

Auckland Unitary Plan Implementation: Stormwater Management

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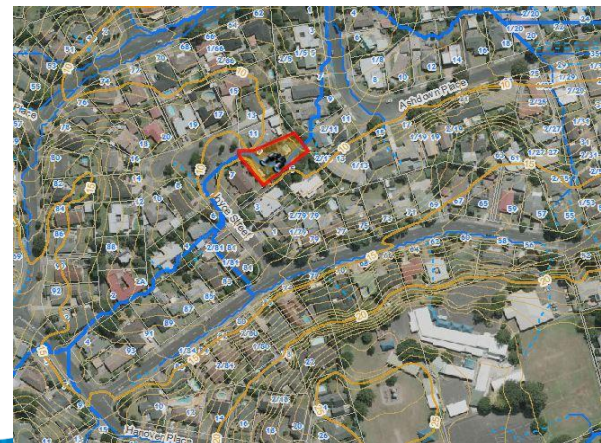
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Background

- Auckland Unitary Plan challenge –
 - provide for significant urban growth while addressing existing issues
- 16,000 buildings predicted to flood in a 1% AEP

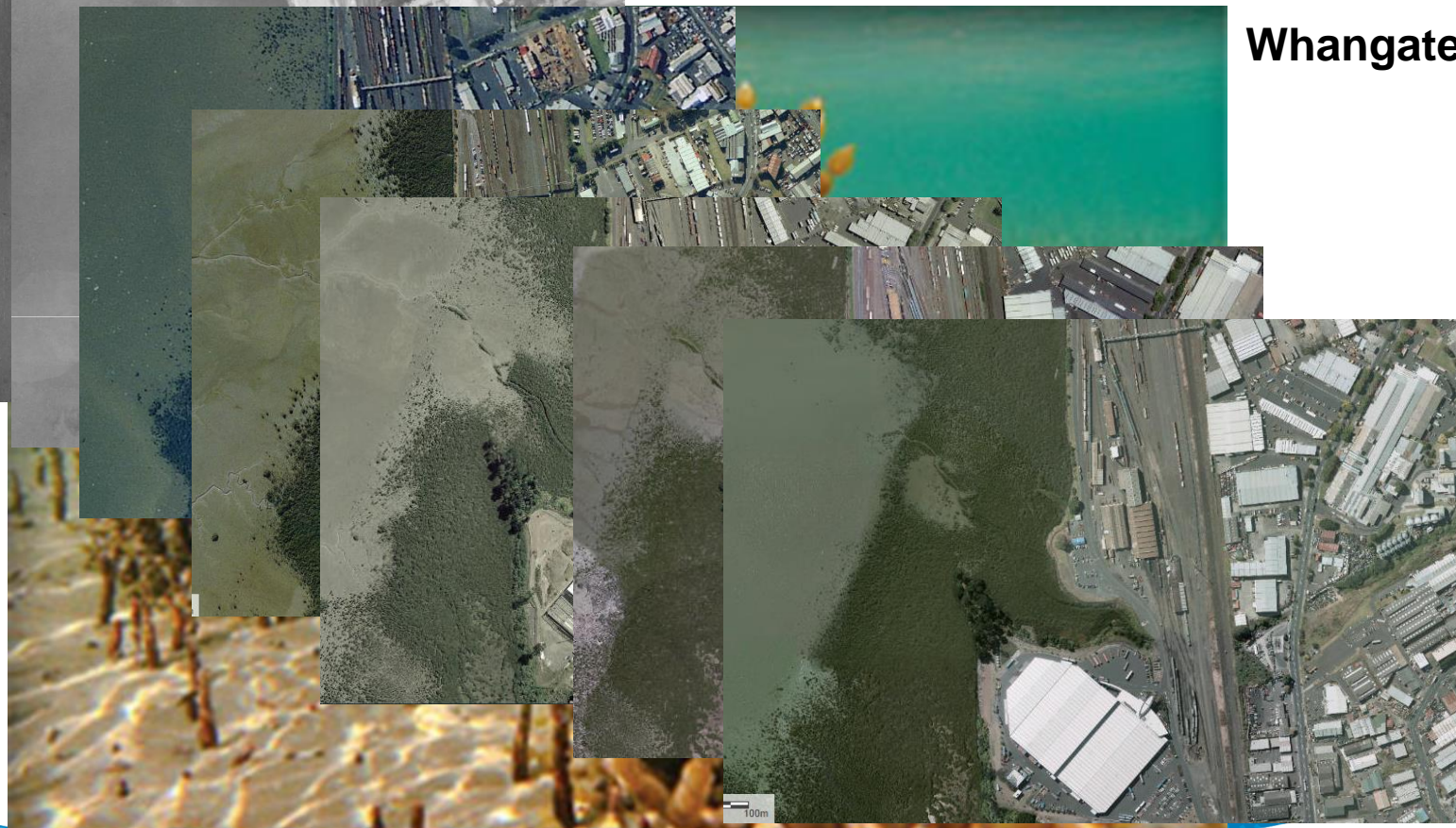


Background

- Urban streams are lost/significantly modified
 - piping, channel lining etc
- Degraded water quality and ecosystem health
 - urban streams and estuarine areas



Whangateau



1940

1950

1996

1999

2001

2004

2006

2008

2011



90% of wetlands have been drained since people arrived in NZ.

Wetlands are important for filtering nutrients, flood control, and native wildlife habitat.

Livestock waste and fertiliser, eroded soil, septic tanks, and wastewater and stormwater systems are the main sources of phosphorus in rivers. Phosphorus levels are improving at more river sites than worsening (1994–2013). Phosphorus, combined with nitrogen, can lead to excessive algae growth.

Nitrogen enters rivers through run-off of livestock urine and fertiliser, septic tanks, and wastewater and stormwater systems. Nitrogen levels are worsening at more river sites than improving (1994–2013). Nitrogen also filters through groundwater. Agricultural nitrogen leaching has increased (1990–2012). High nitrogen levels can affect drinking water.

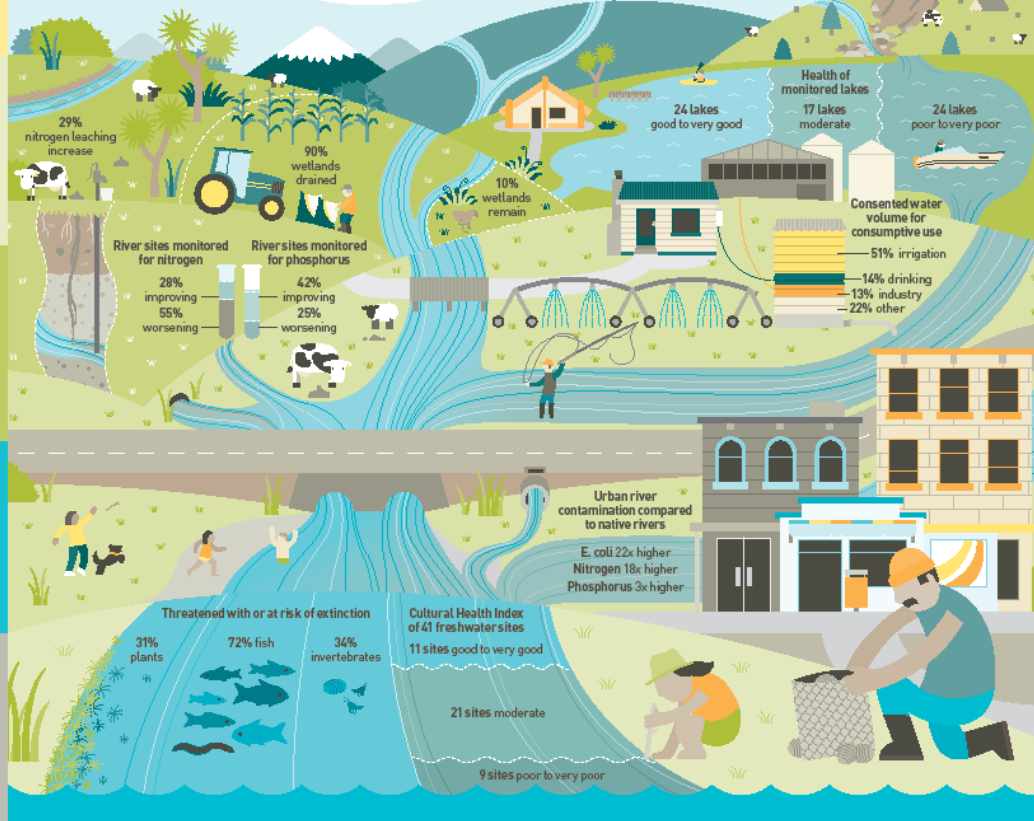
Animal or human faeces in fresh water can increase the risk of illness for swimmers in the area. When E.coli is detected in rivers or lakes, this indicates that faecal matter is present in fresh water. E.coli levels are 22 times higher in urban rivers and 9.5 times higher in pastoral rivers compared to rivers in native areas.

Many of our native freshwater fish, invertebrates, and plants are threatened with, or at risk of, extinction.

The greatest pressures they face are from pests, and habitat loss and change

New Zealand's fresh water at a glance

Our fresh water 2017



Sediment loss is a widespread problem for NZ waterways. Deposited sediment occurs naturally in the beds of rivers and streams, but too much fine sediment (particles less than two millimetres in size) can severely degrade streambed habitat, carry excess nutrients into surface water, and affect water clarity and recreational activities.

The health of our monitored lakes varies. Those that are good are clear (unless naturally turbid) with little algae growth. Those that are poor are green and murky with high amounts of nutrients and algae. These lakes are rarely suitable for recreation and have habitats that are unsuitable for some native aquatic species. Monitored lakes are less than 5% of all lakes greater than 1 hectare.

The ability to take water is allocated through consents from regional councils. Not all consented water is used. Managing water takes is important for maintaining flows downstream. If flows of rivers are reduced, algae and fine sediment can build up, which reduces amenity and recreational value and results in a poor habitat for aquatic species.

Our urban rivers are generally the most polluted of NZ's waterways.

In addition to high nutrient levels, stormwater from roofs and roads contains heavy metals, which can be toxic to freshwater species and for people who eat them. There are contaminants that are much higher in urban rivers when compared with rivers in native areas.

The Cultural Health Index scores a site's traditional status, mahinga kai status, and cultural stream health status to provide a rating of the cultural health of a site on a water body. Tangata whenua groups have assessed 41 freshwater sites and have graded 11 as good to very good, 21 as moderate and 9 as poor to very poor.

Policy Framework and Strategic Direction

- National
 - National Policy Framework for Freshwater Management (2014) (NPSFM)
 - New Zealand Coastal Policy Statement (2010)
 - Hauraki Gulf Marine Park Act
- Natural Hazards
- Strategic Direction – Auckland Plan
 - World's most liveable city
 - Green Auckland: strongly commit to environmental action and green growth



Integrated Management Approach

- Emphasis on integrating land use and stormwater discharges
- Move from infrastructure focus and end-of-pipe management
 - to integrated approach seeking improved outcomes
 - management of land use to manage discharges (inputs and outputs)
- Stormwater provisions are integrated into the plan
 - structure planning, land use, subdivision, discharges etc



Key Direction – Reduction of existing effects

- Policies seek a progressive reduction in adverse effects
- Integrated stormwater management approach = Water Sensitive Design
 - key development approach applying to new development and redevelopment
- Land use rules
 - targeted to specific activities or sensitive areas
 - also apply to redevelopment
 - require mitigation of entire area/site if more than 50% of site is being redeveloped
- Redevelopment in flood plains require an assessment to reduce risk from flooding



Key Direction – Integrated Stormwater Management Approach (= WSD) applied at all stages of development

- Intense debate during the UP hearing process
- Shift towards avoiding (as far as practicable) creation of adverse effects
 - rather than an end-of-pipe, device-led approach
- Holistic approach combining planning and natural and engineered stormwater management
 - to integrate with the urban landscape and minimise impacts
 - achieve multiple community and environmental outcomes
- WSD includes wide range of tools and options
 - management of hydrology key
 - seeks a genuine attempt to minimise hydrological change

Key Direction – Hydrology Mitigation

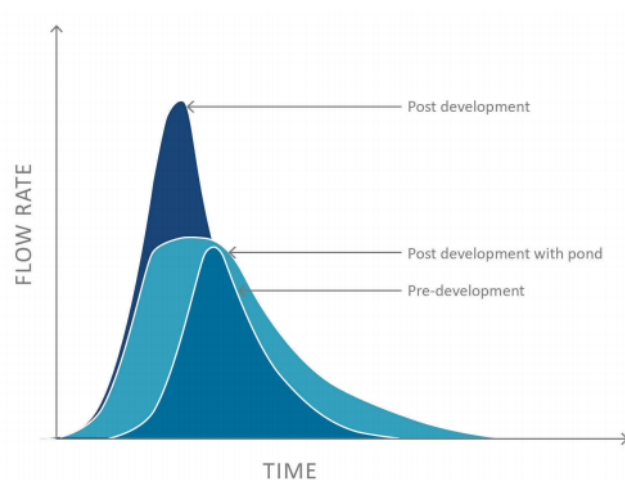
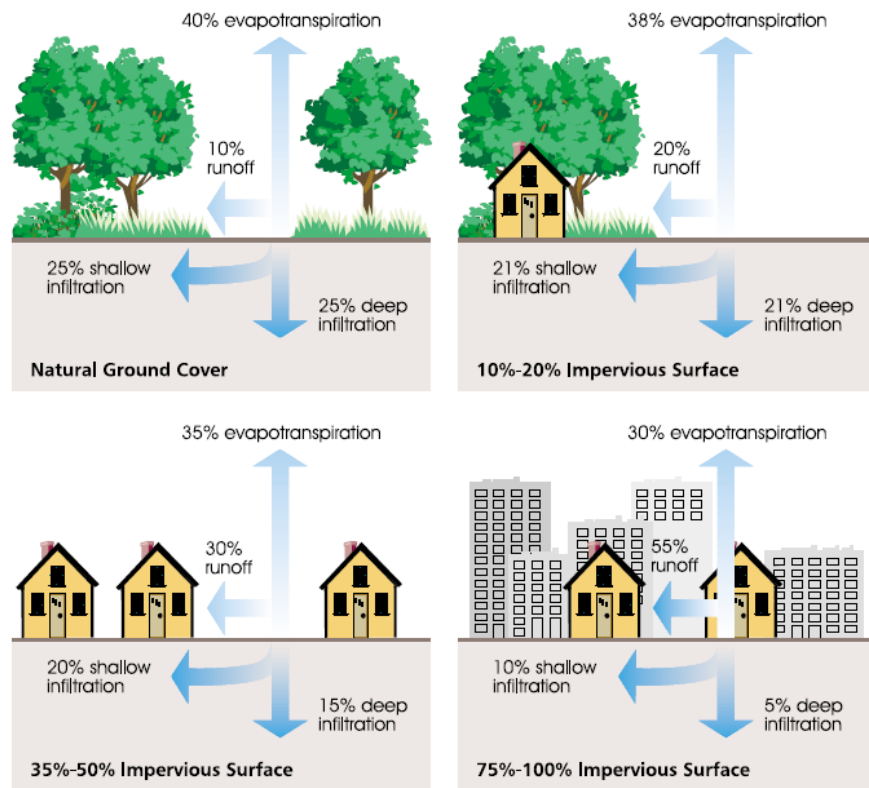
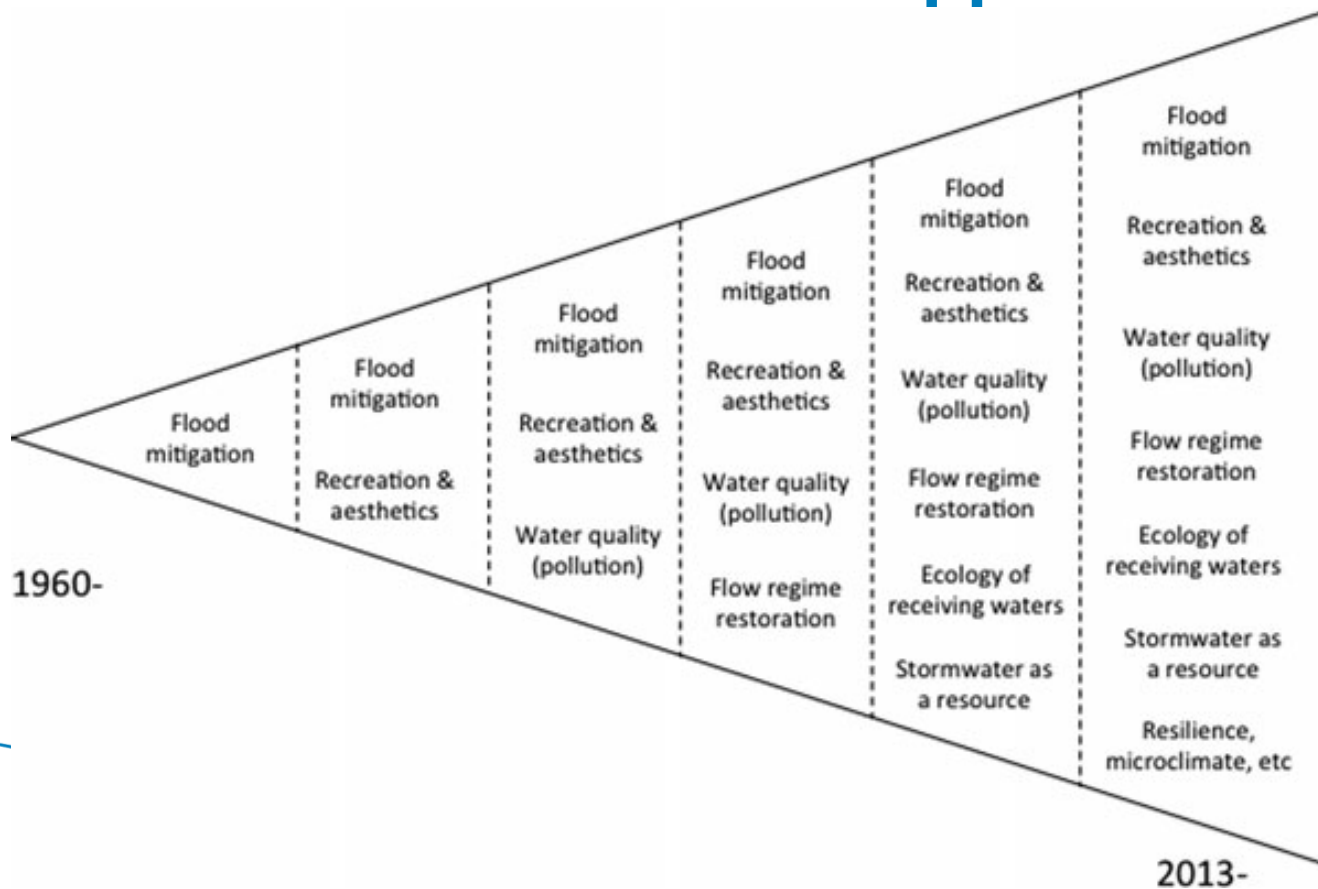


Figure 8: Typical post-development hydrograph with detention (adapted from Shaver, 2000)

Source: Prince George County, 1999

Key Direction – Stormwater Approach



Key Direction – Values and Importance of Intermittent Streams

- Shift towards protection of intermittent streams
 - based on increased knowledge of their value and importance
 - hydrology and ecosystems
- Same management of intermittent and permanent streams
- Key change from previous Plan



Key Direction – No increase in flooding risk

- Greater emphasis on avoidance
- Approach recognises limitations of mitigation based approaches and their cumulative effects on flood plain function
- Avoid development in flood plains in greenfields
- Avoid increasing risk and where possible reducing risk on land already zoned for urban purposes
- 1% AEP standard for flood risk management

Conclusion

- Historical approaches to development have resulted in a range of adverse effects
 - some degradation is inevitable
 - but need to change approach for Auckland is to achieve vision and meet national direction
- Growth predictions in Auckland mean an increased pressure to manage stormwater
 - address effects from urban growth and intensification
 - reduce existing effects (even to maintain overall water quality)

Conclusion

- UP has greater emphasis on integrated management
 - subdivision, land use and discharges
 - applying WSD (= integrated stormwater management approach)/management at source
 - preservation of natural hydrology
 - reducing flooding risk
- Stormwater and flood management
 - not an add-on at the end
 - should inform every step of the development process
 - effective management requires integrated approach

