PCoP Webinar Series

Transcript: "Risk-Informed Decision Making"

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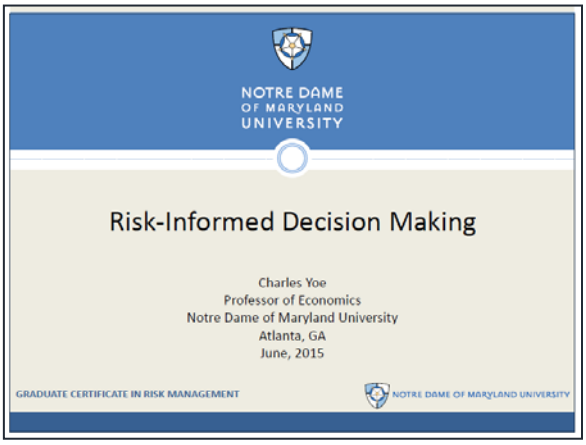
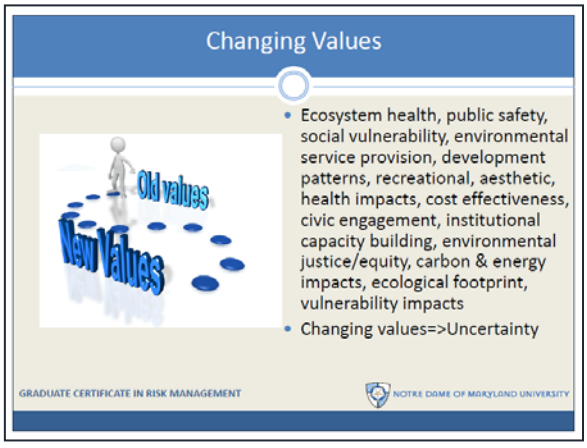


Greetings, everybody. I appreciate the opportunity to speak with the folks from the Planning Community of Practice and I'm going to be talking to you this afternoon about risk-informed decision-making especially in a planning context. I'm going to begin with basically three points this afternoon:

The first one is that planning is changing and in the ways that it's changing, there's a lot more uncertainty than there used to be. This uncertainty is giving rise to more and more risk so it's very important then for planning to step-up to risk management, so that's what we're going to be talking about over the next several minutes.

And I want to begin with a basic idea and that is that planning has changed a lot since the P&G [Principles and Guidelines] were implemented back in 1983. You see some of the ways in which that it has changed. I'm going to unpack each one of those just very briefly so you have plenty of time for comments. I'm not going to be reading the slides for you, but I would begin by saying the world is changing.

The issues that you're dealing with, they're brand new, they're riskier, they're more complex and many of them are global. Life is accelerating in every dimension and all of this change is leading to uncertainty.



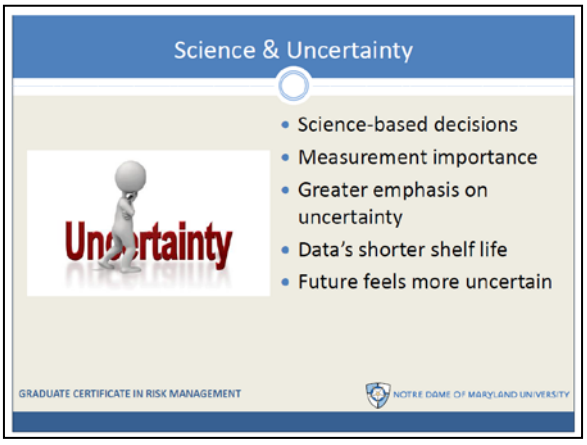
We've got changing values. If you let your eyes run over that list of phrases there on the right, you're not going to see NED [Net Economic Development] in there anywhere or EQ [Environmental Quality] or Other Social Effects or any of the kinds of values that we've used in the past. Changing values make for an uncertain environment that we're working in and that leads to uncertainty as well.

Planning is evolving. We're talking about watershed planning and eco-regional planning and ecosystem management. You're dealing with issues about how to sustain planning because you have fewer career planners than you've had in the past, and this evolution as well adds its own uncertainty to the planning process.

Technology of course is always going to be there. We've got more technology. We've got new kinds of technology and the ways that these are going to impact our plans and people's expectations of the outcomes of our plans adds to the uncertainty.

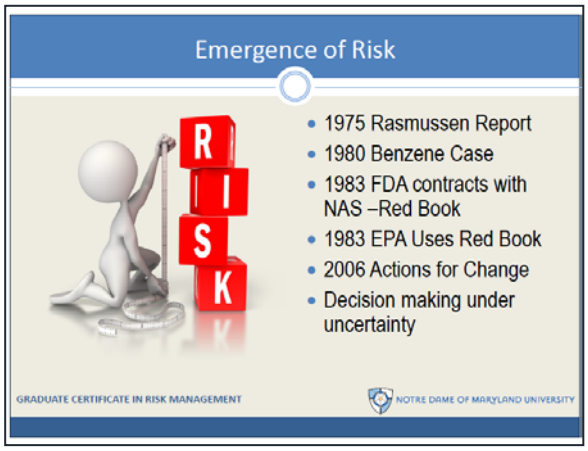
There are economic pressures. You've got aging infrastructure and fewer new starts. You have less time and less money to do your jobs in. All this economic pressure adds uncertainty.

Public involvement has become bigger. We've got more stakeholders and they expect meaningful involvement. There's a whole lot more collaboration, more emphasis on partnership and these public sentiments and especially changing public sentiments add to the uncertainty of the environment that you are planning in.



Now we get down to the idea of science. The role of science we hear more and more we want science-based decision-making. We want evidence-based decision-making. Measure these things becomes more and more important and as a result we're seeing greater emphasis on uncertainty in all the dimensions of our public lives in government. So if the future certainly feels a lot more uncertain when we are paying attention to those things that are uncertain.

So let me give you a brief history of the emergence of risk. In 1975 the Rasmussen Report was the first quantitative or at least probabilistic risk assessment that we're aware of so this risk assessment hasn't been around all that terribly long, not quite a half century yet.

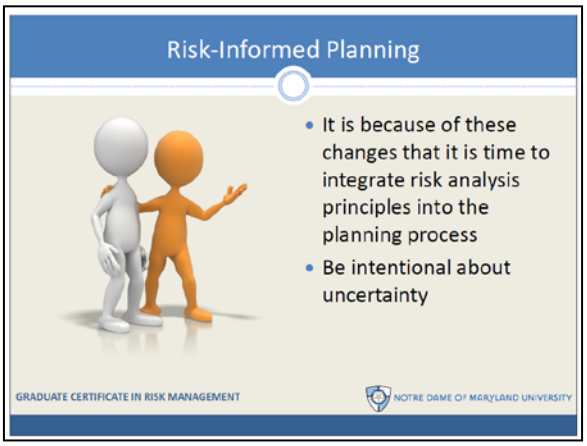


By 1980 the Supreme Court in a benzene case had said risk assessment is the legitimate basis for writing regulations and for making decisions in the federal government. So we had a lot of agencies that were figuring-out what the heck is this risk or trying to figure-out what this risk stuff was. In 1983 the Food and Drug Administration asked National Academies of Science to help us think about this. "What do we mean when we talk about risk assessment?" The National Academy came back with something called the Red Book that basically laid out the process for the first time.

EPA was the first to apply that Red Book in 1983, the same year that it was issued. So if we fast forward some to 2006 and "Actions for Change" from Katrina and Rita, this is when the Corps really began to seriously think about and commit to this idea of risk in a very explicit way.

So now what we talk about when we talk about risk analysis, we're talking about decision-making under uncertainty so that's going to be our premise for moving forward here a little bit.

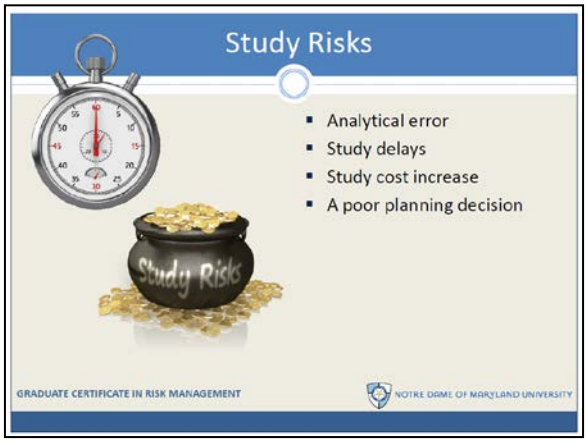
Risk-informed planning then enters into the fore. It's because of all of these changes that we've been talking about that now's the time to integrate risk analysis principles into the planning process so what this basically means is as planners, we want to be intentional about uncertainty and address it in a very intentional fashion.



In the old days before uncertainty we knew everything. We used to be able to talk about numbers like the ones that you're seeing appear on your screen now, a benefit/cost ratio was 1.64, and we could tell people what a plan was going to cost. We would rarely be right but we could tell people. We could talk about dates when we were going to meet milestones, and we could make all kinds of statements and as it turns out, this was never really true. We were often wrong when we used those very precise kinds of estimates and uncertainty has always been our reality in Planning.

So this is not really a marked change. This is a basically a decision, a purposeful intentional decision, to be honest about what we know and what we don't know. So addressing uncertainty, it's not being lazy, it's not being incompetent, ignorant or weak to say that there are things that we don't know. It's just a fact of life. And this fact of life, this uncertainty, runs throughout the project life cycle. It may begin in Planning but there is uncertainty throughout the entire life of a project, as you'll see shortly, and all this uncertainty gives rise to risk in these various project life cycles.

So there are risks in the community. We have flood risks and storm risks and ecosystem service risks and dam safety risks and levee safety risks. There are other risks out there in the community, that's why we're doing the Planning and doing the work that we're doing.



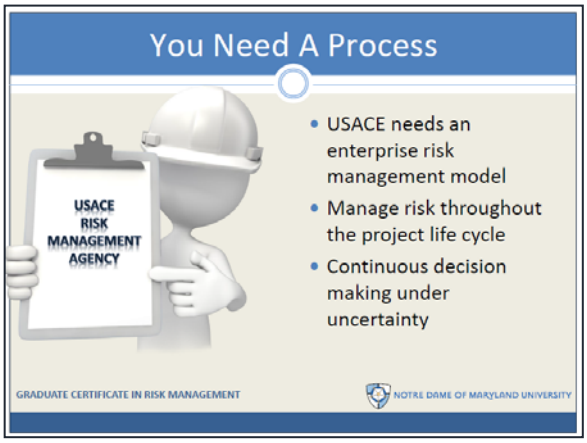
But we also encounter study risks in Planning. We can make analytical errors and we can do things in SMART planning that would result in study delays or increased study costs or we could make a poor planning decision.

There are implementation risks that can be made in the Planning stage. We can do things that could affect the schedule or the cost of construction but when we implement these projects, there are construction risks and project safety risks as well.

When we move into the operation life cycle there are things that we can do as planners that would affect OMRR&R [Operation, Maintenance, Repair, Replacement and Rehabilitation]costs and project performance. But once the projects are built, again they have project performance and project safety risks as well.

When the projects are built, there are outcome risks. These are the ones that got us started and we want to make sure that we are getting the desired outcomes, the reductions in risk that we entered into the Planning process for.

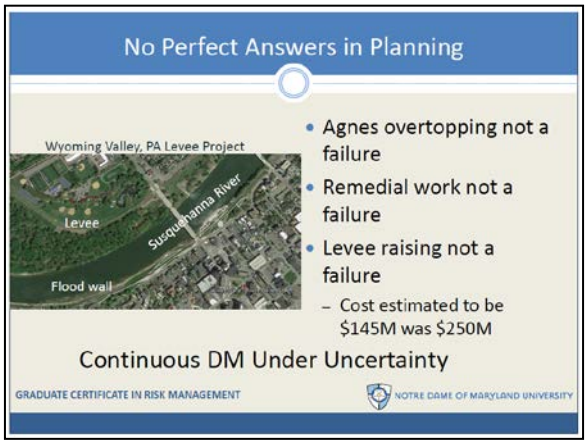
So and I'd like to make a point here and it's a fairly simple but it's a very basic point. The only alternative that we have to risk management is crisis management. If we're not going to manage the risks, we're going to manage the crisis that will inevitably occur because we didn't manage the risks.



So if you're going to do that, you need a process. So if the U.S. Army Corps of Engineers is to become something like a risk management agency, you're going to need an enterprise risk management model, something that will enable you to manage risk throughout the project life cycle.

Because there will be continuous decision-making under uncertainty. That's just the nature of the beast. Risk management is an ongoing process. It's not something that you just do in Planning, it's not just something that you do part of the time. So let me give you an example from a project that I worked with.

Some years ago I worked with the Baltimore district for about a dozen years and one of the projects that I spent time with was the Wyoming Valley, Pennsylvania levee project so you see a little picture up there, the Susquehanna River and on the left bank is the floodwall and on the right bank is a levee.



Once this project was built, Tropical Storm Agnes, in 1972, overtopped it. That was not a failure. That was an unanticipated occurrence. There was remedial work that was required. This was in coal mining country and the ground beneath the levee project was becoming undermined and the levees were sinking. Eventually as a result of tropical storm Agnes the levee was raised. The cost estimates of the levee raising was $145 million, and it eventually cost $250 million. So there's uncertainty throughout a project life.

We are going to be continuously making decisions under uncertainty if you're going to be managing risks. It's the same thing in Planning. You're going to use parametric costs and sometimes that's not going to work out. You might assume no HTRW [Hazardous, Toxic and Radioactive Waste] and find out there was some.

You can use per-unit benefit estimates. You can use existing water quality data. You can do all that stuff. What you want to do is manage a study like you manage a project, and sometimes things are going to happen. You manage your risks, but if something happens, you deal with it like we dealt with it in the Baltimore district and the Wyoming Valley project.

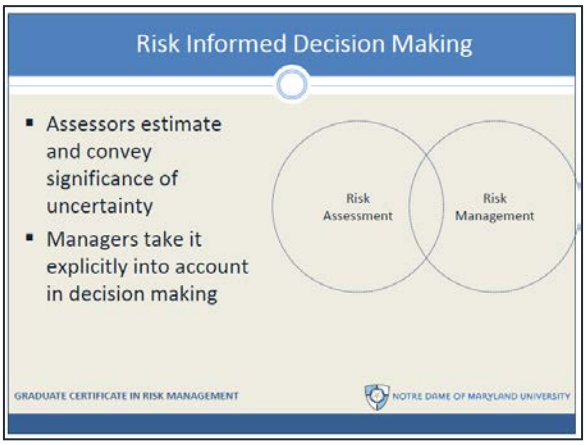
The world isn't ending, we're managing risks. It's a job that doesn't stop

So one of the things that you need to do as risk managers is pay attention to uncertainty especially in the Planning process. You want to be real careful about what you don't know. We would like to be able to separate what we don't know into knowledge uncertainty. There are the facts in the world that are out there that we just don't happen to have perhaps because we don't have the time or money to gather those facts. Nonetheless, we have to deal with it.

Then there's just natural variability. Even when we have all the facts we still don't know when the next flood is going to occur because the systems that you deal with are fundamentally uncertain. So we've got to examine these things as planners.

Pay careful attention to all of this. Be intentional about it. You can't make it go away, so we have to learn how to deal with it.

So this brings us to the idea of risk informed decision-making. If we're going to be intentional in how we analyze and consider the risks, that's going to mean some changes.



Risk assessors are going to have to estimate and convey the significance of uncertainty. So all of you planners who are doing analysis, you know there are things that you don't know. You know there's variability. It's going to become our job to convey the significance of those things that we don't know.

Risk managers are going to have to take that uncertainty explicitly into account in their decision-making. So this risk informed decision-making is really going to require a close partnership between assessors and managers.

So let's talk just for a minute about risk and planning right now. In recent history the Corps has been rather risk-averse, and that's been the traditional or leading approach to how we deal with things. Give me more information, do some more analysis. I can't make a decision yet, get me more, get me more - and that's a very risk-averse approach.

Risk assessment has been racing ahead in recent years, especially over the last decade or so with the Corps we made great strides in this. Risk communication is something that everybody's beginning to appreciate that we need to do a better job at and that's sort of on the outside rail but lagging way behind has been the risk management, what do we do with this risk assessment? How do we direct this risk assessment? How do we make decisions with these new assessment approaches that we're seeing? So this transition to risk management isn't going to be an easy one.

So what I'd like to do is step out of the Corps for a second and give you a couple of examples. I do a lot of work in other government agencies as well and a good bit of that is food safety. So the food safety community of practice what they basically do is they rely on traditional performance criteria and inspections. So on the left you see some examples of traditional performance criteria. They basically tell people what do to and how to do it. Cook poultry to a minimum of 165 degrees Fahrenheit and so on it goes.

And then we have inspectors. They find the problems and then they solve them and the flaw here is that the belief has been if we have people following these performance criteria and if we're looking for problems, whatever happens must be all right because you'll follow the guidance and we're looking for problems.

The problem, however, is that's not working. In food safety, one in six people get sick every year. That's almost 50 million people now. There are going to be 3000 people who are going to sit down to a meal in the United States and are going to die from it. So the food safety community of practice realized that they had a problem here.

And the key, the answer to this problem, as they've seen it, is the risk analysis that we're talking about now. Risk analysis focuses on desirable outcomes, and not on following a rule. It tries to prevent problems. It doesn't try to find problems and solve them. It tries to prevent them. And it frees people to achieve outcomes and not to be following the guidance so much.

So let me give you one more example to kind of close-out this example from outside the Corps. FSO is a "food safety objective," this is a new idea that the food safety community is working on. They're saying instead of following the rules, let's pay attention to outcomes. So you're looking at a little process here: raw ingredients come in; they're pasteurized; there are two different storage periods; people would consume this hypothetical food and then they either get sick or they don't. So the way they're working now with risk analysis is they're saying, "Let's establish an outcome. What's the outcome we want, an acceptable level of protection?" So that might be the number of cases, how many people can get sick from Salmonella Enteritidis from shell eggs in a year? What would be the level of protection that we desire? We can't get to zero yet, let's make that number very small.

And so they will decide what the outcome is that they want, an acceptable level of protection, and then they set an objective. They say, okay to meet this acceptable level of protection at the time you consume the food, we're going to make sure that it has a quality such that it will meet that acceptable level of protection.

So if we said we can live with 100 cases a year, they will determine a level of the number of cells per gram of food at the point of consumption that will lead to that result. Then the companies can basically say okay, if I have to have 50 CFUs, that's the "colony forming units," at the time of consumption, then I know that back there at storage period 1, I have to have 10 because it's going to grow from 10 to 50 by the time of consumption. And to get it to 10, then this company decides what they're going to do, their performance criteria. I'm sorry, I maybe got a little bit off on the food stuff so I apologize because that was a little bit of a muddled discussion there so let me see if I can retrieve that a bit.

Basically what happens is the government says, "This is the outcome we want, you figure-out how to make it happen." It's no longer those set of rules. It's no longer going to be inspectors doing it. They're

saying gloves are off, here's what we want to hit. Number 2, this is the goal that you have to hit when you sell your foods. You figure out how to do that. So that's a very new way for the food safety community to be thinking.

A lot of agencies are struggling with this. The Animal Plant Health Inspection Service (APHIS), they want a pest risk management textbook. I happen to be working on that project now with some folks. The Food Safety Inspection Service (FSIS), they needed to figure-out a risk management model to get out in front of the process for their food safety responsibilities. The Center for Food Safety and Applied Nutrition (CFSAN), they used failure and success stories to define and motivate their risk management process. So other government agencies are struggling with this in the same way that the Corps is, but everybody's moving in this direction.

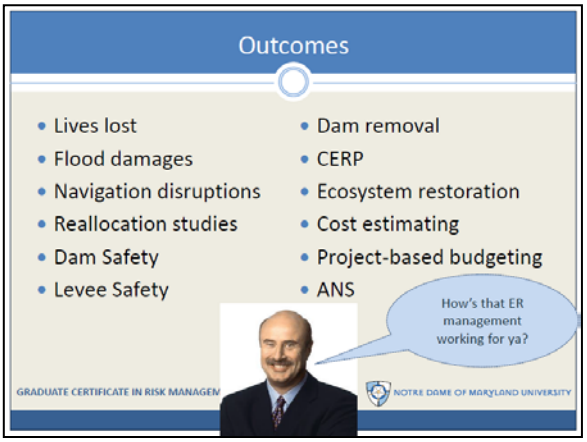
Risk management isn't and can't be some ad hoc assemblage of requirements that have grown over time. That's not what risk management is. That's the antithesis of risk management. Risk management needs to be outcome-oriented, so you make decisions with outcomes in mind. And when you make those decisions, you're never going to have all the information, you're never going to have all the data that you'd like.

So let's consider for a second now the Corps. The Corps uses a traditional performance criteria system just like the food safety community did. Back before going to Atlanta, I took a look at your Webpage and I found 291 engineering regulations and I'd say that's pretty much the definition of an ad hoc assemblage of requirements and control measures.

Now if they're getting you all the results that you want, well that's great. If they're not there's another way to go.

So you see here the gentleman explaining how many times do I have to tell you? "Follow the ERs and stay in your lane." But that is what makes Planning suck, because you spend a lot of your time meeting requirements, and with the vertical team they spend a lot of time making sure you met the requirements. And what somehow gets lost in this is the outcomes, the things that we got into this for.

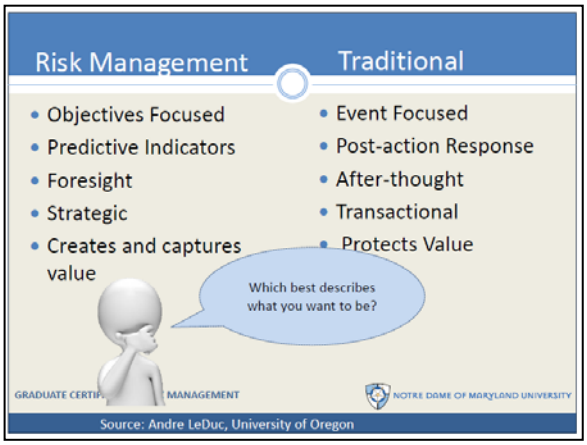
These are some example of outcomes. We want to protect lives. We want to reduce flood damages and navigation disruptions and all these sorts of things. This is what Planning's really for. What it's really about.



So Dr. Phil would ask, "How is that ER [Engineer Regulation] management thing working for you?"

This brings us up to the idea of risk informed planning. Risk informed planning, I believe, can really set planners free. With less guidance, there would be more creativity. There could be more innovation. People could assume more risk, but you would lead to better outcomes. And so that's a rather radical idea, I think, for a lot of folks because the Corps and its guidance have been synonymous for decades now, so that's a big change.

So take a look at these two alternatives. We've got a risk management approach, a traditional approach. Risk management is focused on those objectives, what are the outcomes we want? The traditional approach is more focused on events, what just happened? Risk management uses predictive indicators. Traditionally we use post-action reports and post-action responses, what we do after something happens.



One uses foresight, the other is an afterthought. Risk management is more strategic in its view, while our traditional approaches have been transactional. And I would also suggest that risk management creates value and it captures value. Our traditional approach protects value. There is a lot of value in that traditional approach, but it's time to ask which of these best describes what you want to do.

So we're sitting on the fence. On the traditional side, its stay in your lane, follow the guidance and if you'll follow the guidance, whatever happens must be okay. It must be okay, because you followed the guidance, right, so it must be. Risk management on the other hand says we want to protect life, health and safety. We want to energize the economy. We're going to reduce risk from disasters. Risk management is focused on outcomes, so it's a very different way to going to work in the morning.

So it comes down to this. It's time for the Corps to commit or not. You can't have one foot in the traditional approach and one foot in risk management. It's either risk management or it's not. So you either commit, or you're going to slip back.

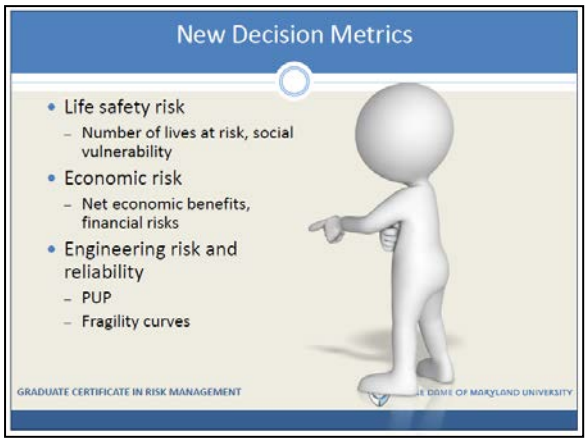
So part of the challenge, then, is to go from a project building organization to a risk management organization. And that's not necessarily an easy transition, but it's one that is being made in other parts of government, and it's one that the Corps is beginning to make. So as a risk management agency, your goal is to assume risk judiciously. There are times when you need to take risk. You would mitigate it when it's possible to do so. But you prepare yourselves to respond effectively and efficiently when it's necessary to do that.

So when some of these bad things happen you know how to respond. You're going to be balancing costs and risk and benefit in just about everything that you do. But this is something that we think can start in Planning.

The risk register has been a great way to begin to do this. So Homer wants to know okay, nice words but what the heck does it really mean?

But part of what it really means is you have to both take risk as risk managers, and you have to avoid risk. And you have to know the difference between the two, so you're going to wear two hats. Sometimes you're a risk-avoider, you're trying to avoid risks in the community, risks from flood damage and storm damage. Other times you're taking risks. You've got to know when it makes sense to deepen a channel, or when it makes sense to try to restore an ecosystem. And then those hats you wear the risk-avoider and the risk-taker, when you are planners and you are trying to figure the way forward in a SMART Planning framework. Some risks you can't take. Other risks you can. There are some data that you can do without

So decision-making has to continue to evolve, as it has begun to do. Decision-making under uncertainty - it's going to be a difficult transition for some folks, because there are people who have been doing this for decades, and there are people are going to want to know, "What is the number?

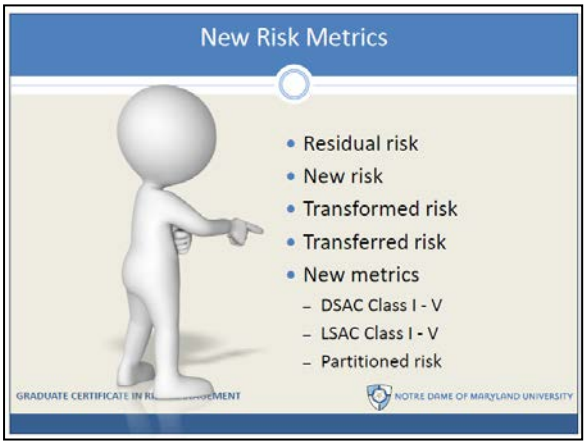


Can't you just give me the number? What's all this uncertainty nonsense?" That boss doesn't understand it, because there is no such thing as "the number." There's too much uncertainty in what we do, and so we need to convey this to people. We need to change the way we think, we need to change the way we make decisions. We need to be intentional about this uncertainty. It's always been there. In the past we would hide behind our numbers. A BCR of 1.64 doesn't allow for uncertainty but we've seen some of the things that have happened when we've ignored it, and we can't afford to do that anymore. So we need to use all the good information that you generate in your risk assessments to make risk-informed decisions.

That's going to frustrate people for a while, so part of your job as a risk informed planner is to develop and use risk information to help people make decisions under uncertainty.

That's already begun. We've got life safety risks. We've got economic risks that we've been dealing with. We've got engineering risks and reliability, so there are metrics that we're using. We need new metrics, too. We need new metrics for residual risks, new ways to convey to people what risk is left after our plans are implemented.

Sometimes we create new risks. We need metrics for the new risks we create, the risks we transform and the risks we transfer. There are new metrics coming up all the time, the DSAC [Dam Safety Action Classification] and the LSAC [Levee Safety Action Classification] ratings that the Corps uses. There are ideas like partition risks. There are all kinds of good ideas out there. What we need are some good aggressive people who are willing to use those and invent new ones as we need them.



And be prepared because your bosses and others are going to say what the heck am I supposed to do with all of these new metrics now? The answer is, we're going to use them to make decisions. We're

going to use them to decide how much detail is enough for now? What level of risk is tolerable to the vertical team in our studies? What level of risk is tolerable to communities that we are doing our studies for? How are we going to manage risks to limit undesirable outcomes in planning studies? How are we going to get our focus back on outcomes in planning studies? This is all part of what we're trying to do.

A good risk manager arrives at practical solutions for dealing with uncertainty and I think, yes in time, that is something that everybody in the Corps will be able to do.

There's a risk communication test, this has not been our focus today, but it's very important. We need to be able to tell vivid and honest stories about what we know and what we don't know. We need to proclaim our uncertainty to the communities that we're working for. We have to think about things like how do we convey what a levee overtopping would mean? We can't rely on probability statements and things because that's not where people live. We got to find ways to take this good professional work we do and make it vividly clear to the public

So the risk managers, the bosses, are going to want to know what do I do when there's a lot of uncertainty and we can't reduce it. Because that's the facts sometimes. That there are things that we're just not going to know for a long time, like climate change. We're not really going to know the effects of climate change for a long time, but we have to make decisions now. So part of what you do is you live with it, and don't punish responsible risk-taking.

People are going to have to make decisions and do the best they can do. But if we do that knowing there's uncertainty, we can do that knowing that this might go wrong, and we can do that knowing how we will respond if and when it begins to.

If you take risks, some of them are going to turn out poorly. If you're working with a risk register and you have 8 or 10 high-risk actions in a risk register, if we were being honest about these risks then 8 or 10 in a risk register for a study, some of those are going to have to happen. Some of those bad things are going to have to happen and we're going to learn from it

So let me summarize and then we'll take some questions if we can.

First takeaway is planning has changed so the Corps should change the way it plans. That means risk informed planning. By the way I happen to be working with Brian Harper on putting together a revision to the Planning Manual that will be a risk informed planning manual so there's some help coming there.

Number 2: Uncertainty has always been there; it's time to deal with it. So that means risk assessors and risk managers must both address uncertainty in their work. Assessors have to address it in their analysis, and managers have to address it in their decision-making.

Number 3: You're either doing risk management or you're doing something else. So the Corps needs to commit to strategic risk management, looking down the road at outcomes.

Number 4: Risk managers balance risk-taking and avoiding risk in order to achieve goals. So that means as an organization, as a Planning organization, as a Planning Community of Practice, you have to take some risks to move forward.

Fifth, and finally, the Corps has the opportunity to become the nation's risk management leader, I believe. And, that would mean adopting an enterprise risk management model so that's what I've got for a kickoff for hopefully some discussion now.