# Monitoring Humpback Chub in the Little Colorado River and Colorado River, Grand Canyon

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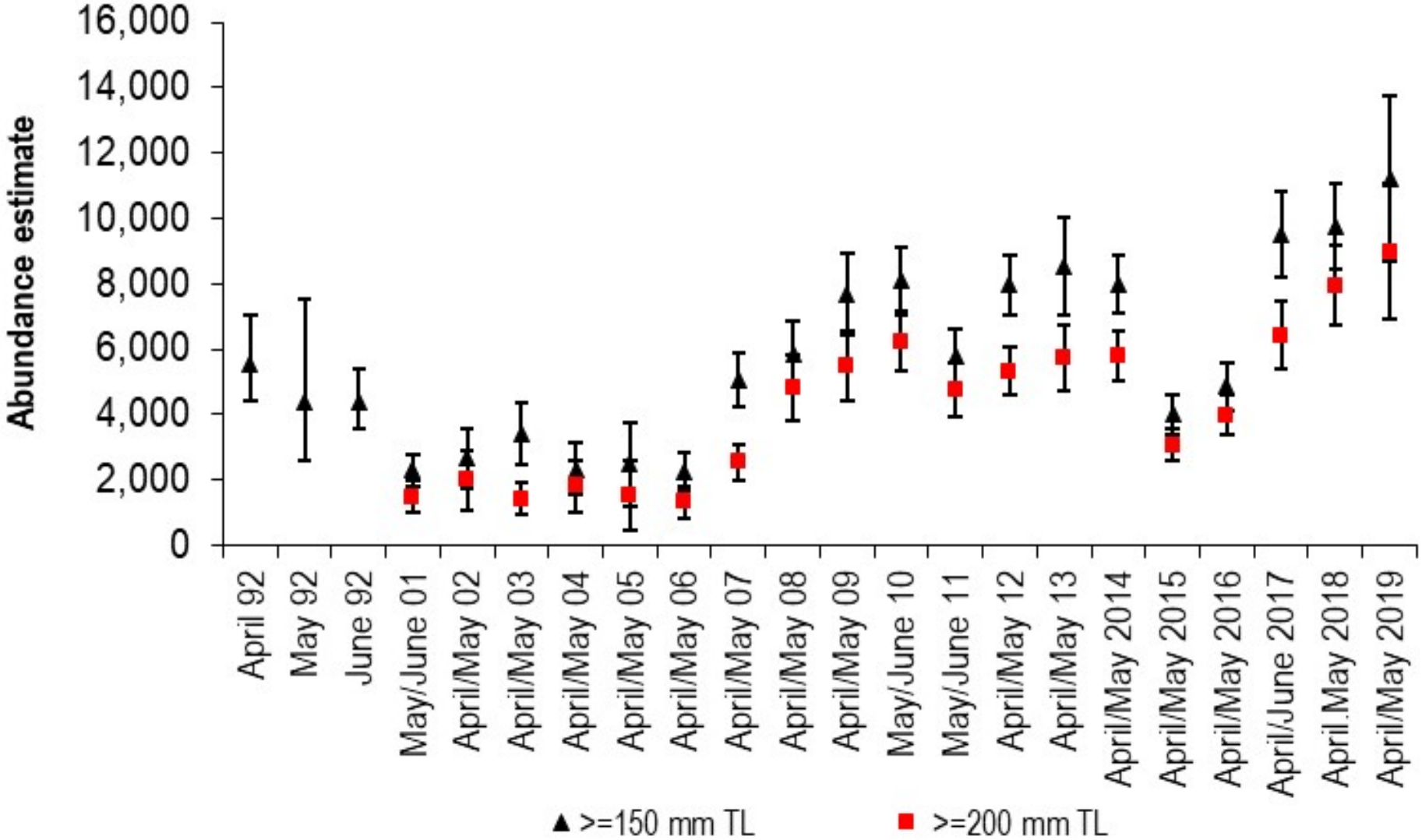
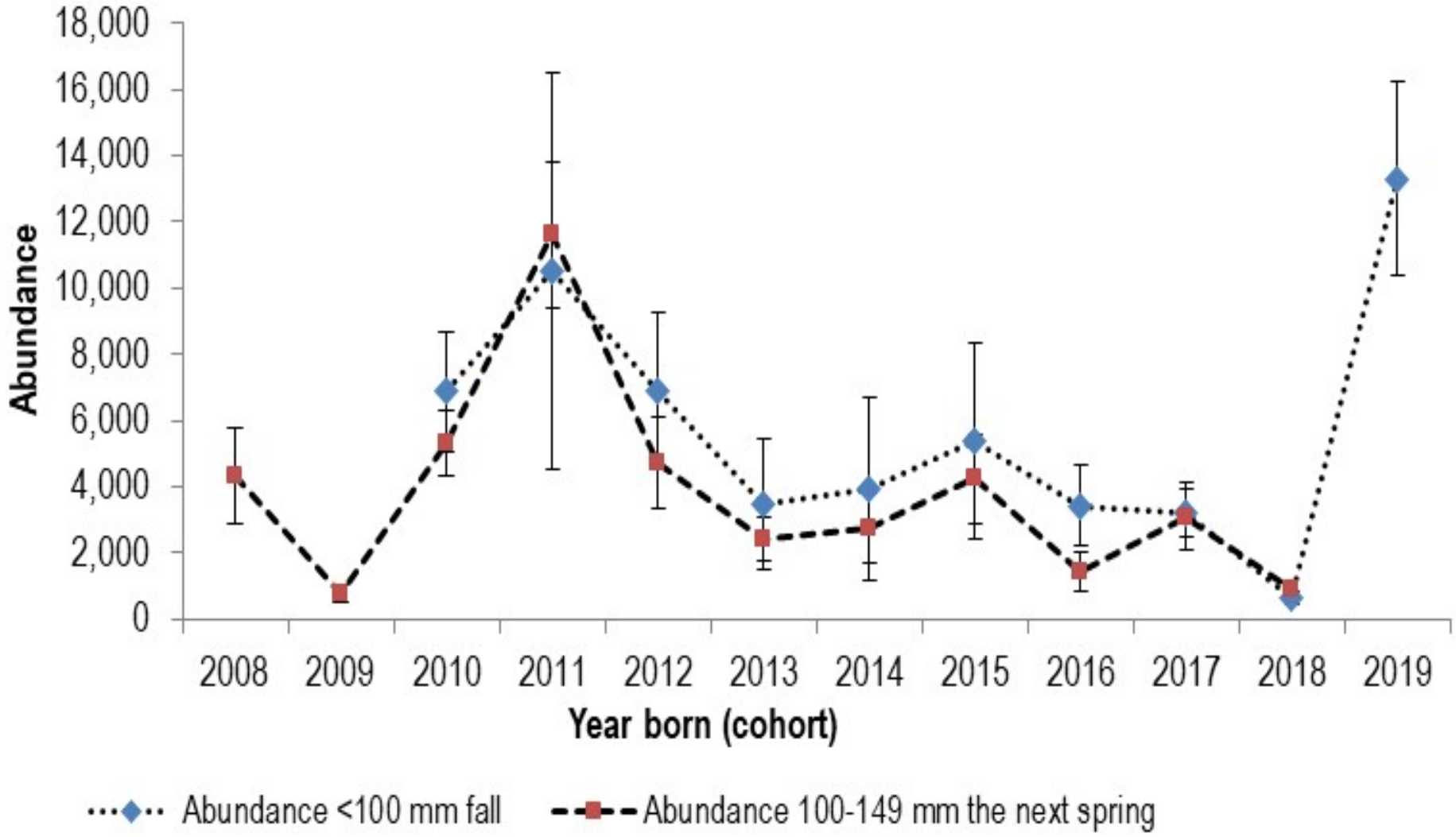
# Monitoring in lower 13.57 km of LCR

# Annual spring abundances of HBC ≥150 mm and ≥200 mm in lower 13.6 km of LCR



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



# Summary

- Spring 2019 represented the highest closed abundance recorded to date for HBC ≥150 mm and ≥200 mm in the LCR.

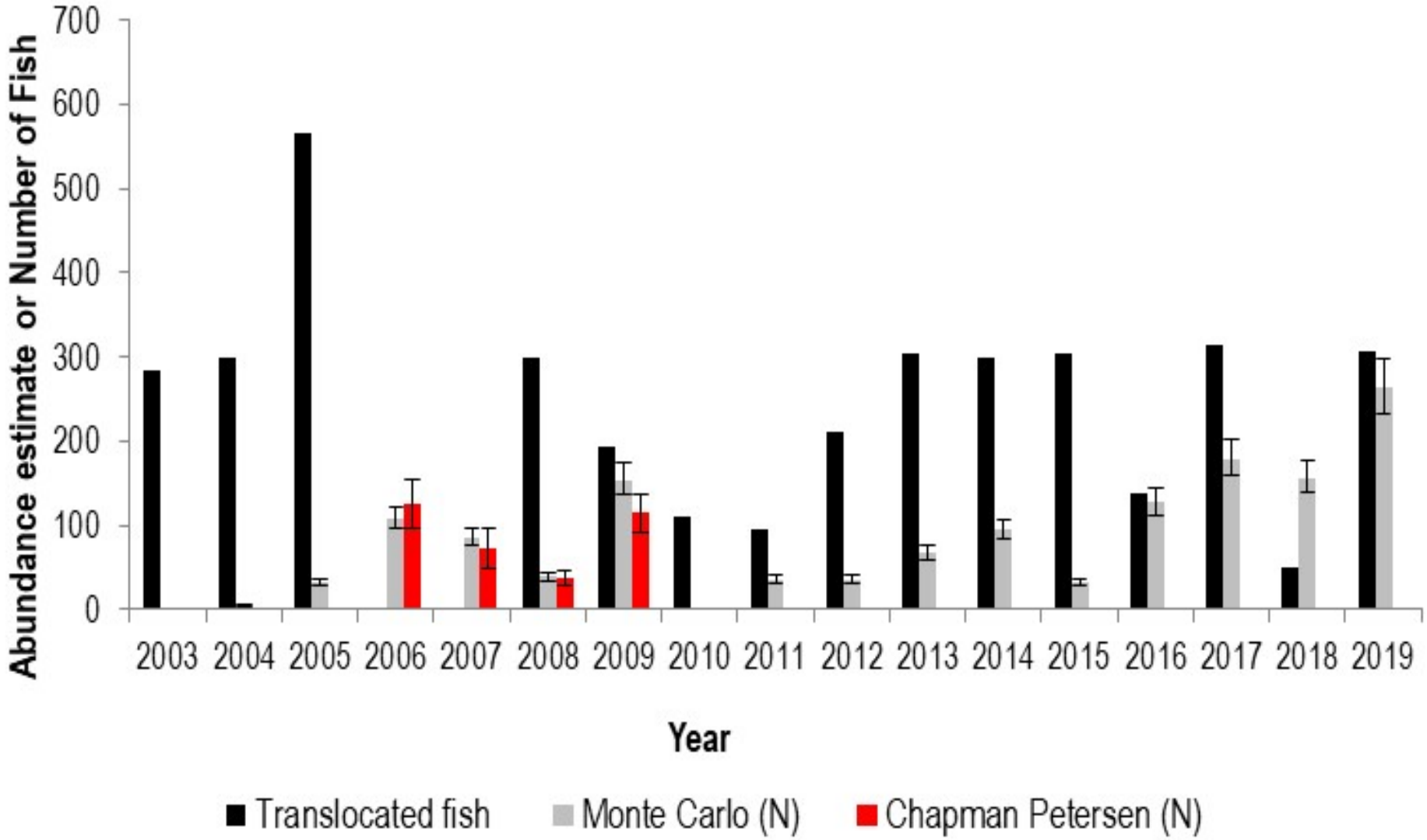
- Fall 2019 was a banner production year for production of age-0 HBC (similar to 2011).

# Translocations and Chute Falls Monitoring

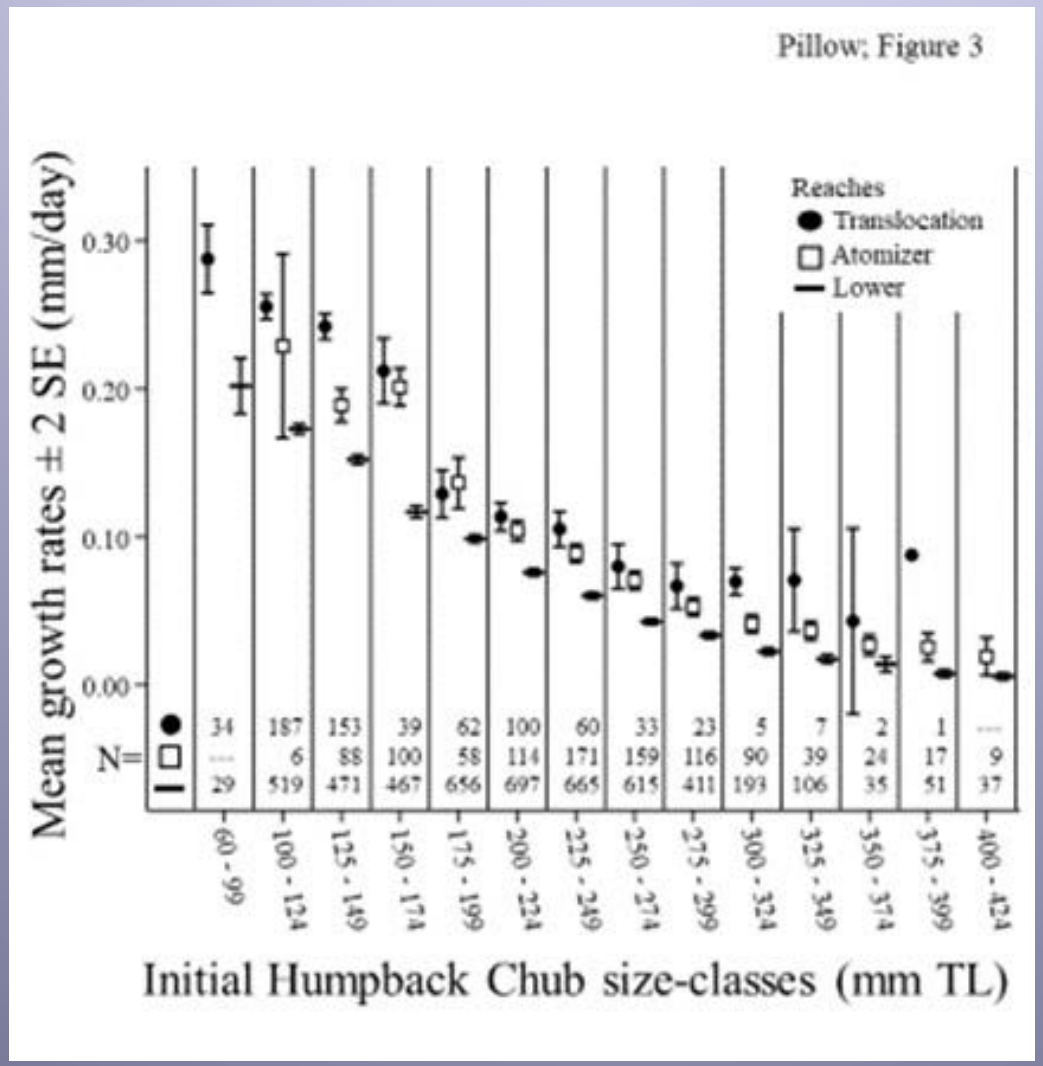
# Numbers and sizes of Humpback Chub collected from the Little Colorado River for translocations (2003-2019)

| Date | Chute Falls * | Size (mm) | SNARRC | Shinumo | Havasu | Size (mm) | Total | Capture Location | Capture Location (km) | Tag |
|---|---|---|---|---|---|---|---|---|---|---|
| 8/1/03 | 283 | 50-100 | | | | | 283 | Boulders | ~1.15-3.15 | VIE |
| 7/30/04 | 299 | 50-100 | | | | | 299 | Boulders | ~1.15-3.16 | VIE |
| 7/29/05 | 567 | 50-100 | | | | | 567 | Boulders | ~1.15-3.17 | VIE |
| 7/22/08 | 299 | ~80-130 | | 207 | | <80 | 506 | Boulders | ~1.15-3.18 | PIT |
| 10/13/08 | | | 300 | 100 | | <130 | 400 | Boulders | ~1.15-3.18 | |
| 7/24/09 | 194 | ~80-130 | 205 | 83 | | <80 | 482 | Boulders | ~1.15-3.18 | PIT |
| 10/10/09 | | | | 238 | | <130 | 238 | Coyote | ~7.56–9.85 | |
| 7/16/10 | 108 | ~80-130 | 175 | | | <80 | 283 | Boulders | ~1.15-3.18 | PIT |
| 11/5/10 | | | | 300 | 300 | <80 | 600 | Coyote | ~7.56–9.85 | |
| 11/9/11 | 96 | ~80-130 | 200 | | 300 | <80 | 596 | Coyote | ~7.56–9.85 | PIT |
| 7/12/12 | 212 | ~80-130 | 202 | 200 | 300 | <80 | 914 | Coyote | ~7.56–9.85 | PIT |
| 5/24/13 | | | | 73 | | <30 | 73 | Boulders | ~1.15-3.18 | |
| 7/11/13 | | | | 99 | | <80 | 99 | Coyote | ~7.56-9.85 | |
| 11/7/13 | 303 | ~80-130 | | 11 | 300 | <130 | 614 | Coyote | ~7.56-9.85 | PIT |
| 5/1/14 | | | | | 660 | <30 | 660 | Riverwide | 0-13.56 | |
| 10/31/14 | 305 | 65-137 | | | | <130 | 305 | Coyote | ~7.56-9.85 | PIT |
| 5/28/15 | | | | | 315 | <30 | 315 | Riverwide | 0-13.56 | |
| 11/1/15 | 303 | 61-128 | | | | | 303 | Coyote | ~7.56-9.85 | PIT |
| 10/27/16 | 137 | 58-146 | | | | | 137 | Coyote | ~7.56-9.85 | PIT |
| 6/16/17 | | | 139 | | | <40 | | Riverwide | 0-13.56 | |
| 10/26/17 | 315 | 66-120 | | | | | 315 | Coyote | ~6.9-10.5 | PIT |
| 10/29/18 | 49 | 63-115 | | | | | 49 | Coyote | ~6.9-10.5 | PIT |
| 6/18/19 | | | 250? | 400? | | <40 | | | | N/A |
| 6/24/19 | 307 | | | | | | 307 | | ~6.9-10.5 | PIT |
| Totals | 3,777 | | 1,471 | 1,711 | 2,175 | | 8,484 | | | |

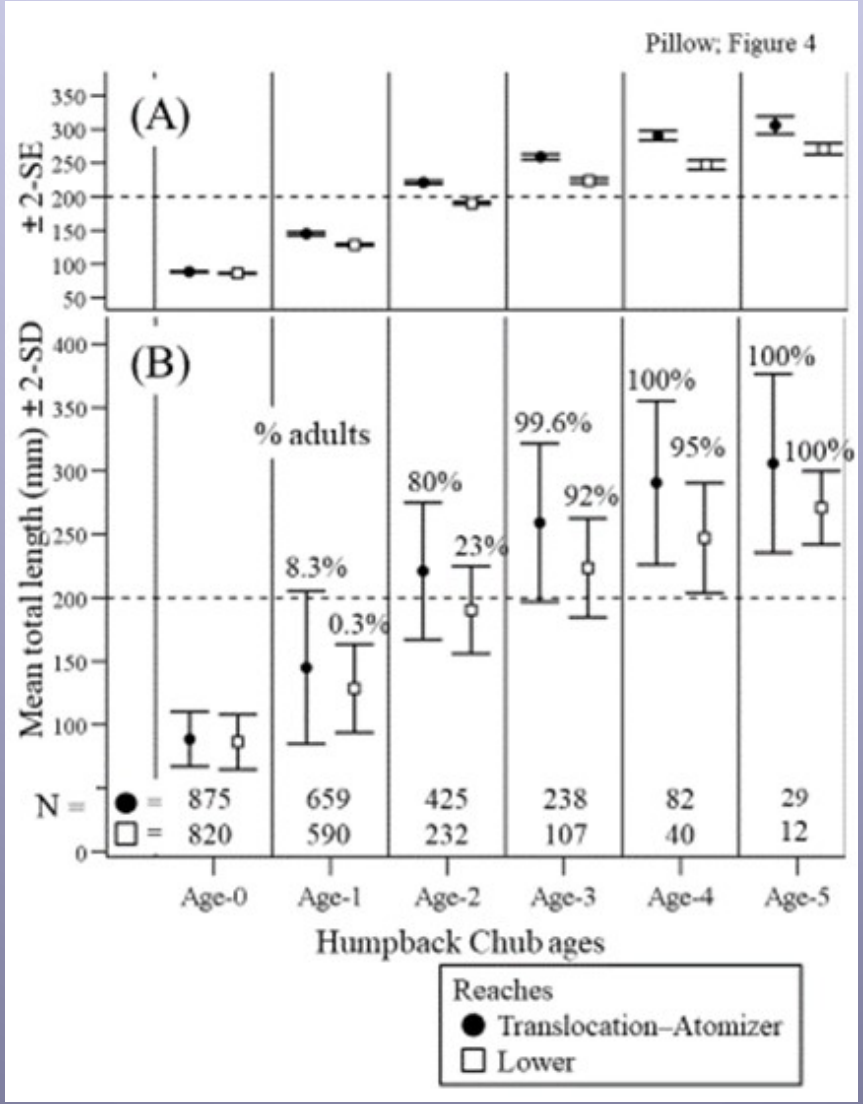
# Above Chute Falls - Number of juvenile HBC translocated (black) and adult HBC >=200 mm abundances (red & grey)



# Growth (mm/day) of HBC in Chute Falls, Atomizer, and Lower reaches of LCR (Stone et al., in review)



# HBC reach adulthood significantly faster in the Chute Falls and Atomizer reaches than in Lower LCR (Stone et al., in review)

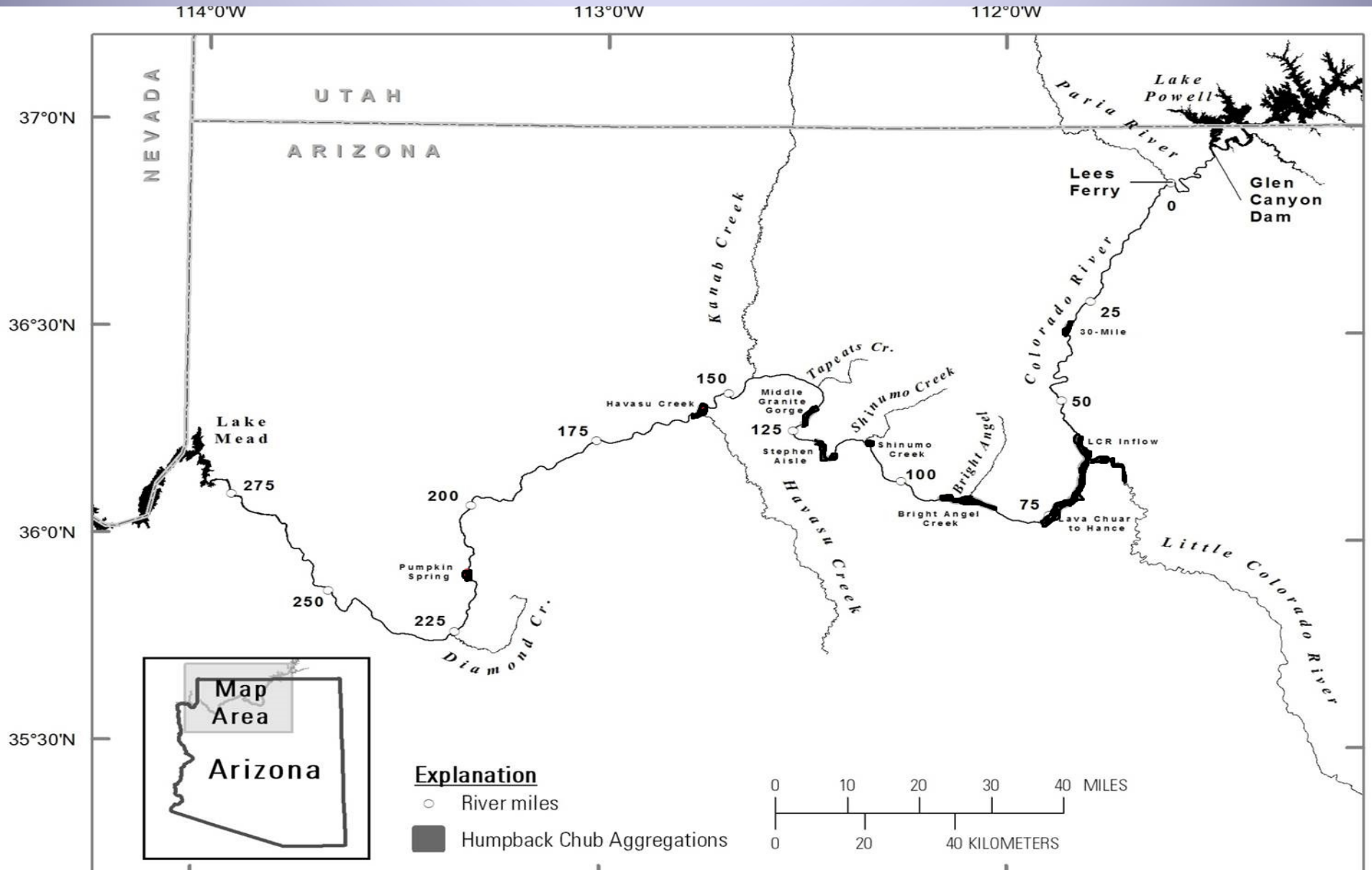


# Summary

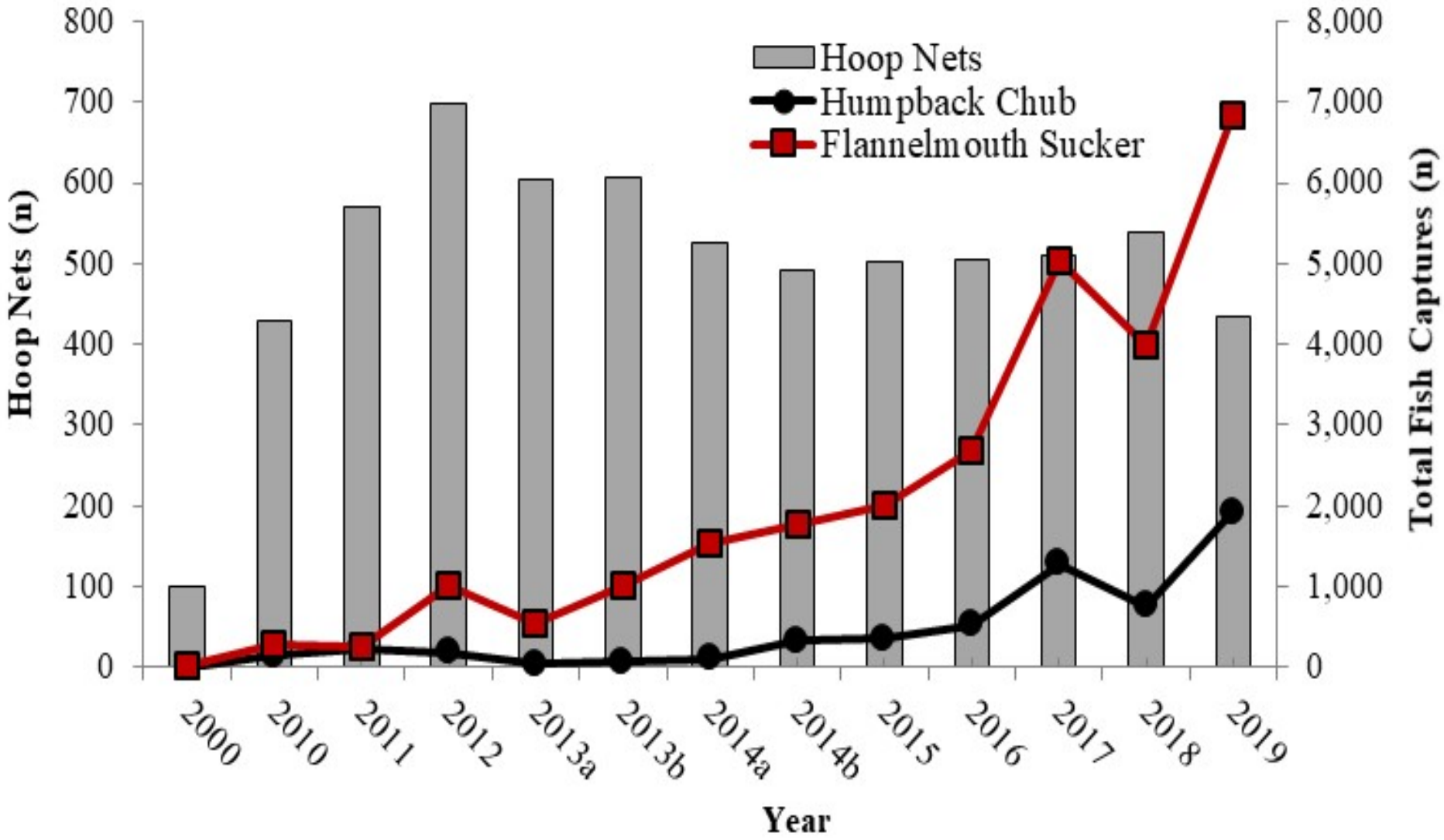
- Significantly higher growth rates are a result of translocating HBC to above Chute Falls.
- With higher growth rates comes significantly quicker time to reach adulthood (hence a headstart for reproduction).
- Translocations are relatively easy and inexpensive beneficial conservation actions compared to other options that may be much more expensive and politically difficult to implement (e.g., predator removal, large changes in dam operations, etc.).

# Mainstem HBC monitoring

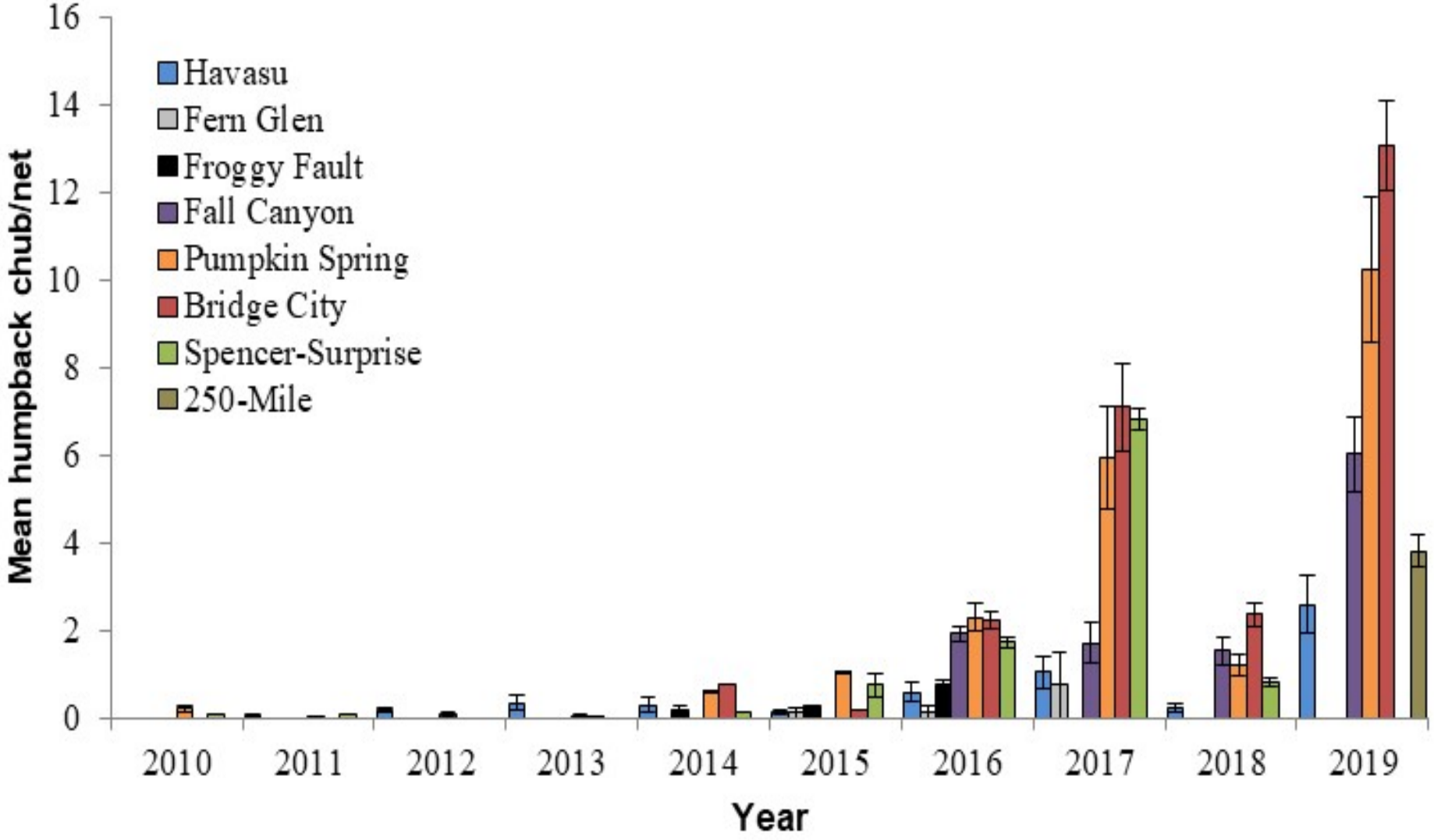
# Map of humpback chub aggregation sites



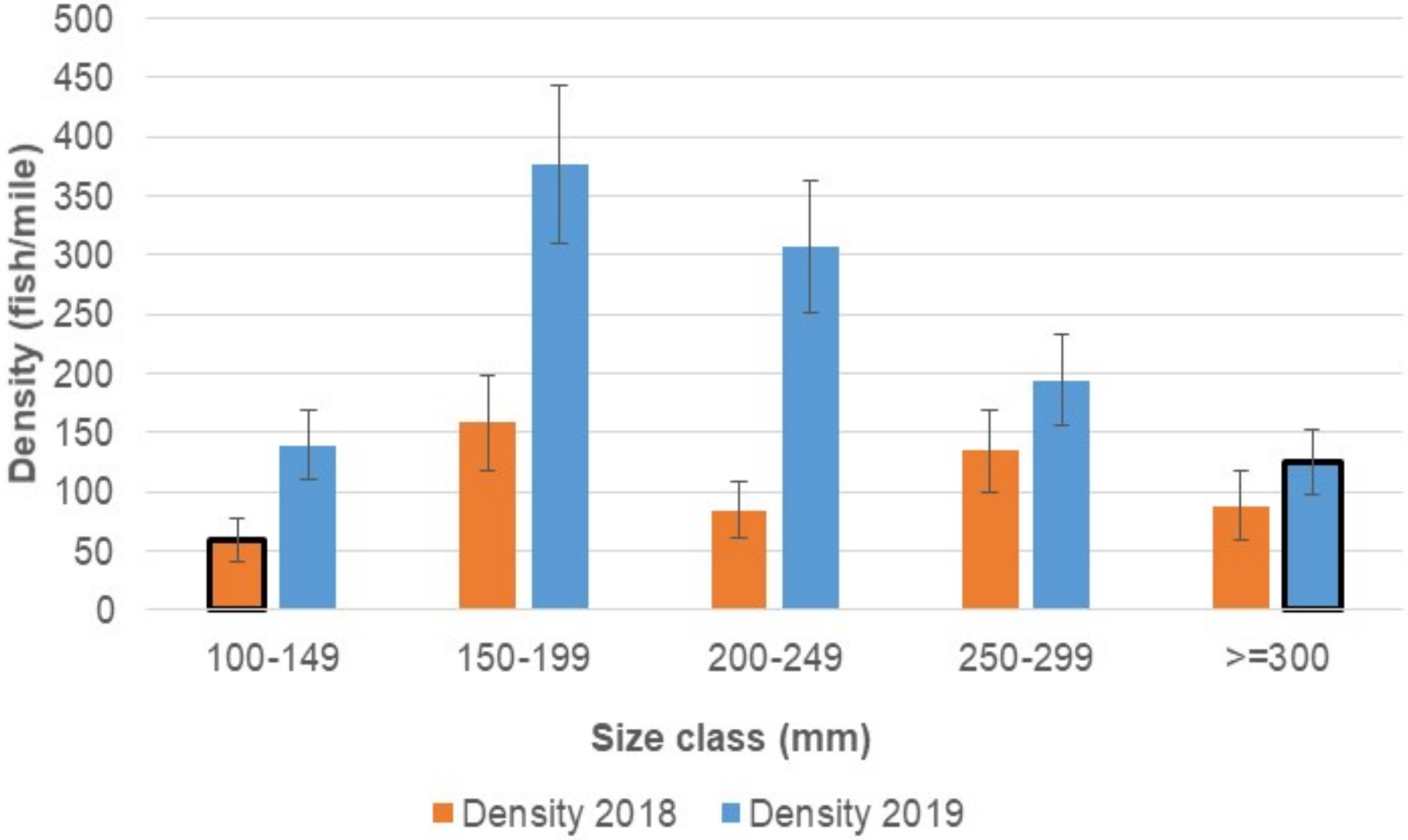
# Effort (# nets) and catch of FMS and HBC on aggregation trips (2000 and 2010-2019)



# CPUE (fish/net) of adult HBC at sampling sites in western Grand Canyon (below 156 mile)



# 2018 and 2019 density estimates (fish/mile) of HBC at Bridge City (2 mile reach)



# Summary

- Observed fish community has shifted since 2010 from one dominated by rainbow trout to one dominated by native fish (FMS, HBC, and SPD), especially in western Grand Canyon. Native fish comprised 99.8% of hoop net catches in the mainstem aggregation trip in both 2018 and 2019.

- HBC and FMS hoop net CPUEs continue to increase in western Grand Canyon.

- Using mark-recapture, we are beginning to obtain successful absolute abundance estimates of HBC and FMS in small reaches of the mainstem in Grand Canyon, largely because densities have increased to the point of allowing estimates to be made (i.e., can recapture fish)

# Thank You