

Committer	Comment	Response to Comments
EPA-HQ-OAR-2021-0240-0005	My family and I are commenting on climate change caused by human activity, as opposed to changes that may have resulted as part of Earth's natural processes. History suggests that this whole self-feeding process started in the Industrial Revolution using oil, gas, coal, etc for power to heat, to cook, to till the land, and to travel. We strongly believe that we, the world's humans, must stop the practices of causing faster and faster climate change. Stop airplanes from their huge impact on our air surrounding the planet; change gas vehicles to electric vehicles being careful to monitor and control where and how the electricity is generated; put a hold on 5G development and intallation; stop sending satellites into the atmosphere and trashing our safety net of air surrounding the earth, stop any and all trees from being cut down or burned .... and the list goes on. Please contact experts on all of these issues. We, the citizens of U.S., are counting on you and are working with you.	EPA has long found that greenhouse gases caused by human activities constitute a threat to public health and welfare. Understanding and addressing climate change is critical to the Agency's mission of protecting human health and the environment. It is noted that the commenter does not raise any specific comments on the technical documentation.
EPA-HQ-OAR-2021-0240-0006	I am a retired marine scientist and grassroots environmental activist living on Cape Cod, Ma. I used to work at the Fisheries Laboratory in Woods Hole and served on the New England Fishery Management Council's Habitat Plan Development Team which helped Omnibus Habitat Amendment 2 which was released by NOAA Fisheries Greater Atlantic Regional Fisheries Office in 2018. This document didn't include climate change effects in the ocean surrounding Cape Cod. The 2020 NOAA Fisheries State of the Ecosystems Report for the Mid-Atlantic and New England Regions regions described the effects of climate change and eutrophication on the marine food chain supporting managed finfish and shellfish species and their Essential Fish Habitat in state (0-3 miles) and Federal (3-200 miles) jurisdictional waters.	This part of the commenter's submission does not raise any specific comments on the technical documentation.
EPA-HQ-OAR-2021-0240-0006	I live in the Waquoit Bay Watershed here on Cape Cod where the inshore EFH (oyster reefs; eelgrass beds and salt marshes) have been negatively effected by warming waters; increased ocean acidity and "nitrogen enrichment" from septic systems and the bay scallop harvest had collapsed. Periodic hypoxia in Cape Cod Bay has killed lobsters in their pots. The wider Gulf of Maine has had dramatic changes in biodiversity; managed species such as cod and sea herring and increased mortality of North Atlantic Right Whales from ship strikes and entanglements in crab/lobster pot gear. ENGO lawsuits lead the Massa. Division of Marine Fisheries to develop a plan for reducing Incidental Takes in state waters and NOAA Fisheries developing a revised recovery plan under the Marine Mammal Protection Act. Unusual Mortality Event lawsuit. The Cumulative Environmental Impact Analysis of BOEM found potential harm from 21 wind farms between North Carolina and southern New England on fisheries management and NARWs.	EPA has long acknowledged the risks that climate change poses to marine environments and the fisheries they support. Impacts on a select number of marine fisheries in the U.S. is actually one of the latest sectors being built into the framework that is described in this technical documentation (results are not ready for the final version of the documentation being published, however). This marine fisheries analysis is based on the following research paper ( <a href="https://www.worldscientific.com/doi/10.1142/S2010007821500020">https://www.worldscientific.com/doi/10.1142/S2010007821500020</a> ). The report has been revised to acknowledge that important ecosystem effects are areas for future consideration in expanding the coverage of impacts.
EPA-HQ-OAR-2021-0240-0006	I don't pretend to understand the potential implications of EPA's Temperature Binning Framework on the ocean, but the Northeast Continental Shelf Ecosystem Conceptual Model which assumes linear food chain interactions and a system which is at a steady state is obviously not true for Nantucket Sound; Cape Cod Bay and the > 52 embayments on Cape Cod. Climate disruption has lead to a system with non-linear interactions which is not at equilibrium, so that the long term adaptation/mitigation to climate effects is unknowable. EPA Region 1 is one of the management entities overseeing the Comprehensive Wastewater Management Plans to reduce "N" loading from septic systems on water quality and habitats in our embayments. This endeavor under section 208 of the Clean Water Act will cost \$ 2-8 billion over the next 20-30 years. The Fishery Management Councils are developing adaptive, ecosystems-based management approaches for finfish and shellfish populations as these species, their prey and predators shift in time and space. There needs to be better integration of climate emergency responses bey]tween the Barnstable County Climate Action Plan; state Gateway to Climate action endeavors; Northeast Regional Ocean Plan/Massa. Ocean Management Plan and Federal efforts by EPA; NOAA Fisheries; BOEM; etc. The Endangered Species Act recovery plan for NARWs to be implemented by 2030 is totally inadequate to increase birth rates and reduce human-caused mortalities.	The FrEDI (temperature binning) framework is designed to quantify and monetize the impacts of climate change under custom scenarios to help inform analysis of alternative GHG pathways. Climate change impacts on marine and coastal ecosystems are relevant effects for inclusion in FrEDI and current work is beginning to build these impacts into the framework. This part of the commenter's submission does not raise any specific comments on the technical documentation.
EPA-HQ-OAR-2021-0240-0008	It looks like the EPA is factoring in the loss of \$\$\$\$ to the industries and practices that are adding CO@ and other gases to our atmosphere thus raising the temperature of our planet causing the dangerous effects to climate and weather patterns and the melting of ice sheets and glaciers resulting in the rise of the oceans and its Ph balance which is resulting in the death of corals and other life forms in our oceans, the increase and magnitude of storms across our planet, mass extinctions of species instead of actually addressing the causes of the increases to the temperature of our atmosphere and correcting them. Our models indicate that there is less than 7 years until we go over the final tipping point and there will be nothing that will stop the progression of climate change across our planet. Scientists have been telling you this for over 100 years (my Dad included and now me). We know the end result and yes it will cause numerous companies to stop their uses of fossil fuels, methane gases, the clear cutting of forests (especially the rain forests that are where our planets various weather systems are "created". So my comment is the following: you must act now not continue to "drag your feet" for the sake of the corporations that will have to change from fossil fuels and other warming gases, stop the wasteful uses of plastics, reduce and even eliminate the use of pesticides (as Rachel Carson told us in her book Silent Spring), increase fully functioning "half earth's" as Dr. E. O. Wilson recommends, sequester Carbon, and go to 100% renewable enegy sources NOW. Time is running out .....extinction awaits or survival. It will depend on actions not BS!	EPA has long acknowledged the risks that climate change poses to human health and the environment, and is taking action within its authorities to address these risks. However, the FrEDI framework is an analytic tool designed to inform decision-makers about the risks of climate change. The technical documentation of FrEDI is not related to the regulation of greenhouse gases or other pollutants, and therefore no changes to the report are needed in response to this comment.
EPA-HQ-OAR-2021-0240-0009	I hope that knee-jerk public opposition to any mention of radiation won't keep us from what I think is the necessary (main) component of a truly green future. Numerous small facilities that create virtually no dangerous waste, require no containment dome, and shut down safely if a problem arises, are in my judgement the only realistic solution to global warming. Current nuclear technology is light years ahead of what it was 50 years ago, but public perception is irrational fear based on a handful of high-profile disasters that would not be part of a properly designed nuclear future! Solar and wind power are welcome, but they have their own downsides, not least of which is inadequacy to produce the power that we will demand in the future. And though fossil fuels will never be totally eliminated, it's essential that our dependence on them be drastically reduced.	The FrEDI framework is an analytic tool designed to inform decision-makers about the risks and impacts of climate change. The technical documentation of FrEDI is not related to the regulation of greenhouse gases or other pollutants, nor how the energy system will change in the future. No changes to the report are needed in response to this comment.

Committer	Comment	Response to Comments
EPA-HQ-OAR-2021-0240-0010	I am a retired geologist with an M.A. in Geology and have travelled widely on our planet Earth during the past 62 years since I was 20 years old. In order for mankind to limit global warming to a maximum increase of 1.5-2.0 degrees C. by 2050, we must use all of the possible green energy methods available to produce enough electricity for everyone living in 2050. This includes solar, wind, hydro, hydrogen, nuclear(fission and fusion), and other possible new discoveries. I believe that the newest 4G & 5G nuclear power plants that are safe and can have no or just low level remaining radioactive waste can provide a very important role in helping to create a livable world for future generations of human beings and all other life forms. This means that all countries and their governments must act now in unison in order to achieve a livable planet Earth for all future generations of life.	EPA understands the serious risks posed by climate change. The FrEDI framework is an analytic tool designed to inform decision-makers about the risks and impacts of climate change. The technical documentation of FrEDI is not related to the regulation of greenhouse gases or other pollutants, nor how the energy system will change in the future. No changes to the report are needed in response to this comment.
EPA-HQ-OAR-2021-0240-0011	I am concerned about our oceans. There is too much over fishing and I am concerned that the drastic changes we are forcing upon our water is not spoken about enough and not enforced enough. Commercial fishing needs to be handled and spoken about more.	EPA has long acknowledged the risks that climate change poses to marine environments and the fisheries they support. Impacts on a select number of marine fisheries in the U.S. is actually one of the latest sectors being built into the framework that is described in this technical documentation (results are not ready for the final version of the documentation being published, however). This marine fisheries analysis is based on the following research paper ( <a href="https://www.worldscientific.com/doi/10.1142/S2010007821500020">https://www.worldscientific.com/doi/10.1142/S2010007821500020</a> ). The report has been revised to acknowledge that important ecosystem effects are areas for future consideration in expanding the coverage of impacts.
EPA-HQ-OAR-2021-0240-0012	I'm concerned about a broad issue, the problem of lack of sensitivity to scale constraints in thinking about economics and climate change. There are, contrary to assertions by economists that price adjustments, substitution for scarce resources and new technology can solve any resource limit, genuine constraints on ecosystem services and natural resources. The planet is finite. Substitutes also run out. There are no substitutes for essentials like water, energy, plant nutrients, biodiversity, temperate climate, etc. EROI puts constraints on fossil fuel supplies, regardless of price. I did some simple projections using the Kaya Identity as a heuristic for understanding climate remedies. $C = C/E \times E/Y \times Y/P \times P$ . C=emissions, E = energy, Y=output or GDP, P = population. With $Y/P \times P = Y$ growing at 2-3% annually, the growth in renewable energy technology has, so far, been like walking on a treadmill. For every step forwards via new solar and wind, there are two steps backwards due to economic growth. It is unlikely that emissions can be reduced fast enough unless growth is moderated. In my opinion, population growth is the easiest to reverse, since it has already been reversed through empowerment of women who, in all advanced countries, choose below replacement fertility rates. The challenge, in a world with 80 million annual population increase (a billion added every twelve years since 1974 (when 4 billion was reached and leading to a doubling to 8 billion by 2023), is to extend modern contraceptive use and smaller family size norms to the rest of the world. This global demographic transition is essential for solutions to many other problems ranging from immigration (Not many immigrants to the U.S. from Europe anymore, TFR 1.6 children/woman) to the sixth extinction event. Yet there is little mention of policies to reduce population growth, or rather to assist women to avoid unintended pregnancies and to change family size norms in a world where mortality has been reduced, in large part due to fertility declines. 3% growth will double Y 16 fold in a century. I doubt you can build that many windmills. Nor do we want to live in an overcrowded world where, as J.S. Mill pointed out in his "Of the Stationary State" essay in 1848, every other species has been extirpated to support a "larger but not happier" human population	The FrEDI framework is an analytic tool designed to inform decision-makers about the risks and impacts of climate change in the U.S. The technical documentation of FrEDI does not discuss or advocate for any particular strategy to reduce greenhouse gas emissions nor strategies to control population growth. These issues are well explored elsewhere in the literature, for example, the Intergovernmental Panel on Climate Change's Sixth Assessment report. The FrEDI tool can account for changes in future socioeconomics, including population growth, however, the analysis is limited to considering how changes in socioeconomics will affect the number of people/resources affected by climate damages. No changes to the technical documentation are needed in response to this comment.
EPA-HQ-OAR-2021-0240-0007	I am a climate scientist and climate advisor to the State and people of Vermont. This draft document is clearly written and highlights some of the key issues in downstream costs by sector and adaptation choices. I have two comments 1) No biosphere costs are included or discussed, even though these will likely far exceed costs associated with human infrastructure by the latter half of the century, and will feedback on both economics and society. Add a paragraph on the need to develop a biosphere sector, while recognizing the large current uncertainties in the natural world impacts. This placeholder will be developed further this decade. Think of it as a biosphere analog for VSL.	Climate change risks to ecosystems, species, and the services they provide are important considerations for decision-makers. The technical documentation is clear that FrEDI does not include all potential impacts from climate change, and that the objective is to populate the framework with as many impacts as the literature supports. Ecosystem impacts is a focus for future work, and we have added language noting this omission in the technical documentation.
EPA-HQ-OAR-2021-0240-0007	2) Model basis is fine but assuming this continues, get used to showing and updating the real U.S trends each decade. NOAA just released the decadal climate update for 1990-2020 and showed these differences from the previous 1980-2010 for temperature and precipitation. Because precipitation and the water cycle is critical, but has a large uncertainty between models (see Figure 3), a look at the real world changes (with suitable disclaimers for a 10-yr shift and smaller deltaT) is a critical help for readers trying to assess Figure 3.	The FrEDI framework has been designed to accommodate updates to the underlying climate modeling projections (including baseline periods) that are developed under the Coupled Model Intercomparison Project. Sectoral impacts within FrEDI are currently estimated using CMIP-5 projections, however, as the next generation of projections are downscaled for the U.S., we will plan to incorporate and apply them as appropriate.