Is this Climate Change?

Experiences that are increasing our resilience.

Nathan Clarke – Acting Operations Manager and Acting General Manager

Nelson Regional Sewerage Business Unit

NRSBU

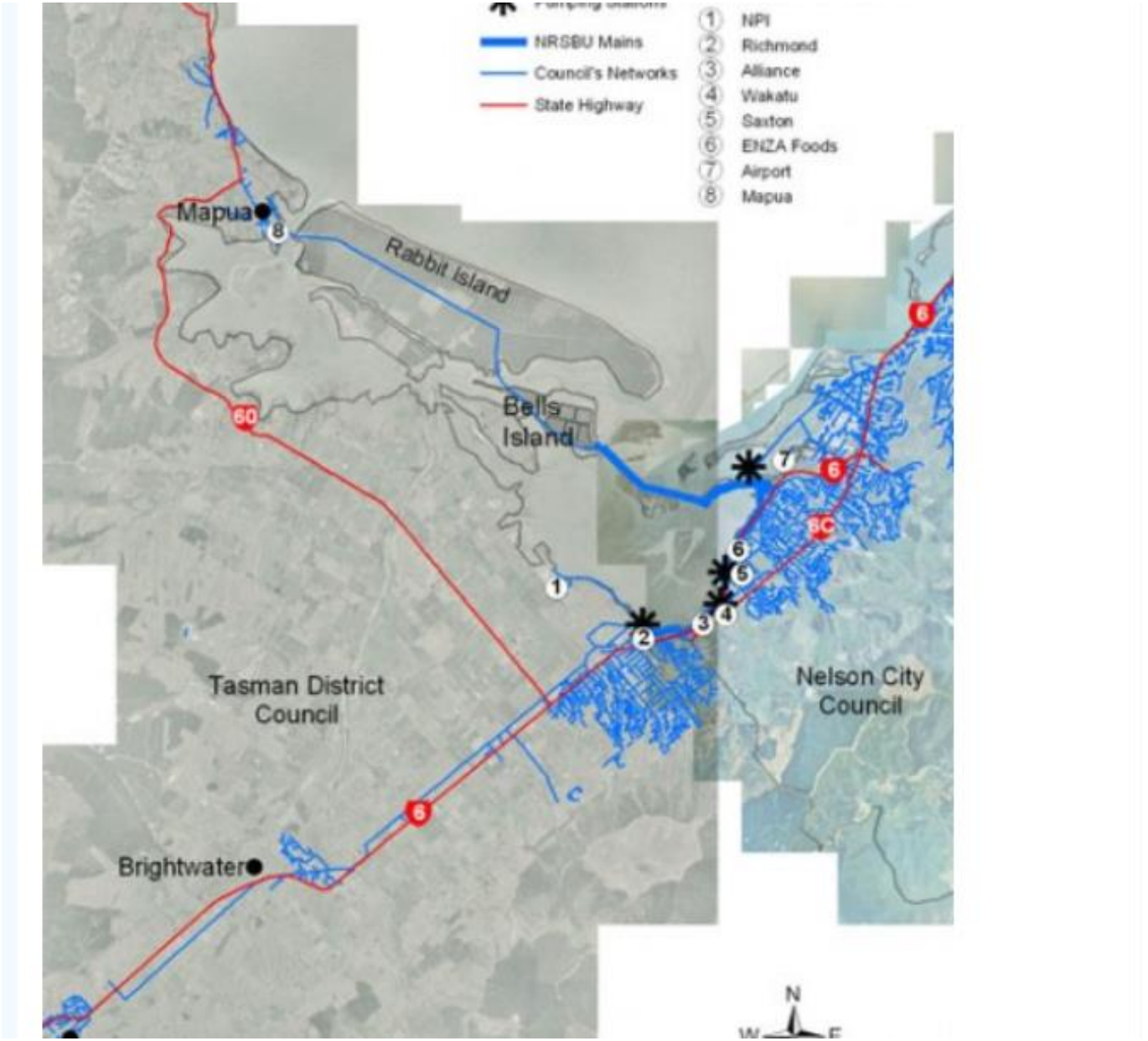
NCC and TDC

Bell Island Nelson Regional Sewerage system

Bell Island wastewater treatment Plant

Bell Island Wastewater irrigation system

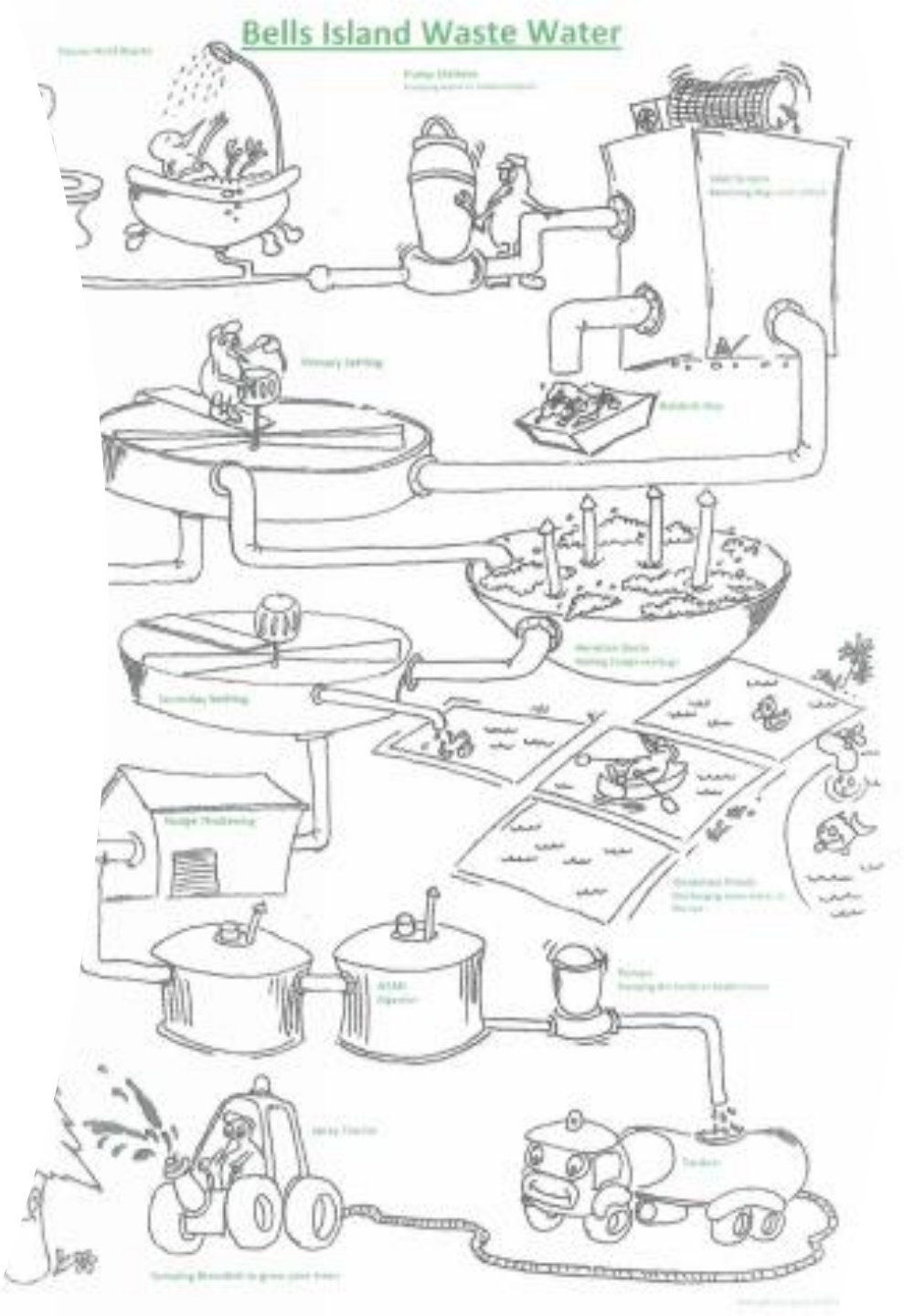
Rabbit Island Biosolids Reuse facility



Major rising mains.

Treatment Plant

Biosolids treatment



Water reuse

Biosolids reuse

Unique Characteristics

Up to 75000m3/day influent

Max 25,000 m3 day out

Discharge to estuary only on outgoing tide for 3 hours

Variable loads

10000kg COD/day

to 50000kg COD/day

Focus:

Reduce overflow risks

Increase water reuse

100% biosolids beneficial reuse

Increase nutrient capture for reuse on forest.

Biosolids Reuse

More than 20% of incoming N recycled

The biosolids application increases value of logs by 32% at harvesting.

We have experienced some extreme weather events.

Ex Tropical Cyclone Fehi


GIVE
WAY


KDC262
01/02/2018 11:08


They have resulted in some problems with assets

It has helped us focus

On what to improve


The effects are broader than they seem on the surface

Salt toxicity issues are a secondary effect.


Issues are not just with constructed assets

We hadn’t planned on significant tree death from salt toxicity, and hadn’t planned for the safety and access issues associated with clearing dead trees.

Access Issues

Can we defend our assets and for how long?

Coastal Erosion – Moturoa /Rabbit Island Foreshore

High intensity Rain Events

December 2011 – 423 mm in 24 hrs

April 2013 -216mm in 24 hrs at TDC office
-101 mm in 1 hr

March 2016…….

Can our assets cope?

Do we need to reconsider our service levels?

Should we increase network capacity?

Drought 2018/2019

Biosolids to Rabbit Island

- 100% of our biosolids reused on the Rabbit island
- Pumped as a 3- 5 % TS slurry
- We have no alternatives available.
- We have no dewatering equipment installed
- Landfill doesn’t accept liquid wastes.
- Our only option - use ponds temporarily – would likely have lead to odour and treatment compliance issues!

We have a fantastic biosolids reuse system

Rabbit Island Zoning of Restricted Activities

Biosolids Debrief- not as bad as I thought

- Trees burned – can respray
- Maggot burned months delay.
- Probably could manage….

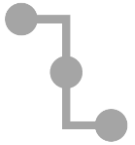
We are already implementing two separate biosolids spraying zones at either end of Rabbit island to manage odour which also reduces risk of both “maggots” being destroyed.

Adversity has helped us.

Expose our weaknesses

Made us examine our beliefs

Allowed us to redefine our goals.



Showed what can work, and therefore gave us options

Lessons Learnt:

Pumpstations

Protect our electrical systems and raise them.

Have temporary bunding available

Seal our wet wells effectively

Have spares available in hand for rapid turnaround on important or critical asset repairs.

Surprise was - We **can** keep our systems operating effectively, and wet wells CAN run underwater!.

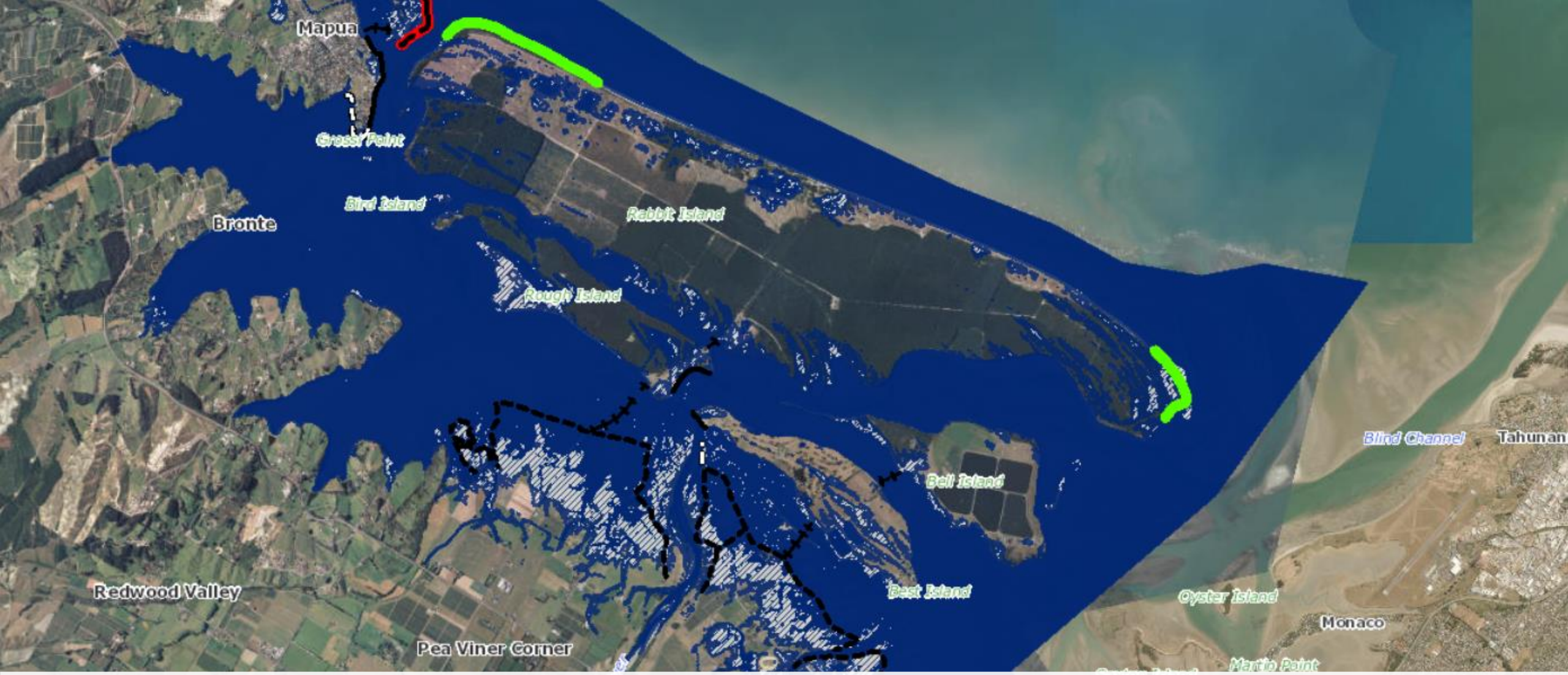
Lessons Learnt Treatment processes

- Flows – Bigger Pipes… Longer HRT during ADWF
- Secondary issues with Salinity,, Odour, Corrosion. Access, Fire risk.
- Buffer capacity – do we have enough?
- We cannot control flow into system from elsewhere
- If pump stations remain working then we could have Resource Consent or Safety Implications.
- Still quite a few questions that need to be answered.

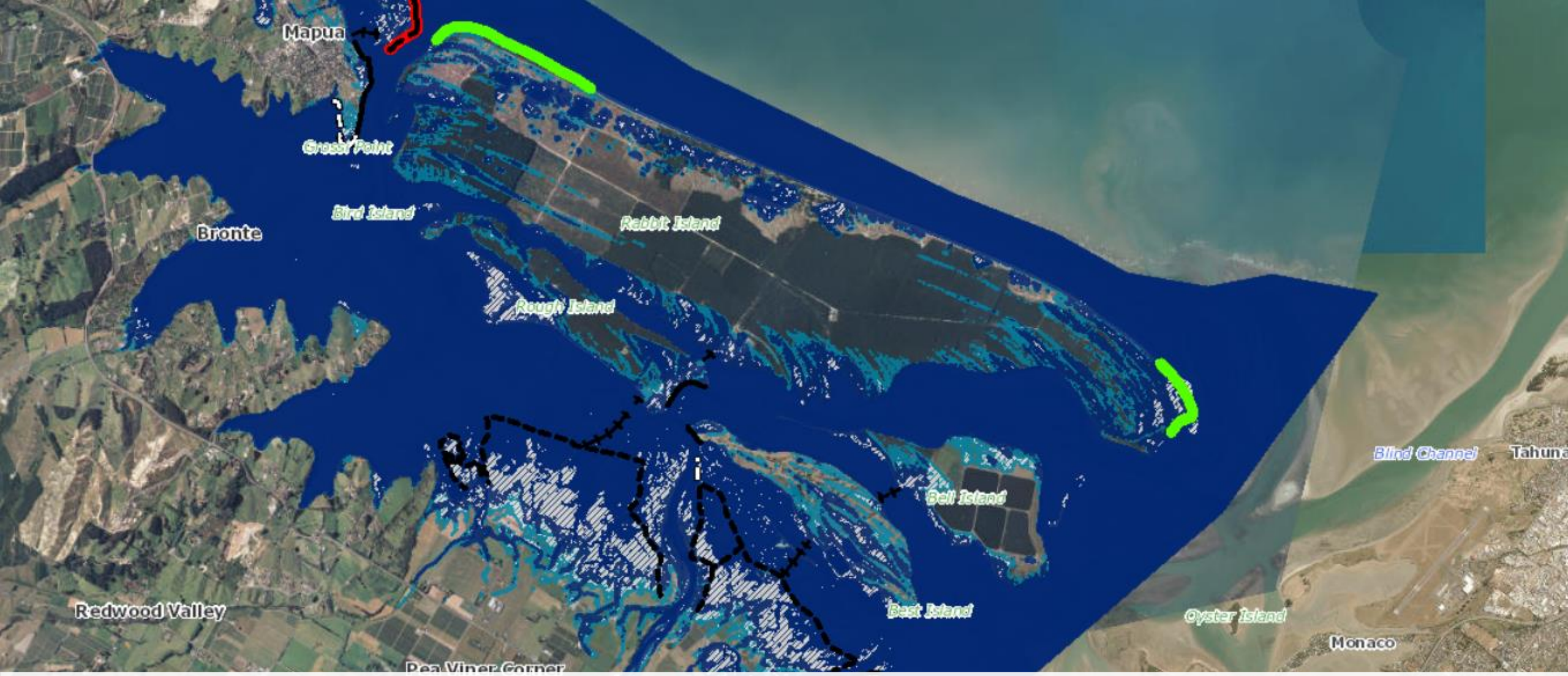
Primary Effects - Reasonably under control

- Secondary Effects
  - Access issues
  - Salinity
    - Process stability
    - Odour production
    - Corrosion
  - Biosolids
    - Might be ok now, but…
      - Need alternative options for future
        - Land area reducing….
        - Trees dying from sea water.

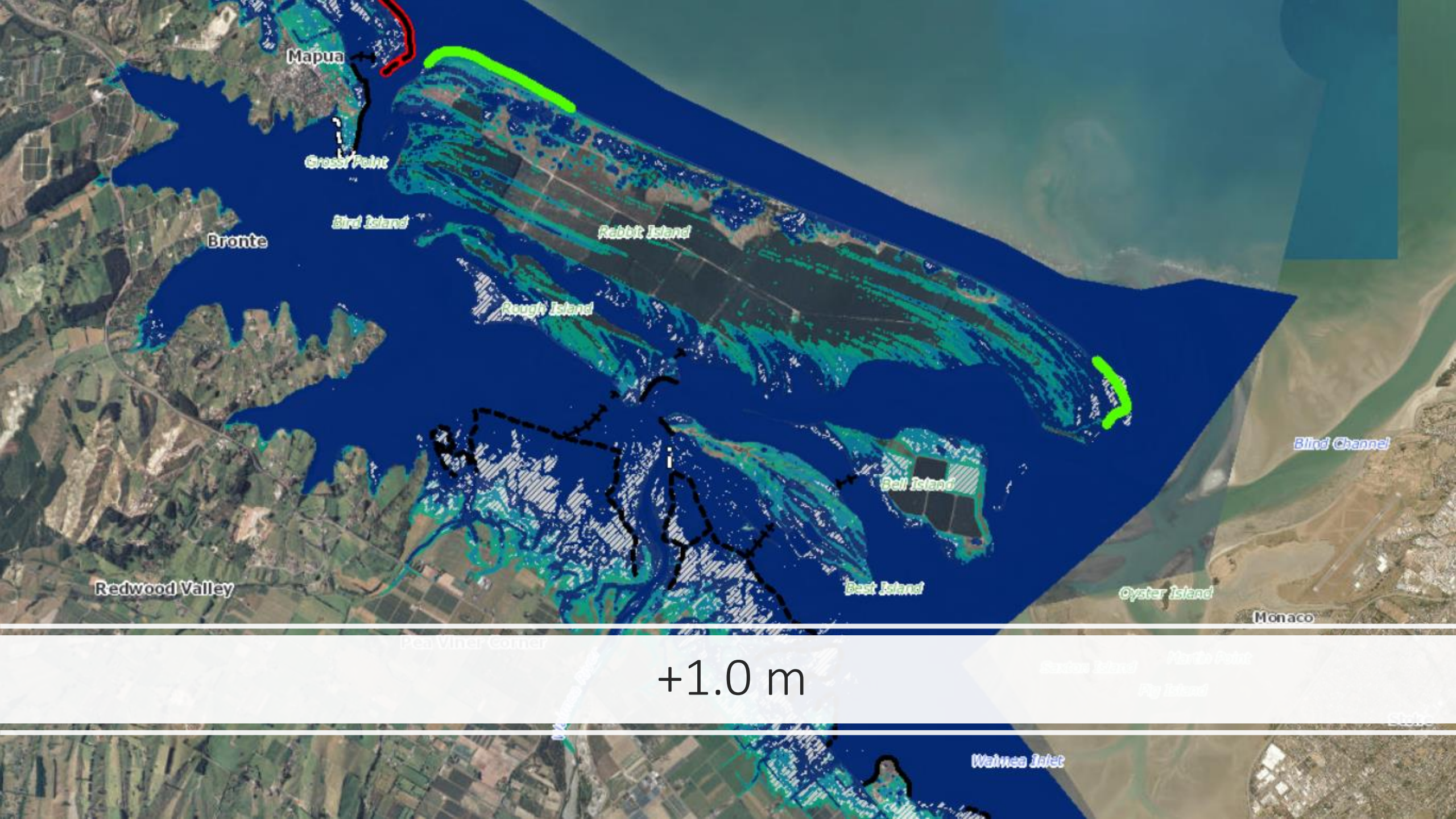
Sea level – How might it affect us?


Mapua
Grossi Point
Bird Island
Bronte
Rabbit Island
Rough Island
Blind Channel
Tahunan
Bell Island
Redwood Valley
Pea Viner Corner
Beat Island
Oyster Island
Monaco

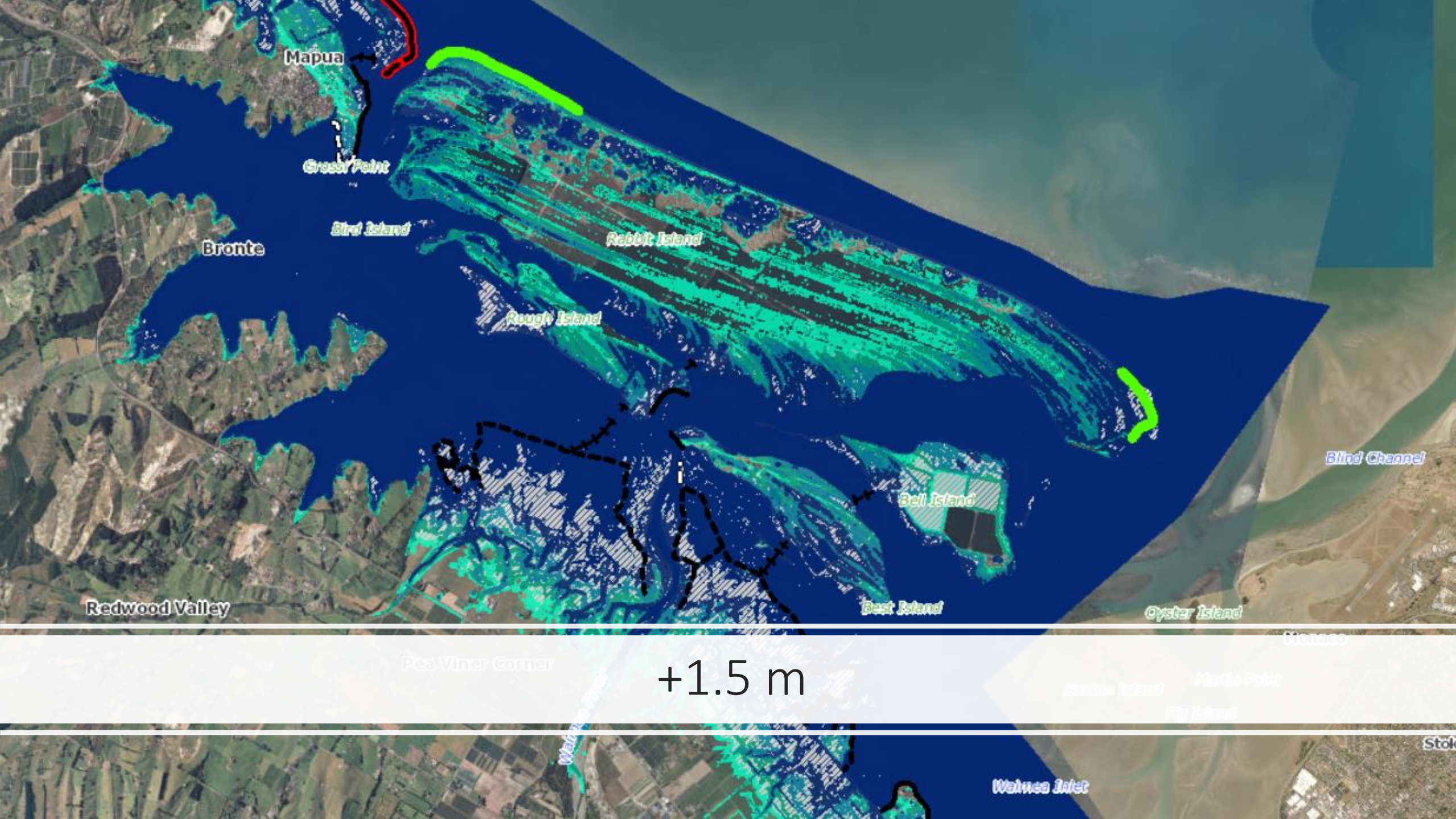
Present Day


Mapua
Grassy Point
Bird Island
Bronte
Rabbit Island
Rough Island
Bell Island
Blind Channel
Tahuna
Redwood Valley
Pea Viner Corner
Best Island
Oyster Island
Monaco
Waimea Inlet

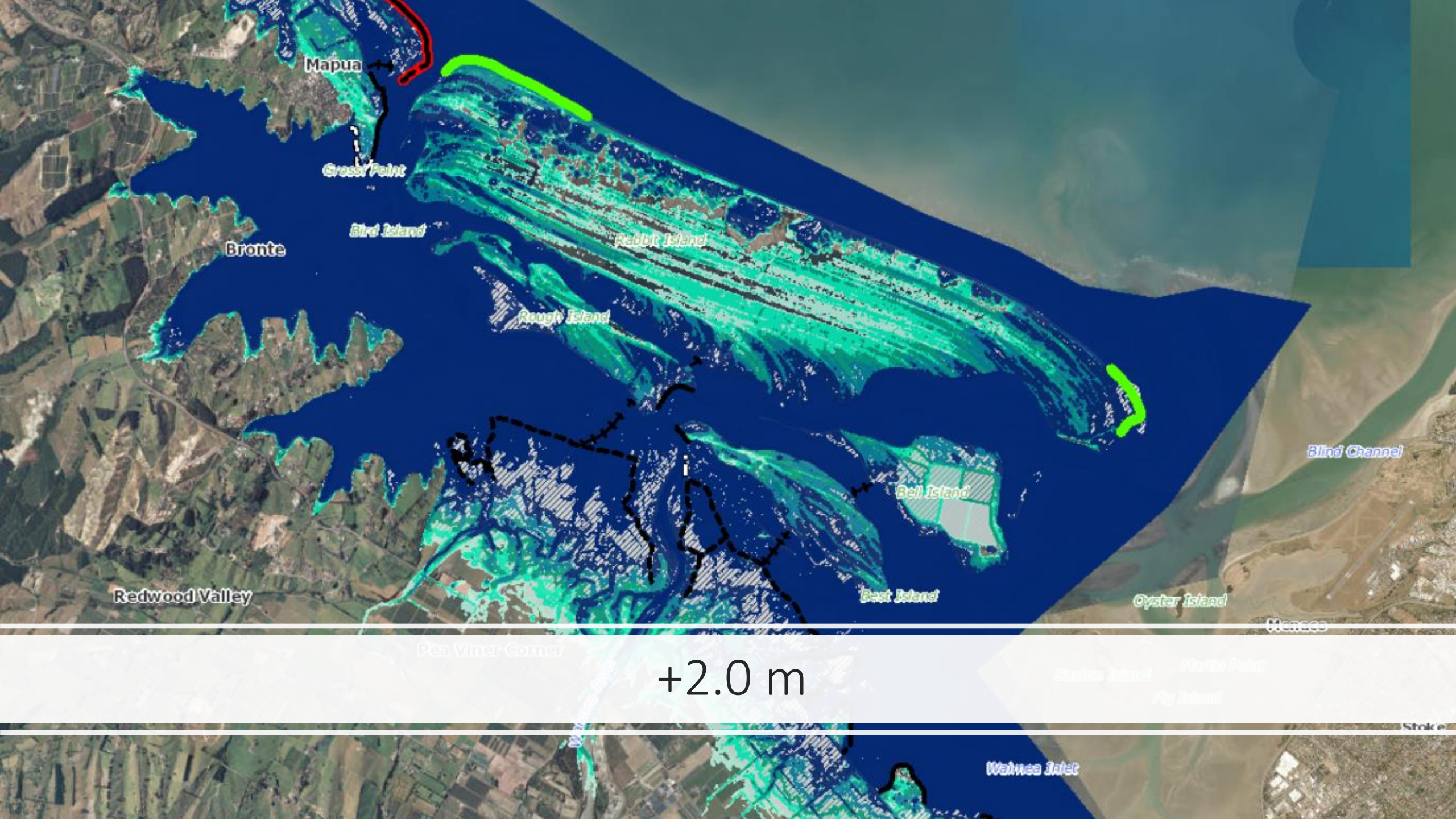
+0.5 m


Mapua
Grassy Point
Bird Island
Bronte
Rabbit Island
Rough Island
Bell Island
Blind Channel
Redwood Valley
Bent Island
Oyster Island
Monaco
Pea Viner Corner
Wahnee Inlet

+1.0 m

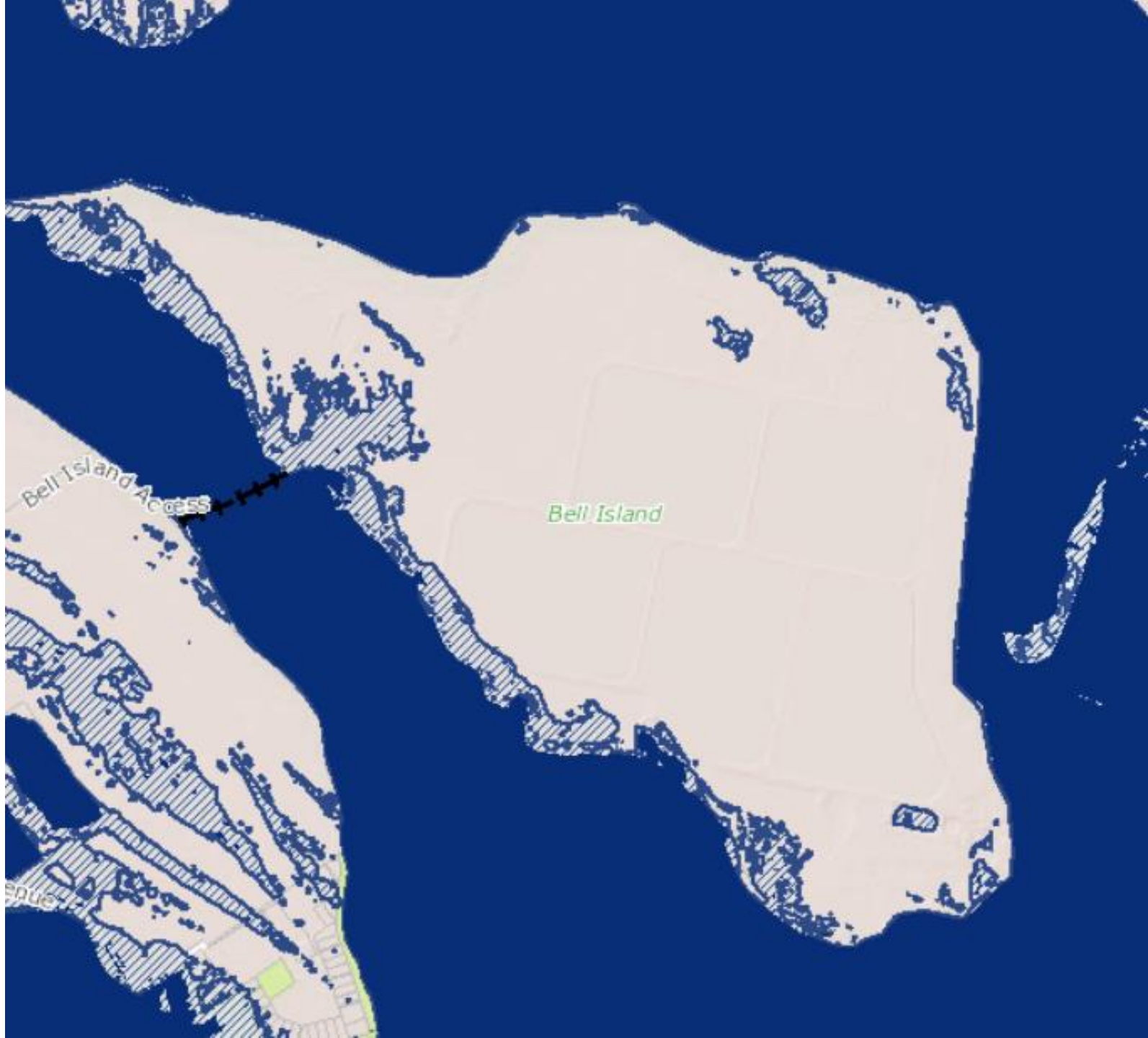

Mapua
Grassy Point
Bird Island
Bronte
Rabbit Island
Rough Island
Blind Channel
Bell Island
Redwood Valley
Best Island
Oyster Island
Pea Viner Corner
Wahnee Inlet

+1.5 m


Mapua
Grassy Point
Bird Island
Bronte
Rabbit Island
Rough Island
Bell Island
Blind Channel
Redwood Valley
Beast Island
Oyster Island
Wahwea Inlet

+2.0 m

Present day



+0.5 m SLR

+1.0 m


Bell Island Access
Bell Island
Barnett Avenue
Best Island Road
Best Island

+1.5 m


Bell Island Access
Bell Island
Barnett Avenue
Best Island Road
Best Island

We think we can defend to +1.0 m

PS and Pipework:

The details count!

- Focus on Sealing
- Consider future pipe routes.
- Make sure our electrics are high enough
- Temporary bunding at all sites.
- Expect to defend assets for significant period.
- Dual pipes for resilience, reduces HRT during ADWF, and allow maintenance.
- Need to plan for revised routes for the future
- Saltwater inflow is not able to be managed from other sources? Should we run the Pumps?

Treatment plant.

Defend in place for 1m Sea Level Rise

Start to plan now for potential future change of site (s).

Access issues will become harder to manage.

Salt damage will make operations more difficult

Odour from sulphides.

Increase salinity affected Algae

Stability reduced in ponds for a few months

Biosolids:

Moturoa / Rabbit Island

Area available will reduce over time.

Need to consider alternatives as we move forward.

Need to have a contingency plan in place.

Consider other reuse locations and methodologies for augmenting current land if required.

These extreme events have taught us valuable lessons. They help us adjust for the future.

We had an events that caused some pain and one that cause 12 hours of loss of service from one PS.

We have been lucky. It could have been significantly worse.

Some assets performed well despite inundation. With the right details we can cope with the SLR for some time. Probably to around 1 m rise.

Our biosolids system will be able to be reused even after a fire, but longer term there will be land availability issues.

Is this Climate Change?

- Questions?