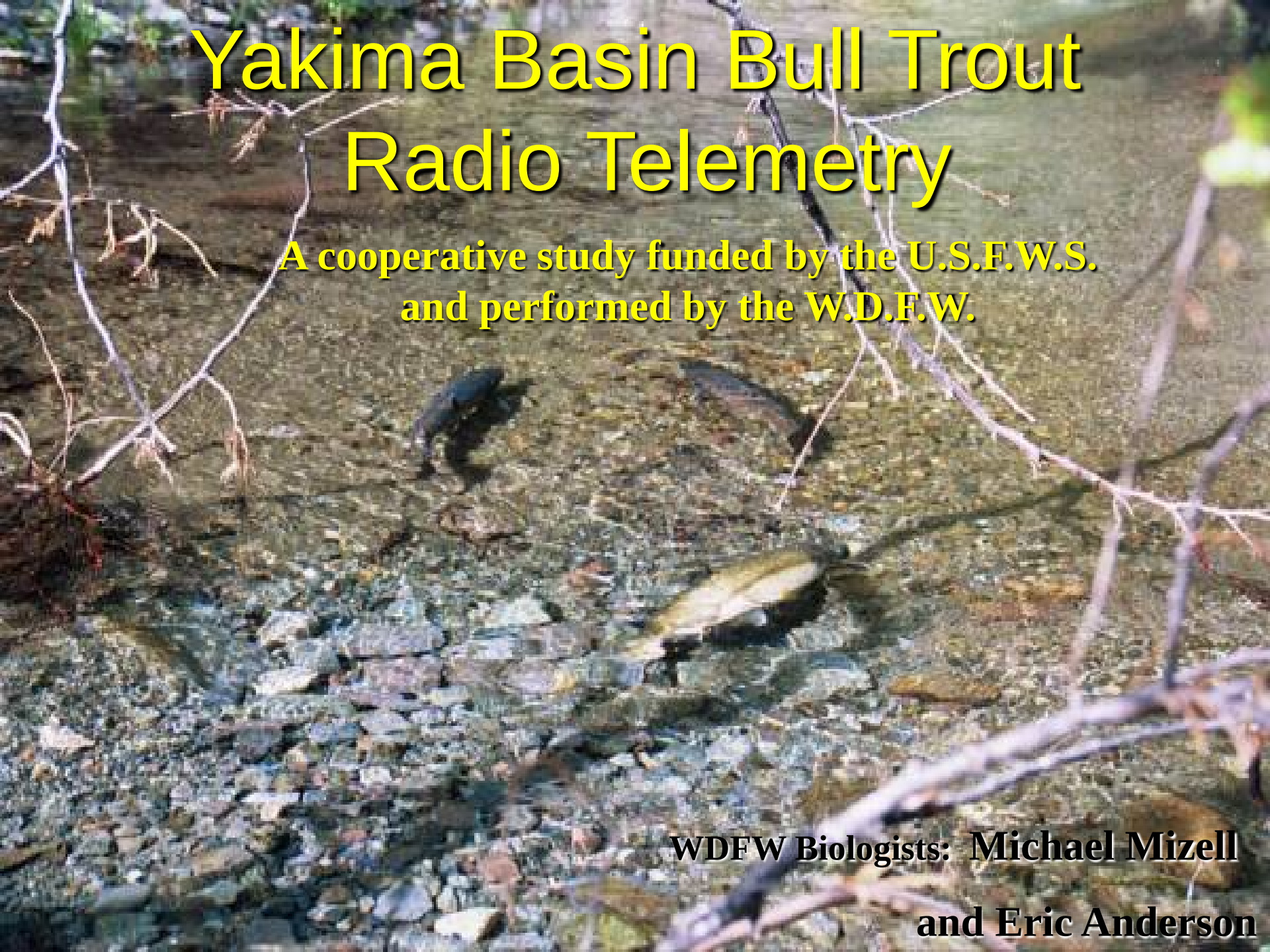


Yakima Basin Bull Trout Radio Telemetry

A cooperative study funded by the U.S.F.W.S. and performed by the W.D.F.W.

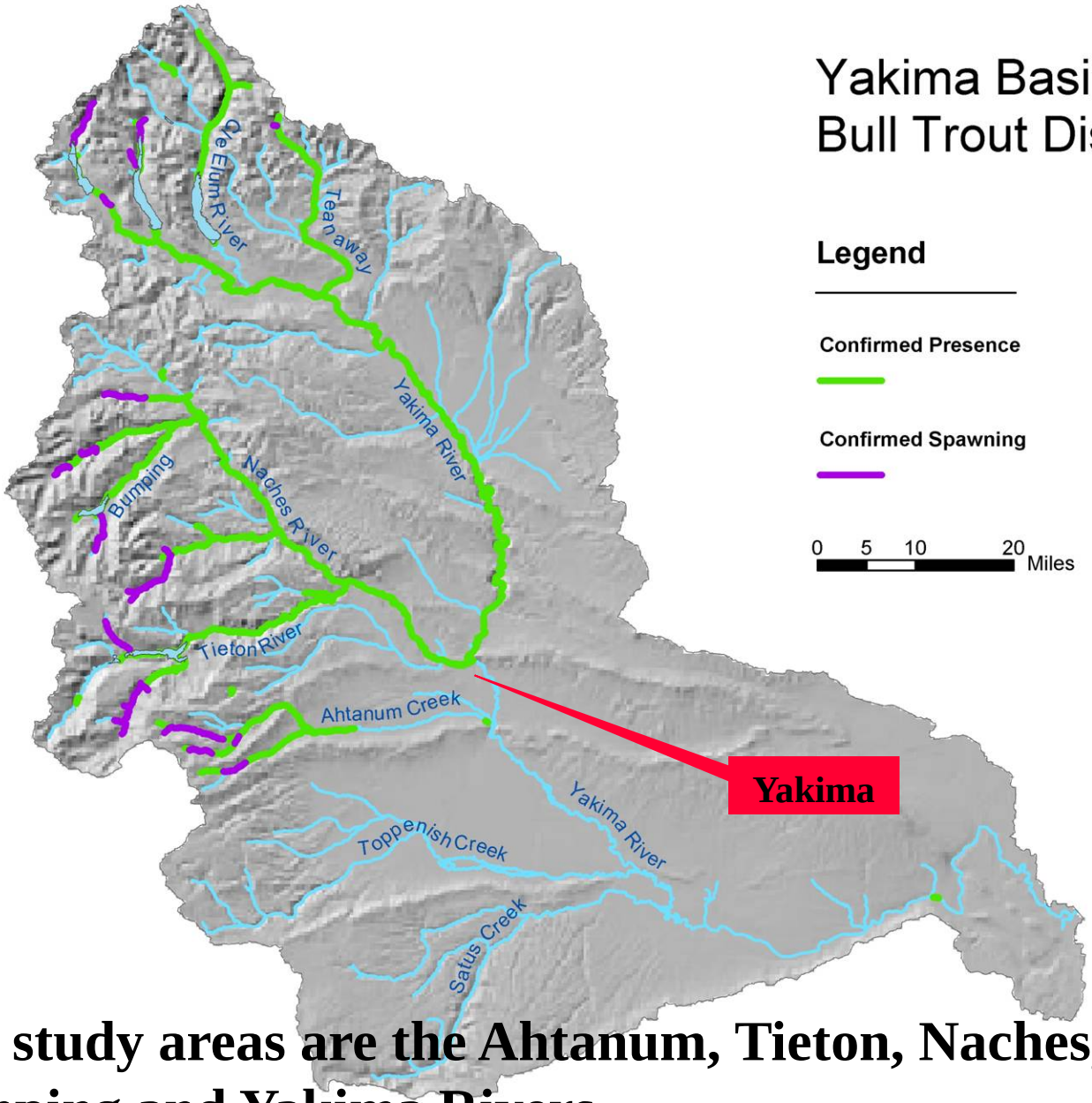
WDFW Biologists: Michael Mizell and Eric Anderson

Project Goal

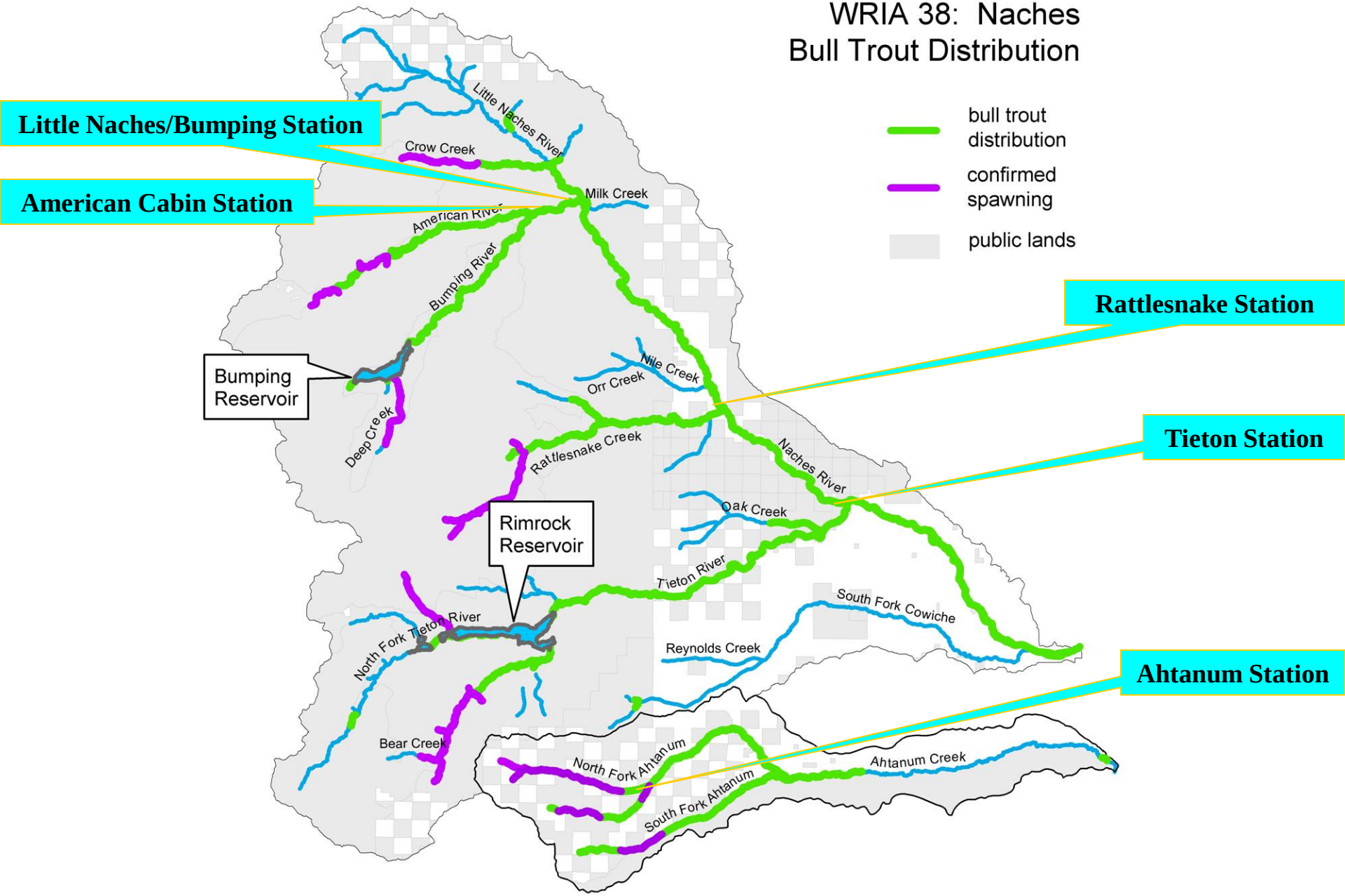
Use radio telemetry to obtain information on resident and fluvial bull trout movements, habitat preferences, and spawning locations in the Yakima River basin

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

Union Creek Weir and Bull Trout



Our study areas are the Ahtanum, Tieton, Naches, American, Bumping and Yakima Rivers.


WRIA 38: Naches
Bull Trout Distribution
bull trout distribution
confirmed spawning
public lands
Little Naches/Bumping Station
American Cabin Station
Rattlesnake Station
Tieton Station
Ahtanum Station
Little Naches River
Crow Creek
Milk Creek
American River
Bumping River
Bumping Reservoir
Deep Creek
Nile Creek
Orr Creek
Rattlesnake Creek
Naches River
Oak Creek
Rimrock Reservoir
Tieton River
South Fork Cowiche
North Fork Tieton River
Reynolds Creek
Bear Creek
North Fork Ahtanum
Ahtanum Creek
South Fork Ahtanum

Objectives

Document bull trout migration patterns & spawning activity

Evaluate habitats used by adult bull trout

A control group of 24 rainbow trout was kept at the Naches hatchery to document tag retention and effects of long term tag placement. They were tagged in September, 2003, and held for 9 months until June 2004.

Healed surgery scar on rainbow trout, six months post surgery.


We tagged a total of 71 fish for this project.

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 next to quarter.

Fish 34, code 160 recapture 10 days post surgery

Fish 36, code 158 recapture 12 days post surgery

Fish 23, code 130 recapture 15 days post surgery


Healed Surgical Scar (2 Years Post Surgery)

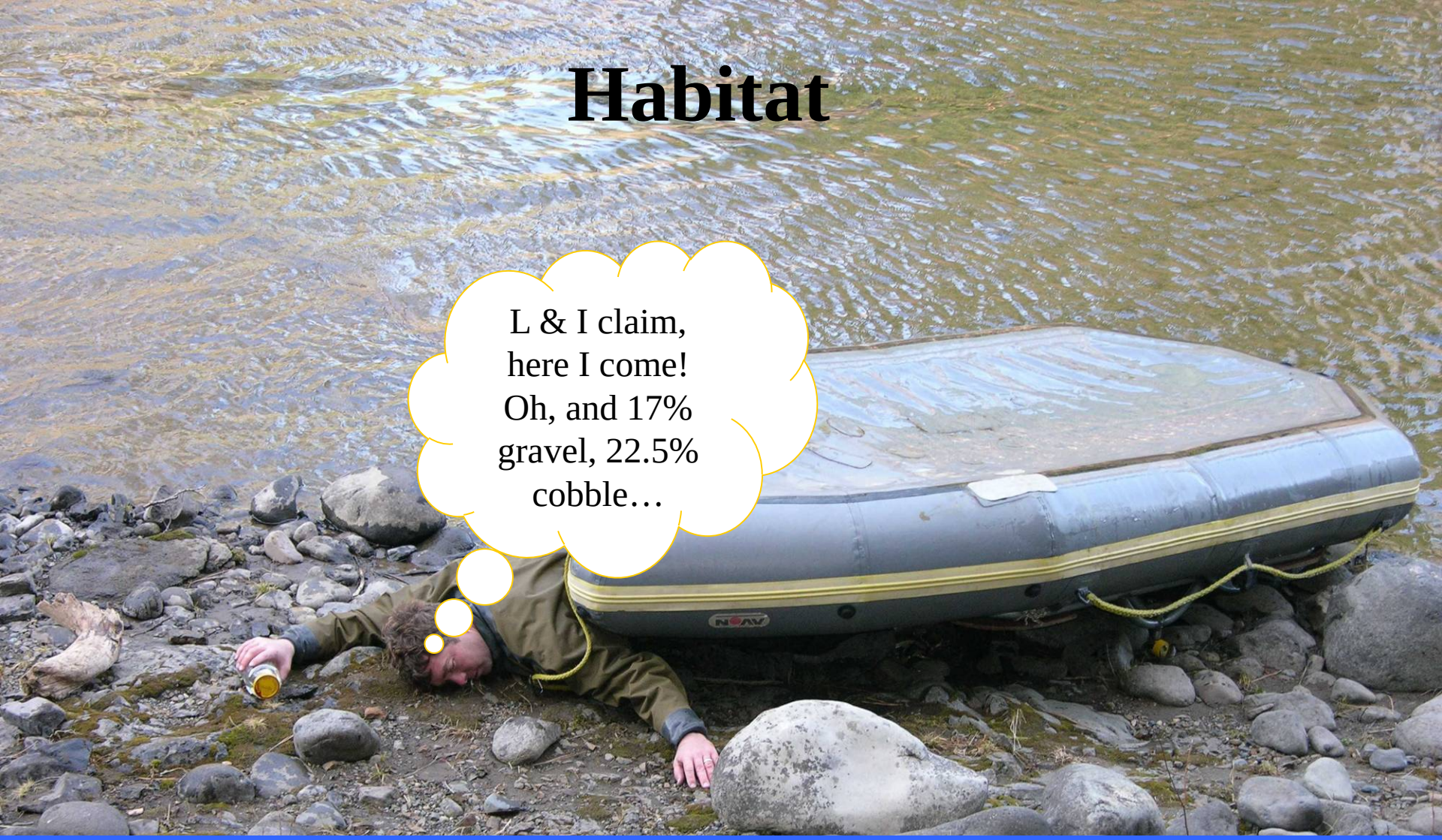

Antenna Perforation (2 Years Post Surgery)

Entrainment

Due to near 100% spawning site fidelity, entrained fish are effectively out of the gene pool.

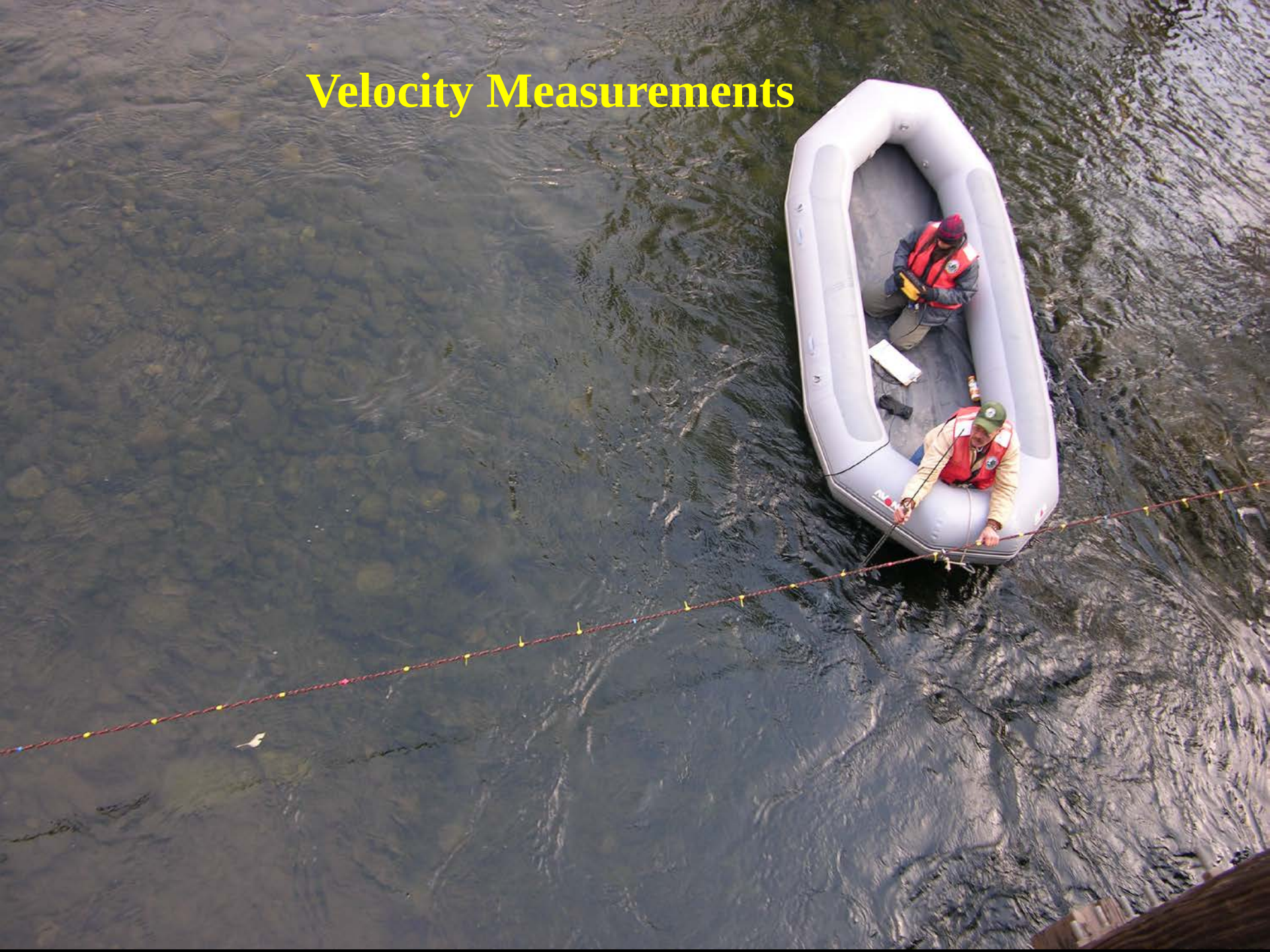
Fish #21 in October 2003 at 1.75 pounds and again in November 2005 at 6.1 pounds.

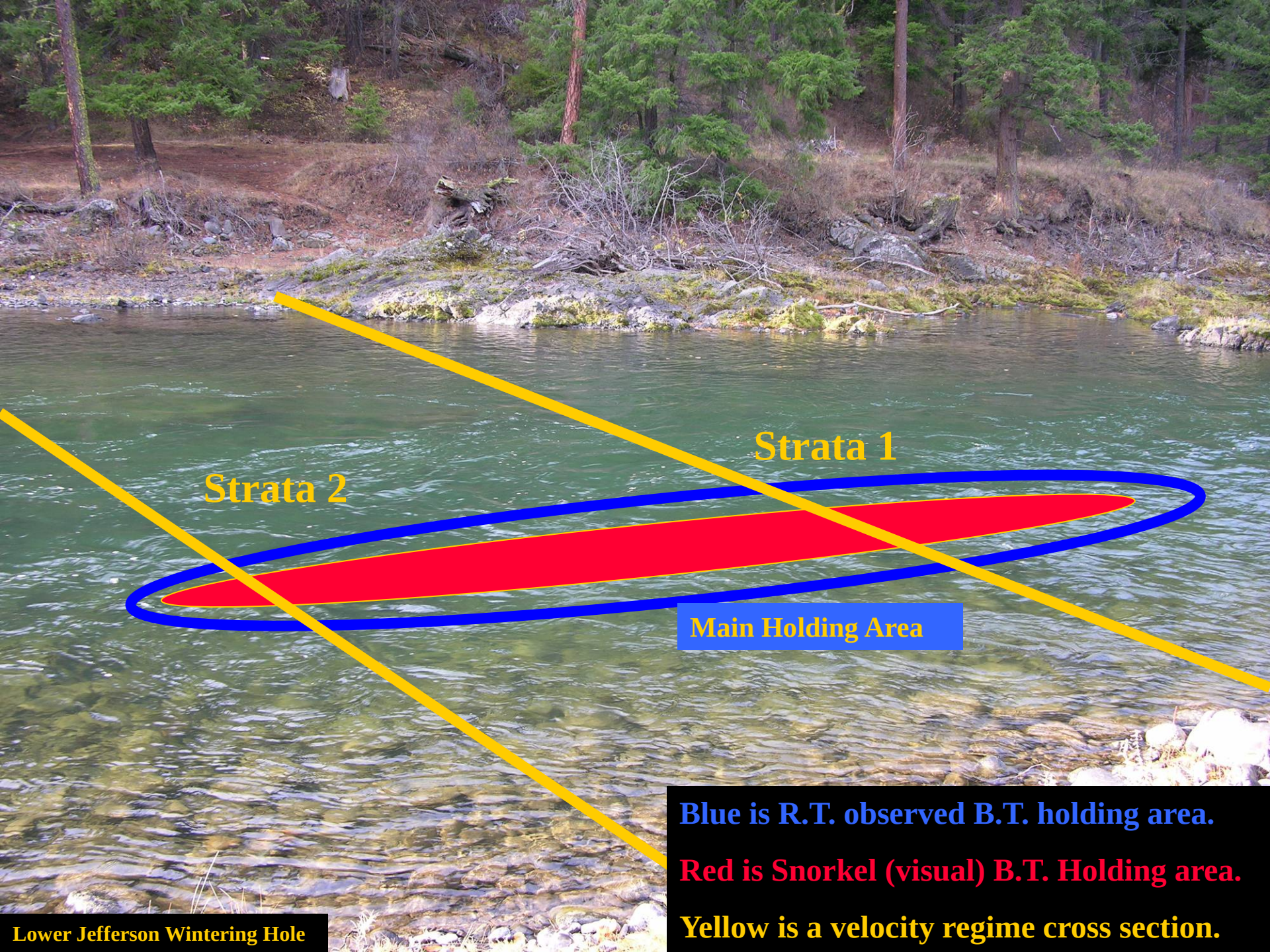
Habitat



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

Velocity Measurements



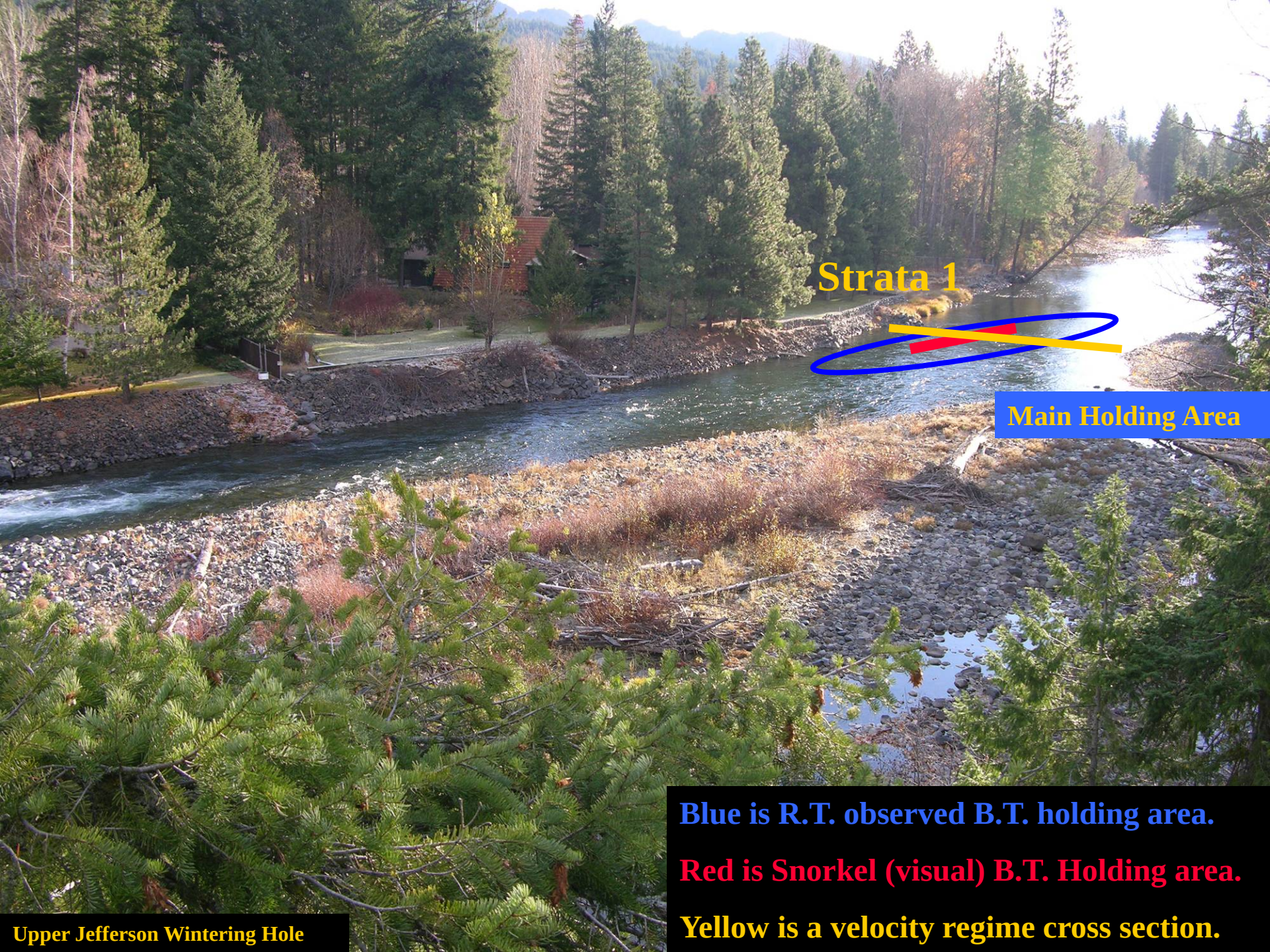


Blue is R.T. observed B.T. holding area.

Red is Snorkel (visual) B.T. Holding area.

Yellow is a velocity regime cross section.

Lower Jefferson Wintering Hole

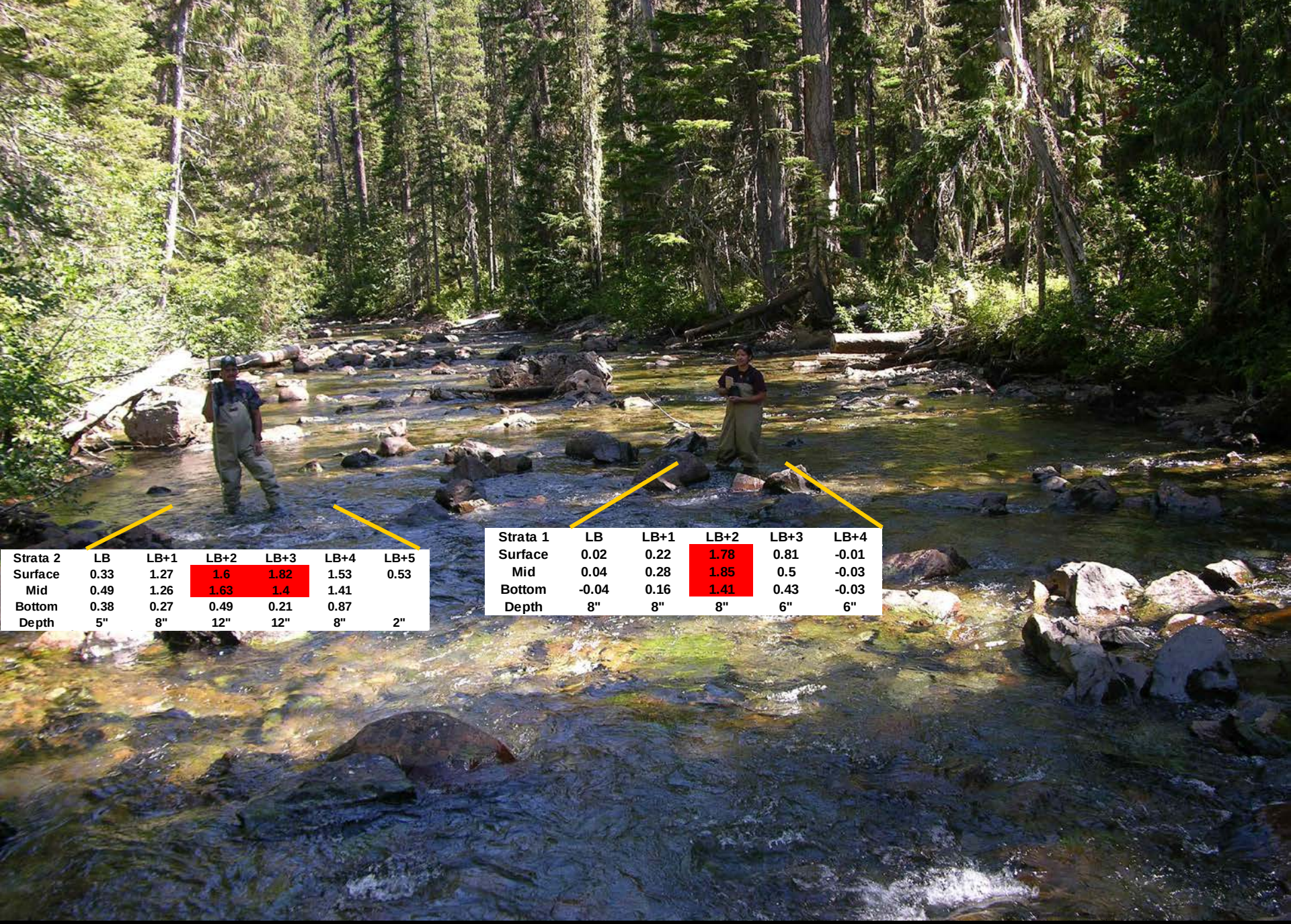


Blue is R.T. observed B.T. holding area.

Red is Snorkel (visual) B.T. Holding area.

Yellow is a velocity regime cross section.

Upper Jefferson Wintering Hole

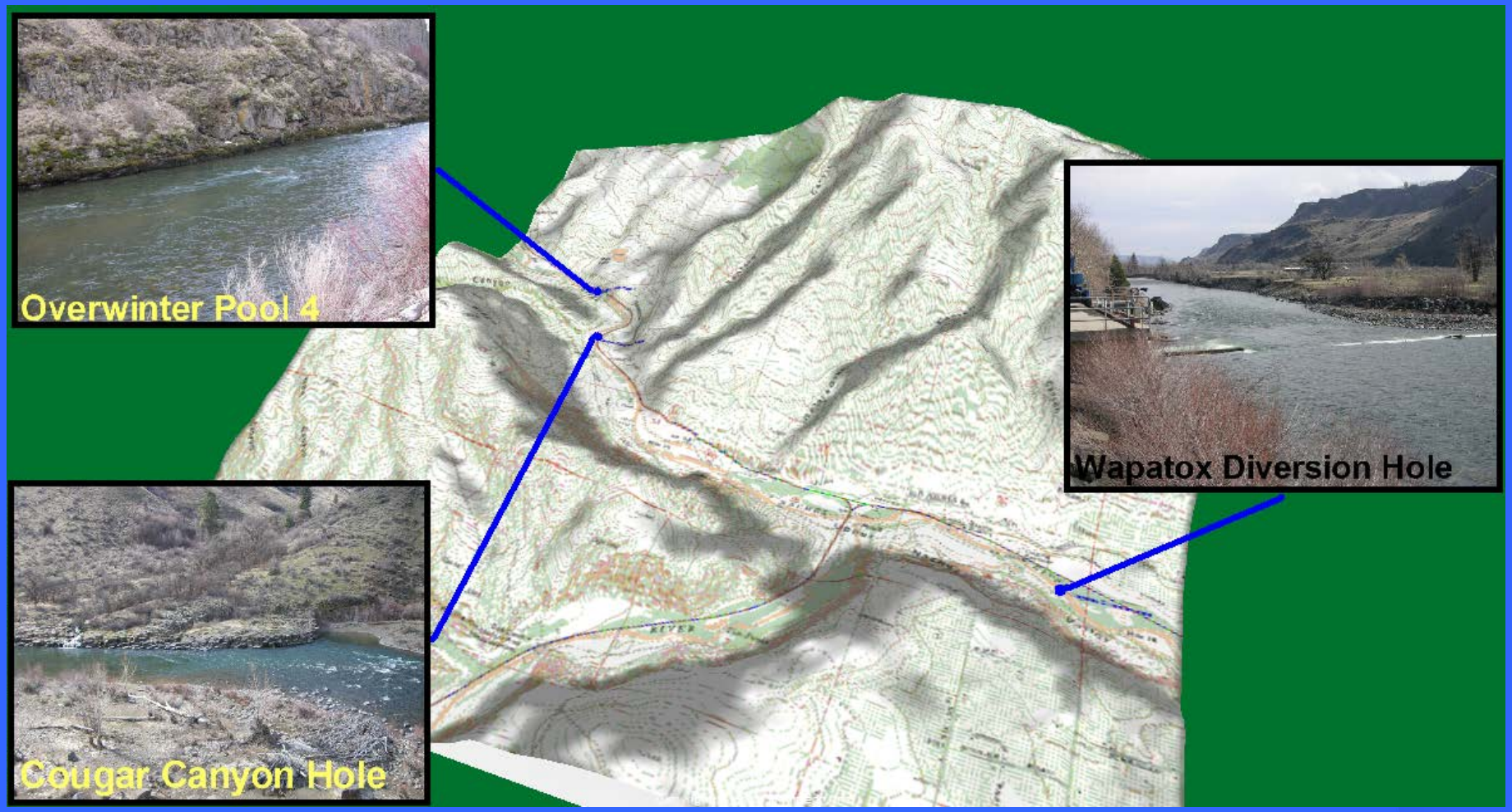


Strata 2	LB	LB+1	LB+2	LB+3	LB+4	LB+5
Surface	0.33	1.27	1.6	1.82	1.53	0.53
Mid	0.49	1.26	1.63	1.4	1.41	
Bottom	0.38	0.27	0.49	0.21	0.87	
Depth	5"	8"	12"	12"	8"	2"

Strata 1	LB	LB+1	LB+2	LB+3	LB+4
Surface	0.02	0.22	1.78	0.81	-0.01
Mid	0.04	0.28	1.85	0.5	-0.03
Bottom	-0.04	0.16	1.41	0.43	-0.03
Depth	8"	8"	8"	6"	6"

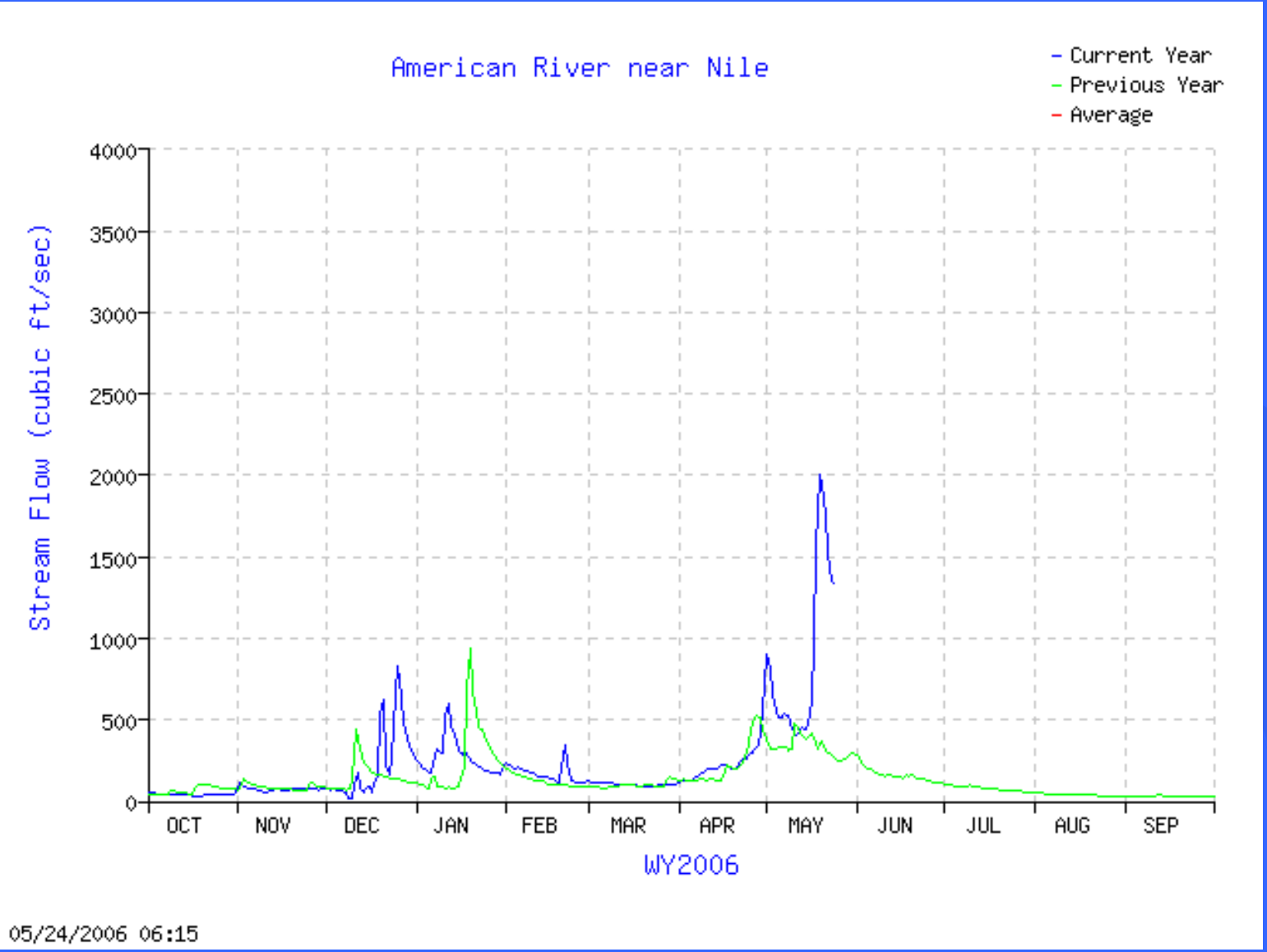
Fish 174 was tracked to this location high on the American River on its way to spawn.

Overwintering vs. Transitional Holes

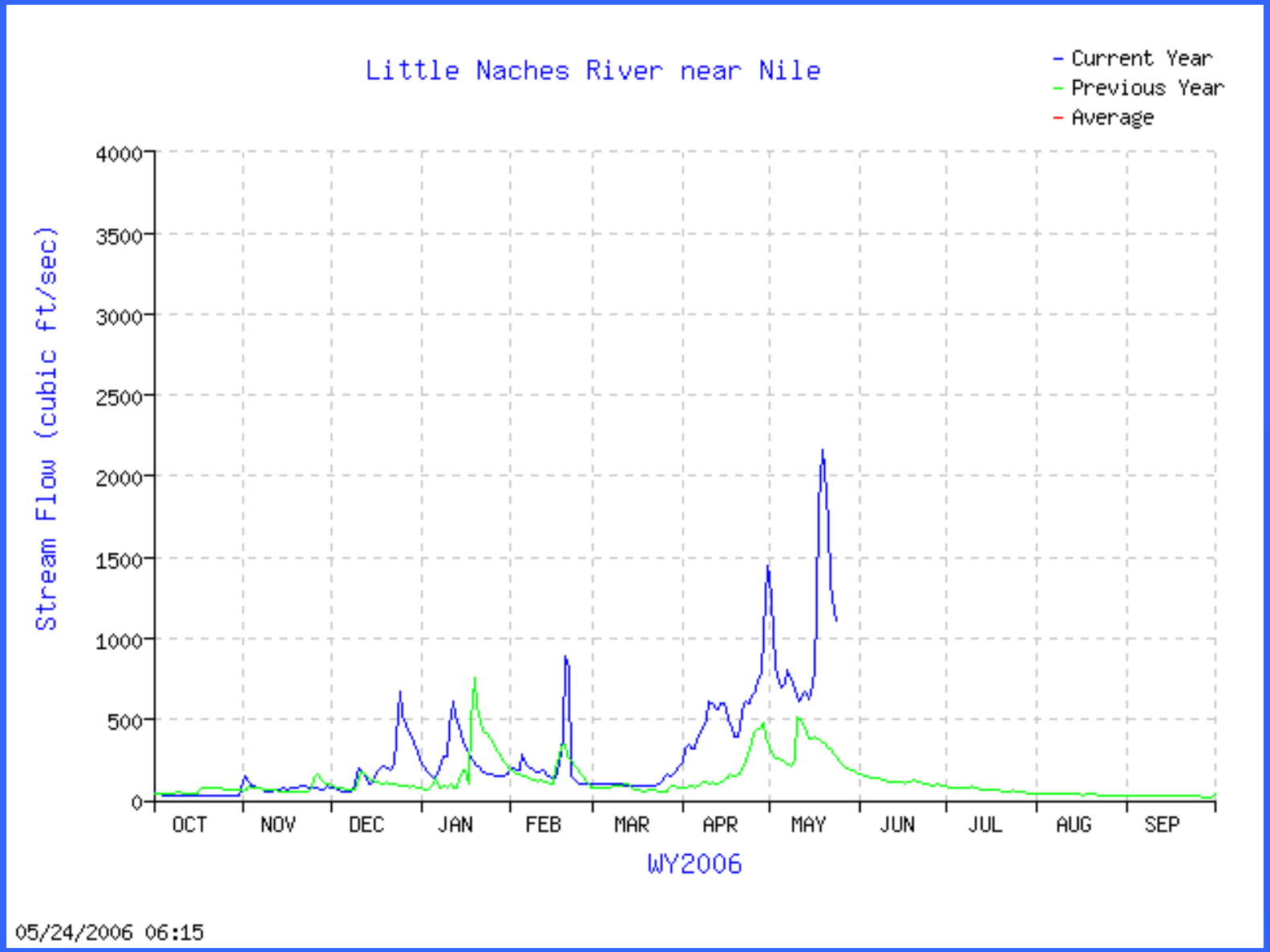


Bull trout rarely overwinter above Cliffdell at river mile 40.

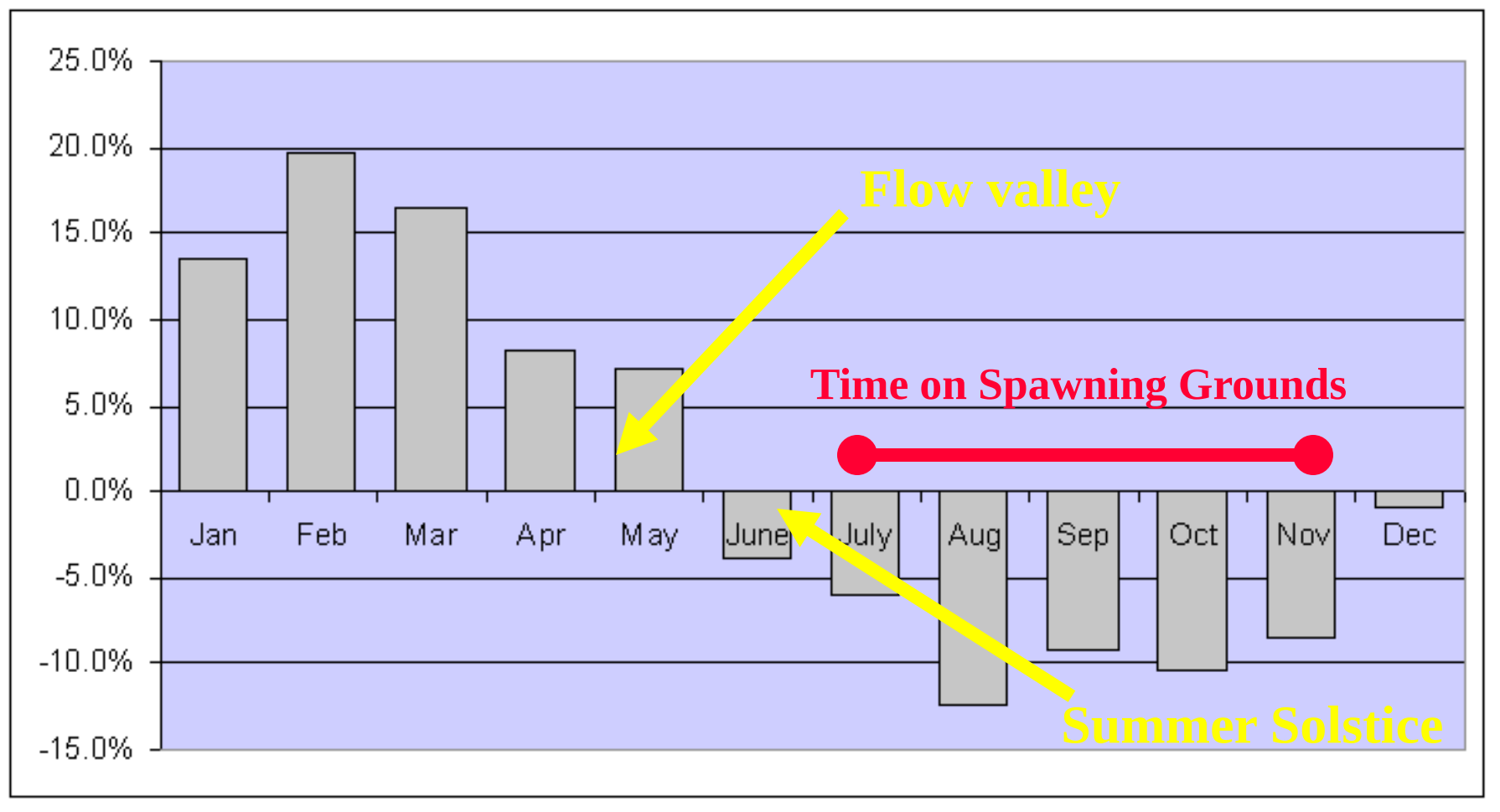
Cessation of overwintering keys



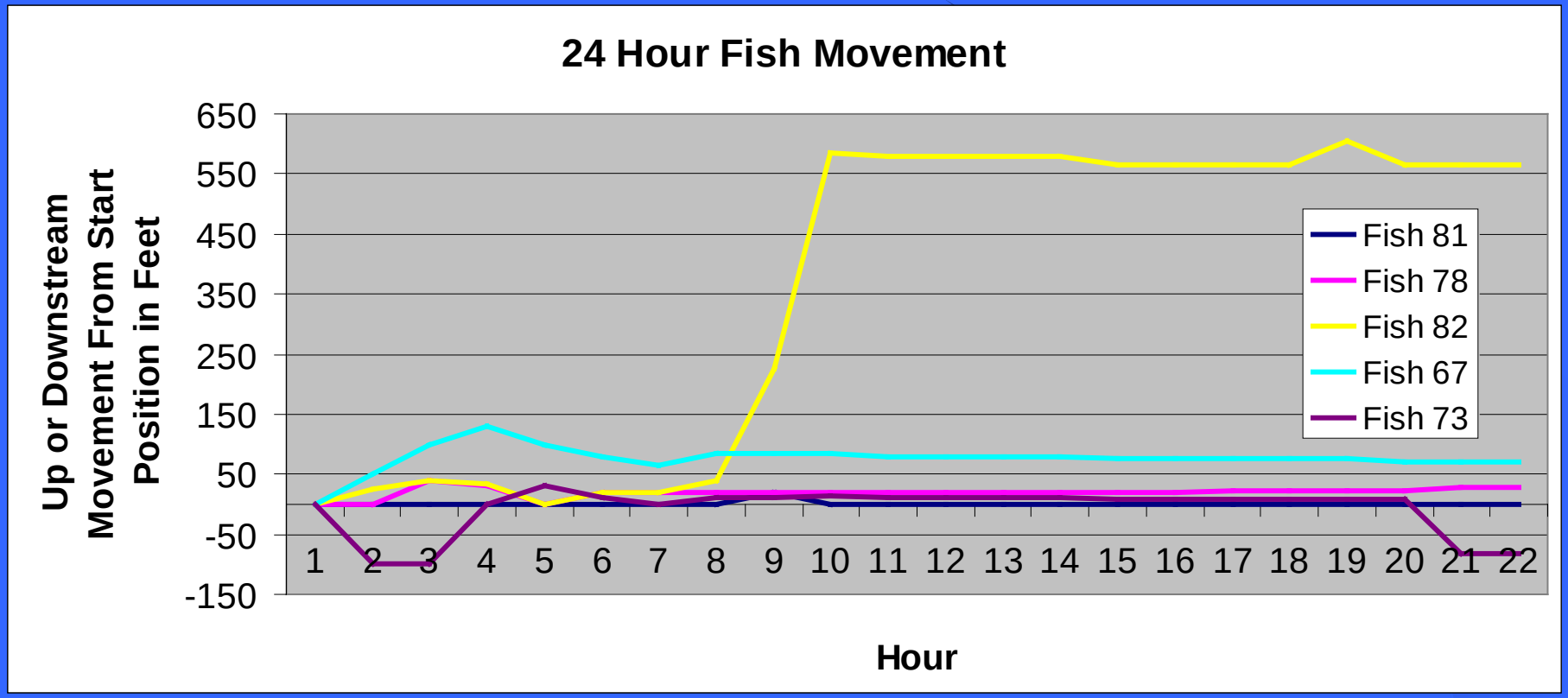
Cessation of overwintering keys



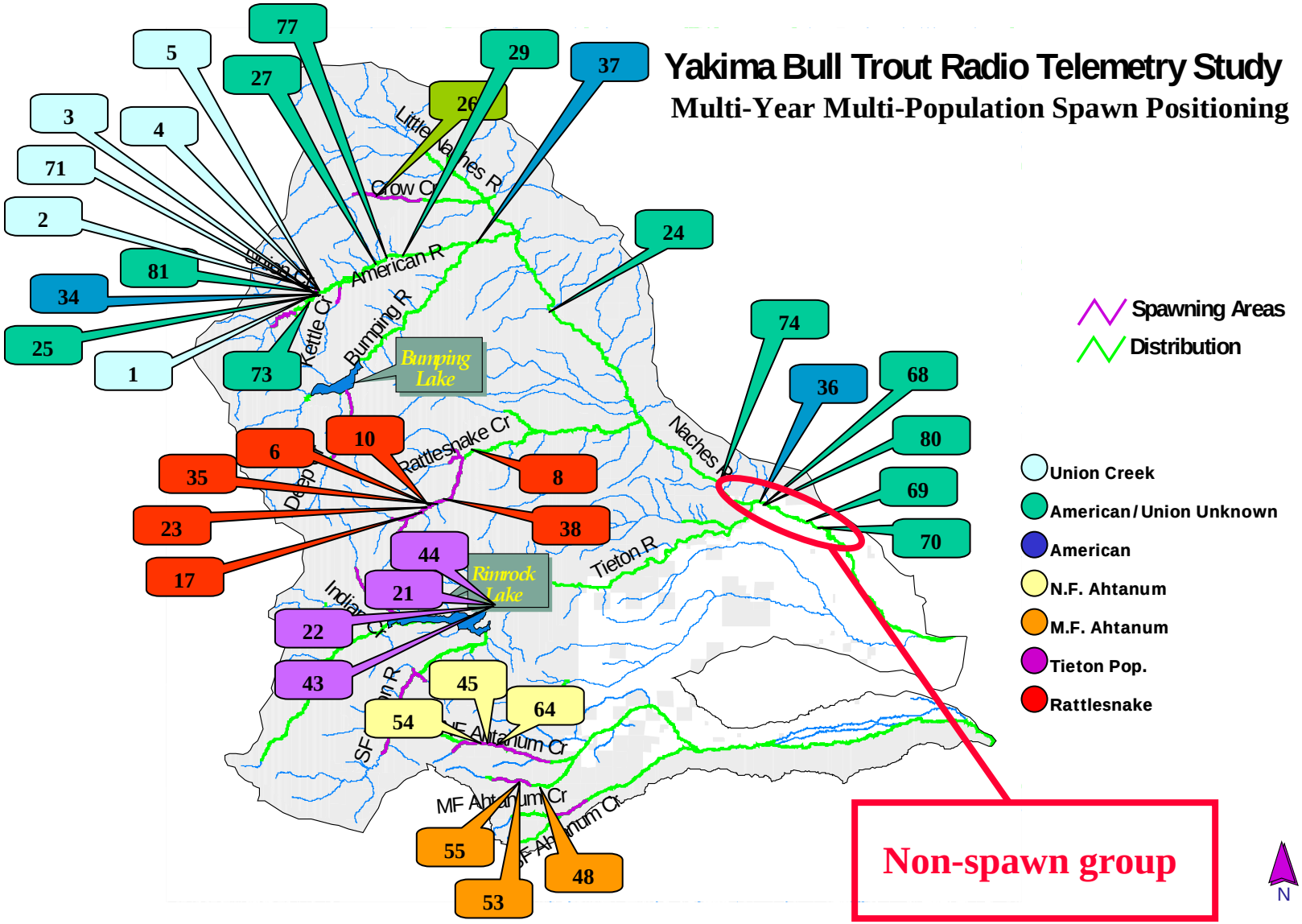
Ambient Moonlight



American/Union Population vs. Rattlesnake



Rattlesnake fish have exhibited a greater propensity for movement both in long term and short term movement.


Yakima Bull Trout Radio Telemetry Study
Multi-Year Multi-Population Spawn Positioning
Spawning Areas
Distribution
Union Creek
American / Union Unknown
American
N.F. Ahtanum
M.F. Ahtanum
Tieton Pop.
Rattlesnake
Non-spawn group
N
American R
Bumping R
Bumping Lake
Rattlesnake Cr
Naches R
Tieton R
Rimrock Lake
Crow Cr
Kettle Cr
Indian Cr
MF Ahtanum Cr
77
5
27
29
37
26
3
4
71
2
81
34
25
1
73
24
74
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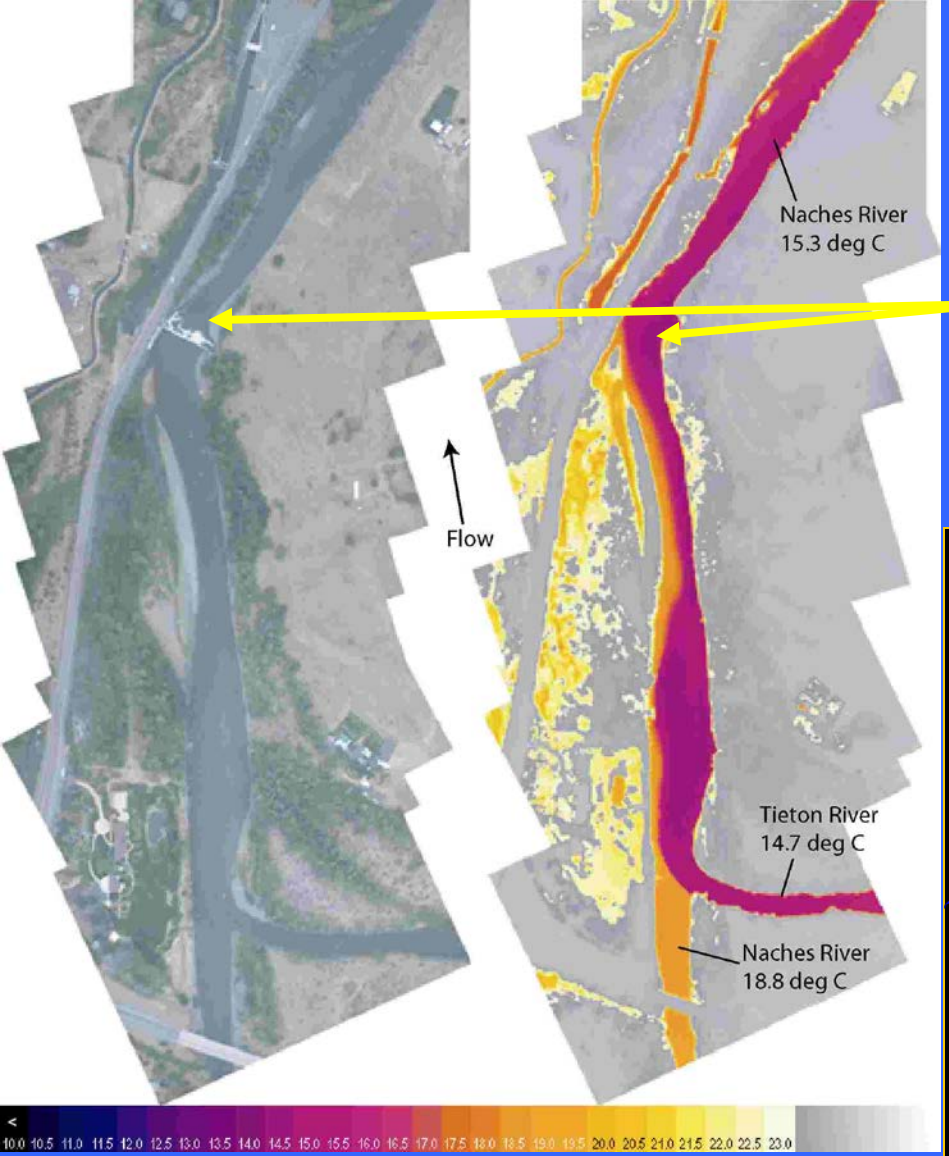
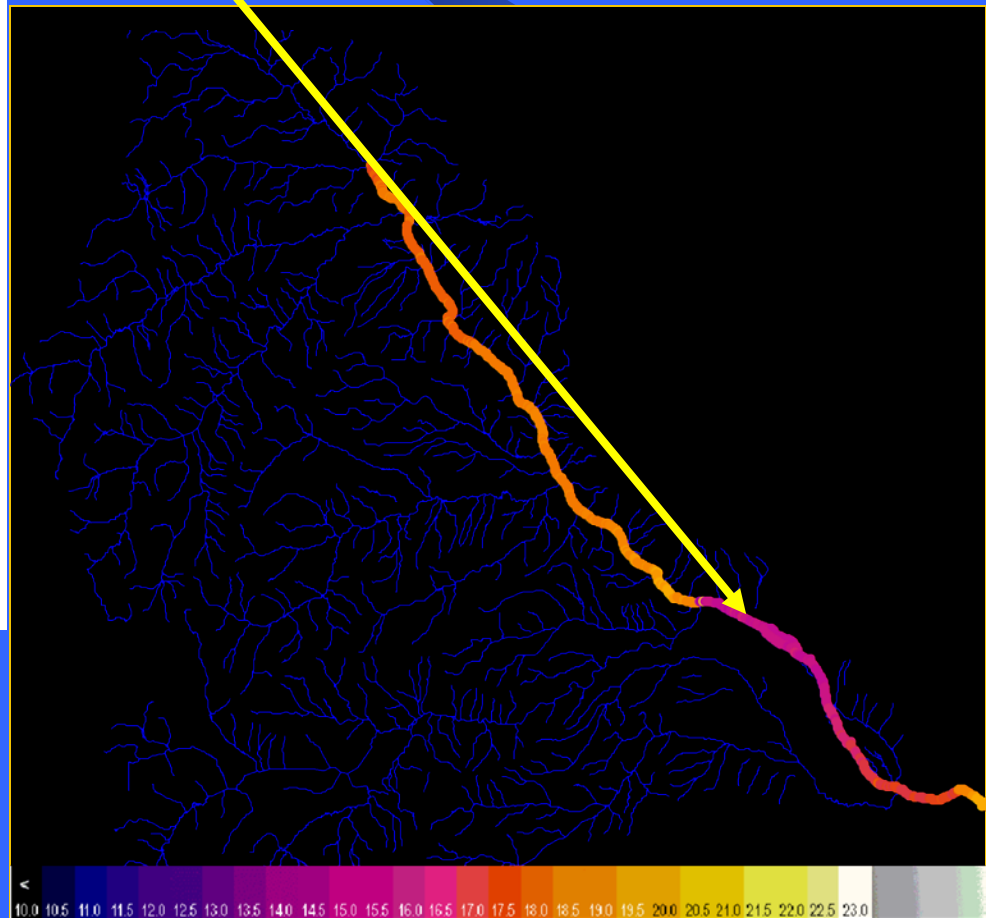


Main summer holding area
(Wapatox Hole)



Thanks to Mark Pederschmidt for the TIR images used here.

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, genetics 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.

Conclusions

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

Pre staging happens on or about mid May. Fish then become active and begin to move towards their respective spawning grounds.

Spawn staging occurs as early as end of June (summer solstice). Many fish reach their holding pools just below their spawning grounds by mid July, although individual run timing varies.

Data indicates a strong correlation between velocity preference, and target and non-target species choice of holding habitat.

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, within larger groups from different populations. Whether these pairs EVER spawn together remains to be seen…

Conclusions

Fish often move on and off of spawning grounds in Male/Female pairs.

Genetics now show that differentiation between spawning groups once thought to be a single population is now possible when used in conjunction with radio telemetry.

A flow spike and dip pattern directly precedes cessation of overwintering posture.

Rattlesnake population fish move greater distances than other populations in the Naches drainage.

Fish that do not spawn often utilize the Wapatox Diversion Dam and surrounding area due to the Tieton Rivers cool water thermal refuge.

Special Thanks To:

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Gary Torretta

Jim Cummins

Judy DeLaVerne

Jeff Thomas

Travis Dick

Bill Darrah

Walt Larrick

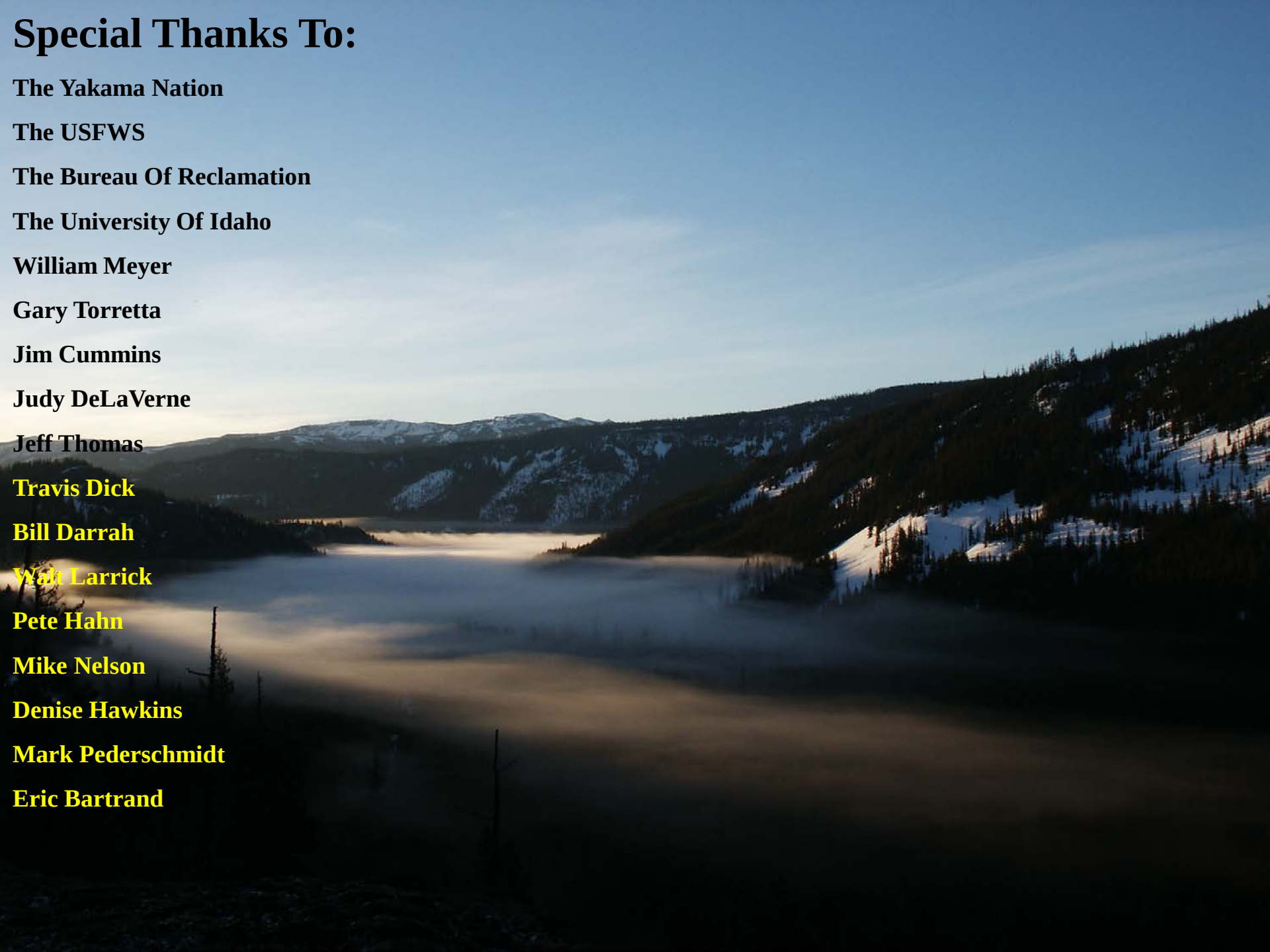
Pete Hahn

Mike Nelson

Denise Hawkins

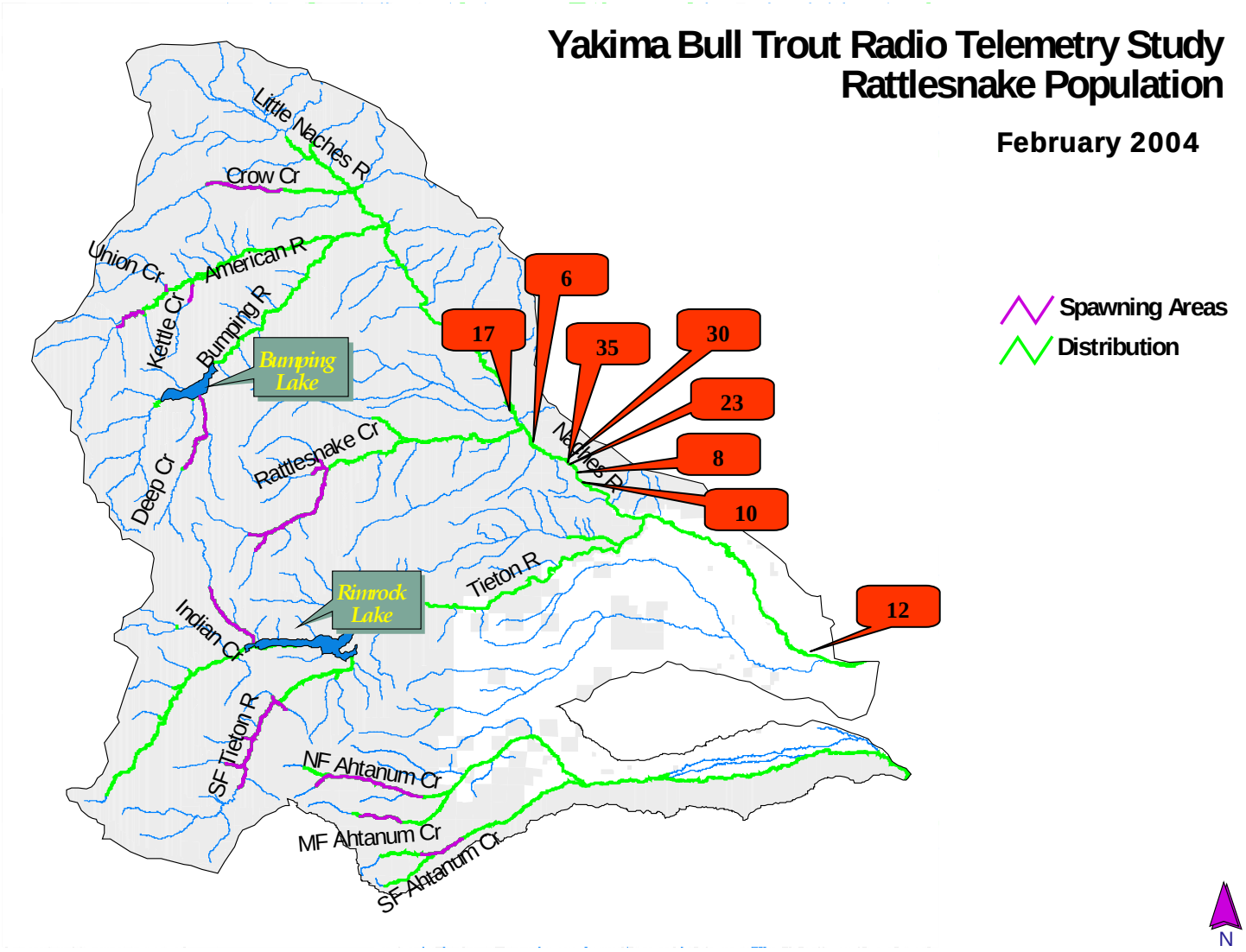
Mark Pederschmidt

Eric Bartrand



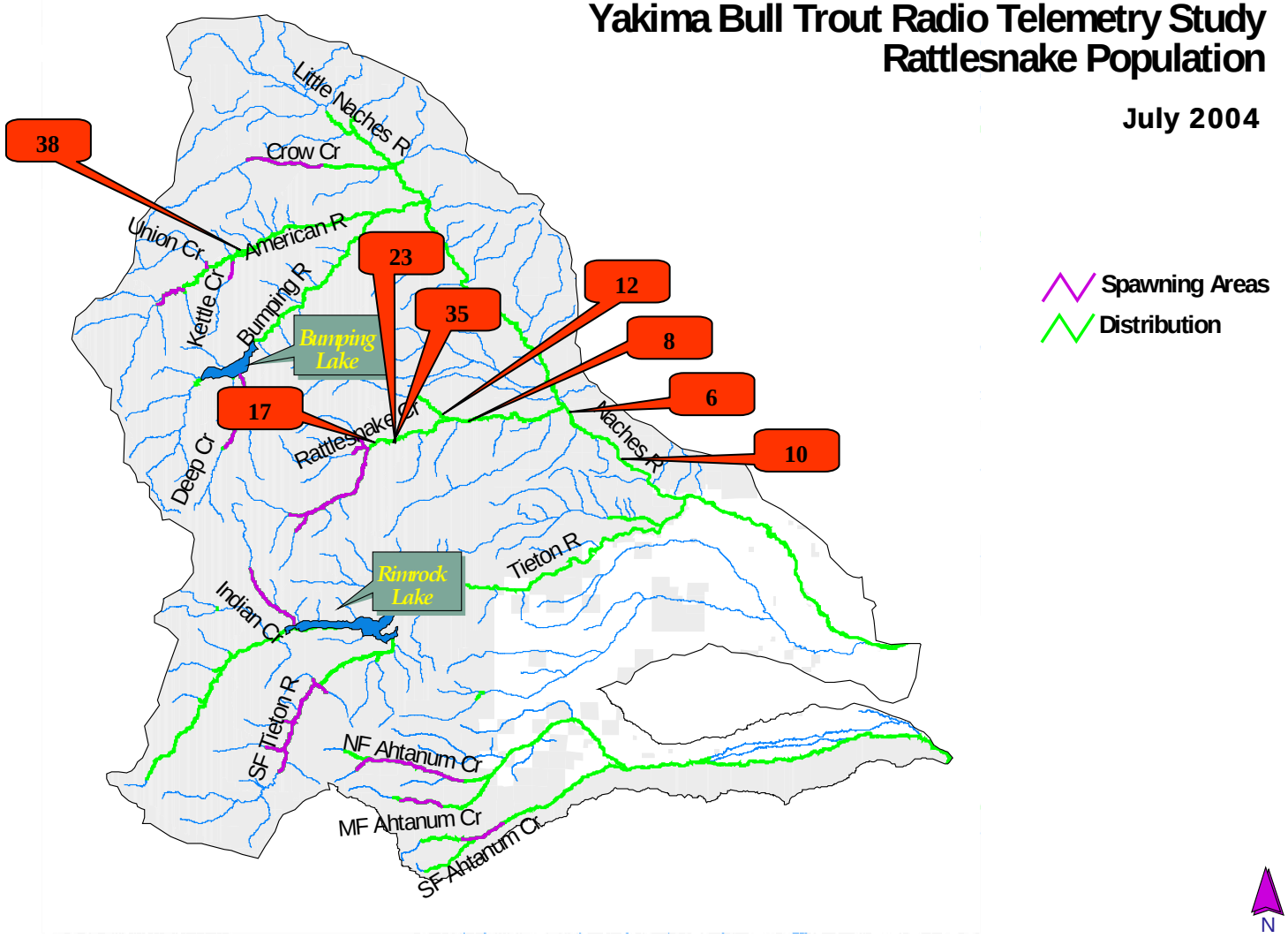
Yakima Bull Trout Radio Telemetry Study
Rattlesnake Population

February 2004



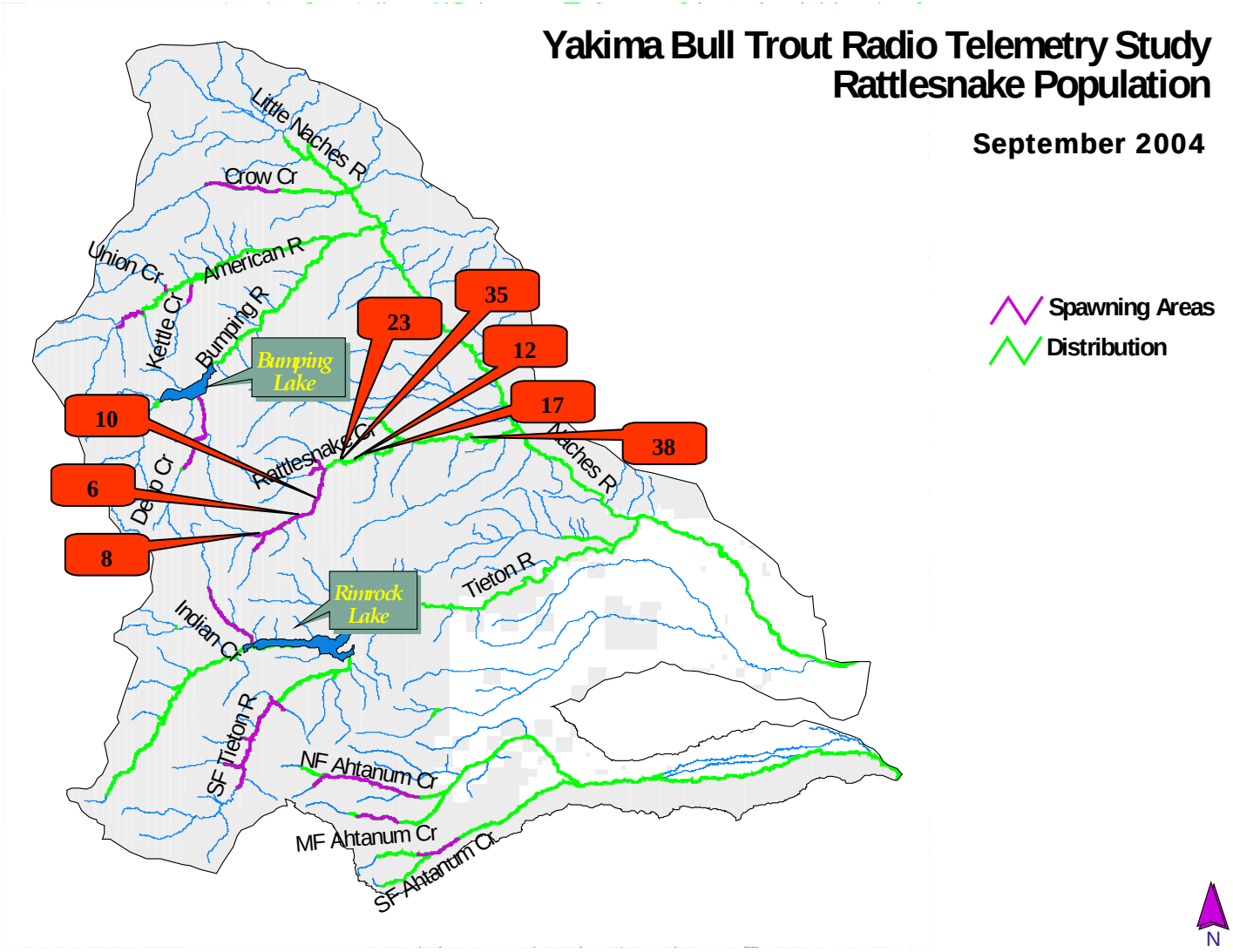
Yakima Bull Trout Radio Telemetry Study
Rattlesnake Population

July 2004



Yakima Bull Trout Radio Telemetry Study
Rattlesnake Population

September 2004



Yakima Bull Trout Radio Telemetry Study
Rattlesnake Population

October 2004