivers of change selection for this archetype (Table 16). As shown, there is a strong association, both practically and statistically, between the selection of a permit system as negative driver of change and the ‘unconfined recreation’ archetype.

Table 16. Association between drivers of change selected and unconfined recreation archetype

Association with POSITIVE drivers of change	
Increase of facilities (with maintenance) at river accesses and campgrounds (for example—outhouses, bear storage, stock areas)	++*
Expansion and/or hardening of river access sites (e.g., more trailer parking, paving of sites)	+++*
Commercial outfitter behavior (for example—educating the public, providing access to those without experience/ability, sending rafts to secure campsites, elitist attitudes)	--*
Association with NEGATIVE drivers of change	
Permit system for float use	+++***
Biophysical impacts of increasing use	--*
Invasive and/or noxious weeds (for example—Spotted knapweed)	--**
Changes in fish (for example—hook scars, changes in size and numbers)	+++**

Note: Levels of statistical significance denoted as: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Participant 2 articulated this association effectively:

With the permit system being the number one negative driver, because all of the other plus three, or four, or five most important categories are all impacted...by a permit system, you know, extended self-sustained experiences would be impacted, experiences with limited planning to go wherever would be impacted, dispersed camping without services may or may not be impacted, social times with friends and family would be impacted. Because now you are trying to schedule different people to go on a river trip with you, around your permitted time. And so people get excluded by holidays or their vacation time, or their work schedules. And so they can't go, you know. Instead of us trying to find a time that works with friends and family that we can all go, now everyone has to change their plans around whenever we got the permit, and you may or may not be able to go. I mean, I hear people going down the Smith all the time, with people they don't know. Because, you know, they happen to get lucky and get included in someone's trip where they had an extra space in the boat, and you know so much for going with friends or family. Now it's all about the river, instead of about the friends and family.

This comment draws a direct connection between how restricting access might influence one's human-nature relationship, particularly as it relates to the social connection element of spending

time in the Flathead WSR system. ‘Social connection’ is a sub-theme that emerged from analysis of the in-depth interviews, as detailed below.

The focus on access is also implicit in the support for increasing facilities and the expansion and/or hardening of river access sites (Table 16). Participants that aligned with the ‘unconfined recreation’ archetype often expressed a desire to see such management actions, as it was seen as a viable way to maintain *experiences with limited planning* [+5] without degrading the natural resource. Finally, the lack of emphasis on ‘biophysical impacts of increasing use’ may partly be due to a perception that human use has, overall, had limited impact on the natural resource, and water quality in particular. For instance, Participant 5 noted: “Having seen water quality over the years since I have been here, there’s a lot of talk of it, but by and large, I am not a scientist, I can just say...[I’ve been doing that North Fork] since 1980, and didn’t see a lot of degradation...our waters are gin clear.” This participant noted the potential benefit of the spring high water surge, which can act as a “scrub brush.”

The contrast between the ‘resource and introspection’ archetype and the ‘unconfined recreation’ archetype highlight the potential tension between protection of the natural resource and peoples’ use of that resource. On the other hand, contrasts can also be drawn between different types of users of the Flathead WSR system, including private users, outfitters and guides, novice visitors, those seeking safety and convenience, and those seeking challenge. The next archetype highlights such a user type.

5.1.3. *Leisure pursuits archetype*

This archetype (Figure 6) highlights a human-nature relationship that may not even pertain to floating the river, as *shore-based recreation* [+4] is prioritized higher by this perspective than all others. Additionally, the ‘leisure pursuits’ archetype assigns a high level of importance to those HEMS that may be attractive and important to, perhaps, an infrequent or inexperienced user of the Flathead WSR system; these HEMS include *easy access to river (e.g., paved vehicular river access sites)* [+5], *comfort, safety, and convenience* [+4], *guided recreation* [+5], and *developed camping with services* [+4]. Participant 17 noted that, while guided recreation may not be the preferred choice if access to a resource is attainable, it could be

necessary, and floating a wild and scenic river is the ultimate goal: “for me, it would be a decision of, am I able to get to it...if I can get on a wild and scenic river, any river, you know, with my friends, I certainly do it. And part of it is of course access and safety, but if that is not attainable then I am in the position where I will take a guided trip.” This perspective may also encompass those who, over time, may be less able to access the resource. For instance, Participant 5 noted, “in the old days it didn’t bother us to have to drag our boat a little ways to...have to get to the water. I’m sixty-five now, it’s a little harder, I like the launches.”

The ‘leisure pursuits’ archetype may align with those people who generally recreate in the front country, as many of the wilderness and reflection HEMS (light green) are located in the negative half of Figure 5. However, *a place for wildness* [+4] is seen as important, but it was recognized that the Flathead WSR system, or its surrounding areas, can provide this human meaning at particular times of year even when traveling by car. As Participant 5 stated:

I think there should be some wild places, without a doubt, you know, it’s getting harder to find those, but you find them as much by time as you do because they are in a wild place or nobody gets to go there. Our drive to Kintla was a perfect example, we were it. Once we got past the Polebridge entry station, we were it. That was it. We found wildness, that was wildness. It was us, if our vehicle had broke down or whatever, it was us, on us, we weren’t waiting for the next car to come along or getting our cell phone out. You know, you looked up at Kintla Lake, I mean it’s wild back there, there’s nothing back there, but the wild right now. There wasn’t anybody hiking the Boulder Pass trail, there wasn’t anybody up there camping to fish, or doing anything. Wild’s there.

The ‘leisure pursuits’ archetype has a generally positive view of the outfitting and guiding industry, as reflected by the level of importance assigned to *guided recreation* [+5] and other related HEMS such as *local economic support* [+2]. This positive sentiment is also reflected in the associated drivers of change (Table 17). There was a positive association with “commercial outfitter behavior” and, additionally, those people who selected “commercial float traffic” and an “increase in commercial services” as negative drivers of change were less likely to associate with this archetype.

Table 17. Association between drivers of change selected and leisure pursuits archetype

Association with POSITIVE drivers of change	
Increase in Wild and Scenic River designation	+*
Fee system for float use	--*
Commercial outfitter behavior (for example—educating the public, providing access to those without experience/ability, sending rafts to secure campsites, elitist attitudes)	++*
Association with NEGATIVE drivers of change	
Land-use change toward more human development (for example—timber production, golf course operations, residential development)	--*
Commercial float traffic (including group size and numbers of groups)	--***
Increase in commercial services (for example—shuttle services, professional photography)	--**
Amount and enforcement of rules, restrictions, and regulations	--*

Note: Levels of statistical significance denoted as: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

There is a strong contrast between the ‘leisure pursuits’ archetype and the ‘exploration and challenge’ archetype to be discussed next.

5.1.4. Exploration and challenge archetype

The ‘exploration and challenge’ archetype (Figure 7) highlights a human-nature relationship that places importance on *solitude* [+4], *personal achievement from testing/developing skills and abilities* [+4], *dispersed camping without services* [+5], and *being free from society and its regulations* [+5]. Those aligned with this archetype within the in-depth interviews often made comments related to the importance of challenge and wildness (a sub-theme discussed in detail below). For instance, Participant 14 noted: “I would have been more of the challenging, want to push myself, want to have wild and fun adventures if you will”.

Figure 7. Exploration and challenge factor array

Participant 12 was clear that challenge and personal achievement were paramount to his relationship with the Flathead WSR system: “I’m like, oh yeah, the nature of it all, but then really more into the challenge of it all too, because I realize that I like those more challenging trips, like flying into Schafer’s Meadows...So, I’d say my personal achievements are kind of first on there...I don’t want developed camping, I don’t want motorized recreation, but I want that personal achievement. The humanness of it all, I guess.”

The ‘exploration and challenge’ archetype is contrasted strongly with the ‘leisure pursuits’ archetype, in part, because it is one of two perspectives flowing from the same bi-polar factor. It is not worth explaining in detail what a bi-polar factor is in the context of factor analysis, other than to note that the sorting of HEMS in the two archetypes are near opposites. However, this is not to say that these two archetypes are in conflict, but to instead stress that they have many differences in their human-nature relationships. Participant 11, who identified in large part with the ‘exploration and challenge’ archetype, captures this point: “I value all of the perspectives, I would say probably [the leisure pursuits archetype] would represent the people that aren’t frequent users, that might value more the commercial experience, I probably have the least in common with those people, but not to say that I don’t value their presence on the river, or their opinion.”

While there are not any statistical findings regarding drivers of change and this archetype (or the subsequent two archetypes discussed)⁴, the in-depth interviews did yield an understanding of the potential drivers of change that could influence those aligning with this archetype. Participant 2 stated that he was mostly captured by the ‘exploration and challenge’ archetype as illustrated in Figure 7, and that relevant negative drivers of change would include anything that restricted the freedom to access or move within the Flathead WSR system. It was stated that “developed camping with services, for me, that isn’t just like negative five, that’s a negative driver.” This was because anything that put bounds on where you camp would negatively influence his experience. Several of the participants that made comments organized under the ‘erosion of unconfined recreation’ sub-theme discussed in Section 5.4.1 below indicated an alignment, at least in part, with the ‘exploration and challenge’ archetype.

⁴ This is the result of using the factor scores of the 157 Q-sorters for each archetype as the dependent variable in the regression analysis, as well as the general methodology that does not employ a large, random sample.

While the first four archetypes discussed place some importance on the recreation experience provided by the Flathead WSR system (even if the natural resource is prioritized), the next archetype generally does not. Commonalities remain, however, including a prioritization of the natural resource, and a focus on unimpeded access to the system.

5.1.5. Indigenous worldview archetype

The ‘Indigenous worldview’ archetype (Figure 8) prioritizes *Native American history and knowledge (e.g., culturally scarred trees) [+5]*, *Native American use of the river system (e.g., exercising treaty rights, religious/spiritual practices) [+4]*, and several ecological meanings and services (e.g., *water quality [+5]*, *wildlife habitat and connectivity [+4]*). This perspective was named based upon the following from Participant 15 (the only person interviewed who identified with this particular human-nature relationship):

It’s self-independent sustainable experiences, I think opportunities in the sense of the Native American use of the river system, basically yeah, comes back to the treaty issues, comes back to our treaty issues to still move upon the landscape, in which I usually call a cultural landscape...[it is about] the perspective that it is not just a landscape, that it is a cultural landscape, you know that it was influenced by man through generations, generations, so that cultural landscape, as being a kind of a narrative to purport more of that indigenous worldview as a cultural landscape, it’s alive, it is there, instead of evolving through our influences.

This cultural landscape supports *subsistence activities (hunting, fishing, foraging food) [+1]* and, as mentioned by Participant 15, these activities were sustainable and often beneficial for facilitating biological diversity:

Native American use of these places, or Native American history of these places...this environment was managed before on a very intellectual level...beyond intellect, it was cultural, it was sustainable too, it was a practice that made things work fairly well, especially for the indigenous peoples. It created those diverse environments and, it created more resources for them to rely on, through our seasonal movements on the landscape.

This Participant stressed the sophistication of how Tribes traveled, used, and benefited the landscape, in part, to highlight the contribution of particular practices such as applying fire to the landscape for creating a “diverse and functioning ecosystem.”

For the ‘Indigenous worldview’ archetype, critical elements of the human-nature relationship include *connecting to the past and passing stories to younger generations* [+4], *learning about social history and the past* [+3], and using the natural environment as an *education and research resource* [+3]. The importance of these HEMS appears to flow in large part from a desire to repair, strengthen, and revitalize cultural and personal Indigenous identities. As Participant 15 explained:

All tribes are looking at their culture, and bringing their culture back. Because, believing that that makes us stronger; stronger in our identity, and stronger individuals within our community so that we can move ahead, forward into the future, with less societal issues of substance abuse, physical abuse, and poverty, issues like that, that hopefully culture would bring them up out of those situations, or issues, or lifestyles. And that cultural revitalization is dependent on the landscape, how are we going to revive, how do we manage our culture, preserve, perpetuate, so that is part of the cultural revitalization.

The drivers of change that Participant 15 discussed with regard to this archetype included anything that would impede the ability to pursue cultural practices and/or use the Flathead WSR system for fostering and revitalizing cultural identities. This includes anything that may restrict access to the resource, as well as overarching environmental threats such as invasive species and climate change. Additionally, there are potential concerns related to the loss of cultural resources stemming from increased recreational use (e.g., impacts from vandalism to pictograph sites) as well as a lack of fire on the landscape, regarding the latter point, Participant 15 stated: “the scarred trees and stuff like that too, if we are not managing by fire, they are going to disappear, you know so we do some hand clearing and other things are mimicking maybe a fire, part of that. So, that is kind of a decay of our, of those resources too, is maybe a loss of perspective of the use of fire.”

Fundamentally, for this particular archetype, the human-nature relationship is about maintaining “the close cultural, spiritual tie, and the sciences, or the complex technologies that our tribes engaged in and developed to be able to move across this landscape and to harvest all their resources they needed to make their life possible for another year.”

5.1.6. Outfitter and guide archetype

The final archetype that emerged from statistical analysis of the 157 Q-sorts is dubbed the ‘outfitter and guide’ archetype (Figure 9). Several participants identified with this archetype during the in-depth interviews, and it was often recognized that maintaining a balance between sustaining the resource (*water quality* [+4], *aquatic habitat* [+5], *biodiversity and abundance of wildlife* [+5]) and deriving livelihoods (*guided recreation* [+5], *local economic support – jobs, visitor spending* [+4]) is important. As Participant 13 stated in reference to the archetype shown in Figure 9:

Guided recreation...is important because that’s what I do for my business, but, I think as an ultimate user it is not the most important thing, for me. Water quality is, but I see myself as a mix in here of water quality, and solitude, aquatic habitat, non-motorized, you know catch and release is important. I think the quality of the water and the resource is the most important thing to me, personally, that’s where I see the longevity in the resource.

Participant 10 made a similar statement, but with an explicit focus on maintaining the balance between the environment and livelihoods:

While the guided aspect is important to us, it is also the water quality, the peacefulness of the river...the wilderness and reflection, you know that still has great meaning for us, and for myself. And so, for me it’s a way about balancing the two. Wanting to keep a sustainable and clean and healthy river system, but also being able to have the river system, you know, help the local residents and people who use it as a means to, as a means for, you know for their financial and economic well-being.

Participant 6 commented in a similar way and, like others who identified with the ‘outfitter and guide’ archetype, there was a tendency to be drawn to the ‘resource and introspection’ archetype as well. Both because of the prioritization of the ecological meanings and services, and because of the recognition that outfitting and guiding was only part of their human-nature relationship. As noted, “there is a little commercial use element...that might be the extent of most the services. I’m not looking for more development, and more, I mean you had the hardening of sites, and things like that. I kind of lean more towards the light green in some of that regard, and being able to get out and get away” (Participant 6).

Figure 9. Outfitter and guide factor array

This acknowledgement of the importance of the ‘wilderness and reflection’ HEMS was accompanied with a statement that when not working on the Flathead WSR system, days were often spent “floating the same stretch that I just worked.”

For the ‘outfitter and guide’ archetype, drivers of change that were mentioned were often related to the strained relationship between commercial users and private users. Often, it was noted that better education of outfitted clients with regard to proper etiquette as well as better education of the general public about the positive contributions of outfitters and guides could help to build a better relationship. While some that aligned with this archetype felt that more development of facilities (e.g., hardening sites) was not necessary, others saw benefit in focusing on improving existing sites:

If we could educate more people about, everything from, the [etiquette] about the river, but also the sustainability and keeping the river clean and pristine, that that would alleviate quite a few problems, and disagreements between all the different groups that have an interest in the river. Really, I feel like that strongly. Same thing, a little bit along the lines with like the increase facilities, I understand and I actually don’t disagree with wanting to kind of keep, keep a lot of the you know the river banks and the river system pristine...But I do feel like the areas that we have already kind of devoted to becoming our river access points, again I think that if they were developed in a way that was, you know, responsible, and thoughtful, that we could alleviate a lot of problems that a lot of people are having.

This suggestion that new development not take place but, instead, that particular areas be improved as a way to improve relations between all river users and protect the natural resource was fairly common across all archetypes.

Prior to moving on to a full discussion of the results of in-depth interviews, it is worth briefly discussing if different archetypes are associated with specific river stretches or classification (i.e., scenic, wild, recreational).

5.2. Are human-nature relationships and drivers of change tied to specific river stretches or classifications?

The primary reason that the mapping exercise was implemented was to understand if there was an association between different human-nature relationships (and relevant drivers of

change), and specific river stretches or classifications within the Flathead WSR system. As discussed in Section 4.5, people did not generally highlight a specific stretch of river when completing their Q-sorts. Indeed, nearly half of the sample applied their Q-sorts to the entire Flathead WSR system. Regression analysis of the mapping exercise did not yield any significant associations between the mapping exercise and the six archetypes discussed above. However, when analyzing the sample of 157 people who completed Q-sorts based upon how they completed their mapping exercise, it became apparent that one archetype was associated with a particular fork of the Flathead WSR system. Additionally, the in-depth interviews did yield some insight into how different human-nature relationships varied across segments of the Flathead WSR system. These findings are discussed in turn.

5.2.1. *The South Fork and the ‘Outfitter and guide’ archetype*

Factor analysis of participants’ Q-sorts based upon their responses to the mapping exercise indicated a relationship between the ‘Outfitter and guide’ archetype and the South Fork of the Flathead River. In other words, when all 157 Q-sorts were analyzed together (or when just those who highlighted portions of the North Fork, Middle Fork, or some combination of the two were analyzed), the ‘Outfitter and guide’ archetype did not emerge as a prominent archetype. Analysis of the 25 people who selected all or some portion of the South Fork River yielded an understanding of the ‘outfitter and guide’ archetype. This finding is consistent with the importance assigned to several of the wilderness and reflection HEMS, as well as the high importance assigned to *catch and release fishing* [+4], as much of the outfitting and guiding on this Fork is focused on angling. This finding is notable as it stresses that future changes that may influence the ‘outfitter and guide’ archetype would be increasingly important if such changes took place within the context of the South Fork.

5.2.2. *Specific locations and the in-depth interviews*

It was fairly common to hear respondents reference a specific stretch of river, or a specific Fork, when discussing their human-nature relationships or relevant drivers of change. Generally, twelve respondents mentioned a specific area within the Flathead WSR system, and

often these mentions stressed how special the resource was as it provides a broad range of experiences. For instance, Participant 1 stated:

I get a totally different experience, you know, when I am doing those upper stretches on the middle fork, you know, from Schafer down, or on the south fork, when, I'm, you know, I've got to physically hike myself in with a pack raft. Like, those experiences, are, god, I look forward to them all year. Because those experiences are totally different than my experiences when I go out just for the day with my raft. You know, when I can just drive right up to the put in, and float for the afternoon and get off.

Participant 1 noted the “quick connection” with nature provided by those river stretches that have drive-up access. The in-depth interviews also highlighted how people may change their floating plans based upon increasing use:

We've been going down to the South Fork. I mean the South Fork today, went from Cedar Flats down to Spotted Bear is a lot like what the North Fork was fifteen years ago. It's less accessible, the road is equally bad which keeps a lot of people out, and it's twice the distance. So, I mean there are other options out here, but the North Fork is just so convenient, and it's easy to row, and that's why people choose to go there. (Participant 7)

Many recognized that the use on the North Fork was mostly private users, but four people indicated they noticed an increase in commercial use on the North Fork, and they hoped that commercial use would *not* increase significantly on the North Fork going forward. Generally, people accepted portions of the Middle Fork as the area where commercial use should dominate: “The amount of commercial traffic on the middle fork I think is very much under control. I don't want to see that much commercial traffic up on the North Fork, and I don't know if there is a way that you can have areas where it is commercial free zone, or something to that effect” (Participant 19).

Finally, several respondents noted how the wilderness trips (i.e., upper South Fork and upper Middle Fork) remain as bastions of wilderness and challenge. Participant 12 considered these areas the only two that have not wasted away, and Participant 13 noted they were “last great wilderness” trips in the lower 48 States. Given these comments, we would expect those that are particularly interested in challenge and personal achievement, such as the ‘exploration and challenge’ archetype, to be sensitive to any changes taking place on these stretches of river running through designated Wilderness.

The final issue to be discussed that was specific to a river stretch was access on the North Fork. Several people commented that access could be improved on the North Fork, both through improvements to current access and, if possible, even expansion with new river accesses. Participant 9 noted that Coal Creek on the North Fork is very busy and in need of improvements to help the “flow of traffic”, and several participants suggested that increasing accesses along the North Fork could help to disperse use along the stretch. Dispersion was considered as a superior alternative to restricting use in any way. Archetypes that may be particularly opposed to restricting use, such as the ‘unconfined recreation’ archetype, would likely be highly sensitive to management actions that influence access on the North Fork.

5.3. What did the publics say about their human-nature relationships?

During in-depth interviews with 19 members of the general public, an understanding of what underpins a variety of human-nature relationships emerged. Table 18 provides an overview of the two major themes, with corresponding subthemes, that emerged from qualitative analysis of the in-depth interviews. Additionally, the number of people making a comment that fits within each subtheme is noted.

Table 18. Themes and sub-themes related to the human-nature relationship

Theme	Sub-themes	People commenting on issue (out of 19)
Connecting to nature	Unplugging and escaping	10
	Challenge and wildness	8
	Social connection	7
	Spirituality	4
Flathead WSR system across time, space, and society	Generational and cultural continuity	16
	Montana and its special natural resources	11
	Water quality	7

One should be cautious to assign too much weight to a theme or subtheme based upon numbers of people raising the issue but, nonetheless, understanding the prevalence of a concept is worthwhile. Both themes are discussed in turn. When possible, direct quotes of respondents are

used. To protect the confidentiality of the participants, a number is assigned to each respondent that accompanies any quote made by that person.

5.3.1. *Connecting to nature at the individual level*

Irrespective of the archetype one may have identified with, it was clear that connecting with nature, or being immersed in nature was integral to peoples' human-nature relationship. As with important relationships with other people, participants exhibited a high level of intensity and investment in their connection to the Flathead WSR system. This was shown both by the language used and the emotions conveyed through earnest conversation, occasional laughter and, at one time, some tears. Of course, there are a variety of reasons that this connection is important for people (as explored in the sub-themes), but 16 participants made more general comments about the connection itself. For instance, Participant 1 noted that it is important to “feel connected with my surroundings,” and Participant 11 noted that their relationship with nature is about “touching it and feeling it and being in it.” Participant 18 noted that, “literally, everything that is in my life is centered around my connection with nature.” In many cases, it was important for individual identity, and sometimes it went to a cellular level (meaning an essence of something). As Participant 8 noted with regard to their human-nature relationship, “it means everything to me. It’s my church, if you will. The river, or the woods, being in the mountains, that is what I am about...so, it’s in my blood.” Similarly, Participant 16 stated that their human-nature relationship is “my lifeblood, that’s everything for me.”

At times, participants would connect a specific element of their human-nature relationship and their identity, such as Participant 12, who noted that an individual part of his identity was “being able to know that I can get through it.” In this context, *it* is referring to the challenge of navigating the Wilderness sections of the Flathead WSR system such as the upper Middle Fork. It is through these connections between, for instance, identity and challenge, that particular sub-themes started to emerge.

The most common of these connections was with regard to ‘unplugging’ and ‘escaping’, which is a well-established element of the human-nature relationship discussed in scientific literature (the study by [Lang \(2018\)](#) on Wilderness Solitude in the 21st Century provides a recent

literature review and discussion). Ten participants explicitly referenced how connecting with the Flathead WSR system helped them escape the stresses of everyday life. Participant 4 stated: “I tend to pour myself into work, so being able to just completely shut off and go to the river...just to go and unplug is really, really nice.” Using *just* in this context does imply that unplugging is foundational to their experience. Participant 14 explained that “when you are out there, you typically are not thinking about the other parts of your life. For me, it is an escape, it is adventure.” Getting away from the “cell phones and the everyday traffic” or the “daily routine” was mentioned (Participant 13).

This escape is valuable, and it can contribute to personal identity as well as other personal needs such as rejuvenation. For instance, Participant 3 explained:

Well, for me it's, a place to recharge, because I do work in a social setting and sometimes to completely unplug and step away is just really what will set me up to come back full strength. And it is just beautiful, you know, we go up and we go, ‘wow, this is our back yard?’ Like we are living the dream, that bumper sticker, ‘my life is your vacation’; you know, true. But we made an effort to make it happen in our lives as well.

This final comment about making an ‘effort’ to live in proximity to the Flathead WSR system is a point to which we will return in the drivers of change discussion below.

The sub-theme of ‘challenge and wildness’, highlighted by eight people, is deeply personal and often relates to escape and unplugging. For instance, Participant 16 said:

Personally, I think there is a lot of value for anybody to be getting out into the wilderness, and I am really stressing the wildness part of that. And having experiences where it's not, the safety valves aren't necessarily all there, you've got to rely on, to some degree, your experience, your commitment, how you prepared yourself. And it's not just a cell phone call away, or a sat phone call away from being rescued out of that situation.

While potential danger is a part of the human-nature relationship for some, it is not necessarily an element that pushes out other components such as relaxation and tranquility. Participant 14 noted that “it brings me peace at one moment, but it brings great excitement around the next turn. I like the yin and yang, ‘oh my god, I just got scared out of my mind by that rapid-that was fun, let's do it again.’”

To some, challenge and wildness constitutes a visceral state whereby raw emotions and

vulnerability are present in a way that is uniquely human, and using one's own ability to successfully and safely manage this can result in a feeling of achievement. As Participant 12 explained:

I think we need these spaces...to remain that kind of wild and challenging, and raw, and being able to feel like you complete your human need, to feel like you can conquer things, you know, and not quite in that utilitarian way, like 'oh, you just conquer it and dam it', but like I can go out and not only survive in it but thrive in it. You know, in a way that nobody else on this planet can, nobody else besides humans. Really being able to feel completely human out there, and I think that's what, at its rawest is what I like about it, is that, you know, you're in the sea, and it is only you. It's you and nature, you know, so, it kind of takes away everything else. And yeah, I don't know, just the challenge of it all, I think this is, the challenging rivers, you know, I feel, I can feel the fight or flight like happening in me when I am on the top of a big rapid. Like every part wants to just run out of the boat, but there is nothing I can do and I got to like flip that switch, and you just got to fight for it. You know, and it is really cool to like, feel, seeing nature at its rawest, and feeling your human emotion at its rawest.

Like the connection to nature itself, it was clear that respondents felt an intense desire to maintain a level of wildness and challenge in their pursuits within the Flathead WSR system. Additionally, there does appear to be a spatial element, in some contexts, that is important for connecting to nature and experiencing the challenge of a trip. For instance, Participant 1 noted that "the non-ease of it getting into those upper stretches, is also really important to me. Like you got to work for it, and so, and that working for it, and sleeping by the river every night for a week, or whatever, is huge. I don't know what I would do without it." This concept of working hard to get somewhere is reflected in the archetype discussions above.

Human-nature relationships are also about social connection. Generically, it is about connecting with family and friends through time spent within the Flathead WSR system. As Participant 2 noted, being on the river is fundamentally about friends and family, the importance of which was stressed with the following: "I would say that it is part of our, my family's cultural identity. It is part of who we are, as Montanans that live, that grew up doing this stuff." At times, respondents commented on specific elements of this social connection. For instance, Participant 1 reflected on the enjoyment derived from showing "people cool stuff" and giving "them that experience" when friends and family come to visit. Participant 10, who works in the outfitting

and guiding business, noted the value of seeing what experiencing the Flathead WSR system can “mean for other people.”

In addition to fostering relationships with existing friends and family, three respondents recognized the value of the river community, and the meeting of *new* people through a shared interest in the Flathead WSR system. Participant 5 reflected on new friends made on the river, who all target permitted rivers with coordinated lottery applications; they go “boating together” and are “more of a river family.” Respondent 4 explained that her “relationship with the river, it’s definitely a group-social piece, because I am not a water person, so I have just been super lucky to fall into a group of friends who have really ushered me into, and really taught me responsible river recreation.” This focus on responsible river recreation, and being safe out there, was a valuable aspect of the river community discussed by others as well. Participant 11 described how river recreation, and whitewater kayaking in particular, is a social activity:

I think it is interesting among other outdoor pursuits, I think climbers can kind of be loners, and mountain bikers can kind of be loners, and sea kayakers are definitely loners, and I think fisherman like the solitude, but I think whitewater kayaking, you can meet up with a bunch of strangers, and you are all looking out for each other’s safety, and by the end of the afternoon you are friends. So, I think, I am kind of an extrovert, and I’ve enjoyed that, but I think I enjoy the activity primarily, but then there is this really cool side, cultural part of it that like, you connect it to a greater community of kayakers and rafters, and I’ve definitely valued that through the last couple of decades.

A primary point to be made is that social connection is important, whether it is perhaps the most fundamental component of someone’s human-nature relationship, as suggested by Participant 4 above, or perhaps a more secondary component of the human-nature relationship as described by Participant 11.

The fourth sub-theme to be discussed with regard to individual connections with nature is spirituality. Four people mentioned spirituality, or the supernatural, or god in their discussions of their human-nature relationships. While there is a long history of both popular and scientific literature that delves deeply into the spiritual connection people have with nature, the respondents in this study were fairly terse in their discussion of this element. For instance, Participant 19 stated the following about her human-nature relationship: “it is important to me spiritually. It is important to me, to, I’m sorry, it is important to me spiritually.” Other comments

related to spirituality were similar. These comments lack detail, which is an indication that such connections to nature are tough to articulate. However, this sub-theme is worth mentioning as it appears to represent a deeply personal connection to nature, and the impact of an interruption or alteration of such a connection via some driver of change would be challenging to quantify.

This section discussed the four sub-themes listed in Table 14, as these themes were fairly prevalent; however, it is important to note that Respondents mentioned a variety of reasons that connecting to nature was important. The opportunity to learn was specifically mentioned. Participant 4 noted, “no matter how many times I have been out for a one to three day trip, I learned something new about how to be more efficient.” And Participant 1, when prompted to explain what he meant about the opportunity to learn, stated the following: “It’s all of it. It’s either geology, or it’s invertebrates, or it’s, or, you know, it crosses over to, for me, it crosses over to a, a spiritual existence that learn, as well, you know, the learning isn’t just physical, biological, but it is, you know, I hate to sound so wishy-washy here, but it is almost, you know, it’s almost supernatural.” The final fundamental facet of connecting with the Flathead WSR system to be discussed is, quite simply, fun. As Participant 6 stated when prompted about the meaning of his human-nature relationship: “It’s really recreation. I don’t, I mean I’m not, you know, you hear people, is pontificate the right word, talk about fly fishing, and how it’s this experience, that’s just not me. I just like doing it. I mean that is what it boils down to, I don’t have a great explanation of what it means, or how it makes me feel, or whatever, I just enjoy it.”

5.3.2. *Flathead WSR system across time, space, and society*

It was clear that the connections that people have with the Flathead WSR system is not only about themselves at an individual level, but also about how the Flathead WSR system is important over time and how it supports society at large. In other words, in addition to seeking a connection to nature for reasons ranging from social connection and escape to challenge and spirituality, Respondents often focused at a broader level in a way that highlighted: (1) the underpinning reasons for the intense connection to the Flathead WSR system and; (2) the facets of the system that are important beyond their respective individual connections. All 19 people interviewed made comments that indicated a level of thinking beyond themselves, and generally those comments fell into one of three sub-themes (as listed in Table 18).

The most prevalent of these sub-themes was related to the importance of peoples' human-nature relationships over time. Specifically, 16 people discussed how their connection to the Flathead represented either generational continuity or change. Much of the discussion fitting into this sub-theme emerged during the answering of the question about how peoples' connection to the Flathead WSR system (or nature more generally) differed, or did not differ, from their parents or somebody they look up to. Within this subtheme, two points become evident. First, peoples' human-nature relationships with the Flathead WSR system are fostered and strengthened over generations. For instance, Participant 13 explained that: "one of my reasons for being here today is because my dad took me into the south fork on horseback when I was a little kid, and uh, so, it's a little bit of a full circle for me to be able to help out with that drainage, and all the other places he took me as a kid growing up here, so, it all boils back to my childhood with my dad." Somewhat differently, Participant 18 highlighted both the generational continuity of his connection to rivers and the social changes that can influence how our natural resources are managed and viewed:

Not only is it a thread in my life, but it is almost a thread that runs through our generations, and maybe skipped my dad a little bit...I talked to my granddad about how differently he views rivers as a manager of one, and then I think about my great grandfather as somebody who was using rivers to harness some sort of economic good out of it, versus where I am at, basically trying to you know, right some of the wrongs of my forefathers, and, but also realizing that I have the luxury to do that, because we have other sources of energy and it is not the middle of World War II where they need power to make aluminum for airplanes.

Finally, Participant 10, who did not grow up in and around the Flathead WSR system, noted that living in the area for 10 years has created an understanding of how deep the connection is for those who have spent a lifetime in the area: "people don't necessarily understand if they haven't grown up here, and have the strong connection and the meaning behind it. And people are fiercely defensive about that, and I understand that now. But I wouldn't have, not even close." Being 'fiercely defensive' about ones' connection to the Flathead WSR system, particularly in the face of potential changes, is further discussed in the drivers of change section below. However, this idea was reinforced generally by Participant 8, who noted, "My dad, he's the one that, he was a guide, way back when, he introduced me to all of that, when I was that tall. So, it's in my blood. It's been in my blood all my life, so it's hard to swallow the all the change." While this sub-theme highlights the intense connection that people

have with the area that has been fostered over generations. The CRMP is a forward-looking effort, and looking at how peoples' human-nature relationships have changed over time may be helpful for supporting this forward-looking need.

Another sub-theme that emerged as Participants discussed the Flathead WSR system is related to the unique and special characteristics of the Flathead WSR system and, more generally, the greater Flathead area. Eleven people reflected on the quality of the natural resources in the area, and many acknowledged being fortunate to live or recreate in the area. In some cases, it was suggested that the Flathead WSR system, and particular parts of it (e.g., the upper South Fork), are unique to the continental United States. As Participant 12 noted, "I continue to speak specifically to the wilderness part, Schafer Meadows, South fork...because I think that is what we need to preserve, because I think they have already wasted away. The North Fork is done, the lower Middle Fork is done, you know, they already dammed the lower South Fork, that's done, you know, and so it's like, that's what we need to focus our attention on, and continue to preserve." This participant is expressing a belief that the 'wild' sections of the Flathead WSR system, as classified by the Wild and Scenic Rivers Act, are those that should be prioritized.

Participant 13 discussed how the Flathead area is reminiscent of a bygone era: "I would like these resources to be as nice for people forty years from now, because we are really enjoying the good old days." More explicitly, Participant 13 recalled a story of hearing a very experienced, non-local river user reflect: "you got to realize that South Fork is the last, the last great wilderness trip in the lower 48." Participant 2 explained the unique level of access in the area: "the beauty of the Flathead Valley in northwest Montana is that there is so much recreational activity, there's so many lakes and rivers and river miles and National Forest in every direction...every direction you go you've got access to resource." Like the sub-theme related to the connection over time, this sub-theme underscores an intense level of investment in the Flathead WSR system given the special nature of the resource.

The final sub-theme that emerged through in-depth interviews that extended beyond the individual was the importance, and often prioritization above all else, of water quality. Seven people focused their comments on water quality. As Participant 17 suggested, "I guess if I had to pick something to focus on, I guess it means if you are protecting that you are kind of protecting

other stuff at the same time. So, I would have to say water quality would be something, should be first and foremost.” Participant 4 made a comment about the foundational importance of water quality as well, not only for those using the Flathead WSR system for recreation, but also for those who are downstream of the system: “what does clean water really mean to, not only recreationists, but to farmers and ranchers and the people growing our food—to that life, I don’t know what you call it, like that chain from the fish up...microbes up, and I think that that goes beyond just quality of life and is really about survival.” Participant 13 explained that water quality is where the “longevity” of the resource lies, and it was noted that: “the history, I find fascinating, but it is isn’t the most important thing, the most important thing to me is that we keep the water quality as good as possible, and a place for people to go out and experience wild places.”

The importance of the Flathead WSR system, beyond one’s individual experience, emerges when considering the system over time, space, and society at large. Generally, it not only underscores the intense investment that people have with the system, but it also highlights a broad range of interests that can be considered by the CRMP planning team, adding yet another layer of complexity to the process. As these different themes and sub-themes are considered with regard to human-nature relationships with the Flathead WSR system, it is also worth noting the comments made by participants with regard to who or what (e.g., personal enjoyment, future generations) the Flathead WSR system and the associated human-nature relationships are important for.

Only two people explicitly mentioned personal enjoyment within the context of their human-nature relationship, but this could be because personal enjoyment or the value that people receive from their connection with the Flathead WSR system ‘goes without saying’. Beyond personal enjoyment, six people mentioned, in some way, future generations. These bequest values, or the desire to maintain important opportunities into the future, were implied with comments such as: “I want these rivers to be able to sustain for a long time to come” (Participant 1), and “I definitely want to preserve it for people going forward” (Participant 5). Four people commented on the importance of the Flathead WSR system for economic productivity, and thus the livelihoods of those in the surrounding community. Three people mentioned the value of simply knowing that the Flathead WSR system exists as a resource for the use of others,

irrespective of their own use. It is worth stressing that these existence values do not necessarily crowd out other types of values such as personal enjoyment. For instance, Participant 11 explained: “I see a value in knowing it exists...I like to know it is there, even if I am not a frequent user. But definitely, when I think about my perspective, and my relationship with the river, it is definitely as a user, and touching it and feeling it and being in it.”

Finally, two people commented on the intrinsic value of the Flathead WSR system, or at least components of the system. Intrinsic value is the idea that the system has a right and value to exist in and of itself, irrespective of the human benefits derived from it. Acknowledgement of the tension between these values was made by Participant 3 when discussing the importance of wildlife outside her residence along the North Fork: “Part of it is the fact that we have access to look at it right outside the window, that is my personal enjoyment in there as well. It is not just the wildlife, it’s also viewing of it for myself.”

5.4. What did people say about relevant drivers of change? A focus on threats

This section focuses on the drivers of change people considered relevant, as well as the potential impact of those drivers of change on peoples’ human-nature relationship. Table 19 lists the themes and corresponding sub-themes related to drivers of change. Three themes emerged and will be discussed: (1) impacts to the social experience; (2) impacts to the biophysical resource and; (3) administrative capacity.

Table 19. Themes and sub-themes related to relevant drivers of change

Themes	Sub-themes	People commenting on issue (out of 19)
Impacts to the social experience	Conflict in the river corridor	14
	Erosion of unconfined recreation	13
	Crowding	9
	Access	9
	Technology	8
Impacts to the biophysical resource	Recreation impacts	11
	Invasive species	9
	Climate change	4
	Train spills and forest use externalities	3
Administrative capacity	Lack of on-the-ground presence	9
	Funding	6

5.4.1. *Impacts to the social experience*

During the in-depth interviews, 18 people commented on factors influential to their social experience. These comments were organized into five sub-themes, the most prevalent of which was related to conflict in the *river corridor*. This conflict was not always a conflict between river users and, additionally, conflict does not always take place on the river. To be sure, eight people mentioned conflict between river users, often through comments about a difference in social values or a lack, from their perspective, of basic river etiquette. For instance, Participant 12 expressed frustration with regard to the “lack of river etiquette, just once again, it is those social norms, I think it’s just, there is somewhat of a party scene on the river in the summer...fortunately we are not seeing a lot of that up in the wilderness section, but you are still seeing evidence of it.” Several participants connected a lack of river etiquette and the ‘party scene’ on the river. Others mentioned specific behaviors that led to conflict, such as Participant 6: “I think it is just a frustration, whether that is other people fishing in, and low holing you, and jumping into the hole right in front of you.”

At times, participants connected particular behaviors seen as inappropriate to specific concerns such as the safety and well-being of fellow recreationists. Six people made a comment similar to that made by Participant 2:

When somebody is going down the river, in an inflatable unicorn blow-up, I think that’s the kind of use that does kind of rub the Wild and Scenic people the wrong way. I mean it’s a hot pink unicorn blow-up...And I think, that person shouldn’t have been on the river, because it was meant for the swimming pool. It’s a dangerous river, I mean there’s rapids, it could kill people. And it’s not, really, what people are expecting to see on a wild and scenic river, you know.

This comment implies a desire to see greater respect for the inherent danger of recreating on a wild river, and four people made such a connection. Additionally, these potential conflicts were accompanied with a focus on a solution related to greater education and safer tourism and recreation. A focus on education is common, and it is an issue discussed in detail below, but with regard to safer tourism and recreation, some respondents signaled a concern about the process of renting gear: “our number one cause of accidental death up here is water. And we have these rental companies renting rafts to any yahoo, no certifications” (Participant 4). Similarly, Participant 3 stated:

Education, one thing that I would like to see, and this is more from our Middle Fork experiences, when people rent their own boats, they are not guided. I don't know whether or not they are given any etiquette or not. Example: we were on the middle fork this summer, and I was fishing, and I was really [close] to the shore, and I have a guy on a kayak come right between me and the shore, and they are clueless, and they were in a rented kayak or something. And I am not sure if they get [any education or etiquette] from the places that they rent from or not.

Other sources of conflict mentioned were related to a strained relationship between guided recreation and private users, often private anglers. As Participant 12 noted about the Middle Fork whitewater stretch (i.e., from Moccasin Creek down), "it's a great stretch of river to go on, but I don't like to go on it in the summer, I mean, I can't, the tour boats taking pictures of me fly fishing. It's just like, I am trying to enjoy my time, and I am trying to enjoy the rapids, unfortunately it is the quickest rapid section we have, but, they just let the commercials do whatever." Participant 8 noted the impact of guided recreation on fishing as well: "You know, some of them, hate to say it, they are actually rude. You know, the guides, when you have the whole river, and we are fishing in this one hole, and you have the whole river, I mean we are pulled over to the bank, and they will come right through where you are sitting there fishing."

The final point made by two people related to conflict in the river corridor was between river users and landowners. Participant 4 expressed offense to the number of 'no trespassing' signs along the North Fork: "It looks like two big landowners, and that is so, it is so offensive to me, because it is so inhospitable." Participant 5 expressed similar dismay:

There's a land holder on the Middle Fork, owns about a mile of the Middle Fork...you see this on the North Fork too, but a lot of postings, no trespassing, but he's even got cameras out, right down to the, filming people below the high water mark. Very invasive, extremely invasive, kinds of things, and that's another thing, when somebody doesn't understand Montana law buys property, they don't own into the middle of the river, but they don't get a clear understanding of that.

Below, there is a discussion about potential ways to address this conflict, or at the very least a recognition that addressing this conflict is important, as it does have a clear impact on peoples' human-nature relationship.

A second major sub-theme related to impacts to peoples' social experience is labeled as 'erosion of unconfined recreation'. This sub-theme details, in many ways, how people would be influenced by the implementation of a permit system. Perhaps unsurprisingly, the topic of a

permit system was commonly raised in both phases of research; some suggested that this was likely due to the media focus on this topic leading up to the CRMP scoping period. Thirteen participants focused explicitly on a permit system, and this discussion highlighted the complex nature of the issue but, in general, there was a desire to maintain the freedom to both access the Flathead WSR system and move within that system generally unimpeded. People worried about losing the ability to go on the river spontaneously, as Participant 3 noted: “we want to go, decide that morning that we want to go rafting for the day.” Participant 8 explained that the “spur of the moment thing is pretty special, but I am sure that the majority of people that live here say the same thing. Because you know, they can’t plan that far in advance, or don’t want to plan that far in advance.” Participant 2 focused not only on the spontaneity, but also the freedom to move within the system: “One thing I kept hearing, you know, during the conversations in which you guys are seeking out, is, we are looking to understand the experience that people want to have. The most important aspect of the experience that I want to have is freedom to come and go, and camp where I want, in that public resource. And the minute you start restricting it, or changing it, or complicating things, complicating it, you’re taking away an element of that experience that is wild.”

Eroding unconfined recreation is generally seen as a negative driver of change, and this not only encompassed concerns about restricting use through a permit system, but also issues related to an increase in the number of rules, including a trend toward designated camping. Additionally, while the need for education (and science) was acknowledged widely (as detailed below), two people noted the need to be careful in that education implementation. As Participant 16 detailed:

Education I still think is important, I just would look at, hopefully some of this as being away from the river experience. That interferes with my experience, having somebody that I am viewing from a regulation standpoint there on that river, over, looking over my shoulder, I don’t want people looking over my shoulder when I am out in the mountains. I am getting enough of that with cell phones, sat phones, monitoring, from the wildlife perspective, you’ve got biologists that have got cameras up everywhere out there. You know, I want to stop and urinate somewhere, I don’t want to be worried about whether some biologist has got a camera up.

Limiting the impact to the freedom of a person’s social experience, sometimes referred to as the ‘unconfined’ element of recreation, was also mentioned within the context of a permit system

that would not limit use, but instead collect data and educate. This desire to make getting on the river easy, while also allowing for education and the collection of data was reflected in the names given to such a ‘permit system’. For instance, Participant 6 remarked that an effort to collect data “is not a permit, maybe call it...a self-issued permit, there is no regulatory piece of it, maybe there is some education attached to it.” Similarly, Participant 2 called this approach “voluntary registration”, which would be relatively low cost, “it doesn’t affect peoples’ experience negatively, doesn’t restrict them from getting on the river at their will when they want to.”

People generally expressed greater concern about losing the ability to take spontaneous trips, or the poor behavior of others on the river. As Participant 11 noted, “I would rather deal with a thousand educated, ethical river users than a dozen unethical river users that ruin the experience for everybody.” The idea that numbers of people was less an issue than the behavior of people was a fairly common sentiment, this was reflected both in the in-depth interviews and in the drivers of change exercise in the initial phase of research (Table 12). However, there were four particular instances in which people mentioned the number of people, or crowding as an issue that has a negative influence on their social experience: (1) crowding on the South Fork, mostly due to number of pack rafts (i.e., light, single person crafts that are easily carried (often long distances)); (2) commercial traffic; (3) large groups and; (4) region-scale tourism.

Regarding crowding on the South Fork, Participant 8 noted that this particular river segment is perhaps “not worth doing now. It’s so busy.” Whereas Participant 12 was more explicit about the issue: “we were counting 35 – 40 pack rafts a day, on the South Fork, in July. I mean, that is not wilderness anymore, you know, that’s overuse.” Commercial traffic was mentioned by six people, and this was often related to the Middle Fork whitewater section from Moccasin Creek: “that whitewater stretch is, that’s heavily heavily heavily commercial, you can’t argue against that. It’s a train of boats. We’ve run fishing trips on that, you stop and you wait for four boats to come through, and you stop and you wait for four boats to come through, and then you row back out and you fish and fish.” When referencing the commercial traffic on this particular Middle Fork stretch, there was not necessarily concern, but it was sometimes stated that a spread of commercial use would be undesirable: “The amount of commercial traffic on the Middle Fork I think is very much under control. I don’t want to see that much commercial

traffic up on the North Fork, and I don't know if there is a way that you can have areas where it is a commercial free zone, or something to that effect. It's not that I am against people making a living, we all have to" (Participant 19).

Three people mentioned group size specifically as something that has a potential negative impact on their social experience, or perhaps on the biophysical resource itself. For instance, Participant 1 expressed concern about the impact that a group of 20 people would have on the riparian area while camping. In two instances, there was a connection made between large groups and commercial traffic. Participant 3, while not 'minding' guided recreation, noted: "sometimes I think, that the guided recreation though, they get a little um, it is in contrast to wanting to have that solitude and quiet soundscapes, because sometimes you get the party mentality. Not that they are out there partying, as much as the quantity of people, and they get loud and whoop it up, and stuff; yeah, that's not why I am out there." Participant 2 explained, "I do think that decreasing or limiting the party group size could go a long ways, but you know I kind of target that unfortunately the commercial users, because I see those guys having the largest groups. And that is when it's annoying, for me, and maybe for others, and I've talked to other people. It's different when a boat of people go by, and it's four Glacier Raft boats full of people with helmets and matching life jackets go by. It's a different deal, and they all look at you like you are a wild animal."

The final point to be made under this sub-theme related to crowding is the concern expressed by several people about region-scale tourism. Five people made comments about sustainable tourism, and the need for greater coordination among relevant entities. For instance, Participant 8 noted that real estate developers and tourism promoters are not concerned about river crowding, or more importantly, the potential restriction of river users: "they don't care about a permit system, so they just keep promoting and selling." While these comments related to over-tourism are not specific to crowding on the river, it is evident that some participants see potential management actions, such as the restriction of use on the river, as stemming from a larger issue related to tourism and increased visitation.

Nine people discussed access issues, and generally comments stressed the importance of unimpeded access (ability to go whenever – as discussed in the 'erosion of unconfined recreation' sub-theme), the quality of river access sites, and the amount of river access sites. The

ability to access the river at a moment's notice is not reiterated here. As for the quality of access sites, three people mentioned that having safe river accesses was important: "I am not saying it has to be paved concrete right to the water's edge every two miles, but I think it is pathetic that we have such nice rivers, and so many of them are hard for people to enjoy. You know, and I am not saying that you got to be able to back in a Cabin Cruiser, but even for small boats like we run. Some of these take-ins and take-outs, I am not talking convenience, I'm talking even safety" (Participant 14). The number of river accesses was also mentioned as a potential driver of change, and it was often expressed that it would be a positive change to see more river accesses, particularly along the North Fork. The stated reason was that this would not lead to increased use or crowding, but that it would disperse users within the system more effectively.

The paramount importance of access moved beyond recreation related HEMS for Participant 15, who prioritized Native American cultural use and subsistence activities within the Flathead WSR system and its surroundings:

We still practice subsistence lifestyle in a way, we go out berry hunting, berry picking, root harvesting, and hunting and fishing, all being very important, so, this cultural landscape, the river and the adjacent land forms to that river are very important to supporting that subsistence lifestyle with of course the treaty rights to move off the reservation, and to be moving freely on federal lands, and what I would consider public lands, as in state also, lands that we have the opportunity to do that...to move across the landscape to those resources of subsistence lifestyle, and of practicing the seasonal round. The seasonal round embodies the vast tracts of land, and varied ecosystems too. From high alpine environments to all the way down to riverine bottom environments, and the landscapes in between that...And so then, I'm looking, always looking for opportunities for our tribal members to practice their culture.

The ability to move freely on the landscape is seen as critical to a variety of human-nature relationships.

The final sub-theme related to the social experience was the impact of technology, and comments included the impacts of the internet and social media on driving visitation to the area, the impact of cell phones and satellite phones on the challenge and wild nature of the experience, and the changes in boat technology that allow easier access to remote resources. This latter change was mentioned both in a negative and positive light, particularly in the case of pack raft use on the South Fork, and in a positive light in that better boats allowed for greater exploration. Five people mentioned the negative impact of boom boxes, as captured by Participant 8: "to see

them even coming down the river with boom boxes. I mean they are in the upper North Fork, and they have a boom box going. God, why are you here?”

5.4.2. *Impacts to the biophysical resource*

Seventeen people made comments that reflect a concern for impacts to the biophysical resource. This theme can roughly be considered in terms of the impact from recreational use (e.g., erosion of river access sites, vegetation trampling), and the potential impacts stemming from more external and Flathead WSR system adjacent forces such as invasive species, climate change, train spills, and externalities stemming from forest use (e.g., timber production). Of course, invasive species issues are commonly influenced by recreation within the WSR system, but the nature of the problem extends well beyond recreation.

Concerns about the impact from recreation users included the impacts to fish from overfishing or the use of the use of treble hooks, the potential impact of dogs on wildlife, the influence of human and dog waste on water quality and, generally, the impacts stemming from a lack of leave-no-trace principles. As Participant 13 stated, “I think it’s cool that the fish numbers have kind of stayed the same. It’s the hook scars that have increased,” and Participant 11 noted the potential impact of recreation on water quality and aquatic species.

In addition to the direct and perhaps more observable impacts of recreation use, several participants expressed concern about large scale threats such as invasive species, climate change, train spills, and grazing and timber production. Nine people mentioned invasive species as a potential negative driver of change, and usually it was simply stated as a problem. Participant 8 wondered about the existence of efforts to impede the spread of invasive species: “they used to have a program, in the North Fork, I guess the whole forest, to take care of invasive species like knapweed, and where did it go?” Participant 10 discussed the nuance between native and non-native fish species:

The big discussion about non-native fish versus native fish, whether you have the lake trout, rainbow trout, and trying to keep with the native bull trout. There is the different factions, commercial, non-commercial, there is the tribe that has...an opinion about it as well. For me, I always thought it would be nice to see, you know going back to a time, when it is kind of back to its normal and original state.

I don't think that is probably possible that we will ever get there. In my particular case, it skews towards the negative of those fish being here, I totally understand the flip side of it for the lake charters who use that in their own sense to have a living, and to have recreation, that may be different from what my recreation is. So, I understand that, and it's very complicated, and I don't think there is an easy solution.

Four people also mentioned the potential impact of climate change on the Flathead WSR system, but it became apparent the exact nature of how climate change might impact the system is not well understood. Generally, there was support for increasing our understanding of climate change impacts, as well as awareness about the issue. With regard to recreation, Participant 6 wondered how it might influence river flows at different times of year, and how those changes might distribute float use across the river system.

When considering the potential impact of both invasive species and climate change on subsistence lifestyles and Native American cultural use, Participant 15 provided the following:

Climate change, of course, is another associated effect with the impacts to our cultural resources out there, we're finding roots coming to harvest at different times, and the berries. A normal practice with chokecherries was to let them go through a frost so they become sweeter, but now that frost, that frost doesn't come...we have certain months that we call like, the bitterroot month, that the bitterroot comes in, up in that month, and it is an indicator of what we are to do that month, is to harvest bitterroot...that is an indication of our environment changing around us, and the culture trying to live within those environments, which then, you know brings on invasive aquatic species and other weeds, and other stuff like that too that are coming in with this climate change also is allowing for. Even different insects, we have praying mantis up here now that I have never seen praying mantis insect around the lake here.

Beyond climate change and invasive species, there were concerns about other large-scale threats such as train spills and the long-term impacts of forest use practices.

Two people explicitly mentioned the threat to water quality and the aquatic environment stemming from a potential trail derailment or spill along the Middle Fork. Even though only two people mentioned this particular threat, it is worth mentioning both because it was a common comment heard during the 'listening and learning' public meetings, and because it seemed, at least for one respondent, to trump other water quality concerns. Participant 5 noted: "when you talk about water quality, it's the threats to it from other things that stand out for me. I mean, the

oil trains, the coal trains, things like that, that are of real threat to water quality.” This comment came after the respondent questioned the long-term impact of recreational use on water quality, because it was thought that issues such as poor human waste practices on the river are mitigated by the surging spring river flows, which acts as a “scrub brush.”

For Participant 15, impacts to biological diversity from forest use practices, such as grazing and timber production are potentially detrimental:

Material culture of our tribes, everything from stone tools on up to basketry and fish traps, and fishing devices, hide tanning and stuff like that, I see that, when our environment is more diverse, there are more resources to rely upon, and more, more, the more ability for me to go into those natural areas where my ancestors gathered those things, and then to bring those things back and to work with them, and to teach my tribal membership that, that that is the most important to me. And, if we didn't have those resources out there, the monocultures of forest lands that are being created today, and the grass lands that hold our roots and vegetables, we've lost, we've lost certain things on our own native landscape because of overgrazing and, the extractive industry of grazing, that happened really early in the historic period, um, that there are some plants that are culturally relevant that I don't really see in abundance of harvest, that were there before, that could have been there.

5.4.3. *Administrative capacity*

Fourteen people highlighted the capacity issues facing those managing and administering the Flathead WSR system. These comments can be roughly categorized into those about the lack of on-the-ground presence in the Flathead WSR system, and those about addressing the lack of funding for a variety of management and administrative needs. Regarding lack of presence among administrative personnel, nine people made comments that were similar to that made by Participant 6:

In all of the years that I have worked on the river, and that was my 18th year last summer, I think I have been checked while I have been working twice, and then I have been checked once on the south fork on a private trip. And I fished the Missouri like four times and I have been checked once. You know, so you think about, years and years and years, and I grant it, game wardens in particular, they are stretched really thin, it's not something that they really have the ability to do, but someone brought up, you know, that, it seemed like during the meeting

someone was talking about just having more administrative personnel or having a ranger present.

Generally, these comments about the lack of personnel, and the lack of funding capacity to support such personnel, were had within the context of a desire to see better enforcement, education, and public engagement instead of any attempts to restrict use and, consequently, unconfined recreation. That is, many participants saw the lack of administrative capacity as a threat to their human-nature relationships, because it was perceived as a hurdle to avoid restricting use. Often these comments about a lack of capacity led respondents to consider ways to address the issues, which included capturing a portion of raft rental revenue, increased partnerships with other government agencies as well as the private sector, and perhaps even a voluntary fee system.

The above themes that emerged during the in-depth interviews, both related to human-nature relationships and relevant drivers of change, provide a high level of detail surrounding a variety of issues. Some of the sentiments expressed, such as the importance of connecting to nature, appear to span all archetypes. Others sentiments, such as the importance of challenging oneself, or the paramount importance of accessing the resource unimpeded, and potentially spontaneously, appear to be more common within the context of particular archetypes. Regardless of the archetype one may align with, respondents had opinions on the CRMP and its implementation. Sometimes these opinions largely overlapped (e.g., education as a first step), and other times there was less agreement (e.g., level of potential improvement of facilities).

5.5. Wearing their planning and management hats: The publics' opinions on the CRMP and its implementation

This public engagement work, primarily through the in-depth interviews, can provide insight into public opinions related to the CRMP revision and its implementation. The final two questions of the in-depth interviews asked participants to, in essence, think like a planner and manager and articulate what they would like to see in the CRMP and its subsequent implementation. As noted above, these questions were asked both to obtain public input on the CRMP, and perhaps foster empathy among the public with regard to the complex and challenging task facing the Planning Team. The two main themes are 'process elements' and

‘management actions’ (Table 20).

When asked what people would like to see in the CRMP that would increase their chances of being satisfied with it, or what one or two things they would do if they were managers implementing a plan, 17 people made comments that were related to the process of decision-making and/or the process of conveying those decisions to the interested citizenry. As previously noted, Participants recognized the highly challenging task. Participant 16 stated: “It is easy to complain, it is easy to point out problems, the solutions, finding the solutions, it’s tough...I don’t have great answers on how you find solutions. Ultimately, I think communication is the key; communication, education, transparency, are the keys.” Participant 14 specifically called for direct communication over a perceived reliance on ‘press releases’:

Information is good. And not just doing a, the government just has a bad way of, ‘let’s just do a press release’. And they take snippets, or somebody is missed quoted, or they take it out of context. Where if you have meetings, so people can hear for themselves and ask questions, then if it is taken out of context, it’s on the people that are there asking questions. You are not relying on that middle man, so direct communication with the public is a good thing. Yet, the downside, it’s very time invasive and they are using a lot of their resources to do it, but I think in the end you get better information and cover more ground.

The comment reflects an understanding of the costs of focusing on communication and transparency, but it was an element of the CRMP process that was frequently mentioned by 13 respondents. Some participants credited the federal government for doing a “good job of notifying the public for communication” (Participant 13), though sometimes there was a desire to see more meetings.

Table 20. Themes and sub-themes related to publics’ opinions about CRMP revision and its implementation

Themes	Sub-themes	People commenting on issue (out of 19)
Process elements	Concerted effort and holistic approach	15
	Communication and transparency	13
	Community engagement	8
Management actions	Education of river users	15
	Facilities	11
	Human waste regulation	7

Moving beyond the general call for communication and transparency, respondents were interested in seeing data to support decisions:

I think first and foremost transparency is good, and meaningful, you know, meaningful reasons, and meaningful rationale of why decisions are made is important. Data to back it up, which is a kind of a little bit of what this is, or a lot of what this is, but, this is kind of data from what people's thoughts and feelings are, and then they are collecting data, you know, hard data of numbers, and fish, and temperatures of the rivers, just more of like hard scientific data, and economic data, so I think all of that has to come together. If they can provide a clear direction of where we need to go, and this is why we need to go, look at the data, I think that goes a long way.

Seven people called for seeing a connection between decisions and data, and specifically there was interest in understanding a comparison between commercial use and private use of the Flathead WSR system, as well as a call for seeing an effort toward creating more data on float use in the future.

Five people commented on a desire to see details on potential management actions and, more specifically, a proposed management-action sequence:

I tell you, the one thing I wouldn't do, I don't know that I would straight into a permit system. I think that it would be a little bit of an upheaval. And maybe I am cutting my own throat to say this, but a little bit at a time. Just a little bit at a time...look ten years down the road, you know what these two years we are going to do this, and we are going to see how it goes.

Implicit in this comment is the idea that perhaps it would be acceptable to discuss restricting use in the distant future, and then spend the near future trying different approaches to avoid restricting use. Participant 2 took a similar approach, with a bit more detail:

It would be good to see them have, tiers of action...they could start with tier one, you know, with tier five being maybe permits, and tier one being education. And you know, things in between, OK, we are starting to get a little bit out of control, we are going to go to tier two, and we are going to go from education, to education and enforcement; you know, and then we are going to go from education and enforcement to education and enforcement and fees, you know, voluntary fee based permitting. You know, hey I am going to buy this permit at the put in, because I am willing to spend money to use this resource, money that's going to be used to better enforce etiquette of the resource, let's say appropriate use, or etiquette use of the resource. And then, you know, maybe a tier four, where that is still not working, of you know, maybe a really limited permit

system, or something as similarly as unpopular, but maybe not a permit system, but maybe just an online registration system where you go online in advance and, you know, register your group, and acknowledge all the rules and regulations and pay your fee, and then there is really good data, there is really good acknowledgement of what you are doing and where you are putting in. And that's a lot more restrictive, and it's starting to restrict the wild and free nature of what people love about the river. But it's like, all these other things aren't quite working anymore, so we're getting more extreme, and then, now we are going to start limiting people through a fee system, at say tier five. So, people know what the game plan is.

It was recognized that a CRMP is generally programmatic. That is, it lacks a high level of specificity, thus leaving discretion to day to day management and creating flexibility to adjust to unforeseen circumstances; however, there was still some desire to see even basic steps:

I understand the plan itself can't have great specificity, but I do want to see education and enforcement. Like we are going to show people how they avoid being a problem, and then if they choose to ignore that, then we've got some enforcement to it. Then if we see large groups of people continuing to ignore education and enforcement action, then maybe a permit is merited. (Participant 11)

Finally, those calling for greater communication and transparency often specified a desire to see more details on related to monitoring methods and decisions. Participant 6 explained his confusion:

What is an encounter? Me and my buddies, we've got five boats going down the river, and three families. That's one party, that's a lot of people. Or when we do our south fork trip, we are each in our own little water boat. That has got to be as annoying as, I know (laughs), you know, it's only six guys, but there are six people that are kind of strewn about, but that is only one party. So, how do you differentiate, is it encounters with the party? What if they lap you and you see them again, does that count again as another encounter? So, I had questions about, the monitoring, how are they going to monitor that, number one, you know I just didn't like, I wasn't satisfied with that piece. That left me with even more questions.

The desire to see more communication and transparency, from issues ranging to data supporting decisions to details around the nuances of monitoring use, is directly connected to the second sub-theme to be discussed: community engagement.

Like communication and transparency, community engagement was recognized as

requiring more effort on the behalf of resource-challenged land management agencies. Nonetheless, it was stressed by eight people, and community engagement was considered important for improving the understanding between the public and land management agencies. This public engagement was seen as important both in the field (i.e., the Flathead WSR system), and the community. Participant 11 focused on the field, “I feel somewhat frustrated it seems like there is a lot of administration, there is a lot of research that gets done, and fewer bodies in the field that are interacting with the public. And again, whether this be, enforcement or education, or just simply getting out there and being a positive example of what a river user should look like.” Participant 9 noted the need for more casual interaction, with effort put forth by both the general public and land managers:

[Managers] are human just like us, and they are part of our community and live and play in our community just like us, so go talk to them. Write them an email. Ask them out for coffee, get a beer with them if you can, and get to know them in their role...it also helps the individual understand how difficult their role is...I think the land manager has to be proactive in breaking down that barrier too, and saying ‘I’m going to make time, especially during a CRMP revision, to hear from my constituents.’ In a community of this size, you just really have to have that individual rapport building experience, cause it is so small and the stakes are so high.

These comments reflect a desire to see a more personal interaction between agencies and the publics, which could potentially build trust. Other comments related to public engagement referred to convenience, such as having meetings and official activities taking place in smaller communities closer to the Flathead WSR system.

The comments related to communication and transparency and public engagement were typically referencing the CRMP process or general trust building activities, but as Participants discussed the revised CRMP implementation and the general goal of a sustainable Flathead WSR system, comments turned toward a ‘concerted effort and holistic approach’ to managing the future of the Flathead WSR system. As Participant 4 suggested:

Like really concerted campaigns, that is where I could see those community non-profits, like Friends of the Flathead, or whatever, responsible river recreation, where they could work with the agencies...so that we are not doing these things in isolated events, and reinventing the wheel, from the Flathead River, to Glacier Park, to the Whitefish Legacy Trails, to just all these different areas that really, I see that are all kind of in need of the same thing, when it comes to sustainability.

This comment refers to a social-ecological systems approach, and Participant 3 made a similar comment: “I’d like to see some type of joint effort, between the forest service, the park service, the real estate developers, and the tourism people, because it all plays together.” Comments related to the amount of tourism promotion was common during the in-depth interviews, and it was also mentioned in the drivers of change exercise, the public comments captured during recent public meetings, and it was a question posed to river users in the initial river user survey in 1980-1981. Finally, several participants were interested in seeing better coordination between the National Park Service and the Forest Service, particularly within the context of the North Fork.

The second major theme to be discussed is ‘management actions’, which is to say that eighteen people discussed specific management actions that would be desired, or at least acceptable as the CRMP is implemented. There were numerous management actions mentioned by a few respondents or less, such as expanding access on the National Park Service side of the North Fork, and ensuring equality between users (i.e., private, commercial, administrative) should restrictive access be pursued. Five people mentioned implementing a fee system, whether voluntary or required; typically, participants saw a fee system as a way to educate and prevent restrictive permits systems. The majority of management-action comments coalesced around three sub-themes: education of river users, facilities, and human waste regulation.

Education was mentioned by fifteen people as a positive step in managing the Flathead WSR system (it was also the most frequently selected driver of change in the initial phase of research). Many acknowledged that education is challenging, because it is difficult to effectively educate a broad range of experience levels with a single message, education has the potential to negatively influence peoples’ experience, and it requires a lot of resources. Despite these issues, there appears to be acceptance for some sort of education campaign. Specific needs for education mentioned include: leave no trace, on-river interaction etiquette, human waste management, fish identification and handling, river-access etiquette, awareness of inherent dangers of river, invasive species, and laws and policies (fishing regulations, high water rules with regard to trespass, the difference between public participation and government to government consultation with Tribes).

Facilities were discussed by eleven people. Generally, people did not request a high level of facilities at river accesses and campgrounds, and focus was mostly on the river launch points (e.g., hardening launch sites to prevent erosion) and creating or maintaining facilities that helped with waste management, both trash and human waste. One respondent wondered about the feasibility of a scat machine (i.e., a human waste disposal machine). These comments were consistent with the third sub-theme that focused on human waste regulation. Seven participants mentioned their support for better human waste regulation. As Participant 7 noted: “One of the things that I think would really be helpful would be requiring, on multiday trips, that people pack out their human waste. To me, it is just not acceptable to me anymore, on any river, to dig a hole.”

As mentioned several times throughout this report, those participating in the in-depth interviews often mentioned the challenging task facing the Planning Team. Fourteen people made a comment along these lines. Given the extensive results presented in this report, the final question to be addressed is: how can this public engagement social science support the Planning Team within the context of this complex and challenging task?

6. SO WHAT? A DISCUSSION OF POTENTIAL BENEFITS AND IMPLICATIONS OF THIS PUBLIC INPUT

This report can potentially support the CRMP Planning Team and the general public in three ways: public relations, decision-making, and framing the Flathead WSR system as being comprised of several niches. The first two general benefits of this public engagement approach are mentioned elsewhere in different contexts ([Armatas et al., 2017b](#); [2019:47-49](#)), but this section focuses on these two management implications in the Flathead WSR context. The third discussion point (i.e., Flathead WSR system niches) is potentially helpful within the context of Wild and Scenic River planning, particularly when a river system has multiple ‘classifications’ (i.e., recreational, scenic, and wild) as the Flathead WSR system does.

6.1. Public relations: providing support for enhanced transparency, communication, and relationship building

A critical component of successful large-scale planning, either in the river or national forest context, is to both clearly communicate with the general public about decisions, and create an atmosphere where there is potential for relationship and trust building. This need is well documented in the literature related to ‘transactive’ planning, and the general public in this work also recognized the need. This public engagement work may be beneficial within this context in several ways.

First, this report provides a foundation of social science, both recent and in the distant past, for gaining a better understanding of peoples’ connection to the Flathead WSR system. The knowledge is based, in part, on a systematic and structured process that incorporates a broad range of human and ecological meanings and services (HEMS). As an individual activity, it is difficult for dominant personalities to dominate the process and, consequently, the potential is lowered that members of the public will feel disillusioned with the planning process. In addition, the in-depth interviews provide a high level of detail, and the statistical analysis applied provides a clear process for arriving at the results (i.e., archetypes and corresponding drivers of change), which may assuage concerns about researcher bias. The inclusion of a broad range of HEMS ensures that each participant thinks carefully about the myriad ways the Flathead WSR system

supports society and the environment, and the approach provides a cognitively manageable way for the Planning team to visualize the role of various HEMS. The typified relationships that result provide an inclusive picture of the different types of people interested in the Flathead WSR system without prioritizing the interests of some over the interests of others. In other words, this approach does not, for example, suggest that 50 percent of people belong in the ‘resource and introspection’ archetype, but instead helps decision-makers better understand the broad range of archetypes. Also, the archetypes are perhaps difficult to overlook in that they are made tangible and serve as constant reminders about the differing perspectives.

Second, there are benefits that result from the broad range of perspectives gathered, which are represented by a limited number of archetypes and can serve as communication tools to engage both the Planning Team and the general public. The archetypes may facilitate continued learning and discussion about how the Flathead WSR system supports the general public and, consequently, they may help to align the Planning Team perceptions about what HEMS are important, what drivers of change are most relevant, and desired management actions going forward. For the general public, understanding the different archetypes may foster empathy and encourage productive conversation. The major themes that emerged from in-depth interviews can highlight some areas of consensus and commonality, such as the importance of connecting to nature for a variety of reasons, and the intensity in which people relate to the Flathead WSR system.

Improved communication between the Forest, Park, and the general public may be facilitated by this work, in part, because the disparate archetypes presented above illustrate how difficult Forest and Park Planning is, as the inherent goal is to protect and enhance *all* the ORVs. As noted at the outset of this report, social science is among the knowledge sources that require consideration, also included are natural science (e.g., wildlife biology, botany), economic impact analyses, monitoring of human use (e.g., numbers of people floating the river on a given day, frequency of parking lots being full, rating of a float experience on a survey), monitoring of nature (e.g., eroded river accesses, bare vegetation at campsites, fish scars), and policy mandates and considerations (both legal and administrative). It is important to stress that all of this knowledge is important within the context of the CRMP revision. While this report and the knowledge presented can help meet the public call for clear and transparent communication as it relates to decisions related to the CRMP revision and its future implementation, it is also worth

noting that the complexity and diversity of perspectives involved generally mean that no single piece of information trumps all else. If there was one, research and the Wild and Scenic Rivers Act would likely suggest water quality. Therefore, communicating the *specific* reasons behind *specific* decisions may be challenging, but communicating the broad knowledge bases considered and the various thought processes on the way to a decision appear attainable.

A clear understanding of the disparate perspectives that are meant to be accommodated could encourage both patience during the planning process, as well as understanding when decisions regarding the CRMP are finalized (even if such decisions are considered undesirable by some). These diverse archetypes can potentially give legitimacy to viewpoints that differ from one's own. If one is no longer skeptical about the existence of a different viewpoint, then perhaps acceptance of that different viewpoint and subsequent civil discourse can commence.

Third, the input related to the drivers of change can facilitate better communication and relationship building within the planning process by highlighting potential differences in perceived priorities among the CRMP team and the general public, as well as highlighting areas where additional information and conversation is likely beneficial. The association between archetypes and the drivers of change selected may be informative. For example, the drivers of change exercise highlighted an association between the 'resource and introspection' archetype and drivers of change related to human impacts on the biophysical resource. This suggests that this archetype considers human impacts on the resource to be significant, therefore, communicating knowledge about the extent (or lack of extent) of this impact would be beneficial. Although human use of the Flathead WSR system may influence the provision of ecological meanings and services, there are likely other drivers of change that influence the ability to derive these benefits as well. Several of these were mentioned in the biophysical impacts sub-theme (e.g., climate change, invasive species), and these drivers of change are, in part, beyond the control of the Forest.

Lastly, the results from the drivers of change analysis (i.e., regression analysis) provides some additional validity to the presented archetypes and the sub-themes that emerged through analysis of the in-depth interviews. For example, the strong negative association between the 'unconfined recreation' archetype and a restrictive permit system provides additional confidence about this archetype itself. As a result, it is possible that the general public will be more accepting of the CRMP if there is increased confidence in the compilation of the public input. As

the public thinks deeply about the HEMS and the potential drivers of change, more confidence and understanding of the overall plan is gained.

6.2. Understanding how CRMP decision-making may impact the public

The reality of river planning and management is that decisions made (e.g., improved river accesses, education campaigns, use-allocation measures) will affect those who have human-nature relationships with the Flathead WSR system. Therefore, this section focuses on how the information in this report may be beneficial for informing decision-making or, similarly, how it may be beneficial for understanding the implications of decisions.

One potential benefit of the public input gathered is the ability to understand perceived tradeoffs regarding the importance of HEMS among the six archetypes. The archetypes presented can highlight when the same tradeoff is being perceived by different archetypes in different ways. For example, it appears that for the ‘resource and introspection’ archetype and the ‘unconfined recreation’ archetype, there is a tradeoff between *being free from society and its regulations* and those HEMS that are highly important to the respective archetypes. The crux of the issue appears to be varying tolerances for the vacillation between unconfined recreation and a pristine and relatively un-degraded biophysical resource. As Participant 16 stated, “I am becoming, probably as I am getting older, more and more of a proponent of, to some degree, let this happen the way it is going to happen. If people end up trashing something out, perhaps it is not quite as popular then as it once was.” In response to a prompt for clarification, Participant 16 elaborated that if ecological degradation occurs in an area, with an acknowledgment that ‘trashing out’ is subjective, then there is the opportunity to take action at that time to restrict access and allow for ecological restoration. This comment aligns with the ‘unconfined recreation’ archetype, and it seems to imply a higher limit of acceptable change to naturalness in favor of unconfined access. On the other hand, Participant 9 made a comment that would align with the ‘resource and introspection’ archetype when she indicated an openness to perhaps restricting use in the future, because the Flathead WSR system is “going to get decimated.” Again, ‘decimated’ is a bit subjective, but this comment reflects a precautionary principled approach and a lower limit of acceptable change to naturalness in favor of unconfined access.

An implication of understanding such situations is that planners and managers can better

understand perceptions of how increasing the provision of some HEMS may influence the provision of another. This can help the CRMP team understand if a planning decision is likely to affect the archetypes in different ways. This will help the CRMP team better prepare effective responses in advance of the decisions that may create backlash from the public. Also related to understanding tradeoffs, the archetypes highlight how increasing the provision of particular HEMS through a planning related decision may affect archetypes disparately. For instance, measures put in place to impede the threat of invasive species and thus protect several ecological meanings and services such as biodiversity and abundance of wildlife has the potential to benefit all archetypes, but it is clear that the ‘resource and introspection’ archetype, the ‘indigenous worldview’ archetype, and the ‘unconfined recreation’ archetype (given the potential benefit to *catch and release fishing*) may benefit to a large degree.

Lastly, the entire body of knowledge presented herein, ranging from the common themes in the in-depth interviews to the river user surveys dating back to 1980-1981, signal particular issues or beliefs that have endured over time and are still highly relevant. For instance, the general opposition to restricting use for reasons other than protecting the biophysical resource is evident in all three river user surveys dating back to 1980-1981, the in-depth interviews, and the public comments collected during the scoping period in August-September 2019. Another finding worth noting is the concern about tourism promotion, which in some ways is beyond NPS and USFS control, but is nonetheless important as the communities of interest aims to work together for the future management of the Flathead WSR system. In the public comments during scoping, the in-depth interviews, and the drivers of change ‘written in’, there was concern that promotion of the Flathead WSR system and its surrounding areas was responsible for some of the issues facing the communities of interest. This sentiment was also evident in the original river user survey in 1980-1981, with a generally high approval to ‘avoid encouraging use by limiting Park or Forest Service advertising and promotion’. This survey segmented analysis by River section and, interestingly, the lowest level of approval for this management guideline was within the context of the lower Middle Fork (48%) ([McLaughlin et al., 1984](#)). This finding, combined with our understanding of how human-nature relationships may vary across space, underscore the potential benefit of framing the Flathead WSR system as filling several niches.

6.3. Thinking of the Flathead WSR system in terms of difference niches

In some ways, the Flathead WSR system is already considered to include different niches or, in other words, different sections of the River system are perceived to provide different conditions and HEMS. For instance, the different Wild and Scenic River classifications (i.e., recreational, scenic, and wild) are dictated by the level of shoreline development and the history of water impoundment. These classifications, to some extent, dictate what those river stretches under each classification should look like (e.g., building a large restroom facility along the Upper South Fork is not likely appropriate given its ‘wild’ classification). In other ways, such as the requirement to determine user capacity, there is the potential for segmentation within the Flathead WSR system. If the Flathead WSR system is thought of as being comprised of several niches, each of which can vary in terms of the level of HEMS provided, then communication and decision-making may benefit.

The results presented in this report show that, to some extent, the various publics already view the Flathead WSR system in terms of different niches. As discussed in Section 5.4, the ‘outfitter and guide’ archetype is somewhat grounded in a perspective related to the South Fork, and several people expressed a desire to see a limited amount of commercial use on the North Fork. The relative acceptance of promotion and tourism in the early river floater survey on the lower Middle Fork highlights a view that this portion of the Flathead WSR system may be the most appropriate place for outfitted use, and it appears that such a view is long-standing (as we heard similar comments in the 2020 in-depth interviews).

Generally, the managers and planners for this river system are required, for instance, to maintain a diverse range of recreational activities (as per the recreation ORV), but they are not required to ensure that all facets of the recreation experience are available on every segment of river within the Flathead WSR system. For instance, ‘solitude’ is an important element of recreation on the Flathead WSR system, but its inclusion as part of the recreation ORV does not mean that ‘solitude’ (however defined) will be experienced on all stretches of river at all times. But, what it does mean is that within the Flathead WSR system at large, one may be able to experience solitude in some portions of the river system some of the time. As the CRMP team develops and rolls out a new river plan, it may be helpful to think about how the various archetypes, the shared and differing themes critical to human-nature relationships, and the

relevant drivers of change align or do not align with different niches of the Flathead WSR system. In communicating these niches to the public, it will hopefully become apparent that one's human-nature relationship is being accommodated within some portion of the system.

7. CONCLUSION

This public engagement social science provided the opportunity for participants to express their human-nature relationships and the relevant drivers of change as it relates to the Flathead WSR system. The task required that participants not only consider a full range of HEMS derived from the River system, but also make tradeoffs among those benefits. The results illustrate six typified relationships, and the themes and sub-themes that emerged from the in-depth interviews add depth to our understanding of the various human-nature relationships. The participants were demographically diverse and, in general, there appears to be support for increased education of river users, as well as support for focusing on protection of fundamental HEMS such as water quality and aquatic habitat.

Being integrated within public meetings and field visits has allowed this public engagement approach to gain legitimacy and access to a diverse range of publics. These engaged citizens are vocal and attentive to issues of Wild and Scenic River management and planning, and this approach has successfully tapped their expertise and desire to be meaningfully involved. With a data-driven approach and subsequent analytical opportunities, the public recognizes this activity has scientific legitimacy and independence. While building on existing planning documents, the insights and results of this activity are neither obvious nor pre-determined. The public engagement research yields insights and documentation of the relationships the public has with the Flathead WSR system not previously available.

REFERENCES

- Armatas, C., Venn, T., & Watson, A. (2017a). Understanding social–ecological vulnerability with Q-methodology: a case study of water-based ecosystem services in Wyoming, USA. *Sustainability Science*, 12(1), 105-121. 10.1007/s11625-016-0369-1.
- Armatas, C. A., Venn, T. J., & Watson, A. E. (2014). Applying Q-methodology to select and define attributes for non-market valuation: A case study from Northwest Wyoming, United States. *Ecological Economics*, 107(0), 447-456.
<http://dx.doi.org/10.1016/j.ecolecon.2014.09.010>.
- Armatas, C. A., Borrie, W. T., & Watson, A. E. (2017b). Gila National Forest Public Planning Meetings: Results of the Ecosystem Services Station. Missoula, MT: The University of Montana, pp. 1-43.
- Armatas, C. A., Borrie, W. T., & Watson, A. E. (2019). Protocol for social vulnerability assessment to support national forest planning and management: A technical manual for engaging the public to understand ecosystem service tradeoffs and drivers of change. Gen. Tech. Rep. RMRS-GTR-396. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 52 p. Available at URL:
<https://www.fs.usda.gov/treearch/pubs/59038>.
- Brown, S. R. (1980). *Political Subjectivity: applications of Q methodology in political science*. New Haven, Connecticut: Yale University Press.
- Craighead, J. (1957). Wild River. *Montana Wildlife*. Montana: Montana Fish and Game Department. Available at URL:
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd570453.pdf.
- Dalenberg, D., Freimund, W., Thomsen, J., & Wheeler, I. (2018). Flathead Wild and Scenic River Visitor Survey 2012-2014. University of Montana, p. 57.
- de Groot, R. S., Wilson, M. A., & Boumans, R. M. J. (2002). A typology for the classification, description and valuation of ecosystem functions, goods and services. *Ecological Economics*, 41(3), 393-408. [http://dx.doi.org/10.1016/S0921-8009\(02\)00089-7](http://dx.doi.org/10.1016/S0921-8009(02)00089-7).
- DeVeaux, R. D., Velleman, P. F., & Bock, D. E. (2012). *Stats: Data and Models*. Boston, MA: Pearson Education.
- Drummond, L., Boyd, S., Dakin, W., & McGlynn, K. (1975). Lifestyles of Western Montana: A comparative study. Report submitted to the Western Montana Planning Area Guide Team, United States Forest Service, Department of Anthropology and the Institute for Social Research, University of Montana, Missoula, MT, p. 85.
- Espeseth, K. J.(1979). The proposed Cabin Creek coal development: The social impact for the North Fork of the Flathead River. Environmental Studies.Missoula, MT:The University of Montana, p. 375.

Flathead National Forest (1975). Wild and Scenic River Study Report. Kalispell, MT: USDA Forest Service, p. 232. Available at URL: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd589796.pdf.

Flathead National Forest (1977). Environmental Statement, Flathead Wild & Scenic River Proposal. Kalispell, MT, p. 213. Available at URL: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd589794.pdf.

Flathead National Forest and Glacier National Park (2013). Outstandingly Remarkable Values Assessment of the Flathead River System, Flathead National Forest and Glacier National Park. Montana, p. 55.

Kline, P. (1994). *An Easy Guide to Factor Analysis*. London, UK: Routledge.

Lang, T. C.(2018). Wilderness Solitude in the 21st Century. Society and Conservation.Missoula, MT:University of Montana, p. 147. Available at URL: <https://scholarworks.umt.edu/etd/11208/>.

McLaughlin, W. J., Sanyal, N., Krumpe, E. E., & Weesner, M. W. (1984). The Flathead River Study, Management Unit Analysis, Final Report. Idaho: University of Idaho Forest, Wildlife and Range Experiment Station.

Moulton, F. W.(2012). Upper South Fork of the Flathead users: What social setting attributes are the most important? College of Forestry and Conservation.Missoula, MT:The University of Montana. Available at URL: <https://scholarworks.umt.edu/etd/1153>, p. 149.

Schmolck, P. (2014). PQMethod - 2.35. <http://schmolck.userweb.mwn.de/qmethod/>.

Steelman, T. A., & Maguire, L. A. (1999). Understanding participant perspectives: Q-methodology in national forest management. *Journal of Policy Analysis and Management*, 18(3), 361-388. 10.1002/(SICI)1520-6688(199922)18:3<361::AID-PAM3>3.0.CO;2-K.

Stephenson, W. (1954). *The Study of Behavior: Q-Technique and Its Methodology*. Chicago: The University of Chicago Press.

Watson, A. E., & Armatas, C. A. (2018). A mental model of science informed by public land managers: Increasing the chances for management based on science. *Journal of contemporary Management*, 8(4), 17.

Watts, S., & Stenner, P. (2012). *Doing Q methodological research: theory, method and interpretation*. London: SAGE Publications Ltd.

Williams, D. R., & Watson, A. E. (2007). Wilderness values: Perspectives from non-economic social science. In: Watson, A., Sproull, J., & Dean, L., eds. *Science and stewardship to protect and sustain wilderness values: Eighth World Wilderness Congress symposium; September 30-October 6, 2005; Proceedings RMRS-P-49*. Anchorage, AK: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, pp. 123-133.