Standing Stock Fisheries Biomass and Production across all USA Reservoirs

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Background

- Reservoirs possess unique potential as ecosystems and fisheries.
- Throughout the last century, USA reservoirs were frequently sampled for fisheries biomass using cove rotenone applications.
- We digitized 1128 legacy cove rotenone datasets from 301 individual reservoirs, mostly in southeastern USA.
- These data were used to extrapolate total biomass of fishes in USA reservoirs.
- We estimated total USA reservoir fish biomass using five different analytical methods as described in the workflow, allowing some estimation of uncertainty.
- All data and reservoir classification systems will be published open access at the following data repository: https://github.com/caparisek/res_biomass_USA

Location of USA Reservoirs & Biomass Data

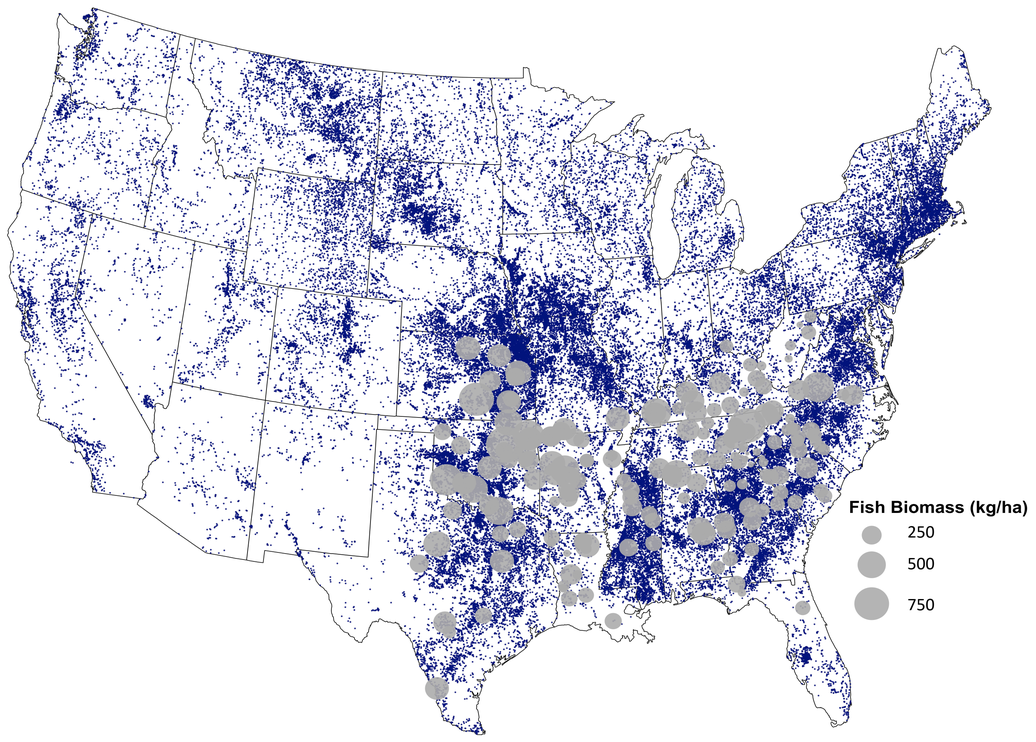
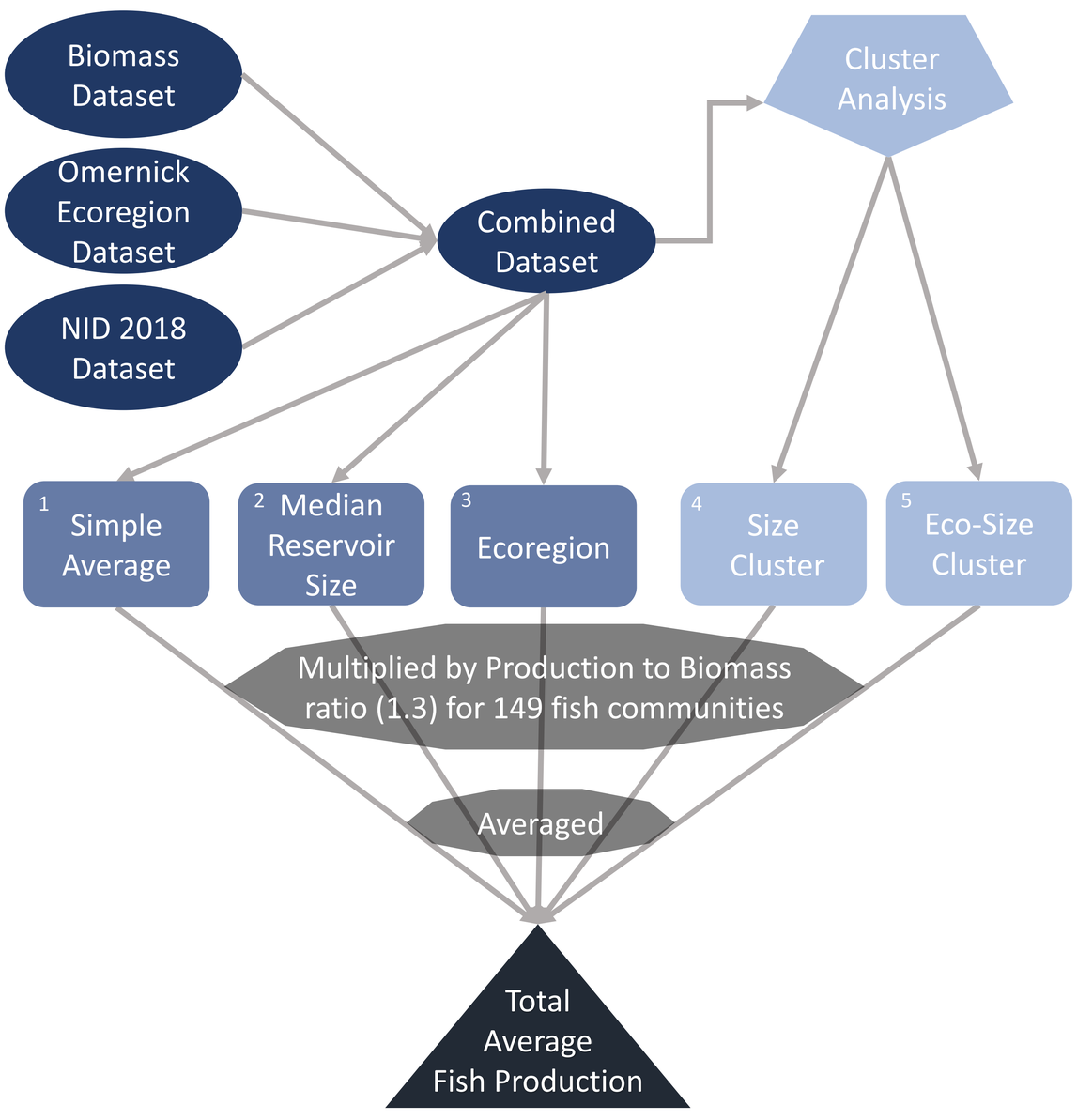


Figure 1. Map of the USA representing all USA reservoirs & reservoirs with biomass data

Figure 2. Ten pictures of the most common fishes in USA reservoirs. Top (From left to right): Yellow Bullhead (*A. natalis*), Bluegill (*L. macrochirus*), Pumpkinseed (*L. gibbosus*), White Bass (*M. chrysops*), and Orangespotted Sunfish (*L. humilis*). Bottom: Threadfin Shad (*D. petenense*), Black Crappie (*P. nigromaculatus*), Redear Sunfish (*L. microlophus*), Warmouth (*L. gulosis*), and Walleye (*A. grunniens*)

Workflow



Results

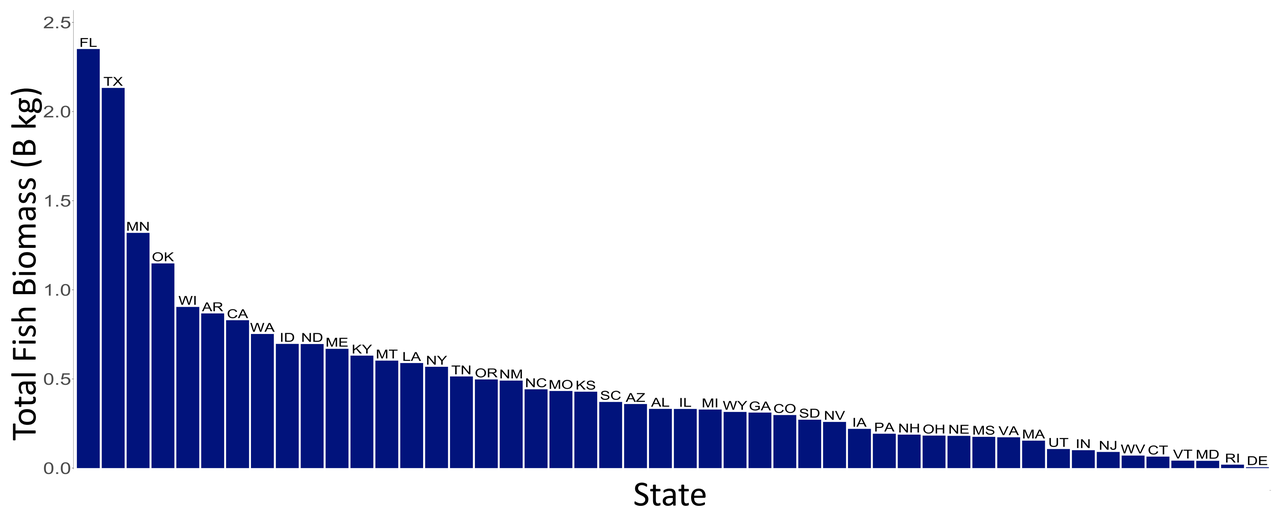
Figure 3. Eco-Size Cluster analysis displaying classification of reservoirs using Omernick ecoregions & 4 cluster separation.

Classification System	Fisheries Biomass	Productivity[1]
1. Simple Average	4.48 B kg	5.82 B kg yr $^{-1}$
2. Median Reservoir Size	4.46 B kg	5.79 B kg yr $^{-1}$
3. Ecoregion	4.48 B kg	5.83 B kg yr $^{-1}$
4. Size Cluster	4.29 B kg	5.87 B kg yr $^{-1}$
5. Eco-Size Cluster	4.48 B kg	5.82 B kg yr $^{-1}$
Mean:	**4.44 B kg**	**5.78 B kg yr $^{-1}$**

Other Values of Interest (2002-2016 avg)

Laurentian Great Lakes annual fish harvest[2]	0.0214 B kg yr $^{-1}$
North America (Inland waters)[3]	0.22 B kg yr $^{-1}$
South America (Inland waters)[3]	0.36 B kg yr $^{-1}$
Africa (Inland waters)[3]	2.8 B kg yr $^{-1}$
Asia (Inland waters)[3]	7.4 B kg yr $^{-1}$
Global annual marine fish harvest[3]	79.9 B kg yr $^{-1}$

Sources: **1.** Rypel and David, 2017 Ecosphere. Pattern and scale in latitude-production relationships for freshwater fishes **2.** Baldwin, N.A., Saalfeld, R.W., Dochoda, M.R., Buettner, H.J., Eshenroder, R.L., and O'Gorman, R. 2018. Commercial Fish Production in the Great Lakes 1867-2015 [online]. Available from http://www.glfc.org/great-lakes-databases.php **3.** Food and Agriculture Organization of the United Nations (State of the World Fisheries and Aquaculture 2018)



Conclusions

1. Reservoirs contain substantial amounts of fisheries biomass.
2. These ecosystems may help lessen demand placed on marine and other freshwater fisheries.
3. While current data encompass primarily southeast USA, rotenone data like these are unlikely to ever be collected again. Further, in the future we intend to develop a small validation data set to examine precision of our estimates for unsampled reservoirs.
4. Future conservation efforts should consider reservoir fisheries as important ecological and food security assets.

Acknowledgements

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