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Testimony of James O'Donnell, Professor of Marine Sciences, and Executive Director, Connecticut Institute for Resilience and Climate Adaptation,

Good afternoon. I am James O'Donnell. I am a Professor of Marine Sciences at the University of Connecticut. I teach and conduct research in Physical Oceanography. That is the study of the processes that determine the motion of water in the ocean. Since it was founded three years ago, I have also served as the Executive Director of the Connecticut Institute for Resilience and Climate Adaptation, or CIRCA.

CIRCA was established in response to a recommendation by a legislative task force and with the support of the leadership of the Connecticut Department of Energy and Environmental Protection, and the University of Connecticut. The mission is to increase the resilience and sustainability of vulnerable communities along Connecticut's coast and inland waterways to the growing impacts of climate change on the natural, built, and human environment.

An important charge to CIRCA at its founding was to provide municipalities with planning advice for sea level rise that accounts for local conditions and *"establishes a mechanism for determining appropriate planning based on the sea level change scenarios published by the National Oceanic and Atmospheric Administration in Technical Report OAR CPO-1"*. I offer a report addressing this task for the record.

The CPO-1 document is careful analysis of trends in global mean sea level that was authored and reviewed by scientists of the National Ocean and Atmospheric Administration (NOAA) in 2012. An important element of their conclusions rested on the report of the Intergovernmental Panel on Climate Change (IPCC) published in 2007. This document was authored and reviewed by the world's leading science experts. The authors were awarded the Nobel Peace prize for their work. The IPCC provided another report in 2013. I reviewed that too, and extracted from an archive of their simulations the predictions applicable to the coast of Connecticut. This analysis showed that because of the shape of Atlantic and changes in the ocean circulation, sea level at Connecticut's coast will increase more than most other places in the world. It is also among the most difficult places to predict change. In addition, I examined all the available data on water level in Long Island Sound and made a statistical projection based on the data record.

The primary finding of my work is that four different approaches to prediction broadly agree that mean sea level in Long Island Sound is likely to rise up to 20 inches (0.5 m) by 2050. Note that this is largely

based on the extensively reviewed IPCC 2013 report and the projections based on local data. I recommend that this is a prudent threshold for planning purposes.

It is critical to note that it is highly likely that mean sea level will continue to increase after 2050. However, forecasts then are less precise. In the coming years new data from tide gages and satellites will allow an assessment of the quality of the forecasts that I used. It is also very likely that ongoing science research will lead to revisions to the models and new forecasts. It is, therefore, essential that the analysis I conducted is updated at regular intervals, at least every decade.

The projected increase in the mean sea level may not seem very large, but even a small change can have a very significant, and very predictable, impact on flood risk. In a recent study of the frequency of flooding of stretches of a coastal road, my collaborators at CIRCA and I found that a 10 inch increase in mean sea level led to a factor of two-five increase in the flood risk. The local geography determines and magnitude of the impact and so localized studies are needed, but the impact is clear.

Though the mean sea level rise will be uniform along Long Island Sound, the impact of the change in mean sea level on flood risk will differ. Broadly, I expect that the increase in risk will be higher in the eastern Sound than in the west. Typically, the storms we experience bring strong winds from the northeast. This causes the storm surge to be larger in the west than in the east. If a constant mean sea level is added to the Sound, then the relative impact will be less in area where the surges are already big.

I believe that the proposed legislative measures in Section 14 of SB-7 are prudent first steps to adapting to the impacts of sea level rise. I don't think that there is "Marine Sciences Division of The University of Connecticut," however, CIRCA and the Department of Marine Sciences have the necessary expertise.

Finally, I would like you to be aware that CIRCA has been very active on other issues. With funds allocated by the Commissioner of CT DEEP and technical expertise available at UConn, we have assisted municipalities in adaptation planning, and in the design and implementation of projects from the northwest hills to the southeast shoreline. I submit for the record, and the information of the legislature, a document summarizing the projects we have completed and have underway. In addition, in collaboration with other State agencies, CIRCA has won several major competitions for federal funds to assist towns and the citizens of Connecticut. Though much more needs to be done, I am heartened by the support that the work of CIRCA has received here in Hartford, Storrs, and from people across the state. I would be happy to provide additional information. I can be contacted by email at James.ODonnell@uconn.edu.