

Looking away from the rear view mirror: making better decisions in a time of uncertainty

Professor Iain White

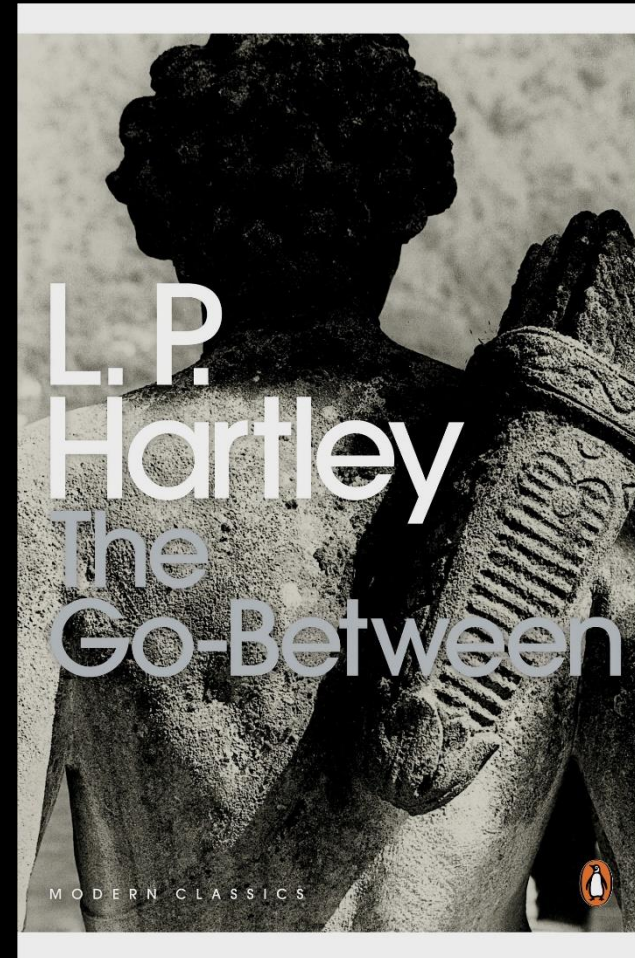
University of Waikato, New Zealand

lain.white@waikato.ac.nz

Sep 2017,  @iain_white

The past is a foreign
country:
they do things
differently there

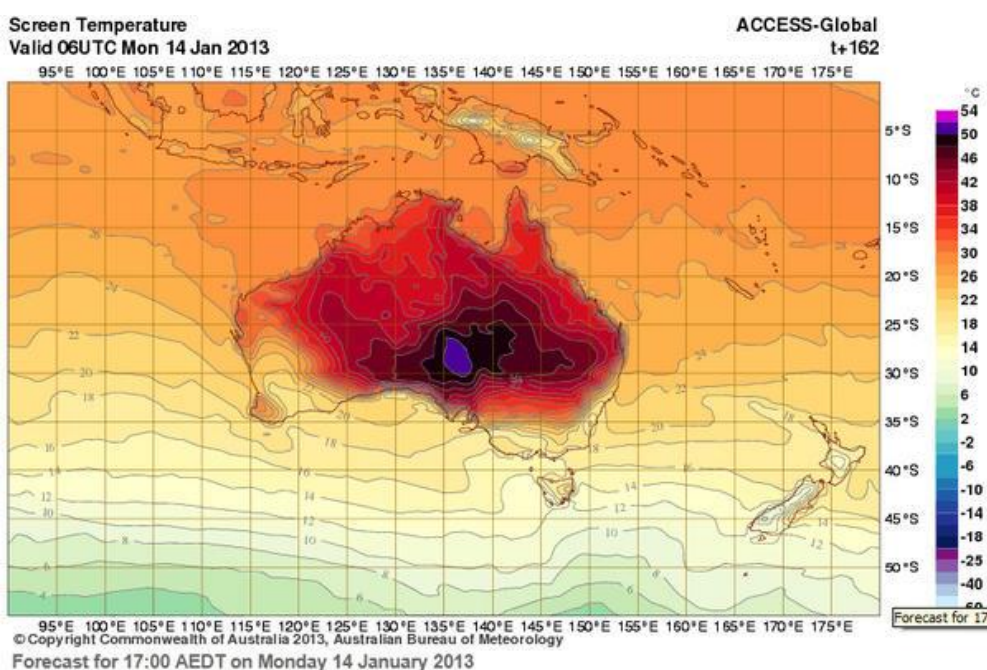
‘The Go-Between’ – L. P. Hartley, 1953



What is normal? What needs to adapt?

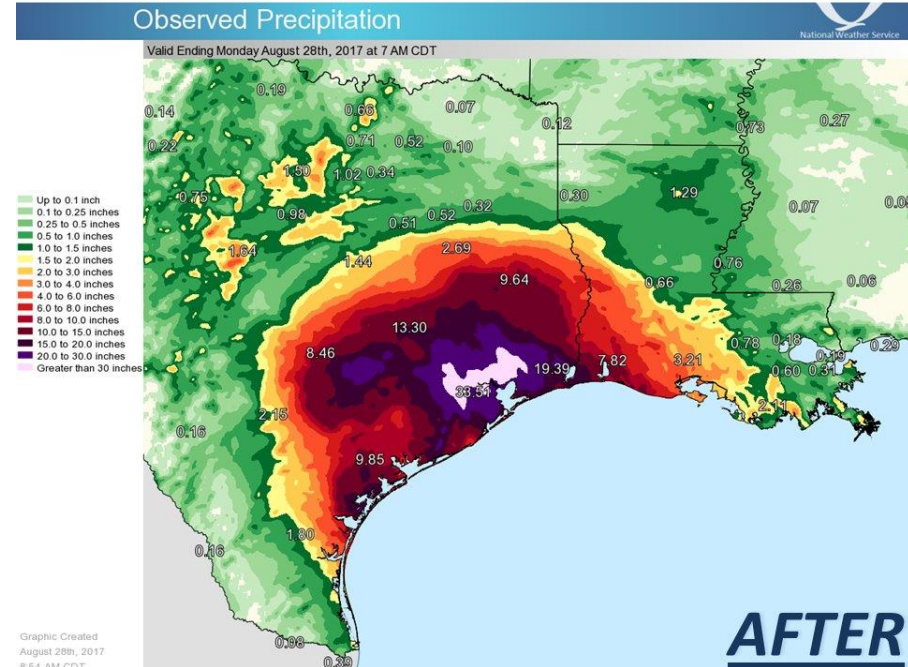


THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Wāikato



In 2013 the Australian Bureau of Meteorology added a new colour for over 52 degrees (previous maximum was 50C)

Adaptation agenda concerns not just the built environment, or our planning and engineering, but also the norms of making decisions and how we conduct science



In 2017 the US National Weather Service added new colour for precipitation over 30 inches (their previous maximum was 15 inches)

Is 'unprecedented' the new 'normal'?



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato



Wonkblog | Analysis

Houston is experiencing its third '500-year' flood in 3 years. How is that possible?

By Christopher Ingraham

August 29, 2017 at 7:30 AM



This drone video taken Aug. 27 shows the historic flooding in Houston caused by Hurricane Harvey. (ahmed.gul/Instagram)

Hurricane Harvey has brought "500-year"

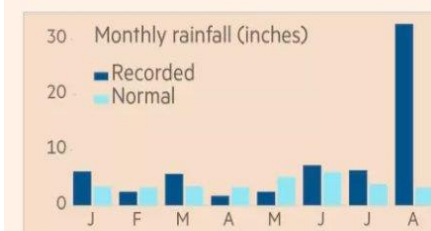
Raises number of questions: not just is it a 1-in-a-500 event? But how useful is the past in influencing future decision making? Is the past a foreign country?



Houston Hobby Airport's runways were underwater-most are outside of the 0.2% of flooding/1-in-500 year flood zone

An 'unprecedented' event

Cumulative rainfall (inches) at Houston Intercontinental Airport, 2017



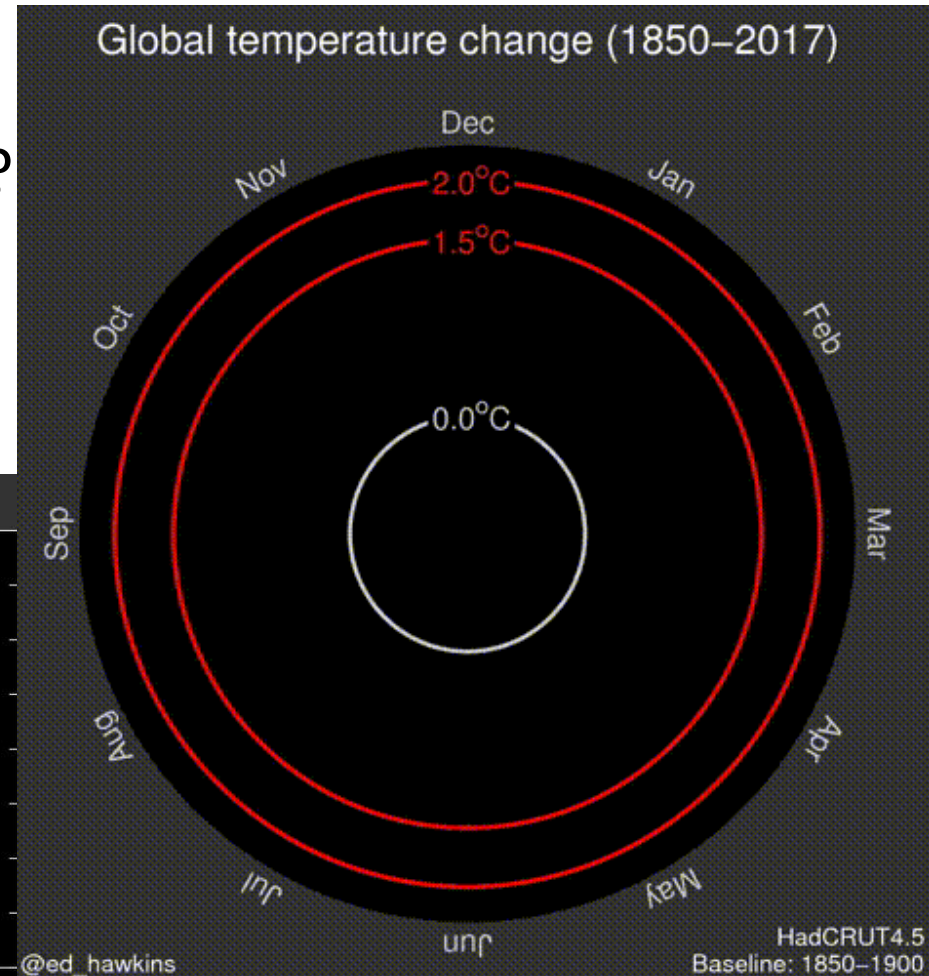
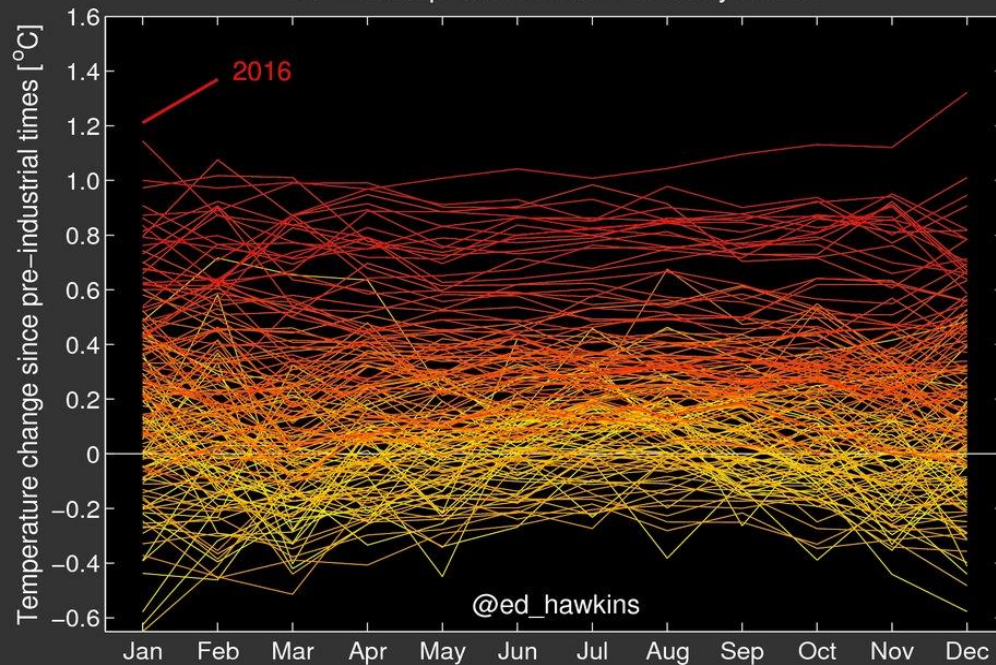
Uncertainty and climate – is the past a good indicator? Dynamic v static.



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

- Climate is changing rapidly
- How confident are we that we know and understand the future? Will uncertainty rise?
- Can our decision making engage with **complexity & uncertainty**?

Global temperatures since 1850 by month



Increasing number of records broken

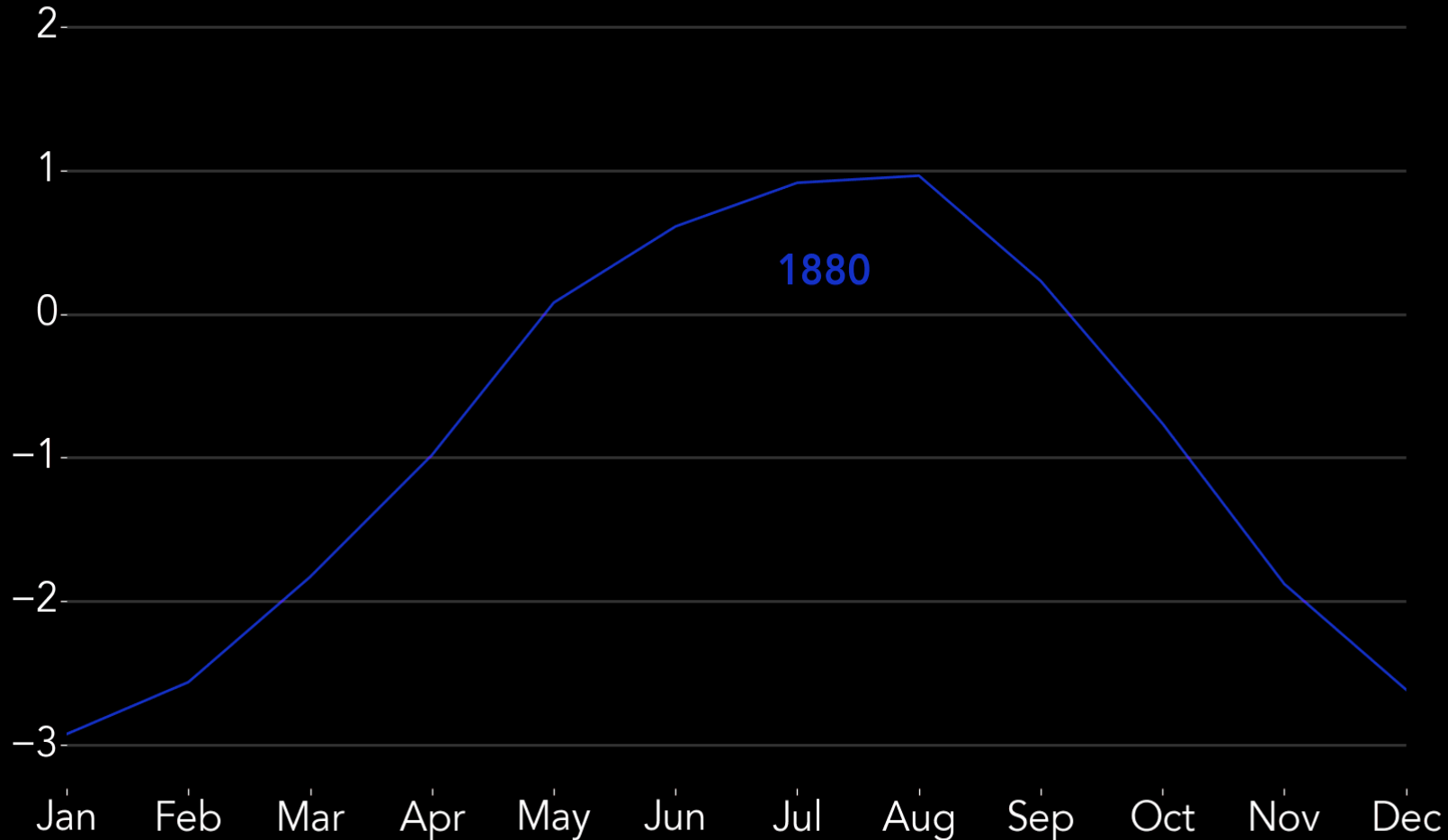


THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Temperature Anomaly (°C)

(Difference from 1980-2015 annual mean)

Record Years

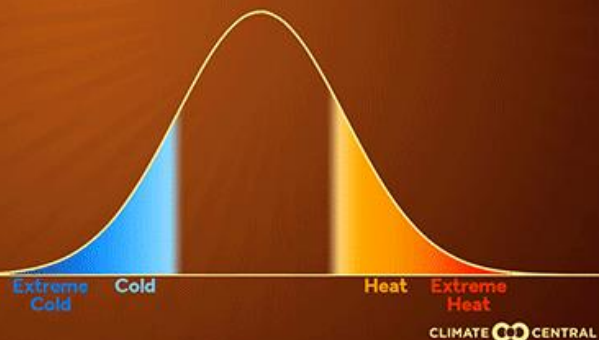


'Extremes' becoming more frequent?

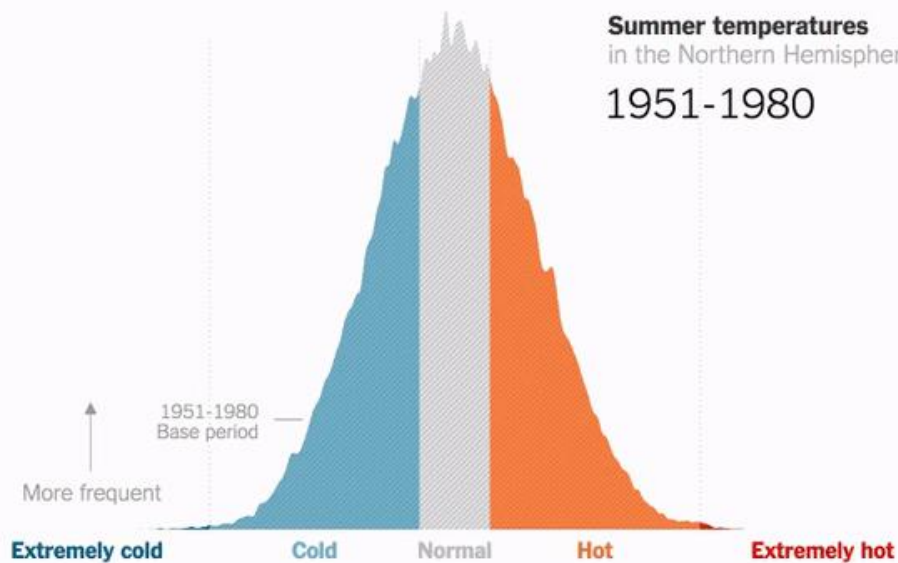


THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

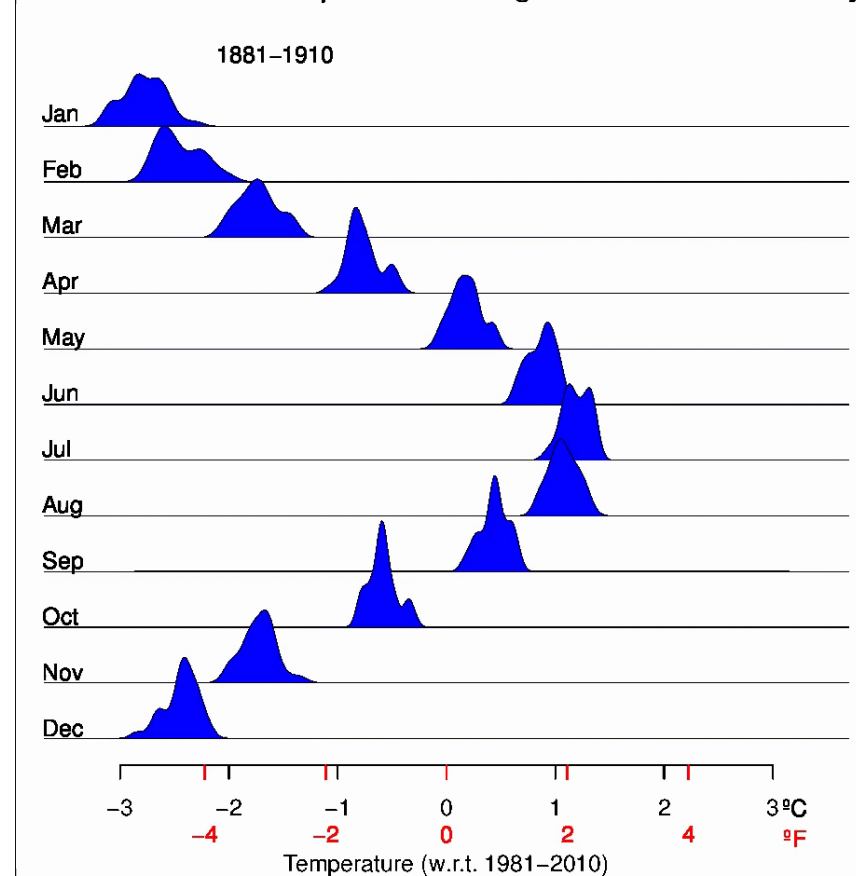
SMALL CHANGE IN AVERAGE BIG CHANGE IN EXTREMES



Summer temperatures in the Northern Hemisphere 1951-1980



How have seasonal temperatures changed since the 19th Century?



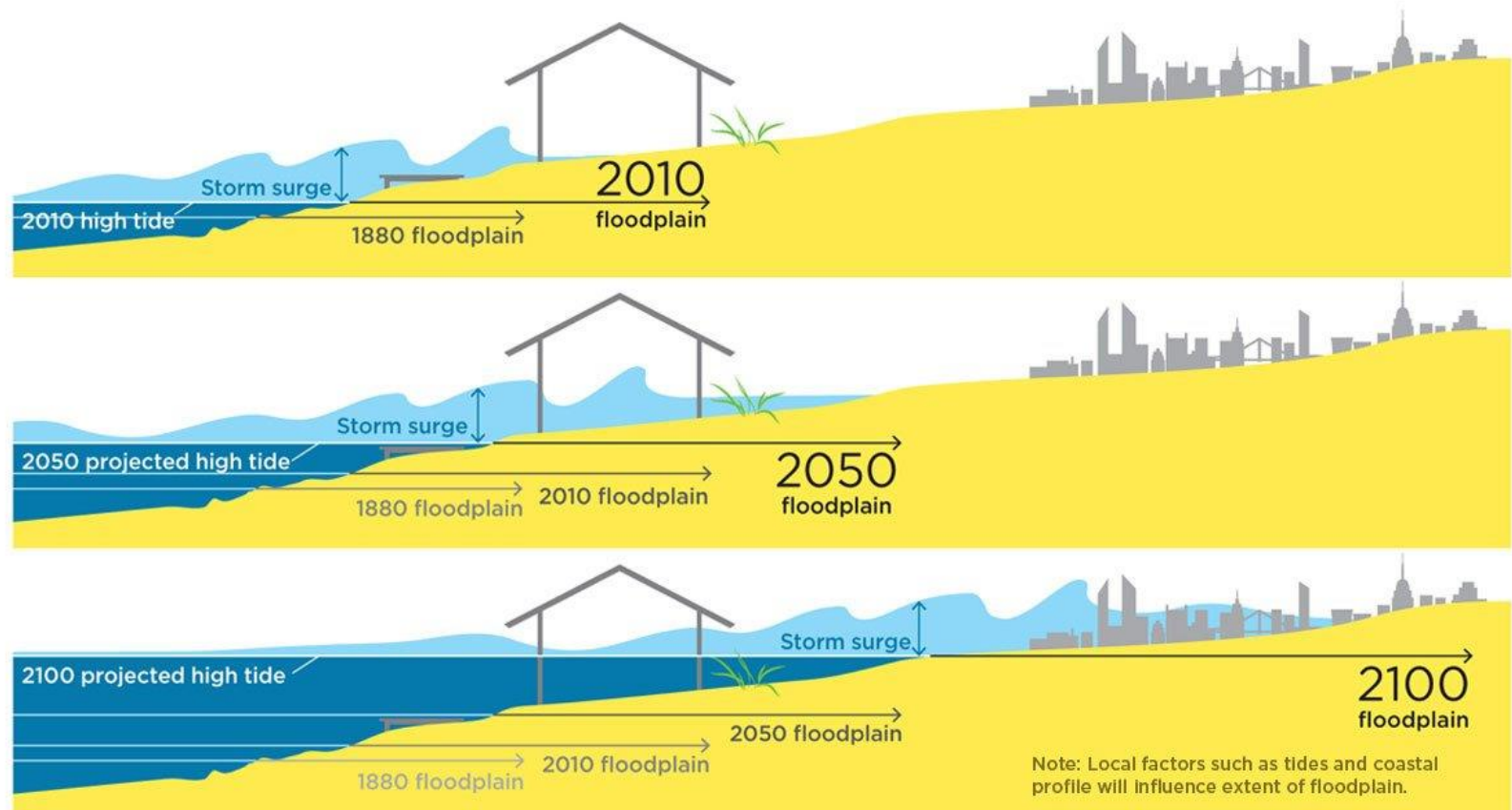
@climateofgavin

'It's not your imagination summers are getting hotter', New York Times, 28 July 2017

In Climate Terms Standing Still is Moving Backwards



FIGURE 3. Storm Surge and High Tides Magnify the Risks of Local Sea Level Rise



Its outd
we don

Sea level sets a baseline for storm surge—the potentially destructive rise in sea height that occurs during a coastal storm. As local sea level rises, so does that baseline, allowing coastal storm surges to penetrate farther inland. With higher global sea levels in 2050 and 2100, areas much farther inland would be at risk of being flooded. The extent of local flooding also depends on factors like tides, natural and artificial barriers, and the contours of coastal land.

© Union of Concerned Scientists 2015; www.ucsusa.org/sealevelrisescience

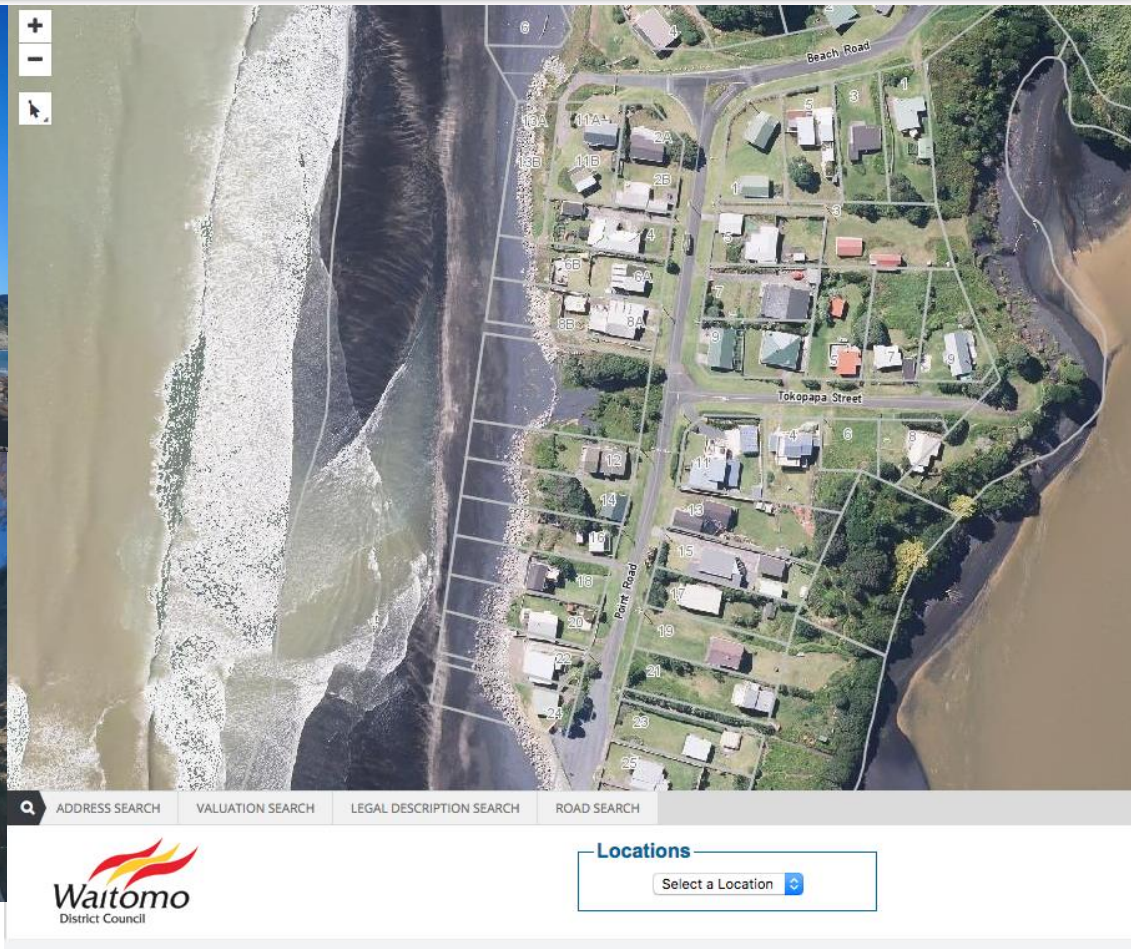
Complex & dynamic intersection of hazards



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

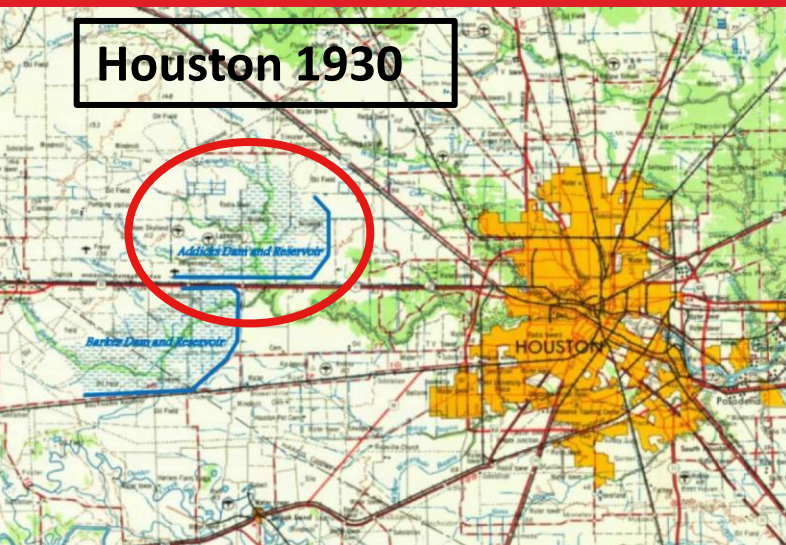


Shoreline erosion, Cape Palliser,
Wairarapa, 2016

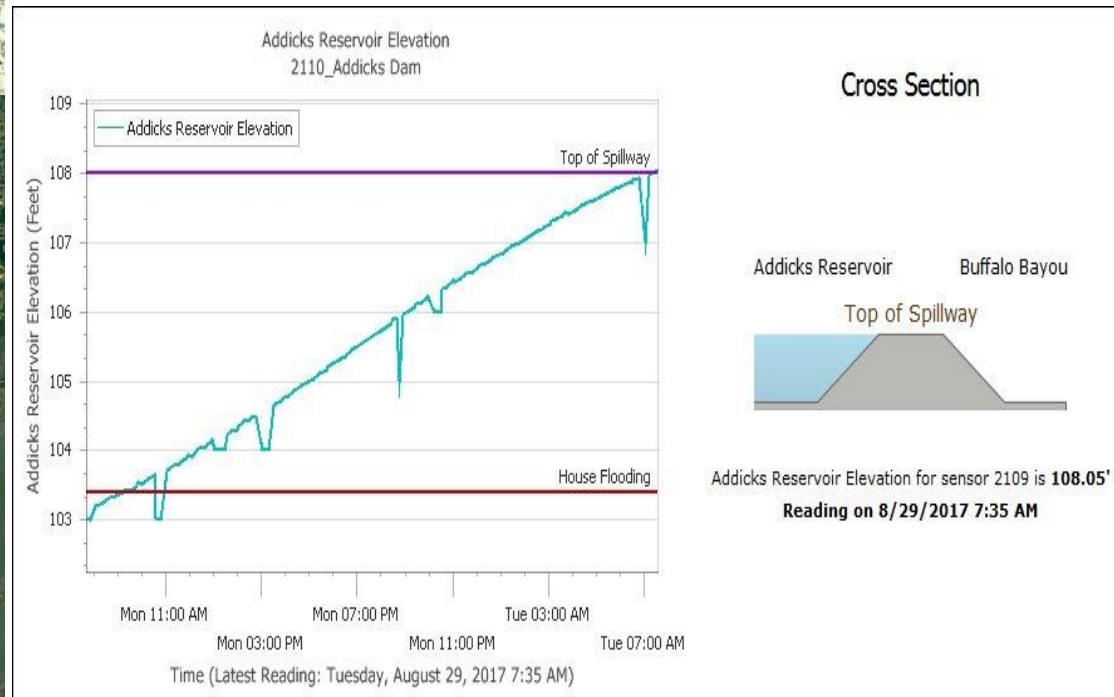
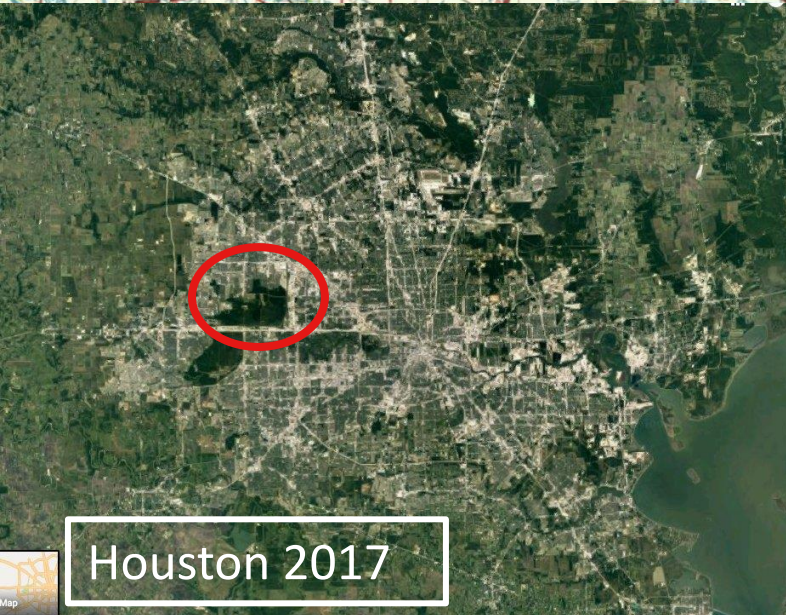


Mokau spit (Waitomo DC) - you can see where
the 1950 property boundaries used to extend to

The dynamism also links to the social & political



- The Addicks reservoir in Houston was built in 1930 to withstand a **1-in-a-1000** year event.
- Now due to fast development is in the middle of suburbia





Boomtown, Flood Town

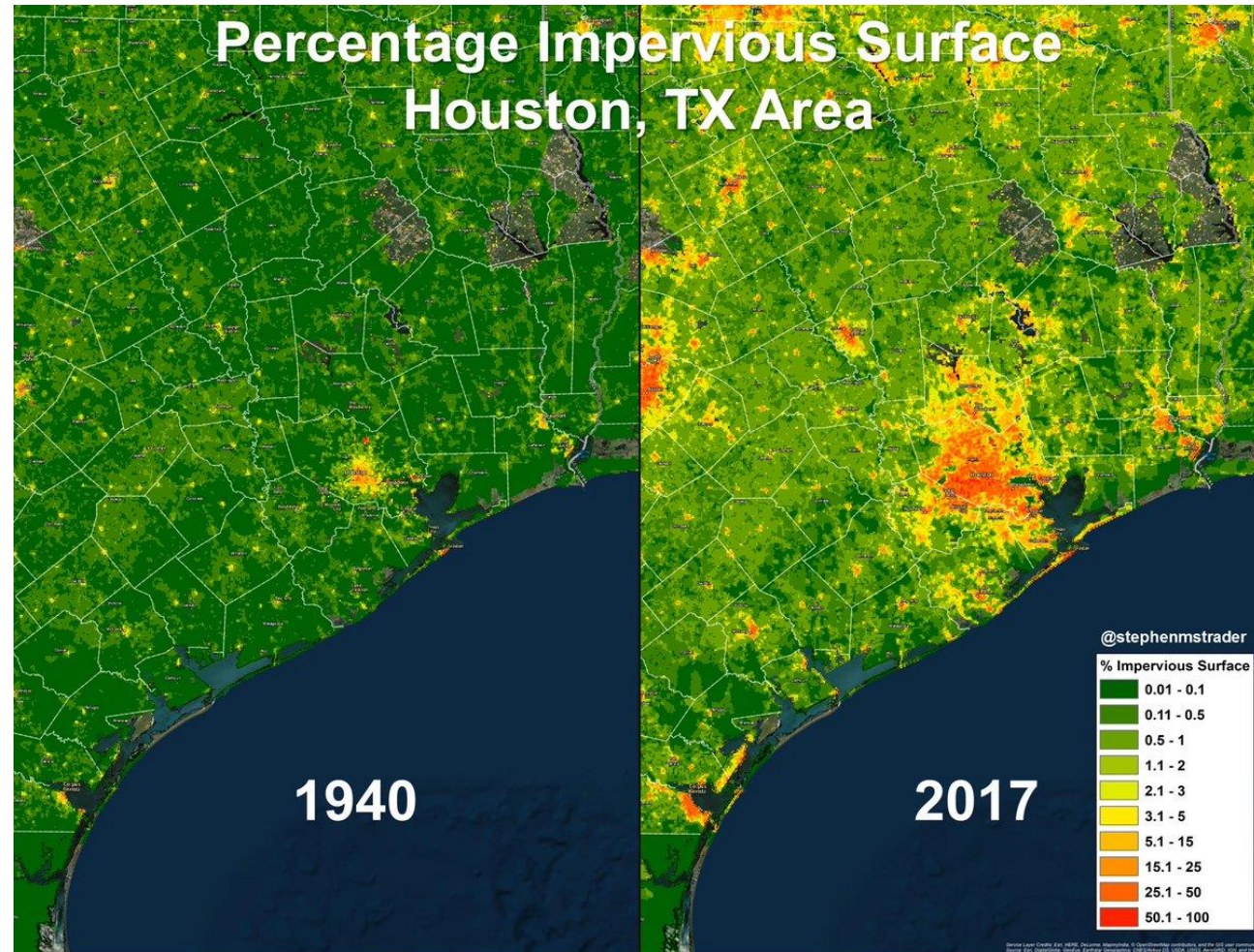
Climate change will bring more frequent and fierce rainstorms to cities like Houston. But unchecked development remains a priority in the famously unzoned city, creating short-term economic gains for some while increasing flood risks for everyone.

by Neena Satija for *The Texas Tribune* and *Reveal*; Kiah Collier for *The Texas Tribune*; and Al Shaw for *ProPublica*, December 7, 2016



An aerial shot of downtown Houston during the "Tax Day Flood" in April. (Jordan Anderson/DoubleHorn Photography)

This is part of a series on Houston's flood risk. Read about why Texas isn't ready for the next big hurricane.



Stephen M. Strader
@StephenMStrader

Certainty? properties in England at risk of flooding over time



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Flood Events

 1947
 1953

 1998
 2000



Year	Estimated properties at risk (23m total in 2011)			Total
	Rivers & Sea	Surface Water	Groundwater	
2001				
2004				
2009				
2015				

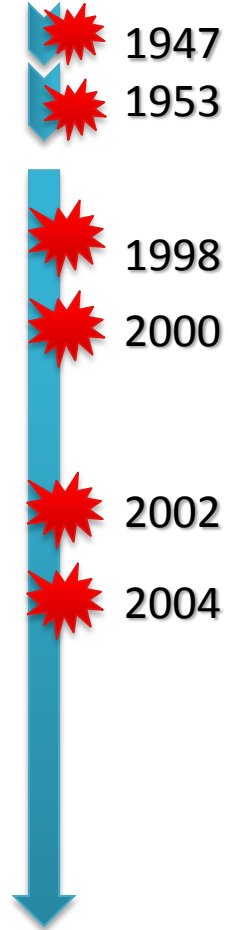
(White 2013; O'Hare, White and Connelly, 2017)

Certainty? properties in England at risk of flooding over time



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Flood Events



Year	Estimated properties at risk (23m total in 2011)			Total
	Rivers & Sea	Surface Water	Groundwater	
2001	1,724,225	0	0	1,724,225
2004				
2009				
2015				

(White 2013; O'Hare, White and Connelly, 2017)





Certainty? properties in England at risk of flooding over time




THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Flood Events

 1947
 1953

 1998
 2000
 2002
 2004



Year	Estimated properties at risk (23m total in 2011)			Total
	Rivers & Sea	Surface Water	Groundwater	
2001	1,724,225	0	0	1,724,225
2004	1,740,000	80,000	1,700,000	3,420,000
2009				
2015				

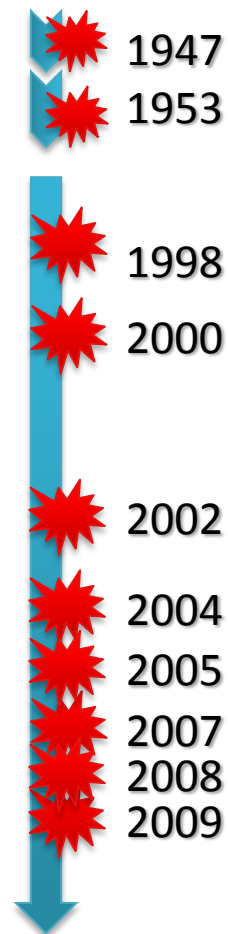
(White 2013; O'Hare, White and Connelly, 2017)

Certainty? properties in England at risk of flooding over time



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Flood Events



Year	Estimated properties at risk (23m total in 2011)			Total
	Rivers & Sea	Surface Water	Groundwater	
2001	1,724,225	0	0	1,724,225
2004	1,740,000	80,000	1,700,000	3,420,000
2009	2,400,000	3,800,000	1,700,000	6,800,000
2015				

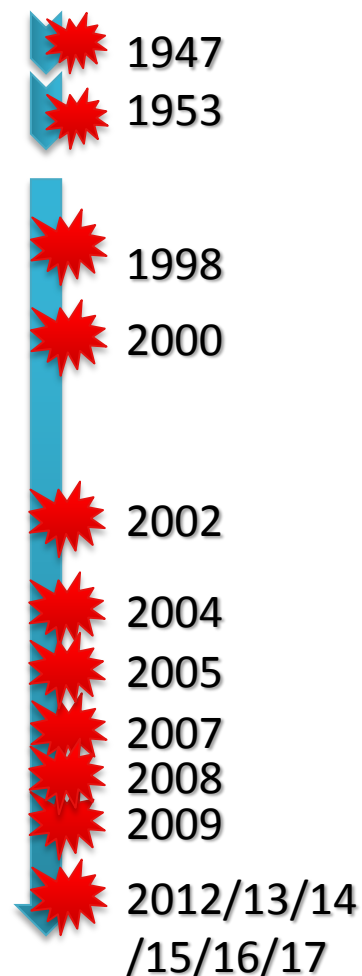
(White 2013; O'Hare, White and Connelly, 2017)

Certainty? properties in England at risk of flooding over time



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Flood Events

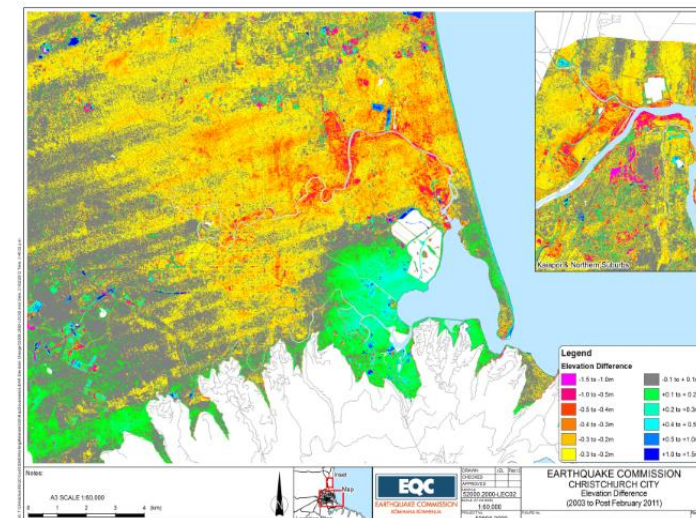
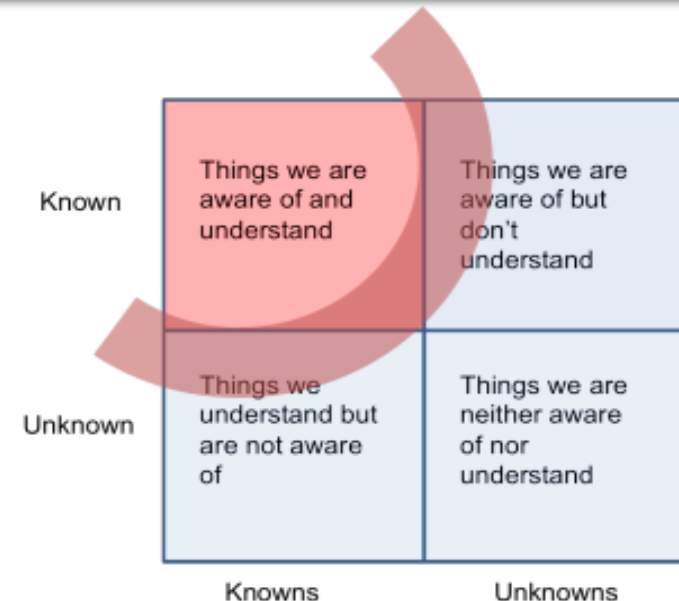


Year	Estimated properties at risk (23m total in 2011)			Total
	Rivers & Sea	Surface Water	Groundwater	
2001	1,724,225	0	0	1,724,225
2004	1,740,000	80,000	1,700,000	3,420,000
2009	2,400,000	3,800,000	1,700,000	6,800,000
2015	2,641,000	3,181,000	Between 122,000 and 290,000	6112,000

(White 2013; O'Hare, White and Connolly, 2017)

- Growing **complexity**

- more data=same uncertainty?
better knowledge of interactions
but while models have got better,
they are no better at predicting
(Batty, 2015)
- Advances in climate models, but
uncertainty range unchanged for
30 years (Roe and Baker 2007)
- Cascading effects, moving targets,
Earthquakes, causing landslides,
due to sodden ground



- Policy needs to **manufacture** certainty
 - Faster decisions, less ‘red-tape’, but less scope for politics and complexity?
 - quantifying risk good for DM can defend institutions, deflect blame, provides political justification, avoids liabilities
 - but ‘false precision’ (White 2013), ‘stationarity is dead’ (Milly et al 2008)?
- Decision methods provide trust in expert systems (Giddens 1990) so techno-political
 - Ewald (1991, 207): ‘to calculate a risk is to master time, to discipline the future’
 - Tend to look for ‘laws’ (O’Neill 2001) to code uncertainty - 1 in a 100 event
 - Set artificial boundaries of impact and time – ie CBA (Lane et al 2014; White & Haughton 2017)





- Similar characteristics of persistent problems that the NSCs are designed to address: interdisciplinary, complex, uncertain, dynamic, etc.
- Acknowledge that the ways the science-policy-practice interface has worked has not been effective in the past.
- We **SHOULD** be disrupting existing ways of working and knowing – but these may **RESIST** change. Our systems are **designed to be stable** for efficient decision making; path dependencies, institutional inertias, practice norms, etc.
- Important that we focus on the system/structures/worldviews of decision making as **well as the decisions/policy**

copyright © Bill Frymire

Key messages



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato



- **Decision making needs to adapt** alongside our built environment and the ways we conduct science – need to be able to engage with complexity and uncertainty, and prepare for the future differently
- How can we create the political space for complex, value laden decisions to be debated, or long-term strategies put in place that can better engage with complexity and uncertainty?
- Climate change will be affected by other public policy trends – we need to ensure that we don't **fast track impacts alongside new developments**
- Reflective, 'boundary' researchers, policy-makers, and practitioners - **To what extent can your existing ways of working and knowing - your tools, processes, science, relationships, etc, - incorporate these non-normal issues?**

copyright © Bill Frymire

Thank you

- White, I. and Haughton, G. (2017) [Risky times: Hazard management and the tyranny of the present](#), *International Journal of Disaster Risk Reduction*, 22: 412-19
- White, I. (2017) '[Past, Present and Future Water: the challenges in creating more beneficial trajectories](#)', in Bell, S., Allen, A., Hofmann, P. and Teh, T-H. (eds) *Urban Water Trajectories*, Springer: London. 165-178
- White, I. (2013) 'The more we know, the more we don't know: Reflections on a decade of planning, flood risk management and false precision, *Planning Theory and Practice* 14 (1): 106-114. [Planning-Theory-and-Practice-Special-Issue-on-Flooding.pdf](#)

Professor Iain White

University of Waikato, New Zealand

lain.white@waikato.ac.nz

 @iain_white