**Planning for Natural Hazards: Preparing for Climate Change**

[00:00:00] **Dr Mark Maund:** Hi, everyone and welcome to the People and Place Podcast by WSP. My name is Dr. Mark Maund and I'm WSP's Planning and Approvals Team Lead for Regional New South Wales and ACT. This year on the People and Place Podcast, we are introducing a mini series titled Planning for Natural Hazards. I'll be speaking with some brilliant specialists around Australia who can contribute to the conversation around planning for natural hazards and a better future.

Before we begin, I would like to do an Acknowledgement of Country. We acknowledge the traditional owners of the lands, where our projects take place throughout Australia and their continuing connection to culture, community land say, sea and sky, we pay our respect to elders past, present and future.

Now, today. I'm very pleased to be joined by Bernadette Quirk.

[00:00:51] **Bernadette Quirk:** Hi, Mark. Thanks for having me. It's nice to be here. Yeah, I'm Bernadette, I am a graduate in the planning and approvals team in the Newcastle office and I've been with WSP for just about 12 months.

[00:01:03] **Dr Mark Maund:** It's great to have you and the reason for talking to you today is because you're an emerging professional, and we're really interested in understanding your experience and what you believe are opportunities in terms of dealing with natural hazards.

[00:01:16] **Bernadette Quirk:** Let's get into it.

[00:01:17] **Dr Mark Maund:** One of the first items I'd really like to talk to you about is the changing weather patterns and the extreme weather events that we're dealing with.

Some of my experience in working across Australia is that people have noticed those changing weather patterns, different rainfall patterns and how those have affected the way they live. For instance, I was working in Tasmania a number of years ago, and people would tell me that the winters weren't as harsh as they used to be and definitely the snow patterns were different.

I know you've come from a regional area, so would be good to talk about some of those regional issues and the weather patterns you've noticed and how the people have tried to manage dealing with those.

[00:01:49] **Bernadette Quirk:** Thanks, Mark. Yeah, I grew up in a small country town called Moree in Northwestern, New South Wales. It's got a population of about 10,000 people. Growing up in Moree I saw firsthand the impacts of climate change and natural hazards on the town and the impacts that has on livelihoods and communities.

Moree is a floodplain district, which is why it's such a rich agricultural area, but we've had changes in the dry and the wet parts of the season. We've always had significant flooding about every 10 years, but the drier periods are getting dryer and the wetter periods seem to be getting wetter.

I lived at home during the 2011 and 2012 floods and saw firsthand the impacts of that on our communities and particularly the agricultural side of the community. And that actually came off the back of what's called the millennium drought. So that began in the late 1990s and persisted through until La Niña came back in that 2011 period.

Since then we've had another brutal run of record-breaking dry spells and then awaiting long periods for that rainfall. So we had a pretty promising winter and spring in 2016, and then that started to dry up by 2017, which led into the 2017 to 2019 drought, which was absolutely awful for our part of the world.

The BOM recorded three years from January, 2017 to the end of, 2019 as the dryest period on record for any 36 month period over the Murray-Darling basin area. And it goes without saying that that was when we had those awful 2019 bushfires along the east coast as well. So there was a lot, a lot happening then.

And then relating to things like drought are the heat waves. So in terms of, Moree in the summer of 2017, we broke the record for the number of consecutive days, over 35 degrees. We reached 51 days of over 35 degrees, which is, I'm sure you can imagine almost insufferable for a lot of industries. And then all the things that come with that, you know, communities, people, animals, vegetation. And then we had floods again in 2021, 2022. So yeah, it's that cycle, you know, like it begins again.

[00:03:57] **Dr Mark Maund:** I agree, we've all noticed those changes. I know in terms of that extended drought leading up to the 2019 bushfires, the emergency services, particularly the fire services knew that they were really severe potential bushfire seasons coming, even though they knew those seasons were coming, even though they prepared, we all saw how challenging that was during those 2019 2020 bushfires.

Houses were lost, unfortunately, people died people working in emergency services were injured and killed they were quite severe events. And this is knowing that these events were happening and pre-planning for a lot of these issues. So even in preparation for disasters that we know are coming, it's increasingly challenging for people to be prepared.

And in terms of floods, obviously it's very typical for Australia that following droughts, we get floods. So again, even though we knew that these floods were coming or likely to come the significance of the floods and the impact in terms of where they impacted the community, the number of houses and people that were impacted.

Again, it was quite severe we saw the challenges and the difficulties of a lot of the emergency services in attending to those floods in being prepared and really having to shift from one disaster, which was bushfire into a different disaster with very similar challenges, which was flooding. So different equipment, different training, different people, different locations. Often in many situations they're really dealing with some quite challenged communities that, are, sadly in some cases had just recovered from Bushfires and now have to deal with floods and are still dealing with those floods.

One of the other issues, which I find really interesting is the changing in rural environments then impacts the type of crops we can grow and where we can grow those crops. So food security and food scarcity is a really big issue across the globe and it's something that we've seen impacted recently with the difficulties in the Ukraine. And it happens in Australia as well, where there's a disruption to the supply chains is changing weather patterns. There's places where we can not longer grow certain crops where we used to. And those issues on food supply and food security are really challenging.

One of the things that rural environments really need to deal with is long-term access to water and water security, and many of those issues now are, feeding into the urban environment as well. We saw during that millennial drought, we saw the low water levels in terms of number of the dams in urban areas and even water restrictions being put in place for those reasons.

So these issues that are affecting us across urban and rural environments, and that I think highlights the, really the importance that we all should identify and pose to dealing with these hazards and the fact that it does affect us all across the globe and across Australia.

I know in western parts of New South Wales, Queensland and Victoria, and also in parts of Western Australia and the Northern Territory as well, the increasing temperatures have created different ways of people adapt to those. In some situations they're actually looking at building refuges in urban areas, which are really just cooled areas with air conditioning, shading for people to actually refuge and recover from some of these heatwaves.

And it's really interesting that our urban environments are changing to adapt to these issues as well. So we're actually trying to plan for some of these, you know, these heatwaves that are coming through. And also the health impacts that some of those heatwaves can have. I'm not sure what they've been doing in rural areas, but maybe you've got some experience in that.

[00:07:07] **Bernadette Quirk:** I think this is it's like everything it's sometimes it takes catastrophic events to force social change and any level of change. So I think that has been one takeaways after the awful seasons we had in 2019. People didn't have harvest, grain harvest for years, it begun a extended period of time when people were hand feeding stock and culling stock that they would never have dreamed of doing that, which is awful, absolutely awful.

But off the back of that, I think there have been some good changes. That there are people that have realized, you know, there's this whole movement that's come from that period of an awful low. The farmers for climate action groups that have come out of that.

Yeah. There's always room for change. And I think that that's, that's been something really good is that people are recognizing that this does have real life impacts and it is, it is on their livelihoods. It doesn't matter if that's how granddad did it and dad did it and with generations and generations that you need to look at the method of how we farm, how we, what we rely on our industries, where we get our resources from what fills that void when we don't have resources, because like you said, yeah, what's happening in the Ukraine at the moment is a big part of a global wheat supply.

But when we, when our domestic crops and livestock fall, we all end up wearing the cost. Our everyday grocery bills go up, people lose jobs, towns cannot keep functioning. So. Yeah, I think that's been one good thing from my perspective, at least, is that in the last decade, certainly the changes I've seen even in Moree and surrounds is that people recognize that there are everyday impacts and their livelihoods are at threat if they don't diversify and change agricultural practices.

And yeah, there's a massive movement for things like regenerative agriculture, and planning for natural hazards and food security, because it's needed now more than ever, our population's growing.

[00:08:58] **Dr Mark Maund:** Excellent. One of the great things that has come out of trying to deal with disasters as they occur and post disaster is really the communities is coming together and trying to solve a lot of these challenges. So there's been a lot of support for each other during these disasters and hopefully support for emergency services as well. While they're responding and also have the recovery in post recovery phases are really important where the communities work together.

Moving into the urban environments, as we know in many people in Australia, live in coastal environments and issues like coastal hazards, coastal erosion, sea level rise, they're issues that we're really dealing with as well at the moment.

And what I've found that that puts pressure on is individuals in terms of where they live in protecting their own homes, but also how we set out our cities and towns, because we have so much development within those coastal areas. It's really important that we manage things like floods, we manage things like coastal erosion and we consider the impact of our development on those areas and how those areas impact on us.

So some of the ways we can deal with things like this are where we build and where we developed also working for an engineering and environmental company. So some of the stormwater systems that we build, some of the infrastructure roads, they really feed into a lot of these challenges that we deal with. Obviously, roads help with access and egress for emergency services.

Stormwater is self evident, appropriate stormwater deals with flooding. But we also work really hard to incorporate the environment into a lot of what we do. So where possible and I know this is a role that you're involved with Bernadette is trying to protect, enhance a lot of the environmental areas, such as mangroves, riparian areas, these coastal environmentally sensitive areas that also support and help reduce the impact of a lot of natural hazards.

So maybe you can give us an example of where you've done some of that sort of work in your recent times.

[00:10:38] **Bernadette Quirk:** Yeah. I'm really excited to be working on a lot of different projects here at WSP, in the planning and approvals space. Most recently I've been added onto a few renewables projects, and I know that we've increased our capacity for renewables in our New South Wales team.

I've worked on a few road projects and have a real appreciation for all of the different environmental constraints that you work with. We've got one particular project where it's near coastal wetlands and having to not only assess all of that in an environmental impact, but design out the potential impacts to that very sensitive space because that is as we know now, so, so important to protecting so much of our coastline and then yeah linking into that in the design is the longterm feasibility of it.

It's an important piece of infrastructure for evacuation access for emergency services. So we have to factor that in we know now on that, just building and hoping it doesn't work like that. We do so much modeling and assessment to make sure these things are right for that reason.

Moving into renewables. Our team are currently working on a project relating to pumped hydro. We've also recently won a wind farm project. I'm very excited to be a part of that. And I think all of our teams are really keen to get involved with that because that will really diversify our projects.

And I think it's so important WSP, we pride ourselves on the fact that we, understand and. And want to plan for climate change. And that's a big part of it is that moving to renewables, we know these things. So yeah, I really look forward to the wind farm proposal actually. And I think it will be really interesting and I'm keen to see all of the specialist studies, that come with that, because I think that will be a really good win.

Another great win we've had locally is the feasibility studies and planning work we've done for our green hydrogen hub in the Port of Newcastle. So that's exciting new technology and an industry that the Port of Newcastle can diversify out of coal operations in Newcastle and more broadly in the Hunter Valley.

And it means a lot working on local projects. And we've also put in for some offshore wind projects. I'm very excited to be involved in the shift to renewables. I think we know that that is the number one step we can take to move away from expediating climate change and reducing our impact.

More broadly I think it's important to me that our planning and approvals team and our specialist teams like ecology have an important role in planning out impact every day. So we, we plan to preserve areas of important habitat and populations of species, and this reduces the pressures that they feel from climate change. So I think that's important to me in my everyday role, knowing that it has a practical application to preserve some of these very important areas.

Relating to all of this is I think it's really important WSP has a future ready program and it's something that we factor into in all of our projects. We want to be future ready. So it's based on three ideas. One, we see the future more clearly two we design for today, so we want to design into the future we see today and three, that we lead in innovation, and it's based on four pillars, climate, society, resources and technology.

WSPs future ready concepts they like evolve into our business and it means that we stay up to date on the most important trends that impact the built environment. And then throughout our projects, we plan and can understand and identify opportunities to provide action on those clear indicators of climate change and where we need to be prepared.

[00:14:07] **Dr Mark Maund:** Yeah, that's excellent Bernadette. That's a really good point. And I think it's a really exciting time at the moment to be involved, especially as the emerging professional in a lot of what we do. So there's a really big push for renewables at the moment. As you say, we're working on wind farms, hydrogen offshore, wind farms.

The other thing I wanted to have a talk to you about was the commitment to the Australian government, as you're talking about the achieving net zero. So there's many ways we can look towards achieving net zero. There's different transport infrastructure, there's different ways we build obviously the sustainability group that we have in WSP, looking towards trying to help assist with net zero. It's really an all encompassing kind of issue and how we capture what is net zero and how we move towards net zero.

So for instance, we have our engineers who look at different levels of carbon in the materials that they use in infrastructure. Net zero can mean a lot of things to many people, obviously it's around reducing emissions and trying to achieve zero carbon emissions. But as an emerging professional, I'd be interested to know what role you think really you can help or play in achieving net zero.

[00:15:10] **Bernadette Quirk:** I think particularly, and again, reaching back into this role, that's part of the reason I'm really excited to be at WSP is because for me personally you're exactly right. The big scale development and the big players in the game are where you can make the most change and lead from the top. I think that's always the way you can change the business model to realize that this is a new norm and that everything diversifies, everything changes.

So for instance, in the Hunter Valley, coal was a big part of Newcastle and the Hunter Valley's history. That's fine. You always accept your past, but there has to be a change at some point that just because things are the status quo doesn't mean they always have to stay that way.

So in terms of, yeah, getting to that net zero for me, I think it's everyday decisions that we make as an individual, a hundred percent make a difference. I think, you know, 22 million people change the way they live their life a little bit in their day-to-day lives. There's no doubt that that makes a difference. But I think that our big industries, like agriculture, energy, all of those things are where we need to create the most change. And I hope that the federal government, and again, state governments and even local jurisdictions actually build the frameworks to make the change and incentivizing that.

[00:16:27] **Dr Mark Maund:** Yeah that's great and that's really coming back full circle, I guess, as we try and achieve net zero. Then that reduces the impact of natural hazards or the risks that natural hazards pose to our built in rural and urban environments. And really, if we could work towards achieving net zero, then ideally we help reduce the impact of those hazards.

One of the other things that's really interesting in terms of hazards has been, or will be where we can live in the future. So all of us are affected by hazards at different times I know in the last three to four years, I've experienced bushfire, drought, flood and earthquake just from where I live.

And so definitely it's been a significant impact for a lot of people. And we really going to need to decide where and how we live, what our buildings will look like, what our infrastructure will look like and where we locate that. I think that's one of the next challenges that really moves into emerging professionals is how will this look?

How do we master plan our communities and also dealing with legacy decisions. Up in Lismore, there are places that people currently live that potentially in the future may not be able to live. I think that's one of the really big challenges what is that going to look like and how will those decisions going to be made and really the opportunity to influence those decisions. It's a great time now to do that. Unfortunately, it's a result of all the disasters that we've experienced but I think the recognition that the disasters are increasing is there, it's really just the framework for how that looks.

So, as you said, from Commonwealth state, local government, definitely, we need that guidance, but really as professionals also, it's an opportunity to, to influence a lot of those decisions and how that can look. Be really interested to understand where to from here for you and what you think your role is in trying to help with our cities and towns and how they're going to look and how we manage the risk of natural hazards going to the future.

[00:18:16] **Bernadette Quirk:** Yeah. Like I was saying, you know, no one wants to think about these things and catastrophic events. But like I said, they, they do drive the change. We sometimes need to see. So being in that planning space, and I understand that individuals are located where individuals are located, but I, in terms of these events, I don't think that necessarily it's as simplistic as saying all these people just shouldn't live here.

It needs to be some sort of escalation higher up that says, okay, we recognize that, like we said, things change. This was once a great and safe place to live and a reliable, but things have changed and there's nothing wrong with that. That's particularly in our Australian climate it's we have such level of variability that you never know what you're getting next. And that's, that's too big of an enemy for us to work against. And at the end of the day, that's everyday people whose lives and livelihoods and wear the cost.

So where to from here in the planning space, I think for me personally, is that I really enjoy working in the planning space. And I think having that every day role in planning people's lives. So I think looking to how we center, I mean, any of our urbanization along the east coast is an interesting thing at this point, because we know that so much of our population lives along the east coast and more and more, that's going to be the center of potential natural hazards and wear the impacts of climate change.

[00:19:35] **Dr Mark Maund:** So now that's really interesting. So as, as you would know, the Royal Commission, Planning Institute of Australia, the Australian Institute for Disaster Resilience, they've all identified how important planning is in planning for communities. Obviously that's the challenge for you coming through to work out what that looks like.

[00:19:51] **Bernadette Quirk:** Yeah. So of course, nationally, we've had the bushfires and the devastating flooding in Northern New South Wales more recently. There's just so much to it. And I think we do have to make sure our planning processes not only capture this, but are ahead of the devastation and strengthen our communities when we need them during those times.

[00:20:08] **Dr Mark Maund:** We definitely need guidance from governments, from a national policy really, and how we address those issues is really important. And I think a decision making framework is one thing that I also would really like to see in terms of how do we make decisions that consider natural hazards across all the things that we do to make sure that they're front and center of our minds.

And part of that is of course, uh, reducing greenhouse gas emissions, but it's also understanding that hazards and disasters are a natural part of where we live and how we function as a society and really trying to work within those systems as well.

And as I'm sure, you know, Bernadette social cohesion is one of the really big things that we need to focus on to help people prepare for and recover from disasters. And I think we're well-placed to do that in terms of a lot of the work we do, which really is about building communities and helping them thrive in a lot of these situations.

[00:21:00] **Bernadette Quirk:** Yeah, absolutely communities need lots of things to function and I think it's not always as black and white as buildings and roads. There is a need for so many other places and things that make a community thrive and just having a space and having something that looks right. It doesn't always mean that it's going to be able to provide adequately for a community. But I think we, I think we know that now we know how to plan that into our communities and our spaces. So I think that that's a really unique thing that's changing at the moment, too, in the planning space.

[00:21:29] **Dr Mark Maund:** And that's really interesting, Bernadette. Thanks for having the chat with us today. I've really enjoyed the tone.

[00:21:34] **Bernadette Quirk:** Thanks Mark, thanks for having me.

[00:21:36] **Dr Mark Maund:** Thank you so much for joining me and thank you to our listeners for tuning in. If you're interested in the work we're doing, please get in touch. Our links will be in the podcast show notes.

Goodbye.