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Article

Adaptive Governance of Water Resources Shared with Indigenous Peoples: The Role of Law

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Abstract: Adaptive governance is an emergent phenomenon resulting from the interaction of locally driven collaborative efforts with a hierarchy of governmental regulation and management and is thought to be capable of navigating social–ecological change as society responds to the effects of climate change. The assertion of Native American water rights on highly developed water systems in North America has triggered governance innovations that resemble certain aspects of adaptive governance, and have emerged to accommodate the need for Indigenous water development and restoration of cultural and ecological resources. Similar innovations are observed in the assertion of Indigenous voices in Australia. This presents an opportunity to analyze the emergence of adaptive processes within complex legal systems. We explore the role of law in locally driven innovation in this context, concluding that any system of governance that requires greater flexibility will only be viewed as legitimate, and thus succeed, if attention is given not only to adaptive capacity, but also to aspects of good governance. Through examples of the assertion of Indigenous rights, we illustrate critical links between adaptive capacity in water management, good governance, and law.

Keywords: adaptive governance; legitimacy; water law; water management; stakeholder processes; Native American rights; Aboriginal rights; Indigenous rights

1. Introduction

The provision of water in the face of climate change and increasing scarcity is complicated by the fact that it is essential for life and has no substitute. As a result, solutions to water scarcity are as much issues of governance as they are issues of technology. Complicating governance efforts is the fact that water ignores jurisdictional, cultural, and economic boundaries. Climate change has introduced a level of uncertainty that challenges traditional bright line approaches to managing shared resources across jurisdictional boundaries. New approaches to governance are necessary to reconcile our obligations as stewards of water resources with our ability to extract its benefits, and to assure that those benefits are equitably distributed.

Much of the current discussion focuses on the need for greater adaptive capacity to cope with uncertainty and complexity associated with social and ecological change [1,2]. Scholarship also suggests an increasing awareness that these new forms of governance will not gain acceptance without the normative overlay of aspects of legitimacy, transparency, accountability, and increased public participation reflected in the term “good governance” [3–7]. In recent efforts to understand the role of law in facilitation of adaptive governance, it has become clear that in setting the stage, law provides an avenue to facilitate both adaptive capacity and “good governance” and that while the first is essential to adaptive governance, the second is essential to its implementation [7]. The importance

of understanding the role of law in enhancing the ability of water basin societies to adapt and solve problems cannot be overstated. Governments cannot force participation or dictate self-organization and innovation. They can only influence how the stage is set. Thus, it is in attention to the law and formal institutional arrangements that society can provide the tools for the emergence of adaptive processes and legitimacy in their outcomes.

Over the past three decades in the United States and Australia, the assertion of Indigenous rights has triggered the emergence of processes with robust public participation, enhanced local adaptive capacity, and strong local legitimacy. On the ground, these processes appear self-organizing, locally driven by stakeholders with close ties to the water resources and therefore resemble the emergent process described in the adaptive governance literature. In reality, none would emerge without a legal and institutional framework capable of re-balancing interests and thus triggering dialog, providing support and a forum for local adaptive capacity building, and institutionalization of solutions, thus illustrating the normative overlay of good governance.

We begin by defining adaptive governance as used in this article and discussing the increasing recognition that attention to aspects of good governance is necessary for its emergence. We then describe the intersection of law, good governance and increased adaptive capacity in collaborative efforts to share and co-manage water resources across jurisdictional boundaries with Indigenous communities. We conclude with a discussion of the critical role of law and good governance in the emergence of adaptive governance.

2. Background

The term “governance” is used to describe the means, including processes and institutions, through which collective goals are chosen, decisions are made, and action is taken to achieve the chosen goals. Government, which is in part a reflection of the law, is merely a subset of governance [6–10]. “Adaptive governance” is *governance* that allows adaptive processes to emerge and much of the literature focuses on the non-governmental emergent aspects that are reflected in enhanced adaptive capacity [1,4,11–13]. Strong adaptive capacity is also observed in efforts described as co-management and collaborative management [6,8,14–20] and we use the term “adaptive governance” to include these types of processes [11]. While there is no exact formula to define adaptive governance, its attributes are thought to include: the capacity to learn, reflect and adapt; the distribution of authority over multiple entities capable of acting in the same sphere (referred to as polycentricity); the capacity to integrate management across jurisdictions and sectors that affect the resource in question through arrangements such as co-management; and the formal and informal engagement of those affected by decision making [6,11].

Substantial overlap exists between the attributes described as adaptive governance and what is referred to as “new governance” [3,21]. This overlap is important, because the new governance literature observes that the move to new governance may be a product of the rise of informal, non-governmental aspects of governance, the increase in interdependency and interaction of actors, the pressure for a greater citizen voice in natural resources management by those affected, and the rise of collaborative governance [3]. The focus of the adaptive governance literature is on managing change and uncertainty in ecological systems as the driving force behind the emergence of new approaches. Thus, new governance approaches emergent, locally driven collaboration from the perspective of a dynamic society and adaptive governance approaches it from the perspective a dynamic ecological system. The two systems are interrelated in any water basin, thus we draw on both perspectives.

Both new governance and adaptive governance call for devolution of governance to local levels, and adaptive governance has as its key focus increased flexibility in environmental governance. Yet it is recognized that major barriers to these approaches include lack of local capacity and practices to assure accountability and legitimacy, lack of attention to the broader public good [1,3–6], and loss of legitimacy from the instability resulting from flexible management [22]. Searching for a way to address these issues has led us to the literature on good governance [3,8,23,24].

Good or “effective” water governance is intended to address social justice and stability [24]. The means include clear definitions of rights and obligations [24], as well as legitimacy; transparency; accountability; inclusiveness; fairness; integration; capability, and adaptability [3,8]. Rather than engage in the problematic discussions of how is “good” governance measured and who decides, we use the overlap between long-tested approaches to governmental process to achieve these same goals of legitimacy; transparency; accountability; inclusiveness; fairness; and integration that is, or can be, imbedded in administrative law [22,25].

The Adaptive Water Governance Project in which the authors are participants seeks to integrate the approaches to good governance with adaptive governance principles to develop guidelines for the role of law in achieving flexible water management [7,26]. Law is thus not only the mechanism to set the stage for the emergence of adaptive governance, but in the viewpoint brought by legal scholarship, flexible, local governance will fail without attention to attributes of law and the reflection of good governance in the legal process. In particular, implementation of adaptive governance will fail to achieve its objectives without attention to: the role of governance in a just and equitable society; the need for resources and capacity building for local participation and decision making; the need to balance flexibility with stability; and the importance of legitimacy, transparency and accountability in any devolution of decision making to the local level. Thus, it is through this lens that we explore the intersection of law, good governance and increased adaptive capacity in collaborative efforts to share and co-manage water resources across jurisdictional boundaries with Indigenous communities.

3. Indigenous Rights to Water

While adaptive governance itself is a product of self-organization of social actors including organizations, it may emerge within complex institutional and legal settings [7,27]. In the U.S., Native American water settlements have become one vehicle for holistic resolution of multiple water resource issues on shared watersheds while at the same time improving equitable distribution of water. Many have done so through collaborative processes that resemble “adaptive governance” (see e.g., [28,29]). Yet, as settlement of litigation generally involving historic treaty rights, these processes are emerging within a heavily constrained institutional setting. The question we ask in this paper is: What is the role of law and good governance in the emergence of adaptive water governance in the context of conflict over scarce water resources? We believe that the applicability goes beyond the setting of Indigenous rights and that these merely represent contexts in which water scarcity has recently come to a head. We address this question through examination and discussion of four legal processes for determining Indigenous rights to water: (1) the state of Montana, USA process for settlement of reserved water rights; (2) a water settlement process in the Klamath River basin, USA; (3) the federal process for participation in Native American water right settlements; and (4) the co-management efforts of the Ngarrindjeri Nation in the Lower Murray River, Australia. In each example we seek to identify: (1) the role of law in creating a trigger or disturbance that may result in the emergence of collaborative processes; (2) the role of law in establishing a process to facilitate adaptive governance; and (3) the role of law in institutionalizing the resulting solutions. Through each of the examinations of the role of law we will trace the thread of good governance and identify any relation to the emergence of adaptive governance.

3.1. Montana and the Settlement of the Water Rights of the Chippewa Cree Tribe of the Rocky Boy's Reservation

Under U.S. law, Native American Reservations hold water rights as necessary for the purpose of the reservation with a priority date of the date of establishment of the reservation [30,31]. The existence of what are generally senior water rights poses a threat to other water uses on a shared source. The unquantified nature of the right poses an impediment to protection and development of the rights for Native American tribes. Over the past five decades, numerous states have engaged in massive general stream adjudications, in part to quantify these vaguely defined rights [32]. The filing of litigation combined with the serious threat to junior developed water rights and the need

for water development on reservations has triggered innovative settlements of water rights for over 30 reservations [33]. The process of settling Native American water rights in the U.S. state of Montana has led to both creative holistic watershed-scale solutions to scarcity and to dialog between tribes and their non-Indian neighbors that have increased adaptive capacity within shared watersheds. The Rocky Boy's Reservation Settlement in Montana provides an example of emergence of a collaborative process.

Established on 7 September 1916 "for Rocky Boy's Band of Chippewas and . . . other homeless Indians" [34], the Rocky Boy's Reservation in the Bearpaw Mountains of north-central Montana is home to over 3000 tribal members. Water right settlement negotiations began in 1992 among the Chippewa-Cree Tribe of the Rocky Boy's Reservation, the state of Montana, and the United States as part of the state-wide adjudication of water rights. At the time, the reservation had high unemployment and half the population lived below the poverty line. Although serving an area economically dependent on agriculture and ranching, the grass lands on the reservation receive approximately twelve inches of precipitation per year. Snowpack in the Bearpaw Mountains provides substantial spring runoff. The two major drainages arising on the reservation are shared with downstream farmers and ranchers [35].

The process chosen by the state of Montana has been held as a model of good governance in settlement negotiations [36], and facilitated emergence of adaptive processes that crossed jurisdictional divides to take a bioregional approach, developed polycentric co-management at the local level to develop a regional tribal/rural community drinking water supply, and incorporated local knowledge into the decision-making process. As part of the 1979 amendments to the Montana Water Use Act, the Montana legislature established the Montana Reserved Water Rights Compact Commission ("commission"), to negotiate water rights settlements "for the equitable division and apportionment of waters between the state and its people and the several Indian tribes claiming reserved water rights within the state" [37]. The bipartisan commission acts on behalf of the state and its citizens as a whole. It does not represent the interests of individual water users [38]. The policy of the state of Montana is to conduct negotiations with Indian tribes on a government-to-government basis [35].

By establishing a clear policy in favor of negotiation, the state of Montana provides a forum to resolve conflicts with practical solutions. Negotiations of Indian reserved water rights in Montana involve three parties: the tribe, the commission, and the United States as trustee for the tribe. Each party is governed by its own laws and rules for participation in a proceeding. The initial step in negotiation is to discuss the basic elements of the process and attempt to integrate the constraints each party brings to the table. Of greatest importance in the emergence of adaptive governance in the Montana process are the agreements on: (1) exchange/development of information; and (2) public participation.

Quantification of Indian water rights requires collection and analysis of technical data on subjects ranging from soil composition, water supply, and climate, to the economics of irrigation, and may involve complex hydrologic models. The focus in negotiation is interest based; thus, rather than discuss the possible litigated outcomes, dialog focuses on the needs and future plans of a tribe for sustained development or resource preservation and the needs of nearby water users to protect their investments. Each technical variable has a range of possible values. If each party were to collect and analyze its own data, negotiation would become mired in efforts to resolve technical issues rather than focus on the issues of policy that negotiators must address. As an illustration of good governance, the commission tries to encourage joint efforts at technical work among the parties. Negotiators then discuss issues of policy from a common database and a more common understanding among parties of how the water system functions [35].

The commission uses a number of approaches to ensure that public involvement is a two-way dialog. Among the approaches are: (1) public meetings are used to inform the public, identify issues and identify leadership in the community; (2) commission staff attend local meetings of various water-related entities, also for purposes of providing information and to identify leadership; (3) commission staff identify interested persons that have not been present at meetings and contact them specifically to provide information and to seek their engagement; (4) through leadership that

either emerges in the process or is identified through attending local meetings, commission staff work more closely with local leadership to try to address their interests in positions taken in negotiations; and (5) in instances where a small group of people or entities will be affected by a particular issue or position, commission staff meet individually and will even do so by going to the particular person's home [29,35].

The locally focused process that involves continual contact throughout negotiations results in tailored settlements that address many local issues that state-level representatives would not be aware of. This process also allows the use of local and traditional knowledge to inform the development of solutions. The process recognizes that there must be a high level of local understanding, acceptance, and even ownership for smooth implementation of a settlement and that the individuals who live within a watershed have the greatest knowledge of their watershed. The lens of local knowledge is essential to the design and evaluation of solutions. The high degree of public involvement has generally led to the commission filling the role of facilitator between a tribe and their neighbors, while the solutions themselves are developed in the emergent local process [35]. The law assures that this emergent process will continue as appointments to the commission change, a factor in providing a stable overlay to local innovation. This robust process of not merely public involvement but also local capacity building takes far more time and resources during the phase of developing an agreement. Nevertheless, as illustrated in the following paragraphs by the emergent collaboration among Rocky Boy's and its neighbors, it pays off in the long term.

At the time of settlement negotiations, the existing domestic water supply on the Rocky Boy's Reservation developed by the Indian Health Service was deficient in both quality and supply [35]. Due to the limited and unreliable nature of the on-reservation water supply, the tribe and the state became convinced that alternative sources of supply must be considered if the tribe was to receive adequate and safe drinking water, despite the fact that off-reservation supplies were beyond the scope of the tribe's legal claims. Many communities near the reservation faced similar drinking water problems [35]. Nine municipal systems and fifteen rural water systems in the area serve populations ranging from seventy to 10,500 people [35]. As a result of changes in the Safe Drinking Water Act standards [39], and obsolescence, in addition to increases in population of the service area, each system faced the need for major modifications or repairs in the coming decades [35]. An off-reservation irrigator suggested importing domestic water through construction of a rural water supply system as a solution. Triggered by dialog arising out of the water rights settlement, efforts to solve this problem evolved beyond the water right negotiations and are now being addressed in an ongoing collaboration between the Rocky Boy's Tribe and 22 rural water entities in North Central Montana [40]. That process is without precedent in both its character and level of tribal-non-tribal cooperation [35]. It is emerging as a polycentric and bioregional local process.

The settlement of water rights on the reservation allocated 10,000 acre-feet of water from surface and groundwater sources to the tribe. The allocation included water to maintain and enhance fish and wildlife habitat, water for snow making at the tribe's ski area, and water for irrigation. An off-reservation source was allocated for the domestic water supply. Funding was made available for the expansion of two reservoirs on the reservation. In an arid region, these measures are the difference between viable and unviable economic development [41,42].

Once completed, the settlement was memorialized in the laws of the state [41], the tribe [43], and the United States [42], and reviewed by the court in which the litigation was filed. This institutionalization of a settlement in law, including funding for its implementation and authorization for any cooperative state/tribal entity or cooperation needed for ongoing resolution of water disputes assures that the emergence of collaborative behavior is not a one-off phenomenon. Instead, it becomes imbedded in a new norm for relations between the state and the tribe and between the tribe and its neighbors.

3.2. Water Settlement in the Klamath River Basin, USA

Rights to appropriate water and associated resources in the Klamath River basin of southcentral Oregon and northern California, USA have been contested for the better part of the last century [44]. At the center of this conflict are four federally recognized Native American tribes spread across the Klamath River basin: the Hoopa Valley Tribe; the Karuk Tribe; the Klamath Tribes; and the Yurok Tribe. Similar to the common narrative across the western United States, the tribes of the Klamath basin were displaced by Euro-American settlers in the late-19th century [45]. Despite a treaty and executive action creating reservations in the basin, tribes were subject to an almost complete loss of access to culturally important lands, waters, and species, such as Klamath River salmon populations in the lower basin and populations of sucker fish in upper basin lakes and tributaries—both of which served as critical food sources for basin tribes [46]. In addition, widespread development of the Klamath River system for agriculture and hydropower and the over-allocation of state-based water rights in the upper basin significantly increased the complexity, and ultimately the difficulty, for tribes to regain access to culturally significant resources (e.g., water) even considering the rise of favorable policy and processes for renegotiating tribal water rights at the federal level.

Unlike the state of Montana, USA, the states of California and Oregon do not have a formal state entity authorized to negotiate on their behalf. With regards to water and other natural resources, federally recognized tribes in both California and Oregon are treated similarly to tribes in Montana and elsewhere in the United States, as sovereigns, with the ability to negotiate as such with both state and federal governments (see Section 3.3 below). This negotiating position, combined with previously favorable litigation by the Klamath Tribes, the unique geography of the basin, and the state of Oregon process for adjudicating water rights, set the stage for the emergence of adaptive governance in the Klamath basin [28].

The Klamath River basin is roughly divided in half: the upper basin representing a mostly arid, high-elevation landscape, with intermittent lakes, marshes, and swamps, subsequently drained for agriculture; and the lower basin representing a rain-driven, mountainous region with numerous tributaries providing salmonid spawning and rearing habitat [46]. The basin looks like an hourglass tilted on its side, and historically, the two halves were segregated by the Oregon—California state line and the Klamath Hydroelectric Project—a series of river impoundments in the middle sections of the basin that divert, dampen, and regulate the Klamath River flow to the lower basin and completely cut off fish passage from the lower to upper portions of the basin [44].

In 1976, the state of Oregon initiated a general stream adjudication in the upper Klamath Basin (Oregon half only) to determine who had water rights in the basin and what the order of use or priority dates each of these water rights retained. The Klamath Tribes filed claims for water rights in the upper basin, based on the boundary of their historical reservation created in the Treaty of 1864 (this reservation was “terminated” under the federal policy of the same name in 1954; although the tribe’s status as a federally recognized tribe was reestablished in 1986, the reservation was not). At the same time, the Klamath Tribes of the upper basin and the Hoopa Valley, Karuk, and Yurok Tribes of the lower basin (along with environmental groups and public scientists) worked diligently to establish three species of fish as federally listed threatened (Coho salmon) and endangered (Lost River and shortnose sucker) species under the U.S. Endangered Species Act (ESA). This process helped the tribes establish critical relationships with state and federal agencies as consulted co-managers of fisheries and other natural resources in the basin.

In the spring and summer of 2001, the legal requirement to leave water in stream for ESA-listed threatened and endangered fish in the Klamath basin, combined with the continuation of a crippling drought, dictated a curtailment of water deliveries to a large, federal irrigation project (210,000 acres; 1400 family farms) in the upper basin resulting in public protest, civil disobedience, and renewed racial tension in the basin between mostly Euro-American farmers and Native Americans [44]. In the fall of the following year, a reversed interpretation of the ESA provided more water for the irrigation project than left in stream at a critical time for migrating fall Chinook salmon, causing a rapid spread of disease

killing over 30,000 salmon along the banks of the Yurok Reservation [46]. These two devastating losses for both the farming and tribal communities in the basin set the stage for years of protest, heated media conflict, contentious litigation, and a virtual stalemate in collaborative relations in the basin [44]. At the same time, these events—triggered by law—ripened the social contexts for the emergence of adaptive governance by first exhausting adversarial options and opening conflicting parties to the idea of collaborative dialog [28].

The expiration of the Federal Energy Regulatory Commission (FERC) hydropower license for the Klamath Hydroelectric Project in 2006 represented a window of opportunity for a more complete emergence of adaptive governance processes in the Klamath basin. As a result of amendments to the U.S. Federal Power Act, private licensees of hydroelectric projects could request an “alternative process” instead of applying to relicense projects. This process had only recently been employed, generally in situations of high conflict over water uses and ecological resources, many of which involved unsettled tribal claims to water [47]. The alternative process created a venue for the project’s owner, PacifiCorp, to sponsor a series of facilitated negotiations between vested stakeholders in water and power use in the Klamath basin (tribes, irrigators, environmental groups, federal agencies, both land and species management agencies, commercial fishing groups, and others)—as opposed to forcing PacifiCorp to either apply to relicense the dams amidst significant stakeholder opposition, or alternatively, to abdicate their license (upon relicensing, PacifiCorp would face legally mandated installation of fish passage at four of its mainstem Klamath River dams, rendering the prospect of relicensing a financial loss) [48]. Once engaged in negotiation towards a settlement of hydropower operations on the Klamath River, PacifiCorp, the federal government, and other involved stakeholders recognized that discussions about governing water in the Klamath were bigger than the dams alone [49]. This prompted a spin-off negotiation from the alternative relicensing talks with a goal of settling Native American water rights in the upper basin and facilitating agreements between tribes and irrigators that conserved threatened and endangered species while preserving the basin’s agricultural economies [28,49]. The process—while closed to only those private parties and public agencies with a legal stake in state-based water rights negotiations, threatened and endangered species management, or those organizations with valid litigation potential under law—included aspects of good governance and emergent adaptive governance at the outset including: space for structured conflict resolution-based dialog; trust building among stakeholder leadership; joint fact finding; and co-production of basin modeling [50].

In 2010, the non-federal stakeholders involved in this process signed two agreements, the Klamath Basin Restoration Agreement (KRBA) [51], and the Klamath Hydroelectric Settlement Agreement (KHSA) [52]. Legally, these agreements comprised both a FERC alternative to relicensing settlement and an Indian water rights settlement, and practically, these agreements represented an effort toward holistic, basin-wide restoration of Klamath River ecosystems, communities, and economies through habitat restoration, fishery reintroduction, dam removal, and preparation for climate change (increasing aridity and drought). The agreements resembled a significant step toward adaptive governance in the basin: opportunities for public participation in a federal review of the dam removal action (under the National Environmental Policy Act); local governance of the agreements via public meetings of a committee of stakeholder leadership representatives; and mediated conflict resolution processes for resolving conflicts with the agreements in the future [50].

Law has played a critical role in the changing nature of Klamath basin water conflicts, both in creating space for the emergence of collaborative processes as well as in creating windows of opportunity for key aspects of adaptive governance to grow and mature. The role of law in institutionalizing adaptive governance in the Klamath basin, however, is still unclear. The state of Oregon-led Klamath basin water rights adjudication process finally concluded in 2013, and although the Klamath Tribes had already entered into agreements with upper basin irrigators as to the future of many of their water claims, the tribes’ legal rights to water were finally and clearly identified, quantified, and dated—many of those rights now holding a priority date of “time immemorial” giving them a significant negotiating position among upper basin agricultural interests. This position was put

to the test immediately when they called on their rights (“called the river”) to have water left instream to bolster aquatic habitat during a dry year in 2013. This action brought the furthest upstream irrigators, many of which who did not participate in or sign the Klamath Agreements (or broke off after 2010), back to the table to negotiate a third agreement for comprehensive water rights settlement in the upper basin [28]. For this suite of three Klamath Agreements to become binding law, and for federal agencies to have legal authorization to participate in the programs designed under the negotiations, Congress must approve legislation authorizing the agreements as well as approve funding to carry them out. The process of seeking Congressional approval and authorization of funding is one embedded in the U.S. system of passing laws. At the same time, the role of Congress is not merely to rubber stamp a local solution. Its role in setting priorities for use of federal funding and in assuring that all interests have been accounted for is of equal importance in providing the stability that allows for local innovation. It remains to be seen how this will play out in the recent emergence of new avenues for both accomplishing and funding aspects of the settlement while leaving other aspects behind.

3.3. Federal Participation in Native American Water Right Settlements

The emergence of adaptive governance in the settlement processes in Montana and in the Klamath River basin were not only triggered by state and federal law, but could not have emerged without a supportive federal process. Native American land and resources, including water, are held by the United States in trust for tribes. While many have criticized the federal process (see e.g., [35]), had the United States chosen a litigation path rather than articulating a preference for negotiation and providing the resources for it to proceed, collaborative settlements would never have been possible.

The federal government’s policy to negotiate settlement of Indian water rights claims was declared by President George H.W. Bush in 1989 [53]. The president’s statements committed the administration to “establishing criteria and procedures to guide future Indian land and water claim settlement negotiations” [53]. The Department of the Interior responded with publication of the criteria and procedures for federal participation in Indian water rights settlements in the Federal Register [54].

The criteria and procedures provide guidelines for federal participation in negotiations that assure coordination of federal interests. A federal team is assigned to each negotiation and is composed of representatives of various bureaus within the Department of the Interior with interests in the watersheds involved as well as a representative of the Department of Justice. All decisions are made through the Working Group on Indian Water Rights Settlements, composed of assistant secretaries and a counselor to the Secretary of the Interior in Washington D.C. [54].

Although the process of formulating a federal position only after the state and tribal parties have identified a solution has been criticized as being in direct conflict with the dynamic necessary for negotiation [35], the presence of people knowledgeable about the various federal interests has proven invaluable in reaching resolution [55]. In addition, institutional stability in the program since its inception means that a wealth of knowledge in creative problem solving accompanies each federal team to the table.

3.4. Ngarrindjeri Nation in the Lower Murray Basin in South Australia

Unlike the other case studies, the rise of the Ngarrindjeri Nation to a role of co-management on the lower Murry River, the possibility of legal recognition of Indigenous rights played only a minor role in creating a trigger for collaboration. Instead, governance capacity building and diplomacy through a combination of self-organization by an Aboriginal community, assistance from external entities in that capacity building, and water reform initiated during the Millennium Drought in Australia led to a process of collaboration. Here we analyze the Ngarrindjeri Nation’s path to obtaining a stake in water governance, as a non-U.S. analog to the previous examples, demonstrating that law can be a vehicle not only for emergence, but also for institutionalization of the resulting co-management.

Australia recognized no rights to land or water of Aboriginal people until 1992 when the High Court of Australia rejected the long-standing doctrine of *terra nullis*. The doctrine stood for

the proposition that on discovery by European nations the land belonged to no one, despite long inhabitation by Indigenous people [56]. Even the ruling in 1992 recognized only limited rights and did not recognize Aboriginal peoples as sovereign. The Commonwealth followed the ruling with passage of the Native Title Act of 1993, with the purpose of setting up a process for the establishment of native title to land and water, and limiting its future extinguishment [57]. Under the act, native title must be established through application to the Federal Court, but the court may refer the process to mediation [57]. In addition, authority to determine claims may be delegated to a state or territorial body under certain conditions [57]. Compensation is provided where actions such as private settlement prior to 1996 are inconsistent with native title that would otherwise exist [57]. Importantly, prior granting of exclusive right to land or water to a private person or entity extinguishes native title, leaving compensation as the only legal remedy for Indigenous people in the more populated areas of Australia. [57].

While the possibility of establishment of native title provided some leverage for Aboriginal communities, the possibility of extinguishment due to settlement and development dampened the threat in the populated parts of Australia. Since the passage of the Native Title Act of 1993, some progress has been made in Australia establishing native title to land in the less populated interior and northeast. However, even in these situations there is a disparity between recognition of rights to land and rights to water. Jackson and Langston assert that:

[t]he current distribution of water entitlements in Australia is transparently inequitable. A comparison of indigenous land ownership and water entitlements demonstrates the extent of the inequity: Indigenous people own almost 20 per cent of the country's land mass/ while Indigenous specific water entitlements are at present such a minuscule figure that is estimated at less than 0.01 per cent of Australian water diversions ([58] at page 110).

Water allocation is generally a matter of state law in Australia [59]. However, in 2004, the Council of Australian Governments (COAG) with membership including *the Prime Minister, State and Territory Premiers and Chief Ministers, and the President of the Australian Local Government Association* [60], developed the Intergovernmental Agreement on a National Water Initiative, with the governments of New South Wales, Victoria, South Australia, Queensland, Northern Territory, and Australian Capital Territory signing in 2004, Tasmania signing in 2005, and Western Australia signing in 2006 [59]. The NWI recognizes the right of Indigenous access to water and calls for Indigenous representation in water planning and accounting of water allocated to traditional cultural purposes ([61] at section 52). The focus on cultural purposes rather than the broad spectrum of economic and environmental uses that a community of people might seek to make of water is thought to be the limitation on the recognition of Indigenous water rights [58]. Nevertheless, some states have taken a broader view of Indigenous involvement. The 2009 “Water for Good” water plan for South Australia calls for collaboration with Indigenous communities including incorporation of Indigenous knowledge and attention to the water supply needs of the communities [62].

The combination of these legal changes and the crisis presented by the impact of the Millennium Drought (lasting from 1996 to 2010) on the Murray River and the Coorong (a series of lakes, wetlands, saline lagoon and estuary at the mouth of the Murray River) provided the impetus for self-organization by the Ngarrindjeri people—Aboriginal peoples with deep ties to the region at the mouth of the Murray River. Through internal organization the Ngarrindjeri articulated their vision of “caring for country” through development of the 2006 Ngarrindjeri Yarluwar-Ruwe (Sea-Country) Plan for the region of the lower Murray River, the Coorong and associated wetlands [63]. The plan notes that the “river, lakes, wetlands/nurseries, Coorong estuary and sea have sustained us culturally and economically for tens of thousands of years” and seeks to work with others “for the benefit of our shared future and for our land and waters upon which we all depend” ([63] at page 6).

With assistance from organizations such as the Yunggoorendi First Nation Centre at Flinders University the community built governance capacity and the Ngarrindjeri Nation Authority was formed and incorporated in 2007 to represent the interests of the people. While law only provided some

leverage in emergence of this local stakeholder-driven effort, it provided the means to institutionalize that effort through incorporation of the authority. Following incorporation, the Ngarrindjeri Nation Authority approached local, state and interstate governments to enter into co-management agreements using private contracts as the legal means for rendering the agreements binding ([64] at page 4). The use of legally binding agreements gave the parties greater protection than reliance on “consultation,” thus filling the current void in state and federal definition of Indigenous rights [65]. Similar to the water settlement process in the United States, the contract approach allows Indigenous communities to represent themselves and to enter agreements or refuse them, voluntarily [65].

The sophisticated approach to organization and diplomacy taken by the Ngarrindjeri Nation is unprecedented and has been recognized as such. On 22 September 2015, the Ngarrindjeri Regional Authority in partnership with the South Australia Department of Environment, Water and Natural Resources, accepted the prestigious Australian River Prize from the International River Foundation for its work on the Murray River [66]. The following is from the press release on the much-deserved award to the Ngarrindjeri Regional Authority:

The Ngarrindjeri’s Kungun Ngarrindjeri Yunnan Agreement (KNYA) established a new and positive relationship between the Ngarrindjeri and the South Australian Government, which has seen an innovative and integrated approach to river basin management for the Murray. In particular, the Agreement emphasised a participatory approach with the land’s traditional custodians—moving past historical barriers to Aboriginal involvement in integrated river basin management—which has led to opportunities to develop Aboriginal-led wetland management plans for land owned by the Ngarrindjeri people ([66]).

4. Discussion

We set out in our initial paragraphs to ask the question: What is the role of law and good governance in the emergence of adaptive water governance in the context of conflict over scarce water resources? In the complex social–ecological system of a water basin, it would likely be impossible to conclude that a specific law or governmental action directly led to a particular collaborative process or to its success—there are too many interacting factors acting upon or within these contexts. What we can do is observe the correlation between emergence of collaborative processes and enabling law, and identify the governmental actions that likely improved accountability, transparency, legitimacy, inclusion, stability, and attention to the broader public good and what role they may have played in assuring a successful collaboration.

First, without the legal forum for the assertion of Native American water rights and the relatively recent recognition of native title in Australia, along with a growing policy in favor of consultation, the development of capacity and entree into water discussions of these formally marginalized populations may not have been possible. In fact, it is possible that the destabilizing effect of recognition of formerly marginalized rights was sufficient to trigger a willingness to seek solutions on the part of those currently in command of the water resource in the United States thus leading to emergence of bioregional processes. Even in the Australia example in which legal rights of the Ngarrindjeri had not been recognized and capacity building was done through self-organization and assistance from non-governmental entities, had the governments of Australia and the state of South Australia not been undergoing a policy shift toward recognition of the need for consultation and co-management, the effort would not have been successful.

Second, without the support for capacity building from the federal government in the United States and from external interests such as higher education in Australia, it is possible that the leadership, problem-solving capacity, and political strategy that Native American communities in the United States and the Ngarrindjeri in Australia have now taken to a highly sophisticated level, would have been much slower in coming. The legal and policy shift of the United States from a paternal approach to governmental assistance to Native American tribes to the fostering of self-determination [67], as well as the UN recognition of the importance of self-determination [68], has led to a greater focus on

Indigenous capacity building worldwide. Without this increased capacity, the sophisticated diplomacy and emergent innovations illustrated in our examples would have been much less likely.

Third, without the legally mandated transparent process in U.S. states like Montana, and vetting of results through legislative and court proceedings, the legitimacy of settlement resulting from local collaborative problem solving might have been questioned by both the tribal communities and external constituencies, and would likely never have led to an ongoing collaboration between a tribe and its neighbours. Similarly, the institutionalization of self-organization of the Njarrindjeri through formation of an authority to speak for their interests enhances accountability and reduces the possibility of claimed representation by a special faction. The attention to a process for determining who to recognize under the Australian Native Title Act and the U.S. federal process for recognition of tribes, while potentially subject to use for exclusion, increases the likelihood of a transparent and accountable process to determine who speaks for an Indigenous people.

Fourth, the formal process and institutional memory of the U.S. federal government in its participation in settlements provides an avenue to consider the broader public good and even-handed treatment across U.S. Indian Country. The federal use of a systematic process memorialized in the Federal Register (*i.e.*, the criteria and procedures referred to above) also provides an avenue for overall stability while leaving open the possibility of local innovation. Similarly, the participation of the state government of South Australia in formalizing the agreement on co-management with the Ngarrindjeri Regional Authority may, over time, result in a systemized approach to similar efforts that will assure consideration of the public good and maintain regional stability as local and bioregional processes are given room to innovate.

Fifth, without the state, tribal and federal processes in the United States used to institutionalize and fund the results of settlement, and the use of a legal contract in Australia to recognize co-management, the good feelings and handshake agreements from a collaborative watershed process could quickly be undermined by powerful special interests seeking a better deal. While the difficulties the Klamath settlement experienced in the U.S. Congress illustrates that these legal processes themselves can be captured by special interests and larger-scale political forces, without the ability to obtain legal recognition and funding, no settlement would be implemented. It is also important that a body such as congress consider settlements in light of the broader public good to assure that they have not merely become a vehicle to fund special-interest projects and that the limited funds available are well spent.

5. Conclusions

The past four decades of settlement of Native American water rights in the United States offers a window on what happens when the law alters the relative power among communities sharing a scarce water source and a chance to study the emergence of adaptation and innovation as communities respond to this new paradigm. It provides a means to consider the role of the legal process in assuring the accountability, transparency, fairness, and inclusiveness in these local emergent collaborations. The example of the Ngarrindjeri Nation in Australia offers a chance to view emergence of adaptive processes from a completely different starting point—internal self-organization and the building of governance capacity in the absence of a clear legal avenue to establish rights. Yet law became the avenue to institutionalize the emerging solution and the willingness of the Ngarrindjeri to formalize their own emergence in law through creation of the Ngarrindjeri Regional Authority provides the basis for legitimacy as they move forward. Adaptive, collaborative, and new governance mechanisms hold promise for the innovation and adaptation needed to respond to the challenges of water scarcity in the current millennium, but it is clear that they do not emerge in a vacuum. Not only may legal and institutional tools be used to trigger these processes and to finalize their results, but without attention to aspects of good governance through legal process, local innovation will also not have the legitimacy necessary to succeed.

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