

Yakima Basin Bull Trout Radio Telemetry

A cooperative study funded by the U.S.F.W.S.

Biologists: Eric Anderson

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Project Goal

A photograph of a person wearing a green safety vest and sunglasses, standing on a large log that spans across a rocky river. The river is surrounded by dense evergreen trees, and the scene is brightly lit by sunlight filtering through the canopy.

Use radio telemetry to obtain information on resident and fluvial bull trout movements, habitat preferences, and spawning locations in the Yakima River basin



Bull trout

Develop recommendations & procedures for future bull trout radio telemetry and archival tag data collection studies.

Yakima Basin Bull Trout Distribution

Legend

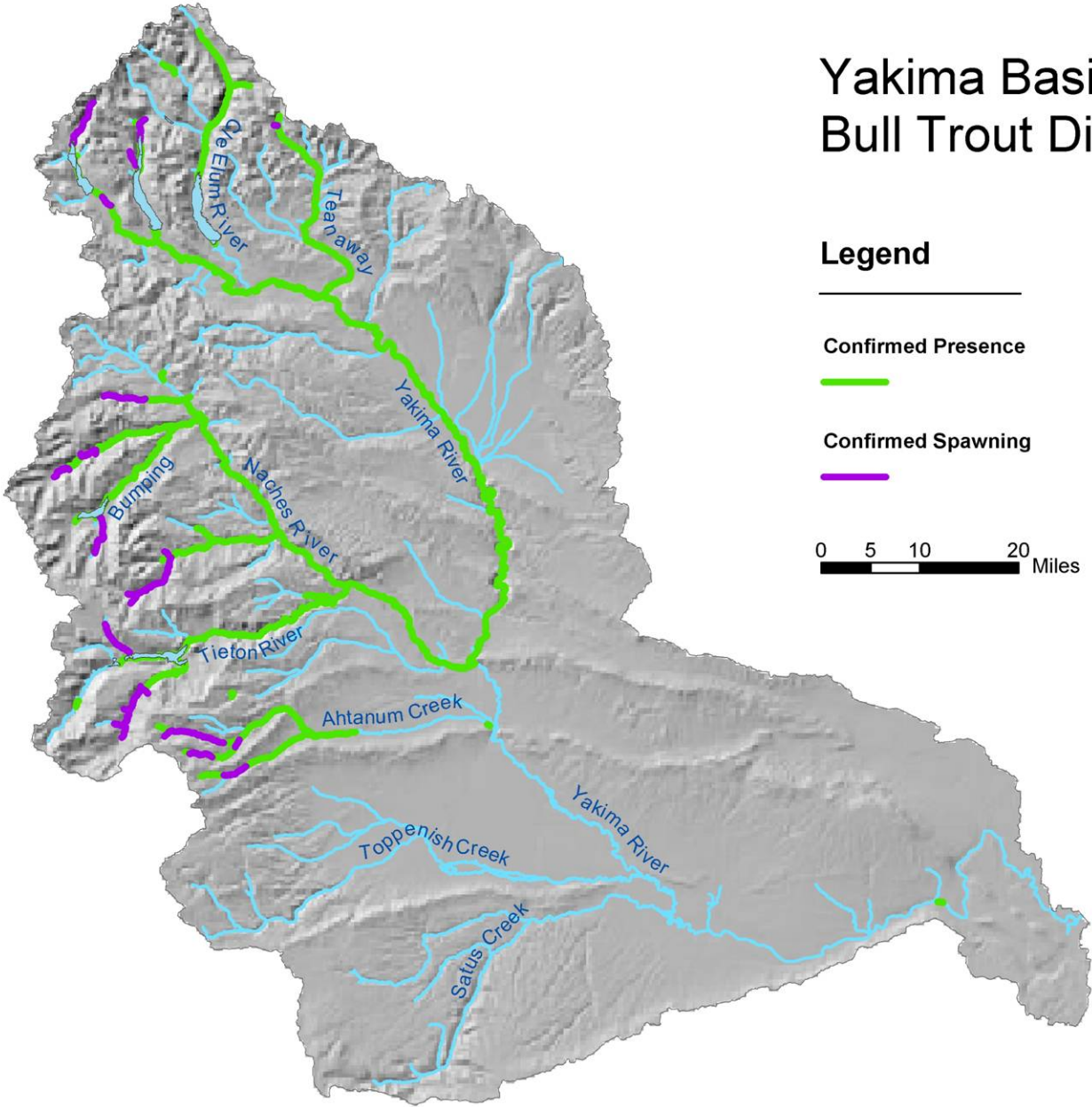
Confirmed Presence



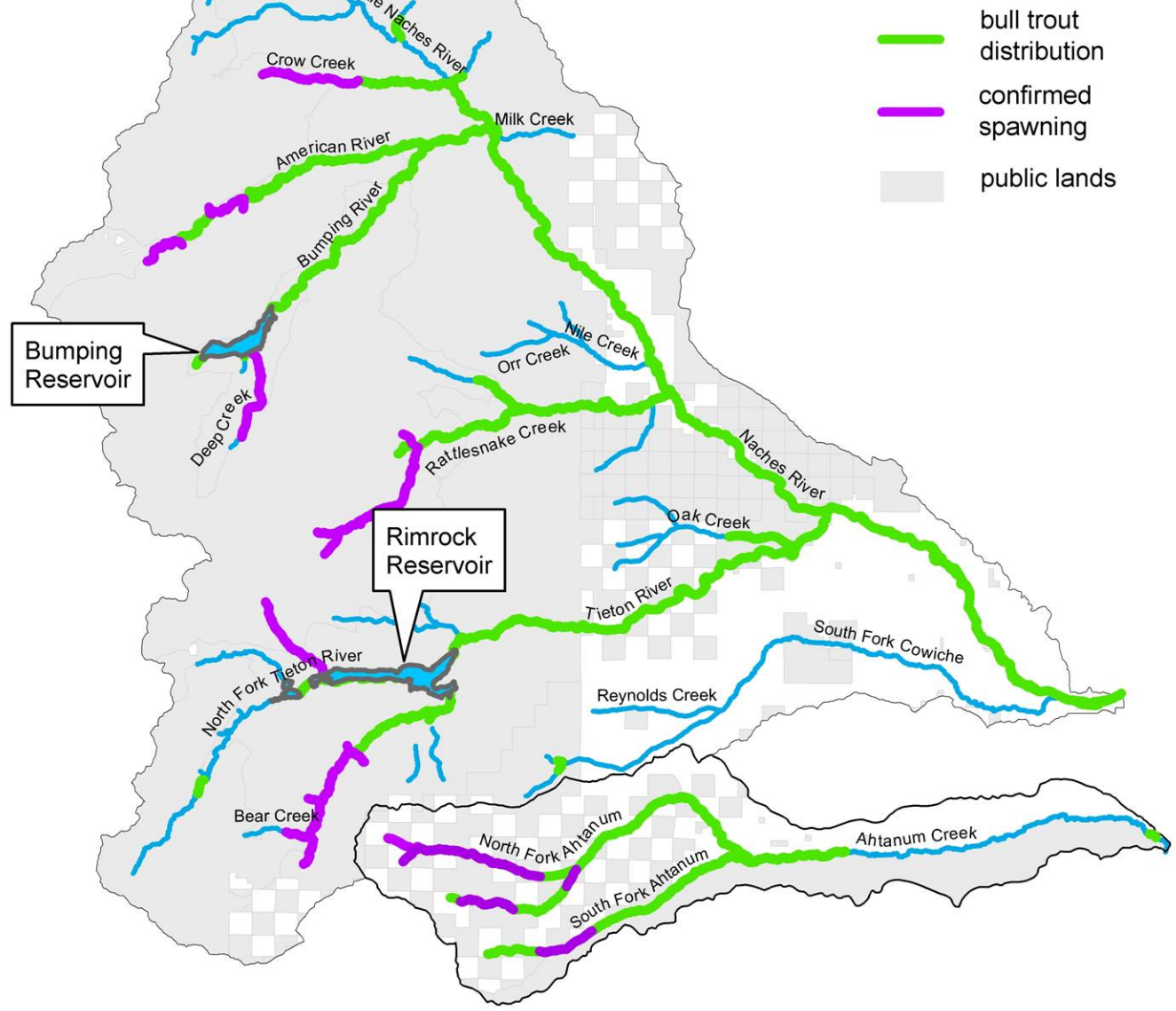
Confirmed Spawning



0 5 10 20 Miles



WRIA 38: Naches Bull Trout Distribution



Objectives

Document bull trout migration patterns & spawning activity

Evaluate habitats used by adult bull trout

Tasks

Evaluate how movement and spawning relate to temperature & stream flow.

Determine general habitat features & cover types in holding areas.

Document over-winter habitats.

Collect tissue samples from radio-tagged bull trout for genetic analysis and scale samples for aging.

Tasks

Set thermographs and measure flows in selected stream reaches.

Record general stream macro-habitat features in fish spawning, staging & holding areas.

Utilize existing temperature, flow & habitat data

Methods

Surgically implant 50 adult & sub-adult bull trout with radio transmitters...



New mobile backpack surgical kit



We now have the ability to implant 68,
with 59 tagged, and 49 active.

New Developments



The standard method involved the insertion of the surgeons finger during the procedure. This proved impossible on 12 inch fish in the Ahtanum, necessitating development of a new tool...

The “Stinger”



The stinger allows for a smaller incision, and a cleaner overall surgical site, as it is less invasive. It is simply a curved catheter inside a second catheter.



The “stinger” and 4 sizes of tags used.

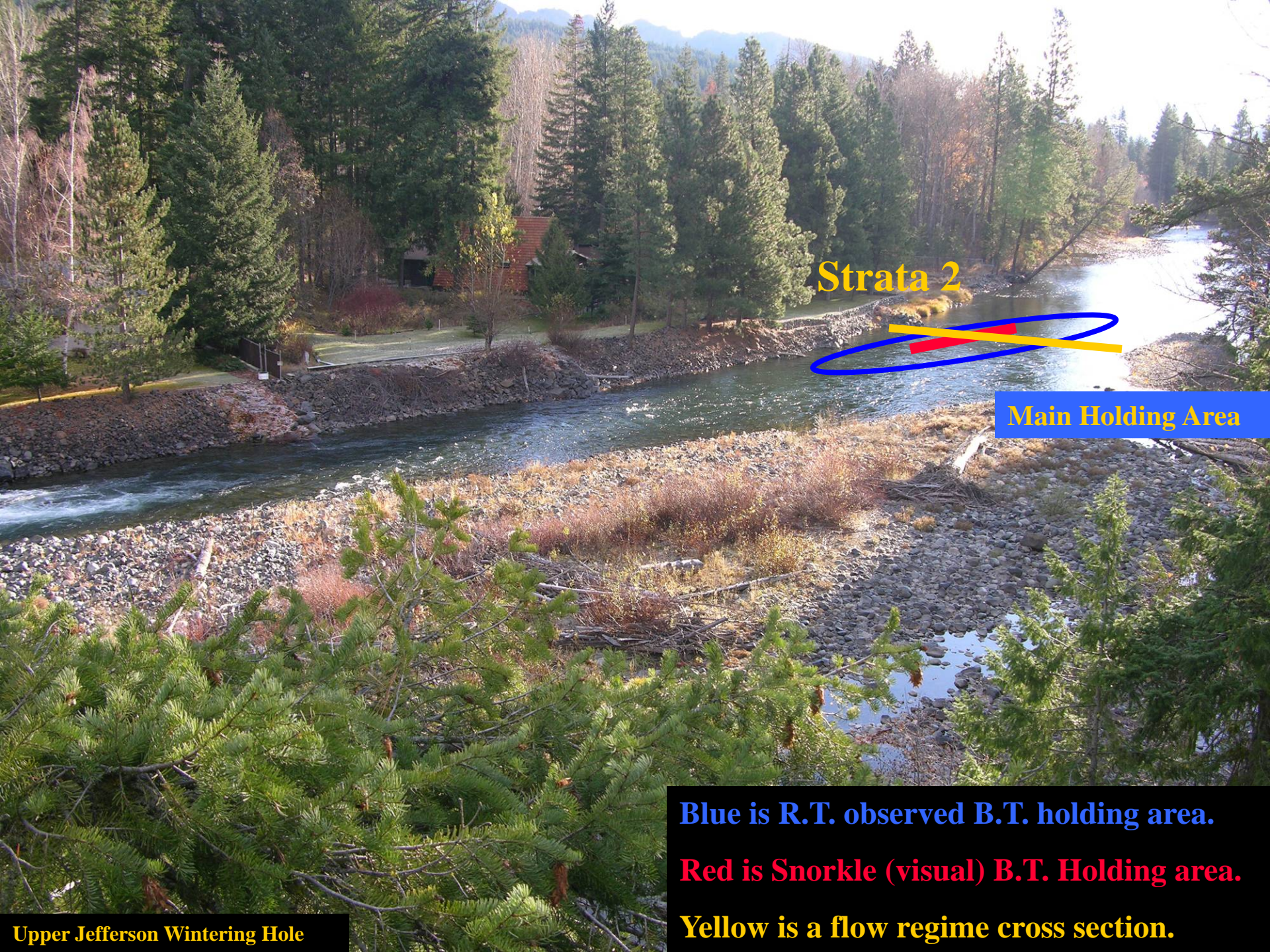
Radio Tagged Bull Trout In Yakima Basin

System	5 year avg (redds 2000-2004)	Total Tagged	Natural Loss	Active at Present
Naches River	NA	24	0	24
Crow Cr.	11	0	0	0
American (Union, Kettle)	35	12	4+2	6
Rattlesnake (Little Wildcat, Shell)	50	10	3	7
Tieton River (Below Dam)	NA	4	0	4
Ahtanum (North, Middle and South Forks)	30	7	1 tag only	6
Roza Dam (Yakima R.)	NA	1	0	1
Kachess Dam Spill Pool	NA	1	0	1
Totals	NA	59	8+2	49

Habitat



Radio tracking during over wintering and visual snorkle surveys have led to some interesting preliminary flow and habitat work. Whether the following data is flow/prey related only, or a greater combination of inputs is still under consideration.



Strata 2

Main Holding Area

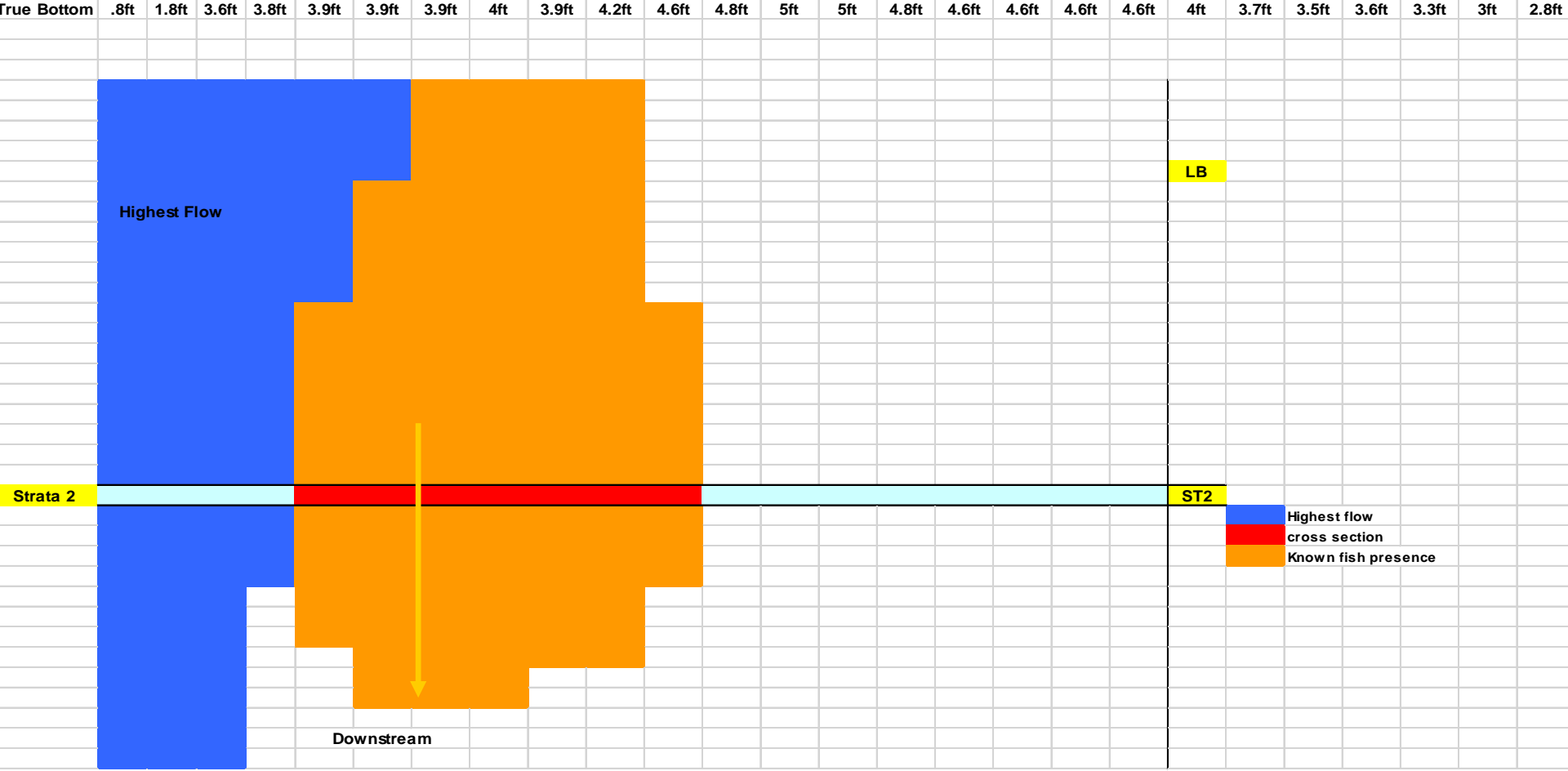
**Blue is R.T. observed B.T. holding area.
Red is Snorkle (visual) B.T. Holding area.
Yellow is a flow regime cross section.**

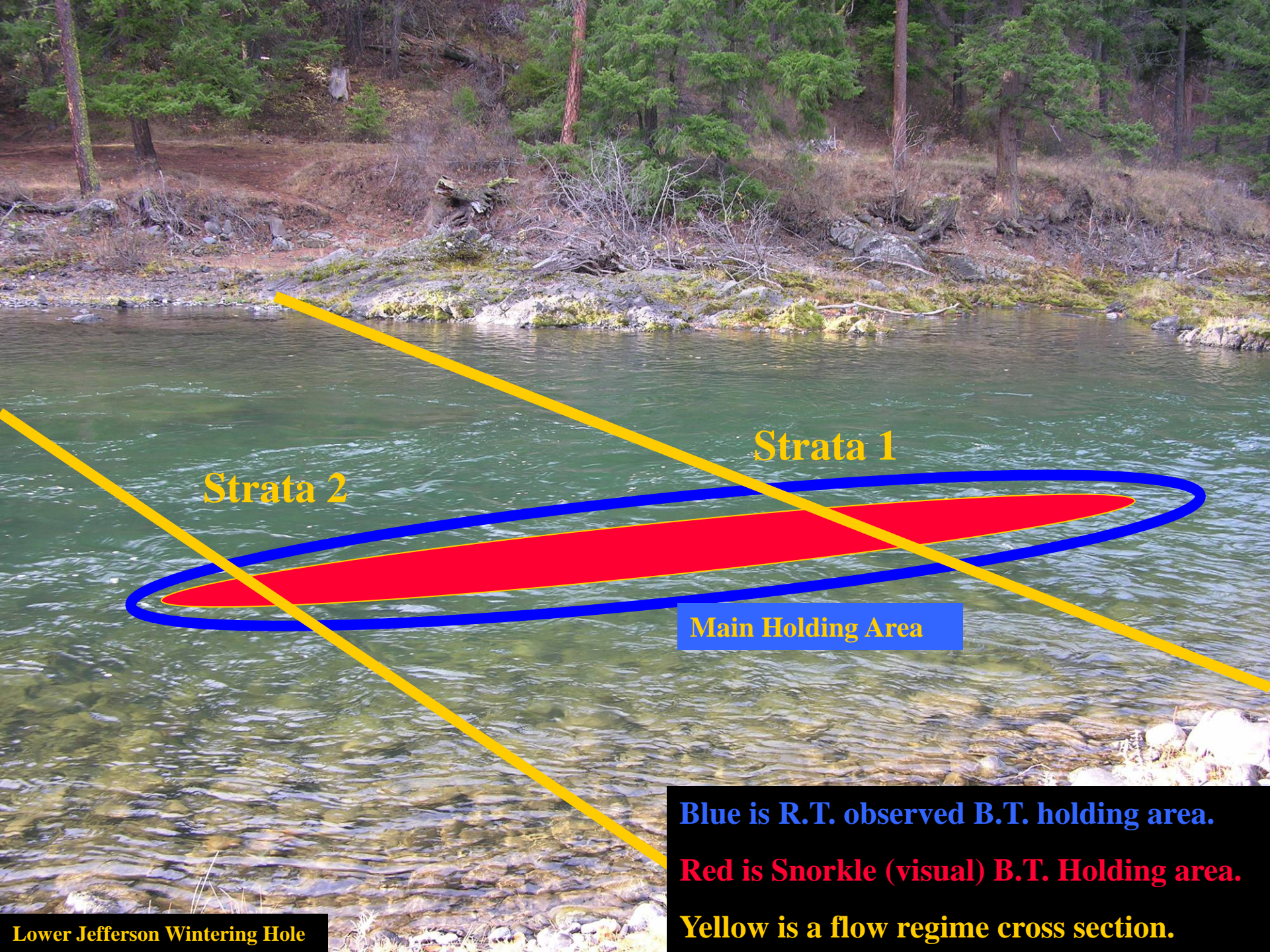
Upper Jefferson Wintering Hole

Standard Habitat Flow Cross-Section

Upper Jefferson Hole

Strata 1	LB+2	LB+4	LB+6	LB+8	LB+10	LB+12	LB+14	LB+16	LB+18	LB+20	LB+22	LB+24	LB+26	LB+28	LB+30	LB+32	LB+34	LB+36	LB+38	LB+40	LB+42	LB+44	LB+46	LB+48	LB+50	LB+52
Surface	0.56	0.94	0.77	0.93	0.58	0.9	0.86	1.1	1.39	1.32	1.41	1.36	1.3	1.8	1.87	1.86	2.01	2.33	2.15	2.31	2.22	2.4	2.23	1.99	2.08	2.26
-1	0.41	0.92	0.81	0.92	1.18	1.19	1.14	1.34	1.55	1.65	1.74	1.81	1.74	1.51	1.78	2.04	2.4	2.38	2.05	2.47	2.07	2.42	2.33	2.36	2.44	2.09
-2		0.68	0.91	0.86	0.88	1.13	1.36	1.29	1.42	1.68	1.58	1.48	1.79	1.85	1.89	1.95	1.98	2.27	2.28	2.09	2.42	1.89	2.13	2.39	1.7	1.68
-3			0.15	1.03	0.72	0.91	0.88	1.02	1.26	1.25	1.47	1.59	1.66	1.65	1.8	1.82	2.01	2.17	2.21	1.7	1.54	1.58	1.27	1.62	1.3	0.79
-4			0.13	0.52	0.59	0.56	0.66	0.45	0.71	0.83	0.9	1.4	1.39	1.53	1.9	1.19	1.96	1.63	1.58	0.56	1.13	0.58	0.78	0.98		
-5											0.69	0.9	0.64	0.4	0.6	1.09	0.38	0.6	0.63							
-6																										
-7																										
-8																										
-9																										
-10																										
-11																										
-12																										
True Bottom	.8ft	1.8ft	3.6ft	3.8ft	3.9ft	3.9ft	3.9ft	4ft	3.9ft	4.2ft	4.6ft	4.8ft	5ft	5ft	4.8ft	4.6ft	4.6ft	4.6ft	4.6ft	4ft	3.7ft	3.5ft	3.6ft	3.3ft	3ft	2.8ft





Strata 2

Strata 1

Main Holding Area

Blue is R.T. observed B.T. holding area.
Red is Snorkle (visual) B.T. Holding area.
Yellow is a flow regime cross section.

Lower Jefferson Wintering Hole

Standard Habitat Flow Cross-Section

3/15/2005

Strata 1

Surface
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12

Strata 1	LB+2	LB+4	LB+6	LB+8	LB+10	LB+12	LB+14	LB+16	LB+18	LB+20	LB+22	LB+24	LB+26	LB+28	LB+30	LB+32	LB+34	LB+36	LB+38	LB+40	LB+42	LB+44	LB+46	LB+48	LB+50	LB+52	LB+54	LB+56	LB+58	
Surface	0.61	1.43	1.71	2.05	2.37	2.89	3.01	3.15	2.89																					
-1	neg.07B	1.2	1.6	1.75	2.24	2.67	3	2.71	3.33																					
-2		.48B	1.19B	.47B	1.79	2.06	2.49	2.45	3.02																					
-3					1.11B	1.81	1.79	1.59	2.38																					
-4						.99B	1.38B	1.28	1.8																					
-5								1.44B	.52B	x																				
-6																														
-7																														
-8																														
-9																														
-10																														
-11																														
-12																														

True Bottom

True Bottom	.8f	1.6f	1.8f	2.3f	2.6f	3.3f	3.6f	4.8B	5.1f	5f	7f	8f	7f	8f	8f	7f	7f	7f	7f	6f	5f	5f	4f	4.5f	4f	4f	4f	4f	4f
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Strata 2

Surface
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12

Strata 2	LB+2	LB+4	LB+6	LB+8	LB+10	LB+12	LB+14	LB+16	LB+18	LB+20	LB+22	LB+24	LB+26	LB+28	LB+30	LB+32	LB+34	LB+36	LB+38	LB+40	LB+42	LB+44	LB+46	LB+48	LB+50	LB+52	LB+54	LB+56	LB+58
Surface	0.24	0.66	1.14	2.29	2.42	2.76	2.98	2.95	3.04	2.65																			
-1	.08B	.11B	0.83	1.22	1.81	1.63	2.14	2.95	2.86	2.86																			
-2		.59B	1.07	1.4-1.7p	1.59	1.51	1.86	2.24	2.62																				
-3			.8B	.67B	1.0-1.6p	1.25p	1.8	1.59	2.21																				
-4					0.4	.76B	1.11	1.42	1.42																				
-5							.91B	.59B	1.45																				
-6									.25B																				
-7																													
-8																													
-9																													
-10																													
-11																													
-12																													

True Bottom

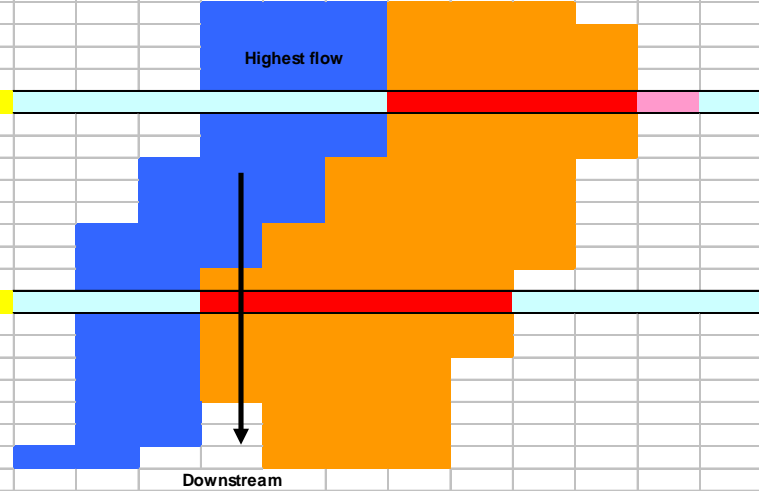
True Bottom	1.1f	1.6f	1.9f	2.2f	2.7f	3.4f	3.7f	4.2f	5f	5.5	7f	8f	7f	8f	8f	7f	7f	7f	7f	6f	5f	5f	4f	4.5f	4f	4f	4f	4f	4f
-------------	------	------	------	------	------	------	------	------	----	-----	----	----	----	----	----	----	----	----	----	----	----	----	----	------	----	----	----	----	----

Strata 1

2
3
4
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6
7
8
9

Strata 2

11
12
13
14
15
16
17
18



LB

ST 1

ST2

Highest flow
cross section
Known fish presence

Fish were only found in the orange section when snorkel surveys were performed, leading to the discovery of a section of laminar flow between 1.4 and 1.81 fps velocity when cross sections were measured.

Tracking

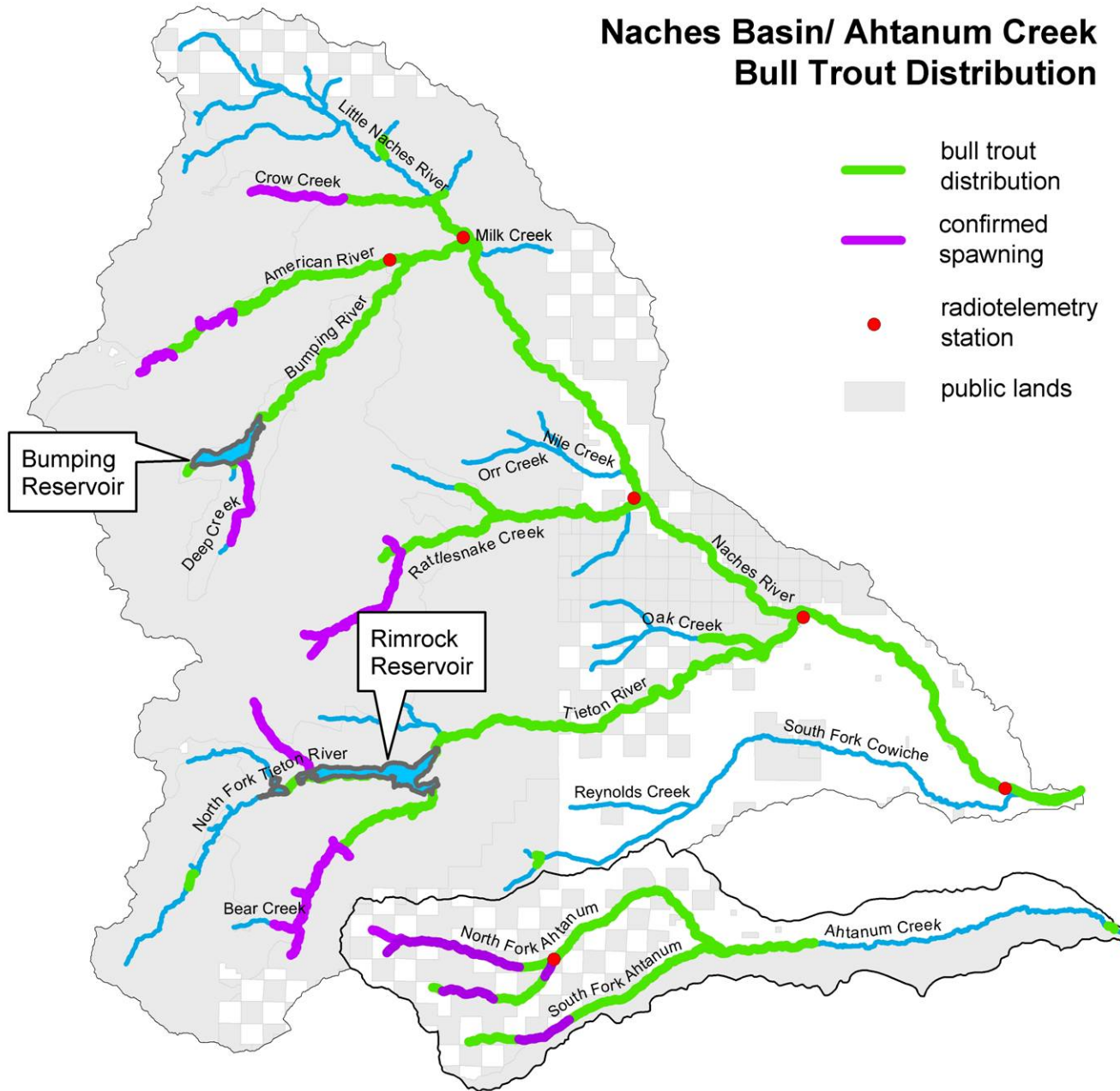


Fish are tracked once a week or more by road

Fish are monitored for habitat choice and bulk movement

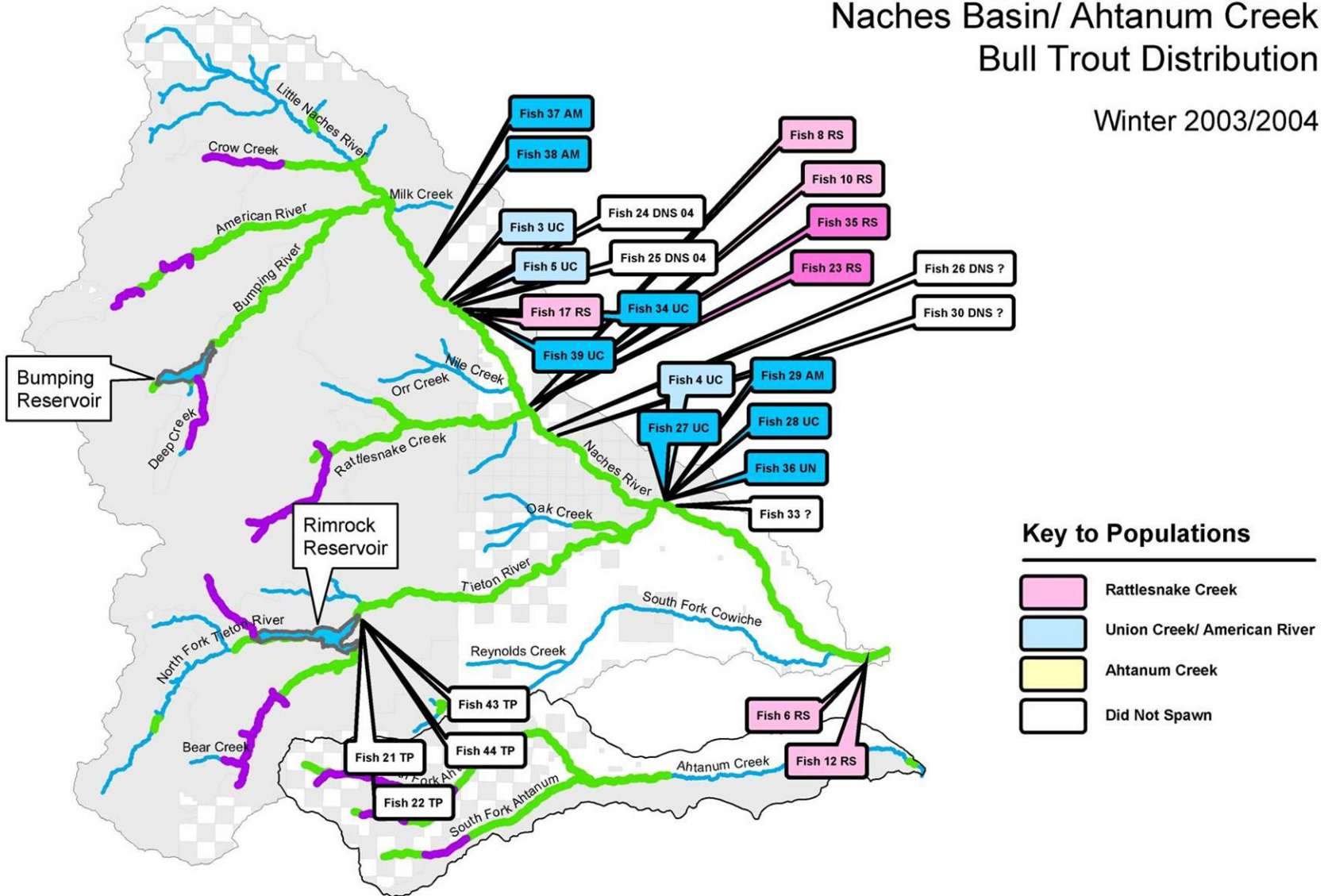
“Movers and shakers” are monitored more frequently

Naches Basin/ Ahtanum Creek Bull Trout Distribution



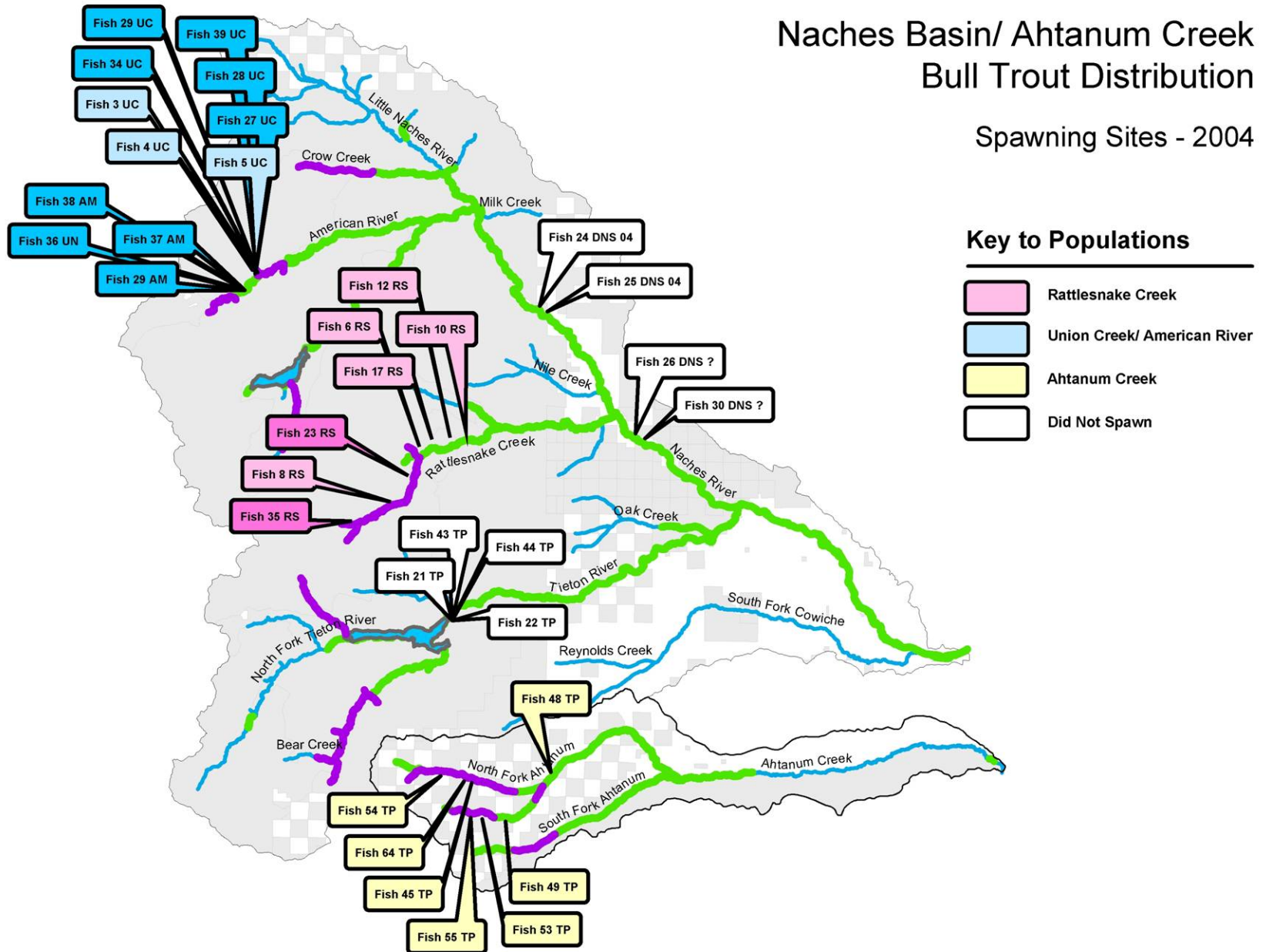
Naches Basin/ Ahtanum Creek Bull Trout Distribution

Winter 2003/2004



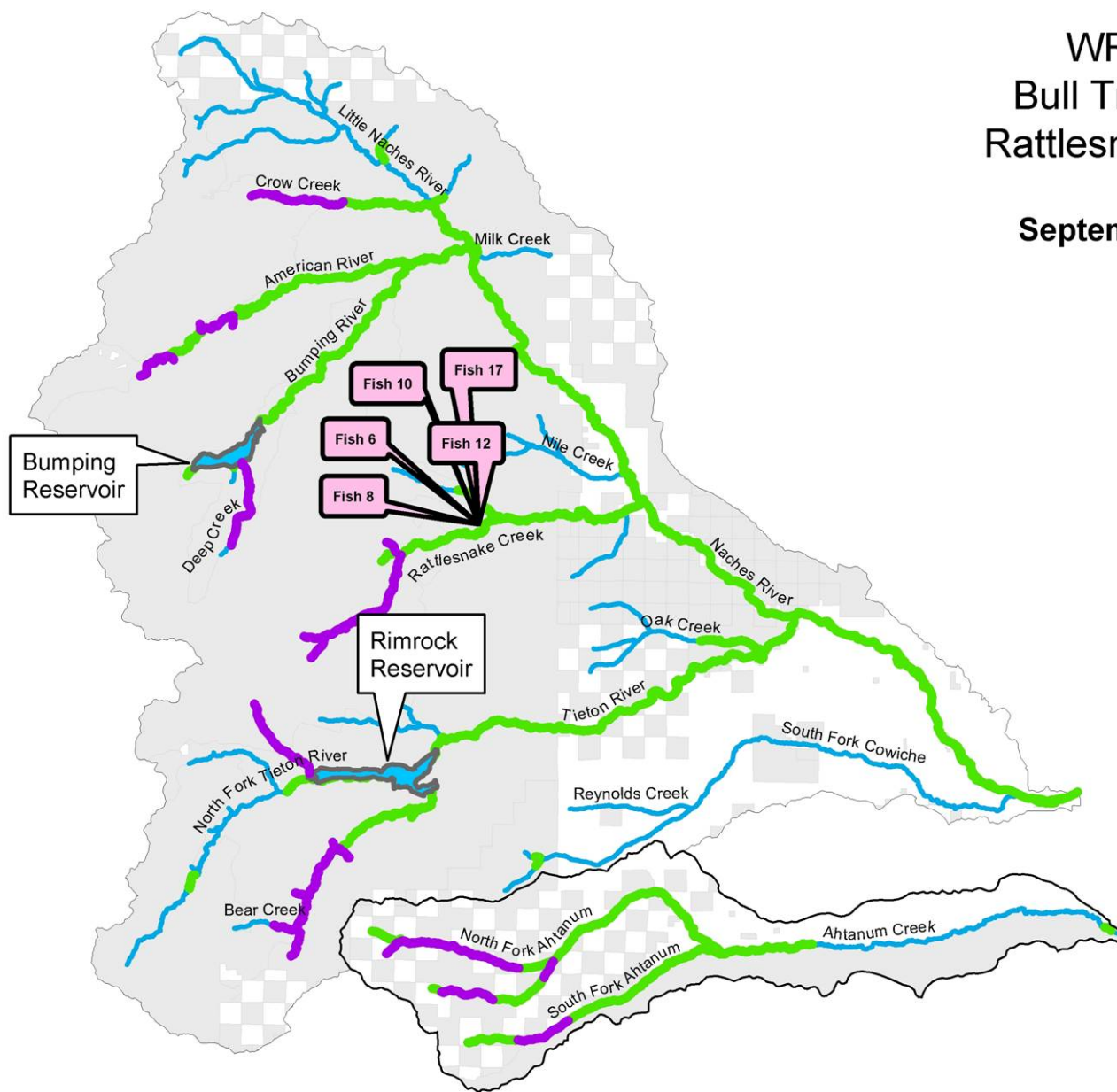
Naches Basin/ Ahtanum Creek Bull Trout Distribution

Spawning Sites - 2004



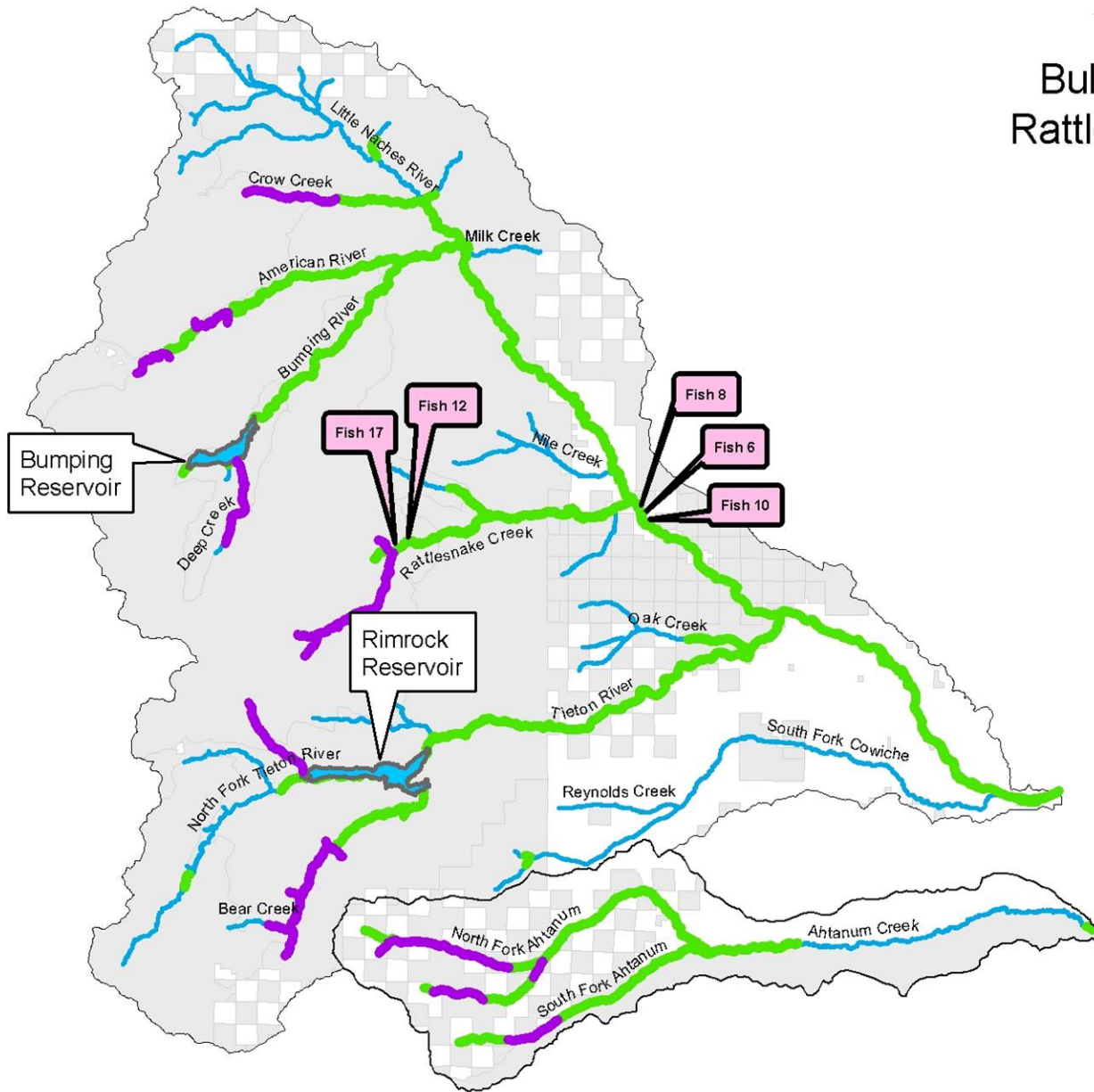
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

September/October 2003



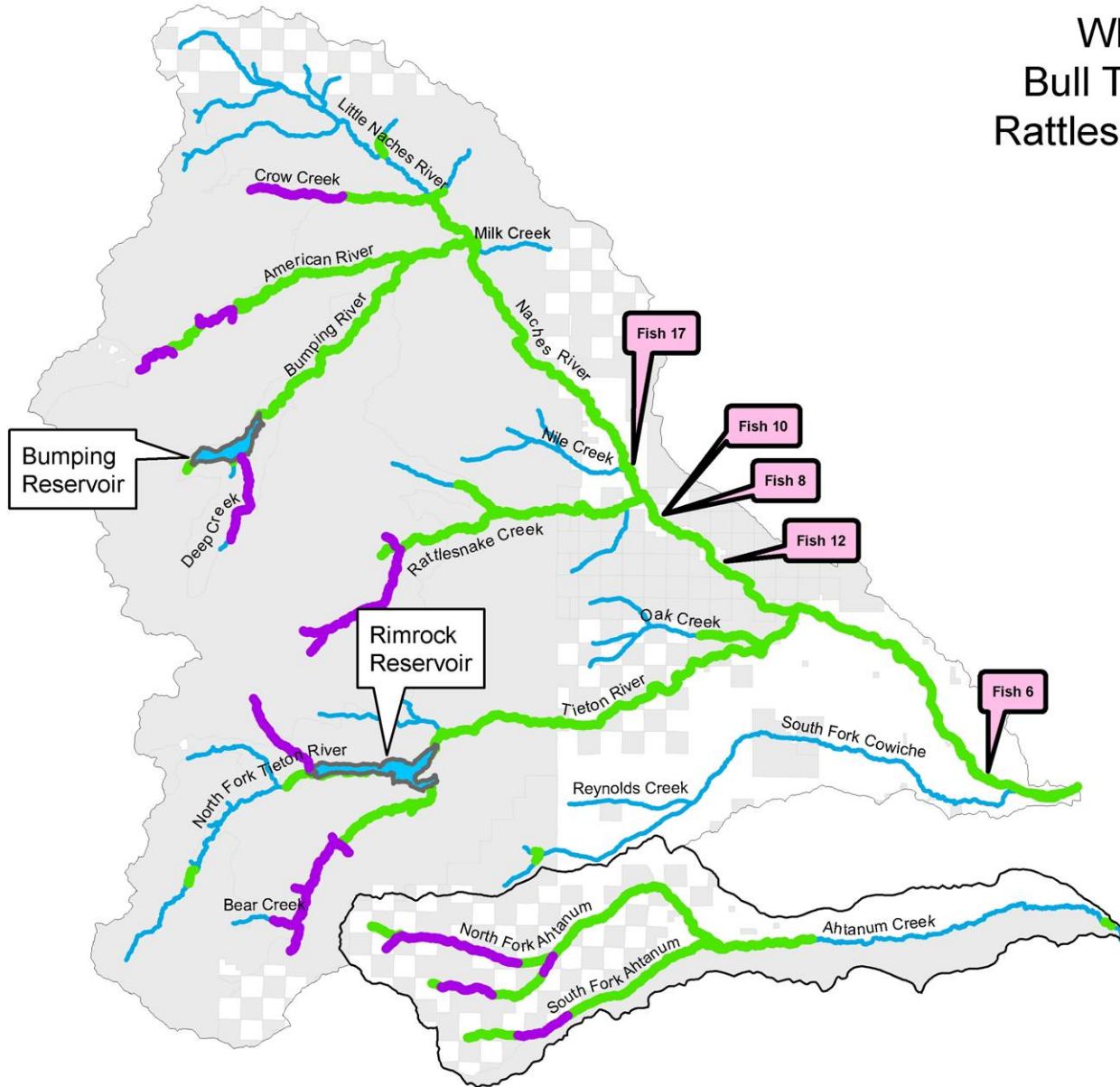
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

November 2003



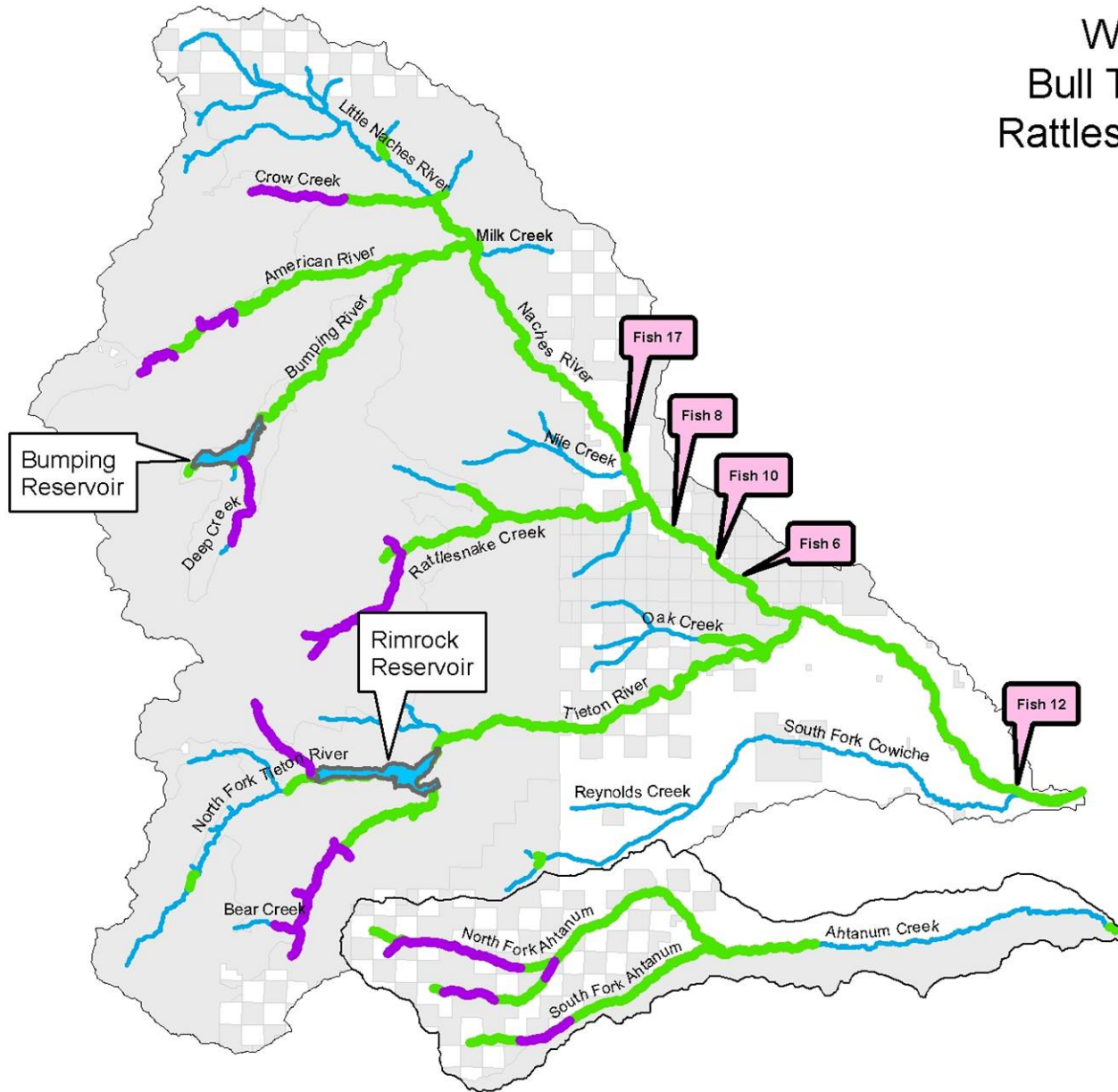
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

December 2003



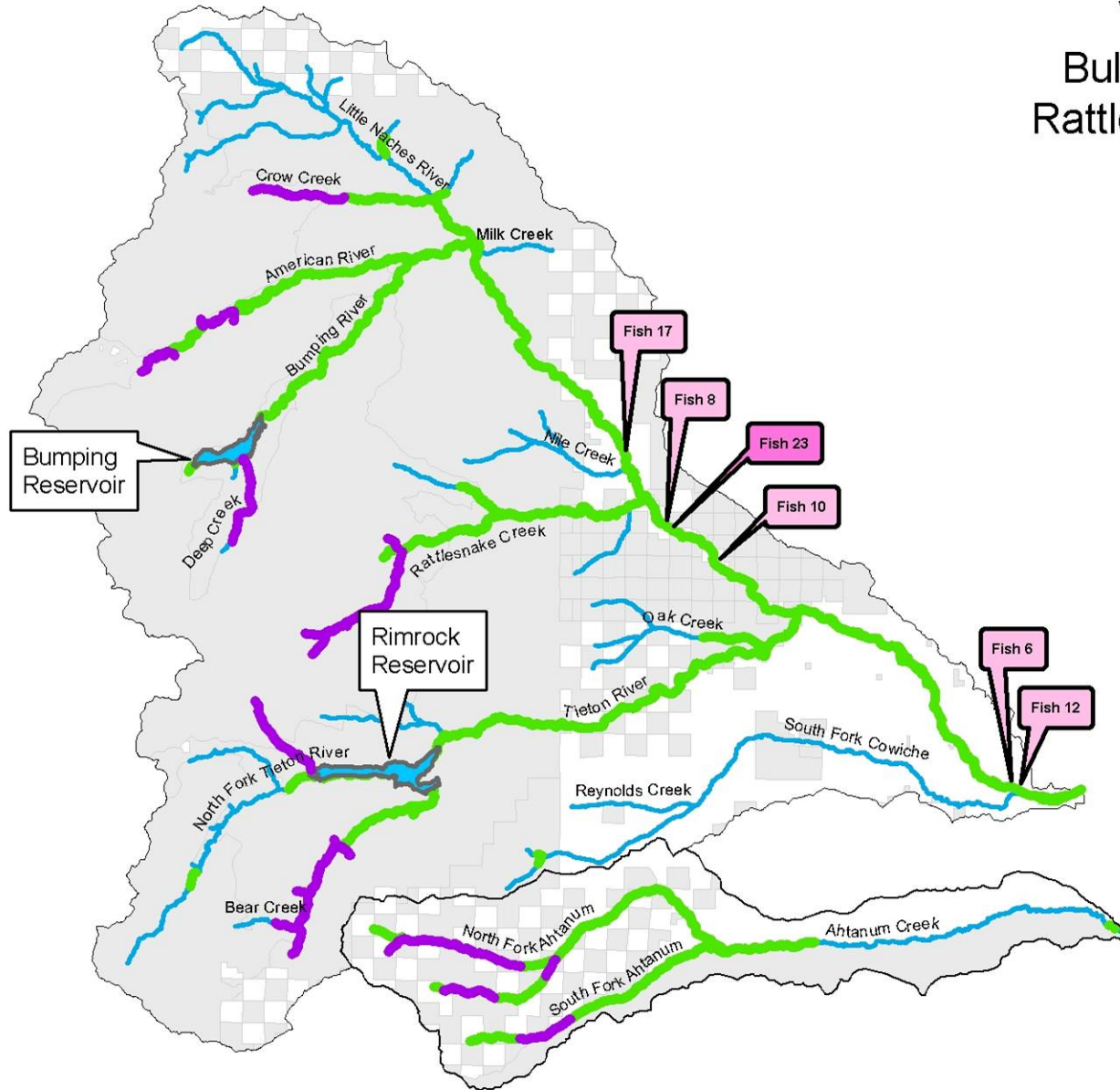
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

January 2004



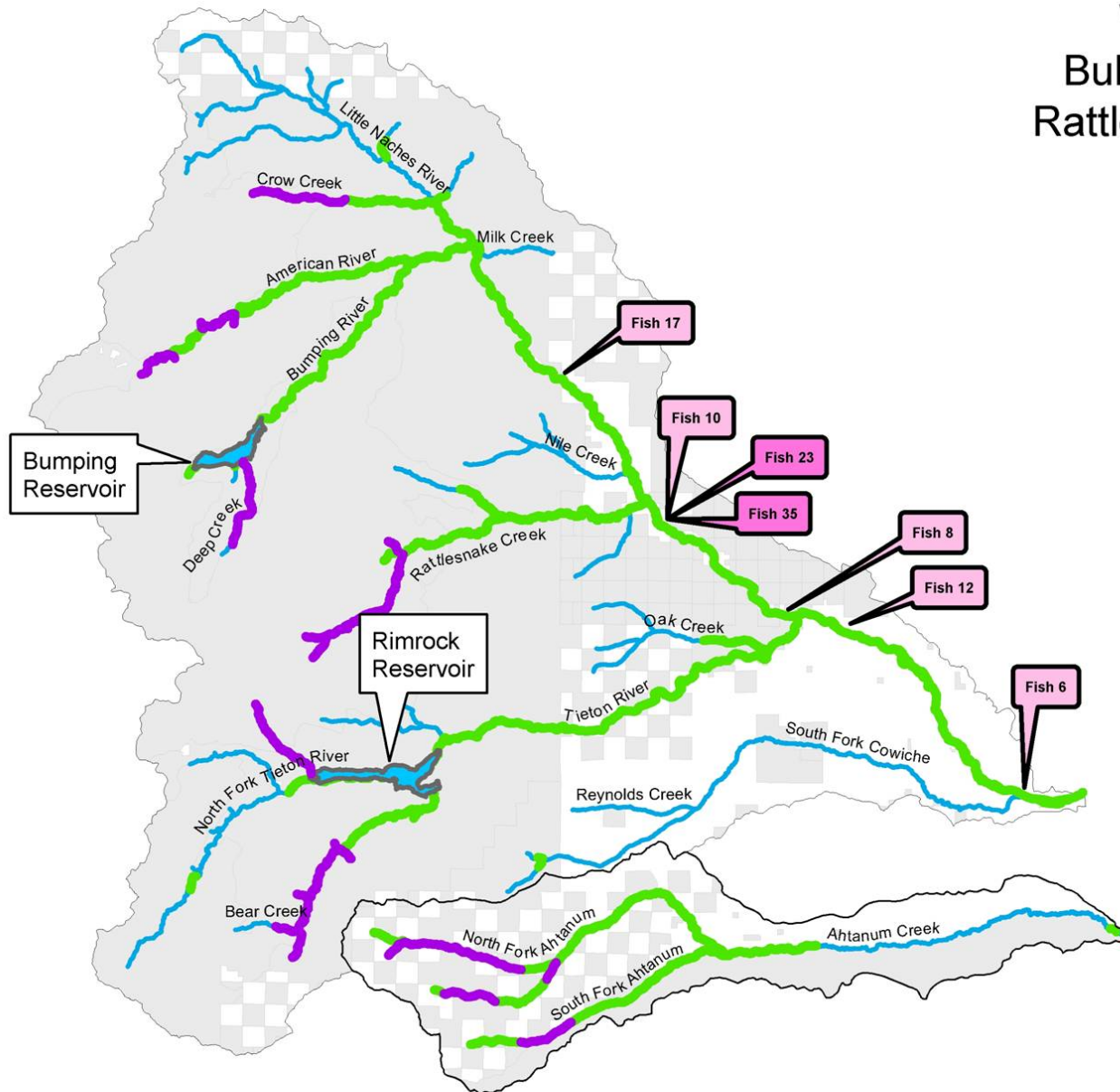
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

February 2004



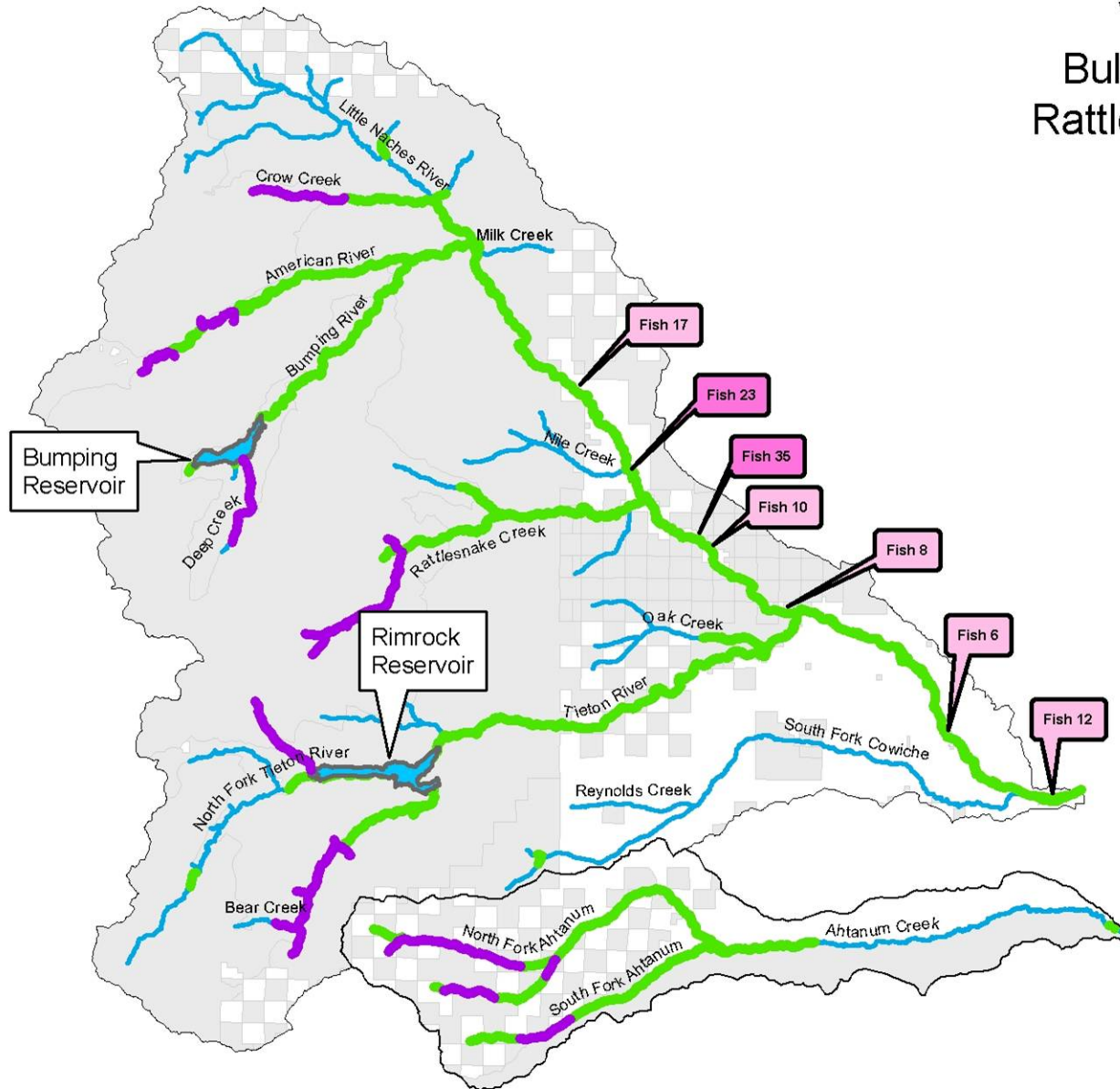
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

March 2004



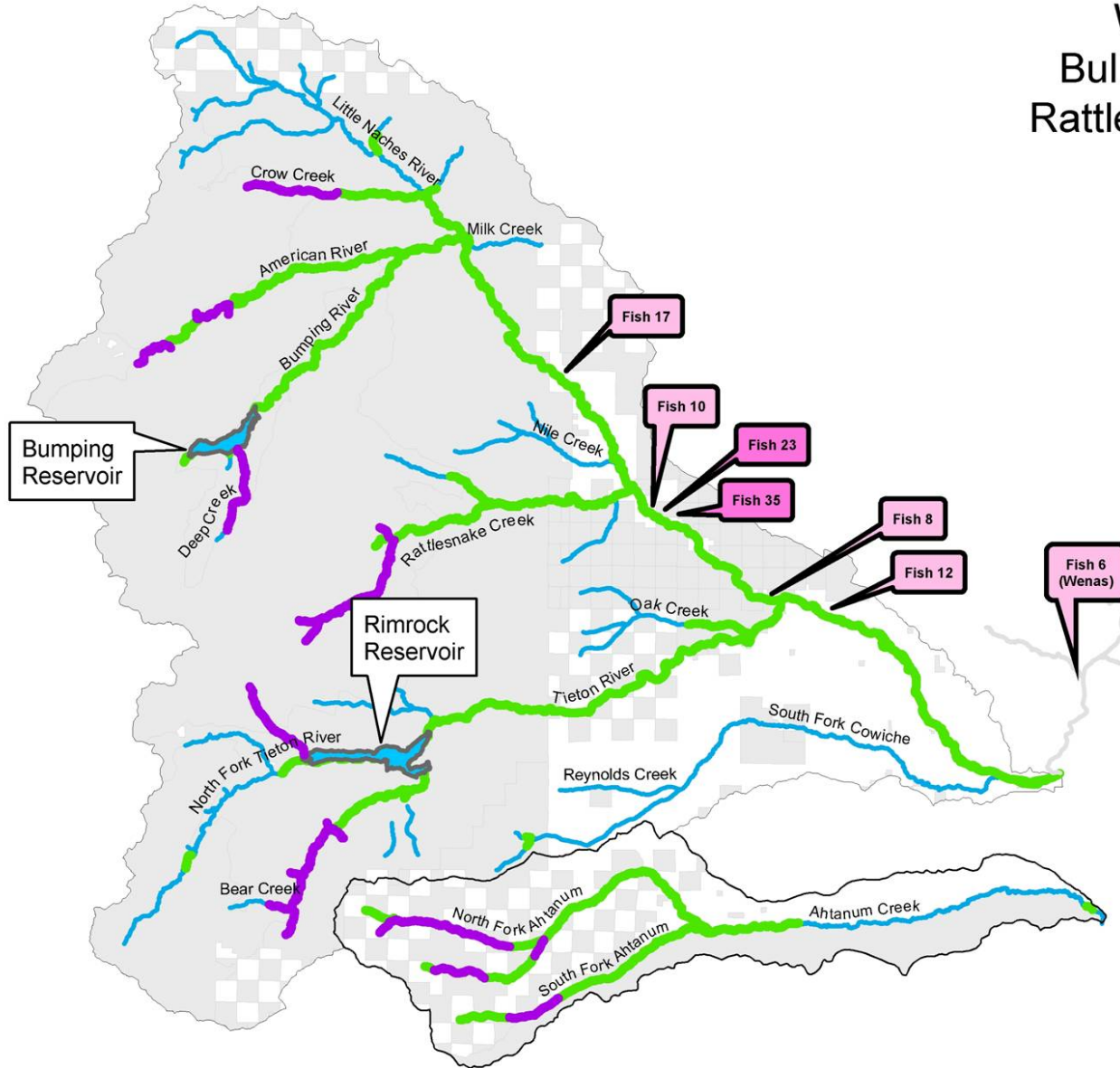
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

April 2004



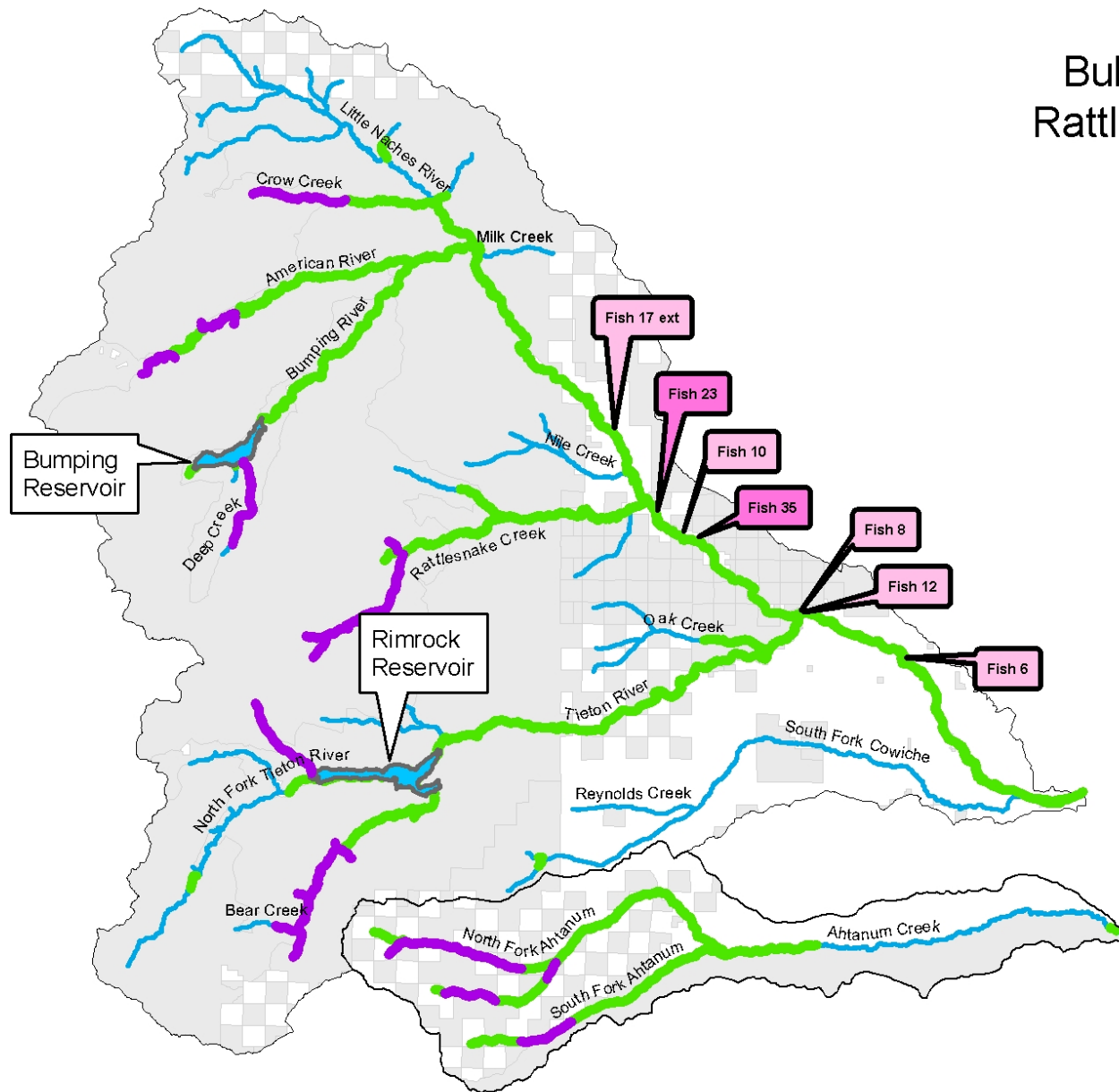
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

May 2004



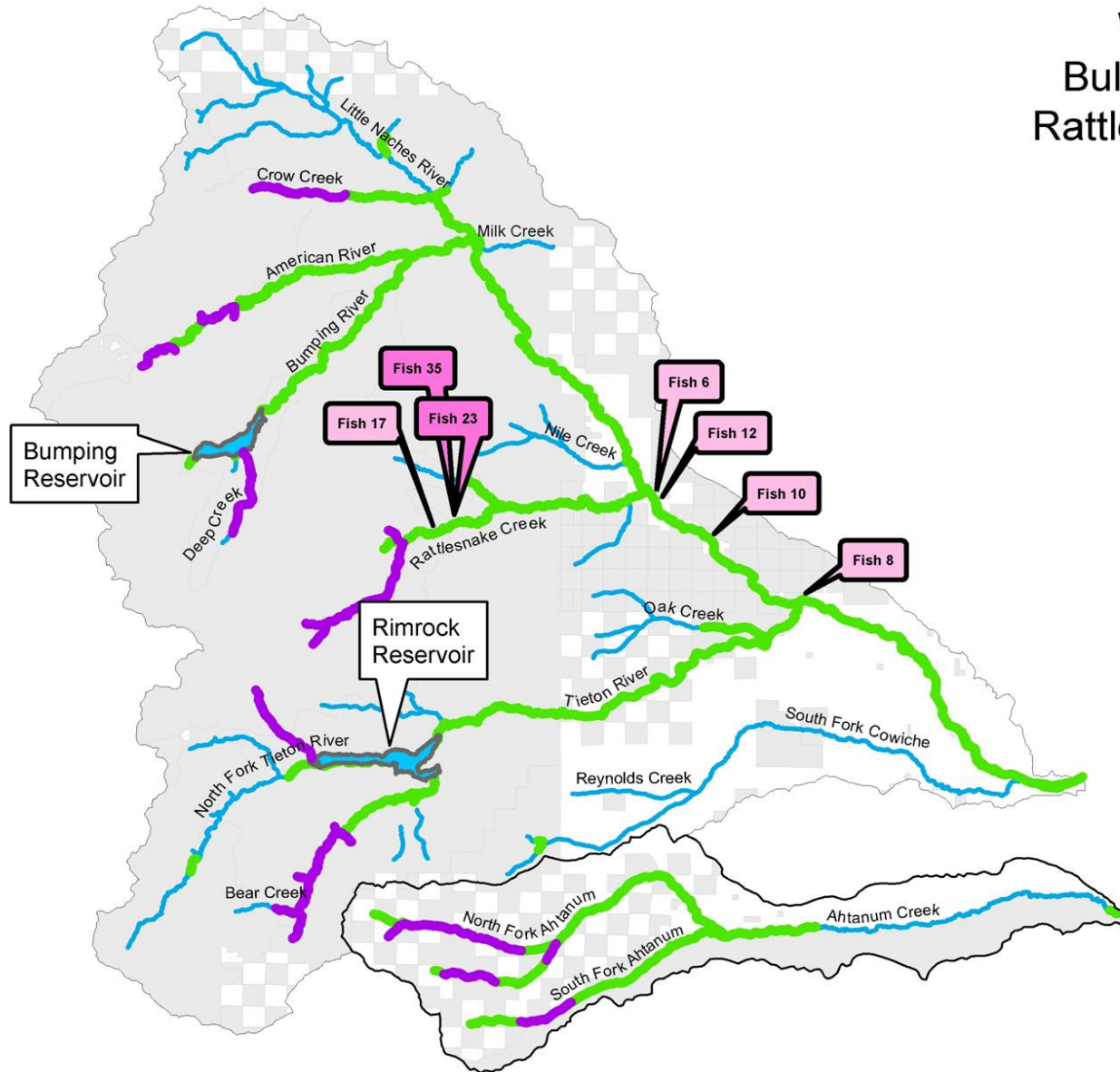
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

June 2004



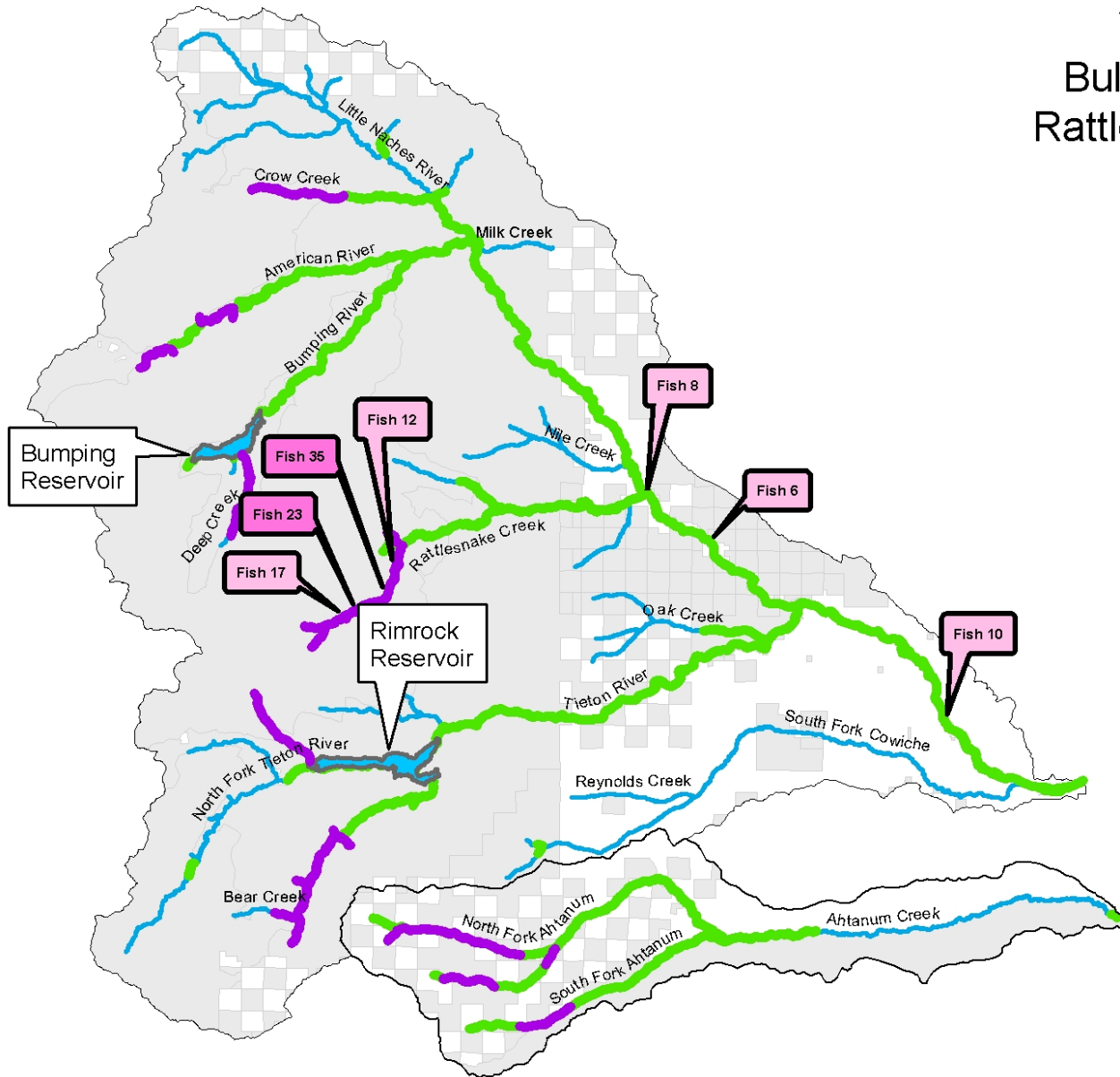
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

July 2004



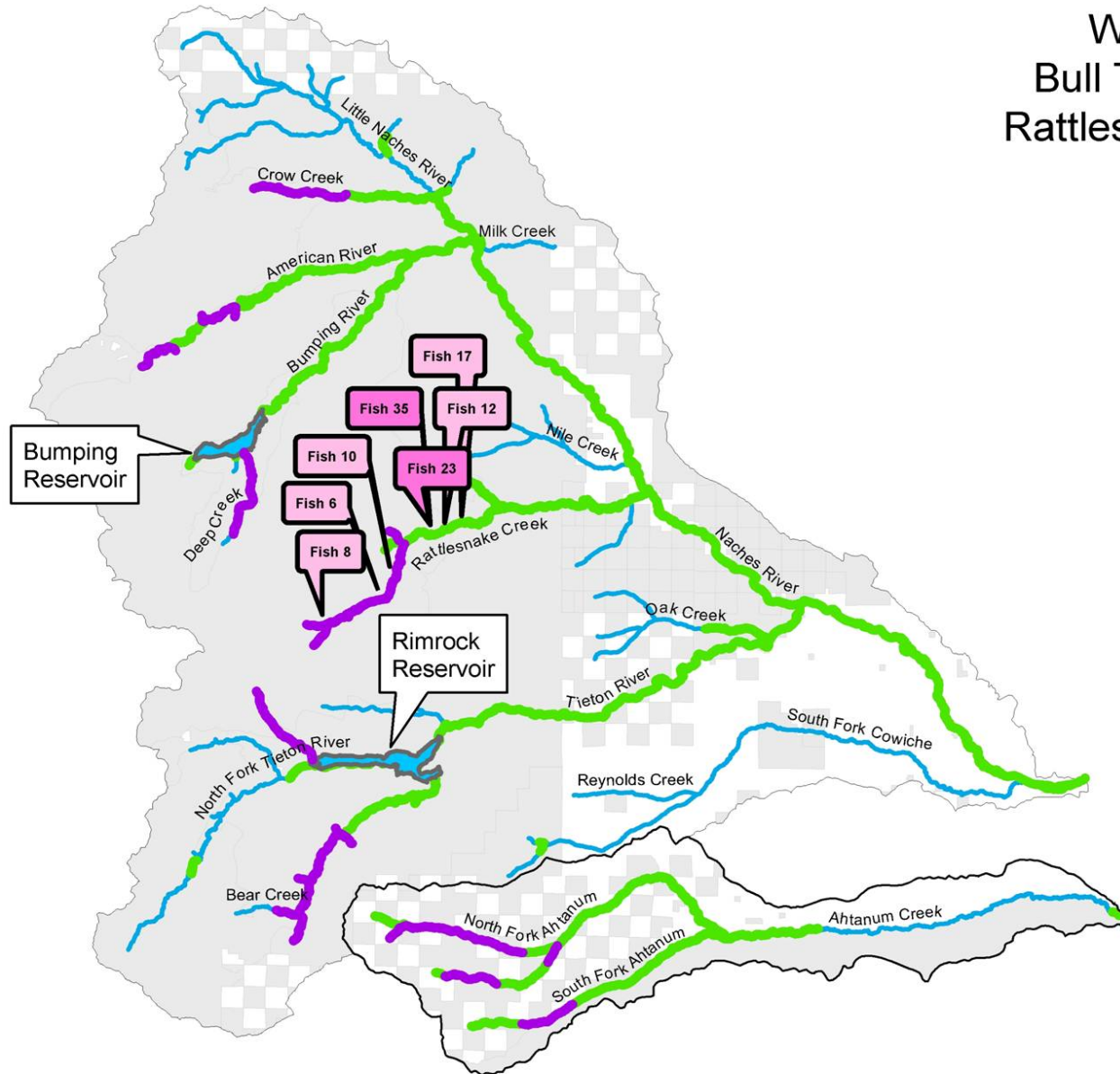
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

August 2004



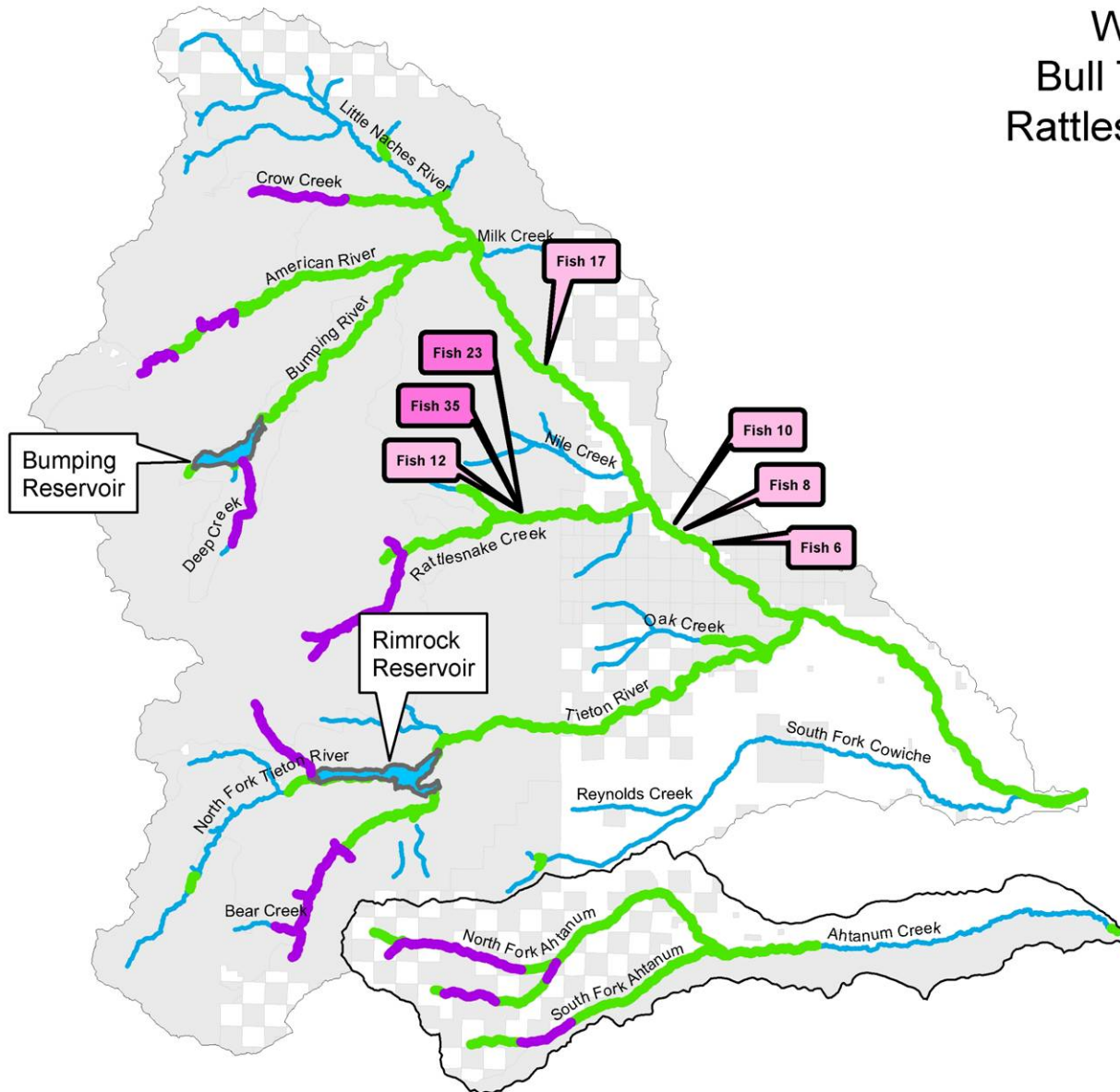
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

September 2004



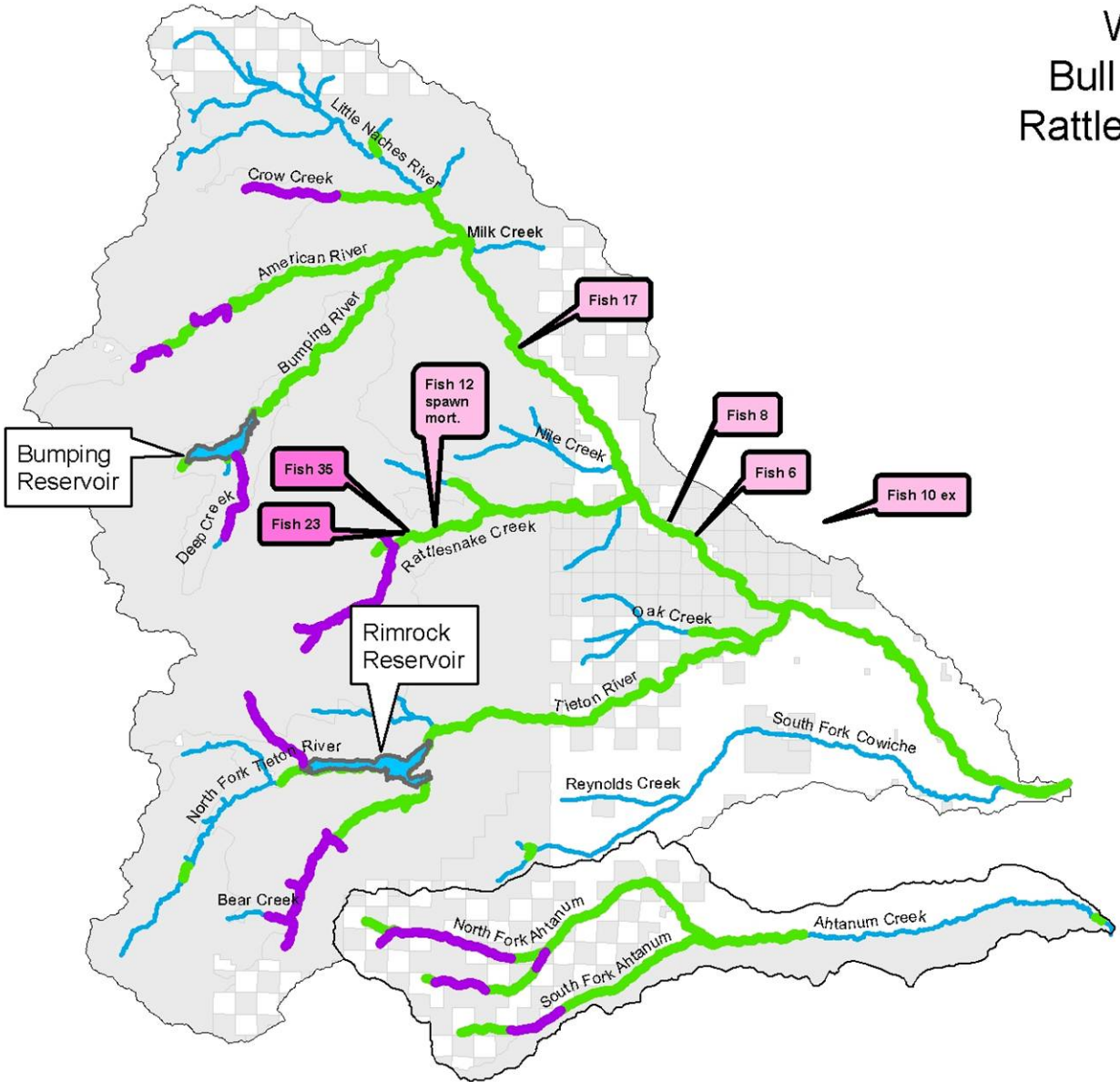
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

October 2004



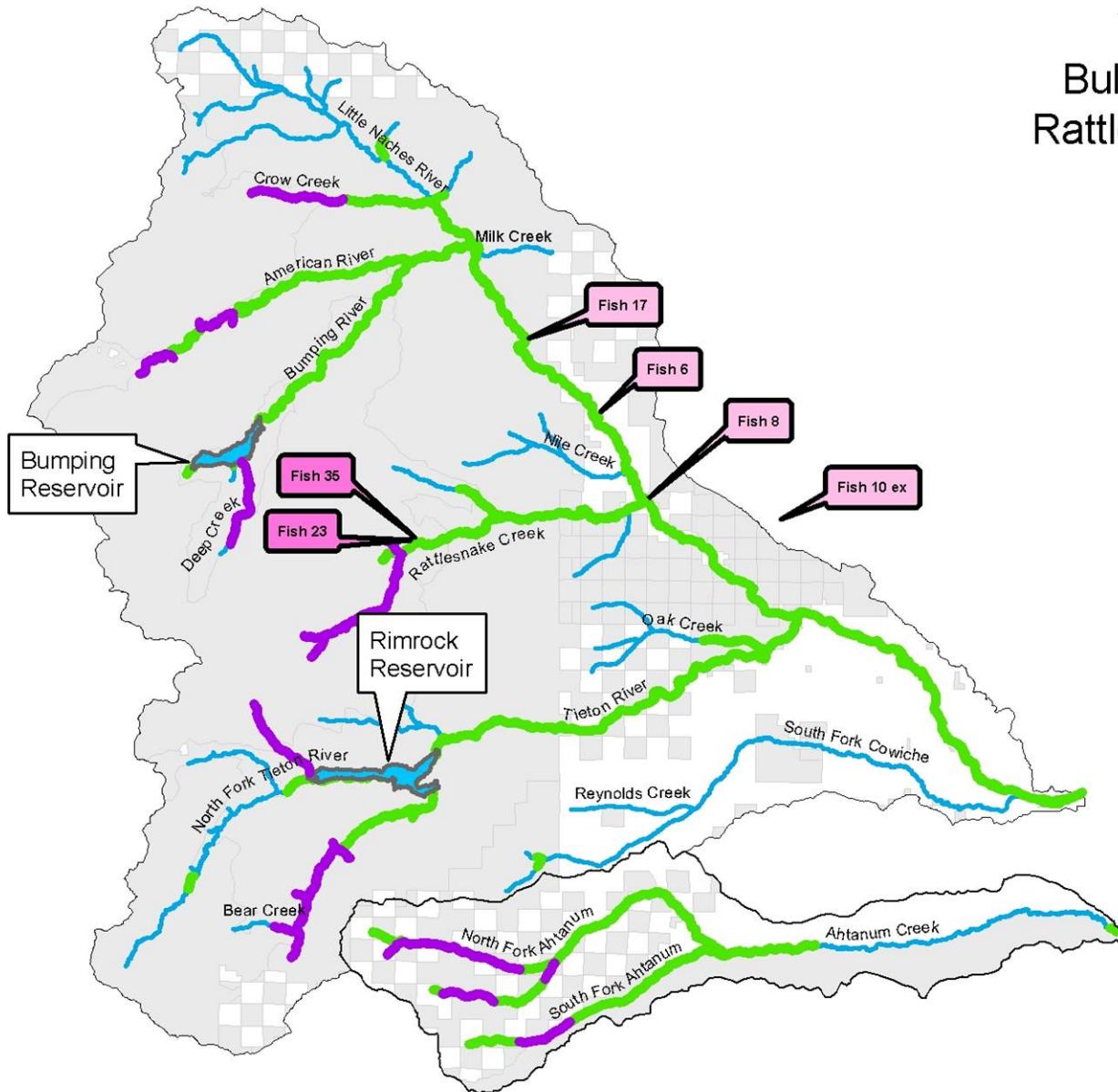
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

November 2004



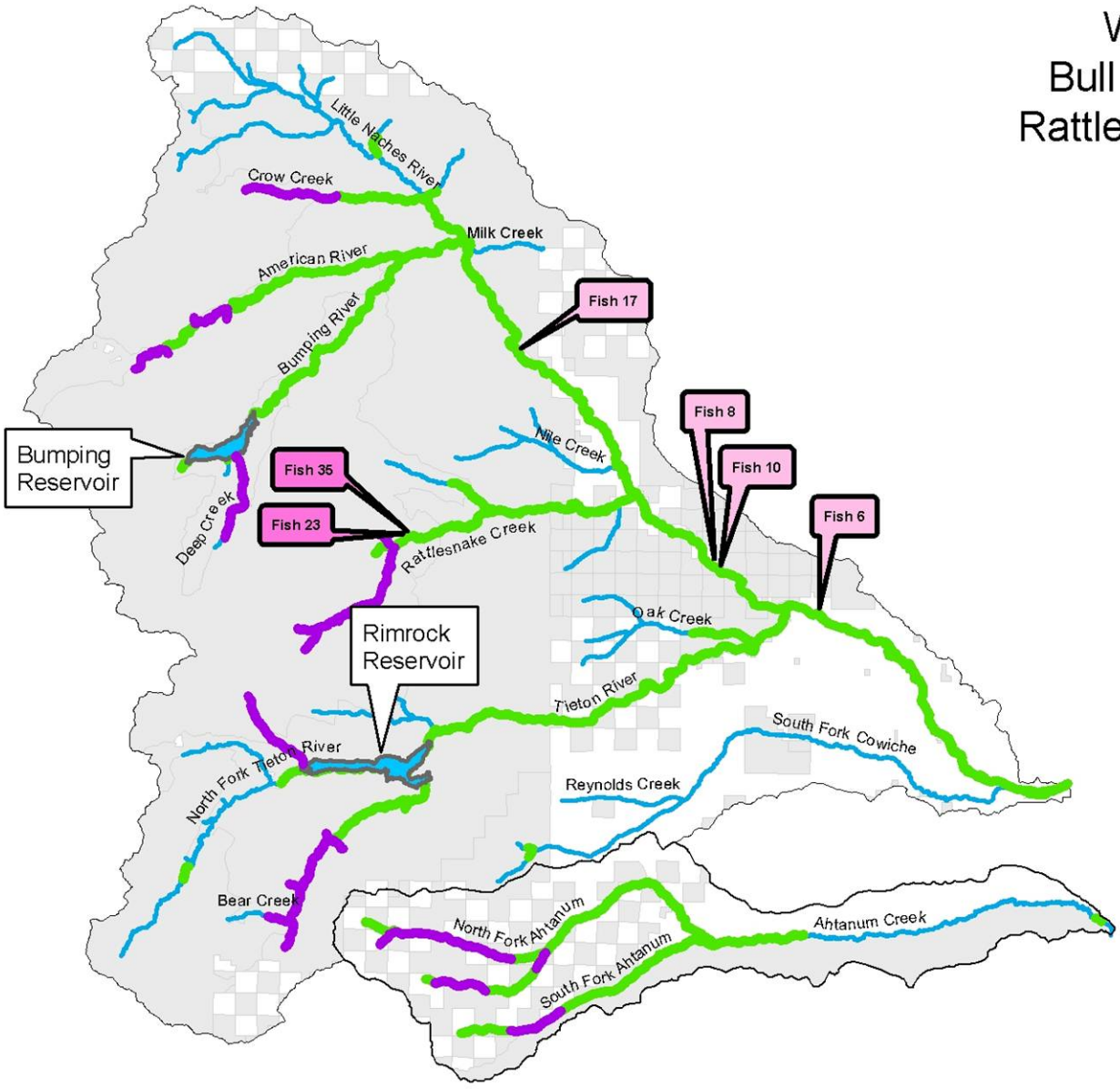
WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

December 2004



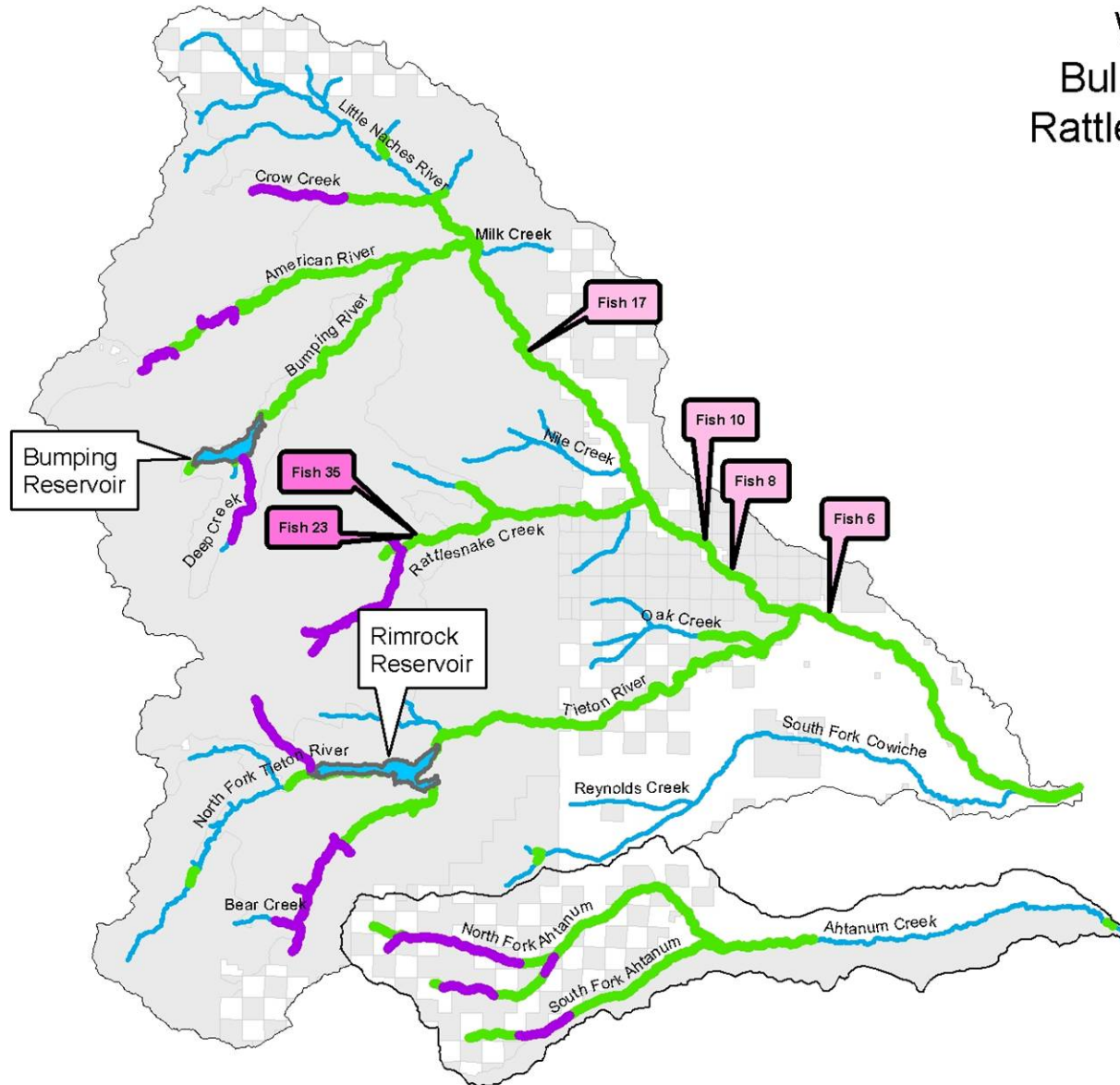
WRIA 38: Naches
Bull Trout Distribution
Rattlesnake Population

January 2005



WRIA 38: Naches Bull Trout Distribution Rattlesnake Population

February 2005



Preliminary Conclusions

Fluvial populations over-winter in the Naches and occasionally move into the Yakima. Most over wintering appears to occur in several deep holes.

Radio telemetry confirms current spawning grounds as being accurate. So far, no new spawning grounds have been discovered.

Telemetry and weir monitoring indicates that Ahtanum and Crow Creek fish are likely isolated or semi-isolated populations.

Surgically implanted tags become keloidally encapsulated within the body cavity of the tagging subject in a few weeks.

Surgically implanted tags may be shed with no ill effects to the fish.

Preliminary Conclusions

Staging and spawn timing varies among populations, even those separated by only a few miles (American/Union).

Pre staging happens on or about May 15. Fish begin to move towards their respective spawning grounds.

Spawn staging occurs as early as mid July. Fish can be found on or just below their respective spawning areas, although individual run timing varies.

Preliminary data indicates a strong correlation between flow corridors/prey use and over wintering habitat use/choice.

Preliminary data from weirs, hook-and-line sampling, radio tracking and other R.T. studies indicates that fish may sometimes over winter in Male/Female pairs. Whether these pairs EVER spawn together remains to be seen...

Special Thanks To:

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Judy DeLaVerne

Jeff Thomas

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Travis Dick

Bill Darrah

Walt Larrick

Pete Hahn

