Delta Independent Science Board and Delta Plan Interagency Implementation Committee

Science Needs Assessment Pre-Workshop Discussion Seminar Series (Part 2 of 4) A Summary

June 3, 2020

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Background

The Delta Plan Interagency Implementation Committee (DPIIC) and the Delta Independent Science Board (Delta ISB) are planning a Science Needs Assessment Workshop to explore the rapid environmental change facing the Delta relative to climate and other change impacts. The goal of the workshop is to develop a science needs assessment that will inform a long-range science strategy for the Delta. To help make progress with the science needs assessment a four-part discussion seminar series was designed to generate dialogue around key questions that serve as the workshop's foundation.

The second part of this series occurred on June 3 and was facilitated by Ms. Amanda Bohl, the DPIIC coordinator. Dr. Jay Lund and Dr. Steve Brandt of the Delta ISB provided an overview of the science needs assessment and of the climate change impacts discussed during the April 28 seminar. Three panelists: Ms. Jennifer Pierre, general manager of the State Water Contractors, Mr. Campbell Ingram, executive officer of the Sacramento-San Joaquin Delta Conservancy, and Mr. Paul Souza, regional director of the U.S. Fish and Wildlife Service addressed the following questions to provide management perspectives and engender a relevant discussion with participants: What will decision-makers and stakeholders need to know in the future? What are the implications of future changes on management and stakeholder needs?

Panelists Discussion Summary

Campbell Ingram laid out three key factors that will illustrate success for the Delta: sufficient funding, community buy-in and support, and strong science. There will never be enough funding for restoration efforts in the Delta; thus, to allocate funds efficiently, there needs to be careful prioritization of effective science actions. A strong understanding of what type of restoration and where the restoration ought to occur in the Delta is part of the science we need now that will be important for future management. Achieving a path towards this type of prioritization will require looking at past restoration to see what has worked and how that should change priority actions in the future. Effective structured data synthesis and adaptive management need to be at

the forefront to support priority-based decision-making moving forward. Using strong science that makes the case for both a level of investment and priorities also helps us advocate for how we structure our science programs to be more effective such as directed action programs.

A critical component of an effective restoration program is local awareness and buy-in over time. It will be valuable to explore ways to better interact with the Delta community and address their concerns so they can recognize their stake in the work being done.

Overall, if we can build a strong science enterprise that is unified around well-supported prioritization, data synthesis, adaptive management systems, and better engagement with the community, we can leverage compelling funding requests to get this work done.

Jennifer Pierre focused on the call for more organized and coordinated science in the Delta. An important initial step forward is to collaboratively define what science we all want to work towards, including an overarching set of management questions that different science programs can build some of their research around. This effort could move us away from disconnected projects and towards better coordination of our funding and efforts in a way that help us build our collective knowledge.

The next major step would be to transparently track the science being done and link it back to those management questions. When everyone has access to the collaborative high-level objectives, we can answer questions like what are we prioritizing and how are we going to fund it. Importantly, if results can be easily connected back to those management questions, decision makers can understand the underlying purpose of the research and what it means for the next suite of management decisions. Tracking work in this way can also reduce duplication of efforts and overlooking knowledge gaps.

When thinking about Delta science in the context of climate change and other impacts, Pierre highlights three ideas. The first is for creating a science program where collaborators can collectively fail and collectively succeed. One reason that restoration in the Delta has been slow is because we have not found ourselves in a position where we can try more risky actions. No one wants to make a decision that might not work, but there can be benefit in working in a space where it’s okay to do something that ended up failing. Setting up a science program that allows us to learn from those failures is valuable. Second, we need to be honest with ourselves about what uncertainties we have and how large those uncertainties are. This can open the gates to questions that we would otherwise feel uncomfortable asking because we were avoiding addressing specific uncertainties around our science actions. Third, there is a need to produce science synthesis more quickly. Synthesis that leads to informative reports is delayed because a lot of it is done on a voluntary basis. We should create systems for timely synthesis so data from 2018 can help inform management in 2019 and 2020, rather than end up perhaps irrelevant in 2024. One mean of achieving this would be to find the right balance between a data set large enough to synthesize information and the time it

takes to complete an informative study. Practically addressing these three ideas in the organization of Delta science can propel us forward.

While these points apply as we move into more complex environments due to climate change and other impacts, we can definitely start to get organized now.

Paul Souza outlined five points that would be helpful. First is the importance of synthesis. He uses Delta smelt conservation as an example of a multi-faceted problem where we have information on many components of the species' biology. However, synthesis would help stitch those components together and give a holistic view necessary for us to define a successful Delta smelt conservation strategy. An ultimate form of synthesis would be to move away from single species management and operate under an ecosystem-wide strategy.

Second is the need to focus more resources and research on flow. We should commit this next decade to challenge ourselves to understand what habitat benefits and fisheries population increases we can get from different amounts of flow in different water year types. As it is such a polarizing subject, it is fair for stakeholders to ask managers, what are we getting for that amount of water? With a scientifically rigorous strategy where we can pose hypotheses, set up performance metrics, and conduct action, we can be better informed to answer that question.

Third is the need to prioritize habitat restoration. While we all want more money for science and conservation, we know that California has an impressive capacity for funding Delta science through supportive state leadership and significant investment from federal programs. If we develop a common currency about habitat restoration projects, where we prioritize tackling the most important actions in order, it would help us get earlier successes that breed meaningful future success.

Fourth is supporting fish populations by being more aggressive with hatchery captive propagation. Expanding propagation efforts of existing facilities for Delta smelt has been an exciting recent development. Doing so at Rio Vista is an opportunity for a multifaceted group of scientists from different organizations to collaborate on Delta smelt challenges. A few years ago the scientific community was not at a consensus about Delta smelt captive propagation, but that has changed in recent years. Therefore, we should take up more active experimentation with captive propagation to see how it can help us make a difference, especially in the light of the listed fish populations struggling in the Delta.

Fifth is consideration of the human dimension. In the Everglades, for example, a large-scale restoration project was funded by the state of Florida and the U.S. congress because restoration was propped up by accompanying water supply and flood protection projects. Compromise in that instance led to a strong restoration program. California has been stuck in many cases, in the old way of binary thinking. We must have a constructive conversation about tradeoffs and optimization of as many variables as we can achieve in order to move forward.

Mentimeter Questions

There was a total of 96 participants during this seminar. Participants engaged with the discussion hosts and panelists by sharing the information and feedback presented here. Answers shown for questions 2 through 4 have been modified for brevity and repetition.

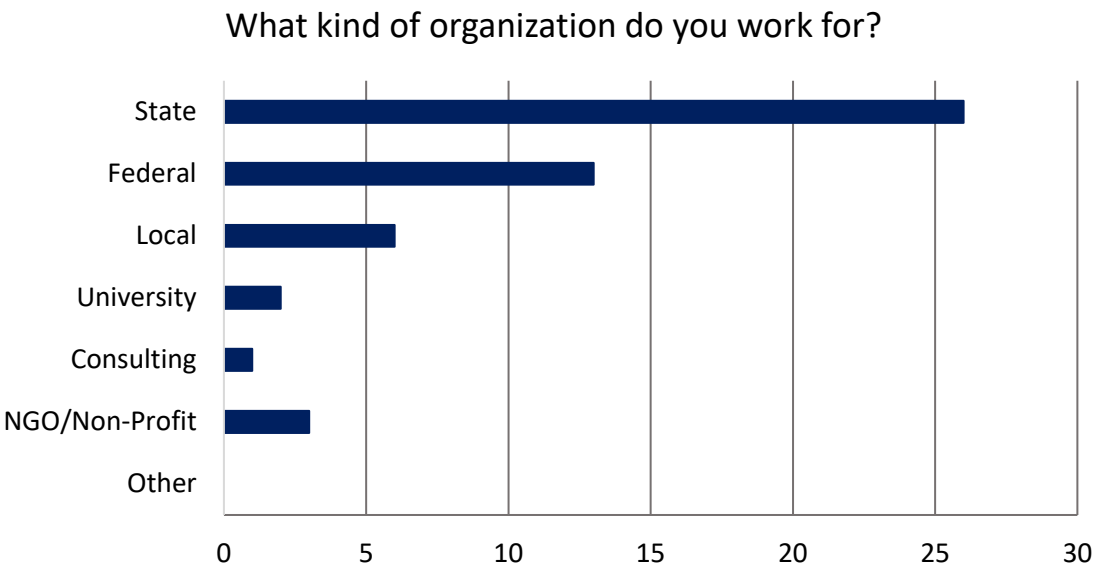


Figure 1: This question was used to learn the demographic of participants. Most participants were affiliated with state organizations, similar to part one of this discussion series. N = 51

Question two asked participants what kinds of information would be useful to decision-makers to help to achieve the coequal goals? N = 31. Answers have been categorized into four overarching themes.

SYNTHESIS

- Synthesis of existing information from decades of monitoring; this could then be coordinated with modeling
- Effects of implementation projects - did they achieve goals and objectives?
- Reliable data that are accessible in ways that inform management
- Performance measures

FORECASTING

- Quantitative forecasting and prediction tools
- Predictions for future conditions with uncertainties clearly articulated
- Iterative short-term forecasting
- Synergistic effects of changes
- Seismic impacts on delta levees
- Water temperature/flow impact on HABs

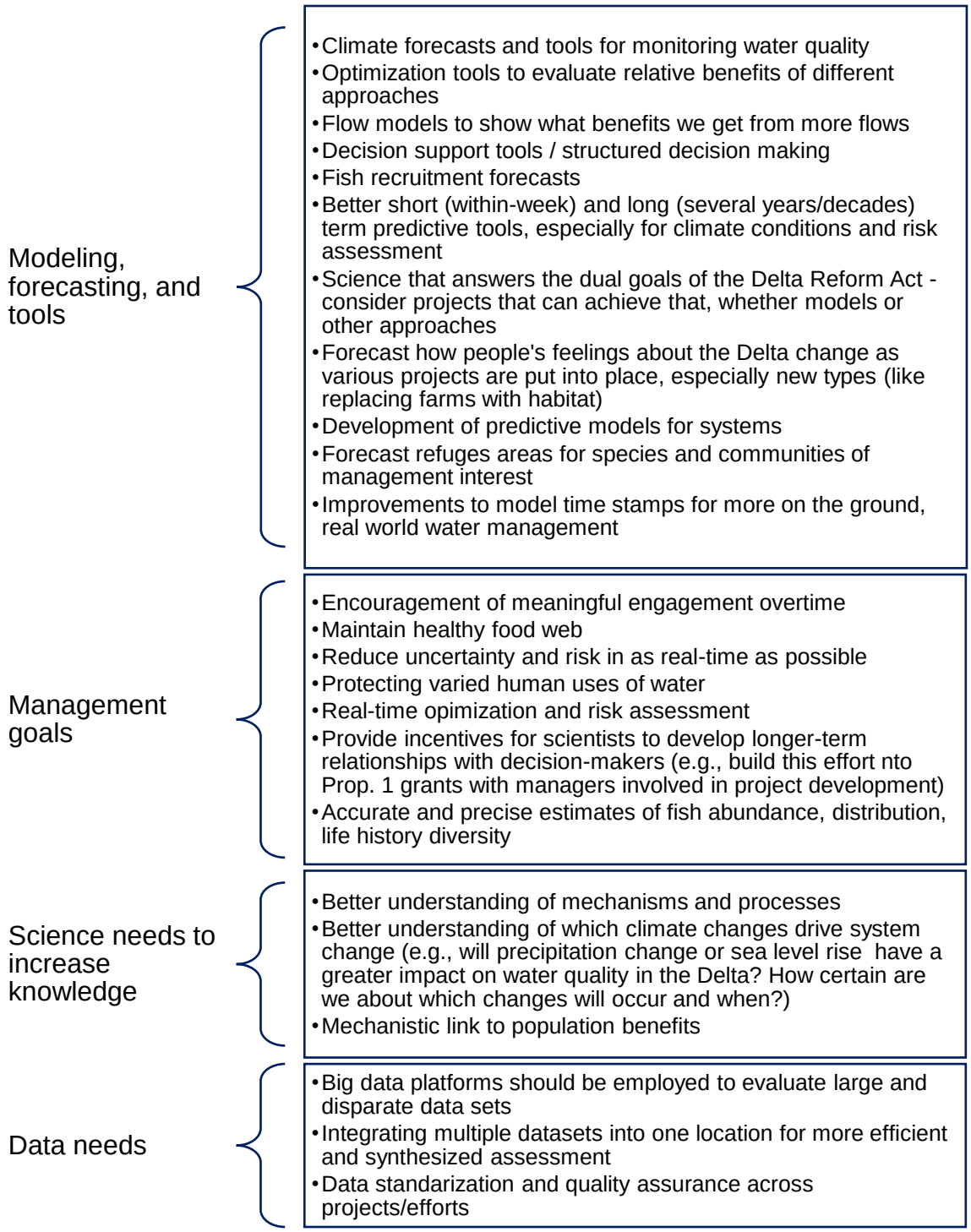
PRIORITIZATION

- Identification of risk spectrum in respect to specific management actions
- Benefits of ecosystem restoration to species including humans
- Better understanding of the trade-offs of different decisions, both for the supply and the ecosystem.
- How do we effectively prioritize and invest in Delta ecosystem function
- "Best bang for the buck" for investments in the Delta.
- How both can coexist/cost-benefit analysis of going more one way or the other
- Quantitative info on tradeoffs
- How do proposals to accomplish the coequal goals satisfy the statutory requirement to "protect and enhance Delta values"?
- Cost-benefit of investing in new water infrastructure
- Real-time status indicators

OTHER

- Community well-being
- Reduce reliance on Delta water for exports
- Integration of the social science perspective
- Experiments derived from management questions with monitoring designed to answer those questions.
- Southern Delta conditions inimical to San Joaquin River salmonid smolt survival through the Delta to San Pablo Bay
- How much time do you have to spend with scientists to learn how to ask questions and discuss alternative approaches to get answers?

Question three asked what are the management goals for science? For example, are there specific forecasts, models, or tools that would be of value? N = 24.



Question four asked how can scientists work with decision-makers in an iterative fashion rather than a reactive one, related to climate change? N = 21. Generally, answers revolved around establishing regular, frank, and clear communication between scientists and decision-makers, normalizing early engagement for both groups, and maintaining close collaboration and coordination among groups.

Early Engagement

- Shared understanding of management needs and linked science questions
- Engage early; develop the management questions together so that they can be answered by science endeavors; distill the science into pieces that can be applied to the management challenges
- By providing structure-time-funding for this activity
- Through key synthesis tools
- Ask for more input and feedback during the early planning phase of a new study
- Create targeted focus gropus with highest decision-makers and scientists withought vested interest in who gets what funding

Communication

- More opportunities for frank discussions like this one
- Limit jargon and allow communication lines to be open and fluid
- Continuing this discussion with agency managers and directors - not just a one-off conference
- Regular communication and open conversations through requent meetings
- Establish an ongoing process that regularly brings decision makers and scientist together to maintain focus
- Science communication professionals synthesyzing scientific messages and communicating them to decision-makers
- Have knowledgable scientists who are good communicators talk directly to decision-makers and answer their questions

Collaboration & Coordination

- Share preliminary findings, don't wait for "the publication." Be more translational by providing information on consequences to many management topics
- Develop agreement on what predicitve tools are needed and then work together to improve forecast accuracy and time and space horizons
- Scientists should learn to change the frame of what their science creates, make their science about people and economy, and not just abut fish and water being used by fish
- Scientists need to be more engaged in the policy and decision making process so that they can understand the constraints on decision-makers and the actual informaiton that feeds into decisions
- Science adivosrs should be part of management
- Utilize decision-maker input up front to design and implement real-time decision making models, monitoring, etc.

Discussion Seminar Q & A

Question 1: One of the real challenges is not just looking at restoration or flow management. It's looking at restoration and flow management and thinking about how to connect flow so that it's used effectively with restoration. So, any thoughts on how we can address that issue as well, besides looking at the individual issues?

Pierre: I agree, and I think that seems to be something that is emerging, where it used to be one or the other. Now we're really looking at what is that interface. I do think there is some science occurring like on Tule Red for example and a lot in Liberty Island and in Prospect where you're looking at the tidal interface. But, I think we could be doing a lot more science on understanding the landscape and flow interaction. What is it generating? What sorts of ecosystem functions are occurring there? And then, how does that inform how we design and select sites, implement operations, etc. to try to recreate those ecosystem functions that we want as best we can, while potentially even avoiding some functions that we may learn we don't want to see.

So that is where a lot of the thinking has been headed. And, as Paul mentioned, up on the Sacramento River, that has been the whole crux of what they've been looking at, the landscape water interface and how to maximize the use of both. Because we don't have unlimited water and we don't have unlimited land, but we know we need both in order to create conditions that we're seeking for fish in our ecosystem. So, targeted science in those specific areas would be really valuable so we can learn what we shouldn't be doing and what we should be doing more of.

Souza: Like you, for me it's this other side of the same coin, flow and restoration together, especially when we think about the resources that we can serve in the Delta. So, we have to think about those two issues at the same time. Now, I'll make the point that if you put water in a highly channelized system and it moves too fast, it may not provide the level of benefits that it otherwise would. Maybe there would be benefits of that water if that water was moving at an accelerated rate into the estuary. But clearly, that accelerating water would not benefit floodplains in the same kind of way. By knocking down some of the berms and levees to spread that water across the landscape, you can help groundwater and create habitat for fish and birds at the same time. So, I think your question is spot on, and for me, you can't think about one without the other.

***Ingram*:** When we evaluate proposals, we look at the best available science applicants provide to justify what it is they want to do. Then, we and another technical team evaluate that. So if you've got four or five different scientists, you've got four different understandings of the flow-habitat relationship. It speaks to what we were talking about earlier: having a body of scientific understanding that's more widely distributed, something that helps more in guidance for all of us to have a shared understanding of what we think those relationships are and can sort of inform and cascade down through the decision making process in an effective way.

***Pierre*:** This is a question back to all of the scientists, especially restoration scientists. We haven't updated our tidal wetland conceptual model in probably over ten years as far as I know. Perhaps that is a worthwhile effort relative to restoration. I think we have learned quite a bit, and if the conceptual model can also help to identify what we still need to understand, that could also help to define some of the research and scientific questions that we need to answer around further restoration.

Question 2: Is it wise to pursue centralized scientific direction or do you think it would be of benefit to incorporate a more federated approach when organizing Delta science and to answer the prime questions?

***Pierre*:** I think that some of the bottom up research has been amazing. Just recently some information came out of DWR about using COVID-19 type genetic approaches for our ecosystem. So, I certainly do not want to hamper that type of work. What I was suggesting was having an umbrella of management questions so that ideas that come up can be clearly linked to the broader management questions. I certainly wouldn't want to create a top down science program that didn't allow for that level of creativity. We have a huge amount of smart and creative thinkers in our system. So, I would not want to hamper that at all, but I do think that their work should be able to be linked to what we are trying to understand. And hopefully we have enough foresight in developing those management questions to kind of capture what those major big questions are. So, I wouldn't want to suggest that we should not leave space for that to occur.

***Souza*:** I think I have a visceral negative reaction to things that are top down. So that's my first reaction to your question. It's been my experience that the most effective science for policy makers has a wonderful mix of bottom up and top down at the same time. I know that there's an amazing amount of science that's being completed right now in California. It's maybe unparalleled, notwithstanding the fact that we could always use more and better science, but I can't tell you what all of that science is. I'm not sure how much of it is actually science for policy makers. We have a lot of long-term time series science investments that help paint the big picture, but I would always invite more conversation about the science investments that we're making across all of the different programs that we see so that we're getting actionable science. We have to make decisions in real time. We have five or ten years to wait, and I think a healthy dialogue that's bottom up and top down at the same time will increase the proportion of science that's actionable by policy makers.

***Ingram*:** I would like to quickly add that if history is any indication, and in taking social science into consideration, any attempt to try to develop a top down approach in our very sort of diffuse system would utterly fail. So, it's good to be comfortable with a federated system.

Question 3: I noted that Paul Souza and Jennifer Pierre talked about the need to take risks and to try new things in science and in restoration and in our management. I

think that is an incredibly important point. I wanted to highlight that for restoration and for other management needs that we have permitting, and the process right now does hinder our ability to take risks. It is hard to try something new and can take a very long time to get permission to do so. I wanted to get your thoughts on what we can be doing now to streamline the process and our opportunity to take those risks.

Pierre: The State Water Contractors is very supportive of the Cutting the Green Tape Initiative that the California Natural Resources Agency has been promoting. So we hope that that will help with advancing some of the restoration. I know that CDFW has also been looking a lot at how they can help in that process and that's very much appreciated. So, hopefully there'll be some good lessons that come out of that.

Going back to one of the questions that was asked before about what kind of models or tools do we need, I think the science community has been starting to do a really good job of this. However, the species that we're trying to monitor for that are rare, and we have to figure out ways to monitor what we are monitoring that doesn't require a take permit. It's going to be more and more difficult. That is something we ran into in 2017 of not being able to implement some of the studies we needed to do. I'm relying on you guys, and I know you'll get there and be creative about how you monitor so that you can reduce the permits that are necessary to do the monitoring that we think is important.

Souza**:** We are excited about the state's leadership in cutting the green tape. We have federal tools as well, programmatic approaches that we can essentially permit with a large but focused effort rather than having to permit project by project. As long as they fit certain criteria, it's a strategy we use with success and the National Marine Fisheries Service has too. So, we're excited to bring those tools into the conversation.

We need to have courage. There is a fear about take associated with some of these activities and it takes some courage and willingness to take some risk to learn. The Enhanced Delta Smelt Monitoring Program, in my view, has taught us so much about the species distribution, both good and bad, and we have to be willing to take some risk if we think it's going to give us information that's going to help us with our broader strategy. Monitoring must happen too. We have to have a science-based action that's smartly permitted, hopefully relatively quickly, that we can then measure based upon criteria. That's the only way we will learn meaningful information that helps us with the next effort.

Comments

During the seminar, a written comment was not addressed, however a discussion regarding the comment occurred over social media. The discussion is presented below:

"How do you reconcile the creativity of bottom-up, versus the guidance and coordination of more centralized, top-down? A mix, but what mix? That's the big question."

“This is crucial when considering the formation of the joint powers authority (JPA) to fund/coordinate science. A JPA does centralize. The science activities under a JPA will have a privileged status in funding, visibility, influence. So care is needed in picking which elements of science are in a JPA.”

“A top-down approach is easy when Delta scientists and decision-makers are focused on the science you care about, but it’s less easy when they’re not.”

“There are at least two crucial social science roles here. One using social science to understand human dimensions of the Delta (e.g., use of Delta resources), and two, social science directed at analysis of Delta programs such as science governance.”

“Innovative and forward-thinking governances is needed to ensure process and inclusivity so individuals feel safe and recognize their science enterprise role and co-production on science and management needs.”

“Focus on generalizing science back to first principals, relate science to statutes, and use best available tools.”

Science Action Agenda Update

Louise Conrad of the Delta Science Program provided an update on the Science Action Agenda. The project leads have been doing outreach to collaborative groups, such as the Interagency Ecological Program, to understand the management questions and science needs that those groups would like to highlight in the next iteration of the Science Action Agenda. Interested stakeholders and groups will also see a survey soon where they can respond to and provide further input. At the end of September, there will be a public workshop, which is another opportunity for input.

Jennifer Pierre had a comment regarding the Science Action Agenda update:

Pierre: I think you guys are doing a fantastic job with starting to put together this broader set of science actions. What’s going to be necessary is transparency from the various science programs about how what they’re doing actually links back to the action agenda. I think that’s one of the consistently missing connections. That’s something we’ll commit to as part of our science program is clarifying how the research we are funding is linked to specific questions so that we can track that. I hope that other science programs, IEP for example as the largest program, can do the same. That’s going to be really critical for decision makers to both understand why IEP is doing a particular study, and how does it and why does it matter to me. And if there’s buy in on the Science Action Agenda, then it’s going to be really easy for people to be supportive of the work that’s being done in order to implement that agenda.

Next Steps

The next discussion seminar will be hosted on July 28, 2020.

Key Links

- Workshop and Virtual Discussion Series Flyer
- Science Needs Assessment Pre-Workshop Discussion Part 1 Recording
- Science Needs Assessment Pre-Workshop Discussion Part 2 Recording
- Briefing Paper for the 2020 Science Needs Assessment Workshop