

IMPACTS OF POST FLOOD INSTREAM DEBRIS CLEANING ON FISH POPULATIONS AND BIOMASS IN NORTH CENTRAL PENNSYLVANIA STREAMS

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Introduction

- Flooding disrupts rural river systems causing bed and bank erosion and other channel alterations.
- Changes in configuration of stream channels following flood events are natural events.
- In September 2011, Tropical Storm Lee delivered over 18 inches of rain to many parts of the central Susquehanna watershed resulting in historic flooding.
- Flooding from Lee created much anxiety about the potential for future flood damage in this region.
- Response to this event was to "clean" instream channels by actively straightening streams, bulldozing and realigning the channels, creating dikes with bed materials and removing large woody organic debris.
- While stream "cleaning" has the potential to temporarily alleviate some negative effects of local flooding, there is a potential for these activities to considerably undermine many economically and ecologically important features associated with unaltered streams.
- Cold water streams in Pennsylvania contribute to a greater than 1.5 billion dollar per year trout fishery and stream cleaning has the potential to affect this fishery.
- Previous studies have shown that trout affected by changes in natural cover, water temperature, riverbed sediments and nutrition; all aspects that can be associated with stream "cleaning".
- The purpose of this project was to quantify the effects of an economically important feature of natural streams: sport fish - in stream reaches that have undergone "cleaning".



Figure 1. Cleaned site at Fishing Creek.



Figure 2. Un-cleaned site at Fishing Creek.

Methodology

- Three streams in north central PA were evaluated: Bear Creek, Fishing Creek and Ogdonia Creek
- Two 100m stream reaches were established on each stream.
 - Cleaned section (treatment) and uncleaned section (reference)
- Each site was double pass electrofished along the 100m portion
- Population estimates calculated via the Zippin method

Study Sites



Figure 3. Map of study sites in north central PA.



Figure 4. Field crew electrofishing at Fishing Creek.

Results

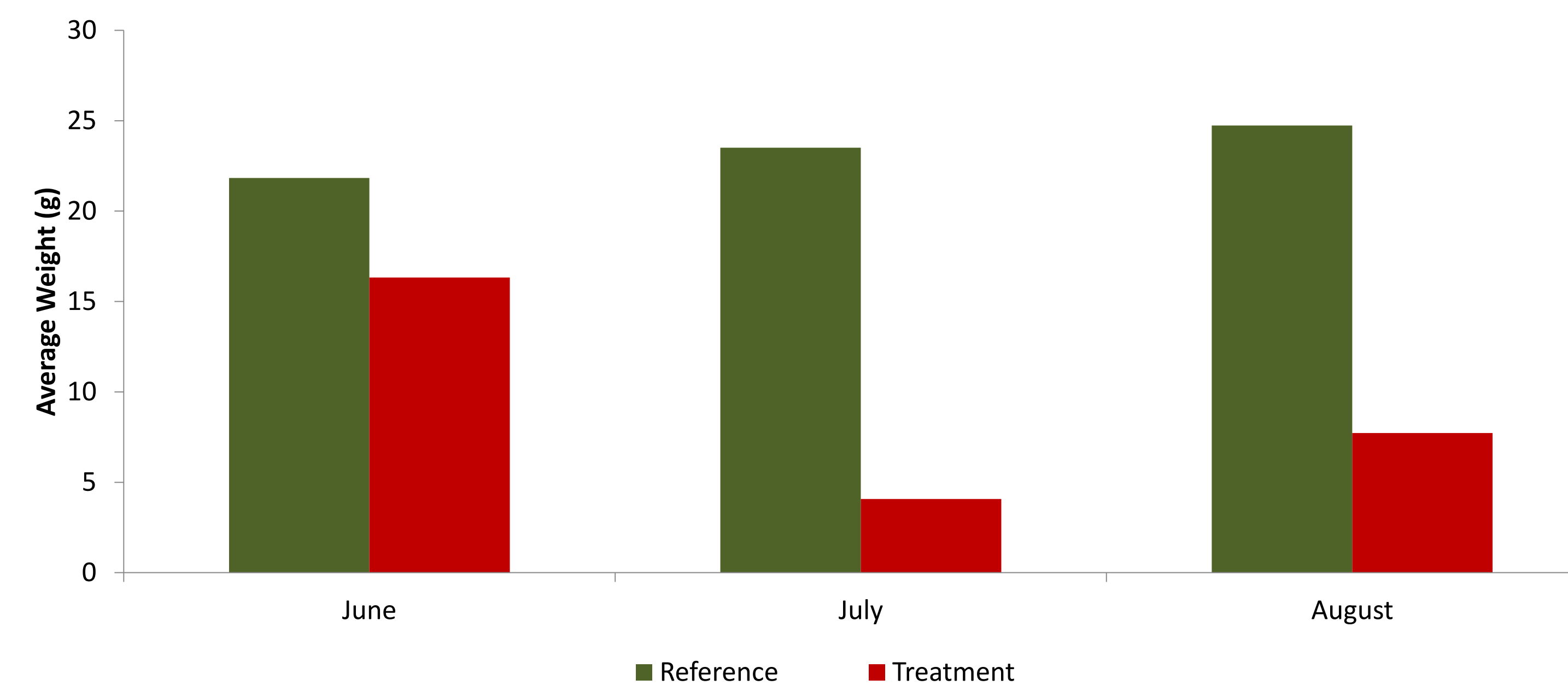


Figure 5. Average weights of all trout from the cleaned and reference sites from all creeks tested in 2012.

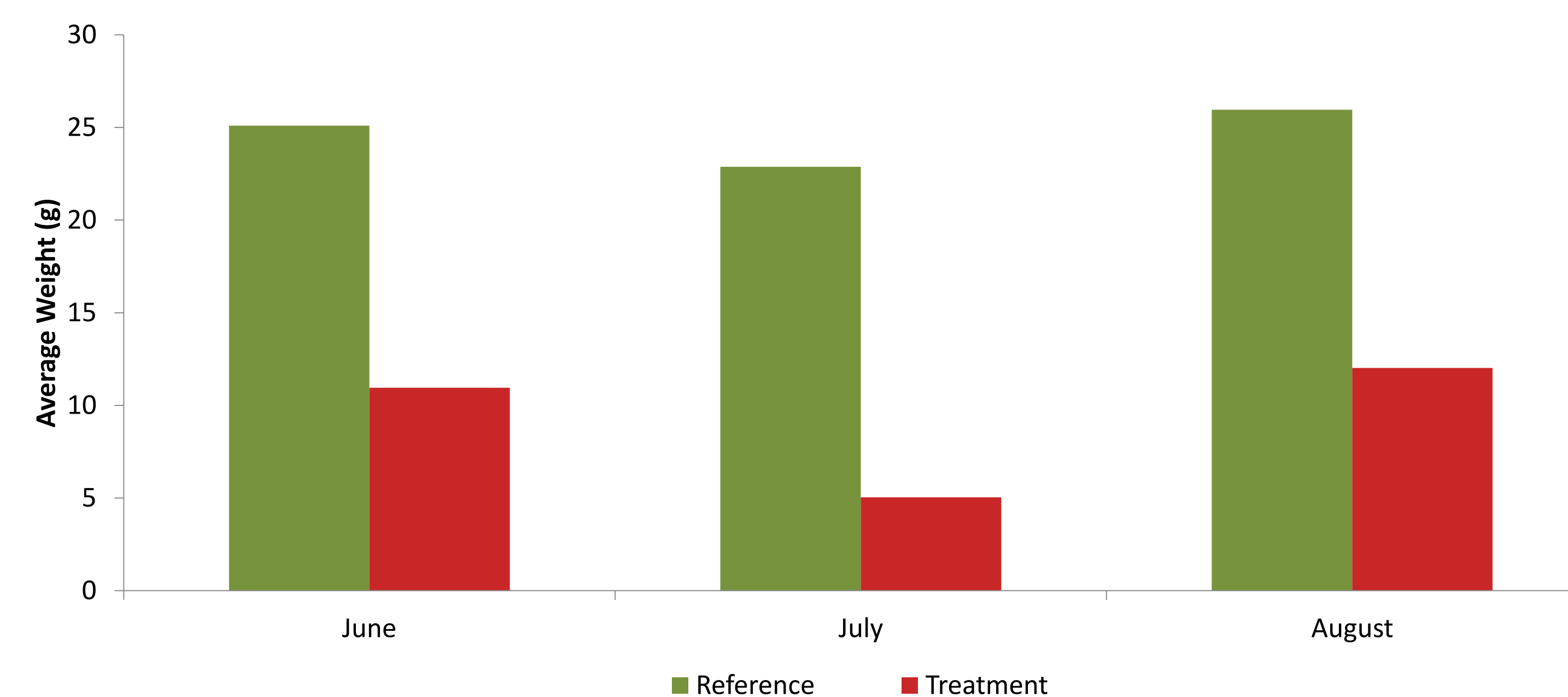


Figure 6. Average weights of brown trout from the cleaned and reference sites from all creeks tested in 2012.

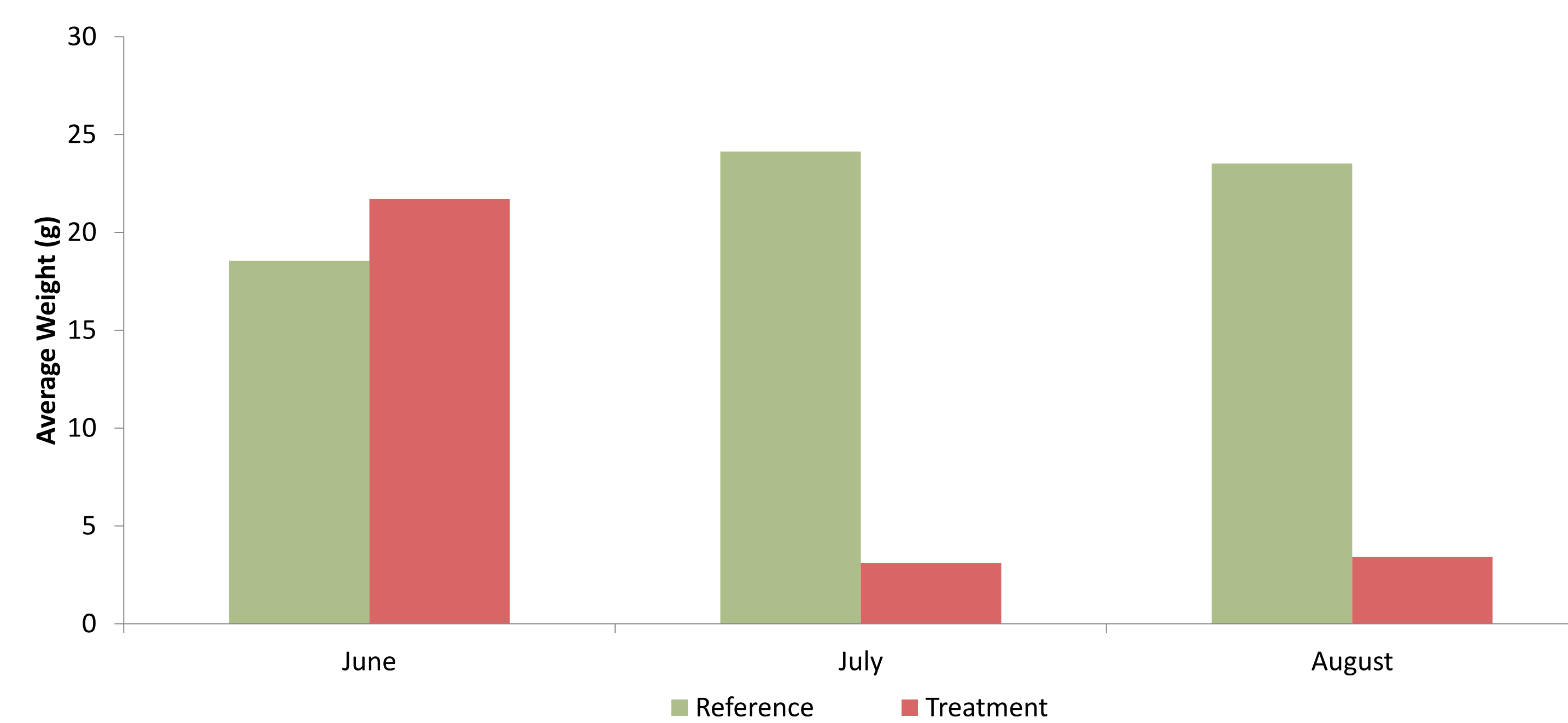


Figure 7. Average weights of brook trout from the cleaned and reference sites from all creeks tested in 2012.

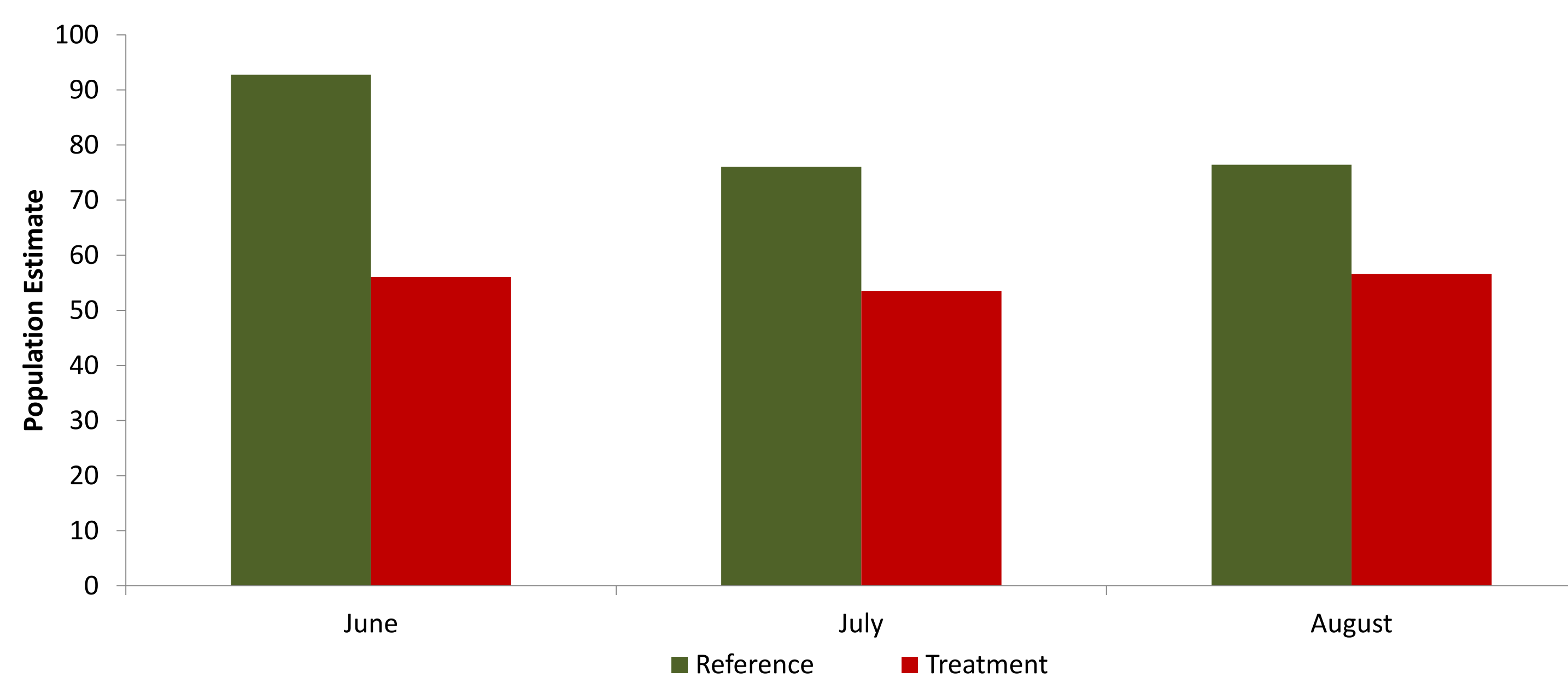


Figure 8. Average population estimates of all trout from the cleaned and reference sites from all creeks tested in 2012.

Results

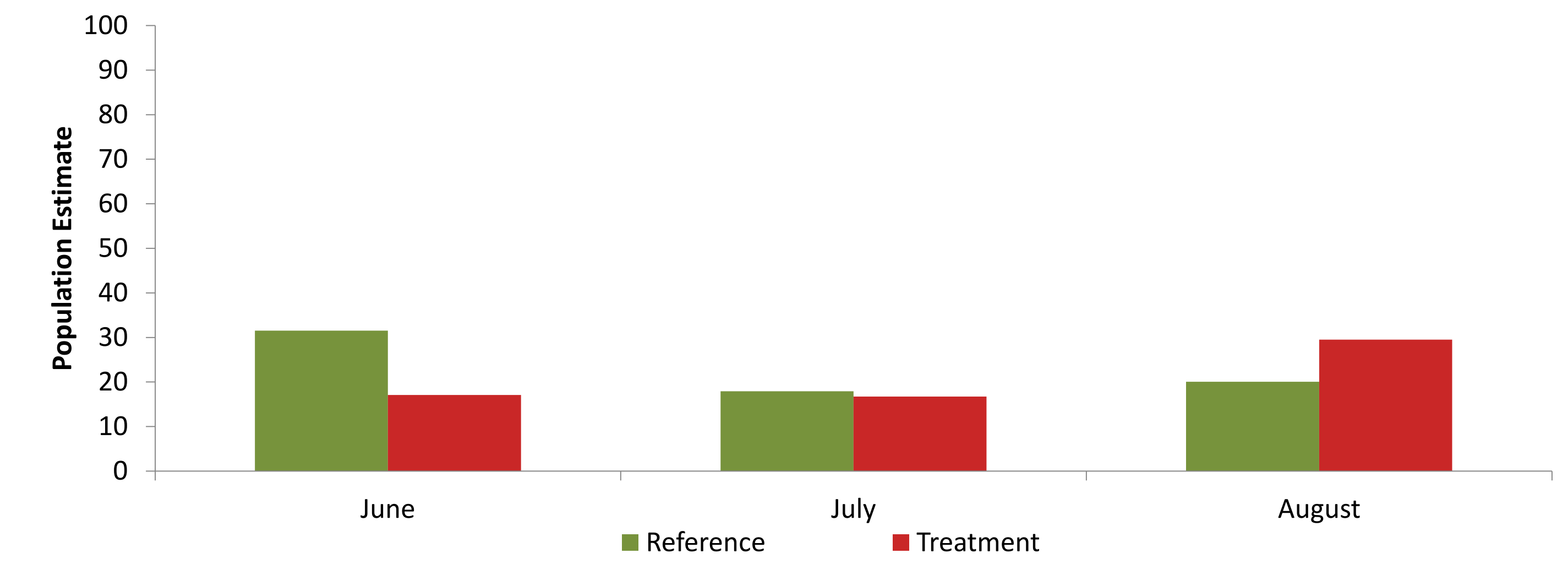


Figure 9. Average population estimates of brown trout from the cleaned and reference sites from all creeks tested in 2012.

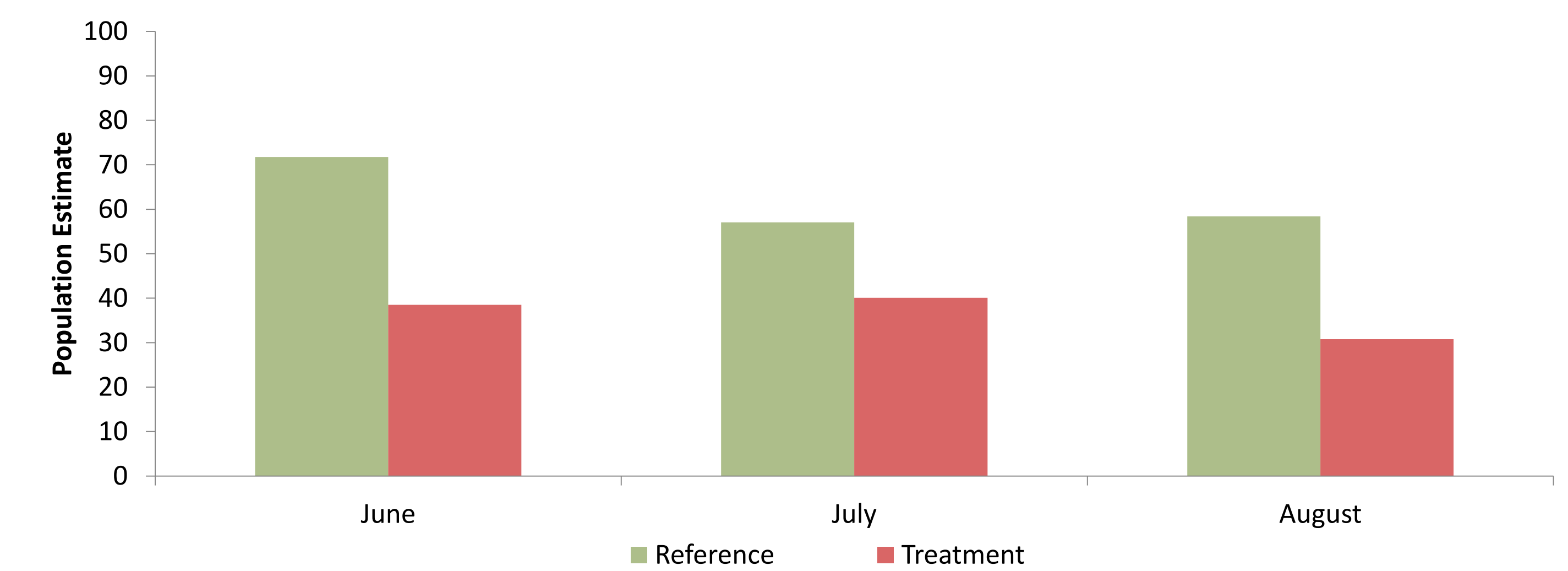


Figure 10. Average population estimates of brook trout from the cleaned and reference sites from all creeks tested in 2012.

Conclusions

- Average weight of all trout severely diminished in cleaned sections of creeks in all months.
- Average weight of brown trout severely diminished in cleaned sections of creek in all months.
- Average weight of brook trout severely diminished after June in cleaned sections of creeks
- Population estimate of all trout in cleaned sections less than in reference sections.
- Population estimate of brook trout in cleaned sections less than in reference sections.
- Population estimate of brown trout in cleaned sections vs. reference sections not conclusive.
- Average population estimate of brown trout less than that of brook trout in both reference and treated sites.

References

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- Pennsylvania Fish and Boat Commission. 2009. Strategic plan for management of trout fisheries in Pennsylvania 2010-2014.
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