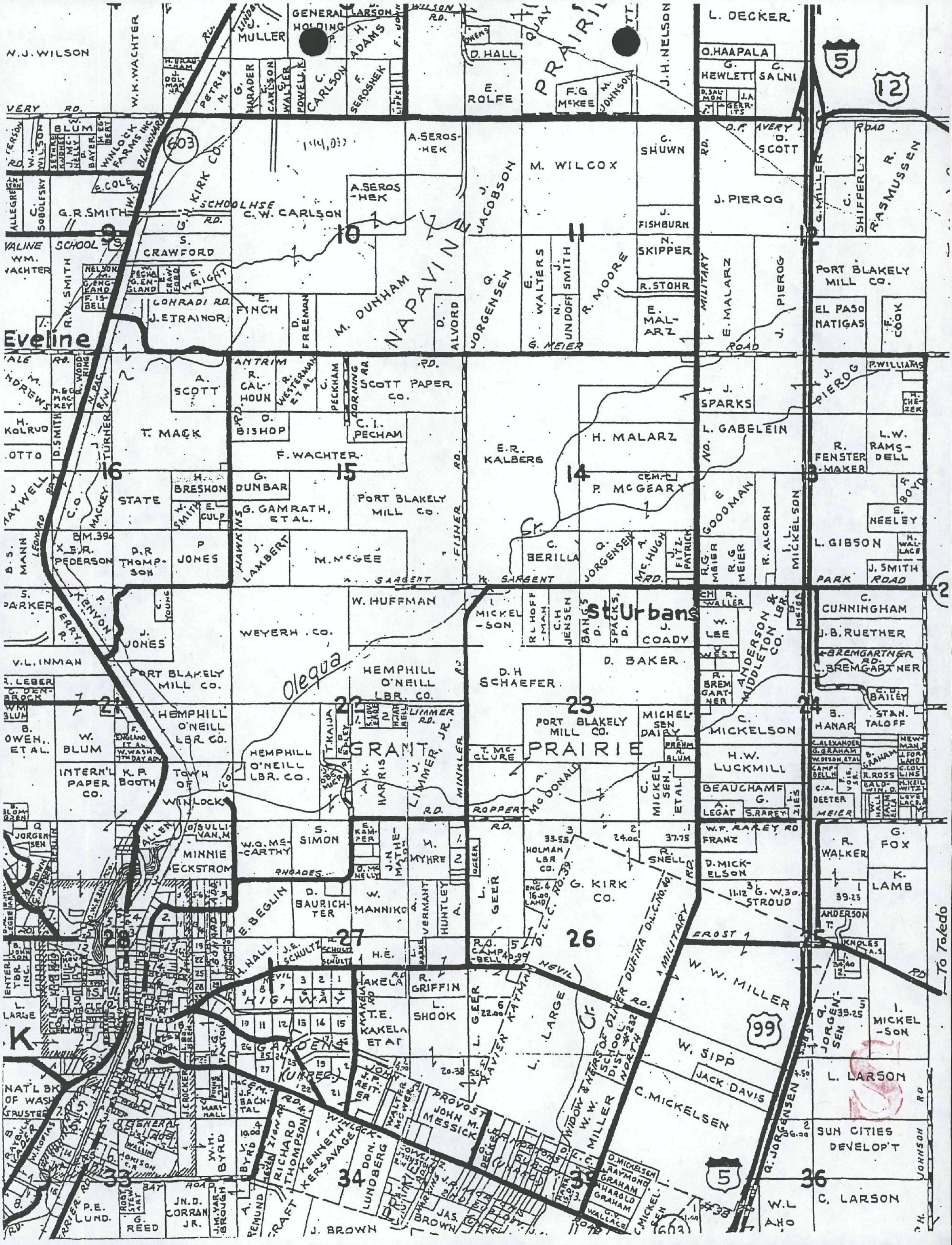

N.J. WILSON
W.K. WACHTER
AVERY RD.
BLUM
WINLOCK FARMS INC.
603
G.H. KIRK CO.
G.R. SMITH
SCHOOLHSE RD.
C.W. CARLSON
S. CRAWFORD
SCHOOL
CONRADI RD.
J.E. TRAINOR
Eveline
E. FINCH
M. DUNHAM
NAPAVINE
GENERAL HOLDING
LARSON
WILSON RD.
J. MULLER
ADAMS
C. CARLSON
F. SEROSHEK
A. SEROSHEK
D. HALL
E. ROLFE
PRAIRIE
F.G. McKEE
M. JOHNSON
J.H. NELSON
L. DECKER
O. HAAPALA
G. HEWLETT
C. SALNI
5
12
D.F. AVERY
D. SCOTT
ROAD
C. SHUWN
M. WILCOX
J. JACOBSON
J. PIEROG
J. FISHBURN
N. SKIPPER
R. STOHR
E. MALARZ
MILITARY RD.
PORT BLAKELY MILL CO.
EL PASO NATIGAS
F. COOK
C. SHIFFERLY
R. RASMUSSEN
G. MILLER
Q. JORGENSEN
E. WALTERS
N.J. UNDOFF
J. SMITH
R. MOORE
G. MEIER
D. ALVORD
D. FREEMAN
ANTRIM RD.
A. SCOTT
R. CALHOUN
SCOTT PAPER CO.
C.I. PECHAM
D. BISHOP
T. MACK
F. WACHTER
E.R. KALBERG
H. MALARZ
J. SPARKS
L. GABELEIN
P. WILLIAMS
R. FENSTERMAKER
L.W. RAMSDELL
OTTO
16
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STATE
H. BRESHON
G. DUNBAR
G. GAMRATH, ET AL.
PORT BLAKELY MILL CO.
CEM.
P. McGEARY
GOODMAN
E. NEELEY
BOYD
BM.394
E.R. PEDERSON
P.R. THOMPSON
P. JONES
J. LAMBERT
M. McGEE
FISHER RD.
C. BERILLA
Q. JORGENSEN
A. McHUGH
J. FITZPATRICK
R.G. MEIER
R. ALCORN
L. MICKELSON
L. GIBSON
J. SMITH
PARK ROAD
SARGENT
S. PARKER
KENYON
W. HUFFMAN
WEYERH. CO.
MICKELSON
St. Urbans
J. COADY
D. BAKER
W. LEE
WEST
ANDERSON & MIDDLETON LBR. CO.
C. CUNNINGHAM
J.B. RUETHER
BREMGARTNER RD.
L. BREMGARTNER
J. JONES
V.L. INMAN
PORT BLAKELY MILL CO.
Olequa
HEMPHILL O'NEILL LBR. CO.
D.H. SCHAEFER
21
22
23
24
W. BLUM
GRANT
PRAIRIE
T.MC CLURE
PORT BLAKELY MILL CO.
MICHELSEN DAIRY
C. MICKELSON
H.W. LUCKMILL
BEAUCHAMP
B. HANAR
STAN. TALOFF
INTERN'L PAPER CO.
K.P. BOOTH
TOWN OF WINLOCK
A.K. HARRIS
J.J. LIMMER, JR.
MINKLER RD.
McDONALD
ROPPERT RD.
S. RAREY
MEIER
G. FOX
R. WALKER
K. LAMB
W.F. RAREY RD.
FRANZ
R. SNELL
D. MICKELSON
G.W. STROUD
MINNIE ECKSTROM
W.O. McCARTHY
S. SIMON
J.N. MATHESON
M. MYHRE
HOLMAN LBR CO.
G. KIRK CO.
D.L.C. No. 39
D.L.C. No. 40
RHOADES
E. BEGLIN
D. BAURICHTER
W. MANNIKO
A. VERMANT
A. HUNTLEY
L. GEER
28
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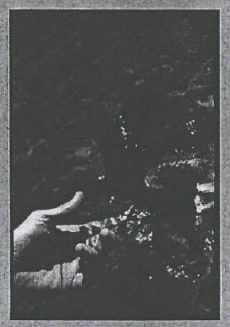
ANDERSON
FROST
KNOLES
MILITARY RD.
W.W. MILLER
To Toledo
H. HALL
H.E.
HIGHWAY
R. GRIFFIN
L. SHOOK
T.E. KAKELA ET AL
NEVIL RD.
L. LARGE
XAVIER KATMAN
OLIVER DUFINA
SCHOOL DIST. #232 NORTH
99
W. SIPP
JACK DAVIS
C. MICKELSEN
L. LARSON
Q. JORGENSEN
I. MICKELSON
NAT'L BK OF WASH TRUSTEE
GENERAL
RICHARD THOMPSON
KENNETH KERSAVAGE
PROVOST
JOHN M. MESSICK
W.W. MILLER
WIDOW & HEIRS OF
DON. LUNDBERG
SUN CITIES DEVELOP'T
JOHNSON RD
33
34
35
36
P.E. LUND.
G. REED
J.N.D. CORRAN JR.
W.H. BYRD
J. BROWN
JAS. BROWN
O. MICKELSEN
RAYMOND GRAHAM
HAROLD GRAHAM
C.V. WALLACE
C. MICKELSEN
W.L. AHO
C. LARSON

Why Trout Anglers Should Care About Groundwater Pumping

BY ROBERT GLENNON

WILD ATLANTIC SALMON in Maine, rainbow and brook trout in Wisconsin, brown trout in Minnesota and fall-run chinook salmon in California share something in common: each is threatened by groundwater pumping. The environmental consequences of groundwater pumping are catastrophic: rivers, springs, lakes and wetlands have dried up, the ground beneath us has collapsed, and fish, birds, wildlife, trees and shrubs have died. Yet, the only



people who know about this problem are a few scientists, a handful of water management experts, and those unfortunate enough to have witnessed it themselves.

Alas, the situation is getting worse. In the ongoing drought, cities, farmers, miners and individual homeowners, in search of new water supplies, have mostly turned to groundwater. Once thought to be as ubiquitous and plentiful as the air we breathe, we now know that groundwater is a finite resource, one that we are quickly and recklessly depleting.

To understand this pressing threat to some blue-ribbon trout waters, it's necessary to understand a bit of the science of hydrology. Ground and surface water are intimately connected in the hydrologic cycle. Rainfall and snowmelt indirectly provide water to lakes and rivers by percolating into the ground and then migrating laterally to reach a watercourse.

If this sounds strange, consider the following riddle: where does water in a river come from if it has not rained recently? It comes from groundwater. The onset of groundwater pumping disrupts this cycle by creating a "cone of depression"—a lowering of the water table in the vicinity of the well. If pumping continues, the cone may eventually grow so large that the well starts capturing water directly from the river. Even if the well is located some distance from the surface water, it indirectly causes harm by intercepting water moving toward the river.

Legal rules compound the problem by failing to limit the size and scope of groundwater wells. Imagine a groundwater aquifer as a giant milkshake glass, and each well as a straw in the glass. In most states, the law allows a limitless number of straws in a single glass. It's a classic example of the tragedy of the commons, and it's a recipe for disaster.

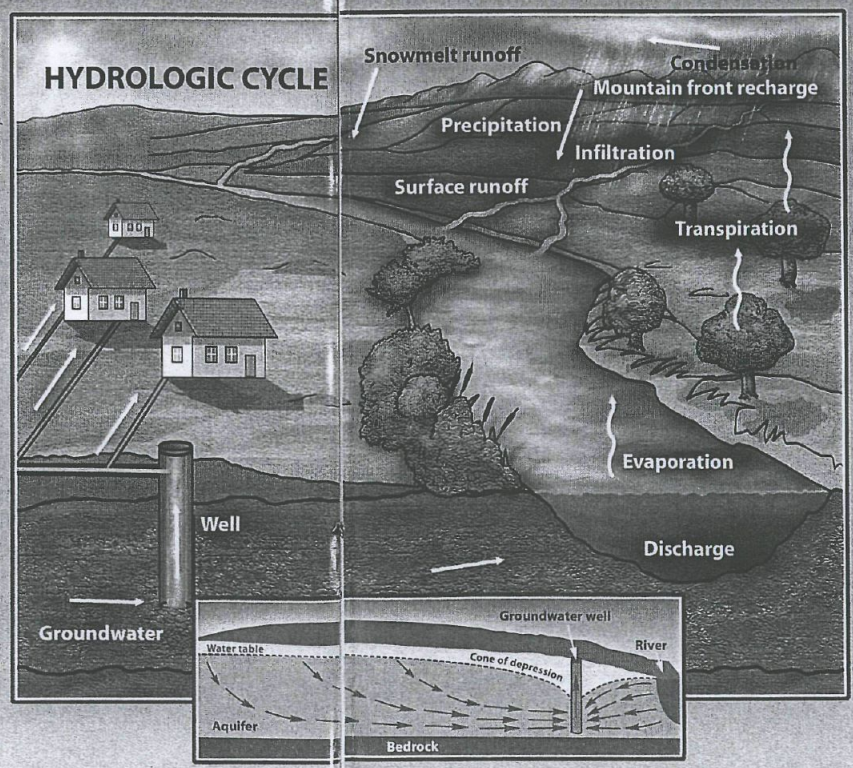
For trout anglers, the need to reform the system is urgent. Because groundwater moves slowly, years or even decades may pass before groundwater pumping lowers the flow in a river, reduces the level in a lake or increases the ambient water temperature. The hidden tragedy is that groundwater pumping that has already occurred will harm trout streams in the future. And as groundwater pumping increases, the consequences will become more severe.

As the accompanying article illustrates, farming, ranching and rapid development consume massive quantities of groundwater in the West. But the problem isn't confined to any one region of the country. Even relatively "wet" states like Massachusetts, Florida, Michigan, Wisconsin, California and Minnesota consume unsustainable amounts of groundwater to support population growth, suburban sprawl, a consumer craze for bottled "spring" water and the fast-food industry's demand for perfectly uniform french fries.

What can we do about this problem? Lots. We can get involved with a local group, such as a TU chapter. At the state level, we can break the relentless cycle of unlimited access to finite groundwater resources. Economic incentives can be a powerful tool to stimulate conservation and to reward those who conserve water with the right to sell some of it. Developers can be required to purchase and retire existing water rights. Simply put, we can no longer afford to allow unlimited new straws in the milkshake glass.

Finally, we must recognize the economic value of our water resources. Although water is a precious commodity, millions of Americans pay more each month for their cell phone and cable television than they do for water. In fact, most Americans pay nothing for the water that they receive. Most water bills simply charge for the costs of the distribution of the water. Increasing the price we pay for water would encourage conservation and reduce the pressure to drill new groundwater wells that threaten some of our favorite trout waters. ■

Robert Glennon is the Morris K. Udall Professor of Law and Public Policy at the University of Arizona Rogers College of Law. You can learn more about bottled water, french fries and other stories in his recent book Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters *(Island Press, 2002).*



TADEUSZ MAJEWSKI / THREE IN A BOX

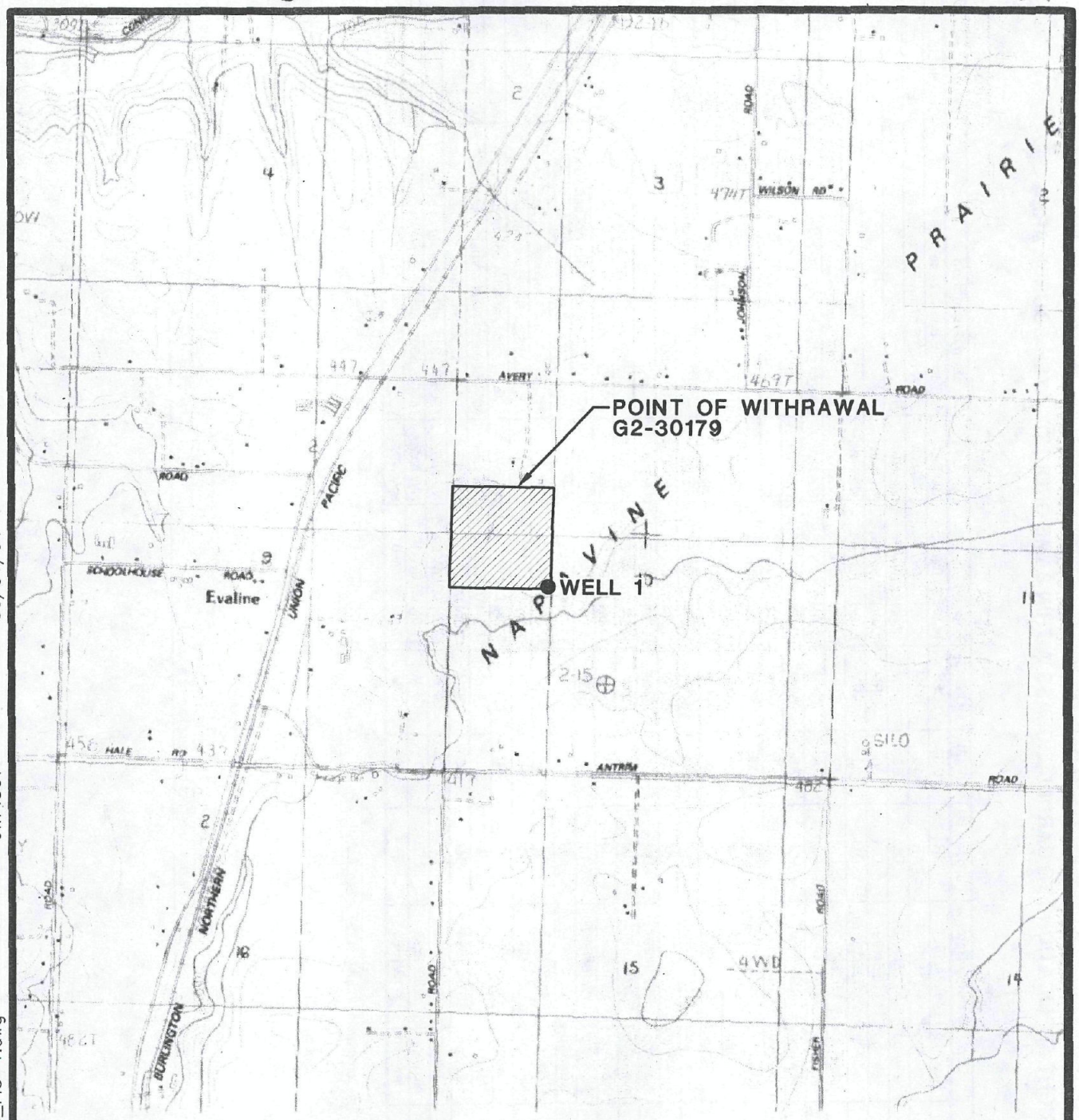
GOOD TO THE LAST DROP

To that end, 1 U's Montana Water Project has publicly called on officials in that state to provide funding for a pilot project that would conduct groundwater surveys in areas experiencing rapid population growth with the potential to threaten streams and rivers. This year, the Utah Water Project worked with that state's legislature to help establish a task force that will look at a wide range of pressing water-related issues, including the administration of ground and surface water rights, instream flows, and water conservation and reuse.

Ziemer also places great emphasis on increased public education about the impacts of groundwater wells on surface water flows. "Education is important because the construction of a house and the digging of a well a quarter mile from the river doesn't seem like a threat to the surface water even though it is," she says. "The public needs a better understanding of how fragile the water resources are."

The hidden tragedy is that groundwater pumping that has already occurred will harm trout streams in the future. And as groundwater pumping increases, the consequences will become more severe.

Gallatin County's Chief Water Commissioner Pruitt, who grew up on a farm and has spent his entire life in the Gallatin Valley, also sees education as important, especially as it relates to respecting the limits of the land and the water. "Everyone wants things to be green and pretty but they don't stop to think that we live in the [high] desert." ■



Data Source: Topography from Sure!Maps at scale of 1:24k.

All locations are approximate.

EXPLANATION:

WELL 1 ● WELL NUMBER AND APPROXIMATE LOCATION

Lambert Conformal Conic
Washington State Plane South
North American Datum 1983

0 2000 4000
SCALE IN FEET

N

Note: This drawing is for information purpose. It is intended to assist in showing features discussed in an attached document.

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VICINITY MAP

FIGURE 1

06/01/04 JWP:SCY

ORCH\0\0504020\00\CAD\050402000_FIG-1.dwg

TABLE 1
SENIOR WATER RIGHT APPLICATIONS TO CARDINAL GLASS WITHIN SAME GROUNDWATER SOURCE AREA

File #	Applicant	Doc	Priority Date	Purpose (1)	Qi (2)	UOM (3)	TRS (4)	1/4 1/4	Location description	Source
S2-29760	Herriford Harold	NewApp	6/24/1998	IR	0.3	CFS	14.0N 03.0W 25	SE SE	650' to SE corner of sec 25	CHEHALIS RIVER
G2-29132	William J. Wilson	NewApp	10/18/1994	IR	10	GPM	12.0N 02.0W 4	SW SW	300'N 825'E of the SE corner of sec 4	WELL
G2-29560	American Water Resources	NewApp	11/25/1997	DM	30	GPM	12.0N 02.0W 06	NE NW		WELL
G2-29553	American Water Resources	NewApp	11/25/1997	DM	30	GPM	12.0N 02.0W 06	NE NW		WELL
G2-29558	American Water Resources	NewApp	11/25/1997	DM	30	GPM	12.0N 02.0W 06	NE NW		WELL
G2-29559	American Water Resources	NewApp	11/25/1997	DM	30	GPM	12.0N 02.0W 06	NE NW		WELL
G2-29771	American Water Resources	NewApp	8/12/1998	DM	30	GPM	12.0N 02.0W 15	NE NW	2280'e 249's of the NW corner of sec 15	WELL
G2-29034	Terrence May	NewApp	4/29/1994	CI	2.5	GPM	12.0N 02.0W 16	NW SW		WELL
G2-29608	Dan Sparks	NewApp	3/24/1998	IR	30	GPM	12.0N 02.0W 23	NW NE	200'S 1520'W of the NE corner of sec 23	WELL
G2-29908	Centralia City	NewApp	3/15/2000	MU	4000	GPM	14.0N 03.0W 01			WELL
G2-28845	Washington Water Service Co	NewApp	5/18/1993	DM	110	GPM	15.0N 02.0W 06	NE NE	911'W 700'S of the NE corner of sec 6	WELL
G2-29524	Mance & Son Water Systems Inc	NewApp	9/25/1997	DM	100	GPM	15.0N 03.0W 01	SE NE	125'W 1150'W of the E1/4 corner of sec 1	WELL
G2-29499	Washington Water Service Co	NewApp	6/19/1997	DM	50	GPM	15.0N 03.0W 01	SE SE		WELL
G2-29700	Rochester Water Association	NewApp	6/8/1998	DM	340	GPM	15.0N 03.0W 03	SE SE	675'N 350'W of SE corner of sec 3	WELL
G2-29505	Lewis Cnty Utility Corporation	NewApp	7/21/1997	DM	30	GPM	15.0N 03.0W 03	SE SW		WELL
G2-29504	Lewis Cnty Utility Corporation	NewApp	7/21/1997	DM	30	GPM	15.0N 03.0W 03	SE SW		WELL
G2-29952	Miller Land & Timber	NewApp	10/10/2000	DM	321	GPM	15.0N 03.0W 12	SW SW	1200'E 1200'N of SW corner of sec 12	WELL
G2-29563	Bean Robert	NewApp	12/16/1997	ST,IR	20	GPM	15.0N 03.0W 13	SE SE	1040'W 50'N of SE corner of sec 13	WELL
G2-29516	Oakville City	NewApp	9/3/1997	MU	500	GPM	16.0N 04.0W 30	SW SW	100'N 700'E of E of SW corner of sec 30	WELL
G2-28811	Gary Briggs/Alexander W. Mackie	NewApp	4/13/1993	IR	220	GPM	17.0N 05.0W 20	SW SE	900'E 20'N of S1/4 corner of sec 20	WELL
G2-28152	Briggs Nursery Inc	NewApp	5/20/1991	IR	1600	GPM	17.0N 05.0W 20	NE NW	125'E 300'S of NW corner of sec 20	WELL
G2-28151	Briggs Nursery Inc	NewApp	5/20/1991	IR	900	GPM	17.0N 05.0W 20	SE SW	1100'W 450'S of N1/4 corner of sec 20	WELL
G2-28153	Briggs Nursery Inc	NewApp	5/20/1991	IR	350	GPM	17.0N 05.0W 20	NW NE	30"S 660'E of N1/4 corner of sec 20	WELL
G2-29060	Lang Mike	NewApp	6/14/1994	DM	175	GPM	17.0N 06.0W 01	SW NE	1564'S 1733'W of the NE corner of sec 1	WELL
G2-29901	Weyerhaeuser Timber Co	NewApp	2/14/2000	CI	500	GPM	17.0N 06.0W 04	NE NW	736'S 1431'E of NW corner of sec 4	WELL
G2-29715	Smylie George	NewApp	6/30/1998	IR,DM	20	GPM	17.0N 06.0W 10	NW NW	1400'S 660'E of NW corner of sec 10	WELL
G2-29717	Rosenbach Doris	NewApp	7/15/1998	IR	500	GPM	17.0N 07.0W 01	SW NW		WELL

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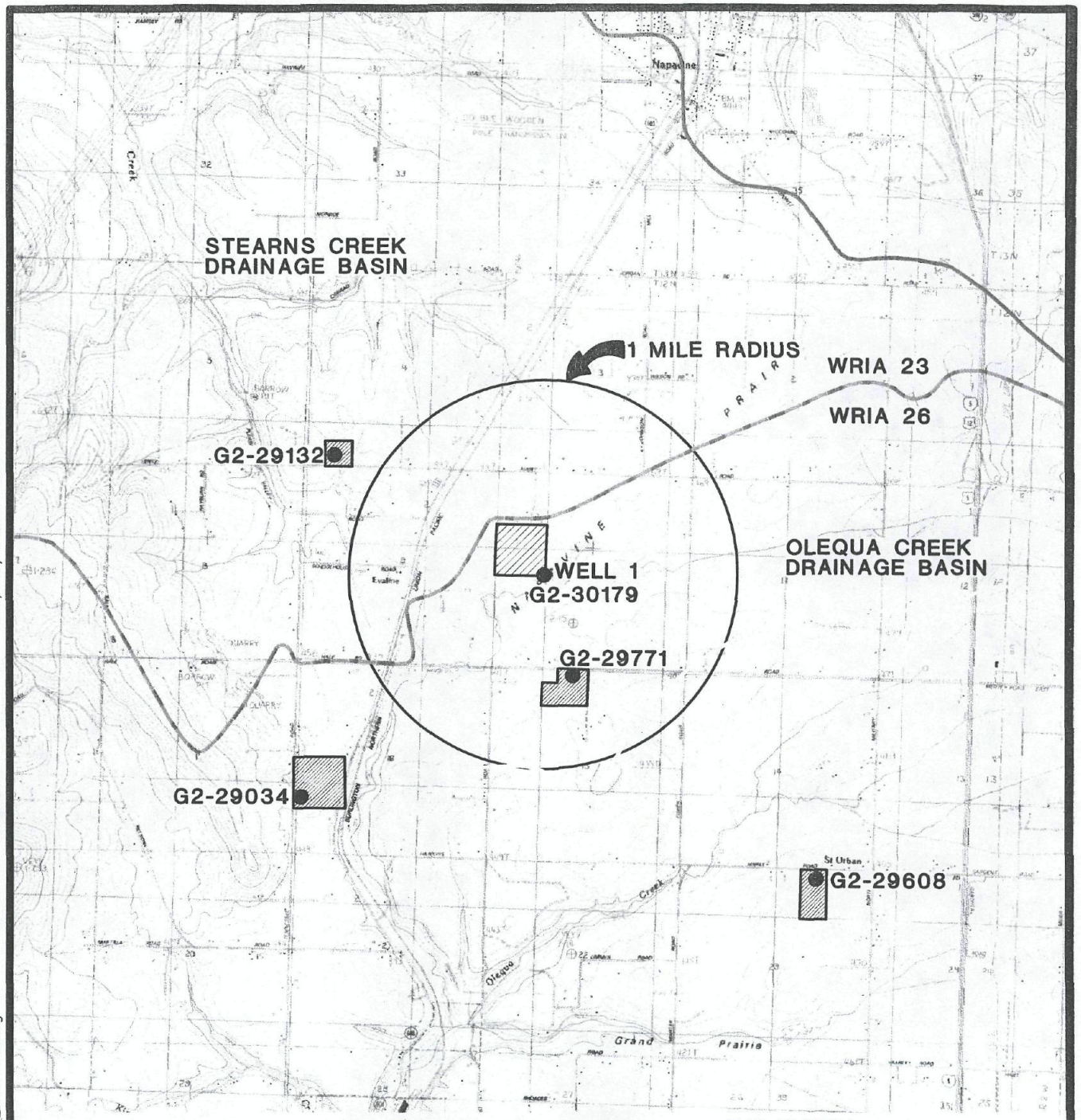
1 IR = Irrigation; DM = Multiple Domestic; CI = Commercial/Industrial, ST = Stock Watering; MU = Municipal

2 Qi = Instantaneous Quanty

3 UOM = Unit of Measure; CFS = Cubic Feet per Second; GPM = Gallons Per Minute

4 TRS = Township, Range, Section

Data Source: Don Davidson, Washington State Department of Ecology, 6/21/04. Note: This data may not be complete or accurate.



Data Source: Topography from Sure!Maps at scale of 1:24k.

All locations are approximate.

Lambert Conformal Conic
Washington State Plane South
North American Datum 1983

0 4000 8000
SCALE IN FEET

EXPLANATION:

G2-30179 ● LOCATION OF WATER RIGHT APPLIED

STEARNS CREEK DRAINAGE BASIN

OLEQUA CREEK DRAINAGE BASIN

WRIA BOUNDARY

N

Note: This drawing is for information purpose. It is intended to assist in showing features discussed in an attached document.

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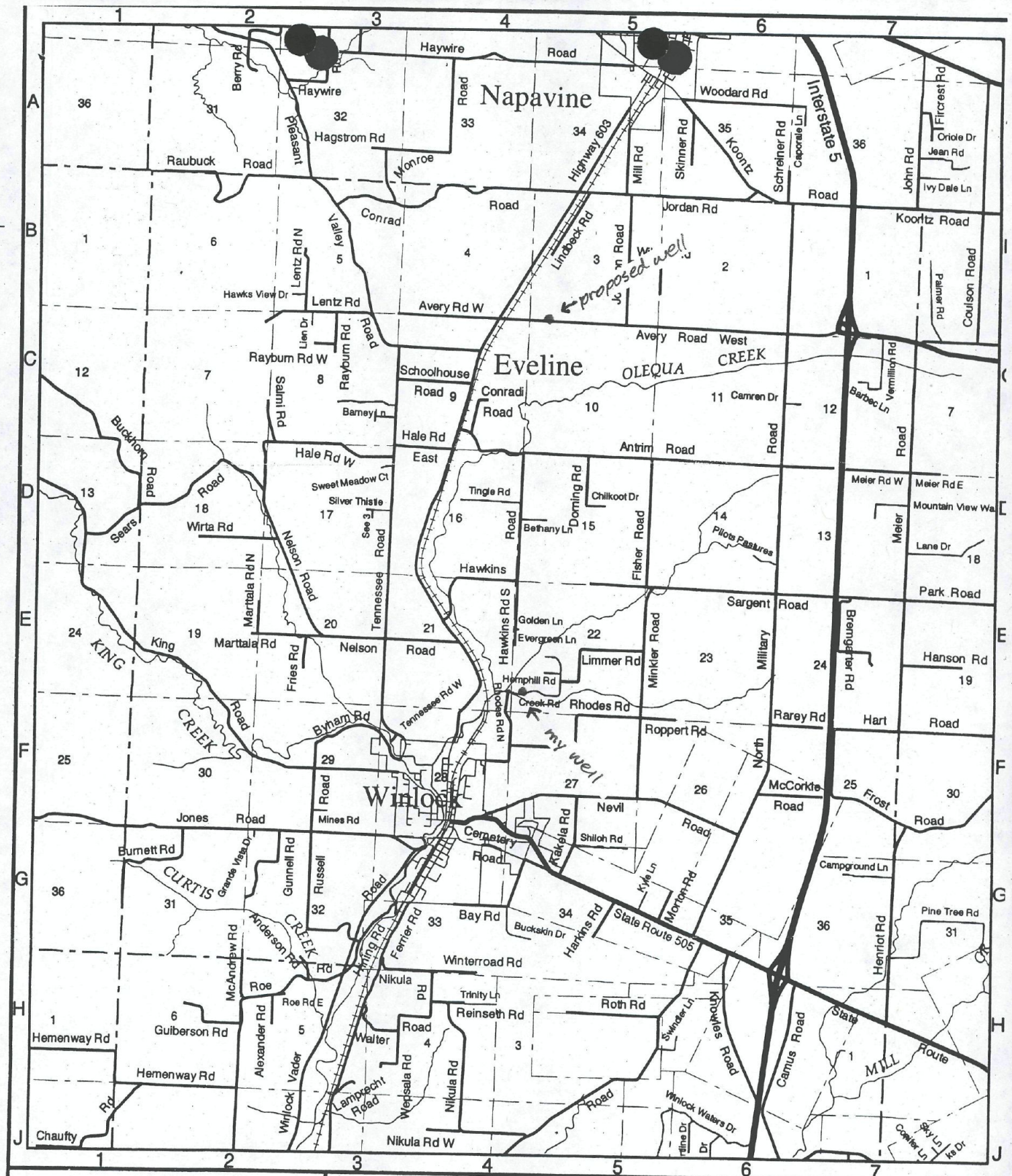
LOCATION OF WRIA BOUNDARIES, DRAINAGE BASINS, AND WATER RIGHT APPLICATIONS WITHIN SOURCE AREA OF THE CARDINAL GLASS APPLICATION

FIGURE 2

06/21/04

JWP:SCY

ORCH\0\050402\00\CAD\050402000_FIG-2.dwg



LEGEND

- State Highway
- County Road
- City Street
- Private Road

Twp. 12 N. Rge 2 W.

Scale: 1" = 1 Mile

Lewis County, Washington

11	12	19
13	14	21
15	16	23

WASHINGTON STATE DEPARTMENT OF ECOLOGY

WASHINGTON STATE DEPARTMENT OF ECOLOGY

RECEIPT 203065

DATE 2/27/04

RECEIVED FROM CARD C.G. COMPANY

TEN DOLLARS

DOLLARS 10.00

FUND:

General ..... UST ..... WWD ..... Other W.R. Cash .....

LOCATION: SWRO

Check # 3938

MO # .....

PURPOSE: W.R. Application

By Maureen Gorsett

Thank You

010-144

WASHINGTON STATE DEPARTMENT OF ECOLOGY

WASHINGTON STATE DEPARTMENT OF ECOLOGY

RECEIPT 203065

DATE 2/27/04

RECEIVED FROM CARD CG COMPANY

TEN DOLLARS

DOLLARS 10.00

FUND:

General ..... UST ..... WWD ..... Other W.R. Cash .....

LOCATION: SWRO

Check # 3938

MO # .....

PURPOSE: W.R. Application

By Maureen Gossett

Thank You

010-144