Todd Richards

TODD: (Slide 1) Well, good afternoon, everybody, and thank you for coming. I hope you're enjoying the conference as much as I am. I have been involved in the Instream Flow Council since 1999 and served as President from 2012 to '14, and I certainly have found it's one of the best organizations that I've been able to be involved with.

Prior to this conference, we had several phone calls about how our presentations were going to form up. And to me, it was a little disconcerting that in 15 minutes I was going to try to describe Massachusetts' Stream Flow Policy. It seems like a hard topic to get through in 15 minutes, but with everyone's help, fortunately we were able to focus. I chose to focus on how we in Massachusetts addressed uncertainty in a few key areas of a large stakeholder-driven process.

So the title of my presentation is Massachusetts Stream Flows, and I toyed around with several subheadings, the first of which was: (Slide 1a) "Now that's Uncertainty." But for folks who are from arid or semiarid areas, this may not be that much of a surprise, really. There are obviously dry streams in lots of places that are both altered and natural. So I put a second subheading up which was (Slide 1b)"How to Have a Water Crisis Amid 44 Inches of Annual Precipitation." So this maybe gives you a little bit of the context of what we're dealing with in this setting to demonstrate why our water policy changes were needed and how we had planned to address it.

(Slide 2) So what I want to do for you today is give you a little bit of an orientation of where Massachusetts is, how we use our water, I'll briefly touch on the uncertainty in water policy and then how we specifically address that uncertainty. As a little bonus, the stream pictures in the presentation are from Massachusetts. It's not all Boston. Massachusetts has some very pretty stream habitat as well.

(Slide 3) So, a little bit of the setting of Massachusetts is a very small state in the Northeast U.S. that gets a lot of precipitation. That square, the box that you're looking at, that is Massachusetts. The square also includes Connecticut and Rhode Island. PowerPoint wouldn't let me make a square small enough to get the state in.

Massachusetts receives more than 44" of precipitation annually but also has an awful lot of people (Slide 3a). We've heard lots of presentations about how water is used. We're really watering people in Massachusetts, 6.7 million people. State regulators consider65 gallons per person per day to be an efficient use of water. Multiply that by 6.7 million people and you're looking at somewhere in the neighborhood of 450 million gallons of water just for people. We have industry. We have limited agriculture, but you're talking about sustaining a population, and that's what our water use focuses on.

(Slide 4) So, over 300 years or so of history, we've done a lot of things to our streams and rivers. We have a lot of impervious surface, we have a lot of infrastructure, and we have wastewater treatment that's sometimes excessive. Ninety percent of certain streams are effluent in the summer months. And I'm not talking about creeks; I'm taking about rivers and streams that are some of our major basins. And while our water use is a little spurious at times and we don't tend to be as efficient as possible, we have made major strides. The leakage and seepage associated with the infrastructure to Boston used to be a dramatic waste of water, and there had been major strides to increase the efficiency of water use in the state. But obviously we still have some issues.

(Slide 5) Our regulatory setting is one of Regulated Riparianism. So if you want more than 100,000 gallons a day, you need a permit to do that. We have somewhere in the neighborhood of 15,000 permitted groundwater wells, 150 surface water reservoirs, and all of the uncertainty that we dealt with in the MA water policy really only focused on impacts due to groundwater use (Slide 5a).

We addressed surface water reservoirs in the water policy revision, but in a completely different manner. As a matter of fact, the stream pictures that you're looking at throughout the presentation are my research streams on a project. It's a PhD project that is probably going to be a 15-year PhD project, and I have no error bars on that estimate either. I'm looking at small streams and reservoir impact associated with them and control streams as well, so the pictures are from a lot of my research streams.

But most of this presentation will focus directly on uncertainties associated with groundwater withdrawal regulation. As Dennis pointed out, in his state, there's a lot of groundwater withdrawal. Ours is mostly groundwater withdrawal as well.

So we needed a water policy revision at this time. Why did we need that? (Slide 6) Obviously, some of our streams were running dry, which is not in general a normal and natural condition amid that rainfall pattern that I illustrated. So, for example, the picture that you're looking at here is one of my research streams, and it is a control stream. It does not have a water supply reservoir. It does not have significant withdrawals upstream of it. Sometimes things just get dry. This reach we sampled last summer in July, I caught 180 brook trout in 118 meters. This is one month after we sampled it. So there are fish existing in refugia within the sample reach, but obviously sometimes things even naturally can get dry.

(Slide 7) We talked about uncertainty, and water suppliers want certainty with regard to the product they can deliver to their constituents. So we need water policy revisions because there was considerable uncertainty in how their permit applications were being handled and it was time to revise the process. Finally, the courts said get together and fix this, which is not a situation that you want to have happen but sometimes that's the only way things get done.

(Slide 8) So out of this court decision was born the Sustainable Water Management Initiative. Some of the core pieces of the Sustainable Water Management included (Slide 8a) an advisory committee which was made up of water suppliers (Slide 8b), state and federal agencies (Slide 8c), watershed advocates (Slide 8d), and industry (Slide 8f). It's a fairly typical process for getting as many of the players in the room as you can possibly get in the room.

So, to advise the advisory committee on very technical matters and often to deal with the science and the technical aspects of the science, (Slide 8g) a technical subcommittee was also developed with a subset of the same stakeholders. There's a lot of reuse going on when it comes to these committees. A lot of the people were on the same committees. And the job for the technical committee was to feed back highly technical information to the advisory committee (Slide 8h), filter it so they can make policy decisions. The biggest benefit of this was stakeholder buy-in (Slide 8i). I will continue to use this for the next decade as our water policy revision is challenged that we put 40 people in the room for 100 meetings over three years and agreed to things. Those are things that should not be able to be undone by other meetings with one of the user groups. So this process was institutionalized, established, documented fully, and hopefully this will carry weight as we move forward and get to implementation, which has its own uncertainty.

We came to consensus (Slide 9) on several items in this process, in my opinion, not enough. Tom's Annear's recommendation for the presentations was to provide more of a "so what" message instead of a "gee whiz," the "so what" is make sure that you get consensus items that you can then build the science on; that you can then get buy-in on. You have to make sure that folks come to consensus on several matters. Some of the consensus items that we identified were to recognize the existence of existing water suppliers. We were not going back to the horse and buggy. We were not turning people off; we were trying to figure out how to use water more wisely moving forward, keep conditions from getting worse, and require suitable mitigation if they did get worse. And then some interesting consensus items from a resource perspective: protect the best of the best in terms of identifying least altered conditions and protecting them, and the importance of cold water fishery resources. Those are things that resonated with all the stakeholders in the group. Anyway, most of what I'm going to talk about (Slide 9a) has to do with those later parts. I recognized since I turned on the tap that existing water supply is important. That's something that I feel I don't need to focus on in the presentation. I'll be focusing on the rest of the processes.

And I'm going to be doing that by (Slide 9b) minimizing the uncertainty by using a series of common sense statements supported by science. So let's start (Slide 10) with that concept – minimizing uncertainty. So the first common sense statement I will examine is: "increases in flow alteration cause decreases in fish communities." Slide 10a) True or false? I don't want to argue about incrementally where we need to be quite yet. I just want to know if folks have a general understanding and agree with the simple common sense statement. We would like to say Slide 10b) of course true. But some of the work that's been done over the last 40 years, often by Claire, some of it is long ago, some of it's as far away as Connecticut and we can't trust them, so we were able to use USGS's significant resources at the Office of Water Resources. Dave Armstrong authored this (Slide 10c) report that I'm coauthor on to look at fish community response to flow alteration in Massachusetts.

So the conclusion is (Slide 10c) that increases in flow alteration cause decreases in fish community metrics that we looked at. The important part here is that these are variables. We own them. So we can then go to the regulators to have confidence in what they're going to do, right? So they can understand these variables. But the response curve has no inflection points. Let's try to figure out if we can use some other common sense statements to do that.

The second statement is (Slide 11) the second group. (Slide 11a) Not all species respond the same, and more sensitive species or life stages need more protection. (Slide 11b) True or false? We put that in the affirmative (Slide 11c) by illustrating that brook trout (Slide 11d), as an example of sensitive species and life stages, respond in a different way, (Slide 11e) a little more extreme, perhaps, than the general fish community attributes. So at boxes one, two and three, we lost a third, two-thirds, and 90 percent of the brook trout with increase in flow alteration. And we can capture those percent flow alteration variables and those points and incorporate those into our model. But we're not quite done yet.

(Slide 12) The third common sense statement is: (Slide 12a) loss of species is bad. Now, setting aside that we have probably far more diversity than we should have in Massachusetts because we have probably 40 percent exotic species, often which are supported through dams and impoundments, let's just say native riverine species, loss of species is bad. (Slide 12b) True or false? And the answer there is (Slide 12c) true, but of course we have to support that with some science. So we were able to look at the likelihood of losing (Slide 12d) one, (Slide 12e) two, and (Slide 12f) three species with increasing flow alteration.

So let's put all these common sense statements together before Claire kicks me off the stage.

So (Slide 13) we're looking here at our curve. That's our initial curve is the blue line, illustrating that increases in flow alteration cause decreases in fish communities. And the important point here is that nothing is free (Slide 13a). The curve illustrates a consistent decline it's always incrementally negative. Sensitive species (Slide 13b) however do respond at a far lower level of alteration and a little more extremely. And, (Slide 13c) loss of species also tends to occur as you increase these flow alteration levels.

Now (Slide 14) we've got a situation where we've got five categories, because in policy you can't have more than five of anything. Everyone gets confused. And we refer to those as biological categories. In terms of mitigation, there are a couple of important points just to throw in. Mitigation (Slide 14a) is required for increases in withdrawal within a category. So if you're staying within your category, you need to mitigate. Why? Because nothing is free. The line's always declining. That's a simple statement; everybody understood. If, however, (Slide 14b) you're going to jump a category, we consider that you'll be required to do additional mitigation because of the change in category.

So we have a really cool color system and we have a situation where we have categories outlined, and in three years the only thing voted on were these categories. The only thing in that group of 40 stakeholders that was voted on was to accept these alteration levels and biological categories.

(Slide 15) We can take our system of 1400 sub-watersheds in the state and now paint those with an existing condition. First of all, it helps us identify the best of the best that have low alteration, protect those resources, which is also protecting cold water resources, and also kind of map out for everybody how much water you could take without changing a category, which would increase the amount of mitigation that you have. The goal was to have a statewide water policy, which was accomplished by having the tools and folks had trust in those tools at an appropriate scale to conduct the work at the statewide level and create a statewide policy.

The only reason that the Cape Cod and the south coastal are not painted is because they are all sand, and when you drop a drop of water, you don't know which direction it's going to go. And the rest of our watersheds, it's all very predictable.

To summarize, (Slide 16&16a) we developed the tool for management. Looking at the science wasn't the hard part; it was developing a tool that would work statewide. Fish community attributes and flow alteration metrics were that the tool we used. We built (Slide 16b) consensus among the stakeholders, and then from (Slide 16c) that we're able to develop a series of common sense statements to support byscience. And that was how we addressed our statewide water policy was to try to build that consensus to gain confidence with those stakeholders, record the stakeholder process, and incorporate it into our policy decisions. Thank you.