*Article*

# Evidence for Ecosystem-Level Trophic Cascade Effects Involving Gulf Menhaden (*Brevoortia Patronus*) Triggered by the *Deepwater Horizon* Blowout

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**Supplemental Material**

*Gulf Menhaden Stock Assessment Data*

We based our estimates of biomass and production on the 2013 Gulf menhaden stock assessment (Schueller et al. 2013), rather than the most recent stock assessment (Schueller et al. 2018), because changes in the methods used to inform recruitment estimates in the most recent assessment led to questionable revisions of stock abundance and age structure prior to 2011. The fishery-independent recruitment index used in these assessments (i.e. the "seine index") is based mainly on results from bag seine sampling in Louisiana. Louisiana reduced the sampling frequency of this test fishing from once or twice a month depending on season, to quarterly beginning October 2010, resuming monthly sampling in July 2014 (Schueller et al. 2018). This change contributed to a reduction in the correlation coefficient between the seine index and an index of the age-1 catch by the fishery lagged one year from 0.87 in the 2013 assessment to 0.42 in the 2018 assessment. In particular, the seine index for 2011 in the 2018 assessment was the highest since the beginning of the record in 1996, and more than twice the 2010 index, yet the fishery catch of the 2010 year class at age 1 in 2011was more than twice as large as the catch of the 2011 year class at age 1 in 2012. These and other changes in the 2018 stock assessment led to substantial revisions of abundance and age structure for the years 1977 to 2010 in comparison with the results of the 2013 assessment. We therefore relied on the results of the 2013 assessment because the sampling methods for the seine index were more consistent for the years prior to 2010. In any case, this choice had little effect on the Gulf menhaden production estimates presented in Tables 2 and 3. Had we used the results from the 2018 assessment, these estimates would have been about 16% higher.

*Gulf Menhaden Condition Factor, 2011 to 2014*

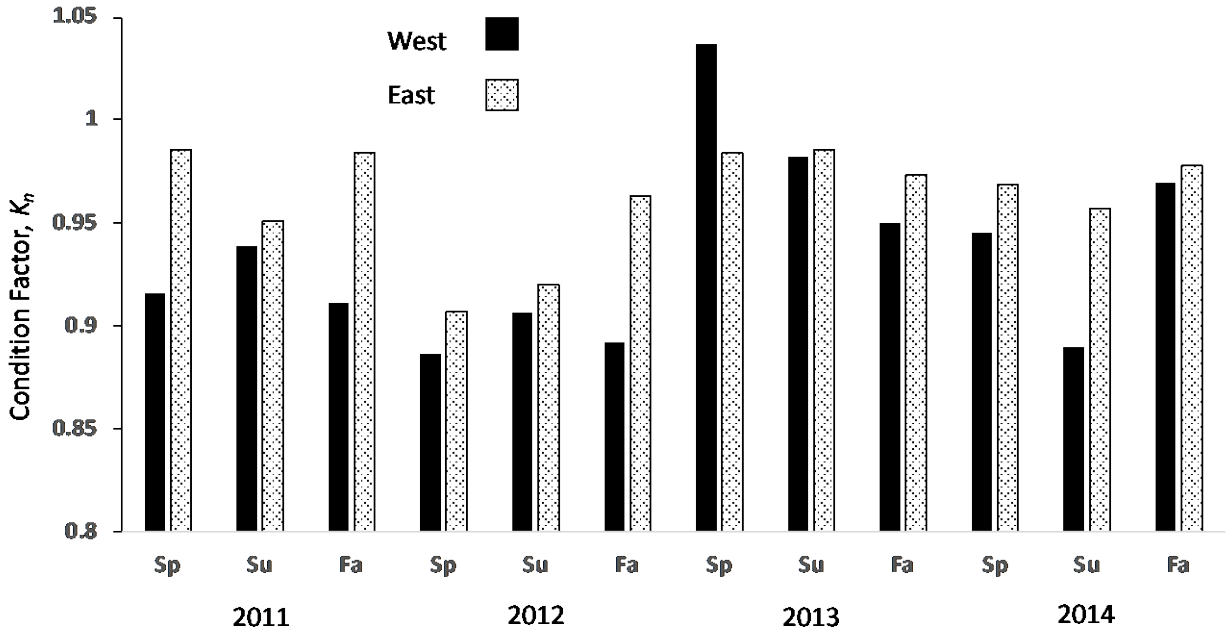


Figure S1.Condition factor of Gulf menhaden sampled opportunistically during spring (Sp), summer (Su), and fall (Fa), east and west of the Mississippi River, from 2011 through 2014.