

Distribution and Abundance of Umpqua Chub in South Umpqua River and Cow Creek, Oregon

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Outline

- Introduction
- Review the description of Umpqua chub
- Review of 1987 and 1998 status surveys
- Methods: 2006 plan of study
- Results
- Notes on other species

Introduction...

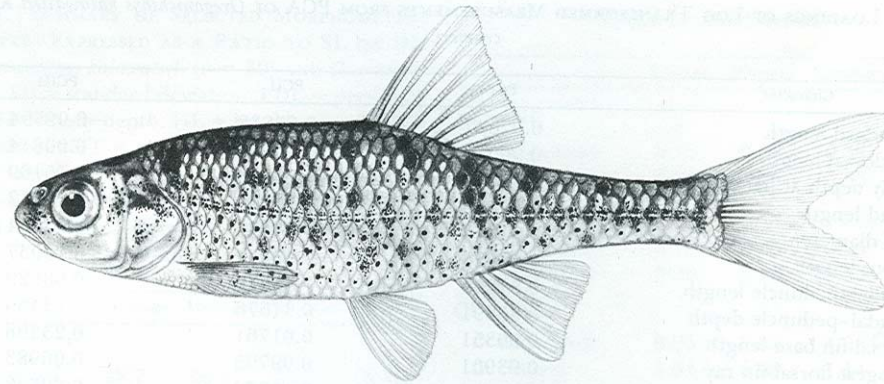
- Small cyprinid formerly recognized as *O. crameri*
- Described as new species *O. kalawatseti* in 1991 (Markle *et al.*)
- Umpqua Basin endemic
- Lives in moderate to no flow habitats in several rivers and stream
- Considered “sensitive-vulnerable” by ODFW

Introduction...

- Carl Bond (unpubl.) noted the species had different habitat requirements
- Long (1984) indicated that the differences might be subspecific

Slightly different mouth position

Oregon chub
(terminal mouth)



Umpqua chub
(slightly subterminal
mouth)

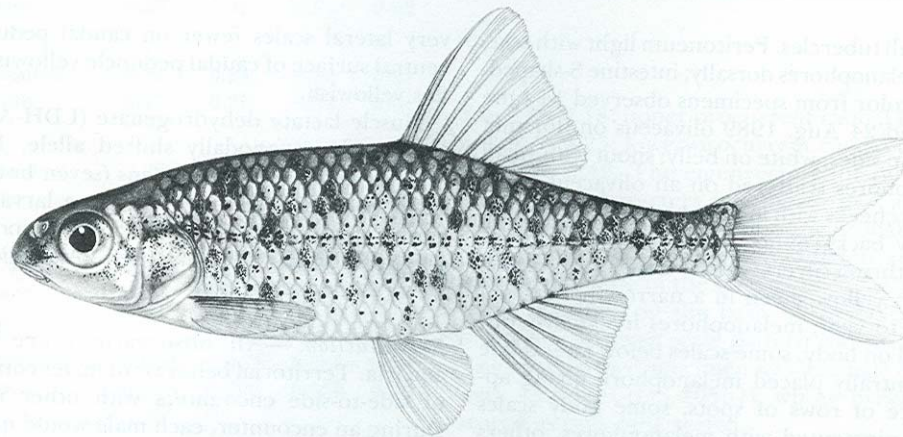


Fig. 1. *Oregonichthys crameri*, OS 12077, 37.7 mm, male (above); *Oregonichthys kalawatseti*, paratype, OS 12078, 40.8 mm, female (below). Reproduced with permission of J. Tomelleri.

Breast scalation pattern

Oregon chub: fully scaled breast

Umpqua chub: naked or partially scaled breast

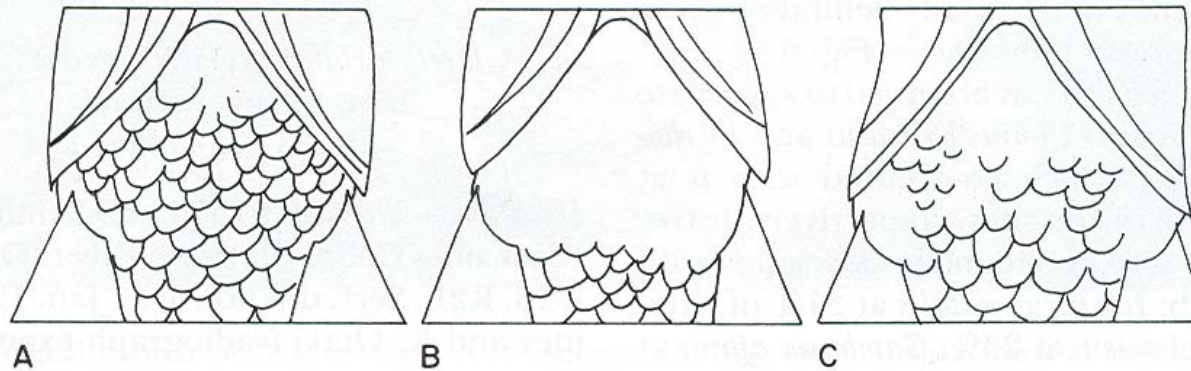


Fig. 3. Breast scalation pattern in *Oregonichthys*: A) *O. crameri*, OS 9620, 40.1 mm, female; B) *O. kalawatseti*, CAS 68130, 40.3 mm, female; C) *O. kalawatseti*, USNM 306791, 46.3 mm, male. Scale bar equals 1 mm.

Breast scalation pattern

TABLE 4. PERCENT OF BREAST COVERED BY SCALES IN *Oregonichthys kalawatseti* AND *O. crameri* BASED ON SPECIMENS GREATER THAN ABOUT 25 MM.

Species	Percent of breast scaled				
	0	25	50	75	100
<i>O. kalawatseti</i>	90	23	6	2	
<i>O. crameri</i>			1	2	64

PCA of 12 measurements

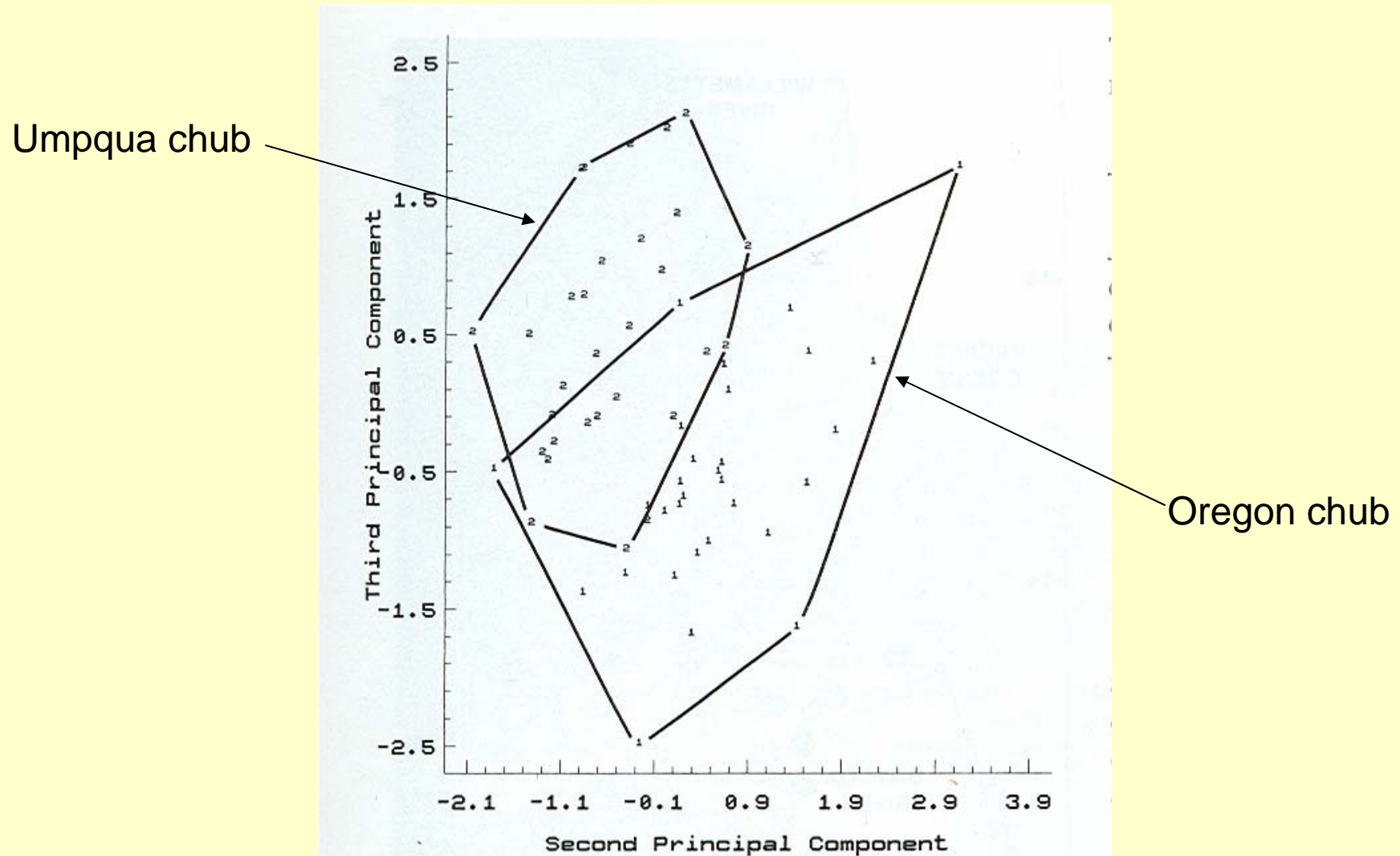


Fig. 2. Scatter plot of second and third axes from PCA of log transformed measurements; *Oregonichthys crameri* coded "1," *Oregonichthys kalawatseti* coded "2."

Reproduction

Spawning substrates (aquaria):

- Oregon chub always chose vegetation
- Umpqua chub always chose rocks or hard surfaces

Spawning behavior (aquaria):

- Umpqua chub males more aggressive than Oregon chub males

Field validation

- Oregon chub choose vegetation in the wild.
- No observations on Umpqua chub

Genetic differences?

(Starch gel electrophoresis—21 enzymes, 88 specimens)

Umpqua chub

Most specimens had a unique muscle lactate dehydrogenase (LDH-A)

Oregon chub

LDH-A allele rare

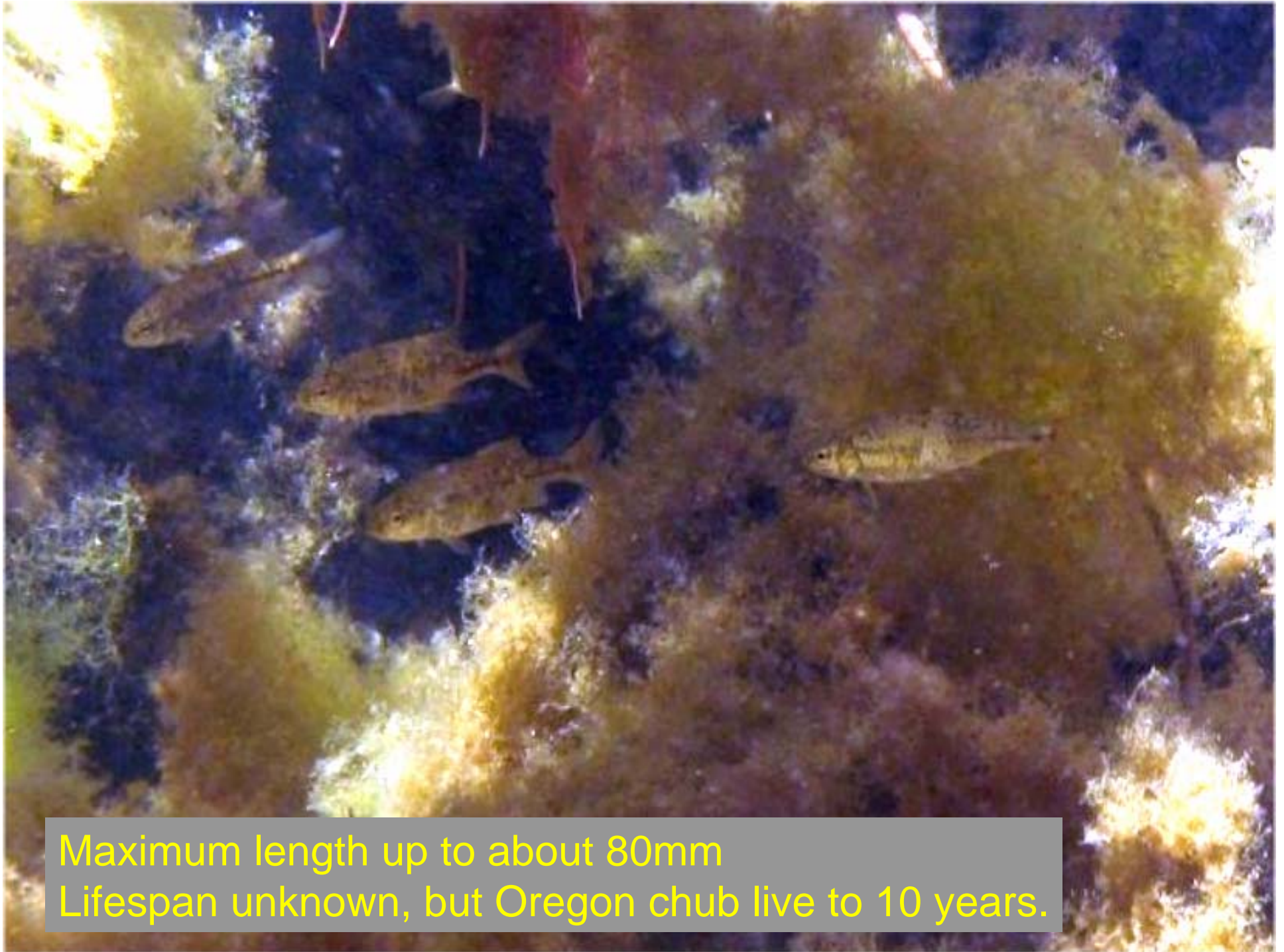
Suggestive of species-level differences and more recent work by Phil Harris and Bill Ardren corroborate genetic differences.

Based on this information.....

- Umpqua chub was described as a new species *Oregonichthys kalawatseti* (Markle et al. 1991)
- Currently recognized as allopatric sibling species

Oregonichthys kalawatseti

Etymology.—Oregon once had a remarkable diversity of native peoples with more native languages than all of Europe. The Kalawatset, a tidewater Umpqua people best known for attacking Jedidiah H. Smith in 1828, were part of this lost human diversity and serve to forewarn of a parallel decline in diversity of Oregon's native freshwater fishes. The name is a patronym and genitive singular.



Maximum length up to about 80mm

Lifespan unknown, but Oregon chub live to 10 years.

Historical distribution

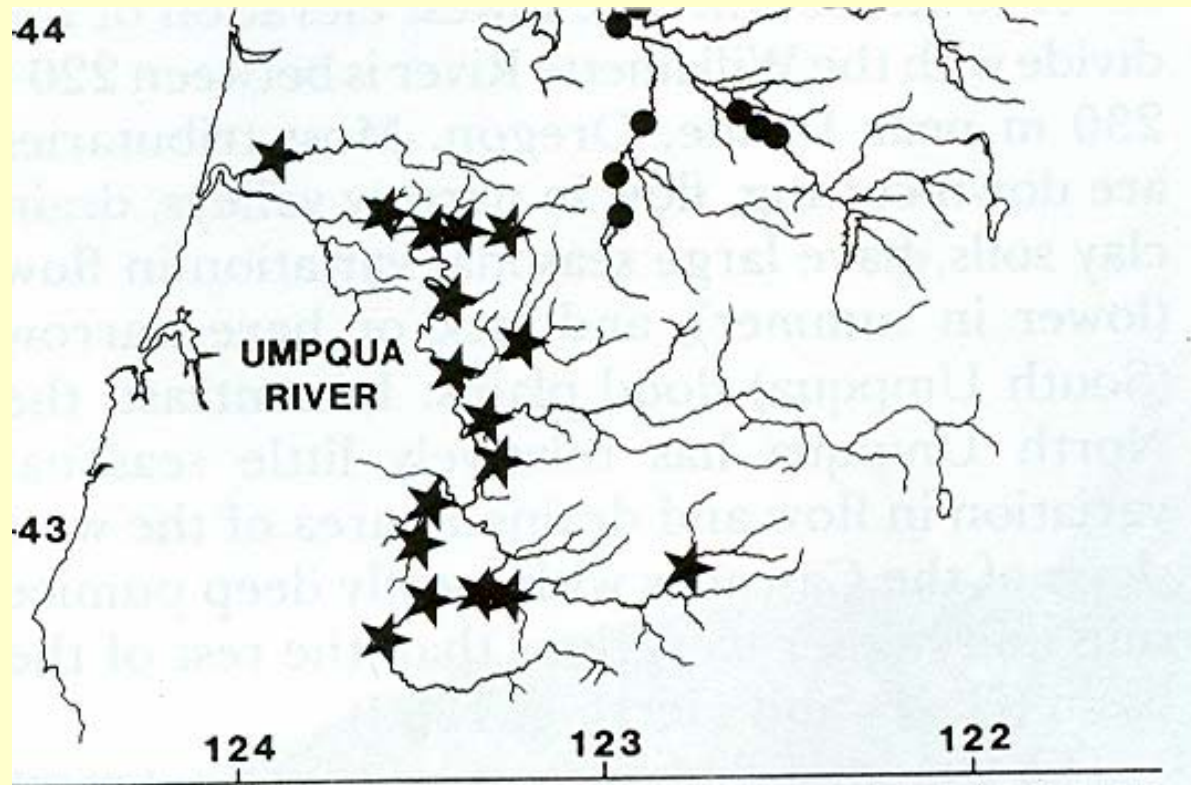


Fig. 4. Historical distribution of *Oregonichthys*. Circles indicate records of *O. crameri*, stars indicate records of *O. kalawatseti*.

Introduction...

Status surveys 1987 and 1998

- 1987: found at **12** of 37 sites
- 1998: found at **6** of 37 sites

Introduction...

Status surveys 1998 and 1987

1998

South Umpqua River (1)
Cow Creek (1)
Ollala Creek (1)
Calapooya Creek (1)
Elk Creek (1)
Smith River (1)

1987

South Umpqua River (2)
Cow Creek (1)
Ollala Creek (1)
Calapooya Creek (1)
Elk Creek (2)
Smith River (1)
Umpqua River (4)

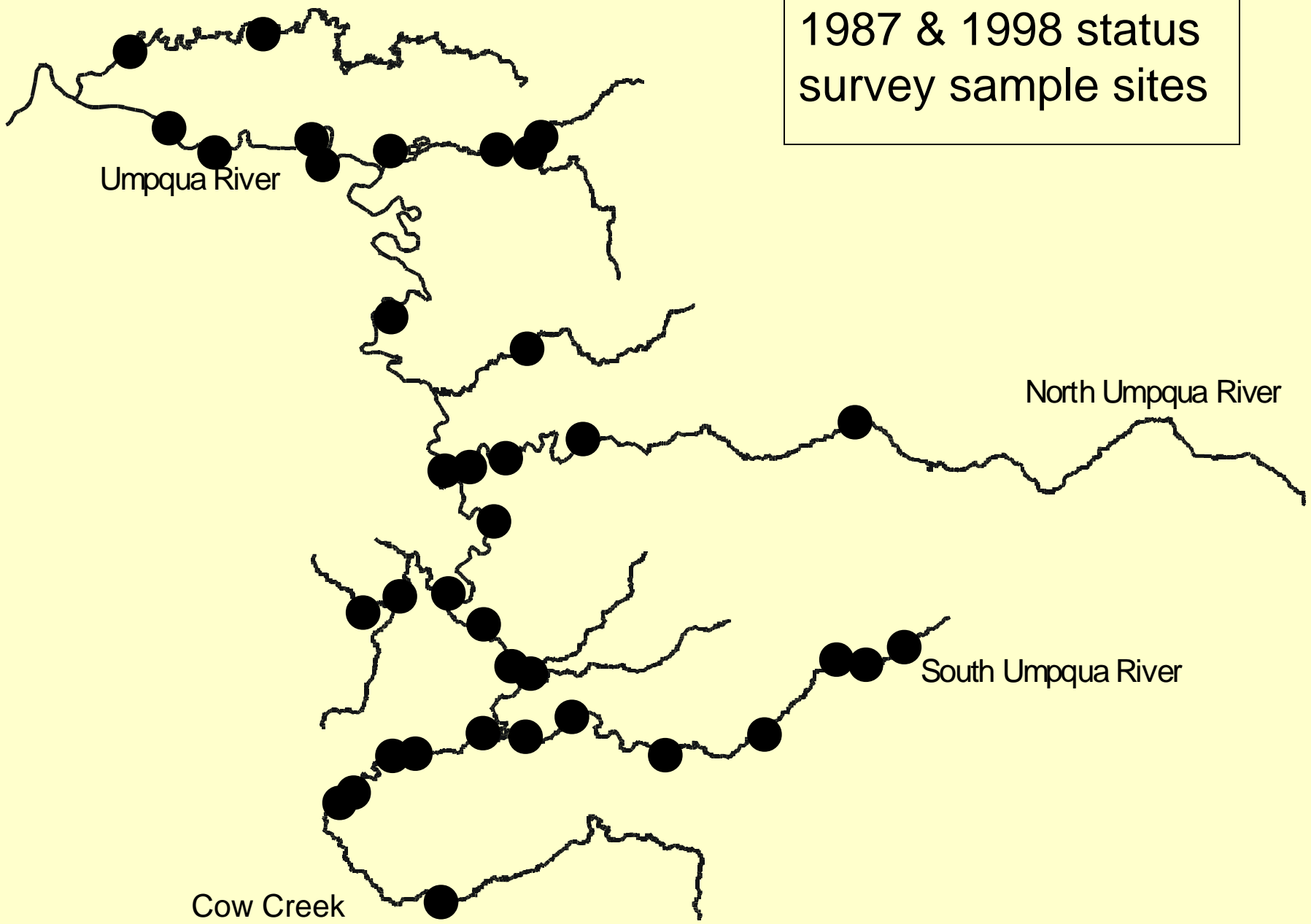
Not found in Tenmile Creek, Lookingglass
Creek, Myrtle Creek, North Umpqua River,
Pass Creek

Introduction...

North Umpqua River

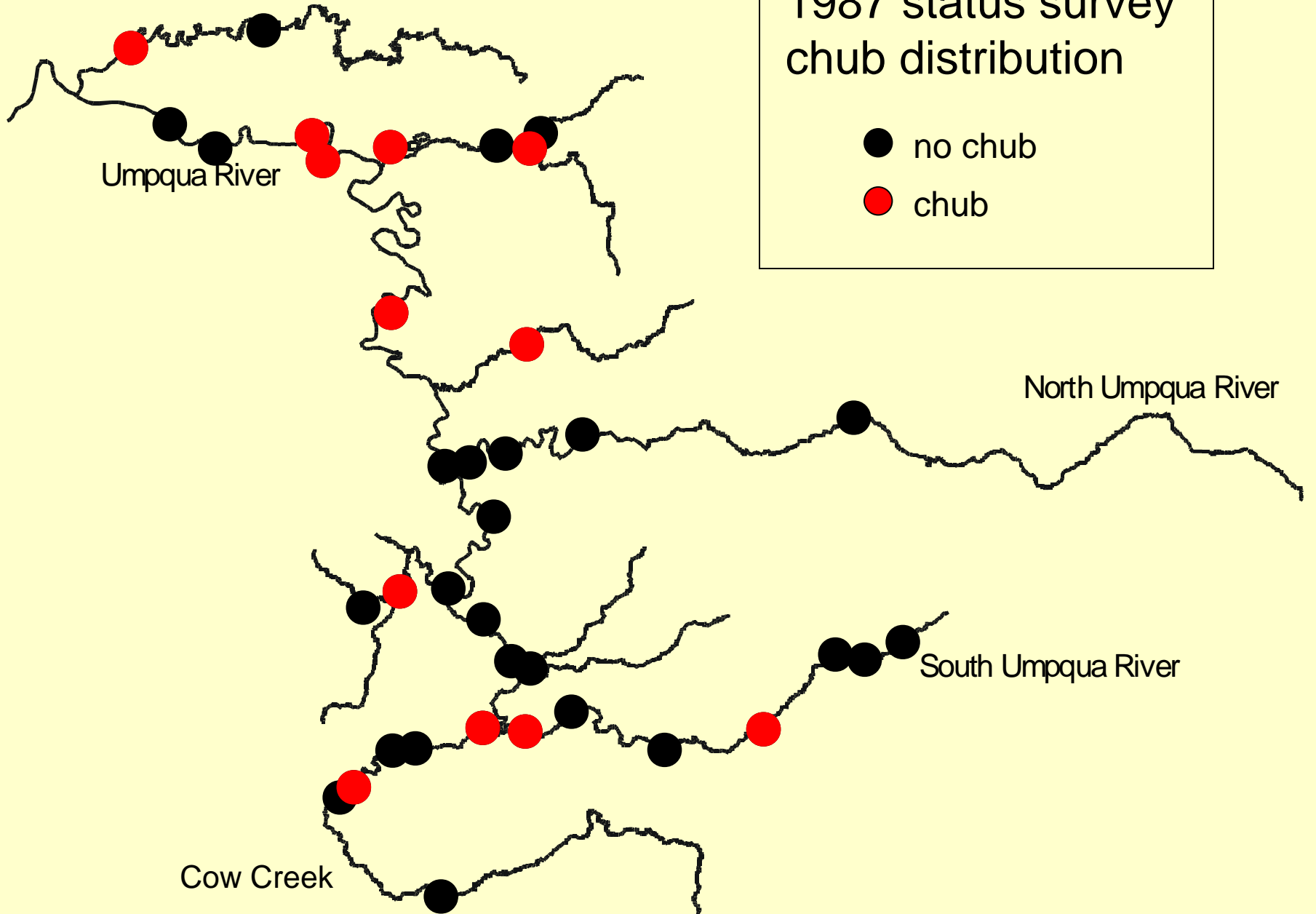
One verified collection in 1926 near
Winchester (UMMZ 94165)

1987 & 1998 status
survey sample sites



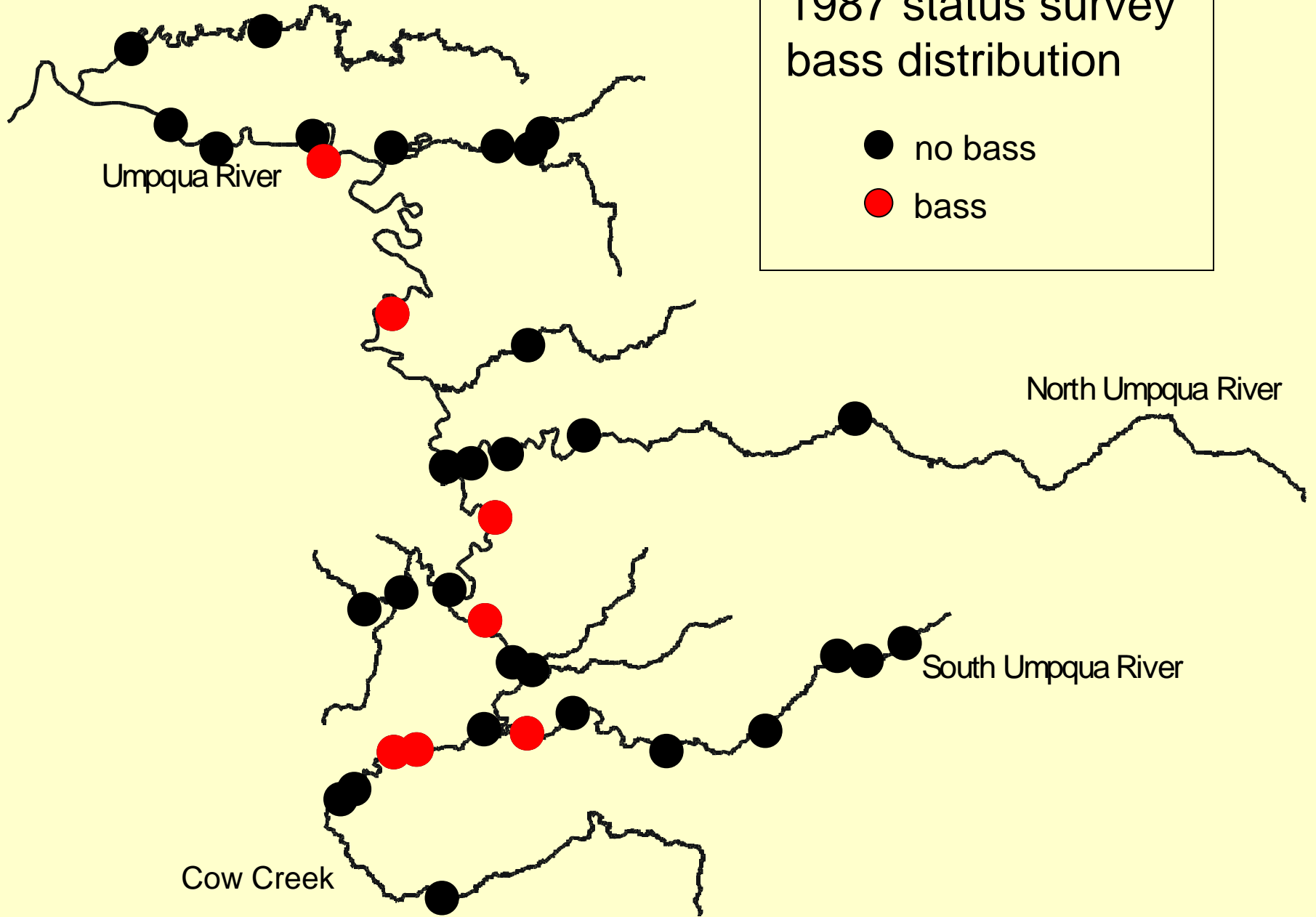
1987 status survey chub distribution

- no chub
- chub



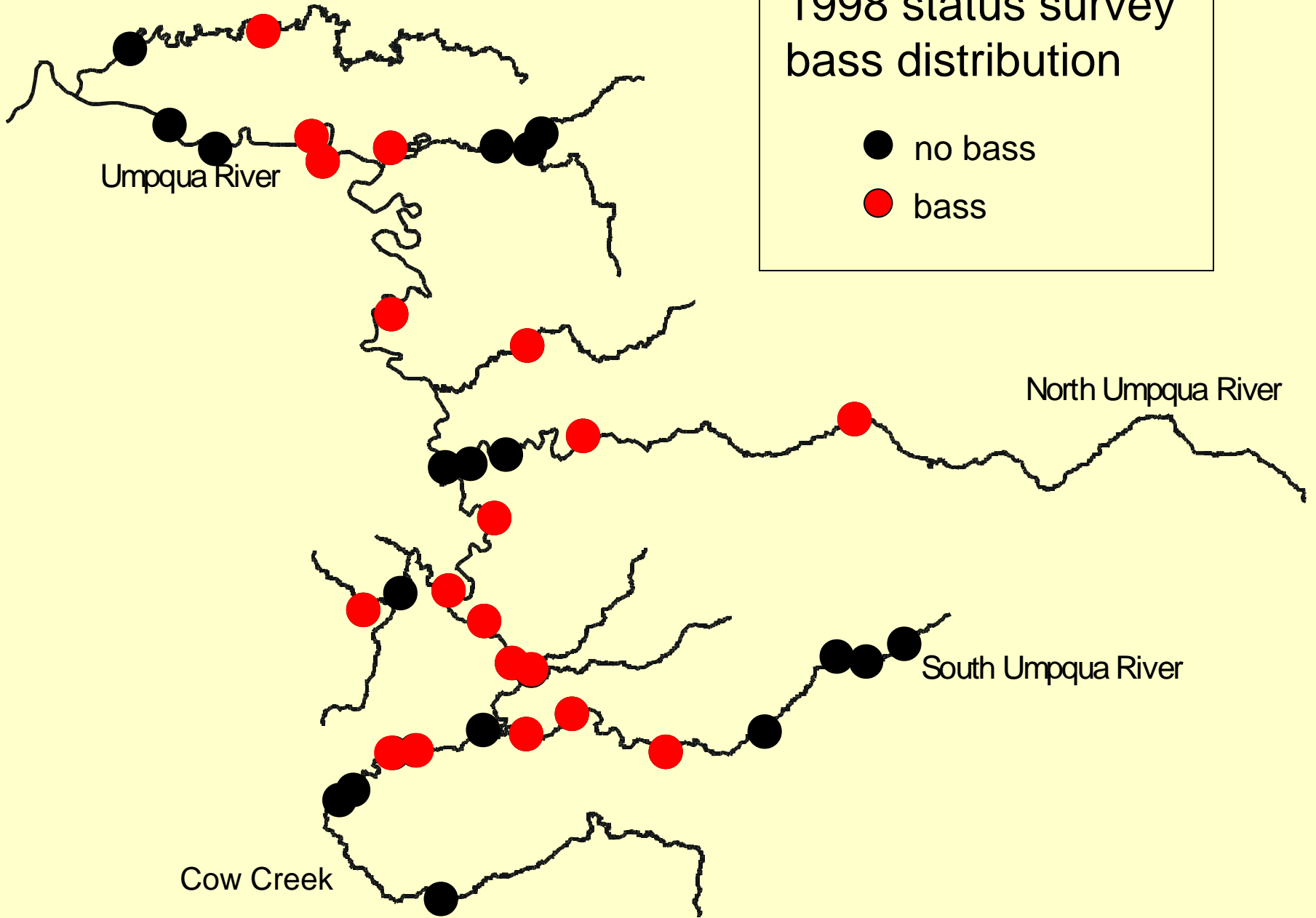
1987 status survey bass distribution

- no bass
- bass

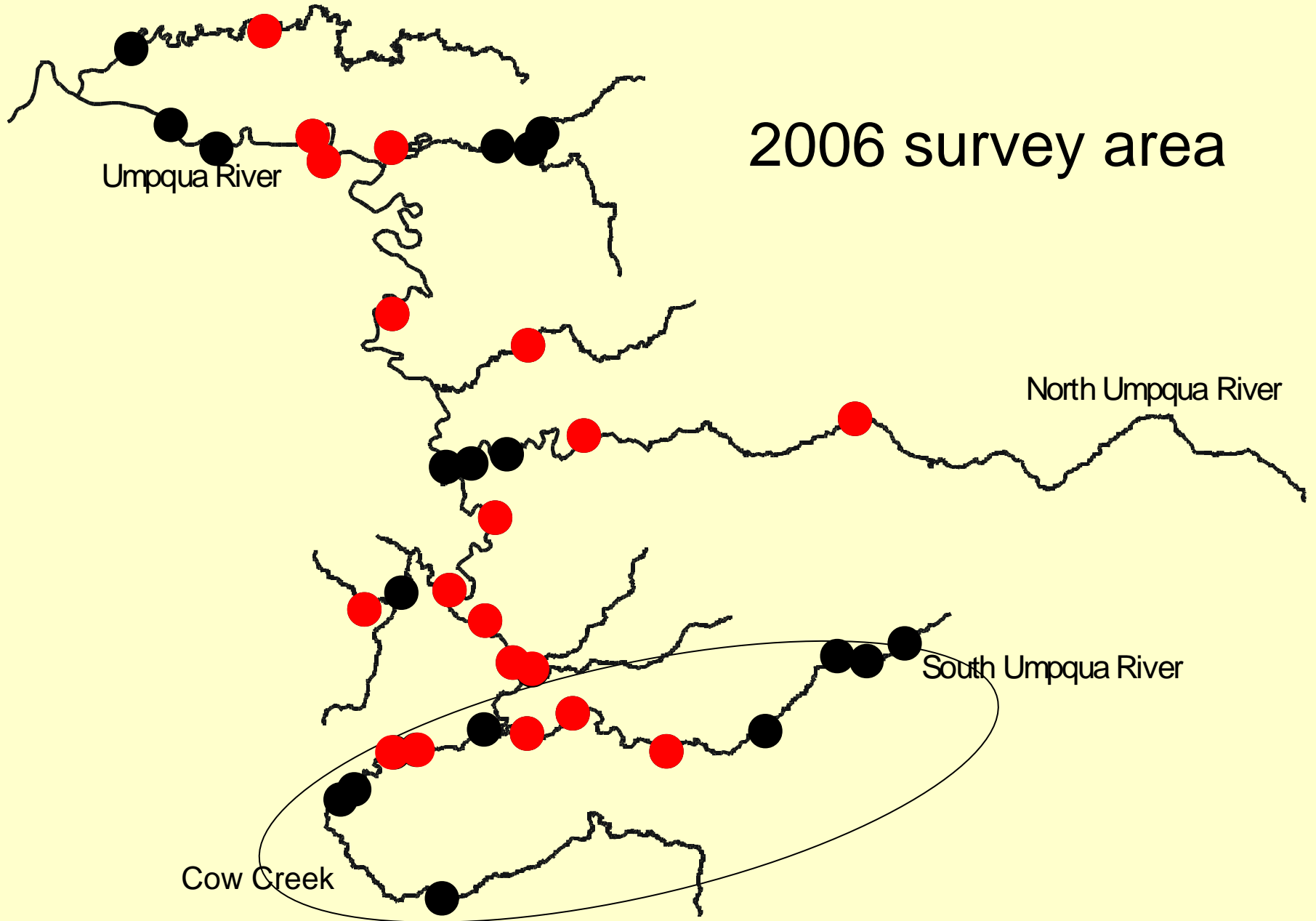


1998 status survey bass distribution

- no bass
- bass



2006 survey area



2006 Survey...

Long term goal

Establish a protocol to lay the groundwork for long-term monitoring of distribution and abundance of Umpqua chub

2006 Survey...

Short term goal

Provide immediate insight
into the status of Umpqua
chub

2006 Survey...

Two objectives.....

1) Gear evaluation

- seine
- kick net
- visual surveys
- snorkel
- minnow traps

2) Sample intensively in Cow Creek and South Umpqua River

Results...gear evaluation

Seine

- too time consuming
- difficult in current or rocky areas
- many small fish
- eliminated this gear

Kick net

- ineffective at catching fish
- eliminated this gear

Visual surveys

- effective for observing fish
- useful in calm/clear waters
- incorporated this gear

Minnow traps

- effective for catching chub
- good for mark-recapture studies
- may use this gear in future

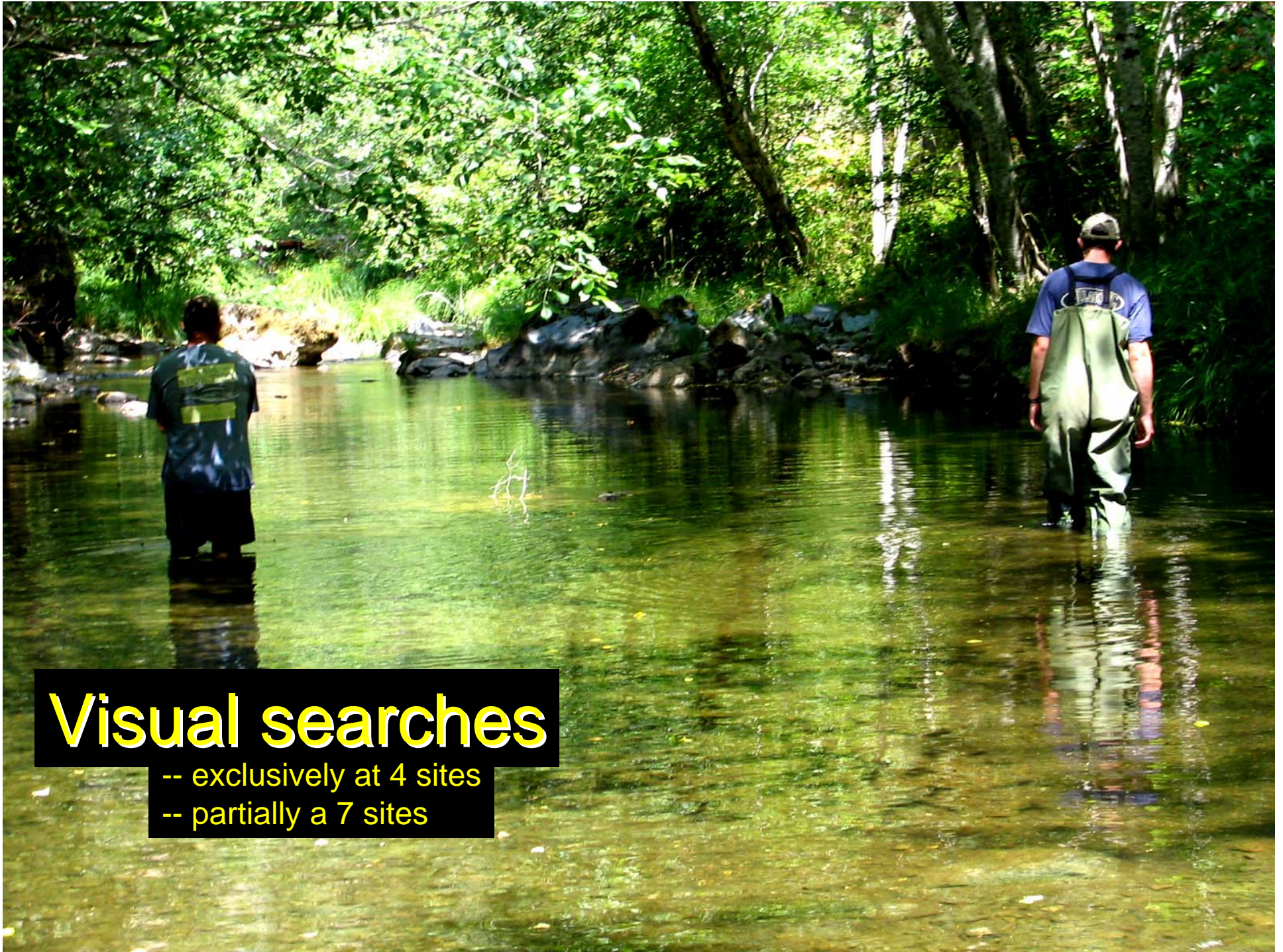
Snorkel

- effective for observing and counting fish
- useful in calm/clear waters
- became our primary gear

An aerial photograph of a person snorkeling in a river. The person is wearing a blue long-sleeved shirt, dark shorts, and a snorkel mask. They are floating in the center of the river, which has clear, shallow water. The riverbanks are covered in lush green grass and vegetation. The water is dark blue in the center and becomes lighter and more transparent near the banks, revealing rocks and the riverbed.

Two-person snorkel surveys...

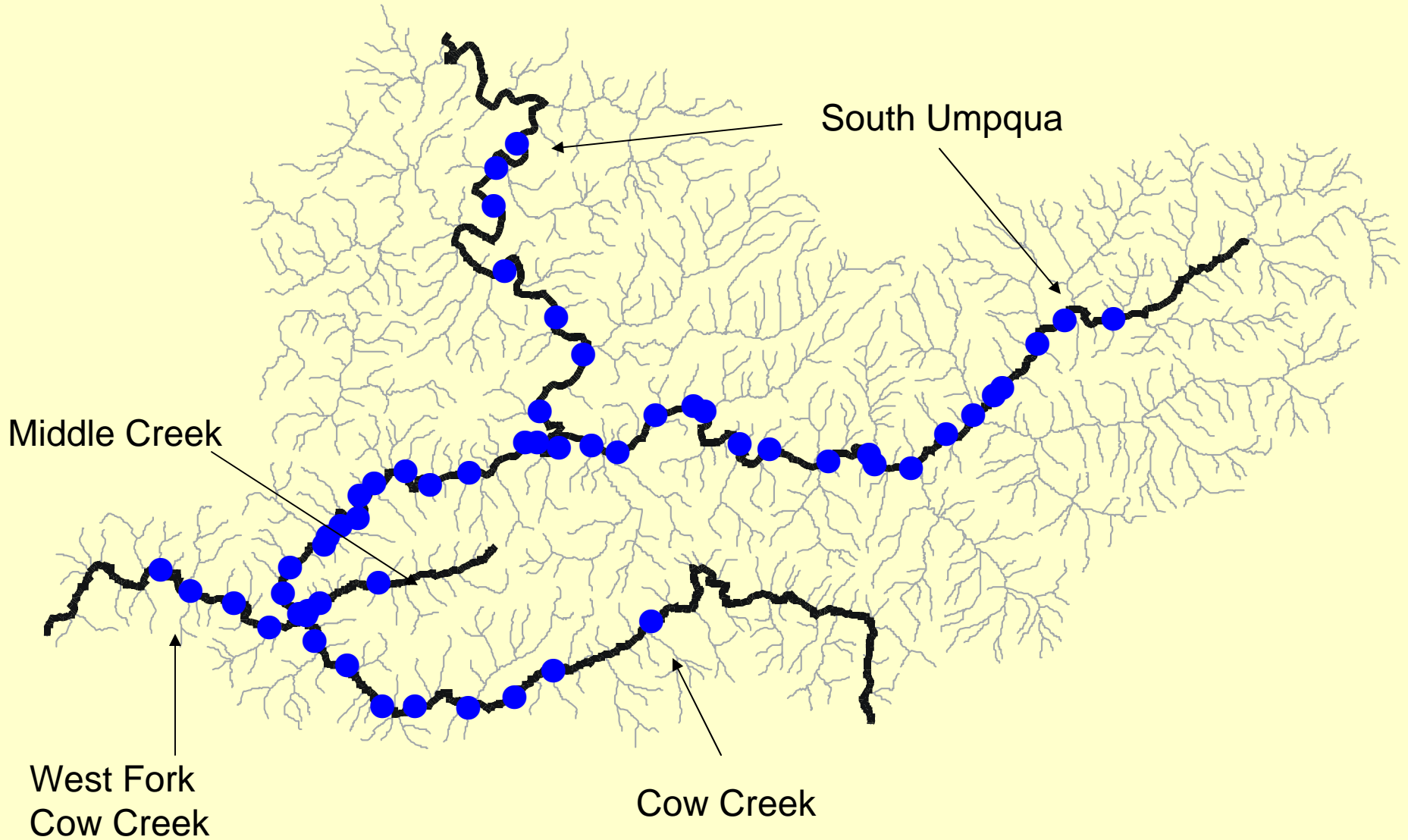
- One snorkeler on each side
- Observer/data recorder on bank
- Typically two 100 m reaches
- Counted all **bass, chub**, and uncommon fish
- Guestimated numbers of abundant fish, e. g. 10-20, 50-100, 100+, etc.



Visual searches

- exclusively at 4 sites
- partially a 7 sites

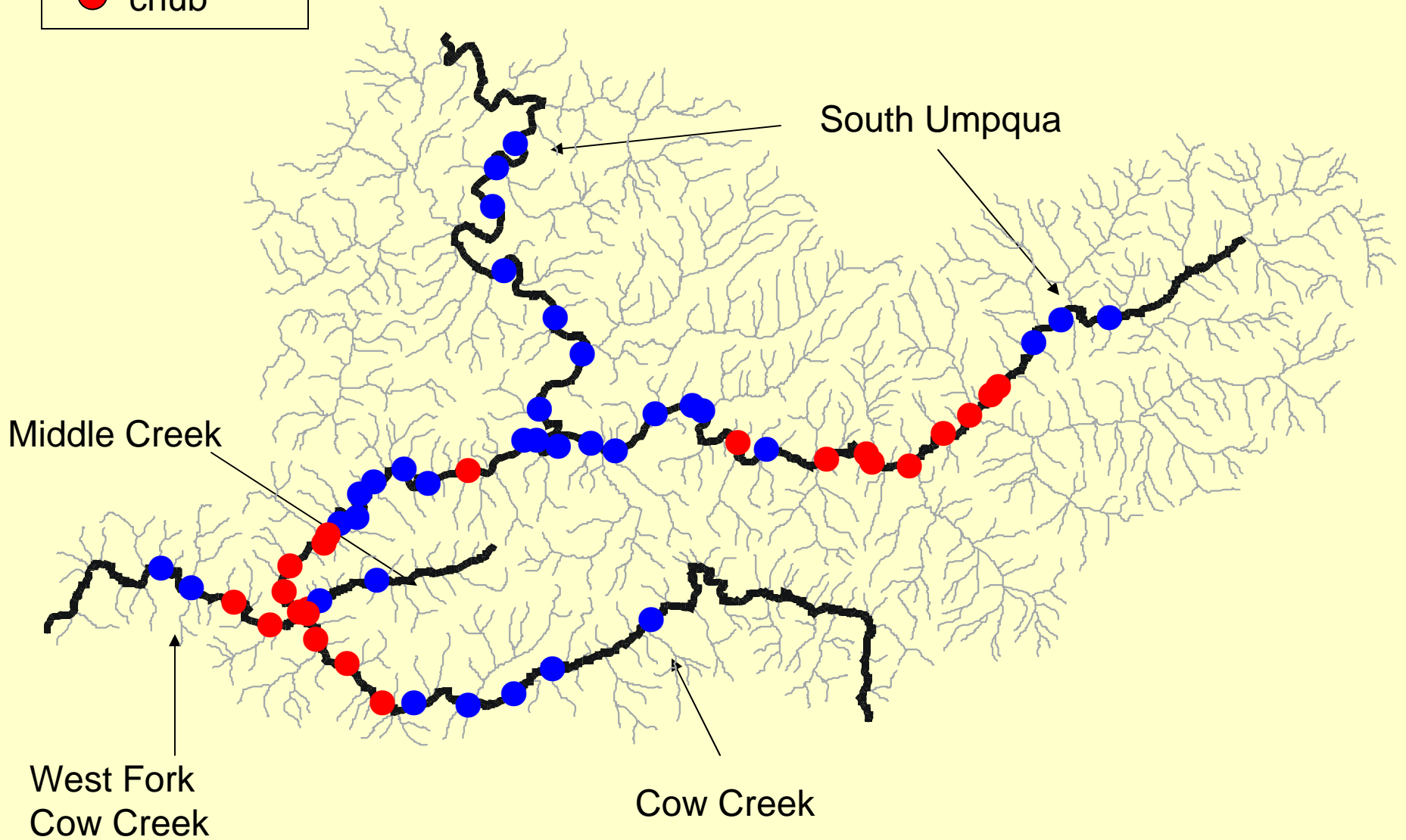
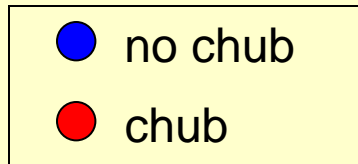
Intensive surveys: 56 sites



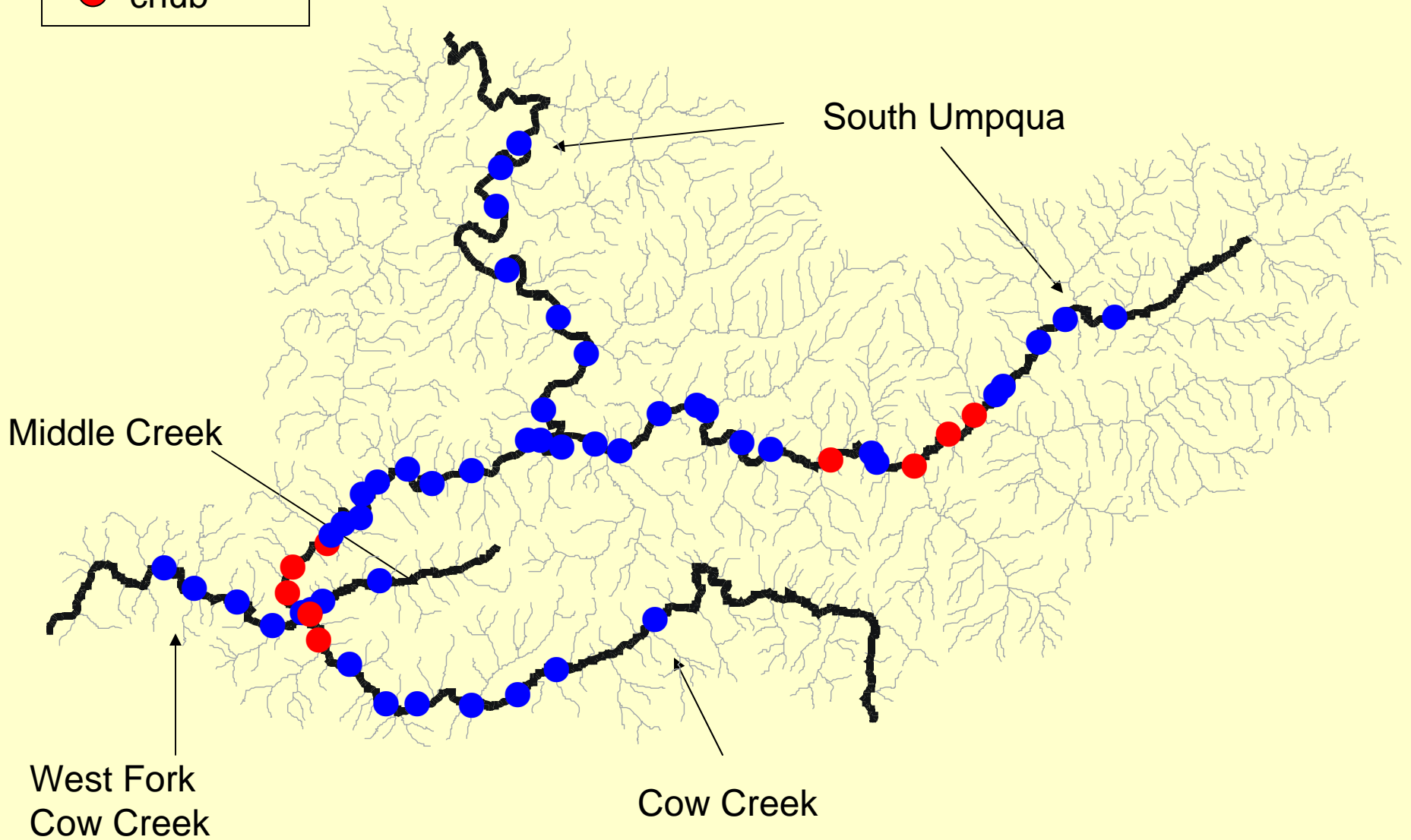
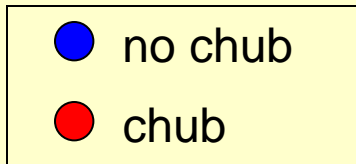
Results...

<u>Water body</u>	<u>Sites</u>	<u>Chub</u>	<u>Bass</u>
S. Umpqua	26	505	1669
Cow Creek	22	429	329
West Fork Cow	5	118	0
Middle Creek	3	7	0
TOTALS	56	1059	1998

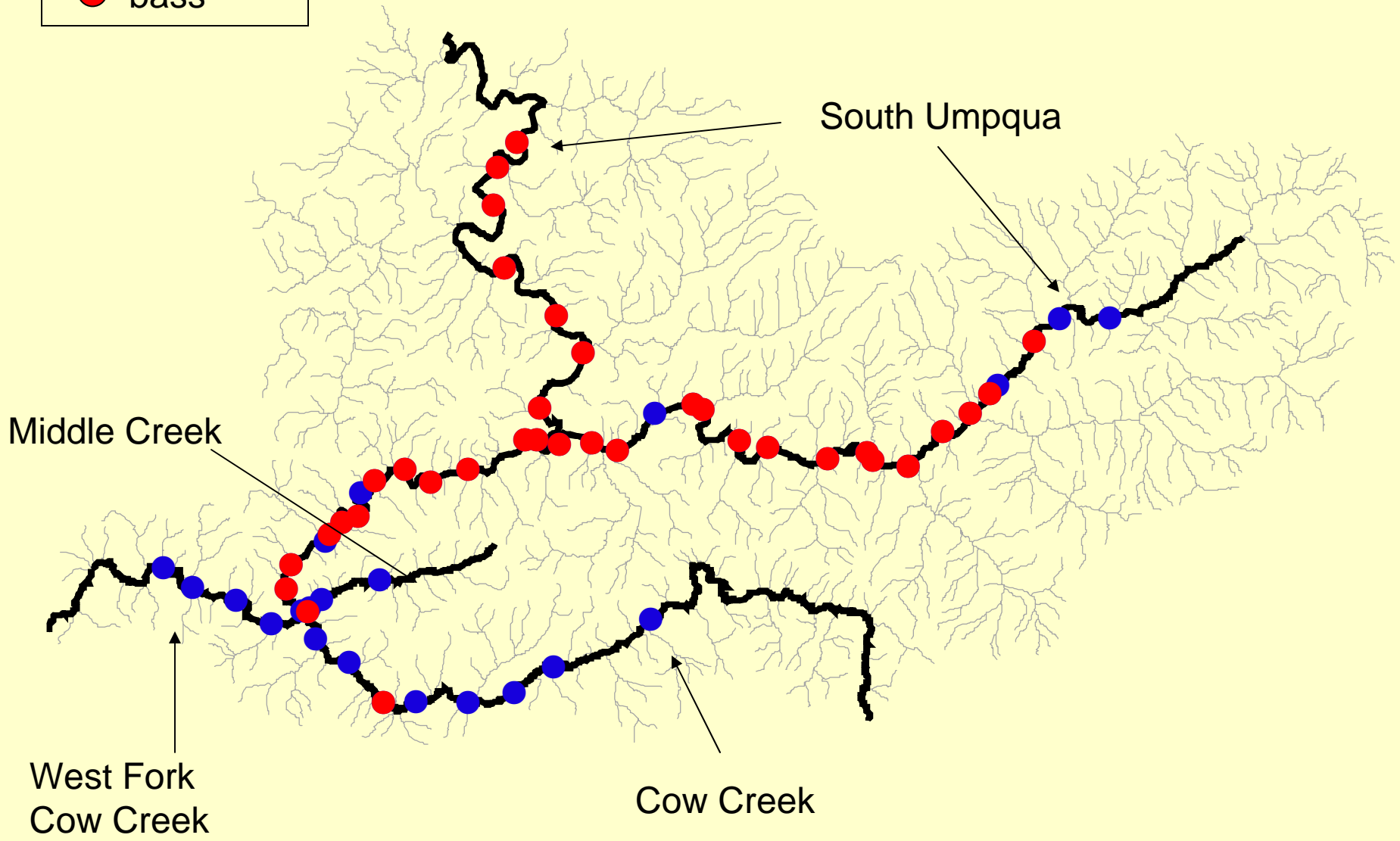
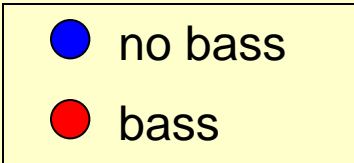
Umpqua chub distribution....



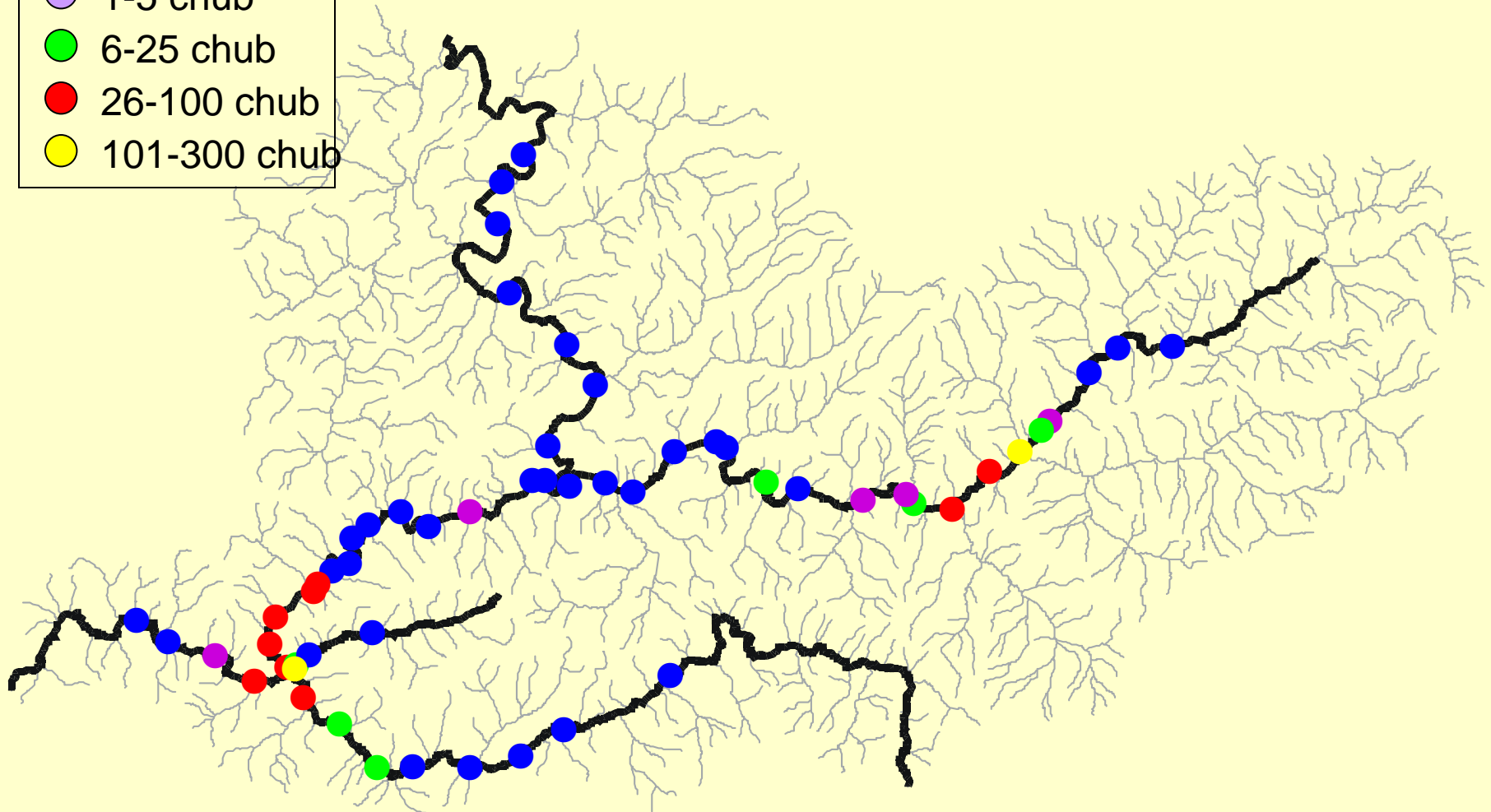
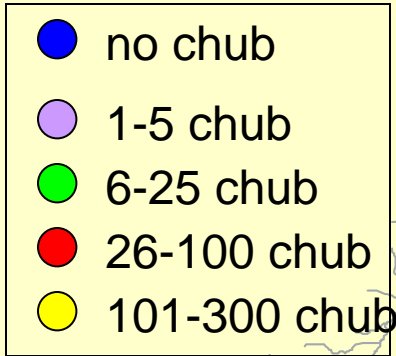
Age 0 Umpqua chub distribution....



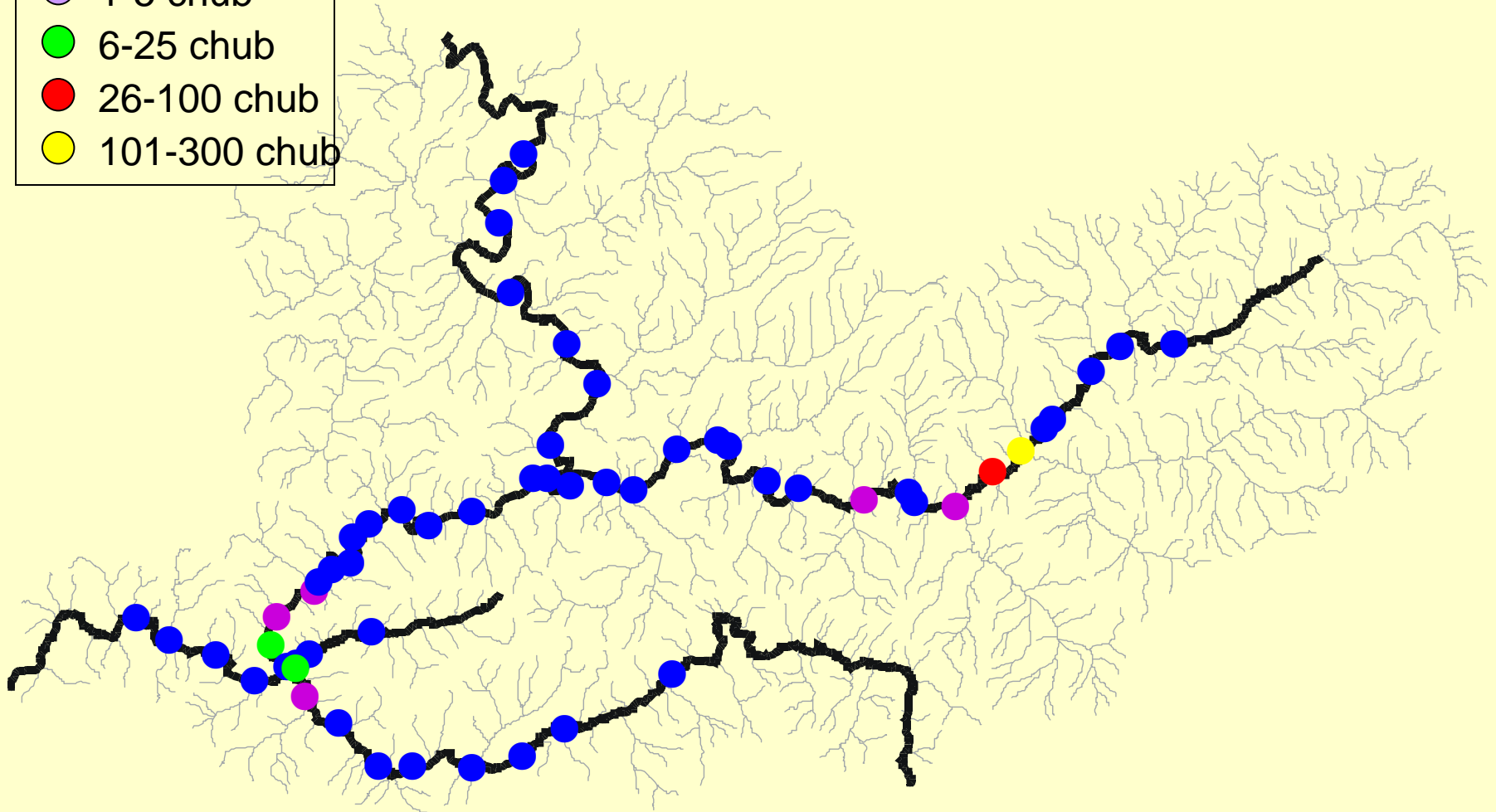
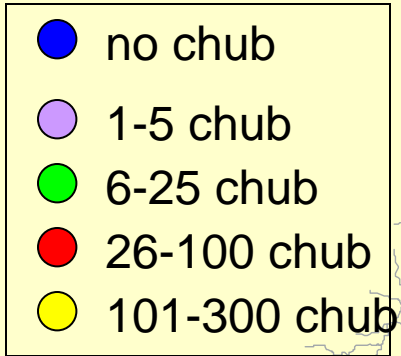
Smallmouth bass distribution....



Umpqua chub distribution....

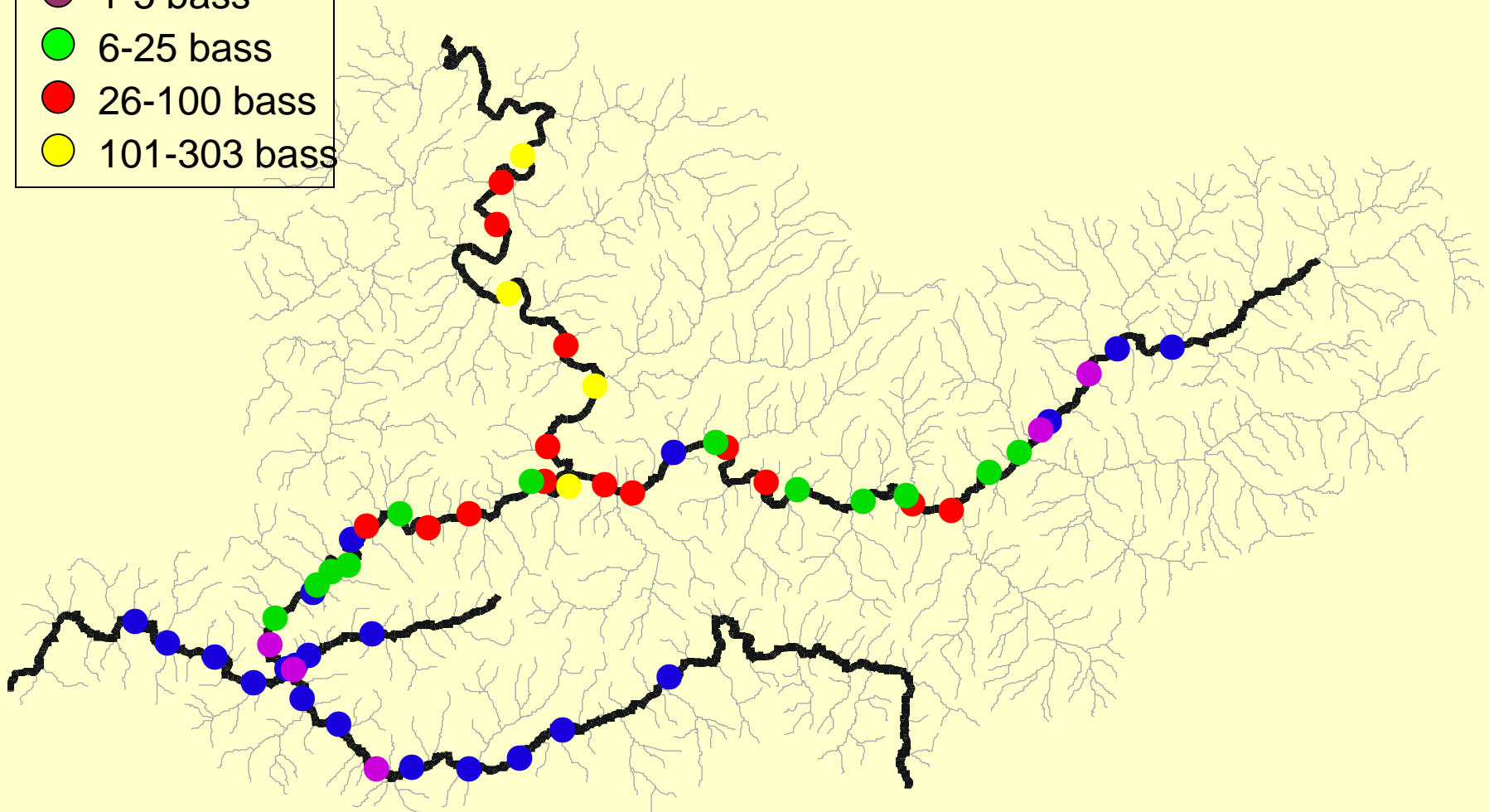


Age 0 Umpqua chub distribution....



Smallmouth bass distribution....

- no bass
- 1-5 bass
- 6-25 bass
- 26-100 bass
- 101-303 bass



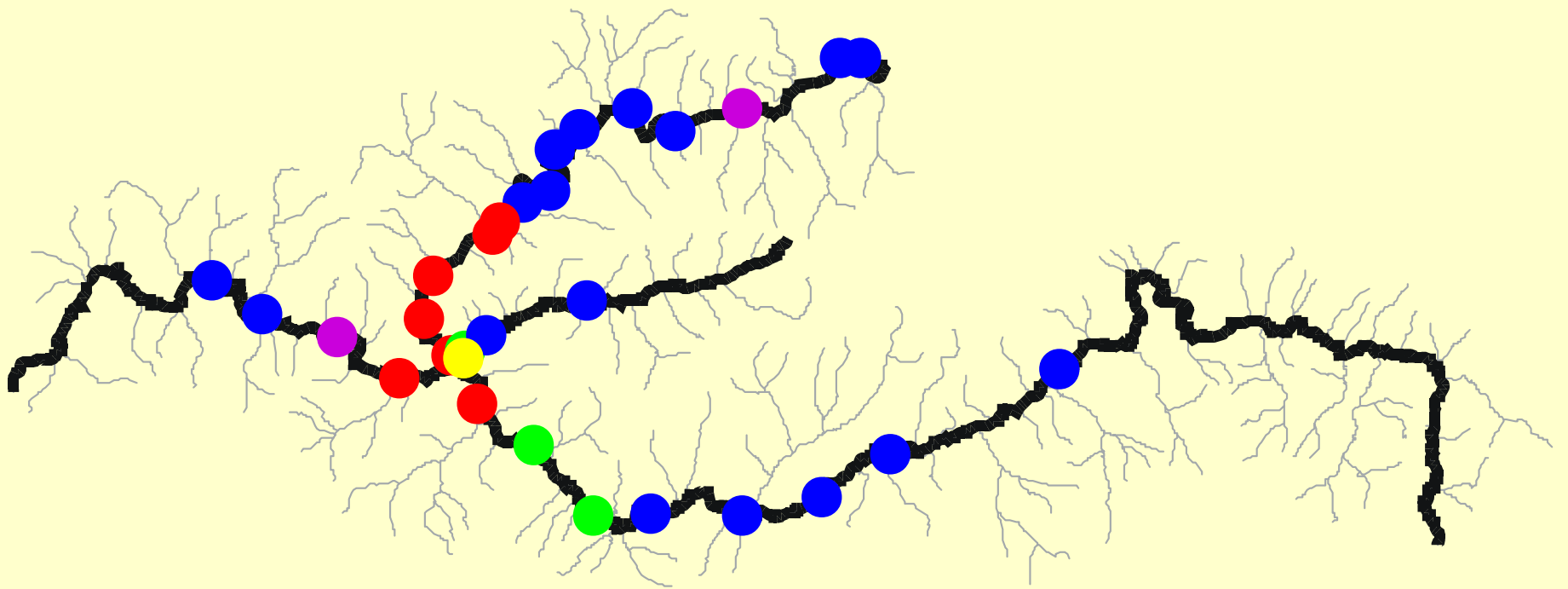
Cow Creek

River length: 129 km

Sampled: 85 km

99% of chub in 23 km

95% of chub in 13 km



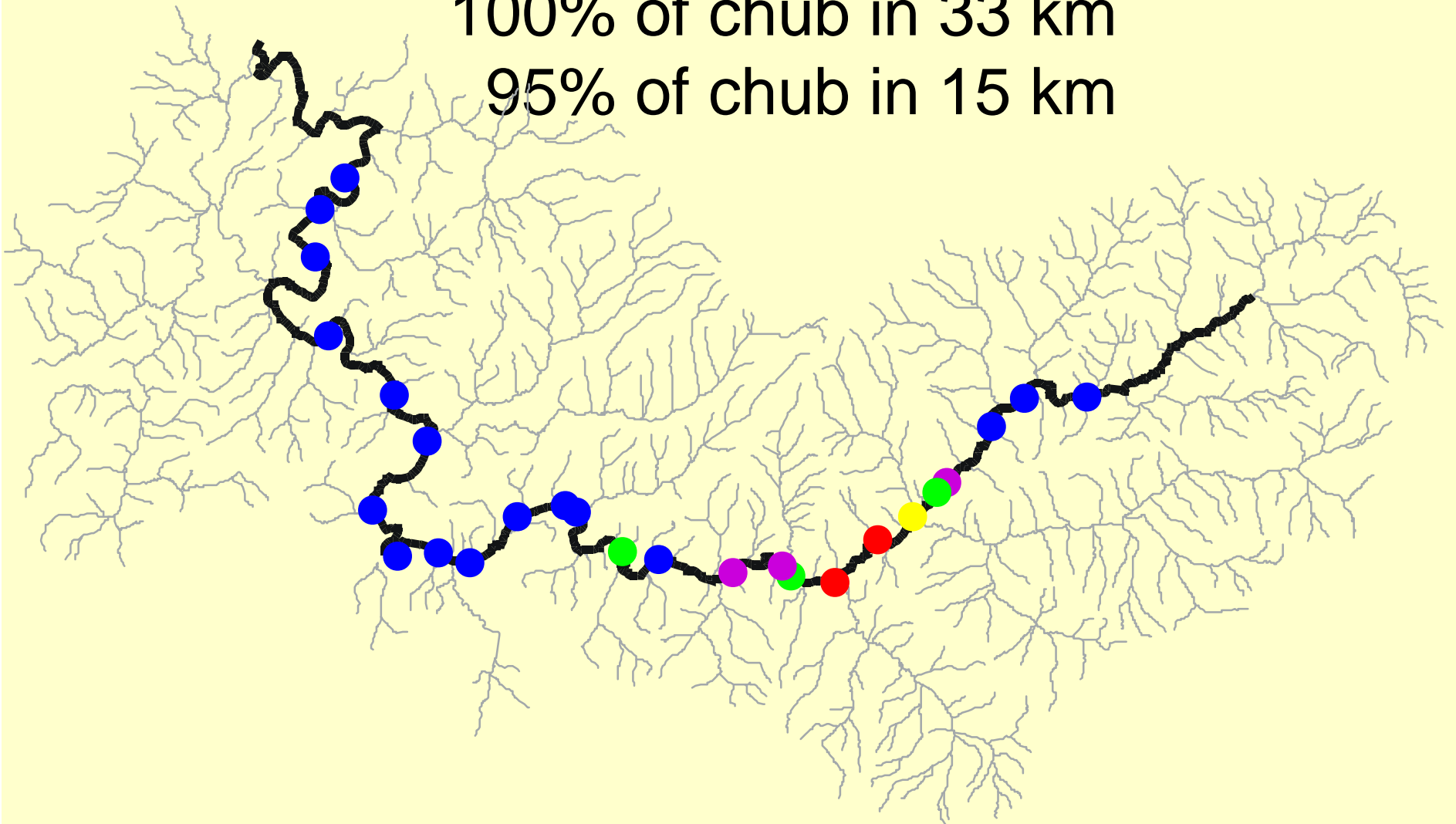
South Umpqua River

River length: 164 km

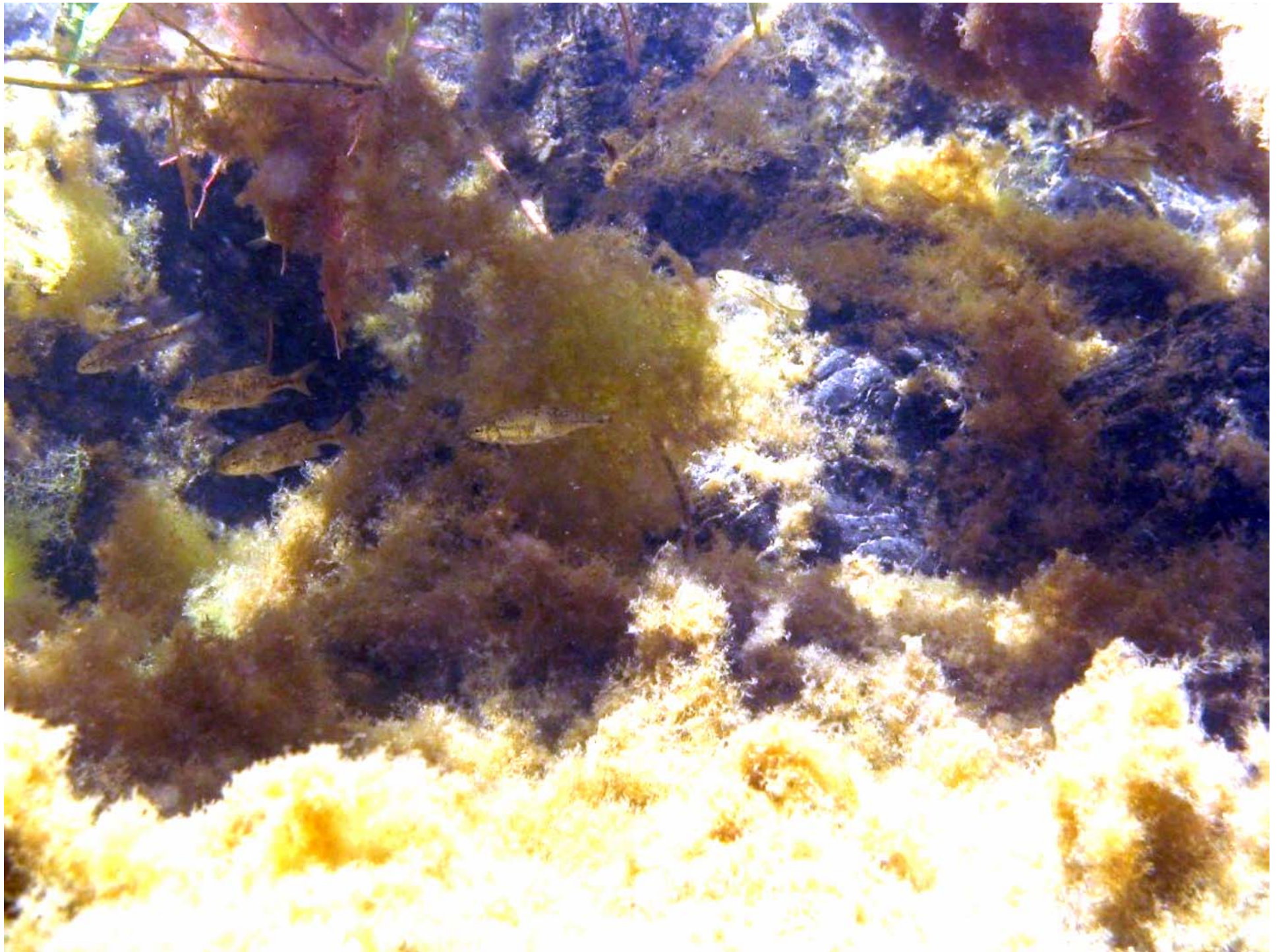
Sampled: 126 km

100% of chub in 33 km

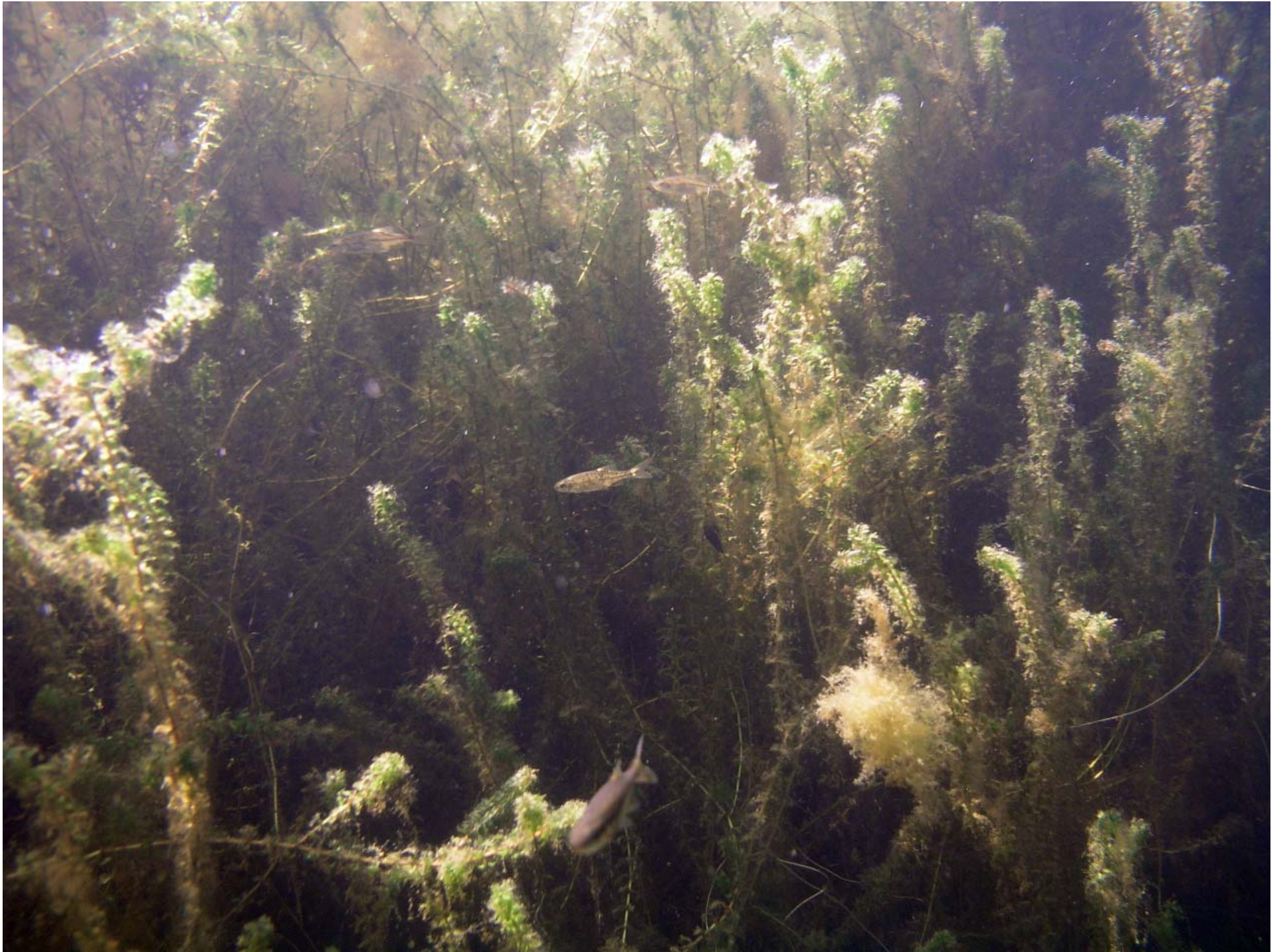
95% of chub in 15 km





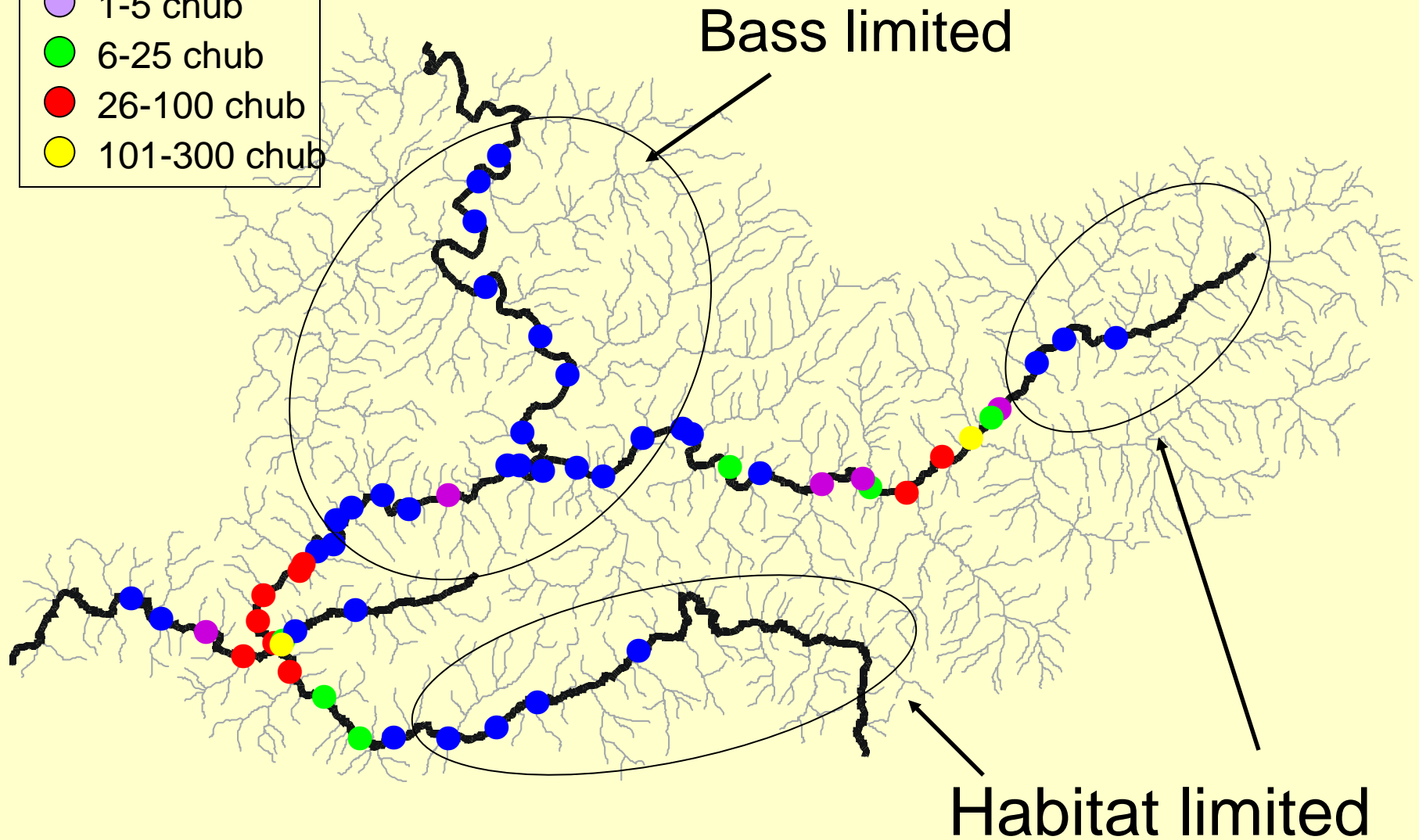






Umpqua chub limitations....

- no chub
- 1-5 chub
- 6-25 chub
- 26-100 chub
- 101-300 chub



What is wrong: smallmouth bass?

- introduced in Oregon in mid-1920s
- 1964 floods apparently liberated bass from farm ponds into S. Umpqua
- early 1970s was common in S. Umpqua
- late 1970s in mainstem Umpqua
- Now common and supports a major sports fishery



What is wrong: water quality?

<http://www.deq.state.or.us/lab/wqm/wqindex/umpqua4.htm>

DEQ has documented water quality issues in S. Umpqua

- High fecal coliforms
- Rural/industrial non-point sources
- Total solids
- High BOD
- High water temps
- Eutrophication

Conclusions...

- Snorkel surveys are an effective technique for Umpqua chub surveys
- Minnow traps can be included
- First documented collection that we are aware of Middle Creek or West Fork

Conclusions...

- Umpqua chub not widespread throughout Cow Creek or S. Umpqua River
- Restricted to small portions of each river
- Appear limited by habitat in the upper reaches and by smallmouth bass in lower reaches

West Fork Cow Creek

Abel Brumo, Jake Godfrey, and Kevin Stertz assisted with field sampling
Mark Jansen did nearly all data entry

Bureau of Land Management-Roseburg (Scott Lightcap) funded this project

Three C Rock



Three C Rock



Three C Rock



Three C Rock



*Cow Creek between Middle Creek
and West Fork*



*Cow Creek between Middle Creek
and West Fork*





*Cow Creek between Middle Creek
and West Fork*

*Cow Creek between Middle Creek
and West Fork*

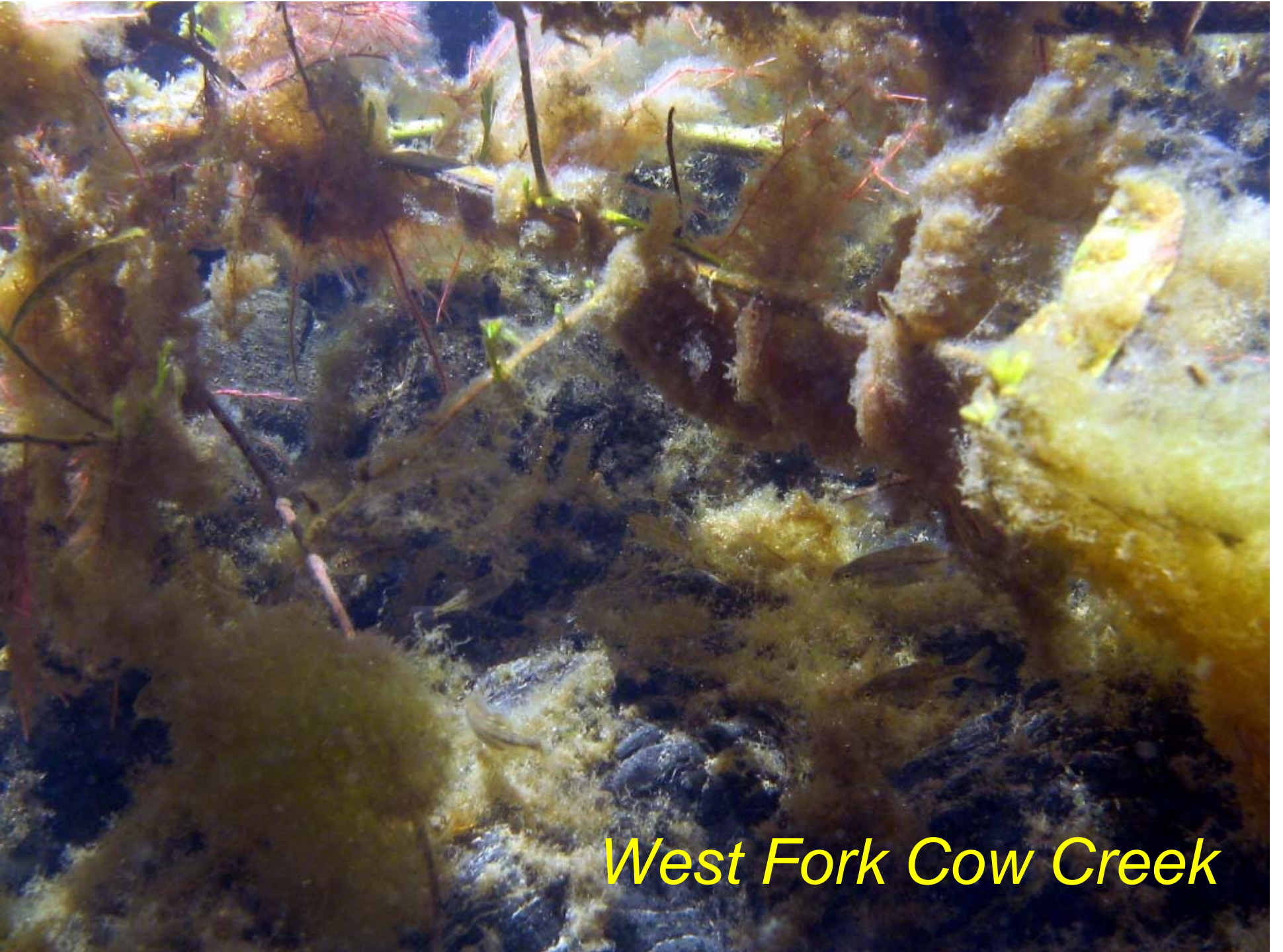


West Fork Cow Creek



West Fork Cow Creek





West Fork Cow Creek

West Fork Cow Creek



*West
Fork
Cow
Creek*



Other species....



Other species....



Other species.....



Other species...



Other species....



Other species....



Other species....

