

EVALUATING THE IMPACT OF OUT-OF-BASIN WATER RIGHTS TRANSFERS IN WASHINGTON STATE

Prepared by UW Evans School Student Consulting Lab

EVANS SCHOOL
OF PUBLIC POLICY & GOVERNANCE

UNIVERSITY *of* WASHINGTON

For the Washington State Department of Ecology



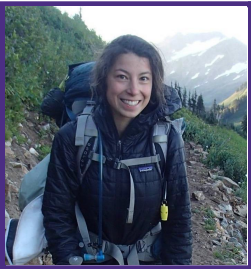
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As external researchers, we have no conflict of interest or coercive opportunities with the intended participants of this study. We neither work in the water rights transactions sector, anywhere in Washington State, nor have direct personal relationships with rights-holders. Our role as researchers was to understand how our positionality affects the conduct of the research, collection of data, and interpretation of data. The research was completed through a comprehensive literature review, interviews, case studies, and data assessments over the course of six months beginning in early 2021.



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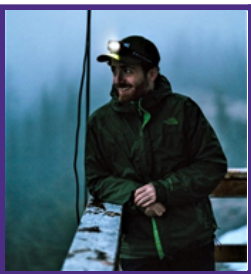
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Executive Summary

This report provides findings and analysis of current trends in out-of-basin water right transfers in Washington State.¹ These trends provide a foundation for understanding the potential economic, social, and environmental impacts of out-of-basin water right transfers.

Methodology

This report employs a mixed methods research approach. Quantitative data was collected from the Washington Department of Ecology’s database to assess the extent and characteristics of out-of-basin transfers. Qualitative interviews were conducted with a selection of relevant stakeholders (including attorneys, consultants, conservation district managers, county officials, tribal government staff, and environmental groups) to identify key themes and highlight local and practitioner perspectives on the frequency, impact, and transparency of water rights transfers across the state. Qualitative and quantitative findings are explored in more detail through specific case studies highlighting different types of out-of-basin transfers.

Findings

Between 1997 and 2019, there were 54 out-of-basin transfers in Washington State constituting 11,182 annual acre-feet of water. These transfers represent less than 0.3% of the total annual volume of water used in Washington State². The 54 transfers represent 1.5% of the total records that indicate a change of place of use in the Ecology database, implying that the majority of water right transfers in Washington State occur within-basin. Of the 54 transfers that did move out-of-basin, 94.4% were used for irrigation pre-transfer and 72.2% were used for irrigation post-transfer.

Qualitative interviews revealed areas of stakeholder disagreement and consensus. Stakeholders varied in their opinions on the threat of out-of-basin water transfers, the efficiency of Washington’s current water market structure, and how to assess the economic and social effects of transfers. Stakeholders agreed on the need to increase public access to information about water rights and transfers, the positive ecological benefits of downstream transfers, and the need to review water banking and long-term leasing as equitable water management strategies.

Counter-intuitively, some WRIAs that carry a strong perception of having high levels of transfer activity like the Methow revealed 0 out-of-basin transfers. Analysis of in-basin transfers is beyond the scope of this report.

¹ For the purposes of this report, “out-of-basin” refers specifically to a change in Water Resource Inventory Area (WRIA).

² Washington State producers alone applied 4.1 million acre-feet of water in 2018 (USDA, 2019).

It is not clear from the quantitative data in this report that out-of-basin transfers have posed a uniquely significant challenge for water management in Washington State. This report did not quantify the local effects of the out-of-basin transfers, but as noted above, found out-of-basin transfers to account for a small amount of the total number of transfers, and the total volume of water used, in Washington State. While some WRIs appear to be more affected by out-of-basin transfers, as seen in Figure 2, there is general dispersion of those transfers across different water bodies as seen in Table 2.

Limitations

These findings carry limitations. The Ecology database is primarily designed as a record keeping system. It is possible that the method of querying and filtering data from this system missed transfers that should have been included in this report. This report also does not include data on water right sales that have not filed a change application with Ecology. Such sales data are necessary to understand the full picture of water right sales and transfers in Washington State. Furthermore, due to a lack of available valuation data, this report is not able to quantify localized economic or environmental effects associated with out-of-basin transfers. This report also does not consider in-basin transfers or transfers using the State Trust Water Rights Program, which includes water banks. These additional transfers might add important additional information to an analysis of transfer effects. Further, this report does not qualify Tribal governance considerations, or management approaches, for water in Washington State.

Areas for Future Inquiry

This report found multiple areas that merit further study in Washington State including: 1) ecosystem services evaluation to understand environmental impacts, 2) effects of water banking on out-of-basin transfers, 3) evaluation of public interest criteria for change applications, 4) water right transfer valuation to understand economic and social impacts, and 5) analysis of in-basin transfers to provide a clearer picture of total transfers in Washington State.

Along with areas of further study, this report also identifies process improvements that could help Ecology better assess current and future trends in water right transfers. These steps include updating the Ecology database and centralizing water rights valuation and sales information with Ecology.

Glossary of Terms & Abbreviations

Acre-foot: a unit of volume equal to exactly 43,560 cubic feet, or roughly 325,851 U.S. gallons.

Acre-inch: a unit of volume equal to exactly 3,630 cubic feet, or roughly 27,154 U.S. gallons.

Allocation: a limit on the amount of groundwater that a well owner can pump (measured in acre-inches) over a certain period of time.

Basin: the area of land over which surface run-off flows via streams, rivers, and lakes.

Consumptive use: the amount of water that does not return to its source after it has been diverted and put to beneficial use.

Cubic feet per second (cfs): a measure of the rate of flow of water commonly used to refer to a water right's maximum instantaneous allowance.

Ecosystem Services: the benefits that people obtain from ecosystems and the direct and indirect contributions of ecosystems to human well-being.

Fallowing: leaving agricultural land unplanted for a period of time.

Groundwater: water found under the Earth's surface, often accessed through wells.

Lease: to convey by contract a water right to a water bank, which is temporary in nature.

Out-of-basin: unless otherwise noted, a basin in this report refers to a WRIA and out-of-basin refers to a transfer of water rights from one WRIA to another.

Overland miles: a measurement of distance; as the crow flies. Used to filter for transfer activity in this report.

Pooling: combining allocations for groundwater pumping, or, the joint operation of tracts of certified irrigated acres across two water bodies.

Prior appropriation doctrine: the first person to take a quantity of water from a water source for "beneficial use" has the right to continue to use that quantity of water for that purpose. First users have rights senior to those issued later—"first in time, first in right."

Priority date: the date when a water right was established. Establishes seniority for water right holders.

RCW 90.03.380: defined in the Washington Water Code as, the right to the use of water which has been applied to a beneficial use in the state shall be and remain appurtenant to the land or place upon which the same is used.

Reasonable use doctrine: a legal framework for water rights that gives landowners the right to use the water associated with their land provided that the use is “reasonable”, meaning that it does not prevent other landowners from using the resource.

Relinquishment: the act of abandoning use of a water right through not maintaining it.

River miles: a measure of distance along the path of a river. Not used for analyses in this report.

Water market: a water use forum that takes a jurisdiction’s rules and regulations into account to facilitate the match of buyers and sellers.

Surface water: water found above the Earth’s surface, a primary source of water rights.

Surface water pump: a device for pulling water from a surface water body.

Watershed: the land area that drains into a stream, river, lake, or wetland.

Water bank: a formal water market exchange institution.

Water right change or transfer: a person or group may be granted a right to use a volume of water, for a defined purpose, in a specific place. A change or transfer of an existing water right can involve changing the period of use, the place of use, the point of diversion or withdrawal, or the purpose or manner of use.³

Water Resource Inventory Area (WRIA): a division of watersheds into distinct management areas.

WRTS: Water Rights Tracking System used by Ecology.

³ Defined by the Washington State Department of Ecology.
<https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-rights>

CHAPTER 1

Introduction

1. Introduction

Driven by population growth and economic development, water demand is increasing across much of Washington State. At the same time, climate change has already started to shift the timing and availability of freshwater resources and models suggest droughts are likely to become more frequent and more severe (Barnett et al., 2004; Elsner et al., 2010; Fosu, Wang, & Yoon, 2016). With less water available to meet the needs of communities, fish, and wildlife, the efficient and sustainable allocation of freshwater resources is now more important than ever. As a result, interest in water rights transfers and other market mechanisms as a means to confer limited water resources to competing uses has increased.

While such market tools may indeed prove useful in managing the state’s scarce freshwater resources, they also raise important economic, social, and environmental concerns. With news coverage of state water market activity increasing, the Washington State Department of Ecology’s (referred to herein as Ecology) Water Resources Program has heard “numerous concerns from legislators, tribal governments, local community leaders, and stakeholders” about the potential consequences of water rights transfers and market speculation (Ecology, 2020, p. 9).⁴ To better understand these concerns and whether the data support them, Ecology contracted with the Evans School Student Consulting Lab to determine the extent of water right transactions in Washington State and the associated economic, social, and environmental impacts.

1.1. Client

Ecology’s Water Resources Program is responsible for managing freshwater resources to meet the current and future needs of Washington communities and ecosystems. In response to increased public interest and press coverage, the Water Resources Program began studying water banking and markets across the state in late 2018. In 2020, the state Legislature, via a budget proviso, directed Ecology’s Water Resources Program to convene a workgroup of key stakeholders and tribes to study issues and concerns related to water rights transfers. The Water Resources Program hosted six meetings throughout the year and submitted a report of their findings and policy recommendations to the Legislature in November, 2020.

⁴For examples of increased news coverage, see Bibliography (Seattle Times, October 27, 2019; Seattle Times, October 28, 2019; Seattle Times, February 14, 2020; Crosscut, February 4, 2020).

1.2. Project Impetus

Ecology's 2020 workgroup discussed many potential benefits and costs associated with water rights transactions. Several workgroup participants were particularly worried about the potential impacts of out-of-basin transfers⁵ on headwater communities, while others saw such long-distance transfers as a net positive, improving critical instream flows and the state as a whole.

The workgroup process helped articulate many potential concerns related to out-of-basin water rights transfers, as well as several policy recommendations. However, Ecology and other interested parties were still unsure of the extent and general trends of out-of-basin transfers including:

- How many out-of-basin transfers have occurred?
- Where are water rights being bought and sold?
- How far are water rights travelling in the transfer process?
- Are the number of out-of-basin transfers increasing?

1.3. In This Report

The following report aims to answer these questions and further explore potential economic, environmental and social impacts of out-of-basin transfers. To do so we conducted stakeholder interviews to better understand various practitioners' perspectives on out-of-area transfers and collected and analyzed available data on water rights transfers in Washington State, identifying summary statistics and key trends.

Our specific research questions are listed below. Chapter 2 provides background information on Washington State water law and water resource management. We summarize the current academic literature on economic, environmental, and social impacts of water rights transfers in Chapter 3. Chapter 4 presents our study area, including key counties of interest. Our research methodology is described in Chapter 5. Chapters 6 and 7 present our qualitative and quantitative findings, respectively. These findings are combined and explored in more detail through the various case studies in Chapter 8. In Chapter 9 we interpret and discuss our findings. Study limitations are noted in Chapter 10 and Chapter 11 suggests next steps and possible future areas of inquiry.

1.4. Research question(s)

As described above, to help contextualize stakeholder concerns and better understand the potential economic, environmental, and social impacts of out-of-basin transfers, this report seeks

⁵ For the purposes of this report, "out-of-basin" refers specifically to a change in WRIA. The concerns shared by workgroup participants are not always as clearly defined and sometimes refer to water rights moving an indeterminate but significant distance out of their original communities.

to determine the number, location, and type of out-of-basin water rights transfers occurring in Washington State. In doing so we attempted to address the following key research questions:

Primary Research Question

What are the local and regional economic, social, and environmental effects of water right transfers in Washington State?

Supporting Research Questions

The following supporting questions guide both key data collection categories and the topics of discussion addressed during stakeholder interviews:

- A. Do water rights transfers have a significant impact on Washington State’s agricultural communities and ecosystems?
 - i. What do the data suggest about the sale or transfer of water rights from agricultural uses to non-agricultural uses?
 - ii. What do the data suggest about the sale or transfer of water rights from agricultural uses to other agricultural uses?
 - iii. What do the data suggest about transfers that do not go through the change application process?

- B. What policy options should be considered given what the data show? Describe and assess the landscape of policy options around water rights transfers and their potential impacts in Washington.

- C. What are the channels for public access to water transfer data?
 - i. How informed do local community members feel?
 - ii. Where is water rights data housed and how accessible is it?

CHAPTER 2

Background & Purpose

2. Background & Purpose

2.1. Introduction to Water Rights and the Legal Framework in Washington State

Water in Washington State is managed as a public resource. The State grants rights to individuals and entities to use water for private purposes. A water right constitutes a specific beneficial use, quantity, season, place of use, and point of diversion or withdrawal. To create a water right, the entity seeking ownership must submit an application to Ecology for approval. The validity of the proposed water right is based on the extent to which water is physically available and a “beneficial use” of the water resource is cited. Approval is also contingent on proof that the new use would not impair any senior water rights and is not detrimental to public welfare. Water rights owners are expected to adhere to these specifications and use their rights for designated beneficial uses in order to keep their rights active and avoid full or partial relinquishment to the State.

Since the State passed its first water law in 1917, water use in Washington has operated under the prior appropriation doctrine. While all water resources in the State belong to the common good and cannot be privately owned, an individual or entity “who first puts water to good use [may] retain the right to continue using it in the future” (Ecology, 2021b). Developed in response to the arid and semi-arid conditions European colonizers encountered in what is now the western United States, the prior appropriations doctrine established the principle of “first in time, first in right” (Gopalakrishnan, 1973, p. 63). All users, regardless of their location and purpose of use, may employ their water right “only in accordance with the priority of [their] claim” (Gopalakrishnan, 1973, p. 64) and new or junior water rights must not impair any previously established rights.

To limit speculation, Washington’s water law also requires water rights holders to put their allotted water to continuous beneficial use. The definition of beneficial use has changed over time and is defined under the Washington Administrative Code (WAC) and the Revised Code of Washington (RCW).⁶ Although initially developed to encourage the economically efficient use of a scarce resource, Washington’s beneficial use requirement does not necessarily imply best use, and can theoretically lead to inefficient allocations. For example, a farmer who uses a water right for irrigation meets the criteria for beneficial use. If that farmer could switch to a less water-intensive crop and still make the same profit, there would be no incentive to do so as

⁶ For the current and specific definition of beneficial use, see [WAC 172-500-050](#), [RCW 90.03](#), and [90.54](#).

reducing the amount of water used could lead to a reduction in the amount of water that the right entitles them to.

In 1967, the state Legislature passed the Water Rights Claims Registration Act requiring the amount and location of all pre-code water rights and exempt groundwater uses be recorded. The Act also established a relinquishment protocol, whereby if the full water right is not put to beneficial uses for a certain period of time, part or all of the right may be relinquished.

Washington's 1971 Water Resources Act established legal recognition of environmental flows as a beneficial use and several instream flow rules were subsequently established in streams and tributaries across the state.⁷ These instream flow rules set perennial minimum flow levels to protect water for fish, wildlife, health, and recreation. While such rules may limit new withdrawals, their priority date corresponds to the date of rule adoption and thus they neither restore water nor impede existing water rights (Ecology, 2021a). If a water body was already over-allocated before an instream flow rule was adopted, Ecology does not have the authority to prioritize environmental flow over senior water right holders. Currently nearly half of Washington's watersheds have an instream flow rule (Osborn & Mayer, 2020).

2.2. Water Markets, Banks, Transfers

With many Washington river systems now over-allocated and new rights harder to secure, interest in water market transactions and water banks as a means of meeting new and future water demands is growing. The legal framework governing water resources in the West has proven flexible enough to encourage the development of water transfer markets in several states, including Washington. "The key to [such] adaptability [is] that water rights [are] not restricted to use on a particular parcel of land or to a specific type of use" (NAS, 1992, p.6). Furthermore, the prior appropriation system builds in an implicit cap and trade framework for water that may facilitate the reallocation of rights to the highest (economic) value uses and locations.

2.3. Washington State Water Rights Transfers Brief Explainer

After a right is established with Ecology, a water right holder may request to change the right. To change one or more of a rights' primary characteristics, the owner must submit a change application to Ecology. Ecology can only deny the change application if granting it would adversely impact other water rights holders, if a newly proposed use is not deemed beneficial, or if the right is found to be invalid. Ecology has no other discretion and only minimal proscribed characteristics by which to review the change. As part of the change application process, the applicant is required to publish a legal notice to allow for public comment on the change. This

⁷ WAC 19.27.097(1)(g) (2018). Ecology's map of WRIs affected by ESSB 6091 also reveals the substantial portion of the state where no instream flow rules have been adopted. See WASH.Dep't of Ecology, Streamflow Restoration Domestic Permit-Exempt Withdrawal: New Regulations (2018); <https://apps.wa.gov/ecology/docs/WaterRights/wrwebpdf/essb6091-dpew-map.pdf>

comment period primarily exists to allow challenges to the legitimacy of the applicant's claim to the right. There are no public interest evaluation criteria used by Ecology in surface water right change application determinations, as there are for groundwater changes.

In terms of possible changes to water rights, water rights holders can apply for changes to the type and place of use of the right, as well as place of diversion or withdrawal. In addition, water rights may be divided into multiple new rights, each authorizing the use of a fractional quantity of the original right. Even if a water right undergoes significant changes, it still maintains the original priority date. Ecology makes information associated with these changes available to the public.

Water rights can be bought, leased, and sold from one party to another. Water right sales that do not include an attribute change (e.g., place of use, purpose of use, point of diversion, season of use, or quantity of water) do not require a change application and are not tracked by Ecology. Because of this, an entire private sector industry exists to help individuals and firms navigate water rights markets and access missing and difficult-to-find information.

2.4. Problem Statement

As previously noted, Ecology's Water Resource Program began studying the use and "potential misuse" of water banks, the Trust Water Rights Program, sales, and transfers across the state in late-2018 (Ecology, 2020, p. 9). In that time, tribes, government officials, water users, and other stakeholders have increasingly voiced concerns about water markets and the economic, social, and environmental impacts of water rights transfers in Washington State.

Based on recent news articles and initial conversations with Ecology staff, the following sections summarizes key, economic, social, and environmental concerns related to water rights transfers in Washington State. These concerns were identified prior to this report and informed the development of interviews, research, and analyses conducted for this report.

2.4.1. Economics of Water Rights Transfers

Due to the importance of water to economic activity in many parts of Washington State, there are a number of economic concerns that surround water right transfers, they include:

- Rural, headwater communities high up in a watershed may lack the economic resources to compete for available water rights on the open market.

- Once a water right is transferred downstream, the state's legal framework makes it nearly impossible to return the right upstream.⁸ As a result, some fear for the future water supply in headwater communities.
- Several recent news articles highlighting water rights interest and acquisition by investment firms have fueled fear of out-of-state investment and speculation.
- Agriculture represents a large portion of the state's economy, particularly in Central and Eastern Washington. If enough water rights are transferred downstream, the agricultural economy in some communities may suffer.
- With less water available for consumptive use, the future growth and tax-base of some communities may decline.
- Information about available water rights and their potential valuation can be more difficult and expensive for individuals to obtain compared to larger entities. Such information asymmetry could lead larger private entities to take advantage of individual water rights holders.

2.4.2. Environmental

Water right transfers present a variety of potential environmental effects in Washington State.⁹ The following impacts have been levied as major environmental benefits and costs across the state:

- As water rights are transferred out-of-basin and previously irrigated land is fallowed, pests and weeds may flourish on the abandoned land, jeopardizing the health of surrounding ecosystems and wildlife.
- Water rights transfers may have positive impacts on instream flows, particularly when a tributary water right is transferred downstream, resulting in increased seasonal or annual streamflow in critically low-flow intervening reaches. Such transfers can be particularly important for endangered salmonid species.

2.4.3. Social/Community

Significant social-community concerns have informed the development of this report. The following present potential impacts felt at the community level, in both old and new places of use:

⁸ When reviewing a water right transfer, Ecology must determine whether the right would result in impairment to another existing right. Rights can readily move downstream without impairing another user. When moving a right upstream, even one that has previously moved downstream, Ecology's analysis will typically conclude that impairment will occur and be required to deny the transfer. This leads to the effect of out-of-basin transfers being effectively permanent.

⁹ For Example: Water held in headwater communities provides economic benefits from use. A downstream transfer removes that existing economic benefit while potentially providing environmental benefits from the addition to instream flows.

- Out-of-basin transfers are likely to reduce the amount of irrigated and cultivated land in some communities. For those with a rich farming tradition, locals may fear a loss of culture, disintegration of community social fabric, and a loss of agriculture-related jobs and industry.
- A lack of public awareness of water rights and transfers could lead individuals and communities to undervalue their current water rights holdings.
- The rate at which out-of-basin water rights occur may overwhelm or undermine some rural communities' capacity to maintain economic activity.

CHAPTER 3

Literature Review

3. Literature Review

To inform the scope of our assessments for this report and develop a strategy for future research inquiries by Ecology, we considered the existing literature, real-world factors, and practical experiences of those captured in our qualitative interviews. Our literature review was aimed at identifying and synthesizing current research methods and barriers to assessing the social, economic, and environmental impacts from water rights transfers.

The following review of academic literature and publicly available information about water-market-related community impacts, includes research material based on the degree of data, oversight, and transferability to Washington’s context. We prioritized content related to scientific evaluations of water management systems and associated impacts, agency white papers focusing on water market activity, and firms operating in water market spaces.

The literature on water rights and water transfers is broad in some areas and thin in others. The legal framework surrounding water rights transfers is well developed (Aylward, 2013; National Research Council, 1992) and there is a sizable body of research analyzing water markets through the lens of economic theory (Libecap et al., 2010; Bauer, 1997; Brickson, 1991; Wahl, 1989, and Willey, 1985). However, literature on the economic, social, and environmental impacts of water rights transfers is thin. Studies evaluating the community-level effects of water rights transfers tend to focus on water markets outside of the United States (Tisdell, 2001; Hadjigeorgalis, 2008), and we were unable to locate literature on the type and frequency of water rights transfers occurring in Washington State. Thus, the questions of how much water is being transferred across different uses (municipal, domestic, agricultural, industrial, and environmental), the frequency of those trades, who owns water rights, and what effects any trends in transfers are having on Washington State’s communities and ecosystems, remain.

3.1. Effects from Water Rights Transfers

The following sections summarize the economic, environmental, and social impacts of water markets as documented in the available literature.

3.1.1. Economic

To an economist, the optimal, or *efficient*, allocation of water is one in which “the marginal values of water across all uses are equated” (Chong & Sunding, 2006, p. 241). Earlier reviews of various water markets (Howe, Schurmeier, and Shaw, 1986; Rosegrant and Binswanger, 1994; and

Easter, Rosegrant, and Dinar, 1998; 1999) highlight the benefits of water transactions, particularly their promise of increased “flexibility, security, predictability, and fairness” compared to other allocation tools (Howe, Schurmeier, and Shaw, 1986, p. 439).

While many economists note the promise of water markets in helping communities “move towards more efficient and sustainable water use[s]” (Debaere et al., 2014, p. 647), some also warn of the difficulty in designing and maintaining well-functioning water markets. According to Debaere et al. (2014, p. 647), “significant logistical hurdles [must] be cleared for markets to be successful.” These hurdles include information asymmetries, accounting for third party effects, and the fact that buyers and sellers must be hydrologically connected.

Information Asymmetry

Lack of clear price signals and information about water rights transfers can “produce uncertainty among [users] regarding the role of water markets in allocating resources” (Palomo-Hierro, Gomez-Limon, and Riesgo, 2015, p. 661). Analyzing stakeholder attitudes towards water markets in southern Spain, Giannoccaro, Pedraza, and Vecino (2013) found water users with direct experience in, or more knowledge of, water transaction processes were more likely to participate in water markets than their less experienced or informed peers. As a result, water users with prior transaction experience are more likely to participate in future water market activity, leading to different levels of market participation within and across communities.

Unlike other markets (e.g., real estate), the number of water rights transactions in Washington State is relatively small. Thus, assessing the price of water rights through comparisons of similar sales in a particular geography is difficult and may not yield an accurate valuation (Washington Rivers Conservancy, 2009).

High Transaction Costs

High transaction costs, such as lengthy and complex approval processes can impede successful water markets and their ability to adaptively and efficiently allocate scarce water resources (Womble & Hanermann, 2020). Womble & Hanermann (2020) also found such transaction costs vary across individual water transfers leading to additional uncertainty in Western U.S. water markets. Furthermore, qualitative data collected by Womble & Hanermann (2020) suggest transaction costs have actually increased over time as competition for scarce water resources intensifies. Where transaction costs and other barriers to entry are lowered, trading of allocated water resources can “help equalize the marginal prices faced by various water users” and thus provide useful information about the economic value of various water uses (Chong & Sunding, 2006, p. 239).

Externalities

Nunn and Ingram (1988) were some of the first to show concern for third-party costs, or external effects, of water transfers that move water from traditional agricultural/irrigation uses to municipal and industrial operations. Nunn and Ingram (1988) note indirect, or non-user, benefits and costs carried by third parties rarely influence the decisions of water rights buyers or sellers. They suggest water market forums are biased, “favor[ing] direct benefits and costs [over] indirect or non-user benefits and costs” (Nunn & Ingram, 1988, p. 476).

For example, water rights leaving an area can have a negative impact on the local economy through a reduction in productivity and tax base (Brewer et al., 2007). Municipalities that purchase concentrations of land for water rights can reduce county tax bases straining communities. As a case in point, “Phoenix’s purchase of the McMullen Valley area of La Paz County in December of 1986 took 10% of the county’s taxable land off the tax roll” (Nunn & Ingram, 1988).

Furthermore, if a large number of farms close down in a community, the local economy will likely suffer. However, the downstream movement of water rights may also produce instream flow benefits that can have environmental and economic value through increases in wildlife habitat, tourism, and recreation (Costanza et al., 2014). When such third-party effects exist but are not accounted for in transaction prices, water markets are unlikely to produce the socially optimal allocation of resources (Schwabe et al., 2020).

Grafton et al. (2010) highlights the complex trade-offs between equity and efficiency, and the importance of market “regulators or governments to support water markets to ensure that they are delivering the desired societal benefits.” Based on identified strengths and limitations across five water markets in Australia, Chile, China, South Africa, and the western United States, Grafton and his colleagues developed “a comprehensive and integrated framework” to assess the relative success of different water markets. In the framework, the authors analyze “institutional underpinnings, economic efficiency, equity, and environmental sustainability.”

3.1.2. Environmental

As Bjornlund (2008, p. 15) notes, the “environmental impacts of water trading are difficult to prove.” Environmental benefits may be both lost and gained simultaneously when water rights are transferred. Thus, accounting for the net environmental impact of one or more water rights transfers can be challenging.

Environmental Benefits

The environmental impact on endangered pacific salmonid species is of particular concern in Washington State. Salmon and other fish require cool, clean, ample stream flows, particularly when migrating upstream to spawn. By the end of the 20th Century at least 16 watersheds across

Washington State were found to be over allocated with the legal right to use water exceeding natural supply (Statewide Salmon Recovery Report, 1999). Long distance transfers have the potential to improve instream flows, particularly when rights are changed from a consumptive use to an instream use or the point of diversion is moved from a small headwater tributary to a much larger water body downstream.

Maintaining and improving instream flows (for example, through out-of-basin transfers) may also benefit the functionality of ecosystem services, where water ecosystems (e.g., rivers, lakes, and groundwater aquifers) provide fish production, water provisioning—including capacities for water storage and quality—and recreation (Costanza et al., 2014; Grizzetti et al., 2016; Kull et al., 2015). Most of these water-related ecosystem services can be directly appreciated by people and quantified (Crossman et al., 2013; Costanza et al., 2014; Kumar, 2010), but some, especially regulating and maintenance services, are less evident. Water markets provide opportunities to balance the delivery of these services, through acquisition of water rights. However, as the functional capacity of water bodies to deliver these services is dependent on instream flow allotments, studying the impacts of water right transfers on ecosystem service provision is limited (Costanza et al., 2014).

Government and nonprofit actors are increasingly interested in water markets as a means of protecting and improving freshwater resources. Significantly, “incentive-based water rights acquisition and transactions have emerged as a market-oriented policy approach to reallocate water resources from existing uses to enhance the provision, regulation, and sustainability of freshwater ecosystem services” (Garrick et al., 2009, p. 366).

Environmental Costs

While many scholars and practitioners highlight the potential environmental benefits of water markets and out-of-basin transfers, others caution that changes in the location and type of water use may create new environmental challenges and concerns. According to Bjornlund (2008, p. 5), water rights transfers may concentrate extractive water use in specific areas diminishing local aquatic ecosystem functions, or “move water into locations where its use might have a [negative] impact on river water quality.” Unfortunately, quantifying such impacts is difficult and highly dependent on local hydro-geographic characteristics.

3.1.3. Social/Community

Socio-cultural ecosystem services have been identified as encompassing the non-material benefits that people obtain from natural environments (Robertson, 2011). Factors that determine the development of the socio-cultural valuation of water include: the way that people value and use the resource, how water supports or sustains culturally important sites and practices, how it shapes and is shaped by beliefs, and the reliance on water for the realization of human well-being, identity, livelihood, quality of life, and social cohesion (Mackenzie, 2012; Villa et al.,

2014). While many scholars argue such services are important, there is a recognized need to more accurately define and specify the social and cultural questions that water managers and planners are to address in the water planning and management cycle (Mackenzie, 2012; Robertson, 2011).

Hadjigeorgalis (2008, p. 1), studying the distributional impacts of water markets on small farmers in Chile, found that “farmers use temporary water sales as a safety-net,” though the long-term effects of these sales are unclear. The author cites additional studies in Australia that reach similar conclusions and notes that other “studies that have touched on equity issues [in water markets] have observed...a resource gap...between buyers and sellers.” We were unable to locate recent literature on equity issues and distributional impacts particular to the United States.

The viability of rural communities can be damaged if there are rapid changes in water access or large, out-of-area transfers. “Retiring irrigated land can lead to losses of farm jobs, crop production, and farm income” (National Research Council, 1992, p. 45). Agriculture is often an economic linchpin and reductions in farm jobs can have ripple effects throughout rural communities potentially lowering local populations and diminishing local economies that are dependent on them. While some scholars argue that we would expect more marginal cropland and farms to be the first to sell their rights, the prior appropriation system provides a clear incentive for purchasers to seek senior rights at convenient locations for their planned use. This effect has been seen in Arizona and Colorado, where even high-value cropland is purchased for the underlying rights. (National Research Council, 1992). From 1987 to 2008 water transfers in several western states increased (Libecap, 2010). Despite a high degree of variability between states, Brewer et al. (2007) found the number of agriculture to urban transactions is rising across the Western U.S. (while agriculture to agriculture transfers are not) and there is a shift from short-term leases to longer term leases and permanent sales.

In regions where water markets are more established, for example in Australia, the trading of water rights has resulted in the abandonment of farms as water entitlements are sold (Fenton, 2007). Bjornlund (2008, p.14) argues such desertion has changed “the composition of the population from traditional farm families with many shared values and aspirations, to a mixed population with an increased emphasis on city values and without shared aspirations.” Qualitatively assessing the social impacts of water trading in Australia’s rural communities, Edwards et al. (2008) report a depopulation effect in some rural communities as farmers sold their water and moved to town. Despite the reported significant social change—described as decline by many survey/interview respondents—Bjornlund (2008) found that census data do not support respondents’ narrative of economic decline. Chong & Sundling argue that there is, at best, mixed evidence of a problem of agricultural to urban reallocation in the western United States (Chong & Sundling, 2006).

3.2. Existing Policies

Successful “water markets require ongoing institutional capacity and adaptive governance”, particularly if they are to maximize social net benefits and meet environmental instream flow needs (Garrick et al., 2009, p.366). Several U.S. states and other jurisdictions have implemented policies intended to address economic, environmental, and social concerns related to water transactions. For example, some states have instituted area of origin protections. Approval of out-of-basin transfers in Oregon is contingent on several criteria, including proof that the proposed transfer does not jeopardize future water needs in the basin of origin. Similarly, Idaho requires out-of-area water transfers to be evaluated against their impact on the local economy and agricultural base.¹⁰ Idaho also has a change of ownership reporting requirement that requires new water right owners to notify the Idaho Department of Water Resources of any change in ownership even if no other elements of the right are changed.¹¹

When environmental concerns were raised in Australia, particularly the notion that trades could concentrate water in areas or uses that could negatively impact water quality and ecosystem health, Australian states established a variety of restrictions and controls. For example, in South Australia, buyers are required to submit an Irrigation Drainage and Management Plan “to prove that the intended use of the water would not have a negative impact on river water quality” (Bjornlund, 2008, p. 5). Victoria limited the amount of water that can be used on a specific parcel. And across Australia, low and high impact zones are associated with additional levies or payments to incentivize buyers and sellers to move water to locations that maximize environmental benefits (Bjornlund, 2008).

3.3. Information Gaps

Water markets do not exist in a vacuum. They are formalized within a set of different institutions, environments, and cultures that can improve or hinder their acceptance by water users and have different effects on solving water problems and user welfare (WestWater Research, 2016). Research suggests that water markets are more effective when information about the prices being paid and offered is made available to all participants in a timely manner (Sadoff et al., 2015; Wheeler et al., 2017). Unfortunately, we were unable to locate such information for Washington State.

Impacts of water markets in Washington are understudied and there is a lack of research quantifying market activity and market effects (Breviglieri et al., 2018; OECD, 2015). Similarly, few scholars have attempted to understand the effects of water rights trading on local communities. These effects are difficult to measure, so even the research that does exist is

¹⁰ For an example of such legislation see:

<https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=3137> and <https://idwr.idaho.gov/files/legal/guidance/Transfer-Processing-Memo-24.pdf>

¹¹ <https://idwr.idaho.gov/water-rights/transfers/>

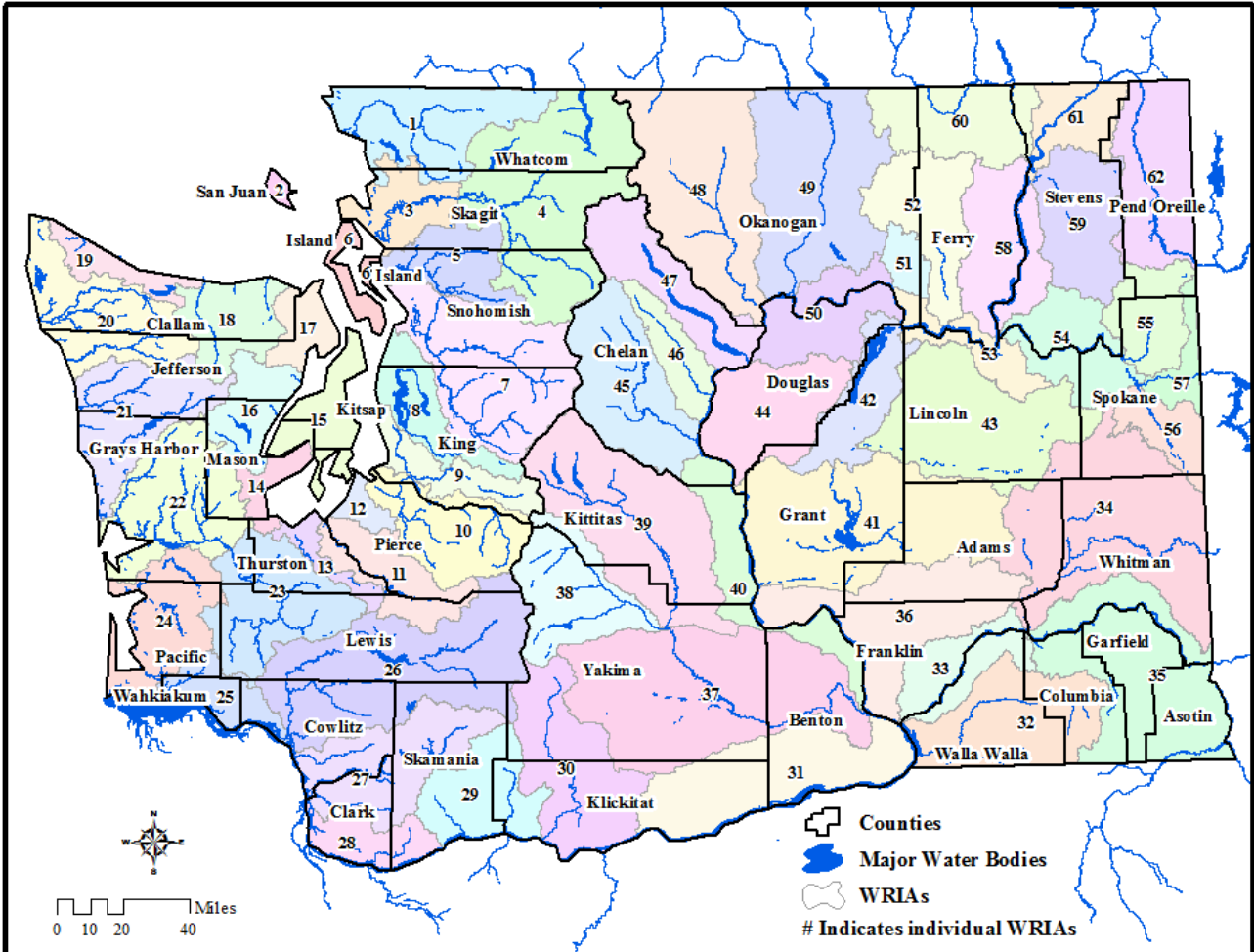
limited. Impacts are highly dependent on location—for example, environmental effects depend on the stream hydrogeology, habitat availability, water storage, and quality improving capacities, etc. Thus, putting value on these effects requires contextual information that must be collected and analyzed locally.

CHAPTER 4

Study Area

4. Study Area

Figure 1: Map of Washington State WRIAs, Counties and Major Water Bodies



This map shows Washington State's 62 WRIAs and major water bodies overlaid with its 39 counties. Many WRIAs cross county boundary lines and most counties contain more than one WRIA.

4.1. County & Basin Selection

Figure 1 maps both counties and WRIAs, as well as major water bodies across Washington State (for a complete list of WRIA names and numbers, see Appendix A). This report analyzes water rights transaction data across Washington State's 62 WRIAs and 39 counties. However, given Ecology most often hears concerns about out-of-basin transfers from stakeholders on the east

side of the Cascade Mountains, we targeted our analysis to further investigate several central and eastern Washington counties.

In consultation with Ecology’s Water Resource Program Team, we selected four counties—Chelan, Kittitas, Okanogan, and Stevens—for additional analysis. Predominantly located along the upper reaches of the mainstem Columbia River, these counties typify rural Eastern and Central Washington. The following subsections highlight summary information for each of these counties and Table 1 provides additional key context-setting statistics, in 2018 values.

4.2. County Profiles

4.2.1. Chelan

As of 2018, Chelan County is home to an estimated 77,648 people, with a median age of 40 years. In 2018, the median household income was \$56,135. The median property value was \$274,500, approximately 76% of the Washington State median value of \$362,100.

According to the U.S. Census, the largest industries (in terms of number employed) in Chelan County are healthcare and social assistance services (5,059 people), agriculture and forestry (4,053 people), and retail trade (3,877 people). According to the 2017 U.S. Census of Agriculture, farmland occupies 59,767 acres (3% of the county’s total land area), of which 23,819 acres are irrigated.

4.2.2. Kittitas

Kittitas County had an estimated population of 45,897 people in 2018, with a median age of 33 years. In 2018, the median household income was \$55,193. The median property value was \$275,000, approximately 77% of the Washington State median value.

The predominant industries (in terms of number employed) in Kittitas County are educational services (4,111 people), accommodation & food services (2,653 people), and retail trade (2,215 people). Farmland occupies 172,515 acres (12% of the county’s total land area), of which 66,818 acres are irrigated.

4.2.3. Okanogan

In 2018, Okanogan County had an estimated population of 43,369 people with a median age of 43 years. The median household income, as of 2018, was \$42,598. The median property value was \$173,500, approximately 48% of the state-wide median.

According to U.S. Census statistics, the major industries in Okanogan (in terms of number employed) are agriculture and forestry (2,540 people), healthcare and social assistance (2,531

people), and retail trade (1,761 people). Farmland occupies 1,231,899 acres (37% of the county's total land area), of which 46,035 acres is irrigated.

4.2.4. Stevens

As of 2018, Stevens County had an estimated population of 46,222 people, with a median age of 47 years. The median household income, as of 2018, was \$49,200, and the median property value was \$187,000, approximately 52% of the Washington median.

Based on U.S. Census statistics, the largest industries (in terms of number employed) in Stevens County are healthcare and social assistance (2,289 people), retail trade (2,197 people), and manufacturing (1,734 people). Farmland occupies 517,938 acres (33% of the county's total land area, of which 7,157 acres is irrigated).

Table 1: County Statistics

County Attributes (2018 Values) ¹²	County				Washington State
	Chelan	Kittitas	Okanogan	Stevens	
Population	77,648	45,897	43,369	46,222	7,529,922
Land area of county (sq. miles)	2,921	2,297	5,268	2,478	66,455
Water area in county (sq. miles)	73	36	47	63	4,757
Agricultural land (sq. miles)	93	270	1,925	809	22,937
Median Household Income	\$56,135	\$55,193	\$42,598	\$49,200	\$78,687
Median Property Value	\$274,500	\$275,000	\$173,500	\$187,000	\$362,100
Total General Revenues ¹³	\$42,718,399	\$58,362,511	\$46,739,369	\$31,715,538	\$38,620,000,000
Per Capita Revenue ¹⁴	\$550	\$1,272	\$1,078	\$686	\$5,129
WRIAs included in each county	40, & 45-47	38-40	47-53, & 60	54, 55, & 58-62	1-62
Population Growth Rates ¹⁵					
1990 Growth Rate	31.5%	41.8%	20.3%	30.7%	35.37%
2000 Growth Rate	12.6%	27.3%	5.4%	10.3%	21.72%
2010 Growth Rate	5.0%	10.9%	1.7%	2.5%	10.70%

¹² Values in the table were pulled from the U.S. Census, U.S. Bureau of Labor Statistics, and USGS. 2018 CAFRs for each county were also reviewed in this summary.

¹³ Excludes tax revenues.

¹⁴ Excludes per capita tax contributions.

¹⁵ Growth rates are total values, calculated from the given year (i.e., 1990, 2000, and 2010) to 2018.

CHAPTER 5

Research Methodology

5. Research Methodology

We employed a mixed method approach to assess the current extent of water rights transfer activity across the state and the potential economic, social, and environmental effects associated with out-of-basin transfers.

Qualitative Research

To identify key themes and highlight local and practitioner perspectives on the frequency, impact, and ease of water rights transfers across the state, we conducted qualitative interviews with 20 stakeholders. Initial interviewees were suggested by Ecology, and we used a snowball approach to identify additional stakeholders. Between March 11, 2021, and May 7, 2021, we conducted 20 semi-structured interviews online via *Zoom*. Interview length depended on the interviewee's time and knowledge, ranging from 30 to 90 minutes. Except when interviewees declined to be recorded, interviews were recorded and transcribed. From our notes and transcriptions, we identified key discussion points and themes and developed a spreadsheet to track interviewee perspectives on each theme.

Quantitative Research

Quantitative data on water rights transfers, supplied by Ecology, was used to assess the extent to which out-of-basin water rights transfers are occurring across Washington State and in Chelan, Kittitas, Okanogan, and Stevens counties, specifically. From February through April, 2021, we worked to collect, clean, synthesize, and analyze Ecology's water rights transfer data. This approach does not include rights that move into the Washington Trust Water Rights Program. It also does not include a study of water banking and its effect(s) on out-of-basin transfers.

5.1. Quantitative Water Rights Data from Ecology

The quantitative data for this project came from the Ecology's Water Resources Program, and specifically from the Water Rights Tracking System (WRTS). WRTS tracks water rights, changes to water rights, and applications to change water rights or obtain new water rights.

WRTS operates as a records system used to retrieve water right records based on user queries. While the database supports some queries, much of the information about specific water rights is stored as scanned pdf documents. For someone interested in pulling trends out of these records, both queryable data and scanned pdf documents need to be used. This can prove time consuming

as records pulled from a query need to be checked against the scanned records frequently for missing information, typos, and to gain a full understanding of a water right's history.

At the start of this research Ecology performed a set of queries from WRTS to generate a list of water right changes and their parent right records. By comparing location data between the right before and after its change, we were able to assess which rights had moved out-of-basin, from one Water Resource Inventory Area (WRIA) to another, and/or out-of-county, and whether the right moved a significant distance to merit inclusion in our analysis.

Through this approach, we found 54 water rights that changed WRIA. Further, 43 of which also changed county. The 54 water right change records were used to create summary statistics and identify basic patterns for out-of-basin transfers that moved more than 5 miles.¹⁶ For the purposes of analysis, each record was treated as an individual transfer including several records documenting water rights that were subsequently split between different uses and/or different end locations. A more detailed explanation of this methodology can be found in Appendix D.

5.2. Data Searches External to Ecology

Rights that are bought and sold, but do not otherwise change their use or location are not tracked by Ecology. If many such transfers are happening in an area, that could indicate future requests for changes of use and changes of location. This sales information can also provide details on pricing and valuation of water rights and ownership. Records for this information would potentially be found in sales of deed, real estate excise taxes, or other forms of property sales records.

As part of the data collection process, detailed in Appendix D, we sent inquiries to Washington State county assessors', auditors', and records' offices attempting to determine the extent to which local water right sales are tracked in hopes of incorporating such data into our analysis. Additionally, we reached out to local title offices and the Washington State Department of Revenue seeking the same supplementary data.

In general, we received unsubstantial offerings from most offices. Of the 39 county offices, most referred us back to Ecology, the Water Resources Program specifically, or county Boards of Health (Environmental). Others replied with assurances that their office did not track such information. Finally, some offices responded with their own questions about water rights or asked for further clarification of our research needs.

¹⁶ Due to the nature of the WRTS data, we were limited in our ability to measure point of diversion changes by river mile and instead calculated such distances by overland miles.

The few counties, such as Skagit County,¹⁷ that do keep water rights specific records have that data stored in systems set up as online searchable repositories of scanned pdf documents. These systems do not allow for pulling datasets that would facilitate analysis.

Repeated unsuccessful inquiries left us without external data sources directly observing water right sales and we were thus unable to include this information in our analysis.

¹⁷ <https://skagitcounty.net/Search/Recording/Results.aspx>

Chapter 6

Qualitative Interview Findings & Analysis

6. Findings

The following sections discuss the findings from qualitative interviews with 20 stakeholders, including water rights consultants, attorneys, irrigators, environmental groups, county officials and tribal representatives. Qualitative findings are grouped by theme and represent both areas of significant agreement and disagreement among stakeholders.

6.1. Economic Impact of Water Rights Transactions

Interviewees had mixed perceptions of the economic impacts of water rights transactions. Fifteen respondents cited positive private and public economic impacts from water rights transactions, while another fifteen interviewees also cited negative economic impacts (some respondents observed both positive and negative impacts). Positive views of economic impact were generally based in a belief that the market efficiently allocates water to high-value purposes, while negative views focused on regional and distributional concerns.

In terms of economic benefits to water rights transactions, interviewees told us that the transaction process enables water transfers “from one location to another and from one use to another,” creating flexibility in the management of Washington’s water supply. One interviewee described the transaction system as the “only feasible way of development due to repurposing water needs,” while another described transactions as “the best way to balance multiple uses” and the “most efficient and logical pathway to secure new water uses in Washington, where water is scarce.” Several other interviewees cited the market’s ability to theoretically direct water towards its highest beneficial use. The view that most transfers are moving from marginally economically productive operations to higher value uses was cited multiple times. An additional benefit of downstream transfers that interviewees mentioned is an increase in fishing related economic activity.

Concerns of negative impact were largely regional in nature. 15 interviewees described unequal gains and losses associated with water transfers based on geographical location. We were told that many water rights in Washington were initially granted along tributaries, where gravity was used to irrigate crops. Much of the farming areas in the tributaries are tracts of land, stretching along river valleys. These tributaries were robust farming communities a hundred years ago. However today, many interviewees reported feeling that headwater communities are struggling economically. One interviewee noted “it is hard to achieve production at the scale and proximity to markets necessary for many agricultural products grown in these regions to be competitive.”

Increases in agricultural production have more frequently occurred adjacent to mainstem rivers, particularly along the mainstem Columbia River, where large scale agricultural operations are able to flourish.

Representatives of communities in the headwaters and along tributaries described feeling particularly vulnerable because their agricultural operations often depend on the ability to irrigate and yet, because of their geographic location, water rights once sold downstream do not return. The question for these communities is therefore: how many farmers selling their water rights and leaving farming will it take for the local economy to become negatively impacted? As small farms in the headwater regions go out of business and sell their water rights to downstream entities, these communities anticipate that they will contract economically: producers will purchase fewer and fewer agricultural services and equipment, impacting local businesses, which will in turn lay-off employees. Several other interviewees indicated associated concerns about shrinking property values due to alienated water rights, which would in turn decrease the local tax base.

Some interviewees mentioned that the high demand in downstream areas for water rights originating in upstream, rural counties has led to an increase in the price of the water. One interviewee told us “it wasn’t long ago that a good water right with a decent seniority was going for about \$3,000 per acre-foot; now we are seeing sales at about \$5,000 to \$10,000 per acre-foot. So, the prices are going up pretty dramatically because there is a limited amount of water.”

While some interviewees recognized the myriad of positive and negative impacts of water rights transactions that are cited across Washington state, others either focused intently on, or largely dismissed, distributional concerns. Importantly, we heard that not all stakeholders support the commodification of water—more specifically, one interviewee suggested that some tribes and their members do not believe that water should be transacted.

Most interviewees did not clearly articulate the frequency at which they perceived water rights transactions occurring, and many indicated they were unsure. One interviewee told us that he thought about 200 water rights transactions occur per year throughout Washington. Another said that “private parties buying, selling, and leasing water rights is a very small, thin, slow market; on the order of about several thousand acre-feet of water have been traded privately over the last 30 years. If there are adverse impacts, it has to be attributable to public purchases of water for instream flow purposes [as opposed to private transactions, because there are more public purchases].” Another told us that he does not know if there are any more or any less transactions going on year to year, but there is a heightened concern and public awareness about water rights transactions.

6.2. Social Impacts of Water Transactions

There were a variety of diverse opinions on the social impact of water transactions in Washington. Several interviewees indicated that there were no significant social impacts associated with water rights transfers, and in particular one respondent noted that he had “never seen a sale hurt anyone.” Others spoke of the dynamics occurring in Central and Eastern Washington and in headwaters communities, where the social consequences of transferring water downstream are connected to other demographic and economic shifts.

The sale of water in these areas is seen by some observers as closely connected to the consolidation of farming operations and the loss of agriculture. Interviewees described sellers as frequently belonging to an aging rural population who have included agricultural water rights as part of their retirement portfolios because they have no younger relatives interested in farming. In other cases, interviewees reported that the sale of water rights is the consequence of financial distress. One interviewee told us that “ranches and farms are going out of business, as many as 3 per month.” The perception from interviewees was that buyers tend to be environmental instream flow buyers, developers, or larger-scale irrigators. Representatives of upstream communities worried about the permanent loss of water and agricultural businesses from their communities. We were told that for many, this is an emotional topic. One interviewee elaborated: “Socially, there are people who want to see green fields and lush agriculture going on. People don’t really want to see these areas become a dry dust bowl, but at the same time, there may be people who are having a really hard time farming, or whose kids don’t want to come back and farm. I think there are a lot of social impacts on both ends of the spectrum when water sales happen.”

Other interviewees viewed any social concerns as largely inflated and fear-based, and even cited potential benefits of downstream transfers to upstream communities. “In terms of the social fabric or cultural impacts, I think that’s a big fear and it’s a barrier to implementing water transactions, but I have rarely seen any kind of major consequences play out because somebody sold their water,” one respondent told us. We were also told that positive social impacts could include increased recreation along streams with healthier ecosystems, and public knowledge of, and engagement with, Washington’s water management system.

6.3. Desire to Maintain Water Rights Within Local Communities

When water transfers occur in the tributaries, there is the potential of permanently removing those water resources from communities and sending them downstream. We were told that headwaters communities, particularly in the Okanogan, are looking for ways to retain water availability for agriculture because agriculture is considered an intrinsic part of their culture. Water users in these communities are already experiencing curtailment of the resource as instream flows decrease. More and more irrigators are having to curtail their water use in “average” years which we were told tend to be drier than they were 25 to 30 years ago. “These are the things that make people really nervous and very concerned. They want to see a way to

sustain agriculture locally, and the only way to do that is to keep water [in their communities],” one interviewee explained. While many interviewees believed in the utility of a water market, those living in headwater areas indicated that they would prefer to see local water right holders sell their water rights to others within the same county, or to the local municipality for the municipality to expand, which would become an economic generator within the county, rather than see the rights sold to out-of-the-area buyers. Water banking, which is discussed later in this section, appeared as the benchmark tool to help communities achieve this.

The conversations around downstream sales also included concerns about the state’s instream flow purchases that remove water from agricultural uses in upper river basins. As one interviewee explained: “if having that increase in water led to an increase in some other industry (fishing guides, or something else related to having a stronger fish run), that would make this more palatable. It would be a transition away from jobs that people are used to, but at least there would be jobs to replace the jobs lost and ideally these would provide an equitable income. We do have some tourism trade for fishing that has suffered in the last 20 years due to low fish returns. If we could get back to having more historic fish returns where there were fewer restrictions on fishing, I am sure there would be an increase in some jobs that are tied to that. The question would be: does that come out as a balance at the end of the day [in terms of jobs lost and jobs gained]?” There is thus a tension between ecological balance and community needs.

6.4. *Environmental and Ecological Impacts*

Interviewees unanimously agreed that converting water rights to instream flow uses and transferring water rights downstream have positive impacts to ecological and environmental functionality. “If people sell water downstream and out of county, the immediate reaches benefit from not getting water withdrawn out of them for agricultural use,” one respondent said. Water that is left instream until it reaches the mainstem benefits the entire tributary. An environmental buyer indicated that his organization “focus[es] on transactions that can be protected along the full tributary—water needs to get to the mainstem to provide the full benefit for fish.” From an ecological perspective, the higher up within the system that a water right can be purchased for instream flow uses, the better, particularly if the right has an early priority date.

Interviewees informed us that changes in flow-related habitat characteristics that can be tracked and identified in protected stream reaches include water quantity, water temperature, pH level, sediment composition and movement, and other water quality indicators. Biological indicators of ecological health include quantities of fish and macroinvertebrates (which provide food for fish) as well as streamside vegetation. A crude calculation of environmental benefit is the percent of instream flows over river miles. Not all reaches are the same, however. One interviewee described a Fish Atlas Project that the Washington Department of Fish and Wildlife developed that makes assessments of various reaches. He told us that the project, used in conjunction with the percent instream flows over river mile calculation, would yield a good evaluation of

environmental benefits associated with transfers that left water instream in different tributaries throughout the state. For example, “at low flows in August, the Wenatchee River can go down to 200 to 400 cubic feet per second (cfs), while low flows in the Columbia River are 50,000 to 60,000 cfs. There is almost no meaningful difference you can make in Columbia River flows as a result of out of stream water rights. The entire part of the Columbia River basin project (including the Yakima River and the Snake River) that is irrigated takes about 6% to 9% of the entire Columbia River flows. There is not enough irrigable ground in the tri-state area to meaningfully impact instream flows. The problems of the Columbia River, then, are qualitative in nature (water slowed by dams heats up and dams provide obstruction to fish), not quantitative.”

In contrast, out of stream water uses in tributaries can have significant impacts on ecological systems because flows are much lower. One interviewee said that “while that water is parked instream or parked in the trust water rights program, it’s providing a streamflow benefit, which provides a benefit to fish, other aquatic life, and water quality.” Another interviewee told us that “in the Yakima basin, [they] have seen a huge amount of benefit from specifically instream flow acquisitions, trust water rights donations, and even the water banking.”

Many interviewees voiced concerns about the pressures of climate change on water resources, and water management, within their communities. “In my opinion, in the future scenarios of climate change, it is really hard to believe, [given] our existing status quo, [that instream flows] will be enough. Every basin is different, but in the basins that I work in, there is rarely enough water for fish,” one interviewee said. Another interviewee from the Okanogan region noted that while concerns about climate change, “are not commonly expressed among farmers because they are not real believers in climate change, I do see farmers talking about the fact that we are getting less snowpack every year. Less snowpack means less water to have for our uses, let alone what potentially gets transferred out.”

A couple interviewees expressed other environmental concerns related to consequences of selling irrigation rights downstream. These included the spread of noxious weeds and the potential that neighboring farms resort to overspraying as a result. Increased risk from wildfires was another concern mentioned because “having irrigated ground is a good buffer against wildfire spread.” This buffer erodes as water rights are transferred out of the area.

6.5. Flow Accounting and Water Needs

Most interviewees reported that they did not feel their communities’ current and (or) predicted future water needs were well known or accounted for. “We do not have an adequate understanding of current and future water needs...which is ridiculous because water is a right,” one interviewee told us. Another said “there is a lot of work to be done (generally) in terms of understanding flow levels. There is not a clear understanding of the water supply.” While

interviewees reported that flow accounting is more well understood in some basins, they told us that areas that lack infrastructure (and some rural communities in particular) struggle to measure and monitor their water resources.

When asked how well known (or accounted for) his community's current and predicted water supply is, one interviewee told us that a few municipalities in the Okanogan and Methow regions have recently experienced growth moratoriums due to insufficient water supply. These areas "will be looking for water rights to acquire in the not too distant future," he said. "Even municipalities that have sufficient water for the next 20 years may not for the 20 years beyond that. I would imagine that most of them are starting to look for water rights now." Another interviewee told us: "I think it's really important for communities, especially in headwaters basins like the Methow, to get some more data answering very basic questions like:

- How much water do we have for each of these uses?
- How much are we going to need?
- How is climate change going to impact that?
- How do we make decisions about transactions affecting our community based on the answers to those questions?"

"I don't think we can answer those questions; So, I'd like to see some more information there," she continued, referring to a desire for Ecology to step in. "I do not want to come across as critical of Ecology because I recognize they are understaffed and underfunded, but I don't think we have a good flow accounting system. If some funding could be driven towards some smart solutions [to help answer these questions], it would really go a long way."

Interviewees indicated that concerns over water supply would likely be exacerbated by climate change. "Ten years ago, when we finished the previous watershed plan on the Okanogan, a forest hydrologist explained that the amount of annual precipitation for the region is estimated to remain largely unchanged. What will change is the form it comes in. Less will come as snow, and more will come as rain. Rain runs off faster, while snow sticks around for late summer. So, we will see lower flows in the streams in the summer, which means a greater impact on aquatic resources and a greater number of irrigators being shut down. All of these things indicate that in the next 20 or 30 years we will have less water to use, and we will have more people. We will need to get more efficient with what we have. What that looks like is a whole lot of unknown right now," one interviewee explained.

6.6. *Improvements in Irrigation Efficiency*

Some interviewees indicated that they are hopeful about programs to help improve irrigation efficiency and technology that allow for "win-win" outcomes for agriculture and instream flows. "I think there is also a benefit when you're able to do win-win projects where an irrigator wants

to continue irrigating a piece of ground, but their system is not that efficient. [Improving the irrigation system] helps their whole bottom line and then they're able to lease or sell some of that excess water" or put it instream, one interviewee told us. More than the transaction itself, it's the ability to do irrigation efficiency work along with the transaction," the interviewee continued.

6.7. Leasing

Ten interviewees mentioned dual benefits of water rights leasing. The ability to lease "water rights provides both environmental benefit as well as opportunities for retaining social and economic benefits," one interviewee explained. In addition, he said, leasing creates "opportunities to retract water to the county of origin." Another interviewee told us: "As far as leasing goes, I think leasing is a really good option for people that need to generate revenue because the actual water right stays within the county. Most of the time, the arrangement would have to go under a long-term lease program because nobody is going to lease water for a row crop or an orchard that does not have a 10- or a 20-year lifespan. I think leasing is a way to allow everybody to win. It allows someone who needs revenue to allow that water to go out of the county, but then at a certain time, it comes back to the place of origin." Another interviewee told us that short-term leasing has been instrumental for his community during drought years, but indicated that changing market dynamics have changed leasing behavior. A fourth interviewee stated that he saw a role for Ecology in simplifying the leasing process.

6.8. Water Banking

Water banking was generally seen among interviewees as a useful tool for water management, particularly if banks are publicly funded with missions directed at supporting the public interest. Interviewees indicated that the concept of local, public water banks is supported by rural irrigators as well, with the caveat that these banks should not be run or operated by state agencies such as the Department of Ecology. Many interviewees shared a concern and skepticism about private banks that are driven by a profit motive. Water banks are viewed as a mechanism for retaining rights within local communities while flexibly serving diverse community water needs, including agriculture and irrigation needs, rural wells, municipal water systems, rivers (instream flow), and recreation. One interviewee also mentioned that local water banks can improve transparency regarding mitigation. Other interviewees share some words of caution about water banks—they are not a panacea, and they will not solve all of the issues or concerns around water allocation. One interviewee questioned whether having a large number of water banks across the state is necessary, noting that it would be better to have uniform administration and centrality of systems.

6.9. Irrigator Distrust of Ecology

Eleven interviewees indicated that in the rural counties of Washington where we focused our analysis, agricultural producers frequently view the Department of Ecology with distrust and

skepticism. Farmers avoided interactions regarding their specific water rights with the agency to the extent that they could, fearing a Department of Ecology “haircut” to their rights should they engage with the agency.¹⁸ One interviewee told us that “too many of the producers have [water rights] war stories, that probably grow over time beyond what they really were to begin with, but there were certainly times where people lost part of their water rights due to interactions with Ecology.” This distrust of the agency was apparent in our own attempts to contact individual water rights holders. We frequently asked interviewees if they would be willing to put us in contact with individual water rights holders to which they responded by politely declining and citing political concerns. One person noted that many farmers “are just angry.”

6.10. Water Speculation

Interviewees were divided on concerns regarding investment speculation in water. Eight told us that they view speculation as a potential future threat that has begun to grow. Some interviewees described hearing from producers who had been contacted by non-local investment entities interested in purchasing their water rights. They asserted that “Washington is ripe for water resource exploitation, predominantly in upstream river basin counties.” These interviewees worried that investor speculation could increase the price of water rights such that local producers are priced out of the market, ultimately contributing to diminished water availability in headwaters basin communities. “Water flows toward money,” one interviewee quipped. Another interviewee expressed concern regarding “monopolization of the small quantity of private rights that can be changed (in terms of place and use) in certain basins”: “the State is being negligent” in this regard, he said.

In contrast, six interviewees indicated that the fear of investment activity in Washington’s water resources are overblown. “It is very easy to sensationalize a lot of that,” one interviewee said. Another interviewee in this camp stated that “a lack of transparency” in water rights transactions is feeding these fears. The same interviewee also noted that Washington agriculture is already predominantly owned by out-of-state entities. Another opined “if Ecology is following the appropriate processes as they are outlined in the Trust Water Rights statutes and in RCW 90.03.380, if they are going through the appropriate process for taking a look at a water right, making sure it is valid, quantifying the consumptive use and evaluating the potential impacts of the moves, I am actually not particularly concerned.”

6.11. Availability of Information

The majority of interviewees (fifteen) felt that the public lacks awareness about, and access to, information regarding water availability, valuation, and markets, though they also indicated that

¹⁸ The “Haircut” refers to a reduction in a water right as part of a change decision. Only in instances where a water right holder has applied for a change is Ecology required to review the right according to RCW 90.03.380, which may result in a finding that less than the full water right is valid and available to be changed.

there is geographic variability in knowledge. A small minority of interviewees felt that the information is accessible, but that the public is simply uninformed.

One stakeholder theorized the accessibility of information and level of public awareness “may vary across the state as different localities have different levels of experience, capacity, and expertise around water transfers (for example in Kittitas County versus in Stevens County).” Another interviewee from Okanogan County told us that “even for someone that has been farming for 20, 30, 40 years—if they haven’t been looking around to sell or purchase water, they probably wouldn’t have a clue where to start.”

Barriers to information access identified by stakeholders included a lack of transparency, time costs, and the complexity of the subject matter. Many interviewees felt that increased transparency around water rights transactions would improve associated impacts of transfers. “The public does not have access to transaction data, and pricing can be vague,” one interviewee said. Another stakeholder expressed her frustration about the lack of transparency telling us: “Something that drives me crazy is that water law, and water transactions, and all of this—it’s really complicated and convoluted, yet water is a public resource that we all need. So, this crazy power dynamic emerges where people who think they know the most about water or want to have the biggest voice and exert power through pulling conversations about the best use of our water down into the weeds of like a “change application” or “CFS” or whatever. I think that we need information that helps bring the conversation of the general public up to a more transparent, broader level, to pull it out of the weeds and move away from these power struggles that can emerge over talking about water.”

Others pointed out that potential buyers can seek information on water rights availability at local conservancy boards or go through private brokers. Most respondents reported that individuals interested in engaging in water rights transactions use consultants who operate via a word-of-mouth network to connect buyers and sellers. We were told that there are “not many players in water markets, water law, or water rights.” Interviewees indicated that transfers usually happen through insiders who connect interested buyers and sellers.

Some interviewees said that while the public is largely unfamiliar with water rights and transactions information, progress has been made: “my sense is that folks are much more engaged and much more aware because these issues have really percolated, or come to a head. There have been water wars, so to speak, that have brought to bear a lot of these issues and made them part of the public discourse. There is more awareness and more engagement in these issues, but not as much as there could be,” one interviewee said.

The same stakeholder pointed out that there has been some development of “smart market tools” to reduce “search and information costs and information asymmetry.” The Western Water Market

tool is one platform that several interviewees felt has contributed to improving market transparency. However, most interviewees felt that there is more to do and that certain gaps in knowledge persist. In areas where physical availability of water is a concern, USGS data and streamflow gauging are important, one interviewee said.

6.12. Transaction Review and Compliance System

Several interviewees described overuse and regulatory compliance issues, though a few others indicated that they were satisfied with the current system. “Ecology has an enforcement issue. If a basin has been fully adjudicated, the enforcement and monitoring is good, but if not, it is poor,” one stakeholder told us. Others concurred, describing the significant monitoring and enforcement costs of the system. “Protecting and monitoring rights is difficult,” one interviewee said.

Several interviewees indicated an interest in having flow meter records tracked and released. A couple stakeholders mentioned concerns that the “compliance measures that we have in place are largely inadequate in order to make sure water rights aren’t being over-utilized.” In general, “water monitoring could be improved,” the interviewee said, though she noted there are different types of monitoring, and some are currently done in some areas.

In reference to transfers specifically, others said that while the system “conceptually makes sense,” Ecology does not have enough staff resources to process reviews in a timely manner. “If transactions are the only tool for new uses and to protect instream flows, we need to support Ecology with increased resources and funding,” one interviewee said.

Stakeholders also indicated problems in the public’s understanding of the regulatory system. Regulatory information exists, and several interviewees pointed to Ecology’s website as a useful resource, but they told us that individual water right holders lack a good understanding of the regulatory framework. “The community would benefit from knowing water allotments and availability to prevent relinquishment,” one interviewee said. “Some folks maybe haven't been using [their water right] for a long time, and think they have a pot of gold [when they actually] don't have anything because they haven't been using it,” another told us. One interviewee had a specific recommendation to amend RCW 90.03.380 and RCW 94.14.140 to change the 5-year period for ‘use-it-or-lose-it’ to 15 years, indicating that “80% of litigation is on this statute.”

CHAPTER 7

Quantitative Findings & Analysis

7. Findings & Analysis

7.1. Overview

We collected data from Ecology's Water Right Tracking System (WRTS) to quantitatively analyze current trends in out-of-basin water rights transfers. The WRTS database serves as a record keeping system of water right transfers and changes. When a water right holder applies for a change to their right (e.g., change of use, point of diversion, location of use, etc.), Ecology records this information in WRTS and uses the system to track the application from submission through approval or denial.

To identify out-of-basin transfers, we queried WRTS for records indicating a change of place of use. That query returned 3,722 unique records.¹⁹ We then filtered those records for those that indicated a change in Water Resource Inventory Area (WRIA). For the purposes of this report, an out-of-basin transfer is defined as a transfer that changes WRIA. Due to miskeys in the WRTS system, it is possible that some out-of-basin transfers did not appear in our query. After removing duplicate entries among the records queried, as well as any entries for transfers that moved less than 5 land miles,²⁰ we identified 54 records between 1997 and 2019 that met our study criteria. In 43 instances, the records also indicated a change of county. The 54 out-of-basin transfers represent 1.5% of the total records that indicate a change of place of use in the Ecology database.

In reviewing the WRTS entries on these 54 out-of-basin water rights transfers, we then compiled summary statistics on a) the frequency of such transfers; b) transfer distance (i.e., from original sources and points of diversion to new sources and points of diversion); c) changes in the purpose of use; and d) estimated date of transfer.

These summary statistics help uncover broad trends in the data and highlight important findings. However, while they may inform our understanding of the potential effects of out-of-basin transfers, the summary statistics and tables presented in the next sections primarily serve as entry points for further study. Analysis of this information alone is not enough to determine the environmental, economic, and social effects of water rights transfers on local communities in Washington. Instead, this study's findings provide a foundation and frame for future analyses.

¹⁹ The 3,722 queried records were not individually verified for accuracy and include similar limitations as found in Chapter 10.

²⁰ The intention of this report is to look at the potential economic, social, and environmental impacts of out-of-basin transfers in Washington State. Rights that move less than 5 miles have not moved significantly out of their original community and therefore were excluded from results.

The next sections review summary statistics associated with these transfers. Unless otherwise indicated, the summary statistics reported are for all 54 out-of-basin transfers. Water rights are designated as groundwater or surface water rights, and except where otherwise noted, all findings include both water right types. Appendix C includes additional summary tables.

7.2. Quantity of Water Transferred

The amount of water a right allocates is measured according to its instantaneous rate, such as gallons per minute (gpm) or cubic feet per second (cfs), and the annual rate recorded as acre-feet per year. The total quantity of water transferred defines the magnitude of potential associated effects on communities across the state. Our query of the WRTS database indicates that in total, 11,182 annual acre-feet of water were transferred out-of-basin more than five miles between 1997 and 2019. For comparison, in 2018 producers in Washington State applied 4.1 million acre-feet of water on farms, ranches, and other horticultural operations (USDA, 2019). Out-of-basin transfers represent 0.3% of that amount.

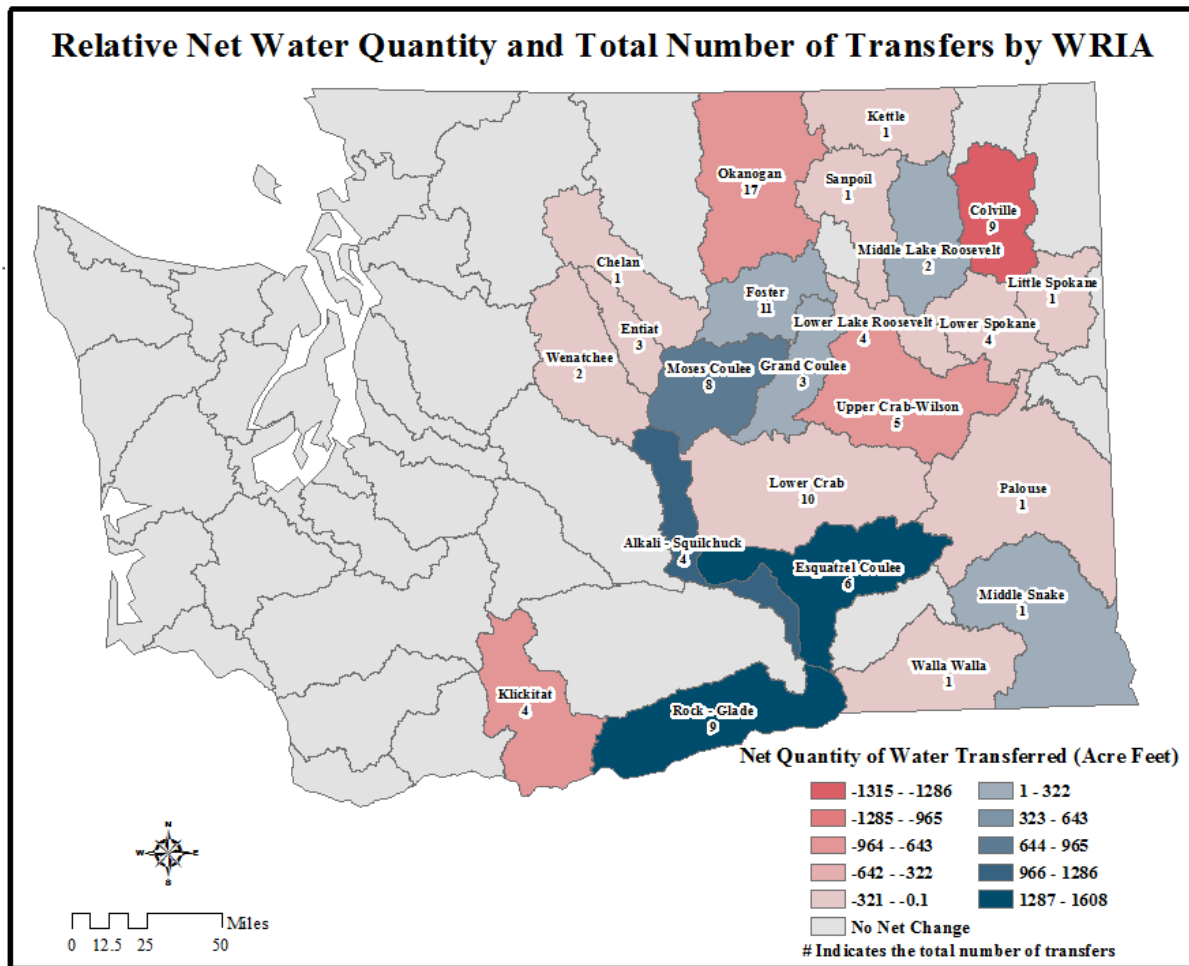
7.3. Absent Transfer Activity

While preparing initial drafts of this report, the absence of out-of-basin transfers in the Yakima Basin and the Methow Basin was noted. There are multiple reasons why transfer activity in these basins would not appear in this report:

- 1) data limitations as laid out in Chapter 10;
- 2) potential transfers that have not yet applied for a change of place of use with Ecology;
- 3) transfers that occurred within-basin or transfers using the State Trust Water Rights Program, which includes water banks.

Preliminary searches of in-basin transfers in the Methow indicate transfer activity that includes putting rights into instream flow, water banking, and the Trust Water Rights Program. None of these in-basin transfer types are captured in our report and merit further study.

Figure 2: Map of Transfer Count and Quantity by WRIA



This map demonstrates the water right transaction activity in Washington State’s 62 WRIsAs. The number listed on each WRIA indicates the total number of rights that moved into and/or out of that WRIA. For example, the Okanogan WRIA experienced a relatively high level of activity with 17 total transfers (5 rights moved into and 12 rights moved out of the Okanogan WRIA). The color of the WRIA indicates the net volume of water associated with the transferred rights. The Okanogan WRIA had 900 acre-feet more water transferred out of the WRIA than transferred into the WRIA.

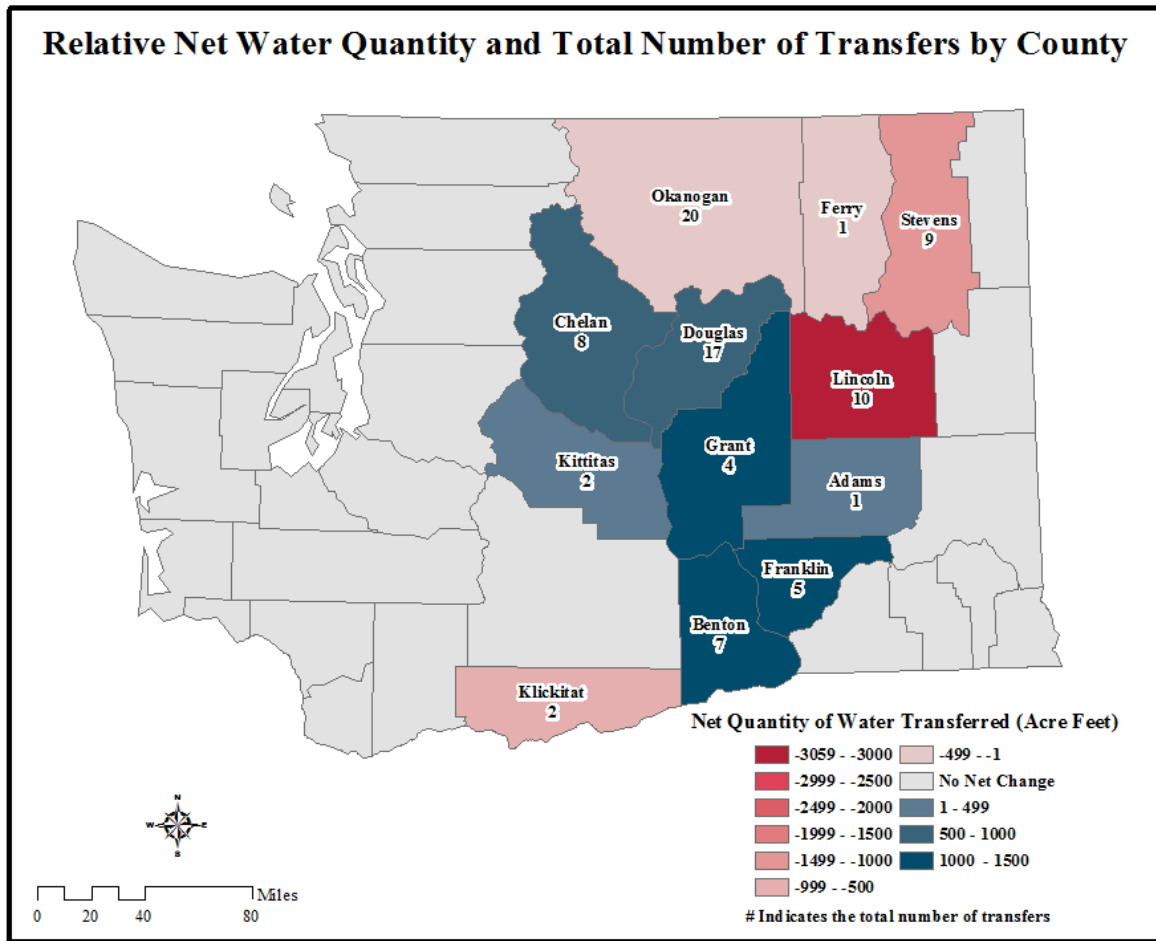
In the map above, we see that total activity in a basin is not always directly correlated with the net transfer of water volume. Some basins, like the Lower Crab, have a lot of activity but the net volume of that activity is relatively low (the volume of water transferred into the basin is similar to the volume of water transferred out of the basin). By comparison, the Esquatzel Coulee basin has fewer total transfers, but a relatively high net volume of water moving into the basin.

Water rights generally move downstream (although the law does allow for transfer of groundwater rights upstream in common pools that remain in the same source of groundwater when there is no impairment). The map in Figure 1 reflects the role that geography plays in water

rights transfers. Headwater basins are geographically positioned for transfers to move out of the basin. These basins have very limited potential for new transfers to move in. Basins positioned midway along the Columbia River are able to transfer rights in as well as transfer rights out, while basins lower on the Columbia River are advantageously positioned for transfers to move in.

While our WRTS data query suggests that the total sum of water transferred out-of-basin more than 5 miles in the past 25 years is modest (54 rights between 1997 and 2019), we cannot rule out the potential for these transfers to have significant impacts on small tributaries and water-limited headwaters communities. In cases where streams have low annual flows, even small amounts of additional water can contribute to improved ecosystems. The average water right in our sample is associated with a withdrawal rate of 0.04 to 4 cfs and about 200 acre-feet of water annually. For context, the USGS assessment of current streamflows in Washington indicates that several small streams have a long-term median flow rate of 10 cfs or less, while parts of the Columbia River have a long-term median flow rate of 350,000 cfs (USGS, 2021). Any ecological impacts of downstream water transfers are therefore highly dependent on the specific streams and rivers that the water passes through. While increased instream flow generally has a positive impact on ecological systems, the transfer of rights away from headwaters communities can restrict available water supply because headwaters communities are limited in their ability to purchase additional water rights. As rights are sold downstream over time, these communities may be required to operate with less and less water.

Figure 3: Map of Transfer Count and Quantity by County



This map shows out-of-basin transfers that also changed county. There are 43 rights in our dataset that meet these criteria. The number in each county indicates the number of rights that moved into and/or out of that county. The color reflects the net volume of water transferred. Only rights that change basin and county are shown on this map. Our data query did not include rights that transferred between counties while staying within the same basin of origin.

Figure 3 analyzes the same data as above by county; it also demonstrates the general movement of rights from basins located in counties upstream to those downstream along the Columbia River basin. Again, we see that some counties, such as Okanogan County, can have a relatively high level of activity (29 transfers) while maintaining a low net negative change of water volume (186.2 acre-feet). By comparison, Grant County has a relatively low level of activity (4 transfers), with a high net positive change in water volume (1,084 acre-feet).

Table 2: Summary of Water Body Movement

Post-Transfer Water Body	Pre-Transfer Water Body	Total Water Moved (Acre-Feet)	Count of Rights	Average Distance Transferred (Overland Miles)	Maximum Distanced Transferred (Overland Miles)
Columbia River	Bulldog Creek	66.7	1	83.8	83.8
	Columbia River	672	5	58.4	122.6
	Colville River	313	3	58.2	78.2
	Eagle Creek	51	1	49.2	49.2
	Kettle River	204	1	64.6	64.6
	Little Klickitat River	551	2	43.3	43.3
	Mad River	311	3	21.3	31.9
	Okanogan River	1,671	10	69.7	164.7
	Spokane River	269	2	69.9	81.3
	Welsh Creek	78	1	68.8	68.8
	Wenatchee River	50	1	12.6	12.6
	Mill Creek (Little Klickitat River)	378	2	27.3	27.4
	North Fork Chewelah Creek (Colville River)	157.6	2	84.5	85.9
	Unnamed Spring (Hunter Creek)	86.7	1	18.0	18.0
	Sheep Creek (Colville River)	118.1	1	76.6	76.6
Columbia River Totals		4,976.9	36	57	164.7
Groundwater	Groundwater	5,545	16	29.6	112.7
Groundwater Total		5,545	16	29.6	112.7
Okanogan River (Wells Pool)	Colville River	300	1	75.7	75.7
	Unnamed Stream (Colville River)	360	1	76.8	76.8
Okanogan River (Wells Pool) Total		660	2	76.2	76.8
Grand Total		11,182	54	49.6	164.7

This table shows the water body that a right was drawing from before and after it was transferred. “Pre-Transfer Water Body” refers to the water body that the right originated in while “Post-Transfer Water Body” refers to the end location. Several smaller streams contain the name of the water body they flow into in parentheses to help locate them. The table also provides information on the number of rights, total amount in acre-feet and distances travelled.

As seen in Table 2 above, long distance out-of-basin transfers in Washington State typically end in the Columbia River. The one exception in this data are the several rights that were moved to the Okanogan River (Wells Pool). The Wells Pool is a combined pool of water from the Columbia and Okanogan rivers. Rights may be allowed to move up the Okanogan River from the Wells Pool roughly 12 miles that is determined to be backflow from the Columbia River.²¹ So while the right is listed as being in the Okanogan River, it is still considered to be pulling from the Columbia River via backflow.

Figure 4: Volume of Transfer by Type

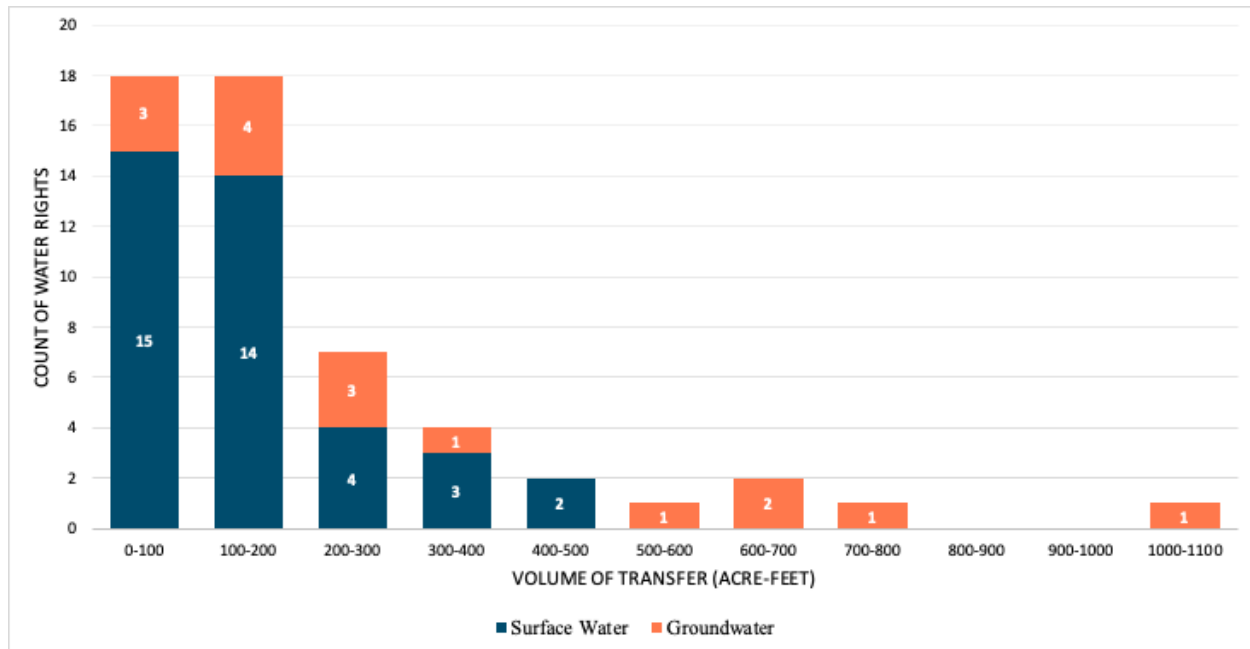


Figure 4 shows the count of transfers of both surface water and groundwater broken out by volume.

Two thirds of the transfers in our data query are for volumes of water under 200 acre-feet per year. The larger volume transfers in our data, over 500 acre-feet, are all groundwater transfers. Groundwater transfers have a larger spread of volumes, while surface transfers represent more than double the number of transfers but with lower volumes of water. Surface water rights account for 38 transfers representing 5,637 acre-feet of water while groundwater rights account for 16 transfers representing 5,545 acre-feet of water. While rights are split into groundwater and surface water rights, hydrologically speaking many of the groundwater rights pull from aquifers that are interconnected with nearby surface waters.

7.4. Transfer Distance

We calculated overland miles from available estimated points of diversion in the WRTS database. Because WRTS does not report the exact coordinates of water withdrawal or diversion

²¹ Personal communication with Ecology.

for each right, we are unable to report transfer distances in stream miles. Stream miles traveled will always be equal to or greater than the overland distance of a transfer, but exact stream miles cannot be derived from the overland distance. While overland distance may indicate how far rights travel from their communities of origin, this measurement is less meaningful for gauging potential ecosystem impacts.

Figure 5: Count of Water Rights Transfers by Overland Distance

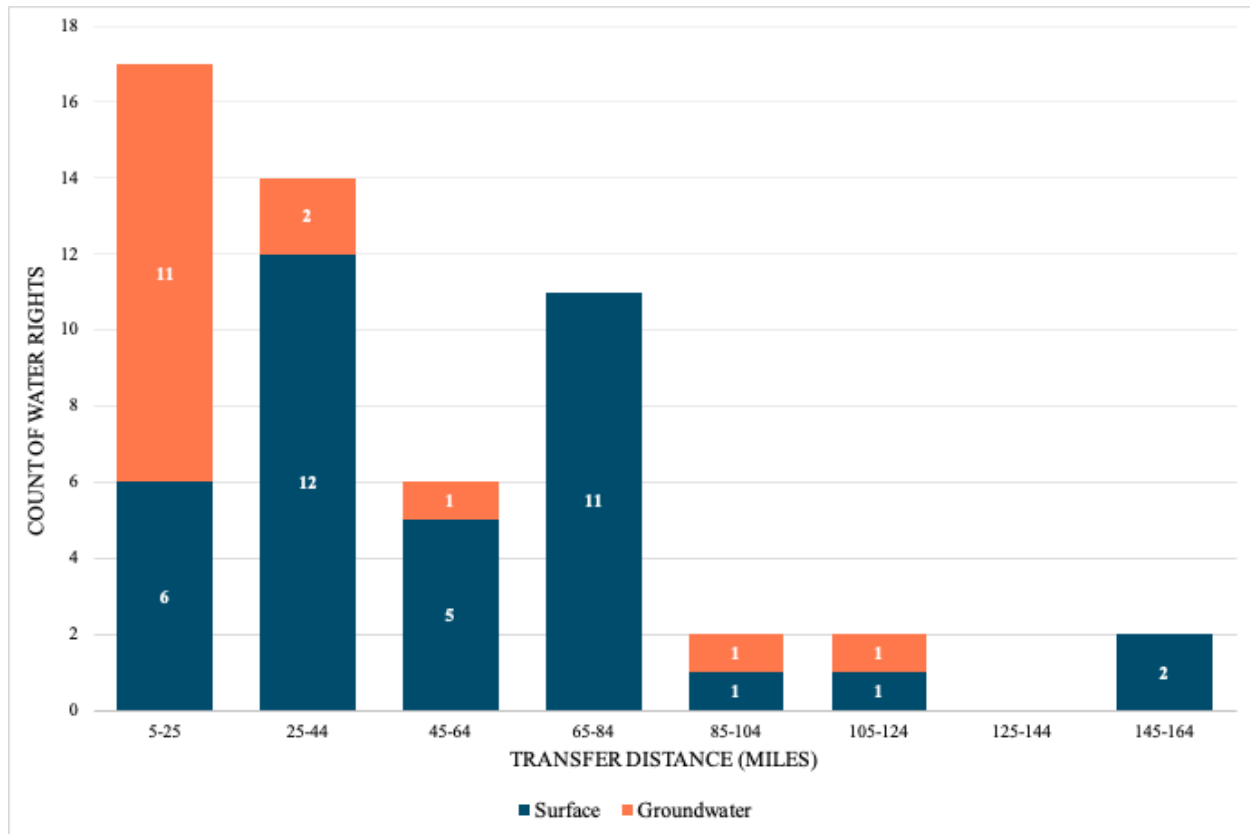


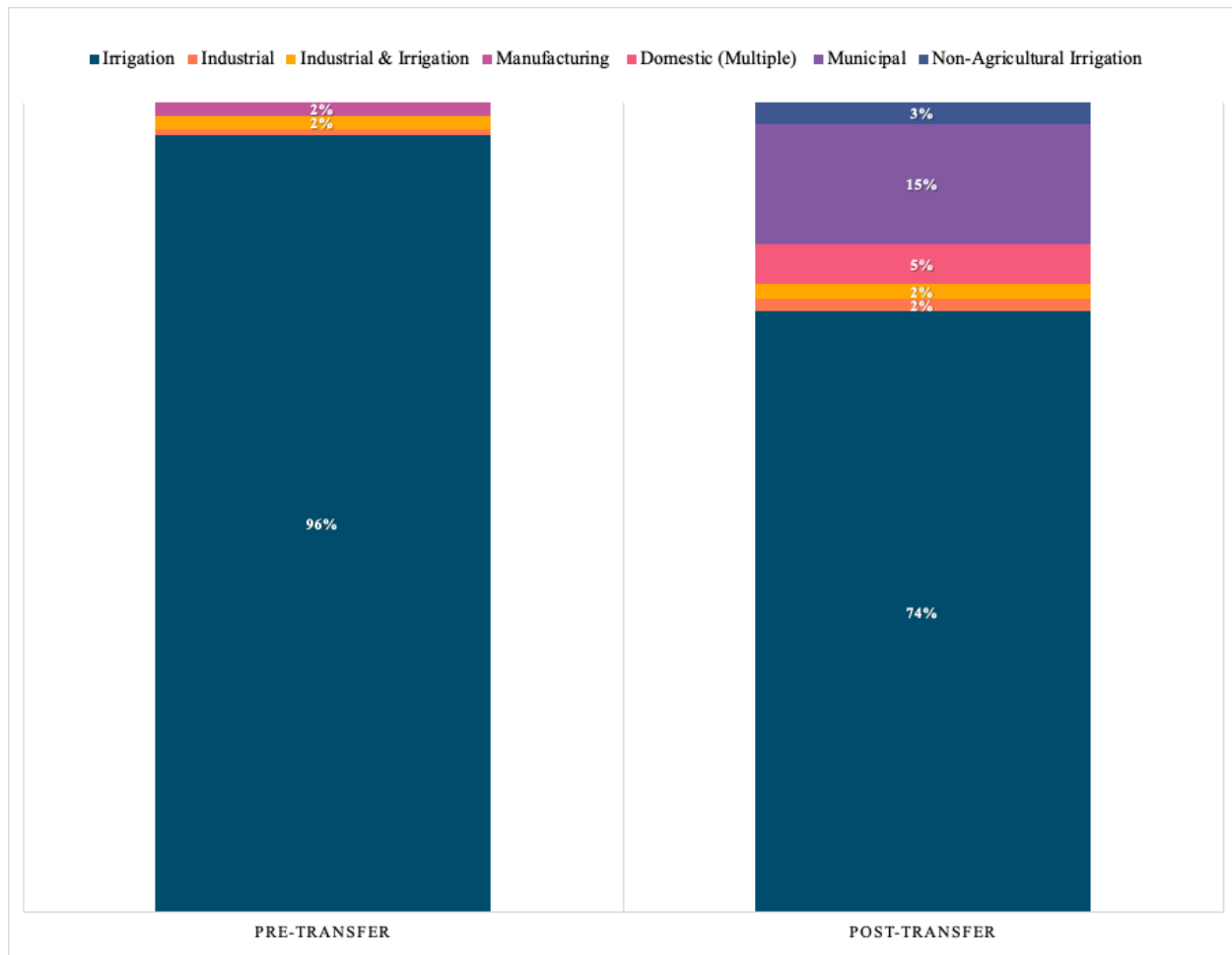
Figure 5 displays the number of surface and groundwater rights transferred by distance.

As Figure 5 demonstrates, few transfers in our dataset traveled more than 85 overland miles. The majority (57%) of out-of-basin groundwater right transfers moved 5 to 45 miles. This reflects the requirement for a groundwater right to pull from the same body of groundwater that it is transferred from. Surface water rights do not share this legal restriction allowing them to move an unlimited distance downstream. The economic, social, and environmental impact of transfer distance on communities depends on a variety of local factors. However, it is generally assumed that the further downstream a water right moves, the greater the environmental benefit as streamflow will presumably increase between the old and new points of diversion.

7.5. Changes in Purpose of Use and Transfer Trends Over Time

Changes in water rights' purpose of use after a transfer may offer insight into shifting community and economic dynamics. As seen in Table 2 below, the majority of water transfers (51 out of 54) in our data were initially used for irrigation. Of those 51 rights, 39 (76%) retained their original irrigation purpose. 14 out of 54 transfers (26%) resulted in a change of use. Four rights in our data set were transferred from irrigation to municipal use and another five changed from irrigation to domestic use. In addition, three rights changed from irrigation to non-agricultural irrigation uses.²² No water rights changed from some other use types to an irrigation use.

Figure 6: Transfer By Use



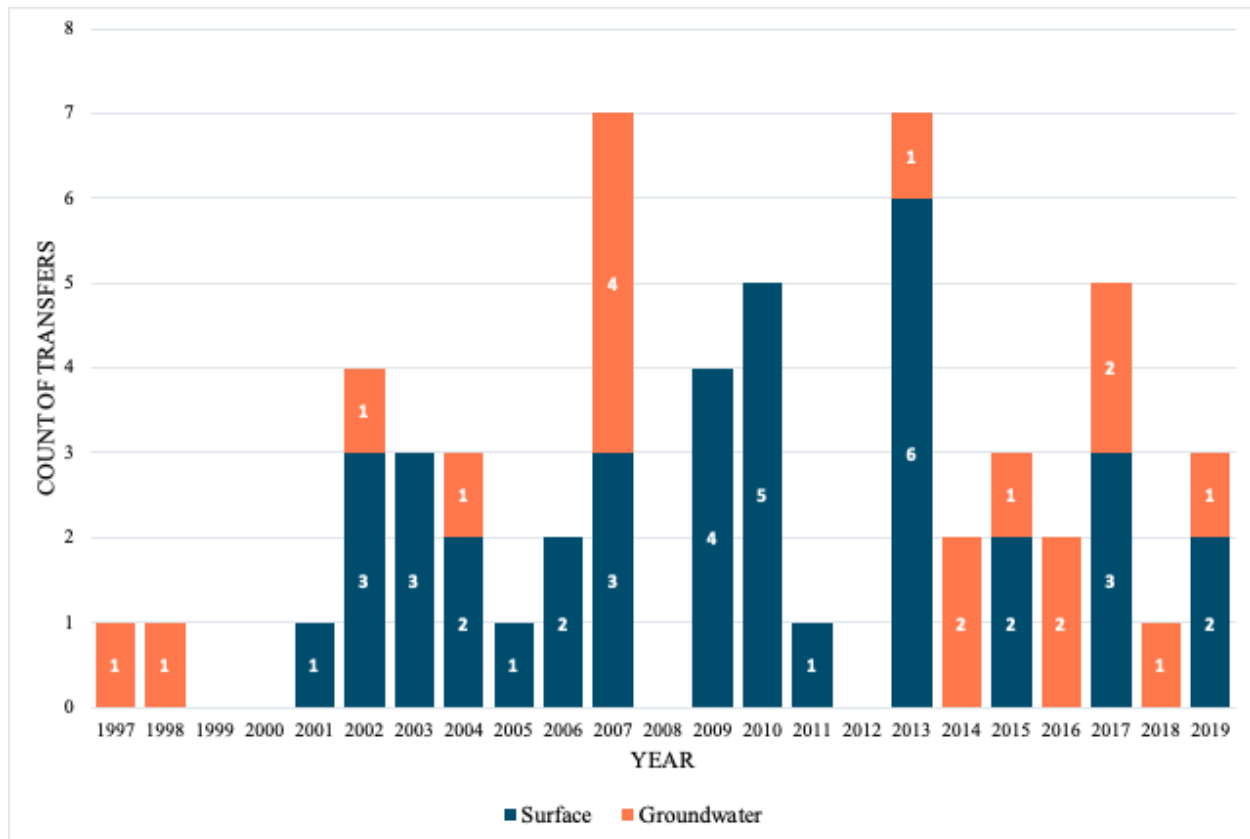
This figure shows the breakdown of pre-transfer and post-transfer uses of water rights broken into seven primary use categories. Percentages have been rounded to the nearest whole number so total percentages don't add up to 100%. Non-agricultural irrigation uses include landscaping of properties or golf courses.

²² Irrigation in this report refers to agricultural irrigation. Non-agricultural irrigation refers to irrigation used for landscaping purposes.

In addition to analyzing the types and locations of water rights transfers, we also looked for trends in the timing of transfers. Specifically, we were interested in whether the rate of out-of-basin transfers has increased over time. Figure 5 shows the number of out-of-basin surface and groundwater transfers (that moved more than 5 overland miles) by year.

The year of transfer is based on an application's initial filing date with Ecology. Due to the length of time that can pass between application submission and finalization of a transfer, exact years can be difficult to establish.

Figure 7. Number of Out-of-Basin Ground and Surface Water Right Transfers by Year



This chart shows the number of out-of-basin water rights transfers (transfers that changed WRIA and moved over 5 miles) by year. Surface water rights are depicted using blue bars and groundwater rights are depicted using orange bars.

Applications for out-of-basin surface water rights transfers generally increased between 2001 and 2013. After a peak in these applications in 2013 (in which 6 rights moved more than five land miles into another WRIA) the number of surface water applications decreased somewhat between 2014 and 2019. Applications for out-of-basin groundwater rights transfers were submitted relatively less frequently than applications for out-of-basin surface water rights transfers between 1997 and 2013. However, thereafter these applications were made with about the same frequency as surface water transfer applications.

Taken together, the total number of out-of-basin surface and groundwater rights transfer applications submitted between 2014 and 2019 is similar to the total number of out-of-basin applications for surface water rights transfers between 2008 and 2013. In general, more transfer applications were submitted between 2009 and 2018 than the prior decade (31 versus 21).

7.6. By County

7.6.1. Overview

Only rights that changed WRIA were included in this report. A portion of those also changed county. 43 total rights moved more than 5 (overland) miles as well as from one WRIA and county to another. Of those, 34 were surface rights and 9 were groundwater rights. The surface water rights account for 4,869.36 acre-feet of water and groundwater rights account for 3,911.05 acre-feet of water being moved. We have selected several counties from the data to look at in more detail.²³

7.6.2. Stevens County Findings

In our data, we see that 9 rights and 1,265 acre-feet of water (all surface water rights) moved out of Stevens County. No new rights moved into the county. The three counties that received the rights leaving Stevens are Douglas with 1 right of 67 acre-feet of water, Lincoln with 1 right of 87 acre-feet of water, and Okanogan with 7 rights totaling 1,111 acre-feet of water. All rights leaving Stevens County had a pre-transfer use of irrigation.

7.6.3. Stevens County Analysis

Due to its geographic position, Stevens County is largely a headwaters county for Washington State. A number of rivers either get their start in Stevens County, or flow into it from Canada (including the Columbia). It is therefore not surprising that Stevens County sees transfers moving more water out of the county than into it. As highlighted in Case Study 7.5.7 *The Regional Player*, these transfers can have a positive near term economic impact by allowing owners to sell rights that are no longer needed, while not necessarily changing the underlying land use.²⁴ These transfers also provide potential environmental benefit through increased instream flow as they enable water to move further downstream.

For example, one of the rights leaving Stevens County had an original point of diversion on the North Fork Chewelah Creek. The new point of diversion is from the Columbia River in

²³ Counties of interest were selected based on consultation with Ecology staff.

²⁴ The seller in this case was a ranching operation that had used the water to irrigate pasture. It is unclear from available documents what changes the original ranch made to reduce the need for this water, but the ranch is still in operation and continues to run cattle in the original point of diversion area.

Okanogan County. This water now provides instream flow benefits from its original point of diversion down the North Fork Chewelah Creek through the Chewelah Creek through the Colville River and into the Columbia River up until the new point of diversion.

7.6.4. Okanogan County Findings

Okanogan County has the distinction of being the most active county in our dataset with 20 total transfers in and out of the county (including 19 surface water rights). 11 rights were transferred out of Okanogan County and 9 rights were transferred in, resulting in a net loss of 186.2 acre-feet of water. Rights that moved out of Okanogan County moved to Benton County (2), Douglas County (7), Franklin County (1), and Kittitas County (1). Rights transferred into Okanogan County came from Ferry County (1), Lincoln County (1), and Stevens County (7). All of the rights moving out of Okanogan County were irrigation rights. The rights moving into Okanogan County were all for irrigation or non-agricultural irrigation.²⁵

7.6.5. Okanogan County Analysis

Okanogan is a prime example of the potential costs and benefits of out-of-basin water transfers and their trends revealing a complex story.

Okanogan County is seeing a modest number of out of county, out-of-basin transfers. All of the movement into and out of Okanogan is along the Okanogan River and the Columbia River as seen in the table of water bodies (see Appendix C, Table 8). From these records, there does not appear to be a large-scale movement of rights out of a localized area. The movement of rights from Okanogan County is largely balanced by the gaining of rights that have moved into the county. The transfers also provide instream flow benefits to the water bodies they have been moved down, with the rights that Okanogan is inheriting also representing beneficial instream flow within the county and WRIA 49 up to their new points of diversion.

Including surface water and groundwater rights, the total amount of water available for out-of-stream use decreased in Okanogan County. However, when looking only at surface water, the share of acre-feet available for use in the County increased. Overall, these transfers likely increased streamflows within the County's boundaries, as water previously diverted in Okanogan now remains instream until its new point of diversion downstream and water transferred into the county will remain in stream until its new, Okanogan point of diversion.

7.6.6. Chelan County Findings

Chelan County had 8 total transfers in and out of the county (7 of which were surface water rights). Six rights, totaling 461.5 acre-feet per year moved out of Chelan County while 2 rights,

²⁵ Irrigation in this report refers to agricultural irrigation. Non-agricultural irrigation refers to irrigation used for landscaping purposes.

totaling 1,095.5 acre-feet per year moved in. This resulted in a net gain of 634 acre-feet per year. Rights transferred out of Chelan County moved to Douglas County (4), Grant County (1), and Kittitas County (1). Chelan County gained 2 rights from Douglas County. Both rights coming into Chelan County were originally used for irrigation and all rights transferred out of Chelan County were also for irrigation.

7.6.7. Chelan County Analysis

Chelan County experiences similarities with Okanogan County. While losing some rights and volume of water, it also added rights, resulting in a net volumetric gain. One unique element of Chelan County is that of the six rights leaving the county, four resulted in a change of use from irrigation to either domestic or municipal use.

7.6.8. Kittitas County Findings

Based on our study criteria, Kittitas County represents a low activity county for out-of-basin-transfers compared with other Central Washington counties. Only two rights, both surface water, moved in or out of the county for a net gain of 89.8 acre-feet per year. Kittitas County gained rights from Okanogan County (1) and Chelan County (1).

7.6.9. Kittitas County Analysis

Kittitas County stands in juxtaposition to neighboring counties in our analysis. Kittitas shares many broad geographic and economic similarities with neighboring counties that had a much larger level of water rights movement in our data. There are a number of potential explanations. Kittitas County may have a more developed water market that successfully connects local buyers and sellers before out-of-area buyers have an opportunity to put an offer in. Additionally, Kittitas County may have more local buyers ready and able to make a purchase when new land and rights enter the market, or it may have fewer rights going up for sale. Another potential explanation is that Kittitas County has the most water banking in the state, allowing interested parties to purchase and sell water rights locally.²⁶ Many factors may influence county-specific water rights transfer trends. Unfortunately, this report is not able to say for certain why different counties see such strong differences in total number of out-of-basin transfers.

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<https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-rights/Trust-water-rights/Water-banks/Tracking-water-banks>

Chapter 8

Case Studies

8. Case Study Assessments

Based on the qualitative and quantitative analyses, this section presents a series of case studies pulled from the 54 out-of-basin transfers offering an in-depth exploration of a few out-of-basin water rights transactions. Case studies present interesting examples of real-world occurrences. While findings from these case studies cannot be generalized to all Washington State water transactions as a whole, they offer a glimpse of the types and motivations of some water rights transactions. They are intended to showcase specific scenarios of water transfers that are reflective, but not necessarily indicative, of broad trends.

The following case studies were compiled from publicly available documents including the Department of Ecology Water Records Database, the Washington State Digital Archives, and newspaper coverage. No persons involved in these transactions were either willing or able to discuss the details of the transactions with us.

8.1. The Long-Distance Move

As seen in the quantitative data, some water rights are transferred over very long distances. When rights travel long distances, it may be less likely the buyers and sellers were previously connected, but qualitative stakeholder feedback suggests that most transfers occur through word-of-mouth networks. The following case provides an example of a long-distance move and how some connections might be made between buyers and sellers.

This case involves two rights sold to one buyer from one seller, to be moved at the same time and manner. A small-scale Okanogan County orchardist sold two surface water rights to a larger vineyard operation based in Kennewick in Benton County. The vineyard bought both the water rights and orchard property before submitting a transfer request to move the points of diversion and use downstream. The rights involved are surface water rights for irrigation of a combined 230 acre-feet per year that were previously used on the single, 58 acre orchard. In total, 174 of the original acre-feet per year were moved. A portion of each right was placed in the Trust Water Right Program to support instream flows. After moving the rights to Benton County, the new owner leased a portion of the rights to nearby (also Benton County) agricultural enterprises consistently over several years. Although the vineyard purchased the land originally associated with the water rights, we were not able to verify what happened to the property after the water rights were transferred.

The rights were secured by the vineyard before the change application was filed and were secured with the intent to move them. This suggests the buyer had reason to believe that there would be little to no risk of denial in the change application process (i.e., that the full water rights had been put to continual beneficial use and the proposed transfer would not impair any existing water users).

The seller had prior business dealings and potential investments in vineyards in Benton County over multiple years before this sale, indicating prior personal and professional connections with the location of the buyer. It is possible the seller learned of the Kennewick opportunity through previous dealings in the area.

8.2. The Contingent Deal/The Family Trust

Multiple records reviewed reveal that water transfers are sometimes contingent on a successful change application being processed. The applicant for a water change of point of diversion and change of place of use will not be the owner of either the land the right is currently connected to, nor the right itself. The change application is submitted first, and only after a successful approval is the water sold to the prospective buyer.

In 2009, a surface water right was moved from Okanogan County to Douglas County. The original right of 100 acre-feet per year, pulled from the Okanogan River, was changed to a 78.1 acre-feet per year groundwater right pulling from wells along the Columbia River, approximately 50 miles downstream.

The original right was part of a family-owned property that changed agricultural production focus over the years. For close to 30 years, the water right was used to grow apples. The apple trees were removed roughly 7 years before the transfer due to poor market conditions and the land was turned over to cattle grazing with the rights being maintained through irrigating pasture. The right had not been put to use for several years before the transfer. To ensure that the right would not lapse, the seller pre-emptively tilled up the land in preparation for planting if the sale did not go through, despite the land being idle for the prior several years and having no long-term plans to begin grazing again.

At the time of the transfer, the land and the water right were held in the seller's family trust. After the change, the right was still designated for irrigation use.

8.3. The Retirement Plan

While some longer distance transfers seem to unfold through chance connections between buyer and seller, others appear to be more intentional. As described by several interviewees, many water rights holders recognize the value of their rights and depend on selling them as a key

component of their retirement plan. However, the success of this strategy depends on the seller's ability to properly gauge the market rate for their right and to find a willing buyer.

One example comes from a well in Okanogan County providing approximately 160 acre-feet per year for irrigation. The owners of this right intended to sell it as part of their retirement. These owners were not currently farming themselves and had professional experience in real estate and business contacts across multiple counties. When transferring their right, they found an interested buyer in a housing development in Douglas County. At the time of change, the right was in Okanogan County, the firm in current ownership of the right was in Chelan County, and the right was sold to a buyer in Douglas County.

The initial change application attempted to change both the place and type of use (from irrigation to municipal). Through a great deal of back and forth between the applicant and Ecology, the right was initially transferred as an irrigation right, but with the immediate intention of filing for a change to municipal use in support of the real estate development.

8.4. The Phantom Transfer

While talking to stakeholders, we had multiple encounters where a stakeholder shared a particularly noteworthy transfer that had occurred and were sure would be included in this report. These cases were not first-hand accounts. The notoriety of these different cases came from their size and an understanding that they represented a typically long distance, out-of-area move initiated by investment firms and/or out-of-area interests. When looking into several of these cases and being unable to find a corresponding change, the stakeholder who had raised it was asked to check their information and clarify which transfer they were referring to. In several instances, the transfer had occurred, but not in the way the stakeholder had initially understood (i.e., it had not travelled out-of-basin or was for a smaller volume of water than the stakeholder thought, etc.). This case is included to emphasize that without a clear and easy system of reference, and a heavy reliance on informal information networks, individuals participating in Washington's water market system are often left to gather information from neighbors, peers, and other unofficial sources. This method of communication can allow incorrect information to penetrate deep into a locality's psyche while missing larger trends revealed in the data.

8.5. The Regional Player

Records show multiple out-of-basin transfers have the same buyer. There are three buyers that each account for three or more transfers in our dataset. These buyers show a level of regional scale in their business interests that set them apart from other, small-scale operations. Stakeholder interviews revealed concern with the effect of regional conglomeration in agricultural enterprises. Other stakeholders saw this as a healthy sign of a free market where willing sellers with excess water rights are able to sell, and growing businesses are able to secure additional rights needed to expand their enterprises.

One such regional player accounts for more than five of the 54 transfers included in this study. One example of a transfer of theirs is as follows. A right originally diverted from an unnamed stream in Stevens County that flows into the Colville River was moved to a point of diversion on the Okanogan River in Okanogan County.²⁷ The original water right was used for irrigation of crops like alfalfa and wheat and also pasture. Roughly a decade before this sale, the right was obtained by a larger ranching operation from the estate of the prior owner. The new owner used the water entirely to support pasture for cattle grazing. The full use from this unnamed stream was transferred to the new point of diversion on the Okanogan River to continue use for irrigation.

The right transferred was a relatively senior right with a priority date of 1970. Between 1977 and 2013 the Colville River dropped below minimum instream flow level eight times. There are approximately 24 water rights holders on the Colville River that have more junior rights and are interruptible by low flow conditions below the point of convergence between the unnamed stream and the Colville River. These rights holders are required to reduce their use until flow levels meet the minimum established under the River's instream flow rule. It was included in the change application supporting documents that this move would be of benefit to these more junior water right holders with the roughly 350 acre-feet per year of the right staying in the unnamed tributary and flow through the Colville River. The Colville River has an average discharge rate of 576 cubic feet per second.²⁸ The right is allowed to pull 1 cubic foot per second so is unlikely to have a dramatic effect on the overall flow of the Colville River.

The new use of the water is for irrigation of an orchard. It is unclear from available documents what changes the original ranch made to reduce the need for this water, but the ranch is still in operation and continues to run cattle in the original point of diversion area.

²⁷ The point of diversion is listed as the Okanogan River, but is specifically part of the Wells Pool and is considered backflow of the Columbia River up into the Okanogan River.

²⁸ <https://waterdata.usgs.gov/wa/nwis/current/?type=flow>

CHAPTER 9

Discussion

9. Discussion

9.1. Interpretation of Results

The purpose of this report is to understand potential economic, social, and environmental effects of out-of-basin water rights transfers in Washington State and to provide insight into how current market systems are working and where there are opportunities to improve water management in Washington State.

As noted in our literature review, studies analyzing the economic, social, and environmental impacts of water rights transfers are thin. Much of the research that does exist comes from outside the American context and has unclear applicability. There is evidence that market transactions can increase flexibility and fairness of water allocation compared to other tools (Howe, Schurmeier, and Shaw, 1986). However, where transfers out of a locality happen in high concentration or are moved from taxable to non-taxable uses in the case of municipal purchases, there can be noticeable reductions in the county tax base (Nunn and Ingram, 1988). There is also evidence that rural communities can be harmed if transfers lead to reductions in local agriculture and jobs (National Research Council, 1992). There is mixed evidence of whether agricultural to urban reallocation in the western United States poses a unique problem (Chong & Sundling, 2006).

It is not clear from this report that out-of-basin transfers have posed a uniquely significant challenge for water management in Washington State. Between 1997 and 2019, there were 54 out-of-basin transfers in Washington State constituting 11,182 annual acre-feet of water. These transfers represent less than 0.3% of the total annual volume of water used in Washington State. The 54 transfers represent 1.5% of the total records that indicate a change of place of use in the Ecology database, implying that the majority of water rights transfers in Washington State occur within basins. While our data indicate a slight increase in out-of-basin transfers in the past decade as compared to the decade prior, the average rate of annual transfers only increased from a rate of about 2 out-of-basin transfers per year to about 3 out-of-basin transfers per year. The average volume of water represented by these transfers is 207 acre-feet per year. Further, 72% of out-of-basin transfers, representing 74% of the volume of water transferred, begin and end in irrigation (i.e., less than 30% of transfers result in a change of use). While there are trends in which counties and WRIsAs tend to be gaining or losing rights through out-of-basin transfers, the total amounts within those WRIsAs and counties are relatively small and spread out over time and

geography. However, there are important limitations to the data and this analysis that are described in detail in Section 10 below.

9.2. Implications

There are counties, including Stevens County and Lincoln County, that see a clear trend of out-of-basin transfers. While the total numbers reflected in the data are low, the differences that geography plays in the experience of a community are clear—headwater and upstream communities will always see more rights moving out of their area than in. At the local level, this was a concern heard in our qualitative interviews: where rights are moved out of headwaters, small streams, and local communities, there is belief that those areas are small enough to feel the effects, whether in terms of negative economic loss or positive environmental stream flows.

Without environmental or economic data specifically tied to these very local geographies, this report is not able to gauge those potential localized effects. It should be noted that in cases where such an effect is felt by a small number of transfers or volume of water, these effects would likely not be limited to out-of-basin transfers. A small stream that sees a measurable environmental impact from increased flows due to an out-of-basin transfer would likely see impact from an in-basin transfer as well. Similarly, a rural community dependent on an agricultural base that feels the impact of a single transfer might experience the same impact even if the right stays in-basin and in-county but moves to a different community 20 miles away. Because out-of-basin transfers are not the only transfers that might be affecting local communities, a full accounting of community impact would require a broader scope of inquiry into in-basin transfers and the Trust Water Rights Program.

In our qualitative interviews, interviewees generally expressed positive views on water markets, though several noted concern over disparate impacts from those markets. Interviewees were specifically concerned with the economic futures of headwater and some rural agricultural communities that may not be able to compete for expensive water rights with downstream purchasers. Interviewees also pointed to a lack of understanding of water rights and water markets in the general public, and their own lack of information around transfers and trends as problematic.

While the Ecology website provides easy access to their records database and basic information on water law and rights, there are no readily available public summaries of water rights transfers that can fill in information gaps among both professionals and the general public. The lack of a common reference for rights transfers appears to contribute to disagreement and confusion over basic facts of what is happening on-the-ground. This is further confused by limited information on water rights sales and purchases that do not (or have not yet) result(ed) in a change application. These information gaps and general lack of clarity appear to contribute to people connecting their experiences with their perceptions of water rights transfers whether those

perceptions match the data or not. These information gaps can make it difficult for communities and policy-makers to know how best to address water rights concerns or if the data supports cause for concern.

This study represents a first step toward investigating trends in out-of-basin transfers across Washington State. While this analysis of Ecology's water rights transfer data and synthesis of stakeholder interviews can help frame future research, significant additional research is necessary to understand the environmental, economic, and social effects of water rights transfers on communities throughout the state. The limitations of our research and important areas of additional inquiry are discussed in the following chapters.

CHAPTER 10

Limitations

10. Limitations

While this analysis reveals key trends and stakeholder concerns related to out-of-basin water rights transfers in Washington State, it is not able to determine the specific economic, environmental, or social impact of these or potential future transfers. This chapter explores the various study limitations we faced and how they impacted the findings and analysis.

10.1. Other Transfer Types

This report only looks at direct, out-of-basin transfers. It does not capture in-basin transfer activity or transfer activity occurring through water banking.

10.2. Asymmetries between Water Rights Records and Actual Use

Real-time monitoring and enforcement of water use is limited and varies across the state. Our analysis is based on Ecology's water rights records (including several inactive rights) and qualitative interviews; as a result we cannot confirm that current on-the-ground water usage aligns perfectly with records.

10.3. Ecology Data

Our data collection and synthesis process revealed several errors (miskeys, duplicate records etc.) in Ecology's database. While we worked closely with Ecology staff to clean-up and clarify specific records, it is possible that some unintended errors remain and that some rights that should have been included in this analysis were not included.

10.4. Economic Indicators

Ecology's data do not include information on water rights ownership changes (that do not otherwise alter the use of the right), nor do they capture economic value(s) of the transfers. Discussed in Appendix D (12.9), we looked for other sources of data on ownership and the sale of water rights at county offices—including assessors, auditors, and records departments—to fill these gaps. However, data on ownership transfers was not feasibly available, or collected, by most counties. The few counties, such as Skagit County,²⁹ that do keep water rights specific records have that data stored in systems set up as online searchable repositories of scanned pdf documents. These systems do not allow for pulling datasets that would facilitate analysis. Understanding trends in water right transfers and their potential environmental, economic, and

²⁹ <https://skagitcounty.net/Search/Recording/Results.aspx>

social effects requires an accounting of these sales, even when they do not immediately result in a change application. Although we reached out to all counties, many indicated that these data are not readily available, thus we were unable to gather sales data to assess the economic value of water rights.

10.5. Environmental Valuation of Water Rights

This report does not assess environmental or ecological valuation of water rights transfers. While downstream transfers are generally thought to have a positive environmental impact by increasing instream flows, without additional valuation data and analysis we cannot determine the relative magnitude of such positive externalities and whether they are offset by any associated negative externalities. However, hedonic methods were not used to evaluate the costs and benefits of instream flow and ecosystem services associated with water rights transfers. Furthermore, the multiple pressures on local instream flows (e.g., climate change, changes in land-use or land cover, etc.), which may have additive or inhibiting effects on stream flows, were not evaluated in this report.

10.6. Distributional Effects

While our stakeholder interviews alluded to some of the distributional impacts of out-of-basin water rights transfers, we were not able to collect localized environmental and economic data to rigorously explore these impacts. Our analyses address temporal and spatial impacts at only a high level.

10.7. Tribal Governance Considerations

Our stakeholder interviews have a paucity of tribal perspectives. There are 29 federally recognized tribes in Washington State, each of which retains customary water rights that pre-date Washington Statehood. Although we were able to interview a few tribal government employees from three different tribes, their input and opinions may not be indicative of tribal perspectives. Given general stakeholder concern about the distribution of both positive and negative externalities borne by local communities, future analysis should consider the explicit economic, environmental, and social impact of water rights transfers on Indigenous nations and communities across Washington State.

10.8. Seller/Buyer First Hand Accounts

Qualitative interviews of buyers and sellers of out-of-basin transfers would help provide important context around motivations and incentives that exist around out-of-basin transfers. Our report was not able to provide these direct interviews. Ecology data was used to identify individual buyers and sellers of water rights involved in a transfer to attempt to follow up with and interview these stakeholders to inform our qualitative investigation and to provide greater context for case studies. Despite multiple attempts to cold call a list of actors within these

transactions, we were unsuccessful at reaching people who were interested in speaking to us. We frequently encountered disconnected phone numbers, and in the few instances where we succeeded in finding valid phone numbers for our contacts of interest, our calls were either rejected or blocked. Qualitative interviewees were also asked to provide water transfer buyers or sellers, and all were unable or unwilling to do so.

10.9. COVID-19 Barriers

Significant to this report, as with many other facets of life, 2020-2021 has been an unprecedented time with COVID-19. Interviews are skewed by availability and willingness of individuals to participate. The individuals we interviewed do not make up a representative sample of all of the actors within the water rights market—in particular, we lack the perspectives of individual water rights holders in our qualitative analysis. In addition, we were unable to visit the communities where out-of-basin transfers are occurring due to the COVID-19 pandemic, which prevented us from connecting with important stakeholder groups. Engaging a wider array of stakeholders in our qualitative interviews would have allowed for a richer understanding of local perspectives on out-of-basin transfers and their associated impacts.

CHAPTER 11

Areas of Inquiry & Recommendations

11. Areas of Inquiry & Recommendations

Much of our experience, research, and analyses for this report have revealed opportunities for future areas of inquiries and additional steps that could address limitations, barriers, and gaps that we came across.

11.1. For Further Study

There are significant areas of study that can address the aforementioned gaps in this report. We highlight a few below, in no particular order:

- 1. Ecosystem Service Evaluation:** This report did not evaluate the impacts of increased streamflows between the original and new downstream point of diversion to functionality of aquatic ecosystems. For analysis purposes, the complex links between developmental pressures and the ecological response(s) of water systems should be considered.
- 2. Water Banks:** This report did not include a study of water banking and its effect(s) on out-of-basin transfers. Water banks may serve out-of-basin water-use needs or may serve as a substitute market for sellers who would otherwise look for out-of-basin buyers, and merit study.
- 3. Evaluation of Public Interest Criteria for Change Applications:** Neighboring states, including Idaho include several criteria on water right change evaluations for community effects to address local concerns. Qualitative feedback from this report suggests value in Washington State exploring the potential costs and benefits of including similar criteria in the water right change application process.
- 4. Economic & Social Attributes:** This report did not develop analyses on transaction costs, ownership characteristics, and land or property related qualities. These need to be systematically accounted for when estimating the market value of water supplies and evaluating the economic and social impacts of water right transfers and should be considered in future research.
- 5. In-Basin Transaction:** This report is a small sample of total water right transfers and water allocation, and place/purpose of use. Local communities may also be affected by in-basin transfers warranting further investigation.

11.2. Recommendations for Process Improvement

Along with areas of further study, there are process improvements that could help Ecology better assess current and future trends in water rights transfers. These steps include:

- Centralizing water rights information - A current limitation for Ecology in providing reports on water right trends is the lack of available, readily accessible data on water right sales that occur outside the Ecology change application process. Centralizing this information with access for Ecology would improve information disclosure and enhance market functions and stakeholder participation.
- Updating the Ecology database system - Analyzing Ecology records for broad trends proved difficult and time consuming as it is primarily set up to be a records keeping system. Once records were queried and filtered, each record had to be checked with associated scanned pdfs to verify information. For Ecology to carry out future studies, track in real time, or provide reports on trends, consideration should be given to updating the Ecology database system.
- Requiring ownership updates tracking - Idaho requires water right ownership changes to be submitted to their Water Resources Department even if no other changes to the right are being made. Currently, Ecology is not able to track ownership-only changes. Allowing Ecology to track ownership changes would allow greater ability to understand trends in water right transfers and remove dependence on external sources of information.

We do not indicate a prioritization in the implementation of these process improvements and suggest that further evaluation be conducted to pursue and assess the relevant, and pertinent, research opportunities.

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Appendices

Appendix A: Washington Water Resource Inventory Areas

Table 3. List of Washington State WRIAs by Number and Name

WRIAs 1-22	WRIAs 23-44	WRIAs 45-62
1 Nooksack	23 Upper Chehalis	45 Wenatchee
2 San Juan	24 Willapa	46 Entiat
3 Lower Skagit	25 Grays-Elochoman	47 Chelan
4 Upper Skagit	26 Cowlitz	48 Methow
5 Stillaguamish	27 Lewis	49 Okanogan
6 Island	28 Salmon-Washougal	50 Foster
7 Snohomish	29 Wind-White Salmon	51 Nespelem
8 Cedar/Sammamish	30 Klickitat	52 Sanpoil
9 Duwamish-Green	31 Rock-Glade	53 Lower Lake Roosevelt
10 Puyallup-White	32 Walla Walla	54 Lower Spokane
11 Nisqually	33 Lower Snake	55 Little Spokane
12 Chambers-Clover	34 Palouse	56 Hangman
13 Deschutes	35 Middle Snake	57 Middle Spokane
14 Kennedy-Goldsborough	36 Esquatzel-Coulee	58 Middle Lake Roosevelt
15 Kitsap	37 Lower Yakima	59 Colville
16 Skokomish-Dosewallips	38 Naches	60 Kettle
17 Quilcene-Snow	39 Upper Yakima	61 Upper Lake Roosevelt
18 Elwha-Dungeness	40 Alkali-Squilchuck	62 Pend Oreille
19 Lyre-Hoko	41 Lower Crab	
20 Soleduc-Hoh	42 Grand Coulee	
21 Queets-Quinault	43 Upper Crab	
22 Lower Chehalis	44 Moses Coulee	

Table adapted from: <https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-availability/In-your-watershed>.

Appendices

Appendix B: Interview Protocol & Questions

Interview Protocol

To achieve the goals of collecting both quantitative and qualitative information, and to engage in discovery of the secondary and tertiary effects of water rights transfers, the following protocols will be used:

- Ask for and set 30-45 minutes interviews.
 - Propose follow-up.
- Schedule 2 interviewers per meeting.
- Conduct background research and decide line(s) of questioning.
- Lead with context setting, followed by alternating questions from interviewers.
- Clean and prepare notes immediately after the interview.
- Codify answer groups.

Responses

Interviewee responses will be anonymized and synthesized.

Project & Data Assumptions/Considerations

To draw cursory conclusions from the review of literature, data, and interviews it is important that eminent questions are considered. The following should be addressed in developing results from any and all analyses:

Interview Questions

Key Questions:

- How do you see water right transactions (buying, selling, and leasing) impacting communities across the state? Or your community specifically?
 - Concerns? Benefits?
- What economic, environmental, and/or social impacts have you observed?
 - Concerns? Benefits?
- In your opinion, is information about water availability, valuation, markets, and regulation sufficiently available?
 - What resources do you frequent/use?

Administrative officials (county and/or state):

- Project Compliance: Do you feel the current transaction review and compliance system is adequate?

- Flow Accounting: How well known (accounted for) is your community's current water supply? What about predicted future water needs?

If speaking with researchers, think tanks, & the scientific community:

- Habitat Responses: What changes in flow-related habitat characteristics can be tracked and identified in protected stream reaches?
- Biological Communities: What changes in the biological community can be detected as a result of streamflow restoration? Stream flow changes?

If speaking with private water rights holders (or lawyers?):

- Have you participated in a water market in Washington State? Would you consider participating in a water market?
- How familiar are you with the water rights transaction process?
- Have you bought or sold a water right?
 - Value and type of water right?
 - Who/how many people were interested in the water rights?
 - Was your community (or other communities) involved in any way in this sale?
 - Do you feel you have good familiarity with buying/selling options?
 - What was your end choice, why?

Concluding Questions:

- What should we have asked you that we didn't?
- Who else would you recommend we speak to?
- Are there any water rights holders in Chelan, Kittitas, Okanogan, and/or Stevens County (or neighboring counties) that you can put us in touch with?

Appendices

Appendix C: Data Tables & Figures

Table 4. Change of Rights and Volume By County

County	Volume (Acre-Feet) Moved Into County	Rights Transferred Into County	Volume (Acre-Feet) Moved Out of County	Rights Transferred Out of County	Volume (Acre-Feet) Change In County	Net Rights
Adams	80	1	0	0	80	1
Benton	1,229.55	7	0	0	1,229.55	7
Chelan	1,095.5	2	-461.5	-6	634	-4
Douglas	1,983.25	14	-1,207.5	-3	775.75	11
Ferry	0	0	-204	-1	-204	-1
Franklin	1,659	3	-287	-2	1,372	1
Grant	1,084	4	0	0	1,084	4
Kittitas	89.8	2	0	0	89.8	2
Klickitat	0	0	-551	-2	-551	-2
Lincoln	86.66	1	-3,145.8	-9	-3,059.14	-8
Okanogan	1,472.65	9	-1,658.85	-11	-186.2	-2
Stevens	0	0	-1,264.76	-9	-1,264.76	-9
Total	8,780.41	43	-8,780.41	-43	0	0

Table 5. Change of Rights and Volume By WRIA

WRIA	Volume (Acre-Feet) Moved Into WRIA	Rights Transferred Into WRIA	Volume (Acre-Feet) Moved Out of WRIA	Rights Transferred Out of WRIA	Volume (Acre-Feet) Change In WRIA	Net Rights
Klickitat (30)	0	0	-929	-4	-929	-4
Rock-Glade (31)	1,607.55	9	0	0	1,607.55	9
Walla Walla (32)	0	0	-178.5	-1	-178.5	-1
Palouse (34)	0	0	-67.5	-1	-67.5	-1
Middle Snake (35)	178.5	1	0	0	178.5	1
Esquatzel-Coulee (36)	1,858	4	-287	-2	1,571	2
Alkali-Squilchuck (40)	1,185.3	4	0	0	1,185.3	4
Lower Crab (41)	1,091.5	8	-1,252	-2	-160.5	6
Grand Coulee (42)	922	2	-700	-1	222	1
Upper Crab (43)	700	1	-1,528	-4	-828	-3
Moses Coulee (44)	767.25	8	0	0	767.25	8
Wenatchee (45)	0	0	-100.5	-2	-100.5	-2
Entiat (46)	0	0	-311	-3	-311	-3
Chelan (47)	0	0	-50	-1	-50	-1
Okanogan (49)	1,021.6	5	-1,911.35	-12	-889.75	-7
Foster (50)	1,457.55	8	-1,207.5	-3	250.05	5
Sanpoil (52)	0	0	-320	-1	-320	-1
Lower Lake Roosevelt (53)	86.66	1	-405	-3	-318.34	-2
Lower Spokane (54)	169.1	2	-268.9	-2	-99.8	0
Little Spokane (55)	0	0	-60	-1	-60	-1
Middle Lake Roosevelt (58)	137	1	-86.66	-1	50.34	0
Colville (59)	0	0	-1,315.1	-9	-1,315.1	-9
Kettle (60)	0	0	-204	-1	-204	-1
Total	11,182.01	54	-11,182.01	-54	0	0

Table 6. Transfer Movement Between Counties

Post Transfer County	Pre-Transfer County	Volume (Acre-Feet) Transferred	Rights Transferred
Adams	Lincoln	80	1
	Total	80	1
Benton	Franklin	287	2
	Klickitat	551	2
	Lincoln	217.55	1
	Okanogan	174	2
	Total	1,229.55	7
Chelan	Douglas	1,095.5	2
	Total	1,095.5	2
Douglas	Chelan	361	4
	Lincoln	190	2
	Okanogan	1,365.55	7
	Stevens	66.7	1
	Total	1,983.25	14
Franklin	Lincoln	1,579	2
	Okanogan	80	1
	Total	1,659	3
Grant	Chelan	50	1
	Douglas	112	1
	Lincoln	922	2
	Total	1,084	4
Kittitas	Chelan	50.5	1
	Okanogan	39.3	1
	Total	89.8	2
Lincoln	Stevens	86.66	1
	Total	86.66	1
Okanogan	Ferry	204	1
	Lincoln	157.25	1
	Stevens	1,111.4	7
	Total	1,472.65	9

Grand Total		8,780.41	43
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Table 7. Transfer Movement Between WRIsAs

Post Transfer WRIA	Pre-Transfer WRIA	Volume (Acre-Feet) Moved	Rights Transferred
WRIA 31 Rock-Glade	Klickitat (30)	929	4
	Esquatzel-Coulee (36)	287	2
	Okanogan (49)	174	2
	Lower Lake Roosevelt (53)	217.55	1
	Total	1,607.55	9
WRIA 35 Middle Snake	Walla Walla (32)	178.5	1
	Total	178.5	1
WRIA 36 Esquatzel-Coulee	Lower Crab (41)	1,252	2
	Upper Crab (43)	526	1
	Okanogan (49)	80	1
	Total	1,858	4
WRIA 40 Alkali-Squillchuck	Wenatchee (45)	50.5	1
	Okanogan (49)	39.3	1
	Foster (50)	1,095.5	2
	Total	1,185.3	4
WRIA 41 Lower Crab	Palouse (34)	67.5	1
	Upper Crab (43)	80	1
	Entiat (46)	302	2
	Chelan (47)	50	1
	Okanogan (49)	160	1
	Foster (50)	112	1
	Sanpoil (52)	320	1
	Total	1,091.5	8
WRIA 42 Grand Coulee	Upper Crab (43)	922	2
	Total	922	2
WRIA 43 Upper Crab	Grand Coulee (42)	700	1
	Total	700	1
WRIA 44 Moses Coulee	Wenatchee (45)	50	1
	Entiat (46)	9	1
	Okanogan (49)	518.25	4
	Lower Lake Roosevelt (53)	78.35	1
	Lower Spokane (54)	111.65	1
	Total	767.25	8
WRIA 49 Okanogan	Colville (59)	817.6	4
	Kettle (60)	204	1
	Total	1,021.6	5
WRIA 50 Foster	Okanogan (49)	939.8	3
	Lower Spokane (54)	157.25	1
	Colville (59)	360.5	4
	Total	1,457.55	8
WRIA 53 Lower Lake Roosevelt	Middle Lake Roosevelt (58)	86.66	1
	Total	86.66	1
WRIA 54 Lower Spokane	Lower Lake Roosevelt (53)	109.1	1
	Little Spokane (55)	60	1
	Total	169.1	2
WRIA 58 Middle Lake Roosevelt	Colville (59)	137	1
	Total	137	1

Grand Total

11,182.01

54

Appendices

Appendix D: Detailed Quantitative Methodology

12. Quantitative Research

This section provides additional details of quantitative methods. Quantitative data on water rights transfers, supplied by Ecology, were used to assess the extent to which water rights transfers are occurring across Washington State and in Chelan, Kittitas, Okanogan, and Stevens counties. From February, 2021 through April 2021, we worked to collect, clean, synthesize, and analyze Ecology's water rights transfer data.

12.1. Quantitative data from Ecology

The quantitative data for this project came from the Ecology's Water Resources Program, and specifically from their Water Rights Tracking System (WRTS). WRTS tracks water rights, changes to water rights, and applications to change water rights or obtain new water rights.

WRTS operates as a records system used to retrieve water right records based on user queries. While the database supports some queries, much of the information about specific water rights is stored as scanned pdf documents. For someone interested in pulling trends out of these records, both sources of information need to be used. This can prove time consuming as records pulled from a query need to be checked against the scanned records frequently for missing information, typos, and to gain understanding of the full history of a water right.

12.2. Water Right Changes and Transfers

At the start of this research Ecology performed a set of queries from WRTS to generate a list of water right changes and their parent right records. By comparing location data between the right before and after its change, we were able to assess which rights had moved out-of-basin, and/or out-of-county, and whether the right moved a significant distance to merit inclusion in our analysis.

12.3. Distance of Movement

Location queries in WRTS are based on the legal description of the point of diversion or withdrawal by Township, Range, and Section. WRTS also tracks the source name for specific surface water bodies like rivers, lakes, and streams, or the names of some aquifers in the case of groundwater rights. Some rights move a short distance, but due to initial proximity to a political boundary move out-of-basin or out-of-county, but haven't moved far enough to have a strong environmental, social, or economic effect. It is important for us to understand how far rights are moving to avoid being misled by a high frequency or volume of movement that is only capturing

local movement that happens to be crossing nearby boundary lines. It is difficult to use Township, Range, and Section descriptions to gauge the distance water rights move.

WRTS also includes GPS coordinates for many rights to allow users to see records on a GIS mapping display. The GPS coordinates are not a part of the official water rights record. They are created for each right by taking a centroid of the legal description of the rights location. We used these GPS coordinates to estimate the total distance between a rights' starting and ending locations to filter out short distance moves. Some records did not have GPS coordinates included. For these records, we used the Bureau of Land Management's GetLatLon online service to generate a GPS coordinate from the given legal land description of Township Range and Section.³⁰ A Section is a one mile by one-mile square parcel of land. GPS coordinates generated from the center of a section that a right is in should be within roughly one-half mile of the actual point of diversion.

With GPS coordinates for right sources, the Law of Cosines formula was used to determine as-the-crow-flies distance between the two points in miles.

$$= \text{ACOS}(\text{SIN}(\text{lat1} * \text{PI}() / 180) * \text{SIN}(\text{lat2} * \text{PI}() / 180) + \text{COS}(\text{lat1} * \text{PI}() / 180) * \text{COS}(\text{lat2} * \text{PI}() / 180) * \text{COS}(\text{lon2} * \text{PI}() / 180 - \text{lon1} * \text{PI}() / 180)) * 3443.89849 * 1.15078^{31}$$

These calculations were compared with a sample of rights that included distance estimates in the application documents and found to be similar to the estimated distances present on legal documents. In future studies, water right location data could be combined with other GIS systems to calculate more accurate distances including river miles moved.

12.4. Estimated Date of Move

From Ecology data, it is difficult to establish the exact date that a right is sold or moved and begins diverting water from its new location. A right can be sold, but continued to be used in its original location for years before being moved by the new owner. Likewise, the application process can range from months to years depending on many factors. Water right holders often don't begin diverting water from their new location immediately after the change is approved. The date the application was received was used in this analysis as an approximation for the date the water right was moved.

12.5. Duplicate Water Right Change Records

There are multiple reasons that WRTS queries return duplicate records that need to be identified and removed.

³⁰

https://gis.blm.gov/arcgis/rest/services/Cadastral/BLM_NatL_PLSS_CadNSDI/MapServer/exts/CadastralSpecialServices/GetLatLon

³¹ <https://www.movable-type.co.uk/scripts/latlong.html>

Some water rights are split during the change application process. Records from these splits will often appear in duplicate in the WRTS queries. These split rights were compared to information on the scanned water rights documents to determine that the correct split was used for each move and that extraneous duplicates were removed.

In some instances, a change application is amended, or a subsequent application(s) is filed closely following an earlier change. In these instances, multiple records might be created for a single real-world change. If not removed these records can create duplications movements when only one actually occurred.

Some water rights include multiple records due to having multiple points of diversion or withdrawal. A record might include a surface water pump for pulling water for a surface water right and also list a well device type for pulling groundwater. A single water right change may describe the relocation of many points of diversion or withdrawal. Where identified, these records have been updated to note only one water right change so as not to duplicate the number of moves or quantities moved.

12.6. Data Entry Errors

Some water right records are mistakenly entered into the database. Correct information can be found by opening the scanned documents that are attached to each record. We did not confirm all data with the accompanying documents, but did flag records that appeared to have errors (e.g., water moving between unconnected WRAs or counties) and then used the scanned records to find the correct information.

When rights are split during a water right change, the split portions may be moved to different counties and WRAs. It is not uncommon for the WRAs or counties to be mixed up among the splits. While looking through the data, we attempted to identify these errors by reviewing the scanned documents to confirm the correct combination of WRA and county data.

12.7. Final Filtering for Distance Traveled Over 5 Miles, and Duplicate Records

Finally, filtering out duplicates and rights that moved less than 5 miles left 54 rights that changed WRA. 43 of which also changed county.

12.8. Analysis

The 54 water right change records were used to create summary statistics and identify basic patterns for out-of-basin changes and transfers over 5 miles. For the purposes of analysis, each record was treated as an individual transfer including the several records that were splits, but the splits had different uses or different end locations.

12.9. Searches External to Ecology

In attempts to collect valuation, attribute, and characteristics data on water rights, we looked to external sources outside of Ecology. The following highlight our steps in locating this information.

12.9.1. First Inquiry

In our first phase of inquiry, we requested any information regarding, or direction to, accessible public records that included water rights from counties. Important object categories, for all water rights transfers (including active and inactive claims), in our request included:

- Scale of the transfer (water quantity and type)
- Transfer paperwork (change application, title, images, etc.)

12.9.2. Second Inquiry

In follow-up inquiries to those that had expressed interest in helping but needed further guidance, we provided a brief on water rights and potential example records where this might be recorded. In addressing this, we noted that, “if a water right is transferred in ownership through a sale of property, but the water usage does not change, the ownership transfer is not recorded or processed by Ecology.” In probing for this information, we proposed looking into the following record types:

- Sale of deed
- Real estate excise tax

Appendices

Appendix E: Qualitative Summary Tables

13. Qualitative Findings

Table 8 Qualitative Findings by Stakeholder Group Represented

Stakeholder Group Represented	Is information about water rights readily available to the public?			Economic Benefits from Private Transactions			Transaction Information/Review System Adequate			
	Yes	No	Not Mentioned	Yes	No	Not Mentioned	Yes	No	Both in some Situations	Not Mentioned
Attorney	1	3	0	3	1	0	1	2	1	0
Consultants	0	2	0	1	0	1	1	1	0	0
County Officials	0	5	0	4	1	0	1	4	0	0
Environmental	1	4	0	3	2	0	0	4	0	1
Irrigators	1	0	1	2	0	0	0	0	0	2
Tribal	1	1	0	2	0	0	0	2	0	0
Total	4	15	1	15	4	1	3	13	1	3

Stakeholder Group Represented	Are there Negative Economic Impacts to Headwaters/Rural Ag. Communities from Downstream Transfers?			Social Impacts				Downstream Transfers Provide Instream Flow Benefits		
	Yes	No	Not Mentioned	Positive	Negative	Both Positive and Negative	Not Mentioned	Yes	No	Not Mentioned
Attorney	4	0	0	0	1	2	1	4	0	0
Consultant	1	1	0	1	0	1	0	2	0	0
County Official	5	0	0	0	3	2	0	5	0	0
Environmental	2	1	2	0	2	1	2	5	0	0
Irrigators	2	0	0	0	2	0	0	0	0	2
Tribal	1	0	1	0	0	1	1	2	0	0

Total	15	2	3	1	8	7	4	18	0	2
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Table 8; Continued

Stakeholder Group Represented	Frequency of Water Right Transactions			Price of Water Rights			
	Gave an Estimate	Indicated they were unsure of frequency	Not Mentioned	Increased	Decreased	Inconsistent	Not Mentioned
Attorney	0	1	3	0	0	0	4
Consultant	1	0	1	1	0	0	1
County Official	0	4	1	2	0	2	1
Environmental	2	0	3	1	0	2	2
Irrigators	0	0	2	0	0	0	2
Tribal	0	0	2	0	0	1	1
Total	3	5	12	4	0	5	11

Stakeholder Group Represented	Respondent Desires to Keep Water Rights in Headwater Basins				Downstream Transfers have some Negative Environmental Consequences			Improvements in Irrigation Efficiency from Water Right Transfers		
	Yes	No	Recognize both	Not Mentioned	Yes	No	Not Mentioned	Helpful	Not Helpful	Not Mentioned
Attorney	2	1	0	1	0	0	4	1	0	3
Consultant	0	2	0	0	1	0	1	0	0	2
County Official	3	0	2	0	2	0	3	2	0	3
Environmental	1	4	0	0	3	0	2	3	0	2
Irrigators	0	0	0	2	0	0	2	0	0	2
Tribal	0	1	1	0	0	0	2	1	0	1

Total	6	8	3	3	6	0	14	7	0	13
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Table 8; Continued

Stakeholder Group Represented	Flow Accounting: Are current and/or predicted future water needs well known or accounted for?				Leasing Downstream is a Good Option			Water Banking		
	Yes	No	In some places but not others	Not Mentioned	Yes	No	Not Mentioned	Views Favorably	Views Unfavorably	Not Mentioned
Attorney	0	2	0	2	3	0	1	3	0	1
Consultant	0	0	1	1	1	0	1	2	0	1
County Official	0	2	3	0	4	0	1	4	1	0
Environmental	0	3	1	1	1	0	4	4	0	1
Irrigators	0	0	0	2	1	0	1	0	0	2
Tribal	0	1	0	1	0	0	2	0	0	2
Total	0	8	5	7	10	0	10	12	1	7

Stakeholder Group Represented	Farmer/Community Distrust of Ecology			Desire for Ecology to Step In/Help			Speculation Real/Concerning		
	Yes	No	Not Mentioned	Yes	No	Not Mentioned	Concerned	Not Concerned	Not Mentioned
Attorney	2	0	2	2	0	2	0	2	2
Consultant	2	0	0	1	0	1	1	0	1
County Official	3	0	2	2	2	1	2	1	2
Environmental	2	0	3	4	0	1	2	2	1
Irrigators	1	0	1	1	0	1	1	1	0

Tribal	1	0	1	1	0	1	2	0	0
Total	11	0	9	11	2	7	8	6	6