

Flood resilience

Motueka Catchment Collective hui: Understanding our catchment better

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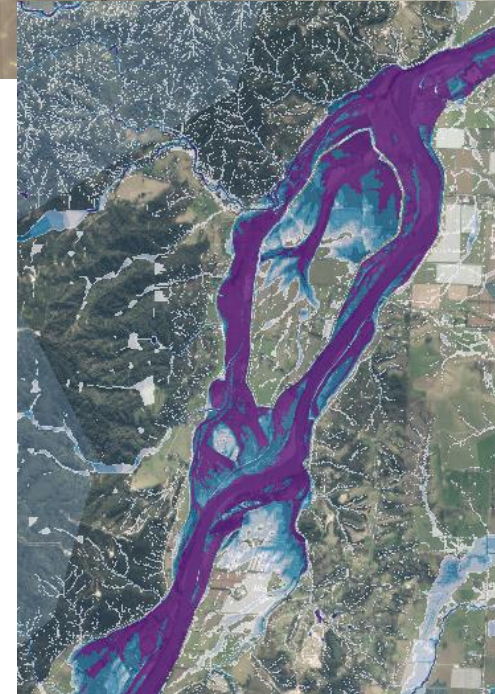
Flow of this talk

- What the natural hazards team does
- What is flood resilience?
- Resilience from smaller floods: potential of nature-based solutions
- High-level results from feasibility modelling
- Resilience from large floods: understand and avoid
- Future planning
- Summing up



Natural Hazards & Geomorphology team

- Understanding natural hazards across the District
 - Historic flood maps
 - Flood modelling
 - Photos from flood events
- Provide advice to a wide range of stakeholders
- Focus is typically on avoiding natural hazard impacts
 - Building Act hazard considerations ('hazard notices')
 - RMA s106 and the new s106A
- Thinking about climate change and longer timeframes is 'baked in' to everything we do



What is flood resilience?

Understanding

Avoiding

Preparing

Our ability to avoid the effects of flooding and, where we can't avoid it, being well prepared, responding well, and recovering quickly from damaging flood events

Responding

Recovering

Thriving resilient 

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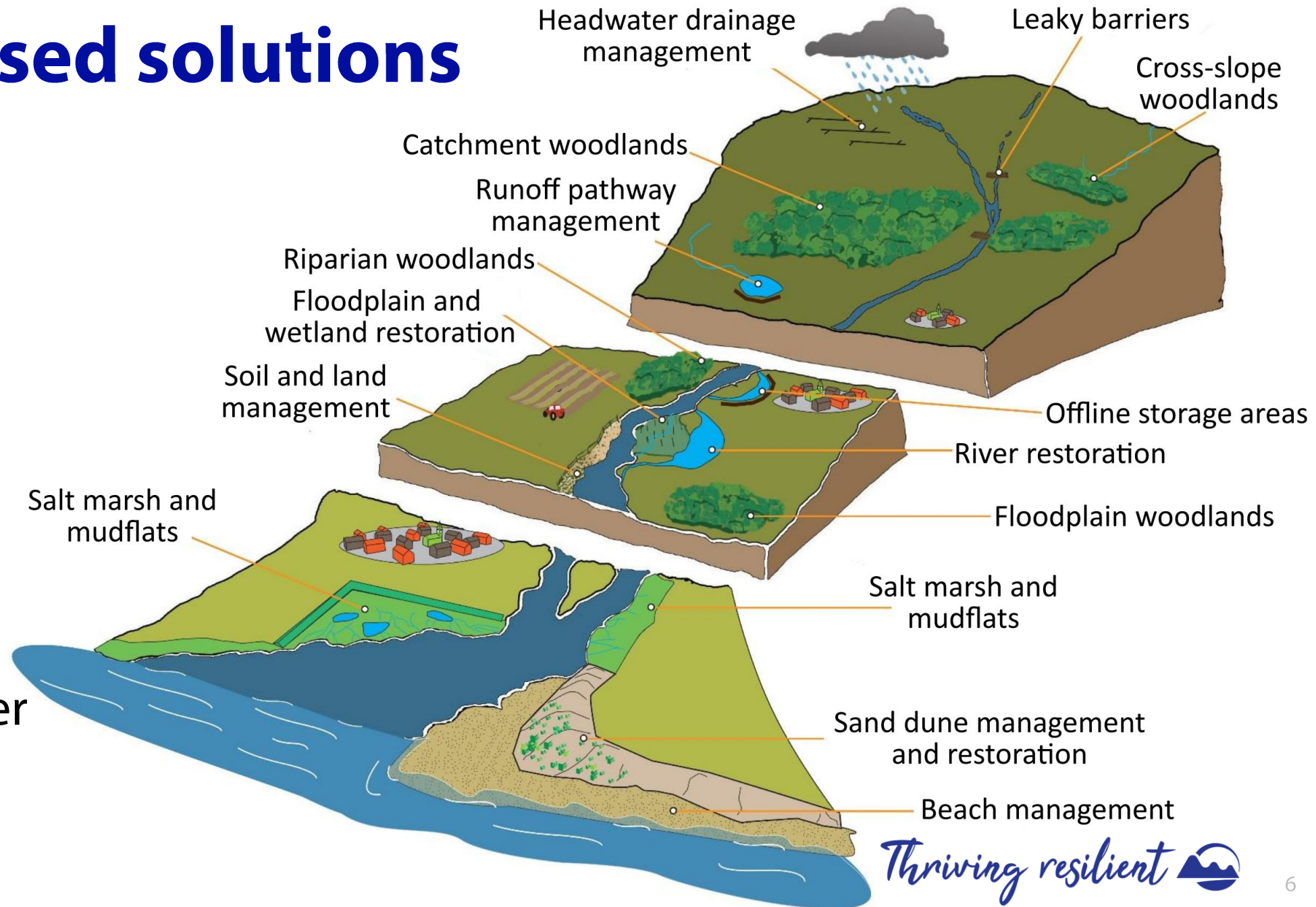
Responding

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Nature-based solutions

- 'Slow the flow'
- Store water in the catchment and slowly release it
- Preparation suitable for smaller floods
- Up to a 20-year flood
- Aligns with other catchment values

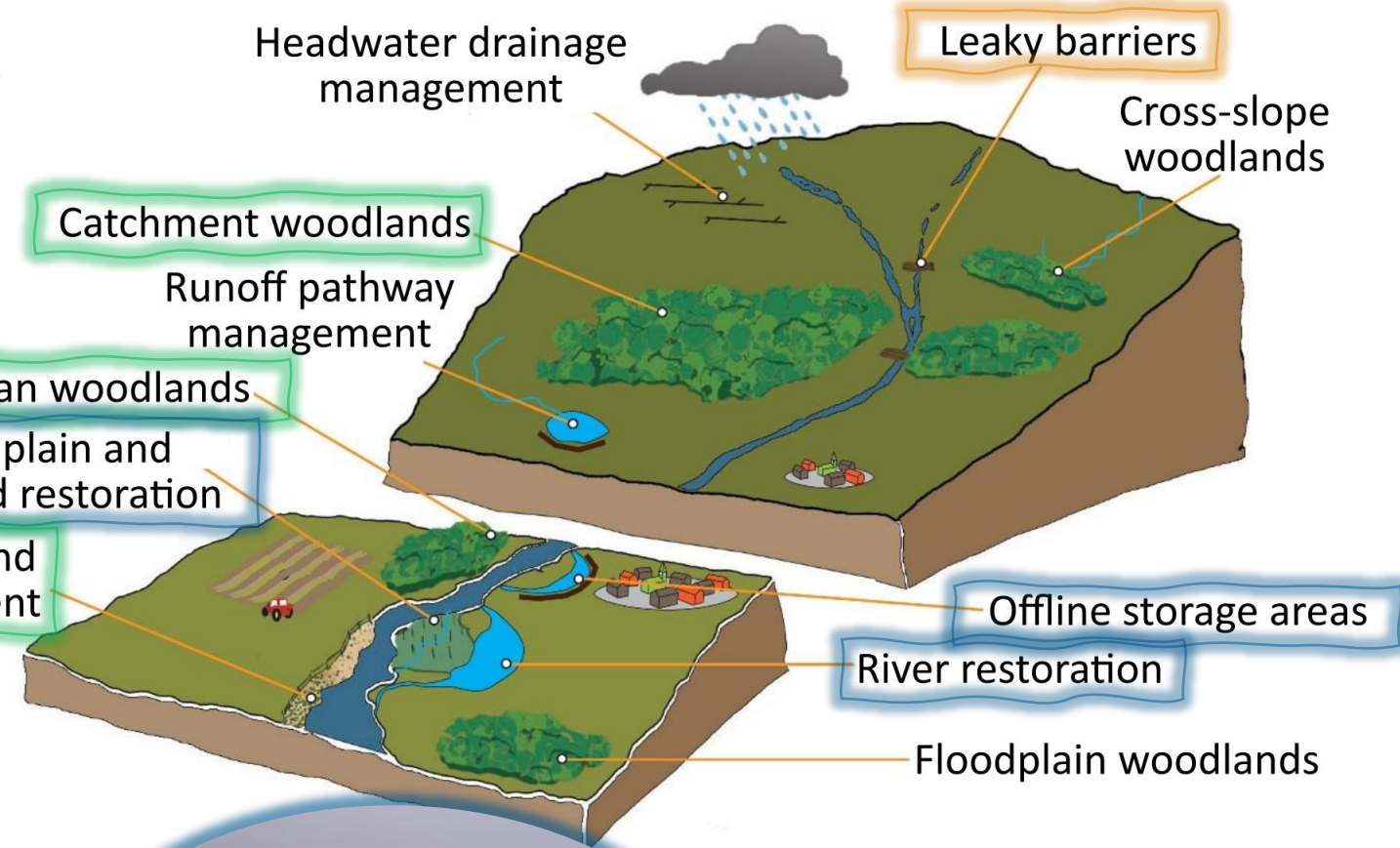


NbS feasibility study

Revegetation of upper catchment and floodplain



Leaky barriers/dams in-channel and on the floodplain

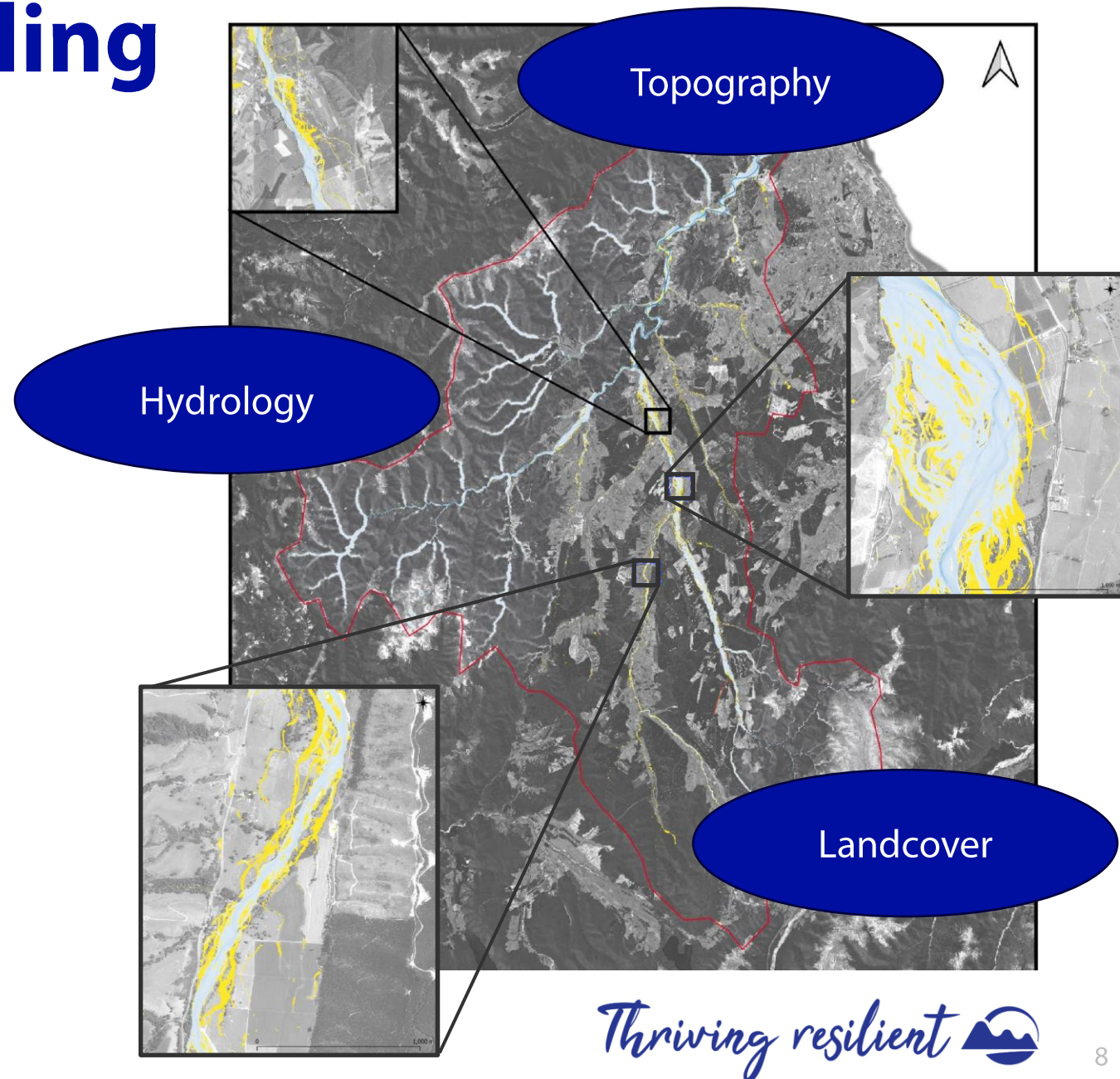


Floodplain reconnection and storage

Thriving resilient 

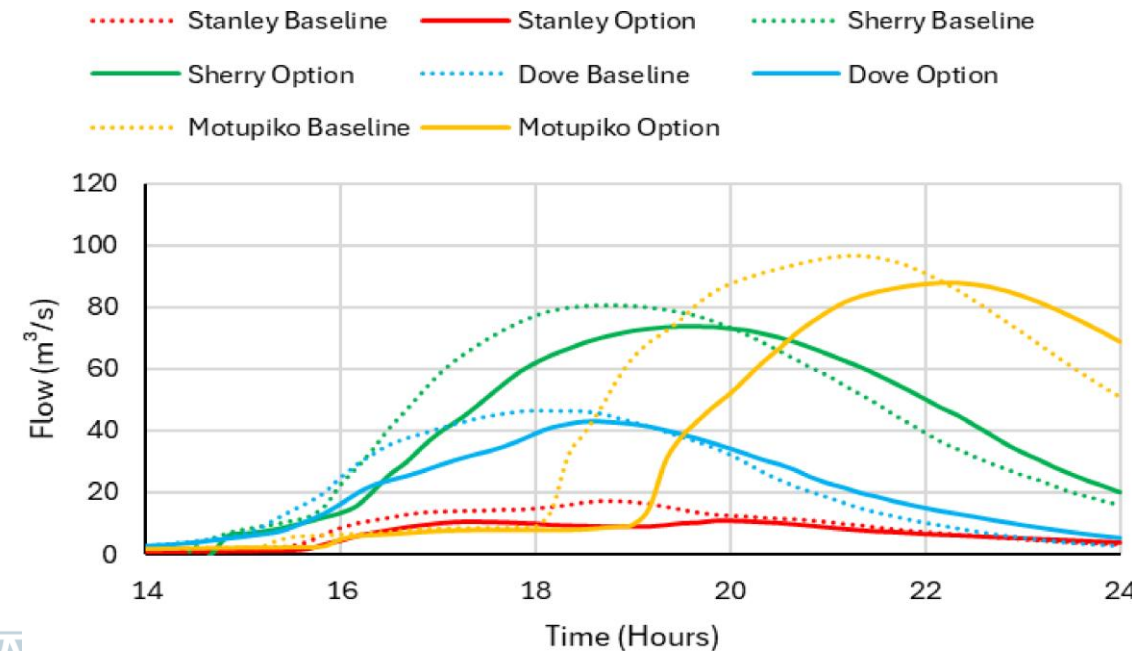
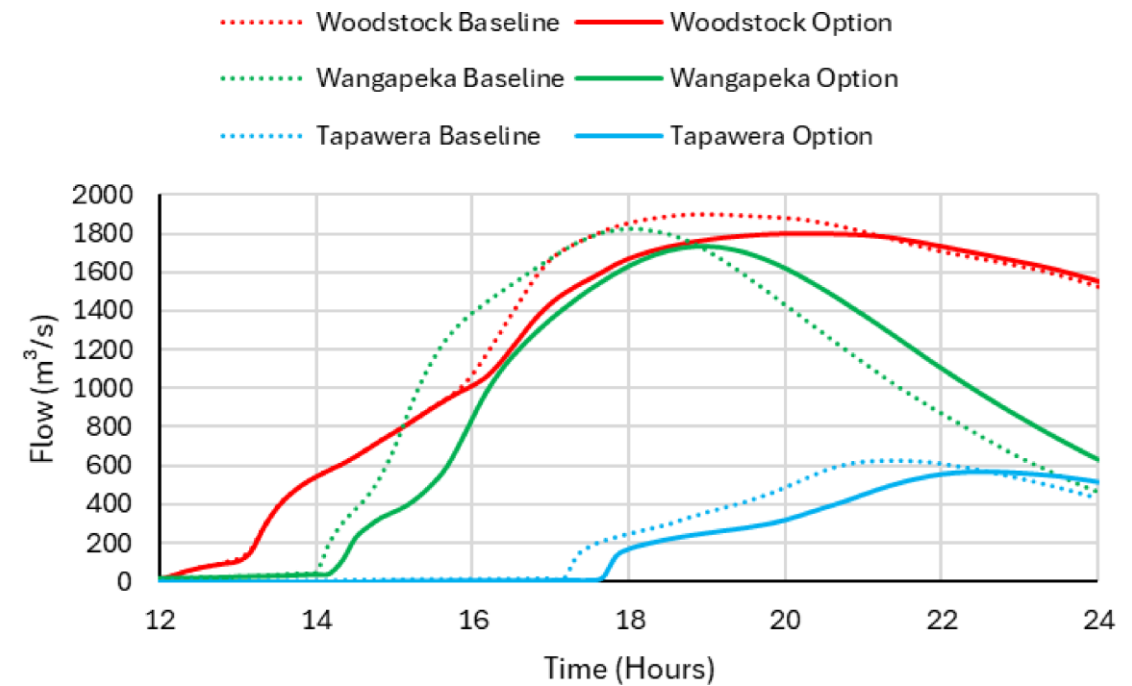
NbS feasibility modelling

- Computer hydrodynamic model of the Motueka catchment
- Model calibrated to historic floods
- Future climate-change scenarios included
- Feasibility of NbS evaluated at different points throughout the catchment
- Compare hydrograph without NbS (baseline) to hydrograph with NbS



NbS high-level results

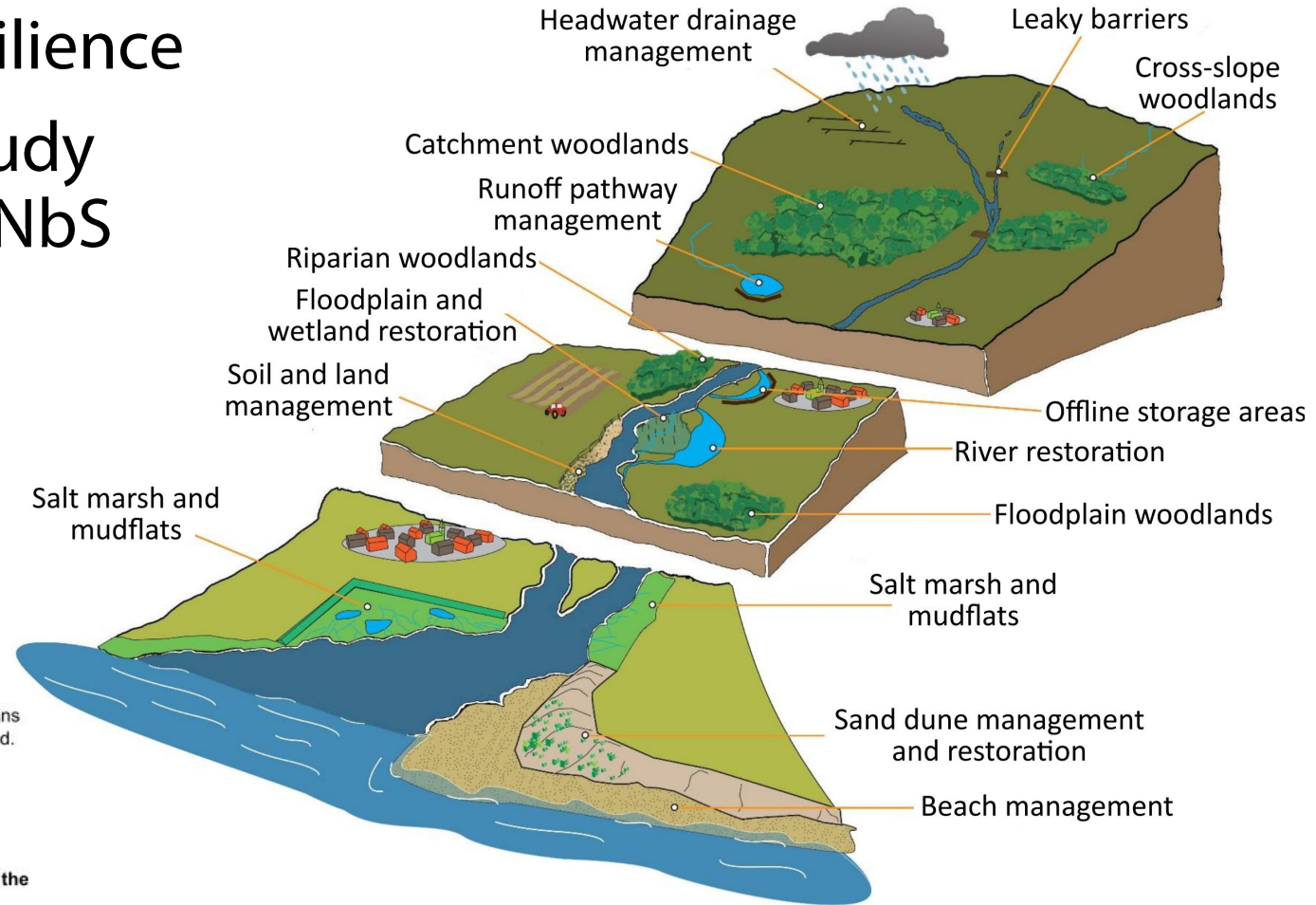
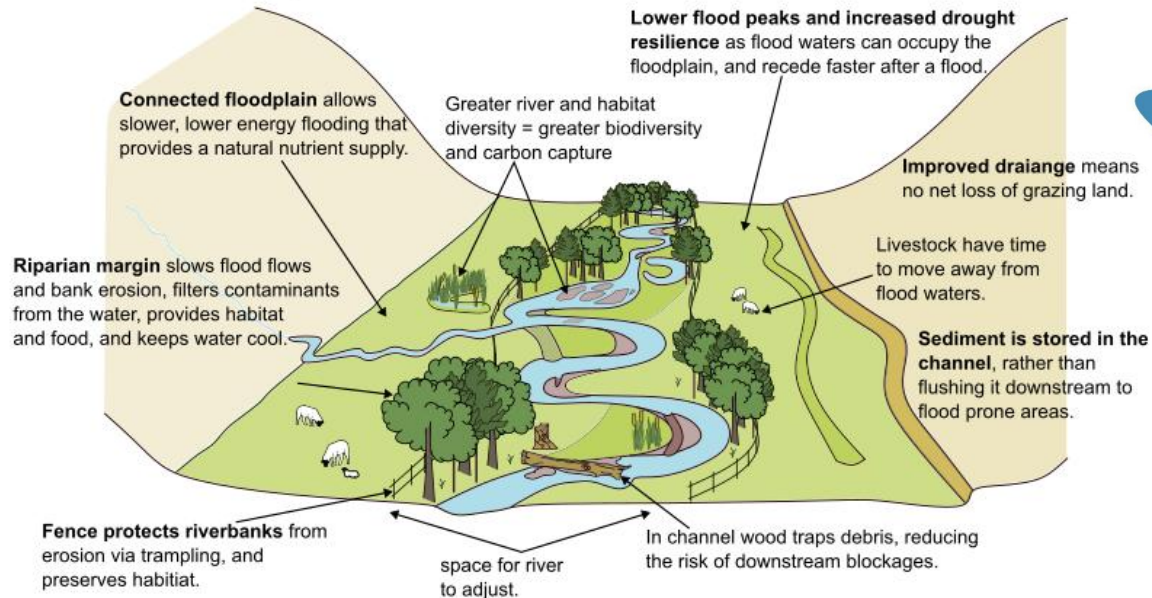
- Increased vegetation decreased flows by 5-27% across the catchment
- Increased connection between river and floodplain had impacts within sub-catchments, but less so the main river
- Leaky barriers in the channel and across the floodplain also had localised impacts
- Combos of approaches were the most effective
 - 3-36% decrease in sub-catchments
 - Decreased flows 9% @ Woodstock



Nature-based Solutions looking forward

- NbS: an opportunity for future resilience
- Leverage the results of the NbS study and local knowledge to integrate NbS into MCC and TDC work
- Links into 'Living Rivers' paradigm

Restoring the river reduces hazards and enhances the environment, creating more sustainable riverscapes:



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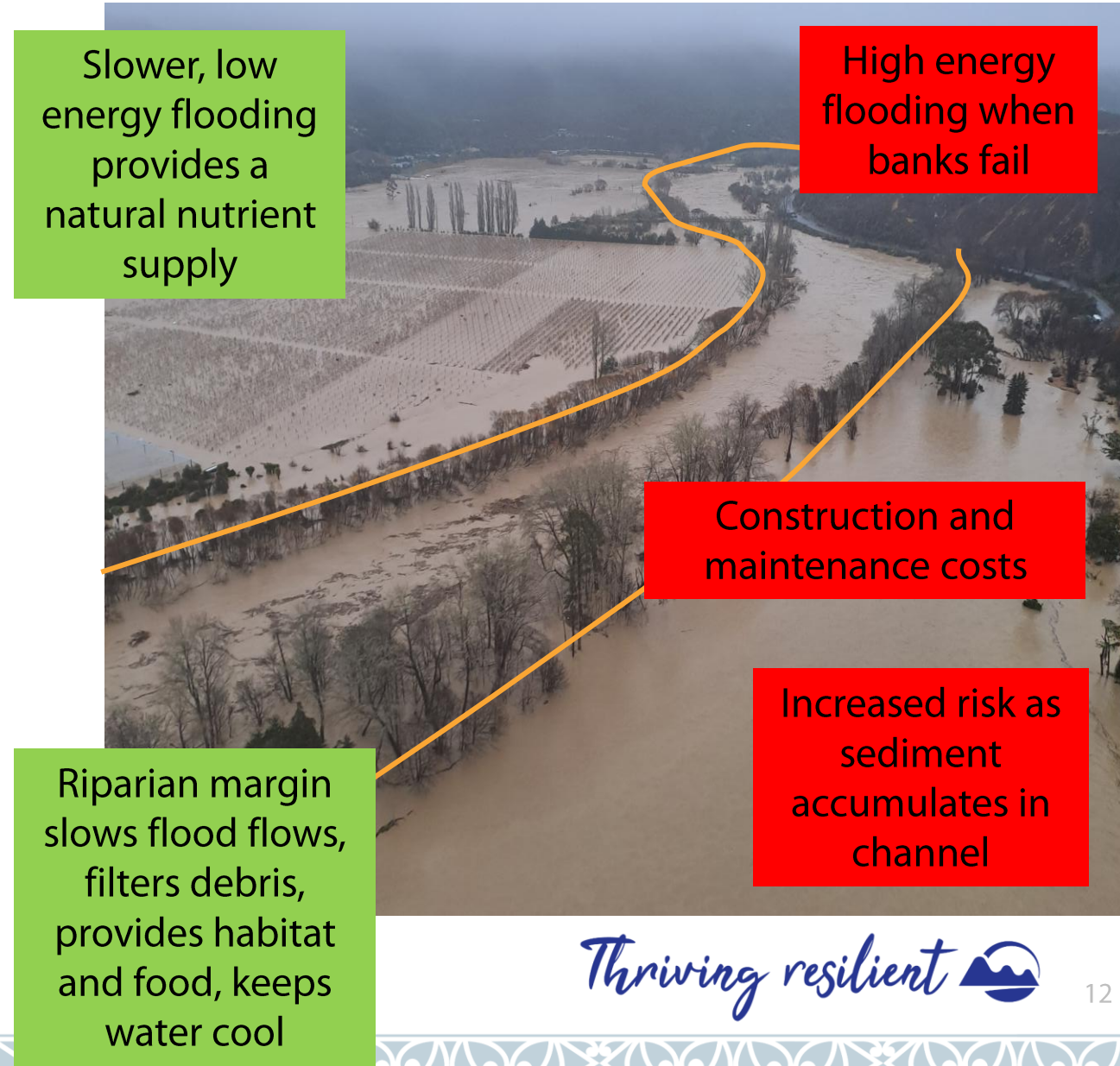
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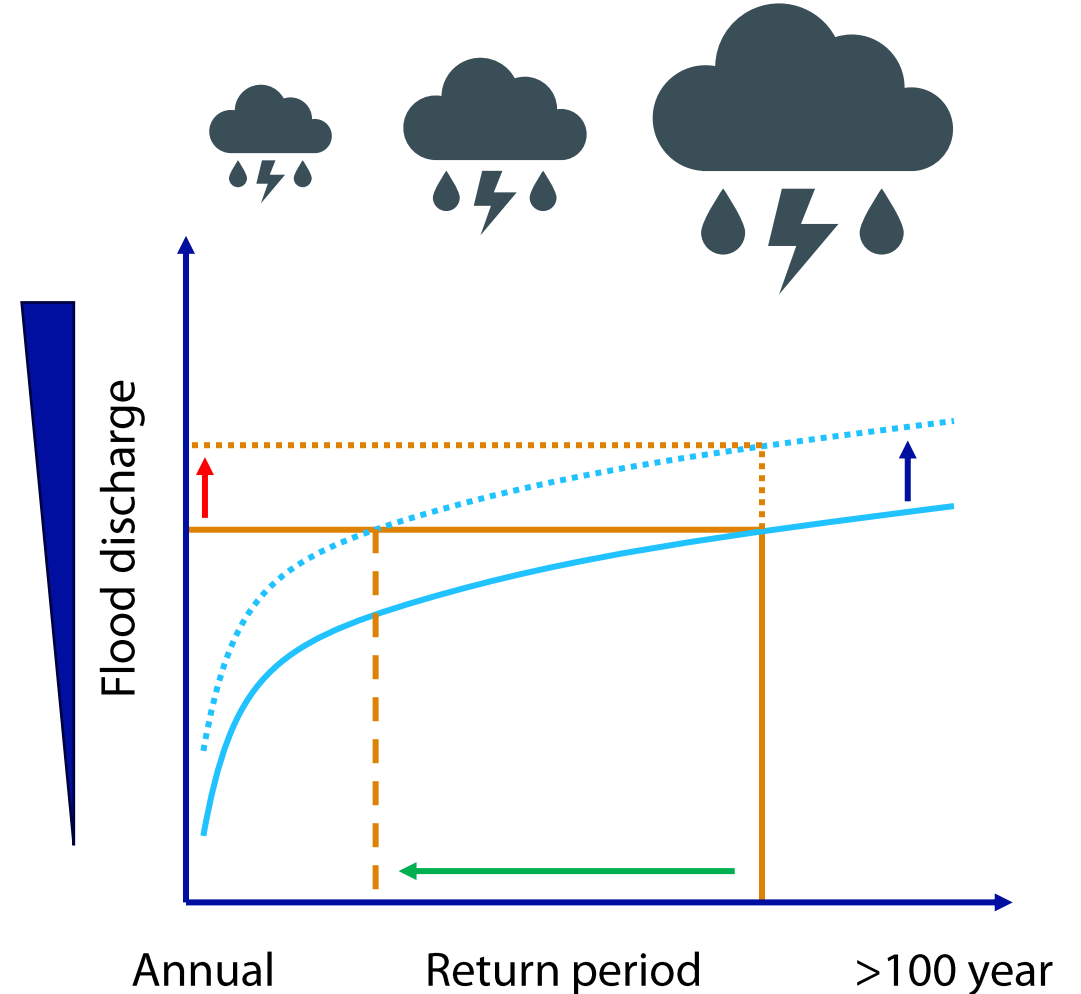
Nature's solution for big floods: floodplains

- Big floods: 1:50 – 1:100 year event, 2% / 1% AEP, or larger
- Floodplains accommodate floodwaters during big events
- Room for rivers to 'breathe'
- Functioning floodplains provide valuable 'services'
- Disconnecting the river from the floodplain increases pressure on infrastructure
- Resilience for big floods relies on understanding the role of the floodplain



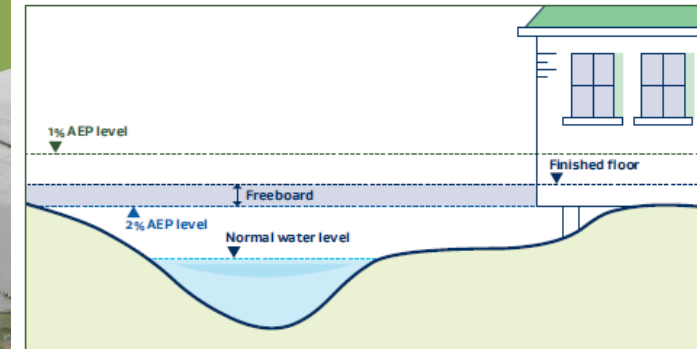
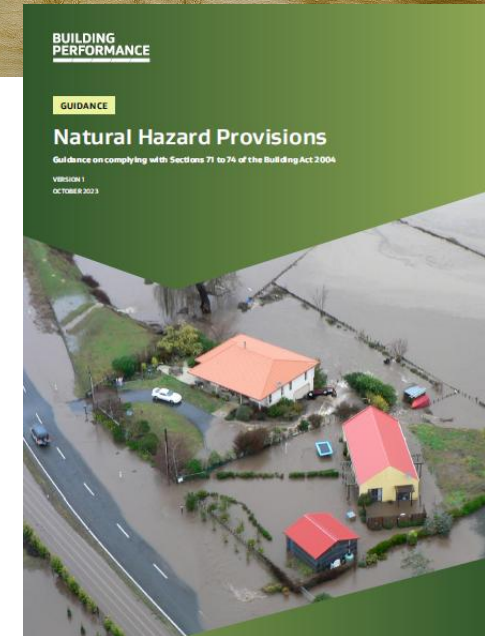
Big floods and climate change (all floods)

- Disconnecting the river from the floodplain increases pressure on infrastructure
- Infrastructure capacity is further reduced due to climate change
- Climate change puts more water vapour in the atmosphere, creating more rain
- Big floods are going to get **bigger**
- Today's infrequent big flood is going to occur more **frequently** in the future



Avoiding the effects of big floods for dwellings

- Big floods are going to get bigger
- Today's big flood is going to occur more frequently
- A safe place of refuge
- For dwellings we need to look out into the future
- Life of dwellings: 75-80, 100 years
- More likely than not that a dwelling on the 1% AEP floodplain will be impacted by a big flood



Planning to avoid the effects of big floods

- Development on floodplains is a national issue
- Nat. Policy Statement for Nat. Hazards
- New regional plans coming
- Understand the role of floodplains
- Get involved in opportunities to shape plans of our floodplains

		Likelihood Level						
		Almost Certain	Very Likely	Likely	Possible	Unlikely	Rare	Very Rare
Consequence Level	ARI (years)	up to 10	10-20	20-50	50-100	100-500	500-5000	> 5000
	AEP	10% or more	10% to 5%	5% to 2%	2% to 1%	1% to 0.2%	0.2% to 0.02%	< 0.02%
	Catastrophic	Very High	Very High	Very High	High	Medium	Medium	Medium
	Major	Very High	Very High	High	High	Medium	Medium	Medium
	Moderate	High	High	High	Medium	Medium	Low	Low
	Minor	Medium	Medium	Medium	Medium	Low	Low	Low
	Negligible	Low	Low	Low	Low	Low	Low	Low

No loss of use, no building repairs required



News Life Radio Podcasts Video

NEW ZEALAND / POLITICS

Hundreds of new builds in Auckland flood zones as councils wait on planning reform

9:53 am on 27 January 2025

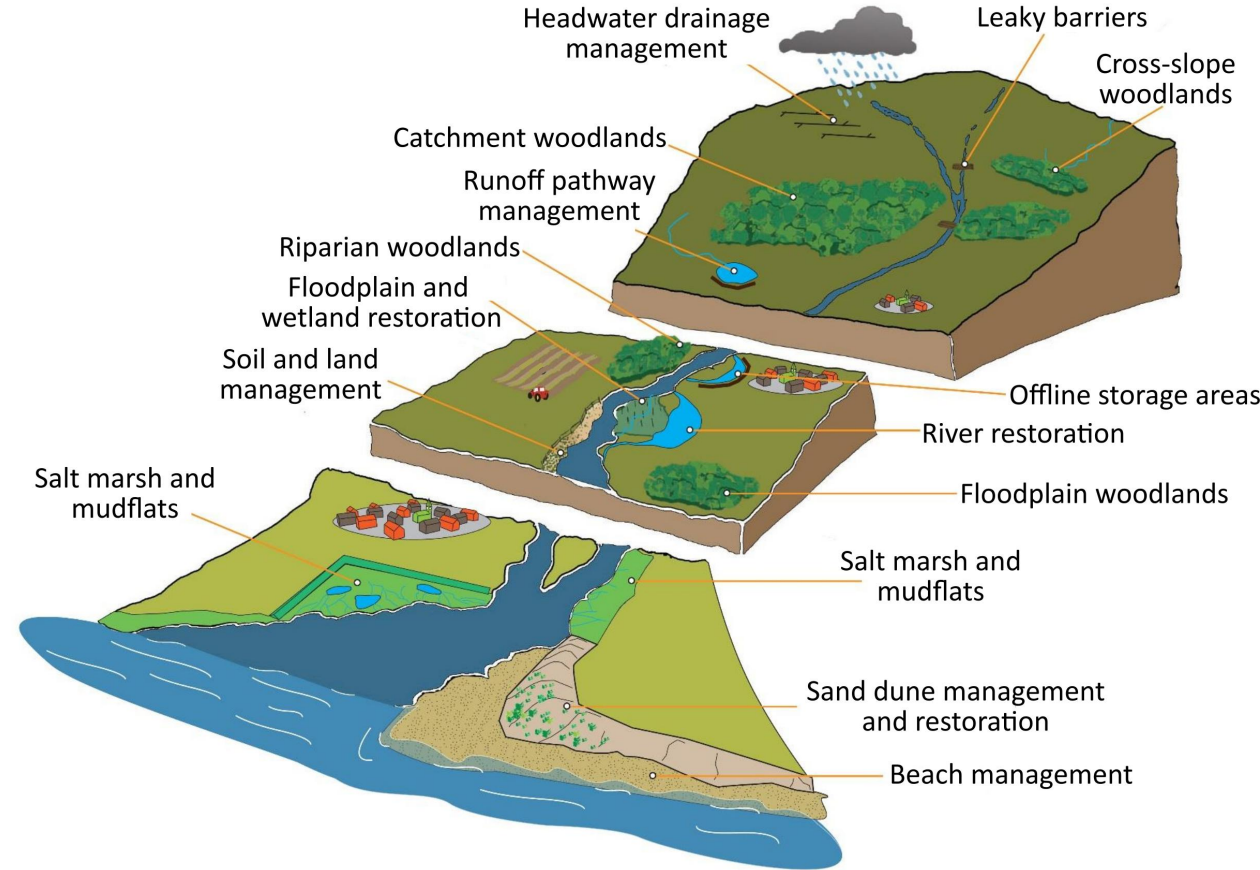
The New Zealand Herald

Auckland Council approves 4000 new homes on floodplains since 2023
storms, Huapai residents oppose plans for more

Thriving resilient

Summing up

- Key components of flood resilience are understanding, avoiding where possible, and preparing
- NbS offer a way to prepare for smaller floods and deliver outcomes for the catchment
- Floodplains have an important function in the catchment
- Climate change will make big floods bigger and more frequent
- Avoid dwellings on floodplains
- Opportunities are coming to input on how the District should plan for resilience in the future



Thank you