Yellowstone River Cultural Inventory—2012

Summary Report of All Segments

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Research Team

The project was directed by Dr. Susan J. Gilbertz, Montana State University Billings. The fieldwork was completed by Gilbertz. Transcription and data analyses were directed by Dr. Damon Hall, at the University of Missouri. Dr. Hall's graduate assistant, Madeline Emerson, was invaluable and provided excellent assistance during the analytical phases of the project.

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The Yellowstone River Cultural Inventory—2012

Introduction

With over 80 percent of the Yellowstone River's riverbank privately owned, and with that management decisions having been challenged in the courts, and with numerous federal and state entities seeking cooperation with, and regulatory compliance from, the people of the river, in 2006 it was determined important to document the perspectives held by people who shared the Yellowstone River. That year, the first Yellowstone River Cultural Inventory was compiled, specifically to record and catalog the variety and intensity of different opinions held by the people of the valley.

For that effort, a total of 313 individuals were interviewed. The participants represented agricultural, civic, recreational, or residential interest groups. Also, individuals from the Crow and the Northern Cheyenne tribes were included. The interviews of 2006 were conducted during a time that most people in the valley understood as "drought years." Many of the participants stressed that the river's shared resources were scarce and that "not everyone" would get what they wanted, when they wanted it.

In contrast, in 2011, the river flooded and the impacts were felt throughout the valley. This flood also played a role in the ExxonMobile Pipeline rupture, near Laurel Montana, which spilled over 60,000 gallons of crude oil into the river. Because the conditions for living near, and with, the river had changed, it was important to revisit some of the original participants to see if their comments regarding life along the river might have also changed.

Funding for a small follow-up project were secured during the winter of 2011/2012. These funds allowed Dr. Susan J. Gilbertz to conduct interviews with 31 people during May and early June of 2012. The hope was to engage the interviewees before the 2012 spring "rise" of the river, thus making the 2011 spring the focus of the interviews. Of the people interviewed in 2012, approximately 81 percent were participants in the 2006 study. The new participants were recruited specifically for their ability to speak to questions concerning the 2011 pipeline rupture.

The 2012 goals, then, were to use open-ended questions to engage participants in conversations that would cover similar topics as discussed in 2006, specifically to encourage discussions of: 1) the physical character of the river and how physical processes, such as floods and erosion, should be managed (i.e., bank stabilization techniques); 2) the riparian zone and the degree to which it was recognized and valued; and 3) management of the river's resources. The 2012 protocol also anticipated that the flood of 2011 would be a topic of concern and that the pipeline rupture and how it might have been caused (flooding and/or human activities) would be relevant topic to many of the participants.

We define our research approach in detail in the next section, including explanations of how we segmented the river, how we recruited participants, how we collected and managed our data and how we analyzed the narrative texts. We then identify the primary implications exposed in the 2012 data.

Following the primary implications, details of the findings from each of the geographic segments are provided as individual sections of this: Segment I: Missouri River to Powder River, Segment II: Powder River to Big Horn River, Segment III: Big Horn River to Laurel, Segment IV: Laurel to Springdale, and Segment V: Springdale to Gardiner. Each of the Segment section provides an overview of the findings relevant to each geographic area, and each identifies the themes of concern among the people of the particular segment. Finally, the Segment sections illuminate the majors themes with quotes from the participants in the study.

The Research Approach

Identification of Geographic Segments: The Yellowstone River is over 670 miles in length. It flows northerly from Yellowstone Lake near the center of Yellowstone National Park in Wyoming. After exiting the park, the river enters Montana and flows through Paradise Valley toward Livingston, Montana, where it turns eastward. It then follows a northeasterly path across Montana to its confluence with the Missouri River in the northwestern corner of North Dakota.

Five geographic segments along the river were originally delineated for purposes of organizing the 2006 inventory. These five segments captured the length of the river after it exited Yellowstone National Park and as it flowed through eleven counties in Montana and one county in North Dakota. The geographic delineations were determined based on physical and cultural characteristics of the river, especially at junctures that members of the Yellowstone River Conservation District Council, the Yellowstone River Conservation District Council Technical Advisory Committee and the Yellowstone River Conservation District Council Resources Advisory Committee recognized as important.

The 2006 segment delineations were adopted for the 2012 study. The original rationales are reviewed, here:

> Segment I: Working from the confluence with the Missouri River towards the west, the first geographic segment was defined as Missouri River to Powder River. This geographic segment included some of the least populated regions of the entire United States. In this segment, the river was broad and relatively slow-moving, serving an expansive farming community that blends the interests of Montanans and North Dakotans. In 2006, this segment was grappling with concerns regarding habitat and fish passage for paddlefish and Pallid sturgeon. Prairie, Dawson and Richland Counties of Montana were included in this segment, as was McKenzie County, North Dakota.
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> Segment II: The second geographic segment, Powder River to Big Horn River, was delineated to include the inflows of the Big Horn and Tongue Rivers as major tributaries to the Yellowstone River and to include the characteristics of the warm-water fisheries. This segment was delineated to recognize the significant agricultural activities of the area and the historical significance of the high plains cowboy culture. This segment included Treasure, Rosebud and Custer Counties.
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> Segment III: By 2006, Billings, known as a regional center for agriculture, business, healthcare and tourism, was notable for its loss of agricultural bottomlands to urban development. Because of its complexity as the only segment with a rural-urban interface, the third geographic segment, Big Horn River to Laurel, only included Yellowstone County. A further consideration for limiting this segment in this manner were the irrigation out-takes that divert water to projects east of Billings, especially in the communities of Shepherd, Huntley and

Worden. Furthermore, it was understood that the river begins its transition to a warm-water fishery in Yellowstone County.

Segment IV: The fourth segment, was defined as Laurel to Springdale, ending at the northeastern edge of Park County, Montana. The river in this area was known as fast-moving and supportive of coldwater fisheries. While there was little urban development in this segment, there were some rather obvious landscape transformations where agricultural activities were being converted to amenity landscapes, home sites for retirees and vacationers. The geographic segment included Sweet Grass, Stillwater, and Carbon Counties.

Segment V: The last geographic segment was defined as Springdale to the boundary with Yellowstone National Park at Gardiner, Montana. This segment was entirely within the boundaries of Park County. Severe floods in 1996 and 1997 had caused this county to spend many hours in public debates concerning river management.

Interest Groups and Recruitment of Participants: The participants in the 2012 field activities were a volunteer micro-sample of the 2006 participants. Dr. Gilbertz had maintained the original database of participants and contact information, which included over 300 entries. They were full-time residents of the towns and communities between the confluence of the Yellowstone and Missouri Rivers in North Dakota and the town of Gardiner, Montana at the north entrance to Yellowstone National Park. Participants in 2012 were recruited from the original interest groups identified in 2006: agriculturalists, local civic leaders, recreationalists, and residentialists living near the river. Different recruitment approaches were used with different interest groups in 2006:

Agriculturalists: Individuals representing agriculture interests, including farmers and ranchers, who were identified and recruited from referrals provided by the local Conservation Districts, the Yellowstone River Conservation District Council and the Montana Office of the Natural Resources Conservation Service.

Civic Leaders: Individuals holding civic leadership positions, including city mayors, city council members, county commissioners, flood plain managers, city/county planners, and public works managers, were identified and recruited through public records.

Recreationalists: Individuals who use the Yellowstone River for recreational purposes, including hunters, fishers, boaters, floaters, campers, hikers, bird watchers, rock hunters, photographers, and others who use the river for relaxation and serenity, were identified and recruited from referrals provided by members of the Resource Advisory Committee. Participants were also identified and recruited by contacting various non-governmental organizations such as Ducks Unlimited, Trout Unlimited, the Audubon Society and by contacting local outfitting businesses.

Residentialists: The names of property owners holding 20 acres or less of land bordering the Yellowstone River, or within 500 feet of the bank, were obtained through a GIS search of public land ownership records. Twenty acres was used as a screening threshold to separate people who lived along the river corridor but whose incomes were from something other than agricultural practices (residentialists) from those who were predominantly farmers or ranchers (agriculturalists). The names were sorted by county and randomized. Recruitment proceeded from the randomized county lists. Other people living very near the river, and whose primary incomes were not generated by agriculture were, also recruited. These additional participants may not have had property that technically bordered the river and/or they may have owned more than 20 acres. In all cases, the recruits did not consider agricultural as their main source of income.

The 2006 database of names and contacts, organized by segment and by interest groups, had also served another purpose. Between 2010 and 2011, Dr. Gilbertz contacted nearly every one of the 2006 participants to inquire as to who would release their 2006 audio-recorded interviews to a permanent archive housed at the Yellowstone Western Heritage Center of Billings, an affiliate of the Smithsonian Institute. Once contacted, well over 250 of the original participants released their audio-recordings.

It was this database of contact names, managed by Dr. Gilbertz, which served as the primary basis for identifying 2012 participants. Indeed, another call from Dr. Gilbertz was not especially surprising to the 2006 participants, and in 2012 Dr. Gilbertz recruited participants by telephone. She set individual appointments at times and meeting places convenient for the participants. As compared to 2006 (with 313 participants), the scale of the 2012 project was cut dramatically due to funding limitations. However, the scope of the project was held in tact with attention to the original geographic segments and the four original interest groups. A few new participants were recruited because it was known that they had suffered from the 2011 oil spill (based on local newspaper stories and local referrals).

Participants in Yellowstone River Cultural Inventory–2012						
	GEO SEG I: Missouri River to Powder River	**GEO SEG II: Powder River to Big Horn River**	**GEO SEG III: Big Horn River to Laurel**	**GEO SEG IV: Laurel to Springdale**	**GEO SEG V: Springdale to Gardiner**	**TOTALS**
AGRICULTURAL	1	3	2	2	2	10
CIVIC LEADERS	1	1	2	1	1	6
RECREATIONAL	3	1	1	1	2	8
RESIDENTIAL	2	1	1	1	2	7
GEOGRAPHIC SEGMENT TOTAL	7	6	6	5	7	**31**

In 2012, a total of 31 people participated in the project. As shown in the table above, the 2012 participants included 10 representatives from agriculture (compared to 86 in 2006),

6 representatives in local civic roles (compared to 68 in 2006), 8 representatives with recreational interests (compared to 76 in 2006) and 7 residentialists (compared to 76 in 2006). At least one person, from each of the four interest groups, was interviewed in each geographic segment, and 29 of the participants were individuals whose opinions and comments had been collected in 2006.

Statement Regarding Native Americans: For the purposes of the 2006 study a number of Native Americans from the Crow tribe and the Northern Cheyenne tribe were included. Native Americans were recruited primarily by means of referrals from state agency personnel and Yellowstone River Conservation District Resource Advisory Committee members. Unfortunately, without agreements that would facilitate similar referrals, the 2012 field effort did not include tribal participants.

Description of Interviews and Collection of Participant Comments*:* The 2006 master protocol, which had been designed from questions provided by the US Army Corps of Engineers and approved by the Office of Management and Budget (OMB approval # 0710-0001), was utilized as the basis for the 2012 protocol. The 2006 protocol was minimally adapted so that discussions of the 2011 floods and 2011 pipeline rupture would fit into the interviews as "natural topics of conversation" (see the example protocol, with adaptations in the appendix).

As was the case in 2006, the questions in 2012 were designed to encourage participants to describe in their own words the local environs, their personal observations of changes in the river, their uses of the river and any concerns they may have had about the future of the river as a shared resource. Open-ended questions were used as a means of encouraging participants to speak conversationally. That said, specific questions were adapted to the participants' interest groups. For instance, interviews with agriculturalists began with the question, "How many years have you been in operation here?" while local civic leaders where asked, "How many years have you lived in this community?" Similarly, agriculturalists were asked, "Are there any problems associated with having property this close to the river?" and local civic leaders were asked, "Are there any problems associated with having private or public properties close to the river?" The overriding objective of the approach was to engage the participants in conversations about the river, its importance and their specific concerns.

Participants were informed that their inputs would be secured at the office of Dr. Susan J. Gilbertz for at least three years, after which the audio-recordings, interview notes and transcripts would be transferred to the Yellowstone Western Heritage Center of Billings, Montana. In this way, knowing it might be at least three years before a transfer of materials would happen, participants were encouraged to be candid in their remarks. All respondents were interested in talking about their perspectives, and they represented a variety of views. Each interview lasted, on average, 45 minutes. The interviews were audio-recordings and later transcribed, producing approximately nearly 500 pages of interview text.

Segment-Specific Analyses: Given the limited number of interviews in 2012, it was impossible to replicate all of the reports produced from the 2006 data. For instance, given that the 2012 data included only one to three agricultural participants in each of the geographic segments, it would be inappropriate to derive segment-specific interest group reports. This left two possible approaches to the 2012 analyses: 1) consider each interest group's set of participants as a coherent community, and/or 2) consider the participants of each geographic segment as a coherent community. Of these approaches, the later was adopted because the flooding and the impacts of the pipeline rupture were localizing, meaning the participants' community of interests was better defined geographically due to the local impacts of flooding and/or the 2011 oil spill.

Thus, the seven participants from Segment I were treated as a coherent analytical community, from which we sought to derive an understanding of how this group was "living with the river" in 2012. Likewise, the six participants from Segment II, the six participants from Segment II, the five participants from Segment IV and the seven participants from Segment V were approached as analytical communities of interest.

The analysis of each set of geographically connected participants went as follows; 1) the primary concerns, or discussion themes, were identified; 2) quotes were then taken from each transcript in the set to illustrate the particular concerns and themes; 3) quotes were arranged to illuminate commonalities and/or differences of thought, especially as those distinctions might reveal possible alliances or tensions across local interest groups, and 4) a brief discussion of each segment's General Findings was developed. Last, the five sets of General Findings were compared for purposes of writing this report's next section, Primary Implications of 2012 Data.

Primary Implications of 2012 Data

Bank Stabilization in Context of 2011 Flooding

Segment I participants expressed concerns regarding levees that were no longer "certified." They mention changes associated with warming trends, and the flood of 2011 was generally viewed as "unusual." In Segment II the rains and flooding of 2011 had wrought havoc, especially in Forsyth where nearly every homeowner and agriculturalist needed federal relief for damages they incurred. In Segment III, the topic of bank stabilization lent itself to conversations about the complexities involved in deciding whether or not a project was useful, permissible and/or cost effective. In Segment III, the flood of 2011 was understood by many in these area to be causally connected to the pipeline rupture. In Segment IV, the flood of 2011 was often compared to the floods of 1996 and 1997, and the comparisons suggested that 2011 was not as damaging. When asked about bank stabilization, the Segment IV participants had much to say, including some whose comments that indicated such efforts were pointless given the power of the river. In Segment V, the 1996 and 1997 floods were still considered markers against which all floods should be gauged. They understood that private property owners would attempt to protect their interests by means of bank stabilization, but they were also aware of that permits were no longer easy to acquire.

Resources and Management in Context of the 2011 Oil Spill

Participants from Segment I reported no impacts from the oil spill of 2011; however, they noted problems with wastewater discharges and they were concerned about the costs associated with pallid sturgeon recovery efforts. Segment II participants had more to say than their downstream neighbors about the oil spill, but they did not express specific concerns that could be linked to fisheries or other resources specific to the riparian areas. Participants from Segment III were especially concerned with the impacts and implications of the pipeline rupture, especially in terms of river bank contamination, impacts to fisheries and avian communities. Some of them explained that scouring of the river bottom was intensified by volume of water in 2011 and that scouring exposed the pipeline—leaving it susceptible to a mishap. In Segment IV, some participants explicitly mentioned the riparian areas, but they had little to say in terms of how an oil spill might impact riparian resources. Segment V participants did, however, have much to say about legacy management efforts, in particular the Governor's Task Force and the more recent Special Area Management Plan. These participants were keenly aware of the tensions between private property rights, the public's interests in the resources, processes and functions of the river, and the various local, state and federal roles in local management.

Findings from Segment I: Missouri River to Powder River

General Findings

In 2012, fieldwork in Geographic Segment I included interviews with seven individuals living near the Yellowstone River from the Missouri River confluence to the Powder River confluence. The participants brought forward concerns from agricultural, civic, recreational and residential communities.

Locals from Segment I portrayed their area as a collection of neighborly agricultural communities. Many of these participants used the phrase "Eastern Montana" as a label for their region, meaning they enjoyed living where people were community-oriented and neighborly. These virtues were explicitly linked to agriculture as the mainstay economy of their communities. The participants expressed varying levels of distress when they reported changes caused by oil and gas activities. They also noted that many adult children had moved away from the area in order to pursue better job opportunities.

Segment I participants typically acknowledged the river's importance to agricultural, industrial, domestic, and recreational needs. The river was described as gradually changing. They articulated specific ways in which the river had changed, but these changes were generally described as occurring over time. The 2011 flood was described as unusual, and the previous winter struck some as odd because of a lack of ice.

Bank stabilization, flood zones, wastewater treatment, the fisheries and the Pallid sturgeons were a topic of concern for many in Segment I. Decertification of the Glendive dike and efforts to address the fish blockage at the Intake diversion dam generated detailed commentaries.

The oil spill outside of Laurel was not brought up by any participants in Segment I, and direct questions concerning this event did not generate much in terms of commentary. The 2011 oil spill was spoken of as an important event but one that had, at most, negligible impacts on the resources of the river in their area.

Water availability, invasive species, and concerns regarding the cottonwood forests were also noted by the Segment I participants.

Ironically, even though the participants from Segment I willingly commented on agencies' management agendas, and even though many stressed that they hoped the future would provide the next generations with the same resources they enjoyed in 2012, the group failed to detail how to best protect "the way things are."

Narrative Findings

Stability and Change: Conversations with the participants revealed a tension between stability and change.

To begin, many of the participants explained that they had spent a majority of their lives in the same location:

> Well I am a local guy, and I think that the first time I paddlefished here was '72, '73…when I was a kid. (Dawson County, Recreationalist)

> I have lived in Glendive at least 54 of my 66 years. (Dawson County, Local Civic Leader)

> I was born and raised here… my parents lived over there… My mother came [here] from Colorado in 1930… to raise sugar beets for the valley…. [and our property] belonged to my parents….We just kind of fixed it so it's just going to stay in the family… As each one of us passes away, it will go to our kids. (Richland County, Residentialist)

They also explained that the communities were hospitable and that it was expected that people would live in accord with rural sensibilities. They demonstrated a pervasive ethic of neighbor-helping-neighbor. For example, one participant received a call during his interview from an upstream friend warning him to take caution in regards to his water pumps because large cottonwood trees were floating down the river and might cause damage. The call prompted the participant to explain that such calls, neighbor-to-neighbor, were common. He told a story about rescuing his neighbors' livestock from islands during high water in the previous spring, and then he explained how it was that he and his family were ready to help during such high water events:

> On a hot day we would take horses out….and we'd swim [them] back and forth.…That way them horses learned to swim on their own [and]…if you ever do have to go rescue somebody's cows or something, the horse won't freak out. (Prairie County, Agriculturalist)

This memory of teaching horses how to swim in order to be helpful when conditions were dangerous demonstrated that his responsibilities as the neighbor who was "good on a horse" were important to his community—he and his horse were able to save his neighbor's cattle during the floods of 2011.

However, participants' comments also revealed that their communities were changing. Several noted that it was "very unusual" to encounter a family whose children were all still living in the local area. Many of the younger generation had gone off to find jobs elsewhere, and despite the centrality of agriculture as a focal point in their cultural identities, the economy of Eastern Montana was overtly influenced by the oil and gas industry. The recent "Bakken boom" was discussed as a force of change in the

community, and not always for the better. One participant explained that the changes in her particular town were not appreciated:

> As you can see when you come down Main Street, that whole trailer mess right there….[Those temporary workers] just come in and park. (Richland County, Residentialist)

Others could see that the "bust" was now a factor:

> Well, it got kind of slow there after the oil boom. (Richland County, Residentialist)

The participants' comments indicated that many from Eastern Montana remained rooted in an identity that valued neighborliness and longevity. Change was perceived as a result of fluctuations in the oil and gas industry.

River is Valued and Changing: Participants from Eastern Montana clearly valued the Yellowstone River. They explained it as a key asset for agricultural, industrial, domestic, and recreational uses:

> We are very, very thankful to be one of the many communities situated on the Yellowstone River because it's a beautiful river, it's the lifeblood going through Montana. It provides lots of water for not only domestic use in cities and towns but irrigation and farming and recreation, and it is just a remarkable thing to have in your community, and we are happy to have it. (Dawson County, Local Civic Leader)

In addition to the river's beauty and productive uses, participants described changes in the river as expected outcomes:

> This is of course, as you know, this is the only undammed river in Montana. So it is nature. The river is changing all of the time. There is nothing we can do about that. (Dawson County, Recreationalist)

Although participants noted the dynamic nature of the river, the changes they noticed were often described as gradual:

> That's been washing out for years because the river has been changing there. So last year [2011] probably wasn't any more than normal. Because the river has kind of settled down in that new channel. (Prairie County, Agriculturalist)

> The Yellowstone River is… a meandering, ordinary body of water going through our community… In six years the Yellowstone River has not changed its course going through Glendive. (Dawson County, Local Civic Leader)

> This… is the original riverbank… it's slowly making its way back across there. (Richland County, Residentialist)

Bank Stabilization and Flood Zones: When asked about bank stabilization, many of the participants in this region commented on the dike protecting the City of Glendive. They were concerned that decertification of the dike meant that areas of the town were now in a flood zone, and thus not appropriate for development. A local leader went into detail:

> The most important [current issue is] the fact that we are still [working] on our floodplain issue, and dike issue, with the Corps of Engineers…[Historically, our] dike was stamped, and approved, and certified for a 100-year floodplain….And then when the federal government came through Montana with the Interstate [highway] project... And for some reason, whether it be politics or poor judgment, they decided to cross the Yellowstone River here at Glendive....The berm that they built, leading up to the interstate on the north side of the river, took away the overflow channel that was a natural one for the Yellowstone River… And sure enough, they caused problems….[So, now] the Corps de-certified our dike and put all that land back in the floodplain... We have been, as a community, fighting ever since….That land [is] a viable part of our community…. We feel, at least in Glendive, that the federal government caused our problem….The people of Glendive did not create the problem, yet we are the ones that are suffering with it. As far as local government…[we] just keep our fingers crossed and hope that someday our plea, or our cry, will be heard, and we will get some relief. (Dawson County, Local Civic Leader)

Other participants also explained that floodplain regulations inhibiting development. One residentialist explained specific areas near his home:

> All of that is in the hundred-year floodplain,…[but we have] never have seen water [back there]... We gave [our grandson] an acre…and when he had it surveyed…the County Planner told him that he couldn't [build there] because 18 feet of that acre lot was in the hundred-year floodplain. So, he couldn't put a house there….I've been here 75 years, and I have never seen it ever [flood]….And there have been some pretty bad floods….It never goes high enough to hurt anything. (Richland County, Residentialist)

Several participants wanting to stabilize river banks voiced frustrations with the permitting process:

> They [the government] kind of made it difficult to stop a problem though. Like we had a place down here... the river washed across and it cut the bank. And we couldn't do anything about putting riprap or anything in to keep it from cutting anymore. We had to just leave it. And that is kind of worrisome. And I am not able to fix it. (Richland County Residentialist)

> And, you know, it all starts of course with the federal and the state governments and what jurisdictions they retain for themselves, etcetera... But the state of Montana… and I think the Lower Yellowstone Conservation Districts and organizations like that are very concerned about the use of the river and trying to keep it from being altered or changed with artificial impairments and things like that. (Dawson County, Local Civic Leader)

Only one participant explained why using riprap to address bank erosion could be a management issue:

> [Riprap] causes an action and reaction, or something like that. (Dawson County, Local Civic Leader)

Water Quality—Wastewater Treatment: Faced with updated requirements from the state Department of Environmental Quality (DEQ), citizens and local government officials discussed difficulties and costs associated with attempting to remain in compliance with the rules. A local civic leader explained the issue in these terms:

> The other thing concerning us and the Yellowstone River is our DEQ permit for our wastewater discharge….[which] is going to expire in 2014. And we have already been informed by DEQ that our present solution for getting rid of our wastewater into Glendive Creek, and eventually into the Yellowstone River, is not going to meet the new requirements. So we are pretty much on top of it….We have the lagoon system….[but] my Public Works Director said we can't do [enough] with our present lagoon system, and we are going to have to go to mechanical treatment….We have an engineer sizing it and designing it for us, and under today's costs we are looking at between eight and nine million dollars. (Dawson County, Local Civic Leader)

Given the fiscal impact, it was not surprising that local residents were also aware of the concern:

> We're in the process of forming our water and sewer district right now and putting in another lagoon, another pond, because we just don't have the capacity. There isn't any place uptown to put anything. (Richland County, Residentialist)

While these participants described obstacles, and they seemed to understand compliance was important. However, none explicitly linked compliance with improved water quality. At best, one might infer they understood why compliance was important.

Fishing and Fisheries: Recreationalists, still pleased with the quality of the fishing on the river, commented on perceived changes. Some of these changes were discussed in terms of natural causes:

> A few years back… it was a slow fish year… You know, getting low water, when we don't get the high water, clear water… maybe [its caused by] a drought in the

> mountains, not enough snow, not enough rain… Fish like the high water and the mud to come up and spawn. (Dawson County, Recreationalist)

> One thing is…there has not been any evidence of a good spawn or good hatch since 1995, and so I think a concern is whether there are any young paddlefish out there. The majority of the ones that are caught, here, are aged. And a big share of them were all born in 1995…..Of course there were some drought years,… but they should be coming up now because they don't come up until the males are nine years old and the females are about 15. (Dawson County, Recreationalist)

Beyond natural weather variation, increased recreational use of the river was described as evolving:

> It was not really popular [to go] fishing back then….I remember as a kid, you could catch two a day….You would get [up] on the hills [and look down] and there wasn't this many people. Of course, it is Memorial Day right now...[But,] I remember sitting up there and there might be eight to ten fishermen down there

He continued:

> You know, so it was a lot different….people come from Germany, and England, and wherever, just to do this. North Dakota, and a lot of Wyoming guys....Lot of people from…Billings, Butte. That guy was from Kalispell, and we get a lot from Gillette and Sheridan [Wyoming]. (Dawson County, Recreationalist)

These recreationalists have taken note of how the changes are being managed. Some of this management was described as a self-regulatory river etiquette adopted by local fishermen:

> We handle [paddlefish] careful…[We] do not pick them up and take pictures and stuff like that. We keep them in the water, and we try to use barbless hooks…[When we] unhook them, we just let them get their bearings before we release them and let them go. (Dawson County, Recreationalist)

However, most discussions centered on formal regulations. Commenting on the quota for the paddlefishing season, one man explained:

> It is crazy. I mean you can only catch one fish, here. So, basically there are 500 fishermen here, and I am sure that some people didn't catch any. (Dawson County, Recreationalist)

Another man recalled:

> Well, when I first came out here, there wasn't officials…. and there was no limit on how many fish you got. (Dawson County, Recreationalist)

While these participants longed for the days when these rules were not necessary, they generally acknowledged the necessity of new rules to govern the new circumstances, as confusing as they are:

> I have a pretty strong opinion on that. I really think that if I was fishing here on catch-and-keep day, and there is a Game Warden here—and there usually is because there are a couple standing down there now—they monitor it pretty closely…..If I bring it in and no one gaffs it, I [want to] keep it in the water and unhook it. I should be able to release it and give the warden my tag and say, "Here, I don't want to eat that fish. Here is my tag." But they said…they are worried about high grading….I could see that point. Then they would have to have more rules. Because there are a lot of rules on paddlefish that people are really confused about. Because you cannot fish from a boat, you have to go a quarter mile down, and then you can catch them down there, and cannot catch-and-release up there, you can catch-and-release here, and you can only use certain sized hooks. So there are a lot of rules and stuff. You would hate to throw another one in there and stir the pot….So, I like catch-and-release time because a lot of people, especially the locals, do not like to catch them and eat them. And like me, I only fish on catch-and-release days. (Dawson County, Recreationalist)

As river management evolves to adapt to increased recreational use of the river, a growing concern in Segment I was public access. In this area, recreationalists noted that public access sites have become more crowded. Riverfront landowners expressed a willingness to allow both friends and strangers access the river through their property, so long as permission is granted and the property and river are respected. However, one of these landowners described significant issues with trash being left on the property and unauthorized access by strangers:

> We just kind of monitor whoever goes down there [to the river] to try to keep out people that are going to do damage. And if they do damage, then they get 'walking papers' [laughs]... If they are going to be doing things they shouldn't do… [like] leave all their garbage behind…[or] shoot things or …[any] kind of vandalism, I guess. We just don't allow that. (Richland County, Residentialist)

None of the participants expressly called for increased public access points.

Pallid Sturgeon: The most prevalent topic regarding fisheries management in this area centered on the issue of the endangered pallid sturgeon and the diversion dam at Intake:

> The Corps of Engineers commissioned, and brought to ribbon cutting, Phase 1 of their Intake diversion dam project for saving the pallid sturgeon….Phase 1 [included] new intake canals…and they put screens over the new intake [that will]…hopefully keep fish from entering the irrigation canals....The new massive structure they have down there is super….But now, they are awaiting funding and/or an okay to go ahead with Phase 2, which would be to build a ramp, a bypass ramp, around the dam so the pallid sturgeon can get further upriver to

> spawn and have a longer spawning area in the Yellowstone... When the Corps is going to move ahead with Phase 2, is anybody's guess with the present congressional funding situation….You know, most of the local people [ask], 'Why are we spending 20 million dollars on extending [the pallid] breeding ground when 20 million dollars could do so much for our community?'....I believe that the fishermen, and people that live in Montana, wouldn't disagree with saving the pallid sturgeon….But at the same time, from an economic standpoint, local residents have expressed some concern over that cost versus the cost of [fixing the dikes and] getting Glendive, Miles City, and Forsyth whole. (Dawson County, Local Civic Leader)
>
> Out here right now the big [issue] is the pallid sturgeon. I don't know if you've seen the new headgates for the dam they just built….I don't want to put a dollar amount out there because I am not sure what it was, but I keep thinking 25 million dollars… My opinion on it… There are other ways I think we could save the pallid... I am worried about if they put a lot of money into that,…[and then] there are a lot of ice jams that come through the Yellowstone, [the ice] can rip it all out....So, that is what I am concerned about: that the money isn't going to be well-spent. They say that it works in the Snake River, but I don't think the Snake River gets ice jams like we get here. (Dawson County, Recreationalist)
>
> The rest of the thing is still up in the air, and they ran out of money to do it, so I don't know. (Dawson County, Recreationalist)
>
> It [the new Intake facility] has not changed anything with the river. (Dawson County, Recreationalist)
>
> It [the new Intake facility] may have helped the river with keeping the fish in [the river and not in the irrigation canal]. (Dawson County, Recreationalist)
>
> I think it will [affect the fishery]. How bad, I don't know… Nobody knows what it will do. It's going to change somewhere, something. (Dawson County, Recreationalist)

Overall, local recreationalists expressed concerns about the health of the fish and dissatisfaction with new rules, yet they acknowledged the difficulties and evolution of management schemes, especially in response to weather variations and increased human demands. Regarding the Intake dam, locals acknowledged the importance of saving the pallid sturgeon, but there were significant concerns about both the funding for this project, its efficacy, and whether or not funding would allow the Corps of Engineers to finish the job.

2011 Flood: Unusual and not the Only Thing*:* While high water is a yearly occurrence, and flood conditions along the river are not uncommon, the 2011 flood stood out as a unique event for participants. Moreover, even though they do not use the phrase "climate

change," they did explain changes that suggest a growing awareness of climate variability:

> This is the first year that the river has not even froze.…It stayed open. It never froze once… Last year was a record ice jam and this year was a record warm… I mean, every year, [by] the first of the year, it freezes—maybe only for a month or two. But, this year it never froze at all out here. New Year's Day I was boating. (Prairie County, Agriculturalist).

> [2011] was very unusual… [and this spring, 2012] has been very dry. We had no moisture, no snow to speak of at all this year. In fact, you can tell the lawns, they just look so bare that they didn't have any shelter and the grass was really slow getting started. (Richland County, Residentialist)

> The high water came, and it beat the old record by three times… for that date. I mean it was like nothing I had even imagined. (Prairie County, Agriculturalist)

> And I understand the Bighorn Dam had to let water out because they were full and had to get rid of their water, and that caused, of course, the Yellowstone to stay higher for a longer period of time. (Dawson County, Local Civic Leader)

The impacts of the flood affected the productivity of riverfront lands:

> Last summer we were underwater down there until well into June because of all the rain and the flooding and everything. It was totally unusable. (Richland County, Residentialist)

> The 2010 and 2011 summers were extraordinarily wet in our community... and because of that we not only had more saturated ground in the area, crops were good. The farmers who were able to get out and plant in-between rain storms did very well as far as crop yields, etcetera. (Dawson County, Local Civic Leader)

Other participants explained the impacts of the event on recreational uses of the river:

> The water levels were very dangerous. And we had to clear this campground out, had to shut down fishing… Seven days they shut it down because of high water. Because right where we are sitting now, I think there was a foot of water. (Dawson County, Recreationalist)

> Well, we were open for about a week and then got shut down with the flood. We closed down for 13 days and then opened another week. So it was a 2-week season. It was weird. It was the highest the river has been in 70 years or something like that, last year. Now this year, it's the lowest it has been in… 2000 years [laughs]. (Dawson County, Recreationalist)

Despite the impacts of this notable high water event, one man seemed unimpressed:

> At no time did the water… get above just touching the foot of the dike. (Dawson County, Local Civic Leader)

Similarly, another made this comment when asked if he planned to do anything differently with his operation based on the experience of the 2011 flood:

> Not really, because I mean if it [happens] every fifty years, I probably won't have to worry about it again. (Prairie County, Agriculturalist).

Pipeline Rupture and Oil Spill*:* Another impact of the 2011 high water was a pipeline rupture and oil spill near Laurel, far upstream of this geographic segment. When asked about it, the participants in this region could not identify any impacts, nor did the questions generate further comments:

> I don't think that I heard anybody saying they heard or seen anything. (Dawson County, Recreationalist)

Water Availability: Increased demand for Yellowstone River water was another issue mentioned by a local leader, but it was not an issue that caused concern:

> Water demand in Eastern Montana, because of the increased growth in the population due to oil exploration just to the east of us and north of us, etcetera, has put a greater demand on water. And, other communities are experiencing the same thing as Glendive, some of them even more so. But our water rights in the Yellowstone River are more than adequate to see us increase [use in] our community—you know, the water we need to intake out of the Yellowstone in order to service the people we have here and [our water rights would] even allow us to increase by 20,000 or 30,000 people in population without any restraints, [except] maybe making a few adjustments in our present water plant to relieve some bottlenecks….So, I think a lot of Montana is in pretty good shape that way. As long as the Yellowstone and the Missouri and all their tributaries keep running, we're in good shape. (Dawson County, Local Civic Leader)

Invasive Plants and Declining Cottonwood Forests*:* Participants expressed concerns regarding changing vegetation and invasive species, such as Russian olives, salt cedar, and leafy spurge, and one agriculturalist linked his observations to possible climate concerns:

> [Referring to a photo] You can see cottonwood trees all along there, [but] there's no trees left in there at all. All these cottonwoods are dead. There are a few Russian olives and some salt cedar. That's sad.…I don't know if it's the climate or what. But [it's sad] when you can look at a 1958 aerial photo and see cottonwood trees, while now there are just none there. (Prairie County, Agriculturalist)

In some cases, participants explained their concerns and their efforts to combat leafy spurge. As one couple noted:

> Participant 1: There's leafy spurge out there...
> Participant 2: There's a lot of it out there, and it all came down the river. We had never seen it…years ago. It is just within the last, probably, 15 years that it's really gotten bad….[At] the experiment station in Sidney, they raise what they call spurge beetles, and they plant them out along the river.
> Participant 1: I brought [some beetles] home and put them in certain spots. And in those spots, they pretty much got it. But, truth is, I think the floods killed them. (Richland County, Residentialists)

General River Management*:* Two participants shared their vision for the future of the river, including their preferences for the role of government:

> Interviewer: What would your vision of this river be for your great-grandkids?
>> Participant 1: That it's just like it is now.
>> Participant 2: That it stays just like it is now, that they can enjoy it the way that we have, our family has.
> Interviewer: Are there any things that we need to put in place now so that what you have will be there in the future?
>> Participants 1: Well, not that I know of, but you never know what the government is going to do [laughs]. I know in other areas they have come in and they really upset the apple cart. But, fortunately for us, they haven't bothered us here too much. (Richland County, Residentialists)

This exchange reveals that some people feel the present state of living with the river is not immediately threatened. Thus, even though they desire a future that is similar to the present, explicit efforts to preserve the present are not yet viewed as necessary.

Findings from Segment II: Powder River to Big Horn River

General Findings

Segment II included the area of the Yellowstone River between the confluence with the Powder River and the confluence with the Bighorn River. Six individuals were interviewed in this segment: one civic leader, one recreationalists, one residentialist, and three people representing agricultural interests.

Here, the river was described as an important asset serving a variety of uses in this community, including agricultural, industrial, municipal, recreational, and as a cultural asset. Some in Segment II claimed fishing was gradually improving, and one participant gave a detailed and impassioned account of why construction of the fish passage on the Tongue River was significant. There was little-to-no discussion of Pallid Sturgeons, but Yellowtail Dam was mentioned when discussing recreational fishing. They noted increased hunting activities.

Segment II was also described by locals as a community in which the traditional rural way of life was changing to accommodate new industrial activities. They explained changes in the community caused by the oil and gas development and by increased land values as recreational uses became more popular. Evaluations of these changes were mixed, especially when discussing access to the river and to hunting areas.

They explained that changes in the river, from year to year, were expected. They also described the river as sometimes dangerous. They emphasized the unprecedented flooding of 2011. Impacts to agriculture, industry, and homes were noted and were explained as requiring immediate responses. Nearly every family in Forsyth was impacted when the water table rose and basements flooded.

They regarded riprap as a protective measure and were quick to discuss the decertification of the Miles City and Forsyth dikes, which they said prompted concerns about flood insurance and floodplain regulations.

When asked about the up-river pipeline rupture and oil spill of 2011, they noted no specific impacts. Comments regarding water availability suggested that participants were not overly concerned about their water rights; however, problems with invasive plants seemed quite perturbing to some land owners who viewed state management of these species as less that effective.

Narrative Findings

Heritage as a Hard Working Community: Many of the participants explained that their families were long-time residents of the area and that the river was threaded into their lives:

> I moved to this area in 1973… my wife is… fifth-generation to this area. Their farm… on Sarpy Creek will be 100 years old this year, this next year. (Treasure County, Recreationalist)

> When you don't move around a lot, you become more of a community, you become more, more responsible in the community… because you know it's your place forever, and you know there's family following you and you want them to have the same, not just chances, but reverence for what we've got. You know, you don't want anybody behind you that's family, or anyone for that matter, that takes what we have lightly. (Custer County, Agriculturalist)

> Our granddad came here in like 1919… they came in on a little dinky railroad… [and he] helped start the very first ditch and put in the [irrigation diversion] dam… he and his brother. And they worked on that dam all one fall and one winter, and finally went broke on it. And they got a team and a wagon and a potbelly stove as their wages for all those months… So they had their struggles. (Treasure County, Agriculturalist)

The River and Irrigation are Central to Life: One participant was especially helpful in describing his appreciation of the local landscapes and his way of life:

> Just sitting right here and looking at that sunrise in the morning or those terrible-looking gray, dry hills, I mean it's just like heaven. Last night there was a red sunset that you could just die for… And I stood up over there by the big canal… and gazed across the green fields and toward the pellet plant, and the red glow and hints of blue sticking through it, it was just absolutely over the top. And it just makes you just so appreciative of where you're at….We can make this good living, and only have to work half days [laughs]—from six to six…Yeah. We get the other 12 hours off. I mean, what the heck? (Custer County, Agriculturalist)

They agreed that the river is a key component of their communities, especially the agricultural and municipal users:

> [This community is] totally [dependent on the river]. From irrigation, recreation is a small part of it, but this whole community in this area relies tremendously on the big ditch that comes out from above Hysham to irrigate all the crops in this area. So yeah, of course without the river here we wouldn't be here [laughs]. Yep, very dependent on the river… And of course our city water supply comes from the river here too. (Treasure County, Recreationalist)

> The river was my television and my entertainment when I was a kid. And that's wherein lies my great love for the river, is the fact that in my formative years, every moment that we could get away from the wrath of my mother's chores, we would stand at the river. We didn't have television; we weren't allowed to use the phone… So our entertainment, our world was the river. And… I'm just so thankful. And I never realized that until many years later in my adult life, that jeez my appreciation and love for the river was because that's where I spent my childhood. And it was, you know, just such a wonderful place and one to be respected. It tried to claim my life a couple of times, and it just built in more respect from me for the river, you know careless things I did as a kid, and learned by it and managed to live to the ripe old age I am now, so. (Custer County, Agriculturalist)

> [Our land] it's all flood irrigated… mostly crops but there is some pasture, irrigated pasture… we basically have hay barley and alfalfa hay… Those [irrigation diversion] dams are really vital to this area. (Treasure County, Agriculturalist)

> Our pumping plant, our water supply comes out of the Yellowstone. (Custer County, Residentialist)

> Of course, we rely on the river for the city water… And without that city water we would all have to have separate wells, and we wouldn't have a water department… That water is important to us here in the city of Forsyth, just as important as itis in Hysham or in Rosebud or in Miles City… I think Glendive gets their water from the Yellowstone. (Rosebud County, Civic Leader)

> The river is vital to all of the communities down through here, and we have to be aware of that and make sure that everybody is conscious about how well the river is taken care of. (Rosebud County, Civic Leader)

Fishing and Fish Passage: With regard to recreational fishing, participants noted its importance, but they also noted increasing pressures:

> We also have a guest house on Sarpy Creek, and we have a group of guys that come from every year from Wyoming just to fish catfish. For three or four days they just have a ball catching catfish, and there is a lot of catfish… We run that year-round. (Treasure County, Recreationalist)

> One thing I really noticed is there's a lot more people in boats on the river, and the fishing is really intense. You know, like you look and drive around the town you know, a couple of people had boats, now like there's ten people have boats… and the Fish and Game is trying to get more access to the river... Well, it's like our attorney, he called me and he says, "Do you have a place I can put a boat in down therein Hysham? It's so crowded up here… We can't hardly get our boat in up here." And I said, "Yeah, you can come down here and put a boat in. So you

see people 80 miles away are shifting down here and trying to get their boat in to go fishing. And it's going to get worse… So you're seeing a lot of that. Those people are going to go fishing and have a boat. You're going to see the intensity on the river being more and more… I can just tell the difference in the last 10 years. (Treasure County, Agriculturalist)

I fish all the time… walleyes and bass… It's a really big income for… the city of Forsyth because of the impact that the river has and the good fishing. You can go down to the boat dock in the summertime, and there's two or three boats down there all the time from Billings and Glendive and Miles City. Well, those people don't come over here and spend all day without spending some money in Forsyth. (Rosebud County, Civic Leader)

When the water is high, I try to stay away from the river [laughs]. And of course in the wintertime we don't do much with the river. But spring and fall I get down once a week…usually fishing…picking anything from asparagus, to mushrooms… hunting…things that kind of go along with the river…[And] there's other treasures [like buffalo skulls and silver dollars] that you get from the floods and stuff too… [so, I] make up lots of stories about cowboys. That cowboy was probably after that Indian that shot that buffalo that got buried in the creek. (Treasure County, Recreationalist)

I was just like, "A whole life has just passed right before me." … I mean I hollered and screamed and bawled and laughed… The ultimate reward, three fish swam on to the apron and went under the gate and into the river, so I got to see the first three fish use the fish passage… [now] 37,000 fish per week is what actually makes it up there…and one day they caught three sicklefin chubs going up there. And so that is just really significant when an endangered species is actually using a manmade passage, you know... See, what it boiled down to is, south of the dam… there was possibly four species of fish south of our diversion dam… so that is how obtrusive this… irrigation diversion dam was to the fish population on the Tongue… but now all these species go clear up to the dam, so now it's repopulated. We changed the whole scope of that river, which in turn will change the whole scope of the fisheries on the Yellowstone, the warm water section, because it's opened 190-some miles of river to warm water reproduction. And the Tongue is a major spawning trib. to the Yellowstone… So it's hugely significant. And it's very gratifying. (Custer County, Agriculturalist)

The fishing has just improved over the last probably 10 years tremendously for some different species of fish… I think the water quality is really good, you know, coming, the water is a lot nicer coming out of the Big Horn Dam, or Big Horn Lake out of Yellowtail Dam. It keeps the river pretty consistent here, and that way we don't have the really low water or the really high water, except the spring runoff. And I think that consistency has given the fish the opportunity to reproduce and survive there… I catch walleye here and bass, the two that I like to catch the most. I've caught some, anything over a 10-pound walleye the call a

> trophy walleye, I've caught numerous ones 13 and 14 pounds… And try not to let that out too much [laughs]. You know, catch-and-release… And the smallmouth bass fishing has gotten really good… And there's carp, and the gold eyes are abundant, you know. They are not a game fish, but as far as catch-and-release goes, they are a fun fish to catch. (Treasure County, Recreationalist)

> By far the hydro is still the best way to go. But then you have lawsuits, you know, different clubs, whatever, suing like the federal government on these [hydroelectric] dams. And like a third of the fish mitigation issues, in expense, are fish litigation. And our CEO for Southern Montana Electric, which went bankrupt by the way… he said it would be cheaper to hire a 747 with a water tank and put the fish in it, fly above the dam, and dump it out, then it was to do all the reconstruction to put the fish over the dam. So, and people don't even realize, the people protesting it, it has an effect on their electric bill. (Treasure County, Agriculturalist)

Hunting Access: Participants also discussed increased hunting pressures and public access concerns:

> Of course during the hunting season it [our rental guest house] is really popular, and we have a lot of people come back from week to week. And some of them fish, some of them hunt. But during that fall time period, we're totally booked… The only thing is you run out of hunting days, everybody wants to come hunting, and you can't do that. The better fishing gets, then more people come summer, spring, and fall too. (Treasure County, Recreationalist)

> [There are] not a lot [of access points along here]. Fish and Game has two, and then there's a guy, he's an airline pilot… and his wife inherited the place, so they put one in there. And he'll never use it except during hunting season. But… even though he used private funds to put it in, he did get the permissions from the Soil Conservation Service to put it in. So that's kind of actually public in a way, but yet, it's private too. So what he does is he blocks it off so nobody can get access to… the state islands, BLM islands to hunt, so he can tie up more of those himself. (Treasure County, Agriculturalist)

Community Changes are Uneven: The participants in Segment II were able to identify a number of recent changes to their communities that were apparently caused by continuing oil and gas development occurring further to the east. Some thought (hoped) the development would be positive, while others implied trepidations:

> Right now they are talking about that Bakken Oil. And not only that, but also that Canadian pipeline coming in from Canada all the way to Texas. And it's going to be coming through here fairly close. I think the next ten years is going to be pretty interesting to say the least….Me, being a landlord,—I have only maybe a dozen or so places—but, even now, I have no problem keeping them full… And if this oil thing hits, like that new hotel out there, there's 90 rooms, they're going to fill

> it up in no time… So that's going to be good. I hope so. (Custer County, Residentialist)
>
> I mean, look around us. Even out here in remote, eastern Montana—I mean how many [new] houses can we see: There, there, there, there. (Custer County, Agriculturalist)
>
> One of my friends…lived 40 years in Sidney, and…last winter, he said, "I'm moving out of Sidney and I'm going to Billings." He said it's [because of] the oil development….and…the quality of [the new] people. He said it is just crazy. So he just sold his house and moved to Billings….People [are] getting high values out of their houses with this oil boom, and they're going somewhere else. If they can go…buy 160 acres—and have money left over—I guess you can't blame them. (Treasure County, Agriculturalist)

A decline in the number of farm families was described as apparent, and the new-comers—described as retirees from Billings—did not want to be farmers. For some, this influx was understood as potentially problematic in terms of property taxes:

> A lot of the farmers have put sprinkler pumps in the ditches and are sprinkling because the labor is so scarce….Everybody is down to the oil fields. And the kids that grew up on the farms are going to school and taking on better jobs… I think the kids are better off out, not coming back, you know. Right now anyway. (Treasure County, Agriculturalist)
>
> We've got most of [the farm land] leased out … [because] when we were farming it was always touch and go because of hail, and there were freezes….I noticed in the valley [that for one] neighbor all of his equity in his land was gone from farming. And the other one, he was like a million dollar in the hole when he died… And then there was a third guy that kept his place and leased it, and that place is surviving today. And so I… thought… I'll just leave it to the lease thing and go fishing more often. (Treasure County, Agriculturalist)
>
> [Hysham] has actually dropped in population… Our school enrollment has dropped down to below 30 [students]….We maintained 50 for a long time, [and] back in the 70's we had 100 in high school. But this year, we dropped below 30 in four grades. So, that's a concern… Agricultural-wise it will probably stay about the same, you know, unless some kind of industry or something comes here. What we are seeing is people from back east buying the property as a hobby….[For the newcomers, land is] not necessarily…productive…[and] they're not hiring hired men….For an example, we have an astronaut that lives right here in the county that bought up five [properties on] Sarpy Creek…..You just see fewer people running the same amount of land….Unless we have some type of manufacturing thing happen here, Hysham won't grow. (Treasure County, Recreationalist)

> You see…more and more people….[Some are] retired people out of Billings. They can sell their house…and they come down and buy a little house, here. And they can live in this town cheaper…One guy sold his house [near Billings] for $300,000-350,000, and then came down here and bought one for $60,0000….But, there isn't a grocery store here…[so, these new people] go to Walmart in Billings, load up on food, and come back….And now, we have a subdivision right on our south fence…I used to drive out there and it was kind of nice because there was no people, no nothing, just nice. Then this rancher died who didn't have any kids….[and] they ended up selling the place to a realtor from Texas. And now they subdivided it, so now we've got four of these 160 acre lots that are along our south fence line. Right across the fence, there's this cabin sitting on this high hill overlooking our place…I find out later, through the sheriff's department, that [one guy] a sex-offender out of California…And I asked this sex molester, "Why would you move and pay $1,600/acre for this land?" He says, "Well, back in California, they sell [land] by the foot, not by the acre." … It makes me wonder… what's it going to do to my value right across the fence when I am trying to raise cows? You know, I can't compete, tax-wise, with this realtor selling land. (Treasure County, Agriculturalist)

The River Changes Year to Year: Channel changes were mostly noted as year to year observations:

> I see a lot of change in the river structure, bottom, you know, from year to year, especially from high water. Sand bar that is there one year might be gone the next and so on, so it changes a lot… To me it shows that it is pretty wild and it's dangerous, because a lot of places where the banks wash out there's big trees in the water and things like that until the next run off, and then the trees are gone and it starts over again and spreads out. (Treasure County, Recreationalist)

> I see it happening gradually trying to cut away the banks a little more south, you know, southeast than north… [and] the more it widens out, it seems to be the shallower it gets. (Treasure County, Recreationalist)

> It [the river] cut a big hole in one of our fields, you know. Our ditch would come down and irrigate off to the side. Well, it cut through the ditch area, so those lands of hay are going to be dryland. You know, they won't be able to water again. So it's done a sizable amount of damage. The bad part of it is it took some of our prime ground… You know, we lost a lot of production. (Treasure County, Agriculturalist)

> [The good fishing spots] change, every year it's a little different because of the river. (Treasure County, Recreationalist)

They also discussed learning to appreciate the dynamics of the river:

> There's a lady from Livingston…and another lady from Bozeman [who] came and gave a talk…[about] the soil structure and everything… Oh, they really do a good job… Like down here—where [the river] makes a horseshoe—they said, "Here's a real hot spot" [for channel changes]. And, that was ours….that's where [we saw the river] cut [our bank]… There's some [areas] down toward Sanders [community] that's cutting toward the tracks. [Those ladies] did a really nice presentation. Really good job. (Treasure County, Agriculturalist)

> I'm such a river person, and I tend to look at some things that people call damage as the way naturally it's going to go. It is a prairie river down here, and it has a certain amount of right to meander, and that's what prairie rivers do. And I always give it the benefit of the doubt….I hate to refer to something that happens naturally from time to time as damage. I kind of look at the other way, we're here and we're kind of more or less the damage. You know?....[Some of] our farmland,…from time to time, has gotten water from ice jams and the like. And we're the newcomers, so [the river] needs to be able to do kind of what it wants, once in a while. I have always felt like that. (Custer County, Agriculturalist)

Riprap as a Protection: Many explained that bank stabilization was necessary:

> Basically it [the river]… keeps washing the banks… to the south. So it's next to the railroad in places and a lot of manmade structures and things like that—they've got to protect those kinds of things. (Treasure County, Recreationalist)

> [During] the last high water we had, we had a washout down below the dike. The river changed channels and came around our corner and cut a piece out down below the fairgrounds. And so the Corps said we'll fix that right now, and they did. They came in with riprap and put that dike back. (Custer County, Residentialist)

> [The river] changed…[and] some of the tracks where sprinklers go would be right in the river… So they're going to riprap it and put some dirt back. I think you have to go like 90 feet back in. (Treasure County, Agriculturalist)

> The only one [entity] that seemed to think you can just go haul rock and dump it in the river is the railroad….A couple of years ago, when that train fell in the river, [it was a mess]… So now, the railroad can go ahead and do [riprap]—and avoid these wrecks. But, [even] the railroad doesn't want to go out too far because it's going to take too much riprap….I can see why they need to have the riprap and have the river shored up if that railroad is going by. We don't want those oil cars in the river, leaking. (Treasure County, Agriculturalist)

One recreationists could see the necessity, but he could also see that erosion could be important to the river:

> If… it's done with big rock or natural… I think it's okay… to a point. There's just some places where you do need to do it. But where it takes out edges of fields and things like that, I think that just kind of puts nutrients back in the river and makes it a good river. (Treasure County, Recreationalist)

One individual voiced a concern about the impact of channelizing the river, but the implied fault and solution were beyond the scope of individual projects:

> The pallid sturgeon, they said with a lot of these bridges, you know for costs as far as bridges go, if you put in another couple spans… then you're probably up another hundred thousand dollars or whatever to span the river, so what they do, is they'll make it abrupt and they'll narrow up the river with the bridge, like these highway bridges. Well, anytime you narrow it, you restrict the water and you get an effect, so it speeds up the water going through the backside which causes erosion, but it also speeds it up so the pallid sturgeon, the way I understood, can only swim up a stream 3 to 4 miles an hour. But right here where these bridges are, they'll speed it up maybe to like 5 or 6. So the sturgeon wasn't going to make it through these bridges… You know what I'm saying? So there's a bigger problem and bigger issue in the middle with the state highways… Where it used to go straight, it will start cutting here. And that'll offset going down a little further… It all has to do with economics… once the new bridge is in... you can maybe add on if you have plenty of money, but this country doesn't have any money. (Treasure County, Agriculturalist)

Participants often focused on the effectiveness and cost of these projects:

> That's like those weirs where they placed them upstream, in a lot of places like Tim's they didn't work. And down here at Myers they put some in by the railroad track, and they didn't work. But down by Rosebud there's a spot where they worked good. But they like them upstream because then it leaves a hole behind for the fish. My father-in-law… he put some in, but he put them so they pointed down just a little bit. And when the high water came, they filled in with gravel just behind them, and it just kind of kept the river where it was. (Treasure County, Agriculturalist)

> And riprap is a thing where if you put it in, you think well you're done. You're never done with riprap. You should have rock standing by so if some of it slips in, and it's a constant maintenance thing. Once you get it in, you got to constantly maintain it or you're going to lose it all… What's happening is like when the ice and that goes out on these dams, it's taking the rock away behind it, you know, and it'll cut… it takes that rock out. We just lose it down the river… and just dump more rock in. (Treasure County, Agriculturalist)

> A lot of cases, it's cheaper to buy another farm than the cost of riprapping. (Treasure County, Agriculturalist)

> In Forsyth down there, they had trouble with… the irrigation dam. And I went to that meeting, and… it got to be about where they were going to get the rock, it had to be natural rock. Everything has got to be green or natural… Well the expense of freighting in this granite rock was just tremendous…. So I made the suggestion to him, why don't you just haul a bunch of pit gravel in there, bring your bag of cement or whatever you're going to do, and set you up a cement plant right on the river bank, and make your own rock…. And they thought that was just crazy. Well that's the cheapest way you could ever possibly do it. (Treasure County, Agriculturalist)

Participants also offered specific evaluations of bank stabilization regulation. Again, these comments focused less on protection of the resource and more on efficiency:

> If you have to get a permit and wait two months to get it, and the river is starting to flood and take your riprap, you need it now, you don't need it when they decide to do the paperwork… That's why… we got a ten year maintenance deal now. You know, there's some places that might take ten loads of rock, in other places only five, you know. So they can just go ahead and do it. (Treasure County, Agriculturalist)

> [And one man] just did a bunch of riprap and that high water took it all… he put a lot of money in it too… they'll only let you riprap like 300 feet, then you have to go get another permit. I think he wanted to go 700 and they stopped him. And I think where the old riprap was that held, but those weirs, they didn't work… I think it [riprap] is [effective]. It's really our only means right now, to protect, you know. But… they should have let him go further. They shouldn't have a limit on it. I mean, when you see with your naked eye where it ends, you know, it's going to cut him up. (Treasure County, Agriculturalist)

> One thing we've been trying to do on the [Conservation District] board, like on the riprap permits and stuff is, before it seemed like it used to take forever to get a response back, we're trying to tell them we want an answer back in 10 or 15 so we can get with it, you know. And that's been helping… [The requests go to] The Fish and Game and then the Bureau, you know. And then on the riprap, I think it was like... I can't remember the guy… [And] I think it is [a better working arrangement now with the different agencies]. When I first got on there was this… state hydrologist, the Bureau, and the Fish and Game hydrologist, and they didn't get along. And one retired. It seems to be going a lot smoother now… But we okayed some projects back then, like for riprap, and they denied them. So then I had to go more to the state level, you know. And we haven't had any of that lately. (Treasure County, Agriculturalist)

One participant who was serving on the local Conservation District board reported on the pace of bank stabilization projects in the area following the 2011 flood:

> I think the pace increased….[and are] about 50-50 [repair projects verses new projects]. (Treasure County, Agriculturalist)

Concerns about Levees: Participants in this Segment were quick to voice concerns about levees, decertification and insurance implications, replete with comments about the Corps of Engineers:

> It's kind of an interesting story here in Miles City about 30 to 35 years ago… they had worked out a plan [to address the levees], the city did… and ironically they had a fire and it burned up all the material, all the research they had done… and they never had copies [so]… they just forgot about it… And then 30-some years later when the mayor gets in involved again, now all of a sudden we got to start over and see what we can do to get levees again… [So] this city has been concerned about that dike for many, many years. The Army Corps of Engineers came in here a few years ago and did an evaluation, and almost the entire north side is either floodway or floodplain, they call it. And right now… the Army Corps of Engineers tells us that for all practical purposes we don't have a dike around this city, which has been protecting us for a long time, but they have eliminated practically all building over in the north side. They don't want to let us do nothing over there anymore… A friend of mine for example, built… a storage shed… and they wouldn't even let him keep that on his property. They said it had something to do with the footprint… I don't understand that … [The] Army Corps of Engineers is pretty much dictating to the city what the city can approve of anymore…I know [that's] the reason that I can't do nothing with it [my property]... So, they feel that we are going to get flooded at any time. Which, god, in 70 years I have never seen water over my ankles… This is kind of hear-say, but I was told that our—not our current mayor, but the one before, Joe Wayland—he got the Army Corps of Engineers involved in this because the Army Corps of Engineers has intervened like in Glendive. They wouldn't let the McDonalds Restaurant up there remodel because they were in their flood zone, so they caused McDonalds to go out of business in Glendive. But this mayor, in his infinite wisdom, decided we should get ahead of the game and call in the Army Corps of Engineers down here, which in my opinion was a big mistake. Part of the reason I think it was a big mistake is they're kind of using, I call it a scare tactic, because… they're saying now that if you don't get your flood insurance now and this quote, unquote "window of opportunity" escapes you… well the next guy is going to have to pay a much higher rate… Which I don't buy into, I mean that's his problem [laughs]. But they want everybody to have flood insurance is what it amounts to… I, personally, am not a fan of insurance. I know it's a necessary evil, but them insurance companies didn't get rich losing money. (Custer County, Residentialist)

> Right now the city [of Miles City] is rebuilding those levies down there, and from what I can tell they are doing a pretty nice job of it… And I know the city is also cleaning up the big trees down along the Tongue River anyway… because if a tree washes out, its root structure really weakens that levy. So the city is working

> on it… I see them every day hauling in concrete and stuff and building the levies down there. (Custer County, Residentialist)
>
> Basically just the elevation [is the difference between floodway and floodplain], one's shallower. Um, the floodway in my thoughts is the deeper channels, it's like the river itself, and then the floodplain is like the surrounding land. (Custer County, Residentialist)
>
> I would say [the impact of the river on Forsyth] was for good but the thing about it, we have just been decertified from the government, you see, it is over the dike… [and] It means the insurances and so forth would go sky high because… this is not considered floodplain. And without the dike, then it would be, it would come back in the floodplain…And the reason for the decertification on it is that when the railroad put in the railroad yard, they cut the end of it off to run the tracks through it… [and] the whole town [is affected]. (Rosebud County, Civic Leader)
>
> The Corps of Engineers [owns the dike]... and when they flew in here with their corporate jet, and we asked them at the time when they decertified us, wait a minute… the old water works plant sits right in the middle of where your dike was at… So that really doesn't hold bearings about the survey lines… because they said we can't put the dike in here. We would have to go around the building… and they didn't do that… And then there is a tree issue on it where we keep it maintained… but on the inside of the dike, the river side, that doesn't belong to the city… and there is cottonwood trees… And they said we can't have any trees on it, but yet there can be trees on the inside… It really doesn't make sense. So now we are in the process to recertify this, and we are trying to correct all these problems… So we are making progress on that (Rosebud County, Civic Leader)
>
> We have a beautiful relationship with state and federal authorities. But like the federal on the dike, they are really not using their head. You know, this has been here for, golly, probably 75 years... That is just the federal, but everybody has trouble with the federal government. You know, for some reason they'll change policy or some new person will come into the office and say we're going to change this, and it takes a pretty big thing. (Rosebud County, Civic Leader)
>
> [The Conservation District Council] They're… a big help… They got us on the right direction on what to do and how to get us back up to code so we can meet the qualifications for the dikes. (Rosebud County, Civic Leader)

The Flood of 2011—We were Brim-full: The flooding was on a scale seemingly no one had experienced before:

> With so much rainfall, it flooded a lot of our timber pastures, took the fences out, and took a dike out above us and it washed through our place…So, we had

trouble. We couldn't use any of our pasture until probably October. We had to…put the fences in, remove the trees, [and there were] a lot of holes in our pasture, and so we had to take [the livestock] to the hills….So, it was really a trying year... As long as I've lived here, I've never seen that much water go down that river in the flood channels and over the fields like it had that year, I've never seen it like that…It was just roaring through—[from] the end of May clear until... probably the end of August…It left a lot of silt on the grass. We had a hay field down there, and luckily we didn't cut it…You couldn't even tell there was a drain channel through our place because it was just solid water… Our hay, it flattened it, and… it was plum full of sit…..I mean, it was terrible. The cows… couldn't hardly eat it… It was a trying year. (Treasure County, Agriculturalist)

There's been areas that have taken out big chunks of field… especially last year with all the rain and moisture we had. You know, it changed the bank dimensions a lot… [The flooding] was a lot higher and higher a lot longer… Last year. It went up into the fields…And, of course our area, Sarpy Creek, flooded. We were under water all around our house, and it stayed that way for a month. So… we're seeing different effects today that [the flood] had on our crops and stuff. And of course, it deposited a lot of silt and sand in our fields. (Treasure County, Recreationalist)

We had high water last year… I think the last time it was that high it was in 1950…[when] it lacked probably 8 feet of reaching the top of the levy…We [thought we] are never going to get that kind of water in here [again]… unless Yellowtail Dam would break… [But it] was quite a thing [in 2011]….We had as much rain in one month as we get the full year….I think 13.4 inches of rain in April and May….I would say [it happens like that] once in a lifetime, but…you can't predict….I can't sit here and say it couldn't [be worse], because it very well could…..No, [I don't get nervous] because I have been here for thirty years, and it has rained, and rained, and rained. (Rosebud County, Civic Leader)

We had every house in Forsyth flooded last year, and it was from the saturation of so much rain that we had. This basement, here…even though I've got a sump pump and the concrete floors, it just overtook it…Like 90% of [the basements] in Forsyth, we had to rebuild and redo it… This town is built on a low floodplain. (Rosebud County, Civic Leader)

For a long time [the river] was… "brim-full," I call it. Of course, the lowlands… had water on parts of them for quite a while, because it was like... six to seven feet higher than it is now. And of course… it would move up and down as rain events affected the river, and of course then the snowmelt played into it…It was… quite an event, to say the least, with the amount of water that moved down it and the speed that it goes. And of course, that's one of the ways [the river] handles a lot more water: the elevation creates more drop so it runs pretty fast. I was on it with my boat several times, and it was definitely a snarl. It was quite interesting….No, there wasn't [much damage] down in this area. The river has an

> immense capacity through this part of the country. (Custer County, Agriculturalist)
>
> Last year we had a near flood. My basement filled with water, and they said it was just groundwater…. I live about two blocks from… the Yellowstone River… I pumped water last year for almost three months to keep the water down… Before I caught up with it, it put out my… hot water heater in the basement. And… half of my basement is dirt, and the dirt caved in and it took the whole heating and air conditioning out of my house… We did get back in there and dig it all out. Replaced the furnace. It was quite a job… Never [had water in the basement before]. (Custer County, Residentialist)

Emergency Management—Mixed Results: No one seemed satisfied with the ways the emergency relief worked:

> I had flood insurance…so, they sent an appraiser out there to appraise the damages… and then they sent a forensic geologist a week or so later—a young college guy. He asked a lot a questions and looked at the damages and stuff, and… he wrote about a 20-page report and basically it said that we didn't have any flooding; all we had was groundwater. So, they didn't pay for nothing, even though I had flood insurance. But that groundwater had to come from some place….I have heard that the flood water has almost got to take your house off the foundation to collect anything… And your homeowners don't cover nothing...They pretty much paid for my furnace. (Custer County, Residentialist)
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> [Before, my basement] was completely furnished and carpeted. And [after the water was gone]…I had to do the drywall. I had to tear that all out….[Then] FEMA said, "You don't actually live in the basement, so you get so much." But if you had an apartment in the basement ….then, those people got substantially a lot more money…But, it was a fair, fair thing. I got a substantial check that helped a little bit… I went down [to my State Farm Insurance representatives], and they said, "We hate to laugh at you, but you don't have any insurance. We're sorry, get going." And that was the case with every family in Forsyth that filed… [Your basic homeowner's insurance] won't cover, not in a floodplain. And we're not in a floodplain because of the dike… And so I inquired. I said I'm not going to have this happen again… [but] I'm better off to just pay it out of pocket than it is to pay the premium on the insurance. (Rosebud County, Civic Leader)
>
> [The FSA office], they were going to help us with emergency cost share in putting fences in and cleaning off your fields…[But] the budgets have been more lean…. [and] they took the Hysham FSA office. All the personnel are gone—so they share with Rosebud….We had our paperwork in on the flood disaster last fall, but they still haven't gotten to it. And so… I said, well, "Are you going to have any money to help us with this flood damage?" And she said, "Yeah, they passed a Farm Bill." But I said… "We still haven't seen any results." She says, "Well, we're understaffed…. We haven't had time to do it." And I said, "Well it's been

> close to seven to nine months… Are we going to see the emergency money out of this, or... are we going to have to eat it all?" She says, "No, you're going to see it, but I don't know when because they're working on current things"…I guess what really irritates me is we've spent, I think it was, 880 billion in Iraq, 330 billion in Afghanistan, and we're going to take the post office out of Ingomar, Montana and shore up the budget… and you get rid of these satellite FSA offices. To me, it's just totally ludicrous. You know, it's really poor management at the top. (Treasure County, Agriculturalist)

Another participants explained that the unusual duration of the 2011 spring rains diminished the local Rural Electric Cooperative Association's profit margin:

> Last year we had a lot of rain, and…the first month we had run $30,000 in the hole….[Later] we started getting sprinklers going and revenue going… our main source of income is selling power to sprinklers. (Treasure County, Agriculturalist)

At first glance, comments from Segment II are confusing: why would members of these communities—who had clearly suffered damages in 2011—not see wisdom in carefully defined flood zones? The answers are implied: a) they are invested in local property values, typically as their primary personal assists; and b) the levees did not fail, even in 2011.

Not a Bit of Evidence of the Oil Spill: Despite initial vigilance sparked by news of the event, participants in Segment II did not note significant impacts from the 2011 oil spill. Moreover, they voiced minimal concerns about future spills. When asked directly if they had seen any evidence of the oils spill they said:

> Not a bit, no. (Custer County, Residentialist)

> I didn't. I don't know of any of my neighbors that did… We heard it had kind of gotten this way, but personally I never did see it. (Treasure County, Recreationalist)

> You know, if you look in some of the wheel tracks and you see this oily scum on there, but... I never did take samples and send it in. And we weren't really sure if it was from the tree sap that's dripping out of the trees. But it did look like a film of oil on some of those puddles in there… No major black tar-looking stuff… but it did have a stink to it… almost like a petroleum smell… And probably it would be diluted enough that hopefully when it got down here it wouldn't be bad….I didn't think it was significant enough to put a claim in. (Treasure County, Agriculturalist)

> I watched for it and could not see anything that you could say that it was part of the damage. I think that…far away [with] the amount of water that we were looking at that it was totally emulsified just by the action of the river…..The vast amount of water and the turbulence….You might have been able to detect it if

> you took… samples… in the right place… But visually, it was just impossible—just too vast of a system…Sometimes you can see a rainbow-ic sheen… [but] I actually, honestly, think it's an oil from decaying cattails. (Custer County, Agriculturalist)

> I was quite concerned over that, and I did go down and check the river. And there was several of us here in town, and I never saw any evidence of an oil spill. The city water department…never ever found any oil in the water…I saw a thing on television, just recently: it was somebody who found a little bit of oil… down by Huntley…And I thought, boy, that's not really far from Billings with the amount of oil, so it looks to me like the amount of oil was pretty large but still dissipated through the waters and then was able to get rid of it. Because there wasn't very much clean up….And a good friend of mine out in Miles City is a fish biologist… with the state Fish and Game… and he's over planting new fish into the river, and they haven't seen anything. (Rosebud County, Civic Leader)

Other Threats to Water Quality: These participants also noted impacts to water quality, including industrial contamination, municipal sewage, and agricultural runoff:

> I have a major concern with the coalbed methane development and the discharge of sodic water into the river and how dangerous that is from the standpoint of fisheries and aquatic life and to crops that are irrigated on the land out of the Tongue River… And it doesn't seem much that we can do about it from a politics end that seems to make a difference. And the states are a bit, or quite slack on monitoring, the oil industry is self-monitoring, and I have never felt comfortable with that at all. I just... our water quality is evident. This year we had an EC in the river near Miles City of 1,180 when ten years ago in the same location you could have it from 270 to 370. And you know, now we're looking at 1,180 and... when you get up to 1,100 in that range, sauger and walleye reproductive rate is down to 2-4%. And you can't maintain a population on a 2-4% hatch rate. That doesn't happen. That's too small a number of fish to reach to maturity, or sexual maturity, to procreate the species. It just isn't going to happen… And that's what's really confounding to me in this day and age that we have a river system that we can't quite seem to get past using it for a discharge waste system for the oil and gas industry. It's repulsive. It's disgusting. And it hurts my feelings, quite frankly… to have the oil industry, gas industry come along and degrade the quality of that water… it's pretty disheartening trying to get these river systems back in shape… [but] there's test places along the river that are instantaneous readout that read the EC of the river… [and] that data is online…the Army Corps of Engineers runs those gauging stations. (Custer County, Agriculturalist)

> No, [I don't worry about the tributaries coming into the Yellowstone]... I think some of the farmers might because of some of the chemicals and stuff that gets put into the rivers, and bring it on down to the Yellowstone. (Custer County, Residentialist)

Our sewage water does drain off and go back into the river but, of course, we have to meet all of the standards of the EPA and those. So we have a scrubber or settling ponds and take care of the wastewater. So the water goes back in there and it goes to Miles City and they can drink it down there. (Rosebud County, Civic Leader)

And the only, the good thing that we are seeing here that pertains to the river is that we have gone to, a lot of our rancher/farmers have gone to a sprinkler system where they sprinkle instead of flood irrigate, and it keeps all the fertilizers and stuff they use on the field in the field, instead of when they ran it across and ran the fertilizer out in the ditch and back out then the river. That's a huge improvement, I think, for our area and wherever else for the river. (Treasure County, Recreationalist)

You don't get near the drainage water from sprinklers as you do with flood irrigation. And it helps as far as fertilizers going back into the main stream, and they use a lot less water, although you do have the electrical cost of pumping it where before you used gravity and you didn't have those costs. (Treasure County, Agriculturalist)

I'd like to see it stay free and clear, and clear of fertilizers and pesticides and that type of thing. And so you know, the more help we can get agricultural-wise to make that a cleaner operation, that is going to keep our river cleaner too. (Treasure County, Recreationalist)

My dad wasn't very environmentally-clicked, but he did a lot of right things… He hated the word "environmentalism," but yet he thought it was a great idea in the 70's that we took all of… the wastewater of our farms, and he made sure that all of it goes into a grass slough filtrate before it enters back into the Yellowstone. Well, how ahead of his time was that? I mean, he didn't want pesticides or fertilizers making it to the river…. You know, it was in the days when if you didn't want something, throw it in the river. If you wanted to get rid of it, throw it in the river… And now we don't have that anymore. We're past that. And a lot of people that really cussed the environmentalism came to grow into time and accepted the fact, "Geez, we can't throw our garbage in the river. That's not the thing to do." (Custer County, Agriculturalist)

I noticed one time there was a young couple went down to the river and was throwing trash, and I got onto them quite severely. I said if everybody done that then the river would be floating garbage just like our highways… And they didn't seem to understand, you know, they were younger… And I said that's fine, but you just need to be conscious of the river and keep it as clear and nice as we can. You are going to get pollution in it anyway, you know, so there is no need in helping it… I love to fish, and I hate going down there and catch a beer can. (Rosebud County, Civic Leader)

Threats to Water Availability: Discussions about water availability did not result in participants expressing great concerns:

> [We're working on] getting our water rights… making sure we have all the water that we have applied for on the ditch. We are just kind of getting that cleaned up… Before they said we had too much that we didn't, you know, apply for. Acre feet, you know… we're still doing some of it yet. The county attorney is helping us. But it looks pretty good, I mean, kind of like we are going to keep what we have, you know… they're putting a measuring device in the ditch… they just put it in two years ago. And they haven't got it perfected yet… but we're working on it… trying to prove how much water we use so we don't lose it, you know. (Treasure County, Agriculturalist)

One participant expressed concerns about water availability in relation to changing weather patterns:

> I think there has got to be concerns, you know, a couple of years ago the river got really low because we didn't have a lot of snow pack and so forth… You know, the Yellowstone is a free-flowing river, it changes. It's just the lower it gets, the harder it's going to be to live in Montana… along the Yellowstone River. Every city along it is so dependent on it that it's a concern. You know, if we keep getting the warming trends and no snow run-off and so forth… Everybody is irrigating a month early. (Treasure County, Recreationalist)

Invasive Plants: Participants in Segment II were concerned with invasive and exotic plants:

> I think one of the biggest things that I've seen with the flooding is all the noxious weeds. We have just tons of noxious weeds now. We could sure use some help on spraying all the noxious weeds that came from upstream… A lot of houndstongue, a lot of mustards, and there's saltcedar like you wouldn't believe. And I'm not sure if there's some Dalmatian toadflax down there or not, but I'm sure there's probably that and other noxious weeds… I am not sure [who to appeal to to get some help]. The way I look at it, the state claims that water, they should have to pay for it [laughs]... [My brother] is on the Conservation District board. I don't think [they] have the funding… You see, and state lands tried to, I think it was last year, tried to incorporate legislation that the lessee had to take care of all the noxious weeds on the state land. And I told them, I said, well I didn't bring the noxious weeds to the state land, your state water did. So if anything you should spray your own, you know what I'm saying? And I should probably have to spray my own, but. (Treasure County, Agriculturalist)

Findings from Segment III: Big Horn River to Laurel

General Findings

Geographic Segment III stretches from the Bighorn River to Laurel, essentially limited to Yellowstone County. The 2012 participants from this segment included six individuals. Each of the four interest groups was represented by one or two individuals.

This segment was described by locals as a community that was progressively urbanizing, and the river was noted as a driver of local development. Agricultural activities—also dependent on the river—were still viewed as important, especially in the eastern end of this segment where one could still see the rural traditions of Montana at play on the landscape and among the residents.

As a group, they described the river as essential and powerful. They acknowledged that high water often caused change along the riverbanks. They spoke of bank stabilization as "tricky business" because there were no options that met all of the known needs. A few participants spoke of the cumulative impacts of bank stabilization projects.

They also offered comments regarding water availability, water quality, public access and a need to engage the public in understanding the information made available by the various studies of the river over the past years. While they could see that management tasks were inherently difficult, they called on river managers to pull people together and to help the public deal with the available information.

By far, the dominant topic in 2012 was the oil spill of 2011. It was clear that the pipeline rupture was a significant event in local history. Local explanations of the cause of the spill and its impacts, as well as evaluations of the management response, were markedly distinct. The participants also explained specific lessons to be learned in terms of pipeline operation and regulation, and more broadly in terms of living with and protecting their shared resources.

Narrative Findings

Essential Connections—Community and River: Locals demonstrated a rooted sensibility, one that connected them to the area. They explain that their parents or grandparents were drawn to the area by various industries, and that they remained to explore their own opportunities:

> [I've lived here] all my life. 68 years now… My grandfather, they were migrant workers, at the sugar factory at that time clear back in the early 30's and 40's. (Yellowstone County, Local Civic Leader)

> I was born and raised in Laurel, so that would be 64 years….My family was originally from Rapelje area….And they owned a dray business there… So, [my father] set up a dray business [in Laurel]. (Yellowstone County, Local Civic Leader)

> [I've lived here] since I was born you might say… When somebody comes along and asks me if I have lived here all my life I say, "not yet." (Yellowstone County, Agriculturalist)

Participants from Segment III described the Yellowstone River as an essential part of their present lives and of the history of the community:

> [The river is] history… John Calder has got his signature and manual lease on that rock down there. We could never find the fort site, but we haven't given up either. (Yellowstone County, Agriculturalist)

> We take care of this because we are proud of it. And everyone uses this. At one point or another, you always go to the water. (Yellowstone County, Residentialist)

> I can remember going down on the river at Riverside Park and fishing quite a bit… I boated and floated… spent some afternoons swimming in the river. So it's been an integral part of my life. (Yellowstone County, Local Civic Leader)

> By and large, I would say living next to a river is a wonderful thing. You get a diversity of wildlife out there, it's a peaceful environment. (Yellowstone County, Agriculturalist)

They emphasized the significance of the river as a resource supporting agriculture, specifically in the eastern region of the county:

> Most of our agricultural crops in the state are coming off Yellowstone River water; the early irrigation projects started there. (Yellowstone County, Recreationalist)

> I mean it's huge, the river... It provides the alluvial water that allows us to get some sub-irrigation in like the hay crops that we have... That river bottom ecosystem produces just the right mix of vegetation that we need for goats. (Yellowstone County, Agriculturalist).

> [Irrigation is] a necessity. (Yellowstone County, Agriculturalist)

> [This area near the town of Custer] is diverse, you might say. Mostly cattle land, but there is prairie, there are hills, trees… and [the town has] 156 people. (Yellowstone County, Agriculturalist)

The influence of urban growth, especially to the west of Billings, was noted as very important, and some saw that growth linked to water supplies:

> Nowhere…between Laurel and Billings… have I seen a section of land that doesn't have a quarter section that is being subdivided and developed. (Yellowstone County, Local Civic Leader)

> Here is the most urbanizing county in the state. (Yellowstone County, Recreationalist)

> The biggest thing I see with the river is the water supply…. [We need water] both for our day-to-day living and for allowing us to have the luxury of good-paying jobs in the valley… I think it's going to be the main reason for growth. (Yellowstone County, Local Civic Leader)

> Everybody's moving west. We don't have the water facilities out there. So we're looking at trying to do some type of deal between here and Park City, a water storage pool, so that we would be able to feed all the west end. Park City would get water, Laurel would get their water, all the way down here. So that's in the works. (Yellowstone County, Local Civic Leader)

Demand for Water—It's Only Going to Become Magnified: Several of the participants discussed increasing demands for water, driven by agricultural practices, new industrial uses and increasing numbers of recreational users:

> The thing that… I look at as we go into the future, is the demand that we're going to be putting on our water resource. It's only going to become magnified. The way we do or have been doing things is going to be looked at. (Yellowstone County, Local Civic Leader)

> Agriculture is going to be no less important in the decades ahead than it is right now. And the demands for Yellowstone River water are going to increase. We've got a Saudi Arabia kind of energy boom going on in the Yellowstone watershed right now… [And] for hydrologic fracking of oil shale… in the Bakken plain, it's millions of gallons of water that they're going to need... Then, we have growing populations in Billings… with higher water demands for urban needs. We have more interest in taking care of our wildlife and the recreation attributes; recreation is the second largest economic driver in our state… The bottom line is all of that is that the demands and the impacts on the Yellowstone River are going to increase in very significant ways compared to what we've seen in the past. (Yellowstone County, Recreationalist)

> I think putting in sprinklers is a way of getting ahead of the shortage of water, before we actually have [a shortage], because it takes less water. (Yellowstone County, Agriculturalist)

Just upriver from Billings, the town of Laurel was described as having room in its water budget for growth (meaning new residents and industries):

> [In Laurel,] we've been established with a little bit better water right, and the fact that it's older…allows us to have water for, not only our use on a day-to-day basis, but for potential growth. And we've not yet quite reached that maximum usage. We're staged in a rather, I think, envious position of allowing for growth. In my humble estimation, water is going to be more highly regarded going forward than it has in the past. (Yellowstone County, Local Civic Leader)

The River is Powerful and It Floods: It was not unusual for people in this segment to speak of the river as a powerful force, especially in regards to the 2011 flooding. Moreover, some indicated how the river changed due to the flood:

> Very dynamic… up and down the river... the force of the river and the dynamics....are pretty hard to stop water. You can put a fire out, but it's pretty hard to put a flood out… So yes, there has been dynamic changes in that river. (Yellowstone County, Local Civic Leader)

> [It] made me nervous, but… it's always entertaining here… There's always something going on that, you know, you can't just bury your head in the sand around here or you're going to get buried in the sand [laughs]... It's always, it's always... It has life, you know. (Yellowstone County, Residentialist)

> It's amazing what the rivers across this part of the state did in one year… I mean, if we haven't learned you got to live with this natural environment, we sure as heck should have had an awakening this past year. (Yellowstone County, Recreationalist)

> This five-week-long pounding, here, was incredible. It was something to behold. It made me feel very, very small, very small in the big scheme of things. Two acres, I lost… It was amazing… nothing really anymore surprises me, but that did. (Yellowstone County, Residentialist)

Evaluations of the flood and the severity of its impacts were mixed among other participants. While the 2011 flood was significant, some felt it could have been worse, and they did not seem particularly concerned with the impacts:

> It was a little higher than usual. I had one field that flooded, didn't kill it but it did damage it to a degree… Only about half-drowned [the crop]. It will always leave silt. (Yellowstone County, Agriculturalist)

> That flood last year was particularly interesting because it was happening when we really did not have the winter snowmelt started yet… At that time we had all the rain, and the lower river was absolutely going crazy. And you think about, what if we had been in the middle of our normal, high-flow winter melt when the

> rest of that happened? The floods we had, which were really bad, would have been really horrible. So I don't think we've really seen the big flood here for decades. We came close last year, but the timing wasn't quite right. One of these years, the timing will be just right. (Yellowstone County, Recreationalist)

Two people noted changes in the flood regimes, and one linked these differences to climate change:

> [The spring rise] is very early, almost a month early. I don't know if them roses lie or not—but, they always bloom when it hits the top. (Yellowstone County, Agriculturalist)

> What we see happening on the Yellowstone is that, I think it's very clear and all the climatologists are pretty much in agreement, that we're going to see weather change, which means that we will get more, our spring runoff will come earlier, we'll have higher spring runoff, it'll be gone quicker. (Yellowstone County, Recreationalist)

Bank Stabilization—Why We Do It: In response to these natural processes of the river, participants discussed bank stabilization, emphasizing the significance of past human actions:

> In 1997 we had a high water event that moved several hundred thousand cubic yards of sediment, forcing the river to go to a more southern channel. And in the subsequent years, '97 to '03, we put into the river various weirs and diversions, trying to keep water into our northern [municipal water supply] intake. And we were fairly successful, but it was quite evident that the river was not to be changed, and the fact that the Corps, Army Corps of Engineers, had made an edict that you will not put in a substance that will cause a diversion of the river in its natural boundary. So we got together with the Corps… Department of Fish, Wildlife and Parks… EPA, and I think there was a conclusion by all parties present that the City of Laurel had one major option available, and that was to… put in a southern intake, which would allow us to capture water on the southern channel. (Yellowstone County, Local Civic Leader)

> We do a little tinkering here, which causes the next guy to do a little tinkering there, which exacerbates on further down, and you concentrate that energy of the river… So suddenly then you've got everybody who needs protection, and then you have a big government project which, in the long run increases the flooding problems for everybody because you've tinkered with a system that you shouldn't be tinkering with. You should be living with it. (Yellowstone County, Recreationalist)

> I would like to [stabilize the banks], but I don't know how to do it without changing the course of the river, because that's the problem with it… [My in-laws] can remember where the river used to flow before riprap was put down on

> the property next to us. And then you know, I mean all you're doing is creating somebody else's problem down the river. (Yellowstone River, Agriculturalist)

> We need that railroad… And we need our highway infrastructure. You know, those things are important to us as a society economically and socially. So they have impacts, and the impacts generally are on the environment…and [on] individuals who had no control over what was going on. (Yellowstone County, Recreationalist)

> For the advantage of the landowners, there has to be some stabilization. And their way of doing it with natural rock I think is fine. Let's forget about putting automobiles in there like they used to, that's not good. (Yellowstone County, Agriculturalist)

> That is such a tricky issue.…On one hand…you are trying to stabilize your banks, but you're creating problems for other people downriver….It's easy to say from a 30,000-foot view that you shouldn't be able to do that, but when you're sitting there with somebody that just lost their house and probably could have made minor modifications there that would have saved it, I don't know… but there obviously is a place for stream setbacks. (Yellowstone County, Agriculturalist)

Some explained that keeping structures out of harm's way would reduce the need for stabilization:

> We have a County Commission that doesn't like the thought of planning. They want to do seat-of-the-pants decision-making without looking at long-term effects of their decisions. Billings City is much better thinking about what the future is going to look like, but our County does not. (Yellowstone County, Recreationalist)

> We have passed some laws that you have to be 100 feet or 100 yards away from the river, so we don't want people building right up against the rivers. (Yellowstone County, Local Civic Leader)

Bank Stabilization—How and How Much: Several participants could see that each stabilization method needed to be understood in terms of advantages and disadvantages. As well, the cumulative effects of projects was noted:

> If I could figure out how to do it with revegetation, yeah, I would definitely be inclined to do it... I mean you definitely don't want to lose property. It's not good for the river to get all that additional sediment into it. (Yellowstone County, Agriculturalist)

> We do need to use our best technology to look at cumulative effects of these [bank stabilization] impacts… I'm somewhat skeptical as to the degree of ability we have to anticipate those kinds of things. We've got some fluvial

> geomorphologists; they have some good tools. There are so many factors involved though... I'm a little skeptical about our ability. (Yellowstone County, Recreationalist)
>
> If people have… such values like a railroad or highways or a particular landowner has such values that they feel that they must do something, then we need to have two things. One is… insist that they get the finest engineering done that mitigates as much of the impact of that project as the possibly can on the river… And two, they have to compensate or citizens and other landowners for the damage that they're going to do because of their project... And the mitigation fund should be acquiring some of these areas that have been rip rapped in the past that need to be opened up for the river… [and] compensating people to allow the river to erode away their land… for their ability to live with the river in a way that's good for the river and the rest of us… Our best shot is to do as little tinkering with the river as we can, and to try to figure out how to make it easier for landowners to face the reality that some of their land is going to be taken away, and that's where I see a mitigation fund and flood erosion easements being a tool we need to try to bring into place on the Yellowstone River… and it could be private; it doesn't have to be government. If people don't want government, there's different ways to do that. (Yellowstone County, Recreationalist)

Water Quality—Better than the Past, More to Do: Several participants expressed confidence that water quality was good, especially when compared to the past. Some of the participants connected water quality to improved fisheries' health. However, the central conversation was in regards to wastewater treatment:

> A lot of stuff that people used to bulldoze right into the river, we can't do [that now]. Thank goodness, because it destroyed a lot of our habitat and everything else down there… [Even in the 1970s] the packing houses… the stuff that they would put into the river… was [grimace]….Nowadays they wouldn't let you… I think the way the environmentalism has worked, it has proven good around Billings—our rivers have been cleaning up. (Yellowstone County, Local Civic Leader)
>
> I think the river is actually cleaner now than it was in the 50's because I think they have upgraded their sewer plants and so on… especially where the refineries dump their waste. (Yellowstone County, Agriculturalist)
>
> I said, "Hey, where are you going fishing?" And they said right below the PPN power plant….People realize that the water that they take out of that power plant is heated... and that's where a lot of the fish live, right around the warm water down there. And, so they got some really nice trout…smallmouth bass…catfish. Once in a while you get lucky, you might catch a pike, or a sauger….I think…the rivers have cleaned up—because of the species of fish we now catch. We could never catch that before when I was growing up. But now you can throw your line in, you don't know what you're getting until you bring it out. So you got some

> good edible fishing down in there now. So it's good. (Yellowstone County, Local Civic Leader)
>
> I think they need more care with the fertilizers and chemicals. I see an advantage of putting in a lot of sprinklers now-a-days because you don't have the runoff into the drain ditches, which don't have any minnows anymore or frogs or anything else. (Yellowstone County Agriculturalist)
>
> What the city is fighting now is surface water on parking lots. And so we are fighting issues on that. We've got to treat that water. (Yellowstone County, Local Civic Leader)
>
> The ability for us as people to manage the consumption and the delivery of our waste back to the waters is going to be looked at. And the point of contact I think is something that is under scrutiny right now… I think some of the people that are in the Helena [area] are starting to bring those type of issues forward. And we should watch [what they do]. (Yellowstone County, Local Civic Leader)
>
> The new thing that's coming out from the legislature last year is that everybody, especially the city, is going to have to clean up their water more and more… So you know I look at the progress that we've come along in a long ways, and with the cleaning facilities that we're going to have to implement, I think it's going to be great. (Yellowstone County, Local Civic Leader)
>
> Conoco Phillips… it would cost them… like $10 million to redo their surface water and their wastewater sewer over there… They're going to have to treat this. So, the way they're setting it up now is they're hooking them back onto the city sewer service, and they guaranteed us that they would treat this water [which would]…in turn, come back into the Billings sewer system where we will treat it again. (Yellowstone County, Local Civic Leader)
>
> We're looking at over $100 million [that] the city has to invest between now and I think it's the year 2024, 2025….Next year we'll start a new wastewater treatment plant to the tune of about $58 million….We still got capacity,…but it's deteriorating… so now we're going to have to redo it. (Yellowstone County, Local Civic Leader)

Another Concern—Public Access: Two participants commented on public access:

> Of course there's difficulties that pop up when you live next to a river. One of them, you know, trespassing issues… with people walking up and down the river and leaving gates open, things like that. (Yellowstone County, Agriculturalist)
>
> I used to pheasant hunt down there and… it was just cattails and bush… and everything else. But with the expansion now of the refinery… and they've got

> other businesses in there now, then we couldn't hunt in there anymore….they closed everything off. (Yellowstone County, Local Civic Leader)

Pipeline Rupture and Oil Spill—A Monster or a Blip: The pipeline rupture and oil spill of 2011 was an important topic to many of the Segment III participants. For those closest in proximity to the site of the spill, that day of discovery was startling:

> I happened to be down at the river that morning, just by accident… and I saw what looked like an oil sheen on the water and I wondered what it was. (Yellowstone County, Recreationalist)

> I was called at the house—woke up at the house by the dispatcher—[who indicated] we had a pungent smell, odor... down by the river. (Yellowstone County, Local Civic Leader)

> A guy called me... at 6 o'clock in the morning and woke me up. And he said, "You gotta come down here." And I said, "Why?" He said, "You cannot believe, the river is full of oil!" … And I said, "You gotta be kidding me." And I said, "Okay." I said, "I'll get up." (Yellowstone County, Local Civic Leader)

> I woke up to [my wife] calling me… I'm like half-awake going, "What now?" I figured there was a goat out or… something like that. And she said, "We got an oil spill on our place." ….We learned about it by seeing it and smelling it; we weren't notified by anyone that an oil spill had taken place… I mean I was concerned: 'Are we in danger? What are we breathing? Do I need to get trucks down there and get my livestock out of there?' (Yellowstone County, Agriculturalist)

> I actually slept through the evacuation, so I was here… made a pot of coffee, and sat down at my picture window, and was looking out and wondering why the air was so heavy with the smell of oil…I can see the guy swinging his arms, and I went, "What the---?"….At that moment, I still didn't know what it was about… and then…the toxins kind of hit me… My eyes were watering….I realized we had a spill… You know, guys with walkie-talkies running around like chickens. And at that moment, I was powerless to do anything. And, then, as the sun came up... I saw the magnitude of how bad it actually was. (Yellowstone County, Residentialist)

Even a year later, those who had suffered from or dealt with direct impacts were still overwhelmed:

> The oil was moving in big slicks, for lack of a better word… But there was a sheen everywhere that there was water, a light one. And then you'd hit these big… sections of just tar… Some of them were huge… bigger than this room… Like we had one slough that was all cattails, and you couldn't even… that whole slough looked like it was covered… it was everywhere… It just became

> everything. I feel like that's all I did last summer was deal with this oil spill. (Yellowstone County, Agriculturalist)

> Everything I lived and breathed for those months was about this thing, about this monster… You can [still in 2012] see the oil marks on the trees… It made it to my well… It turned the shower [water in the house] grey and got in the filter. The filter was completely black…. And I'm just choking this anger down. I'm telling you, it was hard… [It used to be] just the coolest thing to wake up and watch the sun come up over the hill with a cup of coffee in my hand. It never ceased to make me feel calm and start preparing me for the day. It's priceless, priceless. And that's what they spilled on... It has made fragile everything that I thought was solid. It does make you feel small, and it does keep things in perspective for me. (Yellowstone County, Residentialist)

> I've never witnessed that before. I've never been... I've never felt so helpless. (Yellowstone County, Local Civic Leader)

A local official explained why the water supply for the city of Billings was spared from contamination. He noted the irony of the fact that the volume of water was both a cause and a solution:

> If we would have had the pumps on sucking that water in, we could have contaminated the whole city water, but they had turned that off… we could have had a major disaster….What really saved us a lot was high water at the time. [So,] a lot of the oil—I hate to say this—moved all the way downstream. (Yellowstone County, Local Civic Leader)

The volume of water apparently diluted the oil such that people who were not in the immediate vicinity of the spill saw no serious impacts:

> It was not enough, I don't think, to bother. (Yellowstone County, Agriculturalist)

> I think the damages of the spill was way overstated. I really do… I wasn't right [where it happened]… but where I have looked, the oil dissipated really quickly. Organically, I think it just decomposed. (Yellowstone County, Recreationalist)

> The Fish and Game said they lost one duck and one frog and one snake, or something to that effect. They didn't lose a whole heck of a lot of wildlife, which is great. (Yellowstone County, Local Civic Leader)

> We've had a little blip, we'll move forward. (Yellowstone County, Local Civic Leader)

> The big black eye we got last year when the big oil deal broke….I think that's something that we have to put aside, we'll manage that… we'll get past that. (Yellowstone County, Local Civic Leader).

Another participant admitted he might not have known what to look for in terms of impacts:

> I think I did [see some impacts]….There were people [on my property] looking to see if there was any [oil]. But I think they lied to me [when they said they did not find anything]….Because on this one level of weeds, you see could these little black specks. I should have put some of that in a little zip-lock bag—that is what I should have done. (Yellowstone County, Agriculturalist)

Pipeline Rupture and River Scouring—It's Just Time and Water: By the time the interviews were conducted in 2012, many in the community had learned much about why the mishap occurred:

> You stand there at the river's edge day after day after day. You start to see where you're going to have problems. And you try to have a preventative measure, but no matter what you do at that particular moment, it's just time and water. And your efforts, while well-intended, didn't come to fruition, [and] didn't stop the eventuality of the impact of water in motion. It's a dynamic that is very underrated. (Yellowstone County, Local Civic Leader)

> Originally, [Exxon] said the pipeline had been buried like 12 feet, something like that… And then later on I think they said it was 4 feet or 3 feet… We also learned that the other refineries had shut down their pipelines during this time. So I think everybody had a reasonable suspicion that something could happen. And I think Exxon weighed their chances and decided it was worth the risk. (Yellowstone County, Agriculturalist)

> One or two arrogant people made this happen. (Yellowstone County, Residentialist)

> It's interesting to speculate that the reason that pipeline broke is because we started tampering with the river in Yellowstone County years ago, and it's created a river that's cutting down in its channel rather than moving back and forth like mother nature wanted it to… so that river… finally cut down to where the pipeline is. I think that's a likely scenario of what happened here. (Yellowstone County, Recreationalist)

> A couple of years prior to this, we had a rupture of a natural gas line in the same area, and I think that was the beginning of the evidence of the scouring ability of the river—the force that channeling was creating… That water… was to a degree bottled at that particular location. And that bottling effect created a little bit of a hydraulic. And that head pressure, with that amount of water going through that... Now, you have to take in consideration the dynamics of the bridges that were involved… And the result was a scouring caused by the velocity of that water going through. (Yellowstone County, Local Civic Leader)

> At first they thought, because it fell right in by a boat ramp that the Fish and Game had put in up… at Laurel, and they thought... a piece of the boat ramp had fallen in… And after they dug it out, they could see how… the force of the water twisted the pipe around... And they figured a big cottonwood tree or something… hooked it… pulled it out and busted it. So… maybe they'll never know; maybe they will. But they looked at it,… took it out and x-rayed it and they said, "Yeah, something hit it here." (Yellowstone County, Local Civic Leader)

One person put the local spill into a larger context:

> I think we need to step back and think about how we're transporting oil over waterways... not being an engineer, I don't know what the exact answer is, but it seems like having these pipelines buried very shallow under rivers is a bad idea, because we've had… Kalamazoo… Denver… Salt Lake City… Louisiana… so it seems like an obvious pattern of problems. I think part of it also has to do with just the fact that we have aging infrastructure… I don't know if there needs to be additional regulatory oversight over the pipeline industry or if we just need to fully reassess how we're moving oil. But I think, clearly, this series of oil spills we've had over the last few years, that have come from pipelines breaking in rivers, demonstrates that we do have a problem. (Yellowstone County, Agriculturalist)

Pipeline Rupture—Who Do You Call? Participants offered varying evaluations of the governmental and industry responses to the event. Local civic leaders praised Exxon's response and expressed comfort with the government's role. They offered positive evaluations of responders as prompt, capable, and responsive to the public:

> [ExxonMobil] took control of the scene, and… ExxonMobil, I believe, was very transparent… I thought that they had the personnel there that gave me the impression that they were educated to make those determinations [about clean-up techniques]. And, I felt comfortable that they were trying to do the best that they could do, with the circumstances they were given… The County Commissioners I think were very integral, and they did an excellent job in getting the information….Town meetings were set up, public forums were set up….Never did I experience or observe a reluctance on the part of anybody from Exxon trying to shoulder-off the responsibility of their unfortunate event, [and] I think the County Commissioners have to be commended on being involved with the whole affair. (Yellowstone County, Local Civic Leader)

> I had called our City Administrator….They already had [someone from the] Exxon refinery down there, and they were starting their clean-up and trying to divert the water….Exxon did set up quite a few public informational meetings on it… A lot of the people that lived along there...were pretty upset. (Yellowstone County, Local Civic Leader)

However, impacted landowners offered a very different evaluation. They were far from happy about the responses of federal and local governmental officials. Exxon was also criticized:

> I was really, really, really disappointed in our County… The state in the long run was very helpful, like the state DEQ. But, that first morning….they were trying to get their heads around the problem. It was kind of shocking though to see how when these things happen… you think [should I] go to DEQ or go to county officials? And the reality is, everybody just kept steering us back to Exxon… You think this is what government is for, but government is referring you back to the private corporation that caused the problem in the first place—and who has an interest in not necessarily telling you everything that's going on….[For example,] I had one guy, one scientist from Exxon, who came down and told me that for livestock, eating oil was like eating rocks. You know, there's nothing harmful—it'll just pass right through them. Of course, I talked to three or four toxicologists afterward that who said, "No, that'll probably kill your animals." But you know, according to [Exxon], everything was safe, and we could just leave it alone, and it would naturally deteriorate… I tried to contact Exxon right away… and they wouldn't let me talk to anybody… they gave me an insurance adjuster's number… I was irate at this time…because I didn't want to file a claim. I wanted to know if I was in danger, and I couldn't get answers from anybody. (Yellowstone County, Agriculturalist)

> The EPA was a profound, profound disappointment….They continually talked down to the public… I don't know if you attended any of those public meetings, but… they were maddening… You know, like when you're moving cattle through a chute system?…That's what the EPA's public meetings are like: getting us there, calming us down, moving us through a process, and then getting us out as fast as… they could… They just didn't seem to have any interest. (Yellowstone County, Agriculturalist)

> 63,000 gallons. And they only got 630 back. One percent. Oh well, we're good—it all went downriver [sarcastic tone]. (Yellowstone County, Residentialist)

Not surprisingly, reporters were on the scene fairly quickly. One impacted landowner suggested the presence of the press resulted in an interesting concentration of effort:

> The first day they just came down and laid some diapers down and then moved downriver… and I [was] interviewed [so, I] pulled up some of the diapers and showed [the reporters] the black crude that's on the grass there. I mean there were 30 [clean-up] guys at my house that afternoon, you know, in front of the cameras. 30 of them on their hands and knees out here, and they stayed here as long as the cameras stayed here. (Yellowstone County, Residentialist)

Pipeline Rupture One Year Later—More to Do: Even a year later, those dealing with the impacts were not done:

> [Like the landowner said,] you can still see the oil rings around the trees. And they did get ahold of Exxon, and they were going to go back in and take a look to see what they could do….Supposedly, they spent $135 million on the cleanup, which is a lot of funding if you think about it, but there are still some oil plots out there. (Yellowstone County, Local Civic Leader).

> Months and months later… they were going to demolish [my barn and chicken coop] and replace them... So now I'm finally getting my buildings and the work done here a year later. I don't think they like me anymore—now that I'm suing them…It still makes me angry, but I'm dealing with it better a year later. It took me about a year to calm down. (Yellowstone County, Residentialist)

> We had cleanup workers down there it felt like most of the summer… they did a whole bunch of… vegetation removal. And that was a really frustrating experience too… because I did not want them coming down there and just clear-cutting everything… They brought down this consultant who told me they were going to do a "surgical plan," right… They were just clear-cutting everything. And so you know, I got, again, really pissed. I spent most of the summer just really angry… They probably had cleared out 10 acres of vegetation… They offered to replant it… and they didn't plant anything… And so right now that field is just still a big dirt field. (Yellowstone County, Agriculturalist)

Pipeline Rupture—A Wake-Up Call: When asked whether or not there were any lessons to be learned from the 2011 pipeline rupture, many said yes:

> The lesson to be learned is, don't tamper with the river. (Yellowstone County, Recreationalist)

> [The lesson is] to just start thinking more long-term, I feel like events like these are wake-up calls for that. (Yellowstone County, Agriculturalist)

> We need to take decisions out of one or two guys' hands and put it into [the hands of] several. We need to look at this from all kinds of angles instead of profit angle… So it's important to me that we stop this tide of greed and arrogance... And maybe being spilled on in this magnitude was the wake-up call. That's where I want it to go, but if it was up to Exxon…the sooner we forget about it, the better. (Yellowstone County, Residentialist)

> There should be a revisiting of where [pipelines] have crossed waterways….I can't remember how many there were, but there were several that were on the list, and [the Governor]… his agency had made an attempt to go back and to revisit those so that we could maybe avert the catastrophic event that we witnessed. (Yellowstone County, Local Civic Leader)

> Private companies know how to build pipelines, but you got to set the standards for them to do that… And people don't like government, well you better have government doing some of that because sometimes shortcuts will be taken… The lesson to be learned is… build safety into your pipelines, get them deep where you're having to cross rivers… if you have standards that they can see how to comply with, and if you assure them you're not going to change the standards in the middle of their project, and if you set a timeframe for them to comply that they can understand, they'll do a good job. And then you have to monitor. (Yellowstone County, Recreationalist)

> Locally, I think, one thing we need to realize is that accidents happen and we need to be prepared for them….That first day, Exxon was in [a local pool cleaning business and] cleaning them out of pool cleaning equipment….So, to me, I think the industry needs to take this more seriously, and if they're not willing to, then we need to have our regulatory agencies make sure that they're going to do it. ….[It] speaks to a wider problem of just self-policing….be it the oil industry here, gas industry, or even the livestock industry—[We have to question] this whole idea that we can trust people, who only care about their bottom line, to do everything in their power to keep us safe. (Yellowstone County, Agriculturalist)

> I think they probably need to upgrade their safety measures so things like that don't happen. (Yellowstone County, Agriculturalist)

Some noted changes were already taking place:

> Conoco Phillips they told us they [have a pipeline under the river] that's up by Laurel….They were going to go back in and lower it. They didn't want this to happen to them. They were showing us how they were going to take the line and sink it in 47 feet right at the bank of the river. So hopefully this would never happen again. (Yellowstone County, Local Civic Leader)

But Hey, A Flood Can be A Decent Thing—Maybe: One participant was keen to explain that flooding can be beneficial:

> From my perspective, if it wouldn't have been for the oil, the flood actually would have been a decent thing… it would have been good for everything to get a good soak for a couple of weeks….We lost some riverbank… But, you know, all in all, we were really lucky… Lots of people upriver from us… where the river really spread out wide and their houses were surrounded and flooded, they were in a worse spot. (Yellowstone County, Agriculturalist)

And while he also saw a connection between floods and the cottonwood forests, he noted that this was how invasive weeds would also spread, creating other problems:

> I see where you need the free-flowing river to re-create cottonwood trees, but also when it floods, it just scatters those Russian olive seeds, you know. I know the

> islands we used to graze over on the Yellowstone, it was nothing but grass out there, but now it is just all Russian olive trees… [and] there is probably some knapweed. (Yellowstone County, Agriculturalist)

> You have to cut them off and treat the stump [of the Russian olives], and then pile them for a year and burn them, and then do follow-ups for any little sprouts that come back….Young [Russian olives], they don't produce seeds until they are 10 years-old, so you can stay ahead of them if you work at it....[And, the county will] pay you to get rid of them. (Yellowstone County, Agriculturalist)

General River Management: Participants evidenced an awareness of the interconnectedness of these issues and spoke in-depth about the complexities of resource management. They could articulate a "big picture" that was punctuated by conflicting interests, both as individual and as a community:

> The drive for the American way of life is often intercepted through economic needs. Every one of us, I don't care who we are or what we do for a living, have environmental thoughts, but we also have thoughts and concerns of how we're going to be able to provide. And there's a real delicate balance. We're really fortunate in Montana… our impacts, though severe, were not as heavy-laden as the availability of our environmental assets. And so, it never was [in the past] as hard of a question as it will start to become….I'm afraid that [if we don't change] the way we're going, we will be not very good stewards for our grandchildren…. I would hope that through what we do presently, we can go forward and say we did…our part [to] maintain this quality of life and be one of the great last places. (Yellowstone County, Local Civic Leader)

Less philosophically, other participants acknowledge practical difficulties:

> It's tough to do. You know, the old saying is, "You're not going to make everybody happy." You can make a few happy, but you're never going to please everybody. So you try your darndest to think ahead… And it's tough to really do, because you've got a lot of different issues coming in. You know, a lot of times the city will blame the federal government or whoever else, or the state or something. (Yellowstone County, Local Civic Leader)

> The challenge, you got 18 federal and state agencies that have some jurisdiction on the Yellowstone River. And that includes things like FEMA, and that doesn't count the counties, nor does it count the cities, nor does it count two Indian tribes that have autonomy and also have water rights. We say the Yellowstone River is 84% private land along its banks… and then you have major, major industries that are depending on it and competing for the water—agricultural, oil and gas development, cities' urban recreation. Is there a model that fits all that? I don't know what that model is. But my point is that we don't have an entity right now that's thinking about that issue. How do we solve this? And how do we start bringing stakeholders together to start thinking about the problems that we face in

> this environmental-social quandary we have, and these very sensitive resources that we have here in eastern Montana. And we also have two states involved, so that doesn't help either. (Yellowstone County, Recreationalist)

When asked about how agencies should move forward, these insights were offered:

> [Someone has to] bring all the stakeholders together who have… important interests that need to be taken care of….It becomes essential… I do think we need to... think about some mechanisms that start bringing stakeholders together in legitimate discussion about the realities that we face. (Yellowstone County, Recreationalist)

> [Someone should] lead the next step, which means taking all the really good information that they have helped develop [about the Yellowstone River], and given to us as citizens,…and start translating that into thoughtful policies that are good for the citizens and good for…[the] environment….[So,] that we have a chance to live in a place we love. (Yellowstone County, Recreationalist)

Findings from Segment IV: Laurel to Springdale

General Findings

Geographic Segment IV included the area of the Yellowstone River between Laurel and Springdale. Five individuals were interviewed in this segment: one civic leader, one recreationalist, one residentialist, and two people representing agricultural interests.

This stretch was described by locals as an area in which a mixed community—agriculturalists and recreationalists, rooted residents and newcomers—enjoyed the river. Here, the river was perceived as serving a variety of uses, and the health of the fishery was an important topic. They expressed concerns regarding how to manage increasing demands on the river's resources.

The river is viewed as dynamic and powerful. The flood of 2011 was often explained in comparison to the floods of 1996 and 1997. Bank stabilization efforts were discussed in detail and were variously regarded as effective. Few expressed concerns about their personal vulnerabilities. With regard to flooding and erosion, these participants described such risks as simply part of living with a free-flowing river.

A few of these participants explicitly mentioned the riparian areas associated with the river. They also expressed concerns regarding water quality, invasive plants and overall river management

When asked about the 2011 oil spill, these participants discussed indirect impacts.

Narrative Findings

A Peaceful Place: Stakeholders offered useful descriptions of this setting, their home in the geographic segment of the Yellowstone River between Laurel and Springdale:

> It's peaceful, and it's tranquil, and there's no place you ever feel closer to god. You realize how much beauty he's put in this world... To me this is a little piece of paradise. (Stillwater County, Agriculturalist)

> People have different… expectations or ideas when they come here from particularly out of the area that don't know. And the Yellowstone can be very intimidating. You know, big water, big river and stuff. But you know, it's... What's nice about it… in this corridor here where you're floating within ear and eye shot of the railroad and the interstate and all that, it still can be a very peaceful and tranquil experience out on the river. (Stillwater County, Recreationalist)

Despite increasing development, this area is described by locals as a peaceful paradise. They explained that the area supports a diverse population, including agriculturalists—many of whom are who are tied to the area by previous generations—and subdivision residents—mostly drawn to the area for the amenities of Paradise Valley:

> I grew up out by Silesia. So I never got very far away… When I was a kid, we lived on the Yellowstone… Personally, I'd like to die here. (Stillwater County, Agriculturalist)
>
> [I've lived here] a little over 11 years now… I grew up in California. But I spent a significant amount of my time [in] Montana on fishing vacations and other visits and things like that… [So I] discovered it pre-retirement and then knew this was the area I wanted to relocate to, to the Stillwater Valley. It's a beautiful place… I opened this [fly] shop in June of last year… I had been guiding, and… I also got my outfitting license… I thought there was pretty good potential here for taking the … business… to the next level. (Stillwater County, Recreationalist)
>
> [I've lived here] 10 years… I like the location, I like the fishing, the rivers here, the Boulder and the Yellowstone, and most of the people. (Sweet Grass County, Civic Leader)
>
> [I've lived here] since 1992, so 20 years ago last month… This subdivision… was built in the mid-70's I think… When we first moved here I think there were eight houses, and now there are probably 25. (Sweet Grass County, Residentialist)
>
> I know people who come here for the summer months from Florida, the east coast, Texas, a lot of southern states and back east. There are some Californians who come here and spend a couple months during the summertime. They have second homes here. So they come from all around actually… If they have a lot of money, they are on the river. (Sweet Grass County, Civic Leader)
>
> You know, this community is a good community. It has factions that are, they each have their own ideas. But the good thing is every few years, things change all the time. It keeps changing. So the people… see what has changed now, and I think they kind of go back the other way. The pendulum keeps swinging [laughs]. (Sweet Grass County, Civic Leader)

The River Supports Diverse Interests: Distinct agricultural and recreational interests were acknowledged when locals discussed the value of the river. Participants explained that the local economy depends on the shared resources of the river:

> Recreationists [benefit from the river]. That is a big industry around here, a lot of fishing guides and floating trips. Obviously agriculture benefits from being able to irrigate. And just homeowners like us that just like to walk down there, but I suppose that is recreation [laughs]... not that many fly-fishing guides and rafters, but the agricultural economy… the mine and the stores… if there wasn't

> agriculture, there wouldn't be a lot of those stores. (Sweet Grass County, Residentialist)
>
> A lot of people raft it and fish it. They come from all around during the summertime and fall. The agriculture uses it probably about the same as they always did. It is just a nice river that flows from Springdale and Livingston down through here in Big Timber, and quite a few people use the river for weekends and family events and swimming. (Sweet Grass County, Civic Leader)
>
> I know it [the river] is [important] for the ranchers and farmers for sure, and that is probably 60% or more of the people that live in this area. Then… for the people that come here in the summertime, they use the rest of it. I mean it brings money into Big Timber for shopping and what not, just from people coming here to fish. (Sweet Grass County, Civic Leader)
>
> I know you've got other users, you got agricultural interest groups, recreational, other commercial users that rely on the water for you know, everything… really. You know, we're starting to see some other potential impacts in the area of energy development, and there's always real estate development, always that kind of stuff. But yeah, like I say, I think we've done a pretty fair job of all of those interests coexisting [laughs], if you want to call it that. (Stillwater County, Recreationalist)

A Healthy Fishery: Participants discussed various influences on the health of the fishery. While some concerns are noted, they expressed general positivity:

> The fish are typically going to seek out water that has a couple features to it… it's going to be something that affords them some sort of cover and protection… the rocks, logs, disturbed water that is going to prevent their shadow or their body from being as readily seen from above… [And] Cooler, oxygenated water as the summer goes on is key to them because trout are a cold water fish… They'll be in ripples… and also sometimes in the deeper water and so forth…So those are all kind of things that go into the kind of water that you want to fish, and that also goes into the kind of water that a river like the Yellowstone provides. (Stillwater County, Recreationalist)
>
> I bet it [channel migration] does affect some of the fisheries in parts of the year, for a couple of years or so, and it might make it better. (Sweet Grass County, Civic Leader)
>
> It [the 2011 flood] speaks to how resilient the fishery is. And I guess something that's going to be interesting to see… what impact last year's flood has on the fishery this year in terms of the aquatic insect life, the riparian habitat, those kinds of things… It [the river] fished well [after the flood]... The hopper fishing was good last year… The fall fly fishing was good, that's where we were expecting to see the impact… We didn't see prolific hatches in our area as maybe we have

> some years, but yet the fish were still responding. So it's almost like the kind of knew that they were supposed to key in on those bogs that normally occur that time of year in the fall. (Stillwater County, Recreationalist)
>
> The Yellowstone seems to be better for me for fishing in the fall… It [the fishing] is about the same [as it was 10 years ago]. (Sweet Grass County, Civic Leader)
>
> Well, back in… the old days… before the valley got settled and you know started to get irrigated and things like that, this whole region was a cold water cutthroat fishery. So… you read the accounts of Lewis and Clark… they were finding cutthroat trout in abundance down what is the Hysham, Forsyth, Custer area, which you know today is totally unheard of. And you know, just things that change, warmer water from irrigation return with silt and things like that. So I guess I'm trying to say that as the river proceeds down from Columbus toward Billings, it…starts to transition into more of a warm water fishery… which is… actually sought-after by a lot people that like to fish for bass and… carp and things like that... So a lot of people actually seek that out down in that part of the river. (Stillwater County, Recreationalist)
>
> Rainbow and brown trout… they are not native… [But] They were all wild in that they were not hatchery fish. So they were bred, born, and raised in a wild environment. So… these fish can withstand a river that was running 40,000 cfs last June. You think well, how can they do that? Well, because they adapt, they know. And if you were to have dumped a bunch of hatchery fingerlings in there, they probably wouldn't survive because all they've known is living in a tank somewhere eating a bunch of pellets. So I think that's kind of neat... And then the hybridization that has taken place over time… as you go upriver, mainly between Livingston and up toward the park, then you do catch cutthroat trout… to laymen it appears, the characteristics physically, to be pure strain. But we have a lot of what we call cut-bows, that was the cutthroat and the rainbows have crossbred. So the rainbow exhibits some of the key physical traits of the cutthroat, mainly the slashed gills that you see and come of the spots… [which], from a recreation standpoint, it's fun and it makes part of what we have to offer here… in Montana, as I said, the fact that they're wild, you get a great fishing experience from, let's say a small, wild rainbow or brown trout. They put on quite a fight and tussle and all that kind of thing. (Stillwater County, Recreationalist)

Additionally, they discussed river etiquette and educational programs:

> There are some good organizations that do a lot in terms of education and so on… [like] I was pretty involved… in Trout Unlimited. (Stillwater County, Recreationalist)
>
> Of course, we [fishing guides] practice catch-and-release as one of the preservation/conservation habits as well as crimping our barbs. And with all that said, statistically there is a certain mortality rate that just… you can't help despite

> your best efforts of minimizing the handling of the fish and practicing those things… And as the water gets warmer… the mortality rate probably goes up a little bit because it stresses them out… That's when…you want to minimize the amount of time that you're playing the fish. So we stress that with our clients… you catch them, get them in, get your picture or whatever it is, and then get them released kind of thing… Because I see my role… as being as much as anything, a steward of the resource because... I'm deriving income, business from a public resource, so I'm very conscious of that, practicing good habits, relaying those on to my customers and clients… and educating... [and I encounter] very little [resistance]. (Stillwater County, Recreationalist)

Managing Increased Demands on the River: Increased recreational uses and crowding at public access sits were discussed:

> I have noticed since our interview six years ago that there is, I'm not going to say necessarily more traffic overall, but I've noticed more guided traffic in the sections, say between Columbus and Big Timber… [But] the river can, it can absorb quite, quite a bit… And you know, you're putting in the river some busy summer morning and there's five or six boats there. But then during the course of the day, it kind of spreads itself out and there's plenty of water, plenty of places to fish. So I don't think it's like an overcrowded situation right now. And I'm not just talking about commercial, actually guided traffic, they're actually the smaller percentage overall of the total traffic. Most of it is just the public, non-guided… in terms of pleasure rafting and inner-tubing and commercial rafting… But so I think, you asked about challenges, is continuing to maintain the quality of the experience… a lot of fall days… that can be the best time to be out there… you know, peak tourist season is down… and you can get out there some days and have the whole place to yourself, be the only one out there which is just great. (Stillwater County, Recreationalist)

> There are five [access points here] that I know of only in about a five-mile, five- or six-mile run… I believe [we have enough]. (Sweet Grass County, Civic Leader)

The participants regarded the river as abundant, capable of providing for the fishery and for other needs:

> Here, it [minimum streamflow] hasn't been an issue. I mean I suppose a way it could become an issue on the Stillwater which, you know, again could impact the Yellowstone. But I know… on the Bighorn it's a bigger deal in places like that where they've actually had some big to-dos with it. But I haven't seen it being anything right here for me locally, no. (Sweet Grass County, Civic Leader)

> From what I know, it is business as usual. It has been going on for 100 years, it is still going on [laughs]... The only competition [between river-users] is who pulls

> the water out of the river, and that is mostly ranchers and farmers. (Sweet Grass County, Civic Leader)
>
> I don't know of any conflicts… And I am sure there are quite a few [irrigators] that get their water out of the Yellowstone… but I don't know of any conflicts between them and the recreationists… [And] it is hard to see it changing a lot… I mean, we haven't really changed that much in the last 20 years… as far as the river usage. But if anything happens, I would guess there would be more recreational use out of it. So then, I suppose there could be conflict with them thinking the irrigators are taking too much water out of it in dry years, but they have the water rights... So I mean they can't very well say you can't take that water out to irrigate because we want it for fishing, because well, they have the water right. (Sweet Grass County, Residentialist)

A Dynamic and Powerful River: Participants generally described the river as dynamic, and they expressed either positive, or at least neutral, comments about the river as free-flowing:

> It's kind of amazing… the Yellowstone, its primary trait or characteristic being a free-flowing river, that it seeks its course... Pretty amazing… And obviously… it has impacts on my community… the agricultural community and other communities that rely on the, I don't know, the riparian area of the river... and the fish, you know. (Stillwater County, Recreationalist)
>
> It's just changing. I think it's pretty fascinating… it's just interesting… to see what that river does. We all know it's got that power. But it just changes, and if you don't cry about it, you know, the loss or anything and just look at it as being kind of amusing as long as nobody loses their life over it, I think it's kind of fascinating. (Stillwater County, Agriculturalist)
>
> I mean it [channel migration] is all just a natural occurrence on a river that is not dammed. It's just the way it is [laughs]. (Sweet Grass County, Civic Leader)
>
> It [flooding] has kind of purging effect on the countryside, you know. While there can be obviously tragic effects of those kinds of things… looking at it in big picture, you know, over generations and decades and hundreds of years, it's just kind of part of what happens, you know, cyclical. And that's kind of part, again we've got a free-flowing river, you know, it does that. (Stillwater County, Recreationalist)
>
> So when the river comes up, like it'll be probably another week, it'll just, by osmosis sort of just soak up and cave off. And in a normal year, you're going to lose two or three feet anyway, because that's just the way it does. (Stillwater County, Agriculturalist)

In addition to gradual changes, participants reflected on the power of the river in terms ice jams and floods:

> Yeah, it's pretty interesting. But I wish… I'd of started that time and made a series... and shown what the river can do and will do in such a short period of time. It'd be pretty interesting. (Stillwater County, Agriculturalist)
> When we first came… [the barn would] probably be just about 100 feet [from the bank]... In a period of about a week or ten days it just kept working back. And one day I hauled all that old machinery back because it used to be a reasonable distance from the bank, but I could see that I should probably to be safe pull it out of there. Well, there is no ground left where it was sitting. And back where the shed was, one day it just kept coming across the floor and they were just subsiding… And I used to go pull through the horse trailer, have room with the tractor, horse trailer and everything, all of a sudden it's right there at the end of the shed. Then within less than a week, about 20 feet of the shed is hanging out in the river, the rest of it is all gone, washed out underneath… down to Glendive I guess. (Stillwater County, Agriculturalist)

> Participant 1: The hydraulics of those rapids, pretty scary. And I'd never seen this ever happen before, but they were in this sort of raft, and that raft just hung right there… [it] was sticking almost straight up, but it was just about to flip over and they all laid down… it was just vibrating because of the churning hydraulics of that water… And anytime they thought maybe it would flip them over backwards, well I took off running for the building. I was going to get a rope and throw out and see if they could catch it… And just about the time they got back which was probably less than 4 minutes or something like that, it was just like the river spit them out… it kicked them out all the sudden… [And one guy] he said, "I floated almost every river in the United States." He said, "I never been fooled like this out here." He said, "I just never dreamed it was as bad as it was." … Participant 2: But people just don't respect the river as much as they should. Because it can be very, very good and very entertaining. You enjoy it. But there's a danger out there. Participant 1: It's so much power. (Stillwater County, Agriculturalists)

While sudden changes presented riverfront landowners with challenges, participants expressed a general lack of concern about their personal vulnerability to flooding:

> Participant 1: Like one friend of mine, we were talking about that… And seriously, I said, "I just don't know what a guy would really do." He said, "I do. You move out in the dryland hills." [All laugh] "You get away from the river. While you live on the river, you gotta fight it." Participant 2: But you got all the beauty. (Stillwater County, Agriculturalists)

> We don't worry about it flooding because we are high enough up. There is a lower level that floods down the river but not up here. (Sweet Grass County, Residentialist)

> There must be, in this area anyway, there is enough leeway for the river to move without getting next to the buildings. (Sweet Grass County, Residentialist)

> No [I never worry about water near the house]... we're pretty well protected here. It's just the way the land lays or something. (Stillwater County, Agriculturalist)

2011 Flood—It Moved Things Around: The 2011 flood stood out as a significant event for these participants, specifically in terms of its duration. Some compared the impacts to the floods of 1996 and 1997:

> Probably 1997 actually was the highest; I think it was even higher than last year… Last year was really high for a long time… there were areas where the water was running through the low areas down by the river. In '97, I think it was more with ice jams breaking up, and the whole area was flooded, the whole flat down by the river. (Sweet Grass County, Residentialist)

> [It didn't cause problems] around here… I know they did elsewhere… Last year… with the flooding… it was more along the creeks, not so much the Yellowstone… There were problems… it was jumping its banks, and washing out roads, and washing out next to properties, and undercutting buildings. But it didn't happen on the Yellowstone itself. (Sweet Grass County, Residentialist)

> [The river] changed a lot during last year's floods. The high water moved a lot of stuff around, changed the flow of the river. The deep holes, some of them have been filled in with gravel and rocks… There were some huge trees floating down, and it just moved a lot of debris around. It has changed… the flow in certain areas. The river has moved over… maybe 15 or 20 feet [in some places], maybe more…I think that [movement of the river] is the way it is supposed to be… that is what happens. (Sweet Grass County, Civic Leader)

> It [the 2011 flood] was first of all much longer in duration [than the other springs I've seen here]. It lasted well into the latter part of July, around the 20th or so of July. And then the second thing of significance was obviously just the sheer magnitude of it. It created a lot of new structure to the river, moved a lot of gravel around, lot of debris around. And so that made some of the characteristics of the river change a little bit…Last year… my first day back on the Yellowstone was pretty close to the first August, right around the first of August last year. Whereas typically it's probably more around the 20th of July, so it was a full ten days, two weeks later. (Stillwater County, Recreationalist)

> Last year was a pretty rough start [to opening my fly shop business], a combination of events of the probably, what? 25-year flood on the Yellowstone… as well as just general economic downturn that's made business kind of rough. (Stillwater County, Recreationalist)

> I think last year was probably the perfect example… where fence lines get washed in and you may have barbed wire that you have to be careful of, or those kind of things. (Stillwater County, Recreationalist)

> Each year we've been here, it's taken a certain amount of the bank. But that was the worst… last year by far… took away the most… It took anywhere from… 40 to 100 feet of land, 12, 14 feet deep. And on the average, I would say it's probably 30, 40 feet straight through for three-quarters of a mile… Last year, it was just going out at the rate of three or four feet a day, sometimes more. Hard to stop it. (Stillwater County, Agriculturalist)

Bank Stabilization: Some participants explained that bank stabilization could be practical and useful, while others described bank stabilization efforts as futile, expensive, and potentially impactful downstream:

> You could probably control certain areas by backfilling with large rocks and stuff, if it bothers the landowner enough. Other than that… it is a live river and it flows where it flows. And people just happen to get in the way sometimes. (Sweet Grass County, Civic Leader)

> I think the Yellowstone, we have a minimal amount of manmade influences, like riprapped banks and things like that that push the water one way or the other or where we've kind of made changes. So like I say, it can kind of seek its own course. (Stillwater County, Recreationalist)

> [I've seen people stabilize the banks with] boulders, lots of boulders… It seems like [it works]... It deflects the water, the pressure away so it doesn't erode the soil… [But] there have only been a few places I have noticed that that is what they have done… I don't think they can do it a lot. Because the Army Corps of Engineers, I believe, has the say of what goes on the banks. (Sweet Grass County, Civic Leader)

> Participant 1: Anything that they ever put in to protect it before is all gone… The old fellow that lived here... he put four jetties in. And when we came here, there was just one jetty left… The first three jetties I think only lasted two years and it washed them out. And then in … '98… something like that, it loosened that remaining jetty up that winter with that big ice jam, moved the rocks. Then that spring that water came up real high, and it washed it out. And then this time, last year, it started cutting back there… Because where the Cove Ditch takes the water out just a quarter-mile upstream, it kicks the water over to the other side of the river and makes an s-bend, and it comes right back to us. So… it's coming just naturally to chew this out… And there's no way you can change it… Other than you know, riprap all down here. It might not hold. But you could easily spend half a million dollars in this stretch down here to protect it. And no way, no way feasible for us. It [the river] kind of does its own thing… if you're rich enough you can try to change it or stop it, but it looks like to me it's just about going to do

> what it wants to do. Participant 2: Kind of like trying to fight Mother Nature. You're not going to win. (Stillwater County, Agriculturalists)

> I don't think they [people who want to stop the river from changing course] should be living that close. The river is going to move. (Sweet Grass County, Residentialist)

> It [the most important thing to me] is probably keeping the riverbanks healthy, because if you can keep the banks healthy, then you can keep the river healthier. (Sweet Grass County, Residentialist)

Some offered opinions on the regulation of bank stabilization and riverfront development more broadly:

> We've seen it… and usually, history repeats itself. If nothing else changes, just in time it does it again… I guess when people go to get their permits or whatever they're going to, if they're going to build or something, they ought to really take a hard look at it… [and] just do a lot of reading up about advice from other people, what they've seen and what's taken place in past years so that they know unless they're on a pretty secure place or a little bit high on the ground that pretty likely it's going to happen to them. (Stillwater County, Agriculturalist)

> Common sense says you should not build right on the riverbank, because rivers do move. But I don't think people understand that. So I don't know, maybe it is education. Maybe it is educating the realtors so that they tell people that they shouldn't build right on the riverbank. (Sweet Grass County, Residentialist)

However, for those who valued the contribution of riverfront development to the local economy, regulations were seen as obstacles:

> I would say it [riverfront development] would be pretty good because it would bring in more revenue… But the problem… is that most of the riverfront is owned by ranchers. You know, ranching and farming and the way it is set up, I mean they can't sell less than one square, 640 acres in a lot of places. I mean it would be pretty hard to break through that... I think that is regulated by the state. (Sweet Grass County, Civic Leader)

Lastly, one participant acknowledged the complexity of managing a system with far-reaching geographical connections, attended by numerous governmental entities:

> The Yellowstone, being… a major tributary of the Missouri, which is a major tributary of the Mississippi… it's got impacts downstream. And getting more to the federal government, Corps of Engineers… I know that what happens up here has an impact down there. So I know that it's kind of an irreversible motion that once federal intervention… was put in place, then it's kind of a never-ending deal. It's kind of a threshold you cross and you can't go back… so once you decided to

> put some form of control on the river, then you just kind of start down that path. So… I know that they do this a lot for coordination, various agencies or levels as you say of government that are involved, is coordinating what it is that they are doing. Because I know there can be a tendency for people… to take an isolated view in just their on piece of the world… but there's lots of uses of that river, and… again, what happens here has an impact downriver… Controlling the flow of the Bighorn last year was a big deal… for downstream flood relief… So yeah, there's impacts. But… I think overall my impression of Montana… when it comes to all of our waterways, I think they've done a pretty good job in comparison to, whether it's other states in the West or certainly other states in general, but even our states in the region that have mismanaged or done very short-sighted stuff on their water, or what they implemented in terms of regulation or enforcement and so on. (Stillwater County, Recreationalist)

Riparian Areas: Some participants demonstrated awareness of the riparian area and associated values:

> The riparian zone is more between like the upland/dryland area and the riverbank. It is where there is more water and trees grow because of the water there, and there can be wetlands. And I think it can be easily damaged, if you have… the cows coming down to the river to water and too many people...can damage it. But it is like the connection between the river and off the river… I think it is important because that controls pollution… it controls erosion, especially erosion. That is what can keep your banks stabilized in the high runoff years. If you have tree roots growing there to hold the soil and grass and stuff. So if you just have a bare dirt bank, it leaves pretty fast. (Sweet Grass County, Residentialist)

> There are so many types of species that live in that [riparian] zone, you know, rodents and beavers and otters and different birds and fowl... golly… Willows and things like that are always key to the riverbanks, and I think there's a lot that relies on the willows, I suppose even the deer that eat the leaves and stuff. It provides cover, it provides... Or the small cottonwoods that, you know, start to grow on the gravel bars after an event like last year for example, you'll start to see those guys sprouting up probably… I'm sure that those, the cottonwoods, they provide a lot of habitat for a lot of things. (Stillwater County, Recreationalist)

Water Quality: One participant raised concerns about water quality, specifically mentioning agricultural and municipal wastewater disposal:

> I think that probably the biggest concern, and probably everywhere, is the runoff from the ranches and farms in to the river and any sewage waste that is not dealt with properly. Yeah, probably the biggest concern…. [but] I think [the future of the river] will be fine. I think there are enough people that enjoy it. And I think that the ranchers understand too that they need to pull the water out of there for their crops and water their animals; they are conservationists too because they like

> their lifestyle, and they don't want it to come to an end just because of heavy pollution. (Sweet Grass County, Civic Leader)
>
> [Local government] they really don't do really anything I am aware of about the river. I mean they [the city] have the control over the sewage… which is a big deal, I think. Because I don't know what kind of oversight they actually do about that. And that can affect the fishery and the quality of the water. But I think that the Fish and Game pretty much… oversees the quality of water… I don't know. (Sweet Grass County, Civic Leader)

Invasive Plants: Invasive plants were also concerning to these participants:

> Obviously when we get water that significant [as in 2011], there will be some people here in the area… concerned with the noxious weed problem… You know, when a bank collapses that's full of spurge or knapweed or something and it ends up getting deposited a couple hundred miles downriver or something… [and] if it gets severe enough that it chokes off other types of vegetation that provides the riparian habitat, then it has an impact on aquatic insects habitat and other stuff, and then impacts on the fishery so that's kind of how the little chain goes. You know, it can have an adverse impact on just my little piece of the world there. (Stillwater County, Recreationalist)
>
> I guess a couple of the biggest ones in our area I think are the spotted knapweed, probably the leafy spurge, and so I've done a little bit of work… on identification. I was involved with some other agencies and things that did some mapping... So they've done a lot in the area on really getting aggressive on that because it is such a nuisance… [so] the weed management, that's something pretty positive. And while generally the leads seem to have been taken by the agricultural community, I think everybody that uses the river has an interest in that. (Stillwater County, Recreationalist)

General River Management: These participants found little fault with the current management of these issues:

> I think we've done pretty well here in the immediate area [in terms of management of the river]. (Stillwater County, Recreationalist)
>
> The river I think is in good shape, it looks good… and I think there is a bright future actually. (Sweet Grass County, Civic Leader)

Some participants acknowledged the need for both federal oversight and grassroots efforts in continuing to protect their shared resource, the Yellowstone River. Two participants offered broad preferences for future river management efforts:

> I don't have a problem with that [the role of the federal government]. [Other people do] possibly… without a doubt (laughs)... I believe that the federal

> government has the resources… but they don't have any personal contact with anybody around. So I feel that they would do what is best for the river and the people around it. Where if it was a private thing, they would do what is best for them. (Sweet Grass County, Civic Leader)
>
> I think always public education is a good thing. And trying to do it, I think, from the bottom up, grassroots is probably always a good way to go is to… identify key stakeholders and try to get them involved in their communities and you know, I realize that anytime you do one of these deals, in anything there could be a lot of conflict, but you hope that people can kind of see that if you have a greater common goal in mind we'd all work towards. In some cases, it's just preserving. In some cases maybe preserving is not good enough, we got to actually go out and do something and prove it. And that may be different from area to area. But I think that's good. I think that's good to do. (Stillwater County, Recreationalist)

2011 Oil Spill—Minimal Impact, Mixed Concerns: Participants in Segment IV noted some indirect impacts regarding the 2011 oil spill:

> The only thing I did was I publicized a little bit that… the impact of the oil spill was considerably downstream from us... Because… when you use the word Yellowstone to a lot of the general public, they immediately think Yellowstone Park… Well, that was 200 miles away... So I just kind of did that as a way of information, and every once in a while you'd get an inquiry, you know, somebody would ask. So again, just from my… viewpoint, it had no impact because I don't go down there, it's not where I fish… [But] I'm not aware… if anyone elected well geez, I'm not going to go visit that area this year because they got an oil spill. I mean, it's always possible that there was business that I was lost because of that, you know. (Stillwater County, Recreationalist)
>
> There wasn't any [concern about the oil spill], no, not up here. I mean, I didn't read anything about it up here, any concerns. Still have concerns when corporations... they should have control over their own pipelines and whatnot and keep them in check. I don't know what... who oversees that, but that is definitely a concern. (Sweet Grass County, Civic Leader)
>
> We weren't concerned with that oil coming this direction. Obviously, it is downstream. But... as far as I know, we don't have any pipelines under the river, but I am glad to hear they put it a lot deeper this time… All I knew was that it scoured out down to the pipeline… so it was a lot deeper than it used to be. But, I don't know if it was just because it was no longer buried or if that was what caused it to break, that I don't know. (Sweet Grass County, Residentialist)
>
> Oh, I don't know. Seeing it, you're kind of concerned with it… Of course, I worked around oil, hauled it for some years and worked in an oil refinery and worked in the oil field, so it's nothing... It's just part of my life. I don't think of it being so different, you know, oil. But, and I think in a lot of cases... And there

> you go again, somebody starting out, they come from a different area… and they want to build up close. We know, people that have been here all our lives… you might get by 20, 30, 40 years. But you're pretty likely, sometime you're going to get washed out, or something's going to happen, contamination or whatever, just because you're so close. (Stillwater County, Agriculturalist)

Findings from Segment V: Springdale to Gardiner

General Findings

Geographic Segment V stretched from Springdale to Gardiner, essentially limited to Park County. The 2012 participants from this segment included seven individuals: one civic leader, two recreationalists, two residentialists, and two people representing agricultural interests.

This area was described by locals as a setting that seems timeless and beautiful. The river was noted as key to its rural agricultural traditions and to the recreational community that has always valued the fishery.

However, the community was described as "in transition." Over the years, many newcomers landed in the valley, and they wanted property on the river bank. As a result, the community became aware of bank stabilization efforts. These efforts protected private property but also impacted the public resources of the river, including the fishery.

The legacy of flooding and post-flooding management efforts was important part of the conversation. The Governor's Task Force and he Special Area Management Plan were frequently discussed in detail.

The 2011 flood was consider "really something." However, the tendency of participants to frame this event in relation to the 1996 and 1997 floods served to reduce the perceived severity and minimize broader concerns about the 2011 event. The 2011 oil spill was regarded as "eye-opening" and an opportunity to "learn something." Even though the event was downstream, media coverage of the spill seemed to reduce the number of recreational visitors in the upper valley.

These participants expressed concerns about future management challenges, including industrial threats and in-fighting among different factions of the community. However, at least a few could imagine strategies for working together.

Narrative Findings

No Place like It—And, the River is Key: Two stakeholders offered simple descriptions of Park County, home to Paradise Valley:

> It is a wonder of the world… I don't know another place like it. (Park County, Agriculturalist)

> Absolutely beautiful… this is what is nice, looking up at the mountains. (Park County, Residentialist)

Many of participants had been settled in the area their entire lives, some having familial ties that went back for generations:

> [I've lived here] about 72 years… Great-grandparents… thought it would be good cattle country, that was the reason they came in here [in] 1878… right along the river… where we are sitting now. (Park County, Agriculturalist)

> I've lived here for 60 years, and this is home. And I'll go visit places, but yeah, I'll never, ever leave. It's too much a part of who I am, so. (Park County, Agriculturalist)

Individual interests in the river were often framed in terms of uses:

> Being an irrigator, that [the river] is kind of an important facet of my business. (Park County, Agriculturalist)

> We float some, walk along the edge. We've run down by the river sometimes. (Park County, Residentialist)

> The river… is obviously a resource for us. There are a lot of folks in town that make their living directly or indirectly from the river from a recreational standpoint… There are also a lot of folks who live here because of the river and because of the amenity of the river from a floating standpoint and a fishing standpoint. Obviously… the river is important to all of them. (Park County, Local Civic Leader)

Beyond the recreational and agricultural uses of the river, participants praised its scenic value and free-flowing, dynamic and changing:

> We have a great river right here running through this valley… wonderful river... It is a free-flowing river… the last, longest in the lower 48. This is a significant river, a beautiful river… one of the great rivers of the United States, and we are just so lucky to have it right here. (Park County, Recreationalist)

> We've seen really dramatic changes [in the river channel]... this is a river that migrates from bank to bank… as a fishing guide… sometimes your favorite spots go away and sometimes they change, but… that's kind of fun to see a new river. (Park County, Recreationalist)

> Every year it's different. (Park County, Residentialist)

> It sort of is the garden hose or the fire hose I guess that is just wiggling all around. It cuts new channels, it cuts huge swaths through cottonwood forests. (Park County, Recreationalist)

Some elaborated on the value and function of channel migrations and riparian areas:

> I think it [the riparian] is one of the things that sets this river apart… this river has such an ebb and flow to it… high water in the spring, and it tapers off all summer, and then there is very little in the fall, and then in the winter it does its crazy thing with the ice. But in the summer while the water is dropping and the grass and all this stuff grows in along the banks. I mean, these banks are so dynamic, and that is one of the things you don't get [on other rivers]. I know the river that I have been on a little bit, which is dam-controlled, is the Snake down there. And so there, the area between high and low water is... It doesn't have a chance to grow in and have this life cycle… [So] we are so lucky, yes. I think it would be something that would be good for people to understand how lucky we are, how different this is that we have a free-flowing river and all the things it means. (Park County, Recreationalist)

> To some degree seeing the river move around a little bit, that's how the cottonwoods get re-seeded. And [as a fishing guide] in terms of trying to educate clients is, as we float down the river, that's certainly one of things to try to explain to them, that you know, it's difficult for humans to live along the river that in a cottonwood bottom with a gravel bottom river that tends to move a lot, but seeing those new channels and seeing that movement is, to me, just part of the natural course of things. (Park County, Recreationalist).

> I'm really, really pleased that they are limiting the development that takes place in floodplains now. You know, because it's such an important, vital ecosystem… it carries life for not just people but so many species. So, in a very real and practical way too, it represents life. So, it needs to be protected. (Park County, Residentialist)

They also described emotional attachments and desires (expectations) to see the valley remain unchanged:

> I still think that old frontier myth is still very much alive here, you know. There's romance to it. There's truth and beauty and virtue, and in rural places like Montana, there's honesty, integrity... Whether it's actually true or not [laughs], it's what we believe, what we believe to be true. And I think that has a real appeal to a lot of Americans. I know it does to me; I'm a victim of the myth. (Park County, Agriculturalist)

> You become part of it [your ranch]… part of it is the freedom that you have, day in and day out, to make a choice about what you will do. You know what you're doing every day, and you can look back at the end of the day and see what you

> did. And part of that… it just becomes so much a part of who you are that it defines you. You are defined as that person… that's the way people recognize you and that's the way you see yourself… That ranch is you… This is one of the places where you can actually dream something and put it together and see it work, and that's a very rare thing I think in our society now. (Park County, Agriculturalist)

> It should always be one of those places that are empty, you know. It should be. Because I mean, god is in empty places. There's such beauty there… And it does your heart good to know that there are places like that. So I would volunteer us to be that… I'd hope we'd always be a place where a person can come to find those qualities that we find here. Not get too crowded, I wouldn't want to turn into Colorado. Oh boy, scary… I don't think it'll happen here though... I don't think even if you intended for changes to happen, I don't think they could here. Just the nature of the place doesn't lend to it… That's probably not going to happen, and that's fine, that's just fine. (Park County, Agriculturalist)

A Community in Transition: Segment V was also described as in transition:

> We're in a transitional zone. So part of the landscape here is the fact that… we have…the prairie to the east of us and the mountains to the west of us. So I think it's kind of a unique place to be. (Park County, Recreationalist)

> Our area is changing very rapidly. It is becoming a recreation area. And the farms and ranches along the river are becoming, I probably shouldn't say that, hobby farms [laughs]. (Park County, Agriculturalist)

Other participants' backstories reflected this transition:

> I moved up here [and] bought into Yellowstone Raft Company in 1981… Why am I still here? Because I like it here very much… it is nice… to sit outside and look at the river go by… to see… bison walking around… in my backyard. (Park County, Recreationalist)

> Going on 15 years… moved here from suburban Denver… where I was sharing the great outdoors with three million of my closest friends every weekend. This area had a lot of appeal from that standpoint, a recreational standpoint. And being an hour from Yellowstone Park. (Park County, Local Civic Leader)

The distinction between these rooted agriculturalists and the newcomers drawn to the area by recreational and amenity interests was noted by participants. One recreationalist commented about his understanding of how the transition of the local population was perceived by the agricultural community:

> From the ag community, I'm sure [it's difficult] seeing some of that stuff go out of production, to take a piece of productive land and sell it as hunting and fishing property. (Park County, Recreationalist)

A lifelong Park County resident further hinted at this topic when she jokingly described her new neighbor:

> [He is] some man from California that had more money than he had sense [laughs]. Just saying. (Park County, Residentialist)

Comments regarding the extent to which traditional rural values were still operating in Segment V suggested mixed understandings:

> I said, "Okay, I will call Doug Chandler."... And he came right over… So I said to Doug, "Well, what do I owe you?" And he said, "Knit me a hat."... And that was all. I mean these people charge like $150 an hour, so of course I got the yarn. (Park County, Residentialist)

> We lost two neighbors down this way… these neighbors down here always worked with us. We all worked together up until the last year actually… she's a new owner, but she didn't want to... I don't know. She wouldn't do anything… [and] I'm sick of it out here. The roads, the traffic... When we first moved here, you could count maybe 20 cars a day. Now it's 20 cars [a minute]... So… I'm not happy with the way the river is and the problems I've had out there with the property. (Park County, Residentialist)

Some in Segment V were concerned with apparent growth in recreational demands:

> [We are] loving [the river] to death. I mean… there are tons of fishermen now and… everybody has their own boat… so the rivers are crowded, or getting there… And so I think that is a big deal… Nobody likes to be told they can't go on the river… that is the worst thing. [But] the Smith River… there were too many people trying to float it, not enough places to camp, it wasn't good… so there was a place, a time when regulation was appropriate, and people were okay with it… The Bitterroot… I think has gotten some controls. So, there are starting to be some stretches [of the Yellowstone] that have perhaps really reached that point. And some of them are where it is time to restrict some parts of the use… This river now is not restricted… The trick is going to be doing it and having people support it because it has gotten to that point. But I do see crowding and overuse, loving these things to death. (Park County, Recreationalist)

> That recreational buyer is probably going to be thinking more about resource protection than running 100 head of stock on it won't be that big a deal to that recreational buyer, but making sure the fisheries habitat is in as good of shape as possible is going to be important. (Park County, Recreationalist)

> We need to find a way to keep the river viable from the standpoint of maintaining a fishing industry. And the reason I say that is because, without a fishing industry there is not as much of a constituency for river health. So, I think we need to keep enough people in it who have a stake in the outcome from an economic standpoint. (Park County, Local Civic Leader)

The inadequacy of public access points was a growing concern:

> You know, we had days last year where things got pretty jammed up because the season was short. So, they did do an expansion of the parking area for cars. Traffic flow in and out of there was heavy, but it was manageable… I'm not sure I would want to [add more access points]. I kind of like the idea of having long stretches with no access. But that is just me from a recreational standpoint. (Park County, Local Civic Leader)

> I'm kind of dependent on public accesses where you can back down into the river….I can't get to this upper whitewater stretch very well—this first three miles out of Gardiner, which is great white water. (Park County, Recreationalist)

Bank Stabilization—Holding the River at Bay: Some participants discussed bank stabilization methods as means for protecting properties:

> At this point in time we have been able to hold the river at bay, and it seems like every year we have to do considerable amount of rock work and stuff to protect what property we have. I have lost a considerable amount of ground… It's an ongoing process to protect my upper property… The river is making a run at me… I have to do yearly maintenance on my work… that was one of the requirements of the permit I got from the Army Corps of Engineers… just a requirement that they require. (Park County, Agriculturalist)

They tended to frame their current understandings of bank stabilization in reference to the 1996 and 1997 floods:

> I think the real reaction we had against what happened in '96 and '97 was that when property owners saw big chunks of their land being washed away in the river, then they wanted to protect those properties so that they started building whatever kind of protective structures they could to keep the river out. (Park County, Recreationalist)

> In 1996 the river got extremely high… and it cut me off from about three or four hundred acres of property… plus the fact that it was damaging spring creek considerably… [which is important for] spawning ground and fish habitat. I tried to work with the Army Corps of Engineers, and the powers that be, and the EPA, and Fish Wildlife and Parks, and I wanted to shut the channel off. And they were very much opposed to doing that. They wanted to let the river run wild and free. And so eventually, the Army Corps did…assess the situation and see if there was

> not something we could do to… so [a consultant] put together a plan to move the river back into its original course… And I said, "That can't happen." And he said, "Well, why not?" And I said, "Because the regulatories will not allow it to happen. Will you?" And they all stood around and said, "Yes, it can happen."... And I had to go through an environmental assessment of some sort, it took about 60 days in such a manner, and a public hearing… There was some fishermen that formed a Spring Creek Foundation, and they were very supportive of me and what I was trying to do, and morally, it was a local deal… so I put in root wads along the bank… and we closed up the channel… And we planted willows, and we planted grass, and I did a tremendous amount of work that cost pert near three-quarters of a million dollars… Then '97 came along and we had another high event, and I lost the whole thing… It all blew out. It all blew out… I saw my stuff being destroyed, and it was so devastating… The root wads and the willow plantings and the sod deal, it just was not aggressive enough to take care of the running of the river through this area at all… So I built a dike along the river and put in some heavy riprap. (Park County, Agriculturalist)

> [During the '96 flood] the road broke in half… So once that went, it hit the island over there… and my next-door neighbor did not riprap. We were all riprapped… Well of course, the force, it hit there, came back, found here a weak spot and came right in my house… So you know, it just breaks my heart… Then of course, the heavy equipment came down… they built a concrete wall clear across the front of the house. Then they brought in all of these rocks, all these big rocks… It is not as beautiful now as it was when we first came, because I have lost 100 feet of lawn in '96… Now of course, I have got a rock pile. (Park County, Residentialist)

> That was '97 that I did that [put riprap in]... during the flood. Because it came in a gush that year, and it was overflowing so bad. That was real low. And we brought in truck loads and a big crane, and the crane placed it where we were having trouble there… We didn't [get permits] at that time. But then after that we were told that nobody would be given a permit anytime anyway, so. (Park County, Residentialist)

> In '96 and '97, they went on a huge deal there, and they put in a big dike along the river there to protect the lower part of Livingston… then after that they paid a bunch of money and took it out, and then they had to put it back in. I think last year they put in a bunch of dike, and now they are taking it out again… It is an ongoing thing. (Park County, Agriculturalist)

> If there are some lessons that we've learned, one of the things I think we ought to learn is that we are not going to beat the river at its own game. (Park County, Recreationalist)

Some explained that hard riprap was problematic, and some discussed alternative approaches:

Obviously, every time there is a bank stabilization project, it pushes problems downstream or creates problems downstream. So, it dominoes. So… if I were king, I would change how we do bank stabilization and when and whether we decide to do bank stabilization. (Park County, Local Civic Leader)

Mr. White down there who had put a berm out in the river… might have caused probably some of the [erosion] problem [on my property], I don't know. (Park County, Residentialist)

And every now and then you see it, people build too close and then they complain when the river eats away the bank and attacks their house and/or they do something grossly inappropriate to the river in order to try and protect their house. And we need to work hard to protect the free-flowing river in all of its extremes. (Park County, Recreationalist)

[In terms of current projects] there's really not much happening… the ideal is actually not too far off from what we have now. I think it is actually pretty good. (Park County, Local Civic Leader)

I used to mow all that out there. But we're finding to leave willows because it helps… catch things in there. And sand and stuff, it builds the bank up. (Park County, Residentialist)

Several years ago, we did annex and plat a major development east of town…. It was actually a fairly good plan. They had a lot of dense development… [so the plan] was a riverside park and bike path, recreational path. And they already have some reinforcement in that area, some rip rap, and I don't think they plan to change that. It would be an opportunity if they wanted, but I don't think that was in the cards. (Park County, Local Civic Leader)

We have been lucky in town, because there has not been a lot of alteration of streambanks… Obviously, the levy is a major element of historic impact, it has not been altered significantly since it was put in… I would like to see something different, but… Ideally, if we were to go far enough back, I would have said, "Well, let's put some protection in, but back from the river and allow some inundation to that point so you can allow for some seasonal flooding or cyclical flooding… if you have major events. And between the protection and the river… build parks that are okay to be inundated. I think that would have been a better strategy. The levy itself appears to have a fairly high degree of integrity, but there are a lot of old trees there that if they were to topple, the roots would pull out part of the structure, and then you are faced with reinforcing. You have a self-perpetuating issue there. But that's an ideal. As far as, if you wanted to do stabilization there, there are a lot of… soft stabilization techniques there with willow planting and logs. A lot of alternatives to rip rap. (Park County, Local Civic Leader)

One participant linked bank stabilization to the health of the fishery:

> There are obviously places up and down from Livingston where I would manage the bank stabilization differently, because we have lost a lot in terms of side channels for…juvenile rearing and spawning. And it has to have an effect… There has been a lot of restoration work on Fleshman Creek and there is slated to be quite a bit more. So, I see that as being very positive because I think that will replace some of the… the spawning and the rearing habitat that we've lost with the riprapping…. Outside of that [bank stabilization], last year there was a lot… of fishing pressure on the river because the season was a short one. We got started late because of high runoff. And there were times… I could drive across Carter's Bridge and could count 12 rafts upstream… so things were hitting pretty heavy there for a while. But that is an unusual thing. (Park County, Local Civic Leader)

Bank Stabilization—Private Rights, Public Resources: Of great concern were the connections between public resources and private rights:

> Development along the river is not good for the river, depending, you know if it is set back and so it is not impacting the bank too much, not impacting the riparian area and/or the experience of floaters, okay. (Park County, Recreationalist)

> Building along the banks too close to these rivers is really a mistake. Certainly, a free-flowing river like this, it cuts a wider swath then anyone would think. And so you need to allow that to happen. (Park County, Recreationalist)

> I went east there yesterday I saw places where people had built along the river, and I said to Jenny, "I don't understand why they do that in today." I know why they did it a long time ago, but today it really doesn't make good judgment calls… Why would you build out in a place like that? But people do, and I don't know whether education would help or not, but it might in some instances, it might. (Park County, Agriculturalist)

> Probably just because of the…economic downturn, maybe some of the issues in terms of… development along the river, that's sort of slowed down… So, it seems like… we're not seeing that sort of housing development that we might have seen six or eight years ago. (Park County, Recreationalist)

> Looking back, ideally I would have put setbacks in place in 1920, but it is hard to do it now… Madison or Choteau County… one of those had a 500-foot setback. So, it can be done. (Park County, Local Civic Leader)

> There have been several attempts at the legislature that have not been successful. The agreement is always, "One size just doesn't fit all." And so if you say 300-foot setback or 100-foot setback on smaller streams, or try to define it one way or another, there are going to be people who object and then people who don't like government, so they will say that is heavy-handed. So... it is really hard to

> achieve. The last attempt… had a setback but had a pathway for local governments, since one size does not fit all… to develop their own rules, so that a county, say, could do it or a municipality… [because] this river here is really different than the Clark's Fork through Missoula… it is really different here in these headwaters areas and through Paradise Valley than it is in Billings. So how do you deal with the different circumstances?... I'm not sure. (Park County, Recreationalist)
>
> I guess I don't have any hard and fast answers to those kinds of social questions about whether we should be, you know, should we make everybody move off the island that own property there? (Park County, Recreationalist)
>
> I think that there is a lot of room for using market tools to solve conservation problems… I think [easement programs are] a good idea. I mean, it is a way of creating a property right that is transferable, with a transparent set of conditions, you know. They are open to transfer, purchase, and sale. (Park County, Local Civic Leader)
>
> It's one of those quandaries that I get into. I hate the idea of somebody telling me what I can do with my own property, darn it. But at the same time when I see some of the things that people do with their… property, I'm just horrified. So, you don't want the control, yet you need the control. So, it's a hard one. Should we zone or not, you know?... I guess at this point, if I were to come down on a side, it would be in favor of some regulation. Because even though individual property rights are vital, I believe, to the American way of life, nevertheless… we're here such a short period of time and then we're gone, and what we can do is really wreck something… for generations after that by some stupid, selfish… decision we made. So, if I had to choose one over the other, I think I would choose that, but I almost cringe saying that. (Park County, Agriculturalist)
>
> I think there's a little bit higher awareness at least of some of the issues that surround the river in terms of development and you know, conservation and all the rest. (Park County, Recreationalist)

Management Legacies—The Governor's Task Force ad SAMP: Segment V participants often contextualized their thoughts about managing floods, erosion and bank stabilization in terms the Governor's Task Force and the Special Area Management Plan (SAMP) process (both of which occurred after the 1997 flood):

> It's much easier to get all of the stakeholders to agree that we need more information… It's a lot easier to try to be gathering all that baseline information, and then trying to actually see where that gets turned into policy, I guess [laughs] all I can say is good luck… Because I think that from what I saw in the Task Force is that… a lot of the stakeholders will interpret that information very differently… depending on our particular viewpoint going into these issues… the data just feeds either your worst fears or your greatest hopes… [so] I think that

whatever polarization that we may have seen going in [to the Governor's Task Force] was pretty much what we had coming out, and I think that's where it's hard to figure out where policy is supposed to go… I think long term for the health of the river, if there's anything we could fix it would be to get the stakeholders to try to actually sit down and work through some of the issues rather than immediately branding the opposite side as the enemy and not being willing [to work together]... So, I think we need some recognition of that. (Park County, Recreationalist)

The Task Force… they amassed that information, but the river is ever-changing, so you have got to keep updating it and making sure that information does not become obsolete and no longer valid. And if you don't do that then it is absolutely a loss. (Park County, Agriculturalist)

I think that there was a lot more awareness of those issues when the Yellowstone River Task Force was doing its job. And I think with the passage of time, I think a lot of that has sort of been forgotten. And the issues have sort of been subsumed into the culture, and we moved on. Not that they are any less relevant or less important, but I don't think they are so much on the radar anymore. (Park County, Local Civic Leader)

I'm not sure that a lot of the ideas we discussed in the years of the Task Force… and the recommendations that we sent to the Governor, I'm not really sure that there's a much stronger awareness of some of those issues among the public. But I think… in terms of maybe development that's happening right on the riverbanks, I think there's maybe a little higher awareness… since the floods in the late 90's that sort of precipitated that whole thing… It almost seems like in some ways, last year I thought was… a nice acid test, because… we kind of went through reaction to the flooding of '96 and '97, things like the Governor's Task Force, and… we worked on a lot of those issues.... Part of the Task Force thing that fell out of that was the Special Area Management Plan. And I think we're now just sort of in the phase… of seeing how the SAMP is going to be applied, and whether people can work with it … whether the various stakeholders are happy with the results… The idea of the SAMP from I think those that didn't want to see regulation on the river… they saw the SAMP as something that was going to prevent any kind of development, any kind of work. From the ranching community, I think the worry was that we are not going to be able to do anything along the riverbank now. But I found it kind of oddly amusing that, looking at it from the other side… the environmental community looked at it exactly the opposite… that the SAMP is going to rubber stamp every bit of development within the area of the plan. So, I think like in most cases, the sky is falling attitude from either side of the fence is not necessarily what's going to happen. But I think from everything I've seen so far… I've heard people say… that they're still worried that the SAMP is going to create problems... But I think we're just now sort of in that phase where it's going to be a while to see how the ag community deals with it, you know, realtors and people wanting to build houses and seeing

> where the whole thing plays out. And I don't have much of a feel yet for what people are thinking. (Park County, Recreationalist)

> The Yellowstone Task Force… we worked… three, four, five years on that thing, and amassed a huge amount of information. It is now sitting in somebody's basement and nothing really ever happened from it. A portion of it, the Army Corps of Engineers has… worked it into the SAMP program, and I have been concerned in the fact that a lot of that information that we gathered was not supposed to be regulatory. (Park County, Agriculturalist)

Some expressed frustrations regarding flood maps and post-flood interactions between property owners and governmental officials:

> Part of the land [is in the floodplain], I don't know. They're redoing it all. Some of it's floodway, some of it's floodplain… It [the difference between the two] depends, and they're allowing buildings to go on some of it, and I don't know which one it is now… I don't think anybody knows… Because you get a different opinion and a different saying from anybody, everybody along here. (Park County, Residentialist)

> The County Planner… she said, "Because you lost 50% of your house, you can't rebuild." … She told me that it would have to be so many feet from the river, and if I left or if I died… that my family would not be able to take over, in other words, they are just going to take it [my home] away from me… So anyway, my brother-in-law… came to see me… so he talked to her. And it is a funny thing, because as soon as the men get involved it's different. I am sure she would have shown me the door if I had gone… So she came and she said, "You're right, you haven't lost more than 50% of your house. You can rebuild." (Park County, Residentialist)

> I'm not really clear on what the SAMP intended to do… I know it is supposed to be guidance document for how alterations are done. Beyond that, I haven't read it. I don't know whether it changes anything or just administratively solidifies what is already in place in terms of practice. So, I don't know whether any changes resulted… I believe it came from the Corps. (Park County, Local Civic Leader)

2011 Flood—It was Really Something: Participants discussed the 2011 flood as a significant event that impacted both riverfront landowners and recreational interests:

> Last year was an extreme, but in the time I have spent here, I have seen high water like that a few times. And it happens, and it is really something. It gets up into places, and you didn't realize that the river actually got there or could do that. (Park County, Recreationalist)

> Interestingly, as high as that water was, I think in some ways we were just incredibly lucky given the amount of snowpack that we had. I think it almost

> ended up being the absolute perfect scenario in terms of weather to get that much snowpack out of the mountains in some sort of orderly fashion… Locally we actually saw more flooding damage from some of the really heavy rains that we had in June… I was actually really fearful because the river stayed so high so long, and quite frankly so many fishermen and so many guides that were anxious to get out, I was pretty sure that we would probably have some accidents and was fearful we'd have some drownings… I think my very first day [on the river] was the 6th of August. And normally… we'll be floating the Yellowstone by around the 4th of July or even a little earlier… In terms of being affected by it…a lot of the guides and outfitters that depend on floating the Yellowstone... they were scrambling to find other places to fish. I know lots of guides and outfitters that went to other parts of the state to work for a while just because there was very little that was available for us here. (Park County, Recreationalist)

> I said, "Well… I just happen to live in the headwaters… and that [snowmelt] hasn't even started to come out yet. This is going to be a crazy year." And we kind of said, "Yeah." And there was no more to be said. And then of course… it was a couple of weeks before… it came out and wreaked havoc. (Park County, Recreationalist)

> After the flood, found out that whole room, the foundation had been all washed out… this last year. So… that was a big deal. (Park County, Residentialist)

> I think I lost it [the barb] in this last one [flood]... they wash out, they roll… that cost $25,000. (Park County, Residentialist)

Nearly all of these participants framed their evaluations of the 2011 flood in terms of the floods of 1996 and 1997, which had been particularly impactful in Park County:

> Last year was 2011… I think that that is probably the highest event we have had in the last hundred years. It was a hundred-year flood last year, and it wasn't as bad as it could have gotten, but we did have a high event. The thing that puts the difference between last year's and ['96, '97] was it was short-lived, it didn't last all that long… very short-lived. It got extremely high, and it could have gotten a whole lot higher… It didn't do as much damage as I expected, or as it could have had it continued. (Park County, Agriculturalist)

> We had really, really high water for a really, really long time, but… we didn't see the sort of damage that we saw back in '96, I'm sure to some degree because the floods of '96 and '97 changed enough of the river course that some of the side channels that were probably opened up in those years now provide a little bit of natural protection against flooding. (Park County, Recreationalist)

> Last year's flood was... completely different, because I don't think it all got covered out there like '97 did. The ditch was higher or as high because we were

> losing it all over. The high water did not start until late June… it was just a different year. (Park County, Residentialist)

> Last year was not quite a record year, but it was hard to judge because with the '96-'97 floods, the channel morphology changed so much that it has more capacity for water now. So, I suspect we had something close to record flood volume, but we didn't have floods. The city did undertake one action in conjunction with the county; we did extend the flood berm with temporary materials down in sort of the mayor's landing area between the road and the golf course, which would have allowed some inundation of the golf course, but it would have protected homes on this side of the berm. That berm has since been flattened. (Park County, Local Civic Leader)

> Last year I think the level of public concern was substantially less than what I understand it was in '96 and '97. And I think because of those somewhat recent events, at least within memory… people realize that these are the kinds of things that are likely happen. (Park County, Local Civic Leader)

> '96 and '97 were big flood years. It was a little different [last year]. It was a little bit more concentrated [in '96 and '97]… I mean those were spectacular in terms of the damage they did, or the changes. I shouldn't use that word damage, because a free-flowing river, this is one of the things that happens… This place down by Livingston, there are hardly any cottonwoods left… it was pretty dynamic and exciting. So yeah, we have seen some other high-water years, but last year was definitely one of them. And it didn't quite get to the same… peak, I think it was 31 or 32,000 cfs on those '96/'97 years… but it went on and on forever in the high twenties, just strong, strong flow forever. I was a little frustrated because a lot of the river accesses were flooded, and I couldn't get on the river. And that was too bad; I wanted to be on it. (Park County, Recreationalist)

Some participants connected the flood to other thoughts, even to weather variations:

> Last year was an extraordinary year for water. And here we are going to have a very different water year. (Park County, Recreationalist)

> We've never had water this early. It's always been late, sometimes around the 14th of May, it's a good start around that time. Or even last year it was later it started. It depends on how hot the weather is, I guess. And this year it started the 24th of April, and it run until yesterday. And then it's dried up. And I suppose it'll run again when it starts getting a little warmer… Usually it [the ditch] backs up this way… This year it didn't… So that's kind of a change… Because I've never seen it where it didn't back up before. (Park County, Residentialist)

Oil Spill of 2011: While many of the Segment V participants discussed the impacts and implications of the 2011 oil spill, one mentioned the perceived cause of the rupture:

> Perhaps the pipe was already exposed, I don't know. But last year the water was so strong for so long… Maybe something was carried downstream and hit this thing, or maybe it scoured it out and just scoured it in all one action that happened over the course of a week or two or three, whatever. Yeah, I think it... was probably related to that [the high water]. But… it was not buried deeply enough and not monitored. Then they did this effort statewide to look at all the pipelines crossing streams in the state. They found all sorts of things that weren't known. And so, we ought to learn from that… I mean, where I live here almost to the headwaters of the Yellowstone, we are probably okay. But… there was that gold mine that was proposed in Cook City…and we have got our Gardiner sewer system. Every mile you go downstream, there are more and more things that can impact the Yellowstone… You just can't be careless with these water resources. They are valuable, and they will get ruined. And you can't get them back very easily... I think we need to really value this… I think we need to have higher standards and/or better enforcement. (Park County, Recreationalist)

> The only new thing that probably was big for us was the oil spill on the river... I think that was kind of an eye-opener for a lot of us… it was amazing how many clients called after they heard about the oil spill, wondering if all the fishing around Livingston was gone. And we had to report that it was way downstream of us, which doesn't make it any better, but at least it wasn't affecting the trout fishery around here. (Park County, Recreationalist)

> We are upstream a couple hundred miles, and so this [didn't] get us. But... where it occurred down there, it was a serious spill, and they have a serious clean-up, and it is going to take some years before… it is mostly back to where it was… It happened right at high water, and it was floating up into fields and floating into those debris piles, I guess they burnt some of those… Gets rid of oil, but it burns up something that is actually important to the river. So maybe it was a lesson... that we will maybe learn from. Those are some maybes… The Keystone XL pipeline comes to mind. And are those river crossings adequately designed? Is the design requirement enough for the occasional really weird year that comes along with any river? Even dammed rivers, I mean the Missouri was out of control last year… and it was digging huge scour holes in places. So, is the pipeline designed for that? … I think we ought to worry about that a lot actually. (Park County, Recreationalist)

Future of River Management: Two participants discussed increasing human impacts and water quality as apparent issues for management in the (near) future:

> I think the major issue from a river health standpoint is this city is not of the size that is required to have a stormwater management plan. And stormwater management I think is not a huge issue, but it is not insignificant. And I believe the cut-off is a population of 10,000 and we are at about 7,800… [Also] from a river health standpoint… I think it [water quality] has made some marginal

> improvements, probably because the city [of Livingston] has upgraded its sewer treatment plant. (Park County, Local Civic Leader)

> Beyond the pollution problem, it [fracking] takes a lot of water… So you are out drilling and fracking wells in these dry parts of Montana and using a great deal of water, we need to be cognizant of that and not be careless with our water. And where we need to, conserve it, and not let it get used and used up especially. (Park County, Recreationalist)

Some of the conversations touched on government intervention. On this topic, one recreationalist jokingly (but tellingly) offered a definition of local sentiments:

> We don't want those stinking feds in here doing anything to our state. (Park County, Recreationalist)

Another participant discussed the issue in more detail:

> Rancher friends… they'd say if there's going to be any regulations, they'd want it to come from the county, that they'd want it from local people... rather than having a bureaucrat handing down some commandment from on high that everybody is going to have to follow. But I think… if you look at it from the other side… we need to look at it in greater scope… I think something that even the Corps recognized is that if… regulation happens on too narrow a scope… if you do that on a landowner by landowner basis, you don't have a chance to see what the overall impacts are… We can try to manage, not landowner by landowner or particular stretch of the river by particular stretch, but look overall… we need to do some kind of overall planning so that whatever changes we make, whether it's building riprap or a barb to try to protect property, or allowing or not allowing a structure to be built close to the river, that we do need to look at something beyond individual cases. But we also may need to recognize that within a river like the Yellowstone that reaches across huge different expanses of different geography... for example… you don't see a lot of migration of the channel close to Gardiner, I mean you're dealing with bedrock channel up there and it's not that much of an issue… you can have really high water and you're not going to see a lot of effect… but we get down here where the channel does migrate a lot… it's a much bigger issue. (Park County, Recreationalist)

Others discussed what might work in terms of moving the community forward in a constructive manner:

> I think that if those issues can be raised in a way that are sort of collaborative in terms of bringing in interests in a constructive way, I think that would be great. Because I think there are some things we can do. I think there is potential for setback ordinances, you know, if made and approached the right way. But… if things are raised in such a way that they are contentious, that solidifies positions without allowing any space for any kind of potential agreement on how to move

forward… There is no original ways to solve these problems; they are just resuscitations of methods now and then. Part of the matter is trying your best to identify all of the interest groups, trying to make sure everyone has a seat at the table, early, so that there is less of an opportunity for some of these interests to come in after the fact and torpedo what's been agreed. The other thing is just to find as much common ground as you can as early in the process as possible. Once you have gotten past the point of getting into the controversy stage, it is kind of too late… I think that the WSA issue is going down that road, where it could be pretty productive. Because I think everybody, all of the major interests who were involved in the controversy both from a public process standpoint and a legal standpoint, I think they are all represented in that group. And that group is starting out, in terms of process, by developing… a process and not to focus on resolving the issues themselves. So, what we are charged in doing is laying out a framework and some ground rules for how a separate group can move forward and addresses those issues… I think it could be positive. Because it removes the Forest Service as a leader in the process. (Park County, Local Civic Leader)

Pretty much all of the watershed groups I think are a wonderful first step, because if nothing else it just keeps some of the dialogue going. (Park County, Recreationalist)

Appendix
Protocol—Agriculturalists 2006
With 2012 Adaptations in Red

1. How many years have you been in operation here?
   a. Do you live here full time?
   b. IF NOT: How many months a year is your home occupied?
   c. How do you describe your place to people who have never been here (there)?

2. What was it about this site that made you (your family) want to locate here originally?
   a. Is the river important to you?
   b. What do you like best about being near the river?

3. Are there any problems associated having property this close to the river?
   a. What do you think is the most important problem?

4. Have you ever had any flood damage?
   i. (If yes) How much of your place was affected?
   ii. Is there anything that should be or that can be done about erosion?
   iii. Why would that be your course of action?

5. Has there ever been erosion damage to your lot?
   a. (If yes) How much of your place was affected?
   b. Is there anything that should be or that can be done about erosion?
   c. Why would that be your course of action?

6. Did you notice any impacts from the oil spill in 2011?
   a. (If yes) What types of impacts?
   b. How much of your property was effected?
   c. Was the response adequate?
   d. Is there anything that should be done, or can be done about the oil spill now?

7. Looking ahead 10 years, what do you expect your place to be like?
   a. Will the physical facilities change?
   b. Why is that?
   c. As you think about the next generation, what are your primary concerns?

8. Some people talk about the river corridor….How is the river corridor different from the river itself? (follow-up to explore “riparian” zone –with

or without using that word)

9. Besides what you have already described, what are the various uses of the river?
   a. How do you think the rights of all users can best be balanced?

10. What keeps you here?

11. Of everything we've talked about, what is most important to you?

An Example Excerpt from a 2012 Interview Verbatim Transcript

SUSAN: Did you ever have any erosion issues?

PARTICIPANT: We did, yeah. We lost some riverbank. That happened for sure. Blue Creek itself changed course. There was actually more erosion I think out of Blue Creek than on the Yellowstone. But yeah, there is definitely spots where the banks are sloughing off into the river now, and you know, it's been eating out underneath and we lost some trees next to the river. But you know, all in all, we were really lucky in that sense. Lots of people upriver from us, you know, where the river really spread out wide and their houses were surrounded and flooded, they were in a worse spot.

SUSAN: If you were to have more erosion, would you be inclined to try to stop erosion?

PARTICIPANT: Well, yeah I would like to, but I don't know how to do it without changing the course of the river, because that's the problem with it. And you know, we've seen the impacts of people doing that upstream. Well, I shouldn't say we personally, but like [my wife's] parents can remember where the river used to flow before riprap was put down on the property next to us. And then you know, I mean all you're doing is creating somebody else's problem down the river. So you know, if I could figure out how to do it with revegetation, yeah I would definitely be inclined to do it. It's one of those things that I don't know if we're really going to have to worry about because it seems like we're snapping back into drought again, and I don't know that the river is necessarily going to make a regular habit out of coming out of its banks like this. But yeah, I mean you definitely don't want to lose property. It's not good for the river to get all that additional sediment into it.

SUSAN: So as a policy position, where would you stand on people who are trying to stabilize their banks?

PARTICIPANT: That's such, I mean that is such a tricky issue. I don't know. Because you know, on one hand there is what I just said that when you are trying to stabilize your banks, you're creating problems for other people downriver, but I can remember a guy last year that, you know, they had their house right next to the river. And I don't know his full story, but the way he presented it to me was that he had been trying for years to get the state to allow him to stabilize a small part of the bank there, and they ended up losing their house. You know, and so I mean it's easy to say from a 30,000-foot view that you shouldn't be able to do that, but when you're sitting there with somebody that just lost their house and probably could have made minor modifications there that would have saved it, I don't know.

SUSAN: Does that present a lesson for us about future building?

PARTICIPANT: Well, yeah. I mean I think that's the big lesson to walk away from it. I mean, I don't know what you do with the existing places, but there obviously is a place for stream setbacks, you know. And to me it should be common sense to people not to build their house right next to the river, but obviously it's not. So yeah, I think there is definitely something to be learned there. And it's, you know, what people need to remember is that it's about everybody's insurance rates. It's about everybody's property taxes. And all of that goes into paying for protecting these places that end up right next to the river.