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# Water Security



1,679  
FY24 Total Fresh Water Consumption (ML)

20,272  
FY24 Total Other Water Consumption (ML)

12,252  
FY24 Total Water Recycled or Reused (ML)

0.0008  
Total Water Consumption Efficiency ML/t ore processed

## Our Approach

Northern Star acknowledges its responsibility to manage and minimise consumption of all natural resources, including water. There are significant requirements for water management across all Northern Star Operations.

We enter into agreements with stakeholders, including our regulators, to ensure that water is available for the operation of all sites while maintaining awareness of its use as a shared resource.

Our sites in the Goldfields of Western Australia primarily use saline or hypersaline water, with some limited freshwater use by exception. These sites are typically operated as nil discharge sites.

Our Pogo Operations in Alaska primarily access freshwater, however their overall net water consumption is maintained at a lower level due to their managed treatment and discharge of high quality water back to the environment.

Where freshwater is available to an Operation we aim to minimise our consumption.

In accordance with our Water Management Global Standard (Standard), we have an obligation to ensure that we meet all our legislative requirements, minimise our freshwater consumption, and minimise potential impacts on our stakeholders.

0%  
Percentage of Operations with High or Extremely High Baseline Annual Water Stress<sup>1</sup>

67%  
Percentage of Operations With Baseline Annual Water Stress Defined as Arid & Low Water Use<sup>1</sup>

0  
Number of Unauthorised Offsite Discharges

100%  
Percentage of Sites with Water Management Plans

<sup>1</sup> [Aqueduct 4.0](#)

## Water Security Governance

Northern Star's Board has oversight of water security risks and opportunities within the organisation assisted by the Environmental, Social & Safety (ESS) Committee's oversight of operational risks and the Audit & Risk Committee's oversight of the Company-wide risk management framework.

The Company's water security governance structure is shown in Figure 1. Water related matters are considered quarterly by the Board through its ESS Committee meetings.

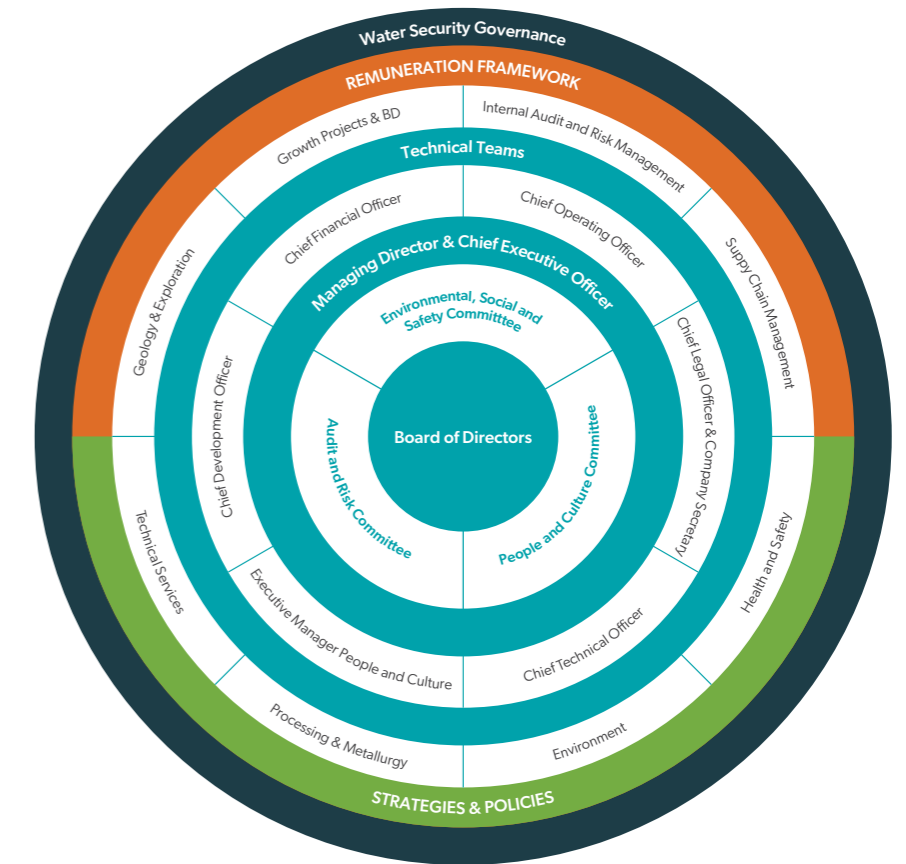
The function of the Committee is to assist the Board in implementing the Company's, environmental, social and safety strategies and ensuring responsible and sustainable business practices. In particular, the Committee will assist the Board in its oversight, monitoring and review of the Company's practices in the following key areas:

- environmental management
- sound business ethics and fair and ethical dealings with stakeholders, and
- long term environmental, social and safety strategic goals.

In addition, the Committee will refer any material environmental, social and safety related risk exposures or potential risks identified to the Audit & Risk Committee, for review and perform such other functions as assigned by the Board.

Development and delivery of Northern Star's water security function is overseen by the ESS Committee and the Chief Operating Officer (reporting to the Managing Director and to the Board), supported by the technical services, operational, environmental and legal teams in the corporate office and on our sites.

Figure 1 Water Security Governance



## Restatements of Information

Nil restatements from our FY23 Sustainability Report.

## Water Security Risks and Opportunities

As part of our ongoing organisation risk identification and mitigation processes, Northern Star monitors and reviews water security risks and opportunities in our mining and mineral processing operations.

### Risks

Water security risks can occur from:

- A decrease in rainfall potentially resulting in less water available either through abstraction or surface water catchments, and potentially contributing to further decline in water quality. This can lead to an increase in demand on third-party supplies include fresh water. Technologies such as reverse osmosis can counteract this as poor-quality groundwater can be treated for use in the process plant; and
- Management of extreme weather events. These are risk assessed and mitigation controls implemented, including ponds, diversion structures, pumping systems and weather monitoring.

To ensure we are mitigating risks, and meeting our obligations for water security, each site must meet our Standard<sup>2</sup> through:

- A risk assessment must be undertaken every time a new water source is identified;
- All water discharges and water harvesting are managed in accordance with licence requirements, environmental management plans and in consultation with stakeholders;
- Water abstraction and consumption rates are designed to maximise the sustainable use of water resources and to recycle as much as practical;
- Baseline surface and groundwater hydrology and geochemical characterisation are conducted for new projects or project expansions as relevant;
- Potential water security impacts and controls are captured in the Operation and Strategic Risk registers and regularly reviewed;
- Ponds for water impoundment must be designed in consideration of the characteristic of the water being contained and in accordance with regulatory requirements;

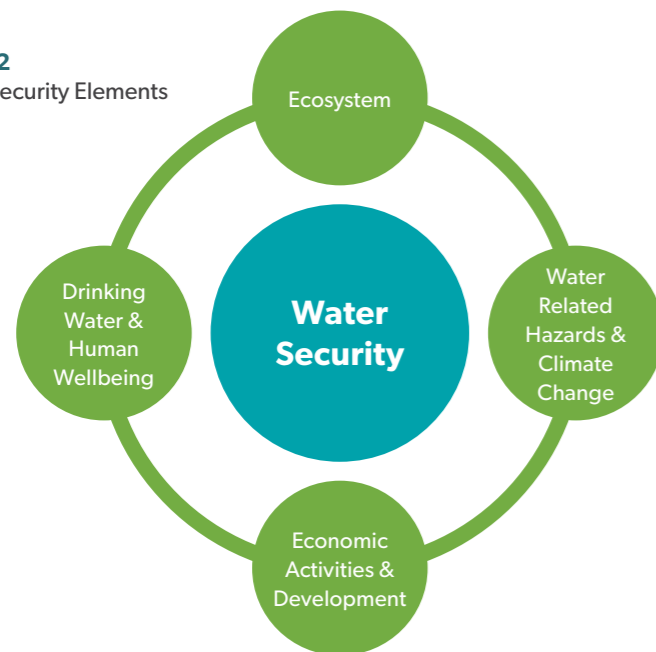
- Monitoring programmes implemented in alignment with the risk assessment, operational needs and licence requirements;
- Sites undertaking water treatment maintain monitoring and control systems, and have in place mitigation plans in case of deviations from approved limits;
- Third party audits may be undertaken to verify ongoing compliance with site, Company and regulatory requirements; and
- All sites use water that is either purchased from a vendor or is pumped to the sites under strict licence conditions.

### Opportunities

We continue to explore and utilise water security opportunities that can optimise consumption while decreasing the demand on external fresh water supplies. Some of these opportunities include:

- Utilising technology to improve the control of dewatering thickeners to recycle more water across the Australian Operations for FY25. This will reduce the volume of water discharged to tailings dams from process plants resulting in more efficient water practises;
- Using lower quality water in the process as opposed to good quality water where it is possible;
- Application of an underground grouting program at our Pogo Operations to control and minimise underground seepage;
- Investigating green energy driven Reverse Osmosis (RO) plants to create useable water from hypersaline water sources in FY25. This is an improvement in the water security as the quantity of hypersaline water in the Goldfields is significantly more than the quantity of good quality water.

**Figure 2**  
Water Security Elements



<sup>2</sup> Water Management Global Standard (NSR-ENV-008-STA)

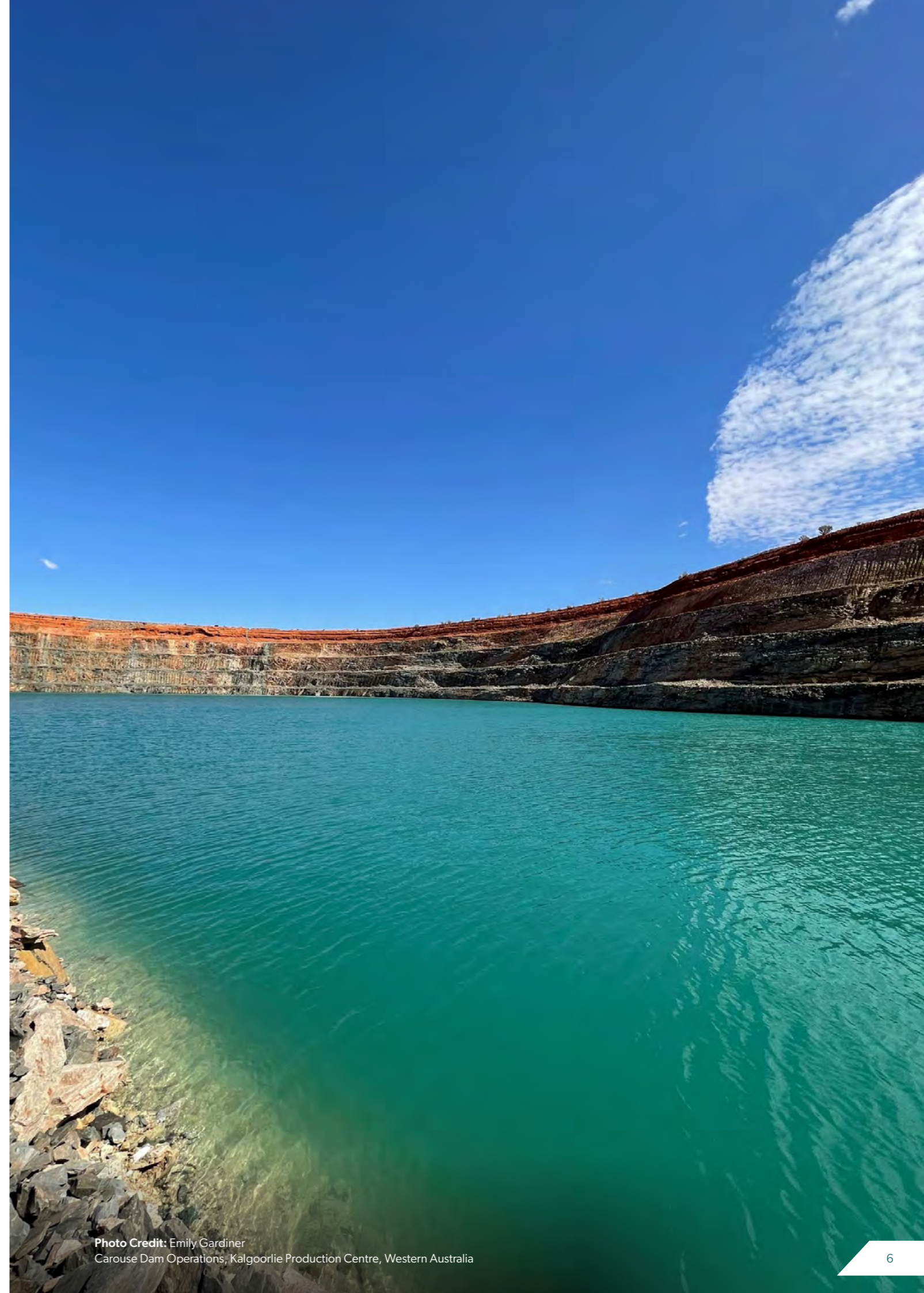




Photo Credit: Brendan Upton, Senior Geology Technician  
Carouse Dam Operations, Kalgoorlie Production Centre, Western Australia

### Water Management

Northern Star's Water Management Plans aim to:

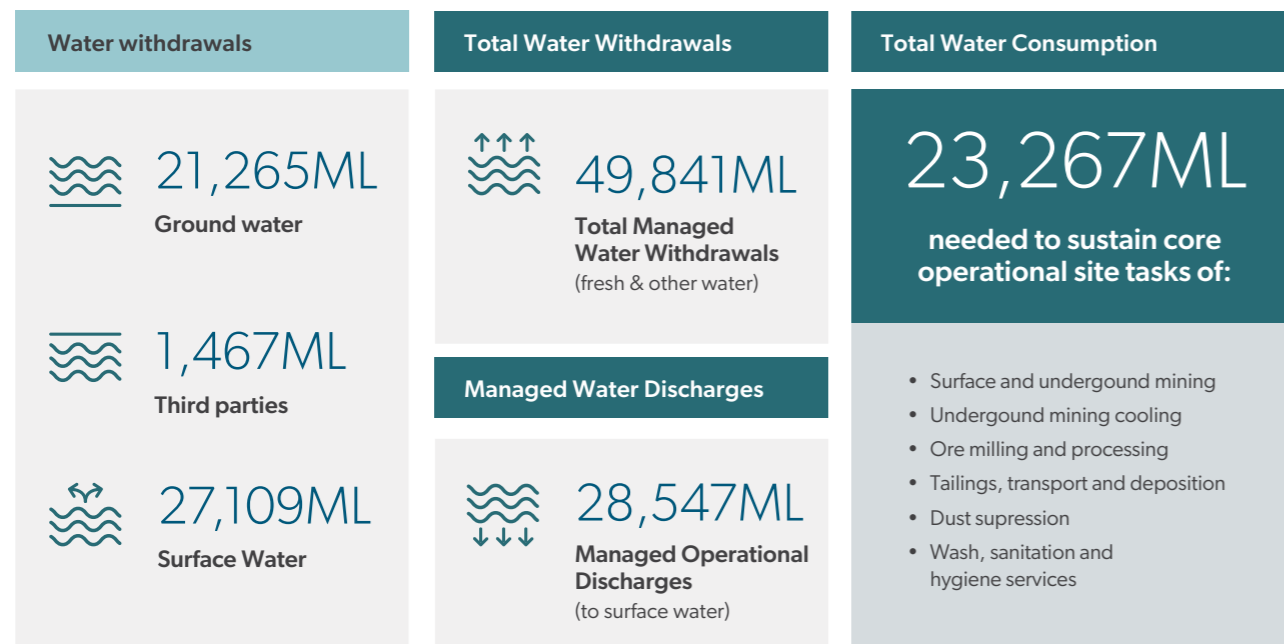
- Minimise excess groundwater drawdown and protect the quality and flows of water in the aquifers that supply water to our Operations;
- Minimise the impact to vegetation and groundwater through preventing spills and managing tailings/process water, saline water and effluent responsibly;
- Minimise required abstraction through water efficiency measures;
- Monitor and record water quality, abstraction volumes and water levels of groundwater bores and surface water storage facilities; and

- Ensure that other groundwater users are not adversely affected by groundwater abstraction.

Most aquifers in the Goldfields are of poor quality with total dissolved solids (TDS) ranging from 50,000-300,000mg/L (sea water is about 35,000mg/L; Freshwater TDS is <1,000mg/L).

As a result, we use a mix of fresh and saline/hypersaline groundwater where possible, as using large quantities of fresh water for gold processing is not appropriate nor efficient.

Figure 3 Group Operational Water Schematic FY24



### Water Monitoring & Control

Northern Star sites have in place detailed management and control systems, which include but are not limited to:

- conducting groundwater and surface water quality monitoring. This may include analyses such as pH, TDS, elemental analysis, chlorine, WAD CN and organic matter depending on the water origin;
- Monitoring aims to verify that Northern Star has remained compliant with environmental and regulatory compliance requirements, as well as providing valuable insights into efficiency opportunities and detection of potential issues with water sources;
- Flow meters and water mass balancing to measure and manage site water transfers. Flow meters are installed at drawpoints as well as discharge points to monitor both abstraction and discharge volumes<sup>3</sup>;
- Control systems for automation of water transfers (leak detections systems, density control etc); and
- Sites may have specific emergency preparedness and response procedures to address uncontrolled releases of saline/hypersaline water and tailings/process water.



Brendon McGillivray, Senior ESR Advisor  
Kalgoorlie Operations, Kalgoorlie Production Centre, Western Australia

<sup>3</sup> Flow meters are typically read on a monthly basis, either via remote telemetry systems or manually. Where a flow meter is inaccessible (ie. due to weather issues) or where a flow meter has become unserviceable (ie. due to mechanical or electrical failure) the flow volumes in our site water balances for that period and water source are estimated to reduce the risk of under reporting water withdrawals/consumption.



Moose and calf, Goodpaster River, Alaska  
**Photo Credit:** Zach Lambe, Geologist - Mine  
 Pogo Production Centre, Alaska

## Water Conservation & Recycling

Pumping water long distances is inefficient and costly and it is important to limit this as much as possible. Wherever practicable, Northern Star prioritises the recycling of water to minimise fresh and bore water withdrawals and consumption.

Our sites have water storage dams or water tanks which receive and store water from various inputs, including: freshwater and borefield supplies, washdown returns, runoff from buildings and hardstands, tailings storage facility decant returns, and mine dewatering. The water is then transferred to required sections of the mine for use.

### Processing Plants

- Water is fed into process water tanks and potable water tanks for storage and distribution within the plant. Water of different quality will be sent to different sections of the plant depending on the process requirement. For example, fresh water will be used in areas that require a high quality of water compared to hypersaline water
- At the back end of the gold recovery process, some sites will utilise a thickener for water recovery prior to tailings disposal. This is a good example of recycling water back into the process before sending to tailings where not all of the water is recovered via decant. In the case where a plant does not have a final tailings thickener, the density at the back end of the circuit is controlled to recover as much water prior to tailings disposal
- Where thickeners are utilised for water recovery, control systems are in place to monitor and change the density to a target setpoint which is chosen to optimise water recovery. The control systems are being reviewed across some Northern Star sites to more tightly manage the water recovery
- Tailings that are discharged settle in the tailings dam and the water that decants is recovered and used back in the process. On some sites the return water is treated to remove residual cyanide. Unlike the Australian operations, Pogo filter their tailings slurry with large mechanical filters which capture the water before the tailings trucked to a dry stack facility
- Tailings lines have leak detection sensors to detect any release of slurry (and hence water) to the environment which mitigates any uncontrolled water losses

### Mining

Water is used in both surface and underground mining mainly for dust control. Roads are consistently wetted down and all drilling is done with water to prevent dust being created. The water drains to the bottom of the mine. It is then pumped back to the surface and then re-used.



Water cart undertaking dust suppression at KCGM Operations  
 KCGM Operations, Kalgoorlie Production Centre, Western Australia.

## Water Stress

Access to water is a fundamental human right. Water is also critical to our operations. We are committed to using and managing this valuable resource sustainably to ensure shared users and the environment are not adversely impacted. Northern Star has assessed each of its sites to

determine their current and potential future “Water Stress” classifications in accordance with Aqueduct 4.0 Water Risk Atlas<sup>4</sup>, the latest iteration of the Water Risk Atlas. This water risk framework is designed to translate complex hydrological data into intuitive indicators of water-related risk.



### Jundee Operations

- Baseline Annual Water Stress: Arid and Low Water Use
- Predicted Future Water Stress (2050)
  - Business as Usual: Arid and Low Water Use
  - Pessimistic: Arid and Low Water Use



### Thunderbox Operations

- Baseline Annual Water Stress: Arid and Low Water Use
- Predicted Future Water Stress (2050)
  - Business as Usual: Arid and Low Water Use
  - Pessimistic: Arid and Low Water Use



### Carosue Dam Operations

- Baseline Annual Water Stress: Low (<10%)
- Predicted Future Water Stress (2050)
  - Business as Usual: Low (<10%)
  - Pessimistic: Low (<10%)



### Kalgoorlie Operations

- Baseline Annual Water Stress: Arid and Low Water Use
- Predicted Future Water Stress (2050)
  - Business as Usual: Arid and Low Water Use
  - Pessimistic: Arid and Low Water Use



### KCGM Operations

- Baseline Annual Water Stress: Arid and Low Water Use
- Predicted Future Water Stress (2050)
  - Business as Usual: Arid and Low Water Use
  - Pessimistic: Arid and Low Water Use



### Pogo Operations

- Baseline Annual Water Stress: Low (<10%)
- Predicted Future Water Stress (2050)
  - Business as Usual: Low (<10%)
  - Pessimistic: Low (<10%)

<sup>4</sup> Aqueduct 4.0 Water Risk Atlas

## Water Performance Metrics

		FY24	FY23	FY22
<b>Freshwater Withdrawal (≤1,000 mg/L Total Dissolved Solids)</b>				
<b>Kalgoorlie Production Centre</b>	Kalgoorlie Operations (ML)	107	179	177
	KCGM Operations (ML)	1,221	1,147	1,401
<b>Yandal Production Centre</b>	Jundee Operations (ML)	239	234	215
	Bronzewing Operations (ML)	112	99	37
<b>Pogo Production Centre</b>	Pogo Operations (ML)	26,574	28,402	27,168
<b>Total (ML)</b>		<b>28,253</b>	<b>30,061</b>	<b>29,008</b>
<b>Other Water Withdrawal (&gt;1,000 mg/L Total Dissolved Solids)</b>				
<b>Kalgoorlie Production Centre</b>	Carosue Dam Operations (ML)	6,486	6,304	3,192
	Kalgoorlie Operations (ML)	2,052	2,184	2,717*
	KCGM Operations (ML)	6,128	5,272	4,394
<b>Yandal Production Centre</b>	Jundee Operations (ML)	1,816	1,803	1,783
	Bronzewing Operations (ML)	82	151	48
	Thunderbox Operations (ML)	3,702	5,509	4,466
<b>Pogo Production Centre</b>	Pogo Operations (ML)	1,316	1,240	901
<b>Exploration</b>	Central Tanami (ML)	6	7	65*
<b>Total (ML)</b>		<b>21,588</b>	<b>22,470</b>	<b>17,566*</b>
<b>Total Water Withdrawal</b>				
<b>Kalgoorlie Production Centre</b>	Carosue Dam Operations (ML)	6,486	6,304	3,192
	Kalgoorlie Operations (ML)	2,159	2,363	2,894*
	KCGM Operations (ML)	7,349	6,419	5,795
<b>Yandal Production Centre</b>	Jundee Operations (ML)	2,054	2,037	1,998
	Bronzewing Operations (ML)	194	250	85
	Thunderbox Operations (ML)	3,702	5,509	4,466
<b>Pogo Production Centre</b>	Pogo Operations (ML)	27,890	29,642	28,068
<b>Exploration</b>	Central Tanami (ML)	6	7	65*
<b>Total (ML)</b>		<b>49,841</b>	<b>52,531</b>	<b>46,574*</b>
<b>Water Recycled or Reused</b>				
<b>Kalgoorlie Production Centre</b>	Carosue Dam Operations (ML)	520	692	447
	Kalgoorlie Operations (ML)	1,884	1,822	3,799*
	KCGM Operations (ML)	7,310	8,698	9,218
<b>Yandal Production Centre</b>	Jundee Operations (ML)	1,352	1,297	1,280
	Thunderbox Operations (ML)	728	1,037	605
<b>Pogo Production Centre</b>	Pogo Operations (ML)	459	493	621
<b>Total (ML)</b>		<b>12,252</b>	<b>14,039</b>	<b>15,970*</b>
<b>Water Discharged</b>				
<b>Pogo Production Centre</b>	Pogo Operations (ML)	28,547	27,717	27,254
<b>Total (ML)</b>		<b>28,547</b>	<b>27,717</b>	<b>27,535*</b>
<b>Net Total Water Consumption</b>				
<b>Kalgoorlie Production Centre</b>	Carosue Dam Operations (ML)	6,486	6,304	3,192
	Kalgoorlie Operations (ML)	2,159	2,363	2,613*
	KCGM Operations (ML)	7,349	6,419	5,795
<b>Yandal Production Centre</b>	Jundee Operations (ML)	2,054	2,037	1,998
	Bronzewing Operations (ML)	194	250	85
	Thunderbox Operations (ML)	3,702	5,509	4,466
<b>Pogo Production Centre</b>	Pogo Operations (ML)	1,316	1,926	901
<b>Exploration</b>	Central Tanami (ML)	6	7	75*
<b>Total (ML)</b>		<b>23,267</b>	<b>24,814</b>	<b>19,125*</b>

<sup>5</sup> Totalised data includes Operations that are no longer part of Northern Star’s assets and therefore not listed separately in the table



**Photo credit:** Douglas Ball, Mine Superintendent  
Pogo Operations, Pogo Production Centre, Alaska

## About This Disclosure

Northern Star has reported in accordance with the GRI Standards for the period 1 July 2023 to 30 June 2024. This disclosure supports the Northern Star Annual Report FY24 in relation to environment and social responsibility.

Management has sought independent, third-party assurance by Bureau Veritas of all data relating to GRI core and material disclosures in this disclosure. These disclosures are identified in our GRI, SASB and UN SDG Alignment Index. Where partial assurance received, or a topic note assured, that information has been included in the Index.

A copy of the assurance statement is provided on Northern Star's website at: [Environment & Social Responsibility \(ESR\) Reporting](#)

This disclosure was reviewed and approved by Northern Star's Board of Directors and published on 22 August 2024. Monetary amounts in this Report are reported in Australian dollars unless otherwise stated.

## Feedback

We welcome feedback and invite readers to send any comments or enquiries about this disclosure to us at [esgperformance@nsr ltd.com](mailto:esgperformance@nsr ltd.com)

## Disclaimer

This disclosure contains forward-looking statements, including statements of current intention and expectation. These forward-looking statements are based on information available at the date of this disclosure.

While these forward-looking statements discuss Northern Star's expectations at the date of this disclosure, they are not guarantees or predictions of future performance, and by their nature, are subject to significant uncertainties, many of which are beyond Northern Star's control. Actual results and developments may differ materially from those expressed in this disclosure and Northern Star cautions readers against reliance on any forward-looking statements or guidance.

There are also limitations with respect to scenario analysis, and it is difficult to predict which, if any, of the scenarios might eventuate. Scenario analysis is not an indication of probable outcomes and relies on assumptions that may or may not prove to be correct or eventuate. Except as required by applicable laws or regulations, Northern Star does not undertake to publicly update or review any forward-looking statements, whether as a result of new information or future events.

## Assumptions

Nil.

## FY24 ESR Disclosure Suite

This disclosure, and our supplementary website disclosures, form part of a suite of documents that provide information and updates on Northern Star's FY24 environment and social responsibility disclosures and should be read as a supporting accompaniment to the Northern Star Resources Ltd FY24 Annual Report, FY24 Modern Slavery Statement and FY24 Corporate Governance Statement.

Throughout this disclosure there are references to supporting information on our website which the reader is encouraged to read. The Northern Star website contains significant additional supporting information including our annual ESR Performance Data Tables, GRI Index and references to our previous disclosures.

# Glossary

## ABN

Australian Business Number

## ADEC

Alaskan Department of Environmental Conservation

## ASX

Australian Securities Exchange, trading as ASX

## ASX Corporate Governance Council Principles and Recommendations

Principles and Recommendations (4th edition) of the ASX Corporate Governance Council on the corporate governance practices to be adopted by ASX listed entities and which are designed to promote investor confidence and to assist listed entities to meet shareholder expectations

## Aquifer

underground layer of water-bearing material, consisting of permeable or fractured rock, or of unconsolidated materials (gravel, sand, or silt)

## Au

The chemical symbol for gold

## Audit & Risk Committee (ARC)

Audit and Risk Sub-Committee of the Board

## B or bn

Billion

## Board

Board of Directors

## Company

Northern Star Resources Ltd  
ABN 43 092 832 892

## contractors

Externally employed contracted workers engaged by the Company to support operations

## Corporations Act

*Corporations Act 2001* (Cth)

## Director

A director of the Company duly appointed under the Corporations Act

## DWER

Department of Water and Environmental Regulation

## employees

Total number of employees of the Group including permanent, fixed term and part-time. Does not include contractors

## ESG

Environment, Social & Governance

## ESS

Environmental, Social & Safety

## ESS Committee

Environmental, Social & Safety sub-Committee of the Board

## Flocculant

substance which promotes the clumping of particles, especially one used in treating waste water

## FY

Financial Year ending 30 June

## GRI

Global Reporting Initiative

## Group

Northern Star Resources Ltd and all of its wholly owned subsidiaries

## Hydrology

Study of the distribution and movement of water both on and below the Earth's surface, as well as the impact of human activity on water availability and conditions

## K or k

Thousand

## KCGM

KCGM means Kalgoorlie Consolidated Gold Mines Pty Ltd, a wholly owned subsidiary of the Company, which operates the Super Pit and Mt Charlotte Underground Mines and Fimiston Processing Plant

## Kg or kg

Kilogram

## kl

kilolitre; one thousand litres

## KMP

Key Management Personnel

## KPI

Key Performance Indicator

## Limited Assurance

Audit and assurance undertaken by an external auditor on whether the data or statements made in this report have been prepared in accordance with GRI

## M or m

Million

## ML

Mega-litre; one million litres

## NSMS

Northern Star Mining Services

## Officer

An officer of the Company defined under the Corporations Act

## Oz

Ounce

## pH

a figure expressing the acidity or alkalinity of a solution on a logarithmic scale on which 7 is neutral, lower values are more acid and higher values more alkaline

## Reverse Osmosis

A water purification process that uses a semi-permeable membrane to separate water molecules from other substances

## SASB

Sustainability Accounting Standards Board

## shareholder

A shareholder of Northern Star Resources Ltd

## stakeholders

An individual, group or organisation that is impacted by the Company, or has an impact on the Company. Examples of stakeholders are investors, employees, suppliers and local communities

## T or t

Tonnes; one thousand kilograms

## TDS

Total dissolved solids

## UN

United Nations

## UN SDGs

The United Nations Sustainable Development Goals

## US or USA

United States of America

## WA

Western Australia

## WAD CN

Weak acid dissociable cyanide

## Water Stress

Baseline water stress measures the ratio of total water demand to available renewable surface and groundwater supplies. Water demand include domestic, industrial, irrigation, and livestock uses. Available renewable water supplies include the impact of upstream consumptive water users and large dams on downstream water availability. Higher values indicate more competition among users

## \$

Australian dollars, unless the context states otherwise. All A\$ to \$US currency conversions used in this ESR Disclosure Suite are at \$0.6556





# Contact Information

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<b>Compliance</b>	<a href="mailto:compliance@nsr ltd.com">compliance@nsr ltd.com</a>
<b>ASX Code</b>	NST
<b>Share Registry</b>	MUFG Corporate Markets (formerly known as Link Market Services)

### Additional Website ESR Disclosures:

- Environment & Social Responsibility Approach
- People & Culture at Northern Star
- Safety & Critical Risk Control at Northern Star
- Community Engagement & Support at Northern Star
- Supply Chain Management at Northern Star
- Environmental Management at Northern Star
- Climate Change at Northern Star
- Water Security at Northern Star
- Waste & Tailings Management at Northern Star
- FY24 Performance Data Tables
- FY24 GRI, SASB and UN SDG Alignment Index
- FY24 Tailings Disclosure Report
- FY24 Biodiversity Values

