USGCRP Listening Session Live Transcript

Session Theme: Global Change and Water **Session Date: 9 November 2021**

>> I am an independent consultant connecting in from Boulder, Colorado. On behalf of the program, the USG CRP I welcome you to this listening session on global change issues with a specific focus on water related challenges and opportunities. Through USG CRP they coordinate global change research and use the results to create tools and assessments to help people make decisions in the context of global changes. Through this session and others in this five-part series, we aim to connect more directly with users and researchers who are building and applying global change information and tools in their work and to gather insights and information that USGCRP can consider as a PDF plans the implementation of its work over the coming decades. In these sessions we are welcoming staff from the USGCRP and agencies that are part of the USGCRP, members of the National academies committee to advise the USGCRP, in which I'm honored to be a member, and all of you, users and researchers who are engaged in building on and applying the types of knowledge and tools that the USGCRP is charged with developing and supporting. So we can see the agenda slide. Okay. So in today's session, following the introductory remarks by myself and USGCRP staff and Wayne Higgins, we have a series of speakers who will provide statements, all of whom have expressed interest in contributing when registering for the session. Everyone here will have opportunities to contribute during an engagement platform that we will introduce shortly. Just note, representatives from the USGCRP and the committee to advise the USGCRP are attending and listening mode today. So thank you for joining and we look forward to hearing from you over the next 90 minutes until 3:30 Eastern. I would like to acknowledge that while today we are gathered virtually warehouse under traditional land of the people's past and present. We honor with gratitude the land itself and the people who have stewarded throughout the generations and we honor and respect the enduring relationship that exists between these peoples and the nation's in this land. We thank them for their resilience, protecting this land, and aspire to uphold our responsibilities to their example. We also acknowledge that our understanding of water and global change issues are closely related to and formed by indigenous knowledge and experience. And that many native communities on the front line of impacts from these changes. As I mentioned earlier, I'm joining you from Boulder, Colorado, which is the traditional land of the Arapahoe and Cheyenne peoples. So I and the other members of the committee to revise the USGCRP are very much looking forward to these sessions to connect directly with researchers and users who are using and applying global change information in their work. As part of our regular meetings throughout the year, we provide this and other opportunities to engage with and hear from broad audiences to inform this important work. The goals of this series of listening sessions include gathering useful actionable input for USGCRP for implementation of its work, making connections and expanding a group of researchers and users were directly engaging with the USGCRP, recognizing connections across researchers, users, and themes of USGCRP and its products or USGCRP work and its products and finally informing potential future engagement mechanisms and opportunities. Including forms, purchase, and participants for such engagement. Today, we are seeking input on how USGCRP may implement its work to better understand and address global change issues. You don't need to be familiar with the USGCRP to provide input. We are specifically seeking to connect with a broader audience in these sessions. If you're unfamiliar with USGCRP, we hope you have had a chance to view the introductory video on our event pages before this session or encourage you to view it after the session. In preparing for these listening sessions, USGCRP requested input and insights on the following themes to inform the development of its strategic priorities and activities. First, diversity, equity, and inclusion. What actions should be prioritized to fully incorporate these values in research, community engagement and workforce development. How do we implement them. Second, advancing science. What are the priority gaps and

foundational science methods, the require enhanced long-term investments. Third, use inspired research. How do we ensure that USGCRP science and products are better driven by and connected to users including, for example, improved use of consultation and collaboration, translation, dissemination, informing climate services, socioeconomic sciences integration. And socioeconomic sciences integration itself is a point. What are the priorities for integrating socioeconomic sciences into our programs and to inform critical decisions. So particularly helpful feedback might include ideas on emerging large-scale scientific questions related to global change and/or response especially those today how science is or is not being used and why. And knowledge gaps and obstacles to implementing science tools or knowledges. Please note the USGCRP is developing its next strategic plan and expects relief the draft prospectus with public comment opportunity before the end of 2021. That is by the end of next month. While these listening sessions may help inform the development or implementation of this plan, individual feedback on the perspective should be submitted to the comet mechanism. I just want to remind all the speakers usually have time we are going to be holding you to a five minute limit. Our expectations were contacted we are committed to fostering professional respectful and inclusive environment where all participants duty all can participate fully in an atmosphere that is free of harassment and discrimination based on any identifying identity-based factors and please note, these specific bullets here, I'm not going to read them and if there is any misconduct, please report this immediately to Stephen. His email is right there. I went to turn it over to Stephen for some other items to cover before we hear from our speakers.

>> Greetings and thank you for the introduction and welcome. So we have these sessions as described are really to seek input from you on how USGCRP implements and carries its work forward over the coming decade. And to hear from you we have a couple of different ways we are going to be interacting for this session. Anybody who is hearing me has successfully gotten onto Zoom so welcome. We encourage you to change your name to reflect your full name and the affiliation or the affiliations you have so that others who may be looking in the chat can find you and understand where you have the date the perspective you are bringing into the room. Additionally, we are providing live closed captioning at this event, so you can find that under the live transcript button within Zoom. If you have any need for assistance, please send a chat to the host through the Zoom chat or send an email to Rob Greenway, my colleague, who will be supporting us on the technical side at the email that's listed. Next slide, please. So our other mode of interaction with you is -- so the diddy what will be happening in the Zoom window we have a series of speakers will be talking about their recommendations and thoughts for you as USGCRP. We also want to give everyone who is in this room the opportunity to provide their insights and contributions. I invite you at this point in time to go ahead and join our slido platform. You can do that either by diddy if you're using a mobile device for your interaction, you can pointed to this QR code. Alternatively you can go to slido.com and enter the code which is hashtag 881326 and then in the chapter is a link directly to slido. It will first ask you to provide your first and last names. And then once you get into slido, we will use the Q&A component. Polls are listed but we are going to be focusing on the Q mandate today. With the Q&A we are asking the same questions we are asking the speakers. What are your insights, recommendations, and comments for USGCRP as it moves into this next decade of work on how they do what they do? Any comments about future strategic plan for the public session. Within the slide, we will be adding points from the speakers and we ask you to add your points as well. And you also have the opportunity to other questions and comments. We encourage you to put statements rather than questions. We will be specifically answering questions in the session. Finally in the platform, you can watch -- you can order the comments either by the most recent comments people

have put in that reflexively uploads other participants may be giving. Finally, we ask that you two respectful in all of your engagements on this platforms. We are, as you would see the beginning, we are recording this session and we will be making this recording available more broadly. There's a disclaimer about that recording. Additionally, the inputs that we received from the slido platform will be part of the public access for this event. Comments and names of people who provide the comments will be included in the public record, so please keep that in mind when adding your comments and contributions. Finally, we have asked speakers who are coming today, they are coming from an organization, and we've asked them to speak from their own perspective. It may well reflect the organizations that the speakers are coming as individuals for their presentations. So thank you, and please provide us with rich and enthusiastic commentary and engagement throughout this session. With that, I would like to invite Wayne Higgins on. Wayne is representing the USGCRP. We want to welcome you into this session.

>> Thank you very much. I appreciate this opportunity to say hello. Good afternoon. Good morning to the West Coast participants. My name is Wayne Higgins. I am the chair of the subcommittee. The duty you heard from jewelry referred to the organization as the USGCRP, so you can think of the subcommittee as the Board of Directors for USGCRP. I am here today representing the 13 agencies that make up USGCRP and we want you to know that we are very serious about our legislative mandate which is to assist the nation and the world to understand, assess, predict, and respond to human induced and natural processes of global change. So on behalf of USGCRP, I really want to say thank you for your interest and your time and your expertise. Again, your input will be heard as we draft this 10 year strategic plan for USGCRP. It will be valid for the period from 2022 to 2031. In addition to staff from the national academies, there are a number of federal agency representatives and also USGCRP national coordination office staff here today as well. They will be listening very carefully and taking notes that will inform our discussions in writing this new plan. The new plan, as mentioned, will be completed late next year in 2022. As Joe mentioned earlier between now and then, you can expect to see a prospectus, prospectus being a high level outline of the plan and that will come out for public comment in the next month. And you will see a full draft of the plan released for public comment and for review by the national academies in the middle of 2022. Please watch for these opportunities to comment on the prospectus and the draft plan. And finally, on behalf of the USGCRP, I want to express our sincere thanks for organizing these listening sessions and specifically today to Stephen, your host, as well as Amanda Stout and Amanda Purcell. I want to extend my thanks to Katie Rees and Julie Morris from the USGCRP. We look forward to your comments and suggestions and I thank you very much. Back to you, Steve.

>> Thank you. Thanks, Wayne for those remarks and now it's our turn to hear from you. Let me just go over the ground rules. To make it fair to everyone to make sure that we have time for 12 speakers to speak we have strict time limits. You each have been allocated 3 to 5 minutes to give you remarks and I will let you know when you have 30 seconds left and that's when you are four minutes and 30 seconds into it and if need be, I will jump in when you have exceeded your five minutes and get us onto the next speaker. I'm going to introduce you by name. Please introduce your institution or your affiliation or your background as you wish. Let me turn first to David Behar.

>> Good afternoon everybody. I'm with the department of the city and County of San Francisco. So my focus is on climate adaptation. It's going to be my focus in his remarks. I was the founding chair of the alliance you will be hearing from Amanda in a minute. I'm currently the chair of the Bay Area climate adaptation network which is a network of local governments and community-based organizations focus

on adaptation in the Bay Area. Finally, I'm also cochair of the grand challenge committee of the world climate research program, which is focused on understanding what science we need to work on the resilience of coastal communities around the planet. There is a theme that I've noticed in this work among science entities and lead research regarding the impacts of climate change like the USGCRP. Your strategic plan about to be updated says we should -- you should inform decisions and provide a scientific basis to inform and enable timely decisions on adaptation and mitigation. The American geophysical Union strategic plan calls for moving science from usable to used. And finally, the W CRP's strategic plan sets a goal of bridging climate science and society. So linking climate science to societal needs, particularly regarding the need to adapt, is a top of mind theme for this science entities out there. We appreciate that, and that's important. Quickly I'm going to review the input on advancing science that was requested. I'm going to go through this really quickly because I don't think this is the most important part of what I'm going to talk about. But in terms of the hard sciences, we need better work on high end salable rise and password has been -- that's an important component of adaptation. Long-term participation are poorly last -- storms are top of mind both in East and West Coast but we need to better understand meteorological drought in the future its intensity and frequency, several good hydrologic model under low flow conditions is particularly challenging. We need a little bit of research on that and then finally on omissions we need to ensure the best treatment of the pathway we are on today is a planet which is 2.7 degrees centigrade in the year 2100. It's not adequate anymore to present our CP 2.6 and our CP 8.5 which are two of the least likely outcomes we should expect to be living in over the next 100 years. In terms of feedback on use inspired research, I think were important on the sensitive science I just mentioned is the process of discerning exactly what decision-makers need for our decision-making processes. You need to meet decision-makers where they left to provide actionable information access and vulnerability for educating the public and then finally, when it comes time to implementing adaptation action which will be both expensive and difficult politically, sociologically, economically. This means engaging with adaptation practice in the production of actionable science. In particular, create connectivity with communities outside the federal government. I often talk about the top agencies in the federal government that are operations oriented like when they get information from federal science entities it's a little bit like the rich getting richer. Think about this entities like us that are much less resourced that really need actionable information and engage with those communities outside the federal government. Doing the hard work of coproduction working with us to understand our questions before initiating some of your science. Invest in -- it's more difficult than research in some ways that's investment we would like to see collectively and the agencies that make up the individually to invest in. We need to expand the provision of climate translation and client services that needs to scale up to meet the need that's growing. You know how to do that and you have the program to know and we have the client adaptation science centers and USGS which feature people and data both. They demonstrated the professional -- how can work and be successful. In other words, the need is not so much for product as were process.

>> You have a few seconds left.

>> Engagement, coproduction, client services are not in and of themselves research. We know that, but they are investments that lead to research that meets the needs of an increasing number of communities trying to understand how to adapt to the challenge of climate change which is the 21st century challenge.

>> I would like to now call on Lucy Rodriguez.

>> I hope you can hear me well.

>> Yes, we can.

>> Thank you so much for this opportunity. It's an honor to talk today. And David Behar brought a very important points, but today, I want to give a couple of points of concern that sometimes are left out of the discussion especially in regards to what are the issues. What I want to discuss today has to be a critical component of how our research efforts. I think we should also focus on water quality and how our changing climate will affect our water sources. In there are points I would like to discuss regarding water quality and the climate crisis was related to an increase in the frequency and magnitude of our overflow events and how climate change will affect our water sources. The first one is something we have already experienced and we are experiencing more often. I'm assistant professor in the New Jersey avenue Institute of technology New Jersey and even in the last storm with Ida flooding here, the community that's next to me, they had a boil water advisory for four weeks following the storm. So this increased flooding events following a drought will affect the operation of our water at water treatment plants and our already aging infrastructure. With the crisis that the drinking water and as a result of the changing water sources, the increase in the pH, dilution of corrosion control and is also a consequence of century-old water distribution center centers. This is already been seen and other parts of the U.S. and we've changed the quality of our drinking water sources. We change the effectiveness of our quality control and now we are replacing the water but there are several sources of lead still in our houses, and it is critical that we understand how it changes and how the water quality will affect led mobilization and as I mentioned already, flooding events will affect the capacity of treatment of our water and our distribution systems and we also live in an area where we have combined sewer systems so we cannot continue to retrofit our utilities but rather invest in improving them. Finally, I will also mention how climate change extensor flood events and flooding will affect the flood events and we expect climate change to drive an increase in temperature a decrease in pH and salinity that will affect our ecological diversity and microbial populations this will affect the biochemical reactions in the leaking of some of these contaminants in these affected lands and it's already been shown that changes in the conditions going from trout to flooding events will affect the ability and increase the mobility of these contaminants and how can we prevent this from happening when it's very happening? Finally, in just the last minute, I want to mention that obviously, this will really affect already impacted communities that have already suffered and they are still recovering from the pandemic they have job in securities they should be the priority of our efforts. There is a few studies that have shown that underrepresented communities have less stress in our drinking systems but have also failed to study what is the source of the water, where is water coming from him what are other factors that might be affecting this. With that, I want to thank you and will be happy to just continue the discussion.

>> Thank you very much. Only to call on Miranda Cashman.

>> Thank you so much. First let me say thank you so much for allowing me to share in this form. I'm a project manager at the Newark APA I'm here on the water utility climate alliance to give you background we think it could be a great collaborator and going forward with federal agencies water utility climate alliance was founded in 2007 and the mission is to collaboratively advance in the role that they play as been critical and vital for New York City DEP for identifying commonalities across the water sector. If you want to learn more about WUCA or look at any products like the leading practices and climate adaptation guide which is gotten a lot of press recently you can go to the website WUCA online.work. I'm kind of on behalf of them but these are also my own thoughts to contribute. We has water sector

practitioners could benefit from more active collaboration and this really just strengthens what David said in his comments. One of the main challenges we face is turning scientific knowledge into actionable science. Many times we are given this prolific scientific conclusions that end up having limited use and adaptation planning for water utilities and many more support from federal agencies to develop research from the beginning that directly advances decision-making and planning for critical water infrastructure for one suggestion is to bring water utilities like WUCA or utilities into the research process early on because we can communicate the challenges and research questions we are interested in and what our user needs are and we really do want to play a more active role in this early stage research ideas are developed. An example of this is New York City DEP is a stormwater utility as well and so we face urban flooding challenges. So hurricane Ida has been mentioned and in the context of hurricane Ida in urban flooding me more data and guidance about precipitation intensity both historical surveys and high-resolution projections which we completely recognize as hard to do. There are limitations to methodologies and scientific uncertainty. We think more dialogue between utilities in the community is vital to making better decisions for the infrastructure that we managed another point shifting gears into equity and went to -- who is the climate policy advisor at Seattle Public utilities she had ideas about how the water sector can better address equity challenges. First, creating targeted workforce development and contractor support for blue-green jobs at them with water utilities. Expanding partnerships with community-based organizations to build capacity and improve outcomes from utility projects and this one highlights the importance of open communication pathways in all areas of the water sector and at all stages of adaptation could third, prioritizing water infrastructure projects and programs designed to generate multiple benefits were communities for example, this could be storm water management improvements and open-space jobs in community connectivity. In this type of multi-benefit approach has been shown to be extremely beneficial. They've done a lot of work in that area. But tying all of these suggestions together is critical him him him.

>> I wanted to remind everybody we have a platform and you can find a link to join them in the chat and am gathering some of the comments from speakers and adding them to that when recommendations and consideration in the platform as well. I welcome you going into the platform.

>> Now let me call.

>> Some of the research that I do and how it relates to issues we are dealing with in the efforts. Along the work that I do with my colleagues this link with trying to do parts of inventory planning and the kneecap from the knowledge to action for what planning activities or implementing solutions or division actions still can be used as a potential solution I think will be really helpful in helping other practitioners in this area and planning for adaptation I think storytelling so I think it will be really helpful especially in our experience that if there were ways where USGCRP could create products or more for documenting, telling, and disseminating diverse knowledge to action stories in small communities or big communities that can be understood by non-technical persons and also showcase how communities can use the different USGCRP products to first of all initiate how you get started on planning in a community that small. Maybe need to partner with other communities and incarnate planning efforts as well as maintaining these efforts but at multiple levels when it comes to efforts focused in the public sector or household and individual actions. How are you maintained over time at multiple levels? Am as well as the local state or federal or even tribal and decision-makers collaborated in the past or are beginning to collaborate continuing to collaborate in different ways and multiple levels as well as other stakeholders in these facilities if they are taken at multiple levels what kind of gaps or trade-offs are complex have

people run into in their own communities that may require new or additional equitable and culturally sensitive adaptation. And then the other benefit I think the storyteller can help is sort of help educate communities that this is not a perfect process. It's not perfect. And then change actions for improving resilience over time. Storytelling can help communities learn from each other and I think there needs to be a much better investment and how we document and share the stories and communities may use these as products. That's it. Thank you.

>> I'm impressed all of our speakers have timed the remarks quite impressively.

>> I summarized my points as requested there in the chat. And I am the officer for South Florida water management District and I just want to emphasize a few points here and I will be reiterating a lot of what Mr. Behar and also some other speakers have already emphasized here today. It's extremely important that we understand the climate projections and the boundaries and how we should be evaluating this range of uncertainty and some barriers we are dealing with and also the need to take into account those factors having tools and better information we can inform our agent. My point is related to Apple more specifically dealing with the need for advanced regional climate projections. Including but not limited to rainfall, increase resolution and that are able to capture local and regional influencing factors and climate processes that have huge interference in the way we are interpreting the results. We have an example of a recent product that we have been developing with the USGS determining extreme rainfall advance and we have elevated to two down scaling products and we have a relatively large uncertainty range and the way we do that and anticipating future rainfall and I think there is need for us to be able to have additional tools that will guide us on how can we get -- I would say better -- my third point is how can we access the sources and tools to review and validate and maybe enhance our efforts, our local efforts? We have two efforts going on in our agency now. The first one we are looking at data that we monitor, so our agency has a very large monitoring program, and we are trying to evaluate trends and correlation between those data sets to see if it relates somehow to some of the stimulus and determining the factors. We are going to be proposing the future extreme rainfall as part of our efforts and we appreciate the opportunity to collaborate and exchange information and knowledge. To end up my points, I think I'm reiterating a lot of what was said here already. Better collaboration and I appreciate the opportunity.

>> There is another minute if you would like to add anything else but otherwise we can go ahead.

>> Don't pray. Those were my points.

>> I apologize. You may be confusing about the order. We will get to everybody. Let me call on Kate next. Are you ready?

>> Yes. Thank you. I am Kate and I am with the University of Alabama at the new global water security center. We are a DoD funding center. The goal of the center is very much about taking in data and water data into use, particularly for the security community and I think this is important not just for security but more broadly as USGCRP thinks about investing in future science. And one of the things we are really saying is it's not just about being responsive to user needs but really working with users to understand the questions. This is something that's come up in earlier points but something we found is really critical. There is a need to invest in actually helping users understand what it is they need to know in order to adapt to changing water future. Another piece of what we seen this important I hope that everyone is able to think about is that is often not actually increased precision that's the thing we need to invest in the most. We often not answering what really are the right questions, particularly the ones

that link climate impacts and changing climate and water impacts to human and biophysical impacts they are. So making that linkage across the biophysical social sciences is something we are excited to see more of. And finally I would like to urge more emphasis on some of the day to day technical products are already in use but can be updated to reflect changing and client and changing water futures. You would be shocked at how often I talked to state and local folks were trying to do water management and all they want is to see it updated with new climate data and I think these workaday products are some of the most important ways we can get new climate science out to folks we use that and for whom it's really important for adaptation. And I want to reiterate my thanks for having a chance to speak here and really, all of the comments that have come before. I think most of what I'm saying is not much different than that so I will end now. Thank you so much.

>> Thank you very much. I would now like to call on Ali. Are you there? Is not there. Let me then next dating we can come back to you. Peg. I'll circle back and see. I will keep going to the list. Ryan Holland?

>> I'm here. Thank you.

>> Thank you for the opportunity to provide comment today as a private citizen, a geographer and computer scientist working in the climate space. My work focuses on several aspects of water quality and impacting of a changing climate on our water infrastructure. So the approach my team and I take is sort of a systems engineering perspective and giving the breath of the topic per we are seeing additional stress is put on the availability and the distribution of water researches across the globe and we have seen huge impacts to both water quality and to water infrastructure like water treatment plant and wastewater treatment plants. So I would argue that we need mature scalable technologies for continuous monitoring of water contaminants in our waterways and also monitoring of water use is that changes giving decreasing water in the West and increased water resources elsewhere. In addition to researching and evaluating the scalable approaches like remote-sensing and imagery analysis for water use, we also need research and development around new material that can both detect or sense and remediate these contaminants. The traditional means of sampling, will for contaminants and broad scaled application of these technologies can really help to screen for these chemicals in both understand how extreme weather events are changing the distribution and movement of chemical contaminants and how our water infrastructure is being impacted by new emerging contaminants. On the water infrastructure angle here, we think we have more research development sensor technologies to make the water treatment and wastewater treatment plans more resilient to these environmental threats. In addition to looking at how we can implement water infrastructure -- actually, there's two enable -- increase the resilience of our stormwater management and this comes with certain risks in a more connected smart water system. As more risks for attacks and cyber vulnerabilities. Also looking at the trade-offs and the risks and implementing some of the smart infrastructure we think is important. To kind of shift focus, another area of concern would be water use and emerging technologies to release water so others than a lot of academic research on antibiotics and water and genes detected in surface water, we don't yet have a systematic way to detect or monitor for these chemicals or the presence of the genes and water effluent and surface waters. This is an increasing a significant problem and we think additional research and looking at monitoring for these contaminants even remotely would help us as these events increase in frequency and duration. You know, robust data on chemical contamination is really needed across the country, including data on the area sample, all of that data is shared can help understand to water utilities, to -- we can learn from both the lessons learned and the mistakes and the successes across different states. With that I want to thank you for your time and I really appreciated

the comments from other panelists and really would love to have a further discussion and for you to consider some of these critical areas of research and developments.

>> Thank you very much and thanks to all of the speakers were being so careful and fastidious with minding your time. It makes my job easier. Would you again apologize. My technological mistakes in terms of giving up the list of people. I am the science director with the American shore and beach preservation Association. One of the co-executive directors of the U.S. coastal director and we have presented to the coastal group at USGCRP a number of times and going to focus my comments today from the perspective of the ASD VPA. That organization is in the 95th year. The comments I will give to you today are very much centered in the needs of coastal managers as they relate to global climate change can the mission is founded in science-based advocacy to restore and protect and preserve healthy coastal systems our organization began in New Jersey in 1926 because the New Jersey shoreline was one of the first to be developed in the first to lose property due to erosion so our organization started out with our headquarters in Washington D.C. at the national account but he did the academies building. We had a strong relationship with the national research Council and the Army Corps of Engineers. What we have done over the years is evolved from this organization that started out very science based and working with the Army Corps of Engineers to help coastal communities to coastal flooding. To the organization we are but many of their concerns have now shifted beach erosion is one of the biggest challenges 20 years ago that a lot of the other half that happened on our oceanfront coastlines over are now in really good shape. One of the things he was here my comments, one has well beach and during restoration projects that it will improve the resilience of our communities over time. Coastal flooding and water that's coming in from the backside not so much deity one of the ways that we work with communities our reach to engage our membership and that user group of coastal managers around the nation has been leveraged by many federal agencies. Every mentioned Vicor worked with US GS in the link I showed on the page with some work we did with USGS to reach out to coastal managers and try to identify what are the top pressing coastal management for today and link you see him take you to a report that was written on that. In particular as their challenges relate to water. We will need to extend that knowledge base and the success we have on the oceanfront coastlines. We had very little experience there and research funding is needed in that area there are lots of them out there water quality and our users need water level data. They really want to know what the water level is in their community tonight when the mayor's wake up in the middle of the night, they need to know whether their town is going underwater and we don't have that capacity in the nature right now. I thank you for your time and I encourage you to visit the website or contact me with any questions you may have.

>> We have a question about spatially dense water level data. I guess this was -- one meter, 10 meter, 30 meter or better than my meter?

>> I am based in Charleston, South Carolina. We have one in Charleston and went up at Myrtle Beach. So more than that is really the answer. Each community wants their own water level data and then we can use models to extrapolate that water level data much more accurately than we can with two sensors along an entire state coastline.

>> Thank you very much. We actually have done pretty well and our speakers have been very timely. There were some people who were signed up but I'm going to double check. Everybody bear with me. I'm going to resend names here and see if you are online. Let me know if you're here and able to offer remarks. Nicholas?

>> I'm here.

>> All right. The floor is yours.

>> I thought you were going to go through a list. Thank you for the national academies and to USGCRP for hosting this listening session. I recently left Noah where I was a policy advisor to the administrator. My comments today are focused on the topics advancing science and using inspired research. In short, my suggestion suggested answer to both of these questions is to encourage engagement with the private sector. While this is not a novel idea, I would still encourage this body and many of the attendees here could benefit from this as well, to reinvigorate that effort, especially in developing the Global change research plans. All the agencies represented here through the USGCRP are working hard to advance climate and weather observations modeling and predictions. Many of the USGCRP agents like NOAA or once I worked directly with have great relationships with each other that's only part of the picture. The private sector could invest more money faster. The market forces that drive the necessary efficiency to move from research to commercial viability is something agencies cannot experience. Thankfully there's been several leaders in government over the last couple of decades have recognized the importance of partnerships beyond federal agencies. Programs like the commercial weather data pilot provide opportunity for private companies to build trust with federal agencies while advancing federal research and operations. NOAA, NASA, and even the Air Force have benefited from those types of pilot programs. So the questions what are the gaps that require enhanced long-term investment and how to ensure USGCRP uses inspired research, my answer, like I said at the top, is simple. Look at the private sector. There's countless innovators developing novel technologies and sensing techniques that can fill gaps in scientific research. In many ways the private sector is going to be who finds those gaps first. Were example, tomorrow they're launching the only known satellite with precipitation radar operational consolation satellite. Why does that matter? The topic in this conversation today is water. Look at the success of PRM, GPM, all of the single satellite radar systems with a low revisit rate showed the importance of precipitation radar from research but they did not provide the coverage to be operational. National academies and USGCRP agencies don't need to develop this capacity. It already exists. The national Academy should be creative and all of the agencies and organizations should be creative in finding mutually beneficial ways to partner with private companies. When executed well, and asked would gain opportunity did he gain access to proprietary any data sets with the potential to significantly improve research at a global scale. In private sector companies gain the opportunity to build public trust and prove their data matters. With that, I conclude. Thank you very much for your time and consideration and I appreciate being part of the group today.

>> Thank you very much. Again, apologies for some of the folks we thought might join and and or not and there are some others on our list so I'm going to do is I have three names and going to read your names and give you a moment if you are online to let me know if you are. If you missed it, let me come back to you. James? In the final one. Let me just see then, are there any other deity as anyone else online that would like to offer remarks or let me offer that first. We also offer for the speakers who have already gone, if you'd like to clarify something or respond to something you heard another speaker say I'd say go ahead and unmute and let me know.

>> I'm going to promote you so that you can talk you will be able to see the timer for five minutes.

>>.

>> I am a national program leader we are a small agency with a big budget. We fund a lot of competitive research and we also support the land grant institutions with only risk based research and long-term research but also extension and outreach and education. And we have a very active water program. We have been active in my time which has been 15 years with the agency and we will continue about a $1.7 billion agency is focused on a program called water quantity and quality it also is picked up in some climate change related programs to universities and others in laboratories and what have you. And we have developed a synthesis for a lot of the work that we did in the last 13 to 14 years and we are still pretty far behind in the information concerning climate change and both water quality and quantity under that large umbrella. And so we are looking forward to folks providing us with proposals to that effect. We are obviously focused on reducing by 50 percent in some cases and also increasing the productivity at the same time. And so we are looking for folks to provide us with some technologies that allow us to reduce the freshwater that agriculture now manages across the country which is about 70 to 80 percent and replacing some of that with the water sources such as recycled water, fresh ground water treated agricultural return flow. Water from mining. And so we will be looking forward to folks providing us with proposals toward that in. We are also very interested in how constituents of chemical concern are impacting or have the potential to impact crops that are crème fraîche that might be irrigated with recycled water or wastewater that is treated. We are also looking at those issues. All of this is focused on trying to alleviate the effects and to adapt to climate change. Obviously, water is one of the biggest issues in climate change and in the future we are going to have a lot more competition for water, but we are still going to have to have aggregated agriculture is our way of increasing productivity in the future. So we look forward to your proposals. Thank you very much.

>> Thank you so much, Jim. We appreciate it.

>> Thanks for the opportunity. I am from the EPA office of research and development. Also, in the task force with water (unintelligible) integrated planning task force. So a lot of our work is integrated in the management deity particularly, the topic is water today. When we talk about water under climate change impact, we need to consider water energy neutral nexus so water energy is closely related and how can we adapt water system under climate change effects. So a lot of it is for transformative change. Wastewater treatment plan are we doing the best? Can we make that system more efficient and in order to recover from the water system from wastewater? And so this kind of thing how to evaluate water system during this climate change impact and at the same time adaptation mitigation is not causing the climate change by admitting more global warming gases. This is a great opportunity and hopefully the USGCRP can invest in the transformative of a paradigm shift kind of approach. And to have more sustainable water systems in the future. So thanks. That's my comment.

>> Thank you very much. Appreciate it. David Behar, I understand, would like to offer an additional comment. Can you do that within about 60 seconds?

>> No problem. The listening session is very valuable. I would also invite consideration on the part of the panel others who might want to assist in probably brainstorming approaches to production and generating user inspired science with the participation of users as part of your reporting process. Randy Cashman mentioned water utility would be a candidate for it. There are many others and if there is a way to kind of envision how that can happen as kind of a conglomerate eating entity I think that would be a really powerful part of the report.

>> Appreciate it. All right. Let me just get my video on. Thank you so much, everybody. They were really a lot of thoughtful comments. I'm not going to try and summarize them. I would not do them justice. In fact, I think I do want to go back and see what did he watch the recording and see the notes they were taking. Really appreciate this and I appreciate everybody taking your time and I appreciate you working with us as I realize we took a few of you out of order and thanks for your patience with that. And this is the first of our five sessions and I have to say I think it's off to a very good start. I want to thank all of you for being here and I want to turn it over to Stephen to discuss some final points and next steps. So thank you very much.

>> Thank you, Joel, for walking us through all of that and for all of the presenters in today's session. So Nikki, can you bring on the remaining slides? So first of all, I do want to follow-up what -- Davis comments. He will not actually be producing a report with this series of sessions. What we are trying to do in having these as a pilot -- this is a pilot effort we are undertaking here -- is identify new ways and additional ways we can have engagement and input into USGCRP in the process. There is existing mechanisms that are going to continue certainly, the products that USGCRP is producing and then also the formal advice that the committee is giving to USGCRP through things such as the recent report that we produced -- the committee produced earlier this year. And so this is an additional input to all of this work and a pilot as well. We are learning as we are getting input from you. So while there will not be a final -- a formal report coming out of this process itself, the input that you are getting are being heard by USGCRP staff and agencies that are involved in the USGCRP as well as the committees. So it will be part as the inputs they are taking into the next steps. Additionally, before the end of the year, USGCRP will be providing a draft prospectus on the strategic plan and there will be an opportunity for a formal public comment period on the strategic plan. The next steps following up on today's session is that you register for this session will receive a follow-up link and email with links and I appreciate you following up and providing additional insight to vote on a questionnaire that provides another opportunity to provide them to USGCRP as well as evaluation to help us understand how to put these pilots turned into a more sustainable mechanism. We will also be posting the video and the transcript of the sessions to the event page for this event and the easiest way to get there is to look for did go to the national academies and search for USGCRP or look on the board on atmospheric science and climate events for the link at the bottom of the page. And finally, this is -- if you could go to the next slide. This is the first of five sessions and the sessions will be structured in a similar way but each will have a different primary theme to the as we are seeking around global change. So we encourage you to participate in any and all of these sessions, and please help us spread the word on the sessions. So thank you for joining us today and we hope to see you in future sessions as well.