Translocation of humpback chub (*Gila cypha*) above Chute Falls, Little Colorado River

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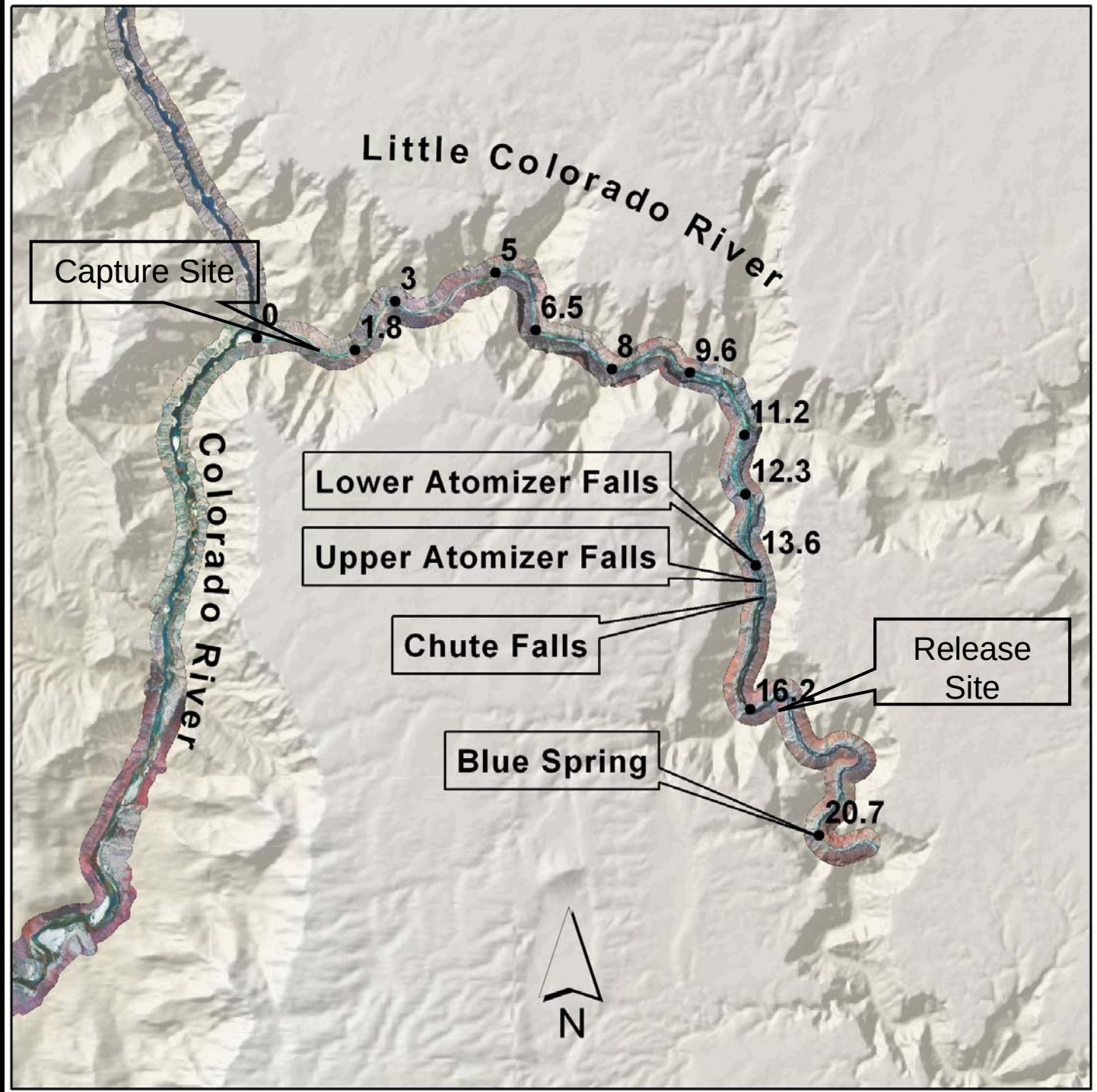

Little Colorado River
Capture Site
0
1.8
3
5
6.5
8
9.6
11.2
12.3
13.6
16.2
20.7
Lower Atomizer Falls
Upper Atomizer Falls
Chute Falls
Release Site
Blue Spring
Colorado River
N

HBC distribution

- Physical Barrier: Chute Falls
  - Robinson (1996)
- Chemical Barrier: CO_2 levels
  - Mattes (1993); Strength (1997)
- Do migrate but are pushed downstream via floods and/or rising CO_2 concentrations


7. 31. 2003


7. 31. 2003


8. 1. 2003

Water Quality

	Temp (°C)	pH	Conductivity (□S)	DO (mg/L)	CO_2 (mg/L)
Above Chute Falls	25.2±0.4	7.8±0.06	4529.0±39.5	9.8±0.2	216.5 ±0.4
Below Chute Falls	22.7±0.01	7.2±0.01	4634.0±8.0	7.4±0.02	86.5 ±0.2

Chute Falls Project

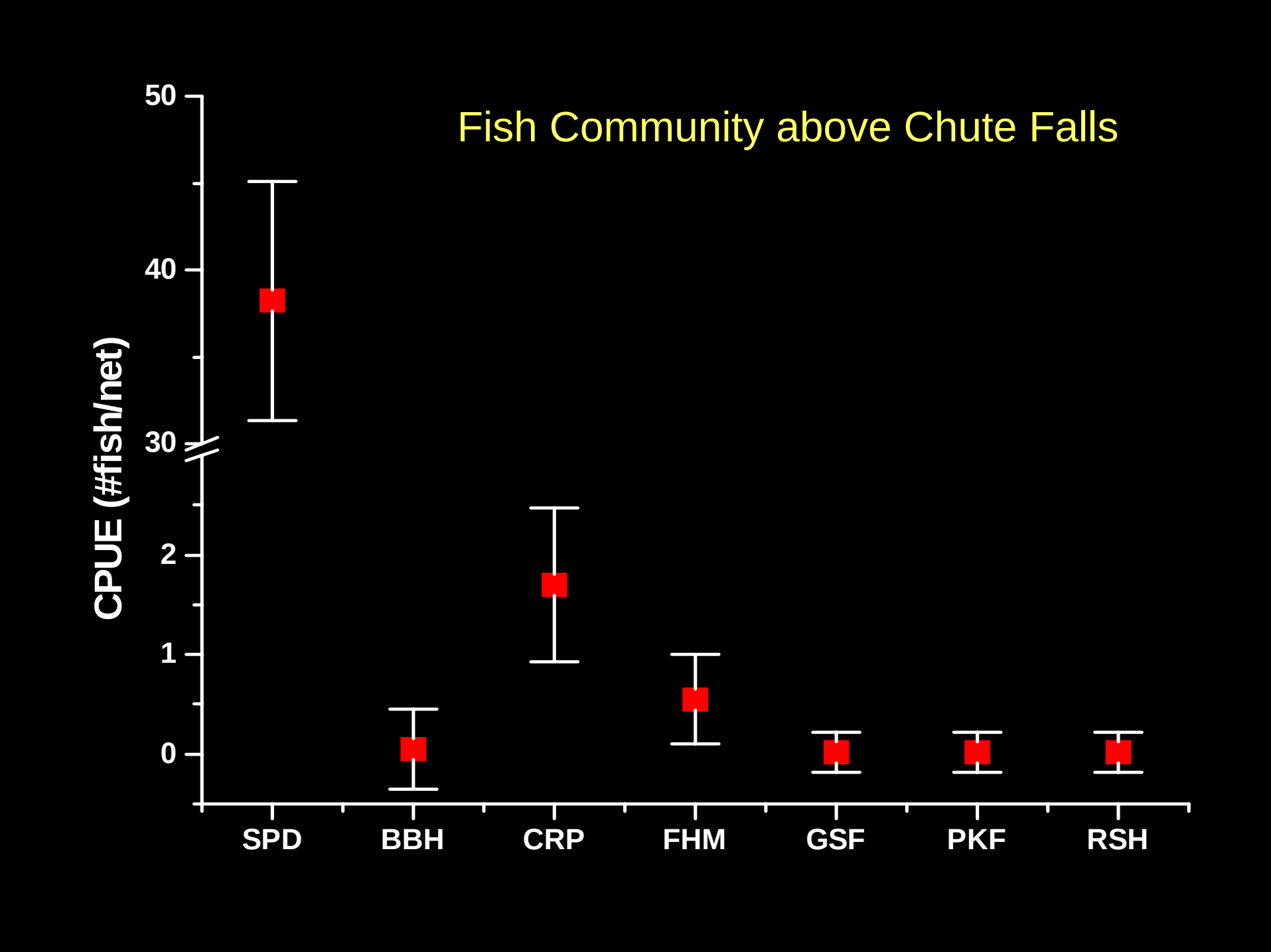
- Reconnaissance Survey
- Translocations in 2003, 2004
- Spring and Fall Monitoring

Objectives

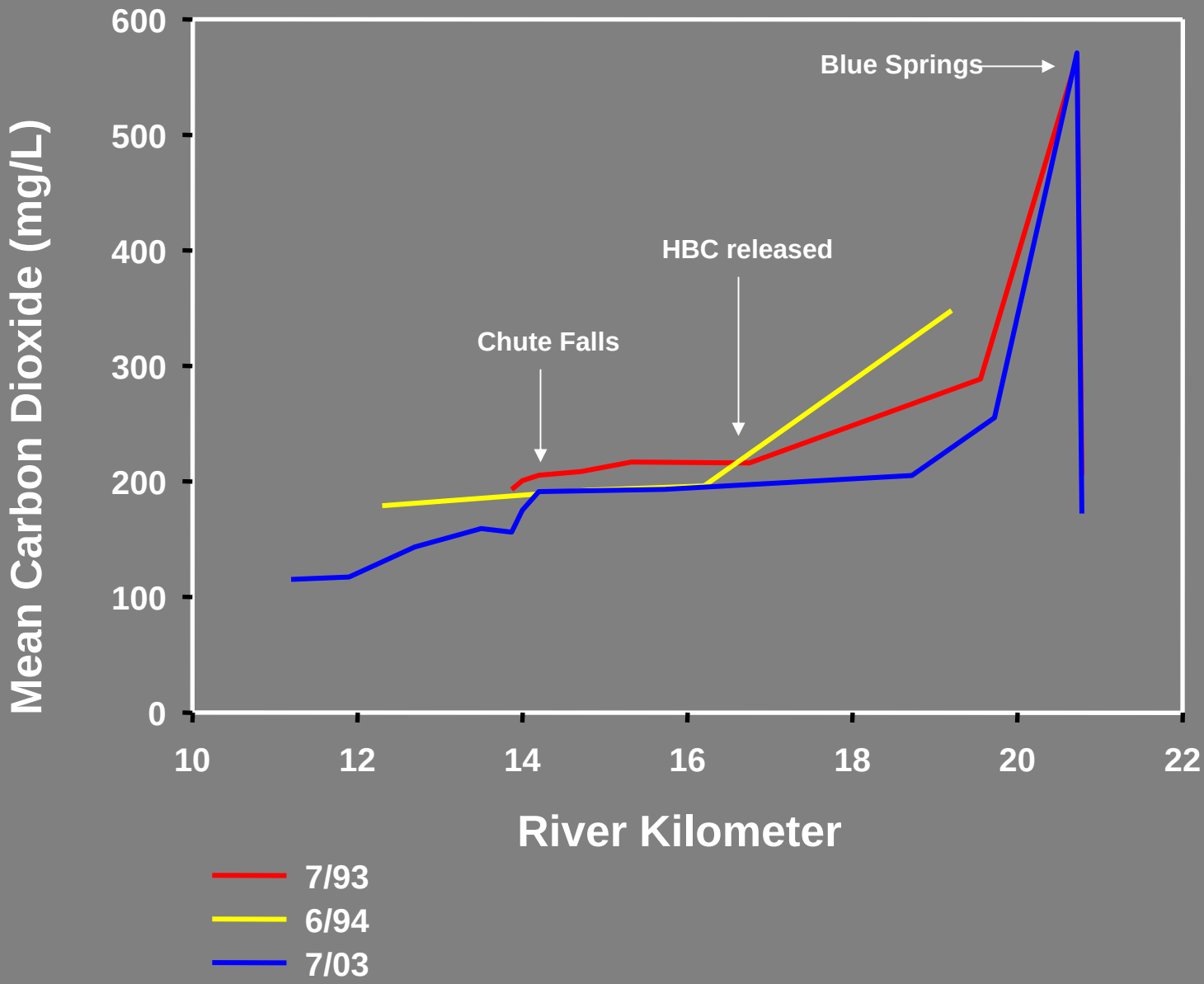
- 1) Determine if transplanted humpback chub can survive and remain above Chute Falls
- 2) Determine if humpback chub will grow above Chute Falls
- 3) Determine if any transplanted YOY humpback chub will recruit to adulthood above Chute Falls
- 4) Determine if a humpback chub spawning population will develop above Chute Falls

Reconnaissance Trip: July 2003

- Collect baseline fish and water quality data
- Identify helicopter landing sites


Fish Community above Chute Falls
CPUE (#fish/net)
50
40
30
2
1
0
SPD
BBH
CRP
FHM
GSF
PKF
RSH


7. 31. 2003


Mean Carbon Dioxide (mg/L)
600
500
400
300
200
100
0
10
12
14
16
18
20
22
River Kilometer
Blue Springs
HBC released
Chute Falls
7/93
6/94
7/03

Translocation: August 2003

- Collect 50-100mm HBC
  - Hoopnets
  - Seining
  - Held for 24hours before handling

Translocation: August 2003

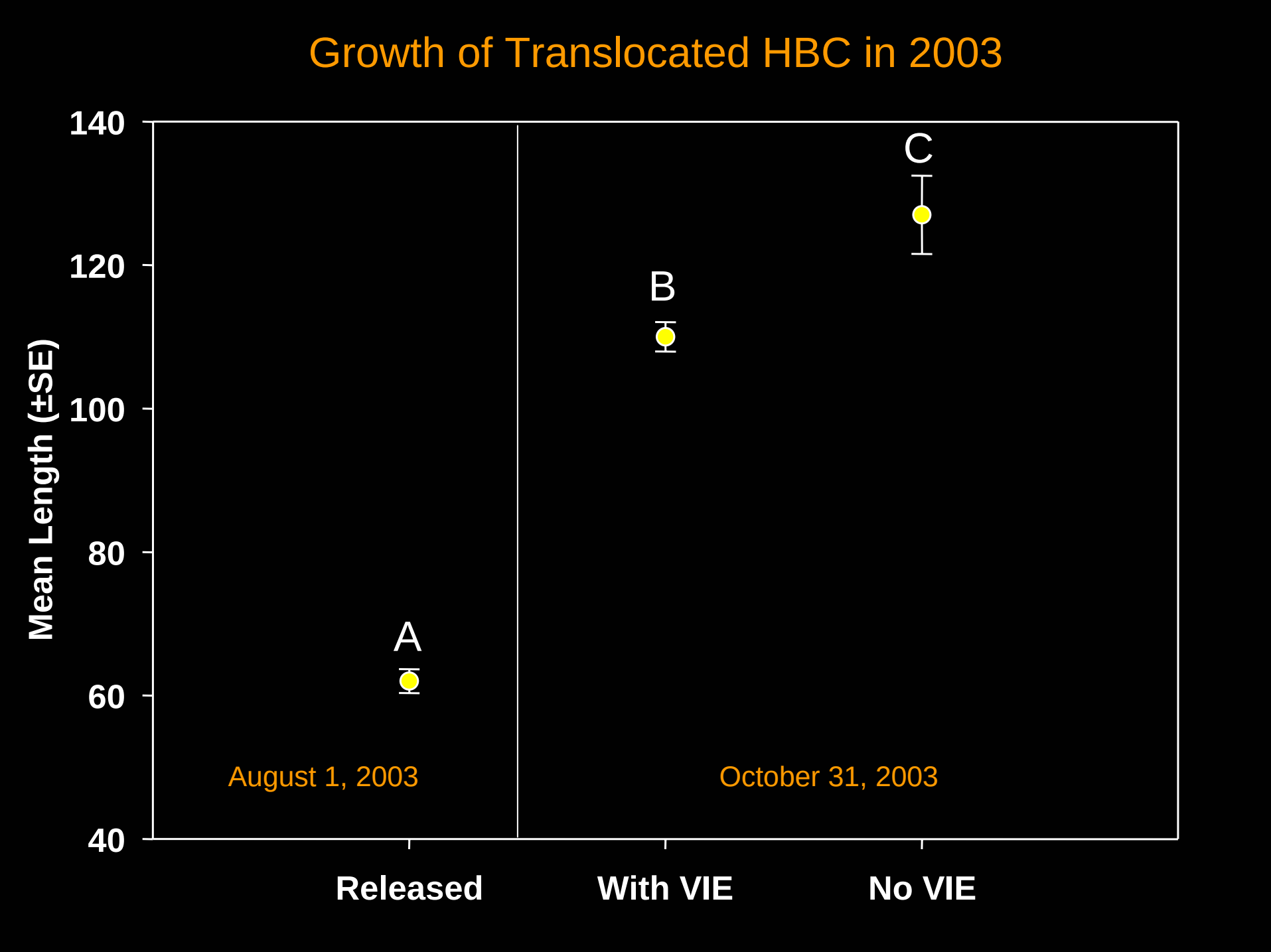
- Implant with VIE
  - Dose with MS222
  - Yellow tag on left side near dorsal insertion

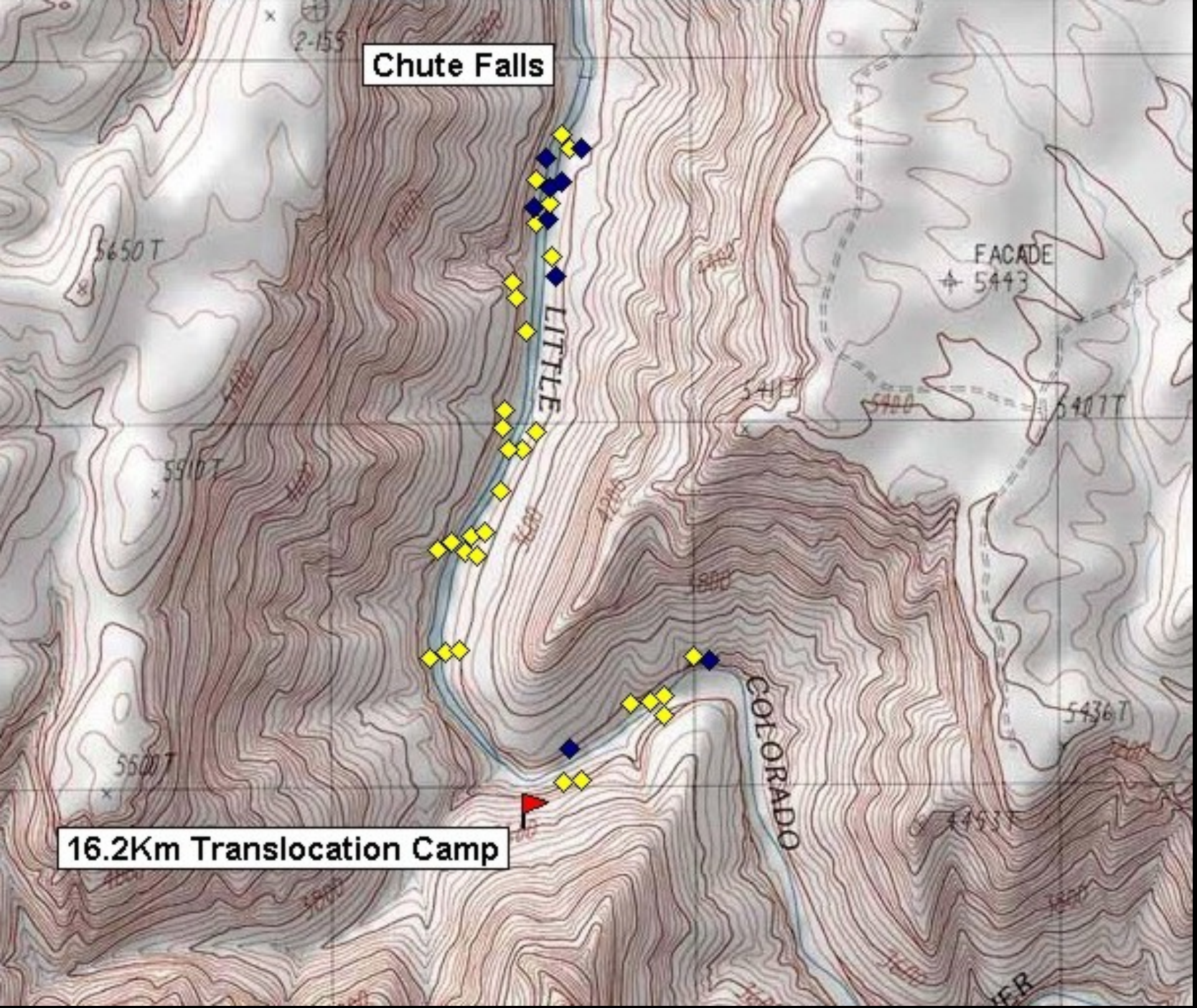
Translocation: August 2004

- Collected 50-100mm HBC
- Implanted with pink VIE

Monitoring: November 2003

- Sample with hoop and gill nets
- 42 captured HBC were PIT tagged and released

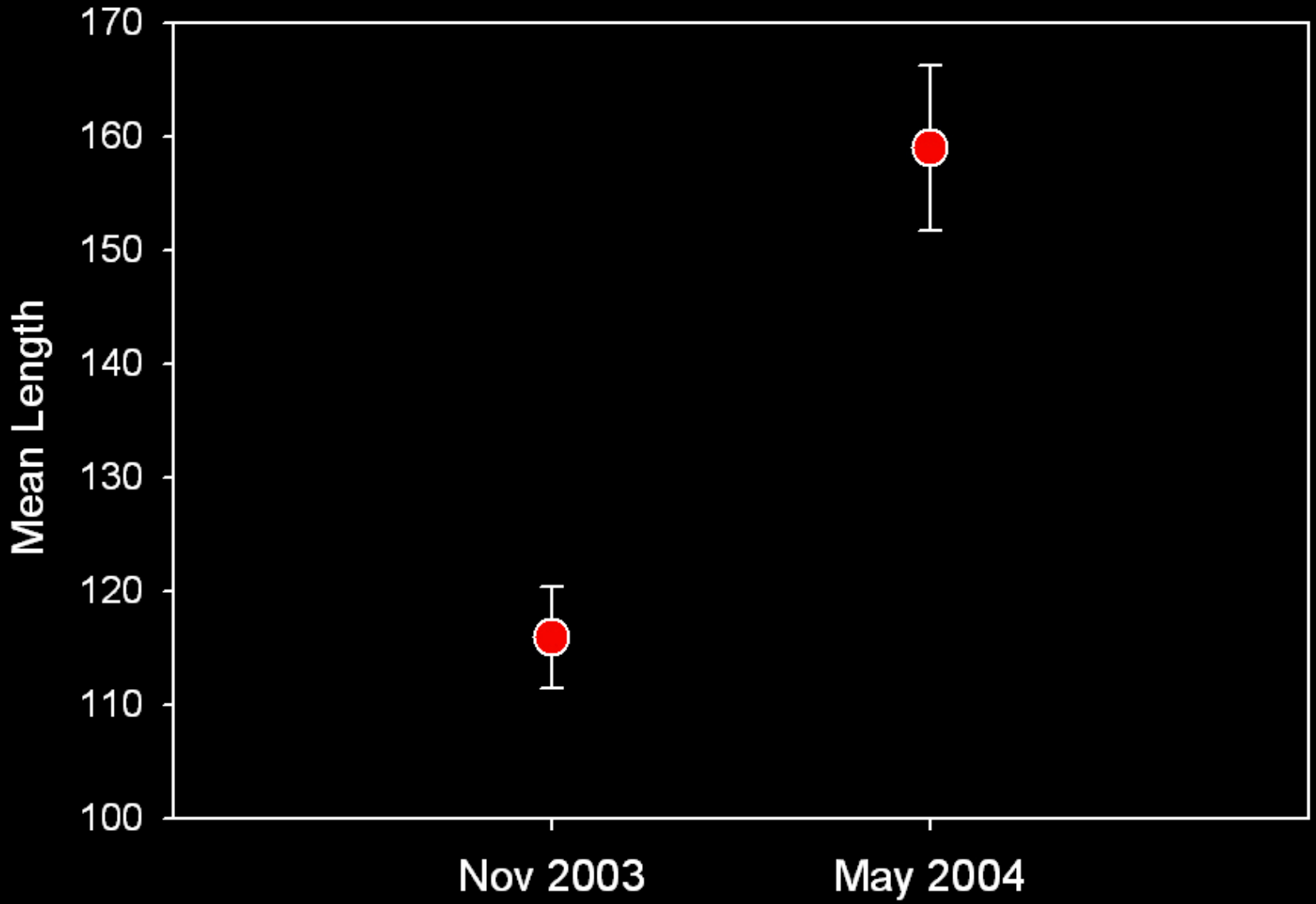

Growth of Translocated HBC in 2003
140
120
100
80
60
40
Mean Length (±SE)
A
B
C
August 1, 2003
October 31, 2003
Released
With VIE
No VIE


Chute Falls
LITTLE
COLORADO
FACADE
5443
16.2Km Translocation Camp
No VIE
VIE

Monitoring: May 2004

- Sample with hoop and gill nets
- 35 HBC were captured
  - 18 recaptures were from November 2003 monitoring
  - 17 were new captures, most without VIE

Growth of PIT tagged HBC above Chute Falls



Conclusions

- Fish community above Chute Falls similar to downstream
- HBC can remain and survive above Chute Falls
- HBC have good growth rates above Chute Falls despite CO_2 levels
    - Tagged: 34-84mm in 90 days
    - Untagged: 55-102mm in 90 days

- May be approaching spawning size next spring!
- VIE tags may be lost prematurely due to high growth rates

What's next….

- Fall monitoring in November 2004
- Another translocation of 300 fish in July 2005?
- Expand scope to include genetics and foodbase studies using isotopes