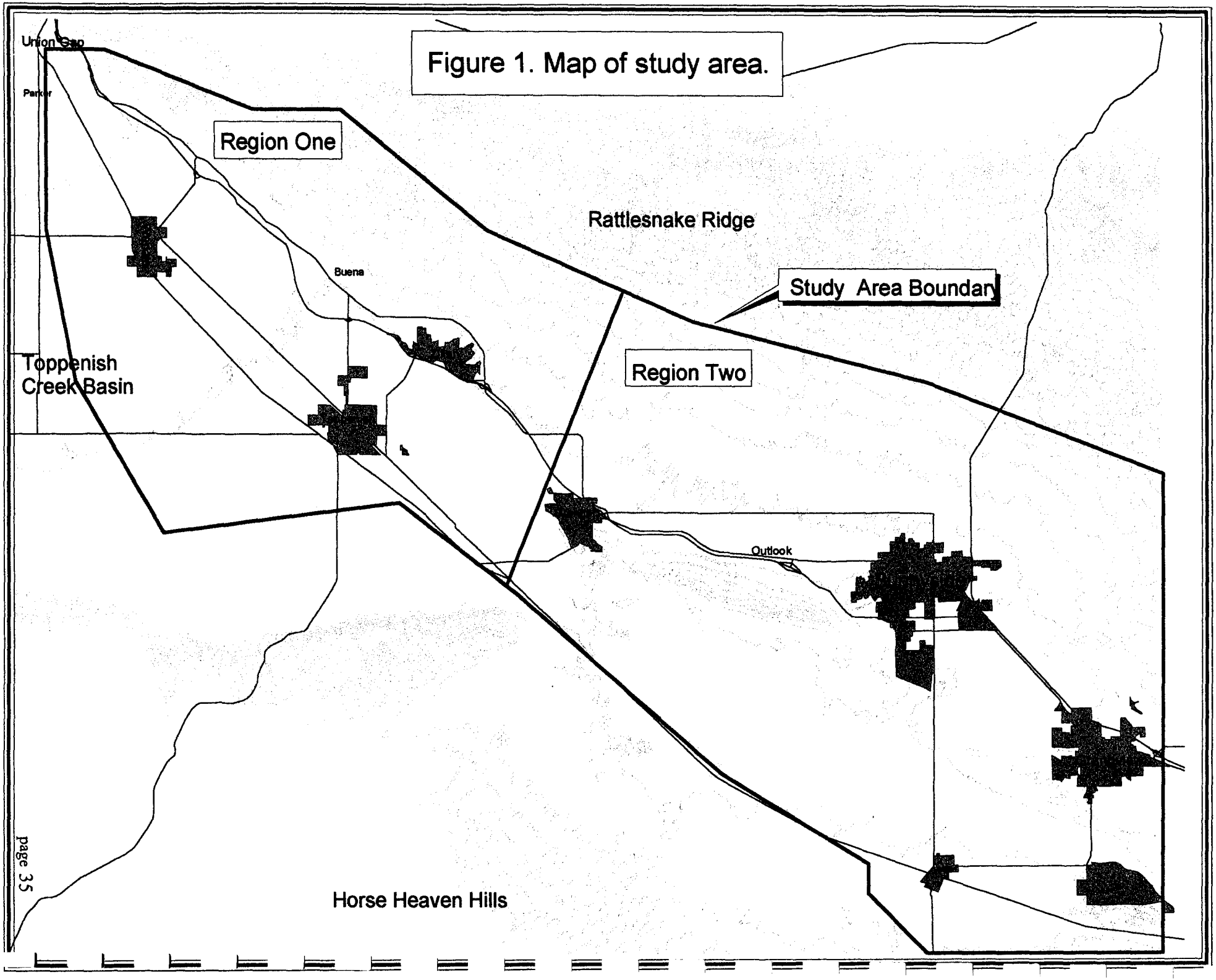
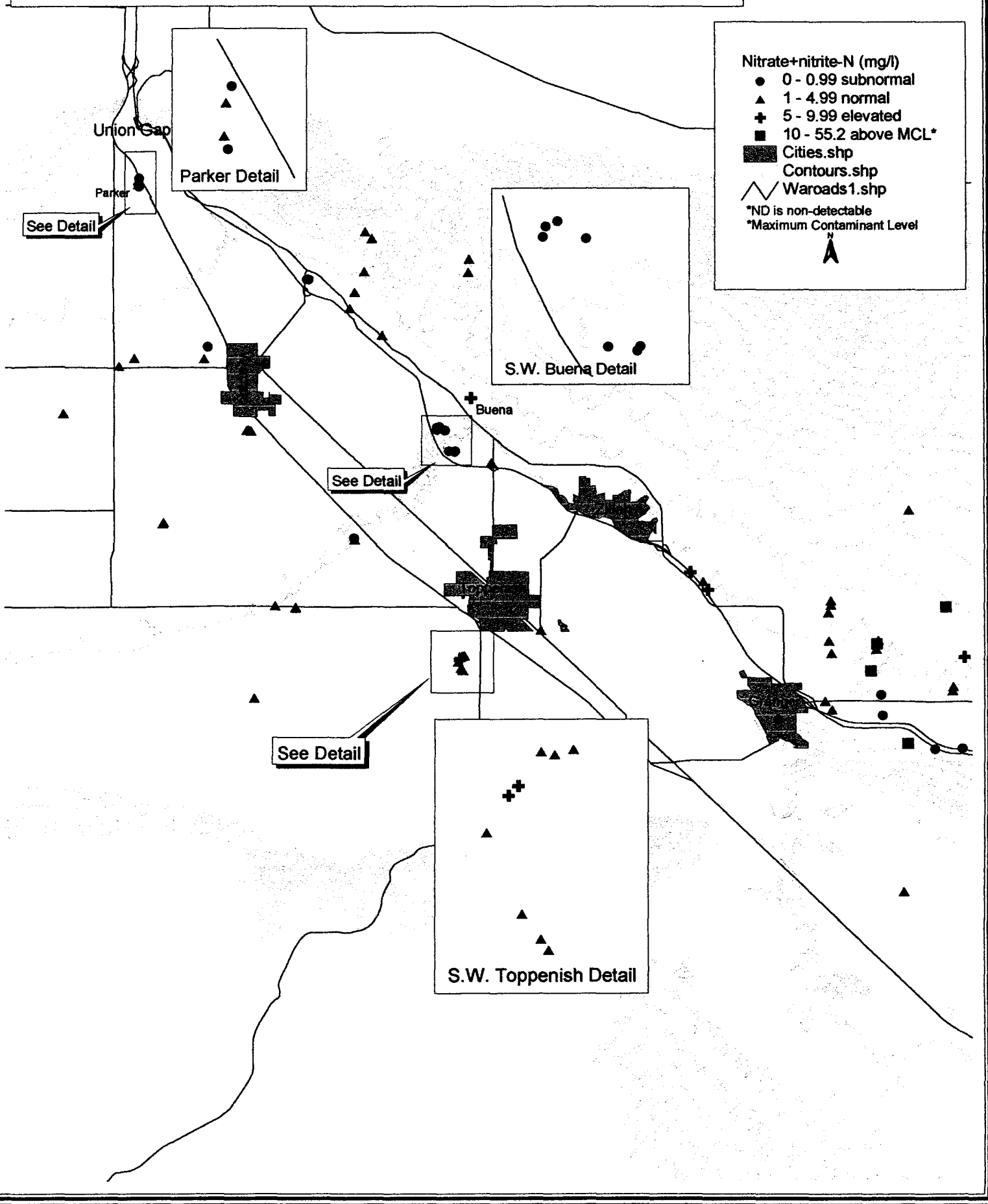


Figure 1. Map of study area.

Figure 2. Nitrate+nitrite-N levels in well water from the lower Yakima Valley.



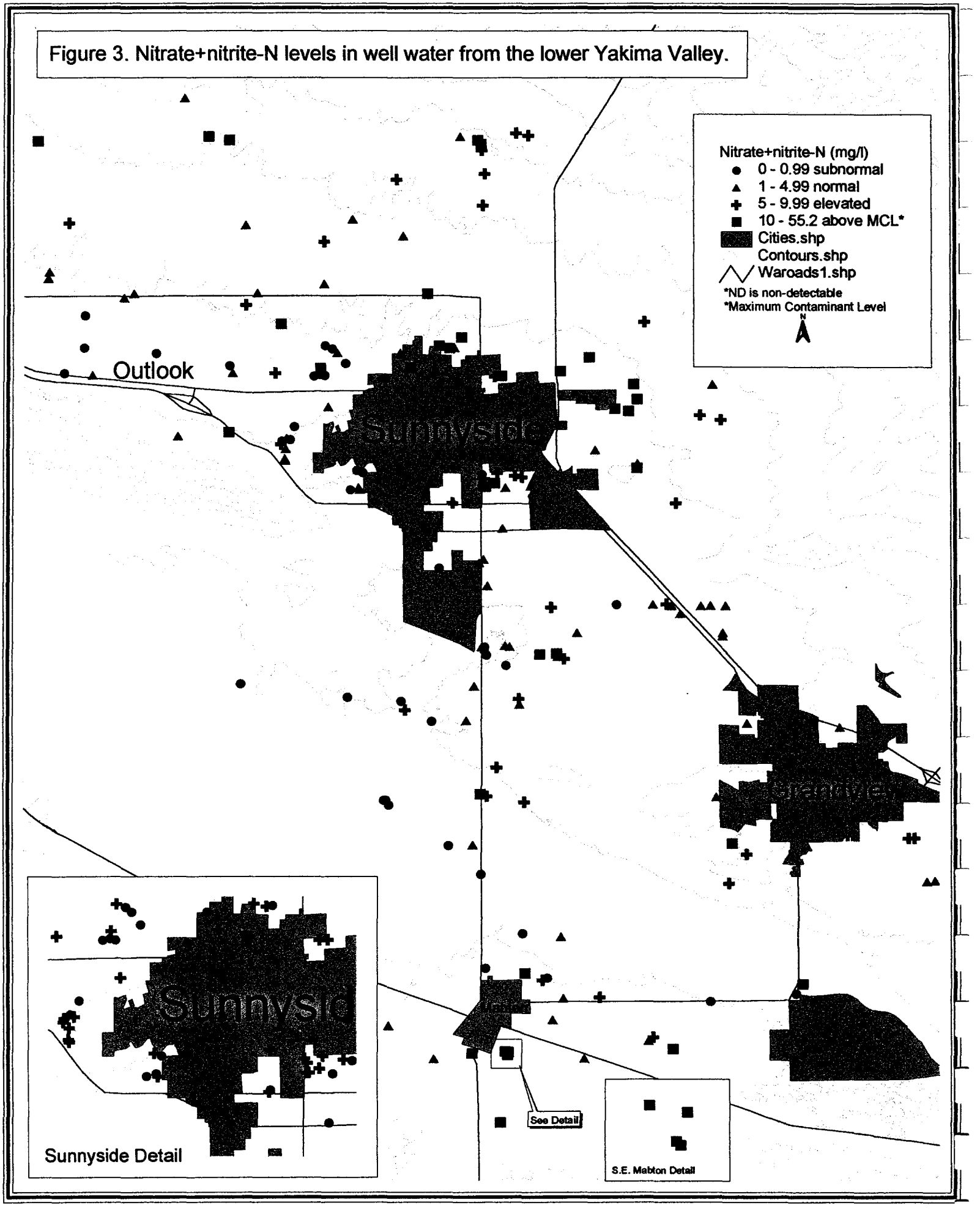


Figure 3. Nitrate+nitrite-N levels in well water from the lower Yakima Valley.

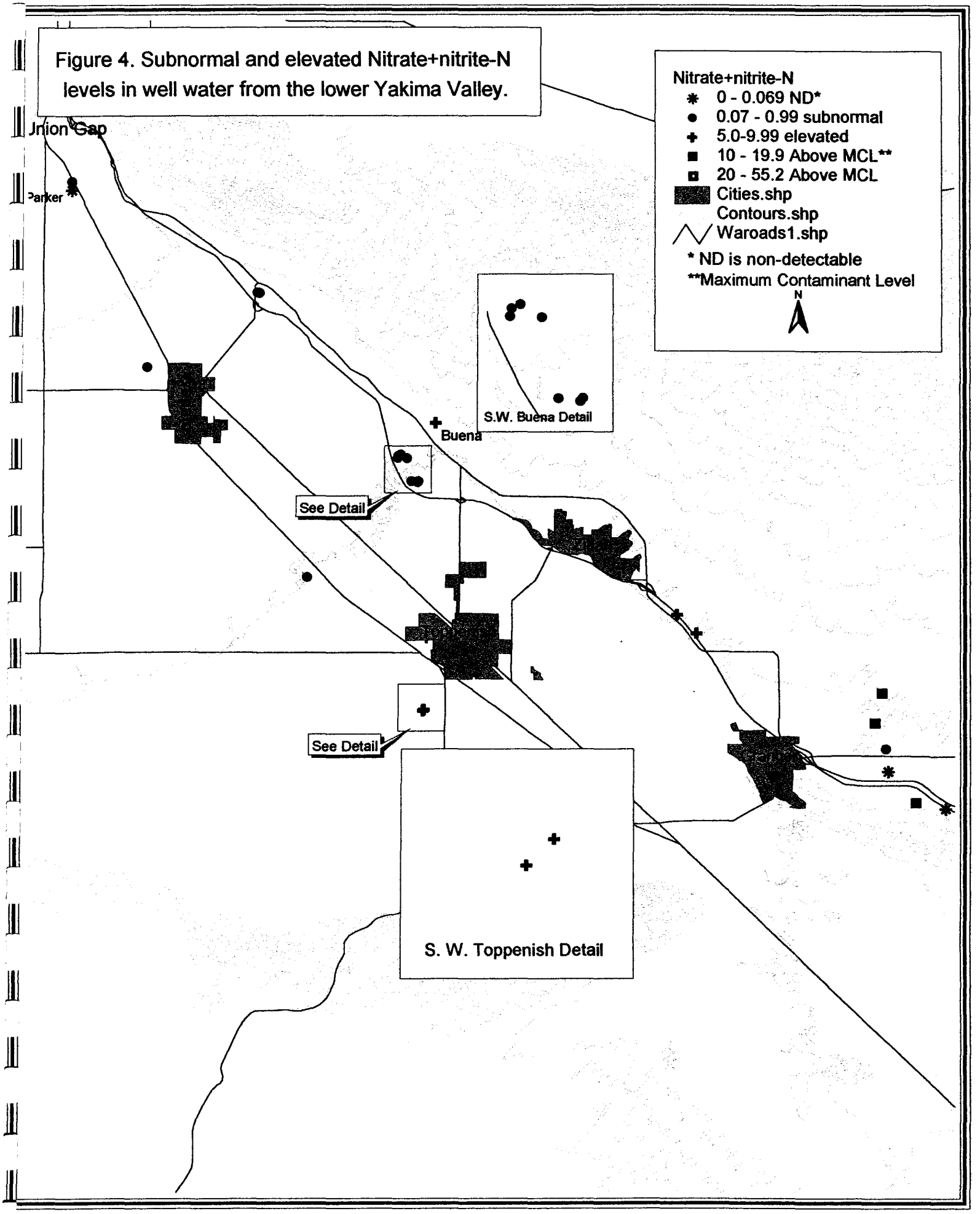


Figure 4. Subnormal and elevated Nitrate+nitrite-N levels in well water from the lower Yakima Valley.

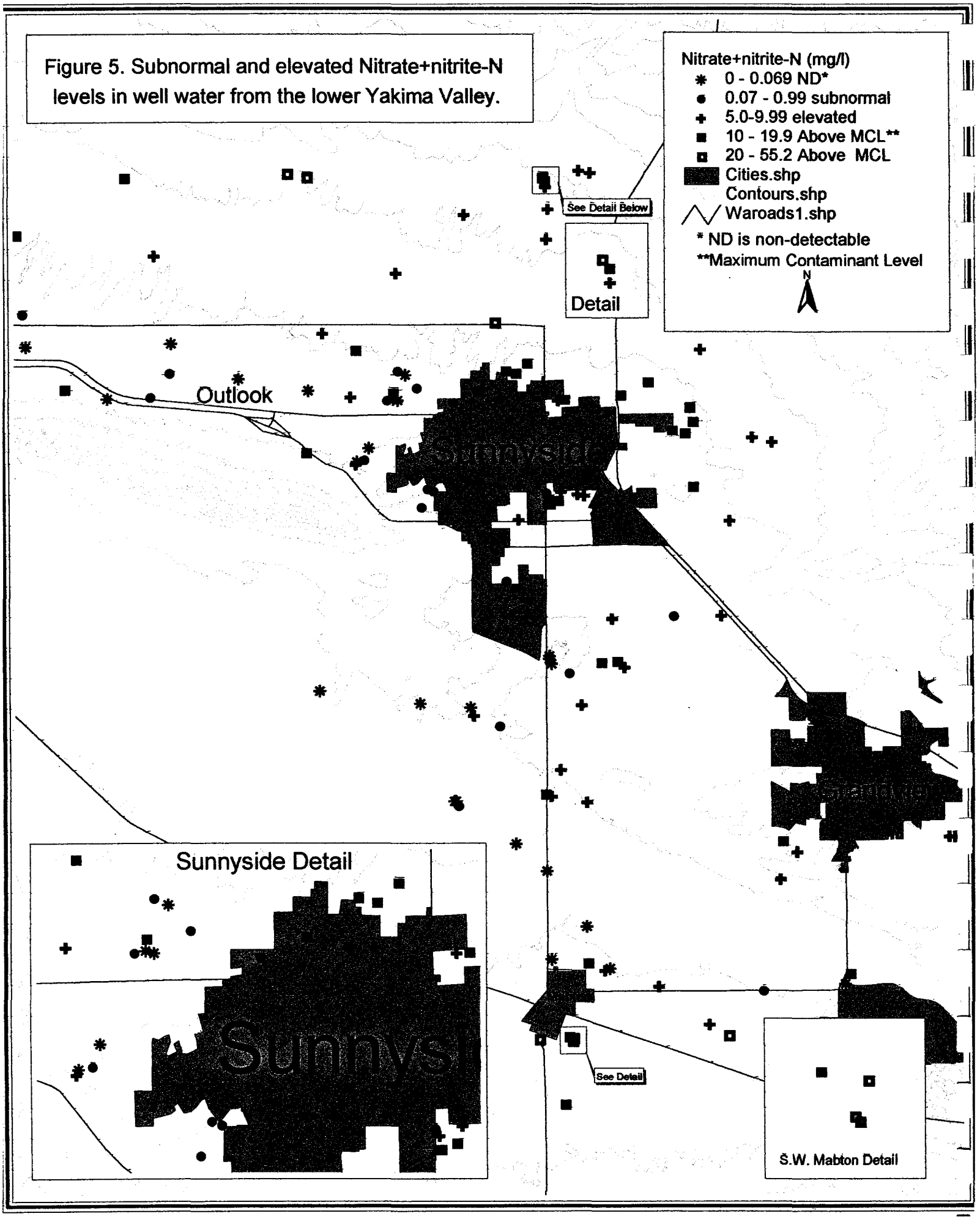


Figure 5. Subnormal and elevated Nitrate+nitrite-N levels in well water from the lower Yakima Valley.

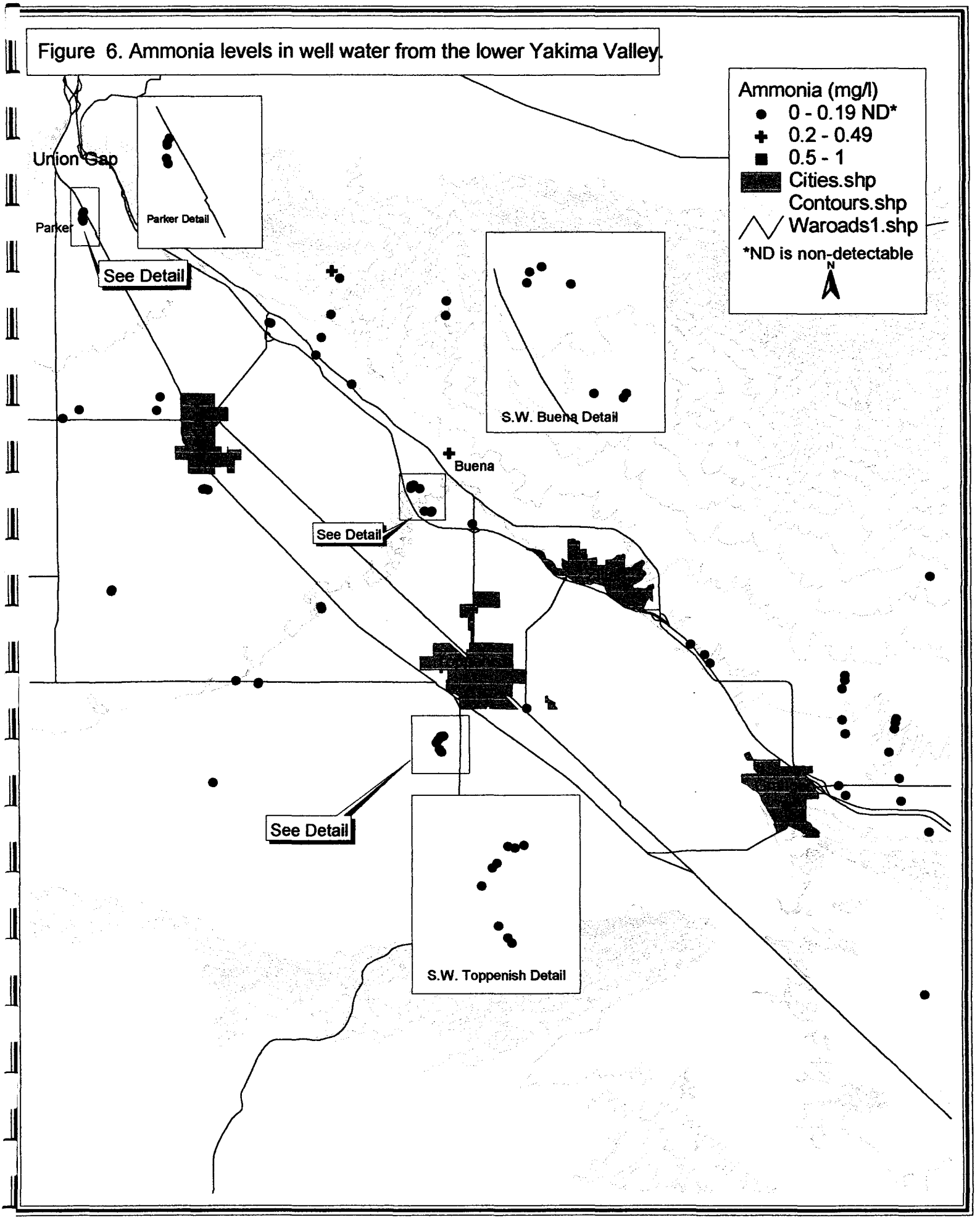


Figure 6. Ammonia levels in well water from the lower Yakima Valley.

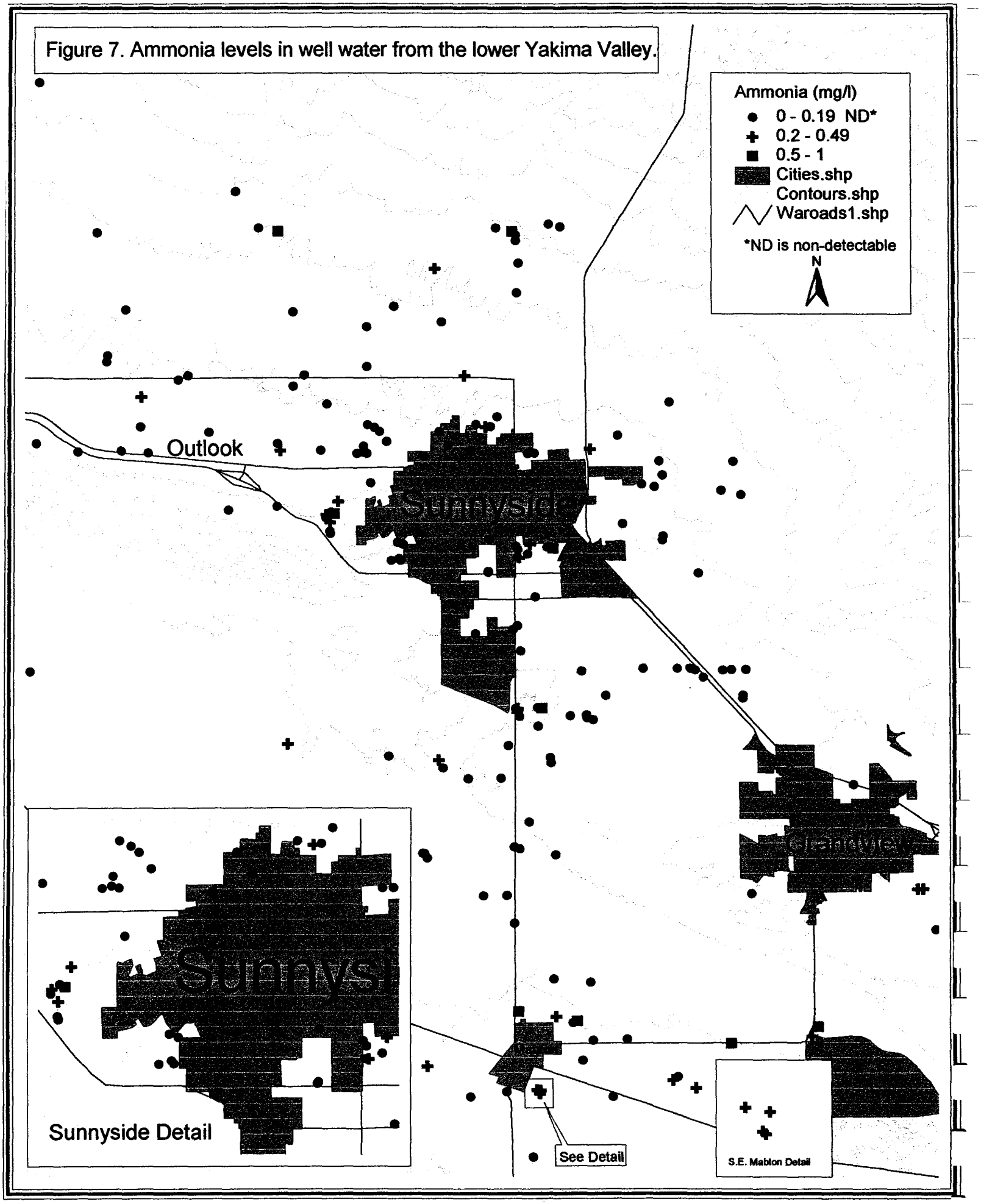


Figure 7. Ammonia levels in well water from the lower Yakima Valley.

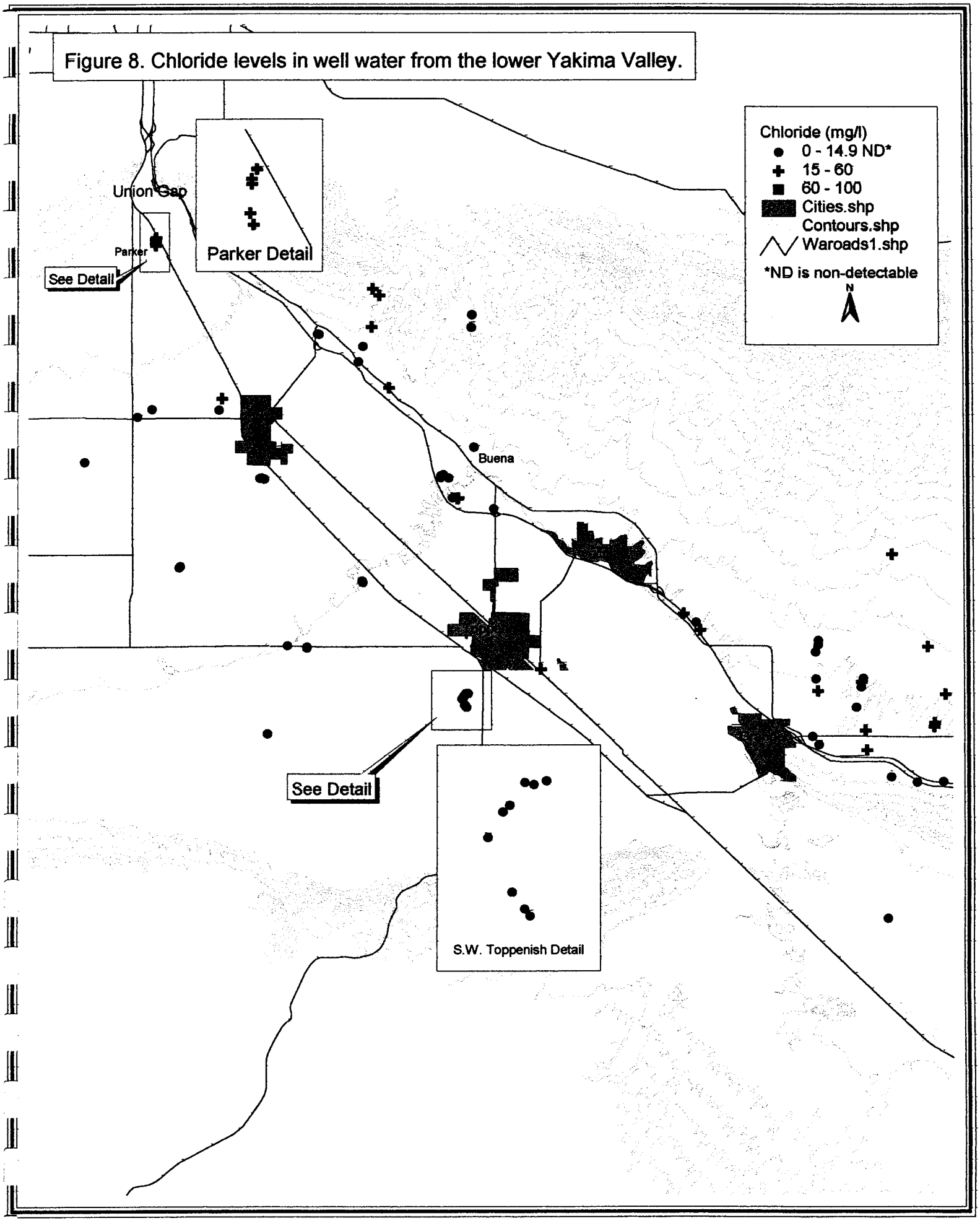


Figure 8. Chloride levels in well water from the lower Yakima Valley.
Chloride (mg/l)
0 - 14.9 ND*
15 - 60
60 - 100
Cities.shp
Contours.shp
Waroads1.shp
*ND is non-detectable
N
Union Gap
Parker
See Detail
Parker Detail
Buena
See Detail
S.W. Toppenish Detail

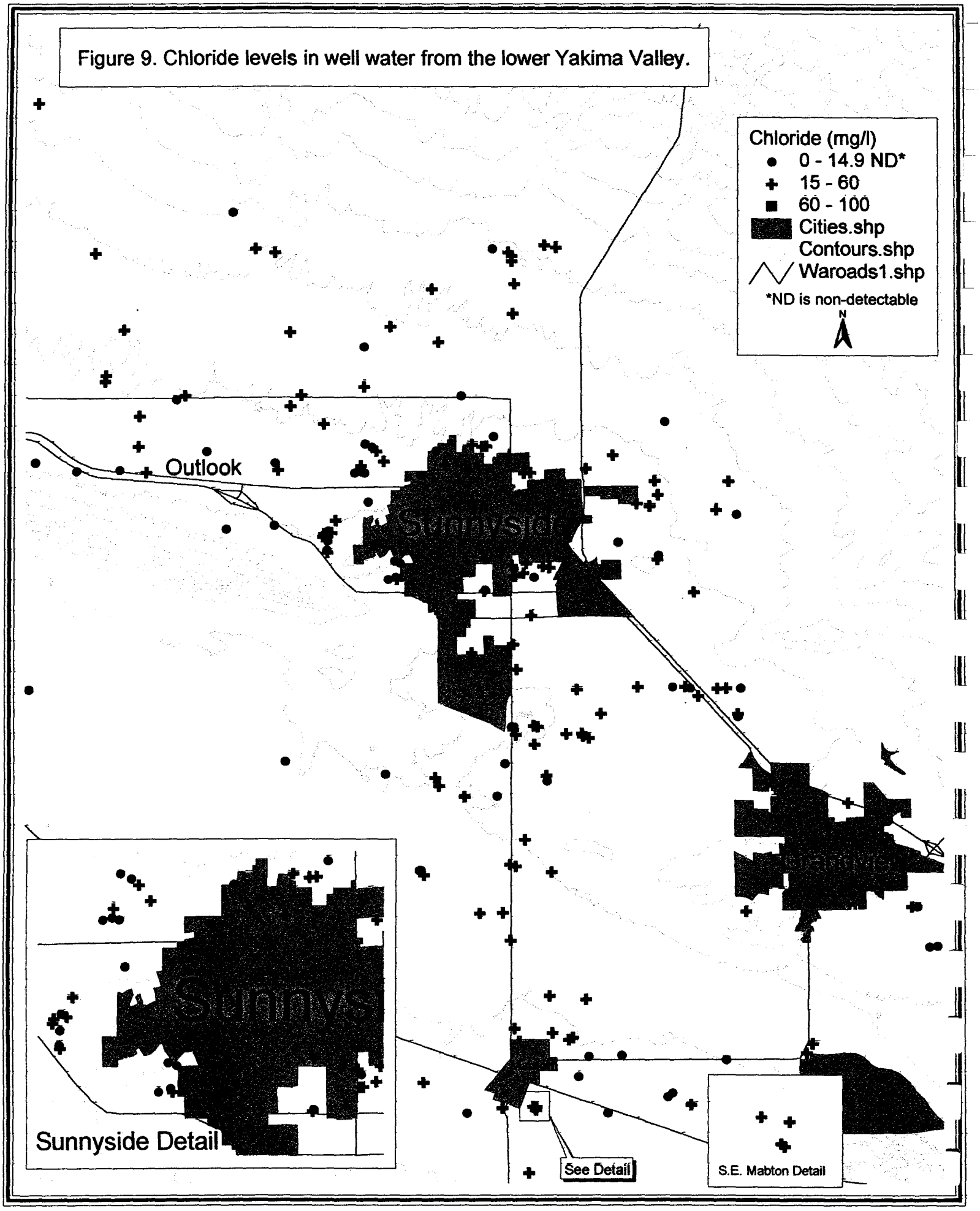


Figure 9. Chloride levels in well water from the lower Yakima Valley.

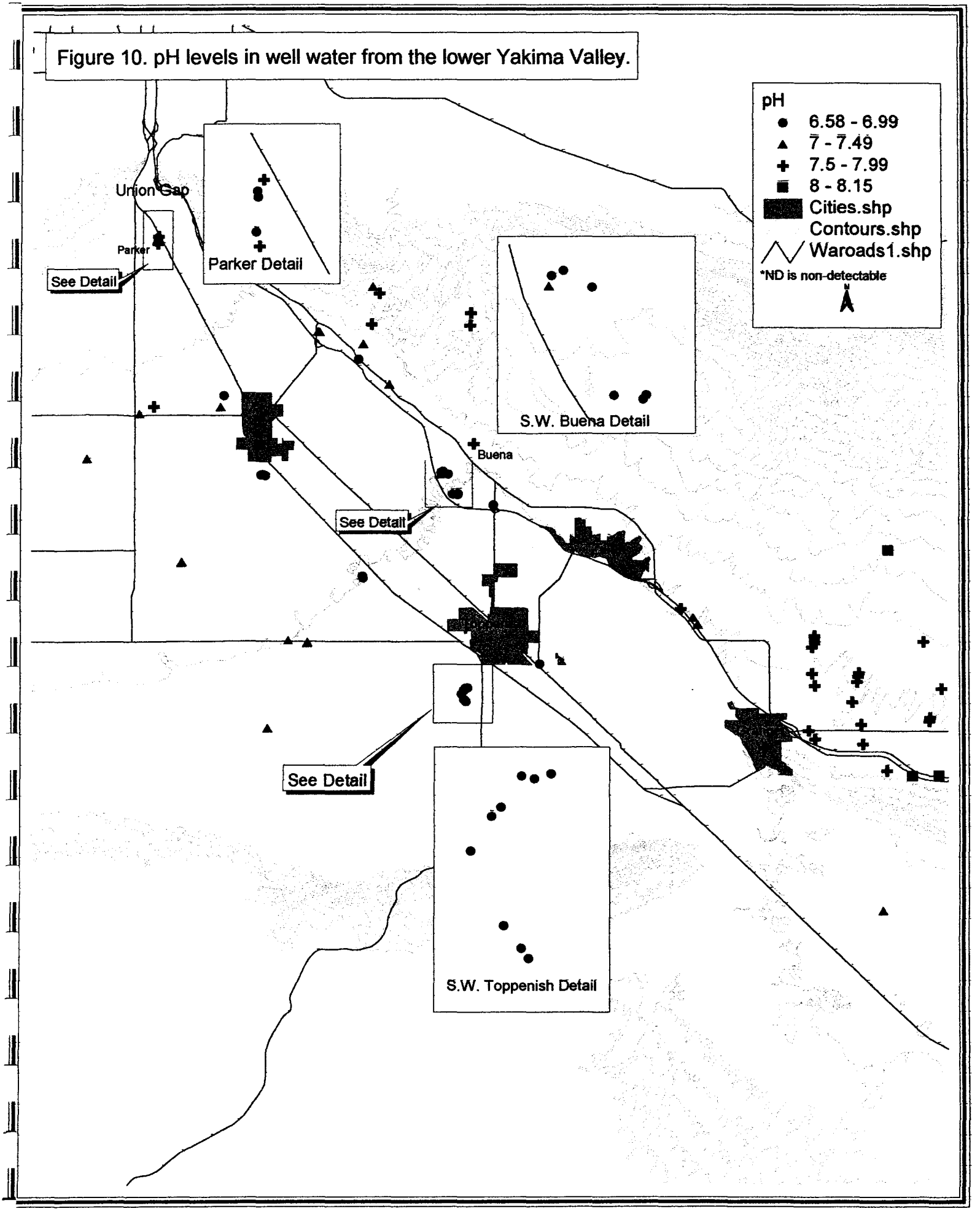


Figure 10. pH levels in well water from the lower Yakima Valley.

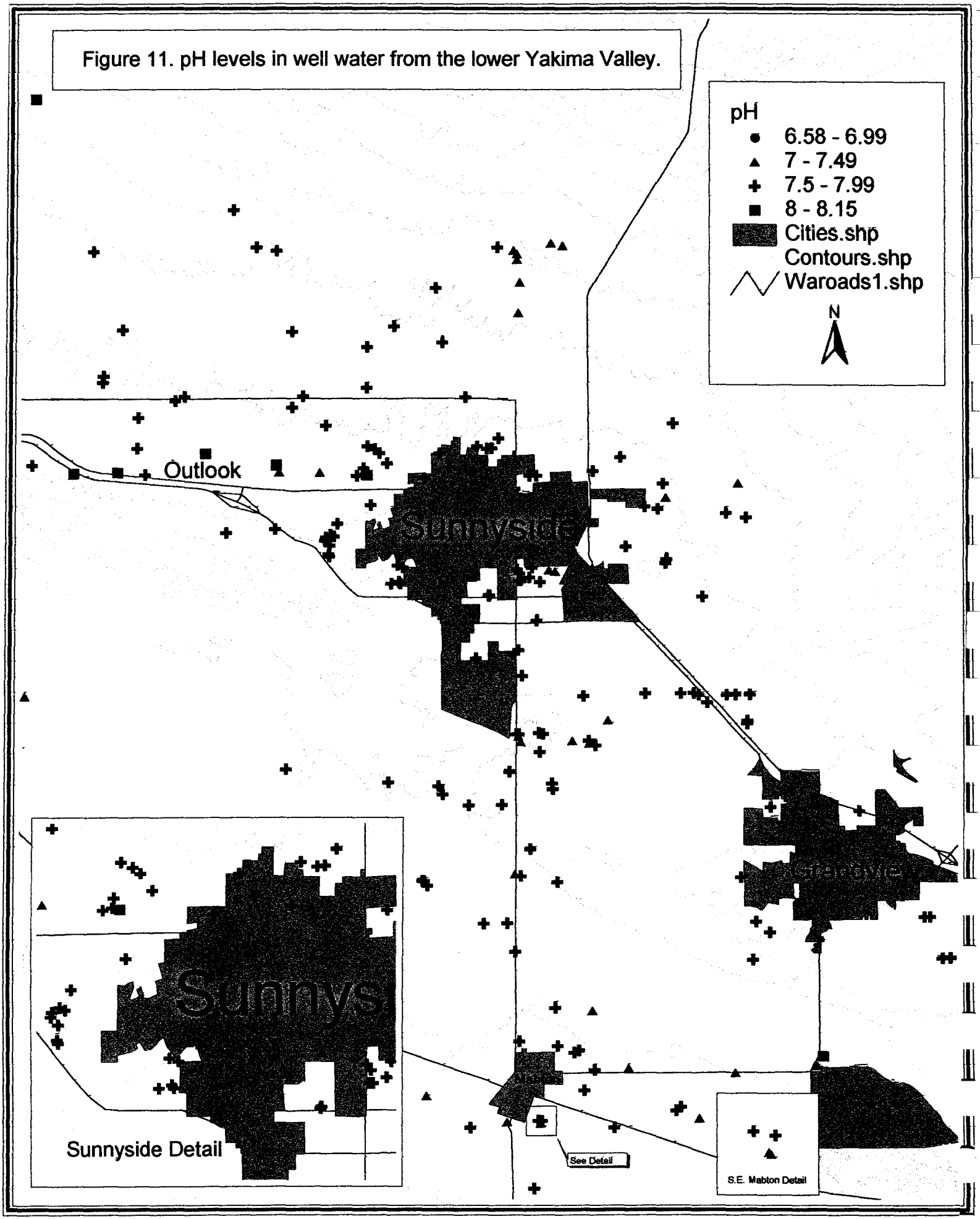
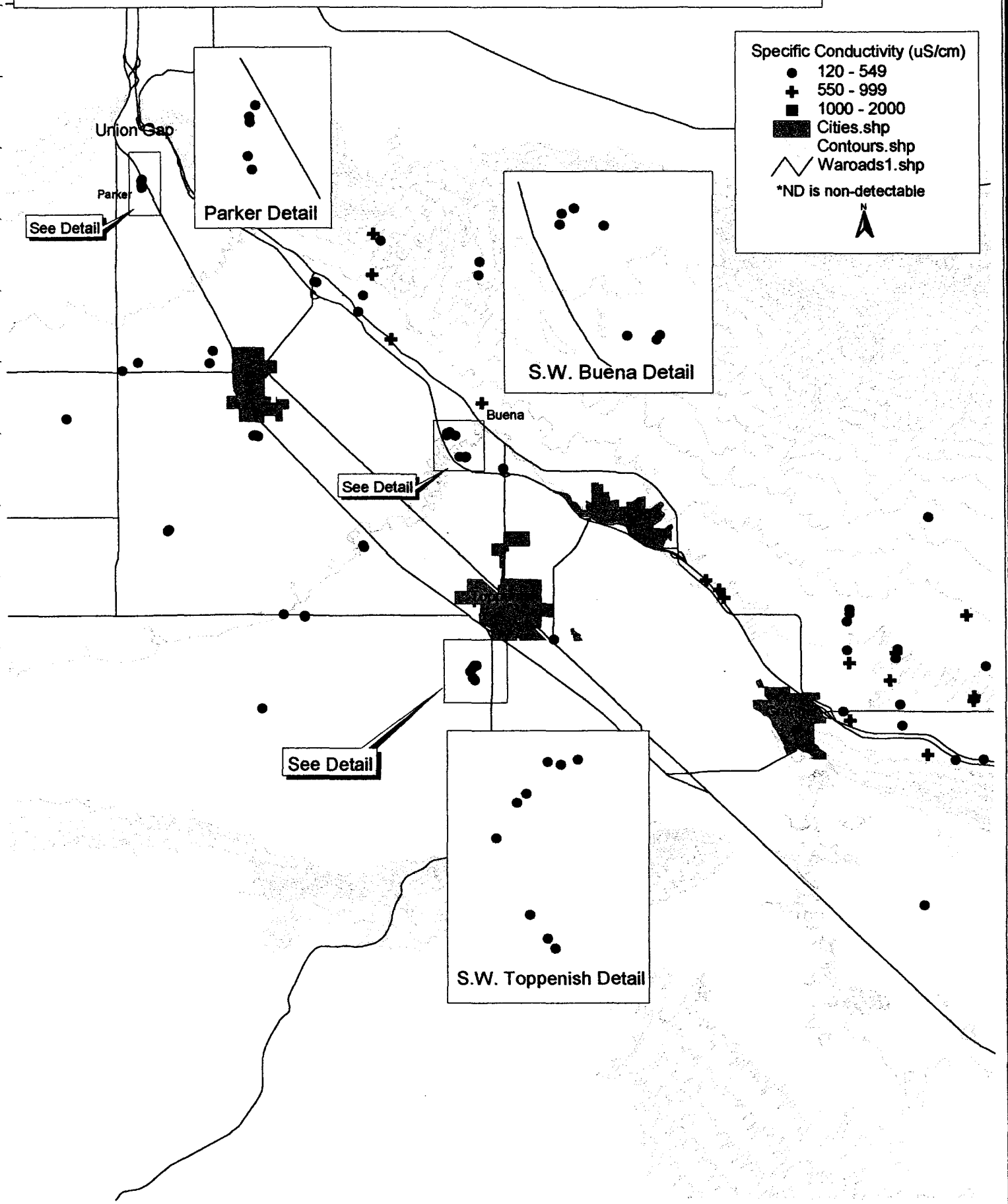


Figure 11. pH levels in well water from the lower Yakima Valley.

Figure 12. Specific Conductivity levels in well water from the lower Yakima Valley.



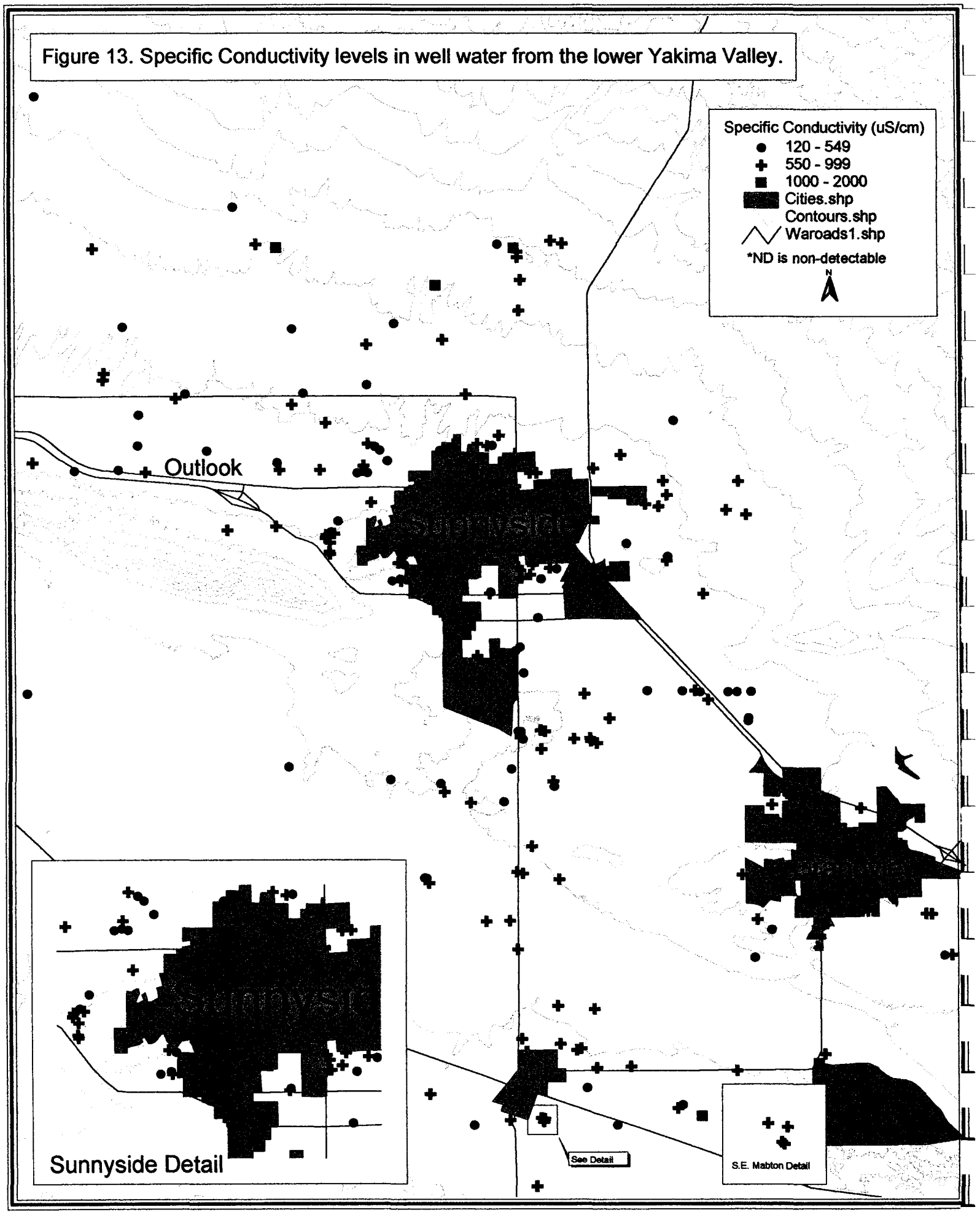
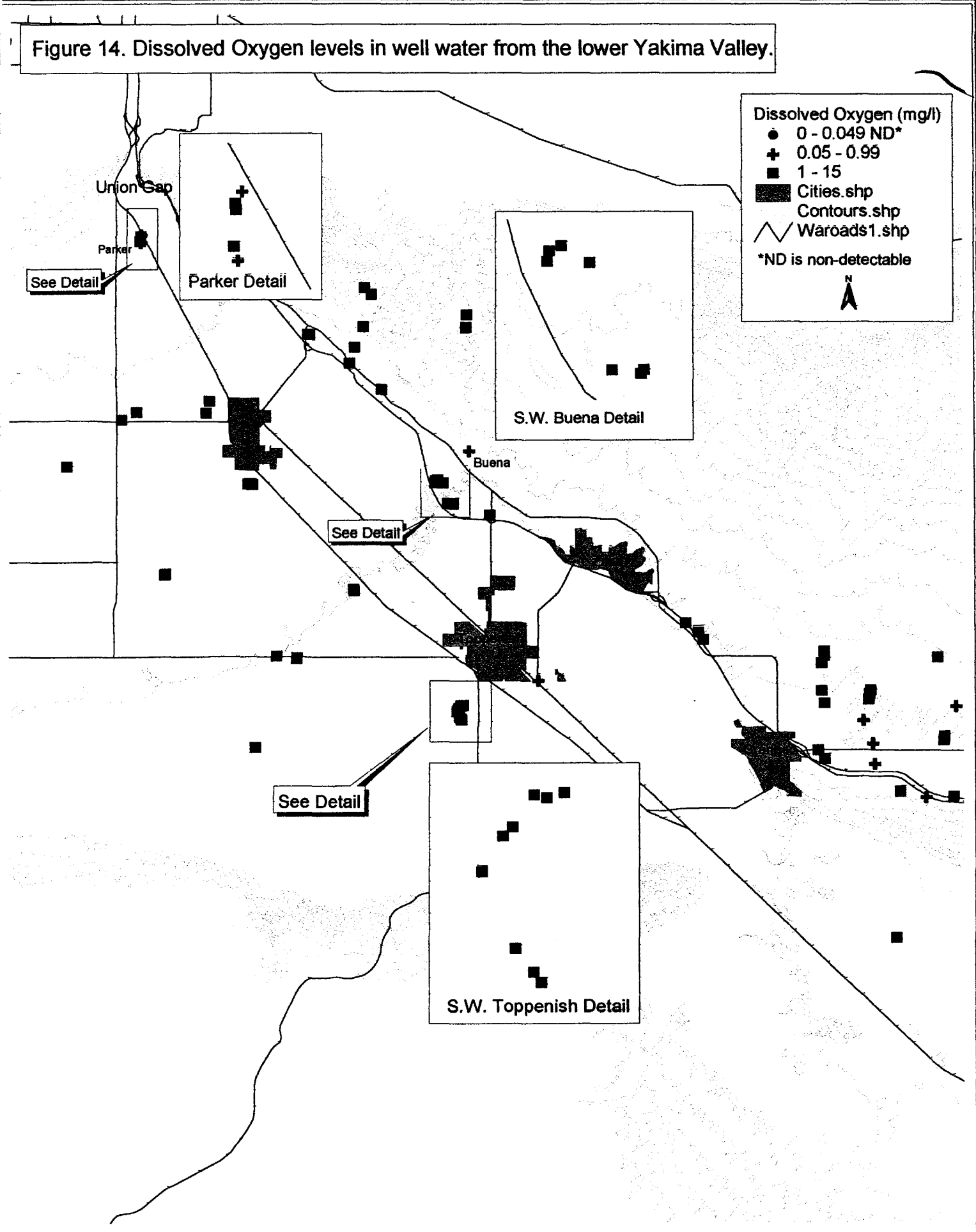


Figure 13. Specific Conductivity levels in well water from the lower Yakima Valley.

Figure 14. Dissolved Oxygen levels in well water from the lower Yakima Valley.



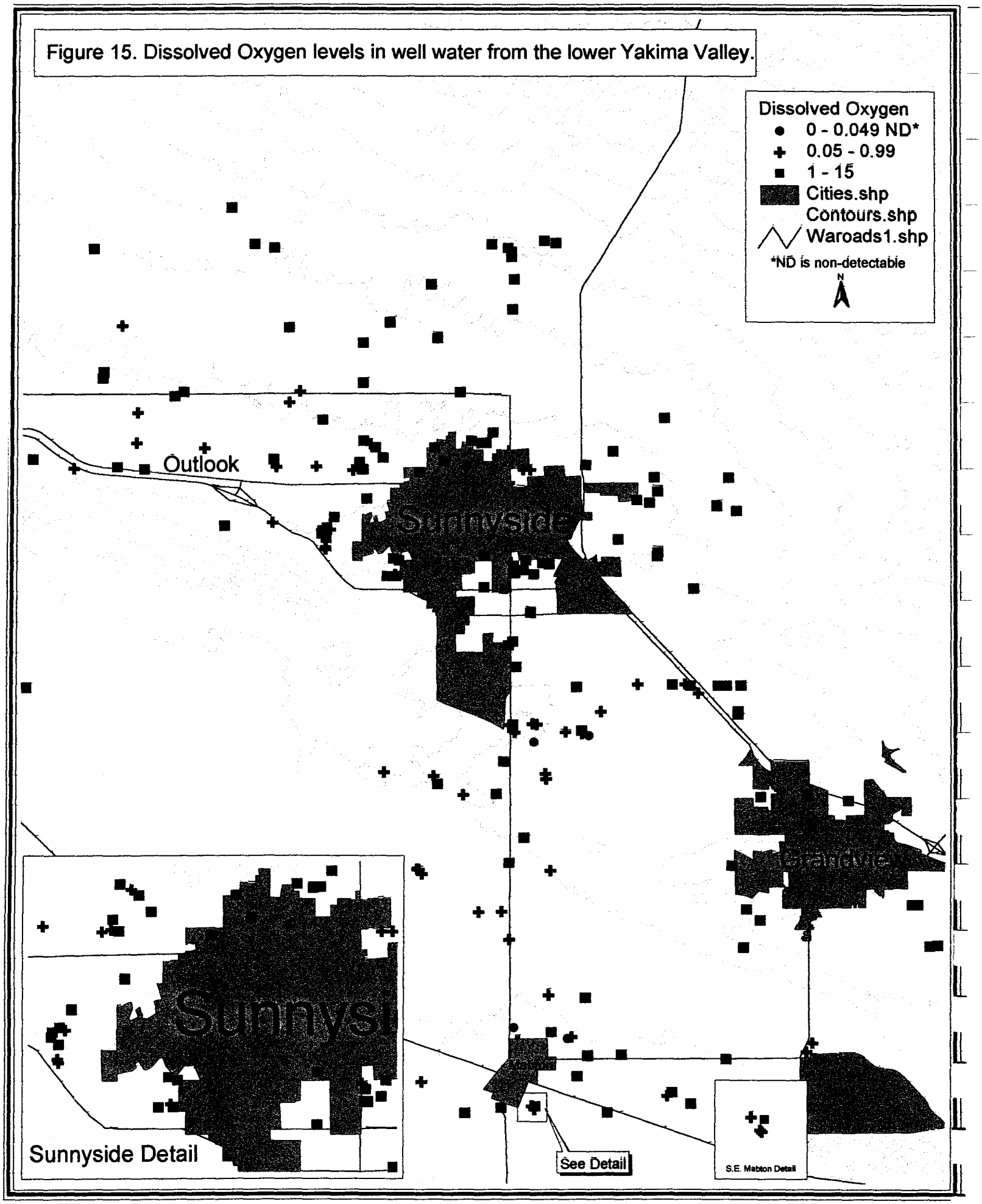
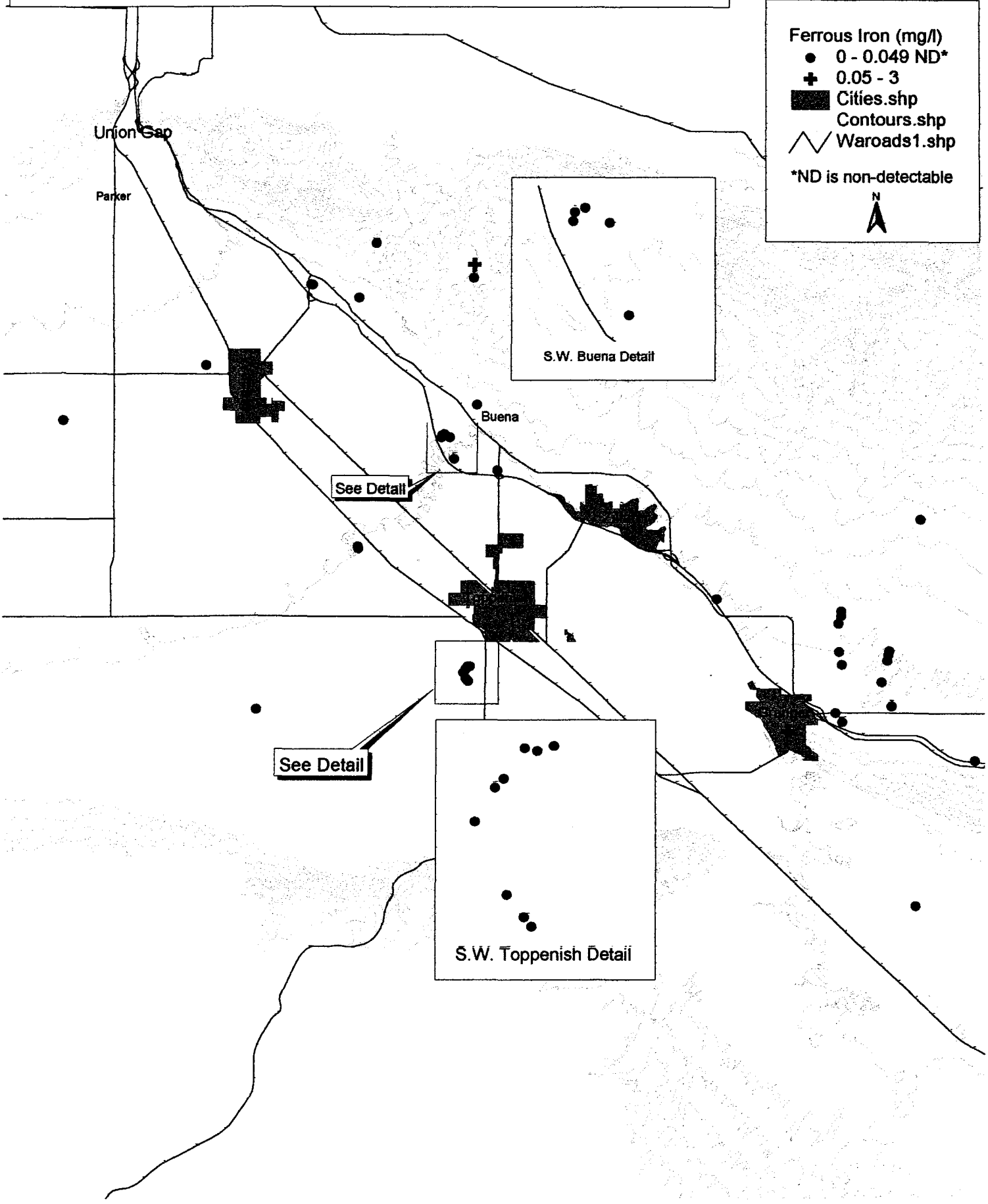


Figure 15. Dissolved Oxygen levels in well water from the lower Yakima Valley.

Figure 16. Ferrous Iron levels in well water from the lower Yakima Valley.



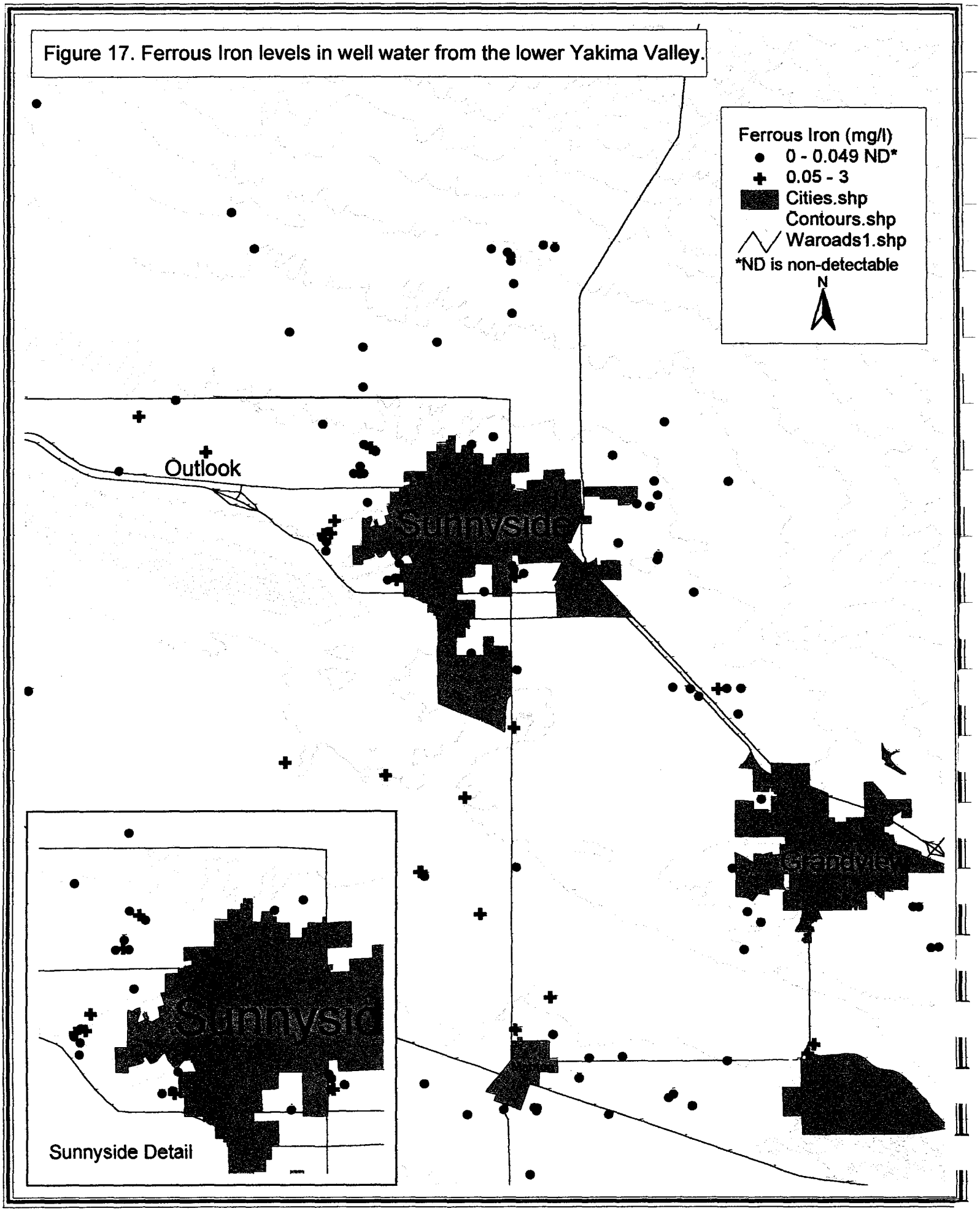
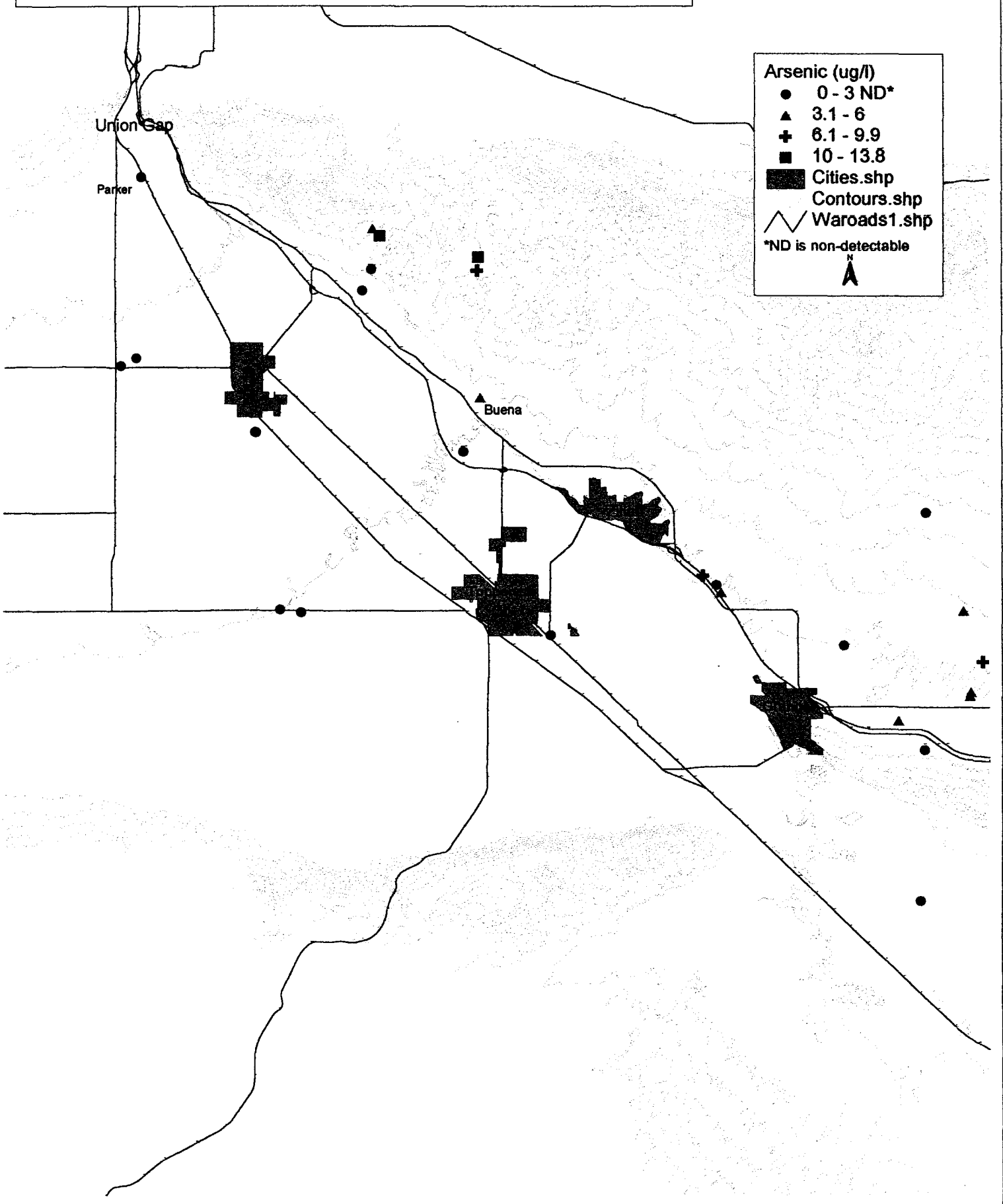


Figure 17. Ferrous Iron levels in well water from the lower Yakima Valley.

Figure 18. Arsenic levels in well water from the lower Yakima Valley.



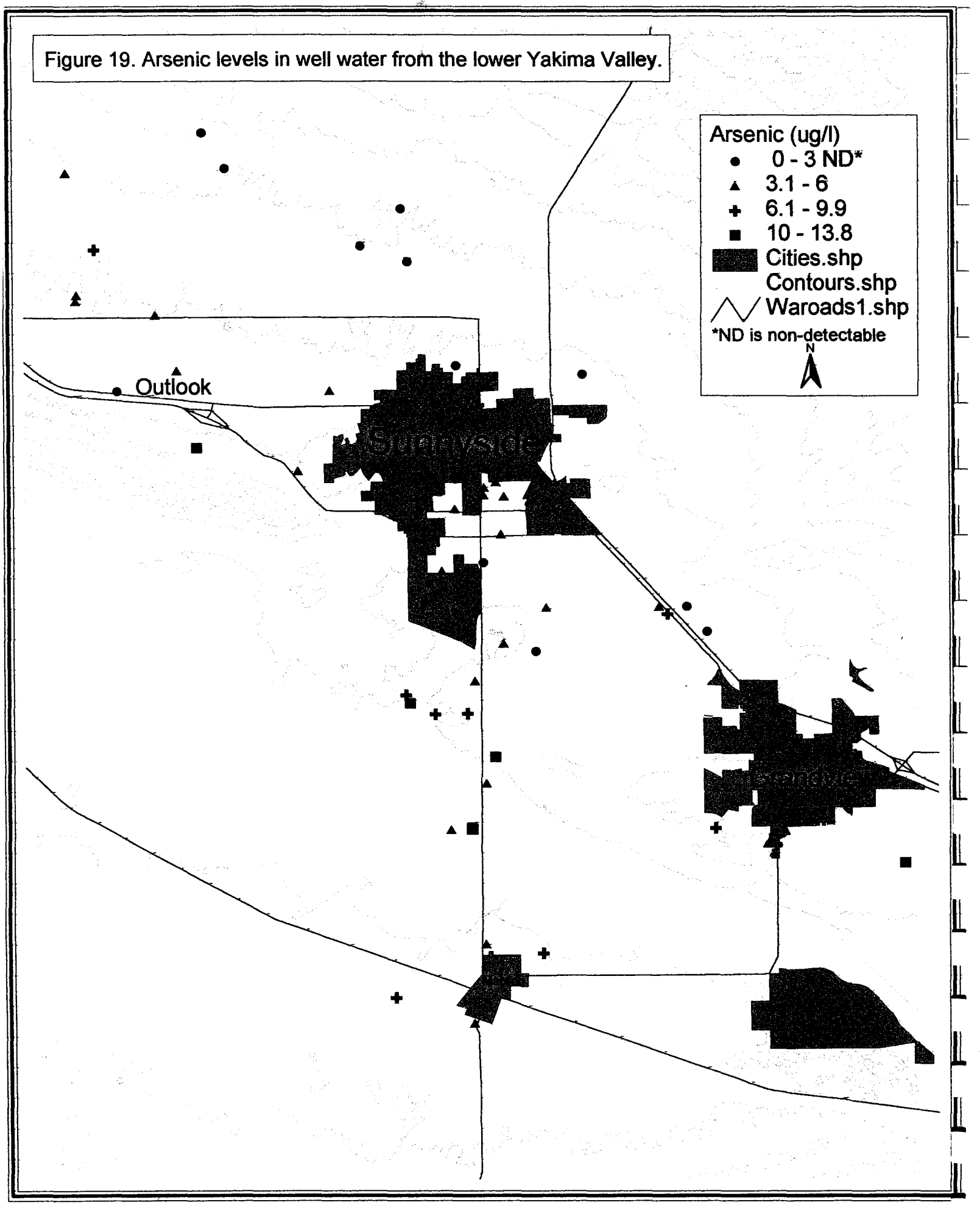


Figure 19. Arsenic levels in well water from the lower Yakima Valley.

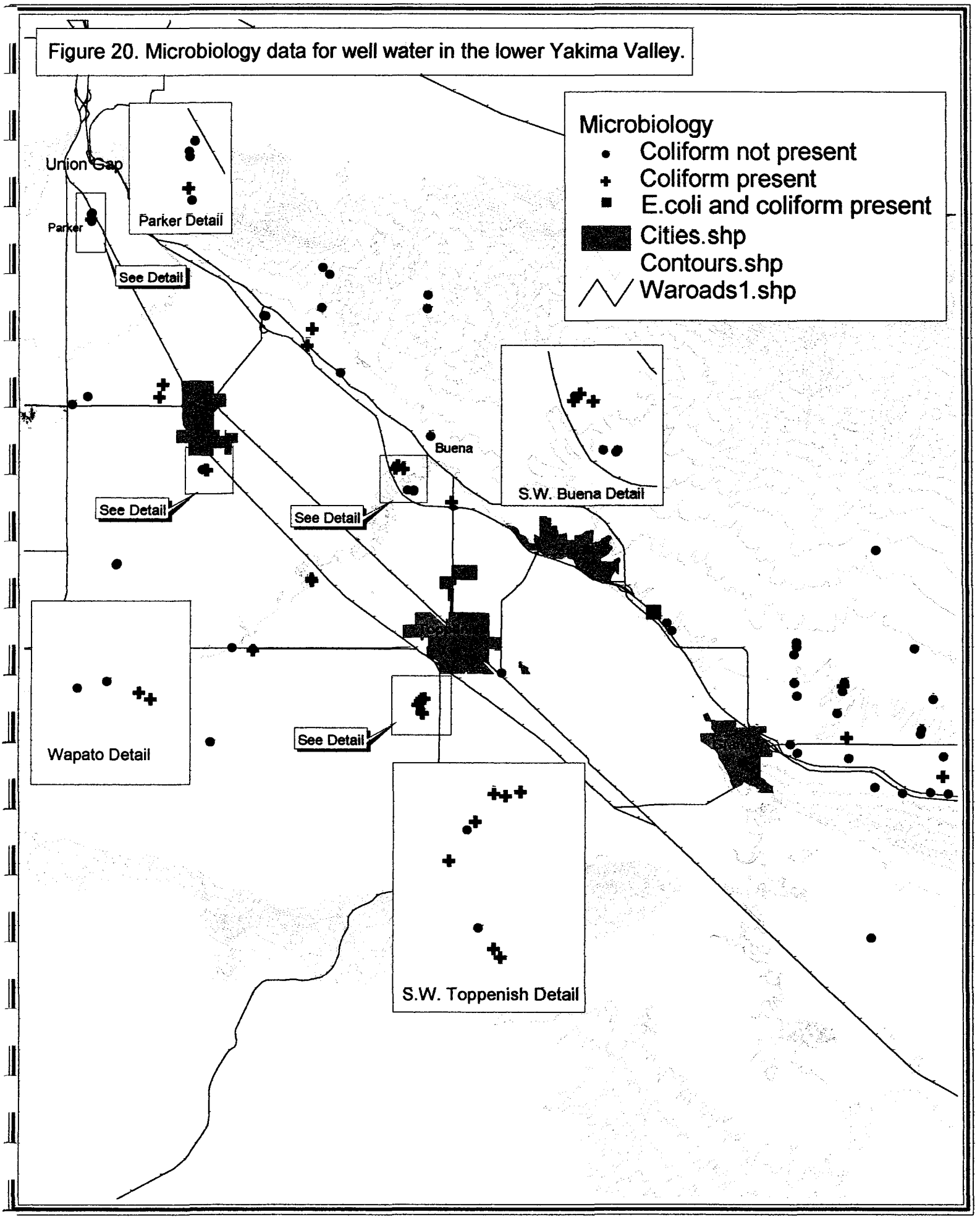


Figure 20. Microbiology data for well water in the lower Yakima Valley.

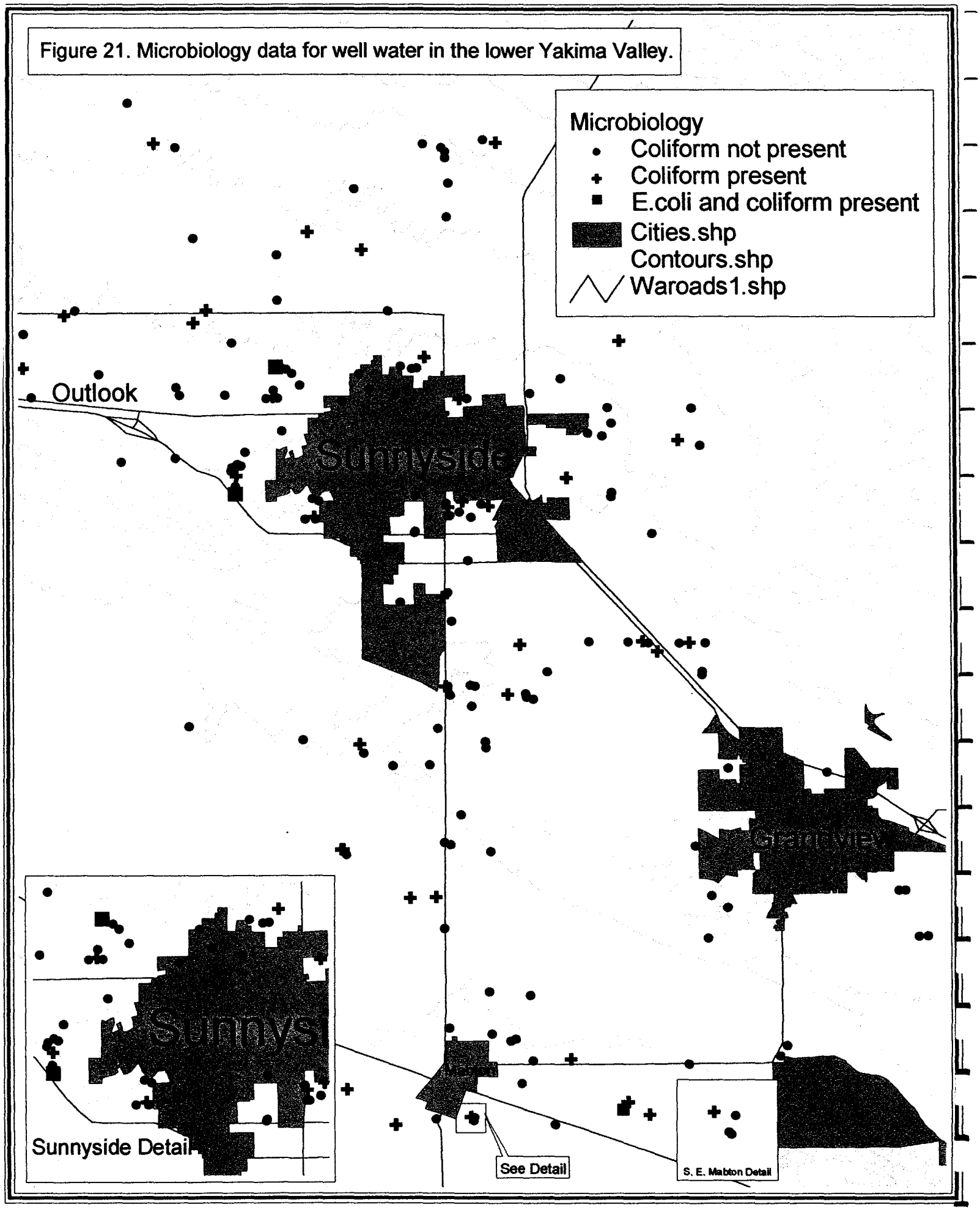


Figure 21. Microbiology data for well water in the lower Yakima Valley.

Table 1. Results of field and laboratory tests.

Well ID #	Re-test	Test date	Microbiology	pH	Temp (°C)	Specific Cond. (µS/cm)	DO[4] (mg/l)	Ferrous Iron (mg/l)	Nitrate (mg/l)		Arsenic (µg/l)	Chloride (mg/l)			Ammonia (mg/l)		
									Primary	Dupe		VIRE		Cas.[6]	VIRE		Cas.
												Primary	Dupe	Anal.	Primary	Dupe	Anal.
321 1		11/17/01	Unsat. + E. coli[1]	7.7	13.8	650	7.40		7.62	7.64	9.7	23			<0.1		
321 1	R[5]	4/28/02	Unsatisfactory[2]	7.7	15.1	644	7.90	<0.05	5.78			<15			<0.1		
321 2		11/17/01	Satisfactory[3]	6.8	16.6	252	0.70		2.99		<3	23	20		<0.1		
322 1		11/18/01	Satisfactory	6.8	14.7	271	3.40		1.80		<3	18			<0.1		
322 2		11/18/01	Satisfactory	7.7	15.2	729	3.60		1.44		3.1	53			0.10	0.15	
322 3		11/18/01	Satisfactory	7.7	13.8	400	4.80		3.22	3.41	4.1	21			<0.1		
322 4		11/18/01	Satisfactory	7.6	13.5	701	3.30		3.96		3.7	58			<0.1		
322 5		11/18/01	Satisfactory	7.7	11.9	538	0.99		6.59		7.5	26			0.10		
328 1		11/24/01	Satisfactory	7.8	11.7	277	0.60		0.95			24			<0.1		
328 2		11/24/01	Satisfactory	6.58	13.2	204	2.70					20			0.1	<0.1	
328 3		11/24/01	Unsatisfactory	6.6	13.4	483	9.60		1.7			17			0.15		
328 4		11/24/01	Satisfactory	7.57	12.4	489	0.05		<0.07			18			<0.1		
328 5		11/24/01	Satisfactory	7.1	13.1	606	4.80		2.60	3.3		29			0.10		
329 1		11/25/01	Satisfactory	7.4	14.1	635	0.22		2.60			15			0.10		
329 3		11/25/01	Satisfactory	7.6	12.8	636	3.70		4.10			38			0.10		
329 4		11/25/01	Satisfactory	7.2	13.1	762	0.40		8.60	7.1		**315**	**285**		0.15		
329 4	R	4/7/02	Unsatisfactory	7.5	13.6	760	5.40	<0.05	9.61		<3	15		13.1	0.25		
329 5		11/25/01	Unsatisfactory	7.5	12.7	425	0.61		2.60			25		7	<0.1		
329 6		11/25/01	Unsatisfactory	7.7	12.6	883	0.09		8.20			41			0.15		
329 7		11/25/01	Satisfactory	7.7	12.4	761	2.40		22.00			<15		16	0.20		
329 7	R	6/18/02	verify lab test	7.7	14.0	702			14.60			<15		13.8	<0.1	<0.1	<0.07
335 1		12/1/01	Satisfactory	7.8	14.3	644	8.60		2.40		<3	24			<0.1		
335 2		12/1/01	Satisfactory	7.8	13.2	512	0.19		0.68			21	20		<0.1		
335 3		12/1/01	Unsatisfactory	7.7	14.5	733	0.21		6.88	7.09		38			<0.1		
335 3	R	1/13/02	Satisfactory	7.5	13.7	741	0.30		6.36			30			0.10		
335 3	R	2/2/02	Satisfactory	7.6	14.1	738											
335 4		12/1/01	Unsatisfactory	7.8	11.7	649	2.19		5.83	5.91	3.1	30			<0.1		
335 5		12/1/01	Satisfactory	7.7	15.2	680	2.50		10.10			30			<0.1		
336 1		12/2/01	Satisfactory	7.8	13.1	723	0.18		<0.07	<0.07	7.5	32			0.90	0.85	
336 2		12/2/01	Satisfactory	7.6	14.2	763	<0.05		5.29			32			0.15		
336 3		12/2/01	Satisfactory	7.2	14.7	671	4.60		4.41			21			0.15	0.15	
336 4		12/2/01	Satisfactory	7.4	15.4	338	0.94		<0.07	<0.07		23			0.15		
336 5		12/2/01	Unsatisfactory	7.9	13.4	609	0.35		3.08			27			<0.1	<0.1	
336 5	R	1/5/02	Unsatisfactory	8.0	14.2	608	0.31		3.03			21			<0.1		
336 5	R	1/27/02	Unsatisfactory	7.9	14.1	608					10.8						
336 5	R	2/10/02	Satisfactory	7.9	14.0	622											
342 1		12/8/01	Satisfactory	7.6	13.5	622	<0.05		0.26	0.25		29			<0.1		
342 2		12/8/01	Unsatisfactory	7.3	14.2	794	0.24		10.30		<3	50			0.15		
342 2	R	1/19/02	Satisfactory	7.5	14.2	799	0.51		10.00	10.2		33			0.15		
342 2	R	2/2/02	Satisfactory	7.6	14.8	795											
342 3		12/8/01	Unsatisfactory	7.2	12.6	497	2.70		9.81			36			1.00		
342 3	R	4/7/02	Satisfactory	7.7	14.3	478	6.20	<0.05	7.23			17			<0.1		
342 4		12/8/01	Satisfactory	7.4	11.4	754	2.60		5.79	5.79		36			0.15		
342 5		12/8/01	Satisfactory	7.4	11.5	858	0.70		2.21			36			0.10		
342 6		12/8/01	Satisfactory	7.7	13.3	647	<0.05		7.02			23			0.15		
343 1		12/9/01	Unsatisfactory	7.6	12.8	637	0.12		5.60			26			0.15		
343 2		12/9/01	Satisfactory	7.6	13.4	770	0.14		17.40			26			0.15	0.2	
343 3		12/9/01	Satisfactory	7.6	10.8	628	2.60		12.40			27			0.20		
343 4		12/9/01	Satisfactory	7.4	14.1	1068	4.50		0.00			38			0.45		
343 5		12/9/01	Satisfactory	7.6	10.7	767	0.20		1.67	1.67	3.2	45			0.15		
343 6		12/9/01	Satisfactory	7.6	13.0	781	4.70		13.20			38			0.20		
349 1		12/15/01	Satisfactory	7.7	12.1	345	6.00		2.07		3	17			<0.1		
349 2		12/15/01	Satisfactory	7.5	13.0	929	0.49		5.07			60			0.15		
349 4		12/15/01	Unsatisfactory	7.7	15.4	518	0.38		2.37			<15			0.15		
349 5		12/15/01	Satisfactory	7.7	13.1	584	2.80		7.70		13.2	16			<0.1		
349 6		12/15/01	Satisfactory	7.6	13.3	526	3.90		2.89	2.91		<15			<0.1		
349 7		12/15/01	Satisfactory	8.0	12.3	360	0.24		2.48			<15			<0.1		
350 1		12/16/01	Satisfactory	7.9	14.3	560	0.50		<0.07			23			0.10		
350 2		12/16/01	Satisfactory	7.6	14.1	703	0.92		5.59	5.66		34			0.10		
350 3		12/16/01	Satisfactory	7.7	14.9	621	5.40		0.59			<15			0.10		
350 4		12/16/01	Satisfactory	7.5	15.9	717	1.98		15.20			26	27		0.15		
370 1		1/5/02	Satisfactory	7.4	14.1	779	4.10		1.82		4.2	30	35		0.20		
370 2		2/5/02	Satisfactory	7.5	14.6	574	5.60		3.25		<3	<15			<0.1		
370 3		1/5/02	Unsatisfactory	6.8	15.2	257	6.70		1.89		<3	<15			<0.1		
370 3	R	1/20/02	Unsatisfactory	6.7	15.0	257	7.80		1.88			<15			<0.1		
370 3	R	5/11/02	Unsatisfactory	6.7	15.0	264	7.90	<0.05	3.10			<15			<0.1		

Well ID #	Re-test	Test date	Microbiology	pH	Temp (°C)	Specific Cond. (µS/cm)	DO (mg/l)	Ferrous Iron (mg/l)	Nitrate Primary (mg/l)	Nitrate Dupe (mg/l)	Arsenic (µg/l)	Chloride (mg/l) VIRE Primary	Chloride (mg/l) VIRE Dupe	Chloride (mg/l) Cas. Anal.	Ammonia (mg/l) VIRE Primary	Ammonia (mg/l) VIRE Dupe	Ammonia (mg/l) Cas. Anal.
370 4		1/5/02	Satisfactory	7.6	14.5	851	2.40		2.61	2.59	<3	26			0.10		
370 5		1/5/02	Satisfactory	7.7	13.4	520	2.60		1.00	0.97	3.2	<15			<0.1		
371 1		1/6/02	Satisfactory	7.7	13.6	401	4.00		3.69		3.69	<15			<0.1		
371 2		1/6/02	Unsat. + E. coli	7.6	14.2	623	0.68		3.22		3.22	27			<0.1		
371 2	R	2/9/02	Satisfactory	7.6	13.5	637			3.60								
371 2	R	2/24/02	Satisfactory	7.6	13.8	627											
371 3		1/6/02	Unsatisfactory	7.8	11.2	432	9.10		2.73	2.81	2.73	22			<0.1		
371 3	R	2/9/02	Satisfactory	7.9	11.9	434			2.81								
371 3	R	2/24/02	Satisfactory	7.9	13.0	429											
371 4		1/6/02	Satisfactory	7.5	14.1	865	1.37		7.57		7.57	23			0.10		
371 5		1/6/02	Satisfactory	7.6	12.6	392	4.90		4.75		4.75	<15					
371 6		1/6/02	Satisfactory	7.5	14.8	562	1.42		1.21		1.21						
377 1		1/12/02	Unsatisfactory	6.7	15.0	186	6.60		0.74			18			<0.1		
377 1	R	1/27/02	Unsatisfactory	6.6	14.3	188			0.68								
377 2		1/12/02	Satisfactory	6.9	14.1	154	1.20		0.46			16			<0.1		
377 3		1/12/02	Satisfactory	6.8	13.8	152	1.66		0.50		<3	20			<0.1		
377 4		1/12/02	Unsatisfactory	8.0	11.6	335	0.33		0.59	0.58		21			<0.1		
377 5		1/12/02	Satisfactory	7.9	12.2	322	1.06		0.59	0.57		20			<0.1		
377 6		1/12/02	Satisfactory	7.7	15.8	560	1.15		9.08		10.1	26			<0.1		
378 1		1/13/02	Satisfactory	7.4	12.3	970	0.19		20.30			32			0.20		
378 3		1/13/02	Satisfactory	7.1	15.3	273	5.00		2.89			<15			<0.1		
378 4		1/13/02	Unsatisfactory	7.3	14.1	273	6.50		2.95		<3	<15			<0.1		
378 5		1/13/02	Satisfactory	7.2	14.0	288	7.10		3.17	3.2	<3	<15			<0.1		
378 6		1/13/02	Unsatisfactory	6.7	11.6	256	6.30		1.86		<3	<15			<0.1		
384 1		1/19/02	Satisfactory	7.7	14.0	1995	5.40		22.20			29			0.60		
384 2		1/19/02	Satisfactory	7.7	9.2	1063	6.10		6.63		<3	45			0.20		
384 3		1/19/02	Unsatisfactory	7.8	14.0	543	0.33		<0.07	<0.07	9.3	22			0.30		
384 5		1/19/02	Satisfactory	6.9	13.2	256	5.90		1.72			<15			<0.1		
385 1		1/20/02	Satisfactory	7.1	13.0	252	7.30		1.50			<15			<0.1		
385 2		1/20/02	Satisfactory	7.1	13.0	252	6.30		1.55			<15			<0.1		
385 3		1/20/02	Satisfactory	7.5	13.7	313	6.40		1.65		<3	<15			<0.1		
385 4		1/20/02	Satisfactory	7.4	14.7	266	6.80		1.76	1.75	<3	<15			<0.1		
385 5		1/20/02	Satisfactory	6.8	12.7	253	8.10		1.74	1.73		<15			<0.1		
391 1		1/26/02	Satisfactory	7.7	14.8	495	9.00		2.25		9	<15			0.15		
391 2		1/26/02	Unsatisfactory	7.7	13.9	486	2.40		1.42			19			0.15		
391 2	R	2/16/02	Satisfactory	7.6	14.2	485			1.49			18			<0.1		
391 3		1/26/02	Satisfactory	7.7	12.7	534	3.40		1.86		<3	23			<0.1		
391 4		1/26/02	Satisfactory	7.5	13.2	845	7.10		19.20	19.4	3.7	23			0.15		
391 5		1/26/02	Satisfactory	8.2	13.1	306	3.00		<0.07			<15			<0.1		
391 6		1/26/02	Satisfactory	7.5	11.6	949	0.24		2.87	2.93		32			0.30		
392 2		1/27/02	Satisfactory	7.6	13.6	660	0.45		1.40			27			1.00		
392 4		1/27/02	Satisfactory	7.8	13.4	410	3.20		1.80	1.84	4.8	20			0.10		
392 5		1/27/02	Satisfactory	8.0	15.3	339	0.06		<0.07			<15			<0.1		
392 6		1/27/02	Satisfactory	7.5	14.2	1027	0.76		7.47			45	44		0.10		
392 7		1/27/02	Satisfactory	8.0	12.9	461	0.46		<0.07	<0.07	3.2	35			<0.1		
398 1		2/2/02	Satisfactory	7.6	12.3	565	5.10		7.08			<15			0.10		
398 3		2/2/02	Satisfactory	7.6	13.1	686	1.90		11.50	11.3	<3	<15			0.15		
398 4		2/2/02	Satisfactory	7.8	14.5	654	4.90		2.97		11.8	<15			<0.1		
398 5		2/2/02	Satisfactory	7.8	14.2	820	0.27		14.60			<15			0.10		
398 7		2/2/02	Unsatisfactory	7.5	14.9	617	4.60		8.15			17			0.15		
398 7	R	2/24/02	Satisfactory	7.5	14.8	625											
399 1		2/3/02	Satisfactory	8.0	8.2	359	10.40	<0.05	1.43		9.8	<15			<0.1		
399 2		2/3/02	Satisfactory	8.0	6.5	356	12.00	0.05	1.45		10.3	<15			<0.1		
399 3		2/3/02	Unsatisfactory	6.9	12.0	341	4.20		1.87	1.85		<15			<0.1		
399 4		2/3/02	Unsatisfactory	7.4	13.5	433	7.00	<0.05	1.72		<3	<15			<0.1		
399 4	R	3/2/02	Satisfactory	7.4	13.3	429											
399 5		2/3/02	Satisfactory	7.2	14.1	229	3.30	<0.05	0.26			<15			<0.1		
399 6		2/3/02	Satisfactory	7.1	14.5	208	4.40	<0.05	0.36			<15			<0.1		
405 1		2/9/02	Satisfactory	7.8	13.4	901	1.24	<0.05	15.80			23		14.9	0.10		
405 3		2/9/02	Satisfactory	7.7	13.4	626	4.60	<0.05	17.60	17.2	3.4	29			<0.1		
405 4		2/9/02	Satisfactory	7.7	14.8	653	14.90	<0.05	11.70		8	41			<0.1		
405 6		2/9/02	Satisfactory	7.1	14.0	280	5.90	<0.05	1.96			<15			<0.1		

Well ID #	Re-test	Test date	Microbiology	pH	Temp (°C)	Specific Cond. (µS/cm)	DO (mg/l)	Ferrous Iron (mg/l)	Nitrate Primary (mg/l)	Nitrate Dupe (mg/l)	Arsenic (µg/l)	Chloride (mg/l) VIRE Primary	Chloride (mg/l) VIRE Dupe	Chloride (mg/l) Cas. Anal.	Ammonia (mg/l) VIRE Primary	Ammonia (mg/l) VIRE Dupe	Ammonia (mg/l) Cas. Anal.
406 2		2/10/02	Unsatisfactory	7.8	15.0	565	0.23	0.20	<0.07	<0.07	3.1	17			0.10		
406 2	R	7/2/02	Unsatisfactory	7.7	15.8	562											
406 3		2/10/02	Unsatisfactory	7.6	12.8	918	0.81	<0.05	19.70	19.6		25		23.3	0.20		
406 4		2/10/02	Unsatisfactory	7.8	13.3	462	1.24	<0.05	4.76			<15			<0.1		
406 5		2/10/02	Unsatisfactory	7.4	14.7	836	0.10	<0.05	2.77		7	33		28.8	0.30		
406 6		2/10/02	Satisfactory	7.7	13.7	431	7.50	0.05	4.23		<3	17			<0.1		
406 7		2/10/02	Unsatisfactory	7.8	13.2	411	7.40	<0.05	3.77			18			<0.1		
412 1		2/16/02	Satisfactory	7.3	13.7	575	9.20	<0.05	4.55			38			<0.1		
412 3		2/16/02	Satisfactory	8.0	15.9	362	13.70	<0.05	1.44		<3	<15			<0.1		
412 4		2/16/02	Satisfactory	8.1	15.1	285	1.45	<0.05	<0.07			<15			<0.1		
412 7		2/16/02	Satisfactory	7.6	14.8	564	0.15	<0.05	0.57			15			<0.1		
419 1		2/23/02	Unsatisfactory	7.7	22.1	972	7.70	<0.05	21.00		<3	45		42.9	<0.1		
419 1	R	3/16/02	Unsatisfactory	7.6	17.7	912		<0.05	19.50			45			<0.1		
419 1	R	4/7/02	Unsatisfactory	7.5	14.7	825											
419 2		2/23/02	Satisfactory	8.0	12.8	536	2.40	<0.05	0.59	0.58		<15			<0.1		
419 3		2/23/02	Unsatisfactory	7.7	12.3	575	7.60	<0.05	3.73			<15			<0.1		
419 4		2/23/02	Satisfactory	7.7	12.7	585	5.20	<0.05	4.94			15			<0.1		
419 5		2/23/02	Satisfactory	7.1	15.6	356	2.70	<0.05	4.76		<3	<15			<0.1		
419 6		2/23/02	Unsatisfactory	7.0	15.5	244	7.00	<0.05	1.59			<15			<0.1		
420 1		2/24/02	Satisfactory	7.6	13.3	760	4.30	0.05	19.40			42		32.7	0.35		
420 2		2/24/02	Unsatisfactory	7.7	18.1	551	6.10		8.99	9.18	3.8	19			0.20		
420 4		2/24/02	Satisfactory	7.8	12.6	398	5.10		3.40			<15			<0.1		
426 2		3/2/02	Satisfactory	8.0	14.5	337	4.00	1.50	<0.07			<15			0.25		
426 3		3/2/02	Satisfactory	8.1	7.3	306	0.46	0.30	<0.07		5.1	<15			<0.1		
426 4		3/2/02	Satisfactory	7.7	13.3	509	2.00	<0.05	2.75	2.75		17			0.15		
426 5		3/2/02	Satisfactory	7.7	13.4	571	5.80	<0.05	4.71		13.8	<15			<0.1		
426 6		3/2/02	Satisfactory	7.5	14.5	629	6.00	<0.05	6.10			<15			0.20		
426 7		3/2/02	Satisfactory	7.5	14.1	746	6.90	<0.05	6.76			21			0.30		
427 1		3/3/02	Satisfactory	7.7	14.2	375	0.21	0.20	<0.07			<15			0.15		
427 2		3/3/02	Satisfactory	7.7	11.4	512	4.60	<0.05	3.54			<15			<0.1		
427 3		3/3/02	Satisfactory	7.8	12.3	396	1.88	<0.05	3.08		<3	17			<0.1		
427 4		3/3/02	Satisfactory	7.9	16.6	513	0.19	0.10	0.86			<15			<0.1		
427 5		3/3/02	Unsatisfactory	7.8	13.2	284	0.16	0.40	<0.07	<0.07	4.2	<15			<0.1		
434 1		3/10/02	Satisfactory	7.4	14.2	762	2.90	<0.05	20.10	20	4.2	29		31	0.10		
434 2		3/10/02	Satisfactory	7.5	11.9	969	0.44	<0.05	21.20			24		24.2	0.25		
434 3		3/10/02	Satisfactory	7.6	13.9	945	9.30	<0.05	20.50			20		24.3	0.30		
434 4		3/10/02	Satisfactory	7.7	12.3	740	<0.05	3.00	<0.07		3.7	30			0.95		
434 5		3/10/02	Satisfactory	7.6	12.7	848	2.80	<0.05	11.00		<3	24		24.2	0.15		
434 6		3/10/02	Satisfactory	7.9	13.7	304	0.46	<0.05	0.22			<15			<0.1		
440 1		3/16/02	Satisfactory	7.7	10.6	695		<0.05	13.80			16			<0.1		
440 2		3/16/02	Satisfactory	8.0	13.4	489		1.00	<0.07			<15			0.35		
440 3		3/16/02	Satisfactory	8.0	15.6	597		<0.05	5.04		5.2	21			<0.1		
440 4		3/16/02	Satisfactory	7.6	12.7	564		<0.05	0.86		5.5	22			0.10		
440 5		3/16/02	Satisfactory	7.6	13.2	696		<0.05	8.44			16		11	<0.1		
440 7		3/16/02	Satisfactory	8.0	7.5	453		<0.05	4.38	4.5	<3	29			<0.1		
447 1		3/23/02	Satisfactory	7.9	13.2	507	0.82	2.00	<0.07			19			0.35		
447 2		3/23/02	Satisfactory	7.6	14.3	870	7.70	<0.05	15.50	15.7		36			0.10		
447 3		3/23/02	Satisfactory	7.5	13.8	713	5.10	<0.05	9.41		3.4	23			0.15		
447 4		3/23/02	Satisfactory	7.6	13.0	845	0.75	<0.05	5.45		3.8	<15			0.20		
447 5		3/23/02	Satisfactory	7.9	15.5	387	10.40	<0.05	1.52		11.4	16			<0.1		
447 6		3/23/02	Satisfactory	7.1	11.9	322	4.80	<0.05	4.82			<15			<0.1		
461 1		4/6/02	Satisfactory	7.8	13.7	468	1.23	<0.05	1.17			<15			<0.1		
461 2		4/6/02	Satisfactory	7.7	14.2	594	3.10	<0.05	3.42	3.38		<15			<0.1		
461 3		4/6/02	Satisfactory	7.6	13.3	453	4.30	<0.05	1.92		<3	<15			<0.1		
461 4		4/6/02	Satisfactory	7.8	14.3	513	4.70	<0.05	4.82			<15			<0.1		
461 6		4/6/02	Satisfactory	7.7	13.7	453	3.80	<0.05	3.16			<15			<0.1		
462 2		4/7/02	Satisfactory	7.6	14.7	593	6.10	<0.05	15.60	15.7		21			<0.1		
462 3		4/7/02	Unsatisfactory	7.5	14.1	593	1.88	<0.05	6.74		4.9	<15			<0.1		
462 3	R	4/21/02	Satisfactory	7.5	14.0	592			5.87			<15			<0.1		
462 5		4/7/02	Unsatisfactory	7.6	14.4	557	9.10	<0.05	4.79		<3	21			<0.1		

Well ID #	Re-test	Test date	Microbiology	pH	Temp (°C)	Specific Cond. (µS/cm)	DO (mg/l)	Ferrous Iron (mg/l)	Nitrate Primary (mg/l)	Nitrate Dupe (mg/l)	Arsenic (µg/l)	Chloride (mg/l) VIRE Primary	Chloride (mg/l) VIRE Dupe	Chloride (mg/l) Cas. Anal.	Ammonia (mg/l) VIRE Primary	Ammonia (mg/l) VIRE Dupe	Ammonia (mg/l) Cas. Anal.
468 1		4/13/02	Satisfactory	8.1	14.8	295	2.90	<0.05	1.82			<15			<0.1		
468 2		4/13/02	Satisfactory	7.8	14.0	503	1.28	<0.05	2.03	1.98		<15			<0.1		
468 3		4/13/02	Unsatisfactory	7.8	14.2	660	4.40	<0.05	17.40			19			0.10		
468 4		4/13/02	Satisfactory	7.9	13.8	518	1.21	<0.05	3.07			<15			<0.1		
468 5		4/13/02	Satisfactory	7.8	13.2	732	0.82	<0.05	14.50			<15			0.10		
469 1		4/14/02	Satisfactory	7.6	13.9	917	1.32	<0.05	11.20			21			0.20		
469 2		4/14/02	Satisfactory	7.9	15.4	902	0.35	0.20	<0.07	<0.07		23			0.15		
469 3		4/14/02	Satisfactory	7.8	15.2	546	3.20	<0.05	4.52			<15			<0.1		
469 4		4/14/02	Satisfactory	7.8	15.8	373	7.00	<0.05	1.66			<15			<0.1		
469 5		4/14/02	Satisfactory	7.8	15.6	684	0.26	0.15	0.92		8.2	27			0.10		
476 1		4/21/02	Satisfactory	7.7	14.9	429	6.30	<0.05	1.11			26			<0.1		
476 3		4/21/02	Satisfactory	7.5	14.9	736	3.00	<0.05	12.00	12.1		23			<0.1		
476 4		4/21/02	Satisfactory	7.5	14.4	753	2.80	<0.05	10.30			21		21.2	<0.1		
476 5		4/21/02	Unsatisfactory	7.7	14.8	538	0.06	<0.05	0.11			20			<0.1		
476 6		4/21/02	Unsatisfactory	6.9	14.6	200	4.40	<0.05	1.29			<15			<0.1		
476 6	R	5/11/02	Unsatisfactory	7.4	14.7	190	5.90	<0.05									
476 6	R	6/1/02	Unsatisfactory	7.4	15.0	189	5.20	<0.05									
482 1		4/27/02	Satisfactory	7.8	16.0	558	3.50	<0.05	4.58			<15			<0.1		
482 2		4/27/02	Unsatisfactory	7.4	14.3	1085	1.20	<0.05	25.50	24.4		**45**		80.2	0.25		
482 2	R	6/2/02	Unsatisfactory	7.2	15.2	1044	2.40	<0.05	21.80			48	53		**0.30**	**0.25**	**<0.07**
482 3		4/27/02	Unsatisfactory	7.3	15.3	586	8.20	<0.05	6.46			<15			<0.1		
482 4		4/27/02	Satisfactory	7.5	14.7	1053	0.15	0.40	<0.07			**45**		96.1	0.35		
482 5		4/27/02	Satisfactory	8.1	15.1	699	0.58	0.10	14.80			30			0.50		
482 6		4/27/02	Satisfactory	7.3	14.3	722	8.60	<0.05	0.08			<15			0.61		
483 1		4/28/02	Satisfactory	7.5	13.6	756	2.20	<0.05	13.60			24			0.15		
483 2		4/28/02	Satisfactory	7.8	14.5	739	4.80	<0.05	11.40	11.4		17			0.15		
483 3		4/28/02	Unsatisfactory	7.7	13.7	523	4.20	<0.05	5.67			<15			<0.1		
483 4		4/28/02	Satisfactory	7.4	15.3	690	6.50	<0.05	8.81			21			<0.1		
483 5		4/28/02	Satisfactory	7.5	15.0	572	3.40	<0.05	9.85			27			<0.1		
483 6		4/28/02	Satisfactory	7.3	13.3	1523	6.90	<0.05	55.20			60		65.2	0.85		
483 6	R	7/24/02	Retest for nitrate	7.2	14.6	1533	2.30	<0.05	52.80	51.9				69.3			
489 1		5/4/02	Satisfactory	7.7	14.4	837	2.00	<0.05	14.90			35			<0.1		
489 2		5/4/02	Satisfactory	8.0	14.7	455	2.00	<0.05	4.57	4.64		15			<0.1		
489 3		5/4/02	Unsatisfactory	7.6	11.6	778	1.77	<0.05	0.70			<15			0.10		
489 3	R	7/24/02	Unsat. + E. coli	7.3	13.8	773	0.93	<0.05	0.93					7.5			
489 4		5/4/02	Satisfactory	8.0	13.8	482	2.13	<0.05	1.31			15			<0.1		
489 5		5/4/02	Unsatisfactory	7.7	13.3	651	2.00	<0.05	10.80			<15			<0.1		
489 6		5/4/02	Unsatisfactory	7.7	12.9	950	0.62	<0.05	1.53		6.7	38		43.1	<0.1		
489 7		5/4/02	Satisfactory	8.0	15.9	306	0.61	0.05	<0.07			<15			<0.1		
490 1		5/5/02	Satisfactory	7.7	14.3	372	2.00	<0.05	2.78		3.5	<15			<0.1		
490 2		5/5/02	Satisfactory	7.9	15.5	357	2.00	<0.05	2.71	2.66		<15			<0.1		
490 3		5/5/02	Unsatisfactory	7.9	13.3	540	0.94	<0.05	2.09		12.1	<15			<0.1		
490 3	R	5/18/02	Satisfactory	8.0	14.0	541	0.85	<0.05	1.98			<15			<0.1		
490 4		5/5/02	Satisfactory	7.7	15.1	698	2.00	0.10	3.19			20			0.15		
490 5		5/5/02	Satisfactory	7.8	14.0	743	0.29	<0.05	3.52			<15			<0.1		
490 6		5/5/02	Unsatisfactory	7.7	14.1	638	2.00	<0.05	2.38			<15			0.35		
490 6	R	7/2/02	Unsatisfactory	7.6	14.5	617											
496 1		5/11/02	Satisfactory	7.7	14.1	696	0.59	0.40	0.13			20			0.60		
496 2		5/11/02	Satisfactory	8.0	14.4	511	1.34	1.50	<0.07	<0.07		27			0.25		
496 3		5/11/02	Satisfactory	7.9	14.7	493	1.21	<0.05	1.96			<15			<0.1		
496 4		5/11/02	Satisfactory	7.8	15.9	601	2.70	0.6	0.00			20	19		0.30	0.25	
496 6		5/11/02	Satisfactory	7.8	15.0	644	1.83	<0.05	5.18			17			0.10		
503 1		5/18/02	Satisfactory	7.8	14.4	261	4.00	<0.05	0.58			<15			<0.1		
503 3		5/18/02	Satisfactory	8.0	14.7	364	3.40	<0.05	0.66			<15			<0.1		
503 4		5/18/02	Satisfactory	7.6	13.7	706	4.00	<0.05	9.99			<15			<0.1		
503 5		5/18/02	Satisfactory	8.0	16.6	294	2.50	<0.05	0.57			<15			<0.1		
503 6		5/18/02	Satisfactory	7.7	14.4	728	3.00	<0.05	11.40	11.2		18			<0.1		
503 7		5/18/02	Unsatisfactory	6.9	13.9	168	6.90	<0.05	0.95			<15			<0.1		

Table 1. Results of field and laboratory tests (continued).

Well ID #	Re-test	Test date	Microbiology	pH	Temp (°C)	Specific Cond. (µS/cm)	DO (mg/l)	Ferrous Iron (mg/l)	Nitrate		Arsenic (µg/l)	Chloride (mg/l)			Ammonia (mg/l)		
									Primary (mg/l)	Dupe (mg/l)		VIRE		Cas. Anal.	VIRE		Cas. Anal.
												Primary	Dupe		Primary	Dupe	
504 1		5/19/02	Satisfactory	7.1	15.0	747	2.10	<0.05	8.50			24	24		0.10	0.1	
504 2		5/19/02	Satisfactory	7.4	14.2	973	5.20	<0.05	13.60	14		30			<0.1		
504 3		5/19/02	Satisfactory	7.7	16.2	347	4.70	<0.05	1.11			<15			<0.1		
504 4		5/19/02	Satisfactory	7.3	15.9	610	9.40	<0.05	7.08			30			<0.1		
504 5		5/19/02	Unsatisfactory	7.4	14.5	622	12.40	<0.05	7.58			27			<0.1		
504 6		5/19/02	Satisfactory	7.6	15.9	583	2.40	<0.05	3.32			<15			<0.1		
517 1		6/1/02	Unsatisfactory	7.9	17.0	423	7.30	<0.05	3.29			<15	<15		<0.1		**7.86**
517 1	R	6/18/02	Satisfactory	7.6	17.0	435			2.82			<15		9.4	<0.1		<0.07
517 2		6/1/02	Satisfactory	7.7	15.1	347	4.60	<0.05	1.48	1.46		<15			<0.1		
517 2	R	6/18/02	verify lab result	7.7	15.0	339			1.08			<15		1.2	<0.1		<0.07
517 3		6/1/02	Satisfactory	7.5	15.6	807	2.00	<0.05	11.90			21			0.15		**43.5**
517 3	R	6/18/02	verify NH3 result	7.5	15.5	720			6.48			<15	<15	11.2	0.10	<0.1	0.07
517 4		6/1/02	Satisfactory	7.6	15.9	594	7.40	<0.05	6.36			18			<0.1		
517 5		6/1/02	Satisfactory	7.8	17.7	418	7.10	<0.05	3.93			<15			<0.1		
518 2		6/2/02	Unsatisfactory	7.5	14.5	544	7.40	<0.05	8.42	7.99		<15			<0.1		<0.07
518 3		6/2/02	Unsat.+ E. coli	7.5	15.0	777	0.26	<0.05	1.64			<15			**0.25**		**<0.07**
518 4		6/2/02	Satisfactory	7.7	14.9	590	0.68	<0.05	0.08			18			<0.1		0.18
518 5		6/2/02	Unsatisfactory	7.9	15.4	463	0.39	0.10	<0.07			<15			<0.1		<0.07
518 6		6/2/02	Unsatisfactory	7.9	15.2	476	0.06	0.10	<0.07			<15			<0.1		0.07
518 6	R	7/2/02	Satisfactory	7.9	15.1	479											
531 1		6/15/02	Unsatisfactory	6.9	13.0	467	2.80	<0.05	2.42	2.31		<15			<0.1		
531 1	R	7/2/02	Satisfactory	6.9	13.2	466											
531 2		6/15/02	Satisfactory	6.8	14.6	149	2.80	<0.05	0.43			<15	<15		<0.1		
531 3		6/15/02	Unsatisfactory	6.8	14.2	121	2.60	<0.05	0.16			<15			<0.1		
531 4		6/15/02	Satisfactory	6.8	11.7	136	4.50	<0.05	0.31			<15			<0.1		
531 5		6/15/02	Unsatisfactory	7.4	15.4	140	5.00	<0.05	0.34			<15			<0.1		
531 6		6/15/02	Unsatisfactory	6.9	17.0	282	5.00	<0.05	3.79			<15			<0.1		
531 7		6/15/02	Unsatisfactory	6.9	13.1	120	4.80	<0.05	0.24			<15			<0.1		
531 7	R	8/7/02	Unsatisfactory	6.8	17.6	124											
532 1		6/16/02	Unsatisfactory	6.8	14.9	215	2.90	<0.05	2.03	1.98		<15			<0.1		
532 2		6/16/02	Unsatisfactory	7.0	14.7	277	6.20	<0.05	3.56			<15	<15		<0.1	<0.1	
532 3		6/16/02	Unsatisfactory	6.9	15.0	358	4.70	<0.05	5.88			<15			<0.1		
532 4		6/16/02	Satisfactory	7.0	13.4	337	4.60	<0.05	5.49			<15			<0.1		
532 5		6/16/02	Unsatisfactory	6.9	13.1	278	5.80	<0.05	3.73			<15			<0.1		
532 6		6/16/02	Satisfactory	6.9	13.5	268	5.20	<0.05	3.54			<15			<0.1		
532 7		6/16/02	Unsatisfactory	7.0	14.2	234	6.20	<0.05	2.38			<15			<0.1		
532 8		6/16/02	Unsatisfactory	6.9	13.1	251	5.20	<0.05	2.94			<15			<0.1		
538 1		6/22/02	Satisfactory	7.7	15.6	502	14.20	<0.05	7.38	7.49							
538 2		6/22/02	Satisfactory	7.5	16.2	542	7.20	<0.05	5.03								
538 3		6/22/02	Satisfactory	7.7	20.2	572	5.90	<0.05	4.57								
538 4		6/22/02	Satisfactory	7.7	14.6	722	1.02	<0.05	1.23								

1. Coliform and E. coli bacteria present
2. Coliform bacteria present
3. Coliform and E. coli bacteria absent
4. Dissolved oxygen
5. Retest
6. Cascade Analytical Laboratory

Table 4. Results of analyses of duplicate samples for nitrate, chloride and ammonia in well water samples.

Well ID	Nitrate + Nitrite-N (mg/l)			Chloride (mg/l)			Ammonia-N (mg/l)		
	Primary	Duplicate[1]	RPD[2]	Primary	Duplicate	RPD	Primary	Duplicate	RPD
321 1	7.62	7.64	0%						
321 2				23	20	14%			
322 2							<0.2[3]	<0.2	
322 3	3.22	3.41	6%						
328 2							<0.2	<0.2	
328 5	**2.60**	**3.30**	**24%[4]**						
329 4	8.60	7.10	19%	32	29	10%			
335 2				21	20	7%			
335 3	6.88	7.09	3%						
335 4	5.83	5.91	1%						
336 1	<0.07[3]	<0.07					0.9	0.9	0%
336 3							<0.2	<0.2	
336 4	<0.07	<0.07							
336 5							<0.2	<0.2	
342 1	0.26	0.25	4%						
342 4	5.79	5.79	0%						
343 2							<0.2	0.2	
343 5	1.67	1.67	0%						
349 6	2.89	2.91	1%						
350 2	5.59	5.66	1%						
350 4				26	27	6%			
370 1				30	35	14%			
370 4	2.61	2.59	1%						
370 5	1.00	0.97	3%						
371 3	2.73	2.81	3%						
377 4	0.59	0.58	2%						
377 5	0.59	0.57	3%						
378 5	3.17	3.20	1%						
384 3	<0.07	<0.07							
384 4	10.00	10.20	2%						
385 4	1.76	1.75	1%						
385 5	1.74	1.73	1%						
391 4	19.20	19.40	1%						
391 6	2.87	2.93	2%						
392 4	1.80	1.84	2%						
392 6				45	44	3%			
392 7	<0.07	<0.07							
398 3	11.50	11.30	2%						

Table 4. Results of analyses of duplicate samples for nitrate, chloride and ammonia in well water samples (continued).

Well ID	Nitrate + Nitrite-N (mg/l)			Chloride (mg/l)			Ammonia-N (mg/l)		
	Primary	Duplicate[1]	RPD[2]	Primary	Duplicate	RPD	Primary	Duplicate	RPD
406 3	19.70	19.60	1%						
419 2	0.59	0.58	2%						
420 2	8.99	9.18	2%						
426 4	2.75	2.75	0%						
427 5	<0.07	<0.07							
434 1	20.10	20.00	0%						
440 7	4.38	4.50	3%						
447 2	15.50	15.70	1%						
461 2	3.42	3.38	1%						
462 2	15.60	15.70	1%						
468 2	2.03	1.98	2%						
469 2	<0.07	<0.07							
476 3	12.00	12.10	1%						
483 2	11.40	11.40	0%						
489 2	4.57	4.64	2%						
490 2	2.71	2.66	2%						
496 2	<0.07	<0.07							
496 4				20	19	8%	0.3	0.3	0%
503 6	11.40	11.20	2%						
504 1				24	24	0%	<0.2	<0.2	
504 2	13.60	14.00	3%						
517 1				<15[3]	<15				
517 2	1.48	1.46	1%						
518 1				48	53	9%	0.3	0.3	0%
518 2	8.42	7.99	5%						
531 1	2.42	2.31	5%						
531 2				<15	<15				
532 1	2.03	1.98	2%						
532 2				<15	<15		<0.2	<0.2	
534 3				<15	<15		<0.2	<0.2	
534 4							<0.2	<0.2	
538 1	7.38	7.49	1%						
570 1	52.8	51.9	2%						
Average =			2%			8%			0%
Standard Deviation =			3%			5%			0%
Total Number of Duplicates =			53			13			12

1 Duplicate sample was collected immediately following the collection of the primary sample.
2 Relative Percent Difference
3 Minimum detectable level
4 RPD that exceed data quality objectives are flagged in bold.

Table 6. Percent recoveries for trip, field and laboratory spikes[4].

Sampling Date	Nitrate + Nitrite-N Spikes (mg/l)			Arsenic[1] Spikes (µg/l)		Chloride Spikes (mg/l)			Ammonia Spikes (mg/l)		
	Trip (10.0)[2]	Field (10.0)[2]	Trip (0.10)[2]	Trip (50.0)[2]	Trip (3.0)[2]	Trip (50.0)[2]	Field (50.0)[2]	Lab (25.0)[2]	Trip (0.82)[2]	Field (0.82)[2]	Lab (0.41)[2]
Percent Recovery											
11/17/01						90					
11/24/01							105				
12/1/01		99	**130[5]**	101	100	110					
12/2/01	98		100	104	103						
12/8/01			100	102			100				
12/9/01	96				107						
12/15/01			110	99					70		
12/16/01	100						100				70
1/5/02		96		99				113	**60**		100
1/6/02		99					108	120	84		91
1/12/02	94					110					**68**
1/13/02	95			109				100			**63**
1/19/02	96			105		99		**128**	72		87
1/20/02	95					96		96	**60**		73
1/26/02	89			100				120	91		85
1/27/02	89					120			73		104
2/2/02	93			97		96			73		
2/3/02		95					105				**61**
2/9/02	104			110		84			85		85
2/10/02	106					90		90	85		98
2/16/02	100					90			85		
2/23/02	106			103		105		108	79		85
2/24/02	109					105		90	98		110
3/2/02	101			105			90	108		79	73
3/3/02	108					90		108	104		110
3/10/02	100			98		90		96	85		98
3/16/02	104			105		96			85		
3/23/02		100		102		96			91		
4/6/02	101			98		90		96	85		85
4/7/02	103					96		84	79		95
4/13/02	100					90		96	110		110
4/14/02								102			85

Table 6. Percent recoveries for trip, field and laboratory spikes (continued).

Sampling Date	Nitrate + Nitrite-N Spikes (mg/l)			Arsenic[1] Spikes (µg/l)		Chloride Spikes (mg/l)			Ammonia Spikes (mg/l)		
	Trip (10.0)[2]	Field (10.0)[2]	Trip (0.10)[2]	Trip (50.0)[2]	Trip (3.0)[2]	Trip (50.0)[2]	Field (50.0)[2]	Lab (25.0)[2]	Trip (0.82)[2]	Field (0.82)[2]	Lab (0.41)[2]
Percent Recovery											
4/21/02								96			85
4/27/02								96			85
4/28/02		106				96		96	73		73
5/4/02	93			110		90		90	85		73
5/5/02	99					96		96	85		85
5/11/02						105			85		
5/18/02	93					90		96	91		98
5/19/02						93		96	79		98
6/1/02	105					90		96	91		98
6/2/02	103					90		96	91		98
6/15/02	97					90		84	79		61
6/16/02	93					90		84	79		73
6/18/02						90			98		
6/22/02	103										
Average =	99	99	110	103	103	95	101	99	84	79	86
STD[3]=	5	4	14	4	3	8	6	11	11		14
Count =	30	6	4	17	3	30	6	27	31	1	32

1. Arsenic spikes were not prepared in the field because of the hazards of handling this chemical outside of a laboratory.
2. Spiking concentrations
3. Standard deviation
4. Laboratory spikes for nitrate and arsenic were performed in-house by Cascade Analytical.
5. Recoveries that exceeded data quality objectives are flagged in bold.

Table 8. Results of analyses of Interlaboratory split samples for chloride.

Well ID	Cascade Analytical[1]	VIRE Lab[2]	Relative % Difference
	Chloride (mg/l)		
405 1	**15**	**23**	**41%**
406 3	23	25	6%
406 5	29	33	14%
419 1	43	45	5%
420 1	33	42	25%
434 1	31	29	8%
434 2	24	24	1%
434 3	24	20	22%
434 5	24	24	1%
440 5	**11**	**16**	**36%**
462 1	13	15	14%
476 4	21	21	1%
482 2	**80**	**45**	**56%**
482 4	**96**	**45**	**72%**
483 6	65	60	8%
489 6	43	38	14%
534 1	9	<15[3]	
534 2	1	<15	
534 3	11	<15	
534 4	14	<15	
		Average =	20%
		Standard Deviation =	21%
		Total Interlaboratory Splits =	20

1. Laboratory used EPA approved analytical method 4500CL-B.
2. Laboratory used Chemetrics test kit K-2010 which employs silver nitrate titration.
3. Minimum detectable level.
4. Recoveries that exceeded data quality objectives are flagged in bold.

Table 9. Results of analyses of performance standards by contract laboratory and VIRE.

VIRE Sample #	Analysis	Results of Analysis	Reference Value	Advisory Range	Date analyzed	Contract Lab/ VIRE Tech
Nitrate Standard prepared by contract laboratory						
337 (1)[1]	Nitrate+Nitrite-N	10.2 mg/l	10.0 mg/l	8.5 - 11.5	12/6/01	Cascade Analytical
337 (2)[1]	Dupe of above	10.1 mg/l	10.0 mg/l	8.5 - 11.5	12/6/01	Cascade Analytical
ULTRA Scientific Minerals Sample, Code # 76137						
342 (7)	**Chloride[2]**	**46.5 mg/l**	**33.7-35.5 mg/l**	**31.6-37.0**	**12/10/01**	**VIRE tech 1**
342 (7)	pH	9.13	9.20 ± 0.02	9.01 - 9.38	12/10/01	VIRE tech 1
342 (7)	Sp. Cond.[3]	749 µmhos	738 ± 3 µmhos	698 - 779	12/10/01	VIRE tech 1
ULTRA Scientific Minerals Sample, Code # 72725						
427 (7)	Nitrate+Nitrite-N	9.26 mg/l	8.64 ± 0.33 mg/l	7.40-9.71	3/5/02	Cascade Analytical
427 (7)	pH	9.18	9.23 ± 0.01	9.04 - 9.41	3/5/02	VIRE tech 1
427 (7)	Sp. Cond.	700 µmhos	738 ± 5 µmhos	698 - 779	3/5/02	VIRE tech 1
427 (7)	**Chloride**	**60 mg/l**	**70.2 ± 1.3 mg/l**	**65.5 - 74.6**	**3/5/02**	**VIRE tech 1**
427 (7)	pH	9.16	9.23 ± 0.01	9.04 - 9.41	4/11/02	VIRE tech 2
427 (7)	Sp. Cond.	746 µmhos	738 ± 5 µmhos	698 - 779	4/11/02	VIRE tech 2
ULTRA Scientific Nitrite Sample, Code # 70088						
489 (8)[1]	Nitrate+Nitrite-N	0.47 mg/l	0.50 ± 0.005 mg/l	0.45 - 0.55	5/8/02	Cascade Analytical
490 (7)	Nitrate+Nitrite-N	0.55 mg/l	0.50 ± 0.005 mg/l	0.45 - 0.55	5/7/02	Cascade Analytical
EM Science Titrisol Standard, Lot # 35171						
490 (7)	Arsenic	10.8 (µg/l)	10.0 (µg/l)	NA[4]	5/7/02	Cascade Analytical
ULTRA Scientific Minerals Sample, Code # 71529						
570 (3)	Nitrate+Nitrite-N	6.58 mg/l	6.55 ± 0.26 mg/l	5.60 - 7.36	7/26/02	Cascade Analytical
570 (3)	Chloride	144 mg/l	149.9 ± 1.2 mg/l	141.3 - 158.8	8/16/02	Cascade Analytical
570 (3)	pH	8.97	9.14 ± 0.03	8.95 - 9.32	8/16/02	VIRE tech 1
570 (3)	Sp. Cond.	935 µmhos	939 ± 2 µmhos	887 - 991	8/16/02	VIRE tech 2

1. Acidified with sulfuric acid, pH <2.0 for preservation.
2. Results that exceed the data quality objectives are flagged in bold.
3. Specific Conductivity
4. Manufacturer of arsenic standard did not provide an advisory range.

Table 10. Results of analyses of trip and field blanks.

Sampling Date	Nitrate + Nitrite-N (mg/l)		Arsenic (µg/l)		Chloride (mg/l)		Ammonia (mg/l)	
	Trip	Field	Trip	Field	Trip	Field	Trip	Field
11/17/01								
11/24/01					<15		<0.2	
11/25/01					<15	<15		<0.2
12/1/01	<0.07	<0.07	<3.0		<15		<0.2	
12/2/01	<0.07		<3.0					<0.2
12/8/01	<0.07	<0.07	<3.0				<0.2	
12/9/01	<0.07	<0.07	<3.0				<0.2	
12/15/01	<0.07	<0.07	<3.0				<0.2	
12/16/01	<0.07	<0.07			<15		<0.2	
1/5/02					<15		<0.2	
1/6/02	<0.07	<0.07						
1/12/02	<0.07	<0.07	<3.0		<15	<15	<0.2	<0.2
1/13/02	<0.07	<0.07						
1/19/02	<0.07		<3.0	<3.0	<15		<0.2	
1/20/02	<0.07	<0.07						
1/26/02	<0.07	<0.07			<15		<0.2	
1/27/02	<0.07				<15		<0.2	
2/2/02	<0.07	<0.07	<3.0		<15		<0.2	
2/3/02		<0.07			<15		<0.2	
2/9/02	<0.07	<0.07			<15		<0.2	
2/10/02	<0.07		<3.0		<15		<0.2	
2/16/02	<0.07				<15		<0.2	
2/23/02	<0.07		<3.0		<15			
2/24/02	<0.07				<15		<0.2	
3/2/02		<0.07	<3.0		<15		<0.2	
3/3/02	<0.07				<15		<0.2	
3/10/02	<0.07				<15		<0.2	
3/16/02		<0.07			<15		<0.2	
3/23/02		<0.07	<3.0		<15		<0.2	
4/6/02	<0.07				<15		<0.2	
4/7/02	<0.07		<3.0		<15		<0.2	
4/13/02					<15		<0.2	
4/14/02	<0.07				<15		<0.2	
4/21/02	<0.07	<0.07			<15		<0.2	
4/27/02		<0.07			<15		<0.2	
4/28/02		<0.07			<15		<0.2	
5/4/02	<0.07		<3.0		<15		<0.2	
5/5/02	<0.07				<15		<0.2	
5/11/02	<0.07				<15		<0.2	
5/18/02	<0.07				<15		<0.2	
5/19/02					<15		<0.2	
6/1/02	<0.07				<15	<15	<0.2	<0.2
6/2/02	<0.07				<15		<0.2	
6/15/02	<0.07				<15		<0.2	
6/16/02	<0.07				<15		<0.2	
6/18/02					<15		<0.2	
6/22/02	<0.07				<15		<0.2	

Table 11. Demographics[1] of participants in study sorted by well location.

Well Location	# Wells in Study	Home Ownership		Report Language[2]		Drink Bottled Water	Avg. Monthly Income	Avg. Family Size
		Own	Rent	Spanish	English			
Buena	1	1	0	1	0	1	$2,200	4.0
Grandview	31	24	7	9	22	5	$1,739	3.5
Granger	16	12	4	4	12	5	$2,094	4.8
Mabton	35	27	8	19	16	9	$1,682	4.5
Outlook	28	25	3	13	15	1	$1,712	4.5
Parker	5	5	0	1	4	0	$1,091	3.0
Sunnyside	85	74	11	36	49	7	$1,829	4.4
Toppenish	16	13	3	8	8	1	$1,709	3.7
Wapato	21	16	5	7	14	0	$1,568	4.0
Zillah	11	11	0	4	7	1	$1,636	3.5
Grand Total =	*249*	*208*	*41*	*102*	*147*	*30*		
Percent =		*84%*	*16%*	*41%*	*59%*	*12%*		
						Grand Average =	*$1,726*	*4.0*

1. Information gathered during interviews with participants.

2. Preferred language for test results and interpretive information mailed to participant.

Summary of Results of Quality Assurance Inspections for Lower Yakima Valley Study of Private Wells

Inspection # 1 *Date of Inspection:* December 2, 2001

Date report submitted to board members: January 28, 2002
Date report submitted to project director: December 7, 2001

Summary of phase inspected, activities or data inspected, and observation made during the inspections.
Inspected pre and post-field activities and laboratory work performed by VIRE technicians and the results are as follows (*Phase Inspected*, findings): *Preparation for Sampling*, detailed preparation according to SOP; *Sample Collection*, well organized and meticulous; *Field Sample Analysis*, smooth, patient accurate work and adhere to SOP's; *Transport, Storage and Shipping*, storage conditions closely monitored; *Chain of Custody,* strong continuous chain of custody; *Work Practice*, well trained staff followed the SOP's; *All Data Reported*, all readings entered into data sheets; *Field Documents*, data sheets double checked in the field; *Sample Containers*, minor changes needed on this SOP; *Laboratory Analysis*, lab work adheres to the SOP's; *Storage of Standards,* standards are segregated from samples; *Standard Prep Documents,* standards are purchased prepared; *Personnel Records,* extensive documentation, minor additions needed; *SOP Archive,* SOP archive is in place; *Chemical Hygiene,* staff chemical exposure minimal and monitored; *New SOP,* SOP for chemical waste disposal needed.

Additional Comments: The project staff is well trained and knowledgeable on the SOP's. Field technicians have their SOP's available at all times for reference. Exceptional cooperation between staff ensures quality work is performed and quality data is acquired. Very good adherence to established SOP's. Some minor changes to SOP's are needed. This is normal for any project as it tests the established SOP's. The project is well organized and is producing quality data.

Inspection # 2 *Date of Inspection: March 2, 2002*

Date report submitted to board members: March 19, 2002
Date report submitted to project director: March 19, 2002

Summary of phase inspected, activities or data inspected, and observation made during the inspections.
Inspected pre and post-field activities and laboratory work performed by VIRE technicians and the results are as follows (*Phase Inspected*, findings): *Sample Collection*, very organized, followed SOP's and did a great job on site testing pH, water temp, etc.; *Chain of Custody*, done according to SOP's, forms filled out at site; *Prep for Sampling*, according to SOP's, good job; *Sample Storage*, according to SOP's, good records; *Work Practice*, did as per SOP. Very courteous at job, staff well trained and followed SOP's; *Chain of custody*, all samples properly labeled, logged and put in cooler, followed SOP;

Additional Comments: Workers did an excellent job of following the SOP's. No variation from SOP outlines or procedures.

Inspection # 3 *Date of Inspection: May 4, 20002*

Date report submitted to board members: May 28, 2002
Date report submitted to project director: May 28, 2002

Summary of phase inspected, activities or data inspected, and observation made during the inspections.
Inspected pre and post-field activities and laboratory work performed by VIRE technicians and the results are as follows (*Phase Inspected*, findings): *Pre-field Activities*, SOP's followed in detail; *Lab Practices*, good team coordination as per Sop's; *Sample Storage*, excellent work as per SOP's; *Chemical Hygiene*, staff safety followed at all times; *Post Field Activities*, SOP 4 followed; *Storage of Standards*, standards segregated from samples; *Standard Prep. Documents*, standard preparations are documented; *SOP's*, *SOP's* are kept current; *Field Coordinator*, filed coordinator followed SOP 4.0; *Preparation for Sampling*, excellent preparation, experience shows; *Sample Collection*, sampling process well established; *Field Sample Analysis*, Very good technique used in the field; *Transport, Shipping and Storage*, Sample conditions closely monitored in detail; *Chain of Custody*, chain of custody well maintained; *Work Practice*, appropriate SOP's followed at all times; *All Data Reported*, all data readings reported; *Field Documents*, documents filled out as per SOP; *Field and QA Samples*, all scheduled samples collected.

Additional Comments: Special attention was noted in pre-field, post-field activities and sample storage. The staff is well versed in the SOP requirements and followed them in detail. Excellent organization from start to finish. The collection of samples flowed very smooth. The sampling team exhibited excellent cooperation. The team members are experienced and well versed in SOP requirements.

Inspection # 4 *Date of Inspection:* July 21, 2002

Date report submitted to board members: October 7, 2002
Date report submitted to project director: September 27, 2002

Summary of phase inspected, activities or data inspected, and observation made during the inspections.
Inspected personnel records, archives and report adherence to SOP and the results are as follows (*Phase Inspected*, findings): *Status of Records including Training*, detailed, readily available at VIRE office; *Field Sampling and Documents,* well organized archive at VIRE office; *Report adherence to GLP*, all reports and drafts of reports adhere to GLP.

Additional Comments: Personnel records are current and readily available at VIRE office. The sampling records and documents are well maintained at VIRE office. All reports and drafts of reports adhere to GLP.

Date of Report: November 18, 2002

QA Officer: Herman Moya