

Determine Distribution, and Relative Abundance of Bull Trout in Columbia Gorge & Bonneville Pool

Jim Byrne



WDFW

Acknowledgements

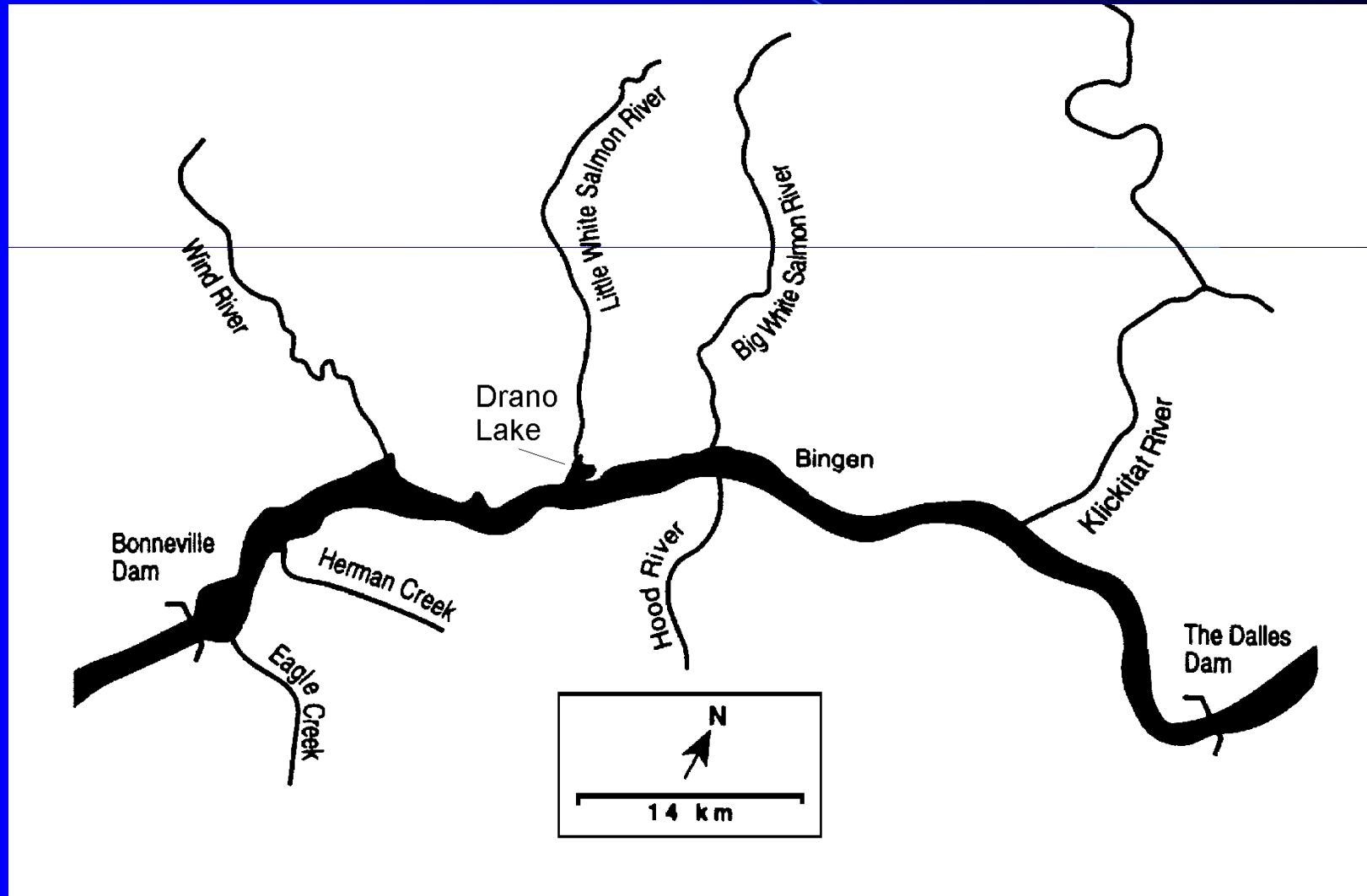
- Yakama Nation
- USGS Columbia River Laboratory
- US Forest Service
- StreamNet
- Bonneville Power Administration

Problem:

- Bull trout was listed by USFWS as “threatened” 1998
- Very little was known about bull trout in the mainstem Columbia River from the estuary upstream to the Snake River

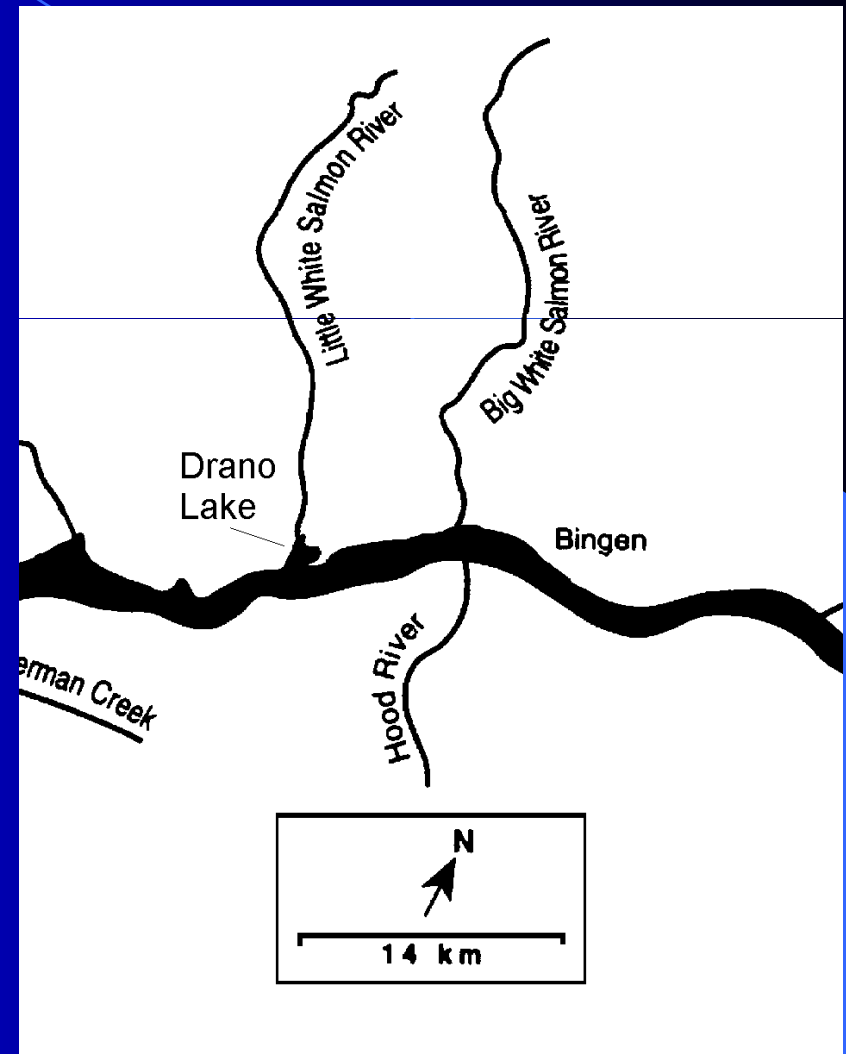


Study Area



What we knew prior to 2000

- Fluvial population exists in Hood River
- Occasionally, Hood River bull trout are captured in Bonneville Reservoir or Drano Lake



Survey Methodology

- Bull trout spawn and rear in the coldest of waters
- Inventoried basins for cold water streams (USGS Columbia R. Lab, UCD, USFS)
- Sampled streams using electroshocking, night and day snorkeling, following the AFS protocol as practical (100m reaches - took habitat inventory)
- Due to low conductivities and nocturnal lifestyle of bull trout – Night snorkeling preferred technique
- Mapping – Assistance from StreamNet



Electroshocking Piscoe Ck. 2001



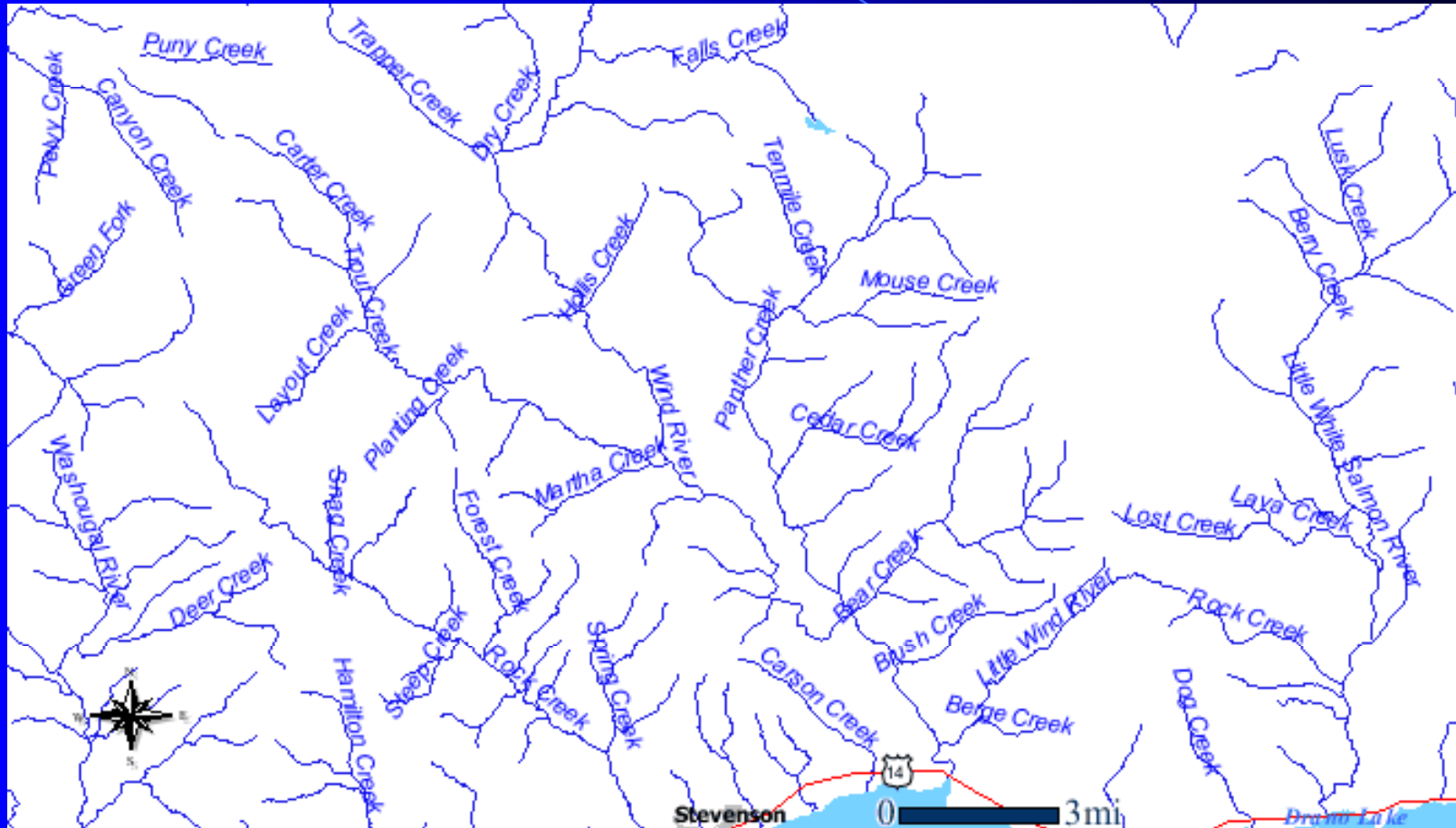
Night Workup -- length, weight, scales and genetics.



Habitat Inventory

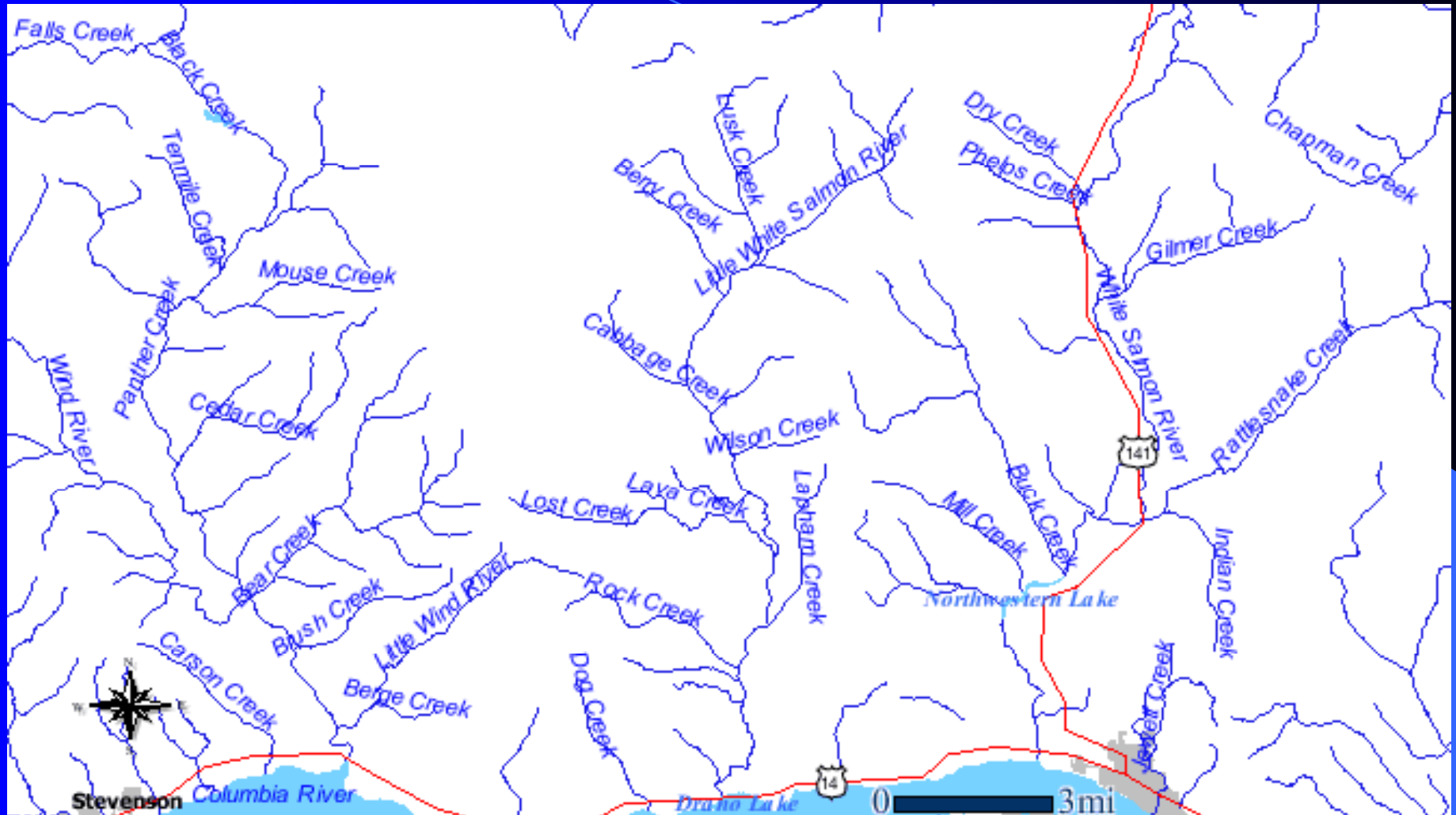
- Water temperature
- GPS coordinates (Lat. & Long.)
- % Canopy
- Wetted width
- Water depths at $\frac{1}{4}$, $\frac{1}{2}$, & $\frac{3}{4}$ stream width; also mean and max depth
- Gradient
- Counted # pieces LWD
- Presence of overhanging banks

Rock Creek & Wind River



Rock Ck., Upper Trout Ck, Upper Panther Ck. and Upper Wind River

Little White Salmon River & Drano Lake.



Drano Lake, Lava Creek, Moss Creek, Cabbage Creek, Rock Creek, Lapham Creek and the Little White proper

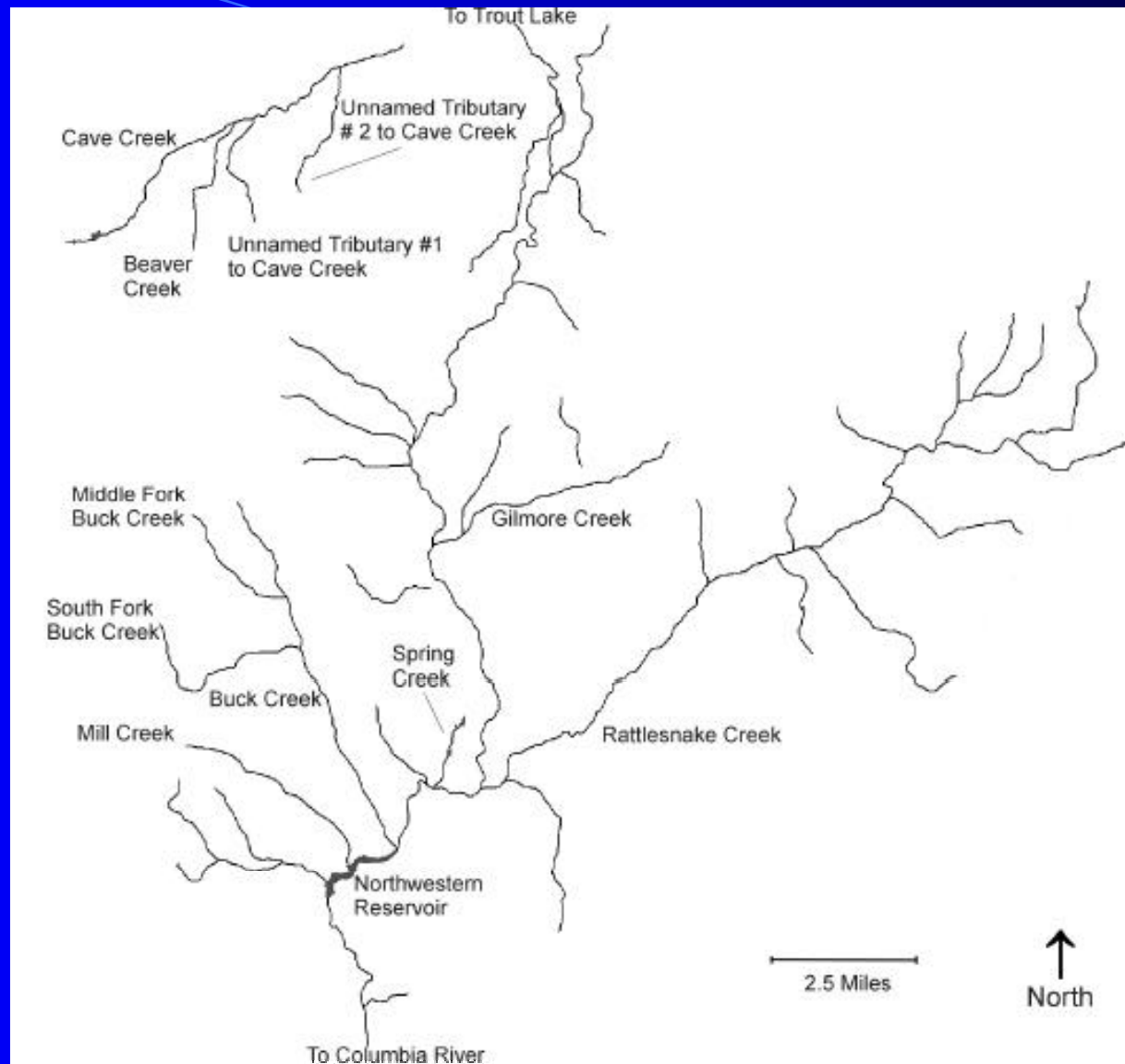
Drano Lake

- Bull trout taken over the years in tribal Northern Pikeminnow control netting
- A Floy® tagged bull trout angled in April, 2000. Fish was tagged and released at Powerdale dam on the Hood River by ODFW staff the previous year
- In 2005 Drano Lake ODFW shocked mystery fish “Sally 182” ¼ mile East of lake. Very confusing genetics -- seemed more Dolly Varden like than bull trout. Sally actually was an escaped Arctic charr from Trout Lodge a Hood River commercial trout farm

White Salmon River

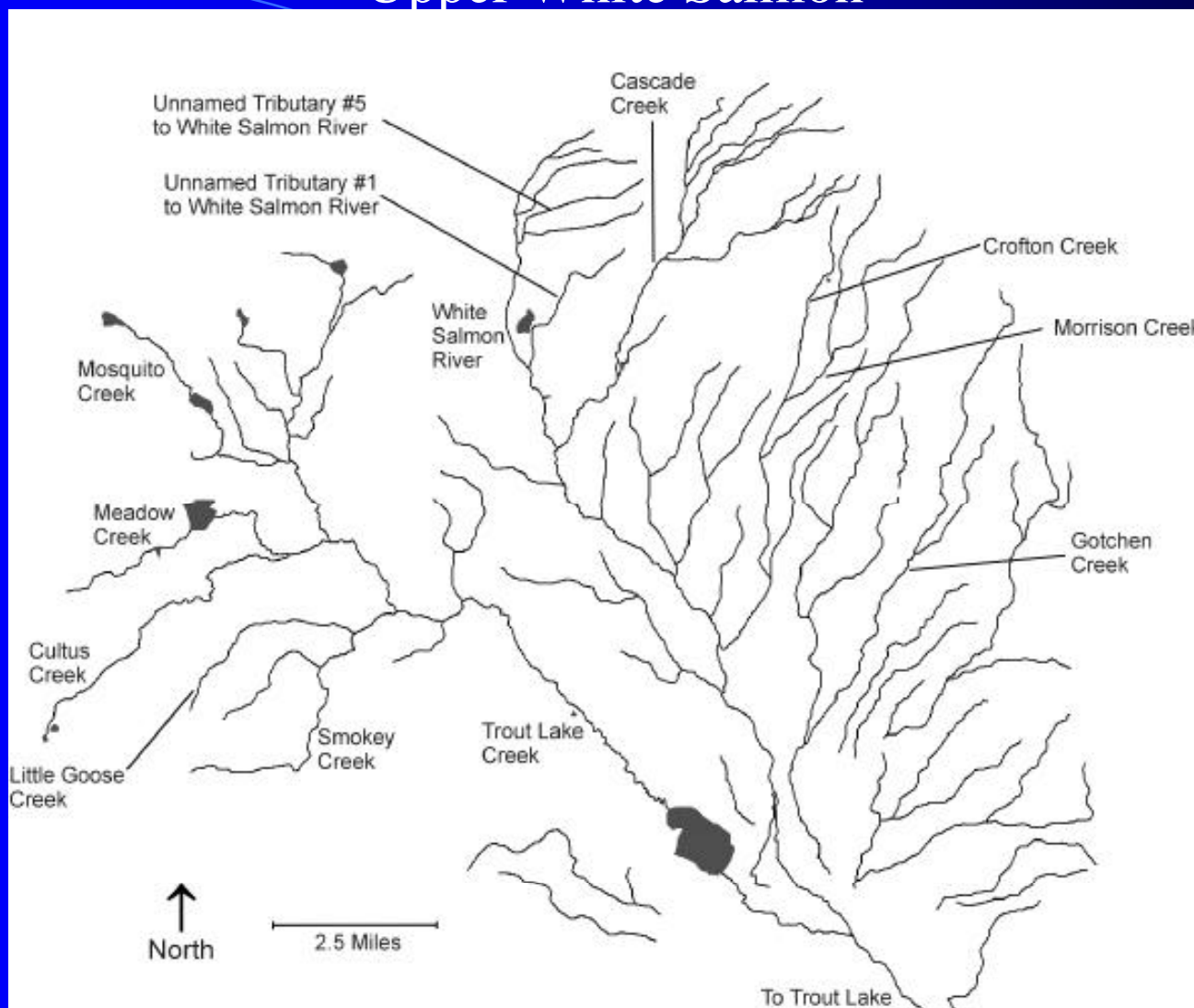
- Bull trout were positively identified by WDFW staff in a 1986 gill net set and 1989 creel check in Northwestern Lake
- Creditable anecdotal reports of bull trout angled below Condit Dam
- Bull trout will be addressed in Condit Dam decommissioning and reintroduction process (Rod & Joe)
- USFWS conducted additional electroshocking efforts in basin in 2007 & 2008, with no bull trout observed
- Some areas of this basin are yet to be surveyed: Upper Spring Ck. and Mainstem canyon

Lower White Salmon



2000 – Upper Rattlesnake Ck. 2001- Mill Ck., Buck Ck., Spring Ck., Tribs of Cave Ck., and unnamed tribs to White Salmon. 2004 – Cabbage Ck., Rock Ck.

Upper White Salmon



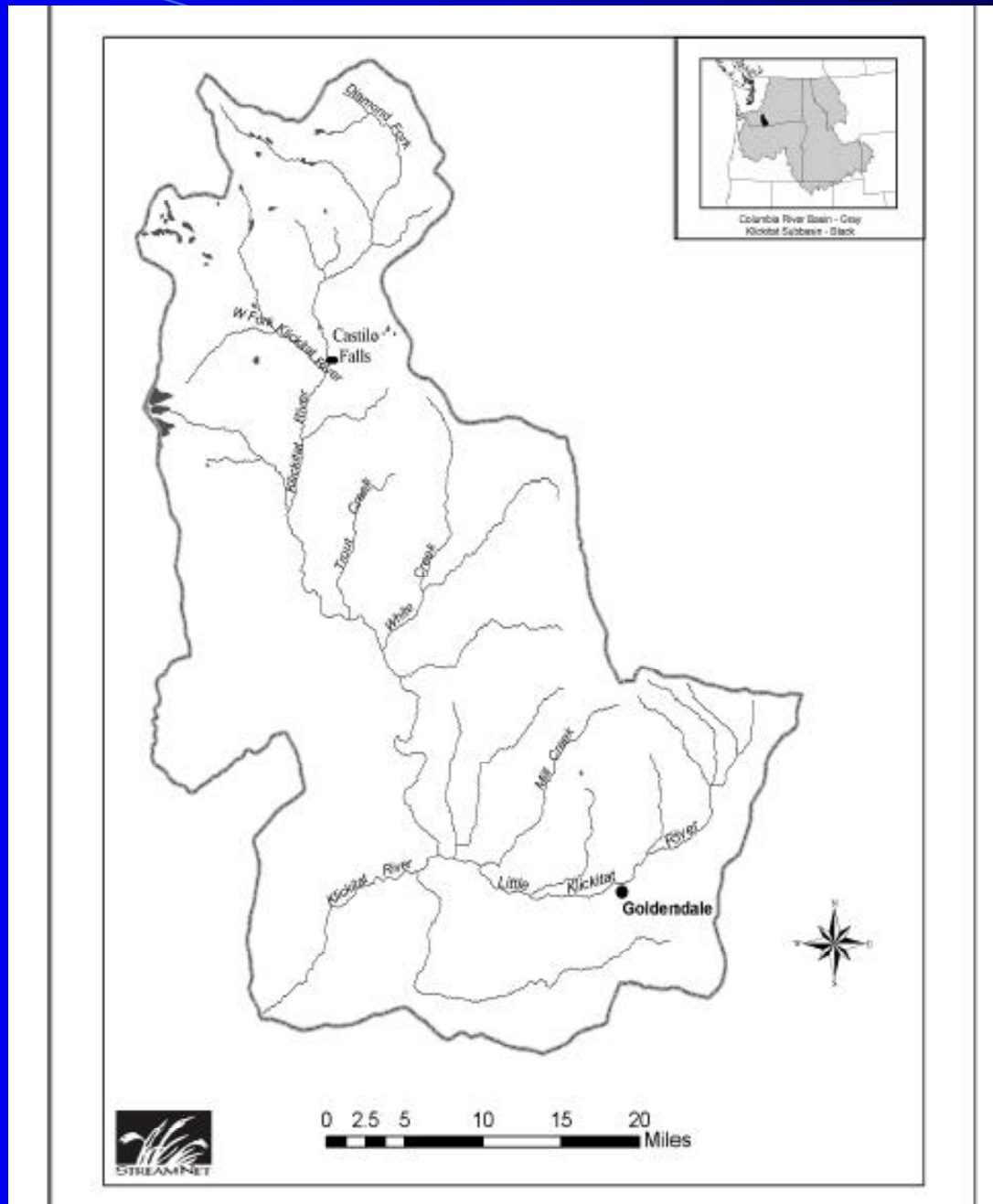
2000 - Upper White Salmon, Ninefoot Ck., Morrison Ck., Wicky Ck., Upper Cascade Ck., Lower Cascade Ck. 2001– Crofton Ck., Meadow Ck., Mosquito Ck., Smokey Ck., Lost Ck., Little Goose Ck., Smokey Ck., Cultus Ck., Elmer Canyon Ck., & unnamed tribs to the White Salmon 2002- McIlroy Canyon 2004- Green Canyon Ck.

USF&WS Surveys

- 2007
- Trout Lake Creek *
- Buck Creek
- Morrison Creek
- Gotchen Creek *
- Cascade Creek
- 2008
- Phelps Creek *
- Dry Creek *
- Weiberg Creek *
- Mill Creek
- Little Buck Creek

* Denotes creek not sampled previously by WDFW.

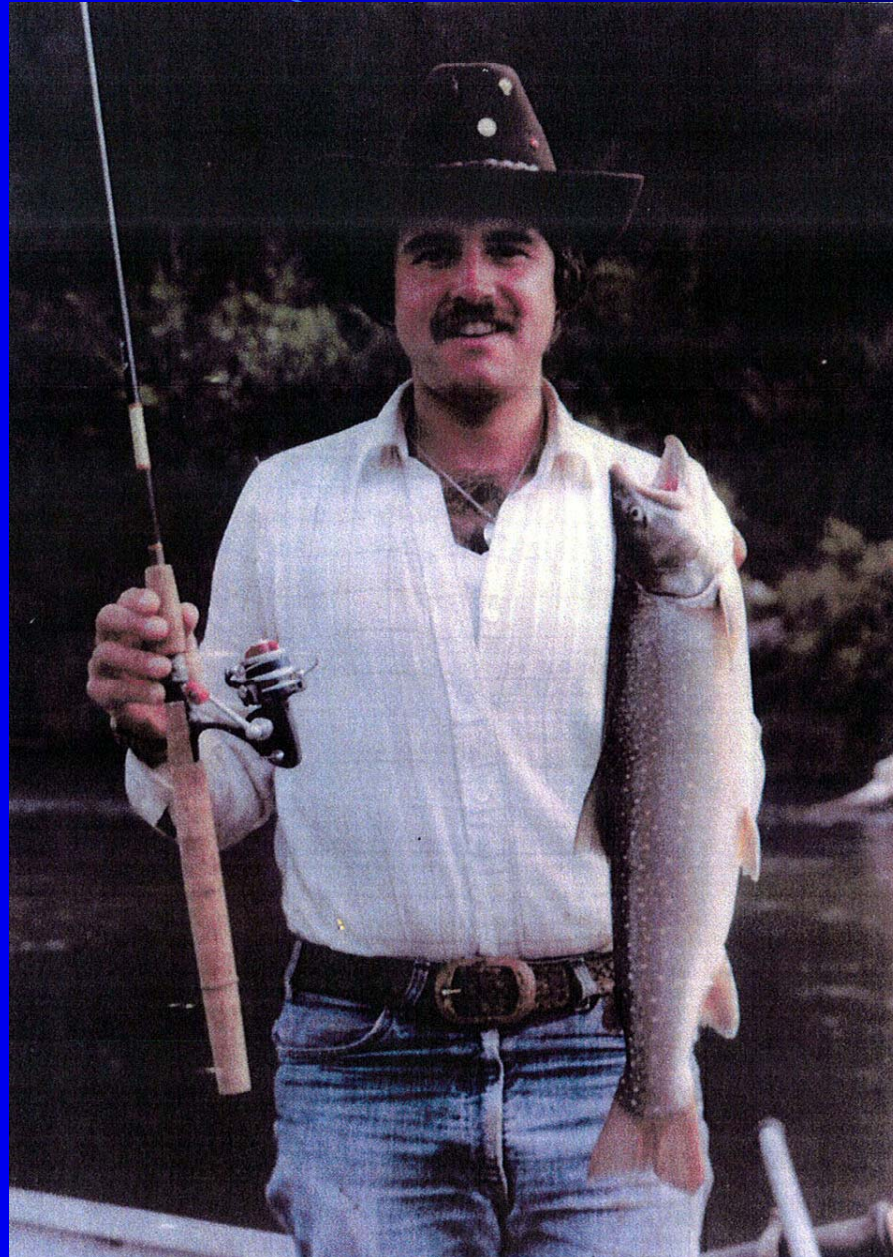
Klickitat Basin



Klickitat Basin

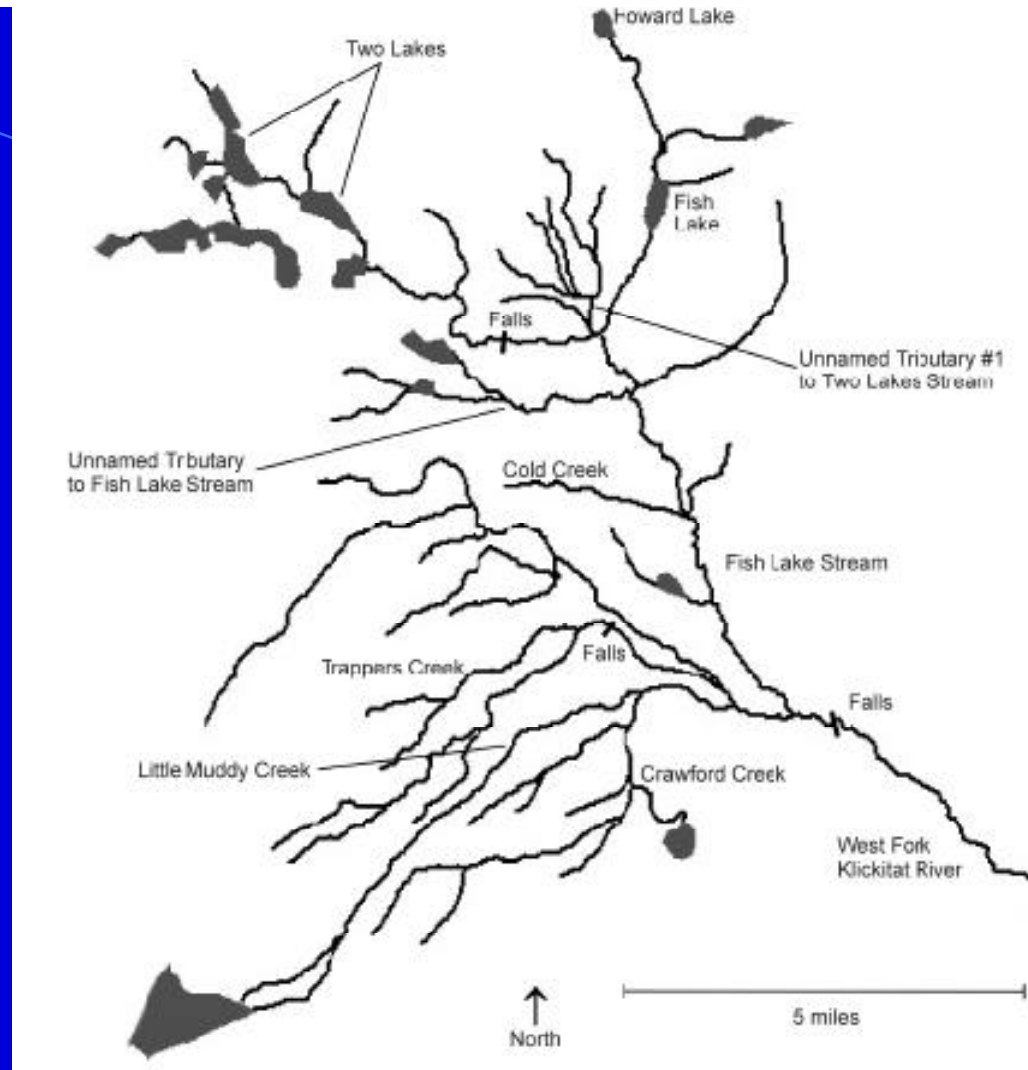
- Since 1980's reports of fluvial bull trout angled in Leidle Bridge area
- WDFW's Dan Rawding 1990 angled bull trout near town of Klickitat
- Bull trout observed over years at tribal smolt trap upstream of Klickitat hatchery

Buzz Ramsey & friend, Liedle area, 1979



West Fork Klickitat

Streams in *italics* do
Contain bull trout



2000- Bird Ck., Dry Ck., Cunningham Ck., *Trappers Ck.*, *Lower Clearwater Ck.*,
Upper Clearwater Ck., *Little Muddy*, *W.F. Klickitat*, Fish Lake Stream, McCreedy
Ck., and Diamond Fk.

2001- Cold Ck., *Two Lakes Stream*, *Unnamed tribs to Fish Lake Stream*
Fish Lake, and Howard Lake Stream

Little Muddy and West Fork confluence



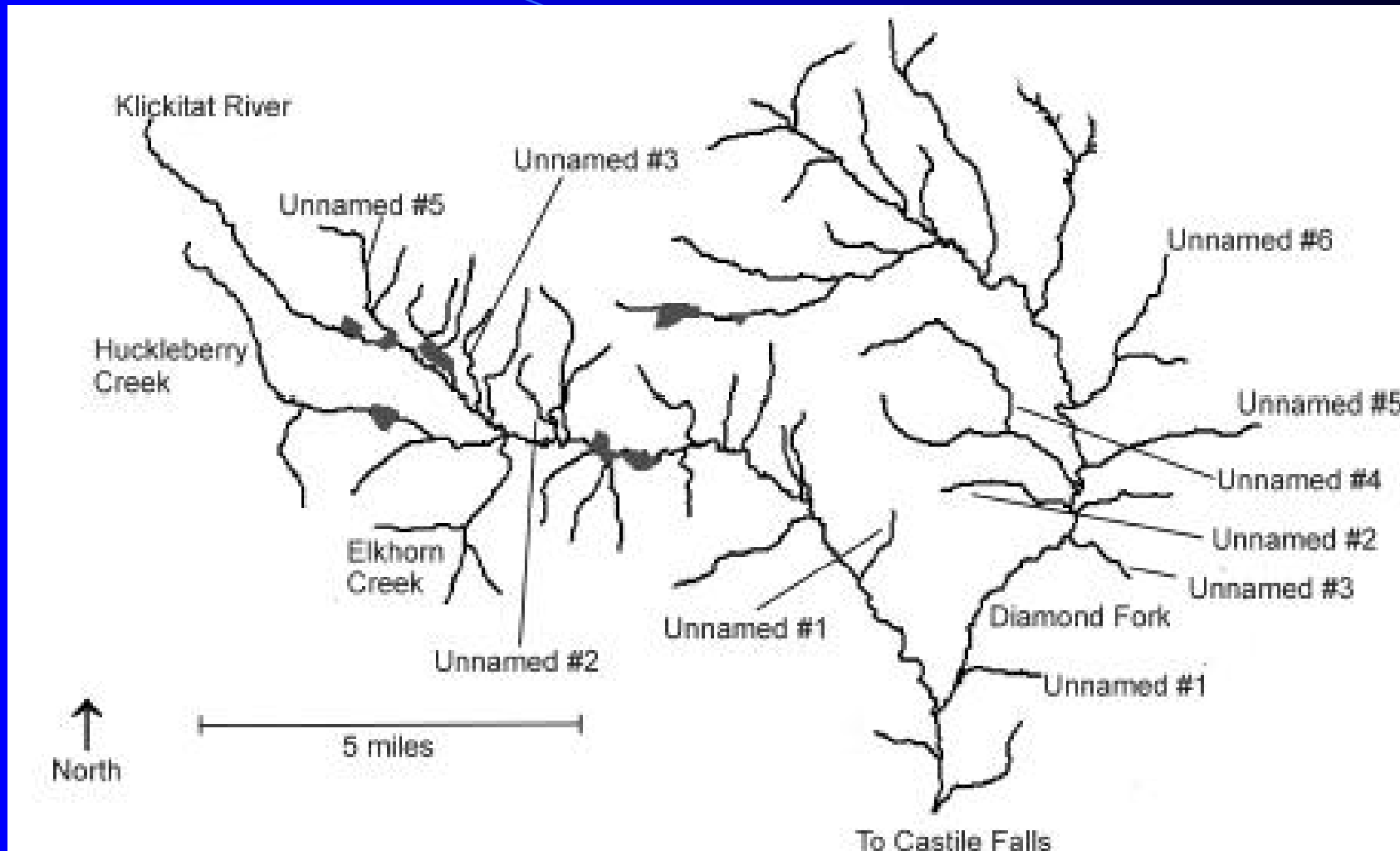
Minnow traps captured fish in the turbid Little Muddy

Relative Abundance

Site	Year	Bull trout	Brook trout
Trappers Creek	2000	6.70	
Trappers Creek	2001	10.8	
Clearwater Creek	2000	2.60	<0.10
Little Muddy	2000	0.40	0.10
W. Fk. Klickitat Bridge upstream	2001	0.11	1.18
W. Fk. Klickitat Bridge down	2001	0.11	1.70
Two Lakes Stream Below Falls	2001	0.07	2.86

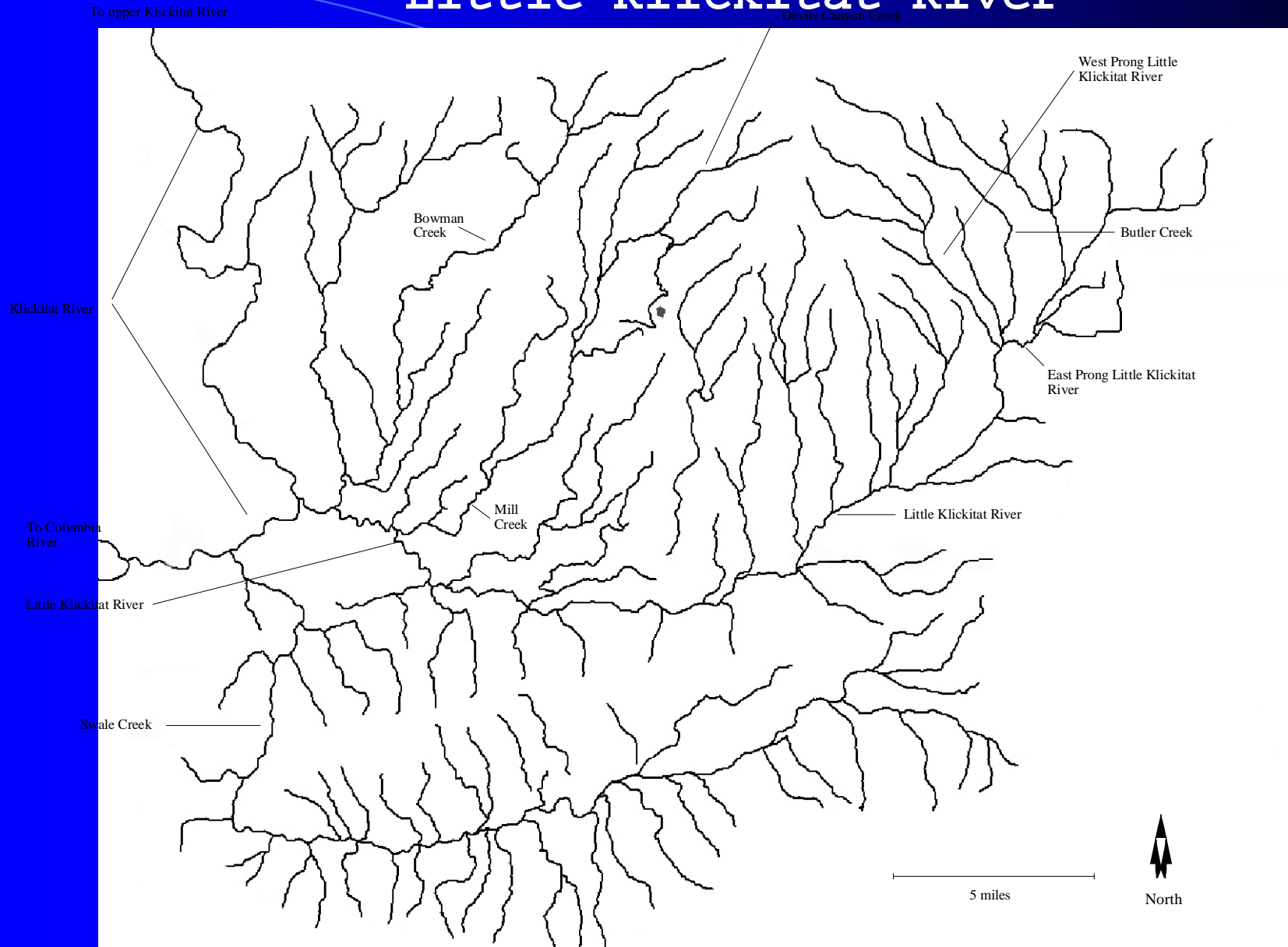
Number of bull trout found/100 m²

Upper Klickitat and Diamond Fork



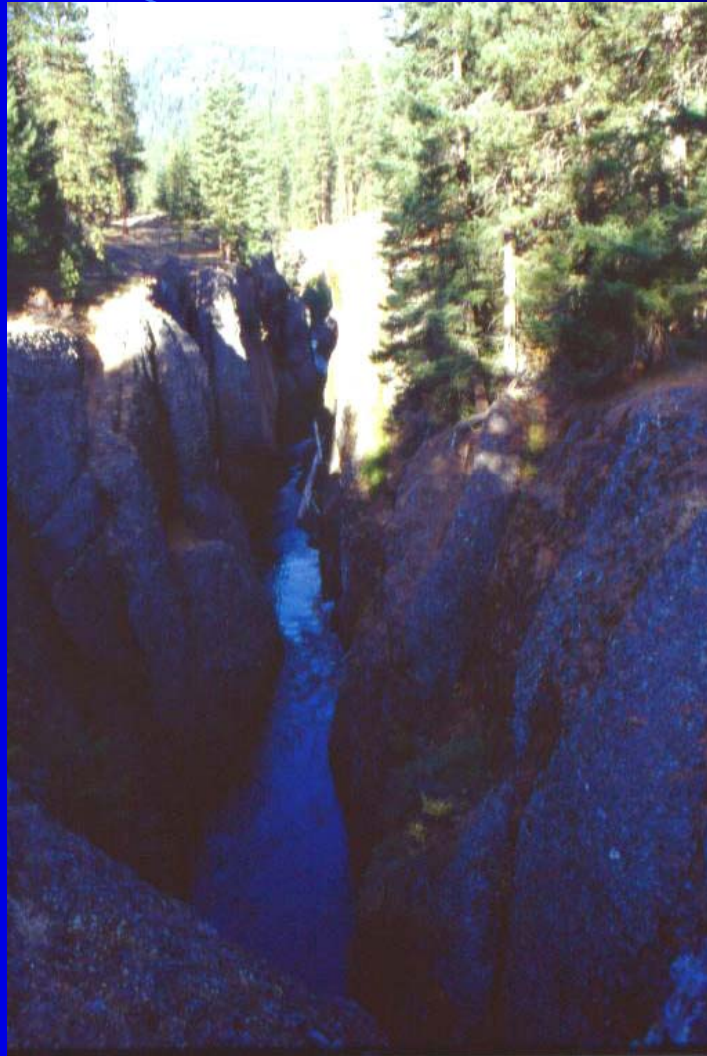
Klickitat Mainstem - Chaparral Ck., Pearl Ck., Elkhorn Ck., Huckleberry Ck.,
Upper Klickitat Mainstem (above McCormick Meadows),
Diamond Fork. – Piscoe Ck., Yedlick Ck., Swamp Ck., Cedar Ck.

Little Klickitat River



Little Klickitat – Bowman Ck., Mill Ck., Butler Ck., Devils Canyon, West and East Prongs of the Little Klickitat

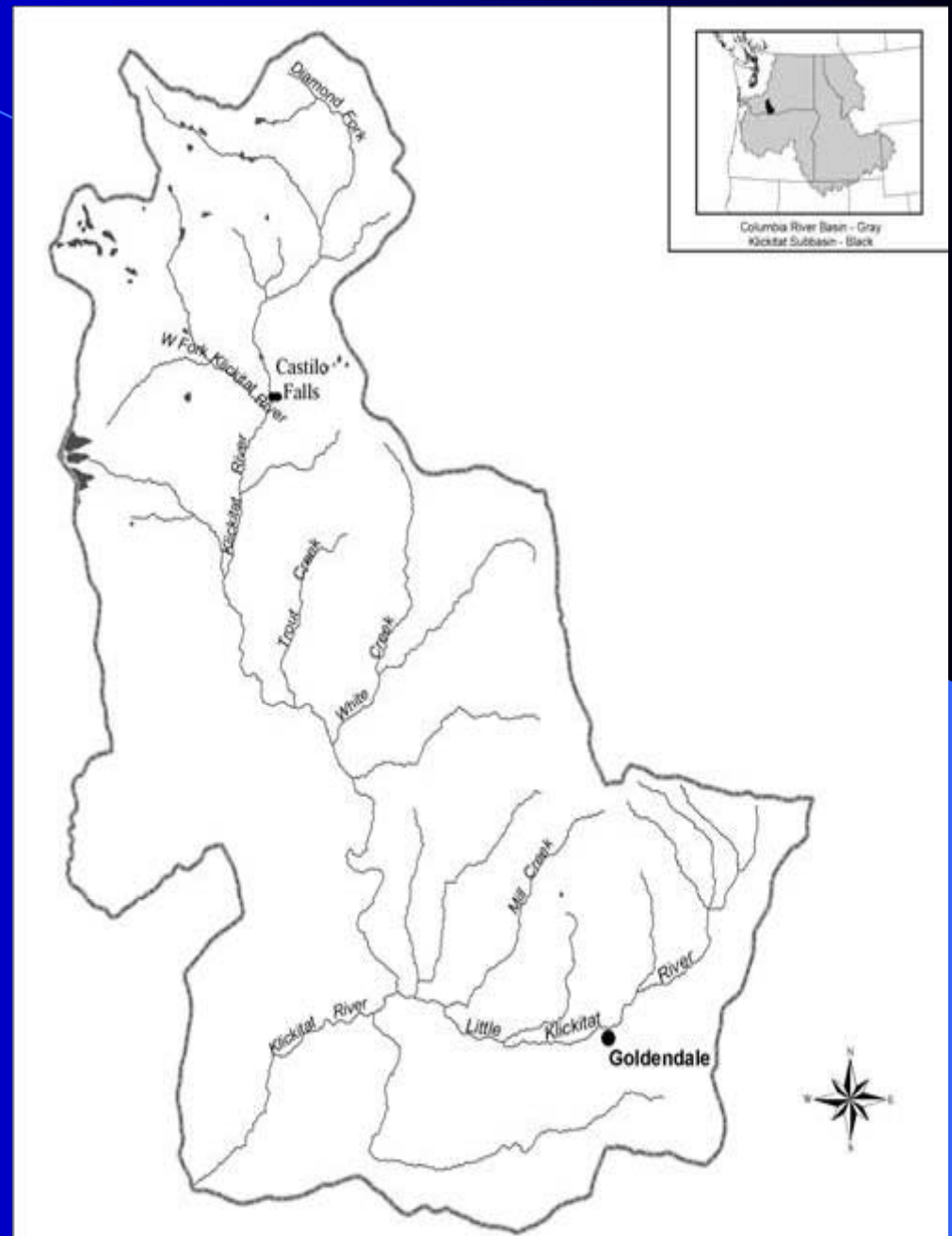
Castile Falls upper “dividing line”



New fish passage at Castile Falls may allow colonization of upper watershed by the West Fork population

So what did we know in 2003

- Population exists in West Fork Klickitat River
- Not sure whether resident or fluvial, but suspect they are resident
- Occasionally, bull trout are captured in the mainstem Klickitat River
- Not sure whether bull trout migrate between the Columbia River and Klickitat River



Efforts Shifted to Bonneville Pool

- Develop effective methodologies to sample for bull trout in Drano Lake and Bonneville Pool
- Monitor salmonid passage in mainstem Klickitat

Sampling in Drano Lake



Merwin Trap

- Drano Lake,
May and June



Minnow trap on steroids

- Drano Lake, May and June
- Mid-water “minnow” traps



Seine netting

- Drano Lake,
May and June
- Beach seines



Gill net short sets

- Drano Lake,
May and
June
- Short sets
20-35
minutes
- Small mesh



Gill netting

- Small mesh to “tangle” fish
- Use recovery box to maximize survival



We successfully captured a bull trout on 5/03/2006

2006 Drano Fish



MAY 3 2006

Angling

- Drano Lake, May and June
- Angling was successful in past.
- Bio's "favorite"



PIT Tagging



Conducted a PIT tag study on Trappers Ck. Two aims: field detect tagged fish and hopefully migrating fish might pass detectors in dams

PIT tag fish

- PIT tag all bull trout captured



Detecting in Trappers Creek (Minesweeping)



We tried two different prototypes. Unit was 38% effective
Did show juvenile bull trout bury in gravel during daytime

Monitor salmonid passage up the Klickitat River

- Utilize existing fishway at Lyle Falls (RM 2.2)
- Monitor fishway trap year round when possible



Monitor salmonid passage up the Klickitat River

- Estimate adult passage for all species with Peterson or Jolly-Seber estimates
- Utilize estimates to calculate more precise smolt to adult survival rates



Monitor salmonid passage up the Klickitat River

- Collect standard biological data on any bull trout captured
- Radio tag any bull trout captured to determine spawning location



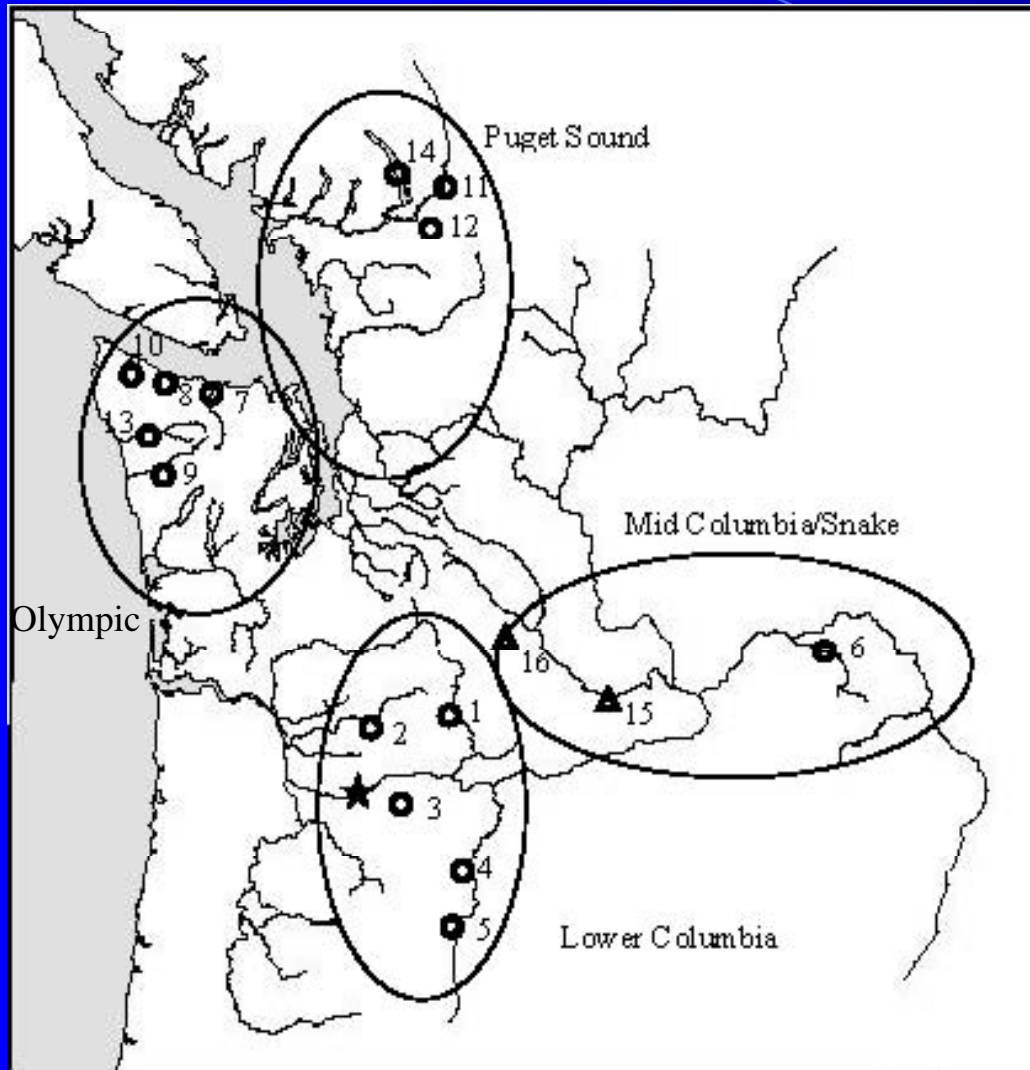
No bull trout were captured possibly due to wide pickets in the trap (were narrowed) and bull trout can jump the falls

Use DNA Analysis to Determine Origin

- WDFW lab completed DNA analysis
- Analyze archived regional bull trout samples
- Use microsatellite analysis to “assign” fish to a known population



Genetic Distribution

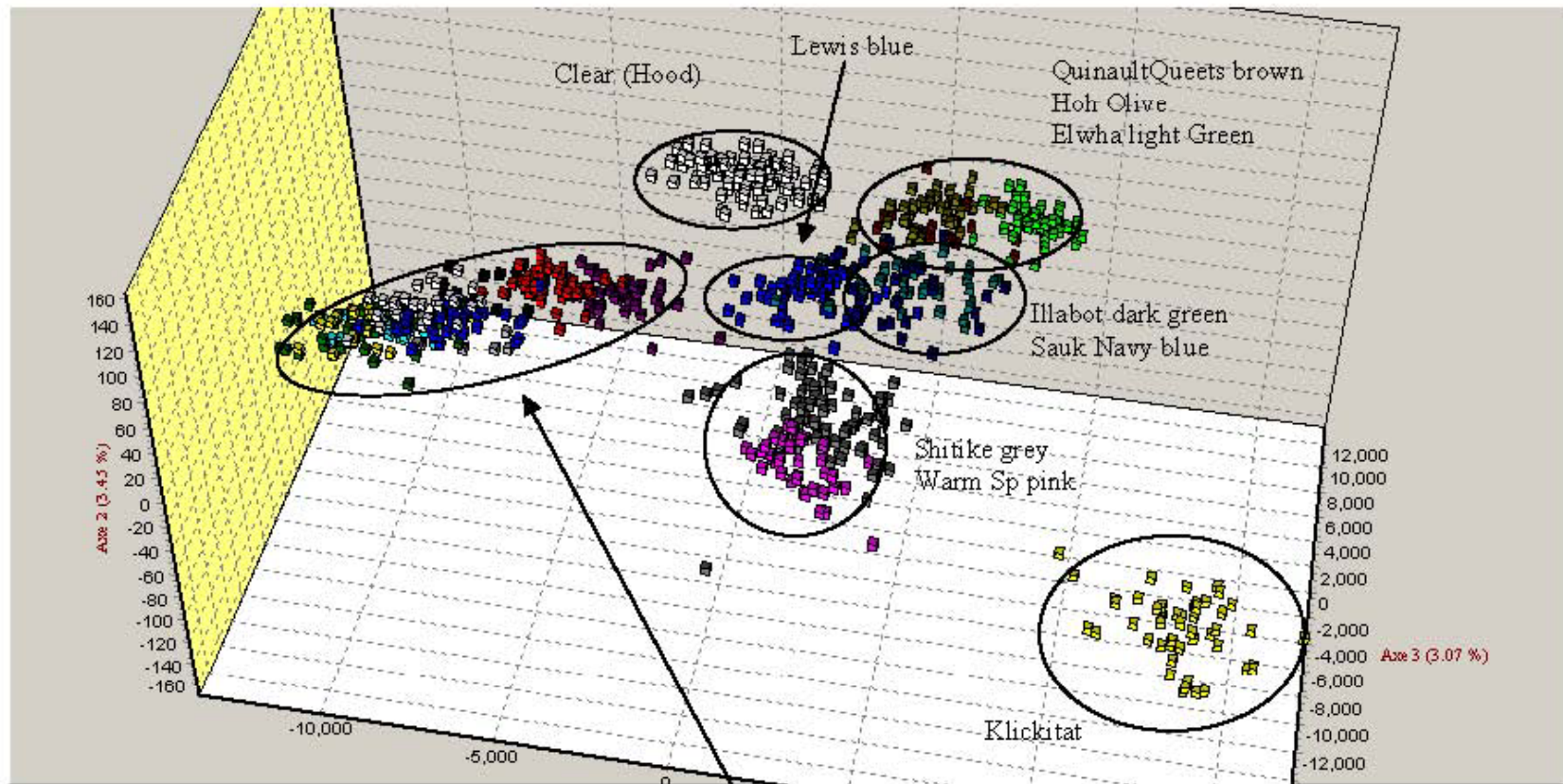


1. Klickitat
2. Lewis
3. Hood
4. Shitike (Deschutes)
5. Warm Sp. (Deschutes)
6. Tucannon (Snake)
7. Dungeness
8. Elwha
9. Queets/Quinault
10. Hoh
11. Illabot (Skagit)
12. Sauk (Skagit)
13. Sol Duc
14. Diablo Lake. (Skagit)
15. Lower Yakima#
16. Upper Yakima#

From Hawkins and Von Bargaen (2006)

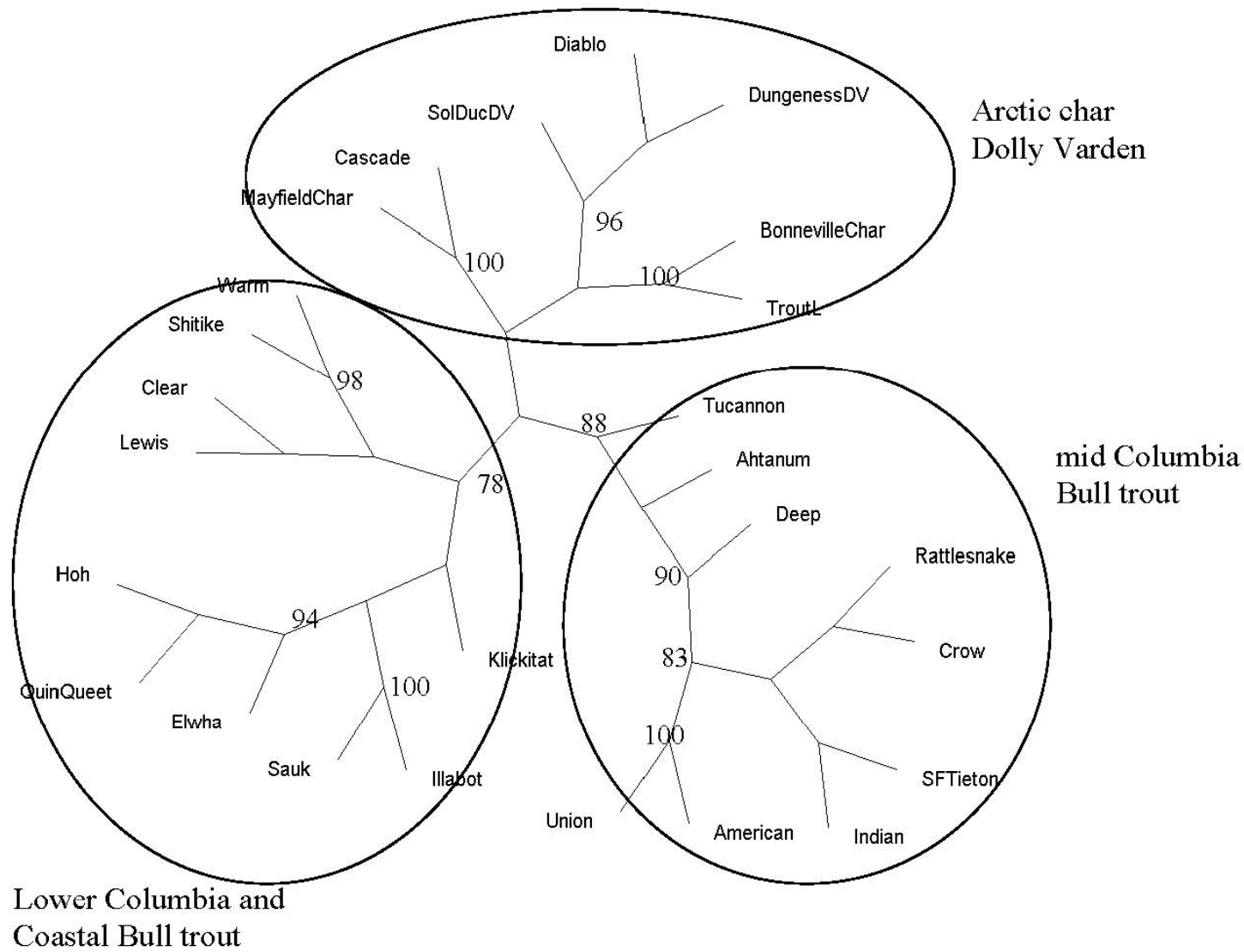
From Small, Bowman and Hawkins 2007

Figure 4. Factorial correspondence analysis plot of bull trout collections. Circles were drawn around Core Unit river groups. Samples were added from the Ahtanum, American, Indian, Deep, Tieton, Union, Rattlesnake, and Crow rivers from Hawkins and Von Bargen (2006) to enhance regional bull trout comparisons.



Mid Columbia:

Tucannon purple, Ahtanum red, American dark green, Tieton gray, Indian light blue, Deep black, Union yellow, Rattlesnake dark blue



From Small, Bowman and Hawkins 2007

Needs: Coordinate sampling and counting methods

- We need to collect biological data and PIT tag all bull trout captured
- We need a central database for bull trout information





Questions ???