Open File Version 3/04 WRIA 13 ASSESSMENT CHAPTER 7 WATER RIGHTS

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7.1 ROLE OF WATER RIGHTS IN WRIA 13 ASSESSMENT AND WATERSHED PLANNING

Identification of the water volume represented in water rights is a required element of the WRIA assessment. Water rights are the fundamental tool utilized by the Department of Ecology for allocating water to various uses. Decisions on new requests and administration of existing rights will be at the core of water quantity management in WRIA 13.

The following core questions are addressed in this chapter:

- What are the uses limitations of the existing DOE water rights data?
- What is the history of WRIA 13 water rights: When were they issued, for what purposes and within which watershed?
- What is the theoretical potential impact of approved water withdrawals on streamflow and lake levels?
- How does water rights volume compare with actual current use?
- Are there opportunities to improve water rights data, as a tool in future water resource management?

What Are The Uses And Limitations Of Doe Water Right Data?

The following points are intended to assist with understanding the nature of water rights data as it pertains to watershed planning.

- "Worst case" withdrawal is reflected in data: Water rights (permit and certificate) and claims data are important indicators of potential use of water resources. The DOE data represents "worst case" water use; i.e. if all rights were valid and every right was used to maximum quantity in the same timeframe. Some rights may no longer be valid or may be valid for a smaller quantity of water – but this is not reflected in the existing DOE records.
- **Incomplete data:** In general, water rights were issued for a specific *instantaneous* maximum volume and an *annual* maximum withdrawal. However, many records do not specify one or the other of these values. The following data uses assumptions to fill some data gaps (such as "approved acreage" utilized to derive an annual water use limit). In other cases, certain data is simply not available for a particular right.
- Legal limitations to water rights: A water right is approved by the Department of Ecology for a particular *water source* to be put to a specific *beneficial use* at a specific location (*"place of use"*). The right to utilize water is specific to this use and location, unless a permit is approved to move and/or change use of the water.

And the water right lapses if it is no longer needed unless a change is approved: With some important exceptions, State law stipulates that the right to use the approved quantity of water is no longer in force (*"relinquished"*) if it is out of beneficial use for five years. The statute includes several provisions that may retain an unused or partially used right beyond five years, including planned development/use of the water within 15 years.

- Absence of update: The existing water rights database provides an accurate record of administrative actions by DOE over the years regarding water right applications. The existing database does not provide an accounting of either actual current water use or current legal status of water rights. Thus, the volume of water in the DOE database represents theoretical maximum potential water use, which has not been "filtered" to remove or reduce quantities to represent recent beneficial use and comply with statute. ¹
- **Certificates:** Most water rights are *certificates* i.e. the water use has been documented (*"perfected"*) and approved by DOE. As explained above, the database does not reflect current beneficial use or legal status of these rights. There are numerous records for rights that have been out of use for many years.
- **Permits:** A smaller number (but still representing a significant quantity of water) are in the form of *permits* i.e. the designated quantity of water is still in process of being put to beneficial use at the designated location. Permits associated with a growing use such as a community water system should appropriately be larger than existing actual water use, as the utility is still "growing into" the permit.
- Claims to water use before water laws: Another data set represents *claims* filed with the State, alleging water use that predates the requirement to obtain a permit (1917 for surface water and 1945 for groundwater) or wells that do not require a formal water right (exempt withdrawals). These applications were submitted without review by DOE staff to identify whether the applications are complete or if the date of use qualifies for a claim. The validity of claims can only be resolved through adjudication by the courts. No adjudication is underway or currently contemplated for WRIA 13.
- Withdrawals exempt from water rights: An important component of water use is not even included in the DOE data. "Exempt" wells using less that 5,000 gallons per day are excluded by statute from the requirement to obtain a water right. Cumulatively, these small withdrawals may utilize a significant quantity of water.

¹ Throughout the document, water rights data is extracted from the Department of Ecology "Water Rights Application Tracking System" (WRATS). A limited review of the largest surface water rights in the Deschutes was conducted using the fiche records from DOE SW Region Water Resources.

7.2 HISTORY OF WRIA 13 WATER RIGHTS: DATE ISSUED, PURPOSE AND WATERSHED



There are roughly 5,500 DOE records for water rights and claims in WRIA 13. The largest numbers of records are *claims* to groundwater.

Viewed by *annual volume*, groundwater rights are the most significant segment of the DOE records for WRIA 13. Total instantaneous volume represented in WRIA 13 rights of all types is about 420 cubic feet per second – roughly equal to the average flow of the Deschutes.



Water Rights Data

Approval Dates

The State of Washington began issuing water rights in 1917 for surface water diversions. In 1945, the State began requiring water rights for groundwater withdrawals. (The exception is individual and small group wells less than 5,000 gallons per day.) In the 1960's - at about the time that surface right issuance tailed off - there was a significant increase in groundwater rights. Groundwater rights volumes increased significantly in the 1970's and 1980's.



Purpose of Water Rights

Water rights are issued for particular "purpose of use". As shown in the chart below, surface water rights were predominately issued for Irrigation and Fish Propagation uses. Groundwater rights were issued to serve Multiple Domestic, Municipal, Irrigation and Industrial uses. ("Multiple Domestic" was in some cases the coded use in rights issued to municipal water systems. Also, many rights were issued with multiple approved uses.)



Water right records by watershed

Water rights are approved for use in a specific area. Through the WRIA 13 Water Right Mapping project, water rights can be accurately located by basin. (DOE records generally identify location to the ¼ or 1/16 section.)

Over ½ of WRIA 13 water right records pertain to the Budd/Deschutes watershed. About 44% of water rights are for Budd/Deschutes groundwater withdrawals, with an additional 16% of total records pertaining to Budd/Deschutes surface water rights. Henderson Inlet basin has about 32% of WRIA 13 water rights – evenly divided between groundwater and surface water right records. About 8% of water right records are for the East Eld basin, divided roughly equally between groundwater and surface water withdrawals.



Water rights approvals include a specific *volume* of maximum withdrawal. Approved maximum volumes range significantly between water rights – some water right records are for single households while others are for large municipal utilities. DOE records may include a maximum *instantaneous volume* (*Qi*) and a maximum *annual quantity* (*Qa*).

Percent of annual volume associated with the principle basins in WRIA 13 is illustrated below, separated into groundwater and surface water rights. Deschutes groundwater rights again account for the largest share of volume – nearly 50% of WRIA 13 total. For Henderson and East Eld surface water rights, the *volume* associated with surface rights is very small compared to the *number* of rights shown in the above chart – in other words, these surface rights are for very small volumes.



<u>Claims</u>

A second set of DOE water use records pertain to *claims* filed under the Claims Registration Act. The Act was passed in 1967 to capture two types of water use: vested pre-Water Code uses and small ground water withdrawals exempt from the water right permit process. "Vested right" claims are for water use alleged to have been established prior to State permit requirements -1917 for surface water and 1945 for groundwater. "Exempt" use claims are for small wells (<5,000 gallons per day), which by statute are not required to obtain a formal water right.

DOE recorded claims but did not determine validity during several time-limited filing periods between 1967 and 1997. Validity of claims can only be determined through a general water right

adjudication conducted through the Superior Court. No general adjudication has been conducted in WRIA 13.

A total of 4,233 claim records were filed in WRIA 13 – about four times the number of water right permit records. However, the volume of water associated with water claims is believed to be relatively small. Total estimated annual water volume associated with claims is about 13,500 acre feet (compared to nearly 55,000 acre feet associated with water right permits and certificates). Summary data tables maintained by DOE provide limited specific data regarding claims. Thus, assumptions must be made to estimate the approximate quantity of water in claims.²



Claims and Rights by Basin

The number of rights and claims *records* for each basin in WRIA 13 is illustrated in these pie charts, along with the *annual volume* associated with these records. For each basin, groundwater claims are the most numerous record but are a relatively small proportion of total volume associated with all water right records.

² Consistent with the methodology used in the 1995 <u>Initial Watershed Assessment – WRIA 13 Deschutes River</u> <u>Watershed</u> and general practice for issuing Irrigation water rights, the following volumes were associated with claims:

Irrigation claims (acreage included in record): Qi = Acreage x 9 gpm = Acreage x 0.02 cfs Qa= Acreage x 2 acre feet/year

Domestic and stock use claims: Qi = 0.02 cfs and Qa = 2 acre feet/year



Data for both water rights and for claims is summarized by watershed on the following table.

TABLE 7 -1 SUMMARY OF WATER RIGHTS AND CLAIMS BY BASIN WITHIN WRIA 13

BASIN	PERMITS	AND CERTIFICA	CLAIMS (2)			
	Number	Qi	Qa	Number		
	of Documents	cubic ft/second	Acre ft/year	of Claims	Qi (cfs)	Qa (af/yr)
Budd/Deschutes basin:						
Budd/Deschutes Surface Rights	196	37.76	3,500	179	10.38	1,038
Budd/Deschutes Groundwater Rights	537	89.24	22,206	2,152	73.34	7,334
Basin Total	733	127.00	25,706	2,331	83.72	8,372
Henderson basin:						
Henderson Surface Rights	205	23.72	400	156	5.52	552
Henderson Groundwater Rights	198	61.36	17,135	1,466	37.58	3,758
Basin Total	403	85.08	17,535	1,622	43.10	4,310
East Eld basin:						
East Eld Surface Rights	55	9.51	220	17	1.30	130
East Eld Groundwater Rights	56	12.05	2,008	263	7.70	770
Basin Total	111	21.56	2,228	280	9.00	900
TOTAL WRIA 13:						
Surface water	456	71	4,120	352	17	1,720
Ground water	791	163	41,349	3,881	119	11,862
Basin Total	1,247	233.64	45,469	4,233	135.82	13,582

4,233 Claims

1,247 Permits & Certificates

5,480 Total

Note: "Qi" = Instantaneous quantity allowed in permit in cubic feet per second (groundwater rights converted from gallons per minute).

"Qa" = Annual quantity in acre feet represented in permit or claim.

Sources: (1) Permits and Certificates data from Water Right Mapping Project conducted for WRIA 13 Watershed Planning

by Thurston County Department of Water & Waste Management. Annual quantities for surface rights are approximate as many records did not expressly include this value. Groundwater Qi converted from gallons per minute. Records from DOE.

(2) Claims data from Department of Ecology WRIS (Water Right Information System) data. This is very approximate as many records did not delineate volume parameters.

7.3 WATER RIGHT CHANGES: LEGISLATIVE AND ADMINISTRATIVE REFORMS

Legislative intent

For years, applications for water rights far exceeded DOE's processing rate. By the late 1990's there was a backlog of over 7,000 water rights application waiting to be processed, including over 1,500 change applications. The lack of timely processing for water right change applications threatens to undercut the objective of maximizing use of existing rights to meet new water needs. Lack of timely action on water right applications also pushes property owners toward measures such multiple exempt wells in order to utilize their property.

The huge backlog of pending water right actions led to innovative efforts by the Legislature focusing on changes to existing water rights. While only providing partial solution to the water right application processing problem, these innovations are improving water resource management. In particular, enabling local Water Conservancy Boards has benefited applicants in WRIA 13 and other parts of Thurston County.

Local Water Conservancy Boards enabling legislation

Starting in 1998, water conservancy boards were formed as local partners in processing water right changes in many areas of the state. Each conservancy board is an independent unit of local government established by resolution of the county and approved by the Ecology director. DOE provides training. Thurston County's WCB is one of only 5 in Western Washington. In contrast, most of Eastern Washington is covered by 16 WCBs.



Water conservancy boards (shaded areas)

Water Conservancy Boards collect the required documentation from applicants, perform field visits and other research, and issue records of decisions (RODs) on water right change applications. Ecology has final review authority to review board RODs. After review, Ecology issues administrative orders to affirm, modify or reverse the Conservancy Board determination.³

2001 "Two-Lines" Legislation ⁴

The 2001 legislature (ESHB 1832) tripled funding for water rights processing to \$3 million, increasing staff allocation from 18 to 55. The 2001 statute also facilitated processing of changes to existing water rights through:

- "Two-line" processing option: Under the new law, water-right change applications can be processed ahead of applications for new water rights within the same water source without first having to evaluate the effects on new water-right applications. This is a modification of the strict "firstin time, first-in-right" doctrine of Western water law.
- No line blocking: New applications for changes to existing water rights can proceed ahead of previously-filed change applications when sufficient information is not available to make a decision on older applications. The practical effect is that older water-right change applications with inadequate information do not delay newer, complete change applications.

The target pursued by the Legislature, Governor and DOE was to eliminate the existing 2001 backlog in change applications within 5 years. The focus on water rights changes also reflected an increasing awareness concerning the benefits of making better use of water already legally appropriated.

Improved opportunities to process new water right applications were also addressed through addition of "**cost reimbursement contracting**." Under this approach, applicants for water rights have the option to speed up their water rights decision by paying the costs of processing their applications through DOE – and also paying the processing costs for other water rights applications in line ahead of theirs. The applicant reimburses Ecology for hiring, managing and overseeing an independent consultant to do Ecology's routine permit processing work. Ecology makes the final decisions.

Cost for processing water rights under the three approaches

³ For more information see "Report to the Legislature: Water Conservancy Boards" (http://www.ecy.wa.gov/biblio/0211017.html or publication no. 02-11-017).

⁴ This section is largely from the DOE <u>2002 Report to the Legislature Water Right Processing</u> available at http://www.ecy.wa.gov/biblio/0311006.html

As reported by DOE, average cost to process water right changes under the three routes:

- Normal DOE process Average cost for DOE staff and other expenses is approximately \$7,500. Applicant fees cover only \$10, under a fee set in 1917. Thus, there is a significant cost to the general fund for processing water rights under the usual DOE process.
- Conservancy Board process DOE cost to support the WCB and process the initial decision by the WCB is roughly \$3,700 - about ½ the DOE staff cost for handling non-WCB transfer applications. In addition, Thurston County Water Conservancy Board charges about \$1,500 per application (paid by the applicant) to cover advertisement, Board insurance coverage and out-ofpocket expenses of Board members.
- Cost reimbursement contracting is costing roughly \$15,000 per application to process. The applicant pays 100% of costs.

Effectiveness of "two lines" process

Change applications Statewide: DOE meet their statewide target for the 2002-2003 biennium to process over 1,000 water right changes in two years. About 56% were approved. DOE made:

- 565 approvals
- 181 denials
- 264 withdrawn or cancelled. Some of these had insufficient information to obtain approval.

Water Right Change Applications Pending at DOE



As shown above, the trend toward greater backlog was reversed in FY 2002. The trend continued in FY 2003, when DOE processed about 550 water right changes and received about 360 new applications – net progress of about 190 applications,

with a remaining backlog of around 1350 change applications at the end of June 2003.

DOE is on track to achieve their five-year target – act on all change applications that were backlogged in 2001. However, a new "crop" of roughly 1000 to1500 applications for water right changes is anticipated during this period, creating a "new" backlog in unprocessed applications to change water rights.

WRIA 13 change applications

The Water Conservancy Board of Thurston County has processed about a dozen water right change applications. Several more applications have been discussed with applicants; some of these initiated processing but then withdrew their applications after initial investigation by the WCB. About 1/3 of the applications have been in WRIA 13. DOE has approved nearly all WCB decisions in Thurston County.

Outside the WCB process, DOE has made no water right change decisions within WRIA 13 for several years. A total of 22 groundwater right changes and 2 surface water changes are in the WRIA 13 backlog at DOE. Action is anticipated on these in the coming months, according to several discussions with DOE staff.

New water rights: During 2002-2003, DOE processed 157 new water right applications statewide, with 54 approvals. Applications are "rejected" by DOE when they lack required information, fees, or some other basic threshold problem exists with the application. Also, the applicant can withdraw applications during processing. Rejection and withdrawal account for the bulk of DOE "actions" on new water right applications during FY 2002.



New Permanent Water Apps. Processed

The huge backlog in new water right applications has dipped slightly as a few applications have been processed and fewer new applications have been submitted.

The statewide backlog is still over 5,000 applications with no target for reversal set by DOE.



7.4 HB 1338: IMPROVING "MUNICIPAL" RIGHTS FLEXIBILITY, CREATING NEW QUESTIONS

Legislative intent

Legislation in 2003 cleared up significant confusion about water rights for public water systems, especially privately-owned expanding water systems. A legal problem had been created by past DOE practice of "certificating" that water was put to beneficial use simply on the basis that pumps and pipes were present. A court case found that DOE failed to properly require documentation that the volume of water was actually used before approving the certificate. All unused certificated water rights volumes were thrown into question by the case. Also thrown into question was the capacity for expanding private systems to meet their service responsibilities to accommodate future customers. These privately owned water systems are very important in both urban and rural areas of Thurston County.

In HB 1338, the Legislature corrected this problem by declaring that *all* Group A water system water rights were "Municipal Purpose" rights - which under existing water law are protected from relinquishment. HB 1338 stipulated that these Municipal rights are "in good standing" regardless of past DOE practice. The bill also directed DOE to avoid this problem in the future by only issuing water right certificates for water that is actually put to use.

The new statute provides all Group A water systems with:

• Flexibility to "grow into" the water volumes described in their certificates and permits, without threat of relinquishment due to "non-use". In addition, water right volumes already in use can be "recycled" to meet new uses in the approved service area through conservation, without limitation of number of

hookups or threat of relinquishment (i.e. municipal rights are exempt from "use it or lose it").

- Ability to use their water rights for all types of customers within their approved water service area. Water rights records still define the *volume* of water that may be withdrawn to meet these "Municipal" needs. But the original water right record details on "*place of use*" and "*purpose of use*" for Municipal water rights are now defined by either:
 - Future water service area approved as part of a Water System Plan and/or the Coordinated Water System Plan (CWSP) for the area. This applies to larger public water systems. For example, in Thurston County each municipality is the designated priority water provider within their designated UGA, through the North and South County CWSPs. Under HB 1338, they can now utilize their water rights to serve customers throughout this defined future service area.
 - Number of DOH-approved service connections. Smaller Group A water systems are approved for a specific number of connections. Approved number of connections in excess of current hookups defines the system expansion capacity. If a water system submits engineering justification that their per-customer use is lower than the standard, they may obtain DOH approval to serve additional customers from their existing source and storage facilities. HB 1338 specifies that Municipal Purpose water rights may be utilized to provide service to the maximum number of approved connections where a mapped future service area has not been approved.

As discussed later in this report, the new definition of "Municipal" water rights also raises several important policy and administrative questions. The WRIA 13 Watershed Plan may provide guidance to DOE and the Water Conservancy Board regarding implementation of the new "Municipal" definition to ensure maximum public benefit for water resource management.

Potential water volumes associated with WRIA 13 "municipal" water rights

The potential volume of "unused" or "inchoate" water associated with the newly redefined "Municipal" rights may be significant. A precise volume is not readily available due to lack of link between DOE water rights records and DOH data on public water systems. The table below summarizes volume of water associated with "Domestic Multiple" water rights, which in many cases are held by non-governmental pubic water systems⁵. These privately owned systems that are now afforded the status of Municipal Purpose rights by HB 1338.

⁵ About 274 different owners are listed in DOE records for Domestic Multiple water rights. In contrast, there are 144 Group A Public Water Systems included in DOH database. While not every Domestic Multiple right is for a public water system, a large number of these rights are associated with privately-owned water systems that now included under "Municipal" water right protections.

The following preliminary evaluation indicates that total potential volume of "inchoate" rights associated with Domestic Multiple water rights may exceed inchoate rights held by the city water systems. Domestic Multiple unused rights exceed 10000-acre feet/year – which is five times estimated actual use by nongovernmental Group A PWS and exceeds inchoate rights held by the city water utilities. NOTE: Existing data does not link water right data specifically to nongovernment PWS. Thus, this is a very preliminary "worst case" assessment.

	# Entities A	c Ft/Yr
Government-owned PWS Water Rights Certificates	s 7	14,402
Permits	5	9,238
		23,640
Gov't PWS Estimated Water Use		15,130
Current Actual Use vs WR Max Volume		64%
Potential "inchoate" rights		8,510
Non-Gov't "Dom.Multiple" Water Rights Certificates	s 274	9,803
Permits	23	2,604
		12,406
Non-Gov't Group A PWS Est Water Use	144	2,050
Current Actual Use vs WR Max Volume		17%
Potential "inchoate" rights		10,356

Table 7-2"Public Water Systems (PWS): Water Rights vs Water Use

A note of caution must be made regarding "inchoate" Municipal Purpose water right volumes: Water rights should reflect the **maximum potential allowable** use in the highest-use year, not typical annual volumes. Thus, "unused" rights in any one-year period cannot appropriately be considered as potentially available to meet future demand. Some of the rights included in the summary above may be relinquished or abandoned. And some of the Domestic Multiple water right holders are not public water systems – and are thus not afforded protection as "Municipal" water rights.

7.5 PENDING WATER RIGHT APPLICATIONS IN WRIA 13

A total of 38 applications for water rights in WRIA 13 are pending DOE action. About 10 of the applications have been pending for ten years or longer, with the earliest application filed in 1988 by the City of Olympia.



Cumulative total volume associated with the applications is illustrated below.



All but two of the pending applications are for proposed groundwater rights. The largest number of applications is for Domestic Multiple purpose (mainly private water systems).



Most of the requested withdrawal is for Municipal purpose, followed by Domestic Multiple and Irrigation. The following chart illustrates pending rights by volume (gallons per minute).



The following table provided by the Department of Ecology summarizes pending WRIA 13 water right applications as of December 2003, sorted by basin within the planning area.

TABLE 7 – 3 PENDING WATER RIGHT APPLICATIONS IN WRIA 13

DOCUMENT		PRIORITY			
NUMBER	BUSINESS/PERSON NAME	DATE	Qi PURPOSE	SOURCE	BASIN
S2-29790	YANTIS, GEORGE	8/13/1998	0.22DS	UNNAMED SPRING	BUDD
G2-30031	FRIENDS OF THE ARTES	11/29/2001	10MU	WELL	BUDD
G2-29090	CAPITAL MALL CO,	7/15/1994	275IR	WELL	BUDD
G2-29697	AMERICAN WATER RESOU	5/26/1998	30DM	WELL	BUDD
G2-30061	BAXTER, KIMBERLY	7/12/2002	50ST IR	WELL	BUDD
G2-29831	WASHINGTON WATER SER	2/1/1999	95DM	WELL	BUDD
G2-29924	DESHON, NORM	7/11/2000	50IR DM	WELL	BUDD
G2-29853	GARDNER, LESLIE	5/14/1999	30DM	WELL	BUDD
G2-29778	MYERS, SALLY	6/29/1998	30CI	WELL	DESCHUTES
R2-28562	INDIAN SUMMER PARTNE	6/2/1992	RE IR	WELL	DESCHUTES
G2-28699	OLYMPIA CITY,	12/10/1992	1500MU	WELL	DESCHUTES
G2-28700	OLYMPIA CITY,	12/10/1992	1500MU	WELL	DESCHUTES
G2-29661	AMERICAN WATER RESOU	5/11/1998	30DM	WELL	DESCHUTES
G2-30062	WA DEPT OF FISH & WI	7/18/2002	3000FS	WELL	DESCHUTES
S2-30063	WA DEPT FISH & WILDL	7/18/2002	21FS	DESCHUTES RIVER	DESCHUTES
G2-29794	HERZOG, KARL	9/16/1998	30ST IR DS	WELL	ELD
G2-27426	OLYMPIA CITY,	8/13/1988	1500DM	WELL	ELD
G2-27941	OLYMPIA CITY,	12/8/1990	1500MU	WELL	ELD
G2-29979	HUSTON, LEWIS	3/19/2001	20CI	WELL	ELD
G2-29888	TUMWATER CITY,	11/23/1999	2000MU	WELL	ELD
S2-30064	WA DEPT OF FISH & WI	7/18/2002	54FS	DESCHUTES RIVER	ELD
G2-29331	MOBBS WATER SYSTEM,	11/13/1995	45DM CI	WELL	ELD
G2-29373	MEENK, ROBERT	4/12/1996	10IR DM	WELL	ELD
G2-29878	MANZANITA BEACH RESI	7/30/1999	10DM	WELL	ELD
G2-29939	ROBINSON, KEN	9/19/2000	50DM	WELL	ELD
G2-28862	CAPITAL DEVELOPMENT	6/7/1993	900IR	WELL	HENDERSON
G2-29951	MILLER LAND & TIMBER	10/10/2000	172DM	WELL	HENDERSON
G2-28148	CAPITAL DEVELOPMENT	5/10/1991	180IR	WELL	HENDERSON
G2-29305	LACEY CITY,	9/20/1995	2500MU	WELL	HENDERSON
G2-29115	LACEY CITY,	9/19/1994	500IR	WELL	HENDERSON
G2-29861	MANCE & SON RESIDENT	6/14/1999	100DM	WELL	HENDERSON
G2-29414	MANKE LUMBER CO,	9/9/1996	750DM	WELL	HENDERSON
G2-29557	WASHINGTON WATER SER	12/5/1997	110DM	WELL	HENDERSON
G2-29953	MILLER LAND & TIMBER	10/10/2000	244DM	WELL	HENDERSON
G2-29250	PRAIRIE RIDGE WATER	7/27/1995	125DM	WELL	HENDERSON
G2-29952	MILLER LAND & TIMBER	10/10/2000	321DM	WELL	
G2-29954	MILLER LAND & TIMBER	10/10/2000	165DM	WELL	
G2-29955	MILLER LAND & TIMBER	10/10/2000	161DM	WELL	

Use codes: DS=Domestic Single; DM=Domestic Multiple' MU= Municipal;

IR=Irrigation; ST=Stock Water; FS=Fish Propagation; RE= Recreation/Beautification. Source: DOE SW Region Water Resources 12/03.

7.6 THEORETICAL POTENTIAL IMPACT OF APPROVED WATER WITHDRAWALS ON STREAMFLOW AND LAKE LEVELS

Comparing water right record maximum allocations to streamflow provides a theoretical worst-case condition: Assuming all rights are valid and all are used at the maximum allowable level, what potential impact could occur to streamflow? While extreme from a *practical* standpoint, water right volumes represent *allocations* from the total water resource for specific purposes.

Surface water rights are a particular concern for impact on streams, lake and spring sources. Surface rights specify the *waterbody* from which withdrawal is authorized. This section examines the quantity of water associated with these water rights.

Deschutes River Surface Rights

i.

A total of 41 surface water rights have been issued for withdrawal from the Deschutes River, with an additional 96 rights issued for tributary streams and springs. Only a handful of large Deschutes surface rights comprise most of the volume – the 11 largest permits (out of 137 total) contain 74% of instantaneous volume and 65% of annual quantity related to all 137 surface rights to the Deschutes and tributaries.

Table 7 - 4

		Number of Permits		Instantaneous		Annual Quantity		Irrigated Area	
		#	% of Total	CFS	% of Total	Acre Ft	% of Total	Acres	% of Total
MAINS	STEM								
Qi	> 1 CFS	5	12%	7.89	57%	790	39%	345	38%
Qi	.5 - 1 CFS	6	15%	2.38	17%	530	26%	265	29%
Qi	.15 CFS	12	29%	2.80	20%	521	26%	258	28%
	< .1 CFS	18	44%	0.86	6%	160	8%	50	5%
		41		13.93		2,001		918	
TRIBUT	ARIES								
Qi	> 1 CFS	0	0%	0.00	0%	0	0%	0	0%
Qi	.5 - 1 CFS	7	7%	0.15	1%	5	0%	4.5	0%
Qi	.15 CFS	26	27%	3.34	23%	520	26%	229	23%
Qi	< .1 CFS	63	66%	10.91	76%	1,456	74%	745	76%
		96		14.40		1,980		979	
	TOTAL	137		28.32	cfs	3,981	acre ft	1,897	acres

SURFACE WATER RIGHTS IN THE DESCHUTES BASIN SUMMARY BY SIZE OF PERMIT IN CFS

Deschutes basin small waterbody surface rights

Deschutes tributary streams, lakes and "unnamed spring or pond" surface rights are listed below. ("Pothole" lakes with no outlet – Ward, Hewitt and Smith – are included in this table.) The most significant surface right maximum volumes compared to waterbody volume include:

- Spurgeon Creek surface rights total over 3 cfs maximum instantaneous withdrawal a significant portion of the 5.5 typical low flow conditions in the stream.
- Ward Lake surface rights allow 163 acre feet/year of annual withdrawal equaling 2 ½ feet in depth in the 65 acre lake (about 8% of total lake volume).
- The 80 acre feet withdrawal from Chambers Lake represented in water rights is nearly 30% of the volume in the shallow lake.
- Annual quantity of 50 acre feet is authorized from Smith Lake which is only 15 acres in size.

Table 7 - 5

SURFACE WATER RIGHTS IN DESCHUTES TRIBUTARIES

From DOE Database (Annual quantity calculated at 2 X "irrigated acres" where Qa not specified)

	Number of Permits	Instantaneous CFS	Annual Quantity Acre Ft	Irrigated Area Acres
AYERS CREEK*	1	0.60	60	120
BARNES LAKE	5	0.07	7	10
CHAMBERS LAKE	4	1.15	80	160
LAKE LAWRENCE	1	0.27	26	52
MCINTOSH LAKE	7	0.16	8	14
MUNN LAKE	3	0.11	9	19
OFFUTT LAKE	10	0.16	2	7
PERCIVAL CREEK	1	0.01	1	2
REICHEL CREEK *	2	0.28	34	69
SILVER SPRS CR *	2	0.47	40	80
SMITH LAKE	1	0.75	50	100
SPURGEON CREEK	8	3.17	200	407
TROSPER LAKE	5	0.12	5	9
HEWITT LAKE	5	0.45	35	70
WARD LAKE	5	1.77	163	325
UNNAMED SPRING/POND	45	6.72	452	915
	105	16.25	1,172	2,358

Henderson Inlet Surface Water Rights

There are about 200 surface water right records pertaining to Henderson Inlet watershed – about the same number as groundwater right records. However, surface water rights represent only about *seven percent of total annual volume* in Henderson water rights records. However, the potential for direct withdrawal from surface waters during the low-flow period heightens policy concerns related to surface water permit records.

Lake Surface Water Right Records:

As shown on the following table, about 120 small water rights were issued to withdraw water from Hicks, Pattison and Long Lakes. The total volume of water associated with these rights totals about 130 acre-feet/year. The places of use for these surface water rights have been provided with municipal water service or privately operated water systems for domestic use. However, a handful of small landscape irrigation withdrawals may persist on these lakes, withdrawing water during the summer period.

Three larger Pattison Lake rights for irrigation purposes total 615 acre-feet per year. This is a significant volume of potential withdrawal from the 370-acre lake, equaling about 10% of total lake volume of 3,600 acre-feet. Status of these large irrigation rights has not been determined.

Woodard Creek Surface Water Right Records

About 1.6 cubic feet per second (cfs) of withdrawal is represented in the 11 surface water right records pertaining to Woodard Creek. This is about equal to minimum recorded flow on the creek, which has an average flow of about 10 cfs. Actual surface withdrawal and status of these rights is not known.

Woodland Creek Surface Water Right Records

The 10 water right records pertaining to Woodland Creek and associated springs have a total instantaneous volume of about 6.5 cfs. In comparison, the lowest 7-day low flow (mean value over the seven continuous days with lowest flow) is 11 cfs. Average mean flow is about 24 cfs. Thus, the volume of water in the water rights records is about $\frac{1}{2}$ of 7-day low flow and a quarter of mean flow over the period of record.

One of the largest Woodland Creek rights is in the name of St.Martin's College, which allows .5 cfs withdrawal to a total of 150 acre-feet/year for Irrigation and Domestic Multiple uses. The other very large right is 5 cfs for Fish Propagation, Domestic and small-scale Irrigation use from springs associated with Woodland Creek (Beatty Springs). While this multiple-use right is coded in the summary data table as "consumptive" the fish farm activity returns nearly all utilized flow directly to the stream.

	NUMBER OF	CUBIC FT PER SECOND	ACRE FEET/ YEAR	ACRES
		(Qi)	(Qa) (1)	
Hicks Lake				
Small Domestic &/or Irrigation Rights	24	0.5	29	11
Larger Irrigation Rights (>.4 cfs)	0	0.0	0	0
Subtotal	24	0.5	29	11
Long Lake				
Small Domestic &/or Irrigation Rights	59	1.2	62	27
Larger Irrigation Rights (>.4 cfs)	0	0.0	0	0
Subtotal	59	1.2	62	27
Pattison Lake				
Small Domestic &/or Irrigation Rights	35	0.5	40	22
Larger Irrigation Rights (>.4 cfs)	3	4.1	615	410
Subtotal	38	4.6	655	432
Woodard Creek				
Small Domestic &/or Irrigation Rights	10	0.7	51	30
Larger Irrigation Rights (>.4 cfs)	1	0.8	123	82
Subtotal	11	1.6	174	112
Woodland Creek and Associated Springs				
Small Domestic &/or Irrigation Rights	7	0.5	56	38
Larger Irrigation Rights (>.4 cfs)	3	6.05	157.5	105
Subtotal	10	6.5	214	143
Other Named Streams & Lakes				
Small Domestic &/or Irrigation Rights	9	0.3	43	27
Larger Irrigation Rights (>.4 cfs)	1	0.4	60	40
Subtotal	10	0.7	103	67
Unnamed Sources				
Small Domestic &/or Irrigation Rights	63	6.8	429	263
Larger Irrigation Rights (>.4 cfs)	0	0.0	0	0
Subtotal	63	6.8	429	263
TOTAL SURFACE WATER RIGHTS				
Small Domestic &/or Irrigation Rights	207	10.5	710	418
Larger Irrigation Rights (>.4 cfs)	8	11.4	956	637
TOTAL SURFACE WATER RIGHTS	215	21.9	1.666	1.055

Table 7-6: Surface Water Rights Records In Henderson Inlet Watershed

Notes:

(1) Many surface water rights for irrigation do not specify annual quantity (acre-feet).

Where acreage is specified, data assumed 1.5 acre feet/year (common quantity used by DOE for irrigation.) Data pertains to water right records not actual use or legally valid quantities.

Deschutes River Instream Flow vs Water Rights Data

An extreme worst-case assumption is made in the following analysis – all groundwater rights are assumed to be in 100% continuity with surface waters. Actual continuity conditions are highly variable depending on aquifer conditions, distance from river and other factors.

Surface right appropriation volumes are assumed to be fully utilized during the irrigation season in this analysis (irrigation ramping up and tailing off in June and October, with highest irrigation in July-September). While most surface rights were for irrigation, some surface rights support industrial activities such as gravel mining which may not be limited to summer withdrawal. For this worst-case comparison, all surface rights are assumed to be summer-period withdrawals. Groundwater rights for irrigation are also allocated solely to the summer period.



Mean monthly streamflow is compared to the "worst-case" water rights volumes below. Even with the worst-case scenario, withdrawals associated with water right records are a very small part of winter streamflow. However, summer conditions are distinctly different due to lower stream flows and higher water demand. Summer worst-case withdrawals are a significant portion of mean Deschutes streamflow.



Low-flow conditions are examined in more detail in the following graph. As shown in the following graph, surface water allocations (mainly for irrigation) equal about 20% of mean September flow and nearly ½ of the lowest recorded daily flow. If all groundwater rights were in full continuity with the river, total water allocation would theoretically equal about ½ of September mean flow and exceed the lowest flow in the river.



DESCHUTES WATER RIGHT ALLOCATIONS S VS LOW FLOW

The 1995 Initial Assessment Fig 5-10 correlated streamflow in cfs to annual volumes in acre-feet. From page 26: "The minimum flow data, read on the acre-feet axis, gives the annual volume which would result from the minimum flow occurring for a full 365-day period." 1995 Fig. 5-10 compared *all* WRIA 13 water rights to Deschutes low flow, as assessing DOE water right data by basin was not included in the 1995 scope of work. This update compares Deschutes basin water right records to Deschutes low flow values.

Woodland Creek Instream Flow vs Water Rights Data

The only continuous period of streamflow record for Woodland Creek is 1949-69. Monthly flow from this period is compared to volume in surface water rights to the creek and tributaries. As can be seen, water right volumes theoretically nearly equal minimum flow during summer.



McLane Creek Instream Flow vs Water Rights Data

Most surface water rights to McLane Creek and tributaries were issued for Irrigation purpose. A total of 96 acres of irrigation were identified in the water right records. A few small rights were issued for Domestic Single dwelling purpose.

Total peak instantaneous quantity associated with the McLane system surface rights is nearly 1 cfs – about 5% of the lowest streamflow conditions. Maximum annual

quantity associated with the rights totals 196 acre feet – less than .5% of total average annual discharge volume.

Surface water rights to the McLane system are summarized below. In the initial assessment of water rights performed by Thurston County, McLane surface rights Place of Use were mainly still in the same or similar use to that stated in the water right Purpose. Whether surface water is being utilized and actual volume is not known.

TABLE 7 - 7 SURFACE WATER RIGHTS - MC LANE CREEK AND TRIBUTARIES							
BUSINESS/PERSON NAME		Qi	ACRE FT/YR A	C FT (1) A	C IRR PURPOSE (2)	SOURCE	
ARNESEN HARRIS & DAL	7/15/1970	0.14	31	31	12 ST RE IR FS DM	BEATTY CREEK	
WINDSPOLE G,	2/27/1942	0.02		10	5 IR DS	CEDAR FLATS CR	
ARNESEN WILLIAM,	5/4/1977	0.01	1	1	DS	MCLANE CREEK	
DENIKE EDWARD E,	7/3/1968	0.02	3	3	1 IR DS	MCLANE CREEK	
APPLEBY ANNE B,	11/30/1973	0.1	6.2	6.2	6 ST IR	MCLANE CREEK	
MUSSER M D,	8/12/1940	0.2		60	30 ST IR	MCLANE CREEK	
MOSS A N,	5/12/1953	0.02	2	2	1 IR DS	MCLANE CREEK	
		0.35	12.2	72.2	38		
ALLEN E S,	5/20/1939	0.01		1	0 IR	SWIFT CREEK	
SANDSTROM E,	4/23/1945	0.01		0.5	DS	SWIFT CREEK	
MEKKES K,	9/27/1951	0.35		70	35 IR	SWIFT CREEK	
HANSEN L A ET UX,	5/16/1963	0.04	6	6	3 IR DS	SWIFT CREEK	
CORBAT R L ET UX,	3/2/1964	0.01		0.5	DS	SWIFT CREEK	
ELIASON JEROME D,	10/21/1977	0.01	0.5	0.5	DS	SWIFT CREEK	
		0.43	6.5	78.5	38		
WEST C H / H,	2/21/1963	0.03	4	4	2 IR DS	UNNAMED SPRING	
AUSTIN R W,	8/14/1940	0.02		2	1 ST IR DS	UNNAMED STREAM	
	=	0.05	4	6	3		
	TOTAL	0.99	53.7	197.7	96		
MINIMUM STREAM FLOW (0	CFS)	20					
AVERAGE ANNUAL FLOW (AC FT)			49,230			
PERCENT	·	5.0%		0.4%			

Notes:

(1) Where acre feet was not given for Irrigation use, calculated at 2 acre ft/acre (common factor used by DOE)

(2) Use codes: DS=Domestic Single; IR=Irrigation; ST=Stock Water; FS=Fish Propagation; RE= Recreation/Beautification.

(3) Used .5 ac ft for DS where annual volume not stipulated in DOE record.

7.7 WATER RIGHT VOLUMES VERSUS ACTUAL CURRENT USE

WRIA 13 Water Right Mapping and Initial Assessment

All surface and water rights in WRIA 13 were mapped as part of the WRIA 13 Watershed Planning project. Using legal descriptions and maps included in the DOE microfiche records, the apparent water right Place Of Use (POU), Point Of Diversion (POD) and Point Of Withdrawal (POW) were overlaid with current parcel geography, streams, and sections.

As the DOE records were mapped, an initial assessment was made comparing "**Purpose**" of water use specified in the water right records with **current land use** as indicated on aerial photos. While this does not define actual water source or use, the comparison indicates whether current land use is consistent with the water right Purpose. The four comparison categories derived for the assessment were:

- "Same": Place of Use for the water right record remains in the same use as the "Purpose" identified in the record. Additionally, the Place of Use still in a single property ownership. For example, a farm with a surface water right for Irrigation is still in agricultural use. (Note that the initial assessment does *not* determine whether irrigation is being conducted or the source of irrigation water.)
- "Divided": The Place of Use appears to have a similar land use as the "Purpose" identified in the water right record but is now in divided ownership. Most commonly, a Place of Use for an irrigation right is now divided into 5 10 acre tracts and at least some degree of agricultural activity potentially using irrigation is evident on the aerial photos.
- "Partially converted": A portion of original area is still in the use identified in the water right Purpose, with part of the property converted to a distinct land use. In nearly all cases, this involved development of a portion of the Place of Use into residential land use.
- "Converted": Distinct change has occurred in land use compared to water right "Purpose" (for example, a farm with irrigation rights has been converted to a residential subdivision served by the city water system).

Findings of the WRIA 13 water right initial assessment are discussed separately for surface rights and groundwater rights.

Surface Rights Initial Assessment

For surface rights, the initial assessment found:

• 52% of the surface water rights (by volume) appear to be the "same" regarding the Place of Use. For example, land with a water right for irrigation is still in agricultural use that likely involves some amount of irrigation, and the Place of Use is still owned by a single party. (This project makes no claim as to where this water is coming from, i.e. surface or ground source.)

- Nearly half of the volume associated with surface water records is for property that is partially or totally converted to other land uses. In most of these cases (termed "divided", "partial conversion" and "converted" in the table below), property with surface rights for irrigation has been divided into parcels ranging from 5 acre tracts to urban-level subdivisions.
- 25% of the rights incorporating over 15% of the total volume associated with surface water right records are for property where a distinct change in land use has occurred compared to the water right Purpose.
- Properties associated with the 478 surface water right records now involve approximately 5,168 parcels.

•	The largest 17% of surface water records comprised 80% of the total Qi
	(instantaneous quantity).

Surface	Surface Water Rights in WRIA 13 Compared to Current Land Use								
	Same	Divided	Partial	Converted	Total				
Total # of	227	78	40	131	478				
water rights									
Flow	37.09	10.63	10.85	13.16	71.73				
represented									
(cfs)									
Number of	1,284	449	1,418	2,017	5,168				
current									
parcels									
Percentage	52%	16%	16%	16%	100%				
of total flow									

	Table 7-8		
_		-	

Surface Water Rights Assessment by Watershed

Over ½ of surface rights by volume are located in the Deschutes/Budd Inlet watershed, with 33% in Henderson Inlet watershed and about 13% in the east Eld watershed. "Converted" land use conditions are particularly significant for Henderson surface water rights – 30% were for "converted" Places of Use.

Table 7-9: Surface Rights by Watershed and Initial Assessment Status

Deschutes Watershed

	Same	Divided	Partial	Converted	Total
Total # of water rights	93	28	20	55	196
Number of current parcels	682	198	1,269	1,085	3,234
Flow represented (cfs)	19.145	6.03	6.98	5.605	37.76
Percentage of flow within watershed	51%	16%	18%	15%	100%
Percentage of total flow	27%	8%	10%	8%	53%
Henderson Inlet Watershed					
	Same	Divided	Partial	Converted	Total
Total # of water rights	91	30	17	67	205
Number of current parcels	162	133	128	863	1286
Flow represented (cfs)	11.075	2.4	3,1955	7.045	23,7155

Flow represented (cfs)	11.075	2.4	3.1955	7.045	23.7155
Percentage of flow within watershed	47%	10%	13%	30%	100%
Percentage of total flow	15%	3%	4%	10%	33%

Eld Inlet Watershed

	Same	Divided	Partial	Converted	Total
Total # of water rights	31	16	2	6	55
Number of current parcels	57	88	16	67	228
Flow represented (cfs)	6.41	2.06	0.56	0.48	9.51
Percentage of flow within watershed	67%	22%	6%	5%	25%
Percentage of total flow	9%	3%	1%	1%	13%

Surface water rights for irrigation

Irrigation using surface water is a particular concern due to potential direct impact on streamflow – as irrigation diversions would occur during the low-flow period of the year. The degree of actual use of surface water rights for irrigation in WRIA 13 is not known. However, the initial assessment indicates that nearly 60% of the volume associated with irrigation rights from surface water is linked to partially or fully "converted" lands.

Nearly 25% of the volume associated with irrigation rights from surface waters is for land that is fully converted to non-agricultural uses. These 109 "converted" rights are now divided into over 1,800 parcels. An additional 1,500 parcels are associated with the 58 "divided" and "partially converted" irrigation rights to surface waters. These two categories comprise 35% of the water volume associated with irrigation surface water rights in WRIA 13.

	Same	Divided	Partial	Converted	Total		
Total # of	88	21	37	109	255		
water rights							
Flow	16.86	4.06	10.27	10.02	41.21		
represented							
(cfs)							
Number of	216	160	1,340	1,821	3537		
current							
parcels							
Percentage of	41%	10%	25%	24%	100%		
total flow							

Table 7-10 Irrigation surface water rights in WRIA 13

Ground Water Rights Initial Assessment

- For most groundwater rights, current land use is largely consistent with the Purpose stated in the water rights records. 75% of the rights by Qi appear to be the "same", this percentage changes to 83% when looking at Qa (acre-feet/year)
- Rights for private wells located within city limits account for about 10% of total flow in the groundwater rights records.
- 10% of groundwater rights (by volume) are for property that appears to be fully converted to other land uses, typically irrigation rights for land converted to residential.
- The largest 28% of the groundwater rights comprise 80% of the total quantity associated with the groundwater right records.

Table 7-11 Ground-Water Rights in WRIA 13: "Purpose" Compared to Current Land Use								
Same Divided Partial Converted Total								
Total # of water rights	404	30	29	92	555			
Number of current parcels	58,997	191	1,706	2,797	63,691			
Total Qi represented	74,233	1,689	3,906	7,508	87,336			
Percentage of total Qi	85%	2%	4%	9%	100%			
Total Qa	44,335	846	1,406	2,386	48,973			
Percentage of total Qa	91%	2%	3%	5%	100%			

Groundwater Rights by Watershed

As a percentage of total annual flow represented in the DOE records, WRIA 13 groundwater rights are predominately in the Deschutes watershed (45%) and Henderson watershed (35%). In contrast to surface rights, most groundwater rights (in number and volume) are for land that is in a use consistent with "purpose" shown on the water right records. This applies to all watersheds.

Only about 7% - 10% of rights (by volume) are associated with "converted" or "partially converted" land. However, continued residential use of land may mask conversions from private wells to public water systems. Results of examining this issue are shown in the "private well within city" category. In this category are 82 rights with over 2,000 acre feet/year of annual allocation (4% of WRIA total). The number of these wells still in use is not possible to ascertain.

Table 7-12: Groundwater Rights by Watershed and Initial Assessment Status

Deschutes Watershed Groundwater Rights

	"Same": Municipal &	Non-muni wells			
	rural wells	within city	Partial	Converted	Total
Total # of water rights	445	36	12	44	537
Number of Current parcels	29,258	822	339	1,258	31,677
Flow represented (gpm)	31,089	2,590	2,036	4,291	40,006
Percentage of flow within watershed	78%	6%	5%	11%	100%
Percentage of total flow	36%	3%	2%	5%	46%
annual quantity (AFY)	19,480	670	584	1,472	22,206
Percentage of annual quantity with					
watershed	88%	3%	3%	7%	100%
Percentage of total annual quantity	40%	1%	1%	3%	45%

Henderson Watershed Groundwater Rights

	"Same": Municipal &	Non-muni wells		•	
	rural wells	within city	Partial	Converted	Total
Total # of water rights	108	43	12	35	198
Number of Current parcels	16,128	2,124	470	1,475	20,197
Flow represented (gpm)	20,558	3,239	1,335	2,334	27,466
Percentage of flow within watershed	75%	12%	5%	8%	100%
Percentage of total flow	24%	4%	2%	3%	31%
Annual quantity (AFY)	14,307	1,551	548	729	17,135
Percentage of annual quantity with					
watershed	83%	9%	3%	4%	100%
Percentage of total annual quantity	29%	3%	1%	1%	35%

Eld Inlet Watershed Groundwater Rights

	"Same": Municipal &	Non-muni wells			
	rural wells	within city	Partial	Converted	Total
Total # of water rights	41	3	3	9	56
Number of Current parcels	2,016	25	247	65	2,353
Flow represented (gpm)	4,712	75	237	378	5,402
Percentage of flow within watershed	87%	1%	4%	7%	100%
Percentage of total flow	5%	0%	0%	0%	6%
Annual quantity (AFY)	1,844	30	58	76	2,008
Percentage of annual quantity with					
watershed	92%	1%	3%	4%	100%
Percentage of total annual quantity	4%	0%	0%	0%	4%

Water Use Estimates Compared to Water Rights Volumes

It should be expected that total volume associated with water rights – which are expressed in *maximum* volumes – would exceed total actual use. Permits are expressly still in process of being fully utilized or "perfected". Certificated volumes are expressed in maximums, which would not always be utilized each year. And some water right records reflect diversions or withdrawals that were significantly reduced or fully curtailed years or decades ago.

The following table summarizes approximate volumes associated with water right records, compared to estimates of actual groundwater use. No estimate has been derived of actual surface water use. As shown, actual groundwater use is estimated at about 40% of water rights and claims volume.

(Annual Quantity in Acre Feet)							
	Rights	Claims	Total	Est Actual Us	se (1998		
Groundwater	41,349	11,862	53,211	21,400	40%		
	,	,	· · · · ·	<i>'</i>			

1,720

5,840

?

4,120

Surface Water

TABLE 7-13 WRIA 13: WATER RIGHT VOLUMES COMPARED TO ESTIMATED USE (Annual Quantity in Acre Feet)