Water Management and Structuration Theory: A Case Study in the Coeur d'Alene, Idaho –

Spokane, Washington Region


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## Authorization to Submit

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## Abstract

There is a lack of understanding about how the interplay between individual actions and social structures informs water management practices. While Structuration Theory provides a holistic examination of individual and structural levels, it is not robustly applied in water management settings. Such an integrated understanding is critical when water crosses jurisdictions and management responsibilities are fragmented among organizations. This situation exists in the case study area, the Coeur d'Alene, Idaho—Spokane, Washington region. Primary qualitative data were collected through interviews with water management, use, allocation, and protection actors. Snowball sampling generated this interview sample. An interdisciplinary component integrated hydrology, environmental science, and engineering data to contextualize interviews, frame analysis, and provide biophysical information. Results were analyzed with respect to Structuration Theory's propositions and concepts. Overall, actors realized collaboration's benefits and held pro-collaborative perspectives, but regulations and institutional arrangements constrained collaboration's scope. Thus, collaborative behaviors were limited to data collection and sharing, capacity building, and relationship development. Norms, state, tribal, and federal regulations, and the differences between Washington and Idaho water management institutions were important components of the water management system. Even with trends towards collaboration and strategic, context-appropriate management behaviors, social structures informed behavior more than actors affected them. This study demonstrated Structuration Theory's explanatory value in framing and understanding complex water management systems. This successful application argues for the appropriateness of and need for enhanced empirical use of Structuration Theory within water management research.

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## Chapter I: Introduction

**Background**

Groundwater and surface water are dynamic and variable, readily flowing across political and jurisdictional boundaries imposed on landscapes. Successfully managing water resources within and across such boundaries is both challenging and necessary to accomplish at all scales of governance. Boundaries not only include political borders, but also those delineating jurisdictional control, such as an organization's geographic boundary or managerial scope. This transboundary sharing of water is extensive. Internationally, there are approximately 260 river basins and 270 aquifers shared by two or more countries (Sivakumar, 2011). In the United States (U.S.), dozens of principal aquifers reside under two or more states, while lakes and rivers, as well as their tributaries, stretch easily across county and state borders (U.S. Geological Service, 2005; 2014). Thirty-two domestic rivers extend for more than two hundred miles in length, some up to thousands of miles, and drain basins encompassing thousands of square miles (U.S. Geological Service, 2005).

The management of water includes not only controlling quantity and flow, but also regulating and protecting quality, providing water for municipal, commercial, and agricultural purposes, ensuring access for recreational, spiritual, or cultural uses, and meeting environmental and wildlife needs. In the U.S., each of these tasks is subjected to complex management frameworks and institutional arrangements, where power and responsibility are fragmented among organizations at local, state, and federal levels (Feldman, 2007; Gerlak, 2008). Water is associated with identity, an individual's connection to broader society, emotions, experiences, social discourse, and cultural significance (Leybourne & Gaynor, 2006). The control and ownership of water can result in political and

economic power, and how water is productively used is tied to survival and social success (Leybourne & Gaynor, 2006). These associations complicate water's meaning and place in society. Water cannot always be treated solely as a commodity or consumptive resource and must be managed accordingly. Adding to this complexity, water is subjected to diverse management arrangements and associated contextualizing factors like demographics, economics, social norms, and political attitudes as it flows across borders. Ultimately, while water is often a source of conflict, it also can be a basis for cooperation and facilitating shared visions for management that help overcome political barriers (Uitto & Duda, 2002).

When consideration water resources in general, there is significant uncertainty about current water quantity and demand, how quantity and demand change with time and the needs of society, and how future conditions, like climate change or population growth, will affect water resources (Loucks, 2011; Sivakumar, 2011). Characteristics of complexity and uncertainty frame the contexts managers work within, and the challenges they must consider to create socially and environmentally appropriate practices. Addressing water management issues through an integration of knowledge involving multiple agencies, perspectives, and partnerships is an arguably valid and appropriate approach to pursue (Freeman, 2000; Smith & Porter, 2010).

However, there can be numerous barriers when changing current bureaucratic arrangements, built on fragmented jurisdictional authorities, to making management approaches more adaptive, collaborative, or larger in geographic scale (Allan & Curtis, 2005; Kilot, Shmueli, & Shamir, 2001; Kwon & Feiock, 2010; Mitchell, 2005). Considerations include the characteristics of existing management practices, institutions, norms, political commitment, and requirements to structure power, involvement, and

responsibility in ways representative of the social setting and affected population (Allan & Curtis, 2005; Leach, 2006; Lockwood, Davidson, Curtis, Stratford, & Griffith, 2009; Uitto & Duda, 2005). While there is intellectual and applied momentum for the establishment of formal, large-scale management systems, such considerations mean there is pragmatic value in understanding how actors work, including the extent and nature of collaboration, within existing bureaucratic frameworks to meet management goals. Structuration Theory (ST) possesses the theoretical framework and empirical approach that is practically suitable and explanatorily valuable to gaining such an understanding.

Structuration Theory, which holistically examines social systems at both the individual, micro-scale of human agency and the collective, macro-scale of structure (Giddens, 1984), is an ideal theoretical framework for evaluating a transboundary, institutionally complex water management setting. Structuration Theory's application is appropriate in situations where both agency and structure have legitimacy, power, and relevance to the design and function of the overall social system being studied.

In ST, individual actor behavior, like management decisions or collaborative action, is informed by broader social structures, which include regulations, social norms, and institutional arrangements. This relationship is not one-way. Actors can affect structures, so the overall relationship between the two is dynamic, recursive, and inter-dependent (Giddens, 1984). Anthony Giddens, who developed ST, argues actor behavior and structures are not independent from the other, actor behavior either changes or perpetuates structures, and thereby is integral to their existence and evolution (Giddens, 1984). Actor behavior is critical to understanding how existing social structures inform and constrain what is possible

in water management, and how structures are affected by such behavior might change through time.

**Problem Statement**

Structuration Theory (ST) has not been robustly utilized in water management studies. While it has been applied to other natural resource management settings, this use has been limited in scope, meaning, and depth. There is both a theoretical and practical need to fill this gap. Structuration Theory has demonstrated explanatory value in other settings involving complex interactions between individuals and social structures, such as studies of organizations (Groves, Meisenbach, & Scott-Cawiezell, 2011; Jones & Karsten, 2008), inter-organizational relationships (Alexander, 1998), and actor influence on social processes (Chang, 2014). When the concept of "water management" is broken into core components it is a collection of organizations, institutions, and actors that interact to create, implement, enforce, replicate, or change policies, laws, and practices to meet specific needs. These attributes are reflected in the other disciplines, particularly organizational studies, where ST is routinely and successfully applied. The lack of ST's productive and rigorous use in natural resource management is noticeable and problematic.

Theories commonly utilized in natural resource management research often do not systematically possess a robust holistic perspective that links and examines both the individual and social scales. As simplified examples of other theories commonly utilized in natural resource management: collective action theories explore how and why actors work together (Lubell, 2003; Ostrom, 2000), network theories concentrate on understanding the structure and characteristics of relationships among actors (Bodin & Crona, 2009), and social-ecological theories strive to inform management practices that respect ecological

integrity while meeting human needs (Yaffee, 1996). These- theories do not necessarily focus exclusively on the individual or the collective scales, but do tend to emphasize one. Water management practices are complex. The individual and collective scales cannot be evaluated separately if an integrated and complete understanding of a water management system is to be gained. This reinforces the practical problem of ST's underutilization in the water management discipline and informs the purpose of this study.

**Purpose**

This dissertation uses ST as a framework to evaluate and understand a case study's water management system. This includes making a theoretical contribution by generalizing findings about ST's empirical usefulness when applied to a water management setting. As described in the Case Study Description section, this region, between and around Spokane, Washington (WA) and Coeur d'Alene, Idaho (ID), is marked by social complexity and an abundance of water resources. This dissertation's practical purpose is to reveal how actors in the case study region work within existing legal, political, and social structures to both meet internal organizational needs and address broader concerns with external actors. This arose from a need to better understand how actors met water-related social and environmental needs within this jurisdictionally fragmented region. The ultimate goals are to gain a detailed, descriptive understanding of the water management situation and tie findings back into the larger body of knowledge about ST's empirical application and explanatory power. These theoretical and practical purposes inform research questions and are the categories of inquiry this study addresses.

**Research Questions**

1. How do water management structures shape actor behavior, and are in turn, influenced by that behavior?

    a. What are the most significant and relevant structures that either enable or constrain actor behavior?

2. What behaviors are actors engaging in to meet management goals?

3. Is management behavior creating effective systems to deal with water-quantity management needs at a regional scale?

    a. What are the actor-identified barriers to achieving effective collaboration in the region?

    b. How do actors seem themselves in the region? Do they have already a regional perspective that influences their management decisions and behavior?

4. Can Structuration Theory prove to be an explanatorily beneficial (that is, valuable and appropriate to explaining the research-identified phenomena and processes) framework to examine the water management system in the region?

    a. What aspects are constructive and productive from an explanatory and practical perspective?

    b. What aspects either refute or support ST as a theoretical perspective?

**Methodology Overview**

Before introducing the research's methodology, it is important to describe briefly the researcher's disciplinary and epistemological perspectives. The disciplinary perspective informs all stages of the research, including assumptions, unit of analysis, data collection and analysis approaches, defining truth and validity, and the use and definition of concepts and key terminology (Miller & Mansilla, 2004). The researcher's disciplinary perspective is grounded in the social sciences, and focused on understanding subjective individual experiences, the design and function of broad social systems, and the relationship between these two scales. The social science disciplines assume that "human behavior is patterned, lawful and principled" (Repko, 2009, p. 78). Relatedly, interpretivst epistemology holds that the world is socially constructed, that subjective interpretation is necessary to understand phenomena, and there is no true objective analysis of information (Repko, 2008 p. 93). As described below, Structuration Theory (ST) is the theoretical framework informing this research, and so further refines the research process, intellectual perspectives, and terminology. How the interdisciplinary component of this research was organized and integrated is described below.

This dissertation research is fundamentally a case study. The case study methodology utilizes in-depth investigations to study social phenomena in a contextualized, holistic way (Patton, 2002; Outhwaite & Turner, 2007, p.111). Case studies are appropriate to use when the researcher is interested in asking "how" and "why" questions, when contemporary events are being studied, and when the researcher has little or no control over the situation (Yin, 2003). All three conditions are present in this research situation. Single case studies are appropriate to use when examining how people frame and solve problems,

when the case represents either a unique or a representative situation, or there is a place for testing theory (Barzelay, 1993, p. 305; Yin, 2014). This research is a single case study design, where the case was chosen for its unique social and environmental characteristics and its appropriateness for testing ST.

Structuration Theory frames the research's overall conceptualization and guides the research questions, data collection process, and data analysis. Though the research design and methodology are primarily qualitative, an interdisciplinary perspective is maintained through all research stages. Primary data were collected through interviews with knowledgeable actors in the region, and interviewees were selected through snowball sampling. The interview instrument was a set of semi-structured questions, which allows for consistency among interviews as well as spontaneity within individual interviews. Interdisciplinary data were collected through secondary sources: documents and websites.

The dissertation's interdisciplinary component follows the definition that interdisciplinary research draws on concepts, methods, data, or perspectives from two or more scientific disciplines or forms of knowledge, integrates that information, and forms a new, whole result (Repko, 2008). Quantitative data are taken from the hydrology, engineering, and environmental science disciplines. The law and planning professions provide social information scaled-up from the behavior-level management practices studied through interviews. As a form of integration, this social and quantitative data contextualize and inform the interview questions and process, data analysis, and evaluation of results. Interview results are analyzed qualitatively, where quotes are used to illustrate how findings related to research questions and ST's concepts and propositions. Overall, this methodological approach contributes to an efficient research process and leads to the

creation of robust results effectively illustrating ST's value for explaining and understanding this water management system.

**Case Study Description**

**The Issue**

The fundamental issue being studied is how water management actors are working within a jurisdictionally fragmented and institutionally complex region to effectively manage groundwater and surface water for social and environmental use. This issue relates to the hydrologic complexity of the region, where there are abundant surface water resources and a significant groundwater aquifer, all of which hydrologically interact and provide a diverse range of services for the local, growing population. The case is appropriate to use with ST as it includes significant components at both the individual agency level and the broader social level. Neither the behavior of individual actors nor the contextualizing framework of social factors, including social norms, institutions, organizations, and regulations can be overlooked when trying to understand how actors are working to manage a complex hydrological system. As the following description illustrates, this contemporary issue is rooted in both historic and current social and environmental conditions.

The case study's geographic location is in northwestern Idaho (ID) and northeastern Washington (WA). Idaho's Lake Pend Oreille bounds the region to the northeast, Lake Coeur d'Alene to the southeast, and the city of Coeur d'Alene marks the eastern edge. In WA, the Spokane Tribe of Indians' reservation is the western boundary, with Spokane County and the cities it encompasses of primary concern. Cities include Post Falls, Rathdrum, and Hayden in ID and Spokane, Liberty Lake, and Spokane Valley in WA. Figure 1 is a map of the case study region.
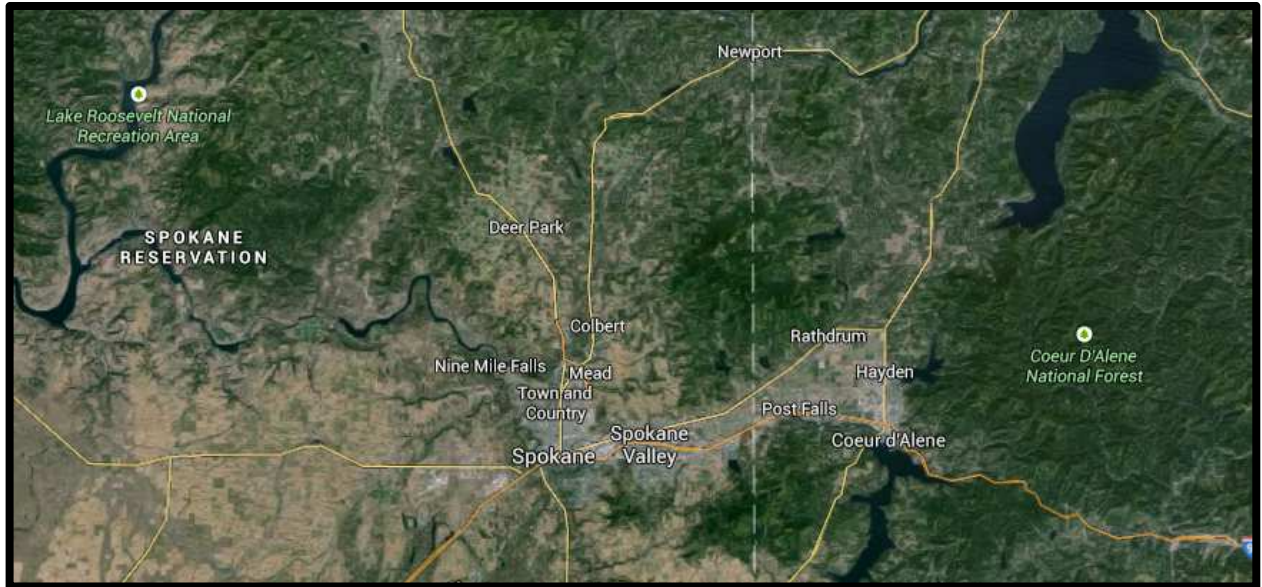
**Figure 1**. Map of Case Study Region in Northern Idaho and Eastern Washington (Google Maps).

**Hydrologic System and Contemporary Issues**

This region has abundant surface water and groundwater resources. The most relevant water bodies are the Spokane Valley-Rathdrum Prairie Aquifer (SVRPA), Lake Coeur d'Alene, Lake Pend Oreille, the Spokane River, and Lake Spokane. In Figure 1, Lake Pend Oreille is visible in the top right corner and Lake Coeur d'Alene in the bottom left. The Spokane River originates at Lake Coeur d'Alene and flows along the I-90 corridor, through the Spokane and the Spokane Tribe of Indians' Reservation. Lake Spokane is located upstream of Long Lake Dam, just before entering the Spokane Tribe of Indian's reservation.

Both water quantity and quality conditions are management concerns. Water quality issues, particularly regarding surface water pollution and the prevention of groundwater contamination were prominent in this study. Though the region currently possesses abundant water resources and has no imminent shortages, quantity issues are relevant and of increasing importance. There are seasonal fluctuations in surface flow, the need to quantify

groundwater and surface water supplies, uncertainty about the allocation of water between ID and WA, and concerns about promoting wise use and conservation.

The hydrologic system centers on the SVRPA. This aquifer underlies the Rathdrum Prairie region between Coeur d'Alene and Spokane, encompassing a total of 370 square miles: 250 in ID and 120 in WA (Idaho Department of Water Resources (IDWR), 2009). Comprised primarily of cobbles, gravel, and boulders, the aquifer is highly permeable and allows water to flow relatively easily, up to 22,000 feet per day (Idaho Department of Environmental Quality (DEQ), 2015a). The SVRPA's average outflow is 946 million gallons a day, with an average inflow of 951 million gallons per day (IDWR, 2009). As an unconfined aquifer, the groundwater readily interacts with land and surface water resources, creating an integrated water system susceptible to contamination and changes in environmental conditions (IDWR, 2009). The SVRPA water is pristine, requiring no or minimal treatment before human use. Conversely, the region's surface waters all have significant pollution issues.

Originating at Lake Coeur d'Alene, the Spokane River flows for 111 miles before joining the Columbia River system at Lake Roosevelt (Washington Department of Ecology, (DOE) n.d.) The Spokane River interacts extensively with the SVRPA, by both losing water to and gaining water from the aquifer as it flows. In ID, the Spokane River consistently loses water to the SVRPA, while the process is more dynamic in WA, with alternate stretches of losing and gaining reaches (IDWR, 2009). This groundwater-surface water interaction has implications for issues including groundwater extraction patterns and potential contamination of the SVRPA. Water in the Spokane River violates WA's standards for dissolved oxygen (DO), phosphorus, toxic chemicals, and heavy metals (DOE, n.d.).

Polychlorinated biphenyls (PCBs) are a concern in the Spokane River, as they are ubiquitous in the environment and have potential human health implications (DOE, 2012).

Lake Pend Oreille is ID's largest and deepest lake, with its maximum length at 43 miles, width at six miles, and depth at 1,158 feet (Lake Pend Oreille Idaho Club, 2013). It connects to the SVRPA at its southwestern end (IDWR, 2009). Lake Coeur d'Alene is similarly massive, with a surface size of 32,000 acres and a 150-mile long shoreline (Coeur d'Alene Lake Management Plan (LMP), 2009 p. 5). Both lakes have pollution issues, including phosphorous and nutrient loading, related to runoff from agriculture, logging, pesticide application, and shoreline development (Lakes Commission, n.d.; LMP, 2009). Lake Coeur d'Alene is also contaminated with heavy metals from historic mining in the Silver Valley, located approximately 40 miles upstream (LMP, 2009). This contamination "includes: mercury, copper, silver, cadmium, copper, lead, zinc, antimony, iron, and manganese" (LMP, 2009 p. 8). These metals are primarily bound to the lake's sediments, but can migrate out of the lake's outlets and contaminate other water bodies, including the Spokane River (LMP, 2009).

Washington's Lake Spokane is an artificial reservoir created by Long Lake Dam and has issues with eutrophication and algae blooms that low oxygen availability in the water (DOE 2010). It is located on the Spokane River, and relevant to this case study for its role in affecting upstream water quality standards and wastewater discharge activities. Water quality in Lake Spokane and the Spokane River have been a concern since the 1990s, with the most recent DO Total Maximum Daily Load (TMDL) plan revised in 2010 (DOE, 2010). The TMDL, which is formalized plan to improve water quality, directed reduction in point-source discharge of materials affecting oxygen levels, including phosphorus and

ammonia, into the Spokane River (DOE, 2012). This created bi-state conflict and had implications for the region's economy, water management practices, expensive technology upgrades to wastewater treatment plants in ID and WA, and questions about modeling accuracy and scientific understandings of lake ecology (Spokane River Forum, 2010.). Though significant work on this Dissolved Oxygen (DO) TMDL began in 2010, actors still spoke of the process and its effects during interviews conducted in 2014.

Water quantity issues have generated significant action by both WA and ID. Idaho is in the process of adjudicating its northern basins, encompassing those in the cases study region, to formalize water rights and account for water quantity and allocation in the region (IDWR, 2015). In early 2015, WA established an in-stream flow rule for the Spokane River. This process essentially gave the river a water right, so its flow is protected for ecological and human uses and from impairment by subsequent withdrawals from the river or SVRPA (DOE, 2015). Finally, there is no legal mechanism directing water sharing between the two states. This lack of legal clarity has created uncertainty, conflict, and suspicion between actors in the two states. For example, as Lake Pend Oreille connects hydrologically to the SVRPA, there is concern over a feasibility study evaluating the pumping of lake water into the aquifer for downstream use by WA (Barber et al., 2011).

Such an issue exemplifies broader questions of water possession, power, legal standing, and positions among the relevant entities, particularly between the two states and Native American tribes. As the following description illustrates, the design of the institutional, legal, regulatory, and organizational frameworks greatly shapes how these water-related issues are addressed. The social context of the region, including settlement patterns, population growth, economics, employment, and social norms, are critical to

acknowledge and understand for their role in shaping water management practices and use patterns. Conditions that inform contemporary water management needs, issues, and systems are results of layers of historical actions and events. Thus, it is important to begin with an overview of the region's history to illustrate the foundation and progression of events and decisions that shape the region's contemporary characteristics.

**Historic Conditions**

The broader region around the case study area is the ancestral homelands of several Native American Tribes, including the Coeur d'Alene Tribe, the Spokane Tribe of Indians, and the Kalispel Tribe. In the 1800s, initial settlements by non-natives were sparse but progressed rapidly with the displacement of native populations and the development of agriculture and extractive industries. The Mullan Road, completed in 1861, allowed for a military presence, commerce, and migration into and through the region (Lambeth, n.d.). There was substantial growth in the late 19th and early 20th centuries. Spokane County expanded from a population of 20,055 in 1890 to 55,542 in 1900 (Caldbick, 2010). Kootenai County experienced a similar growth rate, increasing from 10,216 residents in 1900 to 22,747 in 1910 (Forstall, 1995).

In 1883, the Northern Pacific railroad extended into the region, further opening the area up for settlement and the export of timber and mining products (Shellford, n.d.). Spokane quickly evolved into the region's transportation hub and center of wealth (Spokane County, 2010). Extensive timber extraction began in the early 1900s, particularly in the heavily forested areas in ID's Bonner and Boundary counties, on the northern edge of the case study region. For example, the Humbird timber company operated a mill that, in 1907, could produce up to 180,000 board feet of lumber a day, and had 500 employees (Plaster,

1996). One 30-mile radius of forest was estimated to have 500 million board feet of lumber, taking up to 40 years to harvest (Plaster, 1996). In addition to these timber resources, mines in ID's Silver Valley produced extensive quantities of silver, lead, zinc, and copper (Mining History Association, 2011; Marsh, 2015). This region is a significant silver mining area and has produced 1.2 billion ounces of silver since 1882 (Marsh, 2015).

Before irrigation, the region's commercial agriculture focused on relatively small-scale dryland crops for local military personnel and residents (Bell, 1998). By 1889, however, substantial cropland irrigation began and the first irrigation districts were formed to deliver water to farmers (Bell, 1998). Irrigation districts remain important contemporary components of the regional water delivery system. However, as agriculture has declined, most have transitioned to providing water to municipal or domestic users (Spokane Aquifer Joint Board, 2015a).

Dams and their associated hydropower shaped the region's historic and contemporary power production, economies, recreation characteristics, and fisheries. In 1890, the region's first Spokane River dam was built, with six more constructed before 1922 (Harrison, 2008). The dams also ended the region's anadromous fisheries by preventing fish from traveling upriver. Both the Spokane and Coeur d'Alene tribes, as well as others, had historically participated in the river's extensive fisheries (Harrison, 2008).

Water was essential to the region's early development, especially for movement of timber down rivers and across lakes to reach mills, settlements, and transportation (Plaster, 1996). The Spokane River dams produced hydropower, which powered local and regional homes, businesses, and industries (Avista, 2015). Initially, surface water met irrigation, drinking, municipal, and commercial needs. Post Falls established groundwater wells for

municipal use in 1946, with Coeur d'Alene following in 1955 (DEQ, 2015b). The development of groundwater from the SVRPA increased rapidly since the middle of the 20th century, from a 150 wells in 1950 to over 2,200 in 2009 (DEQ, 2015b). The SVRPA is the sole-source of drinking water for around 500,000 residents in the region (IDWR, 2009).

As the region transitioned away from agriculture, mining, and timber in the 20th and 21st centuries, it urbanized and developed. This included economic transitions, as extractive industries declined and the economy became more reliant on businesses, tourisms, recreation, and service-based industries. In the 1970s, concerns about protecting the local water and environmental resources, particularly SVRPA quality, mirrored broader national trends about environmental health. In 1978, the Environmental Protection Agency (EPA) labeled the SVRPA as a sole-source aquifer for drinking water. One result of this designation was transitioning residents away from septic tanks and onto sewers to protect SVRPA quality (IDWR, 2009, p. 2). Such trends have strengthened over the last four decades, with examples of more stringent water quality standards, the implementation of conservation-oriented water management practices, and the protection of water for ecological and wildlife uses.

**Contemporary Conditions**

The contemporary water management framework builds on these historic conditions and reflects the region's social change through the 20th and 21st centuries. Important components of the contemporary case study region are social norms and political culture, demographics of local populations, characteristics of relevant institutional and regulatory frameworks, and the organizations directly involved in the management of water.

Social norms and related political culture inform the broader context in which managers must work and what is possible for them to achieve. In general, North ID is politically conservative, with strong anti-regulation and pro-property rights perspectives. This conservatism developed in the early 1990s when migrants from California settled in the region, citing a desire to escape that state's population growth, recession, and increasing liberalization (Crane-Murdoch, 2013). This became a self-reinforcing trend as these perspectives transferred to political power through elections. In 2014 elections, Kootenai County residents favored Republican candidates, some of which received 60 to 70 percent of votes relative to their Democratic counterparts (Coeur d'Alene Press, 2014).

Washington is liberal in its politics overall, but the eastern half of the state, including the Spokane region, is generally conservative (Webley, 2013). This creates intra-state political tension, but also has significant relevance for water management practices. In general, WA is more conservation-oriented than ID. Such social norms are reflected state-level decision making about water quality standards or protection.

**Demographics**

The region is currently experiencing population growth and demographic change. This growth has been strongest in ID over the last 10 to 15 years. Bonner County, ID has experienced a six percent growth rate from 2003 to 2013, with a population of 40,699 residents in 2013 (Metts, 2015a). Growth in Kootenai County, ID has been more dramatic, with a 23.8 percent increase in residents between 2003 and 2013, and a population of 144,265 in 2013 (Metts, 2015b). Conversely, Spokane County has a higher total population but has recently experienced a lower growth rate. In 2013, Spokane County had 479,398

residents, with 210,721 people residing in the city of Spokane (Tweedy, 2014). In 2000, the county's population was 417, 939 (U.S. Census Bureau, n.d.).

From a water management perspective, these population trends are important for several reasons. They demonstrate the region is growing and existing water supplies must meet the needs of an ever-increasing population. For example, Spokane County is predicted to have more than 500,000 residents by 2030 (WA Department of Transportation, 2015). Employment characteristics are also relevant, as they relate to different demands for and uses of water. The employment profiles of Bonner, Kootenai, and Spokane counties are diverse. In 2013, Kootenai County residents' employment in business, education, health, government, and tourism outweighed those in agriculture and mining (Metts, 2015b). Similar trends exist in Spokane County and Bonner County (Metts, 2014a; Tweedy, 2014).

Water-based recreation is a vital social and economic component of the region and includes fishing, boating, swimming, and water sports. These activities occur on the region's lakes and the Spokane River. Dams constructed along the Spokane River also provide extensive recreation opportunities, adding to their economic and social value for the region (Avista, 2015). Lake Pend Oreille and Lake Coeur d'Alene are integral to their respective communities' social identity and economy. The total economic impact of Lake Coeur d'Alene is estimated at 2.1 billion dollars a year (Selle, 2014).

**Relevant Organizations and Interests**

The current reservations for the Coeur d'Alene Tribe and the Spokane Tribe of Indians border the case study area, and both tribes are active participants in the use and management of water. The Coeur d'Alene Tribe owns the lower third of Lake Coeur d'Alene and participates in the co-management of the lake with the ID DEQ (LMP, 2009).

The Spokane Tribe of Indians is an influential actor, particularly regarding addressing water quality standards for PCBs in the Spokane River (DOE, 2012; Spokane Tribe of Indians, 2010). The Kalispel Tribe are involved in Lake Pend Oreille management and issues (Lakes Commission, n.d.), but were not directly involved in this case study's scope.

As introduced above, the DOE, DEQ, and IDWR are state regulatory agencies integral to the region's water management. Washington has primacy over the Clean Water Act implementation, while ID does not and relies on the EPA for oversight. The EPA has responsibility for specific actions including crafting and issuing NPDES permits for point source discharge, including from wastewater treatment facilities in ID (Russell, 2014).

At the local government level, a diversity of organizations provide water to residents. The larger cities of Spokane, Coeur d'Alene, and Post Falls, have water departments integrated in their city governments. Smaller cities like Hayden and Rathdrum rely on irrigation districts and water purveyors to extract and deliver water. Liberty Lake has a special purpose district, not affiliated with the city, which provides both water delivery and wastewater treatment services for residents. The city of Spokane Valley has a complex mix of special purpose districts, purveyors, and corporations to deliver water (Spokane Valley, 2014). Wastewater treatment plants are especially important organizations, as they are responsible for meeting certain quality standards in the water they discharge after treatment. All of the region's wastewater treatment plants discharge into the Spokane River.

Local and regional non-profit environmental protection groups are also influential in the region. These include Waterkeeper Alliance branches for individual water bodies, including Lake Pend Oreille and the Spokane River, which conduct activities like citizen-science, water quality monitoring, and advocacy (Lake Pend Oreille Waterkeeper, n.d.;

Center for Justice, 2015). Active local non-profit groups comprise of the Kootenai Environmental Alliance, the Idaho Conservation League, and The Lands Council.

Finally, there are four specific collaborative groups to introduce. These partnerships represent both top-down and bottom-up styles of collaboration, with three initiated through regulatory or legislative processes. There is a formalized partnership between the Coeur d'Alene Tribe and DEQ for management, monitoring, and cleanup of Lake Coeur d'Alene, as codified in the LMP (LMP, 2009). An alternative to declaring the lake a Superfund site, the LMP directs monitoring, goal setting, and program implementation to address contamination, engage in public outreach, and strengthen partnerships with relevant stakeholders (LMP, 2009). The plan was implemented in 2009, and had its first five-year review and renewal in 2014.

The Idaho-Washington Aquifer Collaborative (IWAC) brings water purveyors from ID and WA together to discuss issues, conduct research, and build relationships (Spokane Aquifer Joint Board, 2015b). The IWAC is the example of a bottom-up, grassroots style collaborative. Established in 2012, The Spokane River Regional Toxics Task Force (SRRTTF) addresses PCBs issues in the Spokane River (SRRTTF, 2012). It is a collaborative alternative to establishing a regulatory TMDL for PCBs. The group must make substantial progress towards a management plan or risk being replaced by a TMDL (SRRTTF, 2012). In March, 2015, a U.S. District Court judge ruled against this non-regulatory approach (Sharp, 2015), so the future of the group and the design of management practices for PCBs in the Spokane River is currently uncertain. Finally, the ID legislature initiated the Comprehensive Aquifer Management Plan (CAMP) process to plan for the

long-term use of the SVRPA (IDWR, 2011). The CAMP's primary work concluded in 2011, but it remains an important milestone for collaboration in the region.

This is not an inclusive list of organizations and interests relevant to the case study region. This description reflects those organizations most directly relevant to the daily management of water, and represents the breadth of organizational types and interests present in the region. Other state agencies, including fish and game departments, and local organizations, like county planning departments or chambers of commerce, are relevant on a more limited basis. These organizations and actors are discussed as appropriate throughout the dissertation.

**Outline**

The remainder of this dissertation is divided into topic-specific chapters. Chapter II provides the literature context and theoretical framework, while Chapter III explains the research methodology, discusses interdisciplinary research and details the data collection and analysis process. Chapter IV presents research results, while Chapter V builds on these results and discusses them in context of ST's concepts and propositions. Chapter VI evaluates the limitations and shortcomings regarding ST's empirical application in this case. The dissertation concludes with Chapter VII, a reflective summary of the research process, insights, and a discussion of future research directions.

# Chapter II: Literature Context and Structuration Theory

## Literature Context

The central theme of this literature review is the concept of management scale, a fundamental aspect of this dissertation that connects four relevant fields of study. At a basic level, management scale is informed by boundaries, which are socially constructed and instilled with a range of meanings, including power and social norms. Boundaries also fragment landscapes and water systems, creating divided management frameworks mismatched with the natural resources they overlay. It is here transboundary management practices are relevant, where actors engage in practices like diplomacy, legal agreements, or conflict to reach water-related goals and needs. There are recent trends of creating formal management organizations working at watershed, regional, or landscape scales. These scaled-up approaches are designed to overcome issues associated with more fragmented systems, but also have their own institutional needs and implementation challenges. Collaborative behavior is often integral to both transboundary and scaled-up management efforts. As the collaboration concept is broad in its meaning and function, it is necessary to narrowly define and discuss it the form and scope expected for this study. Collaborative practices like social learning, information sharing, and capacity building are critical to the case's social system and therefore vital to understand. Each of these concepts are discussed independently then briefly summarized and integrated at the end of this review.

Water readily flows across political and jurisdictional borders and is subjected to complex institutional frameworks at all levels of governance, from the local to the international (Milich & Varady, 2011; Mitchell, 2005; Norman & Bakker, 2009). The presence of these boundaries at all scales of governance, including state, county, city, and

agency levels, shape how actors and organizations interact with water resources. Boundaries, like state or national borders, are socially constructed entities with both symbolic and tangible meaning (Norman & Bakker, 2009). They help shape identities and perspectives of people who live within them, through reinforcing social narratives or national identity (Norman, Cohen, & Bakker, 2013). Boundaries and their adjacent borderlands are often socially active and dynamic places, where activities like conflict or cooperation often arise (Norman, Cohen, & Bakker, 2013). Power and space are two aspects of boundaries particularly important to understand, as both are critical aspects of ST and influential in this research setting. Power is also important within natural resource management systems, particularly when thinking of management influence and style, power imbalances, the devolution of power away from centralized government, and actor roles in organizations or networks (Armitage, 2005; Berkes, 2010; Gerlak, 2008).

The transboundary management concept is often applied to surface water, particularly the river basins, and groundwater shared across international borders (Cooley & Gleick, 2011; United Nations, 2014). However, there are transboundary concerns at all scales of management, including river corridors (Plummer, 2006), watersheds (Smith & Porter, 2010), and between states in the U.S. (Grant & Weber, 2010; Oregon State University, 2011). Navigation, water allocation, transportation, hydroelectric power, flood control, aquifer management, and conservation are all cited as reasons for pursuing transboundary practices and agreements (Cooley & Gleick, 2011; Kilot, Shmueli, & Shamir, 2001; Varady et al., 2013).

In certain cases, these goals can be achieved through legal frameworks like treaties, interstate compacts, and formal agreements (Grant & Weber, 2010; Oregon State University,

2011; United Nations, 2014). These formal arrangements are often necessary on an international scale. Approximately 150 international water-sharing treaties have occurred the last 50 years (United Nations, 2014). However, these formal mechanisms are not appropriate in all settings, such as in intra-state situations or where there is no legal space for them to exist. A study of water-sharing agreements both within Canada and between that country and the United States found both formal, such as treaties, and informal agreements, including local-level partnerships, had to exist in such a jurisdictionally layered and complex setting (Norman, Cohen, & Bakker, 2013). In the United States, there are hundreds of interstate compacts, but their successful realization is often constrained by political resistance or barriers and weak enforcement mechanisms (Feldman, 2007). In all cases, effective water management systems require appropriate institutions and suitable actor behavior to be fully realized (Kilot, Shmueli, & Shamir, 2001; Lubell & Lippert; 2011). As with the example in Canada (Norman, Cohen, & Bakker, 2009), there were transboundary water concerns at all levels of governance, and so the legal mechanisms and institutional arrangements used at each scale were context-dependent.

It is difficult to change current bureaucratic arrangements built on fragmented and divided jurisdictional authorities (Allan & Curtis, 2005; Kwon & Feiock, 2010) to more integrated and broadly scaled institutional arrangements. There are numerous considerations when creating and implementing transboundary agreements and practices for all natural resources, and especially water. Simply scaling-up traditional natural resource management practices is not effective, as large-scale systems need new institutions and management approaches to be successful (Milich & Varady, 1999; Mitchell, 2005; Moss & Newig, 2010). One related idea is collaboration or collaboratively driven organizations can have "shadow"

power, where they work within and alongside current laws and practices while also creating outcomes (Innes & Booher, 2010; Innes, Connick, & Booher, 2007). This introduces the idea of collaborative behavior, as discussed below, but also the broader idea that collaborative practices can work within current water management frameworks, a situation relevant in this study.

Fitting the scale of management systems with the characteristics of the natural resources is always problematic and imperfect (Cooley & Gleick, 2011; Moss, 2004; Wyborn & Bixler, 2013). Mismatches can be environmentally and socially problematic by producing inefficiencies, externalities, or questions of legitimacy (Moss & Newig, 2010). Scale can be conceptualized based on spatial characteristics or institutional dimensions, such as a political structure or a hydrologic boundary (Moss & Newig, 2010). This research project is working at the "regional" geographic scale. Previous research into the case study area revealed many actor perceived the area as a "region," for purposes of water management (Daniel, Pinel, & Brooks, 2013), and relevant documents also detail how the area is a region for its shared social and environmental characteristics.

There has been a trend of scaling up natural resource management systems, for both land and water resources, to encompass large geographic areas, like river basins (Kilot, Shmueli, & Shamir, 2001), watersheds (Imperial, 2005), regions (Heikkila & Gerlak, 2005; Lockwood, Davidson, Curtis, Stratford, & Griffith, 2009; Prager, 2010), bioregions (Gerlak, 2008), and landscapes (MacFarlane, 2000). However, there is an argument the optimal scale of management is tied to the unique environmental and social context of an area (Moss & Newig, 2010). However, regardless of the management or governance scale, there will always be problems with boundaries and edges (Mitchell, 2004).

Regionally-scaled planning and management processes can help overcome issues associated with smaller scales of management, where authority is fragmented across multiple agencies or stakeholders (Lubell & Lippert, 2011; Heikkila & Gerlak, 2005; Prager, 2010). Regional-scaled natural resource management is commonly used in Australia (Roberts & Pannell, 2009). There, regional governing bodies oversee certain natural resource management  responsibilities, including implementing plans and coordinating management activities, and often serve as a link between local and state scales (Prager; 2010). Civic regionalism, which is relevant given the urban nature of the case study, is the idea regions can be created through shared characteristics including economics, politics, or cultural identity (Hamin & Marcucci, 2008). These connections can be used to create political and jurisdictional arrangements for urban or rural communities, and are often seen as a scale of management more adaptive and responsive to contemporary social realities and population needs (Hamin & Marcucci, 2008; Jonas & Pincetl, 2006; Visser, 2004). Regionalism literature provides principles of connectivity, of creating social practices more responsive to social realities and environmental needs, and providing a perspective that bounds an area based on shared characteristics and perceptions.

One appropriate, narrow definition of collaboration is from Wollondeck and Yoffee where collaboration is "multi-party interdependent relationships that cross jurisdictional, affiliation, interests, and geographic boundaries" (2000, p. xii). Renard (1997) explains collaboration exists on a spectrum, ranging in level of involvement and responsibility from the lower levels of consultation, participation, co-management, and up to community control. Current natural resource and water management practices, institutional arrangements, and legal frameworks can limit the scope and achievement of collaboratively

derived practices and outcomes practices. Collaboration that can exist within current water management frameworks, as found in the lower levels of Renard's (1997) spectrum, is most relevant to this dissertation. Pertinent reasons for this type of collaboration include facilitating shared visions and common understandings of problems and goals (Smith & Porter, 2010; Pahl-Wostl et al., 2008), coordinating decision-making and cooperative management practices (Bergmann & Bliss, 2004), implementing action and creating policies (Margerum, 2008), and tackling complex problems traditional government or management approaches do not appropriately address (Ansell & Gash, 2007; Lubell & Lippert, 2011).

Social learning can change management practices, shape actor identities, or build capacity facilitating cooperation and information-sharing (Bergman & Bliss 2004; Berkes, 2010; Young, 1999). Shared understanding of a problem helps to build collaborative practices and commitment (Smith & Porter, 2010). Collaboration can be a type of "soft power" allowing actors to use discussion and persuasion instead of domination to achieve management goals and desired choices (Zeitoun, Mirmachi, & Warner, 2011). The actual characteristics of collaboration are context-dependent, and include the purpose and goals of the collaboration (Margerum, 2008), nature of relevant laws and policies (Milich & Varady, 1999), and stakeholder characteristics (Ansell & Gash, 2007). Collaborative activities are bound in social context, time, space, and purpose, and are implemented to accomplish specific tasks in a defined geographic location.

These categories of literature worked in concert to underpin the dissertation's intellectual framing and understanding of the real-life case study setting. How management scale is socially constructed, informed by boundaries, and related to the institutional arrangements and individual agency necessary to enact transboundary management and

collaborative practices is fundamental to this research. These components can be understood individually, but are most relevant and important to understand how they connect to inform not only management practices, institutions, and policies, but also challenges and possibilities. The breadth of literature chosen to review reflects the complexity of this study and its broader social context.

As this dissertation relies on ST as an organizing and explanatory framework, information from these literature sources, particularly those of management practices and collaboration, was used to operationalize ST's concepts and propositions. This relationship between the literature and ST strengthened ST's empirical application and contributed to the creation of a well-contextualized study solidly grounded in both relevant natural resource and water management literature and ST concepts.

**Structuration Theory**

This section provides an overview of Structuration Theory (ST), with specific a focus on explaining the propositions and concepts tested in this study. This discussion details how ST framed this research, justifies the choice and testing of five propositions, and explains what ST predicts the research will find. Structuration Theory's terminology and definitions of concepts are both provided in the propositions descriptions provided directly below and in Appendix A. A concept map illustrating ST's primary concepts and the relationships among them is also provided in Appendix A.

**Theoretical Context**

Anthony Giddens, the sociologist who developed ST, is situated in the post-empiricist or post-positivist school of theoretical thought. Post-empiricism argues that scientific knowledge is not absolute and purely objective, but informed by contextualizing

factors including interpretation, meaning, communication, and the values and experiences of a researcher (Brant & Jary, 2014). Biases are inherent and unavoidable, and so there can be no true and final objectivity (Trochim, 2006). Giddens narrows his placement by specifically separating modern societies from traditional ones, where post-traditional societies are informed by reflexive decision-making about society's function and design rather than following practices set by ancestors (Gauntlett, 2002). This specification is relevant to understand how Giddens conceptualizes both the structure-agency relationship and human behavior in ST.

Giddens examined and expanded out from both objectivist and subjectivist theories and theorists, where he appreciated both the value of individuals' lived experiences and the more objective components of modern societies and their function (Busco, 2009; Gauntlett 2002). However, Giddens did not agree that the individual and collective scales were inherently different and irreconcilable (Jones & Karsten, 2008). Giddens proposed that as each scale informs the other, they are inseparable and must be integrated (Giddens, 1984; Poole & McPhee, 2005). Structuration Theory provides a framework to understand social systems through evaluating each scale's characteristics and emphasizing their intersection and relationship (Giddens, 1984; Poole & McPhee, 2005).

In ST, "agency," or behavior, exists at the individual level, while the collective scale is represented by "structures," or abstract social templates. People are active, knowledgeable agents able to critically engage in and, as necessary, alter the social system. Structures include both rules that guide behavior and resources individuals can use to perform an action (Busco, 2009). The agency-structure relationship is self-reinforcing, where structures guide and constrain agency, while people, in turn, engage in structures and allow for their

perpetuation or transformation (Busco, 2009; Poole & McPhee, 2005). This

conceptualization balances on the idea of "duality," where agency and structures are "at the

same time, the medium and outcome of the practices and activities in the duality of

structure" (Busco, 2009, p. 250). Social systems emerge from this interaction and are

continuously changed, reproduced, or perpetuated across time and space (Cohen, 2005;

Giddens, 1984). Figure 2 is a simple representation of this relationship. The arrows represent

the continuous nature of the interaction between the actors and structures. Neither can exist

without the other, they are interdependent. These relationships are mediated by the

characteristics of human action, whether action perpetuates or changes structures, and how

structures influence actor behavior.



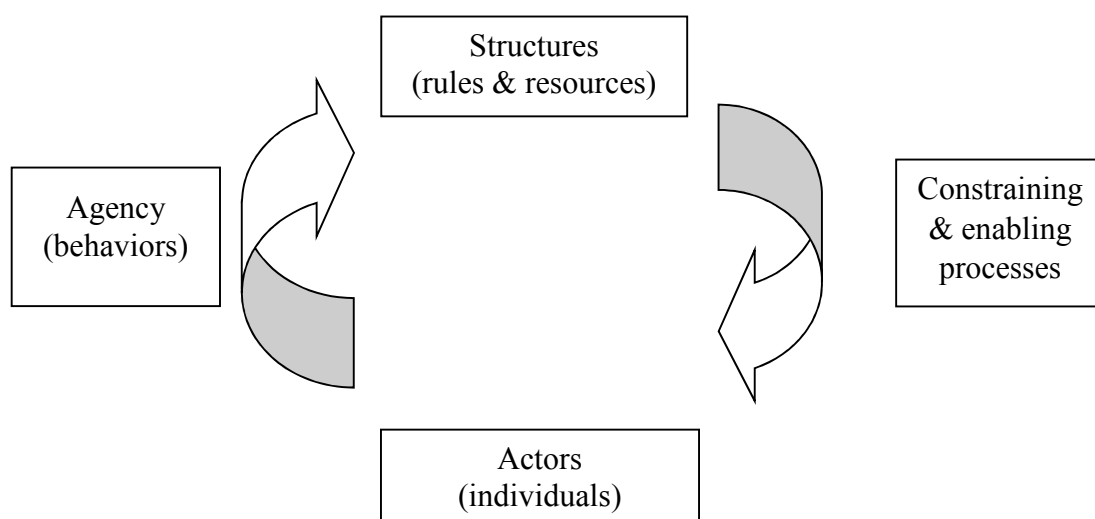**Figure 2.** Structure-Agency Relationship in ST. Adapted from Cohen (2005) & Fuchs (2003).

Of course, Structuration Theory is significantly more nuanced than this simplistic

diagram. Refer to Appendix A for a more complete conceptual map of ST"s primary

components and their relationships. As ST is a framework to understand the processes that

lead to the construction, change, and perpetuation of social systems, its concepts and

relationships are understandably complex and intricate. Structuration Theory allows for the examination of the individual and the social scales, and the dynamics between them, which is valuable for understanding contextualized behaviors like management actions. However, it is acknowledged to be conceptually abstract and vague, broad in it applicability, and difficult to apply empirically (Jones & Karsten, 2008).

To minimize these issues and use ST productively in this study, the researcher operationalized ST's concepts with information from the natural resource and water management disciplines and chose to test only five propositions. Information from these disciplines tailored ST's concepts and propositions to this specific setting and provided relatable, understandable concepts to test and evaluate. These propositions' descriptions also include definitions of ST terminology and concepts significant and directly relevant to this research. As these propositions have been contextualized, and their testable concepts operationalized with information from the natural resource management disciplines and perspective, it is important to clarify definitions and use of terminology. The propositions for each ST concept are numbered for clarity.

**Structures**

Structures are abstract social templates, made of rules and resources, which either constrain or enable human agency. 1. Structures are either replicated or changed by that behavior (Fuchs, 2003; Giddens, 1984). Rules are principles, such as formal laws or informal guidelines, which influence action and can be normative or interpretive (Giddens, 1984). 2. It is expected that formal rules, such as laws or organizational policies, will strongly determine the nature and extent of actor behavior. Both the normative and interpretive aspects of rules are expected to be present and influential in this setting. Laws

and organizational regulations are fundamental parts of natural resource management systems, and strongly guide management behaviors and outcomes.

   3. Resources, which can be allocative or authoritative, are expected to be important as they enable action and define the scope of what actors are able to accomplish (Cohen, 2005; Peters, Vanharanta, Pressy, & Johnson, 2012). Resources, particularly the ability to commit the necessary time or finances to support actions or implement decisions, are critical within natural resource management. For example, collaborative management often requires a significant time commitment to be successful (Ansell & Gash, 2007; Berkes, 2010).

   4. Structures can be changed in response to negative outcomes of action (Poole and McPhee, 2005). When individuals are not satisfied with certain structures, their actions to change them creates transformation in the system. In natural resource management, dissatisfaction with top-down management practices is a common driver of collaborative behavior (Ansell & Gash, 2007). Identifying shortcomings in current management approaches also forces or brings attention to new ideas, for example, recognizing the need for management to occur at larger geographic scales (Mitchell, 2004; Norman & Bakker, 2009). Transformation in natural resource management could also include changes in regulations in response to new information or priorities. One example is when legal standards for a pollutant are made more stringent, requiring the adoption of new technology and management practices to meet the new requirements.

   5. Actor dissatisfaction with traditional water management practices is expected to drive changes in management-related structures, and likely lead towards more collaborative-based structures and actions. 6. Structures are reproduced by actors' engagement; and positive experiences drive reproduction or continuation of existing structures (Giddens,

1984). Most structures are expected to be traditional natural resource management constructs, such as top-down, bureaucratic frameworks, which have endured for a significant time. These structures are likely to be continued into the future. It is difficult to change existing natural resource management practices to new approaches (Allan & Curtis, 2005; Kwon & Feiock, 2010).

## Institutions

It can be difficult to conceptually and practically separate institutions from structures. Institutions are created at the intersection of agency and structures, the large-scale concepts embedded in society and endure over long periods of time (Giddens, 1984). 1. Institutions are closely related to structures, institutionalized practices contribute to the maintenance of structures across time, and institutions also guide behavior (Giddens, 1984). Institutions are fundamental aspects of natural resource management and are often conceptualized as formal, guiding frameworks such as policies, laws, or institutional arrangements (Heikkila & Gerlak, 2005; Lockwood, Davidson, Curtis, Stratford, & Griffith, 2010; Mitchell, 2005). Institutional arrangements affect what is possible for management, and can create problems when they are inappropriate or inadequate, especially when implementing new forms of management, for example collaborative, adaptive, or larger-scale systems (Allan & Curtis, 2005; Berkes, 2010; Gerlak, 2008; Yaffee, 1996).

## Interactions

Every interaction includes meanings, norms, and power, each of which relates to and informs the others (Cohen, 2005). 1. Specific to a social, temporal, and spatial context, interactions work to mediate and shape action (Busco, 2009; Poole & McPhee, 2005), and

therefore are expected to be fundamental parts of how agency is manifesting in the system and working to influence structures.

Power manifests in ST in multiple ways, and is a fundamental part of the theory, as it informs interactions and action. 2. Given its importance within the ST framework, power is expected to be one of the most nuanced and critical variables identified in the research and discussed in the findings. 3. Power can be domination or control (Giddens, 1984), so it is predicted people will use power, through control of resources or their positions of power, to influence others' actions. 4. Power is strongly tied to agency. Agency is not the intent to act, but the ability to act (Giddens, 1984). That is, organizations or individuals with attributes, like resources, necessary for action will be able to engage in the system and either affect change or continue current structures. Power is often contained in organizations or agencies, and can be devolved to individuals or across agencies to reallocate authority and control within management systems (Berkes, 2010; Lockwood, Davidson, Curtis, Stratford, & Griffith, 2010).

In ST, power is not always domination or control. 5. Power can also be productivity that facilitates behavior or outcomes (Hardcastle, Usher, & Holmes, 2009). This manifestation of power is expected to be significant in this setting, as the area is jurisdictionally fragmented and so one actor or organization does not necessarily have domination over another. Power imbalances are expected to be present and problematic. Power imbalances are critical in natural resource management settings, and can drive collaborative participation (Ansell & Gash, 2007; Sandstrom, 2009). Certain forms of collaboration also depend on power sharing among relevant actors (Armitage, 2005).

Norms are highly influential and encourage specific types of behavior (Busco, 2009). Wutich, York, Brewis, Stotts, & Roberts (2012) explored the importance of cultural norms about water justice issues and how they relate to and affect local acceptance of water management institutional rules. 6. Norms can also constrain management outcomes and the implementation of new management practices (Allan & Curtis, 2005). A diversity of social norms are expected to be important in this research setting, including management norms, organizational norms, and norms associated with different stakeholders.

Meaning is how actions or ideas are understood and interpreted (Giddens, 1984). Hardcastle, Usher, and Holmes (2005) explored the meanings nurses ascribed to their routines and how they contributed to the reproduction of these routines through time. In natural resource management, meaning associated with different resources and their uses is especially prevalent and important to understand, as these meanings shape perceptions of management actions and desired outcomes. These meanings are varied and often competing. Harmon and Putney (2003) discuss different meanings associated with protected areas, including cultural, recreation, sacredness, and economic values. Meanings can arise from broader institutions as well, such as how politics affects actions and the social meanings assigned to resources or places (Cheng, Kruger, & Daniels, 2003). 7. It is reasonable to expect both individual-level and institutional-level meanings associated with water and its use will affect management behaviors meant to oversee those resources.

**Disembedding Mechanisms**

The "expert systems" mechanism in ST allows for expertise and knowledge generated in other temporal and spatial contexts to be applied in a specific setting (Busco, 2009). 1. This produces an expectation that actors have experiences and education from

other areas of life, which are then transferred to this water management setting. Management of natural resources involves traditional scientific knowledge from multiple disciplines, as well as indigenous, local, or experiential knowledge (Broderick, 2008; Nadasdy, 2003; Paton, Curtis, McDonald, & Woods, 2004), so it is reasonable to expect a significant portion of such knowledge was developed outside of a specific geographic or managerial context before being applied to a current situation.

**Reflexive Monitoring and Knowledge**

Knowledge shapes action and allows an actor to reflectively engage in a situation, to then either perpetuate or change structures. 1.Reflexive monitoring is one avenue of transformation, as actors who critically engage with and monitor actions can then either identify problems or recognize new beneficial practices and enact change (Cohen, 2005; Poole & McPhee, 2005). Experiential and practical knowledge influences decision-making and action. For example, if an actor had a positive experience with collaboration it is reasonable to expect they would be likely to engage in or promote collaboration again. Discursive consciousness allows actors to be aware of their situation and express their understanding of that situation and its meaning within a specific context (Giddens, 1984). 2. These characteristics predict that actors should be critically engaged in actions and structures and not just passively and reactively performing management behaviors. Actors can be expected to be active participants in either perpetuating structures they find are working well or enacting change to implement new structures.

# Chapter III: Methods

## Interdisciplinary Research

Interdisciplinary research is useful when no single discipline, like the natural sciences, or a way of knowing, like experiential knowledge, can fully address a complex problem (Repko, 2008). Interdisciplinary research draws on methods, data, or perspectives from two or more disciplines, integrates that information, and creates a new, whole result (Repko, 2008). This study utilized interdisciplinary methods for pragmatic purposes, to focus on addressing real-world problems, and to develop skills necessary to gain a broad understanding of complex issues Repko (2008).

In discussing interdisciplinarity, Klein (2004) describes the trend of problems without disciplines. Contemporary, real-world problems cannot be easily defined or addressed by a singular discipline or field of study. Water management, use, allocation, and protection activities do not exist outside their social and environmental contexts. Rather, actors must navigate and work within these complex frameworks to accomplish management goals. Decisions and practices are informed both by social frameworks and by data derived from the natural and environmental sciences. This social and environmental reality of this case informed the choice of disciplines to include. For instance, there was a need to understand hydrological information to relate social conditions to environmental characteristics and contextualize, support, or contradict managers' actions and perceptions of the water system. Research goals and the social and environmental context of the case study dictated how the disciplines were integrated and utilized.

From a research perspective, it is difficult to adequately understand a singular aspect of water management when isolated from its broader realities. Both environmental and

social conditions influence water quantity and quality. Factors like human and environmental health concerns, the technology available to detect and control pollutants, and economic considerations, shape water quality standards. Social norms inform water use and management, so a breadth of perspectives must be acknowledged when evaluating decision-making and areas of conflict, intractability, or cooperation. Interdisciplinary approaches allow the researcher to address such complexity through a productive, structured process. Integrating information from disparate disciplines, identified and chosen for their relevance, also meant the research is tailored to this specific setting.

While this study's methodology is grounded in the social sciences and gathering qualitative data, an interdisciplinary perspective was maintained through all research stages. The primary discipline, the human dimensions of natural resource management, focused on understanding actors' water management behavior as related to their larger social and environmental context. The bulk of the research design, data collection, and data analysis techniques were grounded in qualitative methods and perspectives. This is where "new" data were collected through interviews with actors. The interdisciplinary categories relied on secondary information gathered from existing documents.

Information from the hydrology, engineering, environmental science, law, and planning disciplines were integrated and utilized to gain a comprehensive perspective of water management practices. There was no need to collect primary data from these disciplines, as necessary information was abundant and readily available. There was a need to use such data to inform the qualitative data collection process and contextualize actors' management behaviors, which included actions like the accomplishment of routine tasks, decision-making, and engagement in collaborative and non-collaborative practices.

Information from the law and planning disciplines was used to understand the region's social characteristics and legal frameworks. The legal discipline provided references for relevant local, state, and federal laws regarding the management, protection, and use of water resources. Litigation was a commonly used tool to accomplish management goals, and the outcomes of court cases influenced management decisions. In this study, laws were significant containers of power, and those who had legal backing for actions were able to influence management outcomes and force change in the system. The planning discipline introduced U.S. Census population data and information for rural and urban development trends, economic characteristics, and population change for the case study's cities and counties. This information was critical to recognizing demographic characteristics, development trends, relationships to current water use patterns and uncertainty about future water demand.

Hydrology provided information about groundwater and surface water flows, aquifer characteristics, interactions between groundwater and surface water, and water balances. Engineering information focused on the infrastructure and practices associated with the extraction, delivery, cleaning, and discharge of water. This included information about the infrastructure and management practices related to dam operation, groundwater extraction, water delivery systems, and wastewater treatment and recovery. Environmental science provided information necessary to understand water quality standards and the relationship between climatic, environmental, and social conditions and water resources. These disciplines provided not only quantifiable data about the water resources, but also technical information necessary to understanding how actors from various professional fields related to and managed water.

**Practical Application of Interdisciplinary Information**

Fundamentally, familiarity with terminology, data sources, and practices used by actors in their respective jobs proved beneficial during interviews. This familiarity meant the researcher could use, and understand, an appropriate level of technical, job-specific terminology to successfully conduct interviews. As relevant, this information was used to prepare for interviews, contextualize interview questions, and serve as reference points to generate more nuanced and specific responses. Thus, interviews were tailored, to the degree possible within a semi-structured format, to each individual's job, experiences, and perspectives. Environmental science and hydrology information provided the broadest sphere of influence, water resource system's characteristics, including- the presence of pollutants, water quantity and flow characteristics, and the relationship between groundwater and surface water, touched most aspects of the management setting.

This secondary data served a similar framing role during the analysis and discussion of interview results. This data were used as objective sources of information where interview text could not only be contextualized, but also compared. While the researcher never suspected interviewees provided misleading information, this comparison proved crucial, particularly when actors spoke of controversial or emotional subjects. These issues often had characteristics of power imbalances, forced actions, conflict, and suboptimal outcomes. Being able to reference information like regulations, court case outcomes, water quality standards, water extraction and allocation practices, and predictions about future environmental and social conditions, helped the researcher distinguish between actor perspectives and objective data. While actor perspectives and experiences were a focus of

this research, there was also a need to understand how they manifested and related to these broader realities.

This interdisciplinary method was more reflective of the case study's actual social and environmental context, especially when compared to a single-discipline approach. If the research had consisted only of interview-produced data, this larger perspective would have understood in a piecemeal way or minimized. Proactively seeking and incorporating data from different disciplines allowed the researcher to be more prepared for interviews, more aware of relevant social and environmental conditions, and better able to gather and produce robust, meaningful data. As this study's fundamental purpose was to understand the relationship between actor behavior and broader social structures, ensuring an appropriate breadth of social and environmental factors were referenced and incorporated was essential to reaching research goals.

**Data Collection**

Between August and December 2014, primary data were collected through interviews with actors in the case study region. A snowball sampling process identified 101 potential participants, resulting in 42 successful interviews. The researcher contacted people referred through the sampling process by telephone or email to schedule interviews. In-person interviews were preferred, but telephone interviews were conducted when convenient or preferred by interviewees. Twenty-nine interviews were conducted in person, thirteen over the telephone. Most interviews lasted between 45 minutes and one hour. To allow for spontaneity in individual interviews as well as level of consistency across all interviews, an instrument with seven semi-structured questions was used. This instrument is provided in Appendix B.

**Snowball Sampling**

Snowball sampling is a technique where informants are asked to refer people they think relevant to interview. The sample is produced from this "chain of referrals" (Biernacki & Waldorf, 1981). The chain of referrals idea can be thought of as a connected network of people, where relationships among actors drive the iterative referral process, as they are linked together one-by-one. Snowball sampling is used in studies of social networks and to find samples in populations where individuals are not readily known or accessible to the researcher (Atkinson & Flint, 2001; Bernard, 2002; Maxwell, 1996). Even though the researcher had research experience in the region (Daniel, Pinel, & Brooks, 2013), she was an outsider and only superficially familiar with relevant organizations and interests. More importantly, she was not familiar with which organization employees were most active in the management behaviors and water issues she was interested in studying. Therefore, snowball sampling was a useful and appropriate approach to use in this study.

The first round of initial contacts consisted of seven actors. These actors were from two state regulatory agencies, a city water department, a local university, a non-profit organization, and water utility. The researcher wanted to start the sampling process with actors representing a breadth of interests, to limit biases or the research being heavily steered towards one type of organization. However, depending on when these initial actors responded to interview requests and had their interview scheduled, they did not all provide information and referrals at the start of the research process. Only three of the seven initial contacts were interviewed early in the research. Two of these contacts provided referrals directly after they were interviewed. Because of the third contact's schedule and preferences, they agreed to provide a list of names before their interview. This proved to be

beneficial as this participant was a key informant and provided 22 recommendations. These 22 recommendations, combined with those from the other initial contacts and people interviewed early in the research allowed the process to progress quickly from this initial, name-gathering stage to the full data collection effort. All of these initial contacts were eventually referred by one or more interviewees, confirming their place in and relevance to the system. This overlap reinforced the validity and appropriateness of their selection as initial contacts.

The researcher intentionally gave vague instructions to participants, as to not steer the referral process based on her biases or interests. Interviewees were simply asked to provide names of people they thought important to include in the sample. Some informants wanted to know which actors had already been contacted or included. The researcher purposefully did not disclose this information primarily to maintain informant confidentiality. Also, understanding which actors were recommended by multiple informants or how referrals either stayed within an informant's employment field or crossed disciplinary boundaries was important. This researcher expected this knowledge to further reveal the nuances of the management system. For example, if actors only recommended those in their same field, such as water purveyors only recommending other purveyors, this could reflect the network's overall level of integration or divisiveness. Overly guiding the referral process would have been counterproductive in meeting such goals.

The researcher contacted potential interviewees up to three times. If there was no successful contact or if the person declined to be interviewed, they were removed from the sampling list. Names provided by two or more actors were prioritized. As the research

progressed, names of people representing organizations or interests not already in the sample were also prioritized.

Ideally, a snowball sample ends when redundancy is reached (Patton, 2002). Reaching full redundancy of names recommended was not feasible in this situation for two reasons. First, the heterogeneity of the relevant water interests made full redundancy unlikely. Second, because of time and financial constraints, the ideal data collection timeframe was four months. However, even with these constraints, there was partial redundancy in both the names provided and the information participants gave in interviews. Out of the 42 people interviewed, 22 were referred by more two or more interviewees. The maximum number of referrals for one person was six, which four actors received. For the 59 recommended but not interviewed, only 16 were referred by two or more participants. After initial data analysis, the researcher felt the information collected could adequately answer research questions and accurately reflect the social setting, so data collection could conclude.

**Sampling Outcomes**

The snowball approach created an efficient and productive sampling process. Most informants seemed to engage critically with the request for referrals and were thoughtful in their recommendations. With the exception of several generalized patterns, the referrals reflected the diversity and complexity of the system and were not universal in design. This produced both benefits and challenges, but overall, supported an actor-driven referral process reflective of the system's reality.

The strongest pattern was that people were most likely to recommend others from their own state. There were some exceptions to this. Understandably, actors whose job or

involvement on collaboratives required them to work at a regional scale were more likely to recommend not only actors from the opposite state, but a more diverse list of actors overall. In general, those employed by non-profits provided the most breadth in their referrals, but there were exceptions to this. One actor representing a Native American Tribe offered 11 referrals, which represented actors from a local non-profit, a special interest group, a water utility, and tribal, state, and county government organizations. So, rather than referrals being based on organizational affiliation or role, they were clearly related to the actor's job and specific role in the region. They reflected the people an individual actor thought important, and specifically tied to that actor's perspective and the nature of their work. In examining this from a ST perspective, this illustrates the ideas people are knowledgeable and purposeful agents who have the agency and ability to engage critically in the system (Giddens, 1984).

The majority of actors referred worked in mid-level management positions, like project managers or division supervisors. However, regional and agency directors were included in the sample, particularly for state agencies, city water utilities, and non-profit groups. The weighting towards mid-level managers was likely because there were simply more positions in this range, while there were relatively few director-level jobs. Even though most actors in director-level jobs spoke of how their responsibilities differed substantially from their subordinates and often focused on the policy side of management, they still were aware of the local relevant issues and activities those managers addressed daily. These directors provided a unique perspective on work in the case study region while also demonstrating how they, and others, helped to connect this region to its broader social and geographic contexts.

Each of the aforementioned results had exceptions. Some actors provided referrals from organizations in the opposite state, while others restricted their recommendations to those in their own organization, city, county, or state. A few offered referrals representing such a breadth of actors it was difficult to draw specific conclusions about how they and the interviewee were related. Most actors offered between four and six recommendations, with some listing only one or two, some providing up to ten. The previously mentioned example of 22 names was an exception, and the next highest list had 11 names. In addition, the four actors recommended the most by others represented different organizations and interests. There were no patterns identifying one key actor, organization, or interest in the region. This is understandable, given the heterogeneity and abundance of different organizations in the region and the fact that many did not seem to strongly connect together, at least at an individual, actor level.

However, there was more consistency in the referrals when examining them at a job category level. For example, several actors recommended one water utility employee as vital to interview because of their extensive job experience and role in regional-scaled work. This happened several times, where actors felt a certain person, based on their role, experience, personal perspectives, or length of time in their position, was critical to interview. These recommendations came from both within and outside of the referred actor's specific job category. In addition, these "critically important" actors often did not reciprocate and refer the same people who recommended them. While there were exceptions where two actors recommended each other, overall many of these referrals were one-way. This is also interesting in it shows not only the direction of relationships, but how individual actors perceive others based on factors like roles, power, or position in the system.

These results reflect why the researcher was interested in understanding which actors, and by proxy their roles, organizations, and interests, were recommended for inclusion in the study. If the region is conceptualized as a network of organizations and people, it is valuable to see how different components connect, or do not connect, with one another. By allowing interviewees significant latitude in referring names, the researcher opened up the possibly of this type of inconsistency, but also allowed the actors to drive the referral process. If she had guided the referrals by limiting the number of people actors could provide, for example, then the sample might have been constrained and less reflective of reality. The real disconnect is the relatively small ratio of people actually interviewed as compared to those recommended. When an actor was recommended but not interviewed, they were not able to provide referrals themselves, so the recommendation process not only ceased with them, but also was one-way.

Table 1 lists the sampling outcomes, with the types of organizations represented, and the total number of employees from each category referred, contacted, and interviewed. Actors were classified by their primary roles, most often their salaried jobs. To further protect participants' identities, categories were intentionally kept vague and at an aggregate level. The following section about snowball sampling's limitations discusses why there is a significant difference between the number of actors recommended and those actually interviewed.

**Table 1.** Classification of Snowball Sampling Results

| Category | # Actors Recommended | # Actors Contacted | # Actors Interviewed |
|---|---|---|---|
| State Agencies | 29 | 17 | 13 |
| Native American Tribes | 7 | 3 | 2 |
| City Government | 14 | 8 | 6 |
| County Government | 5 | 3 | 3 |
| Non-Profit Organizations | 12 | 8 | 8 |
| Water Purveyors and Utilities, Irrigation Districts | 7 | 6 | 6 |
| Universities | 3 | 2 | 2 |
| Businesses | 6 | 2 | 1 |
| Attorneys | 2 | 0 | 0 |
| Politicans & Associated Staff | 6 | 0 | 0 |
| Private Citizens | 3 | 0 | 0 |
| Special Interest Groups & Collaboratives | 7 | 1 | 0 |
| **Total** | **101** | **51** | **42** |

**Benefits of Snowball Sampling**

Snowball sampling was beneficial for three specific reasons. Fundamentally, snowball sampling provided specific names of people to contact. This increased the efficacy of sampling, especially in situations where multiple employees or organizations were potentially relevant. One example is of the city of Spokane Valley, WA, which has 23 Class A water systems, which serve 15 or more connections, and 12 Class B water systems, which provide water for up to 14 connections (Spokane Valley, 2014). This abundance would have made it difficult, or at least time-consuming, for the researcher to identify an appropriate organization and then actor to interview. Snowball sampling provided the name of a water purveyor employee who had extensive experience, was involved in regional collaborative groups, and so was important to interview.

A second example was when the person referred through sampling was not available for an interview, the researcher agreed to interview another agency employee. This employee, while having extensive experience in their field, was not directly involved in the day-to-day management practices subordinates engaged in, nor in collaborative groups or regional partnerships. The interview was not only difficult to conduct, but also was an unproductive use of the researcher's and interviewee's time.

These examples demonstrate the value of trusting local actors' judgment and knowledge of the water management system. Actors knew not only who had the technical and job-related knowledge relevant to the research, but also the experience, perspectives, and willingness to participate. This sort of local, on-the-ground type of knowledge was critical to collecting data in a time-sensitive and efficient manner. As an outsider, it could have taken the researcher months or years to establish the relationships and trust with actors to possess this contextualized, specific understanding of the system.

Snowball sampling expanded the case study area to a more context-appropriate size. The first interviewee recommended an actor associated with Lake Pend Oreille, which was not originally part of the case study area. This proved important as several other actors, particularly those located around Coeur d'Alene, worked with people and on issues located in the Lake Pend Oreille and Sandpoint, ID area. This was also relevant hydrologically, as Lake Pend Oreille's southern end connects with the SVRPA (IDWR, 2009). This had social implications as well. There was a contentious issue over the idea water could be taken from Lake Pend Oreille and pumped into the SVRPA to recharge the Spokane River. Several actors expressed concern over this concept, as it would mean "Idaho's water" would be taken for use in Washington. This issue, though not a current reality, reflected broader

concerns about Washington's legal strength and the lack of a defined, enforceable plan for water allocation between the two states.

A greater breadth of job duties and types were identified through snowball sampling than might have otherwise been pursued. Before this sampling process, the researcher was initially unaware of the extent of the education and outreach components of water management. Adult and youth education were critical aspects of many actors and organizations' work. There was significant emphasis on outreach to inform residents of proper practices to conserve or protect water, as well as to change norms about regulations or pro-conservation actions. For some actors, these activities required significant expenditures of time and money, and so recognizing this activity was crucial to fully understanding the water management system. This was one clear area where actors were actively trying to change larger social structures, particularly norms. This directly relates to ST's framework and propositions, and so was critical to recognize from a theoretical standpoint.

**Snowball Sampling Limitations**

As with any research method, there are certain disadvantages associated with snowball sampling. Atkinson and Flint (2001) name three potential problems with the snowball approach: problems of representativeness, initiating the chain referral process, and the use of informants as informal research assistants to perpetuate the referral chain. Biernacki and Waldorf includes limitations of "verifying respondent eligibility for inclusion; monitoring and controlling the chains of referrals, the number of cases and chains, and the resulting data quality" (1981, p. 144). However, most of these concerns had minimal or no

impact in this case study, only the issues of representativeness and ensuring interviewees provided useful referrals were problematic.

Initiating snowball sampling was straightforward. As described above, the researcher had strong key informants who provided an effective start to the snowball process. There were problems with using interviewees as "informal research assistants." Occasionally, they did not provide enough information, like phone numbers or organizational affiliation, for people they recommended. Mostly, this happened when informants suggested people who were retired or involved in issues in a voluntary or informal capacity. These referrals were generally difficult to contact and excluded from the sampling process. Several actors recommended entire organizations rather than specific names, often when they were unsure of whom to contact or did not want to name a specific referral. There were 16 examples of this and they were excluded from the sample.

Out of the 101 names recommended, 11 were for people outside the research area and five did not have accurate or complete contact information. These issues were must less problematic with interviews conducted later in the process, as the researcher's understanding of the relevant organizations and actors developed. The final reason is actors recommended multiple people from the same organization. While this was not problematic when referrals represented different divisions or job responsibilities, but was an issue when multiple people from the same division, office, or direct line of command were provided. As stated, the researcher prioritized interviews with people from different organizations and interests, and so was unlikely to interview a supervisor, a manager, and a field employee from the same office. There were several instances when the researcher contacted a supervisor who then referred a subordinate or colleague, who may or may not have already been recommended.

These realities make it appear that a significant number of recommended names were not included in the research. However, this explanation should illustrate why only about 40 percent of those recommended were eventually contacted and interviewed.

Certain categories of organizations or actors potentially relevant to a water management situation were underrepresented in the sample. Actors did not commonly refer lawyers, federal employees, community planners, members of the business community, or private citizens. When actors did refer people from these categories, the recommendations were often limited in number or missing contact details. As an example, of the six politicians and political staff recommended, two were from a county outside the research area, and two were not politicians, but an aide and member of an advisory group respectively. One was identified through their role as a consultant, and the researcher only realized they were a politician after trying to find contact information. The one local politician recommended was referred near the end of the research and not contacted because of time constraints. Therefore, the snowball process was certainly not perfect or always ideal.

One interesting disconnect is that several actors spoke about how politicians or the political process, like election cycles and turnover, created challenges for their organization's work. Yet, none of these actors recommended politicians for inclusion. This finding could mean excluding politicians from the sample was problematic. As politicians were obviously relevant to actors' work, missing their perspective on issues and management practices is important to acknowledge. This oversight could be potentially detrimental as a politician might counterbalance what actors said or perceived about them and their work. This disparity would be interesting to pursue in future research, to better understand the reasons why actors exclude certain categories of actors.

Reflecting on Biernacki and Waldorf's (1981) concerns about verifying respondent eligibility and maintaining the chain(s) of referrals, these concerns were important to understand and look for, but not limiting or problematic in this case. It was relatively straightforward to verify eligibility, as all actors worked for organizations with websites and readily available contact information. Interview questions specifically focused on water management practices and issues, so any participants not relevant to interview would be easily identified and eliminated from the sample. This problem never occurred. As only one researcher conducted the interviews, she had complete control over the chain of referrals process. Controlling the timing of contacts and interview schedule was therefore manageable and straightforward.

Actors were instructed to recommend people they thought important to include in the research, so the sample reflected interviewee perspectives. In this sense, the sample was accurate and appropriate. There was significant overlap in the names of actors and types of organizations   recommended, so it is difficult to identify one area that might have taken the research in a different direction which, for example, included more lawyers, business employees, or federal employees. The names provided weighted towards those people and organizations dealing with the day-to-day management of the water system: purveyors who deliver water to customers, wastewater plant managers who clean water, non-profit groups who ensure access to water for specific uses. It is possible interviewees saw these other actors and organizations as the most salient to interview, while those actors more tangentially related to water management were less directly relevant. Even with the aforementioned limitations and constraints, the snowball process created an efficient research process that produced valuable and useful results.

## Data Analysis

### Interview Data Analysis

Data from interviews were analyzed in a three-step process. The researcher listened to each interview's recording in its entirety. A coding sheet with Structuration Theory concepts and their operationalized forms (provided in Appendix C), was used to identify portions of interviews relevant to extract. The researcher then transcribed the interviews and incorporated the appropriate quotes into the dissertation. Two interviewees declined to be recorded and a third provided information after the recording finished. In these cases, the researcher relied on paraphrasing written notes taken during the interviews.

Quotes included were often edited for clarity and brevity. This editing meant ellipses were used to replace unnecessary, irrelevant, or repetitious text. The researcher also inserted brackets with her own explanatory or contextualizing information as necessary, so the quote was as clear and understandable. The researcher reviewed and compared edited quotes several times to ensure they accurately reflected original quotes and not inappropriately condensed. The final step was member checking to ensure the quotes were accurate and used correctly, as described in the "Member Checking" section.

### Document Analysis

Case studies often include the use and analysis of written documents and archival records (Baxter & Jack, 2008). Text, graphics, and charts from documents were included in this analysis. Primary sources of hydrological and environmental science data included websites for regulatory agencies including the WA Department of Ecology, the ID Department of Environmental Quality, and the ID Department of Water Resources. These websites provided a range of relevant information, notably water quality standards, water

allocation and water rights processes, and agency management practices and goals. These sites also provided access to summary reports and results from collaborative processes and environmental studies.

In many cases, information like mission statements and management policies were readily available online. United States census and state-level websites provided information about population growth, development, employment and business statistics, and economics. As needed, legal texts and electronic resources were consulted to find relevant state and federal laws and court cases. Newspaper articles provided information about current issues. These resources were particularly helpful for issues ongoing during the research process, namely Washington's establishment of an in-stream flow rule for the Spokane River and actions regarding addressing PCBs in the Spokane River and surrounding developments.

Documents were used to not only understand current conditions, but also learn about past circumstances, including historical management practices or pollution legacies. They were equally as valuable for predictions about future conditions, such as population growth rates or effects of climate change on water resources. This breadth of understanding was critical to the interview process, where having a firm grasp of relevant environmental conditions and social context was vital to conducting informed and productive interviews.

Document-based information was also used in the data analysis phase. There was a need to not only contextualize interview data, but also compare it to objective information. For example, many actors spoke candidly about how a certain law or water quality standard affected their work and their organization. Many of these issues were not only legally contentious, resource-consumptive, or politically sensitive, but also emotional and worrisome for those involved. Being able to understand both sides, for example, the

differences and similarities between a law's language and intent compared to the reality of

the law's implementation and perception. This ability not only creates a more nuanced

understanding of the management system and reasons for actor's perspectives or action, but

also relates back to the ST ideas of how larger social structures relate to individual behavior.

**Informant Protections**

Interviewees were provided with a consent form outlining protections for them and

their data. The form also explained potential risks associated with participation, namely that

anonymity could not be guaranteed. Given the relatively small population being studied,

there was an always a chance participants could be identified based on information they

provided. Protections included assigning each interviewee a coded identifier and providing

the opportunity to review any quotes before their use in the dissertation. Interviewees were

able to opt out of being voice recorded or identified in written products. They could end

their participation in the research at any time. Interview data was kept confidential and

protected as appropriate. Typed interview notes and voice recordings were kept on a

password-protected laptop. Notebooks with handwritten notes were kept in a secure

location. Written and electronic data were only accessible by the primary researcher.

Interviewees were assigned a coded identifier to protect their identity in written

products. This code was randomly generated, so was not tied to names, jobs, or interview

order. Originally, the researcher had wanted to use more descriptive codes, like "WA-Non-

Profit-01," but a significant number of actors wished to have a greater level of anonymity

than they felt these codes allowed. The researcher acknowledged and understood actors'

concerns, as some topics were quite politically or socially contentious. For consistency, the

researcher decided to replace all the descriptive codes with the generic format of "Respondent Number."

Interviewees were also kept anonymous during the snowball sampling process. Several actors objected to remaining anonymous, as they wished to be transparent and allow those they referred know the person who provided their name. Even when guaranteed anonymity, other actors were wary of recommending any names out of concern they may somehow be identified and face backlash from the person they recommended. The researcher also was careful not to identify other participants during interviews. There were situations where this was difficult, particularly in small or shared offices or when members of an organization recommended others in the same organization for interviews. Nevertheless, to the degree logistically possible, interviewees were afforded confidentiality.

**Member Checking**

The practice of member checking helps ensure the meaning and intent of participants' information are correctly captured and reflected accurately in written products (Maxwell, 1996). The researcher emailed quotes and instructions to each interviewee whose information was included in the dissertation. Interviewees were given several weeks to review, approve, or disapprove quotes. The researcher worked with interviewees who did not make this initial deadline to ensure quotes were reviewed. Two participants retired after their interviews and before member-checking could occur. Three interviewees did not respond to repeated requests, by telephone and email, for their quotes to be reviewed. As it was not possible to contact these five interviewees, their quotes were excluded from the final products.

The quotes were given to interviewees in the format as presented in the dissertation. They were edited for clarity and brevity, and some had ellipses in place of text or explanatory information provided in brackets. Interviewees had the option of reviewing their full quotes for comparison. The researcher also offered to speak with interviewees to discuss concerns or questions about how quotes' usage. Most interviewees were satisfied with their quotes as presented, or offered only minor edits to better reflect their intent or clarify statements.

To preserve the integrity of the original data collection process, major edits or complete rewrites of quotes did not occur. Allowed edits included redacting names of organizations, events, or documents actors felt would identify them, correcting mistakes where an actor incorrectly referred to something like a law or policy, or adding a small number of clarifying words. Often, edited quotes could be expanded to add a few more words of context from their fuller versions as a solution. Most concerns seemed to reflect dissatisfaction with how quotes were condensed or that complete quotes were not included, rather than thinking the researcher incorrectly captured interview information. In these cases, the researcher worked with the interviewee to explain why and how quotes were edited and the context in which they were used. If an interviewee strongly objected to a quote and a satisfactory compromise could not be reached, the quote was removed.

**Summary**

The data collection and analysis processes reflect the tension between what is ideal and what is possible in this type of qualitative research. Because of limitations like time, funding, or logistics, there is always a gap between what a researcher can practically accomplish and what a more perfect research process may entail. Yet, this actual data

collection process was efficient and effective, and produced explanatorily valuable, novel, and meaningful data. As the following chapters illustrate, the 42 interviews conducted and the breadth of documents analyzed produced a wealth of data that, at times, was overwhelming in its scope and detail. Information had the appropriate content and breadth to answer research questions, meet the research's goals and purpose, and provide support for analysis, discussion, and the theoretical and practical applicability of findings.

## Chapter IV: Data Analysis

This chapter presents interview results organized by research question. Explanatory text, including data taken from interdisciplinary sources, contextualizes quotes pulled from individual interviews. The goal of this chapter is to describe and explain direct research findings, while the next chapter emphasizes connecting and more fully integrating these findings with ST's propositions and concepts.

**Research Question One**: **How do water management structures shape actor behavior, and are in turn, influenced by that behavior? a. What are the most significant and relevant structures that either enable or constrain actor behavior?**

In ST the idea of a "structure" is abstract and difficult to conceptualize, so was operationalized into more defined, relatable concepts to discuss with actors. It would have been confusing and counterproductive to ask interviewees to explain their thoughts on how broadly defined and abstractly conceptualized social structures affected their behavior and perspectives. Rather, interview participants were asked about the broader "social factors" that informed their behavior. Such operationalization is necessary to empirically apply and operationalize the idea of structures, and in-line with other empirical uses of ST. The three most important categories of social factors were formal regulations and laws, social norms and attitudes of members of the public, and the political environment in which water managers had to work.

Formal rules, such as laws and regulations, strongly shaped actor behavior. Regulations not only constrained what certain actors could do, they also were used by actors to support their positons, defend actions, or affect other actors in the system. These regulations included federal, state, and local laws as well as organizations' internal by-laws

and operating procedures. Laws also created and enforced political and legal boundaries, which set up the jurisdictional framework in which actors had to function. Laws could enable one actor to perform a behavior, while simultaneously constraining another actor's ability to make decisions or act in a certain way. "We don't take particular sides… we just evaluate water rights based on what the water law dictates for us to do" (Respondent 10). Laws were also critical because they differed between the two states and Native American tribes. These differences created institutional disparities between these entities, which had tangible managerial effects:

> Many of the [Washington] water purveyors have significantly more water available to them than they currently use because of the way that Washington State has historically allocated water. . . . Idaho has a completely different legal mechanism for allocating water. . . . Resolving those differences in how water is legally allocated between WA and ID is a significant challenge. (Respondent 22).

Social norms regarding water's use and management also strongly informed behavior. Not only did such norms create the broader cultural environment in which managers had to work, they also required actors to engage with members of the public in both proactive and reactive ways. Proactively, many actors worked on providing education and information to local members of the public, particularly to youth, landowners, and various business owners. Reactively, some actors had to address violations and assure compliance with regulations.

There were significant outreach and education efforts to change social norms, particularly concerning the need to conserve water quantity and protect water quality. Actors commonly cited politics as well as strong anti-regulation and private property rights norms

that embody the regions of North ID and Eastern WA as creating challenges, or at the least friction, to enacting scientifically-based water management decisions. Addressing and overcoming such norms were significant aspects of actors' work, whether it was accomplishing their daily tasks or being able to collaborate effectively with others on issues.

To a lesser degree, there were strong norms associated with the various uses of water: subsistence and recreational fishing, habitat and wildlife benefits, recreation, and economic development. Such norms could be conflicting or complementary, and working to address the desires of certain interest groups was a big part of many actors' jobs as well, particularly for those in non-profit and service-provision sorts of organizations:

> Right now, people are pretty attached to using water not just for washing dishes and brushing their teeth at night, but boating, fishing, swimming; looking at it, all of those things that these lakes up here provide that draw people, they are incredible resources economically. Even from just a fisheries standpoint they're incredible economic resources. (Respondent 3)

Actors commonly spoke of protecting the economic health and potential associated with the region's water bodies. This was a nearly universal theme, with actors working on the lakes, Spokane River, and the SVRPA all mention the economic value of water and its uses. One actor, speaking of Coeur d'Alene city and lake, stated this idea directly "This is just a very business driven community [Coeur d'Alene area]. We think it's in everybody's best interests to keep the lake clean" (Respondent 16). Relatedly, the need to develop, or the ability to allow for development in the future was one way actors saw the economic value of the Spokane River:

The [Spokane] Tribe wants to increase economic resources and may need to

have discharge permits for businesses. So need to have the ability to

discharge into the river, but limited because of upstream discharge amounts.

[The] Spokane Tribe should not lose its right to discharge just because prior

discharges have taken up the loading capacity [paraphrased, no recording**].**

**(**Respondent 42**)**

Norms associated with specific organizations were also critical influences on

behavior. Some of these norms were tied to individual agencies, their mandates, purposes

and mission statements, or even to the specific job an actor performed. However, the most

pervasive and, arguably, influential norm was pro-collaboration attitudes and perspectives.

Almost every actor interviewed spoke positively about collaboration and could

readily describe the scope and type of collaborative behavior they utilized. This pro-

collaboration attitude was pervasive and significantly shaped management behaviors of

decision-making, problem-solving strategies, and goal-setting, both when actors spoke of

working with the public and other professionals:

From my agency standpoint, our culture is well set up to do that [collaborate].

. . . I think some agencies or organizations are less able to, they may be more

rigid in how they interpret things. And some of that is just age, or culture,

some of it is laws and may be perception of how laws need to be interpreted.

(Respondent 3)

Once you really start collaborating with people you're really looking into what each

other's interests are, not their positions. And you start actually supporting the other

person's interests and so it becomes very difficult to keep the same old appeal and

litigate . . . approach with the same agency or group of people you collaborate with. They're not compatible with each other. (Respondent 29)

Formal rules, particularly laws, and social norms interacted to contribute to the political characteristics of the region. Several actors spoke of influences as being related both to the fundamentals of the political system, like elections and turnover, as well as the broader political perspectives that shaped how agencies could and should work:

Sometimes we have leaders who don't really want collaboration. . . . [Y]ou still see . . . where divisiveness plays in some people's favor. . . . [W]e have some politicians that play that game and make it sound like it's going to be much tougher to solve problems that it really might be. (Respondent 19)

These characteristics often created a climate of uncertainty regarding fundamental factors like goal setting or funding, which strongly affected what actors were able to accomplish. Actors in state and local government positions had formalized relationships with politicians, particularly where part of their job was providing information, including scientific data, professional opinions, or management needs, to elected officials. This relationship also allowed the "political" part of water management to be separated from some actors' jobs, so they could stay out of the political realm and focus on accomplishing daily tasks. One actor discussed how they did not feel comfortable commenting on regional issues that did not match the perspective of their organization, ". . . issues that may be regionally based and perhaps not viewed by the [Washington] city itself as perhaps their view, I tend to abstain from comment . . . . Those are for the policy makers. . . not [in] my purview" (Respondent 31).

In turn, actors influenced structures and the overall water management system in several ways. Most broadly, actors were changing structures by making decisions regarding fundamentals like the allocation of funding or the prioritization of issues, or by choosing to engage in behaviors that encouraged innovation, like collaboration. Many of these behaviors were complex and encompassed several stages, like creating a water conservation public outreach program to not only educate residents, but also hope a more informed public will shape elections and the political environment eventually become more conducive to specific goals, such as pro-conservation legislation.

While litigation has been a part of the water management system in this case study, a majority of actors emphasized their desire to avoid it. From a ST perspective, litigation could be part of a "traditional" water management system, given its prevalence in water management conflict, particularly throughout the dry western regions of the United States. A strong desire to avoid litigation and remove it from a water management system is a significant transformation in the system. Actors are knowledgeable and have witnessed or experienced that water issues often lead to conflict and litigation, which often are expensive, lead to loss of local control, and generate suboptimal outcomes. The allocation of water between WA and ID was a looming concern necessary to be addressed in the near future; most actors expressed interest in avoiding litigation as a solution. "I think we have to collaborate or else we end in litigation. So it's a choice. And a lot of times people choose not to collaborate and just let it be litigated out" (Respondent 37).

Actors created transformation in the system through more formalized and discrete approaches when they formed groups like the Spokane River Toxics Taskforce (SRTT) or the Idaho Washington Aquifer Collaborative (IWAC), as described in more detail later in

this chapter. These organizations changed the water management system by creating new working practices, actor relationships, goals, and management documents that served as alternatives to the status quo:

> I think that since [the IWAC group] has come into being we have had a lot more open discussion and not even in like rulemaking. . . just hey this is what's going on here. . . what have you guys done [in Washington or in ID] when faced this type of issue. And its refreshing to have that at our disposal and not just feel like were bound by these administrative lines. (Respondent 2)

> [in speaking about the establishment of the SRRTTF] The Toxics Task Force is an innovative approach. . . . So rather than the more agency driven TMDL. . . . We decided to all work together and develop measurables, we want to make measurable progress, we've initiated several studies as the [SRRTTF], and so that's a really kind of innovative approach. (Respondent 29)

**Research Question Two**: **What behaviors are actors engaging in to meet management goals?**

At the broadest level, behavior could be classified either as that necessary to accomplish routine tasks for the actor's home organization or contribute to building relationships with other actors and organizations, develop capacity, or reach organizational or regional goals. The first type generally focused on producing the tangible results necessary to the daily operation of the organization. The second category included consultation, cooperation, collaboration, public outreach, regulatory action or litigation. These behaviors were not always neatly divided. It was often necessary for actors to engage

with actors from other organizations to meet goals necessary to the daily operation of their home organization, such as gaining resources and information or ensuring compliance.

Collaborative behavior was a consistent and fundamental theme throughout the interviews. Almost every actor interviewed spoke of collaborative actions or experiences. This included a range of collaborative behaviors, including informal interpersonal cooperation, participation in formal groups or events, and maintaining and acting on pro-collaborative to address contentious issues and areas of uncertainty.

Through ST's lens, collaboration can be understood as a response to dissatisfaction with traditional water management practices' structures. Water has been managed through a bureaucratic and divided framework in the United States, where responsibilities for the different aspects of water, quantity, quality, allocation, use, protection and sanitation have been divided among numerous agencies. Jurisdictional and political complexity overlay this managerial framework to create a fragmented water management system. For example, there are county commissioners, city, state, federal legislators and governments in addition to the state and local regulatory agencies, water purveyors, wastewater treatment plants, and non-profits. While actors cannot change the entire management system through collaboration, as many of these institutions will likely endure well into the future, specific components can be affected and transformed to better suit contemporary needs and management perspectives.

When actors engage in collaboration or create new organizations, like the IWAC or SRRTTF, they are working to change some aspect of this existing managerial framework that is not, or was not, working well for them. Even though actors had different definitions and uses of "collaboration," there was a general consensus that collaboration was a way to try a new management approach, to better meet current needs and deal with future

uncertainty, and to build relationships necessary to effectively managing water within a complex environmental and social context.

Depending on their use and understanding, actors spoke of collaboration as having a variety of purposes and meanings: education and public outreach, sharing resources with other organizations, communicating over issues or needs, working together to perform research or collect data, or engaging in joint decision-making. Collaboration was used to meet current needs and address future concerns regarding the quantity and quality of both groundwater and surface water. There was a limit to collaboration, however; it was not universally used or needed in all settings. Non-collaborative behavior was used both to accomplish an organization's internal tasks as well as to work with external partners. Certain social factors also limited collaboration's extent, discussed in Research Question Three.

Experience with collaboration, engagement in collaborative practices, and pro-collaboration attitudes were extensive. There was a general sense that collaboration was, for most issues, the preferred approach or at the least, necessary to engage in at some level. This meant collaboration with other water management professionals, an organization's constituents, or members of the public. This encompassed a general pro-collaboration trend in the region, where collaborative practices have become more accepted and used over time.

Collaboration manifested in both voluntary and bottom-up ways, as well as a through top-down mechanisms, like agency mandates and legal requirements. This reflects how actors were engaging in collaboration in the ways social institutions currently allowed. Some of the top-down collaborative groups and partnerships were formed as alternatives to regulatory actions, further demonstrating the desire to address water-related problems and needs in more collaborative ways. Actors participating in either, or both, the mandated and

voluntary forms of collaboration spoke of similar goals and reasons for their involvement in these practices. At the most basic level, people collaborated because they needed to share information or obtain resources. This approach was often used to meet basic needs and job requirements. Some actors saw these practices as ways to build relationships and practices that would be foundations for collaborative endeavors or build resilience to future conflict.

Actors spoke of two primary examples of top-down informed collaborative practices in the region, the LMP and the SRRTTF. As the state of ID owns the upper two-thirds of Coeur d'Alene Lake, and the Coeur d'Alene Tribe controls the lower third, the DEQ and Coeur d'Alene Tribe are both responsible for management have dedicated staff members that for the LMP (LMP, 2009). This document and management process arose as an alternative to declaring Lake Coeur d'Alene a Superfund site (because of heavy metal contamination from the Silver Valley and nutrient problems), and has to meet certain EPA standards in regards to monitoring, education, and implementation strategies and priorities (LMP, 2009). The structure of the LMP has created a unique collaborative relationship between DEQ and the Coeur d'Alene Tribe, evident in how actors spoke of this partnership:

> We're essentially attached at the hip, because everytime we go out and do education and outreach we want to be side by side, because we go around saying this is joint management plan, so we have to show we are both representing each of our respective groups…. It's just a partnership. (Respondent 6)

As introduced in the Case Study Description section, the SRRTTF is a group designed to address Polychlorinated Biphenyls (PCBs) issues in the Spokane River. This was created in 2011 as part of WA's NPDES permitting process and serves as an alternative to creating a TMDL for PCBs in the river. The group is focused on performing research to

better understand PCBs issues. In 2014, ID wastewater plant operators who discharge into the Spokane River were required, through their NPDES permits managed by the EPA, to participate in the group. The group must make measurable progress towards addressing PCB issues, or else the process will revert back to a more traditional TMDL approach (SRRTTF, 2012). Regulations were foundations for collaborative action and the ability to revert to a regulatory approach if necessary seemed to create both freedom and incentive to try collaborative practices:

> Our agency [regulatory agency] has to make a determination [in the next year or so as to] whether or not this taskforce is making measurable progress towards solving the PCB problem. If not, we have agreed to do a PCB TMDL or equivalent. . . . We call that a regulatory backstop. (Respondent 13)

Voluntary collaboration was used in both formal organizations and informal practices. Much of the voluntary collaboration was casual, ad hoc, and directly specific to the situation or needs of relevant actors. Most of this type of collaboration included sharing of information, equipment, expertise, time, and other resources and prominent in the more technical disciplines, as one actor detailed:

> The thing that helps is that everything I deal with, pumps are working right, meters are working right, we're taking care of our customers, pressure, enough water. Every other purveyor has exactly same set of problems. Knowing what they're going through makes it easy for me to communicate with them. Also makes it easy to cooperate. (Respondent 26)

The Idaho Washington Aquifer Collaborative (IWAC) was formed out of a need to bring WA and ID purveyors together to address current and future water supply and demand needs in the region (IWAC, 2015). IWAC is limited to water purveyors and wastewater treatment professionals and does not currently have any policy-making or regulatory authority. "The IWAC provides solutions to elected officials. It has no power to enforce or legislate, but its purpose is to find common ground and solutions" [paraphrased from notes, no recording] (Respondent 5). This group's strategy is to progress slowly, conduct research to increase scientific understanding of the water resource, and build resilience and capacity among its members to deal with more complex and challenging issues in the future.

> IWAC was made up of water and wastewater professionals. . . . [T]hat group was selected because we are professionals and we do understand the resource . . . my theory is that our customers would expect us to do things efficiently and solve those problems before they become unmanageable. (Respondent 24)

> Washington and ID purveyors, and we have different regulators, and slightly different regulations, but we all have the same goal and we're all using the same resource. They [Washington regulators] report to DOE [Department of Ecology] and we report to DEQ [Department of Environmental Quality], but beyond that, they have the same needs we do. . . . (Respondent 26)

Another organization, which is not a collaborative, but served important roles in educating the public and providing mechanisms to bring area water professionals together was the Spokane River Forum (SRF). The SRF served as a clearinghouse for information and resources and a body that organized public involvement in river events and activities.

The SRF Conference, held about every eighteen months, provided a place for area water professionals to meet, discuss ideas, and present research findings (SRF, n.d.).

> The Spokane River [goes] all the way from Coeur d'Alene to the Upper Columbia-Lake Roosevelt confluence . . . . We do a lot of events and materials to encourage dialogue on water resource issues, water quality issues, recreation issues, economic development issues, basically the many things that affect the Spokane River. (Respondent 41)

There were other collaborative groups and practices mentioned by actors. These groups were important to one or more actors, but did not necessarily have a current or substantial role in the overall water management system. However, they are still vital processes for smaller areas or for certain people and organizations, and further reflect both the complexity and nuances of the water management system as well as the region's pro-collaborative attitudes and practices.

Enacted by the ID legislature, the Comprehensive Aquifer Management and Planning (CAMP) process was designed, among other goals, to plan for future water needs and generate strategies to avoid water-related conflicts assorted with the Spokane Valley Rathdrum Prairie Aquifer (SVRPA) (IDWR, n.d.). The planning part of the CAMP process was finished in 2011, so many actors who mentioned CAMP spoke of it in passing or as an example of how they had served on a collaborative group. Watershed Advisory Groups (WAGs) and Basin Advisory Groups (BAGs) are public involvement groups associated with the ID DEQ, but were only mentioned by a couple of actors and had limited relevance to this research project. Finally, the Spokane River Stewardship Partners, a collaborative group focused on balancing water quality protection and community needs, was mentioned by a

handful of actors, primarily as another example of collaborative practices in the region, or of their own involvement in a collaborative organization.

**Interactions with Members of the Public**

As many actors were in public-service roles, they also thought of collaboration in the context of interactions with their customers or relevant members of the public. Part of this relationship was trying to educate and inform local residents about the need for water management, regulations, conservation, and quality protection. According to certain actors, there were pervasive public misconceptions about the water resource, particularly about the need for conservation and appropriate pricing of water that needed to be challenged and changed. Other aspects were geared towards gaining compliance with mandates or avoiding conflicts. Educational efforts specifically focused on school-aged children. Actors also spoke of holding events, giving talks, and conducting trainings as methods of adult-oriented education:

> I do a lot of outreach on the water issues. . . . So that can be me just going into the classroom . . . out into the field and doing field trips and doing water activities and lessons. I also do some adult water education in the form of stormwater and erosion education programs, SEEP. We teach landscape design, contractors and engineers about sediment erosion control practices. Also am involved in the IdaH2O master water stewards. . . (Respondent 30)

This was not only important to provide necessary services to customers or the public, but also so management actors were able to do their jobs and accomplish tasks. Enforcing regulations and going after violators was expensive and time-consuming. Actors saw

education and a constructive, "working with someone" perspective, as not only a proactive

and positive approach, but one that was necessary to try first:

> Our department does the best it can to enforce these rules and for the most
>
> part . . . we get good compliance, and very rarely have we issued fines. We
>
> work with the offenders, the property owners, to get compliance.
>
> Unfortunately, there's a few that resist and they end up taking a lot of our
>
> time . . . . (Respondent 40)

## Future Water Issues and Concerns

Some actors spoke about future water concerns and uncertainty about the social and

environmental conditions that may affect water availability or quality. The content and

severity of these concerns seemed closely tied to an individual actor's job and focus, as they

were diverse and related to regional population growth, potential climate change effects, and

the need to be prepared for as-yet-unknown water quality issues and standards. The

fragmented nature of the social setting strongly revealed itself here, particularly in how the

different actors, and the states and tribes they represented, were positioning themselves to

face these future concerns.

There were no clear indications that future events would be resolved collaboratively.

Many components of current water management approaches that support collaborative

practices, such as employee attitudes, perspectives of politicians and citizens, and relative

abundance of water, can easily change. One primary concern was over water allocation

between WA and ID. There was, and currently is, no interstate compact guiding this water

sharing, and it is an issue many actors felt needed to be resolved in the near future.

Each state was currently taking individual steps to quantify current water allocations or ensure water quantity; WA was in the process of making an in-stream flow rule for the Spokane River and ID had been adjudicating water rights in its northern basins, these are discussed in more depth in the non-collaborative behavior section below. However, some actors saw current collaborative practices and relationships as ways to be proactive before issues become problems in the future:

> Right now, we have the opportunity to work together and get ahead of some things. You can work together in the beginning and proactively solve it or . . . forced to work together at the end to reactively solve it, but there is that bad timing in the middle when nobody works together . . . . (Respondent 11)

**Non-Collaborative Behavior**

Actors were asked to describe their jobs and responsibilities, which focused on meeting the internal goals of their organization and not necessarily include collaboration with external partners (Interview Questions #1). These included basic tasks like overseeing staff, tending to the organization's daily operation, and meeting the needs of customers or members of the public. Often, and necessarily, prioritized, these tasks required a considerable amount of actors' time. Actors often spoke of having to balance daily responsibilities with effectively engaging in collaboration and working at an inter-organizational scale.

> The external takes away from the internal because there are only so many hours in the day and so many hours anyone can work. I believe that those external things are bigger . . . than this organization, now I don't know if bigger necessarily means more important, I think it probably does in a sense, but you also have to recognize there is

a limit to how much direction and influence you're gonna have on things. . . .

(Respondent 24)

Even though actors were asked about "collaborative and non-collaborative" actions (Interview Question #3), descriptions of non-collaborative behavior, especially litigious behavior, with external actors were limited. Many actors spoke about trying to avoid litigation. However, for some actors, litigation, or the ability to litigate, created legitimacy. "Our first approach is a collaborative type approach. Litigation is last resort, but we use all tools in the toolbox. If we didn't have litigation as one option I think we'd be taken less seriously" (Respondent 17). Most interactions were when litigation or other command-and-control type action were required to address an issue:

> Litigation is a tool in the box that gets pulled out when you see intransigence and you're experiencing behaviors that can't be modified through education and outreach. Absolutely, it's expensive to litigate, it's not really a preferred means of affecting progress. (Respondent 19)

Additionally, reasons for avoiding litigation included its expense, the loss of control it entails, and the adversarial environment it can create. Legal avenues were also used in more proactive ways, particularly by actors on the downstream side of the Spokane River and SVRPA. Actors consistently discussed three major actions: WA's work to establish an in-stream flow rule for Spokane River, the Spokane River's DO TMDL process, and the Spokane Tribe's setting of a fish consumption rule that has recently forced action on PCBs. Each of these actions has sparked significant responses and changes within the water management system for both WA and ID. Some of these changes include aspects of collaboration, but some also included more regulatory-driven processes and outcomes.

These processes also created some conflict, suspicion, and discontent, particularly with actors in ID.

As a downstream state, WA can influence ID to protect the water quality that flows into its borders in certain circumstances. The Arkansas v. Oklahoma (503 U.S. 91) was an influential ruling relevant to this case. This manifested in the DO TMDL for the Spokane River and Lake Spokane; a process that included a significant conflict and litigation, as well as work groups, modeling exercises, and dispute resolution (Spokane River Forum, 2010). Several actors were aware of this court ruling and its affect in their local situation:

Often been asked "how can they possibly require the upstream state to meet the downstream state standards?" Well, all you have to do is look at the 1992 case between Arkansas and Oklahoma. . . . Keep in mind that was a unanimous vote from the nine [United States] Supreme Court judges, it wasn't a five-four split. (Respondent 23).

Arkansas v. Oklahoma (503 U.S. 91) states that the EPA has authority to consider the water quality standards of the downstream state when issuing NPDES permits. Upstream states discharging point-source wastewater under National Pollutant Discharge Elimination System (NPDES) permits cannot degrade the water quality of downstream states. The downstream state's water quality is the standard to meet, but the EPA has final approval of the standards that are set and met. Also, there needs to be a detectable violation of the downstream waters for their standards to impact the upstream state (The Free Library, 2014). A NPDES permit for the upstream state cannot be issued when discharging under that permit would affect downstream states (Garner & Chappell, 2010, p. 3). The EPA has primacy over ID's Clean Water Act implementation and, thereby, directly over its NPDES

permitting (Russell, 2014). Washington can and has used this ruling to affect change in ID, especially regarding the NPDES process for the DO TDML on the Spokane River (DOE, 2010; DOE 2012; Garner & Chappell, 2010).

Washington's instream flow rule for the Spokane River, as described in the "Case Study Context" section, is another example of a management action backed by law. One actor described this regulation and rulemaking process as follows, "… the rulemaking isn't really a collaborative process, [even though] it grew out of watershed planning. In the end it's DOE's responsibility and our requirement to do it" (Respondent 7). As this rulemaking process occurred concurrently with the data collection phase of this case study, as it was an important, current issue many actors were actively addressing:

Right now, we're in process of trying to get this rule in place. The Spokane River is sort of unusual in that its hydrologically connected to the aquifer which is so transmissive and the water moves through it so fast and you can see almost instant responses of river level changes and aquifer level changes and so because the water is so interconnected it affects both the permitting side, so decisions whether or not to issue new water rights are tied to the river. . . . (Respondent 10)

The Spokane Tribe of Indians, located, in relation to Spokane and Coeur d'Alene, on the downstream end of the Spokane River area, have used similar legal tactics to enact change for water quality The Spokane Tribe of Indians has Clean Water Act section 401 certification to administer their own water quality standards and protection program (EPA, 2010). Out of human health concerns related to the consumption of fish and water from the Spokane River, the Spokane Tribe of Indians set a PCBs concentration limit of 1.3 parts per quadrillion (Kramer, 2014). This standard is stringent, and not detectable with current

laboratory equipment (Kramer, 2014). The standard created a domino effect of responses for other stakeholders, particularly wastewater dischargers who have to meet the standards.

This was not only a frustrating and contentious issue, but it significantly affected and included actors from a broad spectrum of organizations, including nonprofits and state agencies. One, it was frustrating to have such a strict standard that was not fully testable or specifically enforceable. The PCBs enter the Spokane River through stormwater runoff as well as from point-source dischargers, so are difficult to manage and regulate (DOE, 2012). Two, not all entities on the Spokane River agreed on this standard, so there was discord around its science and necessity from human and environmental health standpoints. For example, the standard was based on a historical, not contemporary, fish and Spokane River water consumption by Spokane Tribe of Indians members:

> Basically adopted what [Spokane Tribe of Indians] refer to as a legacy amount … of nearly two pounds of fish . . . plus four liters of water per day from the Spokane River. They also apply a risk factor of one death in a million. . . . That has generated a PCB water quality standard of less than two picograms-per-liter. That's roughly the equivalent of one drop [of water] in Coeur d'Alene Lake. (Respondent 23)

Third, the mechanism used to proactively address PCBs was also contentious. As described above, the SRRTTF is a collaborative alternative to establishing a TMDL for PCBs, but not all actors are satisfied with the SRRTTF approach. In 2011, the Sierra Club sued to stop the SRRTTF process, because it was inappropriate for the polluters, namely the wastewater plants and businesses that discharged into the Spokane River, to set the standards through the SRRTTF (Sierra Club, 2015). This is a recent and ongoing issue. On March 16, 2015, a U.S. District Court judge ruled the EPA abused its authority in seeking a

TMDL alternative (the SRRTTF group), and must assist the DOE with establishing definitive PCBs standards for the Spokane River (Sharp, 2015).

This example illustrates several important features of the water management situation in the case study region. Many of these issues are dynamic, complex, and evolving. The Spokane River in-stream flow rule was just established in early 2015, and this recent PCBs ruling has the potential to alter not only management practices and legal standards, but also relationships and partnerships among actors. Thus, there are certainly issues that are easier or more difficult to address, and so understanding the characteristics of each type is a critical aspect of understanding the management complexities of this region.

**Issues that are Easy or Difficult to Address**

Understanding which issues are easier or more difficult to address is important to understand from a Structuration Theory perspective. These responses illustrate what sort of social constructs and context actors must work within, and how actor behavior responds to these challenges and needs. For example, an actor might choose to use a new management practice to address an issue that is currently difficult to collaborate over or communicate about. In ST, making this change has the potential to alter the broader water management system, and thereby create transformation. Conversely, if an issue is easily addressed, it could reflect how current management practices are adequate and justify keeping the at least that small part of the system, the same.

There was no consistent answer as to which water management issues were the easiest or most difficult to deal with. Actors framed their responses in relation to their specific job duties and the social and environmental context in which they worked. In addition to discussing which issues were more difficult to address managerially or

collaborate over, actors also spoke of issues related to communication and working with the public. This arose from the fact that many actors were in public-service type roles and so not only concerned with working with other professionals, but also with the public; the realities of which were certainly reflected in this portion of the interview process. The challenges associated with this breadth of interpretation of this question and responses offered are explored more in the following chapter.

Even within this diversity, several key themes emerged. From an issue-based standpoint, discussions focused on issues associated with the Spokane River versus those with the SVRPA and issues with uncertainty, for instance, a lack of scientific understanding or unknown future conditions. The social and human focused responses spoke to issues of changing behavior, overcoming social norms, and challenges of communicating complex, scientific ideas versus more relatable concepts.

Stormwater is a good illustrative example of this complexity. One actor related this complexity to the lack of legal mechanisms necessary to address stormwater issues, ". . . issues like stormwater or an agricultural non-point source [pollution], that's a really tough problem to solve. . . . [W]e've got some tools [to address those], but nothing like the CWA [Clean Water Act] to help us" (Respondent 19). Another spoke about how stormwater management was one of their easiest concerns to address:

> The easiest issue I'm working on right now is with the stormwater group
> SEEP, [Stormwater Erosion and Education Program] and we're working on
> reducing stormwater runoff into the lake and river by introducing bio-
> filtration swales … that help filter water before going directly into
> waterways. Doesn't seem to ruffle any feathers. (Respondent 37)

There are several reasons why the same issue received two opposite responses. One explanation probably related with how the actor interpreted the question. Another salient reason could have been what aspect of stormwater the actor dealt with, be it the physical infrastructure necessary to control the stormwater, associated water quality concerns, or the need for education and communication about management issues.

At the broadest level, actors spoke not of issues or conditions being difficult or easy to tackle, but of the attitudes and commitments of people involved in addressing these issues. This reflected how some people saw challenges, in that there would always be difficult tasks associated with water's management and use, but that the people involved were the deciding factor in if addressing an issue was straightforward or more challenging.

> There's passionate people on either side that want to work together and that makes
> it easier. They want to collaborate with groups on either side of the border because
> that's the way we're going to find good management in the future of this resource. .
> . , it's like, hey, I'm Idaho, I'm Washington, there's this line here and we cannot
> cross it. That doesn't work with water. (Respondent 2)

Relatedly, some responses focused on concerns removed from any one specific issue, but related more to the scale or type of response required to address a problem or need.

> The more specific you get with what you're trying to say or do, the more
> contentious it becomes. If you say the river should be clean so [people] can
> fish and swim in it, everybody agrees with that, but how do you get there?
> (Respondent 11)

Trying to change behaviors, norms, and attitudes of locals and members of the public was difficult. Again, this issue involved actors from many different organizations, and

especially from nonprofit groups, local and state government agencies, and wastewater treatment plant operators and outreach employees. Engaging in education, to some degree, and especially with youth, was on the easier end of the spectrum, but the fundamental concern behind the previous quote is true here. There was a perception that people were willing to discuss and learn about water, but when it came time for a manager or policy-maker to enact a rule that would restrict rights or cost money, this, in general, created difficulties. This seemed particularly difficult when issues were associated with long-held and entrenched perspectives of the public, particularly those of private property rights and anti-government attitudes. These normative characteristics created a lot of resistance that required managers to spend a considerable amount of time trying to overcome.

> Where it [collaboration] gets tough is when you have values around the river that really kind of collide. . . . [F]or example, this community is really struggling with a value issue around water. We don't value water highly in some ways. . . . It's very easy to . . . visualize and value water as something that's very cheap and comes easily. (Respondent 19)

When decisions or actions required the public to bear economic costs or somehow restricted the public's autonomy or use of resources, then actors saw those issues as more difficult to address. "Conservation [of water] is pretty universally understood. [But] has its own level of complexity because at some point it means I'm going to have to tell my customers what to do" (Respondent 24). This relates to another issue of who pays to address water issues, such as improvements to infrastructure necessary to meet a new standard:

> Another place where it [collaboration] gets tough is when people have a lot of pipes in the river and they employ a lot of people . . . .[I]n some cases those . . . are

community pipes, they are our wastewater treatment plant. . . then that becomes really tough to have that discussion about cleaning that up, especially if those costs are going to be externalized to the public. (Respondent 19)

Another consistent, broad theme related more to people and institutions than to specific issues was the differences in management systems, regulations, and attitudes between ID and WA. Many actors spoke to these differences, and while not all of specifically classified them as making issues more difficult, there was consensus they should be taken into account and understood:

The amount of collaboration between Washington and Idaho with the Dissolved Oxygen TMDL was a difficult collaboration. I don't think that many of the Idaho constituents felt they were being heard or considered in the development of that TMDL. They were invited to some public meetings and not to other meetings that weren't public. Eventually, I think they were heard, but that was the common complaint. . . (Respondent 36)

Conversely, some actors gave answers that focused on where water resources that were easily visible or somehow relatable to were easier to discuss or work on than issues that required understanding of specific scientific principles or visualizing of groundwater characteristics. Actors mostly spoke about these issues in the context of working with or educating members of the public. Respondent 41 described this idea with two quotes: "If you can see it, it's easy to talk about. If you can't see it, it's hard to talk about," and "Something that's easy to explain is if the river is dry, you can see that the rivers dry. You can show people what the river looked like in a high flow year or a low flow year."

Other issues related to easily visible problems with the water were generally easy to deal with. Actors spoke of how these concerns were not only readily visible to the public, but also how they impacted strong public values associated with the water. These concepts were tangible and relatable to the daily lives or experiences of many people in the region:

> There is a campaign to deal with garbage in the river. Almost everybody that I've ever met agrees that it's a big problem that we should do something about. We've had people just come out of the woodwork to support it. (Respondent 21)

Issues more difficult to address related to complex scientific and ecological processes challenging to effectively communicate about as well as understand:

> What's much harder for folks to understand is . . . the interchange between the aquifer and the river. . . . The question is how do you take this abundant resource, which has very significant river values for fish and people, and get people to understand that interchange and the need to use that water wisely. (Respondent 41)

> The science of lake ecology is a lot more complicated than a lot of people realize. . . . They [general public] don't realize it's not one steady flow of water moving through the system, there are tributaries coming in, and some nutrient cycling . . .internal loading from soils. Really hard to convince people there's an issue. (Respondent 6)

Addressing PCBs was a frustrating and contentious issue for many actors, particularly the wastewater plant operators who discharge in to the Spokane River. The problem was associated with the fact there was significant uncertainty about the science of PCBs and the standards the Spokane Tribe of Indians set are so low they cannot be detected

with laboratory equipment. There are also issues with the fact that PCBs are prevalent in a range of manufactured products, pervasive in the environment, inconsistently addressed by other managerial bodies, and have variable and poorly understood health effects (DOE, 2012). Many of these broader factors were out of the local actors' purview and control. These characteristics made it difficult to talk about PCBs:

> You can't see a PCB molecule, so PCBs are a good example of something that is difficult to talk about. . . . Working with very complex equations in things you cannot see. Doesn't make it wrong, it's just very difficult to explain. (Respondent 41)

As compared to dealing with the SVRPA, the Spokane River was considered significantly more difficult to manage, effectively collaborate over, and address with the public. This conclusion was consistent among actors, and naturally prominent among those actors directly involved in the Spokane River's daily management and use. This was because the Spokane River had significant and complex challenges, including variability in flow, a breadth of quality issues, and numerous competing demands and responsibilities for its use, management, and protection:

> . . . the Spokane River is what we refer to as multijurisdictional. . . . [T]here are federal, state and local authorities, more than I can count. . . there's just a lot of different organizations and individuals trying to use, or regulate, or take care of, or protect the Spokane River in a lot of different ways. Sometimes those interests easily coincide, sometimes they are contentious. (Respondent 41)

These realities certainly mirror answers to other interview questions, where discussions about the Spokane River were much more extensive and complex than those about the SVRPA. The SVRPA's water is clean and flows prolifically. The measures in place to protect its quality, such as enforcement mechanisms for hazardous materials storage over the aquifer, or to control water extraction, such as legal frameworks purveyors had to follow, were straightforward:

> The aquifer seems to be doing fine. . . But the wild part is the Spokane River and the losing reaches . . . among some people on the Washington side there is a mindset that there is not enough water and we have to not use so much. Many on the ID side we don't feel the same way . . . . [A]s time goes on, some people in Washington are going to want the Idaho users to use less water. . . . The purveyors are trying to talk to each other so we don't get in the middle of that, but the states, there could be some conflict. (Respondent 26)

> The Spokane River is more difficult. Different water quality standards in each state. Washington trying to put in some really heavy rules on toxics. . . such as PCBs, and then in-stream flows for water coming from Coeur d'Alene Lake and moving through Post Falls Dam and. . . into WA. (Respondent 2)

**Research Question Three: Is management behavior creating effective management systems to deal with water-quantity management needs at a regional scale? a. What are the actor-identified barriers to achieving effective collaboration in the region? b. How do actors seem themselves in the region?  Do they have already a regional perspective that influences their management decisions and behavior?**

**Regional Perspectives**

There was no one overarching response to the questions of creating a regional-scale water management system or how actors saw their place in the larger region. Actors did see themselves as part of a larger region extending beyond their home organization, but that region did not necessarily match up with each other's perspectives or the case study area conceptualized for this project. This section does not follow the research question's order, as it proved more appropriate to combine and discuss the answer to part "b" here rather than at the end. The idea of regionalism was individually interpreted and oriented around an actor's job description or the type of collaboration they engaged in. At the broadest level, there was a strong sense individual actors and agencies did not exist independently from one another or broader social characteristics. "This region is seamlessly connected. It is linked socially, environmentally, and economically" [paraphrased from notes, no recording] (Respondent 5).

Here, as in other aspects of this research, economics were an important reference point, particularly in the economic value that clean water had for use, development and population growth in the region. "Everybody has made the commitment to go to tertiary treatment as a minimum. That's primarily because we [dischargers] all recognize that the health of the river is absolutely crucial for the economic growth of this region" (Respondent 23). One actor viewed region as tied together, at least partially, through basic economics of the supply chain:

> . . . [B]y default, Idaho has a phosphorous detergent ban on both laundry and
> dishwashing detergents. We [Kootenai County] have had a laundry ban on
> phosphorous . . . for a good number of years. . . . But the fact that Spokane County
> phased in a ban on dishwashing detergents affected us . . . because distributors are

not going to carry two products, one for Washington and one for Idaho. (Respondent
23)

Others saw the region as centered on the connectivity of the surface and groundwater
resources, and their corresponding social systems and concerns:

> We can remove all the PCBs in Spokane but if we don't also have
> removal [of] PCB's at Coeur d'Alene and Post Falls we won't meet the
> standards so . . . we're going to take steps to make reductions, but we really
> need everybody to do it for it to be significant enough to move towards
> meeting both state and tribal standards**.** (Respondent 42)

A minority of actors weighed the involvement at the regional level versus individual
costs or benefits. Actors had to balance the requirements of their home organizations, cities,
or counties while engaging in collaboration as much as possible to meet other needs or stay
involved in regional issues. There was certainly a tension between trying to engage at a
broader scale while also not going against what they were mandated to achieve or protect, or
what people they were answerable to, ranging from organization directors, politicians, or
residents wanted to happen. So, while they may have seen the value of working at a regional
scale at a conceptual level, doing so to the fullest extent possible was not always pursued or
possible. In referencing potential limitations for collaboration, one actor compared the
group-level to the regional, "There are a lot of situations where what's best for . . . any [one]
entity might not be what's best for everybody else. So is it better to collaborate and have
regional success at the expense of something within your smaller group?" (Respondent 11).
If actors decided to routinely place the needs of their individual organizations before those

of the region, that outcome could be a significant barrier to productive regional collaboration.

**Actor-Identified Barriers**

Social norms of members of the public were significant barriers. Many actors mentioned how the perception of water abundance was pervasive, which considerably affected public attitudes about water conservation and management actions. Having to deal with such attitudes created resistance for managers, as they had to address misconceptions or deeply held beliefs to make progress with appropriate decisions and actions:

Folks here [in the Spokane-Coeur d'Alene area] use about two times per capita . . . than anywhere else in Washington or Idaho . . . . We have virtually the cheapest water in America here, and people just absolutely scream when you talk about raising their water rates or going to a conservation water schedule. (Respondent 7)

The other prominent social norms, particularly in ID, related to the private property and anti-regulation attitudes. Again, these norms were often seen as barriers to managers accomplishing the management they felt necessary to protect water quantity or quality:

Private property rights, you can feel it through how people talk about Idaho versus Washington policies. They [Idaho] want to keep what's theirs. . . so they don't want to be influenced by downstream users when they're already influenced by federal government and the Clean Water Act. (Respondent 2)

Through the process of elections, social norms were also linked to the political environment. Politics affected the broad context actors, particularly those in state, city or county, jobs had to respond to and work within. The political environment and perspectives

about regulations or private property rights were often seen as significant barriers to fully

performing jobs or making ecologically sound decisions:

> For quite some time, we've had a situation here, because . . . the political issues have
>
> created their own level of distrust, and their own level of problems that may
>
> ultimately be more difficult and take more effort to undo than the physical
>
> problem. (Respondent 24)

The constant cycle of elections and new political officials created both significant

uncertainty as well as extra work for some actors, as they had to educate new officials and

work to protect their programs:

> I mean everything relates to politics . . . in natural resource management and
>
> government, you could have an election change a lot of things about what we do . . .
>
> It can be unpredictable. (Respondent 21)

Differences between jurisdictional entities included fairly abstract concepts like

attitudes or cultural perspectives as well as more specific, discrete points, like regulations.

Political, regulatory, and managerial differences between WA and ID were commonly cited

considerations. Characteristics of Native American tribal, particularly of the Spokane Tribe

of Indians, culture, water and fishery management perspectives, and legal standing were also

relevant and quite different from the state systems.

 Also, some actors cited differences in organizational culture between local, state,

and federal agencies as generally problematic. Some of this complexity directly related to

differences in social norms and attitudes held by residents in the two states: "There is a

difference in the philosophy between the two states, with Washington taking a much more

liberal or green approach, to water quality standards than the state of Idaho. So has this generated conflict? Yes, it has" (Respondent 23). Also, just the presence of so many different federal, state, local organizations, tribes, regulations, political factions, and stakeholder groups created complexity and friction against accomplishing basic tasks or staying on top of certain issues. An actor from one non-profit summed up the challenges having so many different jurisdictions and layers of government in the area caused:

> Can't get other agencies to come to the table to help explain that because the Land Use Code is a county issue. . . . Same with Idaho Department of Water Resources, not involved because it is not quantity issue, but it is development over the aquifer. Difficult sometimes that we have to sit on so many committees because so many agencies deal with just one aspect of natural resource management. . . . It can become frustrating trying to interrelate things at different government levels [referencing issue with shoreline setbacks in the County Land Use Code]. (Respondent 37)

Specific differences in water quality limits generated significant challenges for actors. For the Spokane River, these differences were not just between WA and ID, but the Spokane Tribe of Indians as well. Regarding the DO TMDL process, some actors did not agree with WA's model or with the science behind the reasons for specific reductions in numbers:

> The lack of consideration in the model that they applied . . . to nutrients from Idaho seemed to be strategic and the [Idaho] dischargers . . . never really seemed to get consideration . . . let alone the target levels they were pushing for in the TMDL. (Respondent 36)

As a whole, actors in ID were not satisfied with this process, which led to conflict and lawsuits. And while some concession were reached to improve ID's situation, the power that WA had to set this standard served as a barrier, at least in opinions expressed by some ID actors, to achieving true and positive collaboration between the two states:

> There's always going to be a certain amount of tension between jurisdictions on these types of issues. And it's not a negative thing, it's just a part of who we are and what we're doing. For example, ID folks have a different set of water quality standards than we [WA] have. And to a certain extent . . . their priorities and objectives for water quality management are going to be a little bit different than ours. . . . (Respondent 13)

The Spokane Tribe of Indians' presence and power, including the issue regarding PCBs, as described immediately above, was evident and added another layer of complexity to the system:

> The Spokane Tribe is interested in both of these processes in terms of DO and PCBS and they work together as they much as they can with us. They have their own water quality standards for these same pollutants downstream from Lake Spokane. (Respondent 13)

These dynamics certainly affected the management practices of and relationships among the primary actors in the region, but were not necessarily barriers to collaboration or productive work. There were significant barriers, however, both that affected actors' ability to conduct their jobs as well as to address specific, challenging issues.

**Specific Barriers**

The three most commonly cited barriers were lack of time, staff, and money necessary to be able to fully commit to collaboration and reach internal organizational goals. For many actors these were the first responses given when asked about the challenges they and their organization had to work within and address. These barriers were often also related to the need to balance meeting the internal needs of the organization with the commitments for external collaboration. Many actors felt they had to prioritize tasks or involvement in collaborative groups or issues based on what they had the resources to accomplish. These shortfalls created significant environmental impacts by creating results like having to prioritize issues or falling short on gaining necessary compliance and oversight. This damage was fundamental to more than just the actor's ability to collaborate, but their ability, and their organization's ability, to meet mandated requirements. This reality both influenced the extent of an actor's engagement with collaboration as well as the characteristics of some collaboration:

> Funding always an issue. The LMP laid out an implementation team that's
>
> bigger than what we got. County is. . .asking . . . where's the data? . . .
>
> Asking us to study less, deliver more, we don't really have enough staff to do
>
> everything that the plan asks for. Struggle to balance what falls off the plate
>
> at any given time. (Respondent 6**)**

> Mainly money, there isn't enough staff, there isn't enough resources . . . For
>
> example, . . . .the EPA oversees all the NPDES permits in ID. . . but because this
>
> agency is so heavily understaffed, it can't constantly review each of the plant's
>
> monitoring reports, so we do that, and we see egregious water quality violations of

phosphorous and effluent nutrients into our waterways through these licensed point

source places. So then it's on us as a citizen to file a citizen's suit to even get the

EPA to notice that a wastewater treatment plant has had 17 years of violation.

(Respondent 37)

A few actors directly related lack of staff and funding to the recent recession and its

long-lasting implications. There were lasting effects of the recession, where many agencies,

particularly state agencies, had their budgets and staff reduced. "The budgetary environment

since 2008 has been very difficult . . . we've not got a lot of resources, and will be worse

next year, so a lot of the money we had to support these things is gone" (Respondent 7).

Other actors mirrored this sentiment and related budgets directly to staffing levels and

workloads:

A lot of folks in the federal and state government are doing jobs that used to

be done by two to five people . . . . [D]ealing with much reduced budgets

compared to where they were even five years ago. And so, I think it's really

hard for people to have the time for any collaboration seen by their

management that's not absolutely necessary for whatever their top priority is

at the moment . . . . (Respondent 21)

Finally, organizational staff turnover was only mentioned by several people, and

produced mixed results. Some actors saw turnover as a problem, while others did not think it

a significant concern. Where staff turnover was happening, it could affect the relationships

that had been built among staff members in different agencies. One actor saw staff turnover

with the local United States Forest Service (USFS) as a problem, because certain members

of forest collaboratives remain for a long period of time, while the USFS representative is

often different because of turnover: ". . . and the USFS person is always changing. Some

relationships [with the USFS employee] are fantastic and others seem like they aren't really.

. . into collaboration (Respondent 29).

Other actors saw more continuity in staff members, especially regarding organization

employees that they needed to work with on a regular basis or that they had built

relationships with through time:

> I would say that most of the players [stakeholders] that were here [during an
>
> earlier collaborative process that established relationships] we work with. In
>
> ID, you got the city of Coeur d'Alene, Hayden, and Post Falls, a lot of people
>
> we work with over there are the same as they were before. Quite a bit of
>
> continuity between people even when have changes. Same thing is true over
>
> here on this side [in WA]. (Respondent 13)

Lack of replacement hiring for retiring staff was also cited as a problem, particularly

as it meant a loss of institutional knowledge and the ability to directly educate new

employees and help them prepare for a challenging and complex job.

> Impossible to get some succession going . . . can't seem . . . to hire somebody to train
>
> them in. This is not a job you learn to do in a month or six months. . . . Because
>
> there's an awful lot of institutional knowledge and friendships that will just
>
> disappear with us [current employees]. (Respondent 7)

This implies significant long-term implications can result from current budget and

staffing shortfalls. As discussed in the next chapter, this idea of long-term consequences and

connections between disparate temporal and spatial locations is strong in ST. As institutions

and structures endure, it is important to create and support the types of institutions that are

appropriate and productive within a specific setting. As discussed, the lack of funding, staff, and time, are significant limitations that actors and institutions have to adapt to and accommodate. However, interrupting this cycle, like when a short-staffing situation becomes untenable and someone acts to find funding or hires a new employee, is an exact illustration of ST's prediction on how change can occur in a social system.

**Summary**

The answers to these first three research questions reveal a water management system that is piecemeal regarding areas of change or stasis, issues that are easy or difficult to address through collaborative or non-collaborative behavior, and how institutions and structures, including regulations and social norms, influence actor behavior. One important result illustrates ST's idea of stasis and change in social systems. Within the data collection and analysis phase of this dissertation research (August to April 2015) significant regulatory changes occurred in the region. The instream flow rule for the Spokane River was adopted and the Sierra Club's challenge to the SRRTTF approach for PCBs in the Spokane River produced a court ruling, both of which have the potential to create outcomes including litigation, conflict, cooperation, and new management practices or institutions. This dynamism reinforces the need to both understand a discrete component of the system, like a new regulation, and the holistic, long-term perspectives of how that piece may fit into and alter the system. As explored in-depth in the next chapter, this ability to examine both scales is a valuable attribute of ST that allowed for a critical and nuanced understanding of this case's water management system.

## Chapter V: Discussion

This chapter discusses how well Structuration Theory (ST) explained the case study's water management system. The goal is to illustrate ST's explanatory power, relate findings back to its theoretical framework, and discuss limitations with its empirical application. Research Question Four provides the broad framing for this chapter's two sections. The first section begins with an overview of the fundamental benefits of applying ST to this case. The discussion then narrows to explain specific results, categorized by each proposition tested. Information from the natural resource and water management disciplines contextualizes findings as appropriate. The next chapter, Chapter VI, discusses the limitations of applying and testing ST in this case, which include both the difficulty of translating an abstract theory to an empirical setting and the presence of case study attributes ST did not fully address.

**Research Question Four: Can Structuration Theory prove to be an explanatorily beneficial (that is, valuable and appropriate to explaining the research-identified phenomena and processes) framework to examine the water management system in the region? a. What aspects are constructive and productive from an explanatory and practical perspective? b. What aspects either refute or support ST as a theoretical perspective?**

Structuration Theory proved to be an appropriate framework to apply to this setting. Practically, ST's scope, propositions, and concepts captured the complexity of the water management system, which included a diversity of jurisdictions, organizations, and institutional arrangements. Structuration Theory was not only able to address both the micro and macro scales of this social system, but also reveal the relationships between actors,

institutions, and structures located within them. This allowed for holistic evaluation of the system as well as examination of individual components, like a specific regulation or a certain actor's behavior. This understanding evolved with ST's perspectives about how a social system is perpetuated or transformed, as certain components of this water management system changed, while others remained static. This related to the equal weight ST places on actor-level behavior and structural-level constructs, where both are powerful and integral to the constitution and function of the social system.

Instead of only passively responding to broader social factors, ST sees people as active, knowledgeable agents who draw on their experiences and understanding to engage purposefully in a social system. Through their actions, people have a fundamental role in how social systems, and the structures and institutions they encompass, are formed, sustained, or transformed over time (Giddens, 1984; Poole & McPhee, 2005). For example, regulations not only influenced actor behavior in this setting, but actors were able to utilize them to affect others and create change. Actors often engaged in collaboration to the extent their organizational mandates and other considerations like funding and time, allowed. Many actors had autonomy to pursue actions outside of their job descriptions, like collaboration, they saw as necessary to the effective functioning of the regional water management system. This sort of critical engagement reinforces the strength of actor behavior and the importance of understanding its role, particularly regarding ideas of stasis or change in the water management system.

Structuration Theory's focus on how social systems are either perpetuated or transformed through time provided a unique and beneficial perspective. This revealed while many organizations and institutions had endured for a significant period, they were

surrounded by, and to some degree affected by, dynamic regulatory, managerial, and environmental conditions. This vitality not only included actor-level behavior, like collaboration, but also top-down influences, including new regulations or social norms regarding water use and protection. This understanding of the balance between the status quo and change revealed how the water management system existed through time, the extent of the changes that happened within the system, how resilient the system was to change, and what social mechanisms allowed for or prevented transformation. While this gave a nuanced and real-life perspective of the social system, it was particularly useful in identifying components experiencing change. As ST predicts overall social stability and endurance of structures and institutions, these areas of transformation, and the reasons for them, were important to understand.

Finally, ST's abstract design required the supplementary use of natural resource management information to tailor ST to this case. This literature helped inform the selection of propositions, so the ones chosen were relevant and defensible from a disciplinary perspective. This ability to combine specific natural resource management ideas with ST's concepts created a contextualized and productive research process. As the following section illustrates, the propositions tested revealed a wealth of information about the recursive, dynamic relationships between actor behavior and its broader social context.

**Findings Categorized by Proposition**

This section categorizes results by these five ST propositions: structures, institutions, interactions, disembedding mechanisms, and reflexive monitoring. Individually, each section explains the value of examining the proposition and how well it evaluated its portion of the research setting. Together, these five propositions reflect the case study's core

components and functionality, including how actors used their knowledge and expertise to engage purposefully with the system, and how power manifested throughout the region, where it was vested in regulations, related to actor position and role within the system, and strongly correlated with the ability to affect change. While every proposition produced valuable results, the findings related to power, disembedding mechanisms, and reflexive monitoring were the most robust and interesting to discover.

**Structures and Institutions**

The results from Research Question One, discussed in the previous chapter, illustrated how structures related to actor behavior. This section focuses on the value of understanding structures, their relationship to institutions, and how both contribute to the transformation or perpetuation of social systems. Structures are abstract social constructs, comprised of rules and resources, which constrain or enable behavior (Chang, 2014). By engaging, consciously or unconsciously, in structures, actors contribute to their production and reproduction across time and space. Structuration Theory predicts structures endure, exist largely unchanged through time, and produce routine patterns of behavior (Busco, 2006; Giddens, 1984). However, ST also accepts that structures and institutions can change under the certain conditions, often through the actions of dissatisfied actors. Created at the intersection of agency and structures, institutions are built from the collective influence of many people, serve to guide behavior, and are replicable across diverse spatial and temporal contexts (Giddens, 1984; Lyons & Brown, 2009; Poole & McPhee, 2005). To illustrate an institution, Poole and McPhee (2005) describe an example of a library, which has a consistent purpose and design, and is replicable in similar form through time and across multiple geographic locations.

Giddens conceptualized structures as being internal in humans, derived from their "memory traces," which is the knowledge necessary to conduct daily activities, and then given a concrete form through social practice (Busco, 2006; Giddens, 1984). Poole and McPhee (2005, p. 178) state, "structural features are in practical consciousness, we use them but we cannot explain how, and sometimes we are not aware of them." However, this abstract definition of structure was not easily translatable into an empirically testable concept. Operationalizing structures into more tangible concepts was necessary. Other researchers have understood structures as policy frameworks (Stone & Sandfort, 2009), as safety cultures in healthcare settings (Groves, Meisenbach, & Scott-Cawiezell, 2011), or as guides for interorganizational coordination (Alexander, 1998). In this case study, structures became "broad social factors that constrain or enable work," such as regulations, policies, or social perspectives about water management.

**Stasis and Change**

Social perspectives and needs regarding the use and management of water are dynamic and evolve with time (Feldman, 2011). Some components of corresponding water management systems, like more stringent water quality regulations, have changed accordingly. Other characteristics have remained relatively static, like how responsibility for different aspects of water, for instance the protection of quality or allocation of quantity, is shared among different organizations and institutional arrangements. This illustrates the piecemeal nature of the current system and reinforces the need to not only understand how actors work within this framework, but also which components are static or dynamic, and why they are so.

Even though these larger organizational and institutional arrangements were largely the same through time, actors consistently spoke of change in the system. Change had many iterations. There were evolving social norms and attitudes regarding water, new technology that reduced pollutants, updated or new regulations, and how managers worked with other professionals and the public to accomplish goals. This showed that while organizational structures were relatively static, the actors in those organizations were reacting to a myriad of ever-evolving regulations, norms, environmental conditions, and management practices. For example, the perspective that water should be of good enough quality to protect human health, is in ST's conceptualization, a structure enduring over a significant period, at least since the 1970s with the implementation of the Clean Water Act (Feldman, 2011). Relatedly, the organizations charged with assuring water quality in ID, the DEQ and EPA, have also endured relatively unchanged, at least in their organizations structures and overall missions, over several decades.

Actors were simultaneously engaging in, and perpetuating, these structures and institutions, while also generating change by actions like participating in a new collaborative group. Actors also spoke of how trends towards collaboration had been occurring, in some contexts, for the last twenty to thirty years. This again illustrates the idea of transformation in the system, but also collaboration was an established, routine behavior for many actors, and so was not necessarily something the entire system needed to be changed to include, but an institution that could be perpetuated where it existed and nurtured where it did not.

Top-down mechanisms, particularly regulations, forced significant changes in the system, including some collaborative behavior. As described in more depth in the "Power" section below, these processes created collaborative partnerships, provided mechanisms for

actors to assert control, and changed water quality standards that forced actors to implement new technology or management practices. More bottom-up, ad hoc processes, including cooperative relationships among actors, collaboration to share resources or information, community outreach and education, and grassroots-style collaborative groups were also present. Both processes were meaningful, particularly in how they affected the system and created change in different ways.

While there were piecemeal attempts and successes at changing existing water management frameworks, overall, the system remained jurisdictionally fragmented and mirrored traditional bureaucratic management frameworks. As a whole, actors were more constrained by institutions and structures than they were able to significantly affect these structures and create meaningful transformation in the system. Structuration Theory makes strong claims about the pervasiveness of institutions and stability of social systems are across time (Giddens, 1984). Research results supported this by revealing there was piecemeal progress towards the use of collaborative mechanisms to address relatively small and discrete pieces of the overall system.

As one example of this, the longevity of each of the three major collaborative groups is not clear. The Coeur d'Alene Lake Management Plan (LMP) is on a five-year renewal cycle and must meet EPA-mandated milestones to continue (LMP, 2009). The SRRTTF, formed in 2011, has to demonstrate measurable progress towards PCBs reduction in the Spokane River or be replaced with a traditional TMDL process. As mentioned several times, a recent court ruling could alter or eliminate the SRRTTF process. Still in its early stages of development, the Idaho-Washington Aquifer Collaborative (IWAC) currently focused on research and relationship building (IWAC, 2014). It does not have any regulatory powers.

Thus, the IWAC does not replace other agencies regarding enforcement of regulations or delivery of water, and so is not, from a standpoint of accomplishing the basic duties of water purveyors, indispensable.

This example illustrates how certain actors, in certain contexts, are eager to try approaches that rely more on collaborative practices and less on regulatory force to address water management problems. However, simultaneously, these new approaches are supported, at least in the case of the SRTT and the LMP, by regulatory backstops that can replace them if they fail. Regulations are powerful, and when understood as not just as the individual laws shaping behavior, but the as broader structures and institutions supporting laws, as relatively permanent and enduring features of modern social life. However, if these collaboratives do endure, then they could feasibly gain, replace, or reduce the power currently held by regulations.

**Interactions: Power, Norms, Meaning**

Interactions mediate and shape actions, through which reproduction or change in the social system occurs (Busco, 2006; Giddens, 1984). Power, norms, and meaning interrelate and work together to inform every interaction (Poole & McPhee, 2005, p. 177). Interactions are specific to a certain social, temporal, and spatial situation (Busco, 2006; Poole & McPhee, 2005). People know how to tailor interactions to meet the social context of each setting, but do not necessarily consciously think of this process or how power, norms and meaning combine to inform it. A simple example of an interaction is a manager assigning a subordinate employee a task. The manager has power to direct the employee, norms of behavior direct the employee to follow the instructions, and meaning ascribed to the task guides how the employee accomplishes the work. This interaction helps sustain the

organization's function and presence in society. Most of these interactions are routine and reproduce the organization as it exists, an innovative or failed interaction could force organizational change.

Practically, it was difficult to test how all three components worked together to affect interactions. Actors described behaviors equivalent to "interactions" in ST, including giving and receiving instructions, making management decisions, enforcing regulations, interacting with other members of a collaborative group, or educating members of the public. Trying to understand each interaction to such a nuanced detail would have been time-consuming and at the expense of evaluating other aspects of actors' work. These are complex, multi-layered concepts often deeply engrained in daily life or human relationships. Actors may not have been able to readily identify or adequately verbalize how these three concepts related to each other and then how they worked to shape a specific interaction. As discussed in the final paragraphs of this section, a few actors did speak of power, norms, and meaning in relation to an interaction, but did not necessarily see or state this relationship in such a direct and clear manner.

Discussing power, norms, and meaning separately did produce interesting and usable results. Interviewees were able to verbalize and explain these concepts by providing rich narratives about how they asserted power or how social norms about water management affected their work. Rather than discussing interactions at an organizational-level, actors mostly spoke of their personal interactions, some examples are how they gave an educational program to high school students or how they enforced a regulation. One exception was actors often distanced themselves from the discussion of how regulations were applied to constrain another organization's behavior or their own organization's

actions. For example, actors spoke about how "the state of WA" enacted a law, or how "another organization in ID" was affected by a law," rather than discussing this in terms of how they used or were affected by a regulation. The reasons behind this distancing from the idea of applying regulations were unclear. Perhaps, actors did not see themselves as having this power or want to be seen as eager to negatively affect someone else or as dissatisfied with how another entity projected their influence in the system.

**Power**

Power is a fundamental concept in ST, it shapes interactions by allowing people to assert control and have the ability to act (Giddens, 1984; Poole & McPhee, 2005). Power can mean domination as well as productivity facilitating certain practices or outcomes (Cohen, 2005; Hardcastle, Usher, & Holmes, 2009). Power's strong, integral role in shaping a social system was evident in this setting. Following with ST's predictions, power manifested as both the assertion of influence as well as the ability for actors to work with other professionals and the public to accomplish tasks.

Robust in its strength and diverse in its meaning, power is pervasive in natural resource management. For individuals, power can be achieving representation through elected officials (Roberts, 2011) or empowerment to be more fully involved in management decisions (Norman & Bakker, 2009). The control of water and the ability to allocate it for a specific purpose generates economic and political influence (Leyborne & Gaynor, 2006). More broadly, power must accompany governance, especially when certain responsibilities are devolved away from a centralized government and to local entities (Berkes, 2010; Norman, Cohen, & Bakker, 2013). The imbalance of power between different entities or actors can drive conflict or collaboration. Different actors, members of the public, and

organizations have different types and levels of power, so understanding such relationships is crucial to understanding how new ideas are adopted, information is shared, and decisions are made (Berkes, 2010; Broderick 2008).

Actors rarely spoke directly about power, but used proxies, like an organization's ability to use a specific regulation, to highlight both their standing and influence. This was also true for the reverse, where many actors described how their organization was affected by another's assertion of power. The presence of the regulation was not enough, rather it was its implementation that influenced the system. This relates to ST's fundamental ideas about how agency intersects with broader social constructs, like a regulation, to affect change. So, even though actors did not necessarily want to see themselves as individually having such power, they were the ones perpetuating and enacting this power through their development and enforcement of policies supporting these regulations.

**Differences in Power among Idaho, Washington, and the Spokane Tribe**

An actor's position, relative to others, in the social system helps shape their role and behavior (Busco, 2009, pp. 252-253). Given the diversity and abundance of entities present in this water management system, the location of power was an important factor to recognize and understand. Regarding the ability to influence water quality, entities on the downstream side of the Spokane River, namely the Spokane Tribe and the state of WA, were in a more powerful position than ID.

The DO TMDL process generated significant conflict between WA and ID. While ID actors were able to assert some power to reduce the restrictions placed on their wastewater plants, the imbalance of power was evident and created conflict and litigation between the two states. This extends to the water rights held by the city of Spokane:

. . . [T]he city of Spokane has two times the amount of water available for use than they currently use today. . . . ID [interests] are frustrated by that and are skeptical that the state of WA would provide so much water to . . . Spokane and then pass an in-stream flow rule and then say we're not going to allocate any more [in WA]; but there's still a lot more water that's likely going to be allocated [in ID]. (Respondent 22)

Regarding water quantity, entities were asserting control over the resources in their respective boundaries. Idaho was adjudicating its northern basins to determine the extent of water rights and current allocation of water (IDWR, 2014). In the fall of 2014, WA was in the process of establishing an in-stream flow rule that would maintain specific minimum flows in the Spokane River relative to the season. This rule was adopted in January 2015, and while designed to maintain flows for fish habitat, recreation, and hydropower generation, it also assigns a water right to the river, to protect it from impairment by subsequent water rights (DOE, 2015). How this in-stream flow rule may affect upstream ID is still unclear. Actors in both WA and ID saw this behavior as positioning in preparation for an eventual decision about interstate water allocation.

**Norms**

Understanding norms revealed the strength of the broader social context in shaping behavior, particularly of water managers and non-profits organization employees. In ST, structures are divided into rules and resources, rules are further classified into formal and informal rules. Informal rules equal norms of behavior (Giddens, 1984). Norms are highly influential and serve to constrain or inform behavior (Giddens, 1984; Leduka, 2006).

Social and cultural norms are critical parts of natural resource management, as they often constrain what managers are able to achieve, inform conflicts or cooperation, and prioritize management decisions. These norms are diverse and informed by specific social context, such how norms about water uses are likely different in areas with extensive drought versus those with abundance precipitation. These are examples of norms directly relevant to this context. The social acceptability and support for a political regime and its agenda is normative (Hogl, Kvarda, Nordbeck, & Pregeernig (2012). Ideas about sustainability or what social value is placed on environmental resources are shaped by norms (Roberts, 2011). Cultural norms about water justice issues affected how local residents responded to water management rules (Wutich, York, Brewis, Stotts, & Roberts, 2002). These examples reflect the strength norms can have in shaping political frameworks, ideas about the how natural resources should be used, and how norms should be acknowledged for their role in compliance, or lack of compliance, with regulations that require behavioral change or restrict personal rights.

The previous chapter discussed the dynamic relationships between how norms affected managers and how they, in turn, were working to shape norms held by the members of the public. Here, it is important to discuss how examining norms produced beneficial results and how those results tie back into ST. As a whole, understanding the characteristics of social norms, particularly those held by members of the public, framed of the larger social context in which managers had to work. For example, actors spoke of the importance of conducting educational outreach to affect public norms about water conservation or the importance of protective regulations. Without this understanding, a significant amount of

actor's behavior would have been either unacknowledged or not contextualized, leading to a more incomplete view of the setting.

From an interactions standpoint, there were norms of behavior regarding relationships among professionals and members of the public, the proper and effective way to enforce regulations, and the choice to engage in certain management practices, like litigation or collaboration. While these norms were often embodied in more tangible ideas like a law or codified management behavior, there was a range of relevant norms more abstract and difficult to verbalize.

These findings reinforce ST's ideas about how the informal or normative rules affect not only daily life, but also the social system as a whole. Structuration Theory's perspective of how norms influence interactions, or the actions and relationships among people or institutions and people highlights the importance of these norms on not just the management system as a whole but on individuals and relationships. The understanding of norms and their role in the water management system were only cursorily addressed in this case study. There is certainly a need for further study into the roles of norms in this system. Norms different from the majority (as actors described it) needed to be better understood, such as those held by the public that were pro-conservation or supportive of regulations. As discussed below, actors' descriptions of the meanings they assigned to water were more robust than descriptions of how organizational norms affected their behavior. Having a stronger understanding of the organizational norms that directly guided actor behavior would be beneficial to better explaining behavior, both in a practical sense and as related back to ST.

**Meaning**

In ST, "meaning" is defined as how actions or ideas are understood and interpreted (Giddens, 1984). To translate this into a water resource management setting, meaning can be associated with the values actors place on water and its use, including its value for recreation, utilitarian, or spiritual purposes. One consistent theme in the literature is how diverse the meanings associated with water can be and how these meanings affect management approaches.

Interestingly, actors primarily spoke about meaning as specifically related to their jobs, while they mostly spoke about norms in the context of the broader public. The reasons for this are unclear. It could be "norms" can be talked about in more general terms than can meaning, and so actors were more able to categorize collective norms held by the public. Meaning is more often specific, and since actors are immersed in their daily jobs, which largely revolve around the water-related meaning those jobs embody, it is reasonable their related descriptions are detailed and readily discussable.

As expected in such a complex setting with many different organizations and interests, actors described a range of meanings they associated with water. Rather than focus on the diversity of meaning associate with water in the region, it is more interesting and beneficial to evaluate where these different meanings created conflict or overlapped to produce shared values.

Shared meanings were relatively easy to agree upon, however, mostly focusing on maintaining the basic health of the water resources, by conserving water or protecting quality. Still these shared meanings provided a platform for cooperation and discussion among actors. One of the most important meanings actors assigned to water related to its

economic value and importance to the region. Though actors assigned different reasons as to why water's economic value was important, there was shared recognition that protecting the health of the water was vital to the region's overall economy.

Teasing out the concept of meaning did enrich understanding of actor motivations, the design of interactions with others, and how meaning ascribed to water can create either divisions or a platform for shared decision-making. A few actors described how shared values and meanings associated with water, such as a desire to have the Spokane River usable for fishing, swimming, and drinking, were foundations for collaboration and discussion:

> The easy collaborations are things like access where . . . most people want effective and healthy and ecologically sound river access, it's just a matter of problem-solving . . . so it works for everybody. Respondent (19)

**Relationships between Power, Norms, and Meaning**

While it was difficult to understand this relationship directly from actors, it is readily noticeable through objective evaluation. It would be false to say no actor was able to make the connection between power, norms, and meaning and verbalize how they informed an interaction. However, this was not done explicitly, but emerged when actors provided a descriptive narrative about an interaction. These three components were related several times in terms of interactions, particularly when actors worked to educate the public about a water quality protection or enforce a regulation. Though water managers held regulatory power to enforce regulations, social norms were often strongly anti-regulation, and shaped how managers approached this "interaction." Often, managers spoke of how they appealed to the meanings members of the public held regarding a water body and its use, to try to

affect norms and influence the interaction. While this example is not a straightforward as the earlier illustration of a manager giving a subordinate a task, it does illustrate how managers had to work within this complex mix of social norms, organizational norms, and the different meanings individuals associated with water to effectively assert their power in an interaction.

And while the ability to definitively understanding how power, norms, and meaning specifically worked to inform interactions was limited, the perspective that breaking interactions down into the components produced was valuable. This helped to illustrate managers had to be sensitive to the broader social context in which they worked, their interactions with the public could not just be assertions of power. This viewpoint was particularly important when trying to understand why so many actors, many who were not in traditional public outreach roles, focused on educating the public about the need to conserve and protect water resources. They were attempting to change the norms and meanings local residents held about the regulations that affected land use and water protection. By doing so, managers could shape the context of these interactions, and therefore the alter them to be more productive in gaining public compliance or increasing understanding about the need for regulations.

**Disembedding Mechanisms**

Structuration Theory's disembedding concept is where social attributes are transferrable across time and space to have meaning outside their original context (Busco, 2009). When this transfer involves expertise and knowledge, it is the "expert systems" concept (Giddens, 1984). People gain expertise through university education, life experiences, or previous employment, and then apply that knowledge to their current

situation, like a job. For water management, relevant experiences include the technical skills necessary to perform complex tasks, shape management practices, or inform interpersonal relationships. This concept fit well with ideas about expertise and knowledge from natural resource management literature and research.

Knowing to look for disembedded knowledge revealed information likely missed if questions only focused on an actor's current work and skills. It was important to understand how experiences, both negative and positive, related to an actor's perspective on management style, relationships with other professionals, and interactions with members of the public. Many actors readily brought significant experiences to mind, and spoke eloquently about the nature and scope of their influence on their current job. Actors provided a surprising breadth of experiences, including personal ones, like marrying someone from a local community, and those from a variety of non-management related backgrounds, for instance marketing, journalism, and education.

Actors are expected to have the technical skills relevant to performing their specific jobs. Skill in relevant disciplines, leadership ability, and decision-making are critical aspects to environmental management settings (Cronan & Ostergren, 2007; Hamilton & Selman, 2005; Heikkila & Gerlak, 2005). Depending on their job, water management actors perform tasks including testing for pollutants, managing a wastewater treatment plant, ensuring water flows to customers, writing management plans, and applying laws and policies. Employing their technical, practical skills was the foundation of daily work for most actors in this setting. Two interviewees stated this directly, "We obviously need a solid science background for the science end of what we do" (Respondent 6) and "My background is

scientific. I studied geology in college and studied hydrogeology in graduate school"
(Respondent 22).

Beyond these basic skills, actors must be able to establish and maintain the
interpersonal relationships necessary to working in an institutionally and jurisdictionally
complex setting. It is reasonable to expect actors would gain these skills throughout their
careers. Past experiences, including those with failure, trial and error approaches to problem-
solving, working though conflicts, and engaging in dispute resolution shape actor
perspectives on management styles (Feldman, 2007; Roberts, 2011). As characteristics like
trust and shared decision-making are key to collaborative governance, participants must
have the necessary abilities and perspectives to engage in such practices (Ansell & Gash,
2009; Margerum, 2007). Experience with cooperation can drive collective action, by
fostering trust and social capital among actors (Gerlak & Heikkila, 2007, p. 56). One actor
spoke directly of how they saw interpersonal skills and positive attitudes were key to
effective cooperation:

> Those interpersonal skills . . . make or break effective collaboration. If you've got  . .
> . people that respect each other and can work together in a constructive, positive way
> . . . you can change the world. And if you get somebody in there that doesn't respect
> the other parties in the room, or has some other agenda, or is rude . . . or a couple of
> people who can't get along, that can ruin everything. (Respondent 21)

Actors described about how working in a certain social context, enduring conflict, or
experiencing collaboration affected how they approached working with other professionals
and members of the public. Many packaged these experiences in terms of "lessons learned"
type of perspective, where the experience taught them something about themselves or about

how to work with people in a more effective manner. Some of these experiences were quite personal, including living in and integrating into a community to the point where relationships overcame mistrust or community-held preconceptions about their management role and objectives:

> Previous to this [current job] I lived in Eastern Montana in a farming and ranching community and I worked for the NRCS [National Resource Conservation Service], so I was soil conservationist with them . . . . (Respondent 27)

Some also explained their experiences as how they equipped the actor to overcome specific challenges. The context of these experiences could be quite different than what the actor was currently working within, but still able to identify transferrable pieces:

> [The location worked in before] is . . . as opposite of Kootenai County as you could imagine . . . but there was still conflict . . . a lot of what I did was learning to finesse, dealing with what I knew the politicians would accept and get approved . . . (Respondent 32)

Not all experiences were from a location outside this geographic area. Some managers had worked in the region for years, built extensive knowledge about the setting and relationships with other professionals that helped them perform their jobs:

> My background . . . has been in the water industry for the last 23 years, all of it served here in [city in Washington], so I know all of the people in the other [Washington] water districts, all of the other purveyors, many of them have worked their way through the ranks as I have, so many of them are long-standing relationships . . . . (Respondent 31)

Relatedly, several actors currently working in WA mentioned they had worked in ID before. They spoke of this experience as equipping them with a better understanding of realities ID faced and how the two states' social norms, management perspectives, and institutional arrangements compared:

> I learned the rules in Idaho first [from job there] then came over the Washington side and learned theirs. They're polar opposites at times. Just a whole different set of red tape. . . . Washington is more reactive than Idaho. (Respondent 2)

Questions about the actors' experiences were particularly relevant to understanding the broader movements towards collaborative water management approaches. Positive experiences with collaboration or immersion in a pro-cooperation environment shaped current collaborative practices:

> We put so much time and effort into that [earlier] dissolved oxygen TMDL collaboration process that we are now working together very well compared to way we were back in early 2000. . . , doesn't mean we agree all the time, and there's a lot more cooperation and working together is the way I characterize it. And that's a really good feeling to know that you're working together as opposed to fighting each other. (Respondent 13)

Not all actors discussed how past experiences, negative or positive, informed their attitudes about collaboration. However, when actors did make this connection, both negative experiences, like engaging in litigation or conflict, or positive experiences, like a achieving a meaningful outcome through cooperation, generally shaped pro-collaboration attitudes.

As discussed in under Research Question Two in the previous chapter, many actors described how they preferred collaborative approaches as compared to litigation or power-heavy directives, how they saw the benefits in collaboration, and how they worked to promote collaborative behavior in the region. This reflects the pro-collaboration trend many actors reported had developed over the last twenty or so years in the region. However, while the connections between personal experiences with conflict or collaboration and this broader pro-collaboration context were strong, they were not universal. Not all actors reported this relationship, so reasons for and process of how this pro-collaboration trend developed still needs to be better understood. Part of this understanding arises from evaluating current behavior, particularly how actors engage in and understand the social factors that shape their behavior, and then adjust their actions accordingly.

**Reflexive Monitoring**

Reflexivity is "not merely self-consciousness, but the monitored character of the ongoing flow of social life" (Giddens, 1984, p. 3). Thus, reflexive monitoring is the process by which people continuously observe actions, interactions, and their broader context, and thereby assert control over their surroundings (Giddens, 1984, p. 3). It is strongly related to practical consciousness, which the ability for people to know social conventions and perform activities necessary to continue with life (Giddens, 1984, p. 4). Reflexive monitoring can lead to transformation, as actors who critically engage with and monitor actions can identify problems or beneficial practices and enact change accordingly (Cohen, 2005; Poole & McPhee, 2005).

In a water management setting, actors have to tailor their interactions to the broader social, political, legal, and organizational context in which they work. This context can

include social norms about water use and management (Hogl, Kvarda, Nordbeck, & Pregerning, 2012), the design and influence of political and administrative regimes (Norman, Cohen, & Bakker, 2013), or the role of economics in decision-making (Roberts, 2011). The state and federal laws governing the allocation of water quantity and protection of water quality are diverse, numerous, and complex (Feldman, 2011). Actors were expected to be knowledgeable about their specific job, their place in the water management system, how their work affects others, and how they respond to relevant social conditions. This knowledge allows actors to either perpetuate the broader social constructs they felt effective and appropriate in meeting a certain need, or affect change where necessary. Recognizing this ability to monitor and affect change was explanatorily powerful in this setting.

Actors behaved strategically and employed whatever mechanisms, laws, their standing, or relationships, to affect change that benefited their home organizations and, in some cases, the broader community. As discussed in the previous chapter, the Spokane Tribe of Indians used their legal status to force attention on the PCBs issue in the Spokane River, WA enacted new water quality standards that affected wastewater treatment in ID, and IWAC was established to address a lack of cooperation between ID and WA water purveyors. These examples illustrate how actors were using their knowledge of broader social constructs, like a federal or state law, to create localized and context-specific change. Actors also demonstrated a nuanced understanding of contextually appropriate behavior. One example is the realization the relatively new IWAC group needed to build relationships and the ability to accommodate discord among its members:

> Up until they've [collaborative groups] matured, they may not be able to withstand a
> lot of conflict that can . . . break them apart. . . and so if you're cognizant of that, you

become careful. . . about the topic of discussion, you avoid a topic, even if you see it

needs to be discussed, because you know we're not ready for that. (Respondent 24)

Structuration Theory highlights the continuous flow of action that comprises

everyday life and contributes to how social systems progress through time. This illustrates

ST's dynamic and interactive perspectives about social organization, and relates to the very

specific bounds of actor's knowledge and ability to act. Understanding the reflexive

monitoring aspect of this research reinforced the critical role people have in perpetuating or

changing the overall social system. Results showed actors were knowledgeable, engaged,

and able to make change and thereby were not just passive recipients and executors of

institutional rules. Actors knew how to work within the bounds of the existing social context

to assert control and choose feasible and practical strategies.

This strongly relates to the one of the fundamental reasons behind this research,

understanding how collaboration might exist within existing managerial and institutional

frameworks. This ability for actors to reflexively monitor the system demonstrated how, in

some contexts, actors were able to enact change and implement more collaborative

practices. This has practical value regarding how to promote or enact collaborative

relationships that work within traditional water management frameworks. In such a

situation, it could prove beneficial to start starting at an actor scale rather than an

institutional level.

However, the ability for actors to reflexively monitor the system is dependent on

their knowledge. As discussed in the following section, uncertainty about both social and

environmental conditions was prevalent in this setting. This uncertainty affected the scope

and depth of actor knowledge, and could potentially be limiting to the effective and

appropriate monitoring of the system and resulting actions.

# Chapter VI: Challenges with Structuration Theory's Empirical Application

There were two fundamental challenges with Structuration Theory's (ST) empirical application. First, because of its broad scope, vague concepts, focus on ontology, and generalized nature, ST can be difficult to apply to empirical research settings (Busco, 2009; Jones & Karsten, 2009). These characteristics made it challenging to translate ST's concepts into testable variables that appropriately explained the case and ensure results were relatable to ST. The second challenge was ST's inability to address certain components found within the case study, particularly how uncertainty about social and environmental conditions affected actor behavior. While ST acknowledges actors' knowledge is bounded (Giddens, 1984), there is no specific mechanism for predicting how uncertainty affects behavior or the broader social system, including regulations or institutional arrangements. This was an important limitation, as uncertainty about social and environmental conditions was prevalent in this case, as in many natural resource management situations.

However, these limitations were not extensive enough to question ST's overall explanatory value or usefulness in this case. Rather, they required the careful, critical evaluation of ST's empirical applicability and refinement for future research about water management practices and systems.

## Structuration Theory's Empirical Application

The researcher recognized and understood Structuration Theory's abstract nature and conceptual breadth early in this research process. In fact, ST's flexibility and ability to capture a complex water management system was beneficial and justification for the theory's use. Challenges directly related to ST's breadth were minimized by testing only

five propositions and ensuring concepts were appropriately operationalized and contextualized with natural resource management information. Even with this effort, which was successful, there were three considerations associated with translating ST to an empirical setting worth discussing. One relates to the realities of collecting qualitative data. The second is the possible disconnect between the research's social system and the "true" social system from ST's perspective. Lastly, there were issues with how Giddens conceptualizes trust in ST relative to his broader works on modern society, to trust in natural resource management, and how trust emerged in the interview process.

**Disconnect with Data Collection**

The interviews were semi-structured, where interviewees had significant latitude to answer questions. Although the researcher asked follow-up and probing questions to increase detail and consistency as necessary, responses varied considerably in content and scope. Interviews also needed to respect interviewee's schedules and time. This required tradeoffs between ensuring all questions were answered and ensuring answers were adequately detailed.

Therefore, while there was enough consistency across interviews for shared themes and areas of disagreement to be identified, there was also variety in the depth and detail of answers. This sort of diversity was not problematic from a position of understanding the actual situation, but it did present certain challenges when tying findings to ST. Some actors gave eloquent and nuanced answers, while another's answers to the same questions were concise or simplistic. How actors related to and interpreted each question seemed to be a function of jobs, personalities and experiences, and how politically sensitive or scientifically

complex the issues associated with the question were. Some actors chose to avoid certain issues because of the political nature of those topics or lack of expertise about them.

Again, this challenge does not show ST was not useful to apply here, but the nature of the case study, the interview process, and the actors involved all affected the empirical testing of ST's concepts. It is not necessarily clear another method of data collection would not experience similar problems. Even with a process like a questionnaire, there are limitations based on length, time required for completion, the number of questions asked, and the detail of answers. While a structured questionnaire can create more consistency in answers among respondents, there is the issue of losing the spontaneity and nuance a semi-structured, personal interview provides. This interview approach corresponded with goals of obtaining a detailed, actor-driven description of the case study, as well as with basic considerations like research timeline and funding. A breadth of research methodologies are represented in other empirical applications of ST. These methodologies include case studies, surveys, informant interviews, and focus groups (Leduka, 2009), meta-analyses and literature reviews of previous research (Jones & Karsten, 2008; Pozzebon & Pinsonneault, 2005), and semi-structured interviews (Lyons & Brown, 2010). As such, the methodological choice for data collection is dependent more on the researcher's methodological preference and the research context than on ST itself.

**Defining the Social System**

There is also the consideration of how closely ST's conceptualization of the "social system" aligns with the system identified in the case study. Giddens defines systems as "reproduced relations between actors or collectivities, organized as regular social practices" (Giddens, 1984, p. 25). Social systems are produced and reproduced form the intersection of

human agency and structural properties, and can be as small as interpersonal relationships or as broad as a country's political framework (Busco, 2009; Cohen, 2000). What constitutes a social system is dependent on the particular combination of agency, structures, and institutions present in a certain context. Beyond this definition, ST does not provide specific guidance as to what the social system's bounds should be, so it is difficult to know when to consider the research's social system completely.

The question is if bounding this system definitively is necessary to achieve from either a theoretical or practical standpoint. Practically, research methodologies can define the boundaries of the study or the people included as informants. For this research study, a case study approach informed the rough geographic bounds of the region, while snowball sampling produced the interview sample. Document analysis supplemented these findings and further revealed which environmental conditions, social institutions, regulations, and policies were influential. Yet, it is not clear if these geographic bounds, components, and social connections appropriately match with, from the ST perspective, the "true" social system for water management in the region.

This issue reflects one challenge of empirically applying and testing such an abstract and broad theory. The researcher relied on interviewees to recommend people to include in the sample. This knowledge was based on individual, experiential perceptions about the actors and resources that were important in the system. This process most certainly left out actors, organizations, jurisdictions, and water resources influential in the case. Water flowed into the system from Montana and Canada, and flowed out of the region further into WA and the Columbia River system. Actors in both these upstream and downstream positions affected the water, and so their management decisions certainly could influence the timing

of flows, the use of and demand for water, and the quality of water. So, from a ST perspective, should these actors be represented in the "social system" being studied? If so, how many steps away from the actual case study area should actors be included?

Structuration Theory literature has not systematically addressed this issue. If the "true" ST system is unknowable or not feasible to discover, then perhaps there is limited benefit to engaging intellectually with this question. Possibly, empirical researchers have been satisfied with how chosen methodologies defined their respective samples and so did not feel the need to question how their empirical setting's system compared to the ST system. Structuration Theory's abstractness requires researchers to tailor their application with discipline-specific information and methodologies, so accepting the social system's bounds are defined in this way is acceptable. While this is necessary from a practical sense, it seems some of ST's explanatory strength is lost when this disparity cannot be satisfactorily resolved.

**Trust**

Even though Giddens argues trust is central to individual action and the continuation of society, his discussion of trust within ST's framework is narrow. This limitation is especially evident when comparing ST to Giddens' later work on the characteristics of modern society. This disparity is important to acknowledge, as the more recent work, *The Consequences of Modernity* (1990), is not a radically different topic or line of thought from earlier articles and books. Structuration Theory is outlined in one of these earlier works, *The Constitution of Society* (1984), where Giddens focuses on trust as related to a person's ontological security. This trust develops as a person engages in routine practices. This routinization creates a sense of security, and is what allows a person to participate in and,

thereby, help reproduce the social system (Busco, 2009, p. 255; Giddens, 1984). Other ST researchers, particularly Busco (2009), have drawn on *The Consequences of Modernity* to understand better how Giddens conceptualizes trust.

In *The Consequences of Modernity,* Giddens defines trust as "confidence in the reliability of a person or system, regarding a given set of outcomes or events, where confidence expresses a faith in the probity or love of another, or in the correctness of abstract principles (technical knowledge)" (Giddens, 1990, p. 34). Giddens includes trust as ontological security in *The Consequences of Modernity*, but adds several other concepts, including trust's presence in personal relationships, its relationship to risk, and its place in abstract systems, particularly with regard to expertise. These three definitions are relevant to natural resource management and frame the following discussion.

In interpersonal relationships, like those among friends or colleagues, trust creates social ties. People place trust in the integrity of others and in the alliances they create (Giddens, 1990). Interpersonal trust is discussed throughout collaboration literature, often for its role in building cooperation, effective collaborative partnerships, or shaping governance arrangements (Ansell & Gash, 2007; Gerlak & Heikkila, 2007;). Ansell & Gash (2007) see trust-building as a product of dialogue leading to participant commitment to the collaborative process. Trust is also a type of social capital, where it facilitates cooperation by reducing transaction costs and building relationships (Berkes, 2010). Trust among actors in a governance network (Klijn, Edelenbos, & Steijn, 2010) or cooperative partnerships (Ostrom, 2000) can lead to higher quality management outcomes or higher payoffs for participants.

Given this weight and importance trust has in natural resource management research, it was surprising to not find trust more consistently reported in this case's interviews. When actors did mention trust in terms of collaborative partnerships, these instances were scattered and limited in detail. There could be several reasons for this disparity. The researcher possibly did not ask the right questions to produce responses about trust. Perhaps, actors and the researcher understood trust in different ways. The researcher saw trust as one of the many factors that either constrains or facilitates collaborative work. Trust may be a more intrinsic and personal concept, so was difficult to verbalize or even see as external to what were often substantial, productive, and sustained relationships with other actors. Therefore, even though interpersonal trust was present, it was not as thoroughly identified and examined as other factors, including social norms or power. One actor succinctly spoke of trust's role in collaboration. "Collaboration requires respect, you have to trust and be trusted and respect and be respected in order to effectively work together . . ." (Respondent 7).

Trust in abstract systems is faith placed in the proper working of social principles, like regulations functioning to reach their appropriate, intended goals. This trust was present in this case, even if it was indirectly stated or embedded in narratives about decision-making or interactions. People trusted regulations would produce enforceable, defensible outcomes regarding the use and protection of water.

Trust in expertise means lay people can be confident experts have knowledge and skills related to a certain topic (Giddens, 1990). Giddens relates this type of trust to the ideas of "expert systems" and "expertise" of knowledgeable actors. These experts serve as "access points" between lay people and these abstract systems, thereby they must be exceptionally trustworthy to others (Giddens, 1990, pp. 33-34). These experts are necessary because

modern society is complex, with innumerable unknowable components and conditions. Lay people therefore must place their trust in those with expertise about a certain part of modern society as sources of reliable technical or scientific knowledge. Even professionals in one water management organization may not have the same level of technical knowledge as another, depending on their work environment, job requirements, and educational background.

This type of trust was more commonly described in the case than the interpersonal iteration. Actors described how they used regulations to ensure water quality protection, by doing so they placed their trust in the power and enforceability of those regulations. One exception to this was the idea of mistrust, where there was a lack of faith and confidence in an expert or abstract system. Actors spoke of mistrust directly, and most often in the context of how members of the public mistrusted regulatory agencies and the government.

> The political environment is generally anti-government and anti-[state regulatory agency] in particular so very difficult to earn any sort of trust with virtually anybody when you tell someone you're them from [state regulatory agency]. (Respondent 7)

> There's some lack of trust [in community] when it comes to government agencies and even though working for [university] I'm not a government agency, it's still this sort of skepticism or suspicion . . . and that makes it a lot more complicated. . . . Even if it doesn't require any sort of regulation, there's just a suspicion that it will. (Respondent 30)

The idea that trust exists in abstract systems, institutions and organizations, or in experts, is present in the natural resource management literature. Individual citizens as well as those employed by a federal government trust that devolved natural resource management

bodies will reach management goals (Lockwood, Davidson, Curtis, Stratford, & Griffith, 2009). Interorganizational trust is where actors in different organizations create relationships to mitigate power imbalances or uncertainty about the other organization's behavior (Gulati & Nickerson, 2008). Trust, or distrust, in the power of regulations, in regulatory institutions, in management organizations, in political regimes, and in scientific research are threaded through much of natural resource management and collaboration literature (Feldman, 2007; Floress, Mangun, Davenport, & Williard, 2009; Margerum, 20007; Norman & Bakker, 2009: Roberts, 2011). Such trust is necessary to performing basic management tasks, to sustaining natural resource management institutions and organizations, to being able to collaborate, and to communicating effectively with other professionals and the public.

Overall, Giddens' argues trust serves to reduce or mitigate risk, which is related both to individual activities, like dangerous behavior, or collective actions, like war (Giddens, 1990). When people can trust that a system will function properly, an expert is trustworthy, or a colleague honest, then there is less risk associated with a certain practice or in the overall system. Risk is discussed more in the following section about uncertainty.

So, why is trust included in this section about ST's limitations? The research questions and interview instrument were developed strictly from ST's concepts, outlined in *The Constitution of Society.* In this book, Giddens focuses on trust that relates to ontological security and the routinization of action, which were not relevant to this case. The researcher had to look to Giddens 1990 work, *The Consequences of Modernity,* for more relevant descriptions of the types of trust found in this case. Even though the researcher recognized the importance of trust in natural resource management literature, the lack of trust in ST meant it was not specifically asked or sought in interviews. In the future, asking interview

questions more explicit about interpersonal trust and trust in institutions, organizations, and experts would better relate the dynamics of trust experienced in this case to the broader body of literature.

**Uncertainty**

Structuration Theory assumes people are "knowledgeable agents," who use their knowledge to engage reflexively in the system, conduct daily tasks, inform activities like interactions with others, describe their actions, and be aware of broader social rules and conventions that frame their lives (Giddens, 1984). Yet, this knowledge is incomplete, bound by unrecognized conditions and the results of unintended consequences (Giddens, 1984, p. 27). There is tension between accepting actors' knowledge is limited and realizing actors must have a suitable level of understanding to behave appropriately in the system. Beyond this acknowledgement, ST does not explain or predict the specifics of how uncertainty links with actor behavior. This shortcoming was problematic in this case, as many actors spoke extensively about how uncertainty about social and environmental conditions influenced their behavior. This uncertainty also affected components like regulations and organizational action, including adjudicating ID's northern basins to quantify water supplies and current allocation.

The uncertainty experienced in this water management system mirrors the literature about uncertainty in natural resource management. Social-ecological systems need a significant amount of environmental and social knowledge to function effectively and, among other considerations, work in a "climate of complexity and uncertainty" (Berkes, 2010, p. 490). Creating management systems flexible and resilient enough to deal with uncertainty about future environmental and social conditions are fundamental principles in

adaptive management (Broderick, 2008). Absence of scientific knowledge about resource conditions can negatively affect the policy or decision-making processes for environmental governance (Roberts, 2011). This lack of specific scientific evidence as justification for intervention or decision-making is particularly challenging when trying to implement new policies or practices (Roberts, 2011). Finally, uncertainty about future conditions, particularly how climate change may affect water supplies and function is critical aspect of water policy and management systems (Feldman, 2007).

There were three categories of uncertainty in this case. First, there was scientific uncertainty about the conditions of groundwater and surface water quantity and quality. Second, there was social uncertainty, particularly about how conditions, including political turnover or the broader economy, would affect organizational components like management goals or funding. Relatedly, some actors were reliant on other organizations for basic processes like permitting, which was not always straightforward or transparent. Third, there was lack of knowledge about future conditions, particularly how climate change may affect water quantity or how population growth would occur in the region.

Actors were able to describe, to a degree, how uncertainty affected their work. Uncertainty about the current water quality and quantity conditions was the most straightforward for actors to address. Often, this uncertainty could be resolved through research. There were many examples of this proactive behavior, including:

> That's why we did this big study to try to understand the aquifer, how does the water interact with surface water…. And how [this interaction] affects permitting decisions, appropriation of water, either new water or changes to existing water rights. (Respondent 10).

To address other issues of uncertainty, the SRRTTF worked to identify sources of PCBs and actively monitored water, sediment, and aquatic life to understand PCBs levels it the environment (SRRTTF, n.d.). For water quantity, the IDWR was adjudicating ID's northern basins to understand of how much water is currently allocated through water rights (IDWR, n.d.). In early 2015, WA established an in-stream flow rule to guarantee a certain minimum quantity of water in the Spokane River (DOE, 2015).

Overall, uncertainty placed actors in a reactive position. Political turnover was a concern, as the changes in funding and management goals new elected officials could enact were particularly worrisome to actors in state and local government positons. This meant the constant cycle of elections and change created a significant climate of uncertainty for many actors, one they could not effectively prepare for. The regulations, technology, and social norms regarding water management were constantly evolving. Actors, particularly those in wastewater treatment jobs, spoke of how concern for new pollutants was a progressive, iterative process. As scientific knowledge and social awareness about these pollutants accumulated, new regulations were implemented to address these concerns and the plant operators reacted accordingly. There was no specific way to anticipate these pollutants or prepare their facilities to address them, and one actor spoke of how there how changes in water quality standards were unforeseen:

> Our original facility plan was adopted in 1981 . . . . [W]e never foresaw that we would be dealing with ammonia. Never thought we be dealing with less than twenty milligrams per liter BOD [biochemical oxygen demand] or total suspended solids. That was never on the horizon. Certainly nutrient management was never on the horizon. (Respondent 23)

There was even uncertainty regarding daily operations and basic organizational functions. For instance, the EPA has primacy over Clean Water Act implementation and NPDES permitting in ID, and actors from two different organizations spoke to how EPA's delays in issuing their new point-source discharge permits created uncertainty about current and future water quality standards. These actors were unsure if their organizations were complying with current standards or what actions were necessary to meet standards once known. "Right now, we are actually operating on an expired [NPDES] permit. . . . But EPA hasn't gotten us a new permit yet . . . . They just are behind" (Respondent 25). This connects with ideas about power and how one organization, even by controlling something as straightforward as issuing a permit, can exert significant control and create issues for another organization.

Finally, dealing with concerns about future environmental and social conditions created both proactive and reactive behavior. Trying to address climate change is particularly challenging, as there are models, predictions and assumptions about what may occur, but uncertainty about what actually will happen (Allan, Palmer, & Poff, 2005; Binder et al., 2013; Cohen et al., 2006). Translating science into appropriate, effective governance mechanisms is equally challenging, particularly when thinking of transboundary water management and its associated social and regulatory complexity (Cooley & Glick, 2011).

Many actors acknowledged that climate change, and its potential impact on regional water resources, was an important concern, but felt unsure as to how to prepare for it. More broadly, this was illustrated by the different perspectives actors had with how future issues will progress and develop. As discussed in the previous chapter, there was clear evidence actors wanted to create relationships and collaborative practices to address these issues and

avoid conflict, particularly regarding interstate water allocation. However, some actors were more ambiguous or less optimistic about these approaches:

> I think we will continue to progress and set better standards, but the aquifer is going to basically have more straws in the glass . . . . Become more contentious as more people are vying for the resource. I think that water restrictions will have to become more stringent to accommodate a larger population. (Respondent 37)

> [conditions that will spur collaboration] where there's some huge water user comes in and scares the hell out of everybody, how we react to that is going to tell how it goes, whether we work together to resolve conflict and come up with a regional solution . . . or whether we default to a provincial infighting . . . . (Respondent 7)

Actors were aware they needed to plan for the future, and many were dealing with long-term management plans or mindsets. However, specific, enforceable, and codified behavior to deal with these concerns was limited. Several actors cited involvement on the CAMP process for the SVRPA, which has a fifty-year planning horizon (IDWR, 2011). This process culminated in 2011 with a document outlining objectives to meet future water demand, prevent and resolve water conflicts, and protect the aquifer (IDWR, 2011). However, this was a planning and strategizing document, so its regulatory strength and permanence of funding is limited and currently unclear.

Even though the research showed actors were reacting to uncertainty, ST has no mechanism to predict, explain, or justify uncertainty's role in the social system. Is uncertainty a product of modern society and inextricably embedded in the structures and institutions that frame daily lives? Is uncertainty so highly individualistic in its action and

effect on behavior or the social system there is no reason to acknowledge or address it? Or is the assumption human knowledge is bounded enough to justify this oversight, as people are always dealing with some sort of uncertainty and therefore actions are always shaped by it?

In *The Consequences of Modernity,* Giddens addresses what he refers to as "risk," in modern society. Two of these risks relate to the idea of uncertainty: knowledge gaps and the limitations of expertise (Giddens, 1990, p. 125). Again, Giddens does little more than acknowledge these risks exist and briefly explain them, often relative to the idea of trust. This could reinforce the idea that in Giddens' view, risk, uncertainty, lack of knowledge, and the bounds of expertise, are all inherent parts of modern life, and since ST is applied within the context of modern life, so exists there as well. This assumption however, meant a significant and consistently reported component of this social system was poorly understood with respect to ST's overall framework.

Addressing and understanding uncertainty's role in the water management system and influence on behavior is where adaptive management perspectives could augment ST and create a more robust research process. Using adaptive management principles to focus on issues like capacity development, flexibility, social learning, and resilience (Armitage, 2005; Berkes & Turner, 2006; Folke et al., 2002) could better explain how actors address lack of knowledge, particularly regarding future social conditions and climate change. As uncertainty is so prevalent in many natural resource management situations, and there are attempts understand, minimize, and overcome it, this sort of combination would increase the robustness of ST's use in these settings. As an example, adaptive management concepts would inform interview questions about how specific types of uncertainty affected actors'

decision-making, management practices, or perspectives. Responses would then be connected to ST's ideas about actor behavior and transformation in a social system.

**Summary**

From a perspective of effectively framing and explaining this case study setting, ST was an appropriate theory to apply as it provided an explanatory framework that produced robust and useful results. These results are arguably more reflective of the actual social system and its components than other theories more commonly used in natural resource management, including collaborative governance, adaptive management, organization studies, or intuitional analysis, could produce.

Structuration Theory was especially adept at revealing the role of power in the region, including how power related to agency and actor position, and how actors were knowledgeable, purposeful agents integral to the system's design and function. The ideas of transformation and change were particularly revealing, as they demonstrated not only how management styles had progressed through the past, but also how individual components were either changing or staying relatively the same. There was extensive interest and engagement in collaboration, driven both by top-down and bottom-up practices, but static features, like specific regulations or the missions of certain water management organizations, constrained these more innovative practices.

However, there were mixed results and issues of uncertainty regarding how research findings can integrate into ST. These issues related to ST's overall abstractness and reliance on researchers to select methodologies and operationalize ST concepts with discipline-specific information. The benefit to this abstractness is the ability to apply ST to a variety of social settings. The limitation is there is no consistent ST-directed guidance for issues like

the minimum number of samples necessary to include in the research, or how to ensure the

ST "social system" matches up with the one identified in the research. These disparities

between the empirical and theoretical functions of ST seem important to recognize, but

perhaps they are thought exercises rather than being problematic in reality.

As ST is intended to be a theoretical way of thinking, of developing an ontological

understanding of the concept of society and its constitution (Busco, 2009; Pozzebon &

Pinsonneault, 2005), perhaps trying to tie empirical findings too closely with ST is not

necessary or beneficial. This could explain why ST has remained relatively consistent in its

design and function through its three decades of existence. Dissatisfaction with ST has

resulted in changes, notably with the development of Strong Structuration Theory by Rob

Stones, which attempts to integrate methodological and epistemological perspectives into ST

to enhance its empirical application (Jack & Kholeif, 2007).

Finally, the most relevant limitation may be the breadth of this research project.

Testing five propositions produced an abundance of data and did not necessarily allow for a

specific, nuanced understanding of each component. An aspect of this was the

characteristics and constraints of the interview process, and so if, for example, only three

propositions were tested, more time could have been devoted to discussing and

understanding them. However, it was sometimes difficult to know where one concept ended

and another began. For example, the idea of reflexive monitoring is based on an actor's

knowledge and ability to understand the system, both of which can be informed by the

expertise they brought from another location through a disembedding process. So, there are

two separate propositions embedded in that example that need to be extracted and examined.

The decision to test and include five propositions overcame this issue, but also required the need to make tradeoffs regarding the depth and detail of each proposition's results.

# Chapter VII: Significance, Practical Applications, Conclusions, and Recommendations

## Significance

This dissertation was a novel application of ST to a water management setting. While ST has been applied in other natural resource contexts, this dissertation was the first, with respect to the literature sources available to and identifiable by the researcher, use of ST to understand management behaviors in a water context. This both strengthens ST's empirical value and provides a foundation for its continued refined and strengthened utilization in water management research. There is a clear need to create progressive, sustainable water use, allocation, and management approaches that work within contemporary institutional and organizational frameworks and constraints. This dissertation demonstrated the value of using ST to identify the creative, strategic behaviors that actors are using to advance and refine water management practices as well as understand the social constructs that constrain or enable these behaviors. This understanding can help policy-makers, agency personnel, and researchers identify how to support and enhance these behaviors while reducing institutional and regulatory barriers to their effective application.

## Practical Results and Applications

This research produced practical results applicable and useful for interview participants and other actors in the case study region. These findings summarize interview participants' experiences and viewpoints as analyzed and contextualized by document analysis and ST's lens. These findings reflect the most commonly reported issues and components of the water management system that affect behavior and practice, including the roles of regulations, actor behavior, social norms, and areas of consensus and disagreement.

The presence of a fragmented water management system is not necessarily the barrier to enacting progressive or collaborative practices. In this study, such behaviors did exist within relatively static and fragmented jurisdictional, institutional, and managerial frameworks. Furthermore, collaborative practices arose from top-down sources, as alternatives to regulatory mechanisms, and with goals of building relationships and spurring regional dialogue about issues. The majority of interview participants understood and embraced the fact that water is a regional resource and should be managed accordingly. The reality of the connectivity of the region's water sources and their corresponding social systems was evident in the prominence and strength of issues concerning the balance and assertion of power among various actors, particularly those in upstream-downstream positions and those with power and influenced backed by regulations.

Regulations were the point of disconnect between what was managerially possible to achieve and more idealized or meaningful, progressive practices, including legally substantial collaboration or shared decision-making. Without regulatory support, collaborative groups could not progress beyond basic functions of communicating, building relationships, performing research, and making recommendations to legislative or regulatory bodies. Three of the four collaborative groups included in this research were created through legislative or regulatory processes. Therefore, these top-down styles of collaboration already have a position in the regulatory and political system, and could potentially achieve legal standing necessary to conduct enforceable management practices. However, these groups were either designed as short-term processes or only existed for a few years. There is a need for long-term monitoring to determine if, and why, such legal powers are devolved. This includes understanding the broader implications such a transition would have, and

particularly ensuring local residents' viewpoints and needs are represented in the decision-making process.

Another point of concern is how power is not only exercised by actors from one organization or state, but also perceived by another. Several actors expressed concern over another organization's motivations for action, regarding these actions with suspicion or as a proxy to achieve a desired outcome. Often these outcomes were seen as detrimental to other actors and organizations, and so both the outcome and the process used to achieve it were seen as problematic or disingenuous. This relates the idea of strategic and creative behavior, where actors use whatever mechanisms, such as regulations, that are available and legitimate to achieve a desired outcome. However, such strategic behavior has a downside, where other actors and organizations are also affected by the behavior's process and results. While the number of actors reporting these concerns were relatively few compared to the total number interviewed, such suspicions have the potential to erode relationships or undermine efforts for more substantial and extensive collaboration. Most of these issues were reported on a bi-state basis, so supporting transparency in the decision-making processes, ensuring representatives from one state are included or invited to attend the other's meetings or planning sessions, and being open about motivations and needs are potential practices that could help mitigate this problem and ensure strong inter-state working relationships.

A significant vein of social norms in the region had themes of anti-government, anti-regulation, and anti-conservation perspectives, they created significant resistance water managers had to address and overcome. It is important to recognize how the existing system works within this broader social context and what may be possible for future management practices. Given these norms, it is unlikely any new layer of government, like a regional

water management body, would be feasible. Therefore, it is valuable to identify places where collaboration or progressive behavior can exist without encountering resistance from residents or politicians.

Uncertainty about current and future social and environmental conditions significantly influenced actor behavior and decision-making. Some of this uncertainty was being proactively addressed through research and capacity development, but other was more constraint and less alterable. Political turnover and the uncertainty that comes with the constantly changing agendas of elected officials were of concern, particularly for those in state and local government positions.

Relatedly, concerns about funding, staffing, and the ability for actors to both meet their respective organization's basic daily needs while engaging in regional concerns and collaborative practices were pervasive in the interviews. Again, this is something largely out of the control of many actors, but is something that actors in policy positions, legislators, consultants, or agency directors could proactively address and mitigate. Providing organizations with more money and staff would, from this research's results, not only reduce daily workloads, but also allow for more collaborative, energy-intensive, and regional-scaled networking and decision-making to occur. Of course, budget increases for state and local government agencies require a political will and funding process. Regional non-profits depend largely on donations and grants for funding. However, many interviewees placed significant weight on the region's economic health and related factors like population growth, business development, and quality of life. Therefore, providing the region's agencies with the staff and budget necessary to effectively and proactively manage the water resources that are not only environmentally and socially critical, but also significantly

economically valuable seems a wise investment strategy. Doing so would allow more actors and organizations to manage the water resources proactively, holistically, and with long-term goals and practices in place, rather than from a more short-term and reactive stance.

Actors, with their knowledgeable, deliberate, and active behaviors, were critical to shaping the water management system. Actors were not simply constrained by regulations and institutional arrangements, but rather worked up to the limits of these frameworks to engage as fully as possible in collaborative and innovative practices. By behaving strategically and appropriately for a given context, they were also able to use the correct mechanism, be it litigation, use of power, or collaboration, to achieve desired outcomes. Extensive, nuanced, actor knowledge about organizations, laws, policies, social contexts, and environmental conditions was key to the water management system's effective function. Regulations and institutional arrangements provided the foundations for action, but the real management arose from actors' interpretation and application of these frameworks. This not only strongly supports ST's assertion about the inseparable relationship between actor behavior and social structures, but also reinforces the benefit of examining both holistically and as individual components. Supporting actors' ability to engage in strategic, creative behavior is critical to implementing progressive, sustainable, and adaptive water management practices.

There is value in evaluating where collaboration and innovation occur in existing, fragmented systems and discovering the mechanisms that allow them to be sustained and expanded. It is also not relevant or useful to think that collaboration is the only practice relevant to achieving the sustainable, adaptive, and context-appropriate systems necessary to meet contemporary water management needs. Supporting strategic behavior, where actors

understand and utilize the appropriate tool, including litigation, collaboration, or regulatory action, for achieving a desired outcome is a more realistic approach than solely encouraging collaboration. This corresponds with the idea management practices can progress appropriately as a region's water-related needs, scientific understandings, and social perspectives evolve. Promoting this sort of contextualized, local progress may be more beneficial and sustainable than imposing a highly structured management approach, like a regional management body or a large, complex collaborative group.

**Conclusions**

The initial motivation for this research was an interest in evaluating and understanding transboundary water management practices in jurisdictionally fragmented regions. Out of interest in creating more environmentally and socially appropriate management practices, there is extensive research about the scaling-up of management systems to work at broader geographic scales. Yet, as there are logistical, legal, and political barriers to enacting these approaches, there is value in understanding how their beneficial components can be identified and nurtured in existing, fragmented systems.

The study results allowed the researcher to be more pragmatic and realistic in her expectations about collaborative, large-scale, transboundary management systems. There is value in evaluating where collaboration and innovation occur in existing, fragmented systems and discovering the mechanisms that allow them to be sustained and expanded. It is also not relevant or useful to think collaboration is the only practice relevant to achieving the sustainable, adaptive, and context-appropriate systems necessary to meet contemporary water management needs. Supporting strategic behavior, where actors understand and utilize the appropriate tool, including litigation, collaboration, or regulatory action, for achieving a

desired outcome is a more realistic approach than solely encouraging collaboration. This corresponds with the idea management practices can progress appropriately as a region's water-related needs, scientific understandings, and social perspectives evolve. Promoting this sort of contextualized, local progress may be more beneficial and sustainable than imposing a highly structured management approach, like a regional management body.

Overall, ST provided a theoretical lens unique from other theories more commonly applied in natural resource management. Structuration Theory allowed the researcher to gain a holistic understanding of the water management system as well as extract individual components of stasis, innovation, collaboration, or change. Structuration Theory's emphasis on understanding actor behavior, structural conditions, and the interaction between the two created the robust findings and conclusions. Yet, where ST did not address or produce robust results, for issues of trust and uncertainty, are concerning. The following recommendations propose next steps and alternatives to address such issues and strengthen ST's empirical application in the future.

**Recommendations**

This study demonstrated ST's appropriateness and value for evaluating complex water management systems. However, this research applied ST to a single case study and only specifically tested five of its propositions. Structuration Theory's broader use in water and natural resource management studies is also limited in scope and detail. Structuration Theory's expanded use in water management research has the potential to produce the types of holistic, robust, and pragmatic results necessary to addressing real-life water management needs. Nevertheless, ST's application needs to be broadened and deepened before strong, consistent conclusions about its value in water management research can be produced. The

basic recommendation is ST should be more robustly applied in water management research. Future research should focus on ST's application alone, its combination with other theories relevant, or its contextualization with information from Giddens' later works.

There is value in further applying ST as a standalone theory to water management studies. Depending on the scope and goal of the study, it would likely be beneficial to focus on testing only one or two ST propositions in detail. This is especially important when trying to definitely identify components experiencing stasis or change. If the goal is to evaluate why certain pieces of the system can be innovative or collaborative, while the majority of institutions and regulatory frameworks are static, is it necessary to gain a specific understanding of what mechanisms inform this process. Important concepts can then be identified and specifically supported to help the system strengthen and evolve.

There is value in combining ST with another theory, especially when ST does not specifically address a condition found, or expected, in the research setting. This combination would supplement ST's analytical and explanatory deficiencies, thereby helping to further tailor and support its empirical application to a specific study. For example, as ST does not provide concepts or propositions related to addressing uncertainty, principles from adaptive management could be integrated into a study's theoretical framework. Both theories could be used simultaneously to capture their respective information, and then findings synthesized. This could be a potentially robust approach to understand uncertainty's role in a social system, particularly how it affects actor behavior.

Depending on its scope and purpose, future ST research may not need to leave Giddens' broader theoretical perspective to contextualize or operationalize ST concepts. Giddens' body of literature about sociology and sociological theory is extensive in scope,

including explorations of modern society, self-identity, love, politics, globalization, and climate change. The majority of this work has occurred after Structuration Theory's development. Researchers could reference Giddens' writings to capture his views on topics relevant to ST, particularly where the ST concepts are vague or difficult to translate empirically. This would allow researchers to remain within Giddens' realm of sociological thought, while creating nuance and specificity necessary to ST's successful empirical application.

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# Appendices

## Appendix A: Structuration Theory Terminology and Concept Map

**Terminology and Definitions**

**Structures** are abstract, social templates, made of rules and resources, which either constrain or enable human agency, and are, in turn, either replicated or changed by that behavior (Fuchs, 2003; Giddens, 1984).

**Rules** are principles, such as formal laws or informal guidelines, which influence action. Rules are normative or interpretive (Giddens, 1984).

**Resources** are what actors use to implement actions and are tied to power. They are authoritative (control over people) or allocative (control over material goods) (Peters, Vanharanta, Pressy & Johnson, 2012).

**Agency** is human behavior or action. Agency is also tied to power. Structuration Theory's agency is not the intent to act, but the ability to act (Busco, 2009). One fundamental principle of ST is that the cumulative impacts of many small actions related to daily behavior, perpetuate broader society (Giddens, 1984).

**Duality** is the concept that human agency and structures are interlinked as a dynamic and recursive social practice (Giddens, 1984). Duality allows people to engage in routine, daily practices while also contributing to the development of larger structures (Poole & McPhee, 2005). Performing an action creates a new structure, where the system is transformed, or reproduces an existing structure, where the system is reproduced (Poole & McPhee, 2005).

**Routinization** is a basic piece of daily life, it encompasses habits and actions that a person performs. Routines are comforting and engender trust (ontological security), and help create or perpetuate structures. Routinization allows daily activities to continue across time and space (Giddens, 1984).

**Institutions** are large-scale social constructs that are embedded in society, they often endure throughout time and space, and can be either changed or reproduced (Cohen, 2005; Poole & McPhee, 2005).

**Reflexivity** encompasses reflexive monitoring, which occurs at an individual level when people critically engage in social systems and components, understand their meaning and implications, and potentially change actions. It also includes institutional reflexivity, which is scaled-up reflexive monitoring, like at an organization level (Cohen 2005; Giddens, 1984).

**Interactions or Modalities of Action** include three components part of every interaction: meaning, power, and norms. Meaning is how an action or idea is interpreted. Norms are the standards of behavior that influence how people act. Power is control and used to accomplish tasks or define relationships among actors. Power often manifests as domination, and can be unequal among actors. Power can also can present as balance and relativity, where it is not wholly concentrated in one entity, but that all entities have some amount of power. (Busco, 2009; Cohen, 2005; Giddens, 1984).

**Time and Space** include the ideas that that structures, institutions, and practices are replicated over time and space (Cohen, 2005). Space also refers to an area that actors or organizations control through power (Poole & McPhee, 2005).

**Disembedding Mechanisms** are practices that remove experiences or meanings from their original context, while notions of space and time eventually rationalize them. There are two types. Symbolic tokens are mechanisms that transmit value and meaning, like money. Expert systems are frameworks of technical or professional expertise that help organize social systems and facilitate relations across time and space (Busco, 2009, p. 256).

**Consciousness** has three categories or levels of awareness. Discursive consciousness is the awareness of a situation and the ability of expression and explanation. Practical consciousness includes knowledge and skills useful for a certain action. The unconscious level includes the experiences that are not readily recalled (Cohen, 2005).

**Structuration Theory Concept Map**
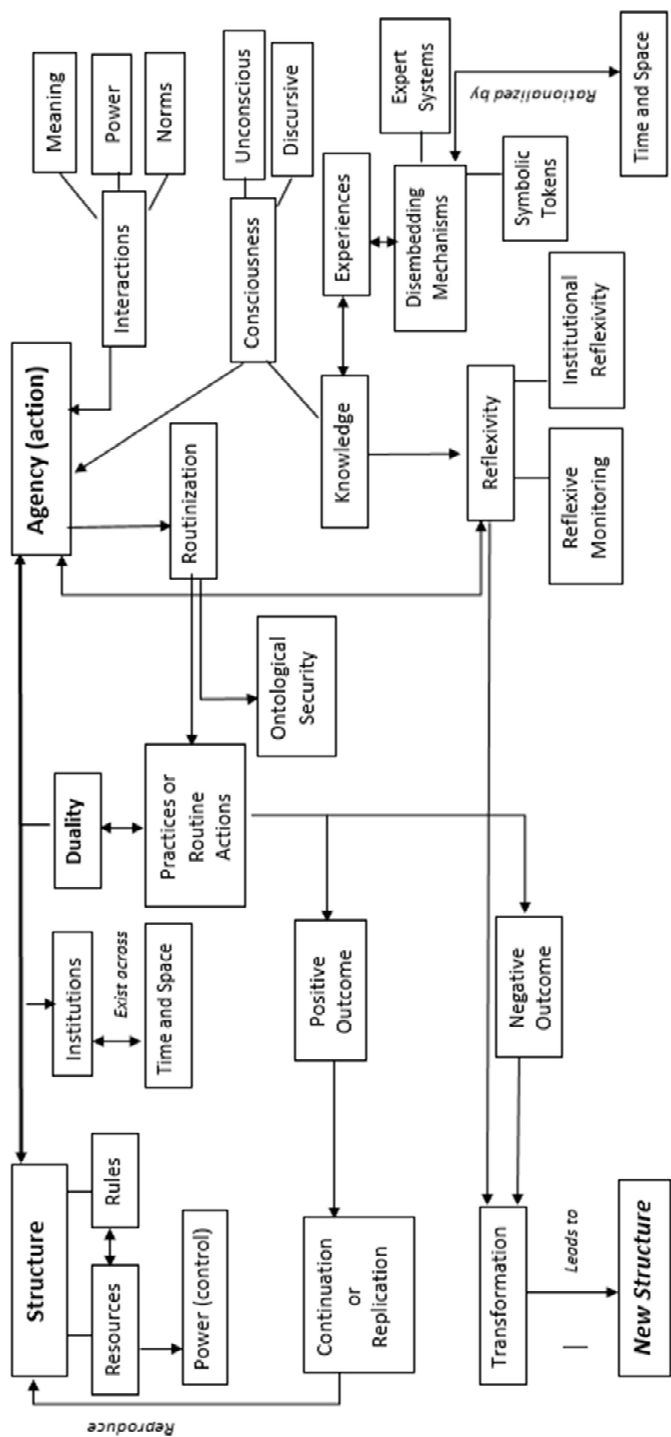
## Appendix B: Interview Instrument

1. Please describe your job within your agency and your role in the regional-scale water management system (I-90 from Spokane to Coeur d'Alene).

2. Who do you work with (other agencies' employees, members of public, etc.) to accomplish your water-management related tasks?
   a. Describe the collaborative or non-collaborative behaviors and interactions you engage to accomplish tasks (scale, scope, time and resource commitment, strategies for accomplishing tasks, etc.).

3. What water-related issues are easiest to collaborate over? Most difficult to collaborate over? Why?
   a. What water-related issues are most often/most effectively/most visibly being addressed at the regional scale?

4. What factors (policies, regulations, best practices, social and/or environmental realities, personal experience, etc.) do you see as hindering collaboration? Enabling collaboration?

5. How do such factors affect your behaviors and practices within your role/job, or at a broad level (co-workers, your agency, other agencies, policies, regulations, institutions)?
   a. Which factors encourage status quo and which encourage change?

6. How and why have water management related practices in the region changed/stayed the same throughout time?
   a. What has changed and what has not?

7. What do you see as the future of water management practices in the region?
   a. How might this come about or be accomplished?

## Appendix C: Operationalized Structuration Theory Concepts for Coding

| Structuration Theory Concepts and Variables | | Codes (concepts used to classify interview text) |
|---|---|---|
| Structures | Rules | • Regulations (organizational)<br>• Laws (government)<br>• Outcomes from court cases |
| | Resources | • Money<br>• Knowledge<br>• Time |
| Institutions | | • State and federal regulatory agencies<br>• Non-profits and special interest groups<br>• Local government (city, county, regional boards)<br>• Water purveyors<br>• Utility districts<br>• Wastewater treatment plants<br>• Collaborative groups |
| Interactions | Power | • Power imbalances between actors or organizations<br>• Dominance<br>• Control<br>• Facilitating action |
| | Norms | • Informal social rules that guide or constrain behavior<br>• Social norms of local residents or water resource users<br>• Organizational norms |
| | Meaning | • Value or ideas people place on water and its use<br>• Examples: recreation, spiritual, subsistence, fishing, boating, utilitarian<br>• Value people assign to management decisions/tasks associated with management and use of water |
| Disembedding Mechanisms | | • Expertise transferred across time and space<br>• Previous employment in another location or state<br>• Education<br>• Job-related experiences<br>• Experiences with collaboration, conflict, etc. that inform current perspectives |
| Reflexive Monitoring | | • Actors are knowledgeable<br>• Possess technical, job-related skills<br>• Interpersonal experiences<br>• Engage in new behaviors (including collaboration) |

# Appendix D: Institutional Review Board Exempt Certification

To: Patrick Wilson

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

Date: 7/3/2014 2:36:19 PM

Title: Application of Structuration Theory to a Case Study of Collaborative Water Management

Project: 14-292

Certified: Certified as exempt under category 2,4 at 45 CFR 46.101(b)(2,4).

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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 2,4 at 45 CFR 46.101(b)(2,4).

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.

To enrich education through diversity, the University of Idaho is an equal opportunity/affirmative action employer