

# “A Beautiful River that Eats People”

*The Value of Streamflow for the Salmon River Bioregion, Idaho*

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## Authorization to Submit Thesis

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## Abstract

To assess both monetary and non-monetary benefits of Ecosystem Services, constructivist Symbolic Interactionism and critical Political Ecology provide insight where Economic analysis alone fails. This research incorporates those theories and the theory of Bioregional Imagination within a Grounded mixed-methods assessment of streamflow benefits for residents of the Salmon River Basin (SRB), Idaho where climate change models predict reductions in streamflow rates as high as 20 to 40% by 2080.

But, what is the value of streamflow for residents and how will streamflow reductions and alterations impact the SRB? Findings presented here indicate that streamflow contributes cultural benefits in conjunction with employment that provides both fiscal and heritage and/or other intangible benefits; residents report a monetary *trade-off* for living in the SRB in favor of nonmonetary values. Through economic analysis combined with qualitative and statistical consideration of the river as a significant symbol, this research provides actual *measurements* of those values.

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## **Dedication**

This thesis is dedicated to my family:

My parents, Jean and Mark, my brothers, Devin and Trevor, and their wives, Liz and Aubrie,

But most of all I dedicate the product of these past three years to the two people whose corollary absence I felt most ardently in all the late nights and solitary holidays, to my nephews:

**Noah Murdock Miller**  
**&**  
**Ryan Anderson Miller**

I'm am excited to continue to know you as you both continue to grow and I hope that I help inspire you to pursue knowledge and truth, in whatever form you find it in your lives.

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## List of Acronyms

- **BI : Bioregional Imagination**
  - A conception of the environment based on personal perspective that reciprocally affects one's perception of one's own culture and oneself (Lynch et al., 2012).
  
- **ES : Ecosystem Services**
  - A framework for understanding the benefits of ecosystems for humans in the form of provisioning, regulating, supporting, and cultural services (Braat, 2012).
  
- **FEA: Functional Economic Area**
  - An economic area as defined by one or many related economic activities that create borders based on trade (Fox, K. A., & Kumar, 1965).
  
- **PE : Political Ecology**
  - Theoretical framework for examining the natural capital impetus and consequences of institutions interacting and the allocation of resource benefits and costs related to the environment (Nygren & Rikoon, 2008).
  
- **SI : Symbolic Interactionism**
  - A social science theory based on the proposition that all meaning is conceived in symbolic dialogue rather than discovered on the proverbial doorstep.
  
- **SRB : Salmon River Basin**
  - The Salmon River watershed that cuts through both vast national Wilderness as well as Custer, Lemhi, and Idaho County in central Idaho (Tang, Crosby, Wheaton, & Piechota, 2012).
  
- **SAM: Social Accounting Matrix**
  - Input/output analysis model that redistributes production according to transactions and transfers between different economic sectors within and outside of a region (Watson & Beleiciks, 2009).
  
- **SARA: Streamflow Affected Recreation Activities**
  - Categorization of economic sectors (typology) comprised of streamflow affected recreation focused firms operating within the SRB.

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## Preface

True to grounded theory and mixed-methods practice, the following research resulted from the collaborative efforts of many participants. Not only do I hereby recognize the contribution of my research participants to these results, but I disclose the input of two research assistants (see acknowledgments). These research assistants helped code interview data as well as enter those codes into the master spreadsheet. Kara Fletcher also disseminated a survey to rafting companies and contacted the forest service on my behalf. Kailie Leggett also examined interviews for pertinent quotes and facilitated in the assessment of respondent maps. Both of these researchers will submit their own academic product based on their efforts for research credit with my major professor, Tamara J. Laninga.

In writing this thesis I utilized the pronoun “I” to identify the role of the researcher in this process, however, much of the research that “I” conducted involved the coordinated effort of myself and these research assistants, together. All three researchers completed the National Institute of Health’s training: “Protecting Human Research Participants” and the methods employed in this research qualified as “exempt” by the Institutional Review Board of the University of Idaho on the basis that participants were not subjected to emotional stress or physical threat and subjects cannot be identified directly in data (Appendix 5).

Since I employed several distinct research methods, based on distinct theoretical constructs, I organized this thesis to reflect both the distinctness of those methods as well as their overall integration. The reader is encouraged to read, therefore, in a non-sequential manner as befitting their individual interest. However, the results chapters, Chapter 4, 5, and 6, are not stand-alone chapters but rather a partitioning related to specific questions, hypotheses, and methods. Chapter 7 provides a conclusion for all the research results presented throughout this thesis. This thesis presents a broad and exploratory approach aimed at a more comprehensive examination rather than more in-depth analysis of any one aspect of this topic.

## Chapter 1. Introduction to Bioregional Ecosystem Services

### 1.1 Bioregionalism in the Changing Northwest

Over a decade ago scholars began to critically reconsider the societal succession currently transforming the physical, cultural, and economic landscape of the American West into a new frontier with new demographics, politics, industries, and culture (Barrett & Power, 2001). As resource extraction became untenable for rural communities an economic decline began for municipalities, continually chasing short-term solutions constrained by federal policy in the 20<sup>th</sup> century (Power, 1996) during an era of social capital erosion (Putnam, 2000). This newly reopened space was resettled by relatively wealthier migrants looking for amenity values and other tangible and intangible community capitals, (re)creating what were once production oriented places into consumption centers that, in turn, created increased demand for amenity space and environmental protection to preserve an emerging service oriented economy (Shumway & Otterstrom, 2001), dramatically altering the political landscape of the west where local, state, and federal land, interests, and economies, collide (Smith & Freemuth, 2007).

For many areas of the West, especially the Inland Northwest, the exact contingencies of this fluctuating transition are characterized by unique conditions, sometimes inconsistent with the larger narrative (Smutny, 2002). For instance, some towns remain dependent on few, or even one, main natural capital resource as the economic base of their regional wealth and welfare (Beyers & Nelson, 2000) to a greater extent than the county encompassing it (Watson & Beleiciks, 2009). These towns depend upon “healthy” ecosystems for both economic and cultural sustenance where “healthy” is a socially constructed function of *both* ecological condition *as well as* access to these resources (Kelly & Bliss, 2009). However, increasingly, this relationship between people and place is subject to larger forces that move slowly but retain



immense momentum in effecting smaller communities that experience changes in composition and resilience much more rapidly (Folke, 2006).

Correspondingly, these common property resources endure vulnerability to both political and ecological forces, agitated by macro-scale political ecological conditions such as climate change (Birkenholtz, 2012). In this context, managing common-pool resources requires an understanding of localized conditions (Ostrom, Burger, Field, Norgaard, & Policansky, 1999), where human activities, on both local and global scales, effect the production and distribution of common-pool resource benefits (Elinor Ostrom & Cox, 2010). A “bioregional” assessment of place that defines area around a suite of regionally specific “natural, political, cultural, social, and human” capitals that augment “built” and “fiscal” capital in defining the wealth of a bioregion (C. B. Flora, Emery, Fey, & Bregendahl, 2004) contextualizes this political ecological interplay more effectively than more generalizable methods such as gross production (Kubiszewski et al., 2013).

Applied to the changing physical, cultural, economic and political realities of the Inland Northwest, bioregionalism presents an opportunity for examination within an emerging academic framework: Ecosystem Services (ES), which directly assesses the value of benefits that emerge in the environment, as affected by humans (Braat, 2012). Inherently anthropocentric, ES focuses on the ultimate human benefit for specific value-holders, rather than hypothetical and imaginary persons (Barthel, Folke, & Colding, 2010), by considering the preferences and policies of stakeholders defined by the regions specific to the benefits in question (Milne, 2012). Insights offered from understanding regional realities bolsters economic observations about the proximate causes and consequences of change (Plumb, Nielsen, & Kim, 2012) especially in the West where economic analysis challenges the dominate narrative of resource extraction simply constrained by an overreaching federal presence, which mitigated the effect of national recessions (Barrett & Power, 2001). Also, these communities possess high amenity values and other community capital wealth relative to the fiscal cost of living (Beyers & Nelson, 2000).

### **1.1.1 Bioregional ES in the Inland Northwest**

The concept of ES simply reevaluates how society manages natural resources to address environmental processes with a focus on tradeoffs between environmental benefits that do not always have market values (Brauman, Daily, Duarte, & Mooney, 2007). Even without market values, these benefits – or the loss of these benefits – have tangible consequences for affected stakeholders (Chan, Satterfield, & Goldstein, 2012). For instance, the value of public land in the west as a storehouse for environmental and recreational resources attracting new residents is often at odds with these lands as sources for commodity production (Shumway & Otterstrom, 2001). However, by redefining environmental benefits according to ecosystem functions, rather than an amalgamation of potential goods, ES provide a useful framework for assessing the value of common-pool resources that are rival between uses but non-excludable and therefore cannot be privatized (Costanza et al., 2014).

Much akin to ES, bioregional theory recognizes natural capital as the foundation of all other capital (Fey, Bregendahl, & Flora, 2006). Natural capital begets not only fiscal capital, the most immediately obvious application to fiscally focused ES assessment, but natural capital also establishes the other capitals as well. The interdependencies and tradeoffs between these capitals mirrors similar synergies in ES (Briner et al., 2013). The particular arrangement of bioregional community capitals related to regional ES functions establishes a human-environmental network (Lejano, Ingram, & Ingram, 2013). And the perception of the environment possessed by humans in these networks emerges from a Bioregional Imagination (BI) that is socially and culturally constructed between agents in these bioregions (Lynch et al., 2012). BI therefore reveals the culturally situated preferences of residents related to the concept of “cultural ES,” which describe both tangible and intangible nonmonetary environmental benefits that contribute to cultural and social capital such as aesthetic, heritage, religious, spiritual, recreation and tourist values (Daniel et al., 2012).

### **1.1.2 Common Pool Resources and Grounded Theory**

Human-environmental networks often receive economic measurement (Dasgupta & Ramsey, 2005) as well as psychological and geographic measurement (Kaltenborn, 1998; Raymond, Brown, & Weber, 2010). But, ES examination of these networks necessarily focuses on how specific benefits, often measured separately, actually operate synergistically to create multiple benefits or specific tradeoffs (Nelson et al., 2009). More importantly, one natural capital feature may provide multiple possible benefits with values dependent on the relevant stakeholders in the human-environmental network (Martín-López et al., 2012) by the same regionally relevant information supported by bioregional theory (Fey et al., 2006). As such, a transdisciplinary approach to environmental value is necessary for assessing the nuanced preferences of stakeholders related to their natural resources (Belsky, 2011).

Also in line with a bioregional approach (Fey et al., 2006) and consistent with common-pool resource issues (E Ostrom et al., 1999), ES examination reveals that the public benefit of total ES is not consistent with the sum of net private benefits (Polasky et al., 2010). Moreover, individually constructed perception of ES values change over time (Kumar & Kumar, 2008). These realities reflect the transitory and ephemeral nature of cultural ES (Davidson, 2013) as well as the “culturality” that defines the perception of all ES benefits in an explicitly bioregional context (Pröpper & Haupts, 2014). Although regional ES assessment is gaining ground in ES literature (Su, Xiao, Jiang, & Zhang, 2012), many regional ES assessments focus on urban values and experiences (Barthel et al., 2010), especially in developed nations such as the United States. For instance, studies of ES benefits values and preferences for healthy watersheds that feed cities provide rich data of disparate preferences and productivity related to purchasing power (Kozak, Lant, Shaikh, & Wang, 2011). But there remains a need for research regarding the regional ES realities for rural populations in rural areas such as the Inland Northwest that rely on natural capital features that will be equally affected by climate change.

### **1.1.3 Bioregional ES in the Salmon River Basin**

Owing to the complicated nature of ES interactions, grounded mixed-methods facilitate better analysis of specific natural capital features that provides multiple benefits to multiple stakeholder groups in a specific area. Mixed-methods studies allow examination of ephemeral and uncertain values by facilitating multifaceted analysis (Creswell, 2009), whereas grounded theory provides a framework for examining as yet unknown questions (Charmaz, 2006). Many recent ES studies have confirmed the importance of understanding the region specific to the ES benefits and trade-offs in question (Briner et al., 2013) as well as highlighted the need for mixed-methods ES research (Rositano & Ferraro, 2013).

This research takes up that charge by relying on a grounded mixed-methods approach to address, individually, the values of ES benefits related to streamflow for residents in a bioregion located in the Inland Northwest referred to in this research as the Salmon River Basin (SRB) of central Idaho. The SRB exemplifies the experience of many rural areas in the Inland Northwest that depend on access to natural capital resources. For example, the SRB provides remarkable access to whitewater rafting and salmon fishing that depends on the natural capital features of the Salmon River. Threats to natural capital threaten the growth and resilience of the nonmetropolitan communities that exist in the West (Beyers & Nelson, 2000) and therefore threats to the Salmon River threatens the communities in the SRB.

As a high mountain desert ecosystem, the SRB depends on water provisioned by the Salmon River. Much of this water originally enters the system as snow rather than rain, and this snowpack builds up over the winter. But, climate change models for western North America project a 1 to 5° C increase in average air temperature by 2080, increasing the portion of precipitation arriving as rain and mixed snow-rain in the late fall and early spring (Davis, Baxter, Rosi-Marshall, Pierce, & Crosby, 2013), potentially reducing streamflow rates as much as 15 to 20% in spring and 10 to 40% in summer (Tang et al., 2012).

## 1.2 Main Research Question and Null Hypothesis

Due to the critical ecological importance of the Salmon River System, the effect of changes to streamflow rates, peaks and temperature in altering ecosystem composition has received extended study (Davis, Baxter, Minshall, et al., 2013). Yet, the consequences for the human component of the SRB human-environmental system remain under-examined.

Recognizing this deficiency directly prompted the need for this research, designed to address the impending reality of streamflow reductions by attempting to answer the overarching question that guided this research:

- ***What is the value of the ES benefits of streamflow for residents of the SRB and how will potential streamflow reductions impact the bioregion?***

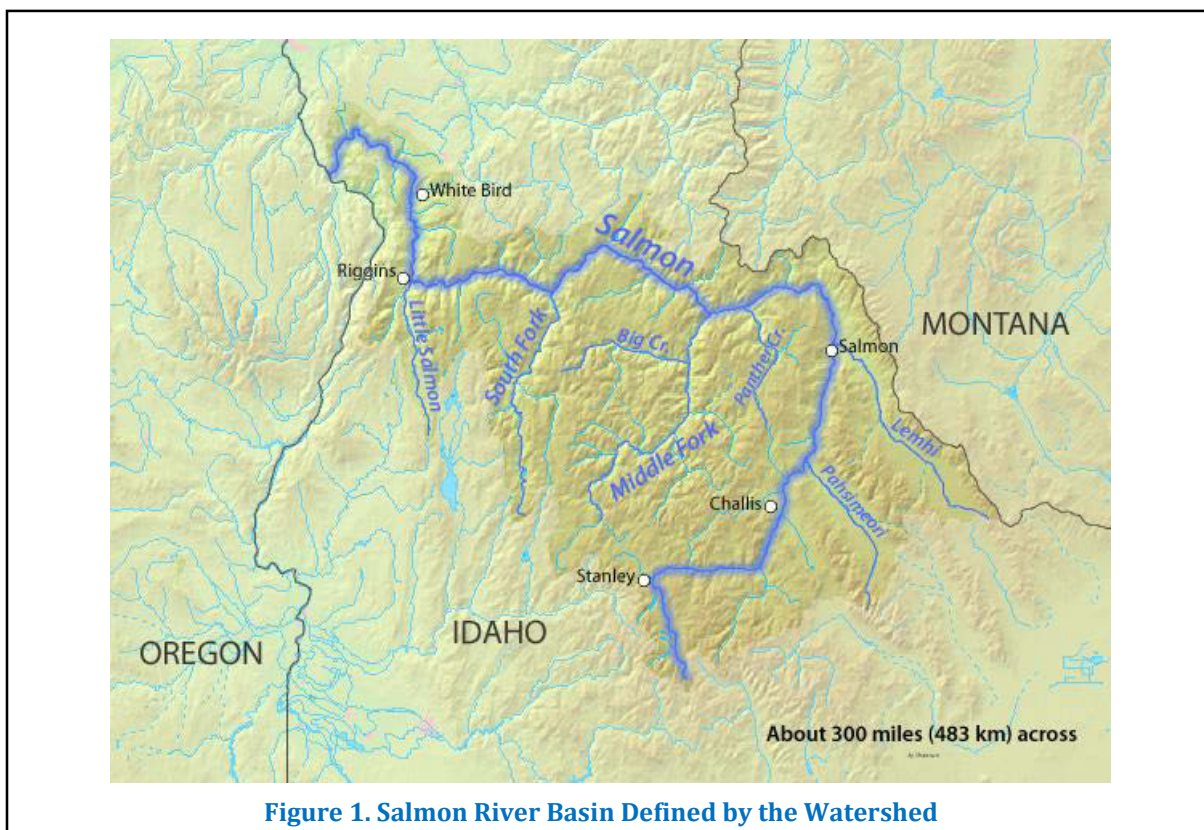
In conducting this research I constructed methods based on the hypothesis that a bioregion exists for the SRB. I conceived of three ancillary questions that guided data collection and analysis (discussed more thoroughly in methods) designed to find empirical support for ***rejecting*** the following null hypothesis:

- ***The Salmon River Basin is not one bioregion based on “The River” and this region will not be significantly impacted by reductions in streamflow.***

However, conducting grounded mixed-methods research requires first contextualizing the study area in an exploratory fashion before realizing more detailed questions. Therefore, I first examined and defined the specific bioregion relevant to the streamflow in question as defined by the river itself before defining the three ancillary research questions on fiscal value, cultural value, and shared narratives designed to answer the overarching research question of streamflow value. So, before presenting these ancillary questions, I first present the study area as defined by the river, which guided the creation of those questions.

### 1.3 Study Area – Salmon River Basin, Idaho

Literally translated into “life-territory,” bioregions define the area required to sustain a life and lifestyle with borders based on physical “truths” (Gray, 2007). Since I studied streamflow I defined the study area according to the watershed boundaries of the Salmon River in defining the SRB. I hypothesized that the SRB comprises one bioregion based on these physical features and the corresponding cultural reality of place related to the river. Much like the ecosystems that define them, bioregions exist within bioregions (Lynch et al., 2012) and the SRB exists inside of the Columbia River Basin as a clear bioregion defining the Pacific Northwest (Aarsand, 2013). Operationally, the SRB refers to the whole geographic area defined by the various watersheds that end in the Salmon River (Figure 1). This research focuses on three specific municipalities within the bioregion, Riggins, Stanley and Salmon, Idaho. These three localities were chosen due to their relative population size, isolation, distribution around the bioregion and cultural importance in each respective county relative to the SRB.



**Figure 1. Salmon River Basin Defined by the Watershed**

### 1.3.1 Salmon River Basin Bioregional Features and Description

The Salmon River is the longest river running entirely within a single state, and remains one of the longest undammed rivers left within the continental United States (Carrey & Conley, 1978) and it provides approximately 20% of the water in the Snake River and accounts for 70% of the remaining salmon habitat for the entire Columbia River Basin (Tang et al., 2012). After 425 miles the Salmon River merges with the Snake River just north of Riggins in Idaho County. The Salmon River emerges from the Frank Church Wilderness headed west, turns north briefly and then turns west again to form a confluence with the Snake River, dividing the state of Idaho into two different time zones: Pacific Time north of the Salmon River and Mountain Time south of it. As a result, most of Idaho County resides in Pacific Time while one small portion of the county, including Riggins, operates on Mountain Time similar to the rest of the SRB. The importance of this physical feature in redefining the political boundaries of this place provides



Picture 1. Tourist oriented map of The Salmon River “of no return” in Riggins, Idaho

our first evidence of the cartography of this bioregion based on logical physical and cultural boundaries (Gray, 2007).

In a simultaneously similar and yet distinct way, the headwaters of the Main Salmon River are defined by mountain peaks that also create the political boarder of Custer County, where Stanley is located. Stanley resides at the confluence of the Main Salmon River and a tributary that runs through the town called Spring Creek. The Main Salmon then runs parallel to Highway 93 for 118 miles, past Challis, until it reaches Salmon, Idaho, which is the county seat for Lemhi County. The namesake of Lemhi County, the Lemhi River, is a major tributary to the Salmon River, and the confluence of these two rivers occurs just south of the town of Salmon, named after the river that runs through it. Salmon, the largest municipality in the SRB, sits 46 miles south of the Montana boarder, defined by the Bitterroot Mountain Range, yet another physical boundary that defines the SRB watershed with political distinction.



**Picture 2. The Main Salmon River near the headwaters in Stanley, Idaho**



### 1.3.2 The SRB Bioregion as a Functional Economic Area

In order to examine the fiscal importance of streamflow affected activities as produced by ES benefits of streamflow for the SRB I also characterized the region according to a functional economic area (FEA) related to regionally endogenous and exogenous economic activity (Cassar & Wydick, 2010). FEAs describe the size and shape of a geographic area as defined by one or many related economic activities. Rather than define a region according to the cultural or *physical* area required to sustain a life and/or lifestyle as bioregionalism does (Thayer, 2003), FEAs define regions in terms of an economic “base” (Waters, Weber, & Holland, 1999). Economic base theory characterizes FEAs according to the endogenous interactions that unify subpopulations and create economic borders based on the range of firms and distribution of exports (Dissart & Vollet, 2011).

Theoretically, the physical isolation of the SRB establishes the possibility of corresponding FEA borders, however, operational regional economic analysis normally identifies FEAs according to county or state boundaries, even when these demarcation lines do not align well with the economic resource in question, especially regarding landscape level benefits (Dissart & Vollet, 2011). In this case, the Idaho, Custer and Lemhi County transcend the SRB bioregion but, arbitrary boundaries become a necessary convention in line with the convention of reported economic data. However, by consolidating economic data generated by considering the SRB as an FEA defined by counties with regionally specific information gathered directly from residents of the SRB bioregion, a more complete picture potentially emerges related to the value of streamflow ES benefits. Thus, the FEA designation serves as one research layer overlaid with bioregional qualitative and quantitative analyses of narratives to triangulate streamflow ES value. Conducting these mixed-methods required intentional questions and techniques related to each methodology outlined in Chapter 3.

## 1.4 Ancillary Research Questions

The following research questions provide a framework for reading through this thesis. Theories are presented related to each specific question, denoted in the heading, as are data collection methods which are further broken into ancillary questions related to data analysis. The three results chapters, Chapters 4, 5 and 6, answer each of these questions sequentially, so one may skip ahead or return for clarifying data.

### 1.4.1 Research Question A

In order to assess the fiscal benefits of streamflow, I draw on regional economic analysis, which characterizes areas according to a FEA. This type of analysis does well at contextualizing the fiscal aspects of a region's wealth, often referred to colloquially as the regional "economy." In order to fully understand the full extent that streamflow affects one economic sector, with attention paid to direct, indirect, and induced benefits, I focus this research question on *streamflow affected recreation activities* (SARA). Specifically, this question pertains to the fiscal and employment contributions of streamflow to the SRB FEA from activities that rely on one benefit of streamflow, operatively: *flow*. This research question asks:

- A. What is the overall economic contribution of streamflow affected recreation activities (SARA) to the SRB economy?**

### 1.4.2 Research Question B

For the socially constructed aspects of streamflow value for SRB residents I considered significant symbols and common representation as representative of cultural ES as well as the culturally conceived perception of valuation. By employing a narratology focused phenomenological approach to interpreting interview narratives bioregionally with a focus on the river as a salient feature in resident BI, this guiding research question concerns:

- B. What are the perceptions of the river and streamflow ES benefits held by different stakeholder groups across the SRB?**

### 1.4.3 Research Question C

The narratives revealed during interviews could either support, reject or both support as well as reject economic analysis, or vice versa. Therefore, understanding the potential universality of observed phenomena provides increased utility to research findings. By statistically assessing the observable subgroup and regional trends as well as statistically testing the relationship between the river and place attachment, the last guiding research question directly answers the question:

**C. Are the perceptions within and/or between groups statistically significant?**

### 1.4.4 Synthesizing the Main Research Question

These three ancillary questions address the overarching research question of streamflow value so that it's possible, by examining answers to these three questions separately, to better estimate the potential effects of streamflow reductions and alterations to the SRB. By synthesizing data, the confluence of research findings will either support or reject the null hypothesis and therefore directly address the main research question:

**Is the Salmon River Basin one bioregion based on the Salmon River and how will potential streamflow reductions or alterations impact the residents of the SRB?**



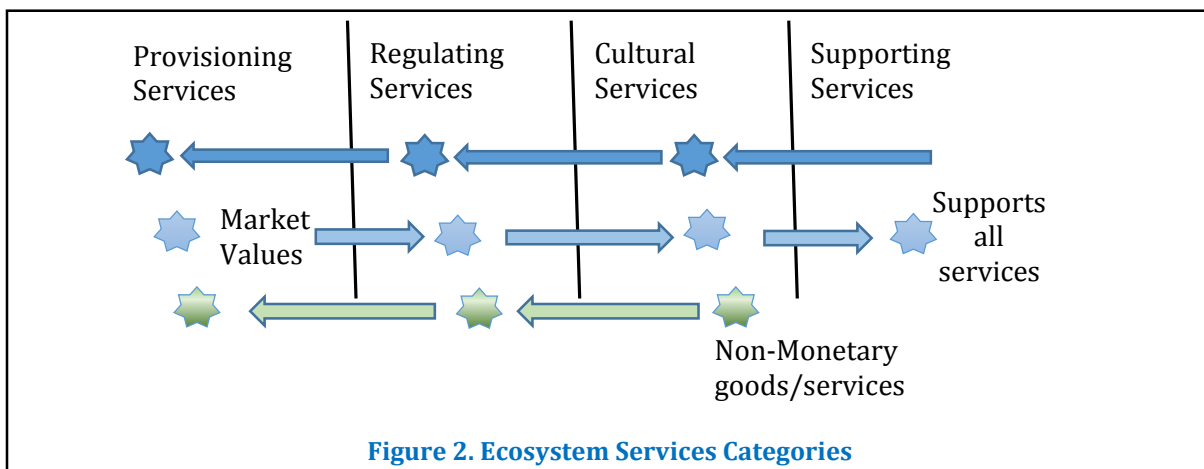
**Picture 3. What is the value of streamflow for residents of the SRB?**

## Chapter 2. Theoretical Background

To assess both the monetary and non-monetary benefits of ES, Symbolic Interactionism (Kumar & Kumar, 2008), grounded theory (Hansson, Pedersen, & Weisner, 2012), Political Ecology (Kallis, Gómez-Baggethun, & Zografos, 2013) and neoclassical economic analysis (Richardson, Loomis, Kroeger, & Casey, 2014) all provide insight, where mixed-methods prove most useful (Busch, La Notte, Laporte, & Erhard, 2012). The research presented in this thesis expands ES analysis beyond these methodologies by incorporating the relevant theories of Bioregional Imagination related to place attachment, phenomenology, and narratology in addressing separate but related constructs and propositions. Theories are presented in a successive manner, culminating in a presentation of relevant propositions related to each ancillary question. Each succeeding section builds on and incorporates preceding theories, ultimately building to one comprehensive theoretical framework.

### 2.1 Ecosystem Services Overview

The Millennium ES Assessment defines ES as the benefits that ecosystems provide to humans (MA, 2005). The concept of ES reframes natural resources so that the functional capacity of the landscape *to produce* is considered rather than evaluating an amalgamation of goods (Braat & De Groot, 2012). For many people “natural capital” is synonymous with the ES classification of “provisioning services,” however, ES incorporate other services (Figure 2)



provided by sequestering carbon, cleaning water, controlling climate, mitigating floods, and performing other “regulating services” (Fisher, Turner, & Morling, 2009). More subtly, “supporting services” are the necessary functions of a properly functioning ecosystem to support provisioning and regulating services as well as infamously ill-defined “cultural services,” emergent from both environmental processes as well as the “cultural landscape” (Tengberg et al., 2012) to the point that cultural ES often constrain the typical ES paradigm (Winthrop, 2014).

### 2.1.1 Valuation of ES

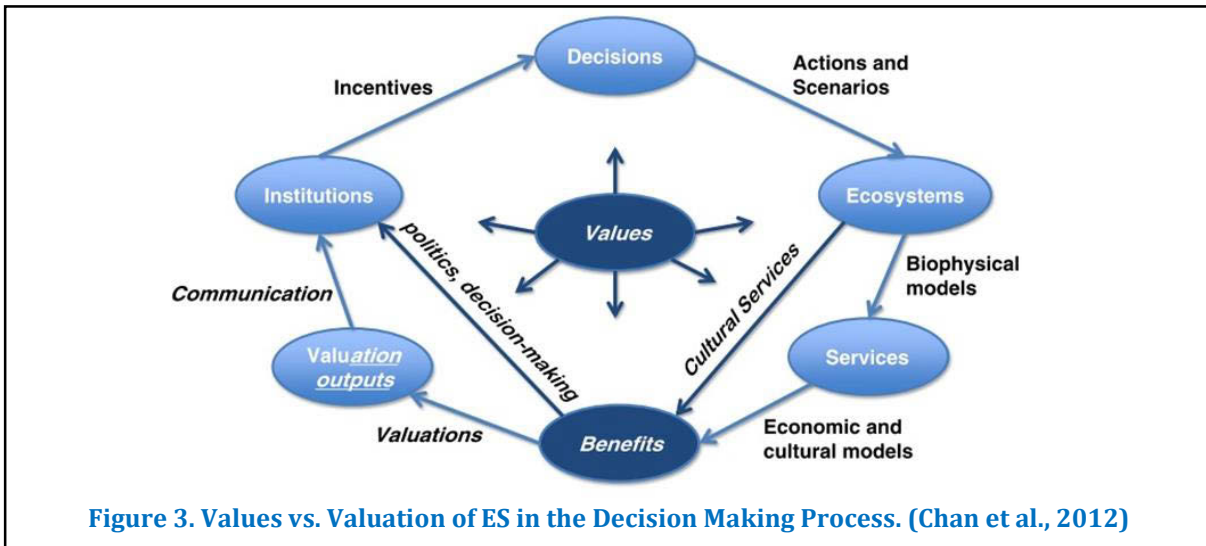
Some ES benefits emerge from an abstract construction of value more than a tangible ecological function, especially “cultural services” (Chan et al., 2012) that are, by definition, defined by the culturally situated variability of preferences for local residents (Szücs, Anders, & Bürger-Arndt, 2015). Although all ES derive *originally* in an environmental function, the *ultimate* benefit of that function depends on culturally and symbolically constructed values (Kumar & Kumar, 2008). Figure 3 represents Chan et al.’s (2012) model of valuation and ES values pertinent to stakeholder decision making, which clearly demonstrates how “ecosystems” beget both symbolically constructed “cultural services” as well as more materially rooted ES that, in aggregate, establish final “benefits.” The role of valuation emerges when values aren’t readily apparent, as in, the connections between ecosystems, services and benefits are not sufficiently obvious to proximate decision makers (Chan et al., 2012). As such, according to Chan et al. (2012) ES valuation should follow three primary tenets:

**First**, “ecosystems provide a variety of benefits through services.”

**Second**, “many services provide several benefits such that interdependencies between services should be expected and accounted for.”

**Third**, “people are likely to have a variety of preferences, principles, and virtues that pertain to ES, benefits, and their management”

Values exist at every level of this process but measurable valuation only exists at one stage where valuation outputs are observable. Thus, valuation must ascertain, from these outputs, the value of empirically unobservable but existent values at other stages of this process.



Since there is an important distinction between the material reality of an ecosystem and the human understanding of the landscape or its services (Belsky, 2011), ES must be evaluated by directly engaging the regional value-holders themselves (Alam, 2011). Streamflow does not emerge *from* the human desire to go rafting, but the human desire to interact with and appreciate streamflow *is* established by the culturally constructed value of rafting as an activity without any discernable instrumental value. But, from this perspective, cultural ES are instrumentally valuable to facilitating these activities and perceptions (Davidson, 2013).

Although many ES benefits may be appropriately measured by monetary benefits including cultural ES (Costanza et al., 2014), valuation frameworks are impoverished if they fail to include non-monetary and otherwise non-quantifiable values (Chan et al., 2012), especially since all ES represent a combination of tangible and intangible services that establish benefits (Pröpper & Haupt, 2014). The theories presented here provide a framework for including both non-monetary and other intangible values into Chan's et al.'s (2012) model of ES. These theories contribute to and increase the explanatory power and guiding insight offered by this model.

### **2.1.2 Grounded Theory Applied to ES**

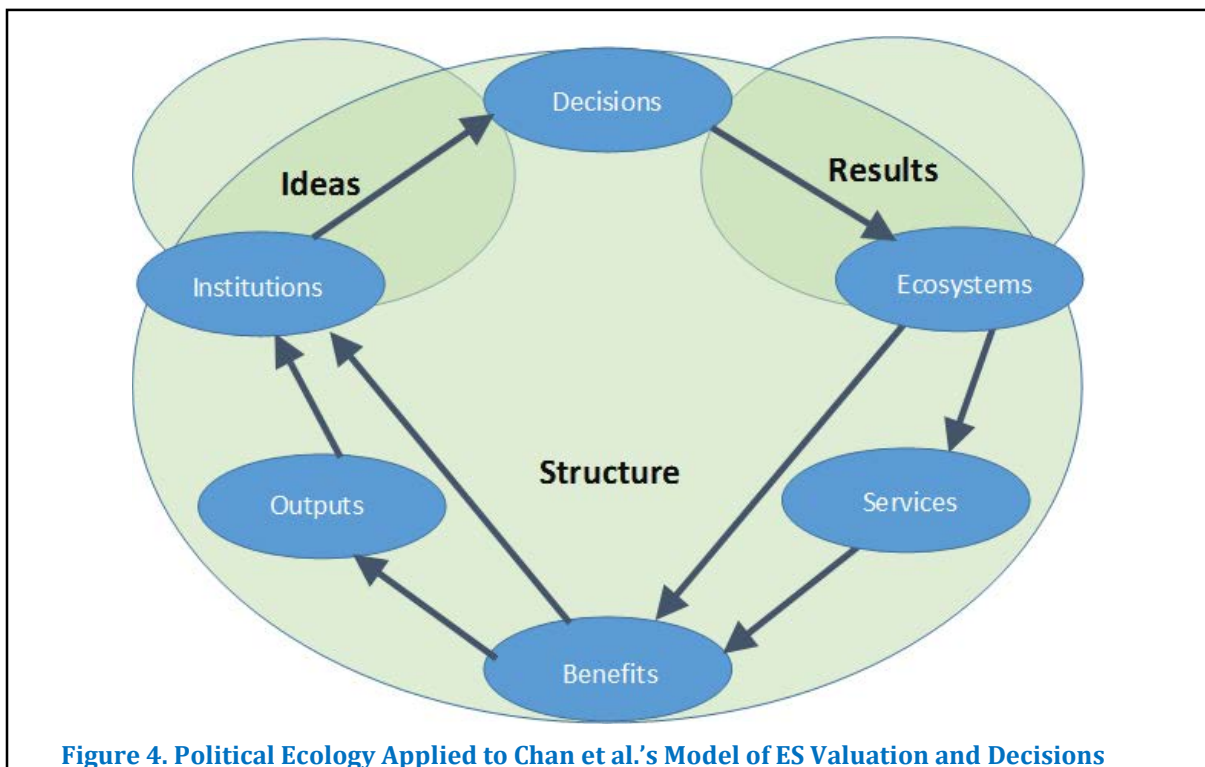
More than merely a research method of iterative description where data is collected and analyzed continuously, grounded theory presents one important theoretical framework for conducting both qualitative and mixed-methods research (Pearce, 2012). Grounded theory facilitates inquiry in complex research where discovery and analysis needs to co-occur by first sensitizing the researcher to the subject and then employing inductive analysis to theorize about connections between local phenomena and larger structures as they emerge (Shapiro-Garza, 2013). The grounded theoretical approach has multiple manifestations including both a constructivist grounded theory approach, where researchers treat data and analysis as created from shared experiences, and non-constructivist objectivist grounded theory that resides on a positivist tradition of empirical data that stands alone (Charmaz, 2006).

The use of grounded theory in ES research has proven both valid and informative (Barthel et al., 2010). Grounded theory provides particular utility to ES studies where relative value remains uncertain and interview techniques are required to assess that value (Hansson et al., 2012). This process requires deliberate techniques, outlined in the methods section of this thesis, calibrated according to the time, place, and actual participants in the study to contextualize observations (Charmaz, 2006). Ascertaining those research specific particulars requires precise theoretical supplements that a grounded theoretical framework encourages. For instance, grounded ES research has employed the theory of Political Ecology (PE) in order to consolidate a combination of material benefits and intangible benefits inherent to ES (Pröpper & Haupts, 2014; Shapiro-Garza, 2013). Grounded theory is foundational for many theories and methods used for this research, including place attachment (Greg Brown, Raymond, & Corcoran, 2015). Similarly, PE contributes to the theoretical framework of this study, especially regarding the material distribution of ES benefits and the effect of decisions made by institutions which, in turn, alter ecosystems and their benefits.

## 2.2 Political Ecology and ES Valuation and Decisions

The concept of “political economy” has well-established roots in both economic and political science fields (Rudel, Roberts, & Carmin, 2011). Based on “broadly defined” political economy propositions, combined with ecology, the theory of PE emerged with “roots in geography, anthropology and rural sociology” that makes PE a natural fit in ES research (Kallis et al., 2013). By combining disciplines, PE reveals how economic status and political authority have material manifestations on the environment, in the form of degradation (Nygren & Rikoon, 2008), and people, in the form of displacement (Rikoon, 2006).

PE propositions describe the process that propels Chan et al.’s (2012) model where decisions have “results” that alter the ecosystems (Zimmerer & Bassett, 2003) that provide ES (Figure 4). And the distribution of ES benefits is subject to disproportionate political power distributed in populations that have pluralistic values that affect decision-making (Kallis et al., 2013). Emerging from this “structure,” institutions negotiate “ideas” to create and recreate this structure via “results” that change both economic and ecological structure (Awanyo, 2014).

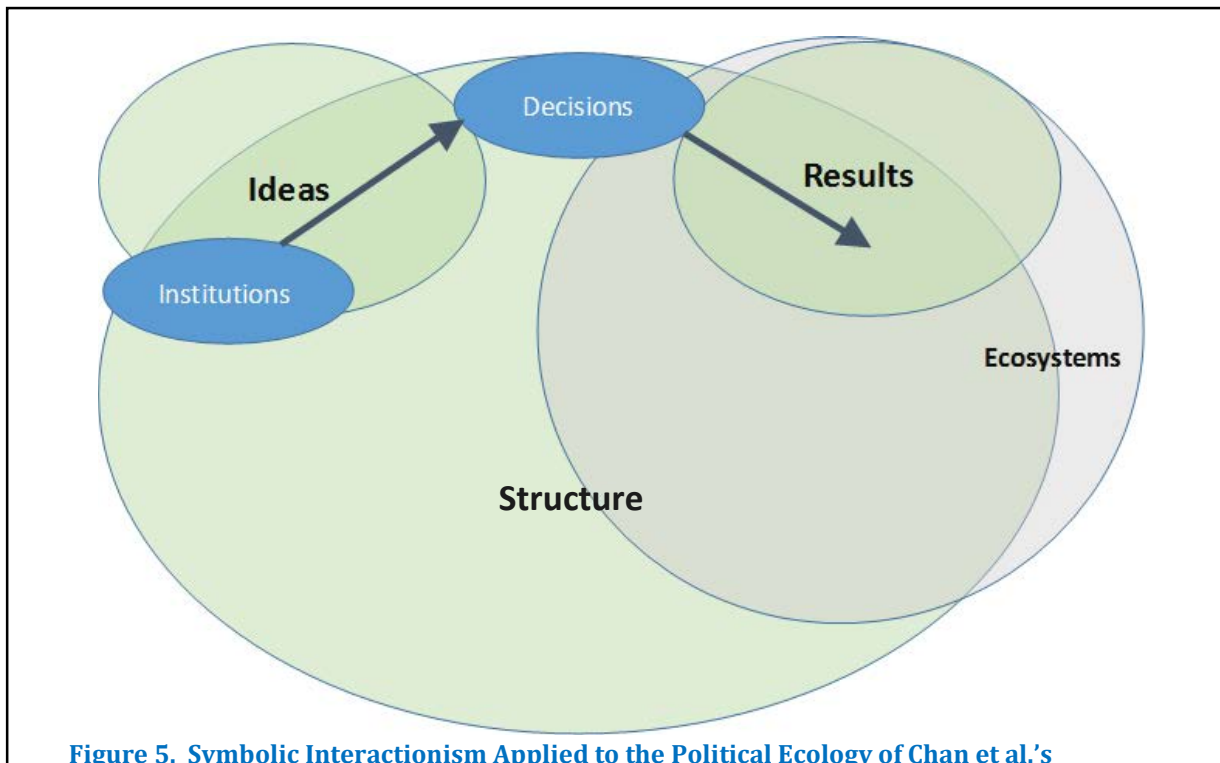




## 2.3 Symbolic Interactionism Applied to Political Ecology

Symbolic Interactionism (SI) is based on the core proposition that all meaning is originally conceived through dialogue and not simply discovered on the proverbial doorstep (Manis & Meltzer, 1967). These negotiations revolve around *symbols*, meaning laden objects that represent abstractions and can be manipulated (Stryker, 2008) just as numerals represent the abstract concept of specific numbers. A symbol becomes a *significant symbol* when the meaning is “agreed upon by many people” (West & Turner, 2003, p. 92). These significant symbols provide individuals, groups, and institutions exemplars with which to conduct valuation of benefit outputs and engage in decision-making that explains the function of negotiated “ideas” of PE between institutions that ultimately lead to decisions that affect the ecosystem.

Understanding the SI of meaning inherent to negotiated “ideas” (Figure 5) contextualizes the perception of ES benefit “values” and provides a useful framework for understanding community capital (Raymond et al., 2010) related to ES (Raymond et al., 2009) and cultural ES on a community, or bioregional, scale (Plieninger, Dijks, Oteros-Rozas, & Bieling, 2013).

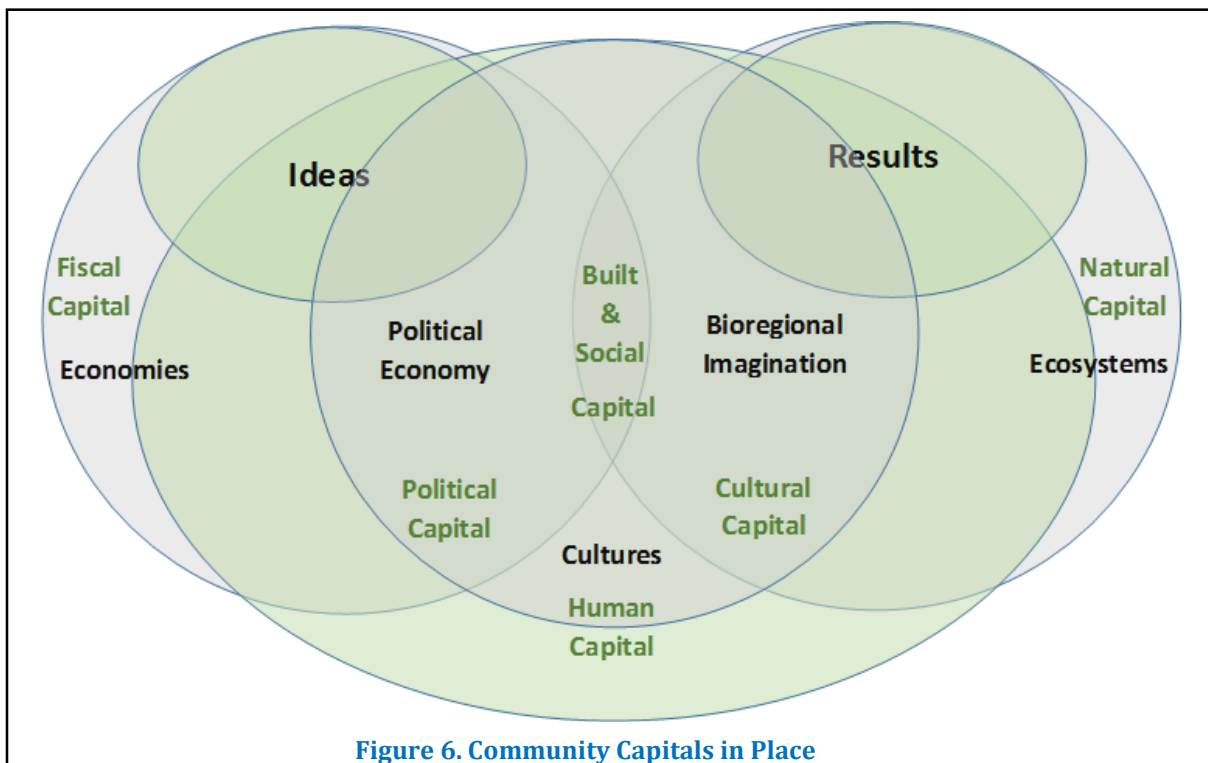


**Figure 5. Symbolic Interactionism Applied to the Political Ecology of Chan et al.'s**

## 2.4 Bioregionalism and Community Capital

Much like PE, bioregional theory incorporates political organization and economic structures (McGinnis, 1999) but, unlike PE, by determining a specific region, other forms of “community capital” emerge in context (C. B. Flora et al., 2004). Bioregionalism materialized in the late 20<sup>th</sup> century (Parsons, 1985) as a means of “reinhabiting” place (Gruenewald, 2003) and realizing place-based capitals captured in the construction of and confluence between cultures, economies and ecosystems (Figure 6) delineated by physical as well as cultural distinctions (Gray, 2007).

Considering the abstract placement of these capitals builds a natural bridge back into ES (Kallis et al., 2013) where natural capital is the physical foundation for all other capital (Fey et al., 2006). Cultural ES exist somewhere outside of ecosystems, contingent on culture (Kumar & Kumar, 2008). As assigned in this model, the space between ecosystems and cultures represents BI: the cognitive conception of the environment informed by culturally constructed bioregional identities (Banting, 2012).



## 2.5 Economic Base Theory Applied to ES (Research Question A)

ES studies focused on smaller eco-regions (Su et al., 2012), comparable with bioregions, that focus on community cultural ES (Plieninger et al., 2013) and other community capitals (Raymond et al., 2009) currently populate a variety of academic disciplines including geography, ecological economics, and land use policy, respectively. Economists have made vague reference to “community capital” for as long as welfare economics has existed but remained mostly unmeasured (Krugman, 1999). Although alternative macroeconomic measurements have emerged more recently (Kubiszewski et al., 2013), at regional levels an entirely different approach is required to account for regionally specific values related to specific political, cultural and social issues (Park, 2012).

In the 1960s Charles M. Tiebout expanded on his analysis of industries to bolster the conception of economic “bases” as the foundation for regional economic activity (Tiebout, 1956). Economic base theory describes the process by which economies emerge, maintain, prosper, or eventually dwindle (Boadway & Tremblay, 2012). Base industries are those (and the amount thereof) that bring in revenue from outside a region by exporting goods or importing visitors to spend money in the local economy as tourists, producing “direct,” “indirect,” and “induced” contributions to the regional economy (Watson & Beleiciks, 2009). Modeling this effect in Social Accounting Matrixes (or SAMs) produces data regarding regional economic interactions (Waters, Weber, & Holland, 1999).

SAMs explicitly focus on interactions between individuals, firms and industries that reveal two important metrics: how much money each sector brings into the economy and how much of that money is then spent in the regional economy. The product of these two metrics establishes economic multipliers (Cooke & Watson, 2011). Since SAMs, by design, only evaluate the monetary contributions to the human-environment network of a regional economy they underestimate the non-monetary values of ES (Davidson, 2013), potentially overestimating the

importance of certain human sectors of the economy and therefore overestimating some ES benefits over others, resulting in the unintended consequences that led to the concept of ES originally (Tallis & Polasky, 2009).

Also, due to economic conventions and limitations of publically available data, county level or state level economic data drives the construction of most regional SAMs (Waters et al., 1999; Watson & Beleiciks, 2009). Thus the FEA designation in constructing a SAM is constrained but, even so, this model has predictive power to estimate the importance of exports (Kilkenny & Partridge, 2009), as well as import substitution (Cooke & Watson, 2011), the impact of specific events (Warnick, Bojanic, & Xu, 2013) and patterns of economic change (Smutny, 2002). Therefore, combining economic base theory, and applicable methods, with the main ES proposition, as illuminated by PE and SI, provides a theoretical framework for assessing the fiscal contribution of streamflow via SARA for SRB bioregional community capital. The following propositions emerge from each theory related to ancillary question A:

**ES Proposition:**

All production, benefits, and value relies originally in the environment.

**PE Proposition:**

Differential political power affects the distribution of the benefits based on perceived value.

**SI Proposition:**

Competing perceptions of value emerge from culturally constructed and negotiated ideas.

**Bioregional Proposition:**

Regionally specific community capitals are a function of the structure of economy, culture, and ecosystems, perceptions of the value of those capitals and the distribution of those benefits.

**Economic Base Theory Proposition:**

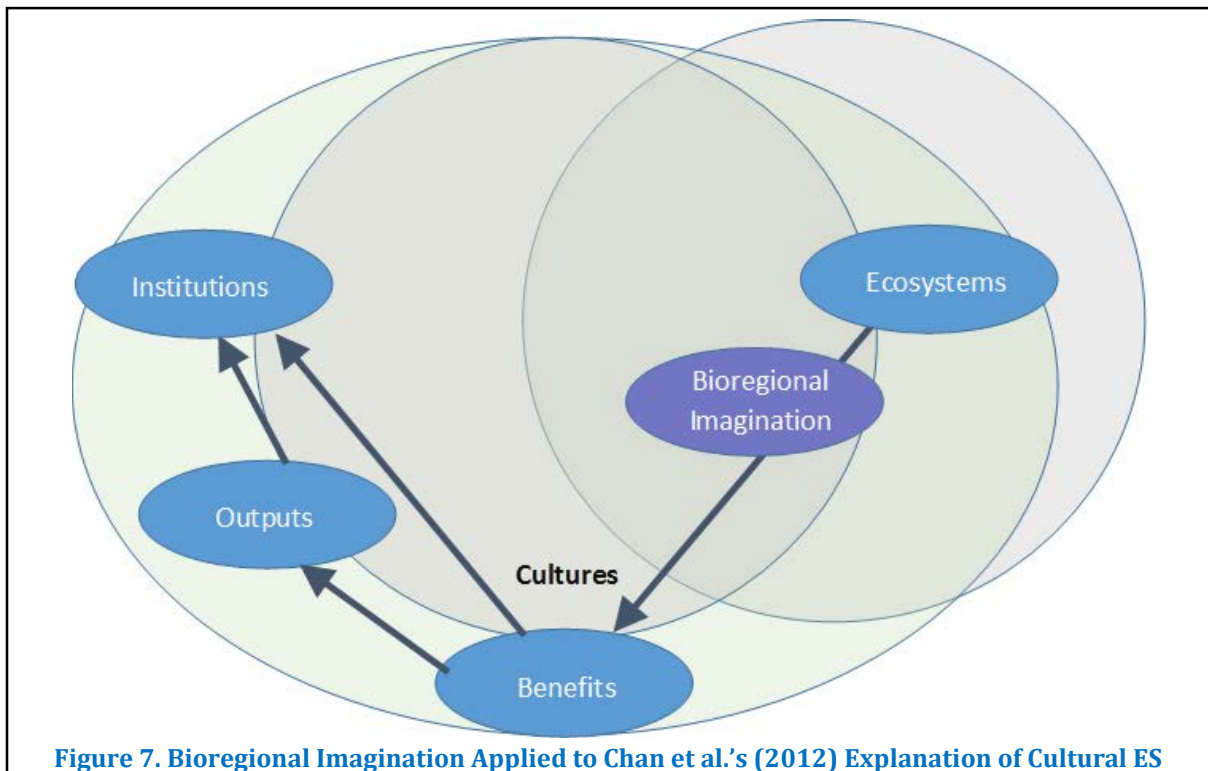
All regional wealth is generated by exporting goods and/or services outside the region and retaining that wealth by limiting imports and increasing regional import substitution.

**Combined Proposition:**

*A bioregional economy depends on the natural capital features that facilitate exports, and limit imports, therefore increase bioregional wealth and welfare of a region.*

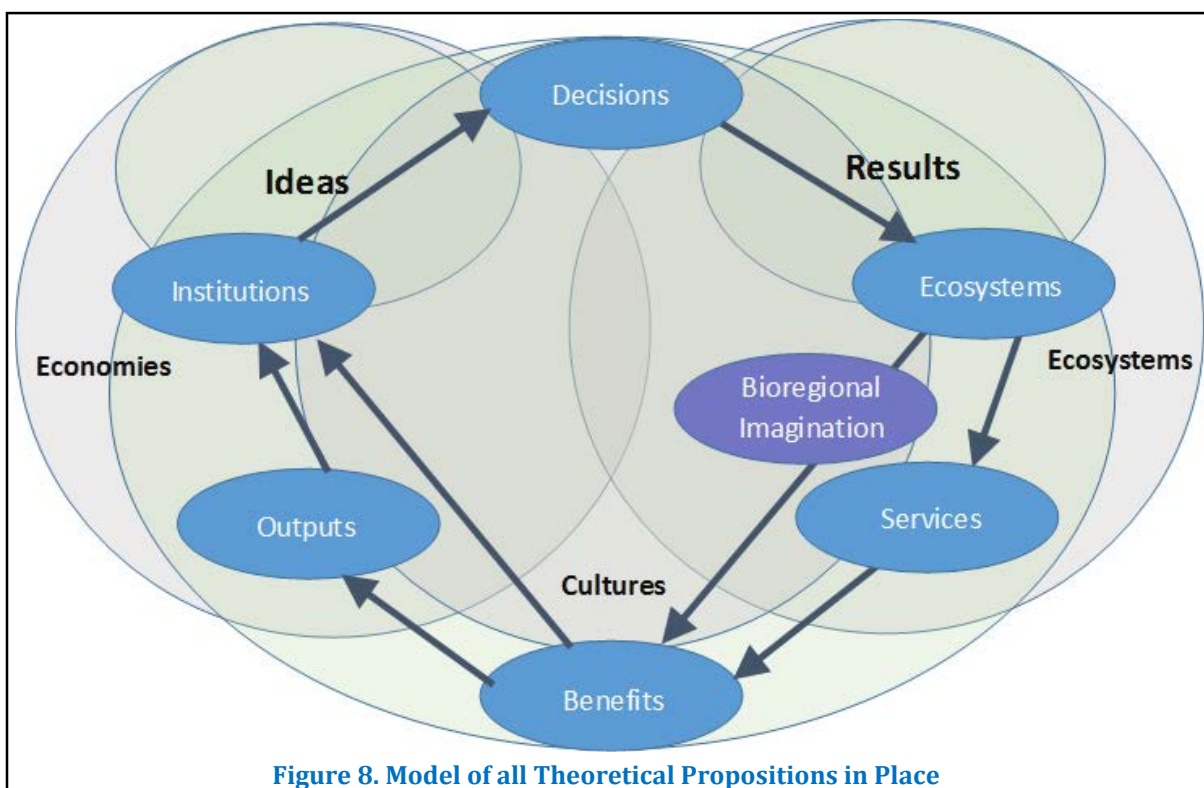
## 2.6 Bioregional Imagination (Research Question B/C)

The theory of BI takes bioregionalism seriously, and then examines significant symbols and shared terminology that reveal a conception of place based on personal experiences (Lynch et al., 2012). Environmental perception is filtered through cultural identities that are reciprocally defined by environmental engagement (Desmond, 2006) shaped through SI between people and place (Nye & Hargreaves, 2009). Residents in the Northwest, especially, possesses a demonstrably stronger attachment to more than an “environment” but explicitly a “bioregion” that includes a human component (Aarsand, 2013). BI occupies a cognitive space between ecosystems and culture where both constitute contested territory between individuals and institutions (E. James, 2012). Adding BI to this theoretical framework provides an essential construct to the amorphous arrow that Chan et al. (2012) use to explain the ephemeral connection between ecosystems and benefits via “cultural” ES. Specifically, BI mediates this relationship (Figure 7). BI determines the importance of cultural ES and subsequent “benefits” but, like other ES, only valuation *outputs* can be directly assessed.



**Figure 7. Bioregional Imagination Applied to Chan et al.'s (2012) Explanation of Cultural ES**

Evaluation of intangible cultural ES values is elusive but important (Chan et al., 2012), and understanding the BI of relevant stakeholders presents one potentially appropriate theoretical framework for assessing that value. So, BI outputs need assignment and measurement; significant symbols reveal cultural values where value-holders perceive objects to possess “intrinsic” value, empirically expressed, and understandable in terms of instrumental value (Davidson, 2013). Intrinsic value, in this context, refers to the perception of intrinsic value held by people. But the intrinsic value of salmon (for instance) remains *in* salmon and not in the instrumental value of salmon as a commodity or food source (Davidson, 2013). However, salmon *do* possess other instrumental values that overlap with these values (Martín-López et al., 2012). But the presence or absence of significant symbols reveal intrinsic values associated with cultural ES “benefits” emergent from “ecosystems” as altered by the “results” of “decisions” made by “institutions” in the PE of ES valuation and decision-making (Figure 8). Adding BI to the preceding theories therefore provides a previously missing proposition for understanding both cultural ES as well as the “culturality” of all ES benefits (Pröpper & Haupts, 2014).



## 2.7 Reading Narratives Bioregionally (Research Question B)

A “sense of self” arises in part due to interactions with place and the subsequent meanings attached to the “people, objects (symbols), [and] practices” found in that place that emerge as salient features in place-based narratives (Burley, Jenkins, Laska, & Davis, 2007). As a contribution to narratology – the theory of narratives, texts, images, events and cultural artifacts (Bal, 1997) – BI explains more than significant symbols in isolation but rather, the assemblage of those symbols in a relation to each other so as to tell an important story (E. James, 2012). Since people tell stories with motivation, these narratives occur “as somebody telling somebody else, on some occasion *and for some purpose(s)*, that something happened” (Phelan, 2007, emphasis added). The *purpose* of storytelling contributes significantly to the utility of BI in this research, where the arrangement of symbols to *redefine* space delineates the different roles of matter versus imagination in creating a perceivable reality (Stiftung et al., 2012).

And, similar to the significant symbols that formulate these narratives, some narratives become significant when they are agreed upon by many people within a human-environmental network (Lejano et al., 2013). These narratives become origin stories for cultures that predictably effect the actions of its members (Müller-Funk, 2003). Not surprisingly, SI describes both the construction, as well as deconstruction and rebuilding, of these narratives (Peace, 2001), and these symbolically constructed narratives compete with each other within a PE context (Rikoon, 2006). Far from random accumulations of subjects, verbs, and objects, these intentional exchanges are “environmentally adventurous activities” where “alternative environmental imaginations” compete (Erin James, 2015). Although the intentionality of interview narratives are occasionally ignored, a phenomenological approach to interview testimony assesses this intent directly (Starks & Trinidad, 2007). This approach possesses theoretical similarities with grounded theory but this purely qualitative analysis describes a unique approach for examining emergent phenomena (Baker, C., Wuest, J., & Stern, 1992).

Where participant informed grounded theory allows researchers the freedom to develop questions and theories after conducting research and analysis, a *grounded* phenomenological approach allows researchers to interpret data as it arises (Charmaz, 2006). This allows for an examination of “how societal members continually interpret their social order and thus reproduce and construct knowledge” related to “meaningful subjective phenomena” (Burley et al., 2007). Allowing phenomena to emerge organically, grounded mixed-methods facilitates an iterative process which begins with exploration and ends with interpretation. So, with every theory presented thus far, modeled in Figure 8, applying phenomenology to “reading narratives bioregionally” (Lynch et al., 2012) provides outputs that indicate and characterize respondent BI. Remembering the role of the researcher as the story recipient, analysis of interview narratives, images, and other cultural artifacts facilitates interpreting subjective meanings associated with propositions related to ancillary question B:

**ES Proposition:**

All production, benefits, and value relies originally in the environment.

**PE Proposition:**

Differential political power affects the distribution of the benefits based on perceived value.

**SI Proposition:**

Competing perceptions of value emerge from culturally constructed and negotiated ideas.

**Bioregional Proposition:**

Regionally specific community capitals are a function of the structure of economy, culture, and ecosystems, perceptions of the value of those capitals and the distribution of those benefits.

**BI Proposition:**

The structure of the environment effects the *negotiation of ideas* between *institutions, subgroups, and individuals* based on competing perceptions of place.

**Grounded Theory Phenomenological Proposition:**

Culturally constructed narratives will emerge in interviews as co-created knowledge through the negotiation of ideas between interviewee and interviewer.

**Combined Proposition:**

*Examining narratives for observed phenomena and important significant symbols will reveal culturally agreed significant narratives related to the BI of SRB residents.*



## 2.8 Place Attachment Theory Applied to BI (Research Question C)

BI, a product of literary narratology, remains almost untested by rigorous “scientific” methods, with some consideration occurring in the field of Anthropology (Lockyer, 2013). Similar to the “bioregionalism” it’s based on, BI appears prescriptive in suggesting how one *ought to* consider narratives, violating the primary condition of “good” scientific theory (Barnes, 2013). “Scientific” theories attempt objectively but, in lieu of achieving it, scientists provide data either supporting or refuting the theory and, where refutation fails, study continues (Popper, 1962). In this research, the question is, does data support the hypothesis that the river affects participant BI? Although qualitative data provides rich utility in characterizing answers (Berg & Lune, 2012), appropriate statistical testing provides rigorous assessment of the significance of findings that either support, or fail to support theories (Field, 2009).

In this research, observed phenomena related to the river in participant BI are also subjected to statistical testing for significance. And, by addressing “personal, community, and natural environment connections” a potentially explanatory measurement materializes in a veritable wealth of empirically supported place attachment studies (Raymond et al., 2010). Since place attachment can be quantified via a series of statements this construct constitutes a measurement valuation output of BI. But, BI occupies a broader cognitive space than place attachment alone; BI describes an active intellectual engagement with place (Banting, 2012).

Arguably, the presence *or absence* of place attachment related to ES benefits characterize participant priorities either way (M. A. Wilson & Howarth, 2002) but since place attached people empirically identify with actual landscape features (Greg Brown et al., 2015) this identifies values. Place attachment theory builds on psychological assessment to create a two-dimensional characterization of the social and nature bonding of stakeholders and their place identity and dependence to a specific area (Gregory Brown & Raymond, 2007).

Adding “place identity,” strongly correlated with “dependence,” adds at least a third empirically supported dimension to the construct of place attachment (Raymond et al., 2010). Subsequent place attachment studies have recognized the more multifaceted formation of this construct related to ES benefits (Plieninger et al., 2013). Since place attachment measures the strength of attachment to significant symbols related to the environment that indicate cultural ES mediated by BI, bringing the proposition of place attachment into the rest of the theoretical framework articulated throughout this chapter, and illustrated in Figure 8, provides another measurable variable for analysis. This variable allows correlational testing between observed phenomena and/or the presence or relative absence of The River as a significant symbol. Taken all together, this creates a final combined proposition related to the finally ancillary question C:

**ES Proposition:**

All production, benefits, and value relies originally in the environment.

**PE Proposition:**

Differential political power affects the distribution of the benefits based on perceived value.

**SI Proposition:**

Competing perceptions of value emerge from culturally constructed and negotiated ideas.

**Bioregional Proposition:**

Regionally specific community capitals are a function of the structure of economy, culture, and ecosystems, perceptions of the value of those capitals and the distribution of those benefits.

**BI Proposition:**

The structure of the environment effects the *negotiation of ideas* between *institutions, subgroups, and individuals* based on competing perceptions of place.

**Grounded Theory Phenomenological Proposition:**

Culturally constructed narratives will emerge in interviews as co-created knowledge through the negotiation of ideas between interviewee and interviewer.

**Place Attachment Proposition:**

Place bonding combined with place identity and dependence establish attachment that affects perceptions of place.

**Combined Proposition:**

*Culturally and environmentally constructed perceptions rely on and recreate significant symbols that inform negotiations that, if statistically consistent, support the hypothesis that respondents share a similar BI related to those symbols.*

## **Chapter 3. Data Collection Methods and Analysis**

The mixed qualitative and quantitative research methods of this research are outlined in a sequential and discrete manner although these data were co-collected and then co-informed analysis, increasing the overall strength of research and results (Creswell, 2009). The presentation of data collection mirrors the approximate sequence of methodological steps taken during research. Data analysis methods, however, are presented according to the specific research questions they addressed. Initial contemplation and contextualization is integral to a grounded theoretical approach to research that requires understanding the reality of research participants' lives in order to study and explain their statements and actions (Charmaz, 2006). Therefore, the first step in this iterative process began by conducting interviews with residents in the SRB bioregion. Following this process, I sent a survey to whitewater rafting companies regarding economic activity. Finally, I conducted regional economic analysis, which was analyzed in the context of the interview as well as survey data.

### **3.1 Data Collection**

#### **3.1.1 Semi-Structured Interviews**

I conducted semi-structured interviews with stakeholders in Riggins, Stanley, and Salmon as well as Challis, Ketchum and Ft. Hall, Idaho during the summer of 2014 and recorded the audio. To control for bias I predetermined the questions based on previous place attachment research and relevant constructs (Burley et al., 2007). Afterwards I gave respondents a place attachment questionnaire. These interview materials were designed to elicit significant symbols as salient features in BI. During the interviews respondents drew a map of the region, and completed a place attachment questionnaire and a form that collected demographic information. A total of 120 interviews were conducted resulting in 70 hours of recorded interview, which was then transcribed and coded for analysis.

### **3.1.1.1 Chain Referral Sampling for Semi-Structured Interviews**

I utilized strategic sampling to identify specific key-informants for each town based on other grounded ES research (Hansson et al., 2012). Emanating from these initial contacts I expanded my sampling in each community via chain referral sampling consistent with the place attachment studies that informed these methods (Burley et al., 2007). I utilized the prompt: “who would agree with you and who would have a different perception from you?” to identify at least three follow-up interviewees who were each sent a letter (Appendix 4). An adaptation of snowball sampling, chain referral successfully identifies and accumulates members of specific populations for study via participant referrals (Penrod, Preston, Cain, & Starks, 2003). Unlike haphazard snowball sampling, chain referral strategically targets multiple predetermined networks in order to intentionally represent the subpopulations (Penrod et al., 2003) rather than seeking a representative sample of the entire population.

I targeted the following stakeholder groups: local politicians, federal government employees, ranchers, other resource dependent stakeholders, river rafters, local business owners, long-term residents, new arrivals and seasonal residents. I operationally defined these groups by their own self-identification as well as peer identification in the chain referral process. I asked some respondents if they knew members of these subpopulations and monitored my referrals to ensure representative ratios of each group. True to a grounded theoretical approach, I recognized certain groups during this process that needed special consideration and whom I made an effort to include (Charmaz, 2006). For instance, loggers and other resource dependent stakeholders proved to be skeptical of my study and were hesitant to participate. In order to reduce nonresponse bias I explicitly sought out members of this subpopulation by learning the congregating places for these groups and spent time with them and gained their trust. I also sought out the perspectives of less integrated members of each community and other groups pertinent to the study to correct against chain referral bias.

For instance, underemployed members of the community needed to be specifically targeted. Also, male respondents tended to refer mostly to other males rather than females. However, I deliberately sought to maintain a 50/50 ratio in *each* subgroup, which proved particularly important for groups of Ranchers and Federal Government Employees. I also purposefully targeted members of minority groups such as immigrants (where applicable) and those who self-identified as gay or lesbian. Also, I monitored the age of respondents along with length of residency to ensure that my sample reflected these demographics as well. By including a diversity of groups, my sample represented each type of member but not the statistical distribution of these members.

In Salmon I encountered one major unanticipated subpopulation: members of the Church of Latter Day Saints. Although I sought out LDS members as much as possible, respondents from this group remained hesitant to participate. Similarly, I targeted Native Americans who actually live outside of the SRB but whose ancestral range included significant portions of the SRB. In Riggins I achieved this by interviewing Nez Perce tribal members and in Stanley I interviewed members of the Shoshone Bannock tribe exercising their ancestral rights to fish the Salmon River. In order to further include this perspective I also traveled to the Fort Hall Reservation where I attended a Sun Dance Ceremony, made contacts with tribal members and leaders and conducted three interviews for reference.

I continued my chain referral in each town until I reached theoretical saturation for each targeted subgroup, defined by no longer revealing different responses (Penrod et al., 2003) or phenomena (Charmaz, 2006). Achieving, or at least understanding, theoretical saturation is an important part of grounded research theory (Charmaz, 2006) and saturation was determined through a saturation form designed prior to initiating interviews (Appendix 6). I reached saturation in Riggins at n=28, and in Stanley at n=43. I completed 43 interviews in Salmon, but did not achieve saturation due to the heterogeneity of the population.

I also interviewed 3 residents in Challis, which were incorporated into the Stanley group based on chain referral and saturation methods. In total I completed 114 interviews in the Riggins, Stanley, Challis and Salmon as well as 3 at the Ft. Hall reservation (Table 1). I also conducted 3 interviews in Ketchum, Idaho with raft guides and guiding company owners. Ketchum does not belong to the SRB but I conducted interviews in with raft guides there who operate on the Salmon River for comparison (interviews were excluded from final analysis).

Table 1. Job by Region distribution of sampled participants		Region					Total
		Riggins	Ft. Hall	Stanley	Ketchum	Salmon	
Job	Other	3	0	4	0	9	16
	Resource dep./rancher	1	0	3	0	4	8
	Rafting/outfitter/guide	7	0	10	3	2	22
	Retired	8	1	5	0	7	21
	Fed. government employee	2	0	6	0	9	17
	Restaurant/bar	4	0	5	0	6	15
	Retail/hotel	1	0	4	0	2	7
	Local public employee	2	2	6	0	4	14
<b>Total</b>		<b>28</b>	<b>3</b>	<b>43</b>	<b>3</b>	<b>43</b>	<b>120</b>

### 3.1.1.2 Semi-Structured Interview Questions

Ranging from very broad to very specific, my initial interview questions deliberately avoided river specific language so that the presence of river reference could be considered “unprompted.” I also avoided regionally specific language for similar reasons (see Appendix 1 for the interview instrument). I modeled my interview questions and this approach after questions utilized in a study that revealed “land-loss” as a salient feature in the perception of place of residents in coastal Louisiana (Burley et al., 2007). Roughly halfway through the questions respondents were asked to clarify what they call the region in order to further assess individual BI as well as provide a specific but respondent-created referential exemplar for “here.” Then I tasked respondents to draw the region they just verbally identified on a map and I directed all future questions towards the drawn representation of the region on the map.

Toward the end of each interview, my questions focused more specifically on the river; I queried the respondents' opinion about the river related to how it "affects life here" and how a reduction in streamflow would affect them. At the very end of each interview, after all other materials had been delivered, I asked "what does Salmon River Basin mean to you?" This question emerged from the grounded theoretical approach to clarify the resonance of the term for respondents while avoiding a priming effect on the rest of the interview. Similarly, other significant symbols, salient features and shared meaning and experiences emerged during interviews, which I noted on my saturation form but did not ask about specifically.

Since interview testimony was intended for analysis as narrative, and remembering the theoretical definition of narrative as: someone, telling someone else, something, for some reason (Phelan, 2007), I elected to not stop respondents at any point during the interview nor did I ask any clarifying questions and made as muted a response as possible so that the narrator of each interview remained the respondent telling me their reaction to my questions only. Interviews lasted anywhere between 12 minutes and several hours but most took approximately half an hour. Since interviews constitute shared experiences contingent on interactions between researcher, subject and place (Charmaz, 2006), I disclose the fact that I intentionally provided some verbal responses such as "Hmmm" "Ok" or "Ah" as well as subtle head nods and other nonverbal communication that is invariably necessary in successful communication.

But, to the best of my ability as a researcher I refrained from offering any exceptional reaction to respondent engagement with or mention of the specific subject of streamflow. In fact respondents were allowed (and encouraged) to talk as much or as little as they wanted in response to every question regardless of subject. By allowing respondents this freedom many consistent phenomena consistently emerged and these were all noted and I listened for these in subsequent interviews. The questions I asked in each interview remained consistent.

### 3.1.1.3 Respondent Participant Mapping

When I asked “what do you call this region” during the interview respondents sometimes asked for clarification, to which I said “this place,” “here” and finally “where you live” without giving any proper nouns for reference. With occasional prompting and reassurance “that there was no wrong answer,” respondents never failed to provide some type of regional name for whatever they cognitively considered to be “the region.”

I asked respondents to draw the region that they had just identified by name on one of the maps presented. Respondents were given maps that ranged from the entire Pacific Northwest to the State of Idaho to further reduce priming. Respondents invariably chose to draw an outline of the region on a map of Idaho, which also included portions of bordering states. After drawing the border, respondents were asked to draw important places on the map, and explain their importance. This technique of identifying their “region” and important places draws from methods used by Brown and Raymond (2007). These maps (and identified important places) were then used throughout the rest of the interview as referential items.



**Picture 4. Research respondent identifies and explains important areas on the map**



### **3.1.2 Place Attachment Questionnaire**

After my official interview questions but prior to clarifying the resonance of Salmon River Basin as a term, I gave respondents a place attachment questionnaire (Appendix 2). Providing the questionnaire after the interview was completed avoided priming of interview testimony. I developed a 13 question place attachment survey based on questionnaire statements used by Kaltenborn (1998), Brown and Raymond (2007), and Brown, Raymond and Weber (2010); each of these studies reported high validity, utility and internal consistency of constructs. For the place attachment questionnaire I explained to the respondents that they should indicate their level of agreement with the 13 place attachment statements from 1 (strongly agree) to 5 (strongly disagree). This produced a quantifiable "Place Attachment" score measuring: nature bonding, social bonding and place identity and dependence. The specific questions utilized in this research were chosen for both their relevance as well as brevity. Unlike the 19 questions utilized by Raymond, Brown and Weber (2010), the 13 statements I utilized did not noticeably relate to the same idea; if respondents get fatigued by questionnaires, even short ones, they will report less accurately out of frustration (Creswell, 2009). Also unlike previous studies I used ambiguous language such as "here" and "this place" rather than a specific place for the same reason that specific language was avoided during interviews.

### **3.1.3 Respondent Demographics**

At the end of all questions I provided respondents with a demographic self-report that I allowed them to look over and fill out as I completed my saturation form. I employed this technique in order to give respondents a sense of privacy and ease in self-reporting due to the sensitive nature of the information and remove pressure on respondents. Although a small minority of respondents elected to withhold certain information, most respondents chose to fill out the form in its entirety. Information collected included: ethnicity, professional identity, marital status, family size, group identity, household income levels, gender, and residency.

### **3.1.4 Rafting Survey**

During interviews with raft guiding company owners I requested permission to send them a short online survey I designed to further characterize interactions between guided rafting companies and other aspects of the local economy. I utilized “Qualtrics Research Suite” (2013) to create and disseminate the anonymous survey. The survey solicited ratings of A: factors that most effect profitability (climate/weather, national economy, local economy, other) as well as B: dependence, C: quantity and D: quality of interactions with other rafting companies, restaurants, hotels, government, retail stores, and “other” on a 10 point scale. Next I asked survey respondents to rate the trips taken, profits, river conditions and “other factors” for the years 2008 through 2012 on a 5 point scale. Then the survey queried perceptions of potential streamflow changes on number of trips taken, starting date of season, ending date of season, profits, and “other.” Finally respondents were encouraged to share any observed trends in streamflow they have observed as well as their biggest concern for their company. 18 surveys were disseminated. Each was followed with a second email and two phone calls. Of the 18 companies, 6 completed the survey in its entirety.

### **3.1.5 Economic Input/Output Analysis Methods**

After completing interviews in the region and ruminating on initial observations in line with my overall grounded mixed-methods approach I completed an input/output analysis of spending and productivity in the SRB FEA. This SRB FEA designation serves as one layer applied over a bioregional layer of the study area, connected by PE assumptions related to the welfare implications for relevant stakeholders in order to successfully characterize ES value (Kallis et al., 2013). After assigning a SRB FEA I created several SAMs of available data for 2008 and 2012, calculated economic multipliers according to these SAMs, completed a shift-share between the 2008 and 2012 SAM and finally I completed an impact analysis of reduced SARA for a typology of industries I assigned according to interview data and survey results.

### 3.1.5.1 Creating Social Accounting Matrices for 2008 and 2012 Productivity

For this bioregionally specific ES research I utilized available economic data for Idaho, Custer and Lemhi County in creating a series of SAMs of the estimated endogenous and exogenous activity for the SRB FEA since these political boundaries provided the best resolution of available economic data aligned with watershed boundaries of the SRB watershed. Endogenous activity refers to interactions within the borer of the FEA whereas exogenous activity involves agents outside the FEA in exporting or importing goods/services.

These multipliers are estimated based on a function related to the location quotient (LQ) in each sector: relative concentration of sector regionally divided by relative concentration of sector nationally. LQs higher than 1 “create” exports” and LQs lower than 1 “create” imports in a series of mathematical matrices in the SAM that re-divide total gross regional production according to sales and then re-categorizes gross production into “base” production based on LQs. County level data informed the creation of a 2008 and 2012 SAM. I constructed SAMs with all three counties as well as without Idaho County and compared them before proceeding with the study utilizing all three counties (see notes in Appendix 9).

I utilized the Automated SAM model developed by Braak, Watson, and Rodriguez (2011), which provided a framework for categorizing production according to the North American Industry Classification Systems (NAICS) codes. The numbers utilized to generate this SAM were gathered from the Census Bureau's Current Population Survey and American Community Survey as well as the Bureau of Economic Analysis' (BEA) National Income and Product Accounts, Input/output Make and Use Tables, and Gross State Product data. I also utilized state data from the Idaho Department of Labor for Idaho, Custer, and Lemhi County. Wage estimates were based on Occupational Employment Statistics. Similar data collected from the BEA informed national level calculations. These publically available data can be freely accessed and the Automated SAM is freely provided by the University of Idaho's College of Agricultural Sciences.

### 3.1.5.2 SARA Typology

I focused on a SARA (streamflow affected recreation activities) typology (categorization of economic firms) because I explicitly studied *streamflow*, which related most directly to benefits associated with amount of water moving through the system on a temporal scale rather than the cumulative benefit of water produced by the river. Based on initial findings I assigned a typology of SARA industries which includes: (114) Fishing-Hunting & Trapping, (312) Beverage & Tobacco, (445) food & beverage stores, (447) Gasoline stations, (448) Clothing & accessories stores, (451) Sports-hobby-book & music stores, (452) General merchandise stores, (453) Miscellaneous Retailers, (483) water transportation, (485) Transit & ground passengers, (487) Sightseeing transportation, (531) Real Estate, (532) Rental & leasing services, (712) Museums & similar, (712) Performing arts & spectator sports, (713) Amusement- gambling & recreation, (721) Accommodations, (722) Food services & drinking places, (811) Repair & maintenance, (812) Personal & laundry services, and (814) Private households.



Picture 5. Pizza parlor/bike shop in Salmon, Idaho associated with whitewater rafting

## 3.2 Data Analysis

### 3.2.1 Regional Economic Analysis and Input/Output Methods (Question A)

The following analysis is presented in relation to question A of this thesis and this analysis directly informs the results reported in Chapter 4.

- A. What is the overall economic importance of streamflow affected recreation activities (SARA) for the SRB economy?**
- 1. What regional economic trends does available economic data explain for the SRB between 2008 and 2012?**
  - 2. How do SARA contribute to the SRB economy?**
  - 3. What are the possible impacts to the SRB FEA if SARA are impacted?**
  - 4. Do the perceptions of streamflow benefits held by SRB residents align with the economic trends observable in regional analysis?**

My main hypothesis in carrying out this economic analysis was:

***SARA contributes significantly to the economic activity of the SRB bioregion and an impact to this sector would have a significantly negative effect on the SRB economic productivity.***

In order to test this main hypothesis I carried out the methods described below in order to *reject* the following null hypotheses:

#### **The Null Hypothesizes:**

- 1. The SARA typology did not contribute significantly to SRB FEA regional production between 2008 and 2012.**
- 2. SARA does not significant contribute to the SRB economy.**
- 3. Impacts to SARA will have no significant effect on the SRB economy.**
- 4. Respondent opinion about the importance of SARA neither consistently aligns nor consistently contradicts economic trends.**

With the completed 2008 and 2012 SAMs, I examined cash flows between NAICS industries and calculated economic multipliers based on economic exchanges. I completed a shift-share to examine the relatively discernable causes for growth or decline in various sectors for this period of time. Specifically, I analyzed the possible effect of the SARA typology on discernable trends. Furthermore, I completed an economic impact analysis related to the SARA typology to assess the potential impact on the regional economic base if a reduction in this sector occurred for any reason. I considered the possibility of streamflow as a cause of a SARA reduction. This type of analysis constitutes objectivist grounded theory (Charmaz, 2006) where results remain positivist facts rather than interpretations, but certainly do not reveal the entire contribution of streamflow to the economy. Finally, these data were examined in conjunction with qualitative data from interviews conducted in the region.

#### **3.2.1.1 Shift-Share**

After examining the SARA typology's contribution to the economic base of the SRB via the 2012 SAM, I conducted two shift-shares where I examined job loss/gain and regional production loss/gain between the years 2008 and 2012. First I examined the differences between the SRB regional economy at large and national trends for the period and then I examined the specific experience of the SARA typology between 2008 and 2012. Afterwards, with growth/decline in mind, I compared the concentration of SARA in the region to the national economy and calculated the relative growth/decline of employment and production for NAICS sectors in the SARA typology relative to growth/decline in the same sectors nationally. This retrospective analysis reveals the relative economic growth or decline for the region while controlling for national and industry trends in order to reveal how the region preformed relative to the U.S. Economy at large. By isolating the SARA typology, the relative contribution of SARA to these observed trends can be considered.

### 3.2.1.2 Impact Analysis

Following the shift-share analysis I conducted an impact analysis of reduced SARA by reducing the economic activity of the SARA typology by a series of degrees as a means of observing the overall effect of an economic downturn in those sectors. This type of analysis harnesses the same matrix logic that calculates economic base contribution and multipliers in order to predict the ramifications for the regional economy if all other things remain equal (Boozer & Self, 2012), thus reducing the reported productivity for the entire FEA by the total contribution of a given sector based on both endogenous and exogenous activity of that sector to each and every other sector in the regional economy. So, reductions to sectors with higher base contributions and/or job multipliers will produce a more dramatic impact on the SAM model of the bioregional economy.

Specifically, I selected NAICS sectors in the SARA typology and isolated their contribution to the SAM where the amount that each sector contributes to each other sector is disassembled and assigned. I multiplied this base contribution in each and every other sector in the SAM relative to the NAICS being reduced by a percentage relative to the effect I wished to observe (for instance, .95 for a 5% reduction). Thus I produced a reduced total contribution to the SAM for each NAICS sector in the SAM. The total reduction produced in this manner was divided against total regional production to produce a percentage reduction. The new base contribution of each NAICS sector was multiplied by the employment contribution of the NAICS sector to each other sector in the SAM to observe an employment effect. Since it is not feasible to determine the actual amount that each NAICS sector might actually be effected by possible streamflow reductions I unilaterally reduced the entire SARA typology by varying percentages. With this approach I elected to have accurate answers to a precise question rather than attempt to inaccurately calculate the exact dollar amount that streamflow contributes to SARA typology and/or address the complete value of a unit of available water for the entire SRB economy.

### **3.2.1.3 Comparing Input/Output Data with Qualitative Data**

In analyzing the data emerging from the SAMs of the SRB, both the limitations and the PE ramifications of objectivist methods of measurement were considered and supplemented with qualitative data (Bagstad, Reed, Semmens, & Troy, 2015). Thus, economic data derived from the SAMs provided a foundation for analysis that was informed by qualitative data from interviews. These data guided the categorization of the SARA typology as well as informed all regional economic data, which were compared to interview testimony for explanation, alignment, or inconsistency. For instance, I examined interview data related to the question “how does the river affect life here” for testimony that explained or illuminated data related to the SARA typology. Also, the results from the shift-share as well as the impact analysis were compared with interviewee responses to the question “How do you anticipate changes in the river’s streamflow might affect your life?” In some cases, interview testimony facilitated an interrogation of the veracity of assumptions inherent to the model and in other cases qualitative data merely contextualized quantitative data.

### **3.2.1.4 Rafting Owner/Operator Survey Analysis**

In the survey sent to rafting company owners the quality of “river conditions” as well as “profits” was determined on a 5 point scale for the years 2008 through 2012. Survey’s also allowed respondents to clarify the amount that, the national economy, other rafting companies, the federal government and weather/climate conditions affect their business. Respondents were also asked about the quality of those interactions. This information was utilized, in combination with hydrological streamflow data from the gauge at Salmon, Idaho and reported rafting permits to assess any correlations between streamflow and the success of their business for that year. Surveys also queried respondents directly about the possible effects of a streamflow reduction on their business and finally respondents were encouraged to share the biggest concern they had for their business. All of this information was examined against results from the impact analysis.



### 3.2.1.5 Limitations

The three-county SAM utilized in this research does not *fully* account for *indirect and diffuse* benefits nor does it align perfectly with SRB boundaries due to the resolution of available data (by county). Interactions between sectors are estimated based on assumed relationships related to monetary transactions (see section 3.1.5.1). However, nonmonetary quid pro quo interactions between firms are ignored as well as the social capital contributions of individuals, firms, or sectors, although this type of economic contribution is measurable in a variety of different ways (J. L. Flora, Sharp, Flora, Newlon, & County, 1997; Ishihara & Pascual, 2009; Poortinga, 2012). Also, in order to better estimate more precise diffuse interactions between firms and sectors (as in: how many out-of-region customers eat out and/or stay in a hotel because they primarily wanted to go rafting) then those customers would need to be surveyed directly in order to complete a travel cost model (Benson, Watson, Taylor, Cook, & Hollenhorst, 2013), or contingent valuation (Sáez & Requena, 2007). Alternatively, I could have employed hedonic regression analysis according to proximity between SARA and river access and/or concentration and proximity with/between SARA on a spatial scale (Zygmunt & Gluszak, 2015). However none of these methods were employed due to time and resource constraints.

In examining this SAM streamflow reductions were only examined in relation to SARA. Economic sectors related to streamflow in non-SARA capacities, such as crop farming, were ignored since this analysis was specifically designed to reveal the impact of streamflow quality not water quantity or availability. This choice reflects a desire to calculate and articulate clear economic data rather than provide inaccurate predictions of the complete cost of potentially streamflow reductions (see: 3.3.1.2). However, streamflow reduction would certainly impact many more economic sectors than just SARA, and this surfaces in interview testimony but these interactions were not analyzed in the impact analysis due to the complexities of interactions (that would necessitate more complete information – see Appendix 9).

### 3.2.2 Qualitative Phenomenological Analysis of Interview Narratives (Question B)

The following analysis is presented in relation to question B of this thesis and this analysis directly informs the results reported in Chapter 5.

#### **B. What are the perceptions of the river and streamflow ES benefits held by different stakeholder groups across the SRB?**

1. **How do different stakeholder groups discuss the river and incorporate the river into narratives and their region?**
2. **Do any consistent phenomena emerge in stakeholder narratives related to the river?**
  - a. **How do emergent phenomena fit into resident narratives?**
  - b. **What function do emergent phenomena fulfill in these narratives?**
  - c. **Does the role of the river and emergent phenomena reveal a BI related to The River?**

My main hypothesis in carrying out these analyses was:

*The Salmon River is a significant symbol for residents of the SRB Bioregion that share a BI related to the river that defines the cultural ES value of streamflow for different stakeholder groups.*

In order to test this main hypothesis I carried out the methods described below in order to *reject* the following null hypotheses:

#### **The Null Hypotheses:**

1. **Stakeholder groups do not discuss The River or include the river in their personal narratives or maps in a meaningful or unprompted way.**
2. **No consistent or interesting phenomena emerge specifically related to The River that indicates anything about respondent perception or the importance of The River for residents.**

In order to test this hypothesis I utilized a phenomenological approach to examining interview testimony as narratives (Starks & Trinidad, 2007). I qualitatively examined these “narratives” for evidence of significant symbols, common terminology and shared language related to the Salmon River. Although significant debate still occurs concerning what constitutes true “narratives” for scientific analysis, interview testimony remains perhaps the most broadly accepted form (Andrews & Tamboukou, 2013). However, other objects, including maps drawn by respondents, may be treated as narratives for analysis (Donovan et al., 2009). In this analysis, both interview transcripts as well as participant maps were treated as two parts of a singular narrative produced during the interview between the respondent and myself, a reality receiving increased recognition in narrative scholarship (Andrews & Tamboukou, 2013). Furthermore, the role of the environment in affecting narrative construction is becoming increasingly recognized in literary narratology (Erin James, 2015). In these methods, the motive of the interviewed narrator, the influence of the researcher as audience, and the effect of the environment on interviews were all considered in analysis.

### **3.2.2.1 Phenomenological Analysis of The River in Narratives**

Not only did “the river” emerge in interview testimony, unprompted, in a variety of expected roles, many unexpected phenomena emerged as well and all of these exemplars were explored under a variety of methodologies established for a diverse place based data (Williams & Patterson, 2007): I explored all of these phenomena by accessing the raw text in QSR International’s NVivo 10 (2012) to queue instances of certain specific responses and reduce selection bias in reporting. First, I examined transcripts for unprompted river discussion and considered the role the river played in the narratives related during interviews. Afterwards I compared these responses to the direct river question responses. Finally I explored emergent phenomena and shared representation that I previously recorded on my saturation form. These included: the use of “lifeblood” to describe the river, use of “home” in response to Salmon River

Basin, consistent history of place, seasonality of place, conflict with the federal government, shared narrative related to lifestyle of place, the impartial role of the river in narratives as both provider of life/lifestyle and death.

During interviews I refrained from exploring these phenomena in my questions. But after transcribing the recorded interviews I freely interacted with these data, exploring observations by following them in the text, and exploring connections. I synthesized common narratives of people and place in relationship to each other. And I considered data from economic analysis in exploring these narratives and connections or consistencies of phenomena or significant symbols in common representation between or within groups to synthesize the typological narrative of subgroups.

#### **3.2.2.2 Consideration of Bioregional Maps**

The maps drawn by respondents and used during interviews were considered as illustrative artifacts of interview narratives, contextualizing significant places identified by respondents. Specifically, I analyzed maps in comparison to interviewees' responses to the questions "What do you call this region?" and "How does the river affect life here?" Maps were also critically considered for incorporation of the watershed. Furthermore, maps for each subgroup and region were examined to isolate trends and tendencies in demarcation related to verbal testimony. Through this process many explanatory details emerged related to interview testimony as the process of drawing the map informed the creation of the narratives originally. In this qualitative analysis of maps certain tendencies and observed trends in the maps were considered as a means of explaining the emergent phenomena referred to in section 3.3.2.1 of analysis methods. Also, other phenomena emerged related to the mapping activity specifically. These qualitative observations of respondent maps informed separate analysis of interview testimony contributed to more in-depth analysis of individual narratives which, together, contributed to analysis of subgroup and region categorical responses more broadly.

### 3.2.2.3 Limitations

All interviews were conducted during the course of a single summer. Not only does the temporal aspect of the study period potentially effect the nature of responses, especially among certain subgroups such as river rafters, it limited the amount of respondents interviewed. Also, due to the nature of chain-referral sampling techniques, certain subgroups of the population may have been missed. Government employees in Riggins refused to be interviewed, and the Church of Latter Day Saints Community in Salmon was underrepresented due to interview hesitance. Alternatively, some groups may be over-represented.

Some respondents perceived me as a source of political authority, which may have affected their responses. In Stanley, I was solicited to exercise that perceived authority to affect the designation of the Boulder White Cloud Monument: *“I wish someone like yourself or I don’t know about you, but someone you know, in a position of power would get with us to influence people about this um, National Monument”* (STN\_5, 2014). In Salmon some members of the community attempted to influence my opinion on a local issue of a whitewater park. The motivation behind this interview testimony was considered during qualitative analysis and recognizing this influence on testimony is an important consideration of narratives. Furthermore, the testimony I gathered was not just subject to the time and place of the interviews by myself as interviewer. More than a perception of authority, my gender, perceivable ethnicity, age, clothing, and even my interest certainly affected interviews.

These limitations also reveal a larger limitation of my methods for addressing this question. The interviews and corresponding maps present one type of data related to BI I accessed for evidence of a BI related to the river but these methods **cannot** fully characterize the complete BI of respondents. In order to achieve that task many more types of evidence would need consideration including resident art, music, even signage and advertising.

### 3.2.3 Quantitative Analysis of Statistical Significance of Observations (Question C)

The following analysis is presented in relation to question C of this thesis and this analysis directly informs the results reported in Chapter 6.

#### **C. Are the perceptions within and/or between groups statistically significant?**

1. **How do respondents in Riggins, Stanley and Salmon talk about the river and do they incorporate it into their maps consistently?**
2. **Do emergent phenomena discovered in narrative analysis occur consistently across stakeholder groups or regions?**
3. **Is “The River” a statistically significant symbol for stakeholder groups and/or regions?**
  - a. **Does the amount that residents discuss the river unprompted correlate with their Place Attachment score?**
  - b. **Does the amount that residents discuss the river unprompted correlate with how they draw their maps?**

My main hypothesis in carrying out these analyses was:

*The Salmon River Basin is one distinct bioregion unified by the Salmon River as both a physical and cultural feature of the landscape that supports a life and lifestyle.*

In order to test this main hypothesis I designed and implemented research methods and analyzed results in order to *reject* the following null hypotheses:

#### **The Null Hypotheses:**

1. **Respondents neither discuss the river a significant amount nor use it in defining their region a significant amount.**
2. **There is no discernable statistical consistency or significance in emergent phenomena.**
3. **Discussing the river unprompted does not correlate with Place Attachment scores or how they draw their maps.**

In order to test this hypotheses I utilized place attachment constructs in examining interview data related to the amount that respondents discuss the river, both unprompted and prompted, statistically using IBM SPSS Statistics for Windows (2013). Also, levels of place attachment of bioregional residents were analyzed as a hypothetical antecedent to place specific behavior and attitudes such as unprompted river related reference and maps drawn according to watershed boundaries (Raymond et al., 2010). I quantitatively examined these data for evidence of significant symbols, common terminology and shared language for evidence of river related BI statistically by utilizing an evolving code system (Appendix 3).

### **3.2.3.1 Coding the Maps for Analysis**

The drawn maps were analyzed according to whether respondents made use of watershed features in defining the border of the region. I used both objective watershed demarcations as well as interview testimony recorded during the drawing process in order to determine whether or not respondents were giving consideration to the watershed features in drawing their region's borders. Rather than attempt to quantify the exact amount of watershed features utilized, maps were coded in a binary fashion as either (1) considered the watershed or (0) did not consider the watershed. This could include drawing boundaries constrained by the river, going out of the way to include part of the river, as well as including a tributary or lake that eventually drains into the Salmon River. Certain watershed features also represent political borders (such as the Idaho/Montana boarder) so drawing borders according to these features was not considered evidence of watershed consideration unless it was clear that the respondent intended to delineate watershed features based on the interview contingent on the exact region where the interview took place. For instance the difference between the Idaho/Oregon border and the Salmon River border near Riggins is about a centimeter on the map but this difference between a political boundary and a watershed boundary represents a crucial distinction in the conception of the region as drawn by respondents in Riggins.

### 3.2.3.2 Transcribing, Coding and Analyzing Interviews Quantitatively

After transcribing each interview I coded responses numerically based on coding (Appendix 3) that was partially pre-determined but also evolved as part of analysis (Weston et al., 2001). Interview Questions 1 through 5 (Appendix 1) contained information to categorize respondents according to codes pertaining to various stakeholder group categories. This information was entered into a spreadsheet along with self-reported demographic information. In this sheet respondents were assigned an intelligent code that revealed where and when the interview occurred (in sequence) but their names were removed.

Questions 6 through 21 were analyzed as “unprompted river” questions and coded in a binary fashion as either ‘about the river’ or not, in accordance with the codebook. Questions 7/8 as well as 12/13 and 14/15 each constitute one question with two parts where I asked the second half only when necessary. After coding, the “unprompted river” questions those results were aggregated into a “river hits” continuous variable from 0 to 12 where 0 indicates that the respondent never mentions the river unprompted and 12 means that they refer to it for every question. To further contextualize that metric, responses from these questions were isolated in separate text documents and the raw text was analyzed for word frequency counts in NVivo.

For question 22: “How does the river affect life here?” interview responses were coded numerically to represent the subject of their answer: (1) Economy, (2) Culture, (3) Ecology, (4) Socially, (5) Politically, or (6) Everything. Responses could receive, one, some, all, or none of the assigned categories for statistical analysis. Questions 24, 25, and 26 each related to the river, its importance, and the effect of streamflow reductions and they were coded: (1) good/more, (2) bad/less, or (3) neither/same. If respondents mentioned the Salmon River in answering “What do you call this region?” their interview was coded as a 1, and a 0 if they did not mention it.



In order to potentially examine the amount of unprompted “river hits” I ran a series of generalized linear Poisson regressions of “river hits” related to a variety of variables including: demographics, subgroup, region, place attachment, map (see 3.3.3.2), and the results from question 22. Not only was this method appropriate according to the Poisson distribution of “river hits” but poisson regression works particularly well with binary data (Zou, 2004). Also, certain phenomena that emerged during interviews were added to the spreadsheet and coded in binary fashion for analysis. Specifically, if the respondent used the phrase “life blood of the region,” or referred to the SRB as “home” when asked what the term meant to them. I also tested the effect of these variables in determining “river hits.” I used crosstabulations and Pearson’s Chi-Square to test for “lifeblood” responses as well as other responses related to “how the river affects life here” (question 22) since these were dichotomous variables related to interview themes (Ryan & Bernard, 2003) and this methods is therefore the most appropriate (Field, 2009).

### **3.2.3.3 Demographic Analysis**

Demographic information supplemented the theoretical saturation form in terms of identifying professional identity, family size, and group identity. I also utilized information regarding income levels, job type, gender and ethnicity to confirm that the population sample fit into the regional demographics provided by the Bureau of Economic Analysis. Also, I used these variables in cross-tabulation as well as poisson regression analysis mentioned above. Finally, these data are used to contextualize qualitative analysis of interview data.

### **3.2.3.4 Limitations**

Despite a large number of interview respondents, these data were constrained: The variety of stakeholder groups represented in each region reduced the statistical power of the data, preventing definitive statistical analysis of groups *within* each region. Also, the chain-referral sampling ensured equal representation of targeted groups (Appendix 7) but does not provide a proportional representation of the population of the SRB by design.

## Chapter 4. The Value of Streamflow for the SRB Bioregional Economy

This chapter reveals data gathered from regional economic analysis that is critically considered in conjunction with qualitative observations. Situated somewhere between macroeconomic analysis and microeconomic studies of individual firms, regional economic analysis examines the inputs, outputs, strengths, weaknesses, opportunities, and threats to a regionally defined FEA (Cooke & Watson, 2011). This type of analysis relies on assumptions related to “economic base” theory, which defines the borders of a FEA according to trade rather than physical or political geography (Tengberg et al., 2012). But this chapter interrogates those assumptions by critically considering contradictory qualitative data as well. Also, when supplemented with qualitative data (Busch et al., 2012), this type of analysis provides important insight into the relative importance of regional ES benefits produced by a natural capital resource (Khandker, Koolwal, & Samad, 2010).

In order to contribute to this tradition, expand ES inquiry, and discover regionally specific economic information relevant to the residents of the SRB bioregion, I examined the contribution of streamflow affected recreation activity in this chapter by well-established regional economic tools, techniques, and best practices. Specifically, I focused on the role of a SARA typology on the SRB economy to expose the contribution of stream~~flow~~ and affected sectors. This important distinction emerges from the specific focus of this research concerning the value of an ES quality as much as the quantity of it; as a service rather than a good, the quality of streamflow provisioned is more relevant than the gross quantity of water in the system. Results from this chapter therefore address the first ancillary question:

**A. *What is the overall economic contribution of streamflow affected recreation activities (SARA) to the SRB economy?***

#### 4.1 Economic Trends Between 2008-2012 (Research Question A1)

The SRB economy underperformed as compared to both national trends as well as industry trends for the period in question. Between 2008 and 2012 the SRB lost 7.17% total “gross” jobs, but accounting for national and industry economic trends in the 2008 and 2012 SAMs and examining the difference in the shift-share reveals that jobs in the SRB actually declined by 4.38% “real” jobs between 2008 and 2012. The difference between “gross,” “real” and/or “base” emerge repeatedly in the results that follow (Table 2). “Gross” describes the actual loss in the region while “real” describes the regional contribution to that observed loss. In this case, by controlling for the direct effect of a national recession we can observe that the SRB endogenously produced a 4.38% job loss due to its internal economic environment.

<b>Table 2. Regional Economic Analysis Terms</b>	
<b>“Gross”</b> jobs/production	What was actually observed
<b>“Real”</b> jobs/production	The regional level of gain/loss for that metric
<b>“Base”</b> job(multiplier)/production	The total contribution to the economy

Similarly, between 2008 and 2012, the export to subsistence ratio for the SRB declined from 35% to 33%, indicating that exports have diminished over this period. However, the employment multiplier increased from 2.85 to 3.03. So, in 2012, for every job associated with exports, a *total* of 3.03 were created in the region (while exports diminished). Interpretation of these two metrics in conjunction reveals that revenue (and therefore income) has declined as employment increased, which implies that residents work more jobs for less money. In an interview one resident explained:

*“I do love chinking, which is the caulking in between the logs on log cabins. I do staining, painting, cleaning, I clean a lodge in lower Stanley. I work for the general store here in lower Stanley. What else do I do? Have about eight jobs right now [laughs]. Just about anything that people [laughs] will pay me on the side to do. We only work four months out of the year so...In the wintertime, I work in the general store”* (STN\_16, 2014).

The largest increases in employment for the SRB between 2008 and 2012 were associated with healthcare: 37 more nursing assistants, 72 more nursing care workers and 73 continuing care retirement community employees. The growth in these industries (in terms of jobs) reveals the aging population of the region and the increase in retirees, many of whom move to the area as amenity migrants. 33% of residents in the SRB are over 60, as compared to 19% in the U.S. at large, according to the U.S. Census Bureau (2010). Although these nurses are paid by a combination of retirement income and insurance/government assistance, which brings money into the region and contributes 0.2% to the economic base, retired and elderly people don't offer much opportunity for economic growth and the high cost of nursing care is associated with high spending outside of the region. Although this amenity migration could help bolster an economy, without a sustainable industry that retains younger people (and their income), a region will decline, a pattern observed repeatedly in the west (Power, 1996) and in the SRB this idea emerged consistently during interviews, as one resident summarized:

*"There are way, there is way less, um, how do I put it? Use of natural resources in consumptive, in a consumptive manner. We don't have an infrastructure for logging or mining anymore. Um, ranching is even having a tough go of it in this neck of the woods. Um, I would say that the, um, the **population of Salmon has decreased** and even as it's decreased, a lot of the people that live here now are um, I don't wanna call them refugees, transplants from elsewhere. **It's become almost a retirement community 'coz people from, you know, bigger cities and other states can buy a piece of land here relatively cheaply...**" (SLM\_42, 2014)*

The 2012 SAM and subsequent input/output analysis confirm this observation, as ranching has decreased between 2008 and 2012. Moreover, sawmill employment decreased the second largest amount by 109 jobs. However, the most significant job loss attrition between 2008 and 2012 occurred in full-service restaurants, which lost 124 full time jobs during this period. This sector is particularly relevant to this research since restaurants compose part of the SARA typology and thus these data begin to address Ancillary Question A directly.

## 4.2 SARA Typology (Research Question A2)

### 4.2.1 Overview

As a regulating ES (MA, 2005), streamflow provides an input to the regional economy of the SRB through the SARA Typology that, in aggregate, produces 11% of the jobs in the SRB via a 5.68 job multiplier and an 18% export to subsistence ratio in 2012. In terms of base contributions, roughly 6% of total economic activity in the SRB FEA resulted from activities in sectors that comprise the SARA Typology. In the SRB, firms in the NAICS sectors of the SARA typology are more tourist oriented than firms in the same NAICS sectors, nationally.

Where most regions have bars that cater to residents, and the SAM assumes that they do, bars and restaurants in the SRB FEA exist to capture tourist dollars and do not cater to residents of the SRB for reasons revealed in the interviews. For instance, while describing the population divisions in Salmon, one resident stated that,

*“It’s a 50/50 town, about half LDS [Church of Latter Day Saints] and they tend to be very conservative and don’t spend a lot time in the local watering holes, etcetera, etcetera and then another half that is fairly party oriented and really if you go down town during the 4<sup>th</sup> of July or whatever just very crowded bars and bands playing and a lot of activities along those lines”* (SLM\_16, 2014).

The date this resident mentions is crucial. The SRB experiences a significant amount of part-time residency where people come only to live and work for the summer season. By the very nature of this type of analysis these residents are excluded from the SAM since they are not actual residents of the SRB and their income is considered uncaptured. Meanwhile, any money that they spend in “local watering holes” is redistributed tourist income since these seasonal workers only exist to supplement other tourist related activities such as rafting. For the SRB bioregion as a whole, the money in question is merely circulating throughout the economy, and not increasing the SRB FEA’s total wealth after its point of origin: original tourist spending.

Evidence for this situation is observable in the distinction between the economic base contribution of the SARA typology, the job multiplier, and the export to subsistence ratio. At a mere 6% of the economic base for the SRB FEA, with a 5.68 job multiplier, *and only* an 18% export to subsistence ratio: for every one job in the SARA typology associated with exports (original tourist spending) a total of 5.44 jobs are created in the SRB FEA, suggesting that these jobs are highly dependent on one another united around tourism based on streamflow recreation. When asked about tourism (and not streamflow) one resident of the SRB observed, “well, you know, tourism this year, in fact I was just talking, we were just talking about this yesterday, we're seeing some increase in some of the boat traffic, boat outfitter end, private and so the river tourism side of things seems to be, and it's just an observation, seems to be picking up a little bit” (SLM\_22, 2014).

Interviewing restaurant owners and hotel managers confirms that these sectors are affected by rafting and associated summer tourism. A restaurant owner in Riggings explained that, “when I hire someone and they are working in June and they wanna take a day off, I say okay, but if you are planning on being here through the winter, just know that winter is coming and they are like, ‘well you are crazy, I mean winter is in six months from now,’ [but] winter is coming and I mean I won't have the hours for you” (RIG\_18, 2014). This testimony reveals the thin margins in this typology associated with low wages and little in retained earnings for either proprietors or employees, quantitatively expressed in a lower than regional export to subsistence ratio of 18%. All of these realities culminate in a typology that contributes 6% to the SRB economic base in terms of production but 11% to total jobs. Employees in these sectors have little dispensable income and, “well nobody's got any money. You know, you don't see people in the bars at night or in the restaurants at night because, uh, young people, you know, they don't have money to spend” (SLM\_29, 2014).

#### 4.2.2 SARA Typology Effected by Regional Trends

It's clear from qualitative evidence gathered during interviews that national trends are affecting these tourist related sectors (beyond the 1:1 assumed effect inherent to the model). Tightened budgets mean less discretionary income available to be spent on vacation and therefore less frequent tourism for the period, which hurts businesses in the SARA typology of the SRB FEA. A bar owner in Stanley, who can be found behind the counter of his establishment seven days a week, suggested that, "tourism is an up and down activity right now. Uh. They brag that there's 1.2 million visitors come through Stanley every year. I think the number's dropping; not only at camp grounds... *There's less motel space available in town.* I think our tourist numbers are dropping. I can't quantify that, but I think it *and I see it in my daily sales*" (STN\_8, 2014, emphasis added).

Bartenders, as an occupation, grew by 2% nationally and 3% in the SRB FEA between 2008 and 2012, but when national trends are accounted for the "real" growth occurring in the region due to SRB regional economic activity only amounted to 0.78% "real" growth. Similarly, in the SRB between 2008 and 2012, waiters and waitresses shrank by 25% "gross" jobs whereas the sector grew by 4.99% nationally so "real" jobs actually diminished by 27.71%. Furthermore, where total SRB employment decreased by 4.38% "real" jobs between 2008 and 2012, jobs in the SARA Typology diminished by 13.81% real jobs. When we account for national economic trends, which grew in aggregate at a meager 1% between 2008 and 2012, this job erosion is revealed to be even 0.81% more dramatic. Worse yet, when we consider that the sectors in the SARA typology nationally performed better than the national economy, at large, and grew by 4.41% from 2008 to 2012 then the "real" job loss in this typology is revealed to be closer to a 19% reduction as in, these sectors should have experienced a 4.41% reduction accounting for industry trends and that economic boost was also lost due to regional economic performance.

### 4.2.3 SARA Contribution to the SRB Economy

This typology is, therefore, particularly vulnerable to down-turns in tourism due to economic recessions. So, as the SBR economy underperforms the SARA typology preforms even worse. Speaking of the economy one resident responded, “In some ways I think that we – it takes longer for it to hit us **but it also takes longer for us to rebound**. So you know big cities see it quicker, but when the economy takes a rough quick drop and we kind of maintain and stay the same but then it seems it takes us longer to climb back out here” (SLM\_36, 2014). Which supports, related to tourism, the fact that as hotel employees across the U.S. grew by a meager 1.07%, hotel employees diminished by 13.88% “real” jobs in the SRB FEA. However, as the national economy recovers, the SBR appears to be recovering as well. “The new development here in Stanley is a highlight, if they’re able to survive and make it work, it’ll definitely be an increase in the local community economy. We have a new owner for the Mountain Village property [hotel, restaurant, bar] so it gives, **fills them with a lot of optimism and excitement** about the local ownership” (STN\_10, 2014) reported a local official in Stanley. A resident (and Mountain Village employee) echoed “the local economy, I believe, um, is picking up because uh, **the economy in general is getting better**” (STN\_27, 2014).

One sector where this growth is particularly observable occurs in an intriguing subset of the SARA typology: “bakers” have grown in the SRB by 30.67% “real” jobs between 2008 and 2012, as compared to 3% nationally. The increase in “bakers” yet again confirms the importance of tourism for the SRB FEA but interview testimony with proprietors in this sector reveals the difficulty of making a living this way. When asked about life in the region, a baker in Salmon clarified, “What’s it like to live here? Um, well, uh, from my perspective there’s just a ton to do. I mean, the **hard part is uh, finding a job that you can make enough money to even support yourself**. And if you have a family, your family, and getting to enjoy what’s, you know, what’s available in the outdoors (SLM\_9, 2014).



### **4.3 Impact Analysis of SARA Typology (Research Question A3)**

In the SRB FEA, the total effect of a 5% reduction in the SARA typology results in only a 1% reduction in regional economic production. At face value, this seems to suggest that the SRB economy is resilient to potential impacts to SARA since the total economic reduction is less (as a percentage) than the amount the typology was reduced by. But, by contrast, the regional job loss that results from a 5% reduction to the SARA typology is 11%. So, although the total wealth of the region won't diminish significantly due to a reduction in the SARA typology, the welfare of the bioregion diminishes much more significantly as people on the margin lose necessary jobs. Remembering that an impact analysis reports a possible future while a shift-share reports a definite past, the two in conjunction can provide helpful resolution to one another. Refer to Appendix 8 for a table of impacts to SARA typology by sector at 5% and 20% reductions.

#### **4.3.1 Shift-Share Compared to Impact Analysis of SARA Typology**

The shift-share analysis I completed previous to conducting the impact analysis revealed that when the SRB FEA economy shrank by 7.1% between 2008 and 2012, the gross job loss for the region was 15.96%. However, when only the SARA typology is reduced by 7.1% (in the impact model) then the total job loss for the entire SRB FEA is roughly 15%. Comparing these results suggests that the job loss reported by the impact analysis is overstated since reducing the SARA typology alone by 7.1% produces the same job loss result as the entire economy shrinking by 7.1% between 2008 and 2012. Intuitively, job losses in one sector are often mitigated by job growth in other sectors as labor becomes a more available input, which prompts many to question the utility in using employment as a metric (Waters et al., 1999). But here, consistent with other input/output analysis, "job" loss is a unit of measurement rather than a prediction for actual "gross" job losses. So, keeping that in mind, the impact analysis reveals that, all other things being equal, a 5% reduction in the SARA typology will reduce the SRB FEA by 11% "real" jobs across the SRB FEA that may or may not get absorbed by other sectors in the long run.

The impact analysis suggests that a reduction to the SARA typology will produce a definite and tangible effect on SRB employment in the short run. This result occurs due to the relatively high job multiplier of the SARA typology as opposed to the economic base contribution of the typology. The larger the reduction, the more drastic the job losses. For instance, a 20% reduction to the SARA typology (in the impact model) produces only a 5% economic reduction but a 41% job loss. This proportionately accurate number suggests that, all other things being equal, if river related tourism is reduced by a dramatic amount *for any* reason than 41% of jobs will disappear and people will need to find new economic activities, or leave the SRB.

#### **4.3.2 Sightseeing Transportation**

Comparatively, the one NAICS code associated directly with whitewater rafting, “Sightseeing Transportation,” only contributes 0.5% of the economic base of the SRB FEA. Consistent with the entire SARA typology, part of this result has to do with how much of the money generated in this sector passes quickly out of the region again. For instance, most rafting guides are not residents, therefore any retained wages (which aren’t recirculated at “local watering holes”) leave when these employees leave the SRB FEA. Many of the actual rafting companies are headquartered outside the SRB FEA therefore any retained earnings for the company don’t contribute to the economic base of the SRB FEA either; in the data 67% of respondents were headquartered outside the SRB.

#### **4.3.3 Data from Survey Compared to Input/Output and Interviews**

Climate change will not only produce a general streamflow reduction but it will cause a shift in peak stream flow to earlier in the spring (Davis, Baxter, Rosi-Marshall, et al., 2013). However, just as in economic analysis, trends do not dictate absolutes, especially in cases of high variability. One rafting company owner/proprietor explained that,

*“We have a unique thing that we depend completely on snow accumulation and then on heat that brings it off. So, we can have 100% snow pack and it rains and*

*snows all of June and July is just kicking. Or we could have 100% snow pack and we have years, I think it was '09, it was uh, May and it comes off, it had been warm in April and a rain event and this whole thing was flooded, like, all of our snow came off in about a week. And so, those kinds of events are huge because of that"*  
(STN\_28, 2014).

In fact, 2008 was the year when this rain event occurred, and the peak flow occurred on May 21st with 9,630 cubic feet per second (CFS) recorded at the gauge located near Salmon, Idaho ("USGS Surface-Water Historical Instantaneous Data for Idaho," 2015). By comparison, the average peak flow for this period is 10,697 CFS. In response to the survey, rafting companies reported both "river conditions" and "profits" as 3.33 out of 5, and in total, 835 rafting permits were issued in 2008, the most for the entire period (Table 3). 2008 was also the year reported as most profitable in the survey although river conditions were reported higher for 2010 and 2012.

Year	Total Permits	Date of Peak (Yankee Fork)	Peak Streamflow (Yankee Fork)	Date of Peak (Salmon)	Peak Streamflow (Salmon)	River Conditions	Profits
2008	835	21-May-08	MAXED OUT	21-May-08	9,630	3.33	3.33
2009	628	Jun. 06, 2009	5,790	Jun. 06, 2009	11,500	3	2
2010	663	Jun. 05, 2010	8,050	Jun. 05, 2010	12,800	3.5	2.25
2011	573	Jun. 24, 2011	5,920	Jun. 24, 2011	13,100	2	1.75
2012	660	Apr. 26, 2012	7,060	Apr. 27, 2012	12,700	3.6	2.6

Comparatively, in 2009 the gauge near Salmon, Idaho reported a peak of 11,500 CFS occurring on June 6<sup>th</sup>. One might assume this would be a better year for rafting, but in fact rafting companies reported "river conditions" for 2009 as an average of 3 out of 5 and "profits" as 2 out of 5 and only 628 permits were issued. In 2010 "river conditions" were reported as 3.5 out of 5 and yet "profits" were reported as 2.25 out of 5. 2011, the highest rate of 13,100 CFS occurred at the latest date of June 24<sup>th</sup> but rafting companies reported river conditions as 1.75 out of 5 and profits as 2 out of 5 and only 573 permits were issued.

Rather than peak flows, issued permits appear to parallel reported profitability, while reported river conditions have no discernable relationship with streamflow CFS peaks or dates. The apparent disparity between actual river conditions and reported conditions may have more to do with overall economic performance that leads to more or less profitable years. For instance, comparing streamflow rates to the shift-share of the SRB FEA there is no discernable effect of high or low years on the SRB's economic activity but reported profitability correlates with overall economic performance for the SRB. Survey respondents further clarify that the national economy has a greater effect on the profitability of their business (7.83 out of 10) rather than Climate/Weather (5.5 out of 10). Interestingly, respondents report a low average value for the effect of the "local economy" (3.43 out of 10). Correspondingly, in 2012, as the economy improves nationally but before the SRB begins to recover in earnest, rafting experiences a boon with 660 issued permits and 2.6 out of 5 "profits" reported.

The last question of the survey asked respondents to share the biggest concern they had for their business. Although one respondent wrote, "economy, weather, technology," which certainly seems to cover all the bases addressed throughout this analysis, another respondent elected to get more specific, declaring that, "All river companies running high quality trips and listening and changing with their guests needs. That is the number one reason (over the economy) that rafting *throughout the country* has seen a decline since the 90's. Poor trip quality and the refusal to change with the times" (Survey, 2015, emphasis added by respondent). It seems that the national economy has an effect on SARA but it also seems that this particular activity is subject to its own particularities.

A rafting company owner in Stanley explained to me that, "this business is funny in the fact that the average person doesn't need, doesn't know what water flows mean. So if I say, the river is at 1350, they have no way to conceptualize what that means. It's more, if it's hot, this is an activity they do.... for the most part, we can see success in our business based on temperature

and weather more than water flow” (STN\_28, 2015). But this same guide clarified that a reduction in streamflow, “Would it make my business more difficult to run? Hell, yes. But as far as people in the door, if it’s 90 degrees, people don’t want to go for a horseback ride” (STN\_28, 2014). Another rafting guide in Stanley offered a similarly paradoxical answer that, “Yeah, I do think that that would definitely affect a lot of things. I mean, you know, in the short term I don’t think it’d affect my business too much. [But] long term I think it definitely will affect the business” (STN\_19, 2014).

#### **4.3.4 Synthesis of Findings**

Neither the shift-share nor the impact analysis of the SRB FEA allows a prediction of the actual effect of a streamflow reduction or shift in the SRB economy but they do present data indicative of real possibilities, especially in conjunction with qualitative data. A SAM qualifies as an inaccurate but interesting model, which is the best a modeler can hope for. The 2012 SAM of the SRB FEA, based on available economic data for Idaho, Custer, and Lemhi counties, indicate that the SRB FEA is vulnerable to shocks to the SARA typology in terms of employment. However, calculating the relative value of a unit of streamflow in cubic feet per second for the SRB economy is difficult for the reasons outlined above and, moreover, such a value may not be very illuminating or representative to decision-making, either.

Even if the previous (per unit) value of a unit of streamflow could be determined, that would not necessarily project into the future as streamflow becomes more variable (rather than strictly diminished) but, moreover, national economic and industry trends affect rafting more dramatically than streamflow rates. Also, according to the SAM, “Sightseeing Transportation” by itself produces a negligible effect on the SRB economy, however, just as climate change promises to alter more than streamflow rates for the SRB environment, the entire SARA typology is codependent on tourism.

#### 4.4 Perceptions of Streamflow Benefits (Research Question A4)

Do the perceptions of residents in the SRB conform to or align with economic analysis? In short, no. Although the SARA typology contributes 11% of the total jobs to the SRB FEA it only contributes 6% to the economic base of the region, but respondents in Riggins, Stanley and Salmon expressed perceptions quite contrary to this finding. 67% of respondents indicate that a reduction in streamflow would be negative for the region, summarized by the proprietor of a brewery in Salmon who reported that a reduction in streamflow: “would affect our tourism, big time. Affect the floating industry and the fishing industry. And yeah, that would be, *that would be very bad for our economy*” (SLM\_27, 2014).

##### 4.4.1 Perceptions of the economic importance of SARA in Riggins

When asked about the economy, a former mayor in Riggins expressed, “we’re very lucky to have that river” and when asked about tourism, “oh, yeah. Yeah, it’s completely gone to tourism. That’s what we are - we’re a tour - tourism based, uh, city now” and about the river, “well, that’s the - the sole economy. It’s based, um -- if it wasn’t for the river, we would have nothing. This town would’ve just dried up” (RIG\_5, 2014). When a proprietor of a business in the SARA typology was asked about how the river affects life in the region he responded “it’s the only thing that keeps this town - Riggins would be - no sense of existing if it wasn’t for the river, um, it’s the main source of revenue with supplying boaters and fisherman, and hunters and um, that kind of thing. The whole town is based on the tourism that is - comes from the river” (RIG\_16, 2014). And a restaurant proprietor expressed, “I would say it’s the hub of the town for sure” (RIG\_18, 2014).

##### 4.4.2 Perceptions of the economic importance of SARA in Stanley

In Stanley, tourism is particularly prevalent in the perception of residents with one resident expressing “that’s the main thing here. That’s what this town thrives for and this is the

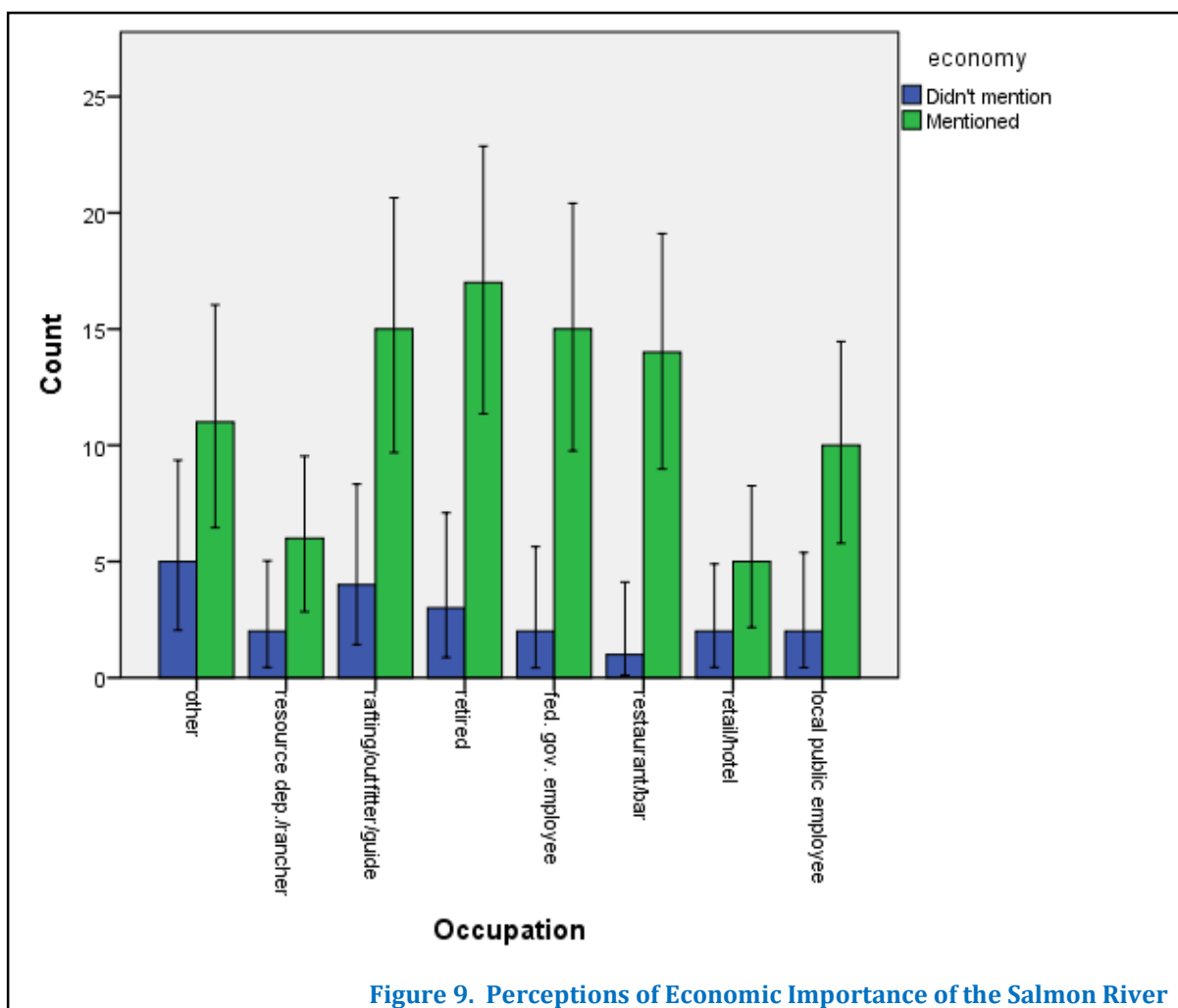
time because during the winter um, winter tourism is pretty minimal” but when asked about the economy this resident clarified that “I think it remains, pretty much the same, because there’s not more hotels going, there’s no more [mumbles] rafting companies going, that is maxed out. There’s 4 outfitters for this stretch, and that’s it. There’s not going to be more” (STN\_32, 2014). This reality has to do with the permits required for rafting that caps this activity but the federal government can (and does) remove those permits. Another resident of Stanley echoed that the economy of Stanley is “staying the same is it’s still just a summer affair, you gotta make your living here, two months, two and a half months. Uh, that hasn’t changed” (STN\_10, 2014).

#### **4.4.3 Perceptions of the economic importance of SARA in Salmon**

In Salmon, residents reported that the river, “well, I think it’s what pretty much keeps the town going – tourism and retired people” (SLM\_28, 2014). And, further supporting the connection between the river, tourism, and the perceived importance of the river another resident of Salmon expressed that there is “a lot of tourists in the summer for sure. They bring a lot of money in the summer, good economy during the summer. And then in the winter, you don’t have that much. You have fall hunters come in and some fishermen and then spring fishermen and then the river starts out in the summer and that’s when it brings a lot of tourist” (SLM\_32, 2014). Although this perception is common in Riggins, Stanley and Salmon, some respondents had a different perspective.

When asked about the economy one resident of Salmon replied that “the economy hasn’t changed, it’s exactly where it’s been for the last 75 years. We’re about 45% dependent on agriculture, the rest of it gets made up in commercial sales, a little bit of manufacturing, and very little logging and mining” (SLM\_24, 2014). However, this response recognizing the importance of ranching for the economic base of the area is the exception which proves the rule that the perception of the importance is divergent from the *identifiable* economic value of streamflow affected tourism according to regional input/output analysis.

In fact, this respondent, clearly familiar with the concept of an economic base, clarified “I’ve told *[omitted to respect privacy]* we can’t ignore tourism and it might be important but you shouldn’t think that’s your salvation or where you should concentrate your efforts, uh-uh. What you do then is alienate your true economic base, really bad idea” (SLM\_24, 2014). This response is clearly actively engaging the idea that tourism is “everything” as so many other residents of the SRB have indicated. When asked about “how the river affects life here” 85% of respondents mention the economy, and this result is consistent across every job type (Figure 9)



as well as by region, with no noticeable statistical difference, in this case this is an informative finding. But the SARA typology only accounts for 6% of the economic base of the SRB as opposed to 16.9% in Crop Farming and Livestock combined, known regionally as “ranching.”



But, when asked about how the economy has changed a resident of Riggins replied,

*“Not for the better, um, expect there is no way to make a living here. We owned a raft company for a while and basically what we got out of that was four kids through college. That was about it, it’s something that, it’s like farming, you **have to love the way of life because you are probably not gonna get rich off it**, even though you have thousands and thousands of dollars’ worth of equipment and all of this stuff **doesn’t mean you have it in the bank**” (RIG\_17, 2014).*

Meanwhile, respondents identify a more dramatic effect of streamflow reductions and alterations because, as one employee of Mountain Village in Stanley explained, “Um, like last year, normally, they would have a longer season. They had to end up flying people in to the middle fork really early in the season. They had a short river season. That affects the economy because this is the hub for most of the river companies, Lodge, people at Mountain Village, um, a lot of ‘em fly in. They don’t have vehicles so they get out, walk about town. It really impacts our economy if the river is not consistent and full enough for floaters” (STN\_27, 2014).

In general, SRB residents appeal to the river as economically important but often simultaneously admit to the lack of economic opportunity in the region. Respondents recognize the utility in living in the area outside of fiscal wealth but also admit to the difficulty in amassing enough fiscal wealth to support themselves, and the river plays a central role in that narrative, as will be examined more thoroughly in the next chapter. This paradox reveals the more than economic value of the ES benefits of the river, even in regards to employment. As the rafting season changes, companies will adapt but, as one rafting company owner reported in the survey, as “the water gets lower in August, as snow runs off earlier each year. Two main resulting effects: 1- **The salmon will spawn earlier closing us down during our floatable season**. And 2- The number of large fires increases, as does the smoke driving our business out of town” (Survey, 2014). In either case, the role of the federal government emerges, which is interesting because relatively few respondents mention the economic importance of federal government although this NAICS sector accounts for 12% of the total economic activity of the SRB.

## 4.5 Discussion – Correcting Assumptions

This analysis calls into question a crucial economic assumption utilized for this input/output analysis. The regional economic analysis presented here was based on traditional economic assumptions about relative sector concentrations, so that if a region possesses a higher percentage of an industry than the national average, it is assumed to be exporting excess goods and thereby bringing money into the region (Dissart & Vollet, 2011). For instance, according to the mathematical formulas used to calculate the economic base contributions of various sectors (Braak, Watson, & Rodriguez, 2011) Food Services and Drinking Places only account for 0.2% of the economic base of the SRB FEA compared to 1.9% of gross production for the region. The formula utilized here operates on the assumption that residents of the region eat at restaurants enough to reduce the “real” economic contribution of this sector. This assumption is flawed (Watson & Beleiciks, 2009).

Anecdotally, ranchers don't eat out at restaurants. Empirically, this important distinction is observable in the qualitative evidence gathered during interviews. Similarly, clothing stores account for 0% of the economic base according to formulas that assume residents of the SRB purchase clothing in these stores. But, as one resident explained, “you're gonna have to realize that there's no shopping” (RIG\_5, 2014). This resident clearly excluded from his statement tourist oriented clothing retailers since these clothing retailers cater to tourists and not to residents of the SRB FEA, which adheres to a pattern observed in rural economies transitioning to service based industries (Kilkenny & Partridge, 2009).

The typological effect of burgeoning tourist economy in the west, which can hurt local residents as much as helping by increasing the cost of living relative to low wages further marginalized by the purchasing power of wealthy visitors (Power, 1996), has been cautioned against (Beyers & Nelson, 2000), and unfortunately observed, even in cases where the positives

outweighed the negatives in resident perception (Andereck & Nyaupane, 2011), which increases the vulnerability of these communities to their environment (Birkenholtz, 2012).

In determining the value of ES benefits (tradeoffs, and costs) the localized conditions of rural communities need to be understood (Elinor Ostrom & Cox, 2010), however regional economic analysis formulas apply a panacea of input/output formulas related to objective fiscal productivity (Beyers, 2005). And, the core assumptions behind these models have been disproven, prompting a call for better spatially oriented economic models (Krugman, 1999). But, as input/output models become more intricate (Warnick et al., 2013) and impact analysis methods become more diversified (Khandker et al., 2010) the goal of accounting for more than monetary benefits (and costs) continues to elude economic analysis.

Although this type of analysis does expose the potential vulnerability of regions, or sectors, scale is once again important. 1,576 jobs lost due to a 5% economic downturn is a statistic, but one job lost is a tragedy for the individual and, as President Harry Truman once mused, “it’s a recession when your neighbor loses his job; it’s a depression when you lose your own” (Keyes, 1992). For each lost job, the economy may restructure and provide another, or this resident may be forced to leave. The effect of this population attrition is more than sentimental since SAMs cannot, by virtue of their derivation, account for certain community capitals. Regarding the “social” component of a SAM, this relates most directly to *spending* as an economic driver (Waters et al., 1999) whereas “social capital” refers to the informal norms that produce co-operation between economic agents and results in higher levels of production (Fukuyama, 2001) and promoting social capital improves economic productivity (Pritchett & Shleifer, 1997). But this type of interaction isn’t measured in the actual input/output analysis of a SAM because those interactions are by definition not reported economic activities. Therefore the social capital possessed by one displaced individual cannot be predicted. Moreover, the cultural capital aspects of an amenity resource are equally unmeasured by this approach.

Alternatively, a variety of supplemental techniques could increase the theoretical scope of economic models, but all of these require qualitative interpretation (Zygmunt & Gluszak, 2015), and qualitative research “follows” quantitative identification (Smutny, 2002). So, after realizing the potential limitations of the SAM, as a model, one might conclude that by simply combining those results with qualitative evidence, reported data can be appropriately contextualized. Although that is true, and this research provides evidence to support that conclusion, it misses the most interesting aspect of incorporating qualitative methods into a regional analysis of an ES by potentially identifying the even more ephemeral values not addressed at all. For instance, the capacity of employment as a measure to convey the production contribution of social, cultural, and natural capital features, continues to frustrate economic research (Pugliese, McCann, & Artz, 2015) despite the prevalence of “jobs” populating the “folk economics” discussed between laypeople (Power, 1996). But perhaps employment trends serve a particularly useful purpose for research concerning non-production (and therefore nonmonetary) values (Park, 2012) such as quality of life and lifestyle.

People in the SRB do not live there for the fiscal opportunity, or because they lack the resources required to leave, but because the *trade-off* is worth it, for them, which puts regional production into perspective. SRB residents work hard for the opportunity to keep living in the bioregion. In this study area, other community capital benefits do not simply supplement fiscal and built capital, they usurp them. Although ES research recognizes an inevitable disjunction between measurement and the so-called “true value” of natural capital research (Chan et al., 2012) future research needs to address this deficit. To this effect numerous ES articles are published on a regular basis outlining some ways to account for cultural ES (Szücs et al., 2015). But measuring these services in conjunction with regional economic models remain elusive although the capacity of qualitative examination nested *within* quantitative approaches to inform analysis has been both recognized and advocated for (Busch et al., 2012).

## Chapter 5. Phenomenological Examination of Narratives

This chapter is committed to a qualitative analysis of interview testimony for evidence of intangible benefits associated with streamflow for continued examination. To access the shared experiences of people related to the landscape in one bioregion then one must examine the narratives of that culture regarding the landscape (Rhodes & Brown, 2005). Narrative scholars recognize that description of place, a symbolic negotiation of meaning, not only reveals the importance of landmarks but asserts new importance onto them (Lynch et al., 2012). These narratives, the uninterrupted story told by respondents in relation to interview questions, consistently include “The River” as a significant symbol, cultural exemplar, and assertive character in a shared narrative of place, history and identity. As illustrative elements of these stories, the respondent’s maps were examined for evidence connected to interview testimony.

From extensive reading of subgroup narratives a series of typological responses are presented that epitomize that group’s collective reality. The typified subgroups below *do not* reveal the complete reality for each respondent in each of these categories, rather, they exemplify the more generalizable observations about that role, as adorned by degrees, by a variety of respondents across the SRB. Many respondents fulfill many roles; ranchers are sometimes rafters and may also work for the local government, have retired from a previous career, which could have been with the federal government, to say nothing of the respondents ethnic identity. These categorizations, however, attempt to isolate the experiences central to the role rather than the respondent. By presenting consistent qualitative evidence for these subgroups across the SRB this characterization directly addressing the ancillary question:

***B. What are the perceptions of the river and streamflow ES benefits held by different stakeholder groups across the SRB?***

## 5.1 Typological Subgroup Narratives (Question B1)

Throughout the interview process certain interviews emerged as particularly relevant or indicative of the broader empirical observations and phenomena for that group, region, or the SRB in general. Sometimes an individual exemplified one particular subgroup of job, identity, or region. Equally as often respondents occupied more than one role, a phenomena typified by an interview with a woman in Challis who was both a member of the Chamber of Commerce and the Arts Council who had two desks, side by side, with two different phones. During the interview she stopped on multiple occasions to pick up one, or the other, phone and identify herself by either title and in one instance she literally held each phone in each hand while putting the person on the “other” line on hold. When she put down both phones, I asked her about tourism and she qualified,

*“Tourism’s great. Tourism would be great. Ahh... improved tourism, **would be great to a degree**. But for instance, with the monument issue, my question is the impact on our infrastructure as well. Again, umm **it is a big, big picture** and you can’t just say ‘Well, it’s going to increase this and everything’s gonna be good.’ It’s not necessarily; let’s take a look at the overall dynamic, not just the individual little items. I’ll... tourism? **I work for the Chamber of Commerce**, so of course we’d like to see ahhh, increased tourism. And tourism is important to our community and to **infuse money into our economic makeup**.” (CH\_1, 2014)*

This respondent clearly struggles with multiple identities in answering this question. As a resident of the SRB she intuitively understands how complicated the “impact” of a natural capital resource can be on the economy. Not knowing my focus, she refers to a current controversy over a national monument, yet her intuition echoes my conclusions in Chapter 4 related to streamflow impacts. After considering, she answers by announcing herself as someone who works for the chamber of commerce as if to distinguish from her other identities before concluding that tourism is important for the economy. After donning her Political identity she answers in a manner observed consistently across the SRB for local politicians.

### 5.1.1 The Local Politician

Local politicians across the SRB often hesitate in discussing tourism and their answers often reflected a more accurate understanding of the nuanced economic relationship with tourism described in Chapter 4. But, even in their reluctance, these respondents associate streamflow with that tourism. When asked whether the Salmon River was more or less important to him, one said, “Probably more, because, uh, *as the mayor*, we like to see people’s heads in beds, bring people into our motels and help us” (SLM\_7, 2014). Once again, this respondent donned his mayoral hat before answering on behalf of the community.

In general local politicians perceive the river as very important to the local economy stating, “Probably 90% of our business is indirectly related to the river” (STN\_13, 2014). Consistent with testimony revealed in Chapter 4 from a former Riggins mayor, this local politician’s off-the-cuff statistic is not consistent with findings from that chapter, except that, as discussed, the *indirect* impact of the river probably exceeds what is observable in the input/output analysis (although probably not as high as 90%). Continuing on with his response, this local politician clarifies, “...And it’s one of the reasons I’m here, to see the crystal clear water even sometimes when the water is very high, it’s still crystal clear which is amazing... I like to fish in it whenever I get the chance [laughs]” (STN\_13, 2014). Parallel with most residents, politicians place personal attachment to the river, outside their roles as politicians.

In a related manner, and equally similar to other groups, local politicians’ perception of the river is filtered through their personal and professional capacity. Perhaps no response embodies this observation as clearly as the local police officer who, when asked about how the river affects life in the region, replies,

*“How does the river affect life here? Uh during the summer uh well during the spring there’s a lot of fishermen to the point where um **parking was a concern. People uh don’t necessarily pay attention to the speed limits signs a lot. And there are people parked into the roadway. It can be dangerous. Ah, some people***

*don't pay attention when they open their doors or when they're walking around their vehicle and not checking oncoming traffic, things of that nature. Not necessarily to point where it's dangerous and it was something I had to address ah but a few times um. **No injuries as far as accidents.** During the summer it's really picked up because there are quite a few river running, white water rafting and things of that nature. There are still fishermen out there. I'm not familiar with the fishing seasons but I'm told that uh there's an upcoming salmon season."*

(STN\_18, 2014)

More interesting than this respondent's recognition of the cultural and economic importance of the river is his immediate account of a personal and professional relationship with the river as a police offer. When this respondent drew his map he circled the section of river he is responsible for in that capacity (see Appendix 10).

This observation holds true for many politicians, including the mayor who spoke of the "90%" indirect relation with the river, who, in describing the map he drew explained, "Well, yes. Um, Stanley, of course because we live here and ***I'm the mayor.*** Lower Stanley, because it's nearby even though it's not part of our, the city of Stanley. Uh, Challis, because ***I'm on the Board of Directors for the Challis Economic Development Association*** that covers our area of Custer County that we meet there and do some shopping there that's not uh, things that aren't available in Stanley" (STN\_13, 2014). This politician's map does not adhere well to watershed boundaries (Appendix 10), instead favoring political exemplars but many local politicians do incorporate watershed features into their maps.

Politician maps are often personal *and* political. For instance the head of a nonprofit and local politician in Salmon clearly drew her map according to the river (Appendix 10) and said about the natural capital feature, "Umm, ***the river is sort of how we know what's going on.*** So, you know, the cool thing is that because the headwaters are around Stanley, you know? Like one of the coldest places in the nation, you like start to get these ice build ups in the river. And so, you know, people really watch that to know ***how cold is it really.*** (SLM\_8, 2014). This response reveals the river's role as a character in the BI of residents in the SRB consistent across groups.



### 5.1.2 The Rancher

Respondents consistently associate their understanding of the river and its importance with their personal and professional way of life yet they demonstrate more generalizable phenomena. As an example, one rancher reported that the river,

*“Oh, The River’s everything. You know that’s, that’s where everybody’s recreating, that’s um, the **lifeblood of these ranches**, the creeks and, and the river. Uh, it amazes me to see the way that the people that came here put those ditches in to irrigate these fields I mean it’s, you know when, when the river is full you see so many more people **and the fishing**, you know, the, we’ve got an **amazing different species of fish**. And uh, you know it supports everything. Deer, elk, everything. It’s got to make it to that river. And uh, besides that I mean **just to look at it**, just like I said when I grew up here. Just, I, **it heals everything I think**.” (STN\_41, 2014)*

Incredibly jam-packed into one response, this rancher identifies the cultural, ecological, aesthetic, and even a spiritual values associated with the river.

Ranchers, like politicians (and every subgroup) have their own experiences with the river that might make them more reticent to discuss it without being asked directly. However, when I asked one rancher in Salmon “how has this place changed over time?” he answered, “well, [pause] most of the smaller tributaries of the Salmon River are now residential, where they used to be smaller Ag. properties at least – or at least some form of Ag. was done on ‘em so there’s definitely a different demographic” (SLM\_15, 2014). This response aligns with other qualitative data about ranching as a way of life in decline and even danger of disappearing, which provides resolution to statistics reported in Chapter 4.

In response to the question “How does the river effect life here?” this rancher reiterates, “I think it has quite a bit to do with the demographics cuz a lot of people really enjoy the water aspect. And then for the tourism and ah service based industry outfitters and guides, the river has a huge – there’s a huge dynamic there” (SLM\_15, 2014). I interviewed this respondent at his home and we sat outside, overlooking his ranch, as he discussed his difficulties ranching in the contemporary SRB. Like many other ranchers he mentioned wolves, but explained that he had adapted to riding around his cattle on a horse to keep them at bay saying, “they’re here and we

just need to figure out a way to live with 'em. Ah – I'm not for or against them. I'll shoot 'em if necessary but I don't shoot 'em if it's not necessary" (SLM\_15, 2014).

But, rather than wolves, or the direct or indirect effect of the river, he spoke of dwindling social capital between what smaller ranchers were left in the SRB. He spoke of repairing not only his own fences, but his neighbor's fences to help them keep their cattle off public land, and out of trouble, "federal law says that if your land adjoins federal grazing land you have to fence out... I'll build all those peoples fences... most of 'em are pretty appreciative of it... I think most of us or certainly I do and my son does, we do this lifestyle not because we're gonna get rich. I mean, we're **rich in certain ways** but financially we're not gonna get rich, but **we do it for the lifestyle**" (SLM\_15, 2014). So, as this rancher explains the particular difficulties of his profession he appeals to a more generalizable experience of respondents in the SRB.

In Stanley a third generation rancher and current undergraduate at the University of Idaho and part time irrigator made the connection herself, speaking of the river:

*"It's a lot of people's way of life because they're boating it, that's their business. Um, the river supplies water to the fields when we're irrigating, so **we're very dependent on having the water**. So on dry years when the river is low and we're not getting all the water that we need, that makes it really tough. Um, so the river's kind of like the lifeline for a lot of what's happening around Stanley and in this work area"* (STN\_20, 2014).

This response addresses the other potential impacts of streamflow reductions that were explicitly ignored in economic analysis in Chapter 4. This rancher drew her map based on the watershed, traced the river and starred her family's ranch off of the East Fork of the Salmon River (Appendix 10). Ranchers associate with the river as well as recognize how "it affects the boat, the ... boaters on the river and the river runners you'd call them I guess ... what d'you call them? Because some years, the water's too high in the spring and then some years it's too low in the fall, summers, so it affects everybody" (STN\_32, 2014). But as a subgroup they grapple with vulnerability and government involvement – this interview was interrupted halfway through as a Wildlife Services employee came to investigate wolf depredation of this rancher's cattle.

### 5.1.3 The Logger

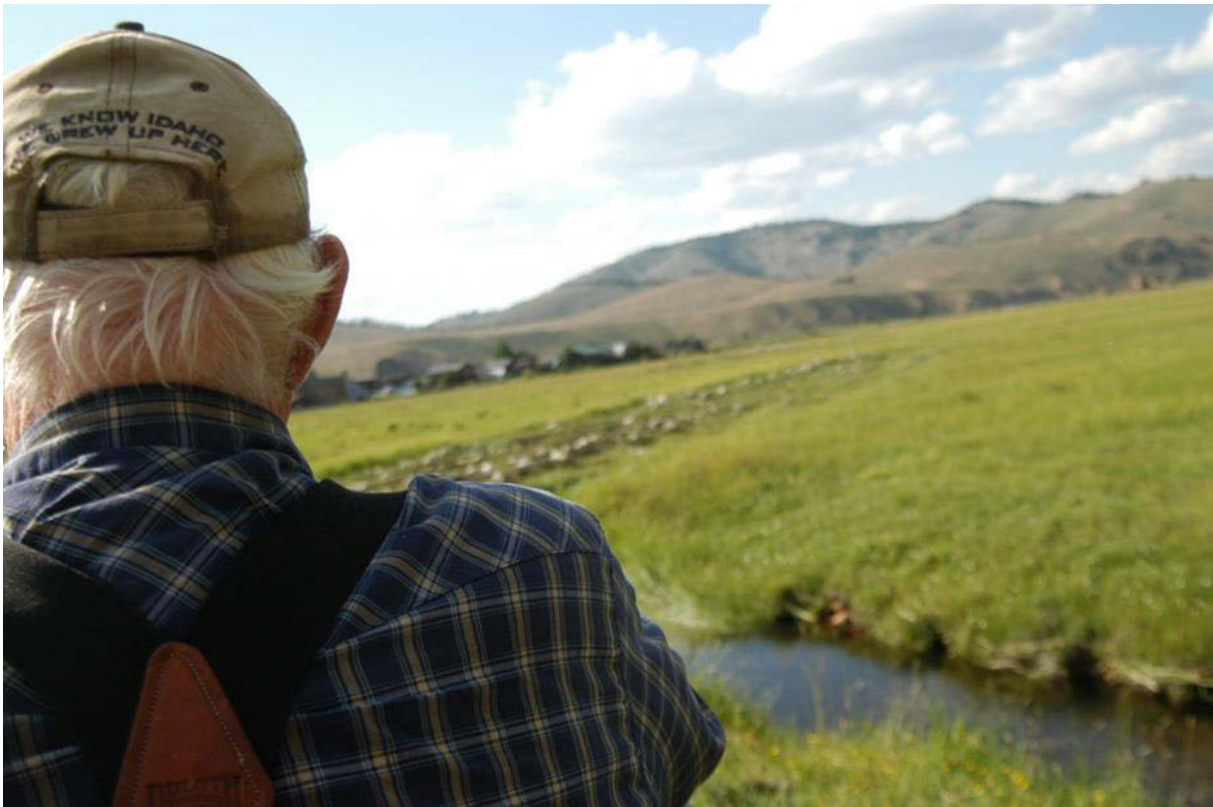
Resource dependent employees not only associate with “The River,” as a salient feature, they conflict with it, such as the logger who refers to the SRB as an “awesome place that I hope environmentalists don’t ruin.” He then adopts an environmentalist role, “having said that, I **consider myself an environmentalist...**” and then continues “You need the green loggers, or the green people that don’t fuck the shit up **but the people making the decisions have no idea** of what they are talking about, and they *have* fucked shit up, forgive the use of my language” (RIG\_27, 2014).

This sentiment mirrors that expressed by a logger in Salmon who I convinced to sit down for an interview with me after many coffees at the local gas station where many of these resource dependent stakeholders congregate early in the morning. Although I had earned the trust of this respondent (initially skeptical of my study) by assuring him that responses were confidential, that he could stop at any time, the study was approved by an oversight committee, and that I expected that none of the question would put him in any harm or discomfort, he became very agitated with me when I asked him what the term “Salmon River Basin” meant to him,

*“it doesn’t – it **used to mean home** but no – because I think this whole thing is now that I listened to you and read your questions and that, you know, I’m starting to get an opinion on where you’re coming from, what you’re doing. **And I hope you’d been authorized because I – I think what you’re after** and probably where you come from is, you know, you want to save all the fish and all the shit and do that loggers are evil and miners are evil too. So that **angers me a lot because I’ve watched my family starved out. I have starved out here.** Did I want to leave Salmon? No. I didn’t want to leave. I had to because I wasn’t going to be broke my whole life so I had to go. And I understand that’s a trend in the society that happens, you know, but you have these groups of people like the Salmon River, you know. They’re all one to say this. What are we saying? I mean I’ve – I’ll explain to you what forest fires did, it’s extreme. We could have cows shitting in the creek for the next hundred years and you’re not going to cause near the problems that these huge catastrophic fires did. I mean so what are we saying? You tell me. If we don’t act like we take care of what we have, **you know, what good is that?**”*

(SLM\_31, 2014).

This sentiment mirrored most resource dependent stakeholders who, perhaps ironically, identify government regulation as an impediment to their ability to be stewards of the land, especially regarding the river. This resource dependent respondent, in particular, resents the transformation that the SRB has endured in the more recent past that conforms to a shared narrative of place, and during the interview this respondent took on a role “as an employer,” and explained that, “I’m trying to find people that are competent to work for me. I have my – half of the value of the load alone just spent on freight. Just to get it out of this county to get it to market. There used to be a huge big sawmill right over there! There’s 4.4 million acres in the Salmon National Forest. Half of the timber dead. ***Why in the hell aren’t we doing something about it***, you know?” A consistent story of place emerges in interviews that possesses particular personal relevance characterized by a dualistic reaction of place attachment to the area and the river combined with anger and frustration. And by association, this anger becomes directed at federal employees and other perceived outsiders and “The River” by extension.



**Picture 6. Ranchers & loggers conflict with federal employees and other perceived outsiders**

#### 5.1.4 The Federal Employee

But, most federal employees also occupy many roles in the community and personally connect with the river on cultural as well as professional levels. One clarified, “I’d say that the rivers are probably one of the most important parts of my life, but more than that I think it’s the community that spans from the river, that’s probably the most important part, you know? I think the river is this easy thing to see and feel and touch and like interact with, but the **community that comes from that**” (STN\_2, 2014). I met this seasonal federal employee outside the Stanley library where we both frequently borrowed publically available internet and power. During the interview he clarified “I guess I have a skewed perspective because I’m a passionate kayaker and I think that the rivers are kind of like the **veins or arteries of our world** and so they kind of provide this sense of community and, you know, we have this natural tie being powered by 90% water, you know, we have this kind of connection to water” (STN\_2, 2014).

Like anyone else, these federal employees can’t help but reveal their personal relationship with the river. A federal employee in Salmon first reported, “the river attracts a lot of, um, floating activity not only for white water downstream of us but also just for day trips with people to just enjoy the river...” mirroring the perception of most residents. But this respondent immediately continued on to say “...There’s a reptilian habitat and it’s a stop-over for a lot of migrating birds, a lot important migrating birds and of course it is a migration quarter for listed salmon, steelhead” (SLM\_35, 2014). Similarly, another federal employee who I interviewed while he fished for salmon in Riggins, associated the river with family saying, “I enjoy being with my family and stuff too and – and incorporating them into um what we do and outdoor stuff as well, floating rivers and whatever, so yeah. My boy is 13. He’s just kind of learning to fly fish and really enjoys it” and he went on to specify that the Salmon River, “Oh, it’s ... it’s everything. I mean it’s uh ... I mean it’s uh ... it’s kind of the **lifeblood**, you know?” (RIG\_7, 2014). Federal employees also often draw watershed defined regions on their maps (Appendix 10).

### 5.1.5 The Rafting Guide

In line with politicians, ranchers, loggers, and federal employees, Raft guides are attracted to lifestyle and livelihood aspects of life in the SRB. For instance, one raft guide whose been running the Salmon River since the 1980s told me, “The River is my mistress and I’ll never leave her” (RIG\_10, 2014). I interviewed this raft guide from his trailer, positioned with a view over the Little Salmon River, after he showed me his collection of driftwood he has accumulated for the past three decades. This was his one day off between two 8-day trips for two different rafting companies. Raft guides, in particular, have an extreme personal, almost spiritual connection, to the river. Another in Riggins said, “It changed my life, just you know in ’93, ’92 when I came up here rafting it’s just, just a power of The River, The Big River, just everything about it” (RIG\_6, 2014). This raft guide was so eager to share the power of the river with me, he offered to let me come along on a trip down the day stretch to share the experience.

As reported by other groups in the SRB, the lifestyle of whitewater raft guiding as an occupation and identity is difficult, but rewarding. I interviewed a guide in Stanley from inside the parked school bus that all the guides slept in who described that, “there are hard, long days, but...it’s more important these days, in that, I...*my life is The River*. And...it, like I just said, brought me back from depression. So it is the most important thing in my life right now because it keeps me a stable person...*the river...The River literally saved me*” (STN\_14, 2014). This guide confided in me that he sustained a traumatic brain injury and he felt the river healed that wound for him – reminiscent of the testimony offered by a Rancher in Salmon.

When I asked a Salmon raft guide and company owner how a reduction in streamflow would affect life she immediately said, “uh, I wouldn’t live here [without it], I don’t think” (SLM\_14, 2014). Similarly, in Stanley another guide said, “oh, you mean the like – yeah, the river is the life here. I think with – if there – if the river wasn’t here, there wouldn’t be

Stanley” (STN\_7, 2014). But this perception is stable across every subgroup, and, raft guides, despite talking about the river more than any other subgroup, and drawing maps more consistently adherent to the watershed (Appendix 10), appeal to many of the same ideas regarding the river and the SRB as a bioregion associated with it. Moreover, as a raft guiding company owner in Stanley remarked, “you know? So that’s the, it’s interesting, there’s not a lot of things or businesses that, *it’s a lot like farming*, honestly” (STN\_28, 2014).



**Picture 7. Raft guides display a deep personal connection with The Salmon River**

### 5.1.6 The Retiree

In general, retirees, whether they migrated to the area or grew up in the SRB, tend to talk about the river, identify with the river, and care about the river. These respondents place spiritual significance in the river, where one told me, “If the breeze is just right, then ***I can hear the river and so that’s a solace to me***, it’s a, it’s a nurturing, nourishing sound” (STN\_4, 2014). And another told me “very important. It’s part of my, it’s part of my lifestyle ***It’s part of my culture***. It’s part of my spiritual being” (STN\_37, 2014).

This group also appeals to and expresses similar phenomena observed in interviews with other respondents, where one retired person in Riggins said “the river is, the ***river is the life blood of this community***, um, you know, because the businesses depend on the river, and what The River brings to the community and what the river represents. It is a very picturesque community, um, you know and without the river, then this community would not be here” (RIG\_14, 2014). And this response was stable across communities where a retiree in Stanley said, “Uh, the river is one of the most important things to me. I, I think... as I said, ***this river is the lifeblood of Stanley***. And so, I, it’s extremely important” (STN\_25, 2014).



Picture 8. Salmon River Community Church in Riggins, Idaho



### 5.1.7 The Bar Owner

Comparable to groups that directly depend on the river, groups that indirectly depend on the river also possessed a BI based on the Salmon River. For instance, when I asked the owner of a restaurant/brewery in Salmon to draw a map of the region he began by explaining, “Well, it would include the Frank Church River of No Return Wilderness, and the main Salmon River, and the middle fork of the Salmon River, um, because that’s all part of what they do here. And it’s probably, I would go along the boundary, the Montana boundary. And ***then along the main Salmon River...***” (SLM\_27, 2014).

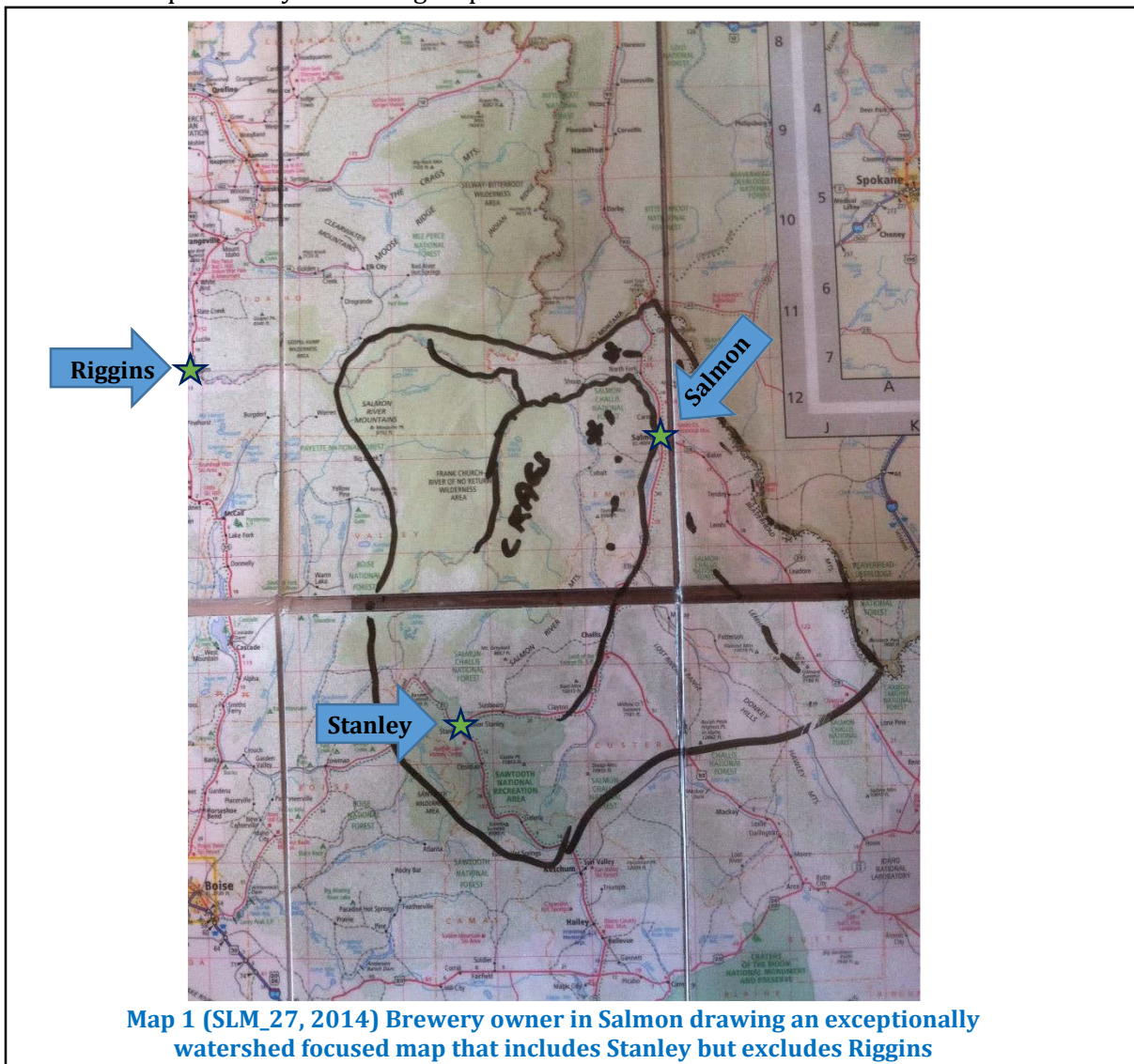
Similarly, in the interview with the bar owner whose testimony informed analysis of the SARA in Chapter 4, when I asked how important the river is to him personally he responded, “Well, economically it’s one of the big draws in my business. Emotionally, I spend a lot of time on [it]... It’s a place I love” however, unlike rafters or ranchers, respondents in the indirect activities associated with rafting don’t get to interact with the river any more directly than their income does. For instance, this same bar owner clarifies “well, it’s a small part of my life due to the life choices, but it’s just as important to my world. I mean, ***I don’t want to see anything detrimental happen to it***” which indicates that, despite limited time, this respondent feels that the river



Picture 9. Rod-N-Gun Saloon in Stanley, Idaho

possesses nonmonetary cultural ES value. But, when I asked, specifically about changes in streamflow he related that, “30 to 40 percent of my business comes from [whitewater rafting], so you change that, you've changed my business considerably” (STN\_8, 2014).

This sentiment is consistent among bar and restaurant owners in the SRB. In Riggins another clarified that “we are ruled by The River here um, as a business owner anything that happens on that river affects our business so, fishing, rafting, recreating brings business here so that’s the river is good for business. So, we keep the river open, we keep our doors open” (RIG\_18, 2014). This testimony of course harkens to government regulations and appeals to sentiments expressed by other subgroups across the SRB.



### 5.1.8 The Hotelier

Similar to bar owners and other proprietors in the SARA typology, employees and managers in hotels express the sentiment that, “Everything actually is derived from the river, basically. Fishing, rafting, I mean, you know, the tourism, um, it’s just beautiful, I mean, it’s absolutely scenic, Highway 95 north, all the way to Canada...” This motel owner, celebrating his 25<sup>th</sup> year in operation, sat down with me in his office for the interview, adored with pictures a caught salmon and steelhead as well as commendations from the chamber of commerce – this motel manager was also a former local politician and displayed a typical tendency among residents to collaborate rather than compete with proprietors in the same sector, going on to say, “...and all the motels are basically great, you know the Best Western over there is a big new one for the wealthier people. But it’s, tourism is a big thing” (RIG\_26, 2014).

But for hotel employees, a connection to the river is more diffuse than it is for members of other SARA sectors. The river connects a larger landscape, where a hotel employee in Stanley talked about how “redfish Lake is one of the most photographed places in the state of Idaho, if not in the world” (STN\_27, 2014) regarding tourism. Redfish Lake drains into a tributary for the Main Salmon River but also carves out its own space in the BI of residents and tourists. This employee went on to say, “we get people from Australia, from England, everywhere in the world, people come to Stanley, Idaho” (STN\_27, 2014).

A hotel manager in Salmon related that “I’ve been here eight years and we have noticed a huge increase in people riding US 93 on motorcycles – so I started visiting with some of the folks who are coming in and a lot of them were from back east and from California and Canada and what they do is they have been shipping their bikes to Boise, they fly to Boise, pick up their bikes, and they ride US 93 up through here to the north, up into Canada” (SLM\_39, 2014). But, this sentiment comes full circle to describe the relationship with tourists passing through the SRB expressed by the first motel manager in Riggins.

### 5.1.9 The Native American

The tribal experience with the Salmon River was partially complicated given the traditional inclusion of the SRB in tribal lands compared to the current political arrangement. Although I was able to interview some Native Americans exercising tribal rights to fish the Salmon River, I also traveled to the Ft. Hall reservation where I attended an annual Sundance, made connection with Shoshone Bannock people and solicited their participation in interviews. In one such interview the respondent used similar representation indicative of the same phenomena observed in every community by saying, “Oh, the river is *our lifeblood*. It’s uh – it’s



Picture 10. Nez Perce man net-fishing the Little Salmon River

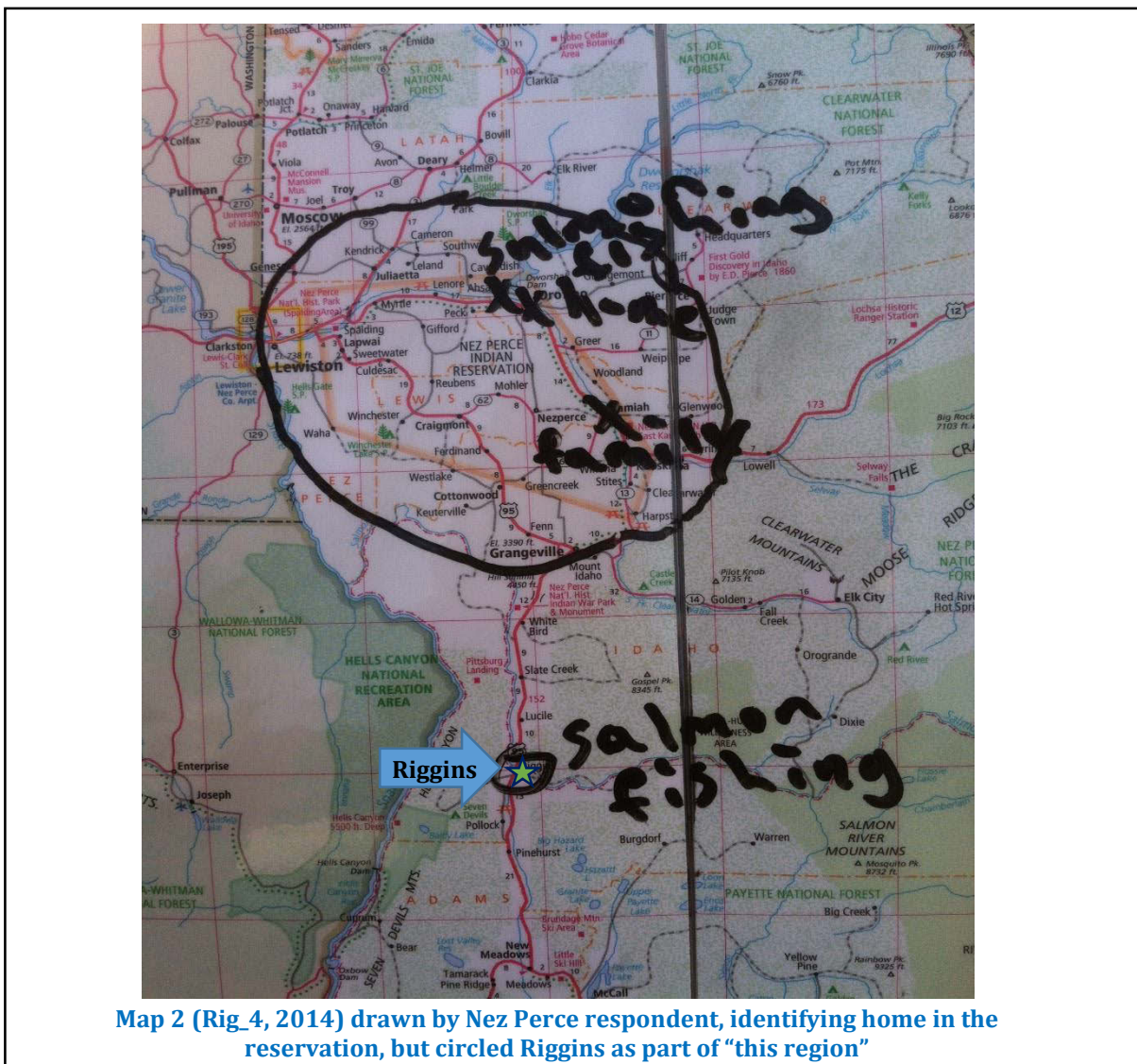
our life source. For us here on the reservation it's – we need the water sources. We need it to keep our, uh, for example a lot of families use, uh, *irrigating*. It's just a life source" (FTH\_2, 2014). In Stanley a tribal member I interviewed while he was fishing in the Salmon River echoed, "It's our *lifeblood*. It's, like I say, it's a *healing for all of us*, if you know what to do or where to look and what, what you're seeing" (STN\_42, 2014). While a Nez Perce tribal member (also fishing at the time) indicated "I mean, it's the *water of life*, mother's milk. I mean, you gotta have it I think. You gotta have the water" (RIG\_3, 2014).

Although these sentiments emulate the statements of other subgroups within the SRB, the Native American experience is more complicated. While both Riggins and Salmon high schools go by the moniker "savages" (despite litigation pressure to change the name) few, if any, tribal members of either the Nez Perce or Shoshone Bannock tribe live within the SRB anymore. When I asked an elderly Shoshone woman, who grew up outside of Salmon, what "Salmon River Basin" meant to her she simply said, "It means a lot to me, but [pause] I really don't have no – no say-so about that place because now it belongs to white people" (FTH\_1, 2014). However, every summer Native American's exercise their rights to draw fish out of the river, which aggravates some nonnative anglers aggravated by the federal restrictions on *their* fishing rights.



Picture 11. Sign boasting the successes of the "Salmon River Savages" in Riggins, Idaho

But, intriguingly, through this disparity in fishing rights, many tribal members actually share an experience with SRB residents who depend on the river for their livelihood. For instance, one Nez Perce man related that, “it’s a really valuable part of my life. It’s how I make part of my living that I ... I catch as many salmon as I can, store it away for the winter. And then I also sell them, but, yeah the river’s a really big part of my life” (RIG\_4, 2014). This respondent’s map emulates maps drawn by other Native Americans that identify areas according to what can be harvested there (Appendix 10). However, where some Native American maps cover a massive area this respondent’s map reveals the complicated inclusion/exclusion tribal members feel towards their traditional food source and cultural exemplar.



## 5.2 Emergent Phenomena (Question B2)

Having exhaustively typified the various subgroups that exist throughout the SRB many emergent phenomena related to the river keep resurfacing. Just as the subgroups above represent an archetype that no individual personified completely but many embodied in part, the phenomena below arose to varying degrees throughout the research.

### 5.2.1 History of Change

Throughout the SRB respondents defined the region in terms of change related to the river. Since narratives functionally relate a series of events in time (Bal, 1997) this phenomena reveals the river's function as a place setting. In Riggins that narrative of place arose even in my first interview with a lifelong resident and local politician who said, "When I was a kid we had, ***the saw mill and it blew up in 1983*** and, um, before that we have a lot people who mostly worked for the saw mill. And ***after it blew up all those people moved away*** that have been here ***and that's when they started doing the rafting tourist trade*** instead of living of the land basically." (RIG\_1, 2014). But the river also emerges as a character in this narrative both before, and after, this change "well, when we first moved here, ***The River was to be revered*** and we did not have people that floated on the river or, ***for heaven's sakes, nobody rafted on the river***. Um, ***then a man came from California***" (RIG\_22, 2014).

In Salmon I heard a similar story: "Um, so when I was younger there was – when dad logged and it used to be big into the logging. We had a mill. So that – the population was bigger, it was more growing in size. And then as soon as that ***shut down and the logging kind of quit, it's gotten more touristy***, more – I don't like to say environmentalist, but people that are – which is fine, you know, there are more river rat people in the summers. ***I love the river but I'm not a river rat.***" (SLM\_32, 2014). In this narrative a tension arises where, "tourism people come up, and a lot of them are really great people and, and uh, ***want to see this for what it is***" (STN\_42, 2014) which seems to appeal to BI conflict over what the SRB, is, was, or should be.

### 5.2.2 A Hard but Rewarding Life

Residents in the SRB report interview testimony that suggests that they live in the SRB in spite of economic opportunity, rather than because of it. One resident stated that, “it’s not easy living here because of the long winters and we only have about a... 4 month season at best” (STA\_35, 2014). But people choose to live in the SRB because life in the SRB is “Rugged. *Difficult*. Uhm... It is beautiful most of the time. Absolutely stunning. It’s, it’s *definitely in a world of its own*” (STA\_26, 2014). This type of response, which puts the difficulty of getting by in the SRB into one breath with how rewarding it is, proves to be very consistent. “It’s a hard place to make a living, uh... You have to want to live here to live here” (STN\_8, 2014).

And this is clearly connected to the river, “*the Salmon River country* has ah, metaphorically magic in it and it’s a wonderful place for the outdoor enthusiasts, the tremendous scope in variety and wonders of the outdoors around here is pretty impressive and, but it’s not for everybody” (RIG\_24, 2014). Remembering that all ES provide a variety of benefits, both monetary and nonmonetary (Chan et al., 2012), and one ES may provide many benefits (Martín-López et al., 2012) that require trading-off some benefits in favor of others (Briner et al., 2013), residents of the SRB seem to be prioritizing lifestyle benefits over economic livelihood. This puts the role of the river in the economy into better context.

The self-identified logger in Salmon identified earlier, explained why he left the region originally, “did I want to leave Salmon? No. I didn’t want to leave. I had to because I wasn’t going to be broke my whole life so I had to go” (SALM\_31, 2014). Ironically, rafting emerged as a response to this economic downturn as one resident explains that, “Well, we went from having, uh, the mill, which was our biggest employer... but, um, a lot of people kind of pulled themselves up by their bootstraps and started some different kinds of companies and the main employer now probably is our raft companies” (RIG\_22, 2014). Importantly, this respondent identified rafting as a source of employment but not a major monetary contributor, a clear distinction.



### 5.2.3 “There Would be No [SRB] if There was No River”

Related to this story of a place defined by change, respondents across the SRB relate that the current SRB could not exist without the SRB, “Oh, you got, *if it wasn't for the river, this town wouldn't be here*. The mill burnt down, you know, so uh, you know, so it's all kayaking, rafting, fishing, jet boat tours, up-river” (RIG\_26, 2014) or, said more succinctly, “there would be no town, no Riggins without the river now” (RIG\_25, 2014). This depiction relates to the culture as much as the economy associated with the river, as a respondent in Salmon articulated, “Ah, I think well, if the river wasn't here I think the culture would have changed dramatically and the weather is a big part of this community from rafting and fishing and tourism and the whole population also does a share of rafting, hunting and fishing” (SLM\_11, 2014).

Similarly, in Salmon, “Oh that's the thing. That's the whole ball of wax here. I wouldn't be here if it wasn't the river, nor anybody else” (SLM\_33, 2014). Echoed in Stanley, “Without that river, there's not much going on here” (STN\_35, 2014). Related to tourism, “the only thing that keeps us just going in the summer is the – the river. If it wasn't for the river, we wouldn't have the tourists in the summer, we don't have any tourists in the winter.... now that I'm older, I realize – you know, that, *the dependency on – on the river itself*” (SLM\_4, 2014).

### 5.2.4 Lifeblood of the Region

One of the most striking and unexpected emergent phenomena in the interviews was the use of “lifeblood” language. This consistent response often relates to specifically different ideas. In Riggins, a respondent informed me that “the Salmon [River] is obviously the *heart lifeblood of it all*” (RIG\_11, 2014). Whereas a Fisheries biologist in Stanley said, “so it means a lot economically, I mean as a fisheries biologist, uhmm, having salmon here is, you know, used to be I guess *the life blood of this place* and traditional people, uhmm ecologically they are very, very

important and they are not here anymore, so, or not in the numbers of days to be, so – yes, so rivers I think are ***for sure the life blood of this place.***” (STN\_12, 2014).

This response emerged again and again, sometimes related to occupations, “It’s – ***I think water’s life. Um, it’s my income.*** Uh, it’s my family. Um, if, you know, if not ***like my blood,*** it’s like people that yeah, water. It’s water. Water’s life.” (RIG\_19, 2014). And sometimes related to ecology, “Well I think the river ***is the life blood of this area.*** And that relates to the salmon and I think that the Salmon River and the Valley Creek and the East Fork all the main tributaries to the Salmon River need to be maintained water quality to be maintained, uh, keeping the tributaries connected to the river through proper irrigation method and screening stuffs. All of that helps the ***lifeblood*** of this area” (STN\_33, 2014).

But, almost as often, each of these associations emerges in responses that also speak of the cultural benefits of the river, “Um, but the Lemhi River and the Salmon River because they are just the ***lifeblood of what I kind of worked for*** when I lived to pursue fishing resources and just the water culture that they bring to the area” (SLM\_38, 2014). The Salmon River permeates every aspect of life in the SRB, more than just economically important, or culturally important, the river sets the stage for every aspect of life in the SRB, “people are always talking about, you know, the river like, like people talk about the weather. It’s like the river’s low, the river’s high, somebody’s gonna drown. It’s gonna ice up and flood the town again. But yeah, it’s just, it’s part of the weather, I guess. (SLM\_8, 2014). And this “life blood” language solidifies that connection, as expressed by one retired federal employee and long-term resident of Stanley,

***“But the rivers here are life, they’re the lifeblood of this whole valley. And we’re fighting yet, to this day, both politically and educationally, with people that this is a resource and if it goes away, we’ll never get it back. And that’s why this town is very interested in seeing the four Snake River dams, the four lower Snake River dams, starting with Lower Granite going down river, being destroyed or dismantled or breached so that these fish can continue to come home here. The people here all look at the salmon the same way the state of Idaho looks at the potato”***  
(STN\_37, 2014).

### 5.2.5 “A Beautiful River that Eats People”

But, as “The River” gives, so does it take way, “The River is life here. [laughs] Um, um, *it’s life and death though, too*, you know. It’s like people die in the river every year, um, but that’s, you know, as far as tourism base, that’s – that’s the biggest one right there” (SLM\_12, 2014). In Riggins a respondent appealed to this power in relating their shared narrative of place where the river is both a character and cartography, “I think that it’s something that needs to be respected and uh, I pulled too many dead bodies out of it, unfortunately with my job. Um, and I’ve had to console family members that have lost their loved ones in it” (RIG\_23, 2014).

This relationship is also incredibly intimate, as it was for one respondent in Stanley who told me, “My boyfriend died on it, 2 years ago. He was the son of [omitted to respect privacy]. That was a pretty significant event. It’s part of life. People die. It’s pretty horrible, but it should happen” (STN\_26, 2014). And in Salmon, “Anything – I don’t know I lost one of my best friend’s right the summer after graduation – drowned in the river. This month – I’m actually – know a lot of people who have drowned in the Salmon River. Um-” and then the respondent’s mother present for interview, succinctly summarized the dualistic nature of the river by interjecting, “*It’s a beautiful river that eats people*” (SLM\_36, 2014).

“The River” is frequently personified: “Right now, *I don’t get along with her*” the respondent who lost someone to the river said, yet she still relates with, “Salmon River Basin? It is like the rugged purity of what it used to be. What the world used to be. [Sigh]” (STN\_26, 2014). When asked about the river’s importance she said it’s “more significant. Less important” presumably because of her lost loved one, but regarding, “how he died. The forest service had gone along the river bank and cut down all the trees on the bank and let them lay there in the river and called it fish habitat,” appealing to PE reality of “The River” in the BI or SRB residents, “you know, the impact of The River on me, we’re not friends, not right now. But it was from the Forest Service that he died, I blame the Forest Service every day of the week” (STN\_26, 2014).

### 5.2.6 Conflicts with the Federal Government

All three regions had residents who expressed conflict with the federal government over what to do with the river. In Riggins, “the river to me is, it belongs to the people. Um, I, I don’t agree, like for example uh, this last year, the BLM went and uh shut down all the, all the programs to it... that was a violation of our rights. Uh, we have to have access to that, there’s, **two thirds of the town or more depend daily upon that river** to be in it and taking people outfitting or whatever. And, to deny access to it, is, it’s just insane. It’s unconstitutional. Um, and so, from me, I guess I’m getting away from the question but um, I think the river is a very valuable resource and it needs to be available to everybody” (RIG\_23, 2014). Whereas a respondent in Salmon clarified, “it is important to me **as long as the people who live on the river, get to use it...** the water rights, the tourism that goes with the town, they’re all parts of the river that gets used you know helps our community and if you start messing with one part you are going to hurt another part. I like the way it is” (SLM\_23, 2014).

When asked what “Salmon River Basin” meant to her one respondent said, “Bureaucratic government involvement [laughing]. When you say it as Salmon River Basin, okay, that means adjudication basin - that means project names” (SLM\_20, 2014). Similarly, when I asked another respondent in Salmon about life in the region he immediately told me about federal employees who, “you know, they’re just out there – the reason why they have federal jobs because they’re not hireable in the private sector. You know you might as well just put your head down and throw your ass in the air and just take the check and I won’t do it. And so I mean that’s why I don’t enjoy Salmon anymore” (SLM\_31, 2014).

Many residents blame economic struggles on government regulation and, by extension, employees. But this conflict presents a perceived misalignment of values rather than an authentic one. For instance, when I asked another government employee about the importance of the river he stated, “It drives life here, everybody that I know or hang out with or talk with

spends some time on the river or makes their livelihood from it, um, either through irrigation or floating it or fishing it.... – we’re named after the river - it just says who we are here” (SLM\_35, 2014). Outside of their positions, these employees are also residents.

But conflict emerges from political vulnerability as one resident who identified that “[the river] is a part of my identity” explained explicitly, “I’m not worried about it in terms of streamflow; I am worried about it in terms of government regulation of it” (RIG\_2, 2014). If the federal government restricts rafting or river access to protect salmon or otherwise preserve streamflow then a reduction to the SRB economy will appear to some as the direct result of government involvement rather than streamflow changes. This realization should remind the reader of the PE reality of this ES research (Kallis et al., 2013).

As federal public land, all U.S. citizens own an equal claim to the Frank Church Wilderness and Salmon River respectively, but by proximity the residents of these towns have increased interest and interaction with these resources. These residents share experiences and narratives that reveal a BI contingent on the Salmon River itself. And, combined with the difficulty of life in the area, this creates a bond, “Everybody is there to help and at the same time, you know you’re there to help and everybody works together” (SLM\_13, 2014). But, residents in the SRB are also an incredibly pluralist grouping of individuals with different ideas that contribute to the conflict, especially with the federal government, that residents agree they dislike, even if they don’t agree why. Summarized by one former Forest Service Ranger:

*You got conservatives, you got ultra-liberals, you have rich people, you have people who don’t have any money. Uh, you have people who are environmentalists and all those things exploded daily around here, in my work. So, I remember that, plus the fact that I had a, I was attacked three times, physically, as a ranger here so I remember that quite, quite clearly. And it was to be expected, really ‘coz you represented government when there was no government available other than you and your badge so uh, when people are mad at a late income tax check or they’re mad at a law that we passed, they come after the nearest, closest uh, representative of government, federal government. That was the ranger or the forester at the local level” (STN\_37, 2014)*

### 5.2.7 Drawing Each Other Out

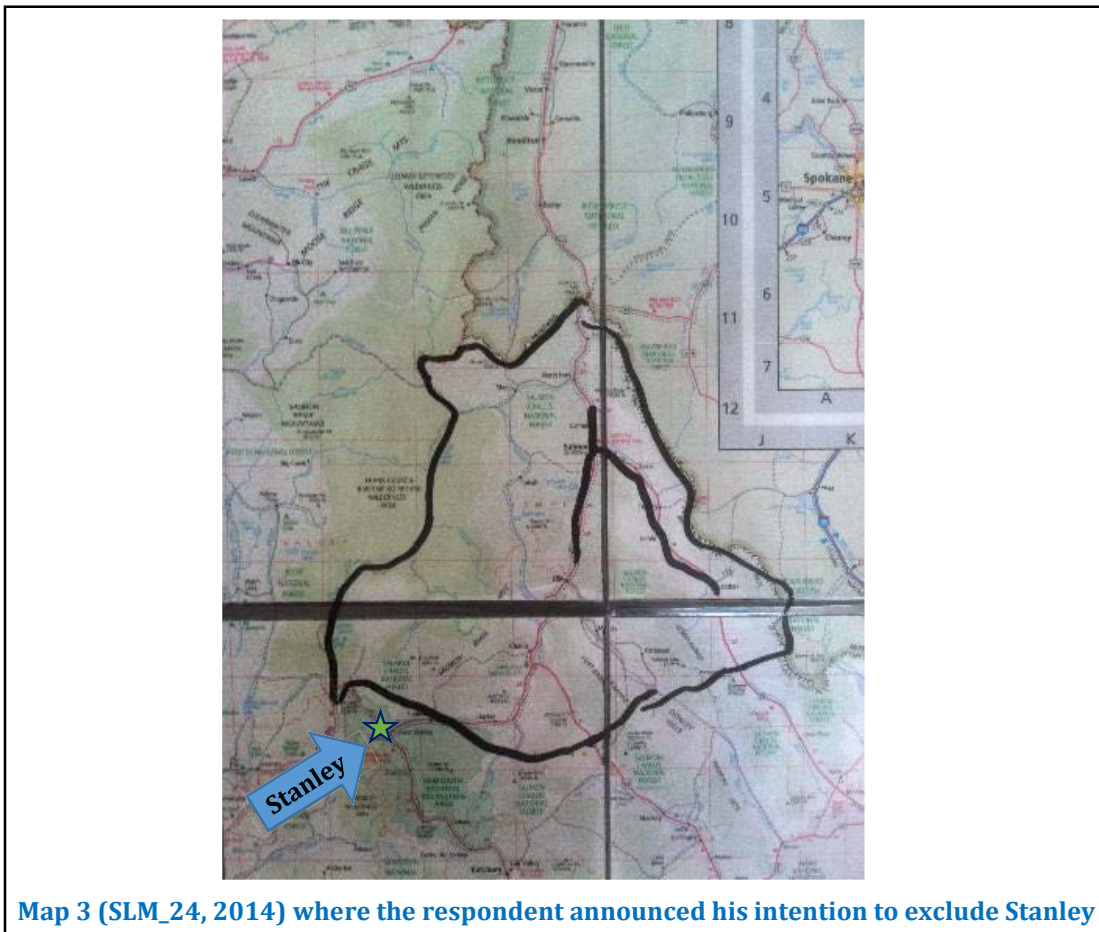
The consistently diverse population of the SRB perhaps explains the most perplexingly consistent phenomena observed during interviews. In Riggins, Stanley, and Salmon, participants failed to include the other municipalities in their regional maps but, more interestingly, some respondents actively drew the other towns out of their maps. During one interview, I end my interview in the usual way by saying, “I just have one last question for you, what does ‘Salmon River Basin’ mean to you?” To which he replies,

“It means the watershed other than just – I mapped it out. If you’re going to refer to the map that is the Salmon River Basin to me. Except for Stanley. I cut Stanley off on the map.”

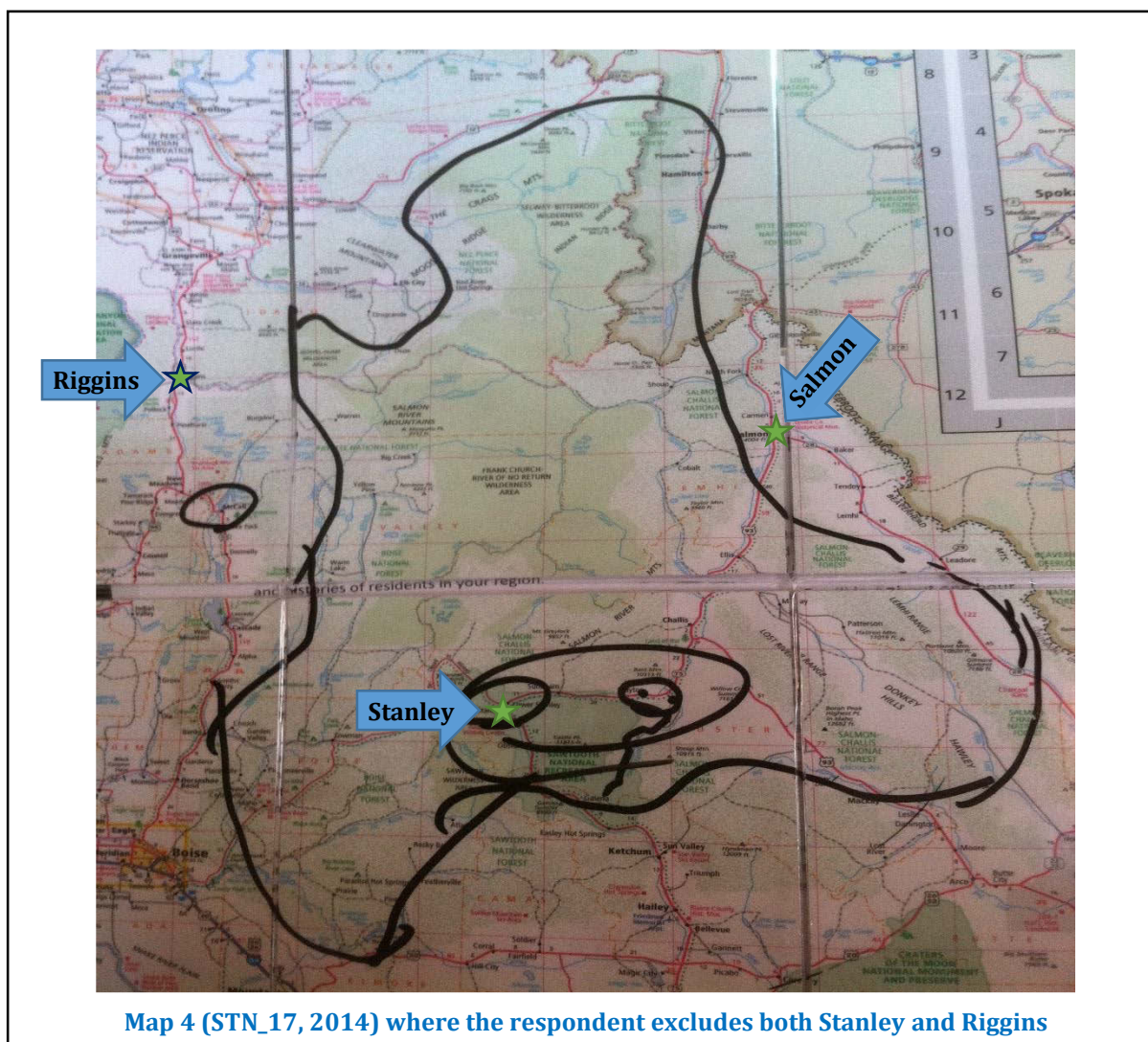
Since the interview is over I allow myself to ask, “But it is in the watershed right?”

And the Interviewee says, “Yeah, part of the drainage.”

So I ask, “What about Riggins?”



And he clarifies “Riggins is but I don’t consider it part, I consider it part of the Snake River although Riggins doesn’t consider it that way. They’re cut off from us because we have that big no return wilderness that’s impassable” (SLM\_24, 2014). Similarly, in another interview, when I ask the same question, the respondent corrects me: “You know, it’s the whole entire Sawtooth Basin. It’s not Salmon River drainage. The upper drainage. Maybe not so much down river, because we have no impact on that. The upper – upper Salmon River drainage” (STN\_31, 2014). Located approximately halfway between Riggins and Salmon, one might expect respondents in Stanley to include these municipalities relatively more but in fact they more actively exclude them.



### 5.3 Discussion – Pluralism of a Shared Narrative Related to BI

“The River” emerges as a salient feature in the BI of subgroups in each municipality in the SRB, yet respondents verbally exclude certain other groups and regions from their definition of the region. However, members of each group in each municipality adhere shared narratives of place with similar exemplars, significant symbols, themes, and events, that builds a shared narrative of place as told by one respondent in Riggins,

*“Tourism has been the economy since the fire in the mill happened and changed everything and you know at that time obviously this was a timber town and the mill was their financial, you know, independence. The mill burned down, there was an explosion, and it burned down. Several people were injured, you know, lives were lost um, and the town basically kind of almost withdrew and died off. But it took the people realizing that they had another local resource they could turn to and their tourism growth started” (RIG\_18, 2014).*

The most interesting aspect of this particular retelling of this familiar story is the fact that the narrator didn’t even live in Riggins when these events occurred! This narrative is so



**Picture 12. Contemplating the role of The River in defining place in Stanley, Idaho**



consistent that relative newcomers to the SRB tell it with ease. And, although residents in Salmon and especially Stanley exclude Riggins in their maps consistently, the narrative they relate sounds very similar to this one, where a respondent in Salmon said, “we love Salmon. We just wish the economy was better here... Back in the day, there was...logging and sawmills and whatnot” (SLM\_36, 2014). Although PE offers explanation for the observed conflict between “locals” and the federal government (Nygren & Rikoon, 2008), normally these instances, especially in rural landscapes, are characterized by strong local groups (Rikoon, 2006). And in fact, within Stanley, Salmon, and Riggins, that is observable. But why is there an apparent conflict between these municipalities?

Literature concerning resource dependent smaller developing nations finds that this dependency, combined with proximity to similarly constrained neighboring countries, heightens political conflict (Cuba, Bebbington, Rogan, & Millones, 2014). This conflict, which leads state officials to make compromised choices (exasperating in-state PE conflict) is one part of the traditional “curse” of natural resources, but empirically, as economies develop and become service-oriented, this tendency diminishes (Ploeg, 2011). However, in many ways, rural communities in the West are experiencing a new form of environmental degradation that threatens resident access to natural resources, namely: new development (Deller, Tsai, Marcouiller, & English, 2001).

This leads to unsurprising resistance from long-term residents in reaction to even the best intentions of new arrivals, tourists, and even pro-social programs explained by considering the importance of place in shaping personal experiences (Hamilton, Hartter, Safford, & Stevens, 2014). When a culturally constructed definition of place in is threatened then residents experience a personal threat to their own identity and react accordingly. These experiences, combined with a legacy of personal experiences of place, affects resident BI, the imaginative lens through which they interpret all place-specific information.

Conflict often emerges when individuals assume similar BI of others, which leads to false expectations of behavior (Erin James, 2015). But, this chapter provides evidence that the BI of residents related to the Salmon River across the SRB is demonstrably similar. So what causes to observed conflict? The most obvious explanation concerns the disproportionate political power of the federal government to dictate, curb, or control change that frustrates local residents (Birkenholtz, 2012). But what explains the in-group behavior the diverse individuals within these communities that occupy many roles, including employment with the federal government? Shared narratives often explain the collective identity of diverse individuals united over a single salient feature or identity (A. D. Brown, 2006), in this case that feature is the Salmon River and the SRB bioregion.

Although results presented in this chapter reveal a shared narrative related to The River in the BI of respondents, the SRB as experienced by residents does not appear to by one united bioregion. Rather, based on *cultural* boundaries, the SRB appears to be comprised of three bioregions that significantly overlap in the space between municipalities. When multiple *different* regions compete over resources (in this case the Salmon River) then conflict emerges (Cuba et al., 2014) especially in the context of government oversight (Kelly & Bliss, 2009). This does seem to describe the *New New West* where place identity is forefront in conflict (Weltzien, 2014). In the book *A Contested West* Cheryll Glotfelty opens by observing that, “from a bioregional perspective, a sharp contrast ought to be established between the validity of political borders, on the one hand, and geographical ones, on the other” (Simonson, Rio, & Ibarra, 2013).

However, the cultural exemplars that respondents used to define their respective regions relative to one another remain consistently similar. Perhaps this is a case of a *presumed* BI differences and actual alignment? In order to test that hypothesis a different level of examination of available data is required. So, before drawing conclusions on my findings, I completed a series of statistical tests of homogeneity of BI, presented in Chapter 6.

## Chapter 6. Assessing the Statistical Significance of The River in BI

The potentially enormous scale of the all-encompassing concept of ES often leads to reductionist research methods that neglect the more ephemeral, indirect, or diffuse values not as easily measured (Tallis & Polasky, 2009). By contrast this chapter focuses on non-monetary ES benefits, explicitly cultural ES, by utilizing the theory of BI to examine The River as a significant symbol. In general, value cannot exist without value-holders; in a place specific context, incorporating BI into PE and SI based ES grounded mixed-methods research can further contextualize the valuation of ES benefits. Having characterized that BI in Chapter 5, this chapter focuses on statistical assessment of observed phenomena to test for the statistical significance of research findings in order to further solidify the validity of observations.

These results emerge from examining interviews for shared representation and common language related to the river. BI describes an individual's perception of place held by inhabitants of a particular bioregion based on their perception of themselves (Lynch et al., 2012). In this chapter, grounded and iterative objectivist statistical analysis of BI is utilized to determine the significance of symbols by rejecting the corresponding null hypotheses. For example, if neither the subgroup nor the region that a respondent belongs to has an effect on responses, then that response should be observed equally across groups/regions (Field, 2009). But, statistically different response rates (as measured by chi-squared tests) still indicate an affect so the question becomes, what is that affect? Statistical analysis alone cannot reveal that answer but when combined with results from Chapter 4 and Chapter 5, answers emerge. This process involves iterative follow-up testing to support explanations. This process lead to a point of correlational testing of The River as a symbol with and against observations. And this process begins with examination of descriptive statistics to start answering the last ancillary question:

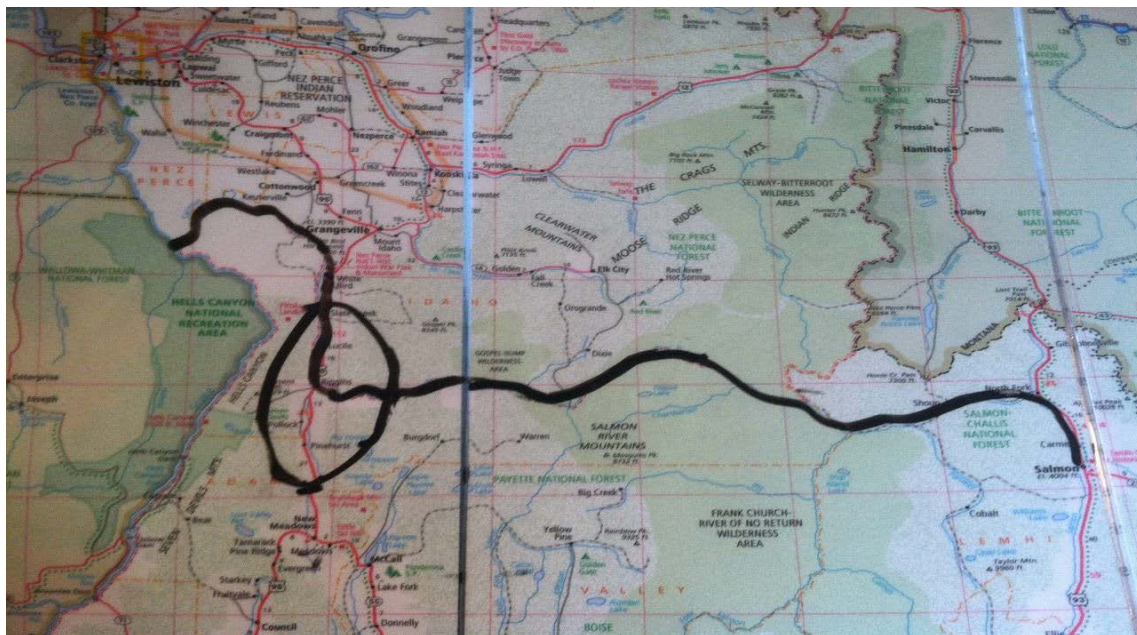
**C. *Are the perceptions within and/or between groups statistically significant?***

## 6.1 Bioregional Maps by Region (Question C1)

### 6.1.1 Riggins

In total, 36% of residents in Riggins draw watershed related maps (Figure 10) and 46% of respondents define “this region” based on Salmon River language. Respondents in Riggins include Stanley 14% of the time and Salmon 11% of the time in their maps. Riggins residents refer to the river as the “lifblood of the region” in 39% of interviews and call the SRB “home” 13% of the time when asked what the term means to them.

When a local restaurant owner, who is also a mother, year-round resident, chamber of commerce member, and a California native, was asked to draw the region she responded, “so, you want me to tell you what I think the Salmon River canyon is?” Although I had not used the term Salmon River yet. When asked to define important areas on that map she said, “Okay, um, well first and foremost the Salmon River, do you want me to mark that on here?” (RIG\_18, 2014). This map, typical of this region, keeps the borders close around Riggins, but she draws the river from Salmon to the confluence with the Snake River.

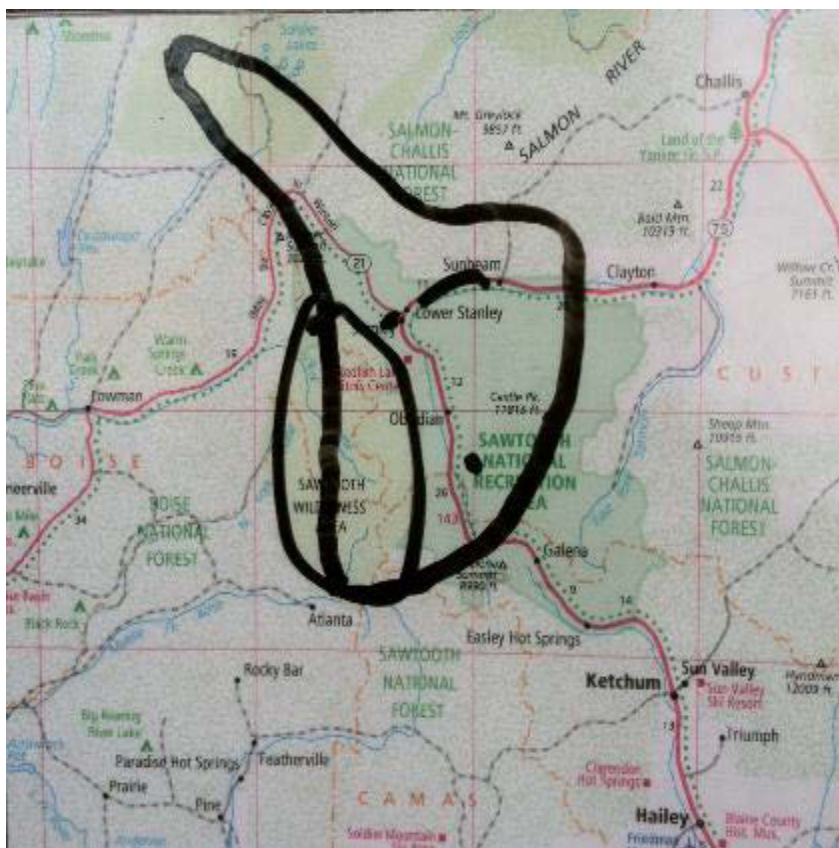


Map 5 (RIG\_18, 2014) Map drawn by restaurant owner in Riggins

### 6.1.2 Stanley

In total, 20% of Stanley residents draw a map based on the watershed (Figure 10). Stanley includes Salmon in their maps 17% of the time and Riggins only 2% of the time. Only 10% of residents in Stanley call the region something related to the Salmon River but 36% use “lifeblood” language in describing the river and 24% referred to the Salmon River Basin as “home” when asked.

A government employee, part-time resident, recreational kayaker stationed in Stanley said, “Salmon River Basin, umm, Salmon River Basin, you know, what does the Salmon River Basin mean to me? Umm, it means the water sharing the same inhibitor, and all the aspects that go along with that, you know? Tourism, the fish, natural habitat, the natural state of the river, the flow of the river. Just, you could write a book on what the Salmon River Basin means” (STN\_2, 2014). In his map he goes out of his way to include the Middle Fork of the Salmon River.

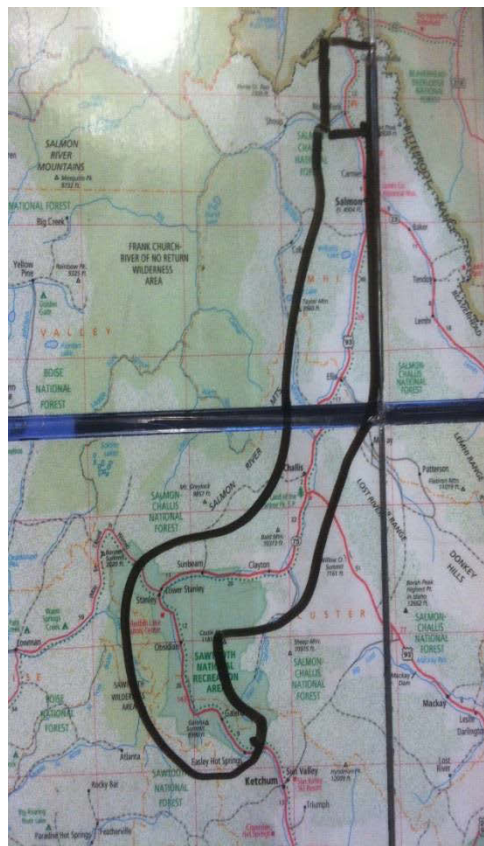


**Map 6 (STN\_2, 2014) Map drawn by Federal employee in Stanley**

### 6.1.3 Salmon

Residents of Salmon draw their maps according to watershed boundaries a statistically significant 42% of the time (Figure 10). Salmon includes Stanley 33% of time and Riggins 5% of the time. Only 19% of respondents in Salmon use Salmon River language in defining the area despite the name of the city being “Salmon.” 29% of respondents refer to the SRB as “home” but only 5% use “lifeblood” to describe the river, statistically significantly less ( $P < .10$ ).

A retired concrete contractor who grew up in Stanley and moved to Salmon to retire along a tributary of the Main Salmon River said of the river, “well obviously it is an important part of the life without it all this wouldn’t be here, the farming, ranching, everything including mining probably somewhat you know. **So it effects everybody's life where The River is part of the community**” (SLM\_1, 2014). His map directly follows the river from the headwaters to Salmon, much like himself.



**Map 7 (SLM\_1, 2014) Map drawn by retired lifelong resident of the SRB**

6.1.4 Statistical Distribution of Maps Based on Watershed

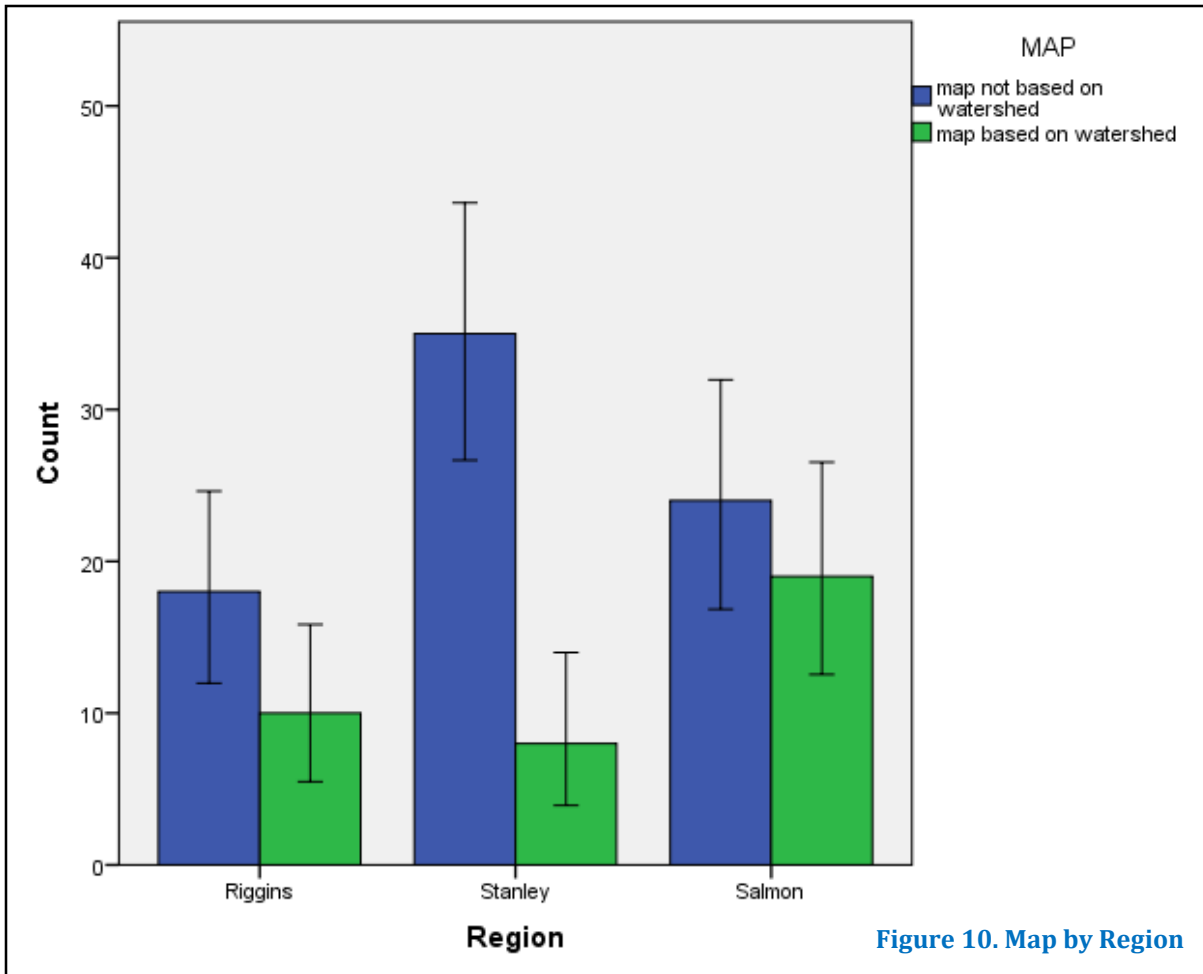


Table 4. Maps drawn according to watershed by Region		Region			Total
		Riggins	Stanley	Salmon	
MAP	Map not based on watershed	18	35	24	77
	Map based on watershed	10	8	19	37
	<b>Total</b>	<b>28</b>	<b>43</b>	<b>43</b>	<b>114</b>

Table 5. Significance of difference between maps by Region	Value	df	Sig.
Pearson Chi-Square	6.598	2	.037
Likelihood Ratio	6.855	2	.032
Linear-by-Linear Association	1.118	1	.290
N of Valid Cases	114		

## 6.2 Evidence of a Variable yet Consistent BI (Question C2)

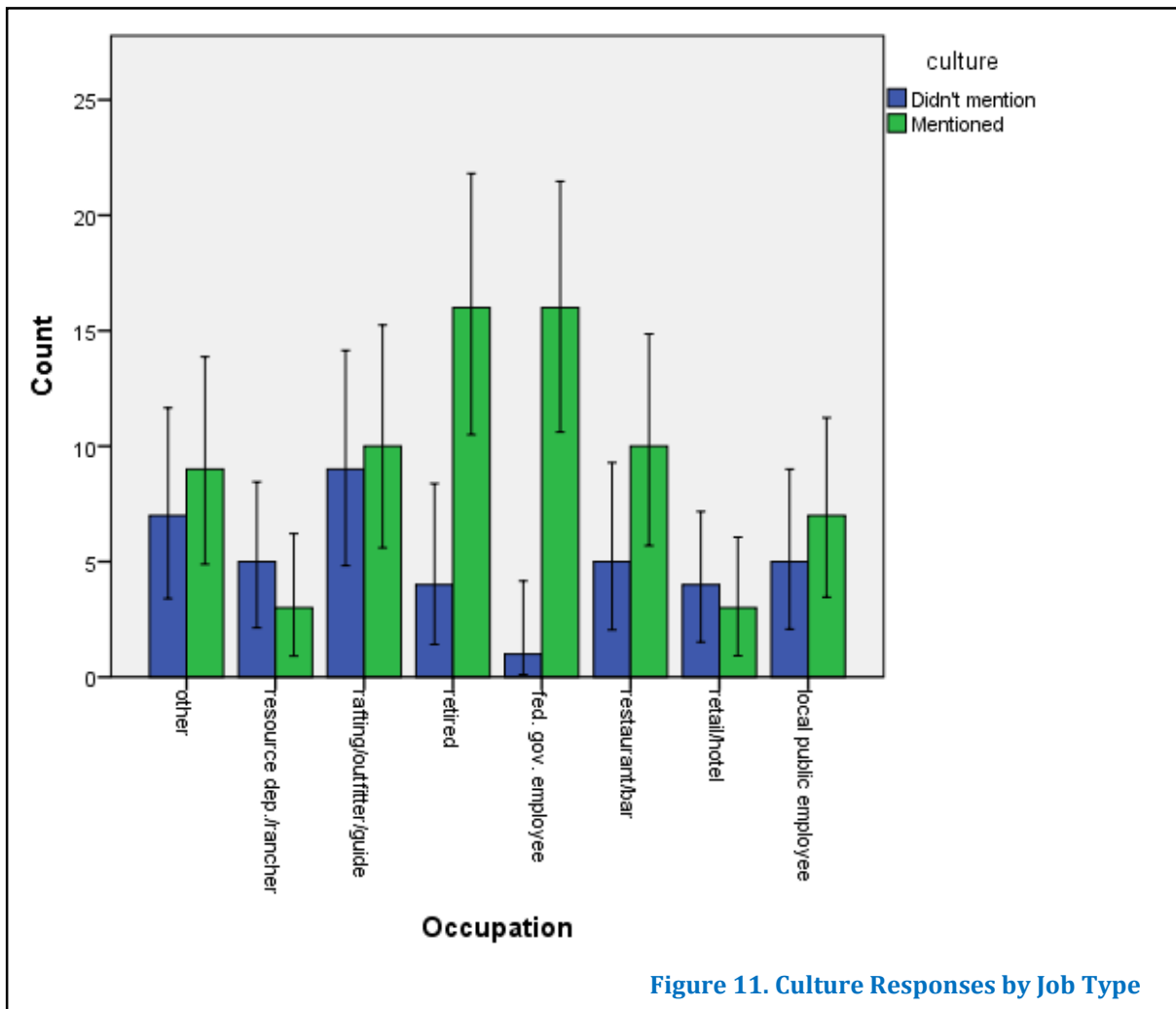
Although respondents in each region incorporate the watershed into their maps, respondents in Salmon adhere to watershed boundaries statistically more (Figure 10 / Table 5). In general, river related responses are variable yet consistent. For instance, respondents in Riggins mention the river unprompted more but respondents in Salmon discuss the cultural values of the river when asked more than respondents in any other region (Table 6). However, the Pearson's Chi-Square failed to return a significant  $P$  value (Table 7) of  $P < .10$ .

Table 6. Culture responses related to The River by Region		Region			Total
		Riggins	Stanley	Salmon	
Culture	Not mentioned	12	18	10	40
	Mentioned	16	25	33	74
<b>Total</b>		<b>28</b>	<b>43</b>	<b>43</b>	<b>114</b>

Table 7. Significance of Culture response by Region	Value	df	<i>Sig.</i>
Pearson Chi-Square	4.251	2	.119
Likelihood Ratio	4.390	2	.111
N of Valid Cases	114		

Although the “culture” response was most common in Salmon, it occurred in groups across the SRB (Figure 11) and some groups discuss the cultural aspects statistically more than others ( $P < .05$ ). The amount that federal employees talk about the cultural importance of the river (Table 8) certainly seems to suggest an effect related to the river for certain groups. By contrast when I asked what the term “Salmon River Basin” meant to them roughly 19% of respondents in *each region* referred to the Salmon River Basin as “home.” Surprisingly though, when respondents in Riggins were asked what they called the region during interviews, they utilized river specific exemplars such as “Salmon River Canyon” (RIG\_5, 2014) more than any other region (see section 6.1), including Salmon (in spite of the city’s name).





	Value	df	<i>Sig.</i>
Pearson Chi-Square	14.533	2	.042
Likelihood Ratio	16.360	2	.022
N of Valid Cases	114		

Yet, respondents in Riggins *and* Salmon discuss the social capital aspect of the river more than Stanley (Table 9) and this is also statistically significant (Table 10).

		Region			Total
		Riggins	Stanley	Salmon	
Social	Not mentioned	18	38	28	84
	Mentioned	10	5	15	30
<b>Total</b>		<b>28</b>	<b>43</b>	<b>43</b>	<b>114</b>

<b>Table 10. Significance of Social response by Region</b>	Value	df	<i>Sig.</i>
Pearson Chi-Square	7.687 <sup>a</sup>	2	.021
Likelihood Ratio	8.375	2	.015
Linear-by-Linear Association	.082	1	.775
N of Valid Cases	114		

By contrast respondents in *both* Riggins *as well as* Stanley described the river as “the lifeblood of the region” more than Salmon (Table 11) and this too is statistically significant (Table 12). However, this unprompted “lifeblood” response was utilized by respondents in each job type a statistically consistent amount when grouped and crosstabulated.

<b>Table 11. “Lifeblood” by Region Crosstabulation</b>		Region			Total
		Riggins	Stanley	Salmon	
Lifeblood	0 didn't use lifeblood language	18	29	40	87
	1 used the phrase lifeblood to describe The River	10	14	3	27
	<b>Total</b>	<b>28</b>	<b>43</b>	<b>43</b>	<b>114</b>

<b>Table 12. Significance of “Lifeblood” response by Region</b>	Value	df	<i>Sig.</i>
Pearson Chi-Square	10.756	2	.005
Likelihood Ratio	12.284	2	.002
N of Valid Cases	8.847	1	.003

It is worth reiterating that “Salmon River Basin” only officially exists as an ecological distinction; no human boundary definition adheres to the SRB as a border. Clearly the Salmon River is significant in each region, but variably so. But how different are these results? Do these results correlate with other data? Neither the “culture” nor the “social” response correlates with “lifeblood” or the “home” response but there is a significant relationship between the “lifeblood” response and discussion of the ecology of the river (Figure 12 / Table 13/14). But there is no statistical difference between job or region groupings and the “ecology response.”

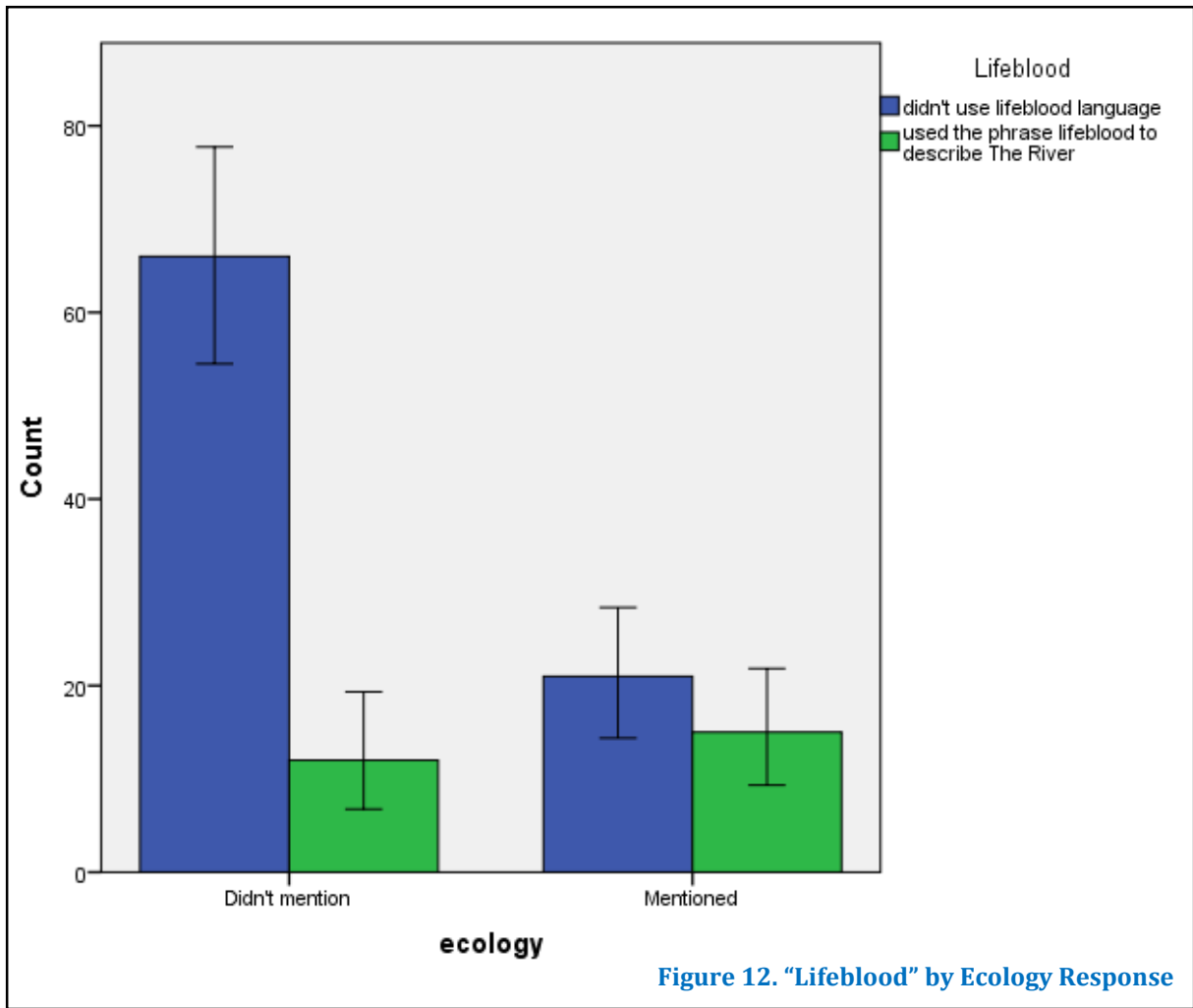


Figure 12. "Lifeblood" by Ecology Response

		Lifeblood Response		Total
		Didn't use "lifeblood"	Used the phrase "lifeblood"	
ecology	Didn't mention	66	12	78
	Mentioned	21	15	36
<b>Total</b>		<b>87</b>	<b>27</b>	<b>114</b>

	Value	df	Sig.
Pearson Chi-Square	9.413	1	.002
Continuity Correction	8.015	1	.005
Likelihood Ratio	8.934	1	.003
Linear-by-Linear Association	9.331	1	.002
N of Valid Cases	114		

### 6.3 The Power of Unprompted River Reference (Question C3)

All these data, thus far, reiterate the variable but equally important role of “The River” for respondents. However, in terms of *significant* symbols, the question remains, does “The River” possess statistically observable power in influencing the BI of SRB residents? The primary variable for this statistical analysis of the interviews was the metric of unprompted “river hits.” Respondents in the SRB mention river in an average of 4/12 questions within a standard deviation of 2.38 (n=114) and this distribution of “river hits” aligns along a Poisson distribution (Figure 13). The high instance of “river hits” provided initial statistical evidence of the importance of The River as a significant symbol in the BI of participants. Equally as intriguing as the high instances of unprompted river discussion, the distribution of “river hits” suggested important variability that could potentially be explained by other variables (Zou, 2004), so I conducted a series of crosstabulations and chi-square tests for significance.

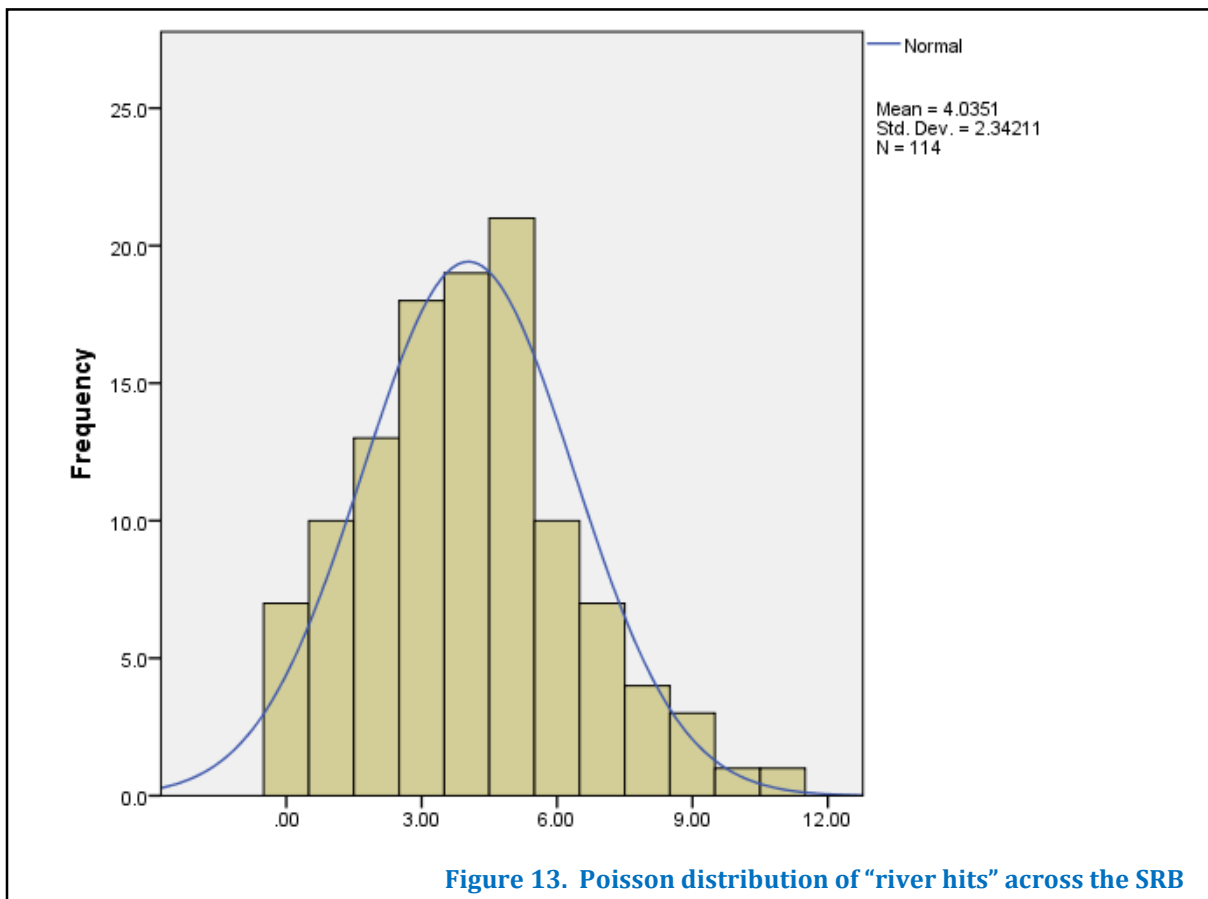


Figure 13. Poisson distribution of “river hits” across the SRB

### 6.3.1 “River hits” by Region

Testing a crosstabulation of “river hits” by region with a chi-square test returned a highly significant  $P < .000$ . As seen in Figure 14, the town of Riggins mentions “the river” significantly more than Stanley or Salmon (Table 15). However, both Stanley and Salmon mention the river unprompted an intriguing amount as well, Stanley mentions the river an average of 4/12 questions compared to Riggins 6/12 questions and Salmon’s 3/12 questions. Meanwhile, the highest degree of variability exists in Salmon, where the distribution of “river hits” almost mirrors the distribution for the entire bioregion. For illustration, word counts of the raw unprompted responses for the Riggins interviews (n=28) reveals that “river” or “rivers” are mentioned 274 times, the 5<sup>th</sup> most mentioned word behind “knows,” “um,” “like,” and “just.” By comparison, in the Stanley interviews (n=42) “river” is mentioned 102 times. In the Salmon interviews (n=43) “river” is the 21<sup>st</sup> most mentioned exemplar at 190 instances.

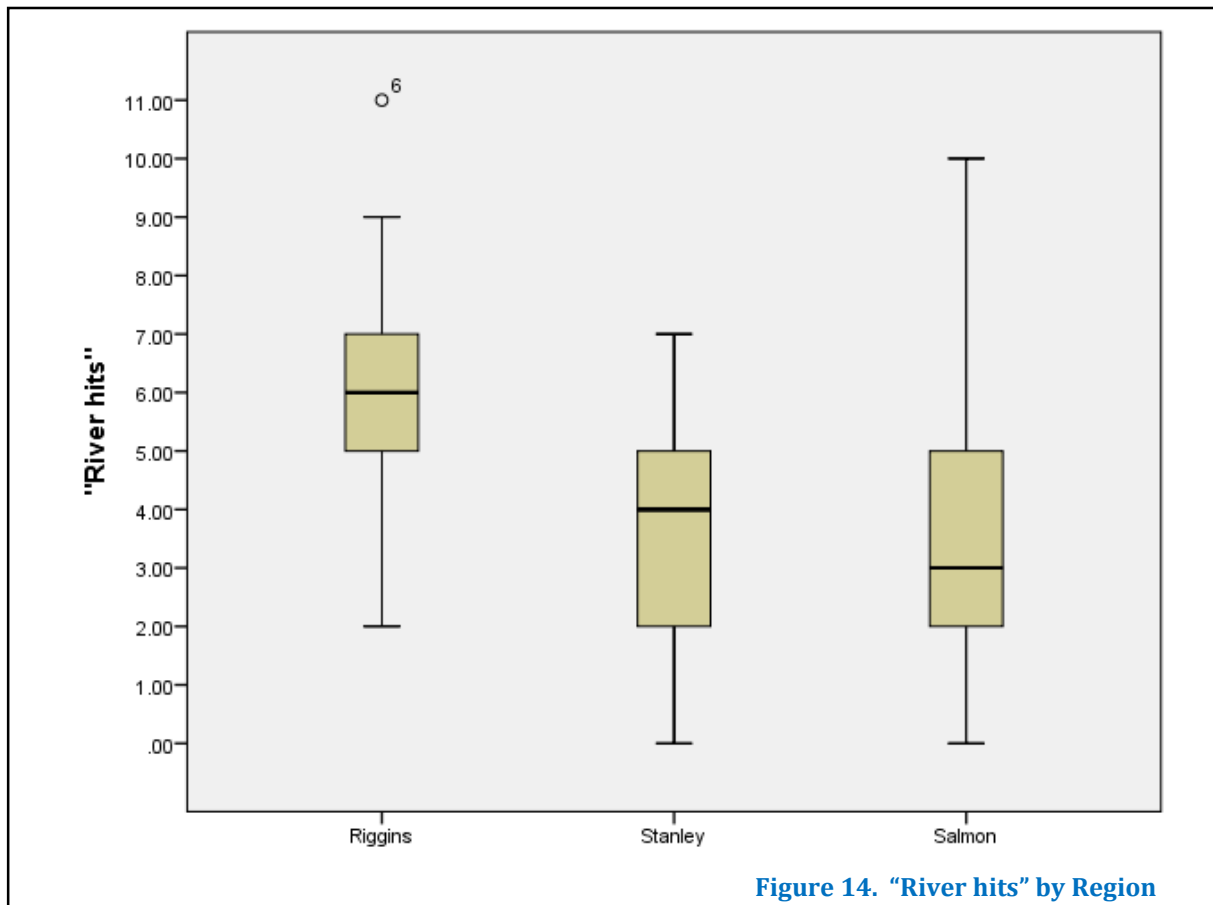


Table 15. "River hits" by Region Significance	<i>B</i>	Std. Error	95% Wald Confidence Interval		<i>Sig.</i>
			Lower	Upper	
(Intercept)	1.249	.0816	1.089	1.409	.000
Riggins	.494	.1137	.271	.716	.000
Stanley	-1.658E-14	.1155	-.226	.226	1.000
Salmon	0 <sup>a</sup>	.	.	.	.

Model: (Intercept), Region

a. Set to zero because this parameter is redundant.

### 6.3.2 "River hits" by Job

Similarly, the crosstabulation of "river hits" by job type and a corresponding chi-square test indicates a statistically significant difference between groups (Table 16). Seen as a boxplot in Figure 15, river rafting guides and outfitters talk about the river significantly more than any other group ( $P < .000$ ) at an average of 6.3/12, whereas ranchers and other resource dependent occupations talk about the river, unprompted much less at an average 2.5/12. However, as observed and demonstrated both quantitatively and qualitatively, ranchers use "lifeblood" language and associate the SRB with "home" significantly. Also of note, retail/hotel proprietors only mention the river on average 2.1/12 times whereas restaurant/bar owners mention the river 3.7/12 times.

Clearly, river reference is variable based on stakeholder groups. Importantly, these stakeholder groups were evenly distributed across the three study areas, with minor variability in the groups, and thus this did not drive results (see Table 1 and Appendix 7). Although, these initial findings expose a significant difference in the amount that different stakeholder groups mention the river, further analysis is required to explain this difference. Below, I incorporated the Place Attachment metric I measured during interviews and looked for possible correlations with other collected and analyzed data.

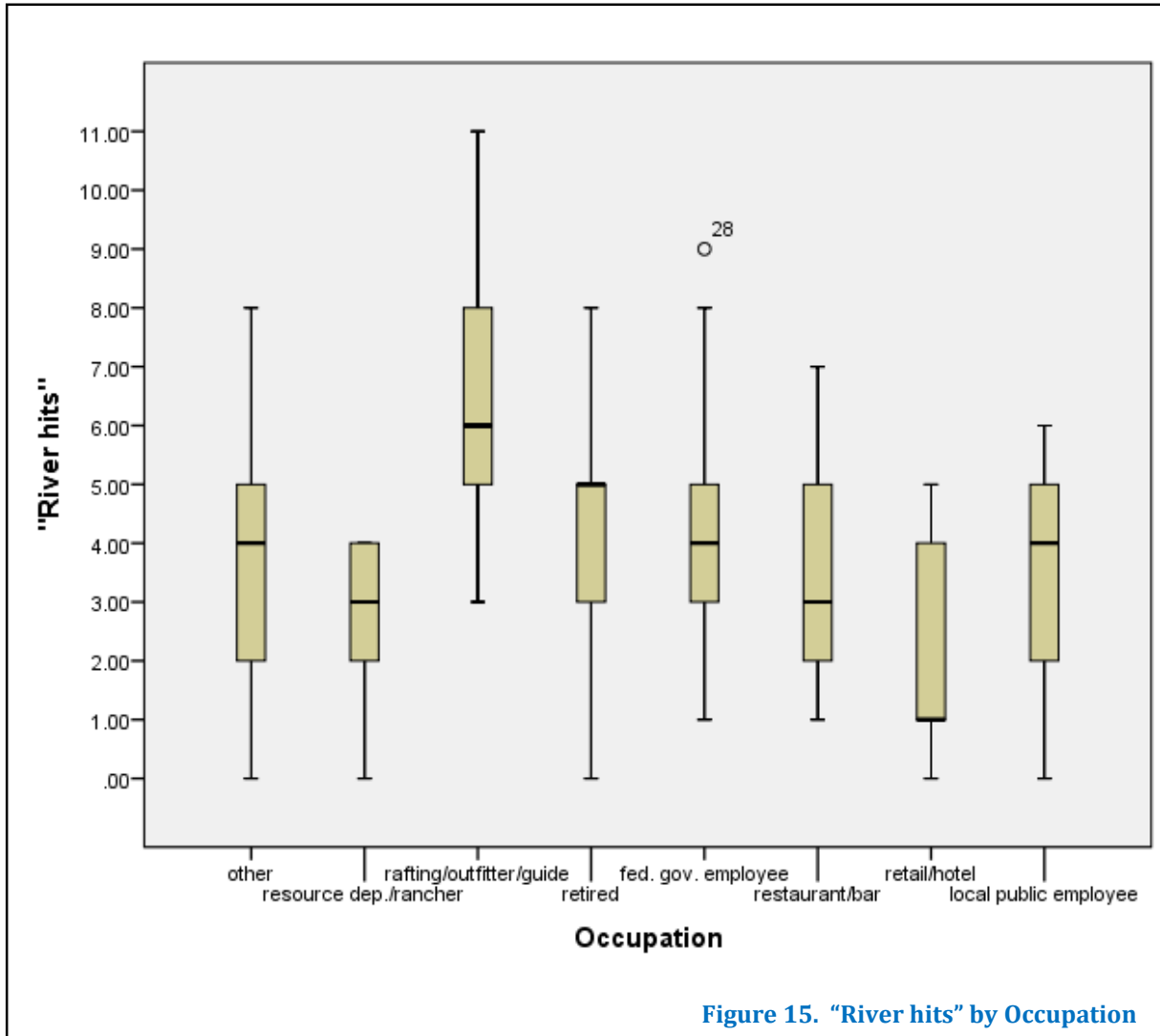


Table 16. "River hits" by Occupation Significance	<i>B</i>	Std. Error	95% Wald Confidence Interval		<i>Sig.</i>
			Lower	Upper	
Other	.056	.2093	-.354	.466	.789
Resource dep./rancher	-.262	.2750	-.801	.277	.340
Rafting/outfitter/guide	.681	.1840	.320	1.041	.000
Retired	.195	.1957	-.189	.579	.319
Fed. government employee	.292	.1979	-.096	.680	.140
Restaurant/bar	.139	.2086	-.270	.547	.506
Retail/hotel	-.417	.3038	-1.012	.179	.170
Local public employee	0				

### 6.3.3 Place Attachment Scores

Place Attachment scores reveal an extremely high “attachment” across the population as seen in Figure 16. Anything above 3 is considered high place attachment and 5 maxes out the scale. Clearly, place attachment is high in the SRB at an average of 4.23. Compared to relevant literature where scores of 3.9 or similar are traditionally considered very high, this is an extremely high place attachment (Raymond et al., 2010). Consistent with literature, the list of statements used in this study return a Cronbach’s Alpha of .63, indicating internal consistency and validity. However, .63 is lower than the previously observed internal consistency of this metric (Raymond et al., 2010), due to a couple of statements in particular that did not resonate with respondents. So, in order to determine a possible effect of The River as a significant symbol, I tested for a correlation between “river hits” and Place Attachment scores.

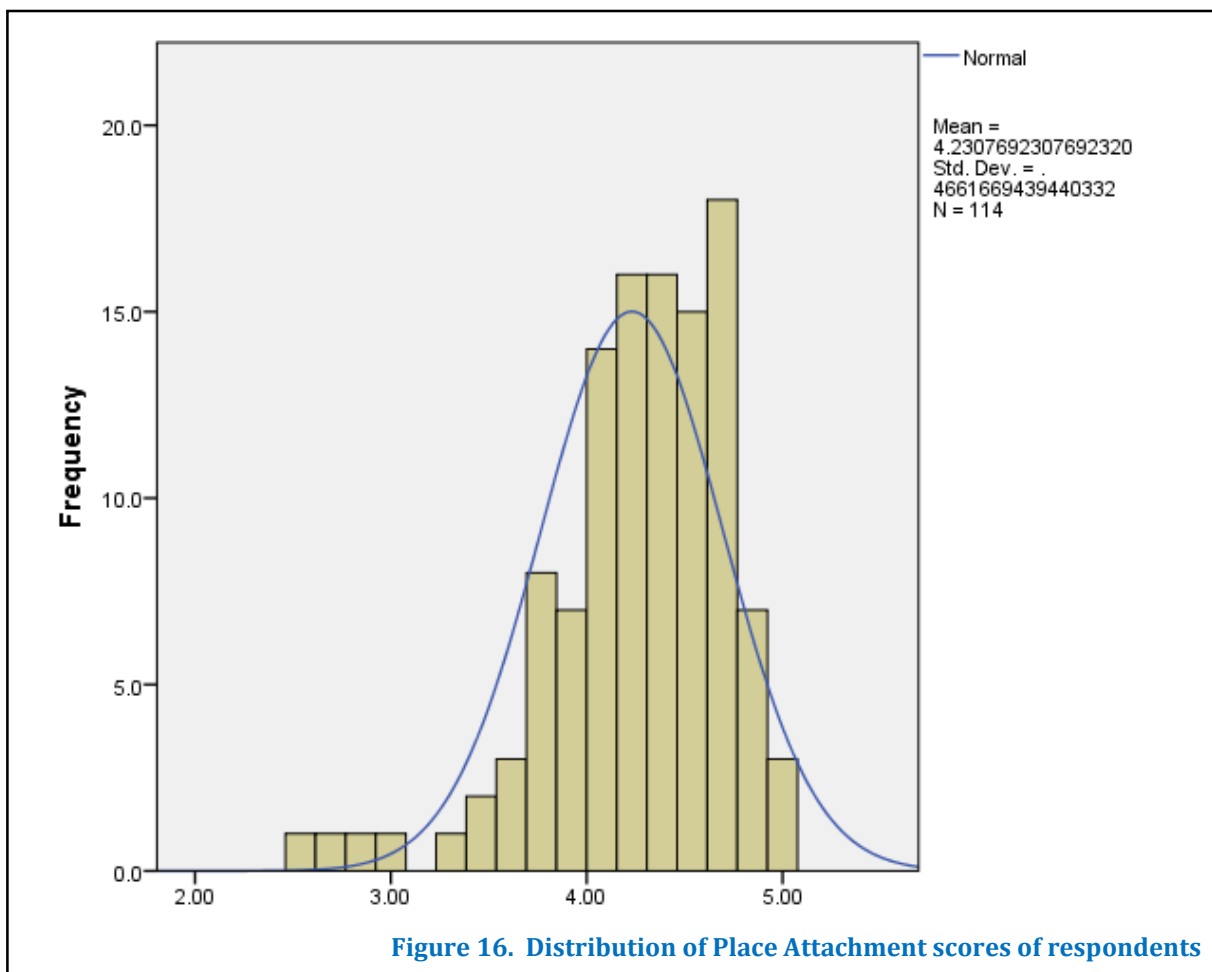


Figure 16. Distribution of Place Attachment scores of respondents



### 6.3.3.1 Relationship Between Place Attachment and “River Hits”

I ran a generalized linear regression to test for a correlation between “river hits” set to a Poisson regression and “place attachment” as a scale variable. Based on the  $P < .000$  (Table 17) we can reject the null hypothesis; Figure 17 demonstrates a statistically significant relationship between “river hits” and “place attachment” where a clear, if variable, relationship exists. This result suggests that the Salmon River not only constitutes a significant symbol for the residents in the SRB but that it correlates with BI based on the strong correlation with Place Attachment.

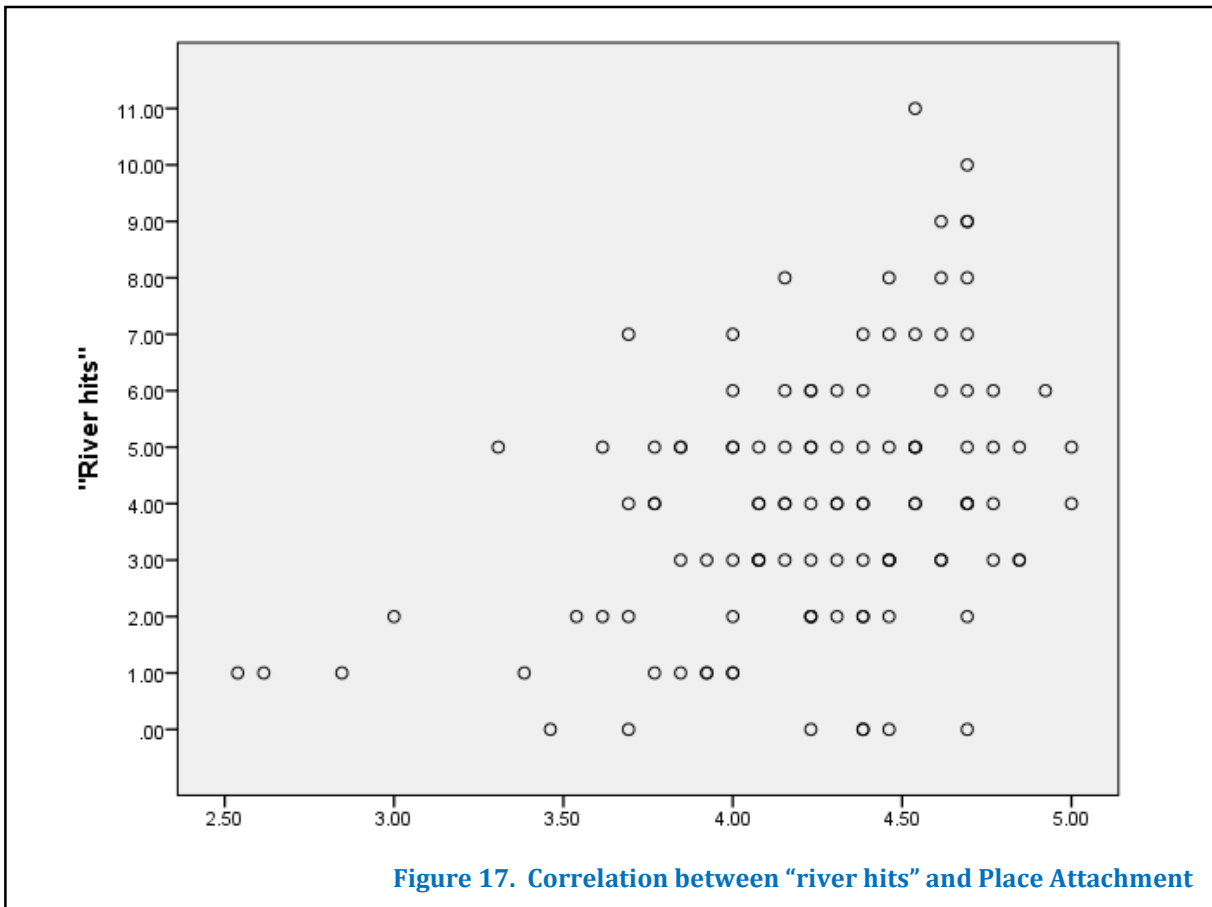


Table 17. “River hits” by Place Attachment Correlation Significance	<i>B</i>	Std. Error	95% Wald Confidence Interval		<i>Sig.</i>
			Lower	Upper	
(Intercept)	-1.001	.5027	-1.986	-.015	.047
Place Attachment (Scale)	.559	.1154	.333	.785	.000

As a valuation *output* the correlation between “river hits” and Place Attachment possesses utility in revealing value of the cultural ES of the Salmon River for residents of the SRB regarding the river. However the strength of the relationship was relatively low and the variance was high indicating that the river is not the only variable contributing to Place Attachment. Furthermore, this test does not reveal which construct leads this relationship, if either, in fact, does. It’s possible that people with high place attachment are simply more *aware* or the river as a bioregional feature due to Place Attachment.

### 6.3.3.2 Relationship groups/regions and place attachment

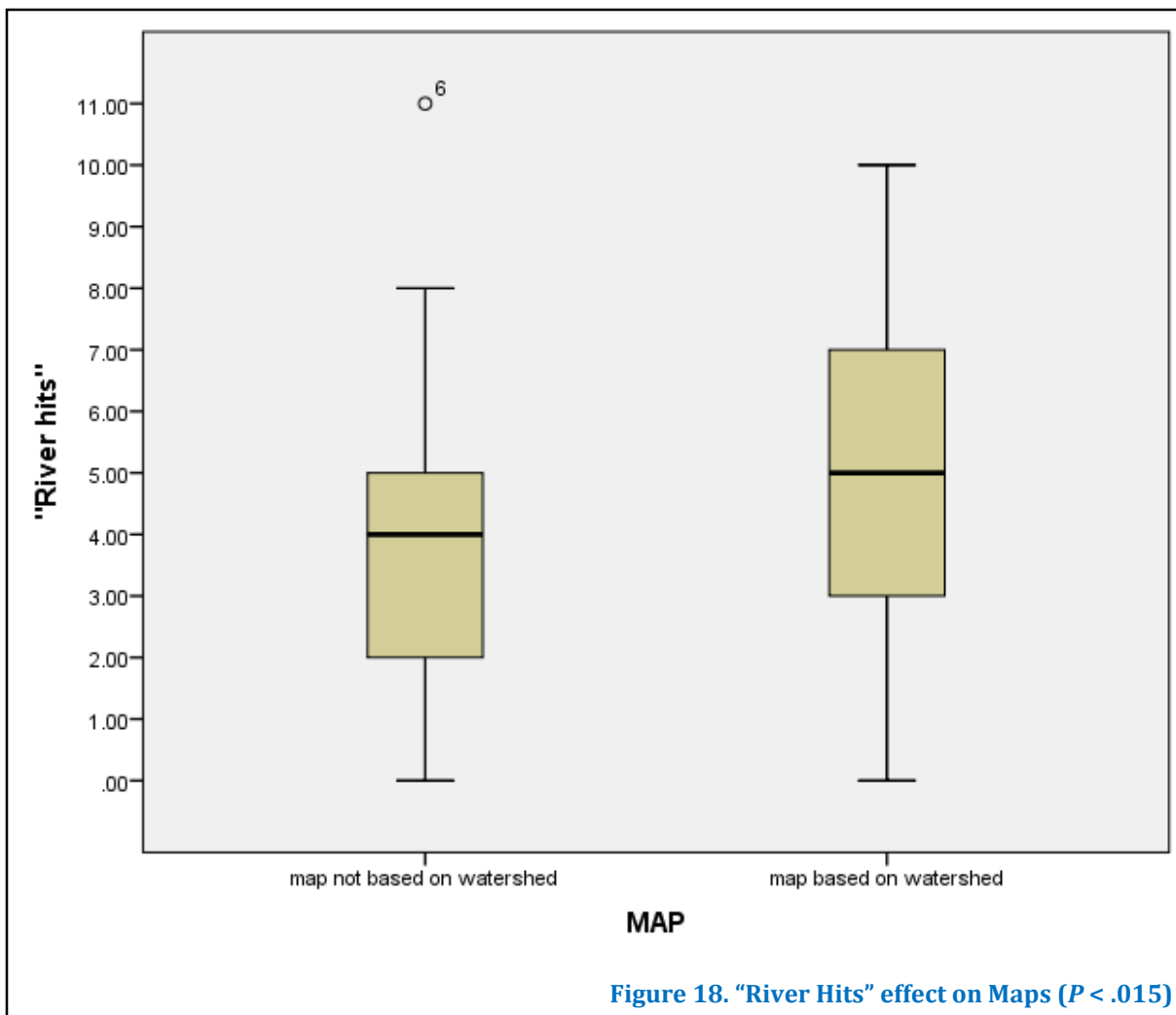
So, since certain groups discuss the river more, and “river hits” correlates with place attachment, I assumed that place attachment would be similarly variable between groups and regions. However, the data did not support this assumption. There is no statistical deference between either job type or region (Table 18) and Place Attachment scores.

Table 18. Place Attachment by Region	Mean	Std. Error	95% Wald Confidence Interval	
			Lower	Upper
Riggins	4.341	0.085	4.174	4.507
Stanley	4.247	0.069	4.112	4.381
Salmon	4.143	0.069	4.009	4.277

This result is particularly interesting since statistically significant differences of “river hits” between groups and regions are observable. Taken at face value these data cast doubt on the validity of the “river hits” metric. Or, considered another way, these data provide *illumination* on exactly *what* “river hits” actually measured. Absence of evidence is not evidence of an absence, although respondents in Riggins *talk* about the river more we cannot determine that respondents in Salmon *think* about it less. As a point of a reference, when asked directly, an overwhelming majority (97%) of respondents reported that the river is “important.”

### 6.3.3.3 “River hits” Effect on Respondent-Drawn Maps

So the question remains, is there a valuation output available in collected data that articulates the strength of The River as a significant symbol in the BI of SRB residents? As in, how can we observe just how important the Salmon River is in the BI of residents relative to other salient features? “River hits” successfully measures the frequency with which respondents *choose* to talk about the river *as opposed* to anything else; trade-off reflects the perception of relative values between ES for residents (Szücs et al., 2015). Similarly, in drawing their maps respondents are making choices between available physical, political, social, and natural capital features in defining place (Greg Brown et al., 2015). Assessing a correlation between maps and “river hits” returns a  $P < .05$  for the relationship depicted in Figure 18.



## 6.4 Discussion – Beyond Statistically Significant Symbols

Taken individually, none of the research results presented in this chapter present particularly unique, unexpected or even very interesting results: people who talk about the river also draw the river. Rafters talk about the river more than other groups. And even less intuitive observations can be explained post hoc: federal employees talk about culture to proactively engage and refute the sentiment that they don't value the community – a similar tendency to that of respondents in Riggins mentioning the river and naming the region with Salmon River exemplars statistically more than respondents in Stanley or Salmon. Remembering the intentionality of narrators (Phelan, 2007) these participants are perhaps responding to their awareness of the perception (Manis & Meltzer, 1967) of other members of the SRB.

But when these data are taken together they provide true utility in assessing the importance of the Salmon River for residents across the SRB and in each stakeholder group. For instance, the relationship between “river hits” and Place Attachment suggests that, more than mere awareness, the Salmon River defines the sense of place of residents in the SRB. And, when considered with regional economic analysis (Chapter 4) as a background, these statistics add a metaphorical foreground to the collective story of place (Chapter 5) that measurably defines the BI of respondents in the SRB (Lejano et al., 2013).

In every region rafters talk about the river more and ranchers have more political strife associated with river regulation by government employees who profess the cultural importance of the river and occupy multiple roles within the community that conflict. And the river itself is strongly correlated with place attachment, consistent with place attachment literature (Greg Brown et al., 2015; Gregory Brown & Raymond, 2007; Burley et al., 2007; Kaltenborn, 1998; Raymond et al., 2010). Moreover, this connection correlates with respondent identification of a bioregion based on the Salmon River watershed as a physical feature.

However, as observed in Chapter 5, these data suggest that the SRB is actually comprised of three overlapping bioregions based on resident perception. However, the consistent variability of emergent phenomena statistics in Chapter 6 provide strong empirical support for the existence of a shared BI related to the Salmon River. These data suggest that the different stakeholder groups possess a BI related to the Salmon River that remains consistent across the SRB. This suggests that these municipalities share a bioregionally explicit experience based on



**Picture 13. Salmon River decal adorning a window in Salmon, Idaho**

similarly constructed (river related) place attachment (Manzo, 2006). This valuation output has demonstrable effects on how people engage with their landscape (Zimmerer & Bassett, 2003) and perceive threats to it (Devine-Wright, 2009). Therefore, although perceptions of the river and the SRB are not identical across the region, the Salmon River emerges consistently as a significant symbol that defines the value of place for residents across the SRB.

But, these findings leave many unanswered questions as well. For instance, does The River drive place attachment, or vice versa? Perhaps both constructs are co-dependent variables that behave as almost contagious constructs, effectively spread through the dialectic Symbolic Interactionism of place (Bozatzis & Dragonas, 2011). Statistically, the idea of co-dependency between variables is valid; studying disease spatially requires understanding “crowding” and “unemployment” in establishing disease risk, which Poisson Regression Models can accurately predict (Munch et al., 2003). Intuitively, it makes sense that place attachment



**Picture 14. Looking across the street from Picture 13 at the Salmon River Inn**

leads to river discovery, as expressed by aging retirees, and relating to the river leads to place attachment, as described by rafters. Thinking of BI as potentially communicable, research conducted to assess the role of social capital in community health and resilience offers interesting insight into these data, where increasing social capital measurably increases the average health of community members (Poortinga, 2012). So, can BI be intentionally spread?

Network analysis suggests that increasing social capital can bolster the ability of network-members to work together (Eklinder-Frick, Eriksson, & Hallén, 2011), in ways that protect communities from network PE realities produced in conflicts between endogenous and exogenous stakeholders in political struggle (Birkenholtz, 2012). However, social capital can also obstruct the ability for networks to adapt (Eklinder-Frick et al., 2011) and hinder the economic progress of certain communities (Banfield, 1958).

Understanding the emerging paradigm of resource dependence in rural communities provides a framework for managing linkages that promote resilience (Kelly & Bliss, 2009). For instance, activating place attachment in these residents increases the possibility of participation and planning (Manzo, 2006) Also, *new* social capital connection *can be* intentionally created within these environmentally engaged frameworks between appropriately activated and connected community members (Pronyk et al., 2008).

Increasing these social capital connections requires intentional communication of shared values, such as place attachment alignment, to community members (Flint, 2010). In this case, communicating the consistency of a BI related to The River to residents of Riggins, Stanley and Salmon could establish stronger connections between these municipalities and merge respective regions into one bioregion. In realizing the potential value of these data towards that effort, a goal materializes. Rather than problematic, this is a crucial component of social science research (Flyvbjerg, 2001). If we want to increase the resilience of SRB and plan for potential impacts then facilitating communication between desperate municipalities becomes the obvious goal.

## Chapter 7. Conclusion

The frequently cited, yet less frequently understood (Boyd & Banzhaf, 2007), concept of “Ecosystem Services” invites new examination of natural capital that potentially accounts for a more complete portfolio of ecosystem function benefits for humans (Scholte, Teeffelen, & Verburg, 2015), as affected by humans (Wallace, 2007; Su, Xiao, Jiang, & Zhang, 2012; Lautenbach, Kugel, Lausch, & Seppelt, 2011; Black et al., 2011; Kroll, Müller, Haase, & Fohrer, 2012) by connecting academic disciplines (Tengberg et al., 2012). With this research I expanded upon that tradition by increasing the theoretical scope of ES assessment to include the theory of “Bioregional Imagination” in a grounded theory mixed-method application. This methodology yielded both fruitful quantitative and qualitative evidence, co-generated between publically available economic data, resident interview testimony, and researcher analysis, which led to the conclusion that: ***The SRB is comprised of three bioregions based on the Salmon River that overlap, and each will be negatively affected by streamflow reductions and alterations.***

Based on these data it seems clear that the SRB will be significantly impacted by reductions and alterations in streamflow due to A: job dependence related to amenity and lifestyle values as well as the unquantified social capital connections revealed in Chapter 4, as well as B: the consistent but multifaceted role of “The River” in SRB resident narratives related to place presented in Chapter 5, and finally C: the statistically significant occurrence of river related exemplars across subgroups in each municipality combined with the statistically significant correlation between unprompted river discussion, place attachment and regional identification shown in Chapter 6. If residents in the SRB depend on streamflow for employment as well as heritage and other cultural ES values, than streamflow reductions will “cost” more than money; this impact threatens the livelihood and regionally specific way of life of residents defined by river related community capitals that are both fiscally and politically vulnerable.



## 7.1 Utility of BI in Mixed-Methods ES Research

Incorporating BI into this ES research facilitated environmentally-contextualized valuation frequently called for in macro-ecological economic research (Boyd, 2007) calibrated at a necessarily bioregional scale. Although these data are far from standardized, as some suggest is necessary (Boyd & Banzhaf, 2007), they possess the simultaneously quantitative and qualitative weight imperative in ES research (Busch et al., 2012).

The classification of ES into discrete categories often hinders rather than helps ES assessments (Wallace, 2007), especially in the context of decision-making based on output benefits often far removed from intermediate services (Fisher et al., 2009). But, rather than attempt to reclassify these services, this research deliberately explored the more complicated reality that ES benefits from one natural capital feature provides a multitude of benefit types based on both ecological as well as cultural processes (Pröpper & Haupts, 2014). Understanding the value of these benefits is not new to economic analysis (Banfield, 1958), or bioregional planning (Brunckhorst, 2013), or ES (Chan et al., 2012) but an integrated methodology for directly addressing those values within an economic context, as demonstrated in this research, retains novelty. And the theory of BI clearly provides utility in achieving that objective.

Having established that a BI related to the natural capital feature of the Salmon River not only exists but provides a foundation for understanding the cultural ES of streamflow presents implications for further research into generalizable methodologies for determining unique BI in other bioregions. Combining these methods with non-market valuation could help establish more comprehensive evaluation of the complete ES portfolio for particular bioregions. For instance, a longer and more comprehensive study in the SRB that addresses more of the indirect and diffuse interactions of ES benefits as well as contingent social capital connections could provide not only more complete data for the SRB in particular, but also further solidify the validity of the BI-focused approach to bioregional ES assessment.

## 7.2 The Social and Cultural Capital of SARA Related Employment

Not only does this research demonstrate that streamflow in the SRB provides aesthetic, cultural, social, and spiritual benefits to residents, but also these data reveal that the jobs “created” by streamflow provide both fiscal as well as heritage and other intangible benefits for residents. As discussed in Chapter 4, although “jobs” often represent a poor metric to consider for economic *development* (Barrett & Power, 2001; Beyers, 2005; Power, 1996; Watson & Beleiciks, 2009) this metric may be very appropriate for considering the economic *sustainability* of the SRB. Although investments in recreation in the Northwest don’t always yield the positive fiscal benefits that “New West” proponents laud (J. B. Wilson, Thilmany, & Watson, 2006), this socio-ecological structure can preserve not just the ecology of the area, but the cultural heritage as well (Peterson, 2000) if properly understood.

This research has demonstrated that SARA produce employment more so than they yield a considerable amount of economic *production* and, according to economic data as well as the self-reported household income of residents in the SRB (Appendix 7), these residents are far from wealthy, which seems to exemplify the “curse” many economists generally attribute to high concentrations of natural resources (Ploeg, 2011). However, in discussing the benefits of living in the SRB, no one speaks of fiscal wealth, in fact many recognize the monetary *trade-off* of living in the bioregion that begs the question, is the fiscal deficit of the region a proxy measurement of its amenity and lifestyle value? This research goes beyond merely posing that question, and provides, through qualitative narratives and statistical consideration of The River as a significant symbol, *actual measurements* of that value. While the SRB does not rely on SARA for production, it does rely on jobs related to SARA for cultural subsistence that preserves the value of place unrecognized in economic base theory (Power, 1996). Therefore threats to either the availability or the ability to access (Kelly & Bliss, 2009) “The River” as a resource poses a serious threat to the continued existence of the SRB as a bioregion.

### 7.3 Resilience in the Salmon River Basin

The ability to contend with climate induced reductions to streamflow and increased government regulation of a common-pool resource depends on the “resilience” of the communities (in the SRB) to adapt to larger scale social-ecological forces (Folke, 2006). The classification and assessment of ES related to human values may facilitate better decision making that could increase the resilience, adaptability, and potential sustainability of these communities (Wallace, 2007). Research on environmental welfare dependence in rural communities occurs mostly in the context of developing nations (Thondhlana & Muchapondwa, 2013) and climate change effects on human migration focuses on transnational movements mostly (Hugo, 2011). However, communities such as the SRB depend on new and return migration of place focused community members attracted to place-based social relations contingent on natural capital features that facilitate a wealth of other social and cultural capitals (von Reichert, Cromartie, & Arthun, 2014). Although these migrants come without expectations of fiscal prosperity, they do at least require an economic livelihood.

Since similarities between less-developed nations and rural communities in the Inland Northwest abound, especially in the context of economic development (Kilkenny & Partridge, 2009), it’s therefore important to clarify that this research is not intended to fit into the paradigm of development economics. As observed in respondent testimony, the SRB does not need to develop (nor could it in the current political ecological climate due to constraints imposed by proximity to public land). But the SRB can diminish, or even disappear, speaking to the complicated relationship between people and the political ecology of place that has characterized politics in the West for decades (Smith & Freemuth, 2007). Even as the Northwest first began to transform in the second half of the 20<sup>th</sup> century, the need for good scientific assessment and politically conscious civic engagement was recognized (Lee, 1993), but actualizing that mandate proves more difficult for rural, often resource dependent, communities

with complex vulnerability to both economic and political forces (Stedman, Parkins, & Beckley, 2004). And, importantly, the interpretation of scientific, economic, or political information is contingent on place identity and dependence (Manis & Meltzer, 1967).

Fortunately, this research highlights both the resource dependence and place identity associated with the Salmon River in the SRB and the potential for backlash from increased political intervention. Unfortunately, that intervention is inevitable if even the most modest climate change scenarios hold true, thus the utility in understanding the ES preferences and perceptions of proximate stakeholders who depend on the natural capital feature in question (Leimona, Noordwijk, Groot, & Leemans, 2015). In a management scenario little, if anything, can be done to mitigate these climate induced streamflow alterations. However, “resilience” is a function of both: system inputs *and* community “adaptability” (Gallopín, 2006) and adaptability in local governance potentially insulates small communities against these macro-level forces (Folke, Hahn, Olsson, & Norberg, 2005).

Although rural, lifestyle rich, communities are often perceived or described by some as inherently resistant to adaptive governance, they possess a sense of place stewardship that can be harnessed (Gill, Klepeis, & Chisholm, 2010). Often, “cultural services” seem to impose limits on the fertility of ES (Winthrop, 2014) but in this case the exposed “culturality” of ES related to the socio-ecological processes (Pröpper & Haupts, 2014) of streamflow provides a framework for integration in assessment (Scholte et al., 2015). The rich qualitative data provided by this research suggests the potential for successful bioregional planning and policy (Gaber & Gaber, 2007) and supporting the bioregionalism of this community increases the potential power of these plans (Thayer, 2003). But, disproportional political position, tied to historical connections between people and place, negatively affects prospects of adaptation (Hamilton et al., 2014). This exploratory research, however, presents the possibility *to create* one SRB bioregion by extending endogenous social capital connections exogenously to the other municipalities.

## 7.4 Bioregional Planning in the SRB

Social capital increases the adaptive strength of a community network (Eklinder-Frick et al., 2011) measurably related to both ES and place (Raymond et al., 2009). However, the power of social capital remains complex, and potentially negative as well (Ishihara & Pascual, 2009). For instance, the strength of more immediate connections out-competes broader-based social capital connections (Putnam, 2009) and primary social capital connections impede the economic prosperity of communities (Banfield, 1958).

In “New West” economies, resource dependency and identity often leads to territorialism and in-group / out-group behavior as the other side of the bioregional coin (Proctor & Berry, 2011). Although this phenomena occurs in the SRB, the strength of the BI across the SRB provides a potential solution: properly facilitated appreciative inquiry that brings stakeholders together on the basis of value alignment could dramatically improve the ability for these diverse groups to collaborate across political borders (Cooperrider & Srivastva, 1987) within the SRB. By demonstrating to SRB residents their similarities, this research could constitute common ground for next steps in the creation of a bioregional plan (Brunckhorst, 2013) for the SRB.

Engaging residents as bioregionally aligned according to their shared BI is the first step to building connections between municipalities (Flint, 2010). Then the strength of social capital connections can potentially grow *in the context* of environmentally explicit planning (Pronyk et al., 2008) where members identify a commonly-agreed goal and work towards it (Cooperrider & Srivastva, 1987). Based on these data, that goal would at least incorporate increasing the visibility of each municipality as a tourist destination. Cooperation between town governance as well as firms in the SARA typology could provide a platform for joint-marketing of the SRB and increase the amount of time tourists *spend* in each municipality. And the success of this voluntary cooperative would create one organization for engaging federal agencies in collaboratively deciding/designing best practices and access to the river’s diminishing returns.

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## Appendix 1 Interview Questions:

1. **Where did you grow up? Tell me the story of how you came to live here.**
2. In your childhood, did you spend time outside? What outdoor experiences did you have?
3. *Can you tell me a little bit about your parents?*
4. *What did your parents do? What about your grandparents?*
5. *Did you know your grandparents well? Can you tell me a little bit about them?*
6. **What do you do for a living?**
7. **What do you do when you are not working?**
8. *What do you do for fun?*
9. Tell me about life in this region? How would you describe it to someone who hasn't been?
10. Do you have any particular memories of this place you would like to share?
11. What do you call this region\*? Can you draw it on this map (give a map to interviewee)?
12. Can you tell me about important places [here\*] and mark them on this map?
13. *What do these places mean to you? Why are they important?*
14. How has [this place\*] changed over time?
15. *How has this place changed since you have been here?*
16. How has the local economy changed, or stayed the same?
17. *What about Tourism?*
18. Have you noticed a change in precipitation patterns?
19. Please tell me about dry years and wet years living [here\*].
20. What about seasons? What are they like? Have they changed?
21. *Are there any other ways the region has changed physically? Tell me about that.*
22. How does the river affect life here?
23. Are there any events related to the river that you particularly remember?
24. How important is the river to you personally? *Why or why not?*
25. Is the river more or less important to you now than it used to be? *Why?*
26. How do you anticipate changes in the river's stream flow might affect your life?

## Appendix 2 Place attachment Questionnaire:

1=strongly disagree 2=disagree 3=neither agree or disagree 4=agree 5=strongly agree

1. What happens in this region is important to me  
1            2            3            4            5
2. I feel attached to this region  
1            2            3            4            5
3. This region is a special place  
1            2            3            4            5
4. I would like to make this region a better place to live  
1            2            3            4            5
5. I identify with this region  
1            2            3            4            5
6. Living here says a lot about who I am  
1            2            3            4            5
7. I spend a lot of time in the natural environment of this region  
1            2            3            4            5
8. I feel I belong here  
1            2            3            4            5
9. I live here because my family lives here  
1            2            3            4            5
10. This region is the best place for what I like to do  
1            2            3            4            5
11. The groups that I belong to can only exist in this region  
1            2            3            4            5
12. What I can do in this region is important to me  
1            2            3            4            5
13. My job directly relies on this area as a region  
1            2            3            4            5

## Appendix 3 Code Book:

Code	Description	Numerical Code
IN	Interviewee number	Sequential
WDYGU	Where did you grow up? Tell me the story of how you came to live here.	Variable
WDYGU2	Grow up in Salmon River Basin?	1=yes 0=no
TOiC	In your childhood, did you spend time outside?	1= yes 0= no
WOE	What outdoor experiences did you have?	1= river experience 0= no river experience response
WDYD1	What do you do for a living? Part 1	What?
WDYD2	What do you do for a living? Part 2	1= river related 0= not river related
DWnW1	What do you do when you are not working? Part 1	1= river related 0= not river related
DWnW2	What do you do when you are not working? Part 2	1= Rafting 2= Fishing 3= Kayaking 4= Enjoying river aesthetics 5= Not river related 6= Jet Boat
LitR	Tell me about life in this region? How would you describe it to someone who hasn't been?	1= river related 0= not river related
PMotP	Do you have any particular memories of this place you would like to share?	1= river related 0= not river related
WDYcTR	What do you call this region*?	1= Salmon River related 0= Not Salmon River related
IPHoM	Can you tell me about important places [here*] and mark them on this map?	1= Salmon River related 0= Not Salmon River related
WdtPM	<b>What do these places mean to you? Why are they important?</b>	1= Enjoyment 2= Job 3= Family 4= Spiritual 5= Traditional/Memory

PCOT	How has [this place*] changed over time?	1= Salmon River related 0= Not Salmon River related
LECoN	How has the local economy changed, or stayed the same?	1= Salmon River related 0= Not Salmon River related
WaT	<i>What about Tourism?</i>	1= Salmon River related 0= Not Salmon River related
TUoD	<i>Has tourism increased or not?</i>	1= Yes 0= No
CiPP	Have you noticed a change in precipitation patterns?	1= Salmon River related 0= Not Salmon River related
WYaDY	Please tell me about dry years and wet years living [here*].	1= Salmon River related 0= Not Salmon River related
WaS	What about seasons? What are they like? Have they changed?	1= Salmon River related 0= Not Salmon River related
RCP	Are there any other ways the region has changed physically? Tell me about that.	1= Salmon River related 0= Not Salmon River related
HDtRaLh	How does the river affect life here?	1=Economy 2=culture 3=ecology 4=socially 5=politically 6="everything"
HlitR	How important is the river to you personally?	1= is 0= isn't
MoLI	Is the river more or less important to you now than it used to be?	1= More 2= Less 3= Niether more nor less
CiRSF	How do you anticipate changes in the river's stream flow might affect your life?	1=bad 0= good/no affect
LBotR	Do interviewees use "life blood of the region" or similar phrase?	1= yes 0= no
MAP	Is the map they draw based on the Salmon River as a bioregional feature?	1= yes 0= no

IncRig	Include other Riggins?	1= yes 0= no
IncStan	Include Stanley?	1= yes 0= no
IncSalm	Include Salmon?	1= yes 0= no
STAKEHOLDER	Preliminary grouping	1= Rancher 2= Indian 3= Rafting guide 4= Local business owner 5= Town politician 6= Retired 7= Lifelong 8= New resident 9= Seasonal 10= Logger 11=Government employee
NOTES	Anything interesting...	
Indigenous	Indigenous?	1=yes 0=no
Region	What region	1=Riggins 2=Fort Hall 3=Stanley/challis 4=Ketchum 5=Salmon
Residency	Type of residency	1=lifelong 2=new resident 3=seasonal
SBOwner	Small business owner?	1=yes 0=no
JOB	Type of job	1=Resource/rancher 2=rafting/outfitter/guide 3=retired 4=government emp. 5=restaurant/bar 6=retail/hotel 7=local public employee 0=other
Politician	Local politician?	1=yes 0=no

## Appendix 4 Interview Letter:

Date

Dear {{firstname}},

I am a Student at the University of Idaho College of Natural Resources. I am helping conduct research about the value of the Salmon River. In order to understand the value of this resource I am conducting a survey with companies that use or rely on the Salmon River, such as yours.

I understand that there are many demands on your time, which is why we designed the survey to take as little time as possible. Although no specific information is required it is important that responses accurately represent your experience. This information provides an important contrast with larger economic information about the region.

If you have any questions about my research I am happy to talk with you via email or phone. This research has been awarded a Berklund Assistantship on the basis that it directly involves and supports local communities. Even if you or your company doesn't reside in the area your company benefits the regional economy.

I am using this information for my Undergraduate Thesis with the guidance of a Graduate student who is also using the information for his Master of Science Thesis. Neither of us expect to have any direct financial gains from this research. If you have any questions about funding, or how we are conducting this research you may contact me via email.

I will follow up this letter with a phone call or email in the coming weeks as well. Of course, if you are unable or unwilling to participate in this project that decision will have absolutely no effect on your relationship with the University of Idaho in any way and I apologize for any inconvenience.

Our supervisor is Dr. Tamara Laninga if you would like to contact her for my information: [laninga@uidaho.edu](mailto:laninga@uidaho.edu)

Sincerely,

Brett Alan Miller, MS candidate, College of Natural Resources  
[Mill6230@vandals.uidaho.edu](mailto:Mill6230@vandals.uidaho.edu)  
Cell: 978-807-4787  
Conservation Social Sciences Department  
University of Idaho  
Moscow ID 83844-1110



## Appendix 5 Institutional Review Board Exemption:

To: Tamara Laninga

From: Traci Craig, Ph.D.,  
Chair, University of Idaho Institutional Review Board  
University Research Office  
Moscow, ID 83844-3010

Date: 6/10/2014 10:03:41 AM

Title: Assessing the Economic and Symbolic Value of Stream Flow in the Salmon River Basin, Idaho

Project: 14-285

Certified: Certified as exempt under category 2 at 45 CFR 46.101(b)(2).

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

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

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

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

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

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

Traci Craig, Ph.D.

## Appendix 6      Saturation Form:

### Theoretical Saturation Form

#### Screening questions:

How long have you lived here? \_\_\_\_\_

Part-time or full-time resident? \_\_\_\_\_

Ethnic group: \_\_\_\_\_ Age: \_\_\_\_\_ Married? \_\_\_ Children? \_\_\_ How many?  
\_\_\_\_\_

Income:

Job:

#### Question Answers:

1. Grew up in SRB? \_\_\_\_\_

2. Outdoor time in childhood?

\_\_\_\_\_  
\_\_\_\_\_

3. Parents? \_\_\_\_\_

4. Grandparents? \_\_\_\_\_

5. What do you do when you are not working?

\_\_\_\_\_  
\_\_\_\_\_

6. What is it like to live  
here? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

7. Name of region? \_\_\_\_\_

8. Important places:

○

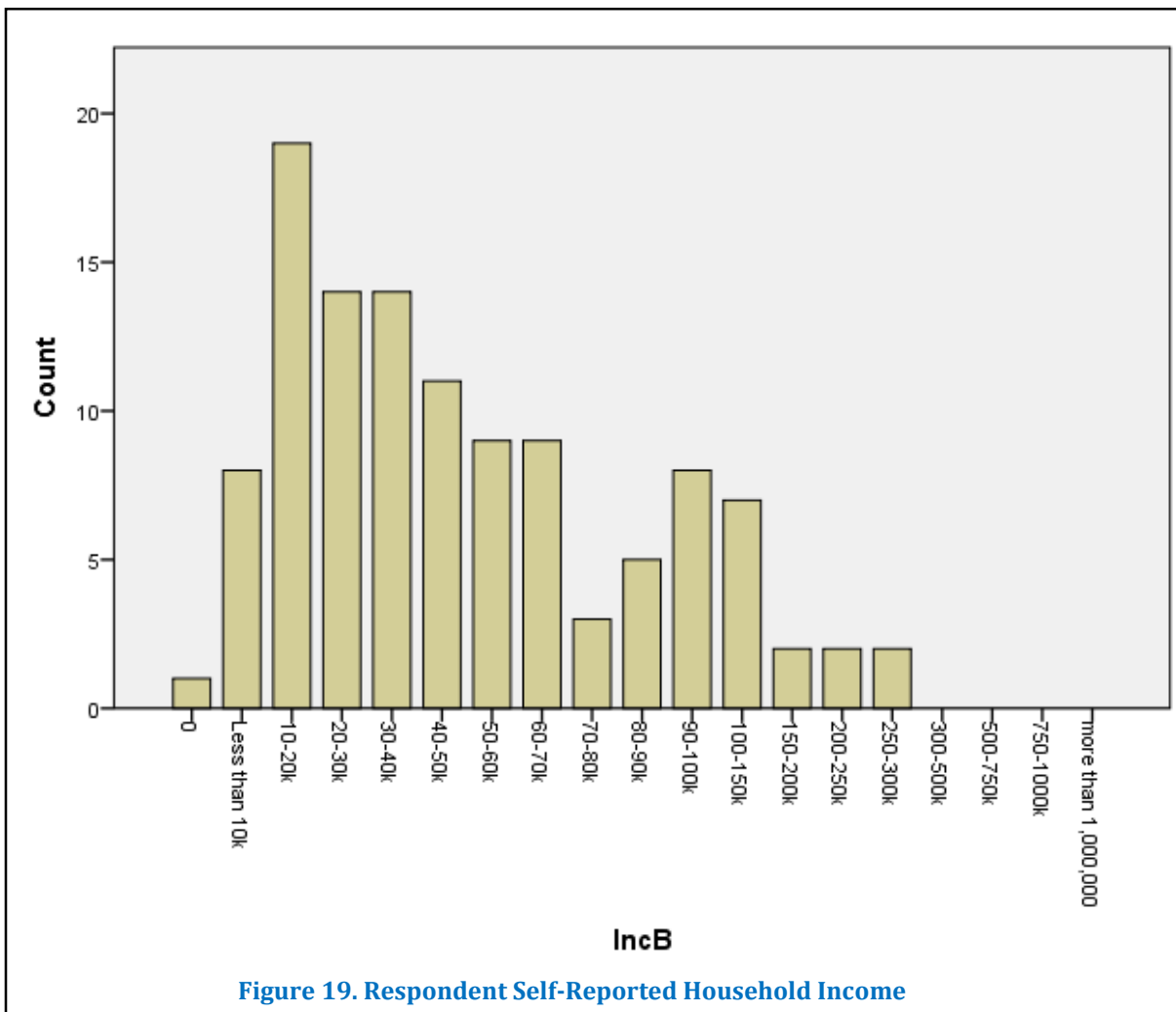
○

○

9. How has [this place] changed over time?  
\_\_\_\_\_  
\_\_\_\_\_
10. Change in precipitation? \_\_\_\_\_
11. Please tell me about dry years and wet years living  
[here\*]? \_\_\_\_\_  
\_\_\_\_\_
12. What about summer and winter? \_\_\_\_\_
13. Do you have any particular memories of [this place\*] you would like to share?
14. How has this placed changed since you have been here? \_\_\_\_\_
15. How has Industry changed, or stayed the same? \_\_\_\_\_
16. What about Tourism? \_\_\_\_\_
17. Are there any other ways the region has changed physically? \_\_\_\_\_
18. How has the river affected your life here? \_\_\_\_\_
19. Are there any events related to the river that you particularly remember?
20. Is the river more or less important to you now than it used to be? Why?
21. What does "salmon river basin" mean to you?
22. Notes:

**Appendix 7 Supplemental Data on Population Sample:**

<b>Table 19. Sample Occupation Distribution</b>			<b>N</b>	<b>Percent</b>
Factor	Job	Other	16	13.3%
		Resource dep./rancher	8	6.7%
		Rafting/outfitter/guide	22	18.3%
		Retired	21	17.5%
		Fed. government employee	17	14.2%
		Restaurant/bar	15	12.5%
		Retail/hotel	7	5.8%
		Local public employee	14	11.7%
<b>Total</b>			<b>120</b>	<b>100.0%</b>



**Figure 19. Respondent Self-Reported Household Income**

## Appendix 8      Effect of SARA Impact:

Table 20. Impact of 5% and 20% reduction of SARA on SRB economy	5% Reduction		20% Reduction	
	Employment Impact	Base Impact	Employment Impact	Base Impact
114 Fishing- Hunting & Trapping	-17.56	\$ (96.85)	-70.25	\$ (387.40)
312 Beverage & Tobacco	-5.89	\$ (138.08)	-23.56	\$ (552.32)
712 Museums & similar	-3.54	\$ (54.69)	-14.17	\$ (218.77)
445 food & beverage stores	-70.71	\$ (198.61)	-282.83	\$ (794.43)
447 Gasoline stations	-140.74	\$ (637.50)	-562.95	\$ (2,549.99)
448 Clothing & accessories stores	-17.59	\$ (103.00)	-70.36	\$ (411.98)
451 Sports- hobby-book & music stores	-27.34	\$ (108.37)	-109.35	\$ (433.49)
452 General merchandise stores	-110.36	\$ (354.52)	-441.42	\$ (1,418.09)
453 Miscellaneous retailers	-13.01	\$ (218.32)	-52.06	\$ (873.29)
483 Water transportation	-1.89	\$ (55.30)	-7.54	\$ (221.20)
485 Transit & ground passengers	-30.83	\$ (201.26)	-123.33	\$ (805.04)

487 Sightseeing transportation	-34.62	\$ (442.93)	-138.47	\$ (1,771.71)
531 Real estate	-41.22	\$ (14,560.80)	-164.87	\$ (58,243.22)
532 Rental & leasing services	-28.08	\$ (268.93)	-112.32	\$ (1,075.72)
712 Performing arts & spectator sports	-23.99	\$ (838.12)	-95.96	\$ (3,352.50)
713 Amusement-gambling & recreation	-174.36	\$ (927.95)	-697.43	\$ (3,711.80)
721 Accommodations	-181.15	\$ (1,105.94)	-724.60	\$ (4,423.75)
722 Food services & drinking places	-429.69	\$ (2,165.63)	-1718.76	\$ (8,662.53)
811 Repair & maintenance	-129.37	\$ (1,020.36)	-517.49	\$ (4,081.43)
812 Personal & laundry services	-29.96	\$ (770.37)	-119.84	\$ (3,081.48)
814 Private households	-64.29	\$ (152.11)	-257.17	\$ (608.45)
<b>Total Impact</b>	<b>-1,576.18</b>	<b>\$ (24,419.64)</b>	<b>-5,989.48</b>	<b>\$ (92,794.63)</b>
<b>Out of SRB Total</b>	<b>14,554.91</b>	<b>\$ 1,869,646.08</b>	<b>14,554.91</b>	<b>\$ 1,869,646.08</b>
<b>Percentage of Effect</b>	<b>-11%</b>	<b>-1%</b>	<b>-43%</b>	<b>-5%</b>

## **Appendix 9      Notes on SAM Construction and Reporting:**

For this analysis, results from the three county SAM were reported. However, important differences between the two-county SAM and three-county SAM exist and comparing them provides illuminative descriptive statistics of the region. In the two county SAM, Lemhi and Custer County generate a total \$909,245,000 of revenue whereas Lemhi, Custer and Idaho County taken together in the three-county SAM generated a total of \$1,869,649 in 2012. In terms of jobs, 6,708 jobs exist in Lemhi and Custer County alone as compared to 14,555 jobs in the three-county SAM. Although this one million dollar and 7,847 job difference appears drastic, the base percentages between the two SAMs remain similar enough that utilizing the three-county SAM is appropriate. For instance government expenditures account for 12.2% of the economic base in the three county SAM and 12.1% in the two-county SAM. For most of this analysis numbers will be reported as percentages rather than dollars since this percentages establish a more accurate and relevant metric related to economic bases, by definition percentage. Looking at the percentage contribution of NAICS to the SRB FEA, important difference emerge between the two-count and three-county SAM.

### **Differences between Three-County and Two-County SAM**

For instance, including Idaho County reduces the base contribution of Mining from 24.5% to 14.1% because of the high concentration of Mining in both Lemhi and Custer County comparatively. Another important difference includes a 1.7% base contribution from truck transportation in the three-county SAM as compared to .7% for the two-county SAM, which reflects the importance of trucking for the economic base of Idaho County that isn't true for the rest of the SRB. However, Management of Companies, which accounted for 3.8% of the economic base in the two-county SAM but only .2% of the economic base for the three-county

SAM, presents the most significant inaccuracy presented by using the three-county SAM. Unlike Mining and Truck Transportation, this difference presents a serious inaccuracy.

To a lesser a degree, Accommodations probably represents closer 1.7% of the economic base for the SRB FEA, as it does for the two-county SAM, but including Idaho County reduces the reported base contribution of Accommodations to 1.2%. This difference is of particular importance because Accommodations are one of the important streamflow effected tourist activities in this analysis so this difference needs consideration in results. However, most SARA have very similar economic base contributions in both the two-county as well as three-county SAM, as seen in table X, and where there is divergence including Idaho County understates the importance of these sectors. In the end including I elected to focus on the three-county SAM for the overall utility of this model.

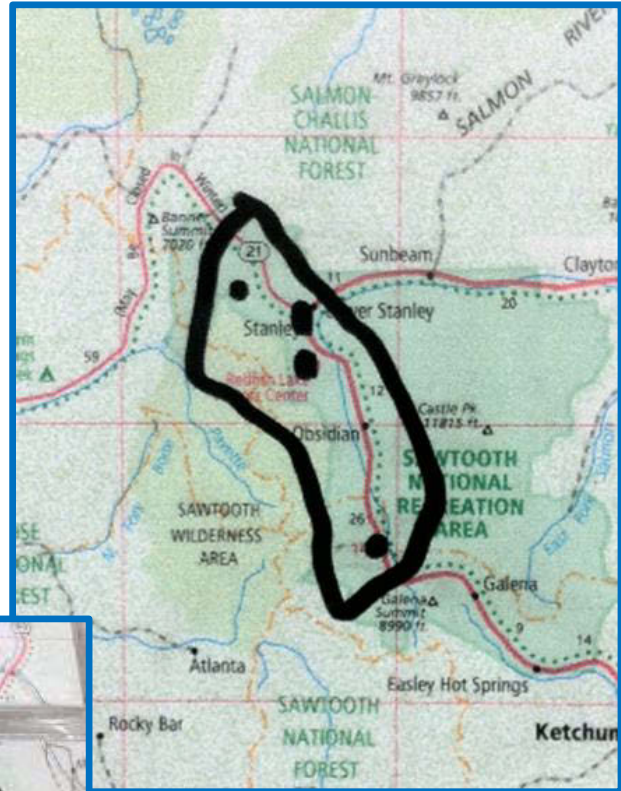
### **Sightseeing Transportation**

The most important Including Idaho County allows the three-county SAM input/output analysis to include one very importance economic activity: Sightseeing Transportation, which accounts for .5% of the economic base of the SRB FEA according to the three-county SAM. This NAICS code is important because this is where day-trip rafting companies are listed. However, the two-county Sam completely excludes this sector for two reasons. First, many of the rafting companies in Custer and Lemhi County are actual headquartered in places outside the SRB such as McCall or Boise, Idaho, or even outside the state entirely. Second, those that are headquartered in Salmon or Stanley are too few to be reported in a two-county analysis due to the relative size of the economies of Lemhi and Custer County. It's for these reasons that including Idaho County allows much more robust economic analysis that potentially reduces the relative importance of this analysis, thus making results more conservative as well as more accurate.

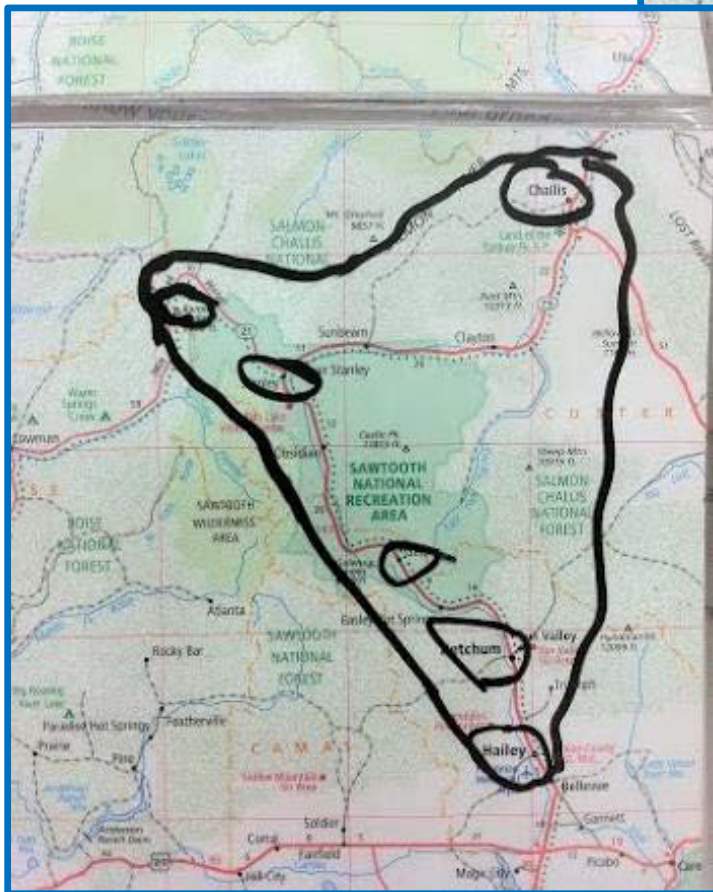


## Appendix 10 Supplemental Maps:

### Politician Maps



Map 8 (STN\_18, 2014) Police Officer map of his own jurisdiction



Map 9 (STN\_13, 2014) Map includes political designations of personal importance



**Map 10 (STN\_18, 2014) Local politician map showcasing The River**

### Rancher Maps

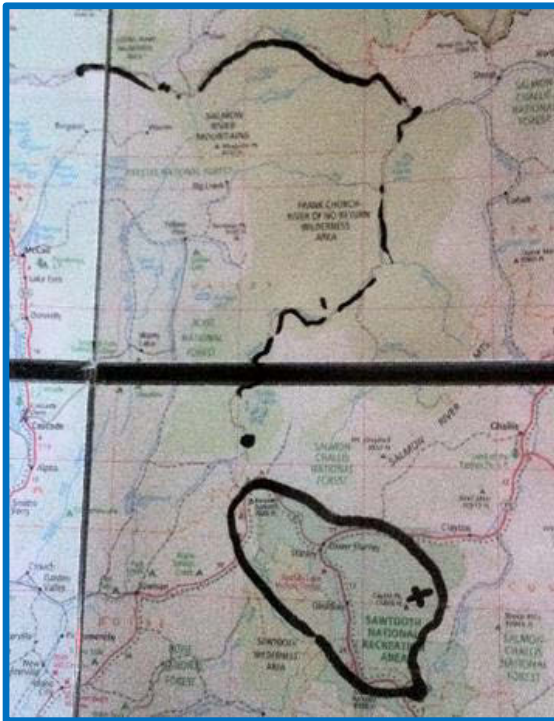


Map 11 (STN\_32, 2014) Map of the immediate area drawn by a Rancher in Stanley

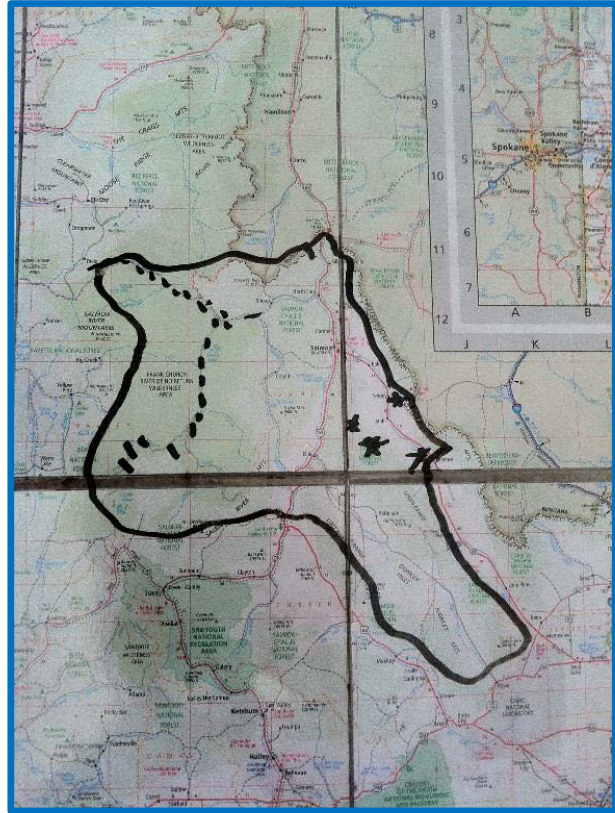


Map 12 (STN\_20, 2014) Rancher map showing rivers as well as ranch off of East Fork

**Raft Guide Maps**



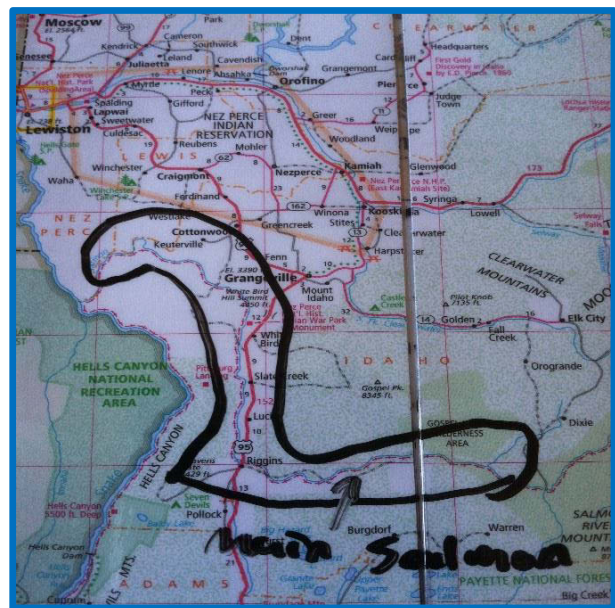
**Map 13 (STN\_7, 2014) Map with Middle Fork drawn through the Wilderness but excluding Riggins (and Salmon)**



**Map 14 (SLM\_14, 2014) Rafter map drawn in Salmon, including Middle Fork but excluding Stanly (and Riggins)**



**Map 15 (SLM\_3, 2014) SRB watershed minus Stanly and Riggins**

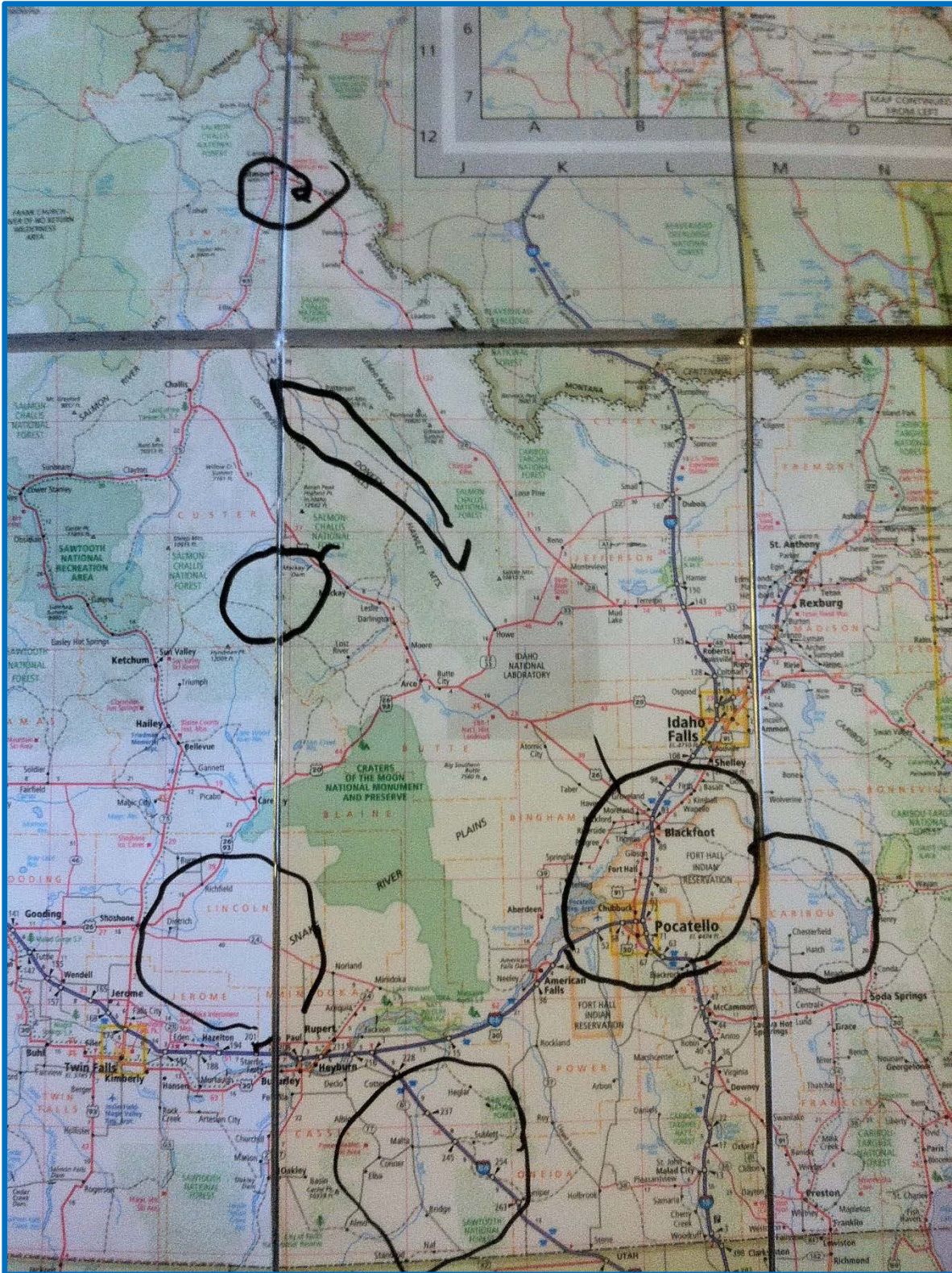


**Map 16 (RIG\_10, 2014) Map of "this region" highlighting the Main Salmon from the wilderness through the day stretch near Riggins**

## Native American Maps



Map 17 (FTH\_2, 2014) Map drawn by Lemhi Shoshone woman thoroughly labeling important areas throughout the lower Idaho region



Map 18 (FTH\_1, 2014) Map drawn by Shoshone-Bannock woman who grew up outside of Salmon, Idaho but lives in the Ft. Hall Reservation now