

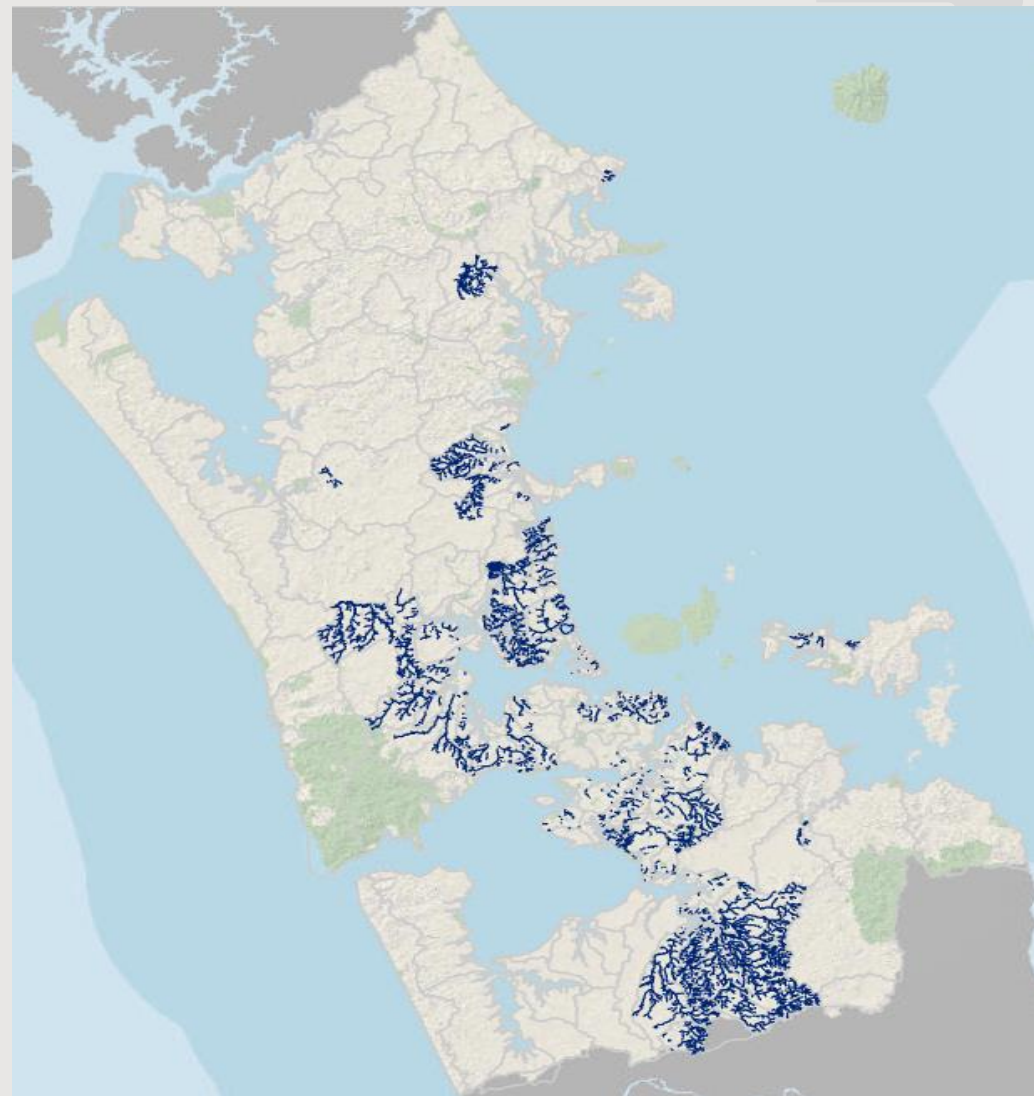
20 YEARS OF WATERCOURSE ASSESSMENTS - RESURVEY IMPLICATIONS FOR FRESHWATER MANAGEMENT

Stormwater Conference 2023

Presenters: Adray Minh Nguyen (Auckland Council), Andrew Rossaak (Morphum Environmental) and Elizabeth Morrison (4Sight - Part of SLR)

Watercourse Assessment

- Methodology has matured over 20 years of use
- Collects 'snapshot' information on the existing condition of our watercourses and associated stormwater infrastructure
- To date over 1,400 km of streams have been assessed with over 70% being urban streams.



Watercourse Assessment

- Watercourse Assessments collect data on:
 - Stream ecological health (biological and physical attributes);
 - Stormwater infrastructure;
 - Stormwater conveyance.
- In order to inform:
 - Catchment management planning and stormwater management plans;
 - Stormwater asset management plans,
 - Asset condition assessments, asset renewal requirements and capital works programmes.



Watercourse Assessment Methodology:
Infrastructure and Ecology (Version 2.0)

January 2016

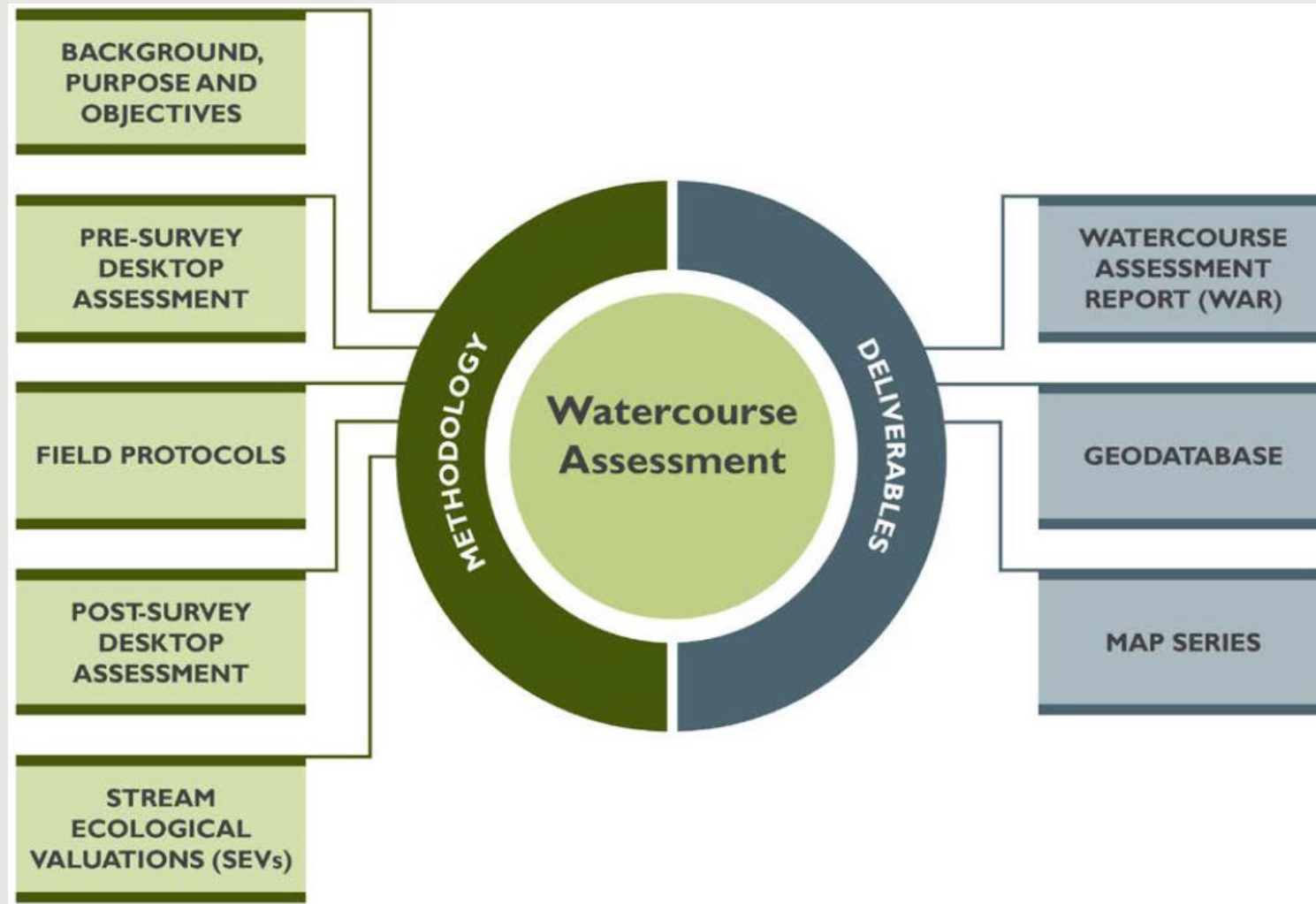
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Methodology



Resurvey

- Repeat of the assessment on the same watercourses roughly 20 years after initial assessment.
- Purpose is to assess the extent of change since the initial surveys
- The resurvey analysis is, therefore, limited to the parameters assessed in the original surveys.



4 Recent Watercourse Assessment Resurveys

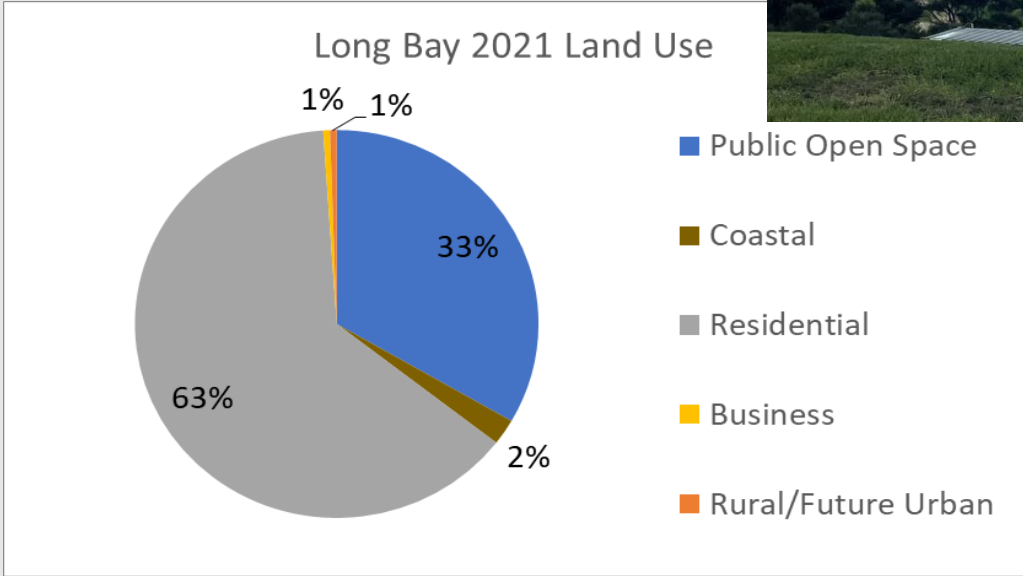
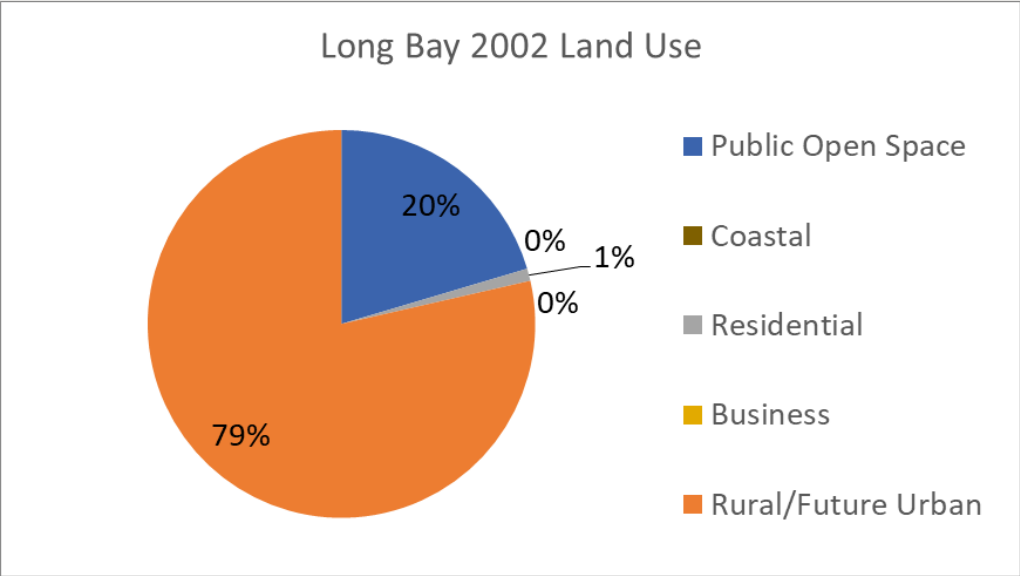
Each catchment is at a different stage of urban development and has followed different stormwater infrastructure design decision frameworks and evolving policy directives



Catchment Map



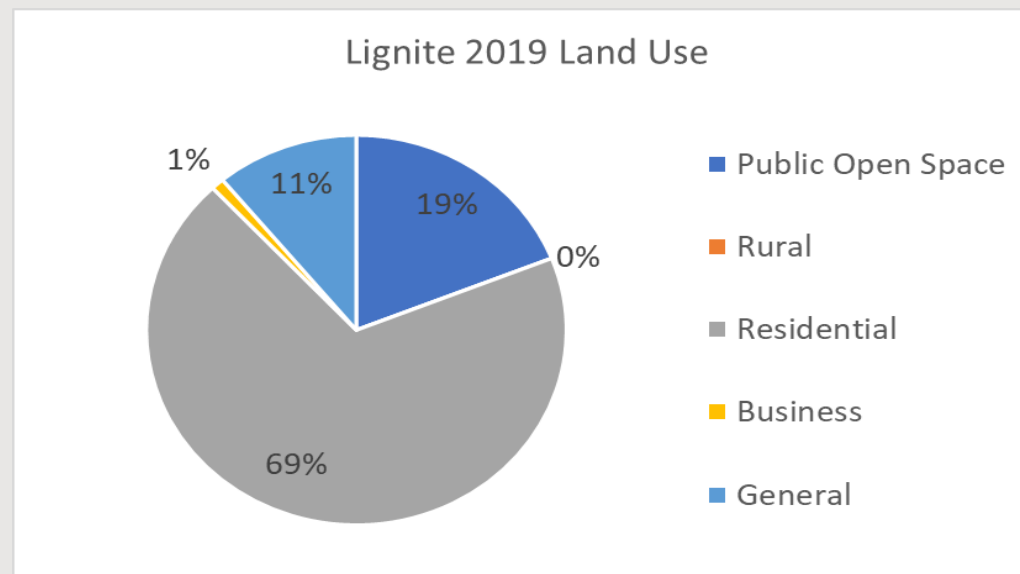
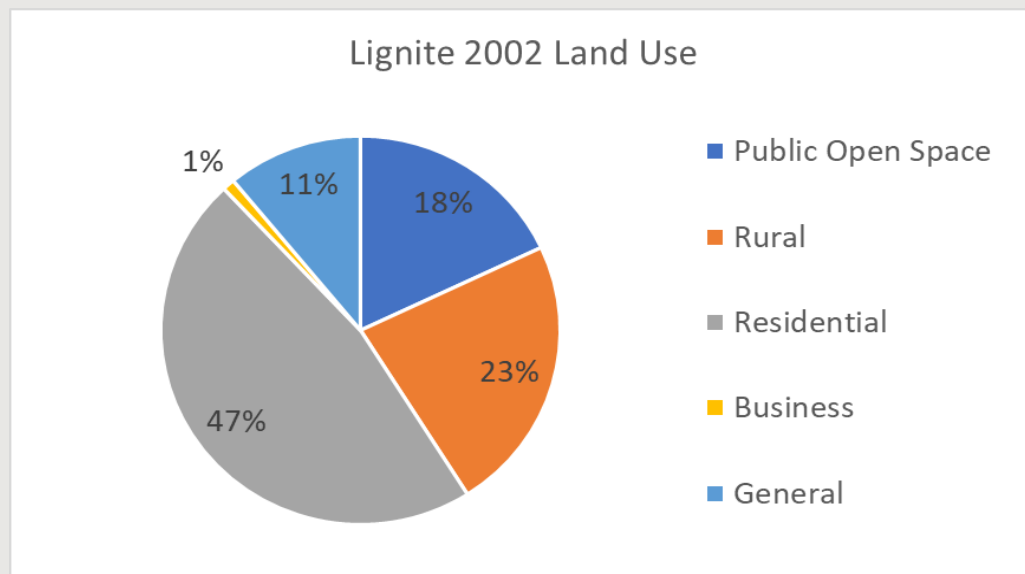
Long Bay Catchment Land Use Change



Developed under its own Structure Plan, with stormwater management through methods and policies very similar to the current Auckland Unitary Plan



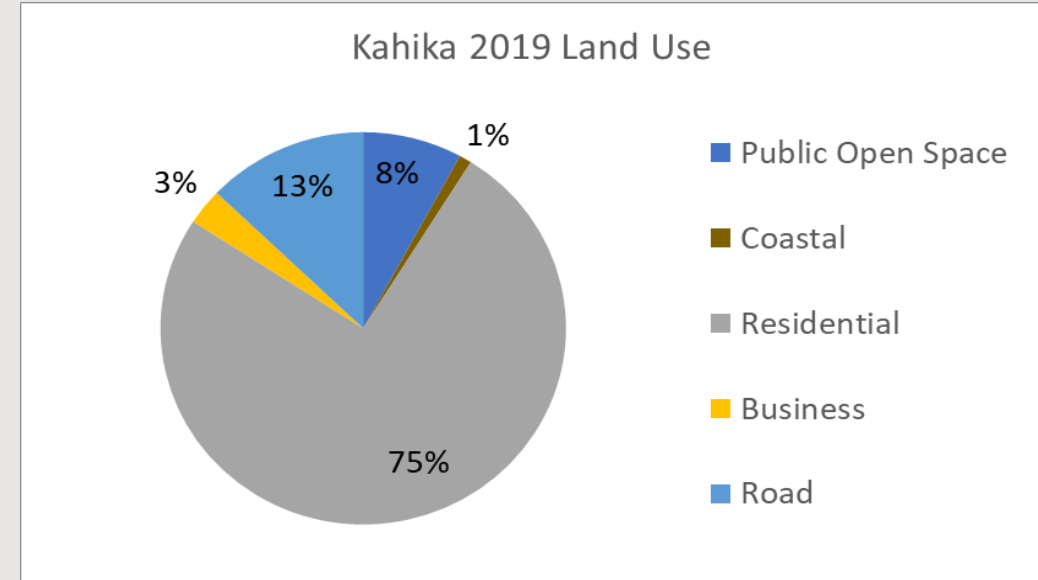
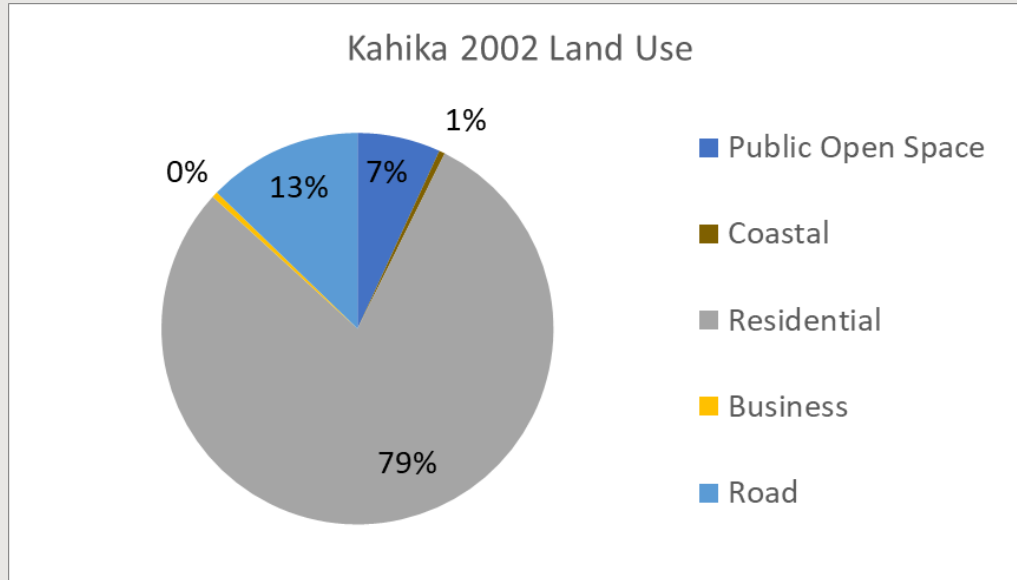
Lignite Catchment Land Use Change



TP_10 stormwater management approach
Rural areas infilled to be residential



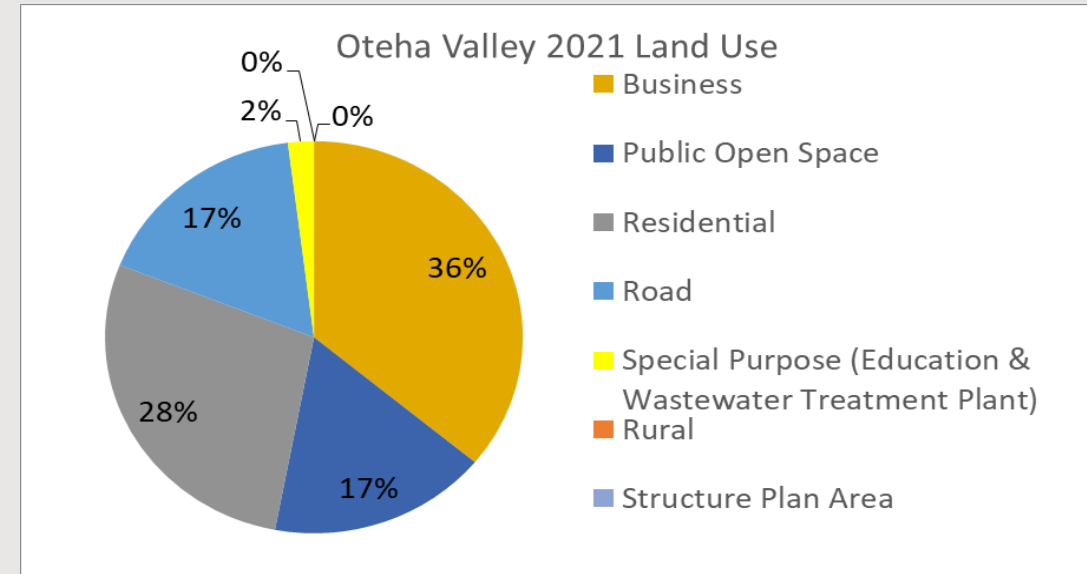
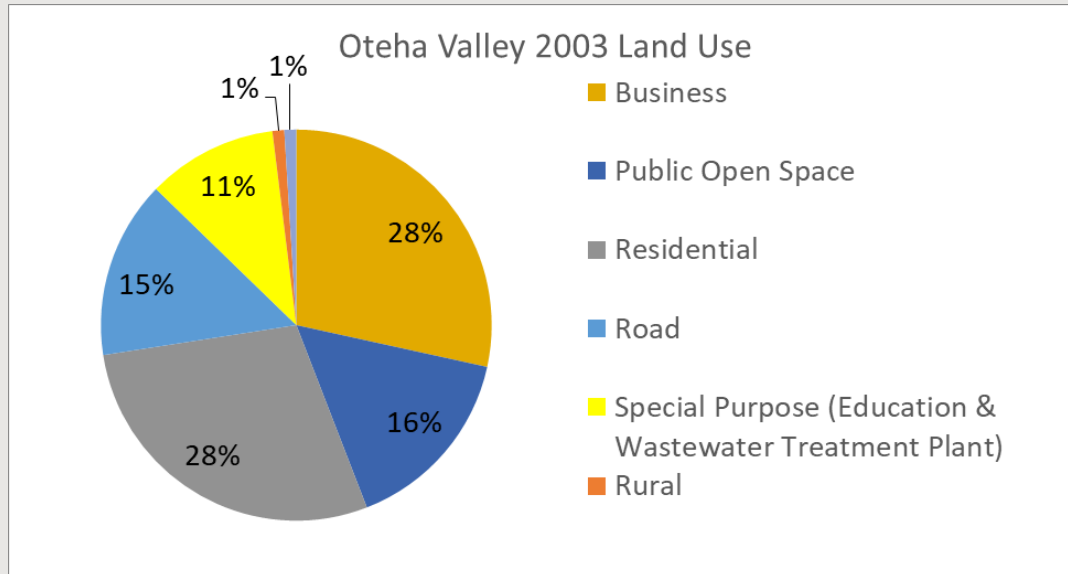
Kahika Catchment Land Use Change



Stormwater management was focused primarily on conveyance and moving water to the coast through pipes and outlets



Oteha Catchment Land Use Change



TP₁₀ based stormwater management approach



Watercourse Assessment

Watercourse Assessment Protocol	Full Urban Assessment	Watercourse Assessment Protocol	Full Urban Assessment
Ecology	Reach Assessment (Ecoline) Wetted channel width; Stream depth; Bank angle; Bank height; Substrate; Active sediment deposition; Floodplain connectivity; Bank erosion; Upper bank stability; Adjacent land use; Stock access; Water quality factors; Biological factors; Riparian vegetation; Stream habitats; fish spawning habitats...	Engineering	Asset Inspection (Inlets & Outlets) Structure material; dissipating structure area; position; height & height above channel; condition; erosion; maintenance; flood risk; safety; drop height; velocity; turbulence; gradient; water depth; ownership etc....
Engineering	Natural Structures	Engineering	Bank and Channel Lining
Ecology	Fish Survey	Engineering	Erosion Hotspots
Ecology	Stream Mouths	Both	Enhancement Opportunities
Ecology	Inanga Spawning	Both	Miscellaneous Points
Ecology	Wetlands		

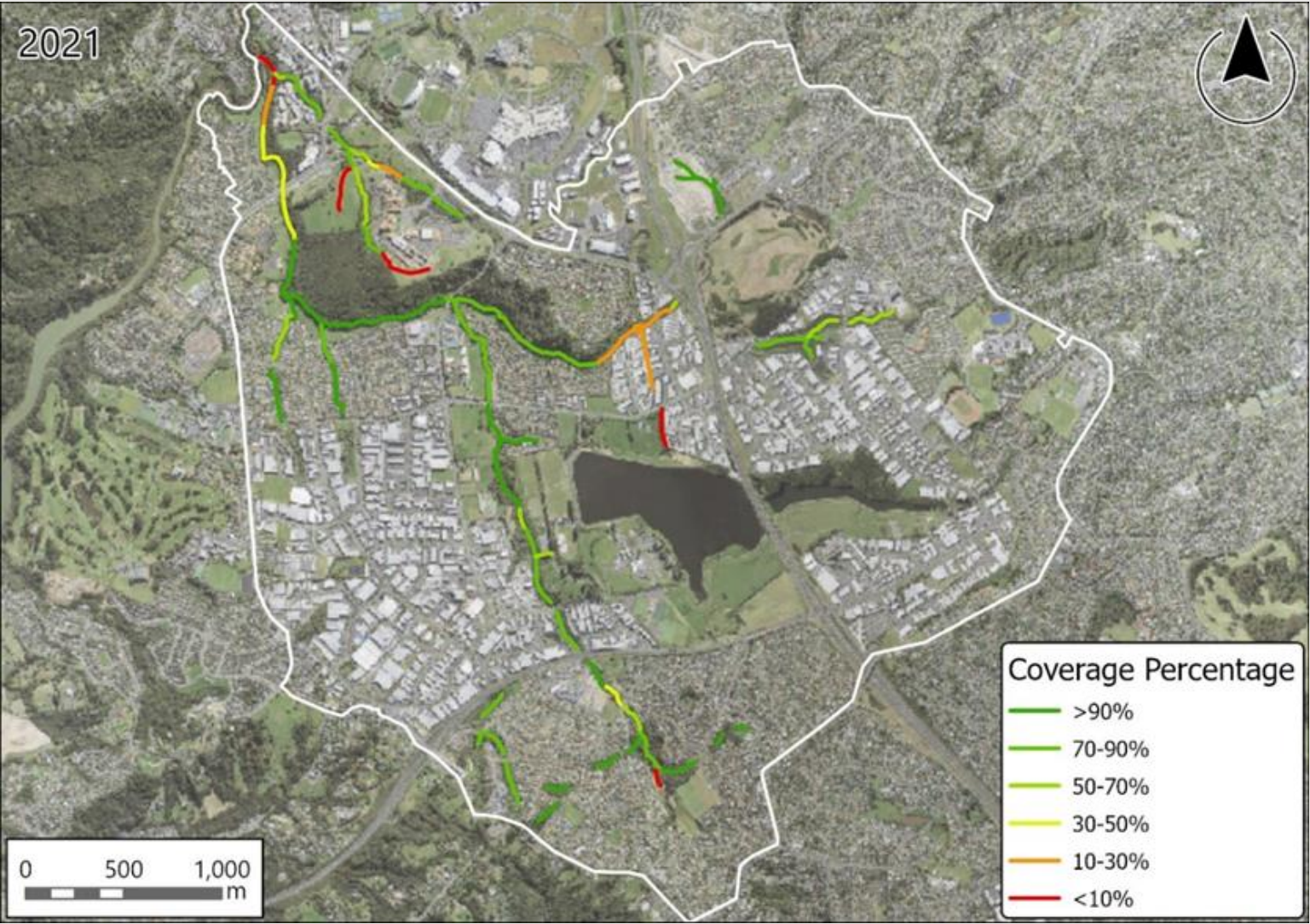


Watercourse Assessment

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Riparian Vegetation





Riparian Vegetation

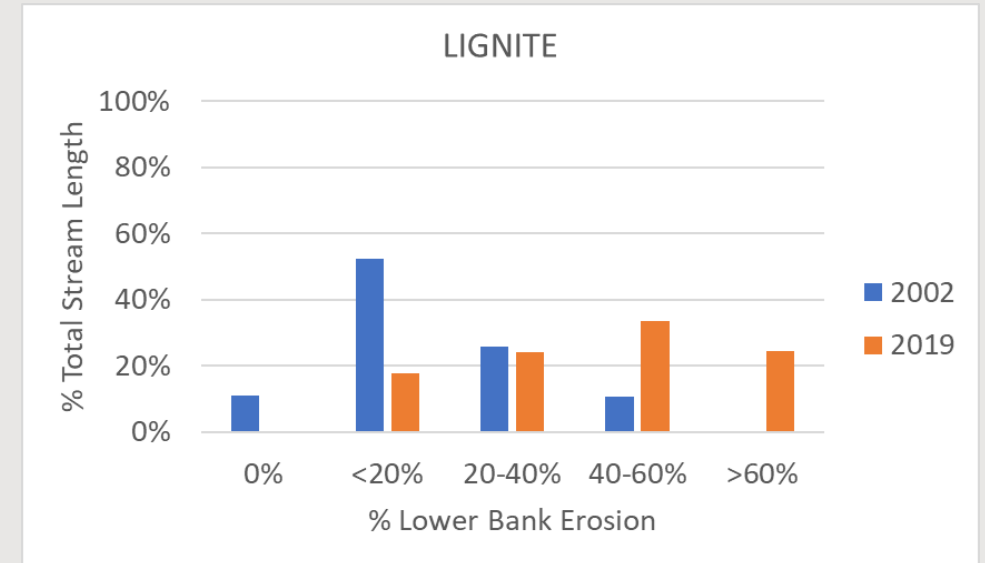
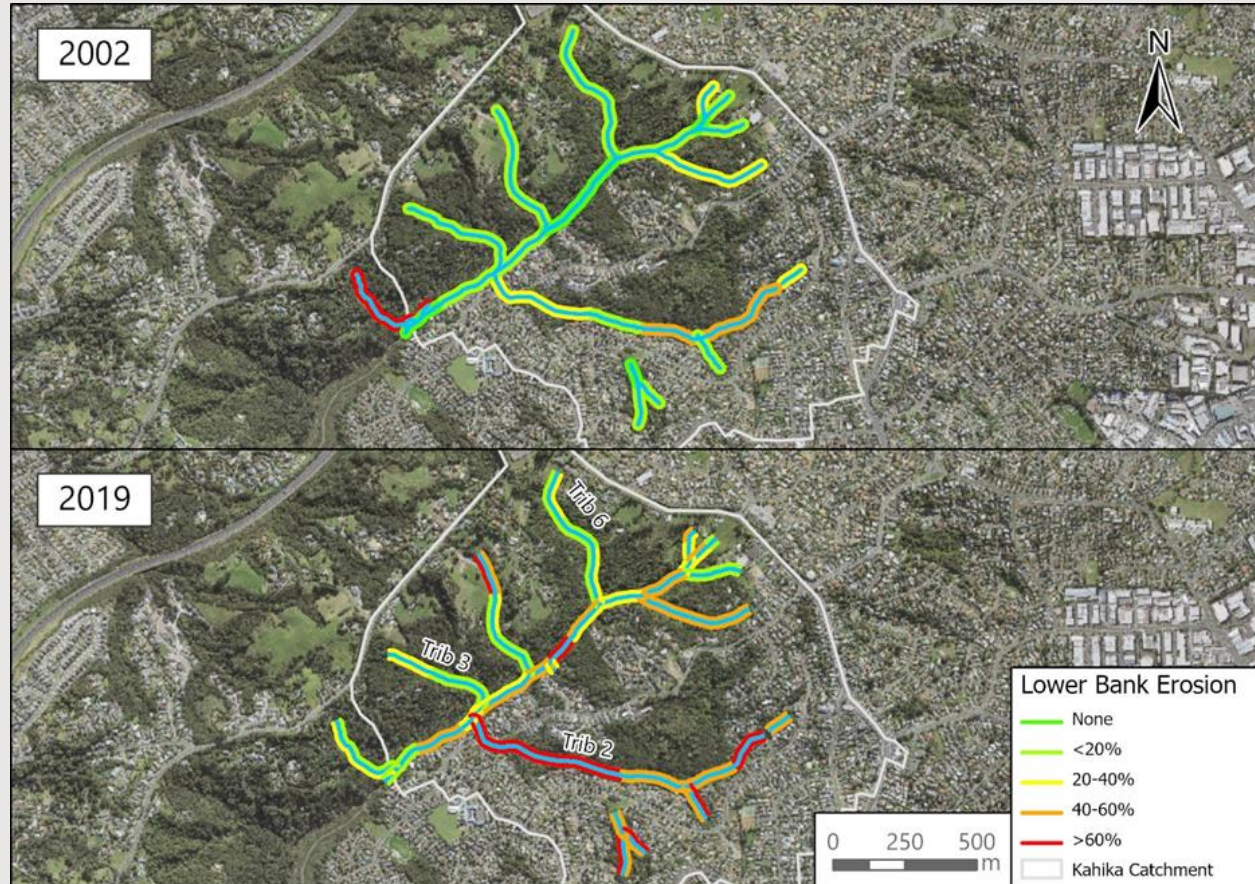
- Across all 4 catchments, riparian vegetation extent increased (width and cover).
- Increased protection and enhancement of the riparian vegetation
- However, there is a noticeable shift towards exotic dominated communities, particularly in the understory and ground cover of maturing riparian areas

What does this mean for the streams?





Bank Erosion



Lower bank erosion in the Lignite catchment during the 2002 and 2019 stream surveys. Erosion severity has increased across the board with no reaches now being recorded with no erosion scarring and a substantially increased number of reaches with high (>40%) levels of erosion scarring.



Bank Erosion

- Process of erosion aligns with our understanding
- All catchments had noticeable erosion (more than would be expected under natural conditions)
- All streams showed incision and early onset of widening when bedrock was reached. Many of the catchments had eroded to bedrock.
- Riparian vegetation didn't stop erosion

What are the implications of this?

Largescale landuse change provides pressure on the streams (imperviousness)

Reducing instream habitat and water quality



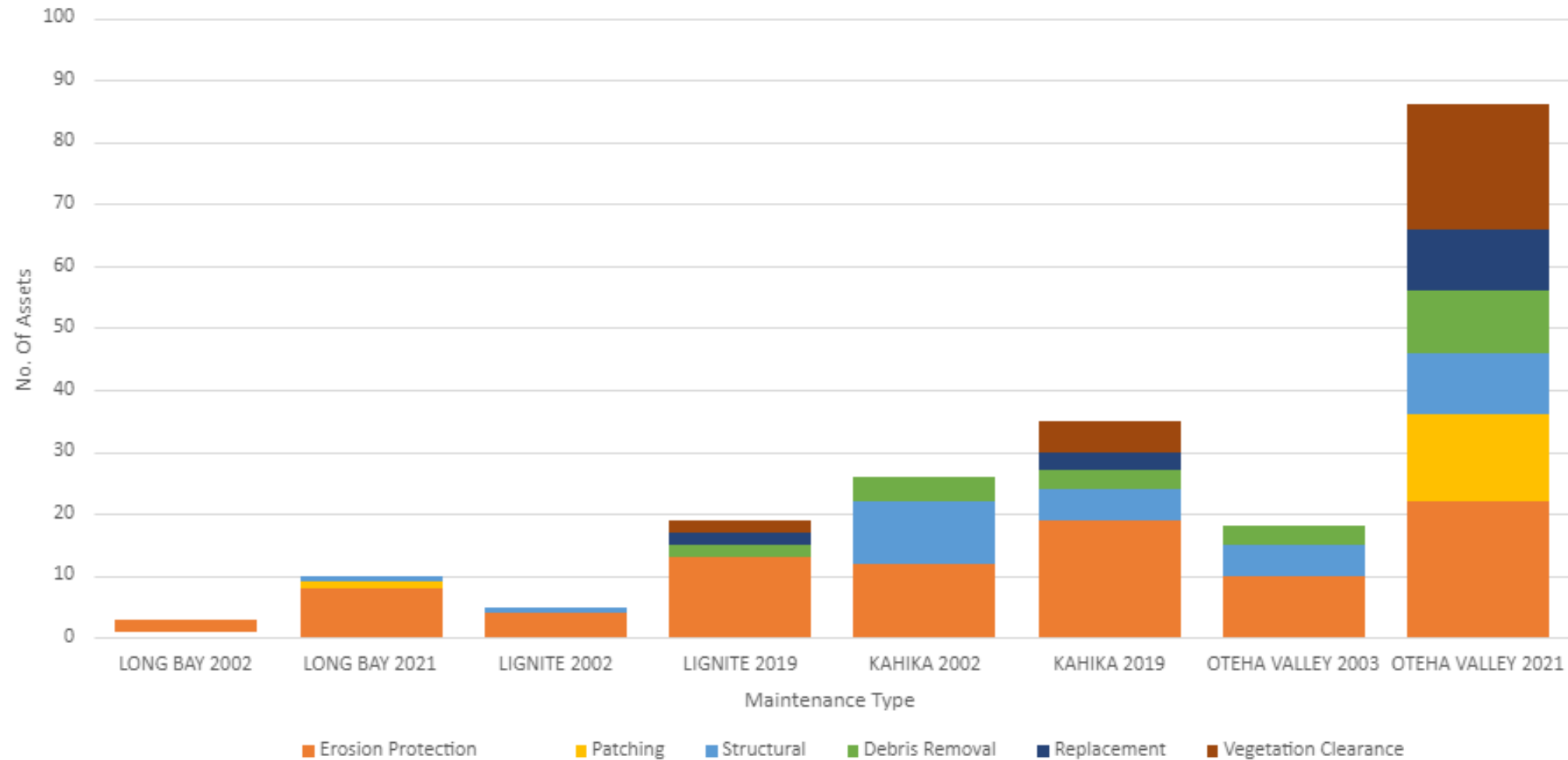


Stormwater Infrastructure Condition

- Many stormwater assets discharge to our streams and their number is increasing.
- Making sure in good condition vital to reducing impacts of erosive stormwater flows.



Stormwater Infrastructure Maintenance



Stormwater Infrastructure Condition



2002



2019

Benefits such as fish passage barrier identification and resolution

Original



Resurvey



Overall Findings

- Urban development
- Riparian planting
- SW asset designs

Recommendations

- Hydraulic energy management needs to be incorporated into designs
- Need to consider the cause of the asset failure in repair and replacement



Take home messages

- Resurvey and the WA are valuable robust methodologies to assess catchments
- Resurvey provides powerful measure of waterway health trajectories
- Watercourse Assessment and particularly the Resurvey provides an opportunity for dialogue with a range of partners (and stakeholders)



A special thanks to:

- Scott Speed (Auckland Council)
- Colleen Brent (Auckland Council)
- Dave Brockerhoff (Morphum Environmental)
- Cat Davis (4Sight - Part of SLR)

