Transcript of Interview with Debbie Lee and Mark Osler
NOAA and ASCE Partnership
March 3, 2023

Debbie Lee, Director of Great Lakes Environmental Research Laboratory

Mark Osler, Senior Advisor for Coastal Inundation and Resilience

Alison Gillespie, NOAA Public Affairs Officer

AG:
Over the last two years NOAA and ASCE embarked on this new partnership. How do you describe this partnership to others?

DL:
How we envision this partnership to work is in alignment with Dr. Spinrad's vision of NOAA being the climate services agency, the climate information provider. Recognizing that role, and recognizing the ASCE role of providing codes, standards, and manuals of practice, not only for the US but in large part for the world, we saw that there was a very specific need for the two entities to come together. One to deliver the climate information and the other to be able to use it more to provide guidance to civil engineers to provide climate resilient infrastructure in the face of a changing climate.

MO:
I've been invited to contribute to this on the particular subject matter and I'm passionate ab out it and I think it is a great idea which I can speak about it in minute, but I was not part of the original thinking on this. That was work Debbie and Ben D'Angelo and others did to actually see this opportunity.

Once the wheels were rolling I was invited to contribute. Debbie highlighted the connections between ASCE and its role in building codes and standards as well as being an international aggregation of private sector expertise on our built environment through their membership. Both through building codes on the page as well as just the day-to-day work of practicing civil engineers.

This is a very specific way in which climate science – and all science gets expressed into civil society. It's quite often through the requirements of codes and standards. OR just the work that engineers do with their clients, answering questions of the day for their clients but doing so with also with access to the best and most recent understanding of our earth system. So I see it as a very important maturation of NOAA's connection into broader civil society. It's a thing that is really going to be transformational in terms of the application of science but also provide NOAA with a very important requirements list or demand signal from practitioners about what they

need from our science. And it will help define research priorities and applied science in a way that is very beneficial to NOAA as well.

AG: People often think of us as experts on the oceans and air, weather and storms. People wouldn't necessarily associate us with building codes.

Debbie you work with the Great Lakes, there's a logic jump that people wouldn't necessarily make, and Mark you work with high tide flooding. What was your role in this partnership? Debbie it sounds like you had more boots on the ground in the beginning.

DL:
Well I am a civil engineer by training, specifically a water resources engineer. I began my work in the state of Ohio and I'm a professional engineer in both the state of Ohio and the state of Michigan. My career has spanned both NOAA and the US Army Corps of Engineers. I've always had one foot in the science realm and one foot in the engineering realm. This gave me the unique opportunity to see the need of both civil engineering and climate for information.

My direct involvement came about because I've been a member of ASCE since my college days. That's my primary professional organization. I had an opportunity and was elected to serve on their second largest institute, their water resources institute, on their governing board. This had me go through four years of leadership positions culminating with being president and then past president of the institute which represents over 20,000 civil engineers in the water resources profession. I had official permission to use my NOAA work time officially for that.

I wanted to make sure I had a return on a benefit to NOAA as well as ASCE. And that at the end of the four years what I accomplished and how that benefitted NOAA – my time with ASCE.

I began by raising ASCE's awareness of NOAA's role and its varied role. ASCE had long been aware of our role in ATLAS14 which is relied upon enormously by the profession for the design of surface run-off, for wastewater, water engineering, but there was more than that.

But I found that there was more than that. And in fact I discovered that we had NOAA people involved in ASCE across their institutes, in particular in structural institutes which is comparable to EWRI that I served in, and that the NOAA people were really important to the ASCE 7 product, which involved wind load standards, wind standards with people promoting that. We had people determining wind loads to their infrastructure. We also had people from NGS and we had coastal institutes and ports institute, we had NOAA people involved. But through my leadership role I was able to move forward the idea of having a formal partnership between the two entities. And the climate program office – I recognized that I couldn't do it alone. There needed to be someone beyond me to make this happen.

The CPO was very interested in supporting the initiative. They were able to provide a grant to the UMD to provide additional person power to make this happen. We produced a series of workshops in which Mark was instrumental in defining the need for climate data. We held a

summit that Dr. Spinrad had asked for when we had a meeting with ASCE about a year and a half before the summit. And it culminated in the signing of the MOU.

AG: Mark, what has your role been?

MO: 17:01
Like Debbie I was a civil engineer by education and training. Before coming to NOAA I worked as a consulting civil engineer in the private sector. I did not carry the very prestigious leadership roles that Debbie had, but it certainly has colored my interest and the directness with which I am able to connect to the work that civil engineers and the work and contributions that NOAA makes.

I came in at the workshop stage from that timeline that Debbie shared.

NOAA and ASCE worked together to define four specific components of the earth system that directly relate to the establishment of building codes. Particularly areas where traditional methods to look at the past history of our earth's system: coastal hazards, precipitation, wind speeds and temperature (DL interjects). Each of these relate to how we design our civil infrastructure in this nation, and they are things where, until very recently, we would just look at our past history over the last 50 or 100 years and say what has Mother Nature been up to, and we used those analyses to define codes and standards. But of course with our changing climate, the averages and extremes are changing. And therefore there's a concern that our building codes and standards are potentially not going to be established properly if the statistics are changing under our feet, of what mother nature might do in the future. So that question sits at the heart of the workshops. I helped convene the coastal hazards discussion. It essentially was a time for scientists at NOAA to talk about what is predictable and knowable about different components of coastal hazards, things like sea level rise or hurricane intensity, wave climate in the Pacific ocean. That was one piece of it. On the ASCE side, it's an effort to describe the requirements of the building codes themselves, what are the variables that go into them, and in which case, if we could make skillful predictions of the future state of our climate, what would be most useful to the civil engineering community. These workshops were essentially a matching exercise, an educational exercise of what would be most useful to the practitioner community by ASCE and, what science do we have on the shelf that might meet those needs? AND Which science is not quite ready but could become ready should NOAA focus on answering some of these questions.

Ag: So this was two-way communication. You are not only thinking about carrying the science you do to the engineers but the engineers are able to give you things you can carry back to your folks at NOAA.

DL:
I would say yes. The civil engineering world is very interested in how we update ATLAS14. They really want to be able to provide input into how that is done what and the outcome products from that. They want to be able to use it to the best effect in their work.

That's one example of that feedback loop.

AG: And Mark, you said something similar at the beginning?

MO:
The broad swath of NOAA's portfolio that relates to applied science or applied research. There is a perpetual question of what do we prioritize, what should we seek to improve? There are lots of ways we do that, individually and organizationally and what I am anticipating from this partnership with ASCE is that we will establish both an expectation from ASCE and a commitment from NOAA that those topics that are deemed a priority research by the ASCE community, that NOAA will closely consider those and seek to prioritize those. Particularly in areas where we have existing bodies of work where it aligns very closely with NOAA's mission and we have the ability to improve our ability to make predictive skills.

As Debbie has highlighted, there's lots of overlap with the water work.

Hopefully this partnership will be clarifying: where exactly can we help, and how soon? And that will be really clarifying both to us and to the user community as represented by ASCE to know what may be coming, and when.

AG:
There was an interesting moment in the recent summit when an ASCE member noted that things are changing. 15 years ago you couldn't convince many engineers to work with ecologists or climate scientists, but now look around the room, we are working very closely with each other. Do you notice this cultural shift too> what are some of the things you've seen?

DL:
Particularly as the profession sees it needs to change it sees it needs to be educating its engineers on a changing climate. Right now it's taught at the university level, not part of the ABET accreditation for engineers, but we see a need for that. So that the civil engineers fully understand and appreciate and see the information that's available to them.

MO:
Debbie I hadn't even gotten there mentally, as far as the ABET accreditation goes but of course you're right. I think that's a really exciting prospect to consider. In terms of how the skills that the engineers need to be required to have in order to compete.

One of the things that changing: Why is it important that we provide climate literacy to engineers and help them see how it relates to their job? One of the ways that's expressed is that there are increasing demands from the client base. These questions of how does our changing climate impact an approach, or a design standard or design level for any given project – we are seeing clients ask engineers those questions and it is a general societal good if we can help streamline and share knowledge about the most common ways on how to answer those questions, and

those common ways will be grounded in access to and application of the best science including science from NOAA.
I will also note, and Debbie, you are probably much more knowledgeable on this than I am and I don't quite know how to say it cleanly. But there are legal requirements for when someone puts a seal on a document that carries legal responsibilities, one of which is a concept of standard of care in terms of what is considered best practice in the community.
I think we are entering a time where an engineer saying well I didn't design for a changing climate because I wasn't trained to, and I don't know what it means to my design – I believe that answer is starting to be unsatisfactory to the point of potentially inviting legal consideration of what is the standard of care and best practice.

That is part of the motivation from the engineering community as well, wanting to have access to the best science and be in closer dialogue of how that science is defined, as Debbie said in ATALAS14 in the case of precipitation and a number of these variables. Debbie do you see that legal motivation?

DL:
I do. I also see an ethical consideration. ASCE recently revised their code of ethics. This is something that all engineers are expected to uphold, similar to the medical code of ethics. And part of the ethics focuses on the natural and built environment. For example it says engineers are to adhere to the principles of sustainable development and they are to consider and balance societal, environmental and economic impacts along with opportunities for improvement in their work. They are also to mitigate adverse societal, environmental, and economic effects. So you can see that now the civil engineering community is being asked to ethically respond to a changing climate.

AG:
Shifting the conversation a little bit in a related note, during that last meeting there was a moment with the ASCE members in the room were laughing at themselves saying we are so often just demanding, saying just give us a number that I can use. Which shows the difference between engineering and climate science fields. Talk to me about that cultural difference. Not to belabor the point, but engineers are looking for a bottom line and climate scientists are looking – talk to me about the difference.

DL:
Mark mentioned the customer earlier that civil engineers are providing services to. And quite often the bottom line for those customers is cost. Cost, and life cycle maintenance and operation. And quite often the CE prefers to have a number that's in a manual of practice because it allows them to go to their customer and say this is the standard to which we need to design. It allows them to justify the cost. It's a bit of a different mindset than the scientist who has room for uncertainty and their role is to express that uncertainty and their role is to have those dialogues and conversations on what contributes to that uncertainty and what the impacts might be. So it's quite a challenge. The civil engineering profession often would like to design to a higher standard or would maybe address more uncertainty. But quite often their customers

may not be able to afford that. Or don't have that same understanding of designing for risk that the practicing civil engineer and scientist may have.

MO:
The cost and the sort of having a standard to rely on – the ability to say of all the things that I might have done to estimate this piece of the design requirement I chose this because it was written down and told to me that is the way to do it and or this is the method. 31:39

There is also a question of tempo. A practicing engineer does not have time typically to undertake a deep research analysis to try to quantify some part of our system or to try to quantify the uncertainty of that and so part of this agreement – we are at the very beginning of the dialogue between these communities about what is predictable or about what point in our future might we achieve or improve in making skillful statements of the future. One of the culture pieces that I find interesting is that the engineers are fairly comfortable with dealing with uncertainty as long as they understand its nature and its bounded, particularly if they have some bonafide scientist to back up why it's uncertain. And the scientists often will try to go for greater and greater understanding and refining our skill about making predictive statements about the future. I'm hopeful that this partnership will help set priorities, as we noted. But also let the scientific community know how good is good enough. That will not mean the end of research on a topic but it can mean the transition of a process that is understood to some degree. There is some moment where that transcends into confidence that says within bounds we understand that the future state will be X, and that's a research result, its an aggregation of research, its a formal statement of best knowledge and that moment where it transitions from research to an authoritative statement – how that happens and the boundaries of it are very poorly defined. And I think that this NOAA-ASCE partnership will help us explore that space jointly to understand how good is sufficient for design and how does the science community tell the design community when perhaps we're not ready, that this is so unknown that we are not able to make a skillful statement about it at this time.

AG: What has surprised you in this work?

DL:
The level of enthusiasm among practicing engineers. They really want to engage in this and are really looking forward to NOAA's engagement.

MO:
I've been pleasantly surprised by the appetite on both sides to engage in this. I will note that even in the early workshop discussions, I've been surprised about the ground we've been able to take relatively quickly with respect to clarifying, here are the codes and standards, here are the parts of your system that are important to those codes and standards, on the NOAA side here's what the federal science enterprise has to offer in terms of filling in some of those gaps. Having those specific conversations has been more productive more quickly than I might have guessed if you were to frame this broadly as what parts of our climate science enterprise are relevant to civil engineering codes and standards. In that broad framing I might have guessed

we'd have a bigger gap between those two communities and the state of the science that can be applied. I've been pleasantly surprised that while we have many gaps and lots to do, they are smaller and can perhaps be closed more quickly than I might have expected coming into it.

AG:
Where do you hope we are with this 10 years from now? Ten years from now when we look back where do you hope we've gone?

DL:
I hope that NOAA organizes itself and provides the resources to provide a dependable climate of information to the civil engineering profession and has a routine and periodic update of that information over every several years. It's something that's recognized as a need and something that NOAA will have to focus on in order to set up that capability.

MO:
I agree 100% with Debbie on that. I hope that ten years from now the future will include a visible and transparent call and response between this part of the user community and NOAA's role from the science producing side of the equation. I would like to see NOAA"s success with this partnership to include a couple of other things. One would be a deeper understanding of teh role that the civil engineer plays in the day to day last mile application of earth science and climate science into practice on the ground. NOAA's mission does not include science. It includes a responsibility for conveyance of that science into civil society and in some cases responsibility for positive public outcomes. Particularly on the outcomes side we do not have a direct lever where NOAA can ensure that happens. But folks that are doing the work of the civil engineering community out in the world are a part of that. I hope that can be recognized. I hope that NOAA will be celebrated for its ability to advance the civil engineering community's literacy and access to data.

The last thing I'll note is that I hope NOAA can continue to lead in the interagency space. Part of our role as an authoritative provider will necessarily be bringing others to the table and distilling the entirety of our federal science enterprise contribution. NOAA often leads by directly doing, but we are very powerful leaders when we lead by convening and creating the space for discussions that others can connect to more easily. So I hope that will happen in a decade's time that can be part of our legacy as well. Not just NOAA's data but NOAA's role in providing access and alignment to the data relevant to other science enterprises and other parts of the civil engineering community that exist within the government, like the Department of Transportation or FEMA, Housing and Urban Development, I hope we are making progress on that leadership by convening that is starting to transcend just these two organizations.

AG:
Anything else you'd want people to know about this topic before we go?

MO:

This is not new but I'd be curious if you feel similarly Debbie. I'm invited to participate or lead a whole lot of collaborations of different sizes and scopes inside and outside of the government. I have to say of all of those, that this work that Debbie and others in the climate program office have set up with Dr. Spinrad's support, this particular connection to me, of all of the things in my world is the most exciting because of its very clear opportunity to make a transformational contribution to connections to the real world in a way that are sometimes hard to design. I don't think that's new but of all of the meetings and all of the things this one is at the top of my current radar because of its ability to be impactful. I really celebate Debbie's leadership and others that had the vision to put their arms around this idea and see it succeed and bringing it into existence.

DL:
Thank you Mark, that's very kind of you to say.

I just think my experiences as a water resources engineer has let me see both sides of the equation. When I was in U.S. Army Corps of Engineers or NOAA we always worked together as part of the federal family to deliver services to the public. It's been a lifelong passion of mine. I'm glad to see that this has come to fruition.

AG:
Thanks for your time today