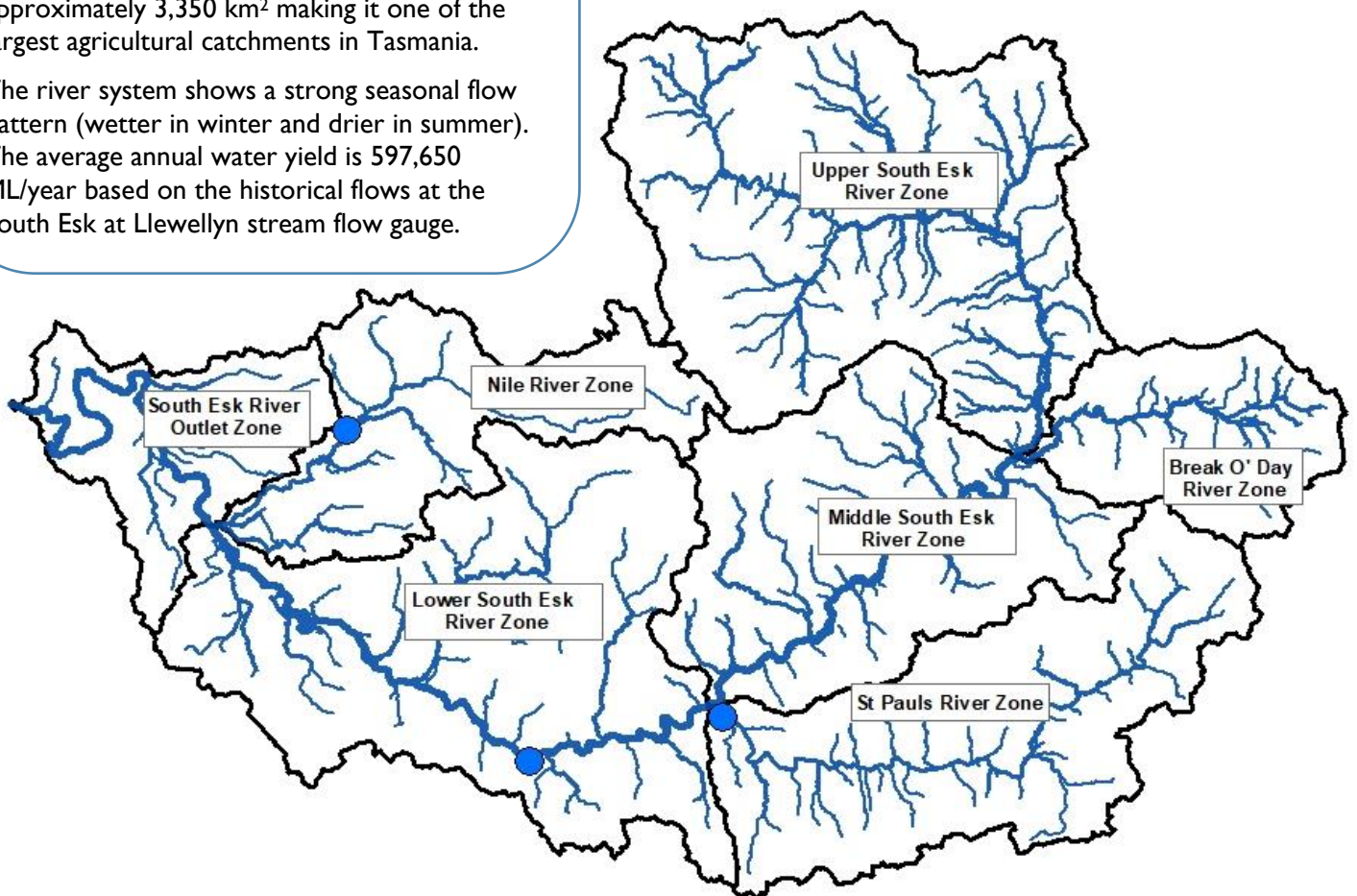


SOUTH ESK RIVER CATCHMENT ANNUAL REPORT 2022/23

The South Esk River catchment (above its confluence with the Macquarie River) is located in the north-east and midlands of Tasmania. The catchment rises in the Fingal Tier in the east and is bounded by Ben Lomond and Mt. Saddleback to the north with a total catchment area of approximately 3,350 km² making it one of the largest agricultural catchments in Tasmania.

The river system shows a strong seasonal flow pattern (wetter in winter and drier in summer). The average annual water yield is 597,650 ML/year based on the historical flows at the South Esk at Llewellyn stream flow gauge.



The South Esk River Catchment Water Management Plan took effect in December 2014. The Plan is a legal document prepared in accordance with the *Water Management Act 1999*.

The Plan sets out monthly cease to take thresholds at three NRE Tas streamflow gauging stations:

- South Esk and Break O' Day Rivers (measured at the South Esk at Llewellyn stream flow gauging station),
- St Pauls River (measured at St Pauls above South Esk),
- Nile River (measured at Nile at Deddington)

CTT thresholds were reviewed to assess access to water during winter and revised thresholds came into effect in 2017.

For full details of the current Water Plan and the revised thresholds go to the NRE Tas Water website.

CATCHMENT LAND USE

Approximately 35% of the catchment is under production native forests and plantation forestry. A further 23% is used for agricultural purposes with the remaining area supporting a diversity of land uses including mining, urban areas and conservation land. The catchment includes the townships of St Marys, Mathinna, Fingal and Avoca in the upper half of the catchment, and Nile, Evandale and Perth being the major population centres in the lower part of the catchment. The land use layer was last updated in 2019.

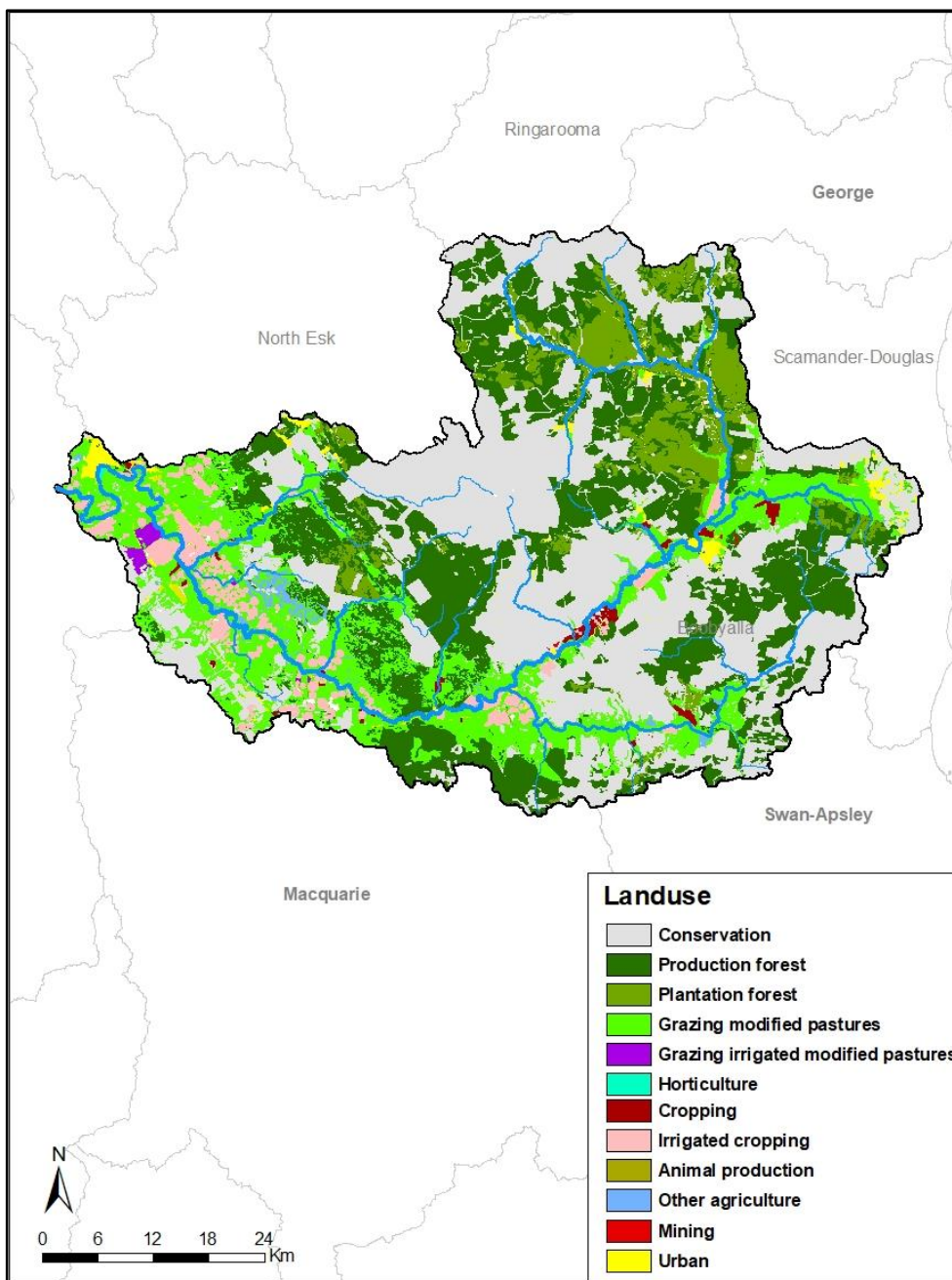


Figure 1. South Esk River catchment land use

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RIVER HEALTH

Waterbugs are used globally to monitor the health of rivers as they are sensitive to pressures on river systems (e.g. poor water quality, sedimentation). River health monitoring by NRE Tas focuses on the composition of waterbug (macroinvertebrate) communities on the riverbed; however, other values that are not monitored can also contribute to the health of rivers (e.g. water plants, fish, riverbank vegetation).

NRE Tas has four long-term river health monitoring sites in the South Esk River catchment. These sites are in the South Esk River at Perth (lower reach), Llewellyn (mid-reach), Heffords Road (mid-reach) and Evercreech Road (upper reach). The monitoring indicates that the South Esk River is in poor condition in the lower reaches, with river health scores (O/E scores) equating to band B (significantly impaired) and band C (severely impaired) being recorded at the sites at Perth (Figure 2 below) and Llewellyn since monitoring began at these sites in 1994 and 2007, respectively. The mid to upper reaches of the South Esk River are in poor to good condition, with river health scores ranging between band C, band B and band A (equivalent to reference condition).

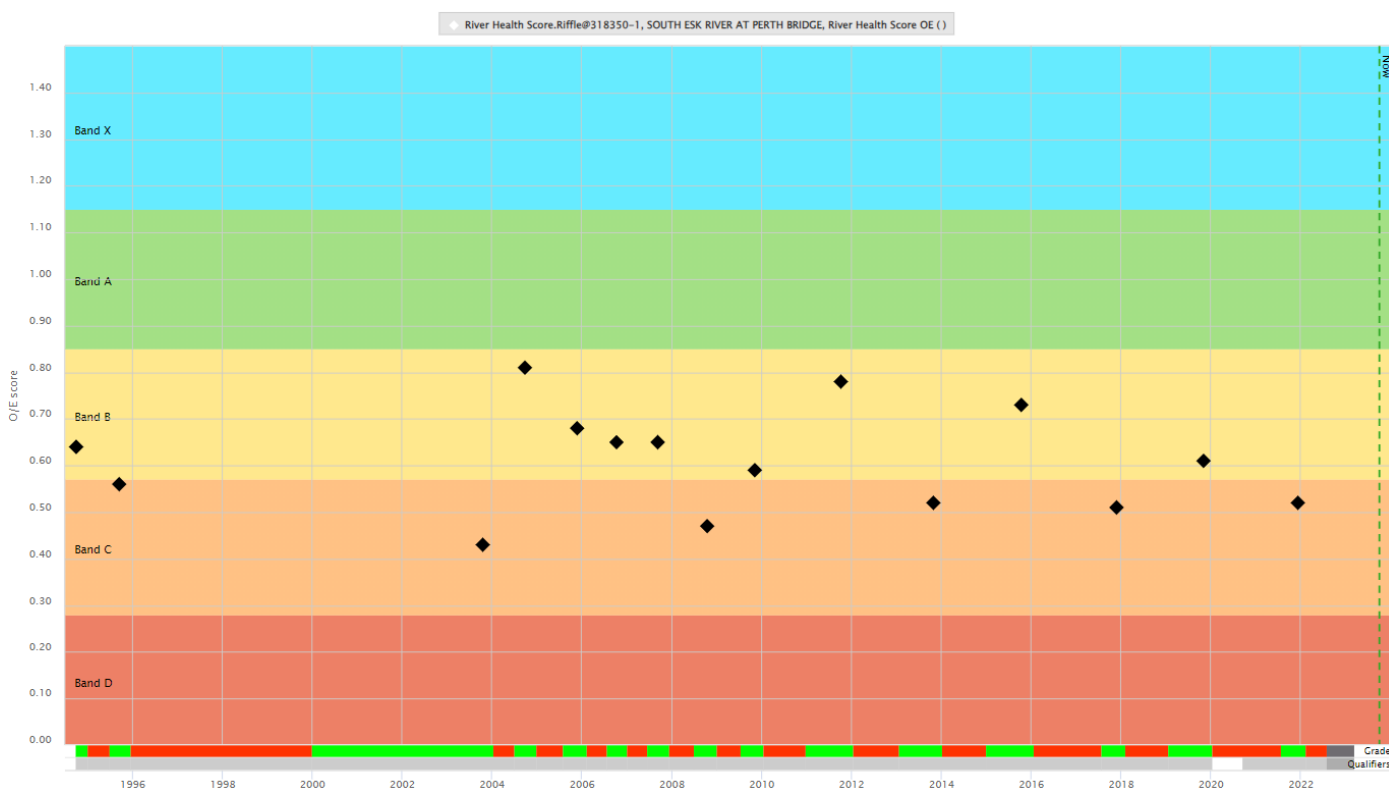


Figure 2. River Health Observed/Expected score at the South Esk River at Perth Bridge site, whole of record

Band X = above reference condition, Band A = equivalent to reference condition,

Band B = significantly impaired, Band C = severely impaired and Band D = impoverished.

HYDROLOGY SUMMARY

The following pages show plots of long-term streamflow (full period of available record), short term flow and rainfall (last 5 water years) for the South Esk at Llewellyn gauge site. Also included are last years flow, rainfall and restriction data, split into winter (May 2022 – November 2022) and summer (December 2022 – April 2023) seasons for the three management points within the catchment: South Esk River at Llewellyn, St Pauls River above South Esk, and Nile at Deddington.

Over the period from May 2022 to April 2023:

- Annual yield was well above the long-term average, with the highest annual flow volume on record.
- Annual rainfall was above average at the Mathinna at Fingal Road gauge.
- The climate drivers included La Nina and negative IOD conditions during 2022, which eased in early 2023 and shifted to an El Nino watch by March 2023.
- There were no water restrictions in the catchment, with flows well above the restriction thresholds throughout the year.



Full flow record, 2009 - 2023

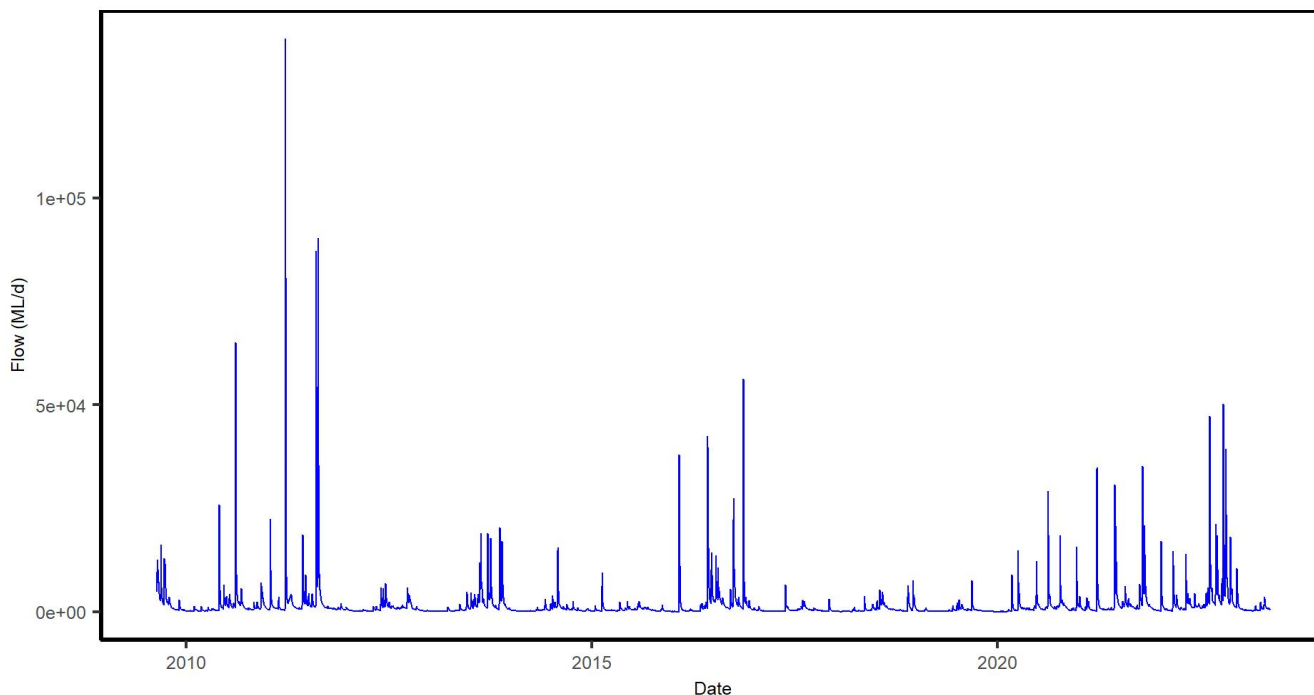


Figure 3. Mean daily flow at the South Esk River at Llewellyn streamflow gauging station, whole of record.

Full record of yields in water years 2009 - 2022

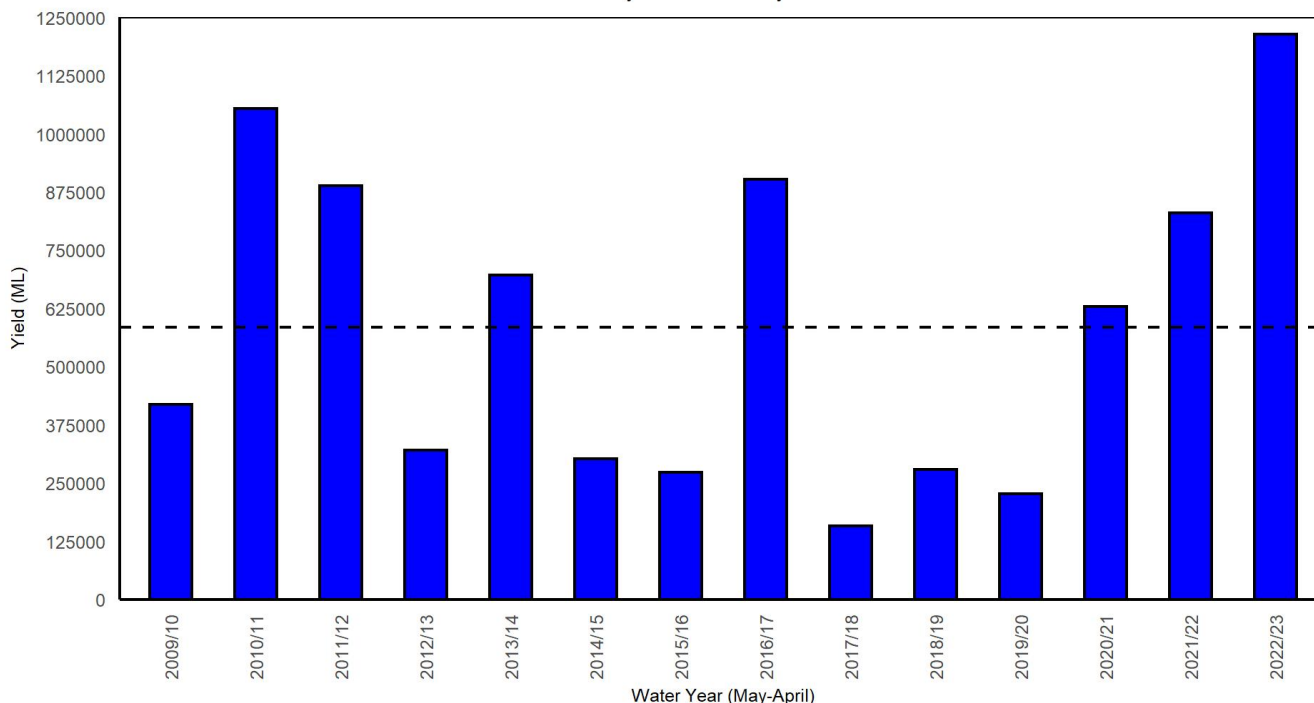


Figure 4. Yields in the South Esk River at Llewellyn streamflow gauging station. Water years with <95% of the daily flow record available are excluded. The long-term mean yield is shown as the dashed horizontal black line (597,650 ML).

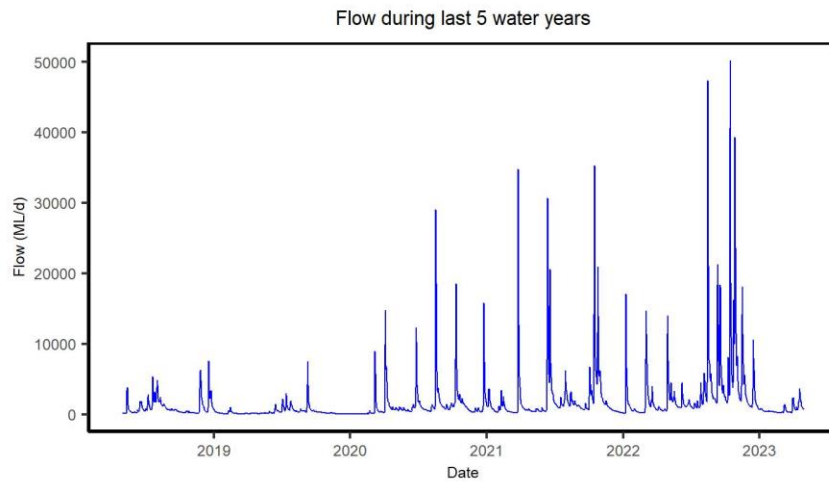


Figure 5. Mean daily flow in the South Esk River at Llewellyn streamflow gauging station for the last five years.

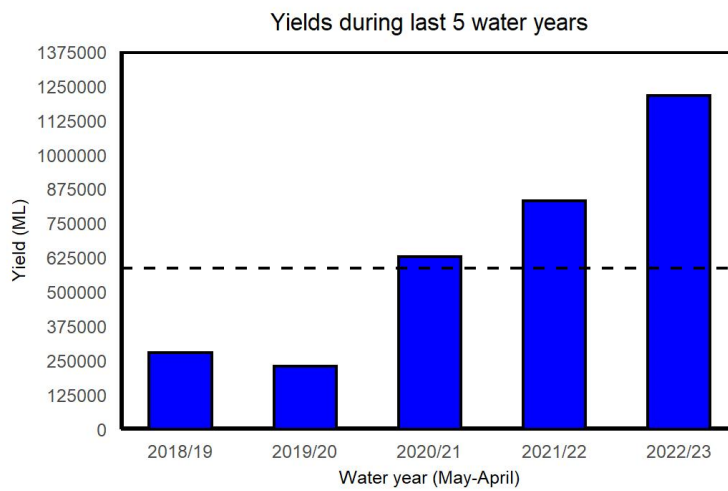


Figure 6. Yields in the South Esk River at Llewellyn streamflow gauging station for the last five years. The long-term mean yield is shown as the dashed horizontal black line (597,650 ML).

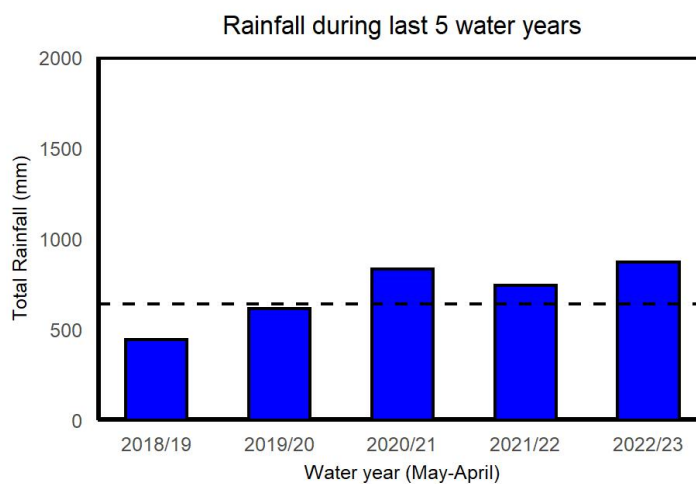
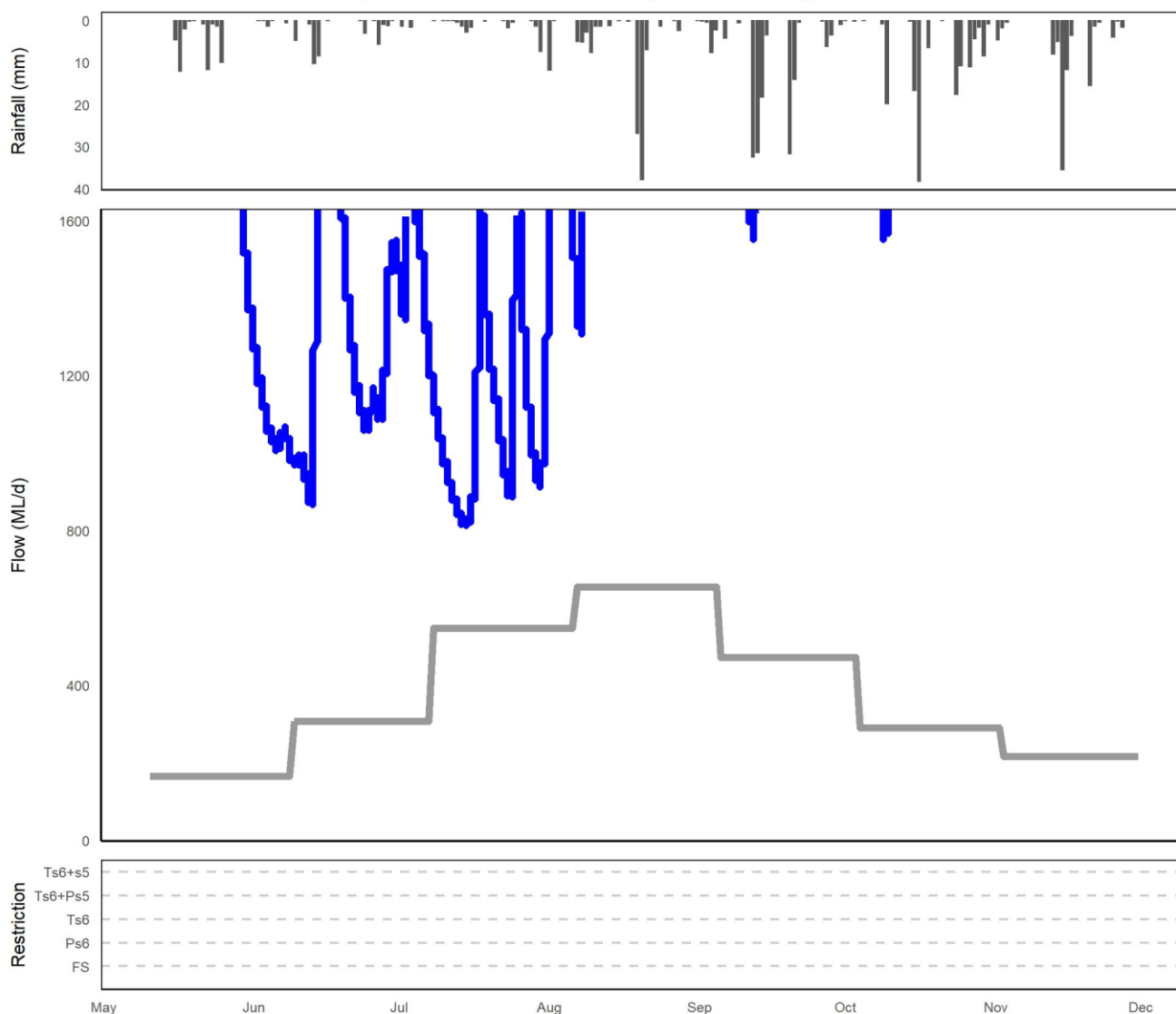


Figure 7. Total rainfall at the Mathinna (Fingal Rd) BoM weather station during the last five water years. The long-term (1970-2023) mean total rainfall (606 mm) is shown as the black horizontal dashed line

Rainfall, low flows and restriction periods during winter 2022/2023



SOUTH ESK AT LLEWELLYN

Figure 8. Summary of rainfall, low flows and restrictions in the South Esk catchment during winter (May-November) 2022.

Top plot: daily rainfall **Mathinna (Fingal Rd)** BoM site.

Middle plot: instantaneous flow (<1600 ML/d) South Esk River at Llewellyn station (compliance flow site).

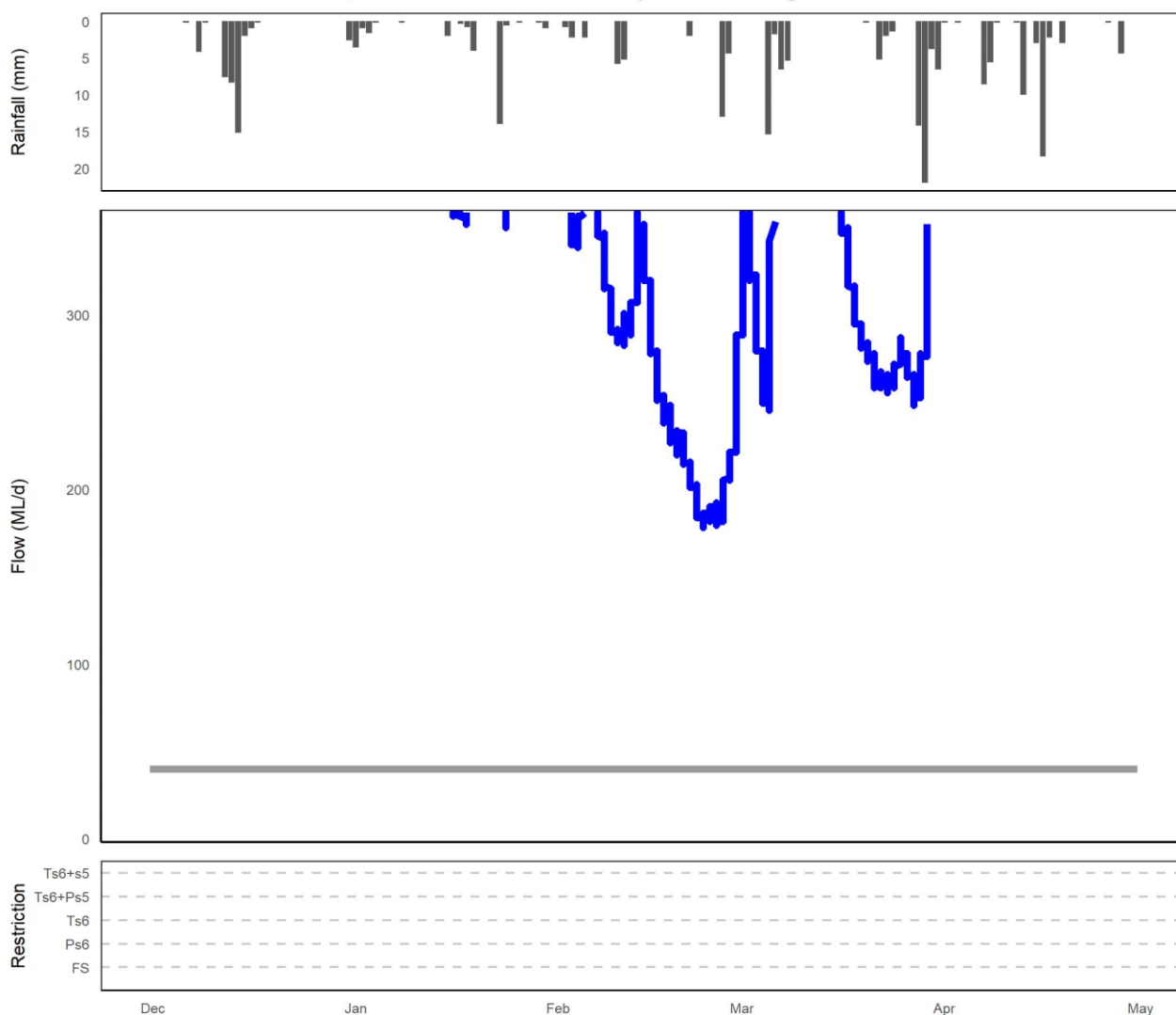
Bottom plot: days when restrictions were in place.

Table 1. Restriction levels and total days at each level for the winter period (May - November 2022)

Restriction Type	Days at restriction level in 2021/22	Days at restriction level in 2022/23
Flow Sharing	0	0
Partial Surety 6	0	0
Total Surety 6	0	0
Total Surety 6 + Partial Surety 5	0	0
Total Surety 6 + Total Surety 5	0	0

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nre.tas.gov.au/water

Rainfall, low flows and restriction periods during summer 2022/2023



SOUTH ESK AT LLEWELLYN

Figure 9. Summary of rainfall, low flows and restrictions in the South Esk catchment during summer 2022/23 (Dec-April).

Top plot: daily rainfall (**Mathinna (Fingal Rd)** BoM site).

Middle plot: instantaneous flow (<350 ML/d) South Esk River at Llewellyn station (compliance flow site).

Bottom plot: days when restrictions were in place.

NOTE: Refer to the last page for a 'legend' and description on how to interpret these plots

Table 2. Restriction levels and total days at each level for the summer period (Dec 2022 – April 2023)

Restriction Type	Days at restriction level in 2021/22	Days at restriction level in 2022/23
Flow Sharing	0	0
Partial Surety 6	0	0
Total Surety 6	0	0
Total Surety 6 + Partial Surety 5	0	0
Total Surety 6 + Total Surety 5	0	0

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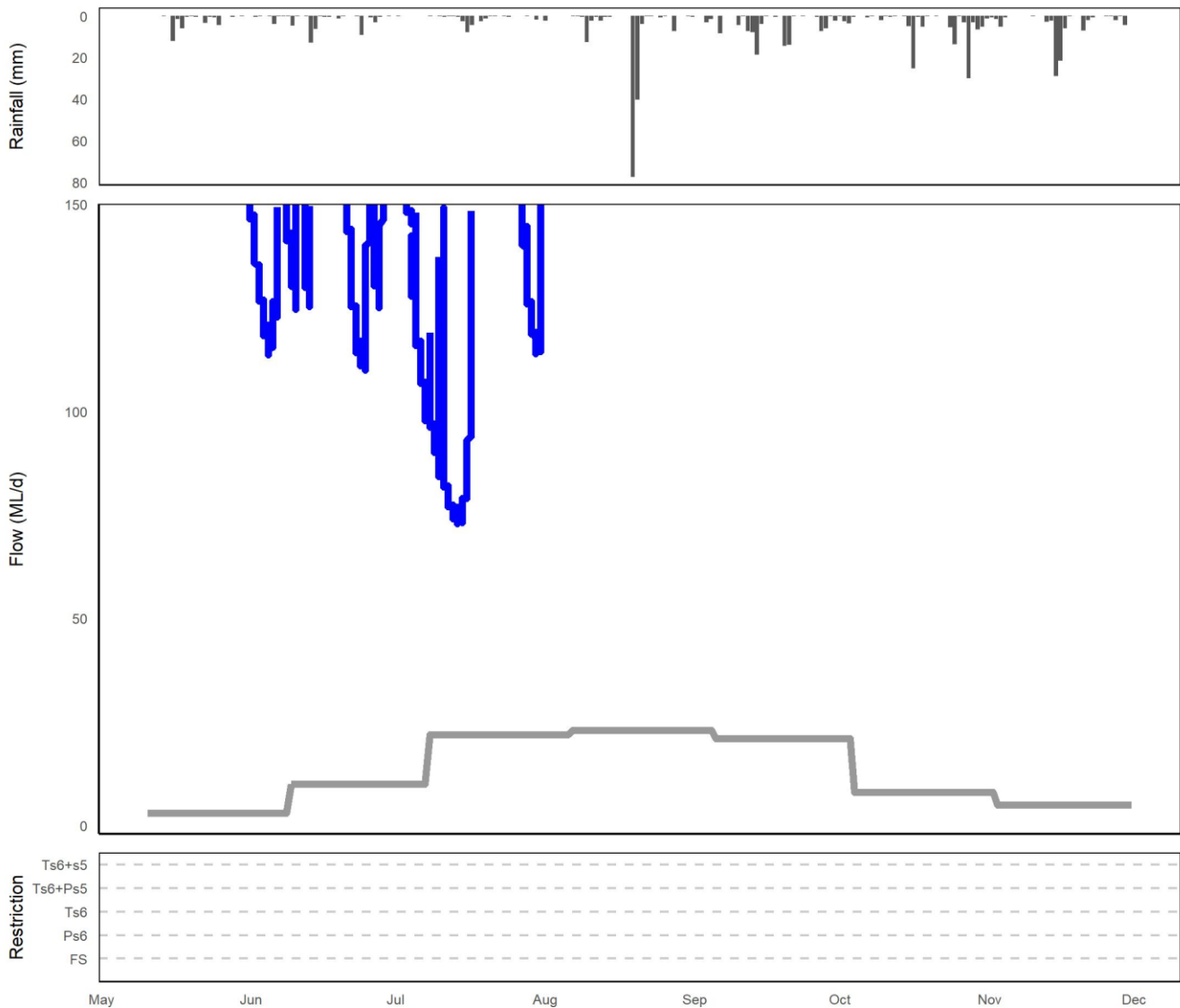
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October 2023

Rainfall, low flows and restriction periods during winter 2022/2023



ST PAULS UPSTREAM SOUTH ESK

Figure 10. Summary of rainfall, low flows and restrictions in the St Pauls catchment during winter (May-November) 2022.

Top plot: daily rainfall (**Lewis Hill (St Pauls River) BoM** site).

Middle plot: instantaneous flow (<150 ML/d) St Pauls River upstream South Esk station (compliance flow site).

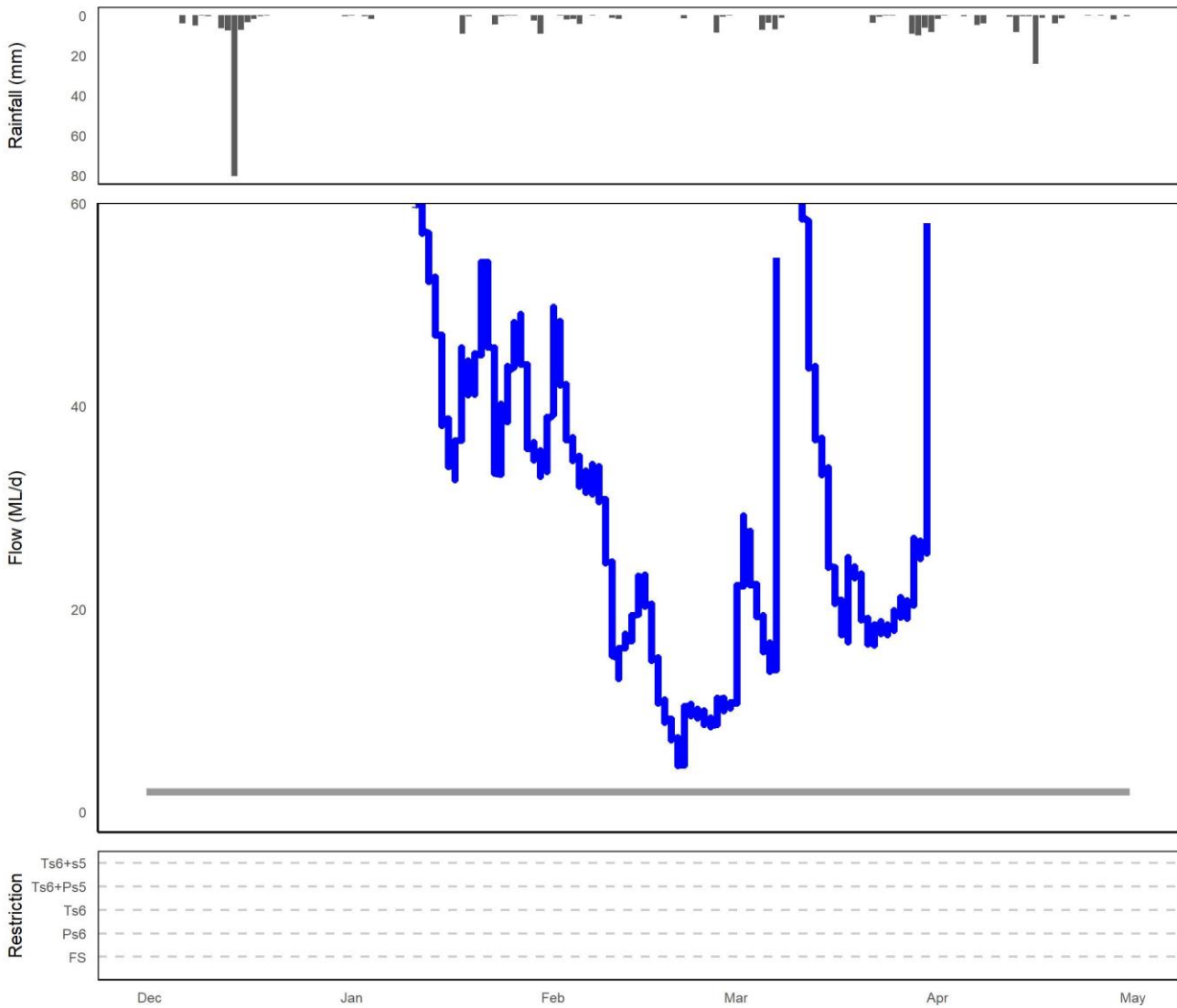
Bottom plot: days when restrictions were in place.

NOTE: Refer to the last page for a 'legend' and description on how to interpret these plots

Table 3. Restriction levels and total days at each level for the winter period (May - November 2022)

Restriction Type	Days at restriction level in 2021/22	Days at restriction level in 2022/23
Flow Sharing	0	0
Partial Surety 6	0	0
Total Surety 6	0	0
Total Surety 6 + Partial Surety 5	0	0
Total Surety 6 + Total Surety 5	0	0

Rainfall, low flows and restriction periods during summer 2022/2023



ST PAULS UPSTREAM SOUTH ESK

Figure 11. Summary of rainfall, low flows and restrictions in the St Pauls catchment during summer 2022/23 (Dec-April).

Top plot: daily rainfall (**Lewis Hill (St Pauls River) BoM** site).

Middle plot: instantaneous flow (<60 ML/d) St Pauls River upstream South Esk (compliance flow site).

Bottom plot: days when restrictions were in place.

NOTE: Refer to the last page for a 'legend' and description on how to interpret these plots

Table 4. Restriction levels and total days at each level for the summer period (Dec 2022 – April 2023)

Restriction Type	Days at restriction level in 2021/22	Days at restriction level in 2022/23
Flow Sharing	0	0
Partial Surety 6	10	0
Total Surety 6	0	0
Total Surety 6 + Partial Surety 5	0	0
Total Surety 6 + Total Surety 5	0	0

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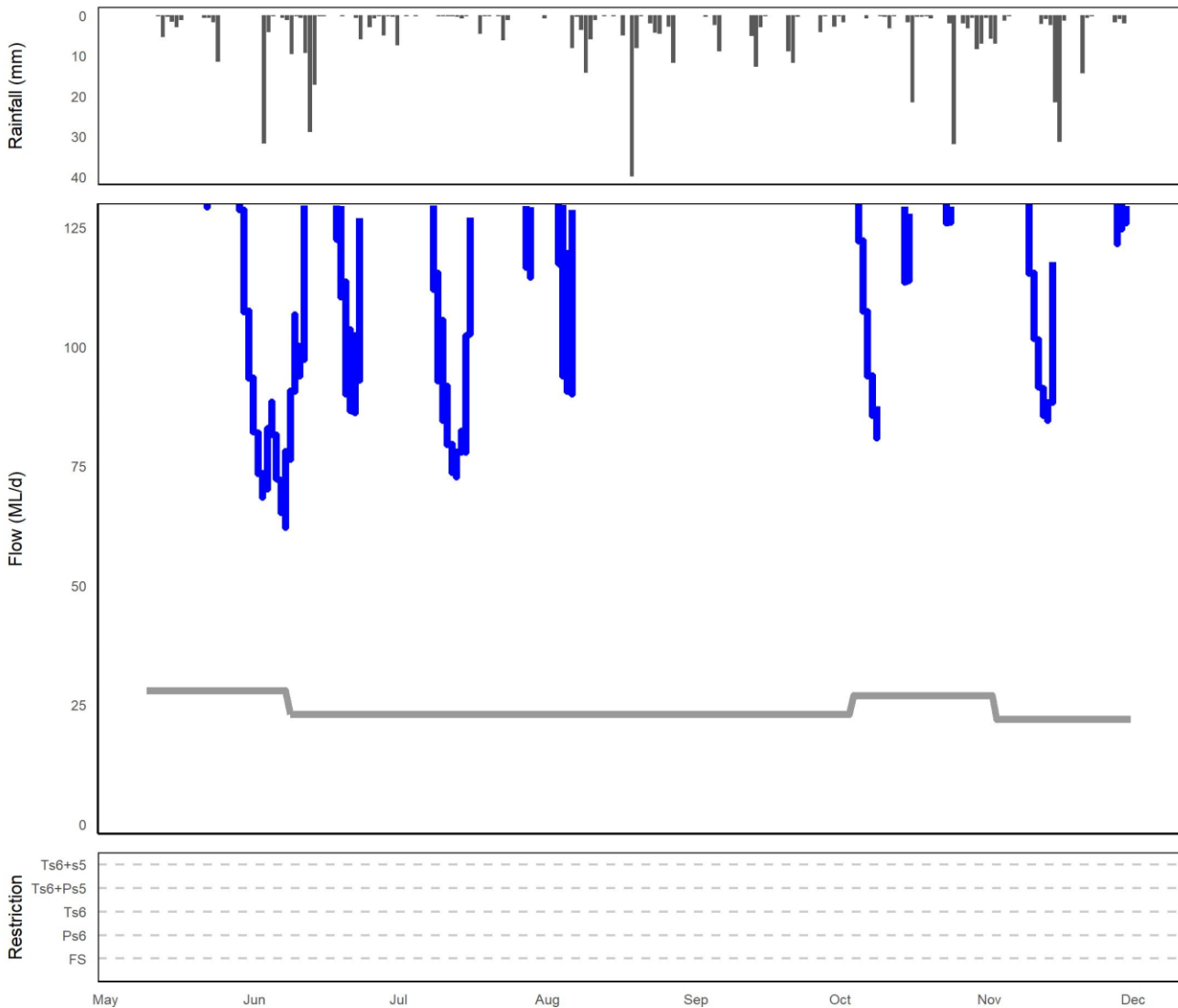
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Rainfall, low flows and restriction periods during winter 2022/2023



NILE AT DEDDINGTON

Figure 12. Summary of rainfall, low flows and restrictions in the Nile catchment during winter (May-November) 2022.

Top plot: daily rainfall (Deddington (Marathon) BoM site).

Middle plot: instantaneous flow (<130 ML/d) Nile at Deddington station (compliance flow site).

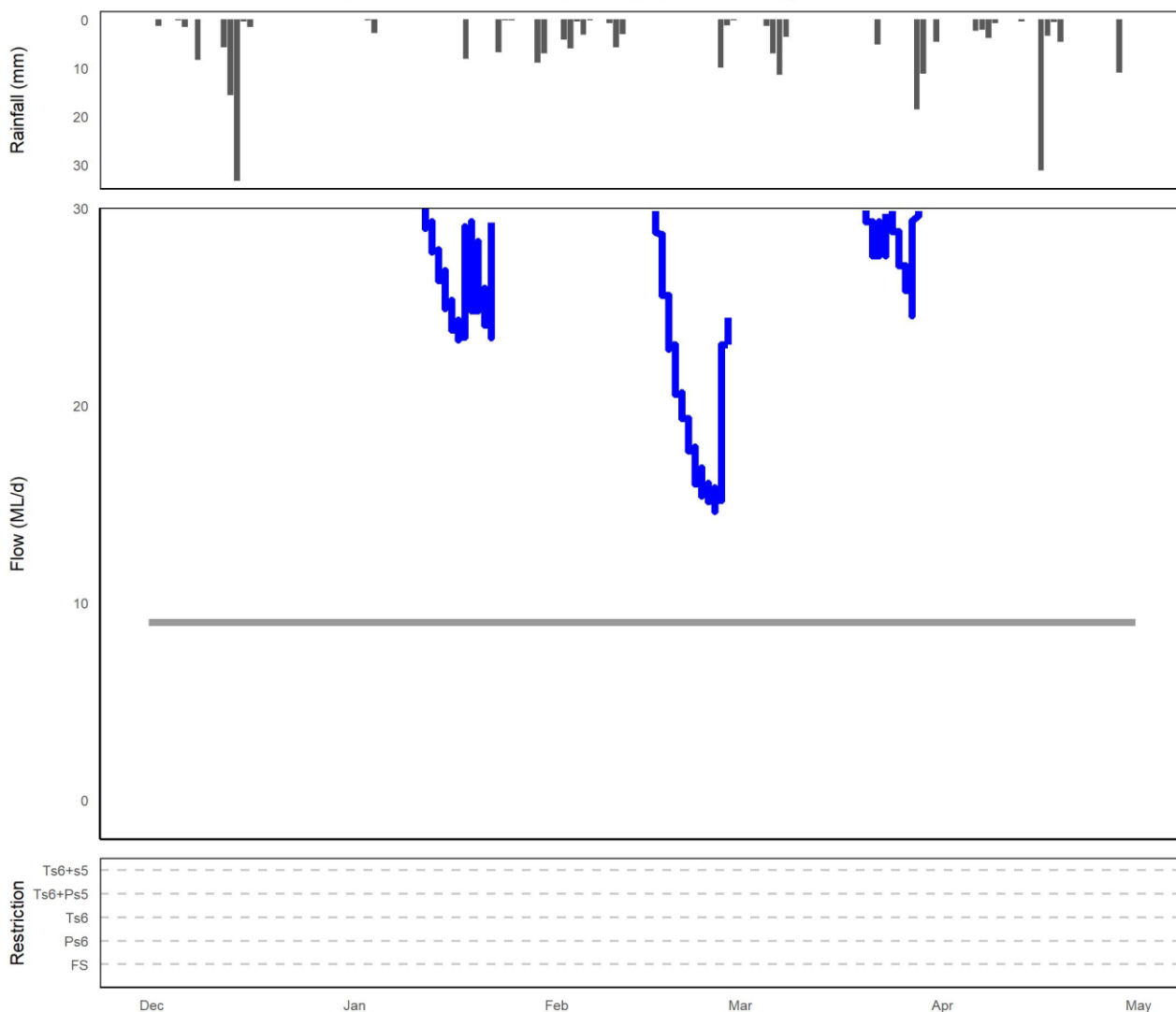
Bottom plot: days when restrictions were in place.

NOTE: Refer to the last page for a 'legend' and description on how to interpret these plots

Table 5. Restriction levels and total days at each level for the winter period (May - November 2022).

Restriction Type	Days at restriction level in 2021/22	Days at restriction level in 2022/23
Flow Sharing	0	0
Partial Surety 6	0	0
Total Surety 6	0	0
Total Surety 6 + Partial Surety 5	0	0
Total Surety 6 + Total Surety 5	0	0

Rainfall, low flows and restriction periods during summer 2022/2023



NILE AT DEDDINGTON

Figure 13. Summary of rainfall, low flows and restrictions in the Nile catchment during summer 2022/23 (Dec-April).

Top plot: daily rainfall (Deddington (Marathon) BoM site).

Middle plot: instantaneous flow (<30 ML/d) Nile at Deddington station (compliance flow site).

Bottom plot: days when restrictions were in place.

NOTE: Refer to the last page for a 'legend' and description on how to interpret these plots

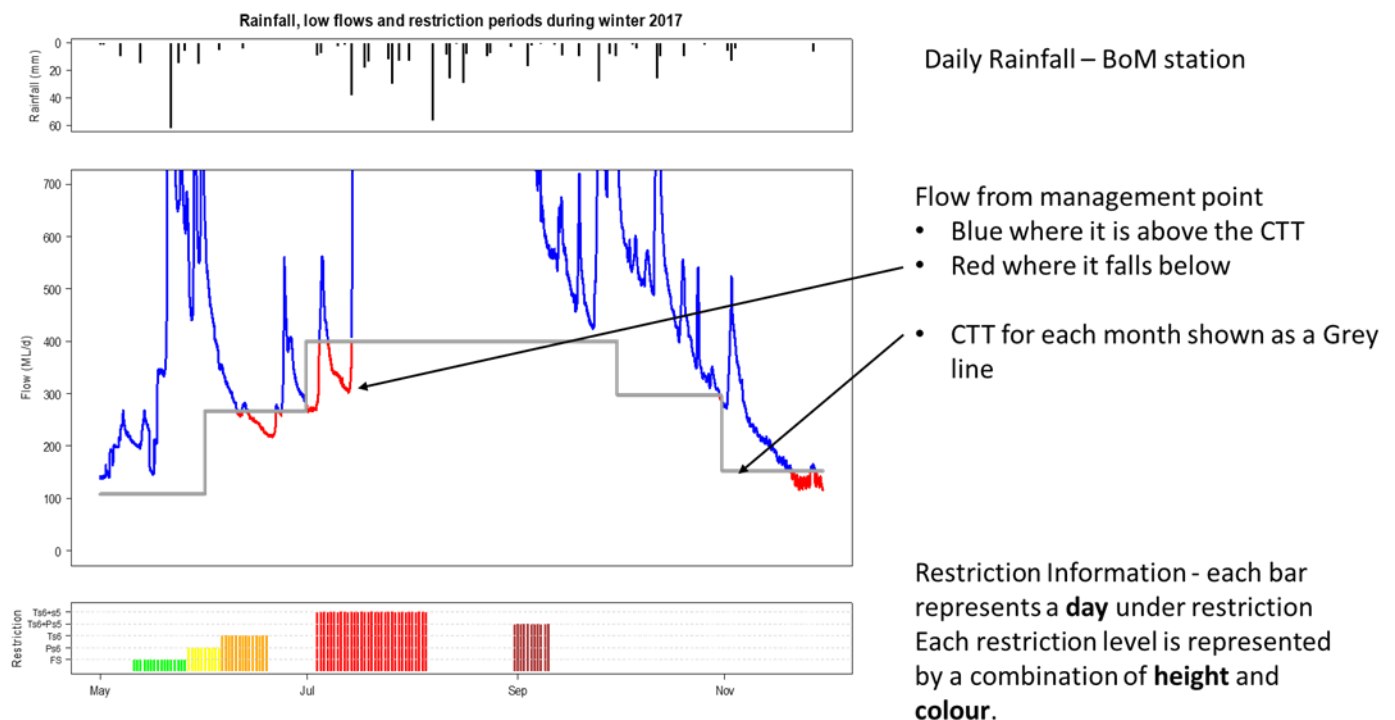
Table 6. Restriction levels and total days at each level for the summer period (Dec 2022 – April 2023)

Restriction Type	Days at restriction level in 2021/22	Days at restriction level in 2022/23
Flow Sharing	0	0
Partial Surety 6	0	0
Total Surety 6	0	0
Total Surety 6 + Partial Surety 5	0	0
Total Surety 6 + Total Surety 5	0	0

EXAMPLE ONLY

Rainfall, flow and restriction plot legend

NOTE: This is a hypothetical example to assist in interpreting the plots in the main body of this document.



Flow Restriction definitions:

FS = flow sharing (only some catchments), shown in GREEN

Ps6 = partial surety 6 ban, shown in YELLOW

Ts6 = total surety 6 ban, shown in ORANGE

Ts6+Ps5 = total surety 6 and partial surety 5 ban, shown in BROWN

Ts6+s5 = total surety 5 and 6 ban, shown in RED

EXAMPLE ONLY

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