

TOM:

That was a really interesting way to peel the onion on uncertainty. There certainly are a lot of levels of uncertainty that we all deal with. A couple of matters of housekeeping – we really want to encourage networking and communication among everybody here today, so to encourage that, you will all get an email list of the names and contact information for all the people that are here today. We are going to send that after the workshop when the list is complete. I encourage you while you're here to meet people, talk to people, and then keep in touch with them afterwards. One of the main purposes of these workshops for the IFC is really to create a network of instream flow advocates and supporters. Also, all of the PowerPoints will be posted on the IFC website. So you will have access to them unless somebody says they don't want us to post it, I suppose, but I don't think there's anything top secret there.

And then the other thing for you to take note of is that the formal presentations and discussion are just half of Flow 2015. We're going to memorialize the presentations and your participation today and tomorrow by recording everything, including all the presentations and all your questions and post them on the IFC web site. So to make the transcription better we'd like you to come to the floor microphones, tell us what your name is and your affiliation and then ask your question. We'll transcribe all of the recorded audio from this workshop and post it all online later this summer. We think that information will be useful and instructive for generations after today. So please get involved, think about questions, and ask them.

[Slide 1] Uncertainty is an interesting thing. It comes on different levels. I just happened to be looking the other day, and I saw that a 60-year-old white male has a 39.3 percent chance of living more than another 25 years. While you might not agree with those odds, you don't ask to see the data it's based on and you're content to just take your chances, even though it's a matter of life and death. And then you talk about water and uncertainty with water allocations and use, how much you need for restoring

environmental values, and usually trust is in short supply there. We often go away past probabilities to seeking proof like what's found in actuarial tables, and when proof proves elusive, which it always does because you're talking about understanding and modeling natural ecosystems, one side or the other demands more data. The resultant stalling tactic or quest for certainty proceeds until one or the other side gets the upper hand and gets more water. But just as often, discussions bog down good projects for years and add cost at several levels and can perpetuate environmental impacts along the way. So it's important to recognize and deal with uncertainty.

The Instream Flow Council was actually conceived in an environment of uncertainty. We all wouldn't be here today if there weren't the uncertainty that we faced back in 1994 or '95. On the heels of the first ever meeting of all the state fish and wildlife agency instream flow biologists in North America, I was asked to lead an effort to explore formation of a new organization that is now what we call the Instream Flow Council. The first thing our steering committee did was conduct a survey of all the attendees at the National Instream Flow Program Assessment and ask them, "if we form a new organization what would it be, what would it do?" The number one thing that people said was "Tell us the best methods to use in various situations," the and number two thing was "tell us how to interpret or apply the data."

In all 50 states, biologists saw a need for a blue book of sorts that could standardize the science and administration of instream flow and improve their ability to address the uncertainties associated with instream flow and lake level management. Well, in 1998, we officially formed the IFC. And by 2002, just four years later, we had written the first book that our new members had asked for [**Slide 2**]. We sold the initial printing of 1,000 copies in four months, ran another publication of 500, and sold those in the next year. During the two years after the first publication, we revised that book and published it in 2004 and promptly sold another 1,500 copies

literally around the world. Now that we had a popular blue book our members continued to get questions about how to integrate the many elements we identified as being key to successful river management. So we sought funding for and wrote another book in 2009 that provided 8 examples of complex river and lake level management situations that integrated the multiple instream flow elements we discussed in our previous two books [**Slide 3**]. The bottom line to me is that IFC members weren't the only ones who were adrift in the world of uncertainty when managing water for rivers and lakes and there are a lot of people and rivers that have benefited from the hard work our members invested in writing these books.

So, to be clear, none of the principles and concepts we wrote about in those books was new. We didn't invent anything. But those books were kind of the first time those ideas were all pulled together in one document with specific policies and critical assessments of methods to help practitioners do a better job of implementing science, understanding and developing laws, and involving the public. There's still plenty of uncertainty to go around. We didn't totally fill the gap because we are, after all, describing highly complex dynamic ecosystem processes. But today you see flow quantification efforts and discussions that embrace the principles and elements in those books that we wrote not that long ago. Speakers in this session and all the sessions this week will mention those elements to varying degrees as if they're just common sense. Fact is they are common sense and were long before we wrote the books.

[**Slide 4**] You'll hear people talk about the complex relationships between scientific processes, dealing with the public, as well as legal and institutional capacity and when managing basic elements of resource management. [**Slide 5**] You'll also hear people talk about the five riverine elements – hydrology, biology, geomorphology, connectivity, and water quality – that are intimately related with each other in highly complex ways that define and form ecological function of rivers and lakes that we

all try to manage. **[Slide 6]** You won't hear much talk of minimum flow because that term is not only misleading, it's a flawed principle. The fact is there's no such thing **[Slide 7]** because a minimum flow immediately becomes a maximum flow as soon as you institutionalize the concept and allow all the water higher than that flow level to be extracted from a stream. So I hope now you never say the words "minimum flow" ever again and will challenge others who persist in speaking of this flawed concept.

Simply stated, if you change the flow regime, you change the habitat. And when you change the habitat, you'll change the organisms that reside there, either the number or the species themselves. In place of minimum flow, you'll hear calls for dynamic hydrographs, intra- and inter-annually variable flow regimes and the importance of maintaining ecosystem processes instead of static conditions. The term "instream flow," is frankly a very complex subject that isn't nearly as simple as some people would like to think. It's much more than leaving a little water in the stream for fish, which was the basis for the lectures I gave yesterday on instream flow concepts. The basic fact is that we're really talking broadly of river and lake management.

[Slide 8] Understanding these linkages and taking appropriate actions is a big task. The speakers in this session have a heavy burden of responsibility in their jobs to develop management or mitigation recommendations that address the many levels of uncertainty that are associated with these complex issues and processes. Though they must know as much of the science as possible, they must also incorporate public input, work within institutional and policy limits, and at all times abide by the guiding principles of the legal capacity that directs their actions – their jobs are just that easy. **[Slide 9]** Our speakers today have all been primed to give us a good sense of "gee whiz" to describe their particular challenges and then dig deeper into the "so what". In my world, those are the only two things that exist anymore. Frankly if you don't ever get to

the specifics of “so what”, you’re missing a great opportunity to make a difference in how the world looks and functions. So your role as attendees here in this session and all sessions is to hold our speakers to the task of ferreting out the “so what” elements of their presentations. Listen hard to their presentations to find things that can make a difference in what you do. I want you to think about yourselves as much as anybody else and come out of here with something you can take home and put into practice.

I'd like you to ask yourself, what did you learn, what else do you need to know? More importantly, what will you do to improve your personal effectiveness to make a difference in river and lake management? Don't look at the person next to you and think they're going to do it. It's all about you. Bottom line is if we're just talking rainbows and butterflies, we're missing a great opportunity to actually make the world a better place. Please remember, this is a workshop. I hope you work and you'll get out of this meeting what you put into it. The presentations in our session this morning are going to go right up to the lunch hour. The facilitated question and answer period will be after lunch.

So I encourage you to write down questions that get to the “so what” part of each presentation and come back from lunch with those thoughts and insights that'll help us have a stimulating discussion. One reminder, you don't have to just ask questions. We're here to learn from each other so if you have things that work for you, share that information, tell speakers if you think they're off base or if some variation of their message works better in your situation. Please do remember that this is being recorded so if you would say your name and your affiliation it will help us when we post workshop transcripts.

So with that, I'm going to introduce Dudley Reiser. Unfortunately I left your introduction down there on the table, so Dudley I'll introduce you like I introduced Lance. To the audience, please read the program to see what Dudley has been up to and get the title of his talk. Dudley?