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Fellow Risk Watchers,

My name is Mike Dunn. I'm the Managing Director of risk management consultancy Intelligent Outcomes Group. You can find my details on LinkedIn or by visiting our web site [www.iog.com.au](http://www.iog.com.au).

The Premier of Queensland declared the recent rain and flood event initially as one in 500 years event and then improved on that to a one in 1,000 years event. No doubt this frequency was used to indicate how unusual the event was and therefore why no one (including her and her government) was prepared for it to occur, and therefore was to blame. I think this example is a great teaching point for us risk watchers and anyone else looking to credibly identify an event's likelihood.

The first teaching point is what exactly was the event that occurred and how might it be conceptualised? Was the event unusually large quantities of rain falling on the Wivenhoe Dam catchment area that quickly filled the dam and threatened uncontrolled releases of water from the dam? Was the event unusually large quantities of rain falling on the Brisbane CBD that caused the creeks and stormwater levels to rise and flood low lying areas? Was the event unusually large quantities of water falling in South East Queensland that caused widespread flooding? SEQWater (the dam operator) was no doubt thinking of the 2011 releases of water that broke the banks of the Brisbane River and flooded large parts of Brisbane, actions that are still subject to ongoing litigation. I suspect the government was thinking of this possibility as well.

The second teaching point is who really thinks an event that is assessed at these frequencies is credible or likely to be taken seriously by anyone including government? Some of the best companies in the world have come to grief relying on this approach to likelihood. And I am sure we all know how difficult it is to gain management buy in for likelihood frequencies much more likely than this one. How do you convince managers to adopt any likelihood controls or consequence mitigations for events that statistically shouldn't occur in theirs, their children's, their grandchildren's, their great grandchildren's lifetimes? As risk professionals, if we are going to be of relevance to decision makers, we need to conceptualise likelihood very differently to just straight frequency projections.

So, two problems to work our way through. The answer to the first problem is to work in scenarios, and not only scenarios based on actual past occurrence, but 'outside the box' scenarios as well. If you are a government concerned with managing the capture of drinking water for the city and to engage in flood mitigation in southeast Queensland, you require a robust scenario planning regime that identifies all events that are possible, all indicators that point towards any scenario's occurrence, and controls that can reduce that possibility of occurrence. This process will lead to the identification of realistic levels of likelihood. The answer to the problem is to associate levels of likelihood with realistic timeframes. I have spoken to many middle-aged people who have experienced four 'one in 100-years' flood events in their life to date. Either they have been exceptionally unlucky, or the likelihood descriptors have been unrealistic. My contention is that it's the second reason. Timeframes associated with likelihood are evaluated best by looking at the full range of indicators and controls identified for each scenario.

My point is made with this scenario: unusually large quantities of rain fall on the Wivenhoe Dam catchment area, quickly fill the dam, and require uncontrolled releases of water from the dam. This last happened in 2011 when the uncontrolled releases caused massive flooding in Brisbane. Reporting by journalist Headley Thomas indicates we came within hours of being placed in the same position with this year's floods. Reporting quoting SEQWater officials indicates they had no idea that such large quantities of water would fall on the dam catchment. The Bureau of Meteorology (BOM) did not forecast such heavy rain in the dam catchment, but SEQWater would surely have had this scenario on its risk register. And the Premier's statement on being surprised

by the scale of the rainfall, indicates that no one in authority thought what occurred was possible.

To risk practitioners this means that relevant indicators for this scenario were not sighted in the catchment area for the Wivenhoe Dam, and therefore relevant controls were not implemented. What might have been the indicators for this scenario: the confluence of the La Nina weather pattern, the Indian Ocean Dipole, the Southern Annular Mode, and the Madden-Julian Oscillation, all indicated significant rain was going to fall in eastern Australia. Prior to this rain deluge, the Wivenhoe Dam held approximately 59% of its total capacity. Because of the inquiry that investigated Brisbane's flooding in 2011, SEQWater was restricted from releasing water based on weather forecast. It had to wait until rain was falling on the dam catchment. The first water releases tied to the heavy rainfall at that time occurred on the Friday in the late afternoon. These releases were criticized as too little too late, but SEQWater considered them adequate as they did not cause the river banks to burst and add to the flooding caused by creek rises and stormwater flowing into the creeks and streets. Within three days (Friday, Saturday, and Sunday) of heavy falls (approximately 220mm per day) the dam's capacity rose to approximately 160%. Luckily, the heavy rain ended on Sunday and Wivenhoe Dam was able to continue to release much of its excess water safely in the following days. Disaster from uncontrolled releases was averted this time unlike in 2011. But SEQWater came close again to having to make uncontrolled releases.

Imagine the furore and consequences if 2011 had been repeated within 11 years? No doubt SEQWater will count their strategy a success but I think this analysis indicates the risk methodology and thinking were flawed. I would think from SEQWater's perspective, the principal likelihood control for this scenario was water releases. If water had been released in the week before the heavy rains, then the Wivenhoe Dam would not have come as close to causing catastrophic flooding as it did. As risk managers contemplated that coming week and the prospect of rising creeks and stormwater backup, and the dam quickly filling, this scenario would have filled them with dread: a repeat occurrence within 11 years. If it did, then they should have modified the above scenario to the following: unusually large quantities of rain are likely to fall on the Wivenhoe Dam catchment area in the short term and fill the dam to approximately 160% of capacity. Therefore, the current mandated practice of only releasing water from the dam once rain is falling on the catchment area, must be stopped. This approach would have warned government for the possibility of significant flooding caused by uncontrolled water releases within 11 years of the last occurrence, and assisted risk managers to obtain a change of policy on when water should be released.

I hope this is food for thought.