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

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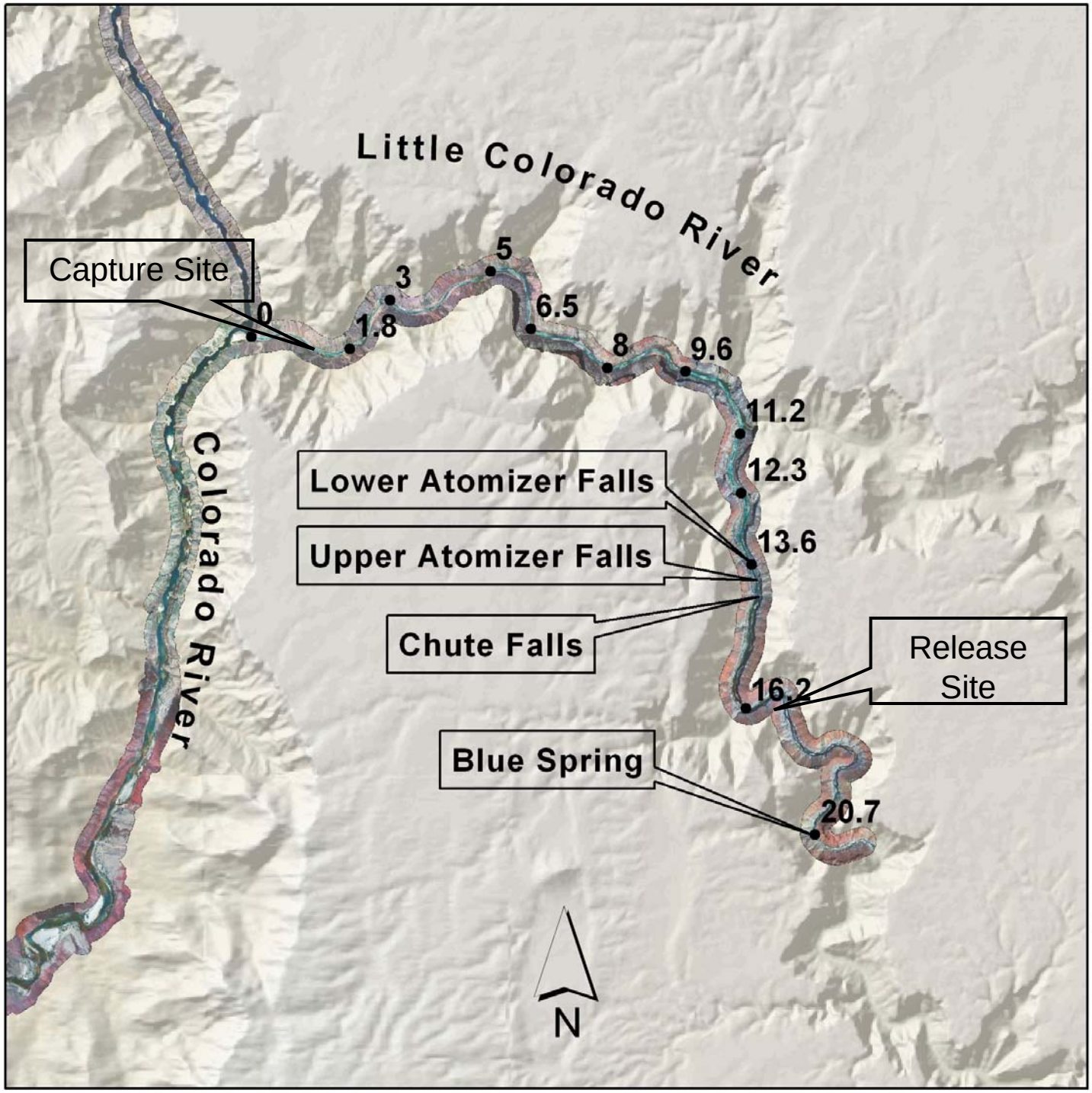
# Chute Falls Project

- December 2002 Biological Opinion “to increase survival from floods, reduce predation…”
    - **Up to 300 fish**
- November 2004 Biological Opinion “increase survival from high mortality area to good nursery area”
    - **Up to 600 fish**


# 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
- Lack of imprinting


Little Colorado River
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
N

# 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
- 5) Develop population estimates for fish above Chute Falls


DESTRON @ FEARING

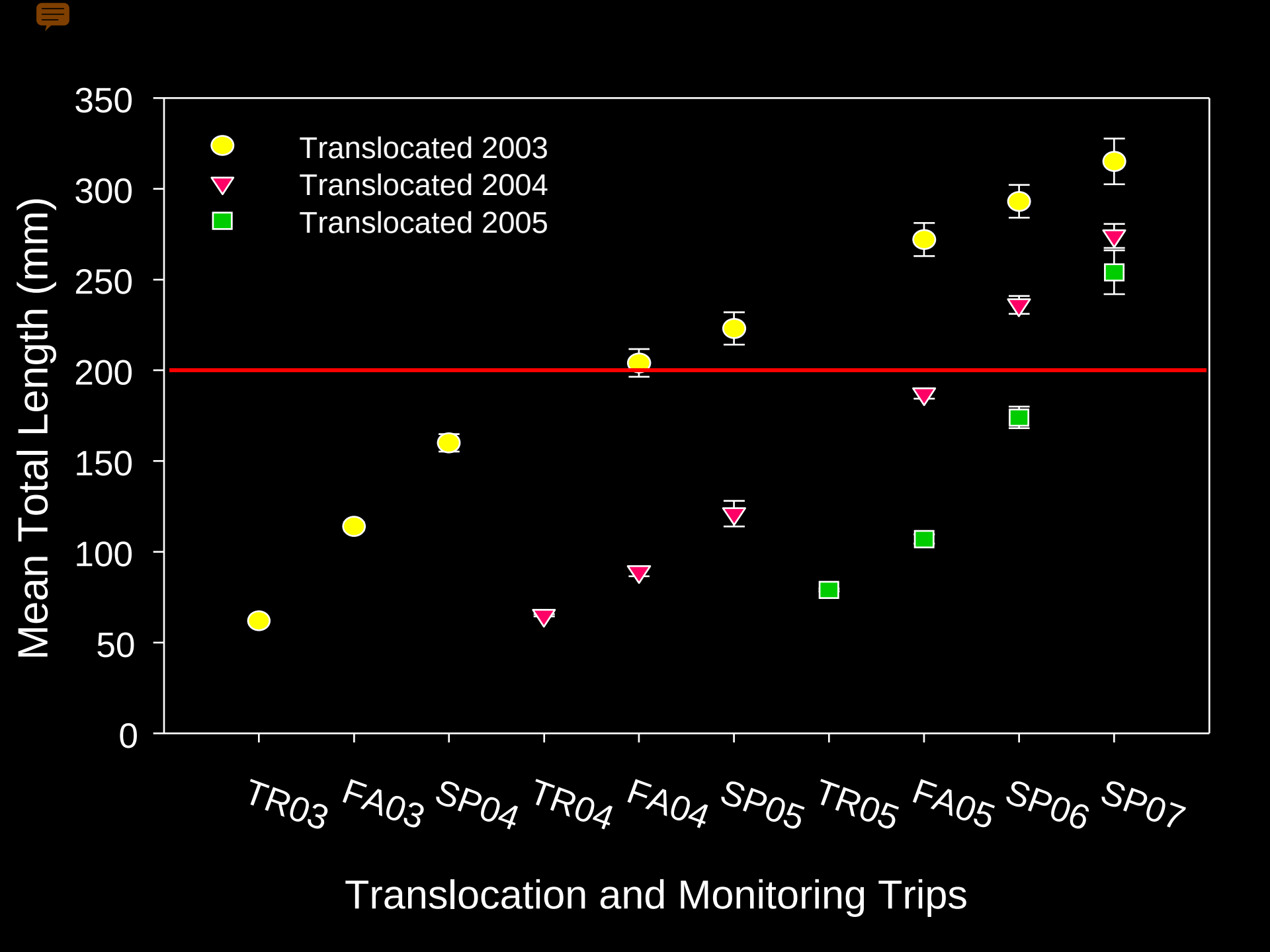
# Translocations

- August 2003, 2004, 2005
- Collect 50-100mm HBC near confluence
- Implanted with visible elastomer tags
- Released 1148 HBC above Chute Falls

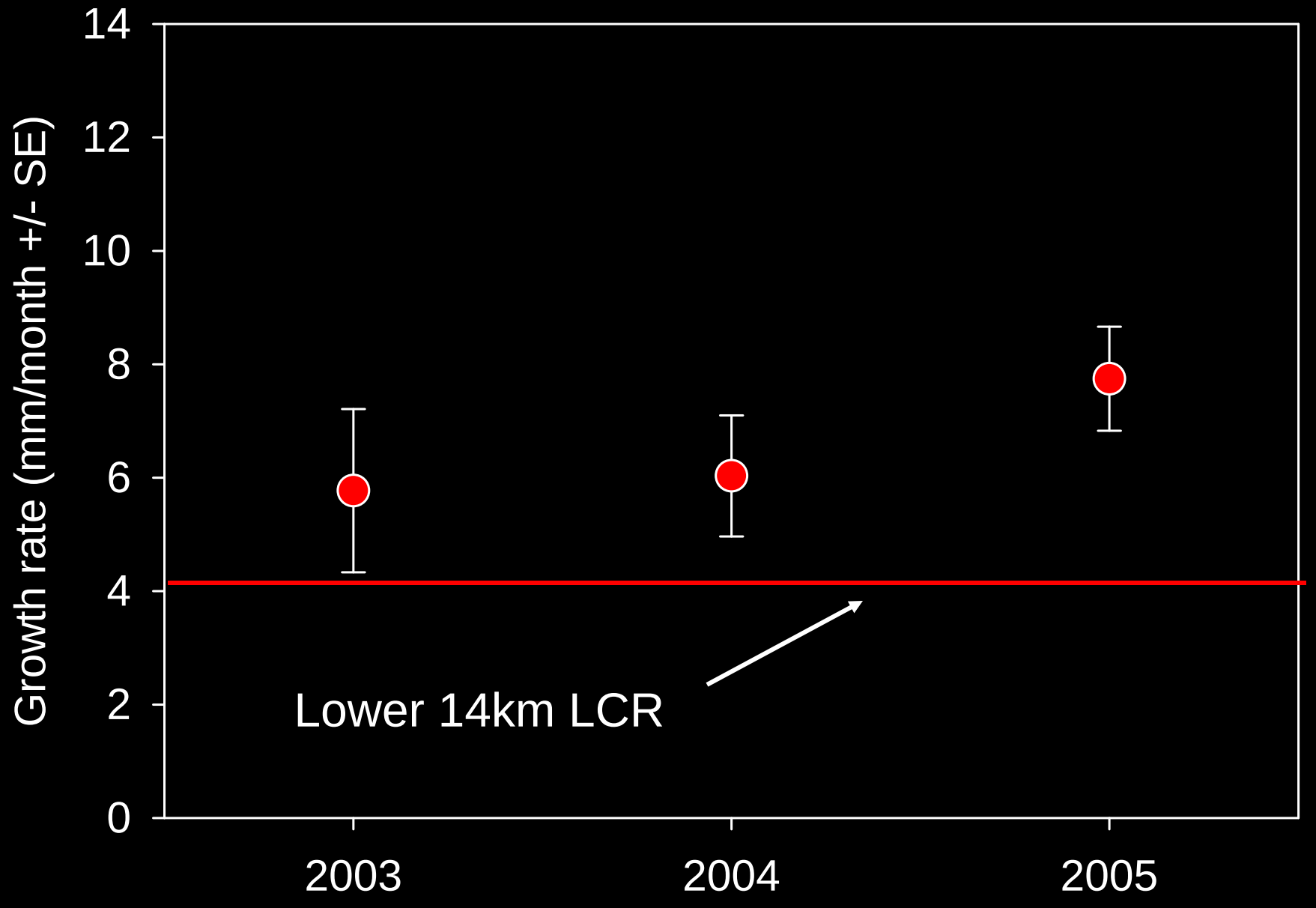

# The 2003-05 findings were insightful…

- Translocated humpback chub were growing extremely fast
- Many were becoming reproductive adults
- Many “unknown origin” chub were caught by fall 2005!
- Could have been previously translocated, progeny thereof, and/or upriver migrants

350 mm female
at 16.2 km

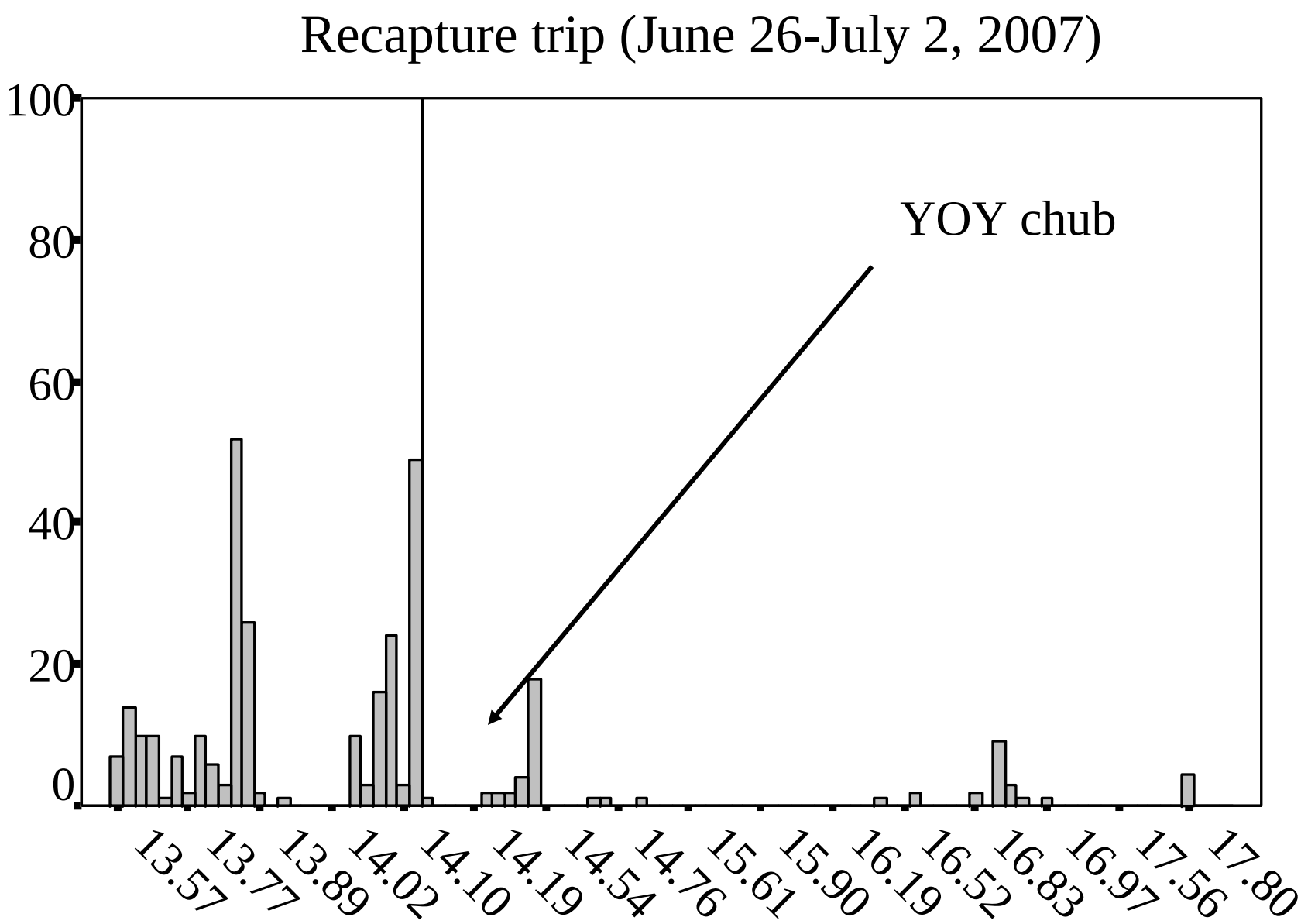

Translocated 2003
Translocated 2004
Translocated 2005
Mean Total Length (mm)
350
300
250
200
150
100
50
0
TR03
FA03
SP04
TR04
FA04
SP05
TR05
FA05
SP06
SP07
Translocation and Monitoring Trips

# Growth Rates for Translocated HBC

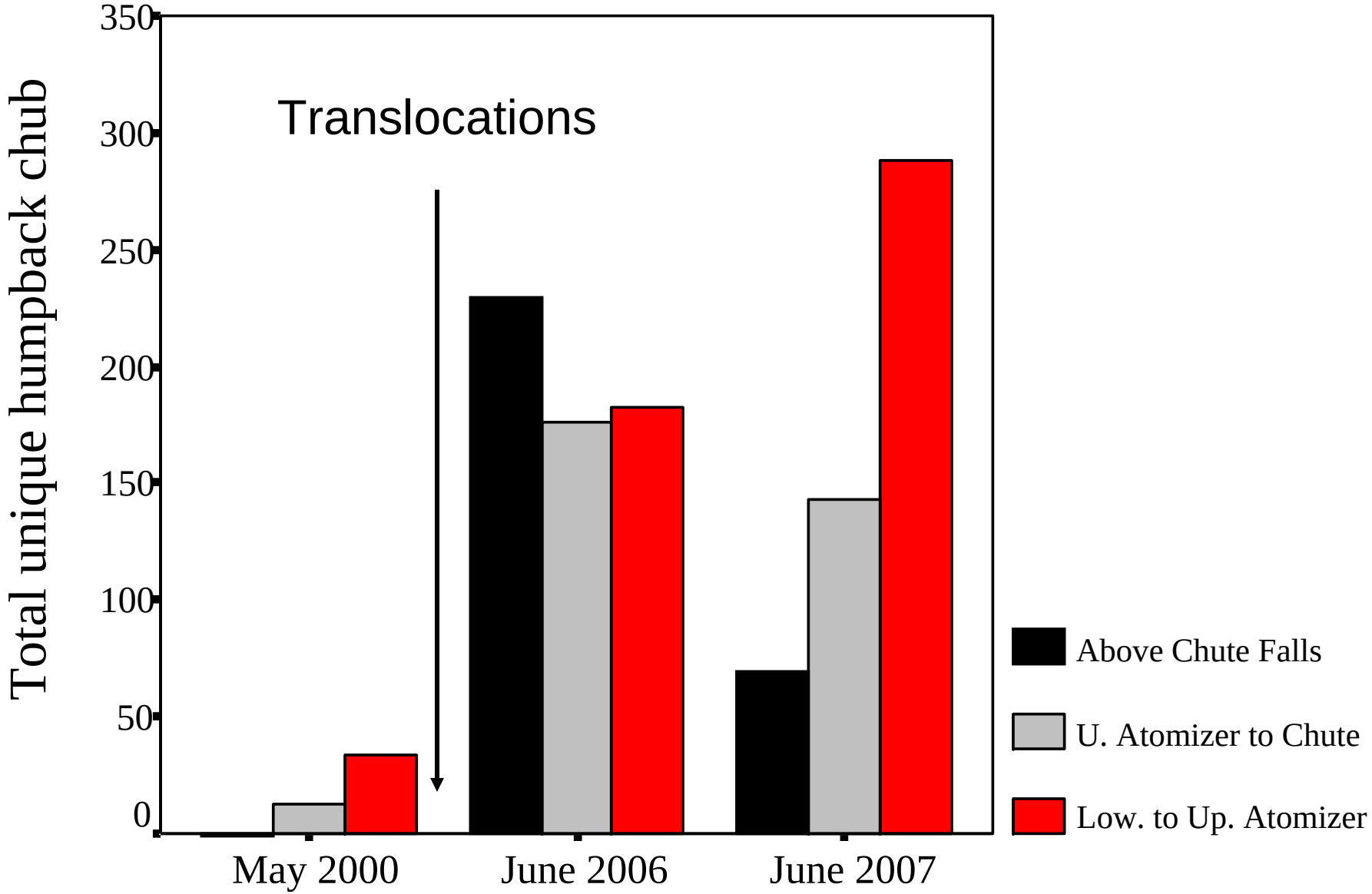


# 2006-2007 Captures

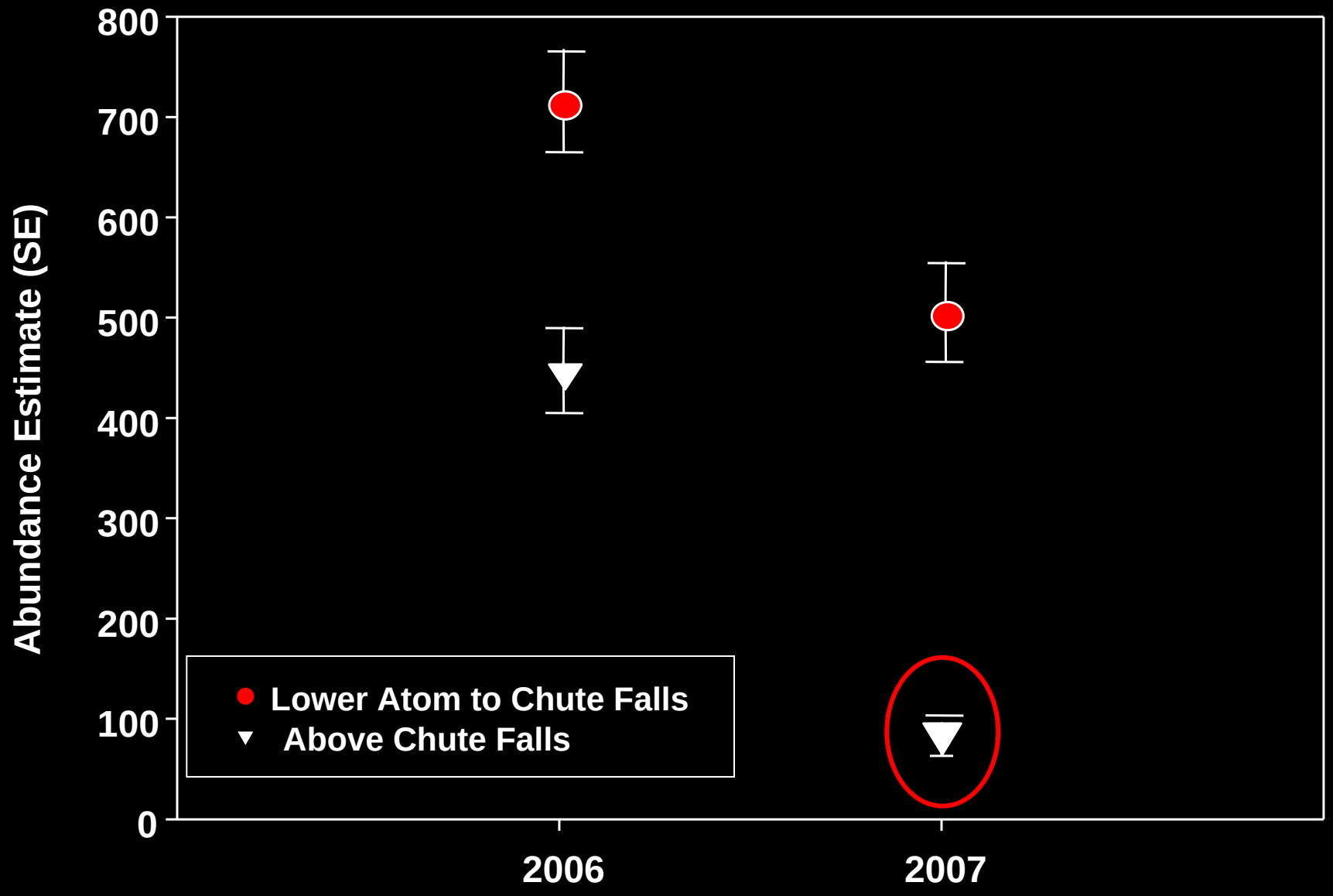
- Numerous adult humpback chub that were freely releasing gametes
- Three non-translocated YOY progeny
- Four adult humpback chub moved above Chute Falls that had originally been captured, tagged, and released below Chute Falls
- Fish above Chute Falls, appear to be moving downstream


Recapture trip (June 26-July 2, 2007)
100
80
60
40
20
0
YOY chub
13.57
13.77
13.89
14.02
14.10
14.19
14.54
14.76
15.61
15.90
16.19
16.52
16.83
16.97
17.56
17.80

# Humpback chub are migrating downriver



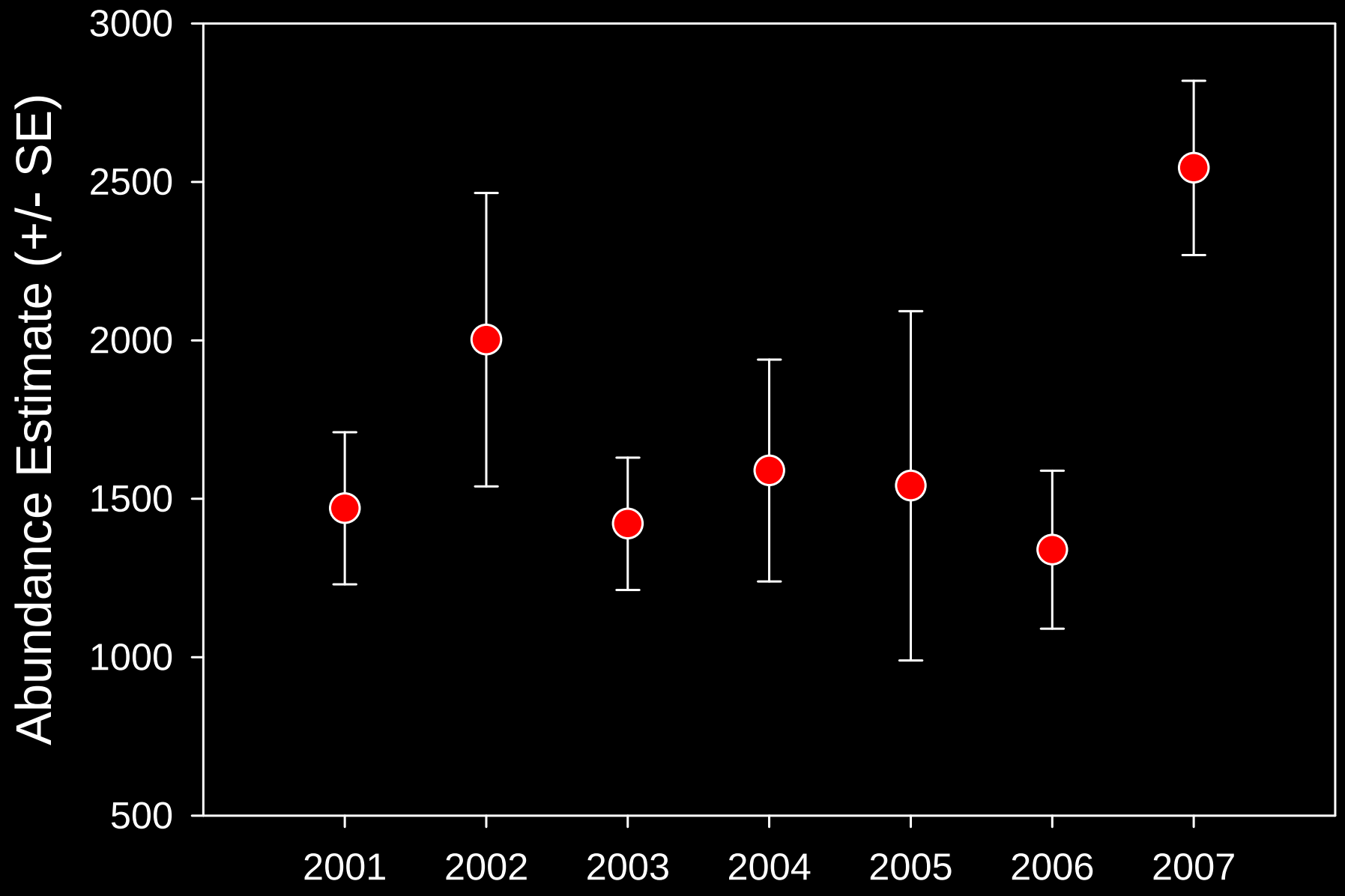
# Population Estimates



# Benefits of Chute Falls Project

- Increased abundance of HBC
- 2yr old fish >200mm
- Reduced mortality of YOY chubs
- Increased historical range by 4km
- Better understanding of life history

# Lower LCR Population Estimates for fish < 200mm



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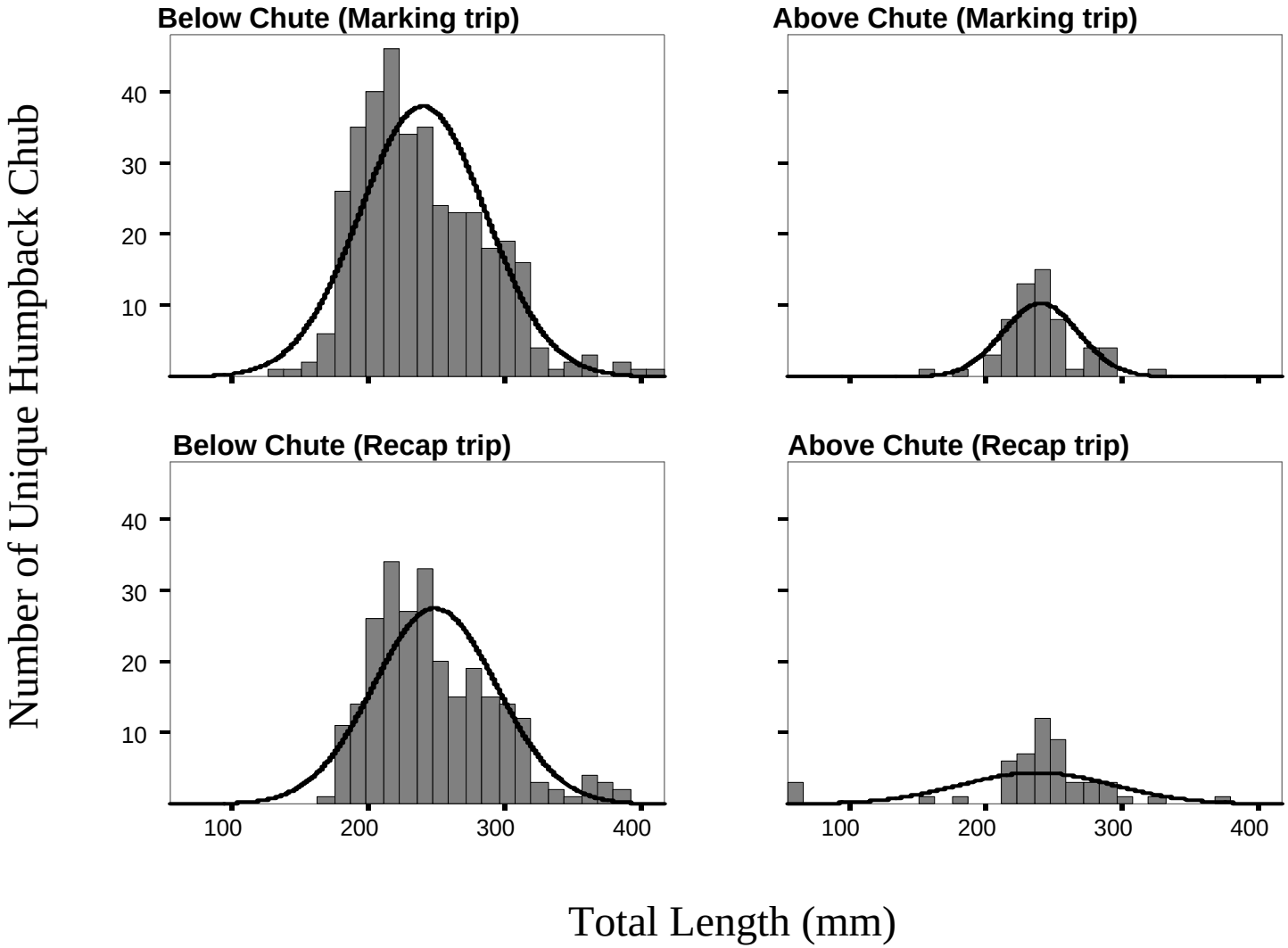
# Why we propose translocations in 2008 and 2009

- Conservation Measure for 2008 BO
- Increase survivorship of small fish..offset losses in the mainstem
- Chute Falls fish have slightly less genetic diversity than Willow Beach fish
- Fewer fish above Chute Falls, geomorphology may limit numbers moving upstream
- Draft Genetics Management Plan Recommendations:
  - » Provide for an influx of fish to span a generation (long lived fish)
  - » Establish a reasonable approximation of a natural population
  - » Normal size, age distribution and gene flow from donor source
  - » Additional 300 YOY should be moved in 2008

# 2007


Below Chute (Marking trip)
Above Chute (Marking trip)
Below Chute (Recap trip)
Above Chute (Recap trip)
Number of Unique Humpback Chub
Total Length (mm)
10
20
30
40
100
200
300
400

# The Future

- Maintain Chute Falls population until:
  - Mainstem reproduction increases and replaces Chute Falls contribution
  - Other tributaries and translocations are completed
  - Spawning and rearing occurs in other parts of the Canyon outside of the LCR
- Continuing monitoring above Lower Atomizer:
  - In conjunction with monitoring that occurs in Lower 14km of the LCR
  - Until number of fish above falls is no longer important from a recovery and conservation perspective