

# Upper Motueka Water User Meeting

## Thursday 22 November 2021 @ 6.30 pm

### Shedwood Hall - Tapawera

#### **Chair**

Cr Stuart Bryant

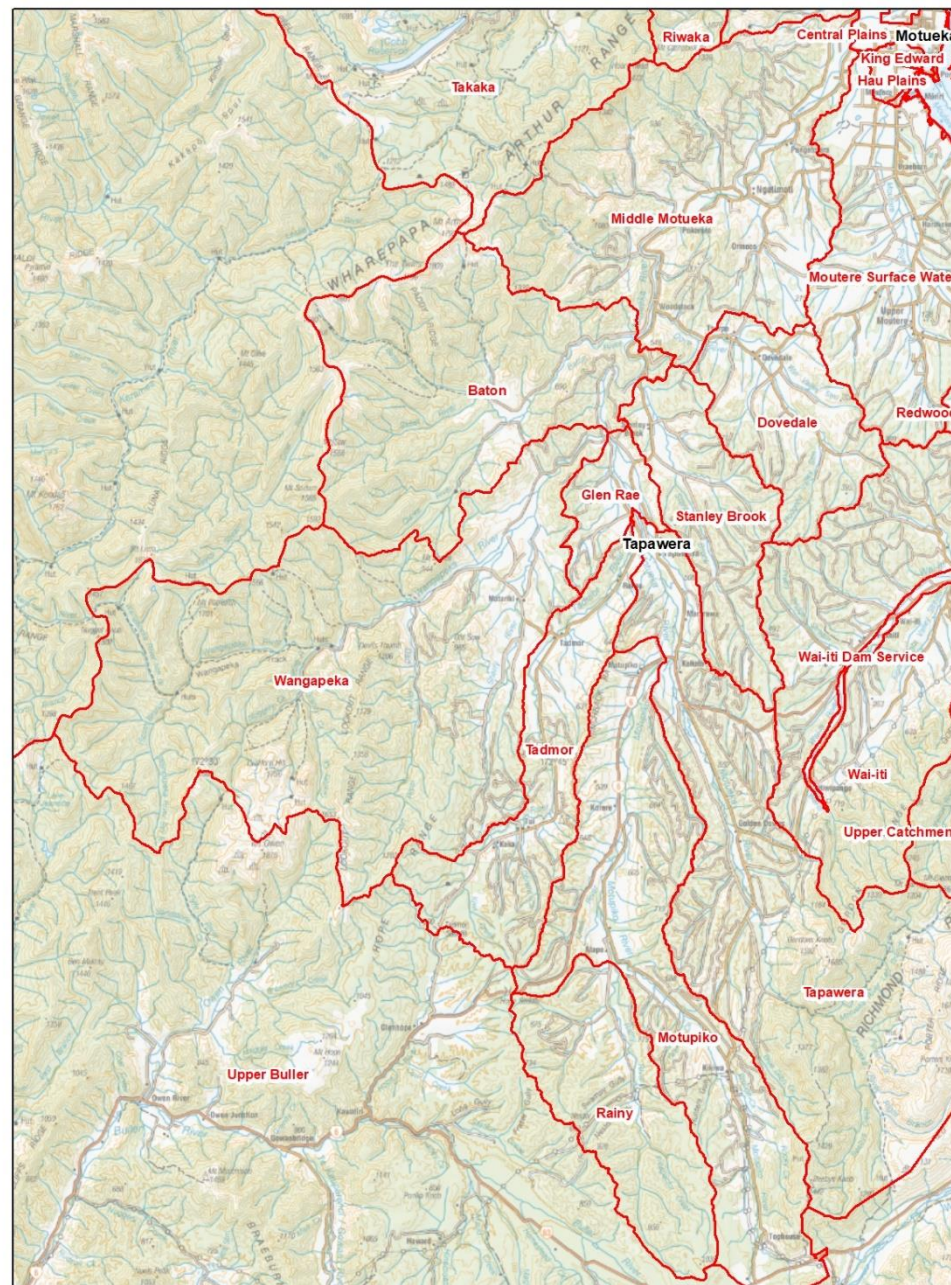
#### **Presentation**

Joseph Thomas TDC

Andrew Fenemor – Manaaki Whenua Landcare Research (Motueka ICM research)

Water Resource : Plan, Allocation, Modelling,  
Review

Monitoring/Rainfall/Flow/Groundwater



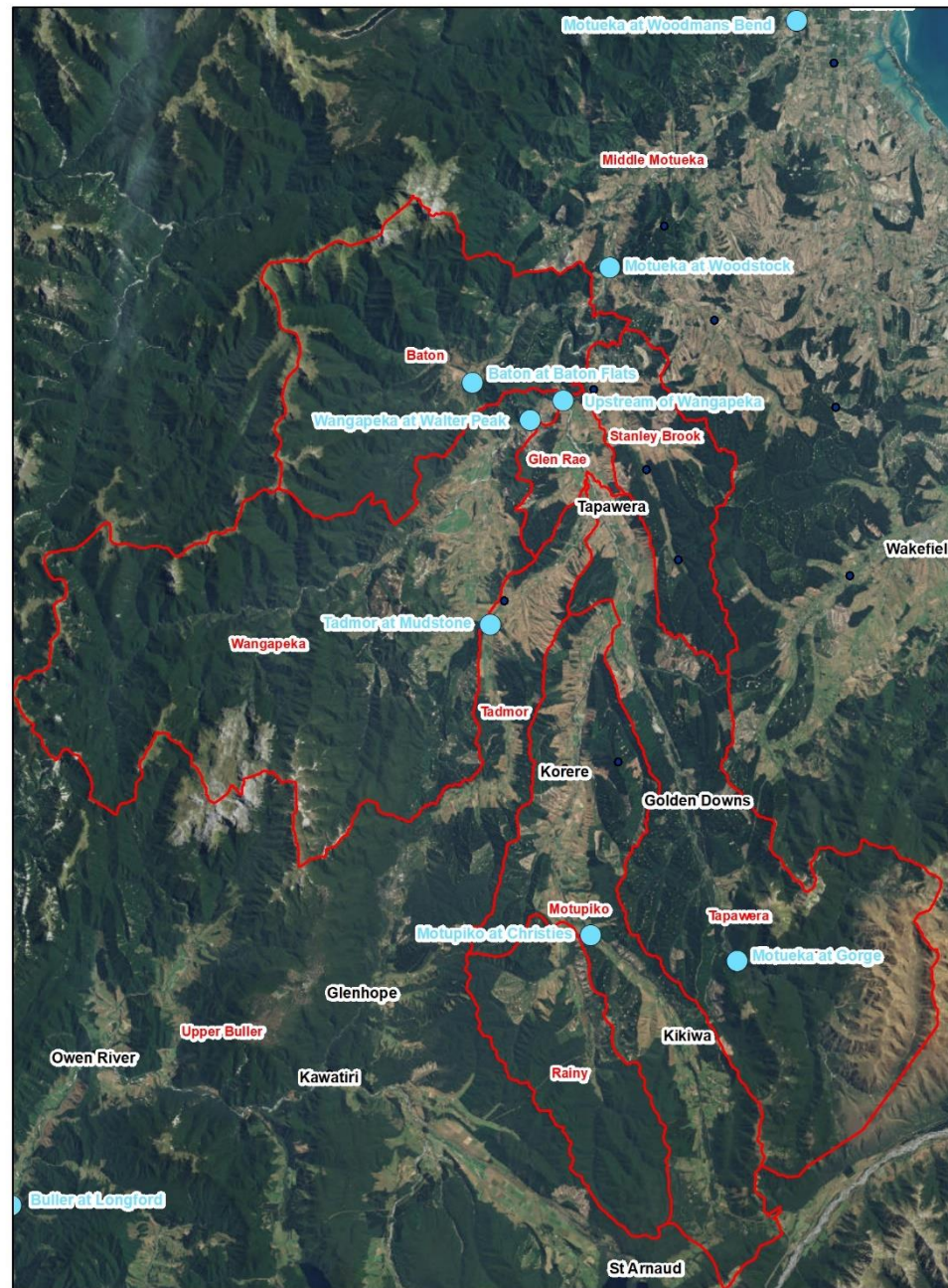
N  
1:290,000

## Water Management Zones - Above Baton

0 5 10 15 20 km







N  
1:290,000

Flow sites above Baton

0 5 10 15 20 km



# NIWA Regional Climate Predictions

Tasman, Nelson, Marlborough, Buller Nov 2021 – Jan 2022

Probabilities are assigned in three categories: above average, near average, and below average.

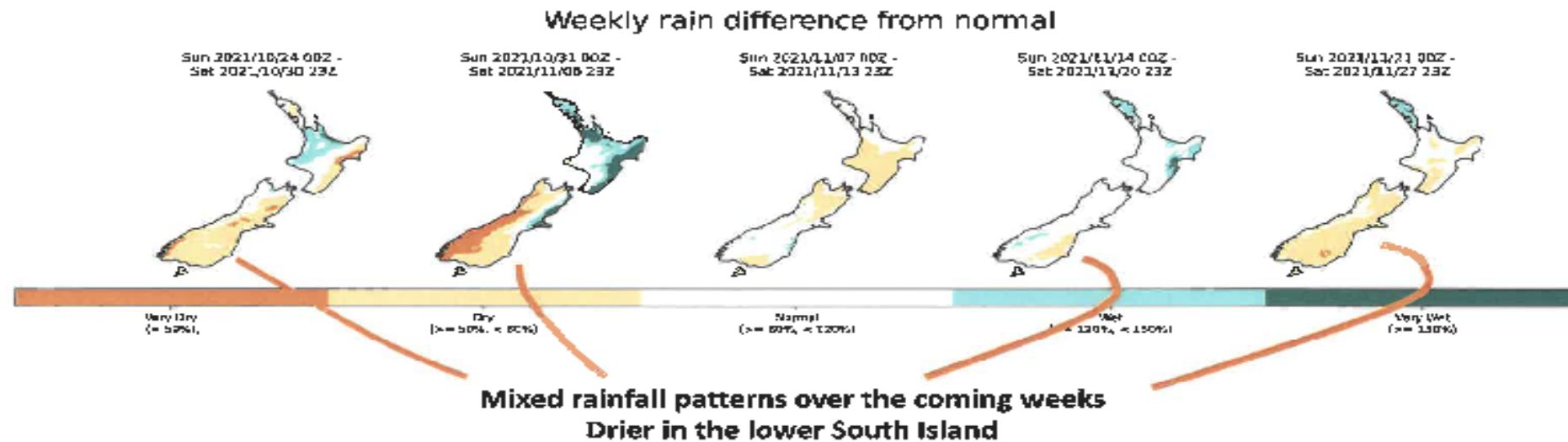
- Temperatures are very likely to be above average (65% chance).
- Rainfall totals are about equally likely to be below normal (40% chance) or near normal (35% chance).
- Soil moisture and river flows are about equally likely to be below normal (45% chance) or near normal (40-45% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	65	25	15	10
Near average	30	35	40	45
Below average	05	40	45	45

# Expected rainfalls difference from normal next 5 weeks: Oct-Nov 2021

## Rainfall as a difference from normal – next 5 weeks



# Upper Motueka Water Management

Council's updated water provisions (TRMP) came into effect July 2017

Water takes are restricted during low flows under the Water Conservation Order (WCO) based on flows at Woodstock, and additional river low flow triggers updated from 2017

# Allocation Limits for Freshwater Takes

Upper Motueka Zones	Allocation limit l/s
Baton	54
Stanley Brook	1.05
Dovedale - Groundwater (to 8 metres well depth) - Surface water	13.2 26.8
Middle Motueka Zone	550
Wangapeka	265
Motupiko	85
Rainy Zone	25
Tadmor (total augmented flow)	56
Tapawera	314
Glen Rae	300



# Triggers for Rationing and Minimum Flows

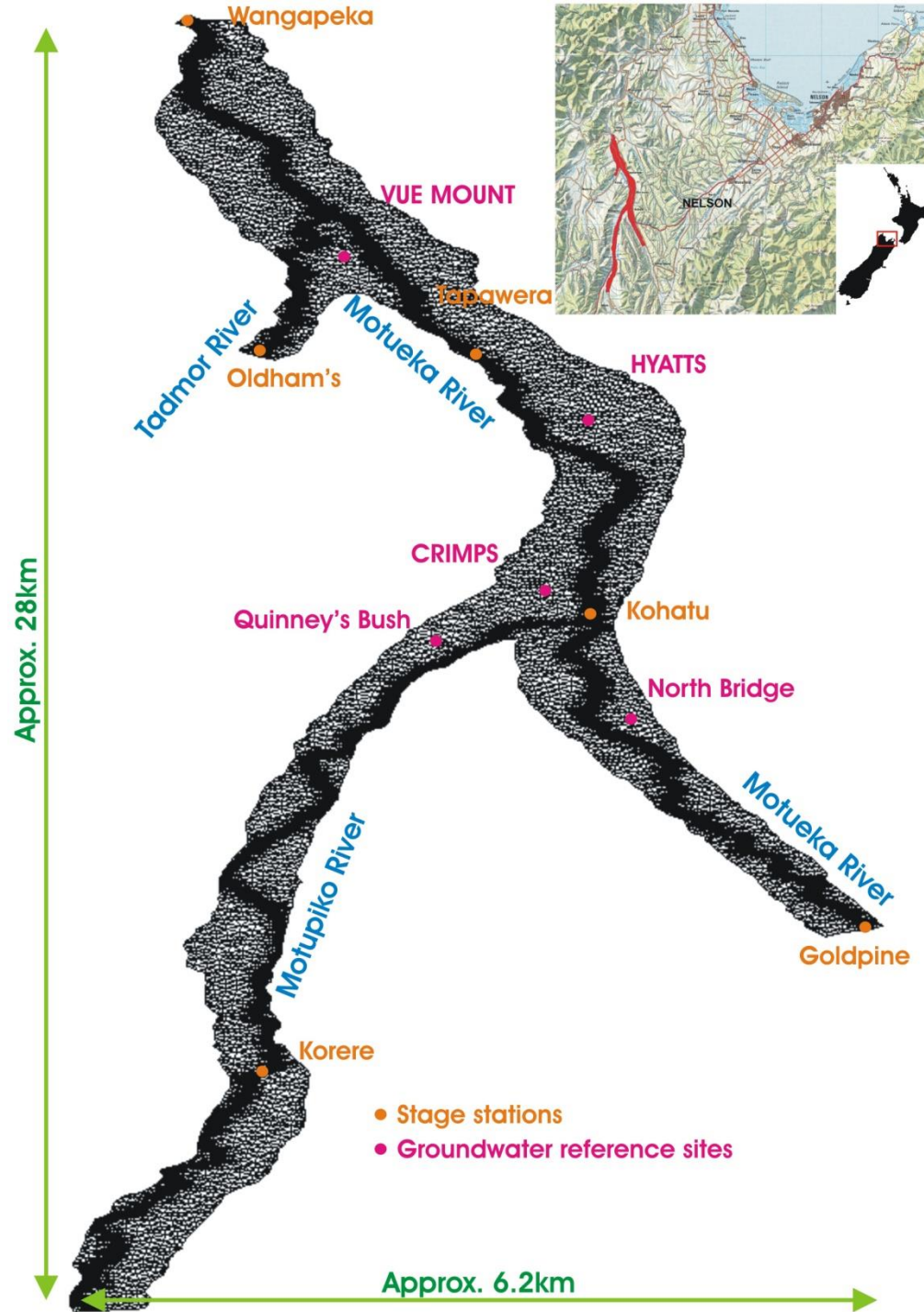
Water Management Zone	Location	Minimum Flow (l/sec)	Trigger for First Rationing Step (l/sec)	Trigger for Consultation (l/sec)	
Upper Motueka Zone					
Motupiko, Rainy, Tapawera, Glen Rae, Baton, Wangapeka	Woodstock	Subject to WCO	7000	7500	
Tadmor River	Mudstone Weir	Subject to WCO	128		
Hope River	Downstream of diversion weir	20	None		
Rainy	Christies	203	250	400	
Motupiko	Christies		250	400	
Tapawera, Glen Rae	Motueka River, above the Wangapeka Confluence		1400		

Motueka ICM research  
published 2010-2012

# GNS river-aquifer model used to guide current water take limits

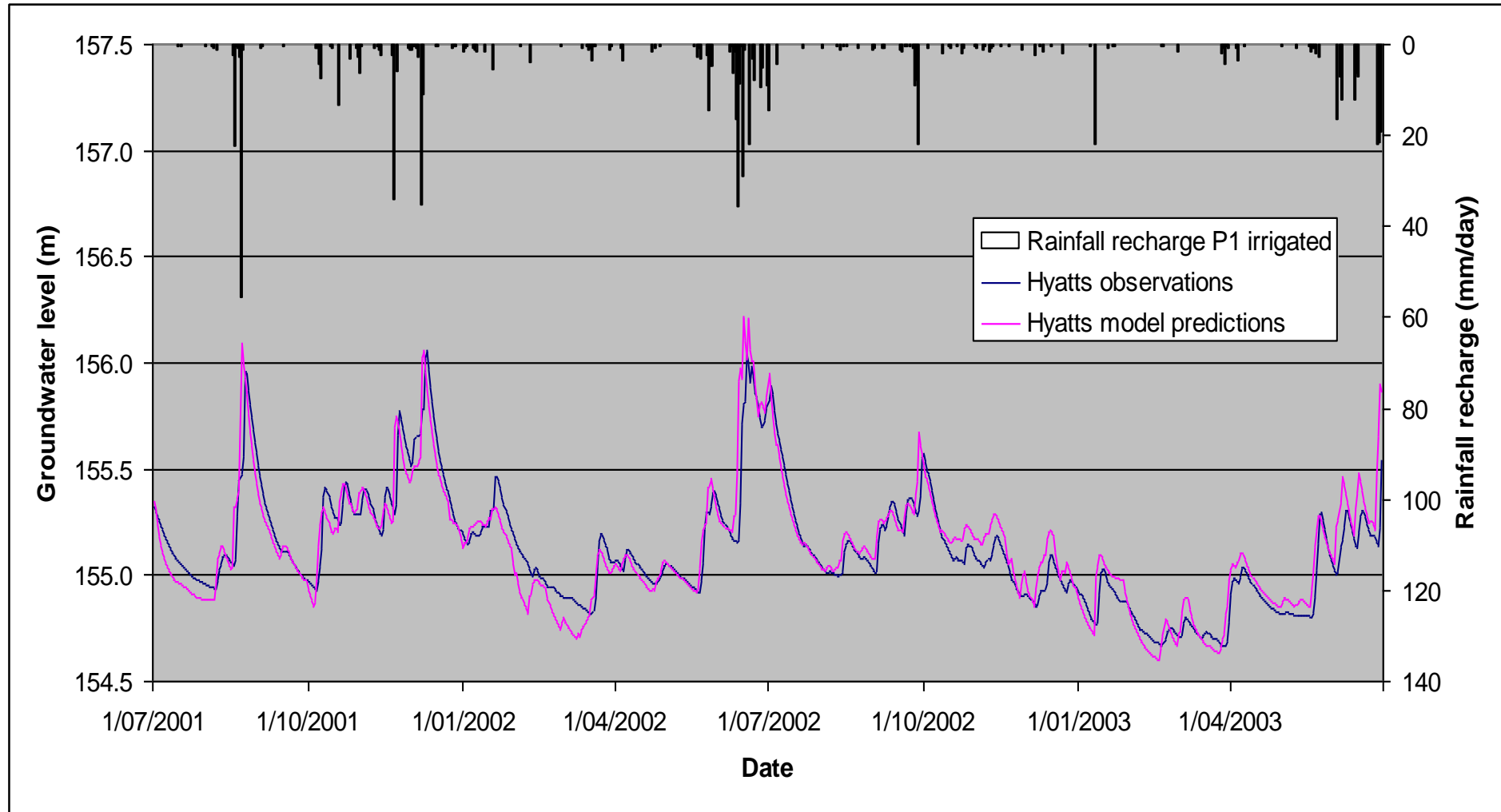
Calculated groundwater levels  
at 30000 points

Was calibrated for measured  
2001-03 water levels and flows



# How good was the model?

- \* Good for predicting groundwater levels (pink plot below 2001-2003)
- \* Less accurate for river flows

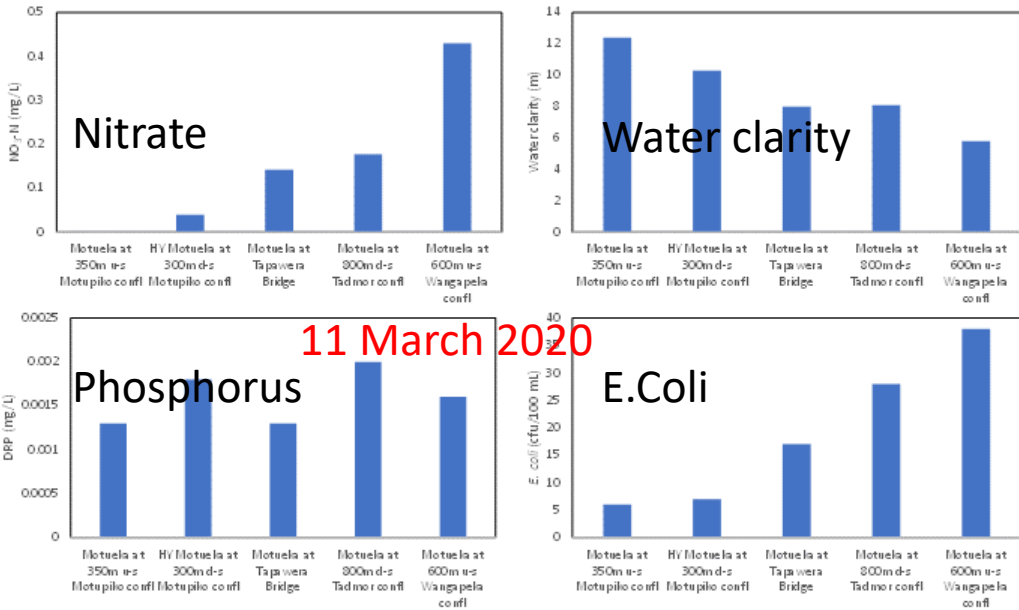


# 5 water allocation scenarios modelled

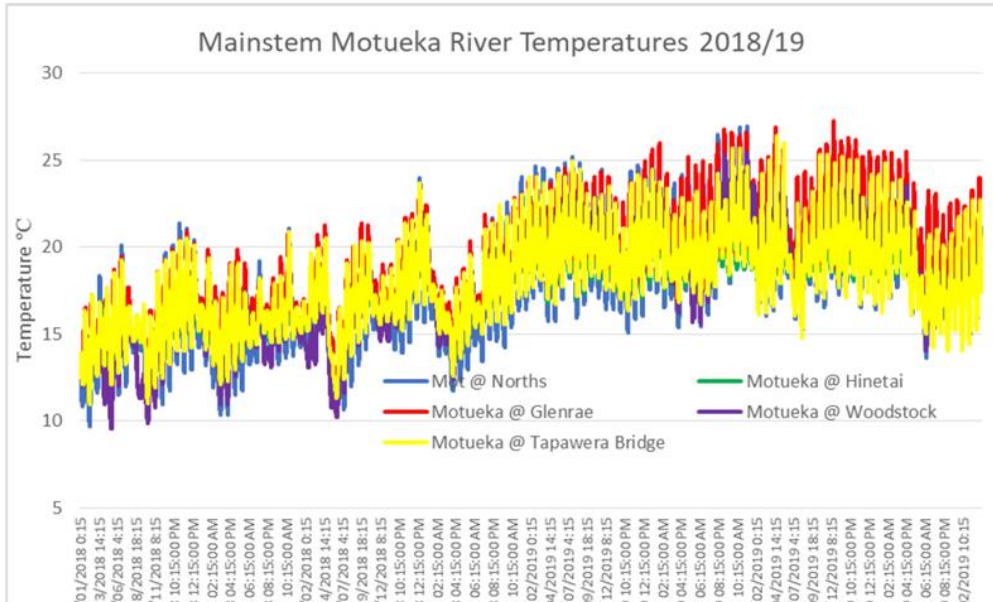
- #1 Current actual water use (i.e. current water permits only)
- #2 Maximum Use of Current Allocations every week
- #3 Irrigate entire valley at current (#1) rates (i.e. all irrigable land)
- #4 Add to #1 irrigation of all irrigable land below Tapawera Bridge at current rates
- #5 Model effects on groundwater levels if riverbeds degrade further

Results justified Council to increase allocation limit in 2014 (by 90 l/sec up to 300 l/sec) below Glen Rae where river flows increase, but no increase was approved above Glen Rae

# Review of the Monitoring Programme Associated with Water Allocation in the Upper Motueka River – Cawthron/Landcare Research 2020



Graphics show water quality sampling 17 Feb 2020, upper Motueka River water quality trends downriver 11 March 2020, and river water temperatures 2018-19





## **Review of the Monitoring Programme Associated with Water Allocation in the Upper Motueka River – Cawthron/Landcare Research 2020**

**Recommending monitoring and review in 2024 of all upper Motueka river data, including water take limits -**

- Water temperature, dissolved oxygen, low flows, metered water takes
- Summer monitoring of water clarity, N, P, faecal bacteria, macroinvertebrates, algae
- Fixed cameras for tracking river drying lower Motupiko and lower Tadmor
- Updated river-aquifer model (Aqualinc Research) to predict river and groundwater response to water takes and drought

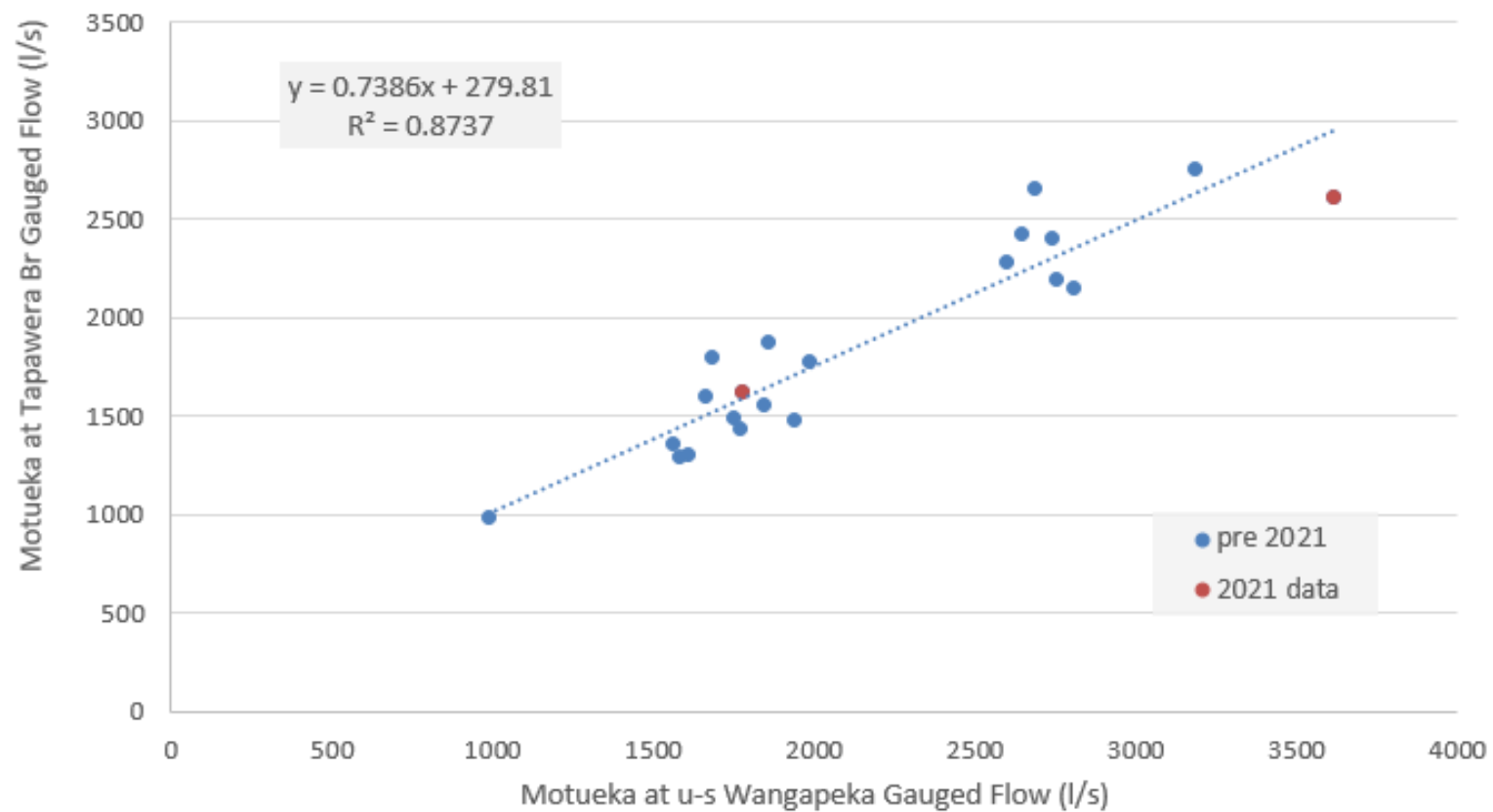
## Ongoing Monitoring - Summers

- Dissolved Oxygen & Temperature at 2 sites and Temperature sensors in a further 4 sites between Kohatu and Wangapeka confluence
- Low flow gaugings along river- Motupiko/Upper Motueka – Norths Bridge and between Kohatu and Wangapeka Confluence
- Annual macroinvertebrate sampling in Motueka River between Kohatu and Wangapeka Confluence
- Working on a new rainfall site in the mid valley area – near Tapawera Bridge – currently sorting access issues
- Water Metering data and flow and weather data influence restrictions

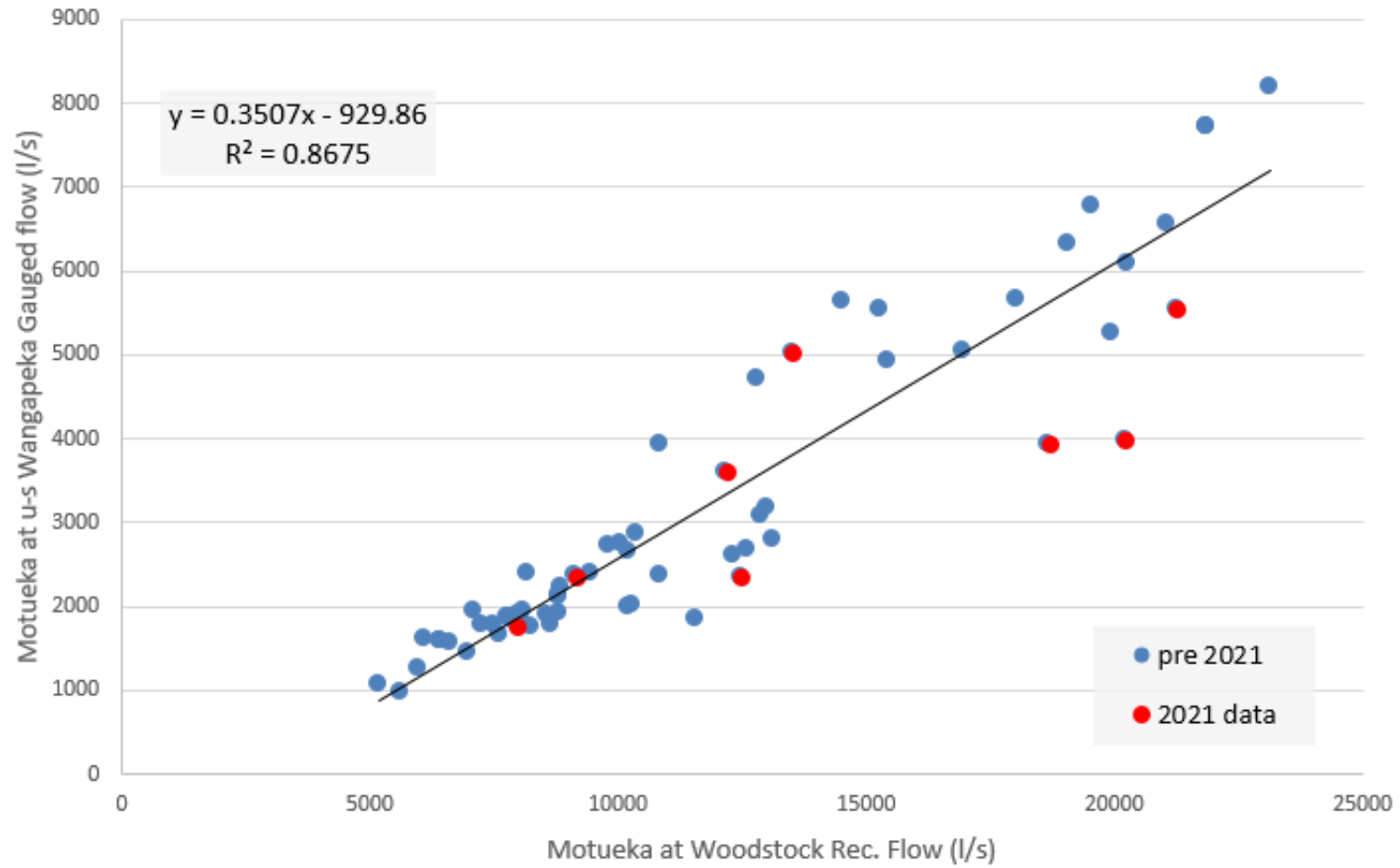
Following 11 slides show

- River flow correlations where there are no monitoring sites
- Monthly rainfalls compared with past 3 years records
- Sept-November river flows compared with historic monthly low flows
- Groundwater levels at 4 sites compared with previous records

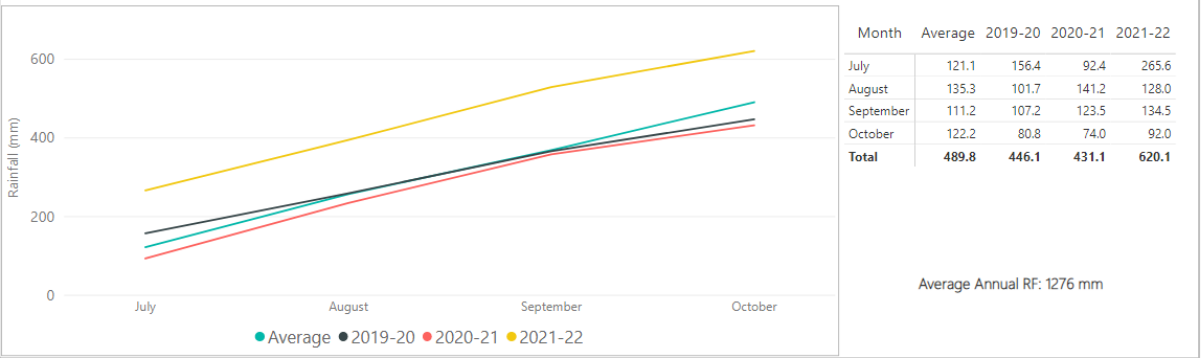
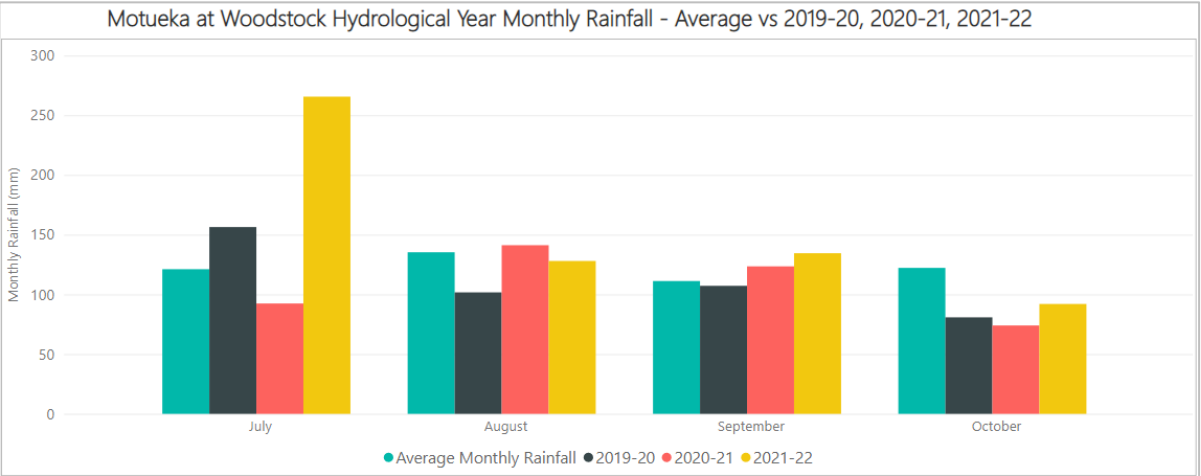
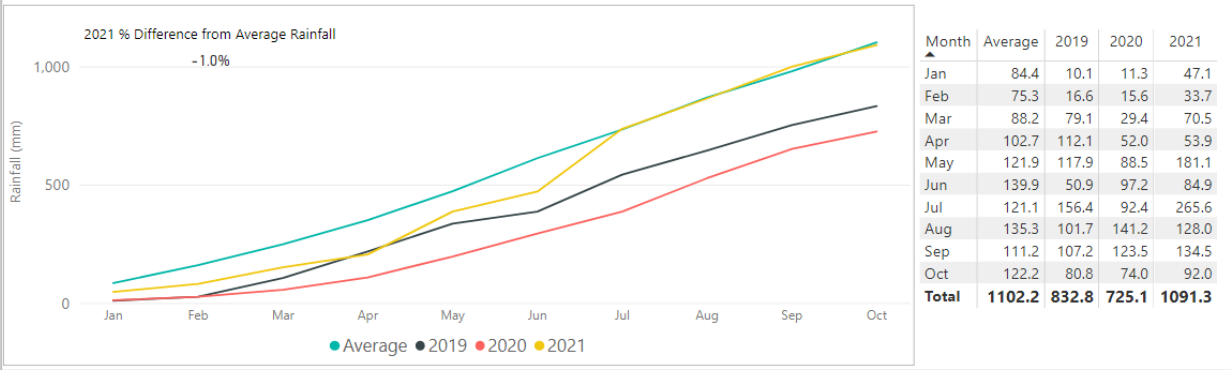
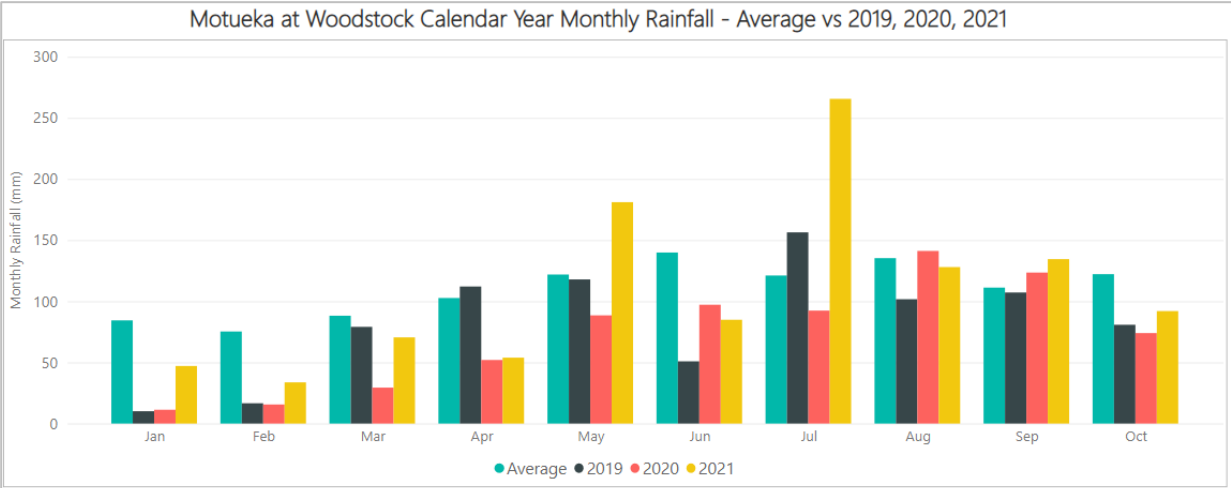
Motueka at u-s Wangapeka vs Motueka at Tapawera Br Correlation - updated Nov 2021

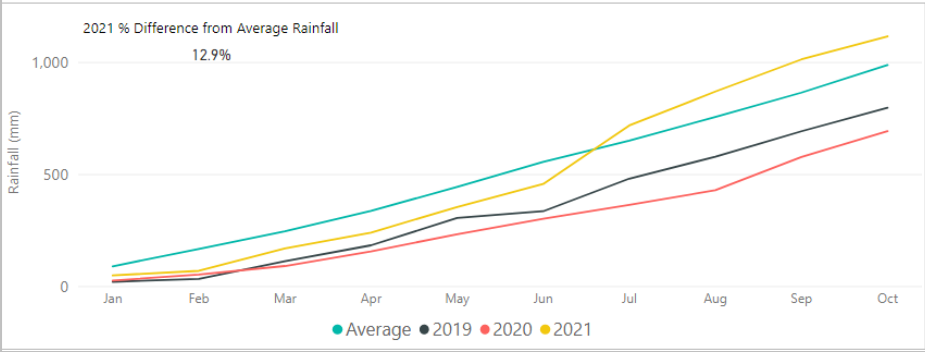
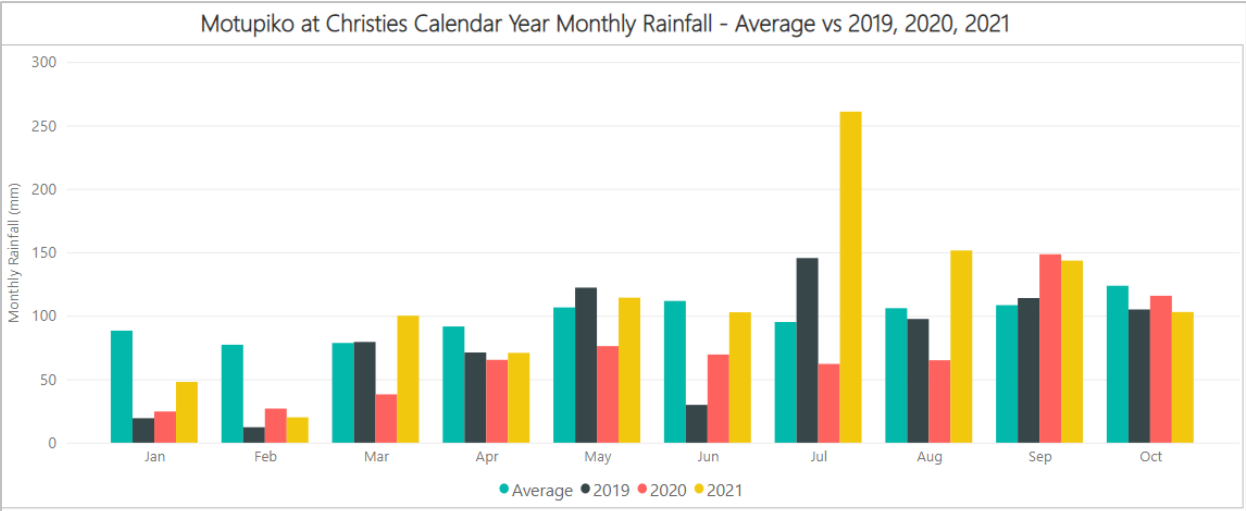


Motueka at u-s Wangapeka vs Woodstock correlation - updated Nov-2021

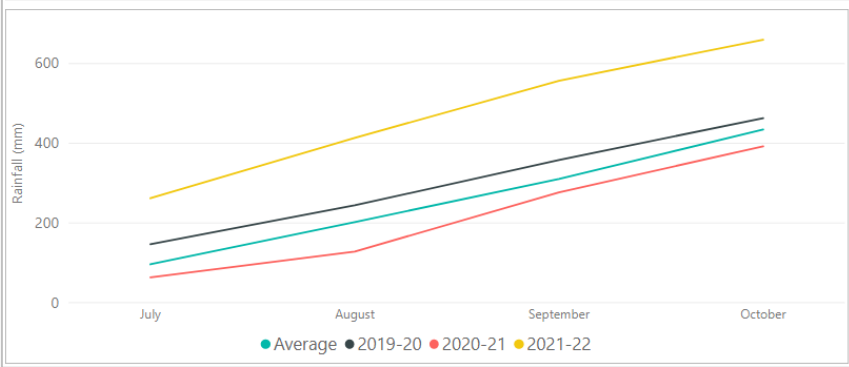
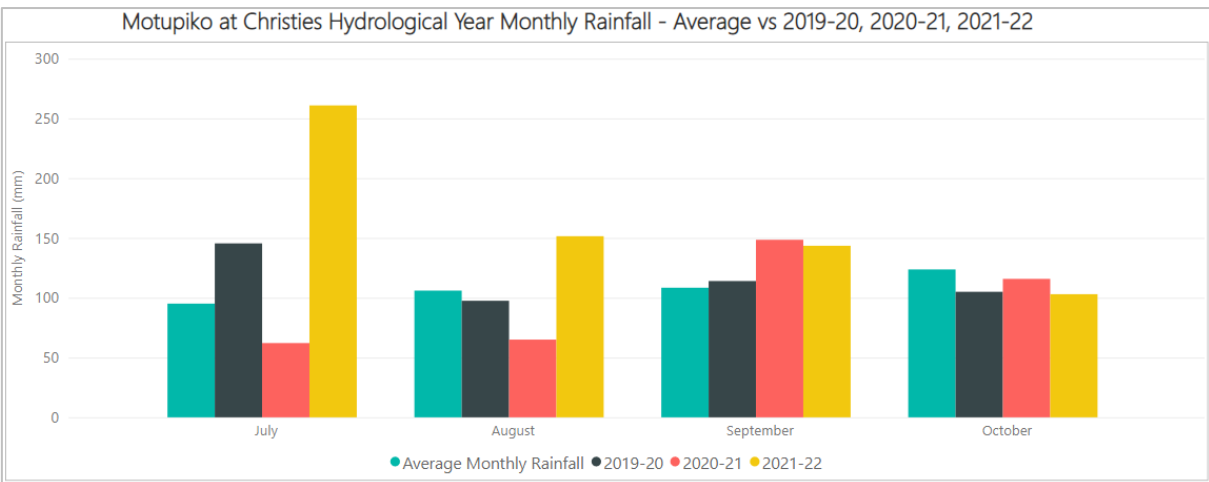






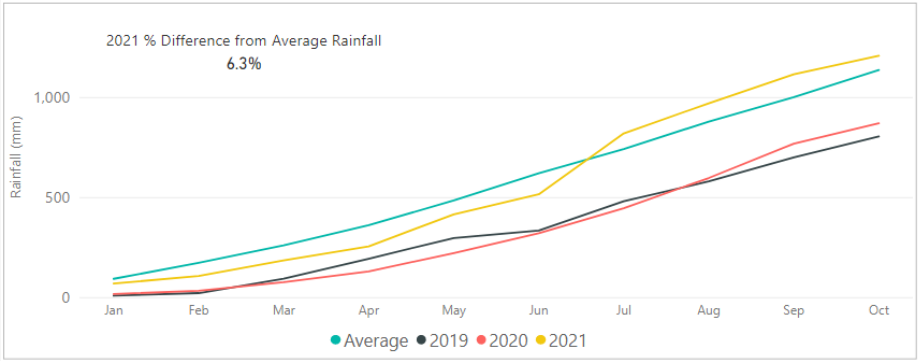
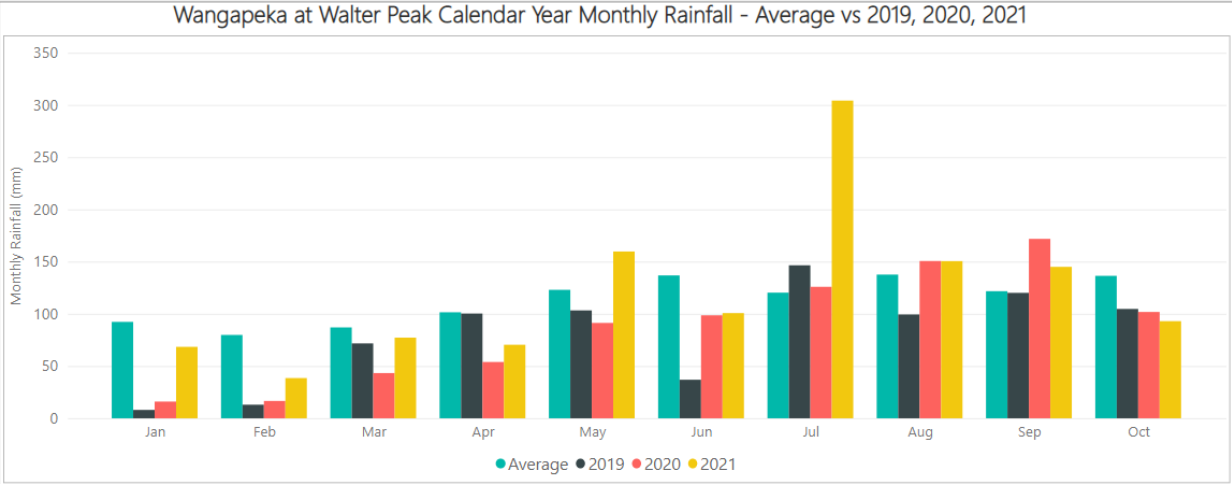


Month	Average	2019	2020	2021
Jan	88.3	19.3	24.6	47.9
Feb	77.2	12.2	26.9	20.0
Mar	78.6	79.4	38.1	100.1
Apr	91.6	71.1	65.3	70.8
May	106.6	122.2	76.1	114.3
Jun	111.7	29.8	69.5	102.8
Jul	95.1	145.5	62.1	260.9
Aug	106.0	97.5	65.0	151.5
Sep	108.4	114.0	148.5	143.5
Oct	123.7	105.0	115.8	103.0
Total	987.2	796.0	691.9	1114.8

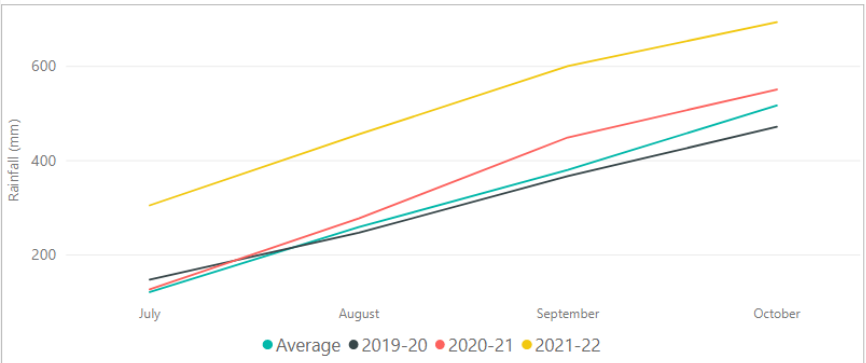
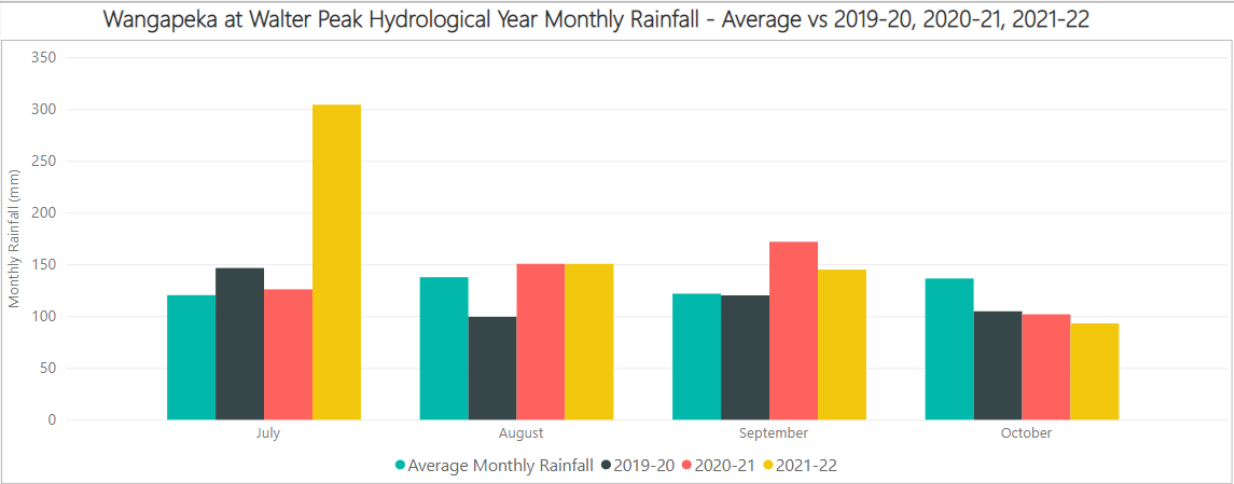


Month	Average	2019-20	2020-21	2021-22
July	95.1	145.5	62.1	260.9
August	106.0	97.5	65.0	151.5
September	108.4	114.0	148.5	143.5
October	123.7	105.0	115.8	103.0
Total	433.2	462.0	391.4	658.9

Average Annual RF: 1185 mm

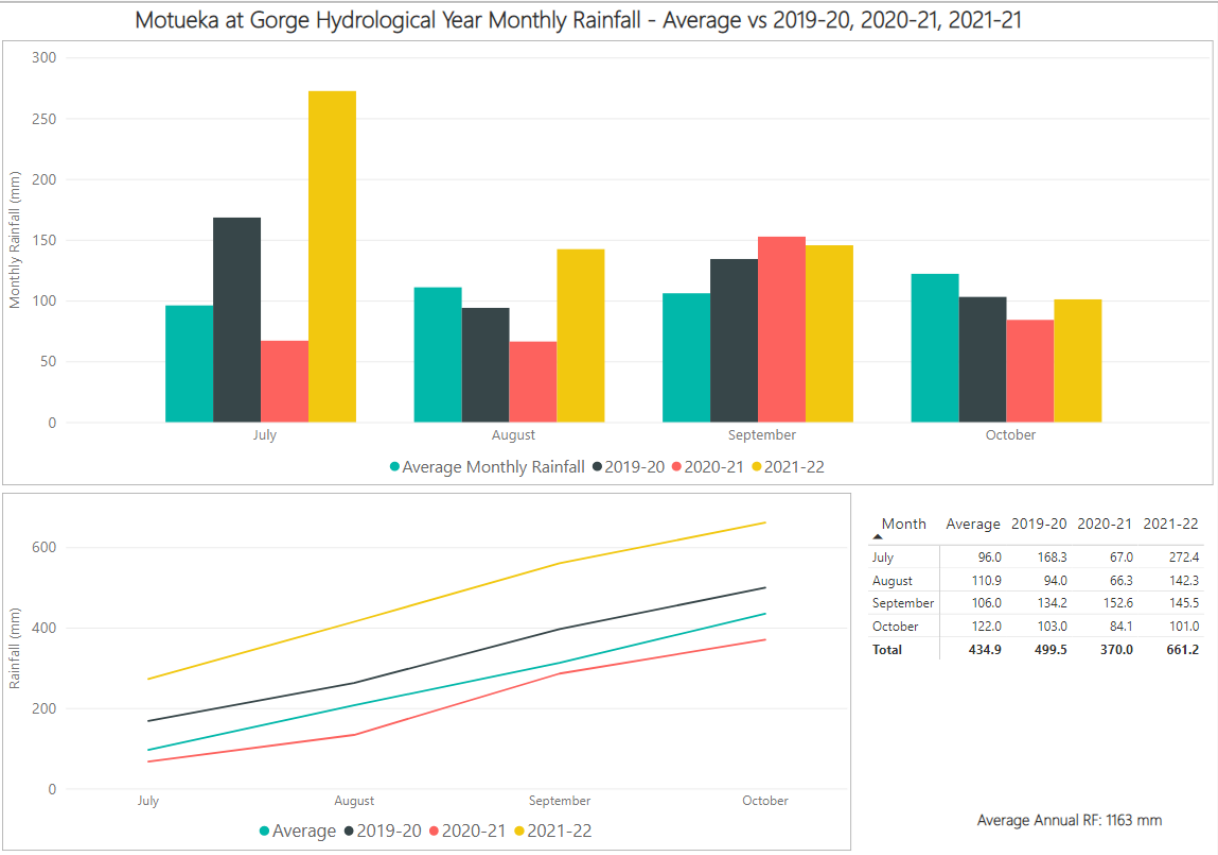
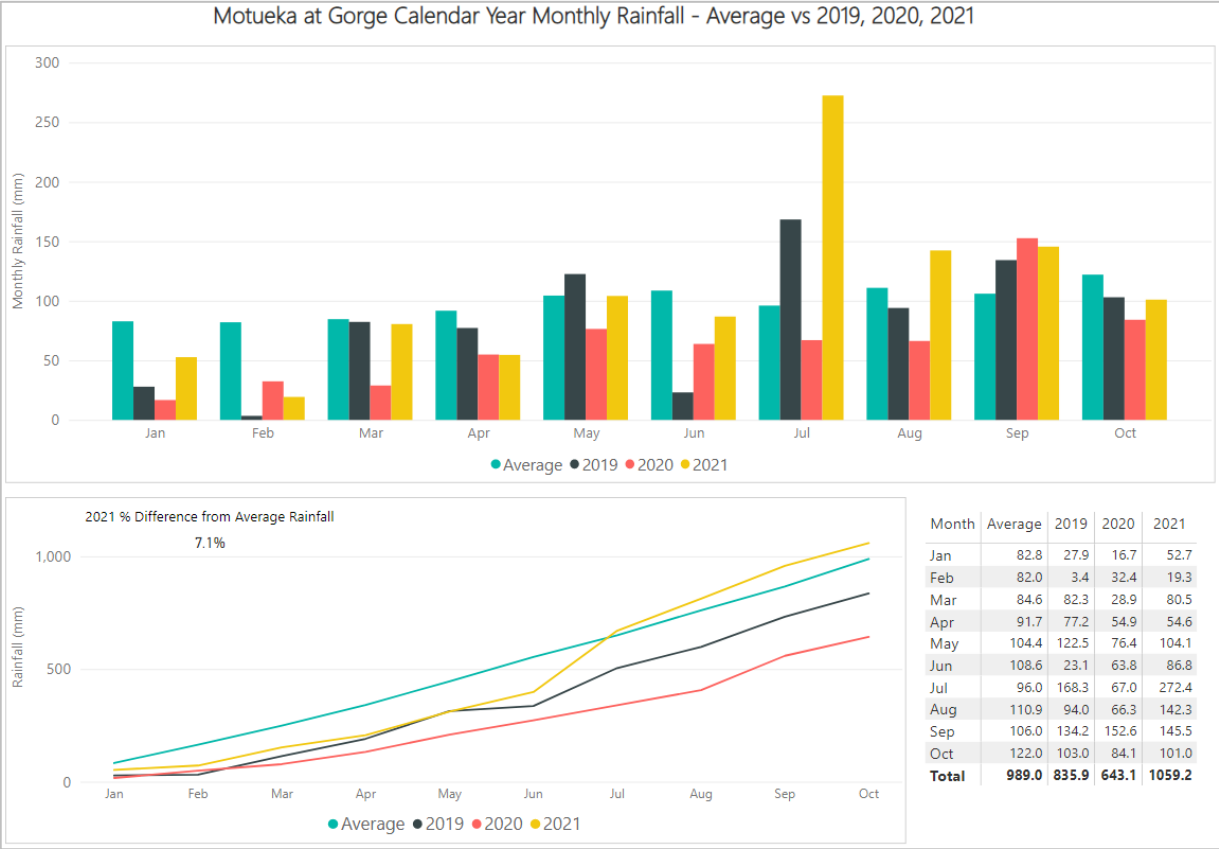


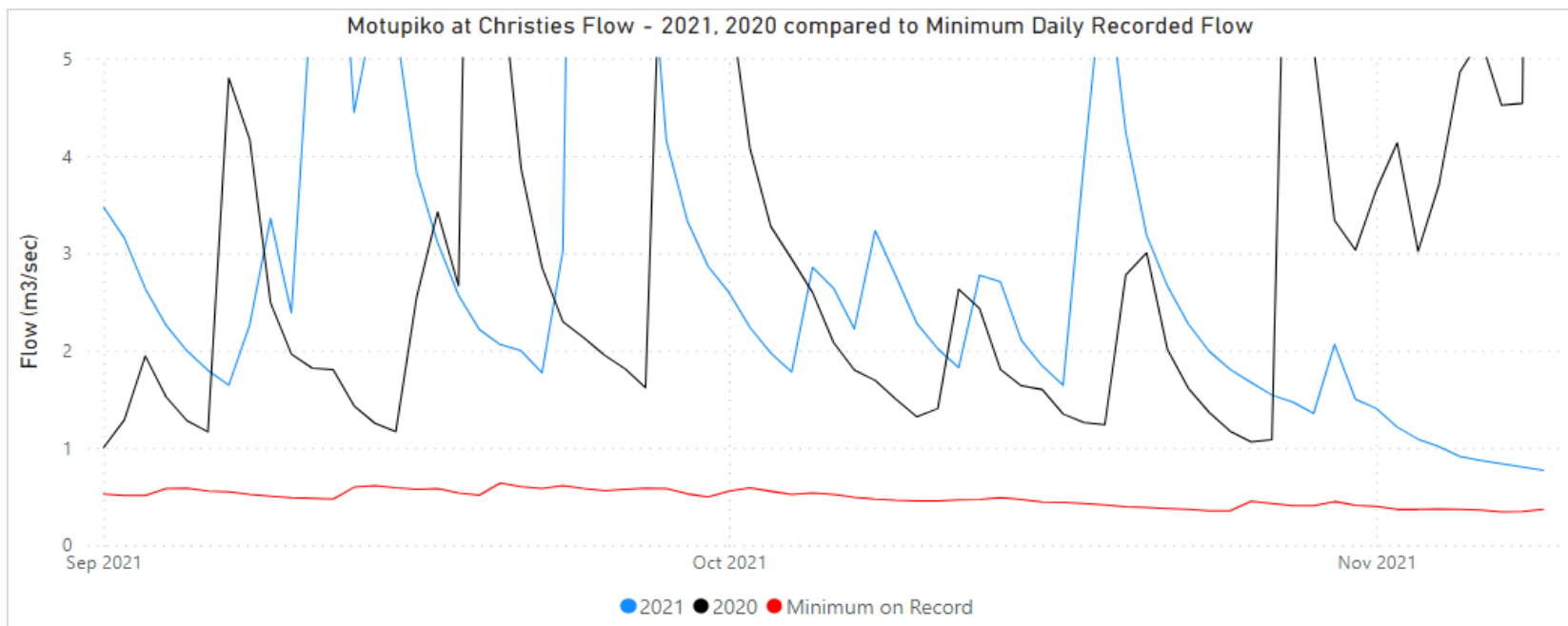
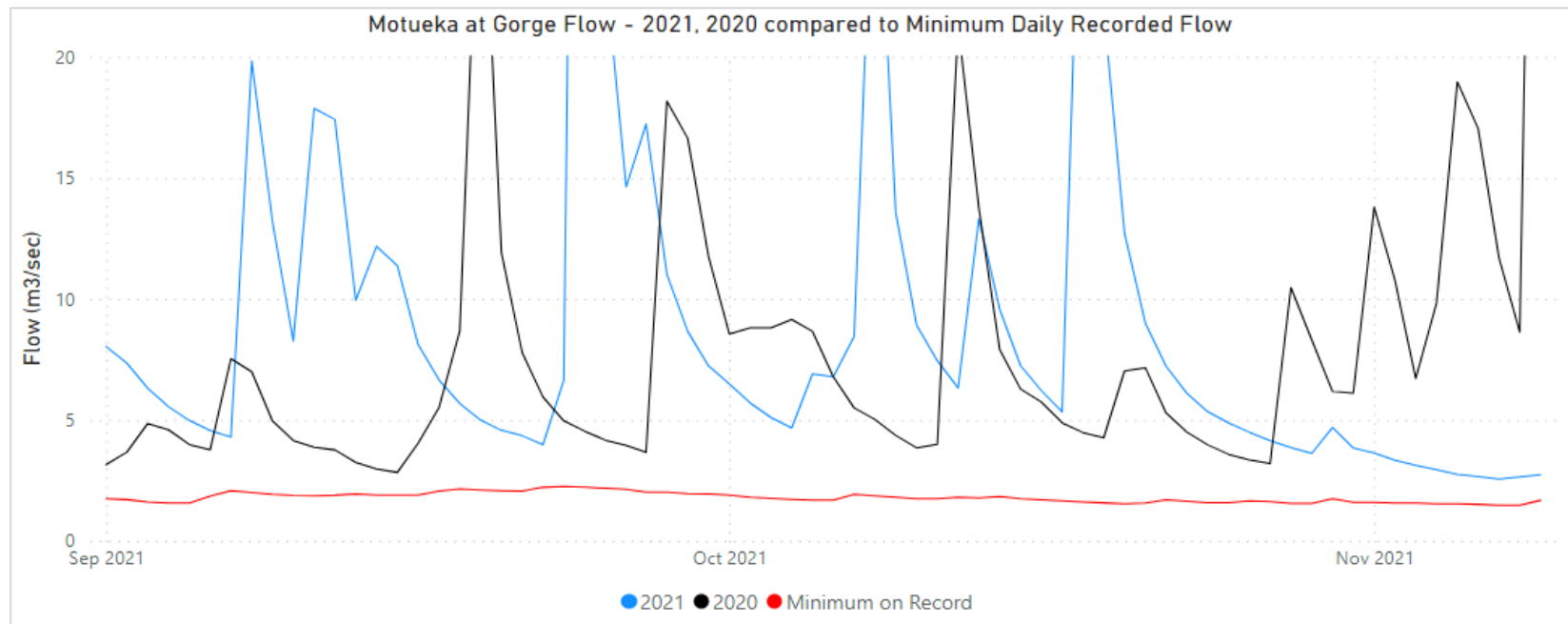
Month	Average	2019	2020	2021
Jan	92.3	8.0	16.0	68.4
Feb	79.8	13.0	16.6	38.5
Mar	87.0	71.7	43.3	77.2
Apr	101.5	100.3	53.9	70.4
May	123.0	103.3	91.3	159.7
Jun	136.8	36.9	98.6	100.7
Jul	120.3	146.5	125.9	304.2
Aug	137.6	99.4	150.6	150.5
Sep	121.7	120.1	171.8	145.0
Oct	136.4	104.7	101.8	93.0
Total	1136.4	803.9	869.8	1207.6



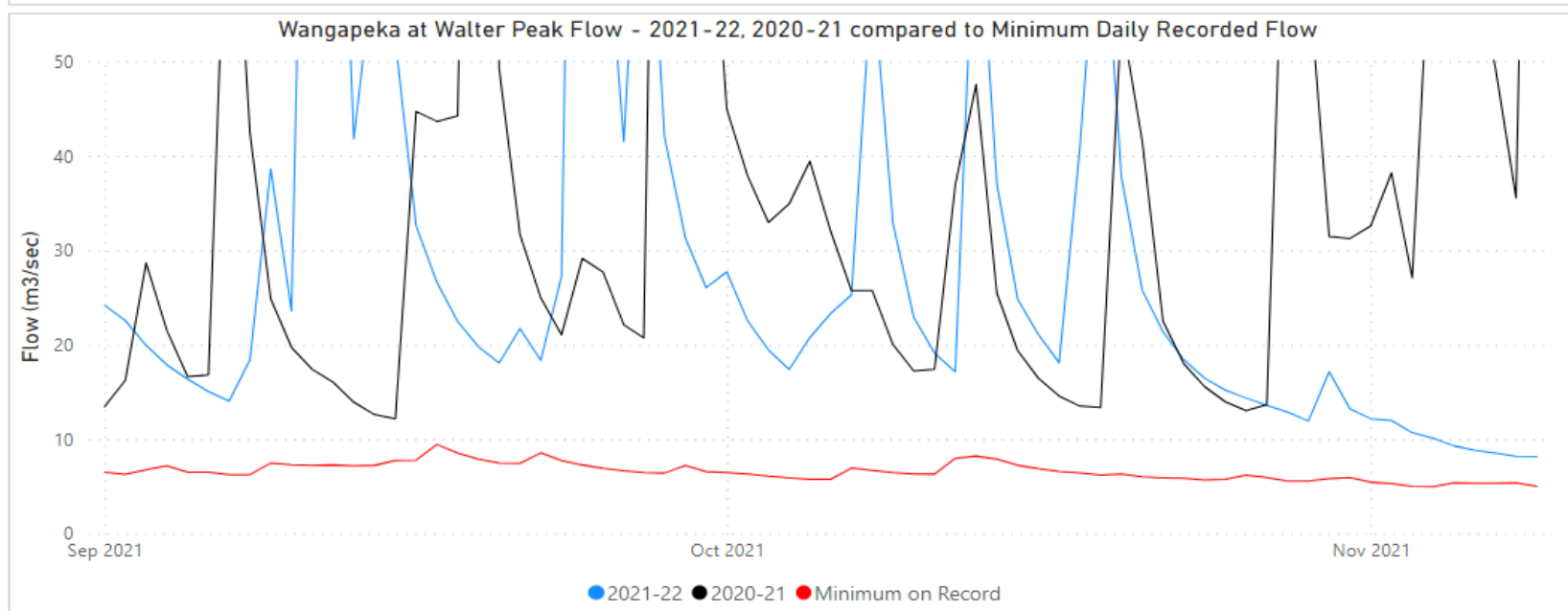
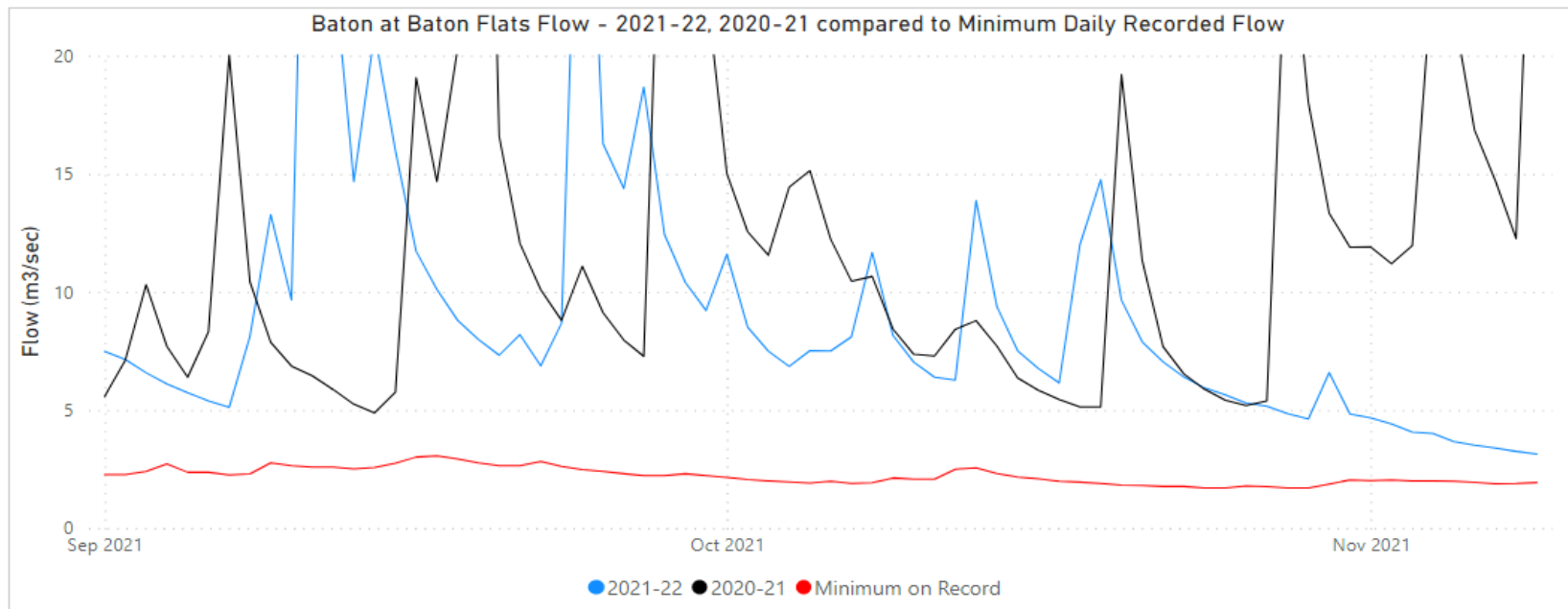
Month	Average	2019-20	2020-21	2021-22
July	120.3	146.5	125.9	304.2
August	137.6	99.4	150.6	150.5
September	121.7	120.1	171.8	145.0
October	136.4	104.7	101.8	93.0
Total	516.0	470.7	550.1	692.7

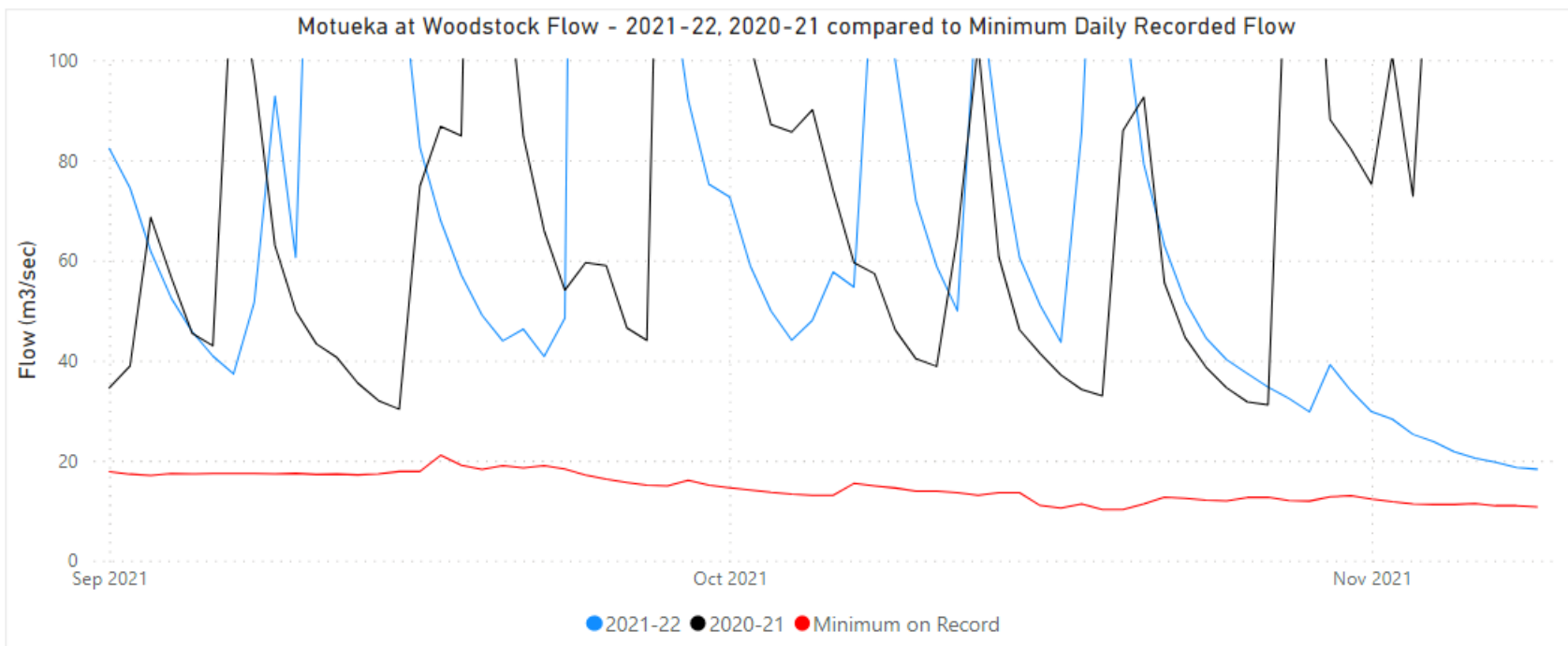
Average Annual RF: 1341 mm





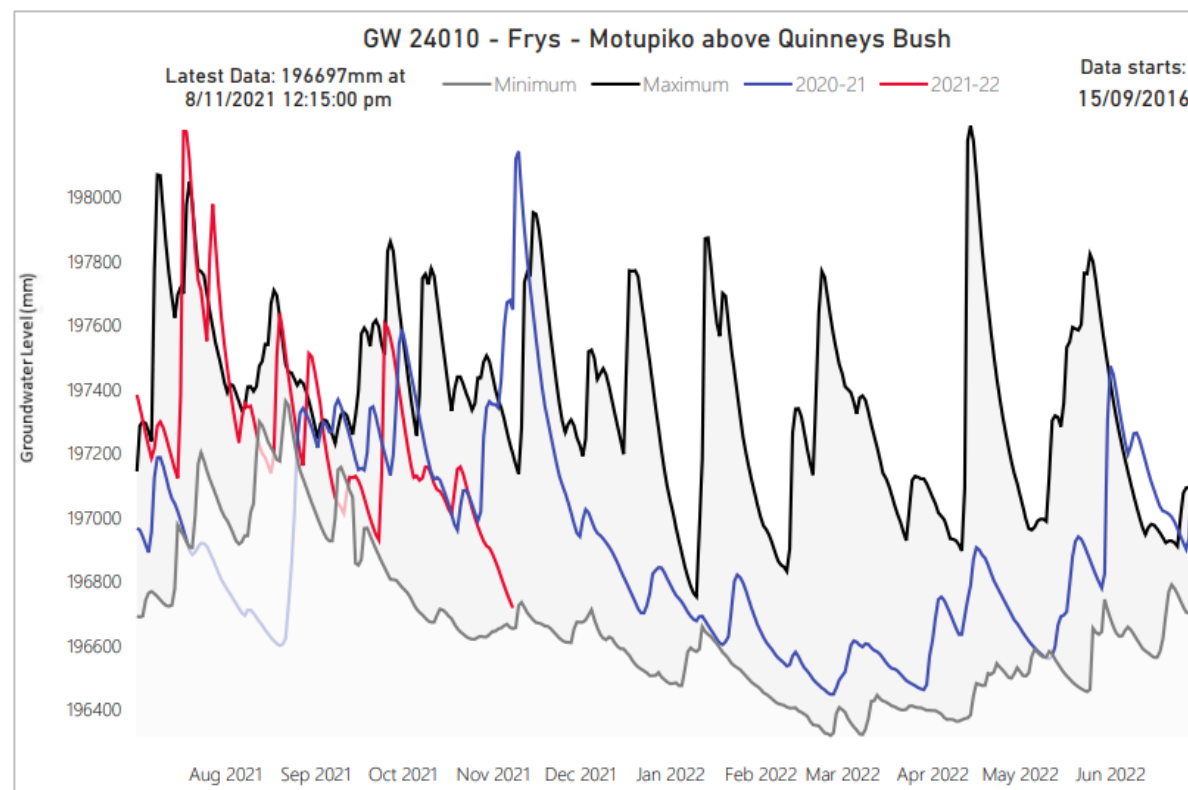
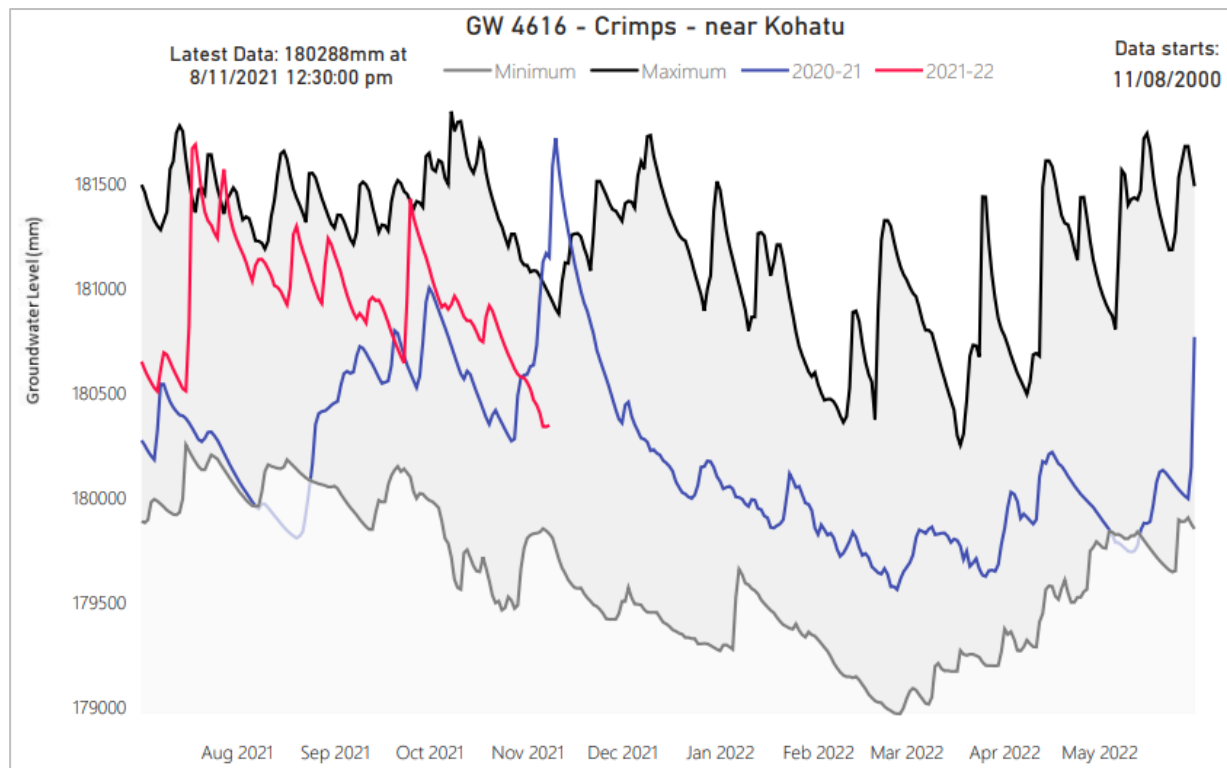






### Upper Motueka 7 Day Low Flow Statistics - Flow (l/s)

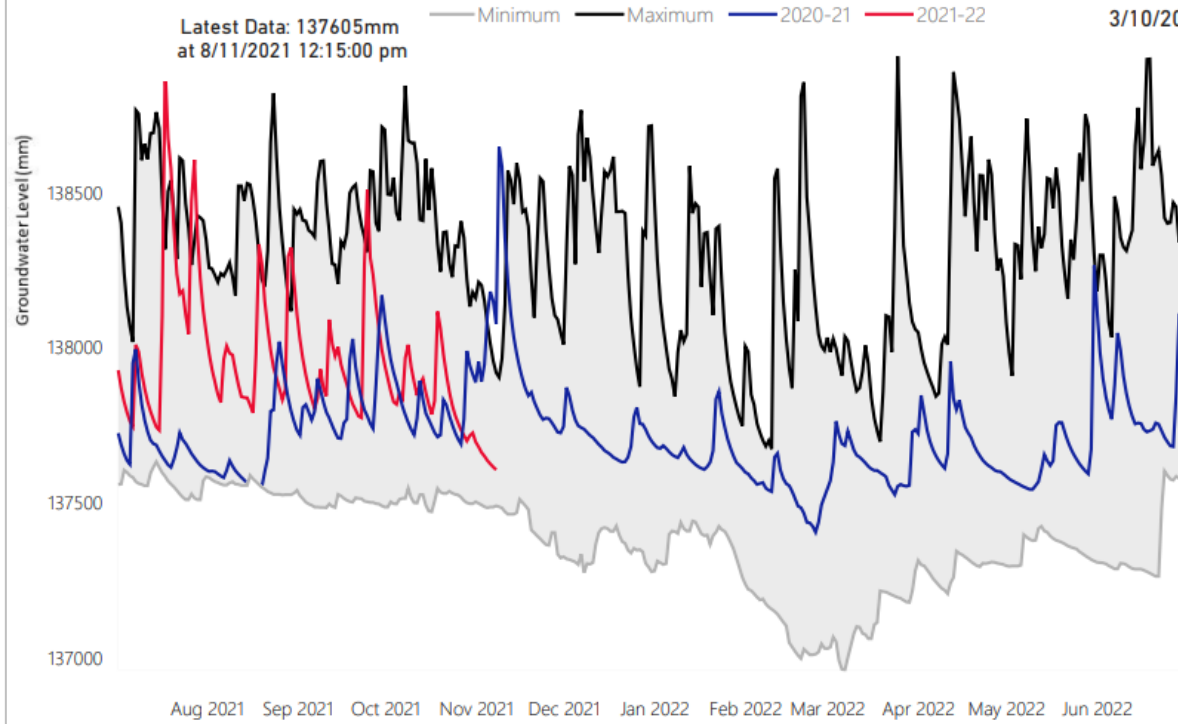
Site	MALF	5 year	10 year	20 year	Minimum Mean Daily Flow Rec.	2020-21 Lowest Mean Daily Flow	Record Length
Motupiko at Christies	283	189	156	133	121	150	Aug-1990 to Aug-2021
Wangapeka at Walter Peak	4374	3446	3126	2899	2411	4014	Aug-1990 to Aug-2021
Baton at Baton Flats	1573	1274	1172	1097	967	1511	Aug-1990 to Aug-2021
Motueka at Woodstock	9464	6984	6141	5521	4951	7715	Aug-1990 to Aug-2021



GW 4619 - Vue Mount - below Tapawera Bridge above Glenrae

Data starts:  
3/10/2000

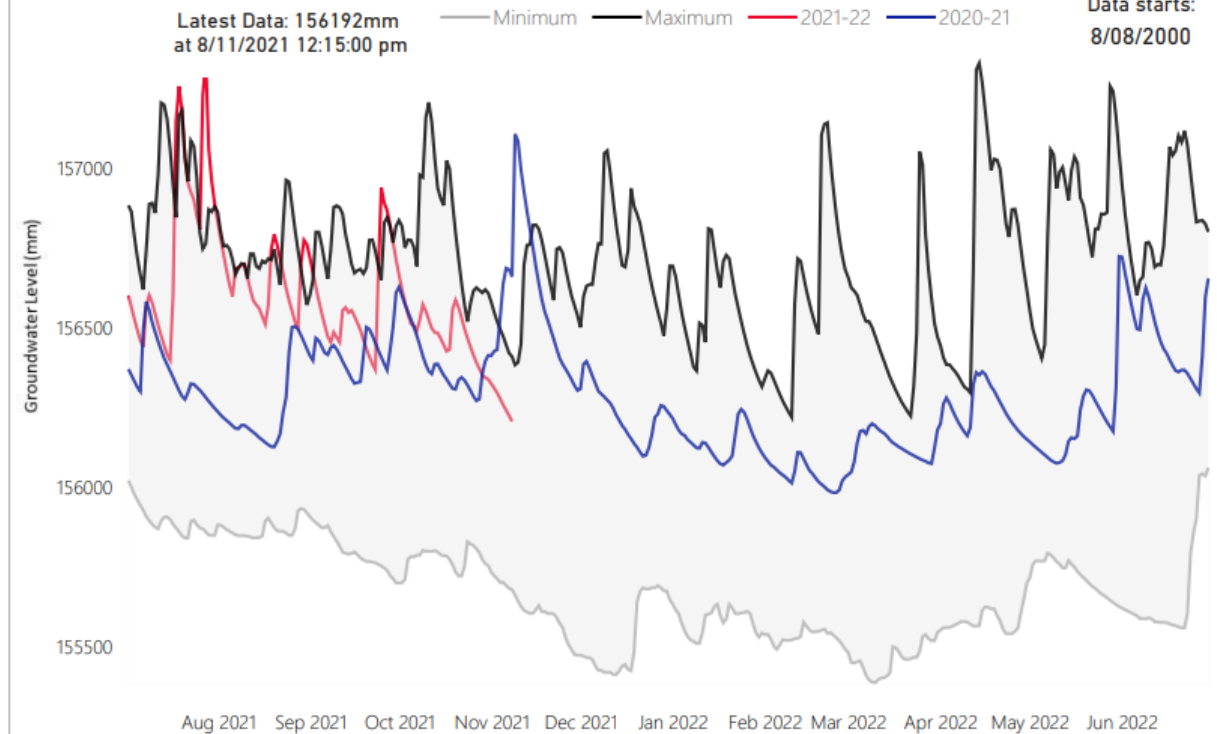
Latest Data: 137605mm  
at 8/11/2021 12:15:00 pm



GW 4617 - Hyatt - between Kohatu & Tapawera

Data starts:  
8/08/2000

Latest Data: 156192mm  
at 8/11/2021 12:15:00 pm



# Questions/Discussion

Implications for water allocation, water take restrictions, water quality,  
and future monitoring and planning