

**COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY  
U.S. HOUSE OF REPRESENTATIVES  
HEARING CHARTER**

*Now Or Never: The Urgent Need for Ambitious Climate Action*

**Thursday, April 28, 2022**

**10:00 AM EDT**

**2318 Rayburn House Office Building and Online via Zoom**

**Purpose**

This hearing will provide an opportunity to examine the findings, conclusions, and recommendations of the three Working Group (WG) reports: WGI, “The Physical Science Basis”; WGII, “Impacts, Adaptation, and Vulnerability”; and WGIII, “Mitigation of Climate Change” which will comprise the Intergovernmental Panel on Climate Change’s (IPCC) Sixth Assessment Report (AR6). The Committee will consider the urgent need for adaptive research and development while meeting short- and long-term sustainable development goals. This hearing also will examine diverse communities’ needs in order to rapidly adapt to climate change and extreme weather events.

**Witnesses**

- **Ms. Ko Barrett**, Vice-Chair, Intergovernmental Panel on Climate Change (IPCC); NOAA Senior Advisor for Climate
- **Mr. Jeremy Harrell**, Chief Strategy Officer, ClearPath
- **Ms. Dominique M. David-Chavez, PhD**, Assistant Professor of Indigenous Natural Resource Stewardship, Colorado State University
- **Ms. Daniella Levine Cava**, Mayor, Miami-Dade County, Florida

**Key Questions**

- Are there outstanding questions in the scientific field that need to be addressed in order to take the next steps in adaptation and resiliency?
- What urgent, near-term steps must be taken on a national scale to address the adaptation and mitigation needs recommended by the IPCC?
- How can community practitioners be better resourced to address climate adaptation and mitigation in their communities and ensure sufficient information and knowledge transfer between communities?
- What type of mitigation efforts are needed in order to not exceed 1.5°C of global warming in the next century? What does the window of opportunity look like for implementing these efforts, and is it closing?
- What climate service support tools can be integrated on a community-wide level to further involve local communities in adaptive climate resiliency and increase equity?

## **Background**

There is increasing data to illustrate the changes that will be faced in the near and long term in communities across the US due to the impacts of climate change. Investment in low-emissions technologies, research and development, and adaptive environments can be made to mitigate climate change and avoid the most disastrous of climate effects. The United Nations (UN) states that climate change is an issue that will require substantial cooperation and coordinated solutions. In 2016, the US joined 192 other parties in the Paris Agreement, which set guidelines to reduce greenhouse gas (GHG) emissions and limit the global temperature increase during this century to 2°C, with an aspiration towards limiting warming to 1.5°C.<sup>1</sup> The Intergovernmental Panel on Climate Change (IPCC) is an organization established by the UN which focuses on assessment of climate change related science. This organization synthesizes reports which consider climate change problems and solutions from a scientific basis, the latest of which is the 6<sup>th</sup> Assessment Report (AR6) due to be released this later this year.

The information synthesized from the IPCC reports can be utilized to catalyze decisions in the US climate research and preparation spaces. The severity of climate related events in the US has become more pronounced over the past decade – but several concentrated climate events across communities in the past year have further highlighted the importance of adaptive, localized, and timely solutions to climate resiliency. For example, not only was 2017 the most active hurricane season in in the past decade, it also included Hurricane Harvey, the costliest cyclone event of the decade due to its record-breaking rainfall and subsequent flooding. The IPCC recognizes that historic rainfall is 3-10 times more likely as the result of climate change.<sup>2</sup> The west coast megadrought – currently entering its 20<sup>th</sup> year – marks the driest the region has been in 1200 years. NOAA predicts a prolonged drought in the west this season.<sup>3</sup> The frequency of heat waves is increasing across major cities across the US, with extreme heat waves becoming more common.<sup>4</sup> In 2021, a 1000-year extreme heat event was observed in Western North America, where extended high temperatures caused an estimated \$8.9 billion in damages.<sup>5</sup> Wildfires across the western US have also been observed in greater frequency and intensity.

Although the scale of climate related events has steadily increased, adaptive solutions are available which can be inclusive and increase readiness for climate-related events. The IPCC reports, and work at Federal science agencies, can provide insight into the research and development opportunities the US should pursue for resilient and adaptive solutions.

## **Intergovernmental Panel on Climate Change Sixth Assessment Report Findings**

Established in 1990, the IPCC focuses on synthesizing regular Assessment Reports (AR) through three working groups: Working Group I (WGI), which focuses on the physical science basis,<sup>6</sup> Working Group II (WGII), which assesses the impacts and vulnerabilities of systems to climate

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<sup>1</sup> <https://www.un.org/en/climatechange/paris-agreement>

<sup>2</sup> [https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC\\_AR6\\_WGII\\_FinalDraft\\_Chapter14.pdf](https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_FinalDraft_Chapter14.pdf)

<sup>3</sup> <https://www.noaa.gov/news/spring-outlook-drought-to-expand-amid-warmer-conditions>

<sup>4</sup> <https://www.epa.gov/climate-indicators/climate-change-indicators-heat-waves>

<sup>5</sup> <https://www.ncdc.noaa.gov/billions/events>

<sup>6</sup> <https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/>

change,<sup>7</sup> and Working Group III (WGIII), which considers the options for mitigating climate change and GHG emissions.<sup>8</sup> The IPCC considers these options through the lens of Sustainable Development Goals (SDG)– 17 goals which can lead to a reduction in emissions while improving quality of life for communities and habitats.

The IPCC’s working group reports have culminated information from hundreds of authors across the planet, and have determined that, in accordance with the Paris Agreement, GHG reductions must reduce global warming below 1.5 °C in the near term (2021-2040) to prevent unavoidable increases in climate hazards. The 2022 AR6 working group reports further synthesized new information on the impacts of climate change, namely that many of these impacts have been attributed to human-induced change. These include coral bleaching, increases in wildfire, sea level rise, loss of ecosystems, and adverse socioeconomic consequences. These changes also lead to irreversible losses: loss of species due to heat extremes, mass mortality events, and loss of kelp forests.

Impacts to core societal functionality have also been observed. Climate change has led to reduced food and water security globally, which impacts SDGs. It has also impacted the physical and mental health of individuals through exposures such as wildfire smoke, atmospheric dust, and aeroallergens. Heat waves, which intensified in cities and combined with air pollution, create severe impacts to marginalized urban residents. Mental health effects from displacement and other cumulative effects are further reported.<sup>9</sup>

The 2021 WGI report focused on the physical science basis and detailed the startling scale at which anthropogenic influence has caused harm to the climate system. The report found that human influence has induced rapid changes and unequivocally warmed the atmosphere, ocean, and land.<sup>10</sup> The report also highlighted that there are irreversible consequences to the oceans, ice sheets, and global sea level that will occur regardless of actions taken immediately due to past GHG emissions.<sup>11</sup> Combatting future climate change impacts will require limiting anthropogenic global warming by confining cumulative carbon dioxide (CO<sub>2</sub>) emissions.<sup>12</sup> Significant, sustained, reductions to other major GHG emissions, such as methane (CH<sub>4</sub>), would also be needed to limit warming.<sup>13</sup> The WGI report provided the facts and scientific basis needed to determine what adaptation and mitigation measures will be needed.

The WGII report highlighted increasing evidence that the human destruction of ecosystems increases vulnerability. This includes unsustainable use of land and natural resources, deforestation, pollution, and biodiversity loss. Adaptive methods such as nature-based infrastructure, covered in a prior hearing, can be utilized to mitigate the loss of natural ecosystems while providing benefits to the communities they are implemented in.<sup>14</sup>

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<sup>7</sup> <https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/>

<sup>8</sup> <https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/>

<sup>9</sup> <https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/>

<sup>10</sup> [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_SPM\\_final.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf)

<sup>11</sup> [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_SPM\\_final.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf)

<sup>12</sup> [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_SPM\\_final.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf)

<sup>13</sup> [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_SPM\\_final.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf)

<sup>14</sup> <https://science.house.gov/hearings/from-gray-to-green-advancing-the-science-of-nature-based-infrastructure>

The WGIII report assessed progress made in limiting global emissions and reviewed available mitigation options across sectors and systems. WGIII found total net anthropogenic GHG emissions have continued to rise and were higher than any previous decade during the period 2010-2019.<sup>15</sup> In addition, net anthropogenic GHG emissions have increased since 2010 across all major sectors globally and can be increasingly attributed to urban areas.<sup>16</sup>

“Overshooting” is an option that has been explored that involves temporarily allowing for global warming to exceed 1.5°C, followed by a broadly implemented use of carbon capture technologies to greatly reduce warming beneath 1.5°C by the end of the century.<sup>17</sup> However, the WGIII report determined that the practice of overshooting and allowing for even a temporary exceedance of 1.5°C warming would lead to irreversible impacts, including the loss of glaciers and coral reef systems. If overshoot is not to occur, all global modeled pathways limiting warming to 1.5°C almost unanimously require rapid, deep, and immediate GHG emission reductions in all sectors.<sup>18</sup>

The WGIII report, recognizing that there is no panacea for mitigation, took a significant step to include a dedicated chapter on demand, services, and social aspects of mitigation. This dedicated chapter found the inclusion of demand-side mitigation—a largely overlooked mitigation response utilizing *Avoid-Shift-Improve* (ASI) options—can reduce global GHG emissions in end-use sectors by 40-70% by 2050 compared to baseline scenarios.<sup>19</sup> ASI options consider specific scenarios, such as transportation sector based GHG emissions, and break them down into options (ie, avoiding transport demand, shifting to efficient transportation methods, and improving the GHG emissions of transportation.) Socio-cultural changes can provide large scale, on the order of Gigaton-scale, CO<sub>2</sub> emissions reduction at the global level, and were also found to improve basic well-being.<sup>20</sup>

### **Recommendations and U.S. Examples of Adaptation and Mitigation**

The IPCC WGII report recommends utilizing diverse forms of knowledge in the implementation of adaptation and resilience strategies, including information from scientific, local, and indigenous communities. When developing climate resilient strategies, the WGII report recommends cooperation by governments at all levels from federal to local, and encourages partnerships with traditionally marginalized groups. These include “women, youth, Indigenous Peoples, local communities and ethnic minorities.” The report states that partnerships are most effective when resources and support are enabled and combined with climate service and decision-making tools. Both near and long-term decision-making tools should be implemented to mitigate the impact on communities and best manage resources. This includes policy “focused on modifying land use impacts, consumption patterns, economic activities, and emphasizing nature-based solutions.”

Developing and utilizing regionally specific climate action plans is a method that many US communities have already implemented. Thirty-four US states have released climate action plans or are currently developing an action plan.<sup>21</sup> Several US cities have also adopted climate action

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<sup>15</sup>[https://report.ipcc.ch/ar6wg3/pdf/IPCC\\_AR6\\_WGIII\\_SummaryForPolicymakers.pdf](https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_SummaryForPolicymakers.pdf)

<sup>16</sup> [https://report.ipcc.ch/ar6wg3/pdf/IPCC\\_AR6\\_WGIII\\_SummaryForPolicymakers.pdf](https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_SummaryForPolicymakers.pdf)

<sup>17</sup>[https://report.ipcc.ch/ar6wg3/pdf/IPCC\\_AR6\\_WGIII\\_Annex-I.pdf](https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_Annex-I.pdf)

<sup>18</sup> [https://report.ipcc.ch/ar6wg3/pdf/IPCC\\_AR6\\_WGIII\\_SummaryForPolicymakers.pdf](https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_SummaryForPolicymakers.pdf)

<sup>19</sup> [https://report.ipcc.ch/ar6wg3/pdf/IPCC\\_AR6\\_WGIII\\_FinalDraft\\_Chapter05.pdf](https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_Chapter05.pdf)

<sup>20</sup>[https://report.ipcc.ch/ar6wg3/pdf/IPCC\\_AR6\\_WGIII\\_FinalDraft\\_Chapter05.pdf](https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_Chapter05.pdf)

<sup>21</sup> <https://www.c2es.org/document/climate-action-plans/?msclkid=8092e07abfea11eca86aff7e5ed18cd2>

plans in accordance with the Paris Agreement. Implementation of these plans involves determining the greatest sources of GHG emissions and the steps needed for drastic reductions. Cities implementing climate action plans include Houston, Texas which began implementing its climate action plan in the spring of 2020,<sup>22</sup> and Miami-Dade County which has implemented an action strategy to cut emissions by 50% by 2030.<sup>23</sup> Methods for GHG emissions reduction include the retrofitting and construction of low energy buildings, reduction of fuel consumption, and the investment in green energy production methods.

### **Federal Climate Assessments and Services**

Federal agencies have produced a variety of reports and assessments in parallel to the IPCC. Several Federal agencies provide services that can implement the recommendations of Agency reports and the IPCC. For additional information regarding climate services provided by the Federal government, please see *Working Towards Climate Equity: The Case for a Federal Climate Service* and *From Gray to Green: Advancing the Science of Nature Based Infrastructure*.<sup>24,25</sup> Recent and forthcoming agency reports incorporate climate change information into the themes of their messaging.

*US Global Change Research Program (USGCRP)*: The USGCRP leads a quadrennial assessment of the current and future impacts of climate change on the US. The 5<sup>th</sup> National Climate Assessment, produced by a collaboration between USGCRP agencies, is currently in progress and set to be released in 2023.<sup>26</sup>

*National Oceanic and Atmospheric Administration (NOAA)*: In early 2022, NOAA released the Sea Level Rise Technical Report, a multi-agency effort which considers sea level rise projections for the US and territories. The report considers sea level rise projections in both the near-term (2020-2050) and long term (2050-2150), and provides the structure to considerations that could be made in developing adaptive methods for coasts and inland areas. Per the IPCC WGI report, as floodplains expand, adaptation may require the use of retrofitting structures or revising zoning, with the understanding that some structures or neighborhoods may need “to be abandoned altogether to accommodate expanded flooding risk.”<sup>27</sup>

*Environmental Protection Agency (EPA)*: The EPA’s 2021 Climate Change Impacts and Analysis (CIRA) assesses climate change as it relates to social vulnerability in the US.<sup>28</sup> This assessment provides information on where areas of social vulnerability are the highest, and can be utilized in the implementation of inclusive climate adaptation strategies.

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<sup>22</sup> <http://www.greenhoustontx.gov/climateactionplan/index.html>

<sup>23</sup> <https://www.miamidade.gov/green/library/climate-action-strategy-final-draft.pdf>

<sup>24</sup> <https://science.house.gov/hearings/working-towards-climate-equity-the-case-for-a-federal-climate-service>

<sup>25</sup> <https://science.house.gov/hearings/from-gray-to-green-advancing-the-science-of-nature-based-infrastructure>

<sup>26</sup> <https://www.globalchange.gov/nca5?msclkid=74d48641bfed11ec8d5696f984c8f272>

<sup>27</sup> [https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC\\_AR6\\_WGII\\_FinalDraft\\_Chapter14.pdf](https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_FinalDraft_Chapter14.pdf)

<sup>28</sup> [https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability\\_september-2021\\_508.pdf](https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability_september-2021_508.pdf)