

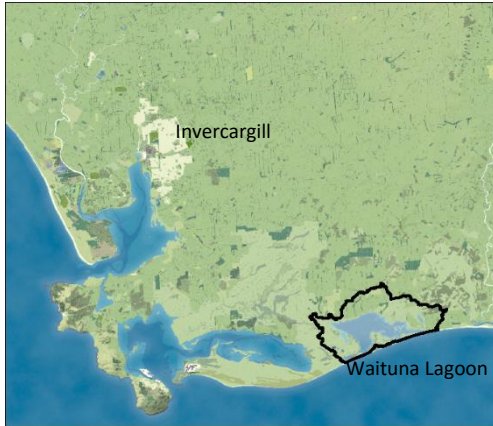


For now &
our future

Modelling Waituna Lagoon Response to Change: Climate and Management

Chris Jenkins *Senior Hydrologist*

Waituna Lagoon



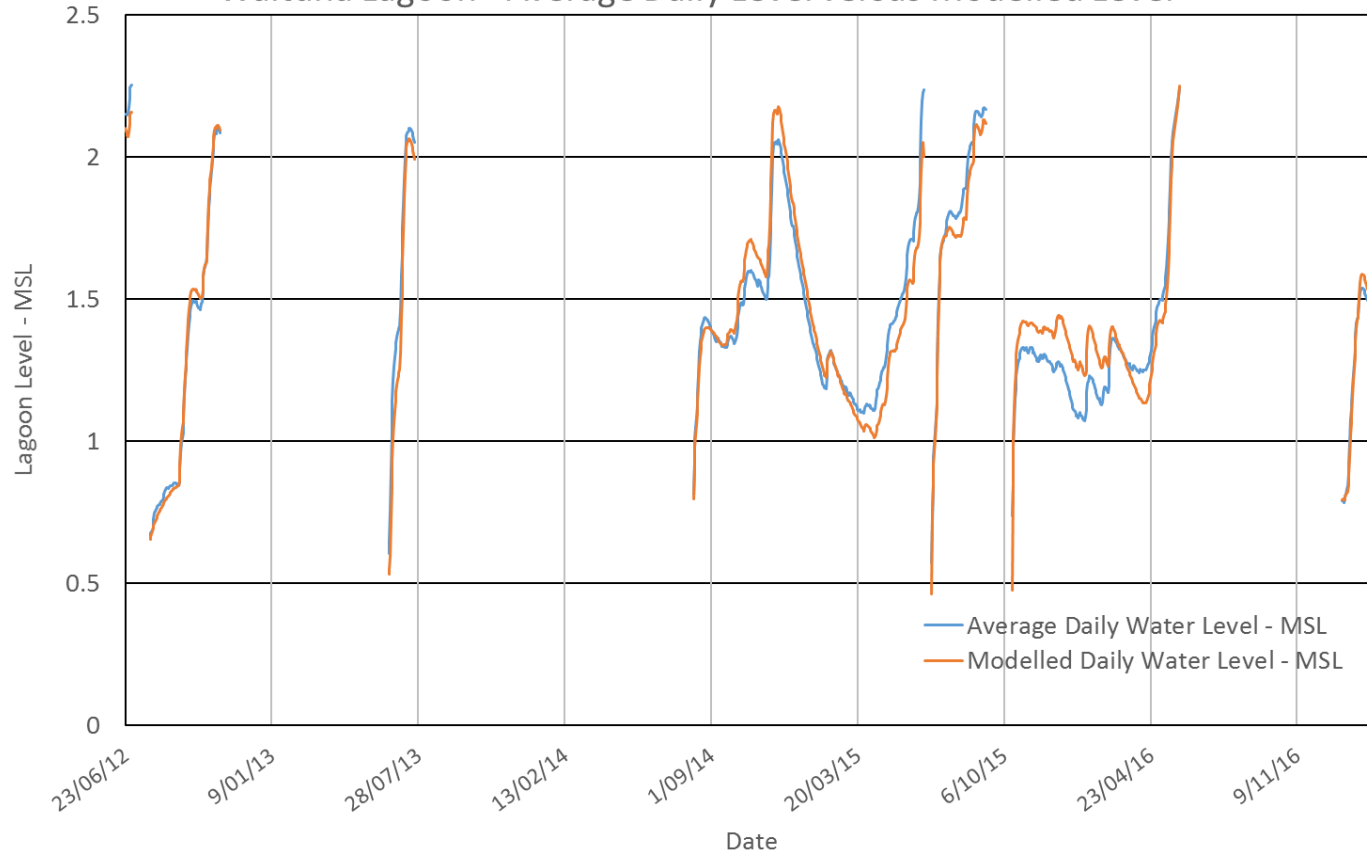
Opening the Lagoon to manage drainage



- Lagoon open at 2 MSL in winter and 2.2 MSL from spring through autumn

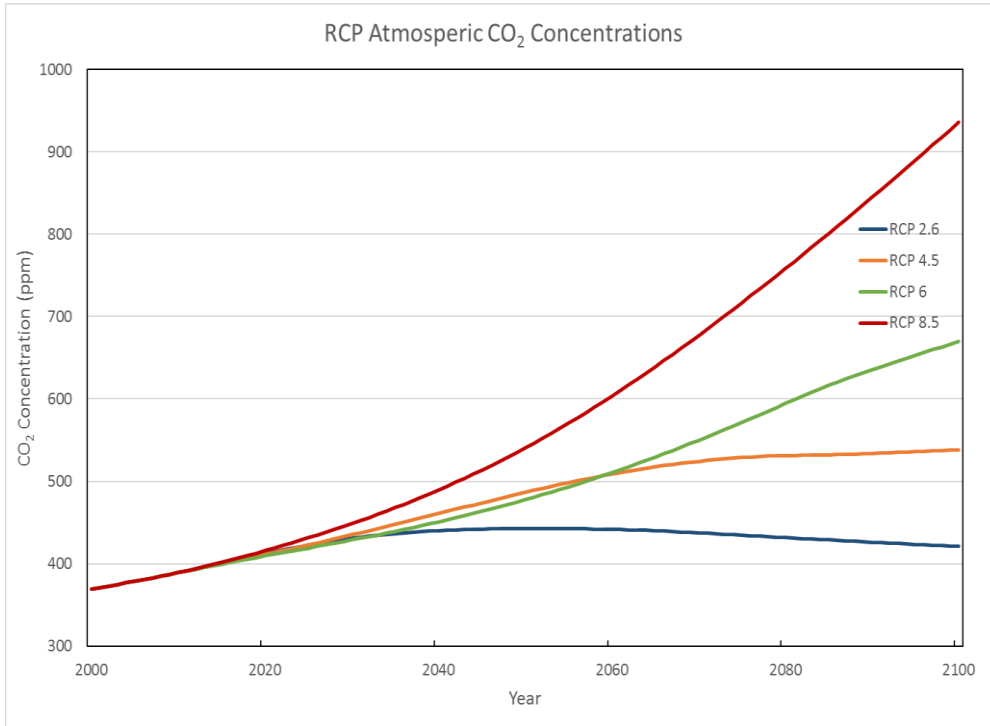
Model validation

Waituna Lagoon - Average Daily Level versus Modelled Level



Average daily
water level versus
modelled
 r^2 0.9378

Climate change scenarios



Source - IPCC Fifth Assessment

Four Representative
Concentration Pathways (RCP)

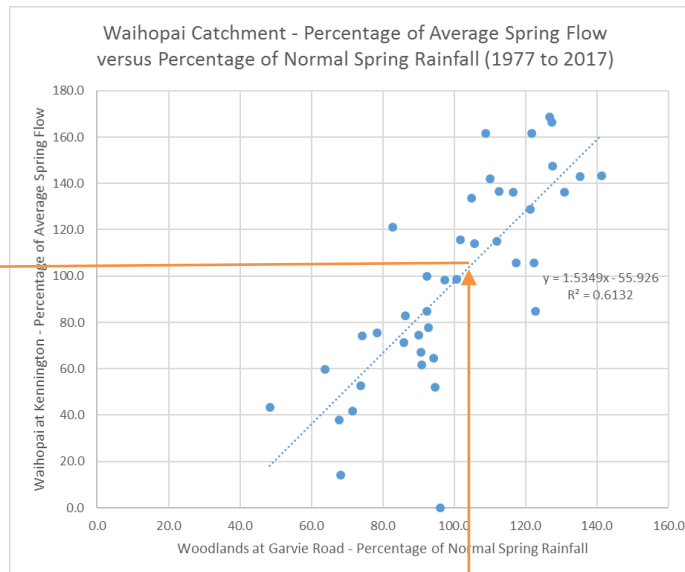
RCP 2.6 – Mitigation

RCP 4.5 and 6 – Stabilisation

RCP 8.5 – Continued Growth

Climate effect on rainfall and river flow

| Projections for Waituna Flow Inputs (2031-2050) | | | | |
|---|---------|---------|-------|---------|
| % Increase in Flow | | | | |
| | RCP 2.6 | RCP 4.5 | RCP 6 | RCP 8.5 |
| Summer | 0.0 | 3.9 | -2.0 | 3.9 |
| Autumn | 4.6 | 2.3 | 0.0 | 2.3 |
| Winter | 2.4 | 5.2 | 4.3 | 5.2 |
| Spring | 5.2 | 5.2 | 3.7 | 6.8 |

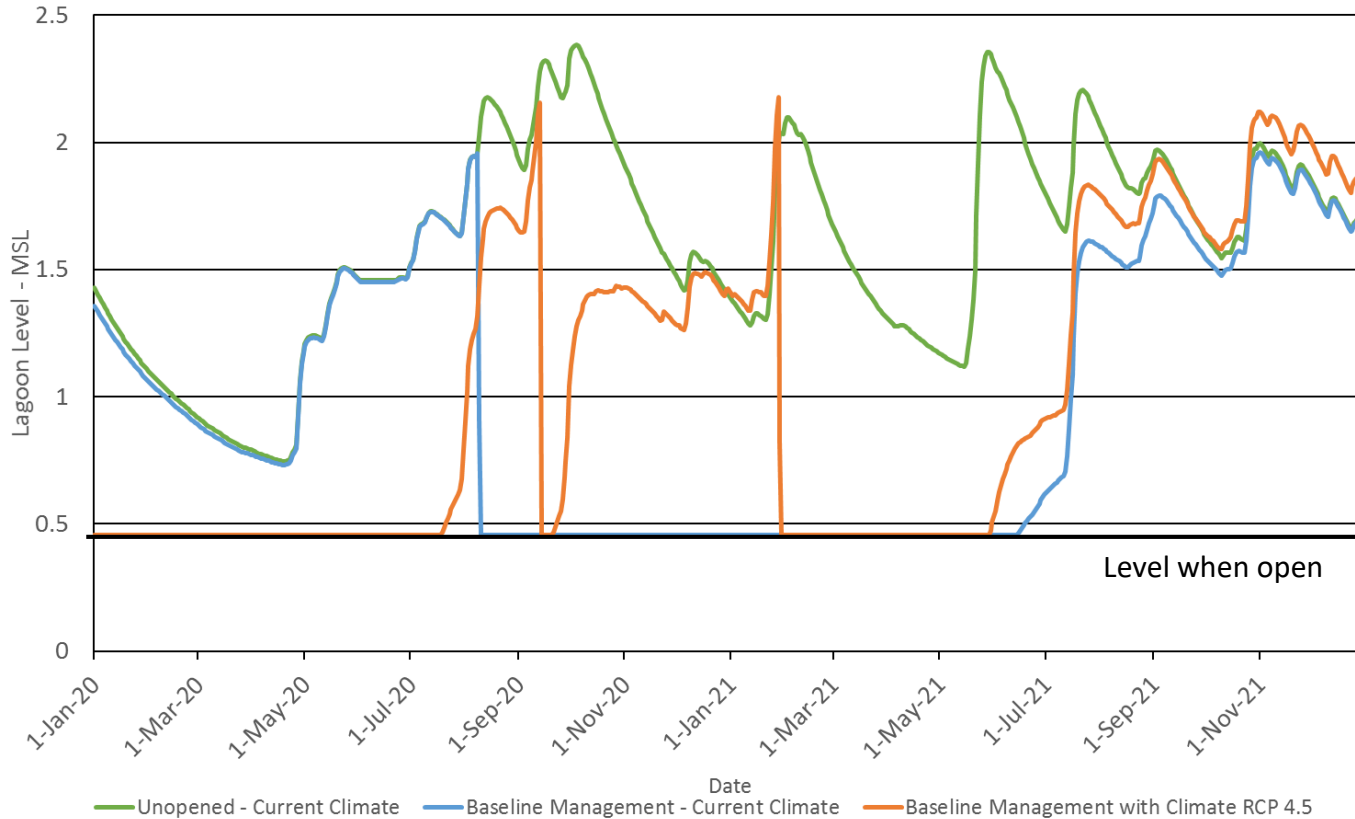


| Projections for Southland Rainfall (2031-2050) | | | | |
|--|---------|---------|-------|---------|
| % Increase in rainfall | | | | |
| | RCP 2.6 | RCP 4.5 | RCP 6 | RCP 8.5 |
| Summer | 0 | 2 | -1 | 2 |
| Autumn | 2 | 1 | 0 | 1 |
| Winter | 5 | 8 | 7 | 8 |
| Spring | 5 | 5 | 4 | 6 |

Source – MFE (2016)

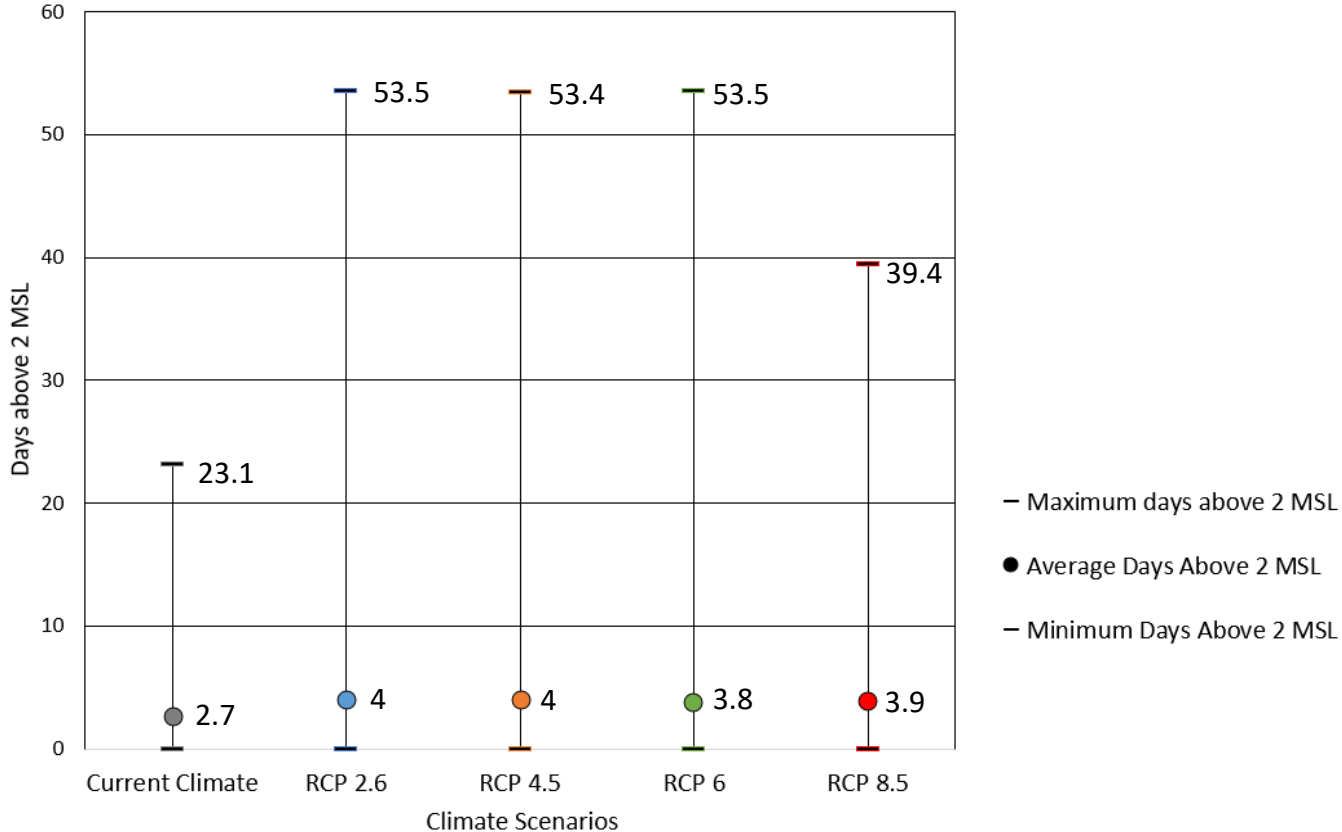
Lagoon model outputs

Waituna Lagoon - Modelled Water Level for various scenarios



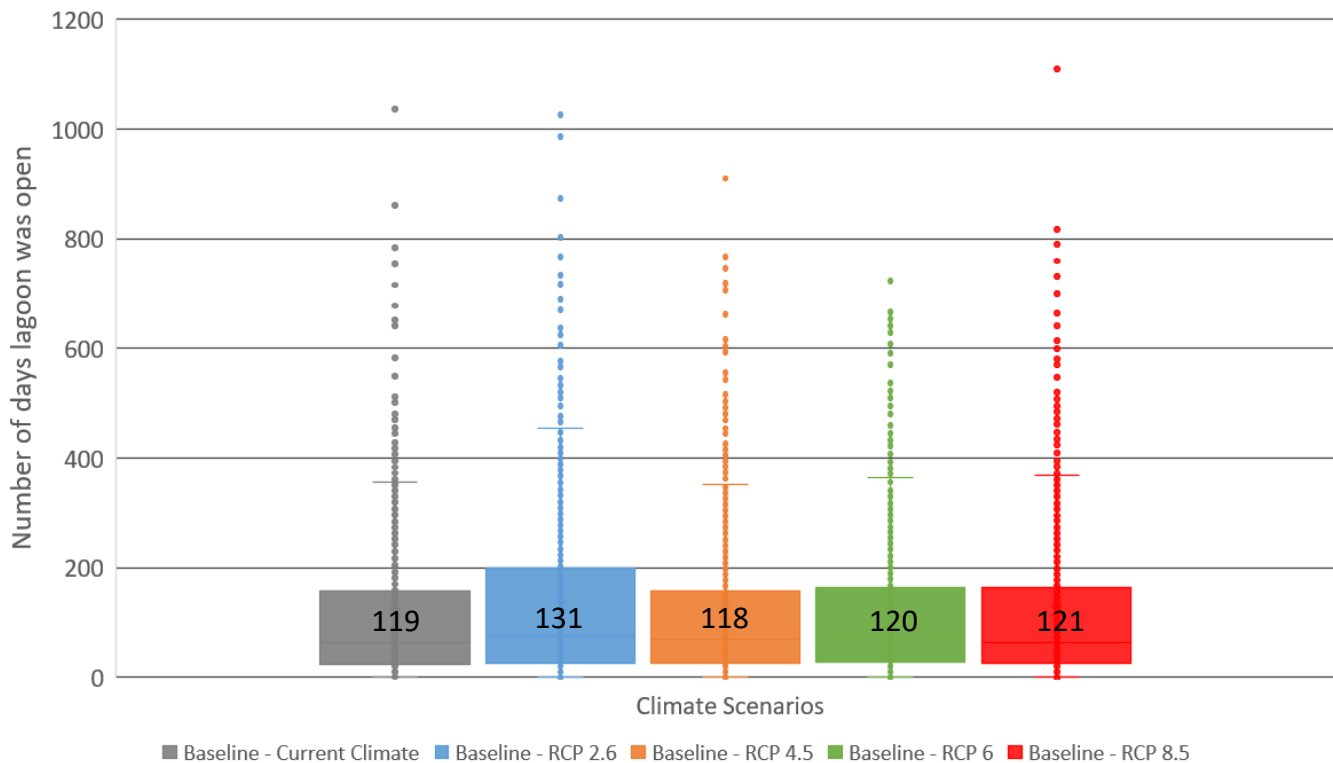
Results - days above 2 MSL

Waituna Lagoon - Baseline Management for different climate scenarios



Results – days open to the sea

Waituna Lagoon - days open for different climate scenarios with baseline management criteria (1170 years modelled)





Points for consideration

Managing resources in a sustainable manner can be challenging

- We need to consider change from the current conditions to plan for resilience

Models are a useful tool for assessment of hypothetical criteria and help us to plan for:

- Resilience to climate change
- Resilience for management criteria