



Humpback Chub in the Little Colorado River Monitoring of Juveniles, Sub-Adults, and Adults and Translocations

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Objectives

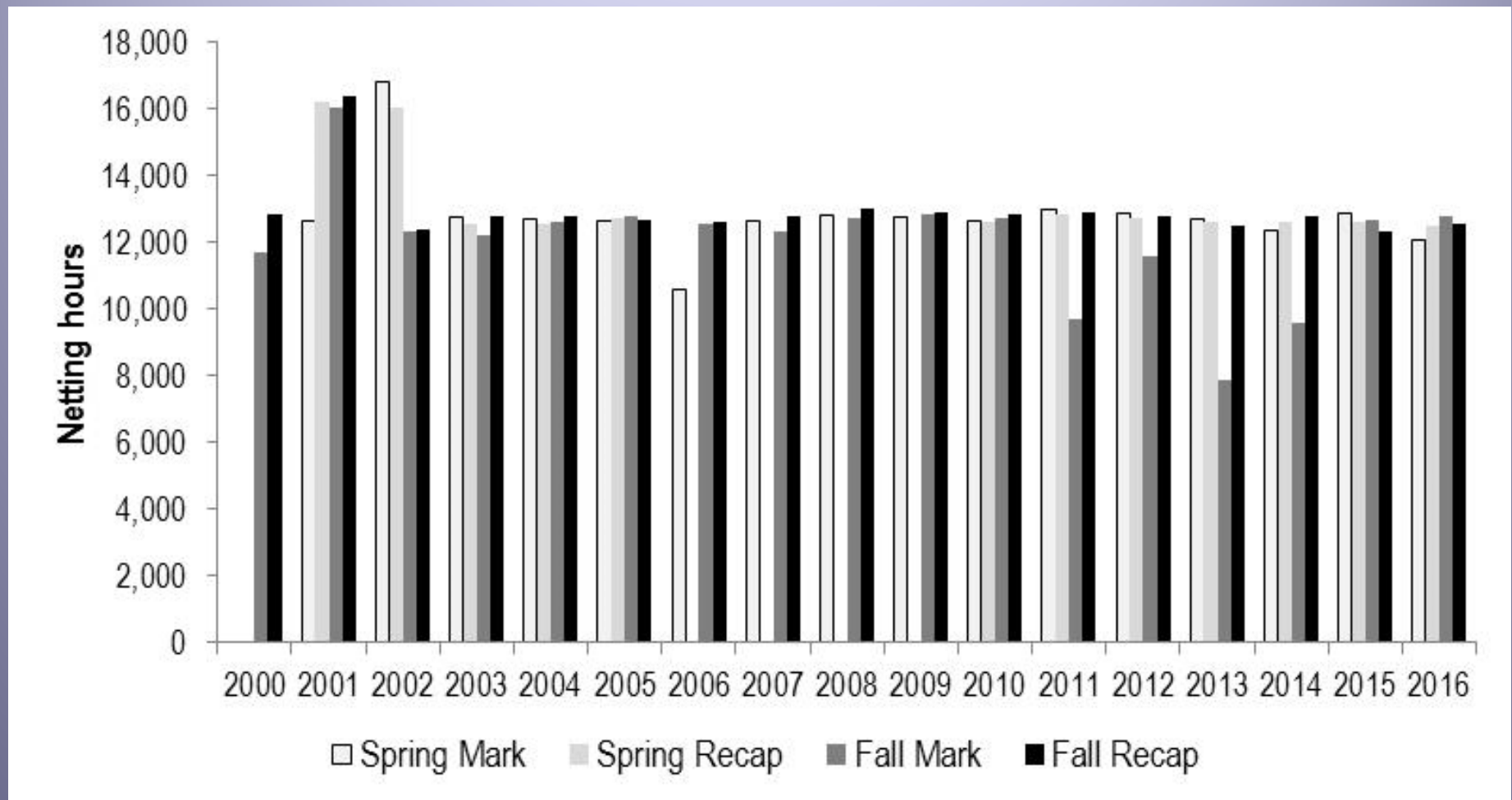
- 1) Address Project 7: Population Ecology of Humpback Chub in and around the Little Colorado River
- Conduct long term monitoring of Humpback Chub (*Gila cypha*, HBC) and other fishes in the lower 13.56 km of the Little Colorado River (LCR).
- 2) Address Project Element 8.2. Translocation and monitoring of Humpback Chub above Chute Falls in the Little Colorado River
- Annually translocate juvenile Humpback Chub to above Chute Falls and monitor.

Little Colorado River Humpback Chub hoop net monitoring

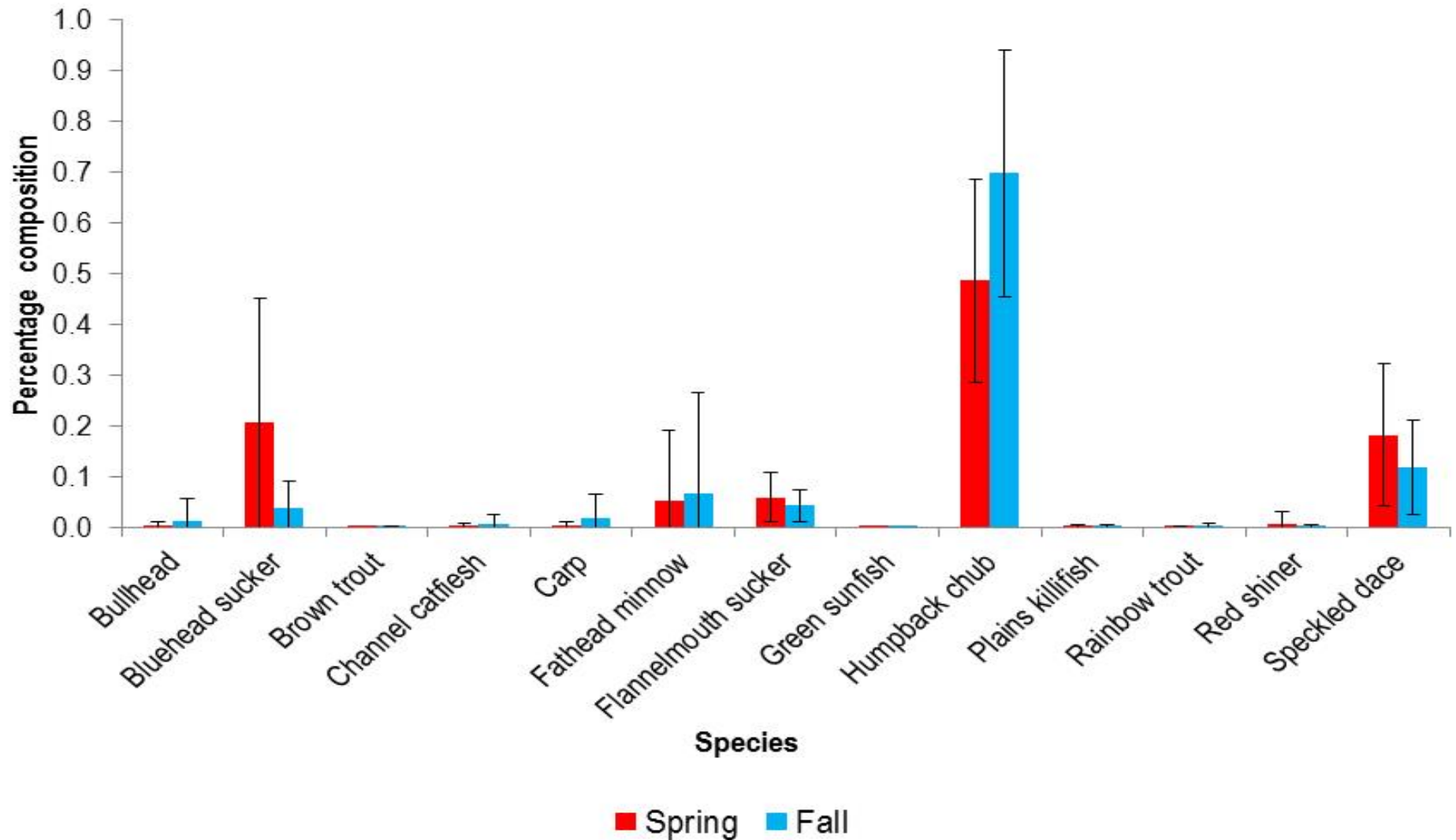


Effort

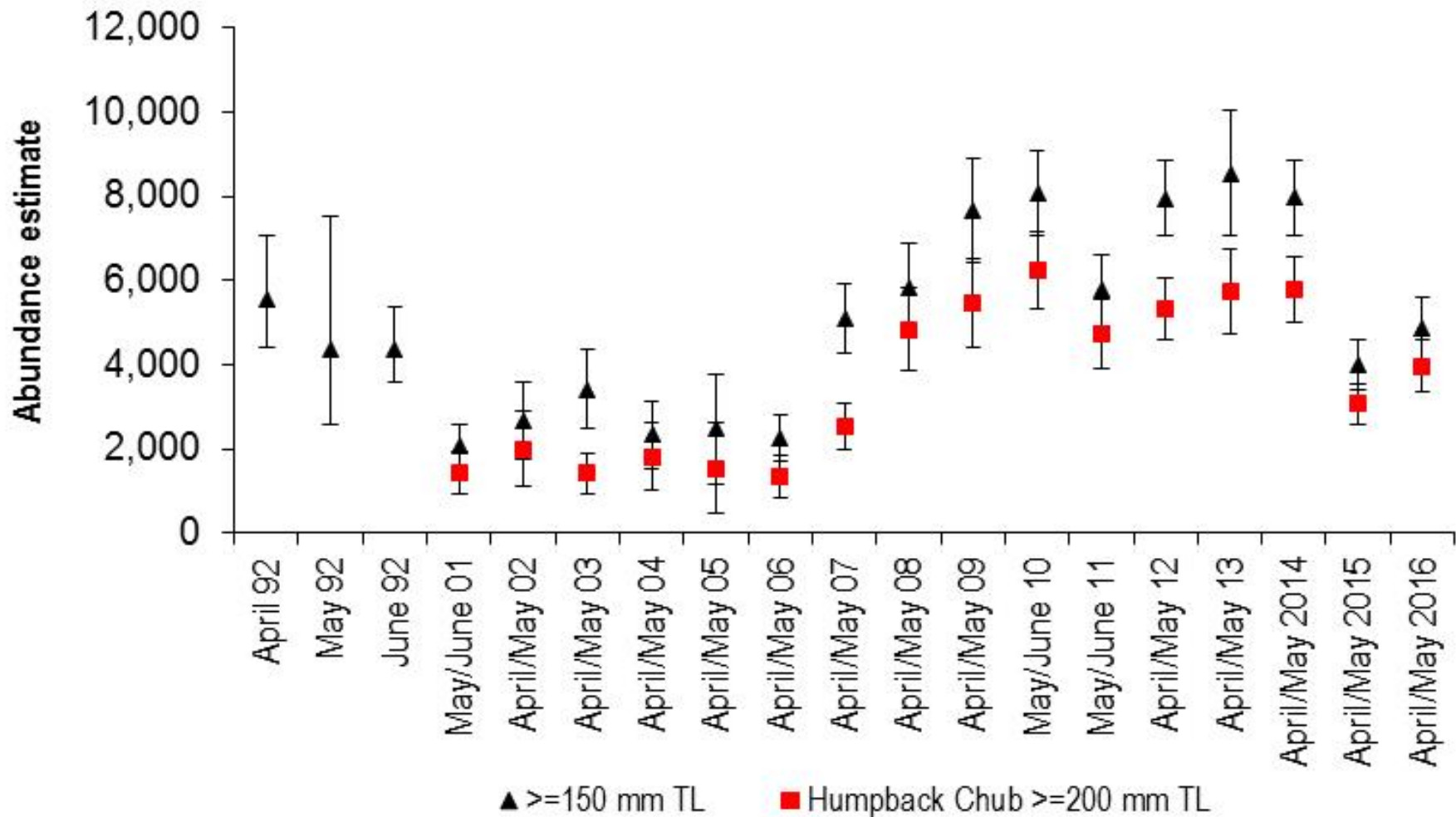
Typical trip = ~13.8 net sites/km minimum
~540 net nights/trip or ~12,500 net hours/trip



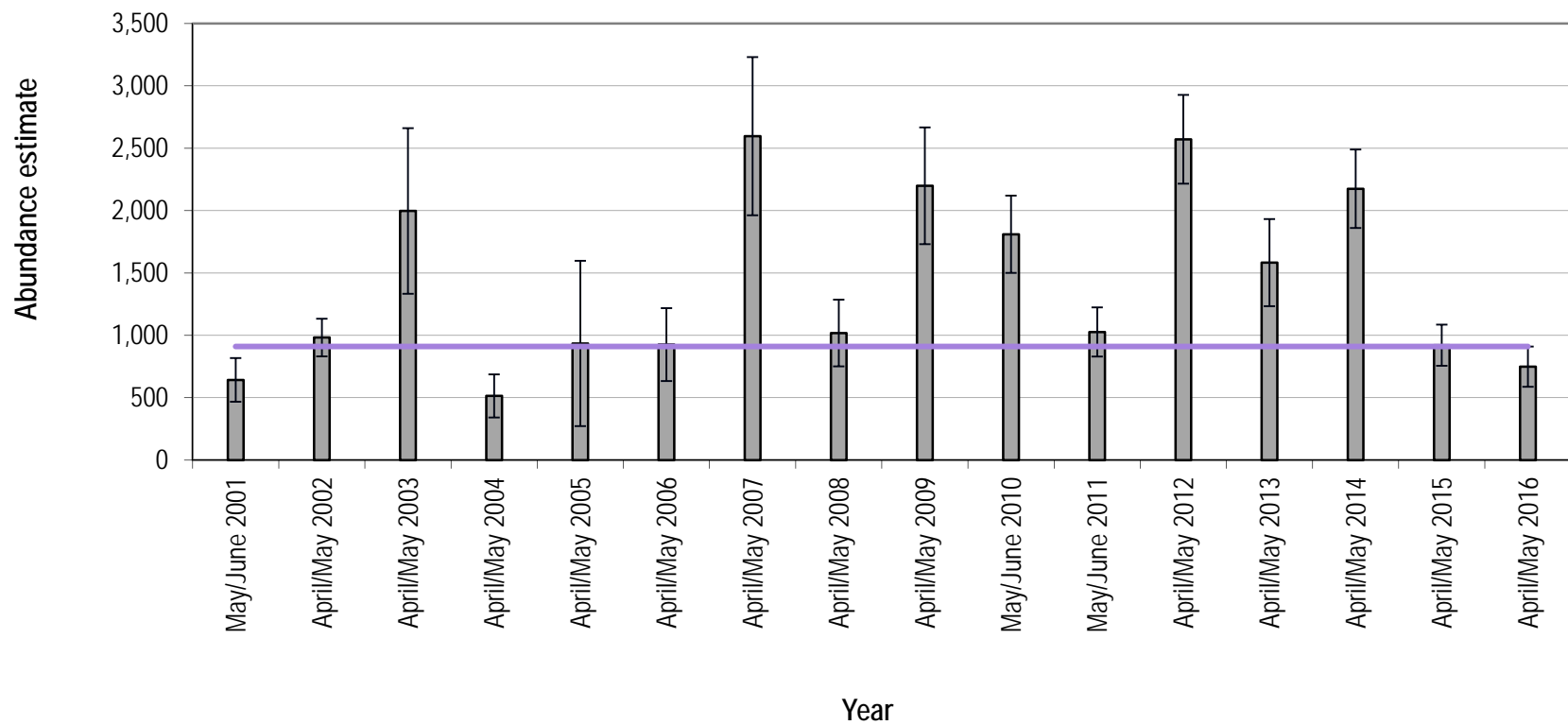
Observed species composition in LCR using hoop nets (2000-2016)



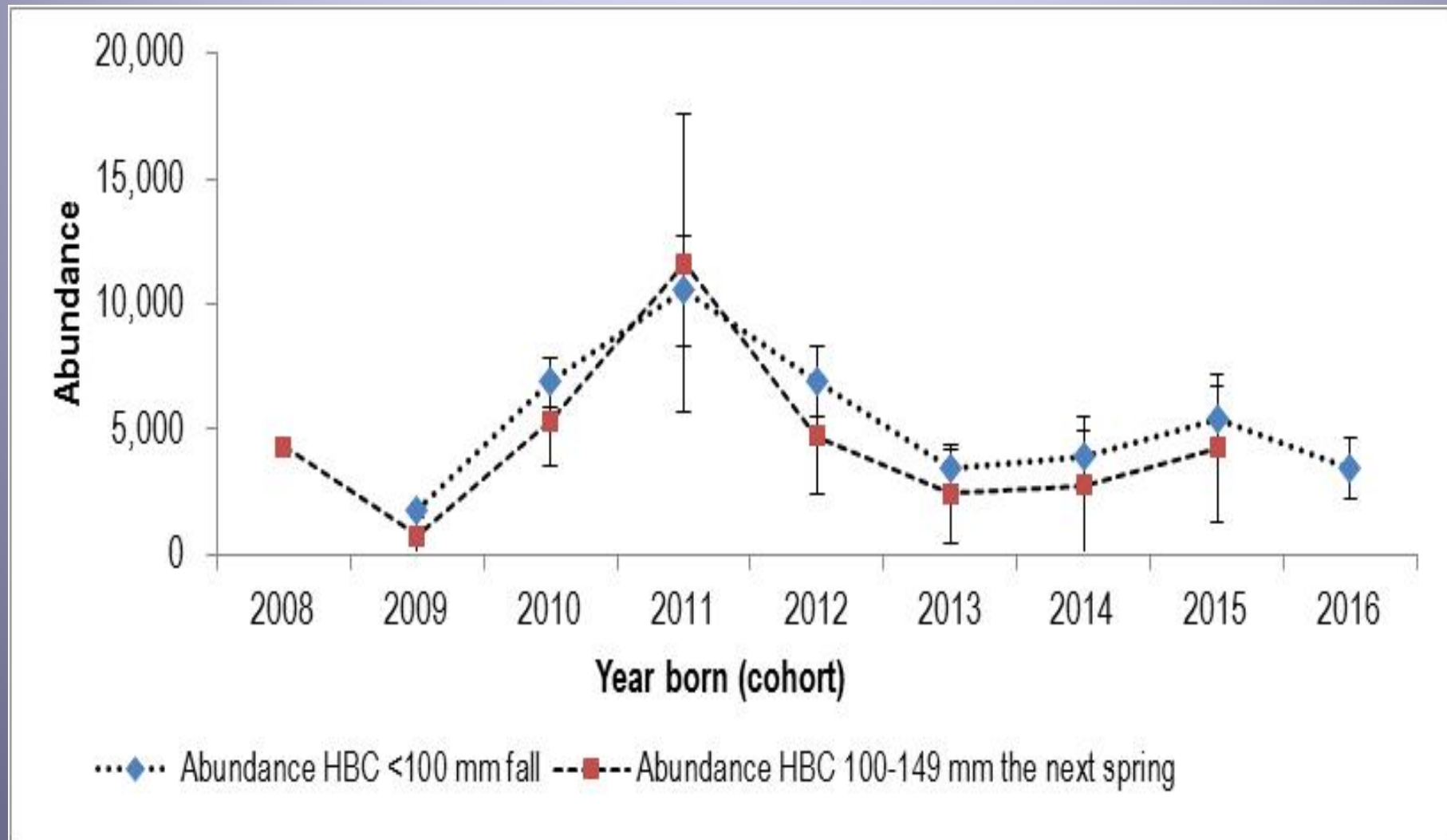
Annual spring abundances of Humpback Chub ≥ 150 mm and ≥ 200 mm in lower 13.6 km of LCR



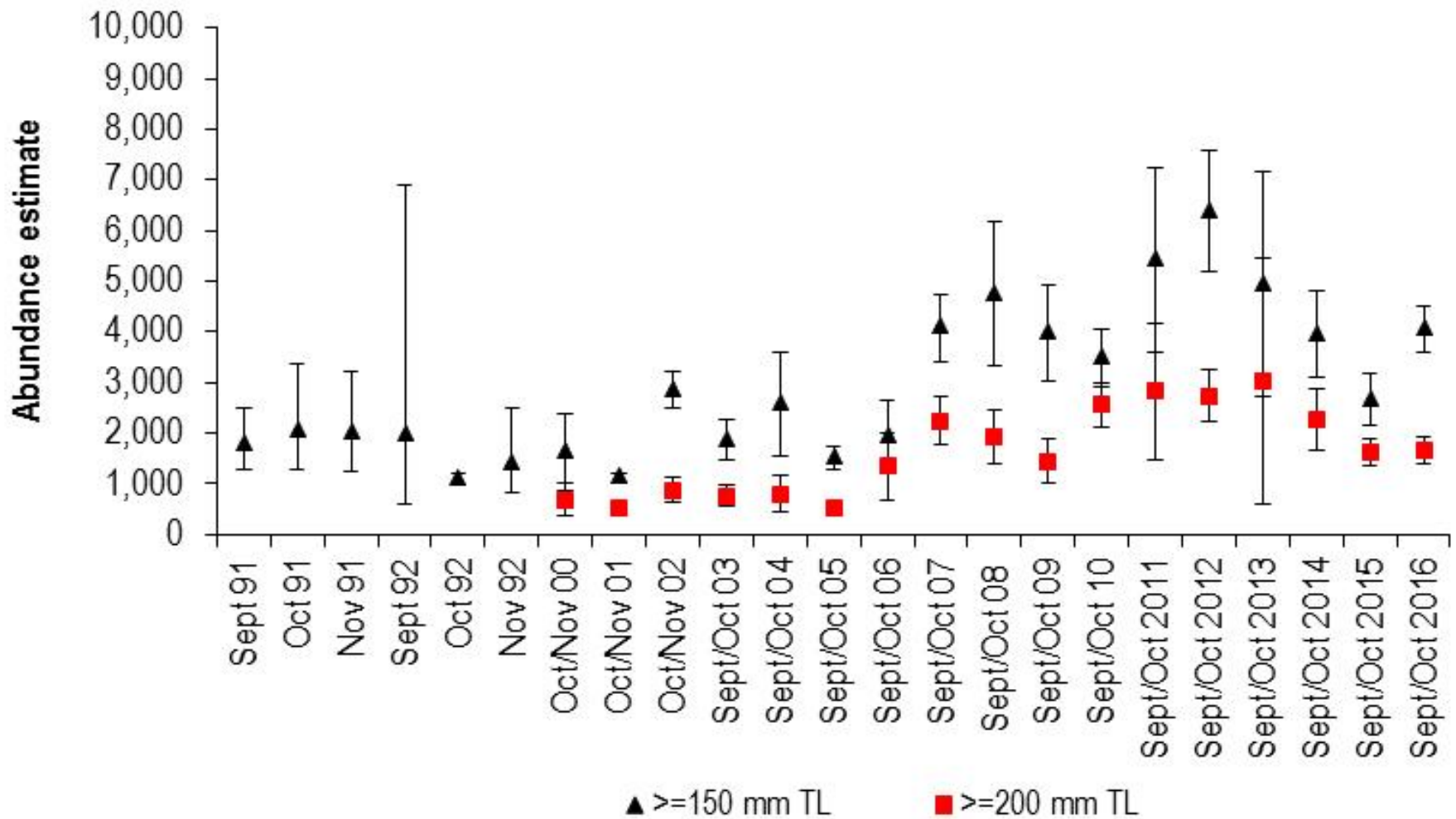
Annual spring abundances of Humpback Chub 150-199 mm in lower 13.6 km of LCR



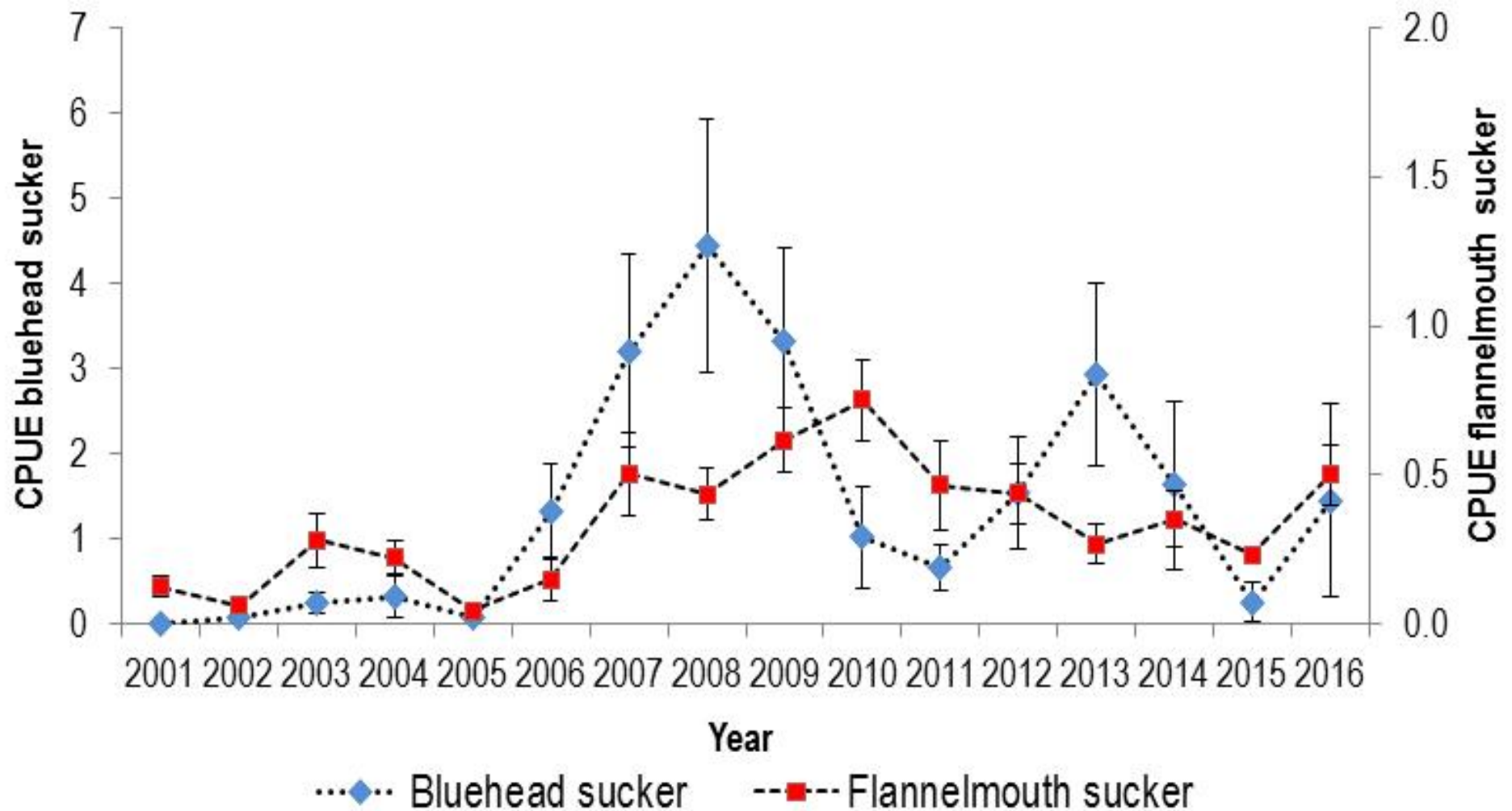
Annual fall age 0 abundance (blue) and the following spring age 1 abundance (red)



Annual fall abundances of Humpback Chub ≥ 150 mm and ≥ 200 mm in lower 13.6 km of LCR



Spring relative abundances (CPUEs) of Bluehead Sucker (blue) and Flannelmouth Sucker (red)



Summary

- 2015 and 2016 saw a significant apparent decline in the number of sub-adult and adult Humpback Chub in the Little Colorado River.
- This apparent decline may be partially stemming from lower production of age 0 chub in 2014 and 2015.
- There is also evidence that a higher number of sub-adult and adult chub have been inhabiting the mainstem outside of the LCR for the past two years.

Summary

- These monitoring efforts provide an immediate (annual) indication of the status of all size classes of Humpback Chub in the Little Colorado River.
- Further, data collected from these monitoring efforts are used to generate open population models (ASMR, multi-state), without which these other models would likely not be possible.

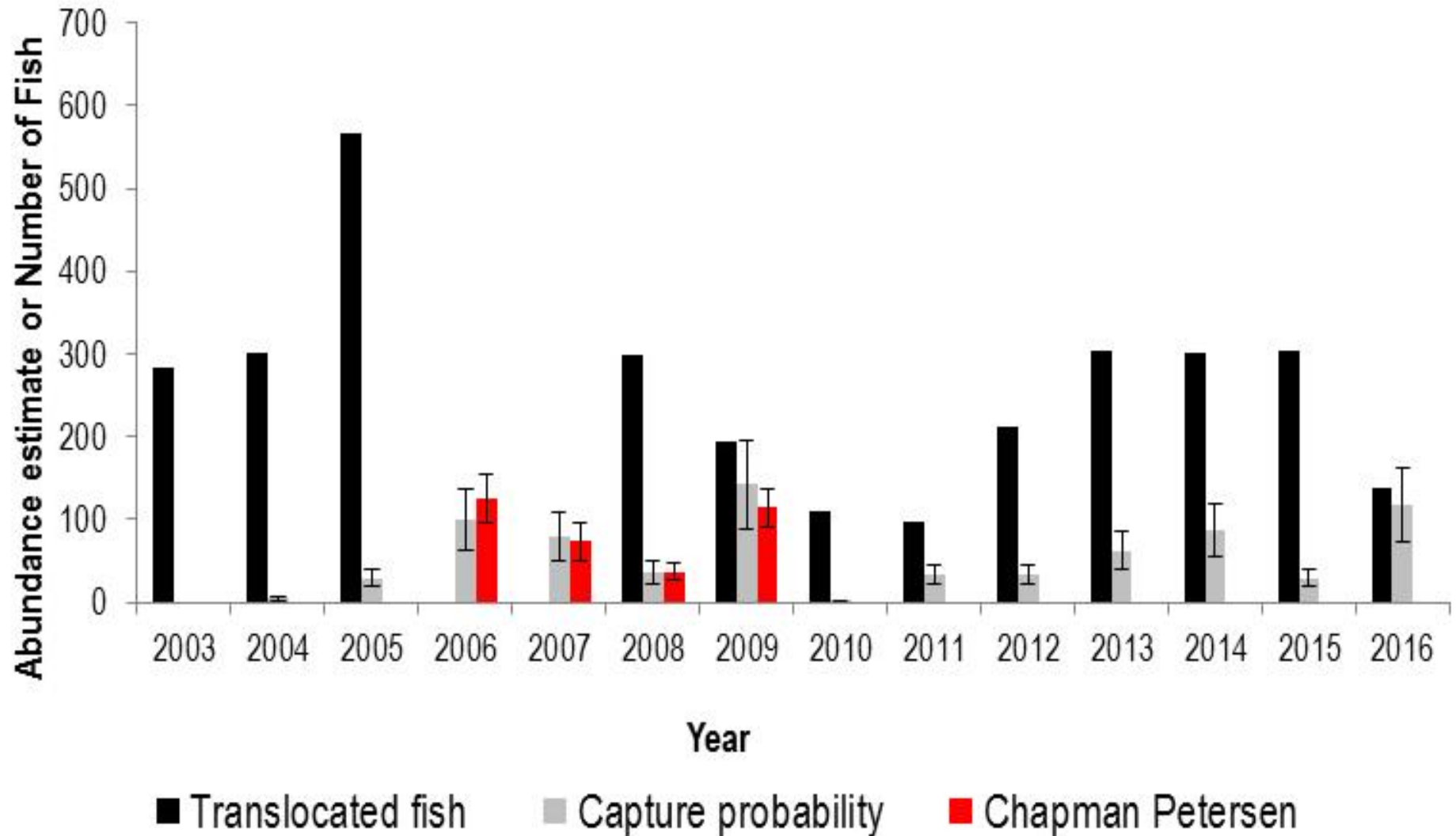
Translocations



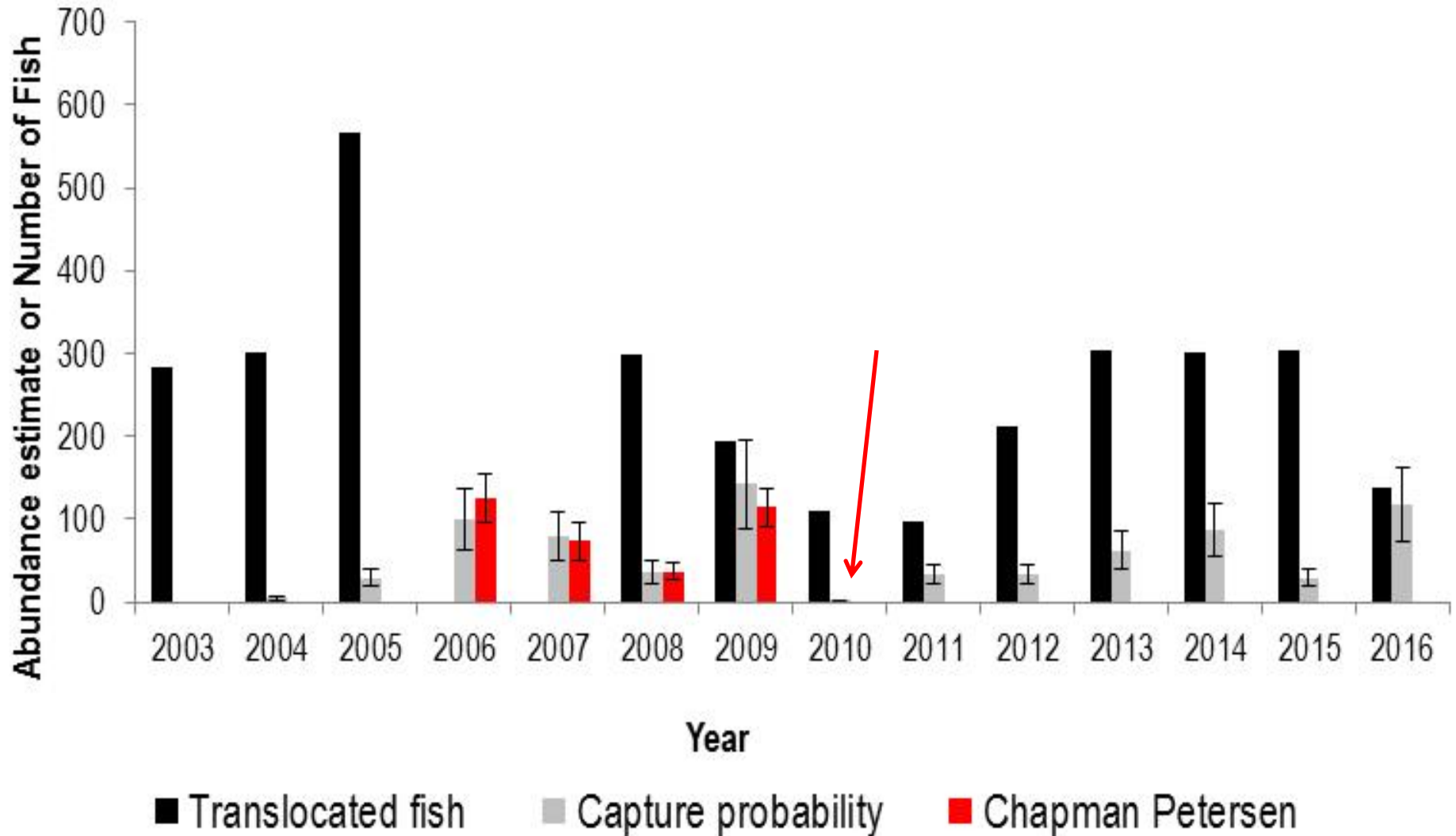
Numbers and sizes of Humpback Chub collected from the Little Colorado River for translocations (2003-2016)

| Date | Chute Falls * | Size (mm) | SNARRC | Shinumo | Havasu | Size (mm) | Total |
|----------|---------------|-----------|--------|---------|--------|-----------|-------|
| 8/1/03 | 283 | 50-100 | | | | | 283 |
| 7/30/04 | 299 | 50-100 | | | | | 299 |
| 7/29/05 | 567 | 50-100 | | | | | 567 |
| 7/22/08 | 299 | ~80-130 | | 207 | | <80 | 506 |
| 10/13/08 | | | 300 | 100 | | <130 | 400 |
| 7/24/09 | 194 | ~80-130 | 205 | 83 | | <80 | 482 |
| 10/10/09 | | | | 238 | | <130 | 238 |
| 7/16/10 | 108 | ~80-130 | 175 | | | <80 | 283 |
| 11/5/10 | | | | 300 | 300 | <80 | 600 |
| 11/9/11 | 96 | ~80-130 | 200 | | 300 | <80 | 596 |
| 7/12/12 | 212 | ~80-130 | 202 | 200 | 300 | <80 | 914 |
| 5/24/13 | | | | 73 | | <30 | 73 |
| 7/11/13 | | | | 99 | | <80 | 99 |
| 11/7/13 | 303 | ~80-130 | | 11 | 300 | <130 | 614 |
| 5/1/14 | | | | | 660 | <30 | 660 |
| 10/31/14 | 305 | 65-137 | | | | <130 | 305 |
| 5/28/15 | | | | | 315 | <30 | 315 |
| 11/1/15 | 303 | | | | | | 303 |
| 10/27/16 | 137 | 58-146 | | | | | 137 |
| Totals | 3,106 | | 1,082 | 1,311 | 2,175 | | 7,674 |

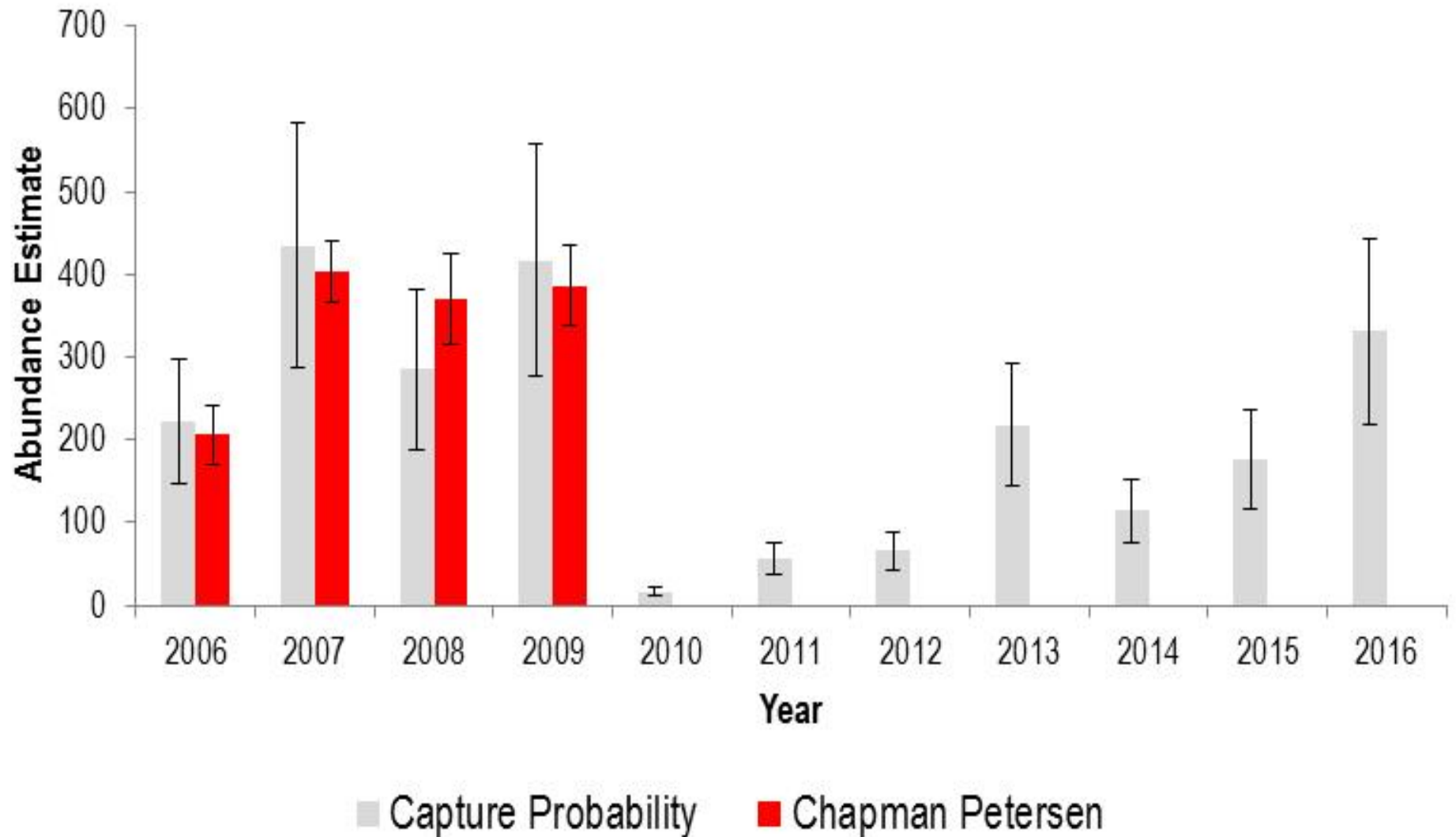
Above Chute Falls - Number of juvenile Humpback Chub translocated (black) and adult abundances (red & grey)



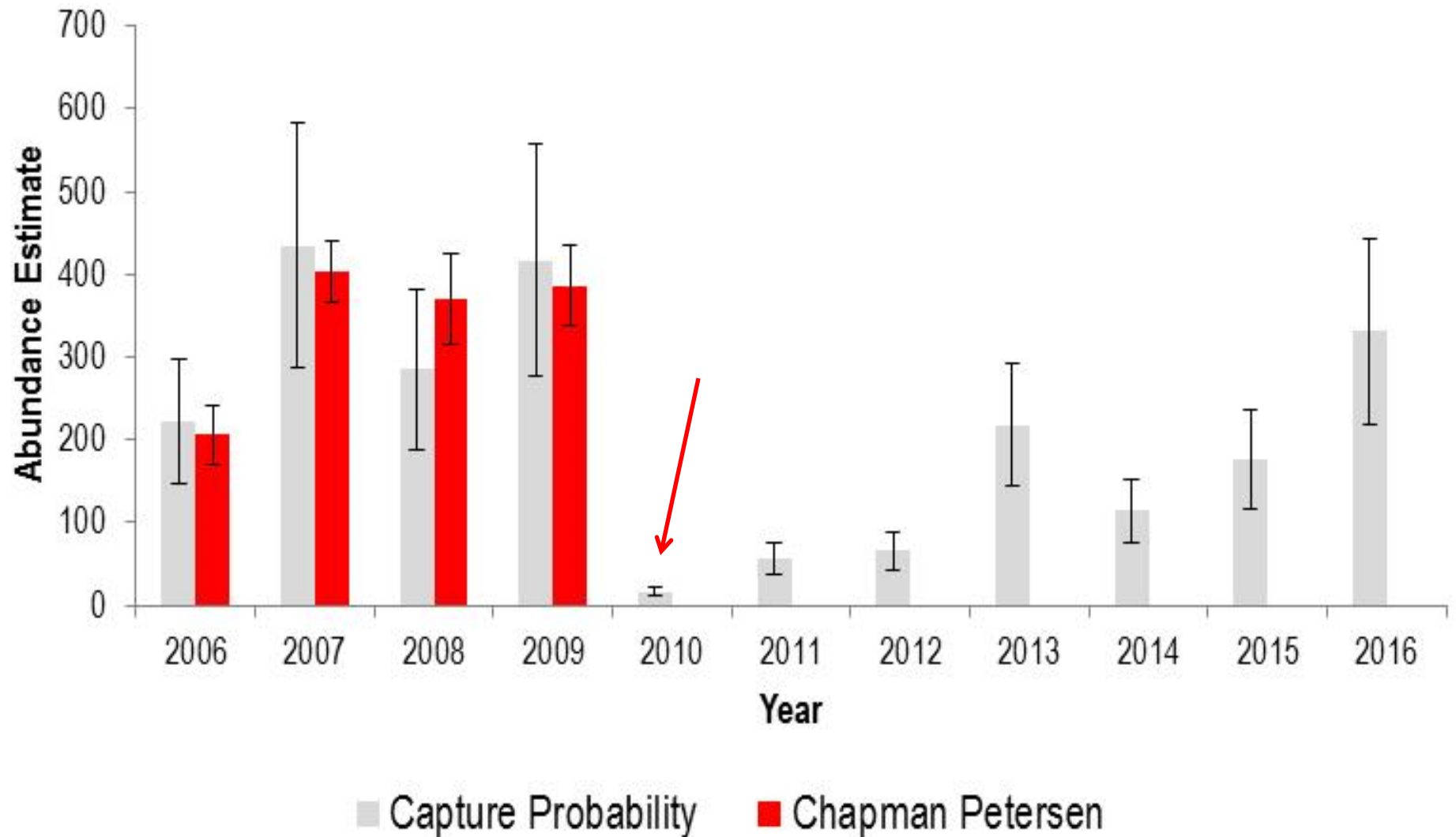
Above Chute Falls - Number of juvenile Humpback Chub translocated (black) and adult abundances (red & grey)



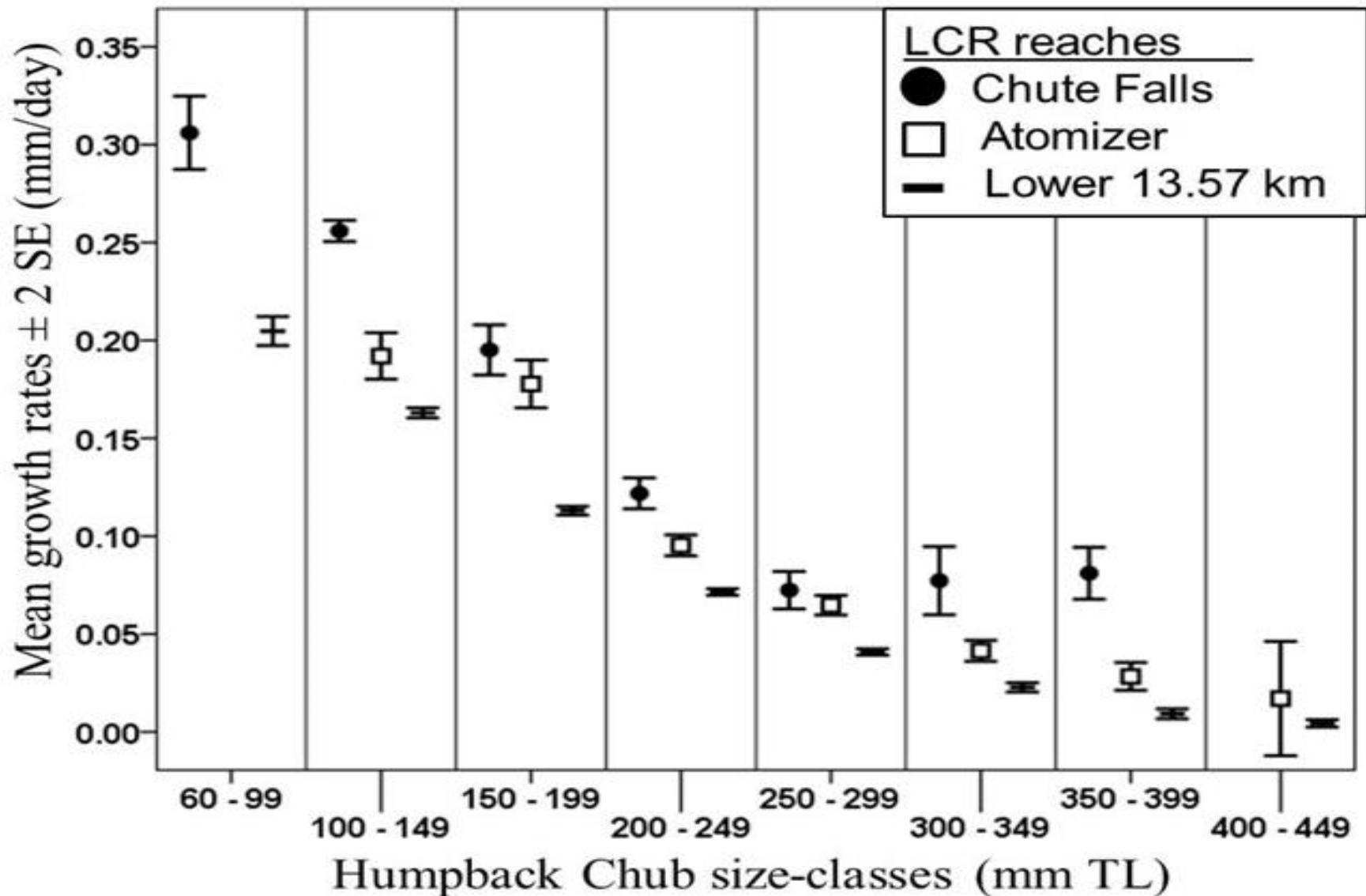
Below Chute Falls (Atomizer reach) - Adult Humpback Chub abundances (red & grey)



Below Chute Falls (Atomizer reach) - Adult Humpback Chub abundances (red & grey)

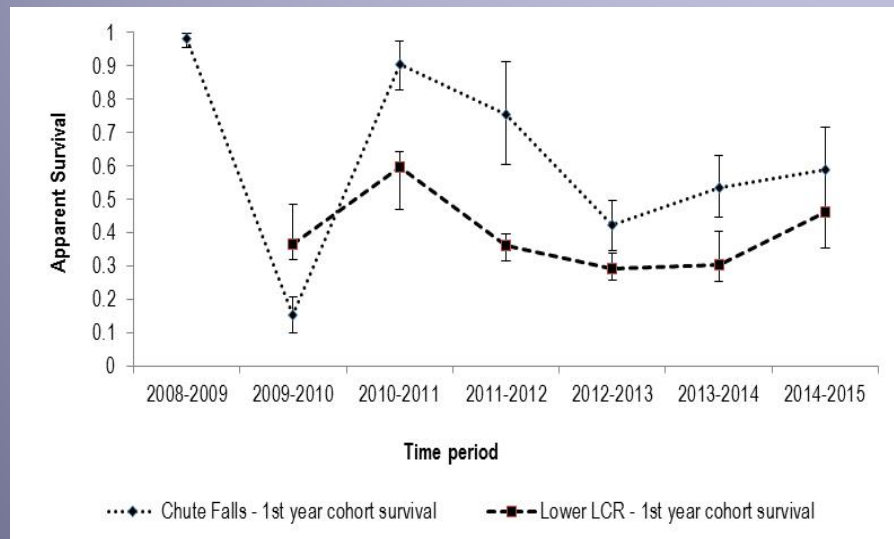


Growth of Humpback Chub from three Little Colorado River reaches

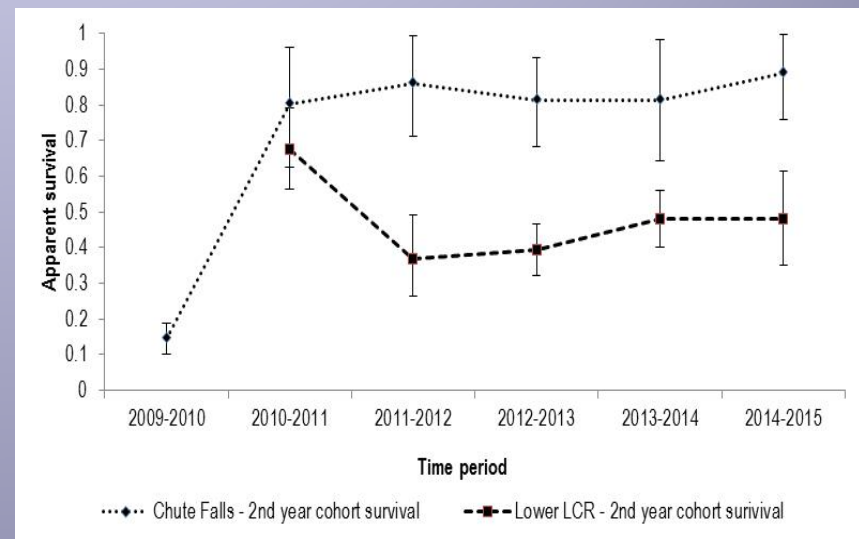


Apparent survival of translocated age 0 chub vs those not translocated (provisional)

Survival of translocation cohorts during first year

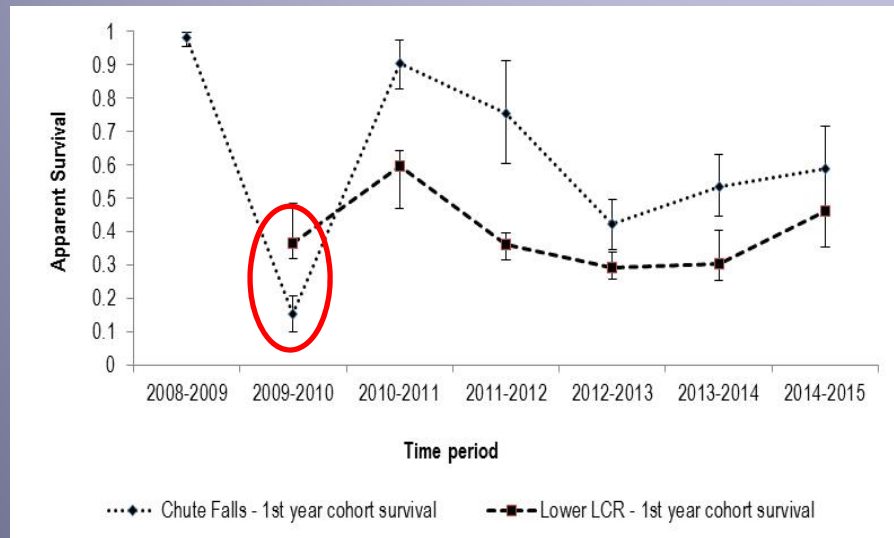


Survival of translocation cohorts during second year

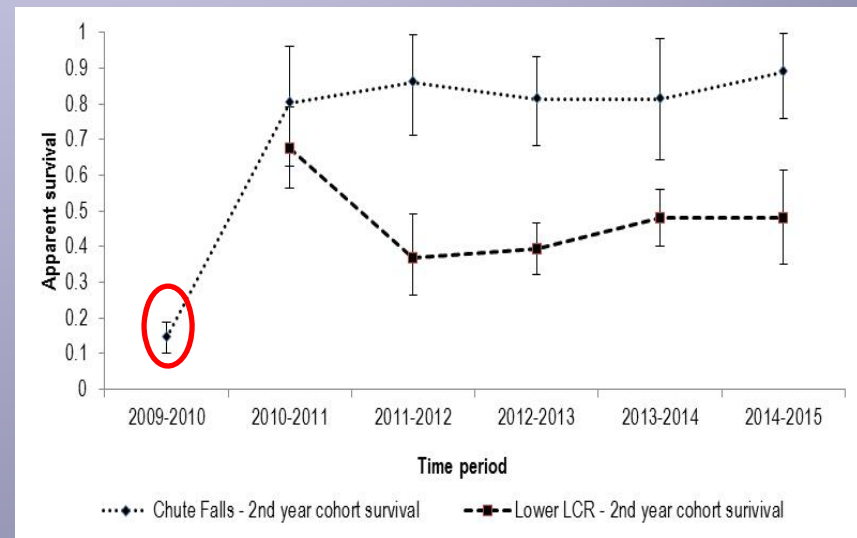


Apparent survival of translocated age 0 chub vs those not translocated (provisional)

Survival of translocation cohorts during first year



Survival of translocation cohorts during second year



Summary

- Higher growth rates and increased survival appear to be a result of translocating fish to above Chute Falls.
- Environmental stochasticity (floods/loss of habitat) may be one factor ultimately precluding permanent colonization of Humpback Chub above Chute Falls.
- Translocations are relatively easy and inexpensive beneficial conservation actions compared to other options that may be much more expensive and politically difficult to implement.

Thank You

