

## 2. The National Climate Report

The long-awaited Fourth National Report on Climate Change was released November 23, 2018 by the federal government, and it is a blockbuster. <https://nca2018.globalchange.gov/>. Apart from stating that our climate is changing and that humans are responsible due to burning hydrocarbons, the report has an entire section devoted to the Southern Great Plains which include Texas. Among other things, the report includes the graph below about flounder abundance, an issue I have been following for some time. It has been reported that Texas Parks and Wildlife has been finding fewer and fewer juvenile flounder in their surveys. Flounder require certain low temperatures to be reached/maintained in order to successfully reproduce, and climate change is raising the water temperature. Many of us seem to think we are exempt from the effects of climate change. We are not, and certainly not if you fish the coast.

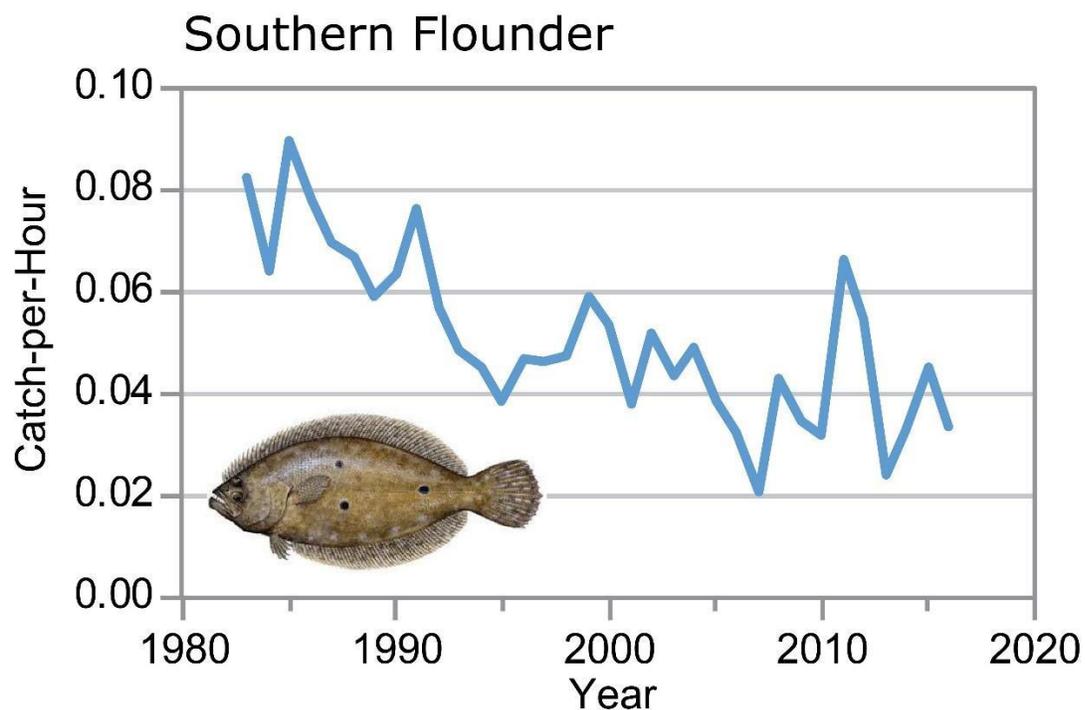


Figure 2. Graph of flounder abundance from the Fourth National Climate Assessment, Southern Great Plains Regional Assessment, which was originally Figure 23.9: Climate Winners and Losers

(Gray Snapper and Southern Flounder). Gray snapper, which is expanding in numbers, is omitted from this image.

We don't talk about climate change in Texas, and that attitude needs to stop. We must be honest about this issue if we are to have any chance of successfully adapting and responding to alter current carbon dioxide emission rates and atmospheric build-up. Our economy is tied to hydrocarbons, particularly here on the coast, and we need to carefully consider our economic future given the certainty that pressure to reduce carbon dioxide emissions will increase. Later in this newsletter I discuss the oil and gas boom and its impact on the coast (see Section 6). The question is – how much harm is going to be inflicted to our coast in what may well be the last boom of hydrocarbon era? At the least, we should make sure that where we have alternatives, we push for the adoption of the least ecologically harmful one to be pursued, such as offshore mono-buoys for oil export rather than onshore deep-water channels and ports.

Irma and Maria and Harvey – the superstorms of 2017 – were storms made more powerful by the changed climate. At SSPEED Center at Rice, we conducted computer modeling of Hurricane Ike where we increased wind speed by 15% and changed the impact point to near San Luis Pass on the south end of Galveston Island, representing a bad fact situation for damage to the Houston Ship Channel from surge flooding associated with the storm moving ashore. Ike was a unique storm, one that had maximum force winds extending out at least 40 miles, much further than normally seen with a category 2 storm. Regarding the SSPEED Center's modeling, I was told by "experts" that a storm like Ike, with such a large wind field, could not exist with Category 3 winds or higher because those higher winds physically could not be maintained

over such a large area. Maria, as it turns out, was a Category 4/5 storm with a wind field more extensive than seen with Ike. So much for the theory that such winds cannot be maintained over such a large area.

We have never seen such a storm, but it is in our future, just as we had not seen a Harvey which dumped a year's worth of rain in four days. If we had modeled Harvey prior to 2017, we would have been derided as fearmongers. Unfortunately, these storms are real.

In the sections which follow, climate change is an underlying thread. The GBRA-TAP agreement (Section 3) was necessary because of reduced freshwater inflows to San Antonio Bay due to droughts and negative impacts to the endangered whooping crane which will be influenced by sea level rise and habitat loss. The Texas Coastal Exchange discussed in Section 5 is being developed to provide options to sequester carbon dioxide and to help individuals, institutions and companies reduce carbon dioxide emissions and become carbon neutral. Section 6 is about the oil and gas boom that is currently occurring, but for how long and at what cost to the environment of the Texas coast? And section 7 is about the need to erect a barrier to protect the Houston Ship Channel industries from the destructive force of hurricane surge that will become more severe due our changing climate.

We can solve these problems, but only if we talk honestly about them. Denial doesn't help any of us. We are better than we are currently behaving. It is time for us to grow up in this era of the changing climate and become responsible adults.