THE HAMMER AND THE HAND:

PLURALISTIC GROUNDWATER GOVERNANCE AND CONFLICT TRANSFORMATION IN OREGON'S MALHEUR LAKE BASIN

by

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THESIS ABSTRACT

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This thesis examines place-based water resources planning in Oregon's Malheur Lake Basin and analyzes the extent to which pluralistic governance has the capacity to transform conflict in groundwater governance regimes. It provides a qualitative analysis of current literature on groundwater governance and uses process tracing to extract best practices from three case studies to identify best practices in pluralistic groundwater governance specifically as they apply to the Malheur Lake Basin. Findings suggest that in addition to a pluralistic governance structure composed of community-based processes and state-based enforcement mechanisms, conflict transformation is the most appropriate lens through which to address groundwater conflicts and disputes and should be an integral component of groundwater governance structures.

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CHAPTER I

INTRODUCTION

Groundwater. The mysterious and occult[1] resource that seventy percent of Oregonians rely upon as their primary source of fresh water.[2] Out of the 2.5 million acre feet (AF)[3] of groundwater pumped annually across the state, the majority is put to consumptive use, with ninety percent used for agricultural purposes.[4] And yet much of groundwater pumped annually goes unregulated and unrecorded by the state.[5]

Harney County is located in southeastern Oregon and relies heavily on groundwater from the Malheur Lake Basin to support its rural agricultural economy. Groundwater from the Basin's aquifers is used primarily for irrigation and stock watering, although the highly lucrative business of growing water-intensive crops has prompted many ranchers in the area to trade in their cattle for alfalfa seed.[6] However, as more people begin growing water intensive crops in arid high-desert country, some older, shallower pumps are running dry. The increasing frequency and duration of drought in

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[1] *Sipriano v. Great Spring Waters of America, Inc*, 42 Tx. Sup. Ct. J. 629 (1999).

[2] OREGON DEP'T OF ENVIRONMENTAL QUALITY, OREGON PUBLIC WATER SYSTEMS GROUNDWATER RESOURCE GUIDE 2 (Oct. 2017).

[3] OREGON WATER RESOURCES DEP'T, WATER RIGHTS IN OREGON 2 (Nov. 2013) (noting "[o]ne (1) acre-foot is the volume of water that will cover one acre to a depth of one foot and is equal to . . . 43,560 cubic feet [or] 325,851 gallons).

[4] Memorandum from Justin Iverson, Groundwater Section Manager, and Brenda Bateman, Technical Services Division Administrator to Oregon Water Resources Commission 3 (Oct. 13, 2016) (on file with author)(reporting that of the 2.5 million AF of groundwater pumped annually in Oregon, "90 percent is used for irrigation, five percent for municipal and community supply, three percent for domestic use, and the remaining two percent for other permitted and exempt uses.").

[5] BARTON THOMPSON, JR. JOHN LESHY, & ROBERT ABRAMS, LEGAL CONTROL OF WATER RESOURCES, 459 (West, 5th ed. 2013) (discussing the tendency of groundwater users to resist well registration requirements out of fear that a reported well will be monitored and eventually regulated by the State).

[6] Kelly House & Mark Graves, *Draining Oregon*, THE OREGONIAN, 4 (Aug. 26, 2016), http://media.oregonlive.com/environment_impact/other/Draining_Oregon_0826d.pdf.

recent years has simultaneously contributed to an increased demand for groundwater to offset the effects of dry streambeds.

Despite the high rate of groundwater consumption within the Malheur Lake Basin, the most recent groundwater study of the Basin was conducted by the United States Geological Survey (USGS) in 1968 and provides little insight to the current location or quantity of groundwater in the Basin.[7] This lack of current data paired with an increased demand for groundwater supplies to meet population growth is resulting in groundwater security concerns relating to the quality and quantity of the resource.[8] Such insecurity is magnified by climate change and poses catastrophic consequences, particularly for rural agricultural communities reliant on ancient groundwater, or "fossil water" pumped from deeper, confined aquifers.[9] Critical voids in current groundwater data and perceived legal barriers to conservation create an existential conundrum for the Basin: how do water users ensure that existing and future needs are met without exceeding the quantity of water the Basin can provide?

Concerned by increasing drought frequency, duration, and intensity, the Harney Watershed Council applied for a grant from the Oregon Water Resources Department (OWRD) in 2016, which selected the Malheur Lake Basin as one of four pilot basins to undertake a four-to five year long place-based integrated water planning initiative

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[7] *Id.* at 10.

[8] UN Water, "What is Water Security." Infographic. May 8, 2013 (illustrating that groundwater insecurity refers to a community's capacity to access and protect water to sustain human life and livelihoods).

[9] OREGON STATE UNIVERSITY, *Groundwater and Aquifers* (2018) http://wellwater.oregonstate.edu/groundwater-and-aquifers (documenting that aquifers in Oregon are made out of either basalt, sand and gravel, or out of bedrock).

recommended in Oregon's 2012 Integrated Water Resources Strategy (IWRS). The locations of each of the four pilot basins are provided by Figure 1 below. [10]

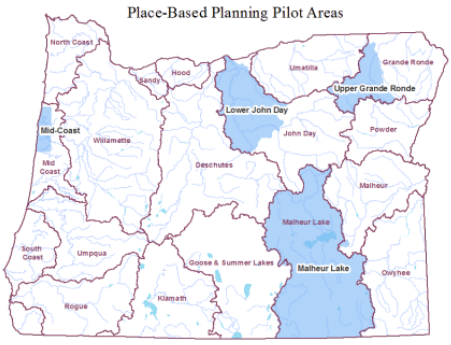

Figure 1: Place-Based Water Planning Pilots

With support from the OWRD, participants in the Malheur Lake Basin's Community-Based Water Planning (CBWP) pilot are collaborating on voluntary, place-based integrated water resources planning which necessitates a strong groundwater governance structure for the Basin.

Whereas management refers to discrete actions taken, governance refers to the overarching framework that facilitates decision-making processes that set the stage for specific management actions. A strong governance foundation is a critical element for addressing water security, in which scarcity a symptom of poor governance.[11] In essence, management provides the ends, while governance provides the means.[12] To this end, the Malheur Lake Basin CBWP is a catalyst for groundwater governance between local stakeholders and state water regulators by helping communities devise and implement

[10] OREGON WATER RESOURCES DEP'T, PLACE-BASED PLANNING UPDATES JULY – DEC. 2016 1 (2016), http://www.oregon.gov/owrd/docs/Place/UpdatesHandout_DEC2016_PBP_2017JAN01_FINAL.pdf.

[11] K.G. Villholth & K. Conti, *Groundwater Governance: Rationale, Definition, Current State and Heuristic Framework*, *in* ADVANCES IN GROUNDWATER GOVERNANCE 3, 4 (Karen Villholth et al. eds., 2017).

[12] *Id.* at 11.

pluralistic governance procedures for voluntary, community-lead water management strategies in areas with unique water challenges.[13]

The term "pluralism" in this context refers to de-centralized governance structures which span horizontally rather than vertically between state-level government and local communities.[14] Derived from scholarship in the political sciences, the pluralization of governance creates a structure that is capable of quickly responding to change by speeding up decision-making and implementation processes by reducing pressure on the state and building governance capacity at a community level.[15]

The concept of plural groundwater governance can be effectively described by the following metaphor: Just as the hammer is only as strong as the hand that wields it, so are state water regulations effective only to the extent that they align with community values.

Figure 2: The Hammer and the Hand of Pluralistic Governance

Similarly, the community hand, being more in touch with local needs, values, and conflicts, is well-equipped to produce an enduring governance structure when it works in

[13] OREGON WATER RESOURCES DEP'T., OREGON'S 2017 INTEGRATED WATER RESOURCES STRATEGY 115 (2017).

[14] Aditi Mukherji & Tushaar Shah, *Groundwater Socio-Ecology and Governance: A Review of Institutions and Policies in Selected Countries*, 13 Hydrogeology Journal 328, 339 (2005).

[15] *Id.*

concert with the hammer represented by state enforcement. This pluralistic governance embodied by the OWRD's place-based planning initiative, like the hammer and the hand has the potential to build a groundwater governance structure in the Malheur Lake Basin that reflects community values and wields the regulatory strength of the State. This thesis evaluates the CBWP in the Malheur Lake Basin and proposes that pluralistic groundwater governance can serve as a robust mechanism for water security through long-term and positive change as seen through the lens of conflict transformation.

Part I of this thesis provides a background on various geological and legal forces impacting groundwater in the Malheur Lake Basin and introduces the Basin's place-based planning pilot. Part II reviews water law as the "hammer" of top-down, regulatory groundwater governance, while Part III reviews the "hand" of bottom-up, community-based groundwater governance. Part IV addresses the integration of state- and local-level groundwater governance regimes in the Basin and proposes that such a pluralistic governance structure can transform conflict into opportunity for positive change as prescribed by Lederach's conflict transformation framework. This proposition is supported by a comparative analysis of three different groundwater governance strategies adopted by agricultural communities in Kansas, Colorado and Utah that are experiencing groundwater scarcity due to climate change and high agricultural demand. Part V concludes with recommendations for how the Malheur Lake Basin can use the pluralistic groundwater governance approach embodied by the place based planning program as a foundation for transforming barriers into opportunities for future groundwater security in the Basin.

CHAPTER II

LITERATURE REVIEW AND METHODOLOGIES

While a robust literature exists on natural resource governance models encouraging public engagement there is a notable gap in scholarship on conflict transformation and pluralistic groundwater governance in the American West. Indeed, much of the literature on groundwater governance in the American West that more closely matched the legal and cultural landscape of the Malheur Lake Basin addressed groundwater conflict as an issue in need of resolution or as a problem that could be fixed by the right market, pipeline, or attorney. Even Oregon's Integrated Water Resources Strategy, from which the place-based integrated water planning process applied in the Malheur Lake Basin arises, emphasizes conflict resolution in its implementation guidelines.[16] This is compelling because water is by its very nature a dynamic and constantly changing resource. It is moreover an emotionally charged resource because of how people identify with water.

The methodologies employed in this thesis consisted interdisciplinary research and qualitative analysis of primary and secondary sources relating to diverse approaches to groundwater management and governance. Much of what was found included case studies conducted across Asia and northern Africa which drew comparisons between

[16] *See* Figure 8, *infra* 28.

community-based groundwater governance and instances where the state or national government exercised its power over the resource.[17]

Additionally, process tracing was used to identify and analyze best practices from three case studies discussed in Chapter VI. The process tracing methodology determined whether a case study was sufficiently similar to the Malheur Lake Basin by identifying parallels in water law, climate, dominant industry, and historic use of water. While California boasts what is arguably the most robust legal and regulatory framework for groundwater management in the United States, the state applies a mixed or "hybrid" of prior appropriation and riparian doctrines to allocate water resources.[18] Despite regulatory similarities between Oregon and California, the applicable legal doctrines differed substantially. The California model of groundwater governance and management therefore fell outside of the scope of this study.

Although the pluralistic governance structure provided by the place-based water planning Draft Guidelines provides for flexibility of governance, this thesis proposes that conflict resolution is too linear and rigid a process to created strong groundwater governance structures, and therefore evaluates groundwater governance through the lens of conflict transformation as devised by pioneering scholar, John Paul Lederach. Lederach's framework is unique to the extent it considers conflict not as an undesired state to be avoided, but as an ongoing, inevitable process to be used to achieve positive change.

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[17] *See generally* Asma Yaqoob, Mutual Vulnerability in the Indus Basin (Regional Center for Strategic Studies, 2013) (exploring integrated water security as a conflict transformation strategy to bring about peace in the Indus Basin).

[18] THOMPSON et al., *supra* note 5 at 200.

Although conflict transformation is more commonly applied to interpersonal social conflicts and conceptually in peace studies, Lederach's framework provides an appropriate lens through which to evaluate pluralistic groundwater governance in the Malheur Lake Basin because it provides the flexibility required by water resources governance and management. To this end, additional scholarship on the transformative potential of pluralistic groundwater governance between local stakeholders and the state could be helpful for groups like the Malheur Lake Basin CBWP that will be expected to maintain water governance structures after the original legislation is repealed in July, 2019.[19]

[19] OR SB 266 (2015) §3(2) (confirming that "the repeal of Section 2 of this Act [on July 1, 2019] does not affect any rights or responsibilities established in a grant, contract or agreement made under Section 2 of this 2015 Act prior to July 1, 2019").

CHAPTER III

THE MALHEUR LAKE BASIN: FORCES AT WORK

The Malheur Lake Basin is an endorheic, or internally-draining basin that is composed of seven distinct sub-basins.[20] Each of these sub-basins has limited groundwater supplies stored in confined and unconfined aquifers that are separated vertically by layers of impermeable material such as clay.[21]

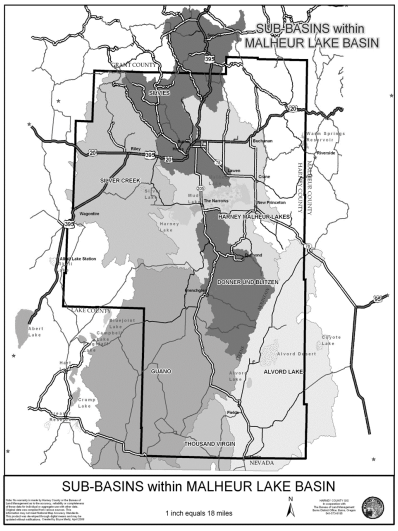

Figure 3: Sub-Basins Within Malheur Lake Basin

Groundwater supplies in the Malheur Lake Basin's unconfined, shallow aquifers recharges primarily from percolating rain and snowfall in the Basin's highlands.[22] These

[20] ESTHER LEV, JOHN BAUER, JOHN CHRISTY, OREGON CLOSED LAKES BASIN WETLAND CONSERVATION PLAN 3 (Portland State Univ. 2012) http://wetlandsconservancy.org/wp-content/uploads/2015/01/Oregon-Closed-Lakes-Basin-Wetland-Conservation-Plan-June-2012.pdf. (describing an endorheic basin as one whose waters drain internally through evapotranspiration or percolation to the underlying aquifer.)

[21] United States Geologic Survey (citing Piper, et al.), *Groundwater Study Area of Concern Presentation* (Jul. 18, 2017), http://www.oregon.gov/owrd/docs/Place/Malheur_Lake_Basin/GWSAC_Presentation_2017JUL18_USGS_PreviousStudies.pdf.

[22] A.R. Leonard, *Groundwater Resources in Malheur Lake Basin, Harney County, Oregon*, STATE OF OREGON 25-26 (Nov. 1970).

are confined by the saturated water table above and recharge primarily by way of waters percolating from the surface.[23] The Basin's confined aquifers, on the other hand, recharge by way of percolation from the overlying water table and unconfined aquifers. This recharge is extremely slow due to the aquifer's confinement.[24] Figure 3 below illustrates the recharge and extraction processes for confined and unconfined aquifers:[25]

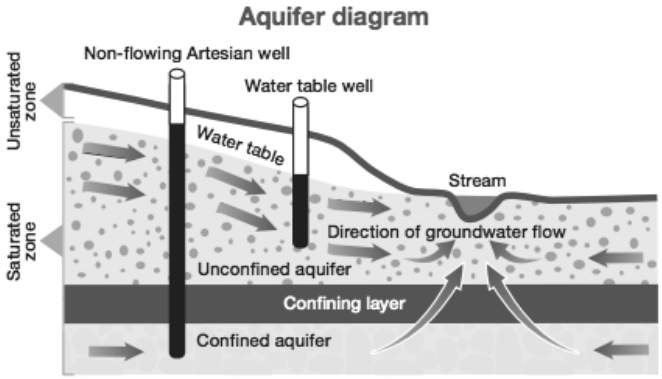

Figure 4: Confined and Unconfined Aquifer Diagram

Wells in the Malheur Lake Basin extract groundwater from both confined and unconfined aquifers. Unlike water diverted from the surface horizontally, groundwater is pumped vertically from a water table which, if depleted too quickly, will decline beyond the reach of shallow pumps – similar to the effect that multiple straws have in a

[23] *See generally* Thomas Harter, *Reference: Groundwater Quality and Groundwater Pollution* 3 UNIV. CAL. DAVIS (2003) (explaining how surface water percolation can contaminate the aquifer below with foreign bacteria and chemicals from human activities).

[24] Howard Perlman, *Aquifers and Groundwater*, UNITED STATES GEOLOGICAL SURVEY, https://water.usgs.gov/edu/earthgwaquifer.html (last visited May 14, 2018).

[25] OREGON WATER RESOURCES DEP'T, WATER WELL OWNER'S HANDBOOK 1 (Jun. 2015), http://www.oregon.gov/owrd/pubs/docs/Well_Water_Handbook.pdf.

milkshake. This effect, results a "cone of depression" which is illustrated in Figure 5 below. [26]

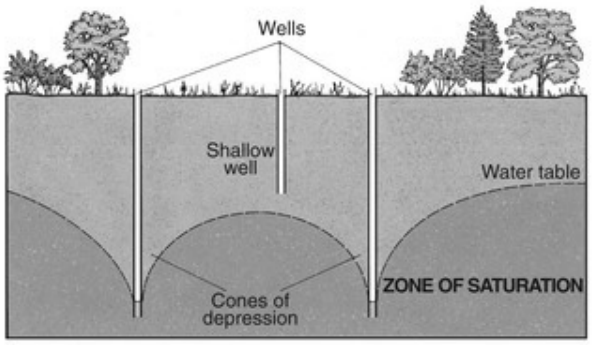

Figure 5: Pumping Effects on Water Table

As illustrated above, when a well punctures an aquifer the groundwater surrounding the well changes its directional path towards the point of extraction. This directional change can result in a cone of depression surrounding the pump which draws groundwater away from other neighboring pumps and may cause some to go dry in places where the water table has substantially declined. Over-extraction of groundwater from unconfined aquifers can also have an effect on surface water supplies, which may interfere with legal rights to the surface.

While groundwater extraction from a unconfined aquifers bears a higher risk surface water right interference, water extracted from confined aquifers, or "fossil water" is less likely to have an immediate, adverse impact on surface supplies. Because negative effects of groundwater extraction are less noticeable on the surface, the OWRD has historically approved permits for wells pumping from confined aquifers, since

[26] PAST-PRESENT-FUTURE, https://past-present-future.weebly.com/ (last visited Apr. 30, 2018).

consumptive use of fossil water is less likely to result in immediate harm to prior surface rights.[27] This practice of approving new wells in confined aquifers originates in large part from limited data on the Basin's groundwater, as it is difficult if not impossible to effectively regulate a resource that has not been measured.[28]

Although no longer mysterious or occult, the relative lack of data on Malheur Lake Basin's groundwater has severely handicapped governance and management responses to scarcity by creating a lack of awareness and understanding.[29] The acclaimed Oregonian series "Draining Oregon" highlighted this decades-long practice at the OWRD of approving new water permits and certificates despite a substantial data gap surrounding the effects that existing pumps have on groundwater supplies and the Basin's water system as a whole.[30] This is particularly significant given the contingency of permits on whether the proposed groundwater use would exceed the annual recharge of the water table or interfere with surface stream flows when added to existing groundwater

[27] House & Graves, *supra* note 6.

[28] WILLIAM ALLEY & ROSEMARY ALLEY, HIGH AND DRY 246 (YALE UNIV. PRESS. 2017). In order to close the data gap, the OWRD has encouraged the drilling of observation wells to collect data on current groundwater levels that will help inform the permit administration process. However, observations wells are few and far between, and typically exist in areas with known groundwater problems, rather than collecting a balanced, statewide dataset. House & Graves *supra* note 6 at 10, 22, 30.

[29] Villholth, *supra* note 11 at 17 (observing "[l]ack of awareness and understanding of groundwater issues leads to absence of a sense of urgency and forms . . . a key obstacle to the development of leadership and commitment to effective groundwater governance."). *See also* Robert Varady, et al., Modes and Approaches of Groundwater Governance: A survey of Lessons Learned from Selected Cases Across the Globe, 8 WATER 417, 419 (SEPT. 23, 2016) (describing a recent shift in small-scale, institutional water management to broad-scale, multi-elemental governance).

[30] House & Graves, *supra* note 6.

uses.[31] The exposé generated public concern that the OWRD is willfully blinding itself to the reality of water scarcity.[32]

A. State Regulatory Response to Scarcity

In response to reports of dry wells and criticism that the OWRD was allocating more water than the Basin could naturally provide, the OWRD designated the Greater Harney Valley Groundwater Area of Concern (GHVGAC) in 2016.[33] That same year, the United States Geological Survey (USGS) initiated a groundwater study of the Basin that will continue until 2020. Furthermore, the OWRD has placed a moratorium on new well permits in the Basin – with the exception of statutorily exempt uses[34] – until the study's completion, since the lack of data on groundwater use and increased demand for groundwater raises concerns about the quality and quantity of the resource.[35]

These state-level regulations come as good news for senior water rights holders and individuals concerned about water supply in the Basin. However, arguments exist that such regulations may restrict economic growth in the Basin, giving rise to concerns regarding the power of the state over what some view as more of a proprietary interest in,

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[31] RICK BASTASCH, THE OREGON WATER HANDBOOK: A GUIDE TO WATER AND WATER MANAGEMENT 83 (OR. State Univ. Press 1998).

[32] Andrew Theen, *Draining Oregon: 1 Year Later, State Still Treading Water with Little Changes*, OREGONLIVE, (Sept. 5 2017), http://www.oregonlive.com/environment/index.ssf/2017/09/draining_oregon_1_year_later_s.html. (In response to concern generated by the article, Governor Kate Brown assured the public that legislator and stakeholder engagement is imperative to ensuring Oregon has a sustainable water future).

[33] OR. ADMIN. R. 690-512-0010, 20 (2016). *See* Douglas MacDougal, *Consensus and Conflict in Oregon's Troubled Waters – A Tale of Four Basins*, MARTENLAW, (Feb. 22, 2016), https://www.martenlaw.com/newsletter/20160222-consensus-conflict-oregon-basins.

[34] OR. REV. STAT.537.545.

[35] Harney County Watershed Council, *Groundwater Investigation*, HARNEY COUNTY WATERSHED COUNCIL, http://hcwatershedcouncil.com/groundwater-investigation/ (last visited Jun. 6, 2018).

if not a right to the Basin's subterranean waters.[36] While western water law has indeed evolved under the umbrella of property rights, as the forthcoming section explains, the right is not to the resource itself but rather is a right to use the resource to the extent allowed by the state. The role of the state as the steward of water and of citizens as its users further emphasizes the importance of a pluralistic groundwater governance structure that minimizes the strength that the state regulatory hammer and gives communities a degree of agency over their water futures.

B. Conflict Transformation: A Lens of Assessment

Conflict scholar, John Paul Lederach defines conflict transformation as a framework which focuses "on creating adaptive responses to human conflict through change processes which increase justice and reduce violence."[37] Like groundwater, conflict transformation is not static but is constantly moving, evolving, and adapting to changing circumstances. Assessing pluralism the Malheur Lake Basin CBWP through the lens of conflict transformation is therefore fitting because the framework is as dynamic a process as groundwater is a resource.

While water conflicts can involve direct disputes between diametrically opposed parties, water conflict in the Malheur Lake Basin stems from the reality that more groundwater permits have been allocated and for a greater quantity of water than the Basin can naturally sustain. This is not an isolated conflict between a handful of

[36] Despite the almost ubiquitous transition of groundwater allocation from the doctrine of "absolute ownership" to "prior appropriation," ongoing constitutional challenges to state stewardship of groundwater indicates an enduring proprietary understanding of groundwater resources. *See* Stefano Burchi, *Legal Principals and Legal Frameworks Related to Groundwater, in* ADVANCES IN GROUNDWATER GOVERNANCE, 119, 121-122 (Karen Villholth et al. eds., 2017).

[37] JOHN PAUL LEDERACH, THE LITTLE BOOK OF CONFLICT TRANSFORMATION 22 (2003).

interested parties, but rather a systemic conflict that is made better or worse depending on variations in climate and demand. It is therefore helpful to evaluate the Malheur Lake Basin CBWP through Lederach's lens of conflict transformation, which provides a framework for looking at conflict both episodically and dynamically.

1. Intersecting Change Processes, Relational Context and Opportunity

Fundamental to Lederach's concept of conflict transformation are "creative change processes" which function as vehicles for progress within a conflict.[38] Whereas the commonly cited process of conflict resolution focuses on the problem by providing a method of bringing an undesired conflict to an end by finding a solution, Lederach suggests that conflict transformation seeks to understand conflict holistically "as an opportunity to engage a broader context, [and] to explore and understand the system of relationships and patterns" involved.[39] Change processes interact with relational contexts and the ability of those involved to view conflict as an opportunity for positive, rather than destructive change. Conflict transformation is found where these three fundamental elements coincide, illustrated by Figure 6 below:

[38] *Id.* at 19, 23-27.

[39] *Id.* at 30.

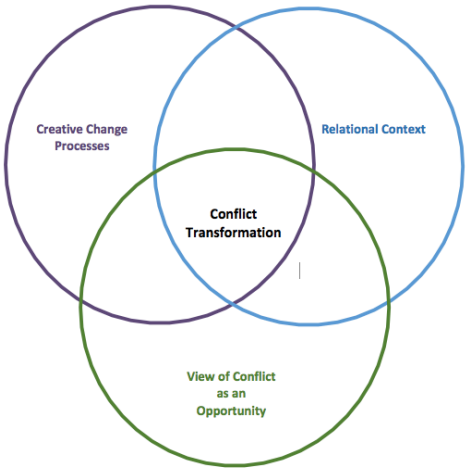

Figure 6: Conflict Transformation Intersection

The effects of change processes can be either specific or broad and can include processes generated by the conflict that are then altered to facilitate positive change. They also include processes that are initiated during the transformational process, the effects of which help conflict progress in a constructive direction.

The context of relationships between the diverse interests involved in conflict is vital to encouraging positive potential that Lederach views as inherent to all conflict.[40] In order to build the capacity of participants to understand conflict as a positive force, the less visible dimensions of the relationship must be focused upon in addition to the context and substance of those relationships. The capacity of people to understand conflict as an unavoidable part of life that creates the potential for constructive change is fundamental to the idea of conflict transformation, and this includes a willingness of participants to respond to obstacles or setbacks in ways that maximize potential for positive change.

[40] *Id.* at 17.

2. Change as a Circle

Ledearach continues with the view of conflict as an ongoing process by illustrating its transformative lifecycle as a circle. The circle in this context represents that social change does not necessarily move at the same pace, nor does it move in one singular direction.[41] The cyclical process of conflict transformation is illustrated below and provides a flexible, cyclical framework that facilitates transformative governance.[42]

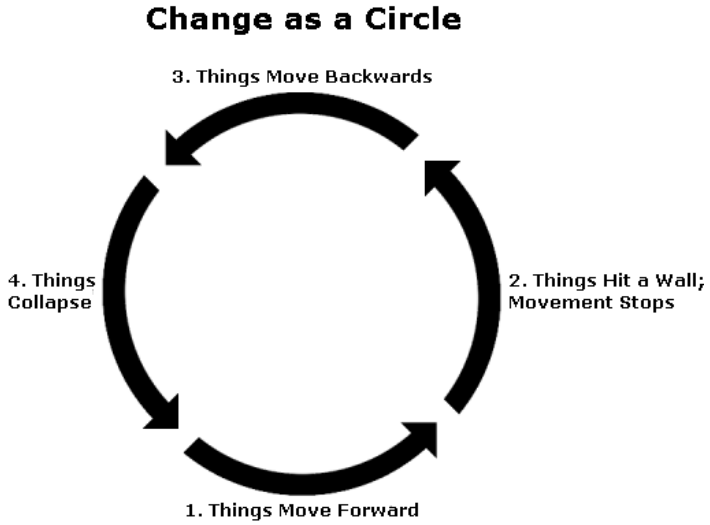

Figure 7: Lederach's Change as a Circle

The Place-based water planning processes in the Malheur Lake Basin could be greatly enhanced after the project's expiration through engaging Basin stakeholders in a progressive, procedural cycle of issue identification, collaboration, accomplishment, and reevaluation as illustrated in Lederach's depiction of "change as a circle." Viewing groundwater governance as a circle of change that it rooted in collaboration between the hammer of state regulation and the hand of locally devised governance regimes rather

[41] *Id.* at 41.

[42] *Id.* at 42; Conflict Transformation, FORGIVENESS AND RECONCILIATION BLOG (Apr. 2, 2013), https://forgivenessandreconciliation.wordpress.com/2013/04/02/289/.

than in a definite end-goal, the structure of groundwater governance in the Malheur Lake Basin will be foundationally much more resilient to external threats than it would be otherwise. This is due in part to the fact that local governance tends to more accurately reflect local circumstances.[43]

In contrast to the rigidity of traditional legal and regulatory governance and management frameworks which place a premium on conflict prevention and resolution, conflict transformation proposes a governance framework that is continuous, flexible and adaptive to changing circumstances. The following sections will be observed through the lens of conflict transformation.

[43] Megdal et al., *Innovative Approaches to Collaborative Groundwater Governance in the United States: Case Studies from Three High-Growth Regions in the Sun Belt*, 59 ENVIRONMENTAL MANAGEMENT 718, 721 (2017).

CHAPTER IV

TOP-DOWN GROUNDWATER GOVERNANCE AS A "HAMMER": OREGON'S LEGAL AND REGULATORY TOOLKIT

The post-war advent of inexpensive pump technology which came about in the 1950s gave farmers access to groundwater and enabled them to irrigate crops and stock miles away from any surface water source or federal distribution project.[44] However, such advances in pump technology have necessitated a more prominent role for the state government in regulating and managing groundwater supplies.[45] In the United States, the federal government regulates water quality while the regulation of quantity falls to the states. Because the Oregon retains legal ownership of water resources, it also retains the authority to regulate those resources.[46]

A. Governing Oregon's Water Resources

The doctrine of prior appropriation is the dominant legal framework used to allocate water in the arid states west of the Mississippi River. Based on the Gold-Rush era notion of "first in time, first in right," prior appropriation fulfills water rights in the order in which they were obtained, giving those with senior rights priority over juniors during times of shortage.[47] While gold and mineral prospectors in Colorado and

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[44] *See* THOMPSON et al., *supra* note 5.

[45] VANDANA SHIVA, WATER WARS 20 (S. End Press 2002) (noting that "[a]s new technologies displace self-management systems, people's democratic management structures deteriorate and their role in conservation shrinks.")

[46] S.S. Sugg & E. Schlager, *Participation of Stakeholders and Citizens in Groundwater Management: The Role of Collective Action, in* ADVANCES IN GROUNDWATER GOVERNANCE 137, 138 (Karen Villholth et al. eds., 2017).

[47] *See* A. Dan Tarlock, *The Future of Prior Appropriation in the New West*, 4 NAT'L RESOURCES JOURNAL 769-793, 770 REGENTS UNIV. (2001). *See also* ANDREAS N. CHARALAMBOUS, *Transferable groundwater*

California established usufructory or "use-based" rights to water under customary law, most western states today have adopted prior appropriation administers through a permit system.[48]

In Oregon, permits for both surface water and groundwater are allocated according to priority and are administered by the Oregon Water Resources Department (OWRD).[49] Under Oregon's 1909 Water Code, a surface water right is legally attached to the land and requires the right holder to use the entirety of their water right for a beneficial use that is not wasteful.[50] Once applicants have obtained a certificated water right, they may only lawfully cease beneficial use of their full right under exigent circumstances such as drought or financial hardship. During times of scarcity when water is unavailable to fulfill every water right, senior right holders to surface water may

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rights: Integrating Hydrogeology, Law and Economics 63-64 (ROUTLEDGE, 2013) (providing a brief history of the cultural context giving birth to the prior appropriation doctrine).

[48] OREGON WATER RESOURCES DEP'T, WATER RIGHTS IN OREGON: AN INTRODUCTION TO OREGON'S WATER LAWS 5 (Nov. 2003). Every western state except Colorado allocates water rights through state-based permit systems that have the plenary police power to oversee the creation, transfer, and enforcement of new and existing water rights.

[49] *See* JANET NEUMAN, OREGON WATER LAW: A COMPREHENSIVE TREATISE ON THE LAW OF WATER AND WATER RIGHTS IN OREGON 24 (Janet Neuman, ed., 2011) (describing that the "Oregon Doctrine" is a term used to refer to states whose water allocation laws began under the common law riparian doctrine and then transitioned to a prior appropriation system. Because Europeans settled in the wetter, western part of Oregon first before moving East to the more arid reaches of the state, the State's waters were first managed under riparianism before transitioning into the prior appropriation system of management to accommodate more arid environments).

[50] OR. REV. STAT. 537.525 (3); Water may be used in Oregon for any use deemed "beneficial" under Oregon law. Such uses include but are not limited to: domestic water supply, fishing, industrial water supply, boating, irrigation, water contact recreation, livestock watering, aesthetic quality, fish and aquatic life, hydropower, wildlife and hunting, commercial navigation and transportation. OREGON DEP'T OF ENVIR. QUALITY, *Beneficial Uses of Oregon's Waters*, http://www.oregon.gov/deq/wq/Pages/WQ-Standards-Uses.aspx (last visited Feb. 06, 2018).

effectively "call the river," forcing upstream junior rights holders to close their headgates to ensure that the senior right is satisfied first.[51]

While the scramble for gold has invariably been replaced by the need for water as a commodity itself, the prior appropriation doctrine has evolved only slightly to cope with rising demand. Prior appropriation was designed specifically to manage water scarcity in the arid North American frontier and has generally been successful in that capacity, but some question the doctrine's continued relevance in the modern era of climate change and water scarcity.[52] Specifically, arguments against the use of prior appropriation as a groundwater allocation doctrine include that it promotes inequality and conflict between senior and junior rights holders, rural and urban populations, and environmental and agricultural uses.[53]

In contrast to surface water which has a ubiquitous visual presence, groundwater is relatively invisible and was once considered so mysterious and unknown that it was effectively beyond the reach of the law to regulate.[54] Increased and unregulated access to groundwater prompted the Oregon Legislature to pass the Groundwater Act in 1955 (the Act) which declared groundwater, like surface water, a public resource held in trust by

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[51] J. David Aiken, *The Use of Equitable Principles to Resolve "New" Western Water Disputes, in* WATER ON THE GREAT PLAINS 54,56 (Peter Longo & David Yoskowitz, eds., 2002) (nothing the entitlement of senior appropriators to claim water even at the expense of juniors unless that junior is located downstream because the water would have effectively already passed by the senior).

[52] *Id.* at 54 (noting that "[p]rior appropriation has worked well in that it provides clear rules for resolving conflicts to use over-appropriated western streams.") However, critics point out that PA "is inflexible, and gives an unfair advantage to [senior] users." (*Id* at 55); *See also* A. Dan Tarlock, *Prior Appropriation: Rule, Principle, or Rhetoric?* 76 NORTH DAKOTA LAW REV. 881-910, 883 (2000) (arguing that the doctrine of prior appropriation finds more power in the threat of its application than in the application of the rule itself).

[53] BASTASCH, *supra* note 31 at 301. *See generally* Charles Wilkinson, *Aldo Leopold and Western Water Law: Thinking Perpendicular to the Prior Appropriation Doctrine*, 24 LAND AND WATER LAW REV. 1 (1989) (proposing an alternative to the classic doctrine of prior appropriation for allocating western waters).

[54] *Sipriano*, *supra* note 1.

the state and allocated by permit according to priority.[55] Prior to the Act, prospective groundwater users were not required to obtain a permit at all before using the subterranean waters and could therefore exploit groundwater supplies regardless of the potential or actual harm caused to other users.[56] While rights to groundwater that predated the Act were grandfathered into the new permit system, individuals wishing to attain a groundwater right subsequent to the Act's passage were required to apply for a permit, with priority favoring the senior user.

Notably, the Act provided certain exemptions under which an appropriator is not required to obtain a permit.[57] The exempt well provision was intended to reduce agency backlog in the permitting process by exempting domestic and other uses under 15,000 gallons per day that were considered minimal and do not weigh heavily on the capacity of the aquifer.[58] However, the provision has drawn criticism that the absence of a permitting requirement for exempt wells has resulted in a substantial data gap on the quantity and quality of groundwater throughout the state.[59]

The debate on exempt wells also indicates persevering attitudes towards groundwater rights as more of a proprietary "stick in the bundle" of property rights, rather than a usufructory right to a common resource.[60] Such a proprietary stake in a

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[55] *Id.* at 24.

[56] *Id.*

[57] OR. REV. STAT.537.545 (2015).

[58] *Id.*

[59] *See* Neuman, *supra* note 49 at 75-76; *See also* Megan Vinett & Todd Jarvis, *Conflicts Associated with Exempt Wells*, JOURNAL OF CONTEMPORARY WATER RESEARCH & EDUCATION 10, 14 (Aug. 2012).

[60] *See* Sugg & Schlager, *supra* note 46ch at 137 (noting that "as common pool resources, [groundwater basins] are subject to the tragedy of the commons because of the collective effects and actions needed to

commonly held resource resembles Hardin's tragedy of the commons in which limitless private use of a limited shared resource will inevitably lead to depletion of that resource and the downfall of the community.[61]

B. Groundwater Conflict in the Malheur Lake Basin

Conflict over available groundwater in the Malheur Lake Basin generally takes the form of disputes between senior users with shallow wells and juniors with newer, deeper wells.[62] Unlike surface water rights holders who may legally "call the river," a senior with a shallow well may not deny access to junior users with deeper wells as this would effectively close the aquifer by prohibiting anyone from drilling a well that reaches any lower than the water table.[63] This "shallow senior" problem poses a risk to the transformative potential of conflict where it becomes zero-sum and adversarial. Individuals involved in conflicts and disputes over who gets water during scarcity can result in administrative hearings, adjudications, and more commonly, in litigation. In the context of groundwater disputes, litigation is often considered a viable option since its direct effects are typically considered more proximate than the effects of a depleted aquifer, which is still considered to be a far-off, future consequence.[64]

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manage groundwater extraction and storage). See *also* Shiva, *supra* note 45 at 24 (observing that "water is a commons because it is the ecological basis of all life and because its sustainability and equitable allocation depend on cooperation among community members).

[61] Harney County Watershed Council, *supra* note 34.

[62] *See generally* House & Graves, *supra* note 6.

[63] Robert Abrams, *Legal Convergence of East and West in Contemporary American Water Law*, 42 ENV. LAW. 65, 73-74 (2012).

[64] *See* Janet Ivey, et al. *Community Capacity for Adaptation to Climate-Induced Water Shortages: Linking Institutional Complexity and Local Actors*, 33 ENVTL. MGMT. 36, 44 (2004) ("planning for collaborative adaptation to climate change may strike some municipal and other local water managers as a low priority item in the course of their daily duties.").

It is clear that science is at the core of disputes over groundwater,[65] however, institutional conflict resolution processes like litigation can be problematic to the extent they focus substantially on a singular episode of conflict rather than on the larger scope of the conflict and its sources. Attempting to resolve rather than transform a conflict is both overly-exclusive and overly-specific to help communities address the short-term and long-term needs. Because adversarial procedures of conflict and dispute resolution only directly concerns the parties involved, any outcome likewise typically only applies to parties rather than to the conflict as an amalgamation of integrated parties and issues.

Methods conflict resolution that are adversarial in nature are also problematic at an institutional level. Increased water scarcity and drought conditions have given rise to more legal action against the State, besieging the OWRD with transactional costs associated with an onslaught of water rights adjudications and lawsuits.[66] The risk of the OWRD overspending its biennial litigation budget is due in part to the increasing prevalence of water-related conflicts across the state and is amplified by substantial budget cuts made by the Oregon legislature last session.[67] Considering these hardships, while the threat of litigation certainly incentivizes community and regional action, water

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[65] W. Todd Jarvis, *Cooperation and Conflict Resolution in Groundwater and Aquifer Management, in* ADVANCES IN GROUNDWATER GOVERNANCE 177, 178 (Villholth et al., eds. 2017).

[66] *OWRD on Track to Overspend Litigation Budget*, HERALD AND NEWS (Mar. 21, 2018) https://www.heraldandnews.com/news/local_news/owrd-on-track-to-overspend-litigation-budget/article_b7058ad6-03ba-5e05-ba90-3edfcc5fc195.html (reporting that the OWRD has already spent much of its $835,000 litigation budget, placing it on the road to going $1.3 million over its estimated 2017-19 budget).

[67] *Id.* at 2. The report alleges that the agency's budget has fallen from $107.4 million during the 2014-2016 biennium, to $98.6 million for 2017-2019. *See generally* OREGON WATER RESOURCES DEP'T, GOVERNOR'S 2017 –2019 RECOMMENDED BUDGET (2017).

rights litigation alone is too particularized and costly to effect long-term, positive change for communities reliant on diminishing groundwater resources.[68]

[68] *See* Megdal et al., *supra* note 43 at 732 (discussing how "[l]ong-standing and new legislation, along with litigation or the threat of litigation, continues to drive regional actions" in groundwater management efforts in the United States "Sun Belt".). Megdal also emphasizes the importance of stakeholder engagement in groundwater management options. This supports the proposition made here that private litigation (which necessarily excludes all but the parties involved) in an inappropriate solution alone for conflicts concerning groundwater).

CHAPTER V

EXTENDING THE HAND: COMMUNITY-BASED COLLABORATIVE GROUNDWATER GOVERNANCE TOOLKIT

Acclaimed physicist and human rights activist Vandana Shiva has held that the most sustainable way to govern water resources is through local and decentralized governance regimes.[69] When addressing water security concerns posed by scarcity at a local level, it is critical that the governance structure represents the culture, values and history of the community in which it will be employed. A governance structure without a foundation in the local vernacular will not likely attract the necessary community interest or long-term dedication to the process. Because groundwater insecurity has distinctly local effects posed by scarcity, local conflict that results must be addressed by the affected stakeholders, using locally devised processes to achieve desired outcomes.

Because the Malheur Lake Basin is endorheic, groundwater insecurity in the has distinctly local effects. The capacity of the Basin to supply a consistent source of water therefore has a direct effect on local groundwater users reliant on a predictable supply. Because groundwater planning will directly affect the residents within the Basin, laying the foundation for a strong groundwater governance structure is a vital precondition for groundwater management and the continuation of adaptive processes to a changing climate.

A. Malheur Lake Basin Community-Based Water Planning

[69] Shiva, *supra* note 45 at 24 (noting that "because water falls on the earth in a dispersed manner, because every living being needs water, decentralized management and democratic ownership are the only efficient, sustainable, and equitable systems for the sustenance of all.").

Oregon's 2012 Integrated Water Resources Strategy (IWRS) proposes a set of guidelines meant to encourage this kinds of community-based, flexible groundwater governance framework through place-based water planning. The stated goal of place-based planning is to "allow communities to identify their water resources needs and . . . partner with the state to develop solutions and a suit of projects that will help meet those needs now and into the future."[70]

Recommendation Action 9A of the IWRS proposes a trial framework and provides a set of Draft Guidelines which facilitate collaboration between communities and the state on solutions to local water needs.[71] The Draft Guidelines also articulate the value of pluralistic groundwater governance between state regulators and local communities, emphasizing that community support for water resources projects will increase community involvement and result more state funding by the state for those projects that demonstrate the most community interest.[72]

The Draft Guidelines break down place-based planning into five Planning Steps. During Step One, participants work to build a collaborative and integrated process through which to identify stakeholders, convene community meetings, define the scale of the project area, ensure that the collaborative processes used by the conveners are public and transparent and that decisions are made through consensus.[73] After identifying

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[70] OREGON WATER RESOURCES DEP'T, *Draft Guidelines: A Tool for Conducting Place-Based Integrated Water Resources Planning in Oregon* 5 (Feb., 2015).

[71] OREGON WATER RESOURCES COMMISSION, OREGON'S INTEGRATED WATER RESOURCES STRATEGY (2017); *See* Oregon Water Resources Dep't, *Place-Based Planning Updates July–December 2016* (2016) at 2, http://www.oregon.gov/owrd/docs/Place/UpdatesHandout_DEC2016_PBP_2017JAN01_FINAL.pdf.

[72] OREGON WATER RESOURCES DEP'T, *supra* note 69 at 5.

[73] *Id.* at 7-9.

diverse interests and solidifying process, Step Two guides participants to work with the OWRD in identifying challenges concerning water resources, water quality and ecological issues within the project area.[74] Planning Step Three quantifies participants existing and future water needs, while Step Four helps participants develop solutions to meet long-term water needs.[75] Lastly, Step Five provides for the adoption and implementation of place-based plans.[76] Plans that are approved by the OWRD will be integrated into the Oregon Integrated Water Resources Strategy.

B. Application in the Malheur Lake Basin

Community-Based Water Planning (CBWP) in the Malheur Lake Basin commenced in 2016 and is co-convened by the Harney Watershed Council and the Harney County Circuit Court, with support from OWRD. The stated goals of the CBWP are to test the Draft Guidelines, identify best practices, and recommend how to improve the place-based planning process.

[74] *Id.* at 9.

[75] *Id.* at 10-15.

[76] *Id.* at 16.

IWRS Guiding Principles

- Accountable and Enforceable Actions
- Balance
- Collaboration
- Conflict Resolution
- Facilitation by the State
- Incentives
- Implementation
- Interconnection/Integration
- Public Process
- Reasonable Cost
- Science-Based, Flexible Approaches

Figure 8: IWRS Guiding Principles

For the duration of the place-based planning pilot, the Malheur Lake Basin CBWP is expected to develop a place-based plan in accordance with the Five Planning Steps by following the IWRS Guiding Principles listed in Figure 8 above.[77]

The identified purpose of the process employed by the CBWP is to "engage a broad, representative group of stakeholders and other interested members of the public to begin the process of developing a long-term integrated water resources strategy that will meet the needs of Harney County."[78] During Step One, the Harney County Watershed Council Coordinating Committee worked to establish this process which laid the foundation for sub-committee working groups to address specifically identified areas of concern later in the process.[79]

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[77] *Id.* at 17.

[78] Quarterly Full Collaborative Summary Notes, Harney County Community-Based Water Planning 1 (Jul. 19, 2017) http://hcwatershedcouncil.com/wp-content/uploads/2016/12/Summary-HC-CBWP-July-19-2017.pdf.

[79] There are presently four Working Groups in the CBWP collaborative – Agriculture, Domestic Well & Municipal Water, Ecological, and Vegetation Management. Harney Watershed Council, *Harney County Community-Based Water Planning Public Planning Session, Meeting Summary/Notes* 1 (Jan. 18, 2017) https://drive.google.com/file/d/0BxtG96VYSHkCWHVndXM1OG9HU28/view. The Harney Watershed Council indicates that a new Working Group focusing on Storage Issues will form early in 2019. HARNEY

The CBWP identified a number of challenges under Step Two pertaining to water in the Malheur Lake Basin. While a number of those challenges exceed the scope of this thesis, they are worth noting in full for the sake of full disclosure. The group identified that the Basin is challenged by surface water variability which leads to management difficulties, as well as by groundwater development which, as explored in detail above, has resulted in water table declines and documented shortages in some areas of the Basin.[80] The group also identified challenges posed to local industries, wildlife and migratory birds, and to residents by water scarcity.[81] Lastly, the group identified a commonly held concern that water use in the Basin is unsustainable and that long-term impacts of high water use in the Basin will worsen with the frequency of drought years.[82]

In accordance with Step Three, the CBWP has identified a number of long-term goals that will help define the desired water future of the Basin. These goals include developing a better understanding of surface water and groundwater in the Basin, determining current and future needs for both instream and consumptive use of water, and identifying and prioritizing non-regulatory strategies and methods by which to achieve these goals.[83] By devising these strategies, the CBWP aims to 1) balance water uses between diverse needs, 2) promote conservation and water use efficiency, 3) use

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COUNTY WATERSHED COUNCIL, *CBWP Meetings & Materials* (last visited on May 23, 2018) http://hcwatershedcouncil.com/cbwp-meeting-materials/.

[80] HARNEY COUNTY WATERSHED COUNCIL, *Community-Based Water Planning* (last visited on May 23, 2018) http://hcwatershedcouncil.com/community-based-water-planning/.

[81] *Id.*

[82] *Id.*

[83] *Id.*

water efficiently by maximizing use, and 4) ensure water quality and quantity within the Basin.[84]

The full CBWP collaborative group meets quarterly to discuss accomplishments and next steps. Moreover, results from the USGS groundwater study trickling in to the OWRD's Groundwater Study Advisory Committee which is working with the CBWP Coordinating Committee to ensure that the processes and governance decisions made by the group are science-based and flexible as urged by the IWRS Guiding Principles.[85]

C. Critique: Why Community-Based Collaborative Processes are Necessary but Insufficient

Just as arguments exist that prior appropriation is inappropriate for efficient groundwater allocation, some suggest that collaborative governance processes –without more– are ill-suited to natural resources management because of their propensity to magnify stakeholder participatory inequalities, preclude true collaboration, and limit the potential for consensus.[86] However, groundwater governance as understood as a means of conflict transformation does not emphasize an absence of conflict as the desired outcome, and therefore does not compromise the integrity of change processes in its pursuit of placating stakeholders through consensus.[87]

The literature suggests that community-based governance solutions, while necessary to long-term positive change, are effectively toothless without engaging with

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[84] *Id.*

[85] *See* Figure 8 *supra* 28.

[86] TRACYLEE CLARKE & TARLA RAI PETERSON, ENVIRONMENTAL CONFLICT MANAGEMENT 20 (Matthew Byrnie, Ollivia Weber-Stenis & Elizabeth Swearngin, eds. 2016).

[87] *Id.* (referencing Peterson et al. (2005)).

state enforcement mechanisms.[88] The resilience of groundwater governance structures to external change hinges on the extent of stakeholder involvement, although stakeholder involvement alone does not guarantee success. Rather, in order to ensure that a governance model is tailored to the needs and interests of a community or basin, it must possess the necessary procedural qualities to lend predictability to conflict transformation.

[88] Robert Varady, et al., Modes and Approaches of Groundwater Governance: A survey of Lessons Learned from Selected Cases Across the Globe, 8 WATER 417, 419 (SEPT. 23, 2016) (recognizing that water specifically requires direct participation from both local stakeholders and governmental regulatory entities, and that giving full responsibility to communities to govern and manage groundwater more often than not ends in failure).

CHAPTER VI

THE HAMMER AND THE HAND: PLURALISTIC GROUNDWATER GOVERNANCE AS A HARBINGER FOR CONFLICT TRANSFORMATION

American jurist and lawyer Lee Loevinger observed that an expert of any discipline will confront a conflict believing that his or her specialized skill set is the only means of resolving the issue.[89] Where water conflict is concerned then, it is unsurprising that lawmakers laud regulatory solutions and many communities, particularly those in rural agricultural areas, defend the their right to localized governance of natural resources. However, conflicting opinions on the appropriate scale at which to govern and manage groundwater support the proposition that top-down and bottom-up governance methods are more effective when utilized together. Just as the hammer and the skilled hand construct a stronger structure together than separately, so do local governance regimes when enforced by the hammer of state regulation.[90]

By combining the strengths of community-based solutions with legal and regulatory tools, communities can enjoy the benefit of their collaborative efforts while relying upon the security of existing state legal and regulatory frameworks to enforce governance strategies that are distinctly tailored to that community's unique needs and desired outcomes. Furthermore, a community-based groundwater governance framework will encourage conservation through efficient use of groundwater resources in closed

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[89] Loevinger adopted for politics Maslow's widely used adage that "if the only tool you have is a hammer . . . treat everything as if it were a nail." ABRAHAM MASLOW, THE PSYCHOLOGY OF SCIENCE 15–16 (Harper & Row 1969).

[90] *See* A.M. Duda, *Leadership and Political Will for Groundwater Governance: Indispensable for Meeting the New Sustainable Development Goals, in* ADVANCES IN GROUNDWATER GOVERNANCE 99, 109 (Villholth et al., eds. 2017). (arguing that "only place-based, integrated approaches . . . combined with sector reforms [such as water pricing] will work").

basins such as the Malheur Lake Basin, while contributing to a healthful judicial economy by mitigating or resolving water conflicts preemptively.[91]

This section provides a comparative analysis of three similarly situated communities in Kansas, Colorado, and Utah, and demonstrates how each has navigated actual and perceived barriers to localized groundwater governance. Each case study was chosen based on similarities in water law, common agricultural use, and conflict surrounding overallocation and overuse of groundwater resources. The purpose of this analysis is to provide examples and note best practices by tracing processes of similarly situated communities that have attempted to address groundwater problems by integrating place-based planning with state enforcement mechanisms.

A. A Comparative Analysis of Case Studies from Colorado, Utah, and Kansas

1. Voluntary Fee Agreements in the San Luis Basin, Colorado

As in many western states, demand for groundwater in Colorado has grown more abundant than the water supply. Additional stress factors accompanying severe drought and the pressure to put water to beneficial use has put pressure on Colorado's water and groundwater supplies, particularly in the Rio Grande Basin's San Luis Valley.[92] While the water rights allocation systems in Colorado and Oregon differ slightly, hydrological and agricultural use similarities between the San Luis Valley and the Malheur Lake Basin

[91] The Oregon Water Resources Department is currently on-track to overspend its litigation budget for the 2017-2019 biennium. While most of the litigation costs are related to water rights conflicts in the Klamath Basin, the frequency of water rights litigation against the OWRD rights is likely to increase in the future if conflict is not prevented at a community level. Herald and News, *OWRD on Track to Overspend Litigation Budget*, HERALD AND NEWS (Mar. 21, 2018) https://www.heraldandnews.com/news/local_news/owrd-on-track-to-overspend-litigation-budget/article_b7058ad6-03ba-5e05-ba90-3edfcc5fc195.html.

[92] Colorado Water Conservation Board, *Water Supply Planning*, http://cwcb.state.co.us/water-management/water-supply-planning/Pages/main.aspx.

make the voluntary imposition of groundwater use fees in Sub-District 1 an applicable case study for groundwater users in the Malheur Lake Basin.

In order to prevent state regulators from shutting down well operations in the San Luis Basin collaborated with farm owners to create the Basin's first sub-district in 2006. The San Luis Basin "sub-district project" was undertaken by Sub-District 1 in 2012 in response to irrigators' continuous reliance on groundwater resources. Rather than succumbing to a tragedy of the commons, irrigators within the Sub-District collectively devised a groundwater use scheme which allows irrigators within the sub-district to pay $75 per AF of groundwater used.[93]

The sub-district project requires irrigators to choose how they will restrict their water consumption, between paying a usage fee or fallowing a portion of their land. While there are several options given to irrigators, the sub-district model provides local irrigators an opportunity to determine conservation methods that are tailored to specific characteristics and needs of one particular sub-basin. Funds collected through self-imposed fee arrangements compensate irrigators that opt to keep marginal areas fallow rather than pay the $75 per AF fee.

Although the sub-district project began slowly, it has since demonstrated success and the aquifer has recovered almost 250,000 feet of water since 2012.[94] Conservation measures have resulted in 10,000 acres of land left fallow of the 40,000-acre goal to be

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[93] Lisa Marshall, *When Farmers Must Pay for Groundwater, They Cut Use by a Third*, CU BOULDER TODAY 2 (Jun. 22, 2017) https://www.colorado.edu/today/2017/06/22/when-farmers-must-pay-groundwater-they-cut-use-third.

[94] Paige Blankenburger, *After years of drought and overuse, the San Luis Valley aquifer refills*, HIGH COUNTRY NEWS (May 26, 2016), http://www.hcn.org/articles/after-years-of-drought-and-overuse-a-water-basin-refills-in-the-san-luis-valley.

reached by 2021.[95] As of 2016, groundwater pumping in the San Luis Valley had decreased to 200,000 AF from 320,000 AF in 2015.[96]

The voluntary fee arrangement model has been touted as a successful example of community-based groundwater governance, although it was the subject of some litigation coming from individuals adverse both to state water regulations and the community-based response.[97] Despite the threat of litigation, a locally-devised groundwater management plan will typically enjoy a presumption of validity by the courts.[98] Notwithstanding treatment by the courts, threat of litigation represents a deficiency in the relational sphere of conflict transformation and emphasizes the necessity of ensuring every stakeholder has an opportunity to participate.

2. State Delegation of Authority to Local Groups in the Grand Escalante Valley, Utah

In Utah's Escalante Valley, groundwater users are looking at a long-term groundwater management strategy. Rather than subject themselves to regulatory interference by the state, groundwater users in the Valley, most of whom are agricultural irrigators, organized to create the Escalante Valley Water Users (EVWU) association to devise a management plan to help users minimize the effects of groundwater mining in the Valley.

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[95] *Id.*

[96] *Id.*

[97] San Antonio v. Special Improvement District No.1, 270 P.3d 927 (Colo. 2011).

[98] *Id.* at 940.

Like the Malheur Lake Basin, groundwater in the Grand Escalante Valley has been overallocated and overused.[99] In response to conflict over how and when to taper groundwater use in the Valley, the EVWU and Utah state legislators devised a bill (SB-20) that transferred the power of groundwater management from the state engineer to local groups.[100] Since the passage of SB-20 in 2007, the EVWU has faced economic barriers to groundwater user reduction based on the agricultural projects sustained by groundwater that fuel the regional economy.

In order the soften the economic impact of the Bill on the agricultural economy, EVWU proposed stretching out the timeframe for use reductions, possibly by a mere five percent every twenty-year period.[101] While this poses a palatable solution to the economic barriers of groundwater use reduction, it poses another problem regarding time: at the proposed rate, groundwater users in the Escalante Valley will continue mining the aquifer for another 180 years.

3. Incentivized Reduction in Groundwater use through Local Enhanced Management Areas in Sheridan County, Kansas

In 1972, the Kansas legislature adopted the Kansas Groundwater Management District Act.[102] The Act and its subsequent amendments provide for the establishment of Intensive Groundwater Use Control Areas by either water rights owners, the Groundwater Management District, or the Chief Engineer. In 2013, Governor Sam

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[99] Jamie Hansen, *It Takes a District: Utah Landowners Control Groundwater Use*, HIGH COUNTRY NEWS 4 (May 10, 2010) https://www.hcn.org/issues/42.8/it-takes-a-district.

[100] *Id.*

[101] *Id.* at 5.

[102] K.S.A. 82a-1020 – 1042 *Groundwater Management District Act* (Jul. 2017).

Brownback called for a statewide Kansas Water Vision to "[p]rovide Kansans with the framework, policy, and tools, developed in concert with stakeholders, to manage, secure, and protect a reliable, long term statewide water supply while balancing conservation with economic growth."[103]

In response to groundwater depletion across the state, the Groundwater Management District Act included a provision introducing Local Enhanced Management Areas (LEMAs), which provide a voluntary, procedural framework for communities to govern and regulate groundwater usage.[104] While the framework is provided by statute, groundwater regulation itself is devised locally. Once an irrigation district has devised a groundwater management plan, the plan is submitted for review and, pending approval, is enforced by the state. Community participation is voluntary, and the role of state regulators is limited to the review process, order implementation, and enforcement. Proposed orders that are created at a community level are submitted to the Chief Engineer for approval where they are subject to both administrative and judicial review if challenged.

The state approved is first LEMA in 2012 in order to extend the life of the Ogallala aquifer. The LEMA applied to groundwater users in parts of Sheridan and Thomas Counties in Northwestern Kansas and is collectively known as the Sheridan 6 (SD-6) LEMA. Local stakeholders in Sheridan used collaborative processes to generate the Sheridan 6 LEMA proposal before the Senate Bill providing for a LEMA option had

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[103] STATE OF KANSAS, A LONG-TERM VISION FOR THE FUTURE OF WATER SUPPLY IN KANSAS (2015). https://kwo.ks.gov/docs/default-source/water-vision-water-plan/vision/rpt_water_vision_reformatted_kf1d56e11da40b6667970cff000032a16e.pdf?sfvrsn=0.

[104] K.S.A 82a-1041.

even been codified. The proposal indicates a collective agreement that "[a]ll water diversions within the SD-6 area to be collectively restricted . . . to no more than 114,000 [AF] total."[105] The proposal included a defined expiration of the LEMA in 2017, but upon review, the Chief Engineer approved a proposal to extend the Sheridan 6 LEMA for the years 2018-2022.[106]

Actual implementation of water conservation measures in the Sheridan 6 LEMA has been slow due to a number of factors acting as barriers to preventing aquifer depletion. First, as with groundwater supplies in the Malheur Lake Basin, groundwater in the Ogallala Aquifer has been over-allocated and aquifer depletion far outpaces renewal. Moreover, the State is apprehensive about implementing top-down mandatory restrictions on groundwater use because of potential "takings" issues stemming from the United States and Kansas Constitutions.[107] Lastly, a top-down method for restricting use may prompt large irrigators that tend to dominate membership and hold considerable political clout in Groundwater Management Districts to retaliate politically.[108]

While it may still be too early to determine the overall success of the LEMA project, current data is promising. As of May, 2018, the Sheridan 6 LEMA and

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[105] Sheridan District 6 HPA Stakeholders Proposal to be Recommended to the Northwest Kansas Groundwater Management District No. 4 Board of Directors Along with a Request that Said Proposal be Adopted by the Groundwater Management District 4 Board and Submitted to the Chief Engineer, Kansas Dep't, Ag., Div. of Water Resources as a LEMA Proposal 1 (June 15, 2012) http://www.gmd4.org/SD6/SD6-EnhancedMgtPlan-V2.pdf.

[106] Kansas Dep't of Agriculture, *Sheridan County 6 LEMA* (Aug. 24, 2017) http://agriculture.ks.gov/divisions-programs/dwr/managing-kansas-water-resources/local-enhanced-management-areas/sheridan-county-6-lema.

[107] Burke Griggs, *Lessons from Kansas: A More Sustainable Groundwater Management Approach*, STANFORD: WATER IN THE WEST (August 18, 2014), http://waterinthewest.stanford.edu/news-events/news-press-releases/lessons-kansas-more-sustainable-groundwater-management-approach.

[108] *Id.*

Groundwater Management District 4 District-Wide LEMA are the only active LEMAs in Kansas.[109] However, Groundwater Management District Number Five has since proposed the Rattlesnake/Quivira LEMA, which is currently undergoing review.[110]

B. Takeaways for the Malheur Lake Basin CBWP

Although each case study above differs from the Malheur Lake Basin CBWP in fundamental ways, valuable lessons may be extracted from each and are illustrated in Table 1 below:

Table 1: Best Practices and Barriers to Groundwater Security

	GW Doctrine	Problem	Governance	Barriers to Groundwater Security
Sub-District 1 San Luis Valley (CO)	PA + water courts	High AG overdraft + concurrent drought years	Voluntary Fees	Legal challenges - Presumption of validity to plan with State approval.
EVWU Grand Escalante Valley (UT)	PA	High AG Overdraft	Delegation of Power	Slow progress
SD-6 LEMA Sheridan County (KS)	PA	High AG overdraft + concurrent drought years	Statutory governance framework for voluntary GW MGMT	Political Retribution? Constitutional Takings?
CBWP Malheur Lake Basin (OR)	PA	AG Overdraft	Place-based Water Planning; Statutory governance framework for voluntary GW MGMT	?

First, an issue experienced by stakeholders in all three case studies concerned the length of time between the initiation of a change process and the estimated realization of

[109] Kansas Dep't of Agriculture, Current Local Enhanced Management Areas (LEMAs) (last accessed Apr. 30, 2018) http://agriculture.ks.gov/divisions-programs/dwr/managing-kansas-water-resources/local-enhanced-management-areas.

[110] Kansas Dep't of Agriculture, GMD5 Rattlesnake/Quivira LEMA (last accessed May. 23, 2018) http://agriculture.ks.gov/divisions-programs/dwr/managing-kansas-water-resources/local-enhanced-management-areas/gmd5-rattlesnake-quivira-lema.

the desired outcome. Particularly in the case of the Grand Escalante Valley, which for all their efforts will not likely see their desired outcome for nearly two centuries.

The CBWP will need to assess its desired timeframe – one which will likely be influenced by the new data produced by the USGS study when it concludes in 2020. Discouragement produced by a long timeframe can place a group on Lederach's circle of change at the point where "things collapse."[111] It will be important at this stage to maintain equilibrium between relations, change processes and the ability to view conflict as an opportunity in order to continue through the collapse and transform into forward motion.

Second, it should consider the potential consequences of increased state regulatory presence in the Basin. An important takeaway from the SD-6 LEMA case study is that even voluntary conservation that is vetted by the state may come with potential concerns under constitutional takings. However, it does also indicate that the state stands to benefit greatly from pluralistic governance of groundwater resources. Devising a process locally reduces the takings potential of groundwater conservation, while similarly reducing the likelihood of political retribution.

Third, while community-based solutions to local problems will generally prove less litigious due to robust stakeholder engagement in the process, the Sub-District 1 case study provides an example that litigation is always an option. Although voluntary groundwater management plans may become subject to judicial or administrative review, this risk should not be viewed as a deterring factor but as an opportunity to produce a

[111] Figure 7 at 16.

governance structure that includes diverse interests and promotes long-term groundwater security.

CHAPTER VI

RECOMMENDATIONS: TRANSFORMING A TRAGEDY OF THE COMMONS INTO AN OPPORTUNITY FOR POSITIVE CHANGE

If understood as an ongoing process for positive change, groundwater governance can provide a robust mechanism for groundwater security in the Malheur Lake Basin that will ensure conflicts arising around groundwater and water resources in the Basin in general will continue to transform once state support for the CBWP is no longer available. The importance of building local capacity within the CBWP to facilitate transformative, positive change through a circular process is immeasurable and also requires legal and regulatory enforcement to be seen as a viable, long-term groundwater governance framework.

A. Intersections

In order to devise a transformational, pluralistic groundwater governance structure, CBWP participants should consider stakeholder relations, stakeholders' abilities to view conflict as an opportunity, and creative change processes within the unique context of the Basin. While the stakeholders represented in Figure 9 below are not exhaustive, the Figure itself represents a visual application of relevant stakeholders and creative change process that are likely necessary to affect desired outcomes in the Basin.

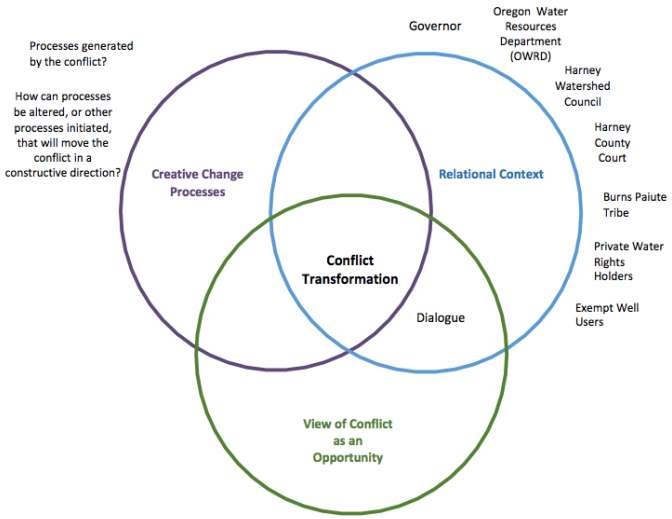

Figure 9: Conflict Transformation Intersection as Applied to CBWP

The entities associated with the blue circle represent stakeholders that must be included in each step of the process. The purple circle containing creative change processes represents the importance of considering both desired processes and those processes that may have been inadvertently created as a result of the conflict. These processes are essential to achieving identified outcomes and group objectives, and are evaluated within the context of the Malheur Lake Basin below. The ability for stakeholders and interested parties to view conflict as an opportunity is a critical link and is represented by the green circle. Maintaining the relational context such that conflict is viewed as an opportunity enables stakeholders to assess both positive and negative processes associated with the conflict and determine whether to alter or create processes that will move the conflict in a positive direction.

B. Creative Change Processes

As seen by the case study analysis above, creative change processes might take what some may consider an unreasonable amount of time to achieve their intended result. Therefore, in order to ensure current and future water rights are met in the Basin in a timely manner, stakeholders might consider two potential outcomes: Reduce use of the basin's waters until the completion of the USGS groundwater study in 2020, or augment supply through inter-basin transfer of water resources. These two options and considerations are illustrated in Figure 10 below.

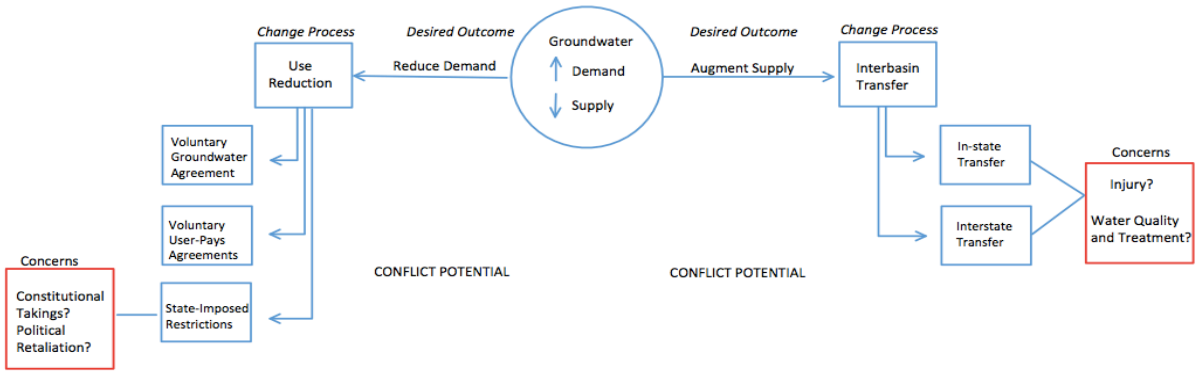

Figure 10: Short-Term Considerations for the Malheur Lake Basin's Water Future

1. Reduce Demand

In order to increase water security in the Malheur Lake Basin, one objective for consideration is reducing demand for water. Irrigators in Basin have already begun changing their irrigation techniques from high-volume irrigation such as center pivot to low-flow techniques like drip irrigation. Low-flow irrigation techniques enable irrigators to produce the same output by using water more efficiently, presenting the opportunity for conservation of groundwater that would have otherwise been consumed.

As demonstrated by the case studies above, local incentives to reduce water use and promote efficient irrigation practices can be devised locally and given enforcement power by the state. However, there is some concern amongst rights holders that voluntary conservation of their groundwater could result in forfeiture of all or part of their water right for non-use. While these concerns are valid under prior appropriation's tradition of valuing water for its consumptive over non-consumptive use, there are two avenues described below under which groundwater rights will likely not be forfeited should the rights holder engage in voluntary conservation. Two such regulatory avenues in Oregon state law are described below, which facilitate voluntary conservation through aquifer storage and recovery and voluntary groundwater agreements.

a. Aquifer Storage and Recovery

As described above, extreme climate variability[112] has created a sort of conservation conundrum for groundwater users in the Malheur Lake Basin interested in conserving waters associated with their permitted groundwater right but worry that waters saved through voluntary conservation may be viewed as grounds for forfeiture. Fortunately, aquifer storage and recovery (ASR) projects satisfy Oregon's beneficial use requirement on the premise that water "conservation . . . benefits all water users, provides water to satisfy current and future needs through reduction of consumptive waste, improves water quality be reducing contaminated return flow, prevents erosion and allows increased in-stream flow."[113] ASR allows groundwater supplies to be stored in a

[112] *See* Daniel Swain, Baird Langenbrunner, J.David Neelin & Alex Hall, *Increasing Precipitation Volatility in Twenty-First-Century California*, NATURE CLIMATE CHANGE 1-10 (2018), https://www.nature.com/articles/s41558-018-0140-y.pdf. (using the term climate "whiplash" to describe the detrimental effects of extreme weather variations on California's water supply".

[113] OR. REV. STAT. §537.460(1)(2017).

reservoir prior to beneficial use as long as the groundwater right allows for storage and the reservoirs don't interfere with surface water supplies.[114]

All ASR projects require a permit, which the state will grant after the applicant conducts a test project that ensures a baseline quality and quantity of the injection source water and the water in the receiving aquifer.[115] If granted, an ASR project has the capacity to increase water security within the basin by storing water below ground where evaporation does not pose a threat to the stored supply.

b. Voluntary Groundwater Agreements

Oregon law provides another avenue for groundwater conservation through voluntary groundwater agreements. In 2015 Oregon's Legislative Assembly passed a statutory framework for voluntary, community-based governance of groundwater resources in response to the Governor's emergency drought order. Codified at ORS 537.745, the voluntary groundwater agreements statute allows groundwater users from the same groundwater reservoir to form voluntary agreements recognized by the Water Resources Commission.[116] These agreements are valid so long as they are executed in writing, filed with the commission and consistent with applicable state law.[117] Once acknowledged by the OWRC, the voluntary agreement controls groundwater

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[114] Oregon law allows for aquifer storage and recovery projects that are permitted by the OWRD. Prior to being issued a permit to engage in a permanent storage and recovery project, a person is required to first apply for a limited license to complete a test program to ensure the project does not cause injury. OR. REV. STAT. 537.534 (2017).

[115] NEUMAN, *supra* note 49 at 100.

[116] OR. REV. STAT. § 537.745 (2017).

[117] Voluntary Agreements must be consistent with OR. REV. STAT §§ 537.505-795 (2017).

management within the reservoir to which it applies, "in lieu of a formal order or rule of the commission".[118]

In passing ORS 537.745, the Oregon Legislature intended to provide local groundwater users with a procedural alternative to natural resource regulation by the state,[119] but lack of funding and concern surrounding inadvertent forfeiture have made the framework provided by ORS 537.745 difficult for communities to engage with. That the legislation itself is a reactionary measure to the 2015 drought demonstrates the importance for communities to be proactive in how they adapt to water scarcity.

2. Augment Supply Through Transfer

In addition to decreasing demand for water resources within the Basin through increased efficiency and voluntary agreements, another alternative entails augmenting the current supply of water in the Basin through inter-basin transfer. Until relatively recently, the legal right to use groundwater was attached to the ownership of overlying property in accordance with the English Common Law doctrine of absolute ownership.[120] However, it is now possible to separate a water right from the appurtenant land through a transfer

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[118] *Id.*; OR. REV. STAT. §537.515(6)(2017) (defining the term "groundwater reservoir" as "a designated body of standing or moving ground water having exterior boundaries which may be ascertained or reasonably inferred.")

[119] The statute "clearly express[es] an overall public policy and interest in controlling the appropriation of ground water and set[s] forth a uniform system to effectuate that policy. Although the statute vests considerable authority in the director to establish rules . . . the statutory and regulatory scheme cannot be read as *expressly* prohibiting local bodies from engaging in regulatory activity of their own that is not inconsistent with the statute or agency regulations."[emphasis in original] of Oregon, By and Through the Water Resources Department v. City of Klamath Falls 68 Or. App. 148, 785; 682 P.2d 779 (1984).

[120] Charalambous, *supra* note 46 at 60-62.

process that is administered and regulated by the state. This is a relatively common practice for municipalities and agricultural projects situated in water scarce locations.[121]

When applying for a water rights transfer permit, the applicant must assess potential harm or "injury" that the change may cause to existing rights holders and show that the transfer will not result in injury to those rights.[122] However, given the importance of injury-prevention, the OWRD has a surprisingly limited[123] approach to injury assessment, using an unstandardized, subjective process to quantify potential injury from water rights transfers.[124] Koda proposes using an actuarial science method of injury quantification to reduce perceived risk posed by transfers and increase the quantity of accurate water rights data across the state. Simplifying the job of state water masters by standardizing the injury quantification process through actuarial scientific methods would effectively remove subjectivity from the current analysis and increase certainty to support efficient use of Oregon's waters.[125]

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[121] Interstate water transfer agreements, while beyond the scope of this project, are far from perfect and consistently require room for flexibility and renegotiation as to the capacity of the Colorado River to provide a sustainable source of freshwater, particularly during times of drought. Henry Brean, *States Consider More Cuts on Colorado River to Prop Up Lake Mead*, LAS VEGAS REVIEW-JOURNAL (Apr. 26, 2016) https://www.reviewjournal.com/local/local-las-vegas/states-consider-more-cuts-on-colorado-river-to-prop-up-lake-mead/ (reporting that in order to slow the decline of Lake Mead and Lake Powell, states including Arizona and California that rely on the Colorado River must negotiate use reductions in order to adapt to increasingly arid regional conditions).

[122] Although the term "injury" is not defined by statute and is only mentioned briefly in the Oregon Administrative Rules governing transfer (Or. Admin. R.690-380-0100(3)), Rick Bastasch provides the following definition, which is useful here: "A statutorily undefined adverse impact to existing water right holders that must be guarded against in issuing new water rights or approving transfers." Bastasch, *supra* note 31 at 341. *See also* Neuman *supra* note 49 at 197.

[123] Bastasch, *supra* note 31 at 90.

[124] Keely Koda, Analysis of Water Right Transfers and Injury Quantification in a Prior Appropriation System – A Perspective from Actuarial Mathematics (August 9, 2007) (unpublished Honors B.S. thesis, Oregon State University) (on file with the University Honors College, Oregon State University).

[125] *Id.*

C. Opportunities for Further Research

The accuracy of the conclusions and recommendations proposed in this thesis are contingent upon the USGS groundwater study findings and results. Disclosure of the full set of data collected by the USGS over the course of this study will open up avenues for further research on groundwater governance structures and potentials for groundwater management in the Basin. Increased data will also help forthcoming research on the quality of water in the Basin and how to best minimize the effects of arsenic and nitrate levels in the water.

Another opportunity for further research concerns the effect that the Malheur Wildlife Refuge has on planning efforts. The quality and quantity of water flowing to the wetlands housed within the refuge is a variable that is imperative to long-term water resources governance and management within the Basin. Because the wetlands are situated on the Pacific Flyway and provide habitat for a variety of birds, mammals, fish, and amphibians, it will be interesting to see the effect that groundwater mining has on the wetlands and whether lack of water or degraded water quality triggers claims under the Migratory Bird Act, the Endangered Species Act, of the Clean Water Act.

Lastly, there is room for further research on any potential tribal claims to the Basin's groundwater that may be brought by the Burns Paiute Tribe should over-extraction within the Basin continue. To date, no claims have been raised as to the legal water rights held by the Burns Paiute Tribe, nor by federal agencies with regard to federal water rights connected to Malheur Lake and the species which rely on the wetlands located within the Malheur Wildlife Refuge.

CHAPTER VII

CONCLUSION

As state support for the place-based planning pilot draws to an end in July 2019, it will be essential for the positive progress made during the project to continue to transform and address short-term conflicts as they arise while progressing towards long-term, systemic change in the Basin's water future. Effective management of a dynamic resource like groundwater requires a strong governance structure that is dynamic in equal measure. The place-based planning framework provided in Oregon's Integrated Water Resources Strategy with support from the OWRD provides the CBWP with such a dynamic and flexible framework for pluralistic groundwater governance in the Malheur Lake Basin.

Just like the hammer and the hand, the integration of state and local groundwater governance processes can transform conflict and build a secure groundwater future the for the Basin. This integration of top-down and bottom-up governance has the capacity to speak to local needs while enjoying the security of state enforcement. When viewed through the lens of conflict transformation, this pluralist governance structure is the most appropriate for governing groundwater resources for its ability to adapt to changing circumstances.

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