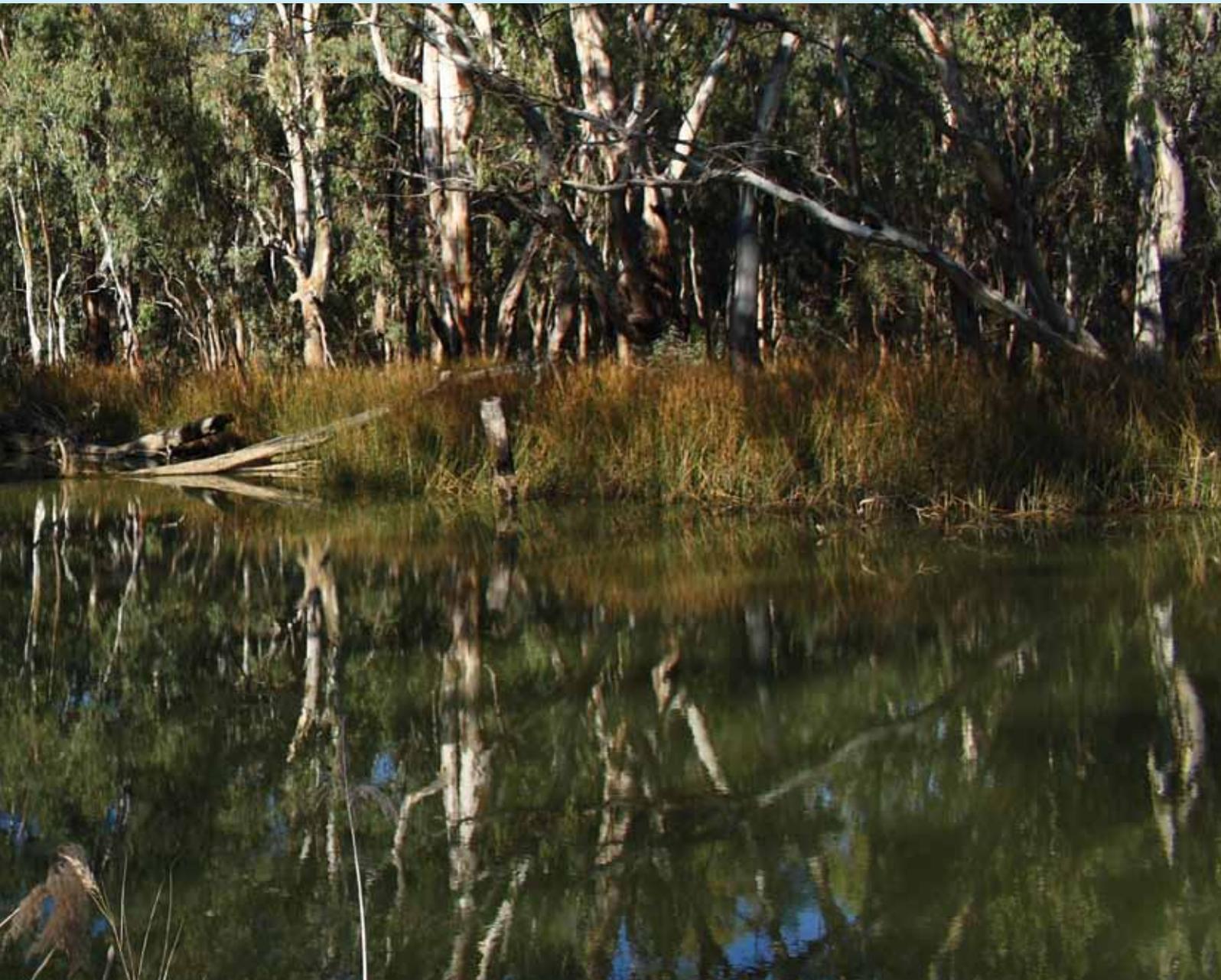




Australian Government
Bureau of Meteorology

The National Water Account Companion Guide



The National Water Account: Companion Guide

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1. About this document

The National Water Account provides a detailed account of the total water resource, water available for abstraction, rights to abstract and actual abstraction of water in significant water use regions across the country. Its annual publication fulfils a legislative responsibility of the Bureau under the Commonwealth *Water Act 2007*.

This *Companion Guide* has been written to help you understand and interpret the National Water Account and explain the context in which it was developed.

Chapter 2 provides an overview of the National Water Account and the regions reported on.

Chapter 3 helps you find your way around the National Water Account by describing its structure and content.

Chapter 4 teaches you about the concepts used in the National Water Account. This includes:

- information about how the physical environment is conceptualised;
- the way water accounting regions are defined; and
- what constitutes the water assets and water liabilities of the region.

Chapter 5 provides the context of the National Water Account and explains why and how it was produced. It includes background information about:

- water reform;
- the development of water accounting; and
- the development and production of the National Water Account.

Other supporting material can be accessed from the National Water Account online at www.bom.gov.au/water/nwa. Definitions of specific terms are available in the National Water Account Glossary, part of the *Australian Water Information Dictionary*.

Purpose of the National Water Account

A key aim of the Council of Australian Governments' National Water Initiative is to increase public confidence in water management.¹

The National Water Account helps to achieve this aim by improving the evidence upon which public policy is based and increasing the transparency of water management. More specifically, robust water accounting contributes to building confidence in the integrity of the water entitlement system and, by extension, the water market system.

The specific objective of the National Water Account is:

To disclose for the reporting period the total water resource, the volume of water available for abstraction, the rights to abstract water and the actual abstraction of water for economic, social, cultural and environmental benefit, in water use regions of national significance.

The reporting period of the National Water Account is 1 July to 30 June. It is referred to as the reporting year.

Information reported

There are many competing demands for water in Australia. The National Water Account details how water is shared between the economy, critical human needs and the environment. It does not report on how water is used once it has been abstracted.

The National Water Account provides a comprehensive picture of the water resources and water sharing in the

regions it reports on. It is prepared by the Bureau and involves collaboration with over 30 reporting partners. Its scope is expected to evolve over time, based on the needs and interests of users, and the development of new and improved methods for measuring and estimating water volumes and flows



Chapter 3 provides details of the structure and content of the National Water Account.

See Chapter 5 for more information about the background to the National Water Account.

¹ Derived from information reported in National Water Commission 2011, 'Urban Water Utilities', *National Performance Report 2009–10*.

The emerging practice of water accounting

The National Water Account is a product of an emerging practice of water accounting in Australia. It combines the science of hydrology with the rigour of financial accounting.

Water accounting is underpinned by a conceptual

framework and standards for report preparation and presentation.

The National Water Account is prepared and presented in accordance with Australian Water Accounting Standard 1.²

The reporting regions

The National Water Account reports on nationally significant water use regions across Australia where water-sharing pressures are significant.

Eight regions were reported on in the 2010 and 2011 accounts. This was increased to nine in 2012 with the addition of the Daly region. More regions will be added in the future.

The regions reported in the *National Water Account 2012* are:

- Adelaide
- Canberra
- Daly
- Melbourne
- Murray–Darling Basin
- Ord
- Perth
- South East Queensland
- Sydney.

A large portion of Australia’s economic activity occurs in these nine regions, which are home to over 70% of Australia’s population.

Most of the major horticultural growing areas are also represented within the nine regions,³ and 70% of Australian’s urban water abstraction occurs in the six capital city regions.⁴

Most of the nation’s water market activity occurs in the Murray–Darling Basin which generates over 40% of the gross value of Australian agricultural production. In 2010–11, 83% of water entitlement trade and 98% of water allocation trade took place in this region.⁵



See Chapter 4 for an explanation of some important water accounting concepts and how they are used in the National Water Account.

Chapter 5 has more information about the Australian water accounting standards and their development.

² Bureau of Meteorology 2012, *Australian Water Accounting Standard 1: Preparation and Presentation of General Purpose Water Accounting Reports* and associated illustrative water accounting reports.

³ Department of Agriculture, Fisheries and Forestry, 2012, *Australian Horticultural Fact Sheet*, accessed at www.daff.gov.au

⁴ Derived from information reported in National Water Commission 2011, ‘Urban Water Utilities’, *National Performance Report 2009–2010*.

⁵ National Water Commission, 2012, *Australian Water Markets Reports 2010–11*.

3. Navigating the National Water Account

Structure

The National Water Account is a collection of water accounting reports on nationally significant water use regions across Australia.

Each water accounting report presents quantitative and qualitative information on the water resources of the region. The structure of each report derives from the Australian Water Accounting Standard 1, and is as follows:⁶

- contextual information
- water accounting statements presented in the form of financial statements
- detailed notes
- an accountability statement.

Contextual information

A comprehensive picture of the region is provided in the contextual information. It provides important background for understanding the water accounting statements.

The contextual information includes:

- a general description of the geographic features, land use and population centres
- the administrative and legal frameworks of water management
- information about water rights including entitlements, allocations and trade
- an overview of the climatic conditions and important water related events during the reporting period
- a description of the surface and groundwater resources.



The regions used in the National Water Account are largely based on hydrologic catchment boundaries but are defined by the water assets of the region.



See Chapter 4 for a detailed explanation of the concept of the region used in the National Water Account.

⁶ Bureau of Meteorology 2012, *Australian Water Accounting Standard 1: Preparation and Presentation of General Purpose Water Accounting Reports* and associated illustrative water accounting reports.

Water accounting statements

The National Water Account reports volumetric information about regional water resources in three Water Accounting Statements:

- *Statement of Water Assets and Water Liabilities*
- *Statement of Changes in Water Assets and Water Liabilities*
- *Statement of Physical Water Flows*.

Water assets in the National Water Account include water (physical water assets) and rights or claims to water (non-physical water assets).

Only information that meets the recognition criteria specified in the Australian Water Accounting Standard 1 is presented in the statements.⁷

Quantitative information that does not meet the recognition criteria but is still important to understanding the region's water resources is provided in the notes.

Each of the three water accounting statements presents a different but related perspective of the region's water.

They present information about changes in the status of the region's water assets and water liabilities. These changes arise from the various transactions to and from the region during the reporting year. The prior year information is also presented for comparison.

The water transactions of most relevance to the National Water Account are those that change the volume of water held in the water stores that make up the physical water assets of the region. The water stores of a region may include the surface water, groundwater, urban water system water and irrigation scheme water stores. These transactions are reflected in aggregate in the line items of the water accounting statements.

Transactions between the water stores are not presented in the statements. This is because intra-regional transactions do not affect the total water assets or water liabilities of the region. Information about intra-regional transactions can be found in the notes.



- *Statement of Water Assets and Water Liabilities* = a balance sheet
- *Statement of Changes in Water Assets and Water Liabilities* = an income statement
- *Statement of Physical Water Flows* = cashflow statement



In the National Water Account the **reporting period** is the same as the financial year—1 July to 30 June.



See Chapter 4 for a detailed description of how water assets and water liabilities are defined in the National Water Account.

⁷ Bureau of Meteorology 2012, *Australian Water Accounting Standard 1: Preparation and Presentation of General Purpose Water Accounting Reports* and associated illustrative water accounting reports.

Statement of Water Assets and Water Liabilities

The *Statement of Water Assets and Water Liabilities* is like a balance sheet. It presents the volume of water assets and water liabilities at the start and end of the reporting year.

As shown in Figure 1, water assets in the National Water Account include water (physical water assets) and rights or claims to water (non-physical water assets).

- **Physical water assets are referred to as the water stores, and include:**
 - surface water
 - extractable groundwater
 - urban water system water
 - irrigation scheme water.

- **Non-physical water assets** include claims to water located outside the region.

Water liabilities in the National Water Account include commitments to deliver water to users, and other agreements to transfer water outside the region.



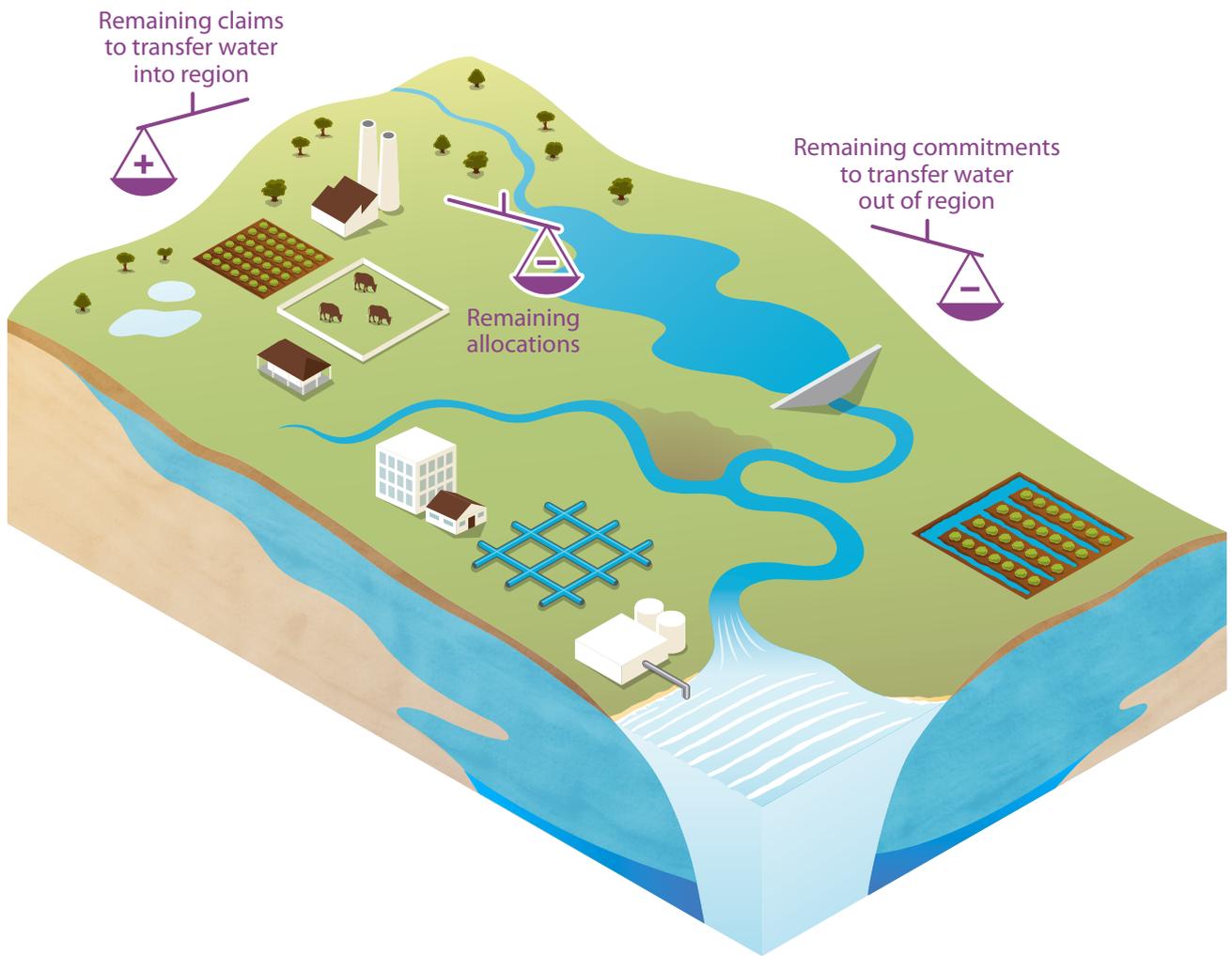
Presentation of numbers in the National Water Account

- Where a volume that is represented in the water accounting statement is equal to zero, it is denoted by '0'.
- Where information is relevant but the volume could not be quantified for a line item included in the water accounting statement, it is denoted by a dash '-'.



Definitions used in the National Water Account

- Water assets include actual water (physical water assets) and rights or claims to water (non-physical water assets) held by a region and for which a future benefit is expected.
- Water liabilities are present obligations of the region to deliver water.
- Net water assets equal the total water assets less the total water liabilities.



Legend

Physical water assets

-  Surface water
-  Extractable groundwater
-  Urban water system water
-  Irrigation scheme water

Water users

-  Agriculture
-  Industry
-  Stock and domestic
-  Business and household

Water not counted as a water asset of the region

-  Sea
-  Off-channel water storage
-  Flood water out of channel
-  Soil moisture
-  Non-extractable groundwater

Non-physical water assets and water liabilities

-  Non-physical water asset
-  Water liability

Figure 1 Graphic representation of the *Statement of Water Assets and Water Liabilities*.

Statement of Changes in Water Assets and Water Liabilities

The *Statement of Changes in Water Assets and Water Liabilities* is like an income statement. This statement shows the changes to water assets and water liabilities that occurred during the reporting year.

In the same manner as an income statement that is prepared on an accrual basis, the changes in water assets and water liabilities are recognised in the statement when the claim to water or the obligation to deliver it is recorded and not when the actual flow occurs.

Figure 2 shows the transactions that change the water assets and water liabilities of a region, including:

- **accrual transactions** (non-physical transactions) are represented by purple arrows;
- **physical transactions** (actual water flows) are represented by black arrows:
 - **natural water flows** are represented by dotted black arrows
 - **engineered flows** are represented by solid black arrow.



Definitions used in the National Water Account

In **accrual water accounting**, the changes to water assets and/or water liabilities are recognised (or recorded) when the obligation or claim upon water arises or is incurred. This may not be when the actual flow event occurs.



See Chapter 4 for a more detailed explanation of accrual water accounting.

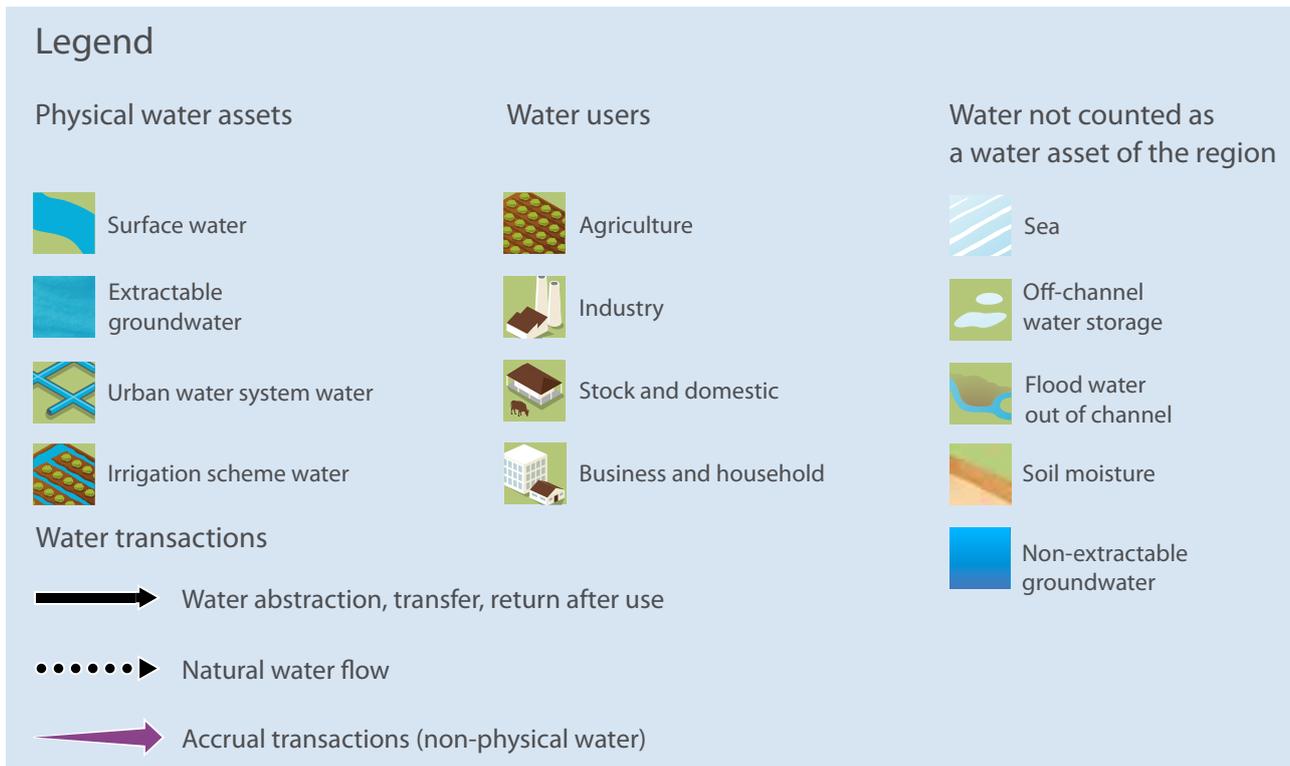
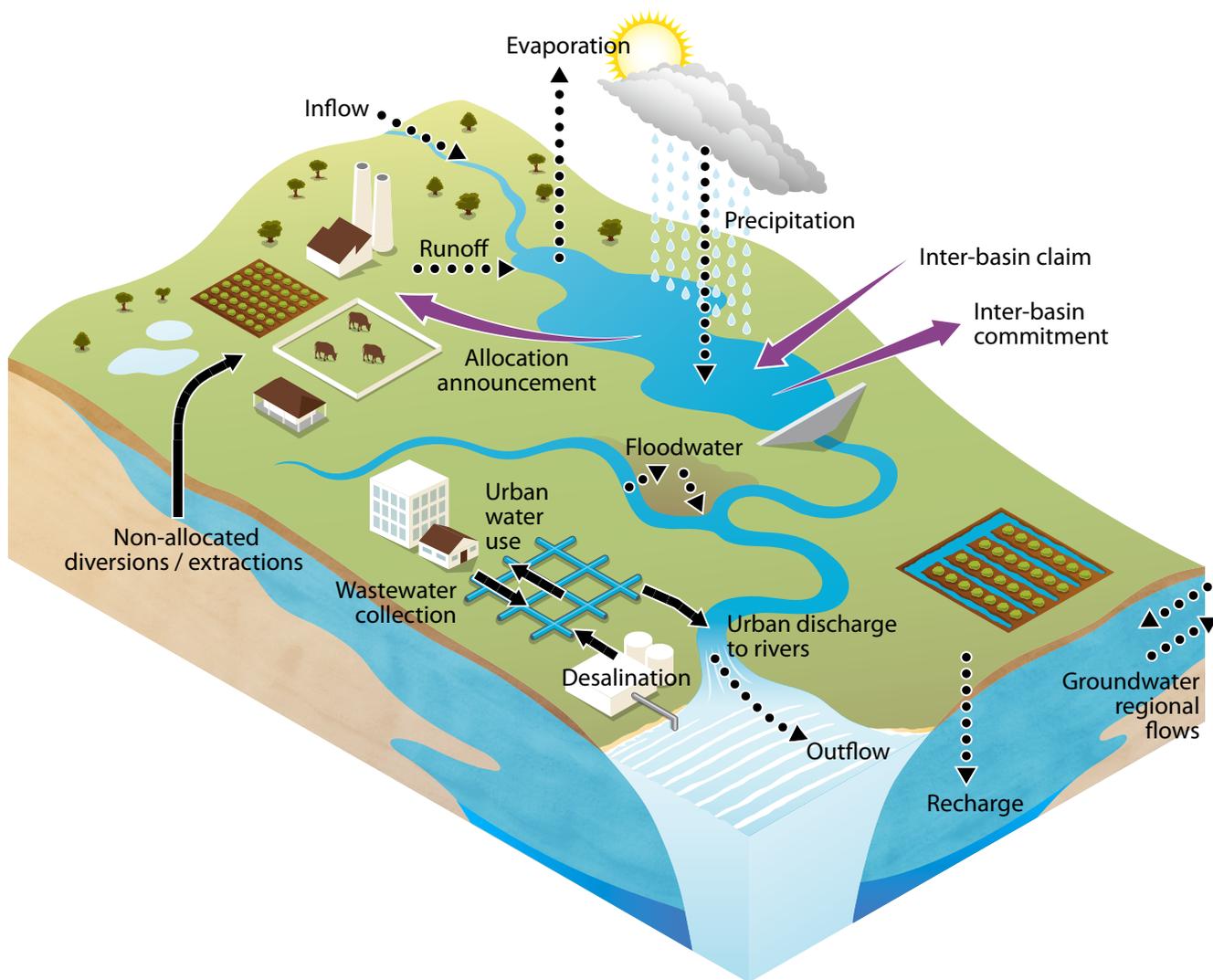


Figure 2 Graphic representation of the *Statement of Changes in Water Assets and Water Liabilities*. Not all transactions are represented in the diagram.

Statement of Physical Water Flows

The *Statement of Physical Water Flows* is like a cashflow statement. This statement shows the actual water inflows into and outflows from the water stores of the region that occurred during the reporting year.

Figure 3 shows the actual water flows, including those corresponding to the accrual transactions that are shown in Figure 2.

In a region where no accrual transactions were recorded, the *Statement of Physical Water Flows* and the *Statement of Changes in Water Assets and Water Liabilities* contain identical information.

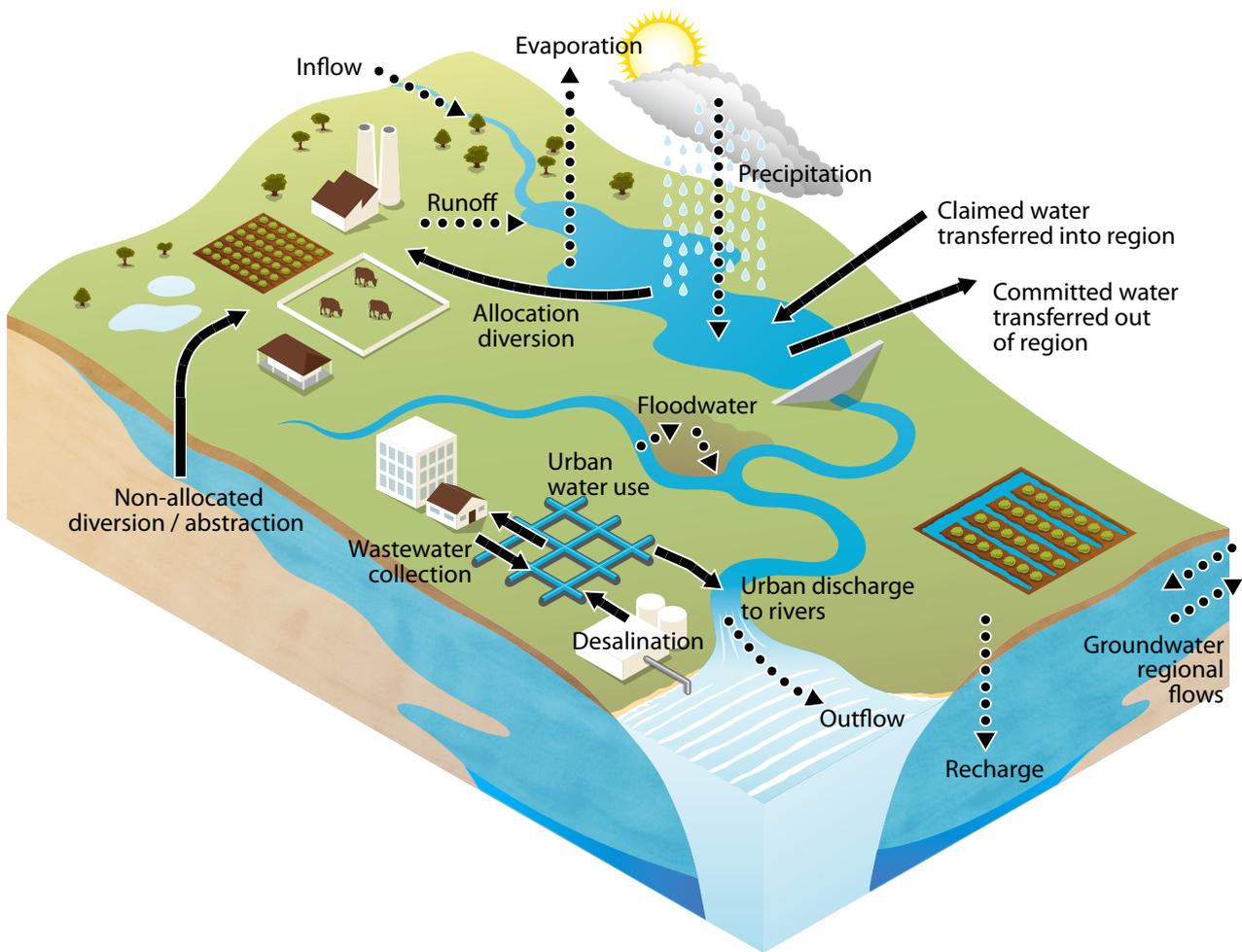


Intra-region flows

Intra-region flows are not reported in the water accounting statements. This is because:

- they do not affect the region's total water assets and water liabilities; and
- showing intra-regional flows could result in the same water being reported multiple times as it transits between the various water stores.

Information on intra-region flows is useful and is reported in the notes. Notes also describe the surface water store, groundwater store, urban water system and irrigation water schemes.



Legend

Physical water assets	Water users	Water not counted as a water asset of the region
Surface water	Agriculture	Sea
Extractable groundwater	Industry	Off-channel water storage
Urban water system water	Stock and domestic	Flood water out of channel
Irrigation scheme water	Business and household	Soil moisture
Water transactions		Non-extractable groundwater
Water abstraction, transfer, return after use		
Natural water flow		

Figure 3 Graphic representation of the *Statement of Physical Water Flows*. Not all transactions are represented in the diagram.

The relationship between the water accounting statements

The three water accounting statements reconcile with one another.

1. The *Statement of Water Assets and Water Liabilities* reconciles to the *Statement of Changes in Water Assets and Water Liabilities* as follows:
 - The difference between the opening and closing volumes of net water assets in the *Statement of Water Assets and Water Liabilities* equals the change in net water assets reported in the *Statement of Changes in Water Assets and Water Liabilities*.
 - The unaccounted-for difference on the *Statement of Changes in Water Assets and Water Liabilities* represents the unexplained change in water assets and water liabilities during the reporting year.
2. The *Statement of Water Assets and Water Liabilities* relates to the *Statement of Physical Water Flows* as follows:
 - The difference between the opening and closing volumes of the physical water assets in the *Statement of Water Assets and Water Liabilities* equals the total water inflows minus outflows minus any unaccounted-for difference in the *Statement of Physical Water Flows*.
 - The unaccounted-for difference on the *Statement of Physical Water Flows* represents the unexplained change in physical water assets during the reporting year.



Unaccounted-for difference

Unaccounted-for differences are due to data and knowledge gaps and limitations in the methodologies used to quantify the line items that make up these three statements.



Reconciling accounts

To reconcile, in the context of water accounting, means to bring the water accounting statements into agreement or make them compatible.

National Water Account notes

The notes in the National Water Account provide a wealth of additional information to that presented in the water accounting statements. This information can be qualitative or quantitative.

Qualitative information includes, for example, provisions for rules-based environmental water. A quantitative example is volumetric information about intra-regional transactions (that is, physical flows and accrual transactions between the water assets of a region).

Information disclosed in the notes is consistent with the requirements of the Australian Water Accounting Standard 1.⁸ These include:

- A description of the significant water accounting policies that were applied in a region. This may include the application of the recognition criteria on the water assets and water liabilities.
- Reconciliation tables that verify:
 - how the region's closing water storage in the *Statement of Physical Water Flows* reconciles to the total water assets reported in the *Statement of Water Assets and Water Liabilities*; and
 - how the water accounting region's change in water storage in the *Statement of Physical Flows* reconciles to the change in net water assets reported in the *Statement of Changes in Water Assets and Water Liabilities*.
- Information supporting the volumes recognised in the water accounting statements including quantitative approaches used to produce volumes in each of the line items.

In keeping with the Australian Water Accounting Standard 1, the National Water Account includes notes on a number of other areas depending on the specific conditions in the region during the reporting year, as follows:

- consolidated information about the region's surface water and groundwater resources. These notes

include the intra-region flows (transactions and flows) that occurred between the water stores that are part of the region;

- consolidated information about the urban water system, including transactions and flows that occurred between it and other water stores that are part of the region;
- information on water held in and harvested into off-channel water stores, including farm dams. This information is important as it constitutes a water resource for the owners of the storages and its capture may impact upon the availability of water in the surface water or groundwater stores. This information is not reported in the water accounting statements because off-channel water is not considered to be part of the region's assets;
- water access rights granted on the surface water and groundwater assets of the region and how much water was allocated and abstracted under each type of water right;
- water market activity, that is, trade of water access entitlements and water allocations that occurred; and
- non-volumetric information about the use of water to provide environmental, social and cultural benefits.

Further:

- The note about future prospects looks forward twelve months and indicates whether the current water assets held by the region, less its water liabilities, will be sufficient, allowing for future probable inflows, to meet future commitments to deliver water to users.
- The contingent water assets note provides information about water assets that might become available in the future if particular conditions are met. For example, if a dam were under construction that could supply water in the future. Contingent water liabilities are also described.



See Chapter 4 for a detailed description of how water access rights and water market activity are defined in the National Water Account.

⁸. Bureau of Meteorology 2012, *Australian Water Accounting Standard 1: Preparation and Presentation of General Purpose Water Accounting Reports* and associated illustrative water accounting reports.

Surface water note

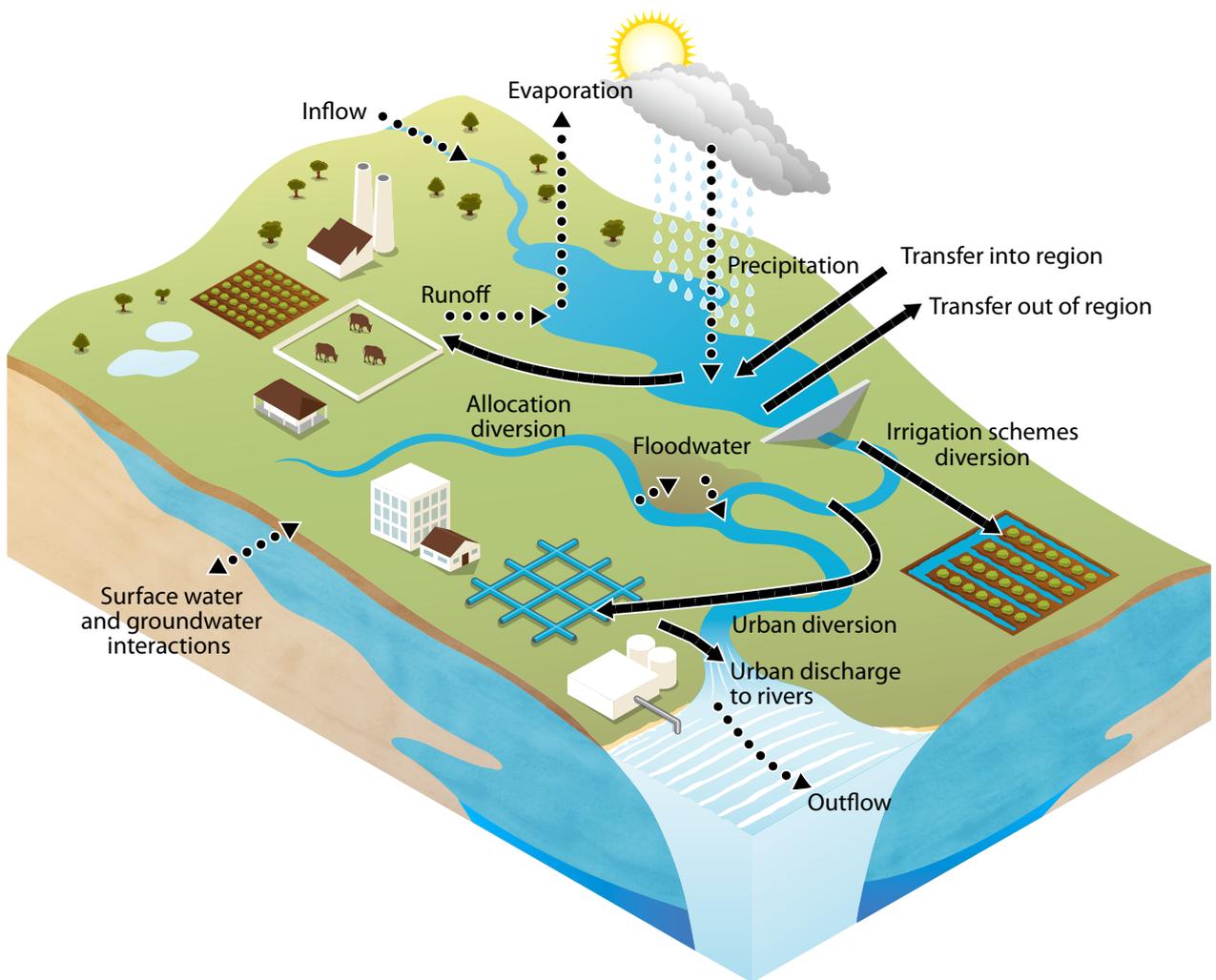
The surface water note provides a consolidated picture of the surface water resources of the region. It includes the water inflows and outflows affecting the surface water store that occurred during the reporting year.

As mentioned in the description of the *Statement of Physical Water Flows*, the note includes flows between the surface water store and other water stores that are part of the region.

Figure 4 illustrates the types of flows that may be reported in this note.



Confluence of Murray and Darling rivers at Wentworth, New South Wales | photograph by Ashley Whitworth.



Legend

Physical water assets	Water users	Water not counted as a water asset of the region
Surface water	Agriculture	Sea
Extractable groundwater	Industry	Off-channel water storage
Urban water system water	Stock and domestic	Flood water out of channel
Irrigation scheme water	Business and household	Soil moisture
Water transactions		Non-extractable groundwater
Water abstraction, transfer, return after use		
Natural water flow		

Figure 4 Surface water inflows and outflows that may be reported in the surface water note.

Groundwater note

The groundwater note offers a consolidated picture of the groundwater resources of the region, including the water inflows and water outflows affecting the groundwater store during the reporting year.

The groundwater note includes intra-regional flows between the groundwater store and other water stores that are part of the region.

Figure 5 illustrates the types of flows that may be reported in this note.



Groundwater monitoring point on the Queanbeyan River, Australian Capital Territory | photograph by Lynton Crabb.

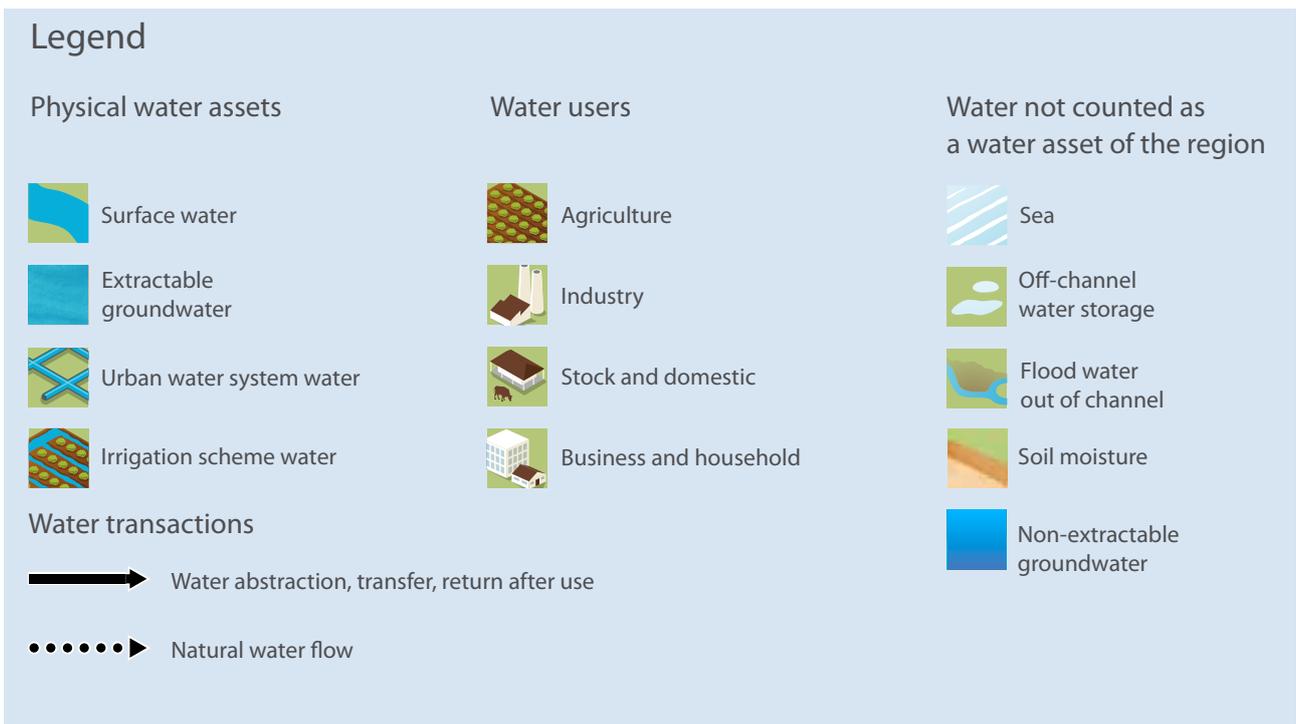
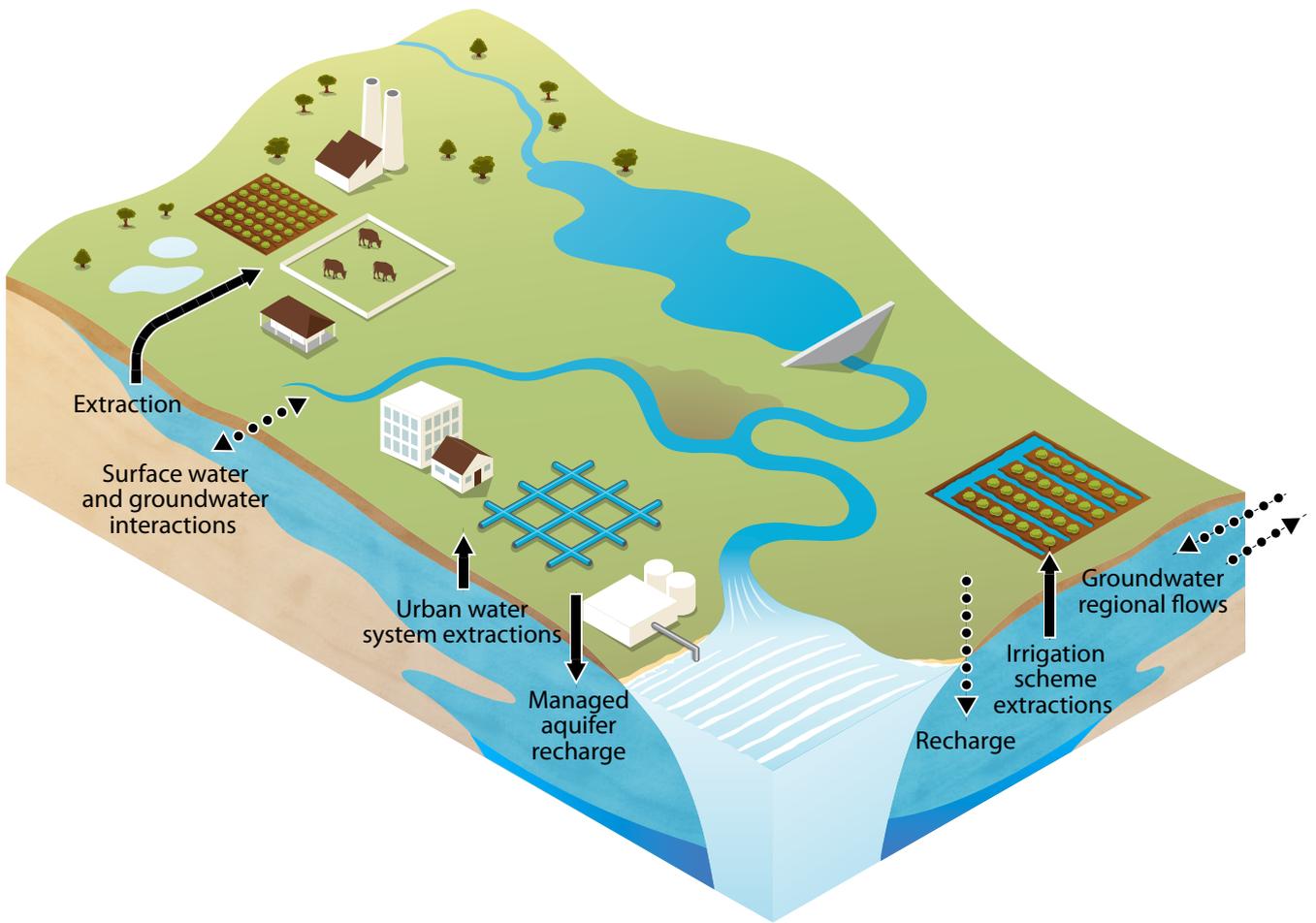


Figure 5 Groundwater inflows and outflows that may be reported in the groundwater note.

Urban water system note

The urban water system note provides a consolidated report on the urban water system of the region. It includes information on all water flows to and from the urban water system as well as between store flows and transfers that are not presented in the water accounting statements.

The urban water system is made up of three sub-systems:

- urban water supply system
- wastewater collection system
- recycled water system.

An analysis of the sub-systems is also included in the urban water system note.

Figure 6 illustrates the flows that may be reported in this note.

The following flows reported in Figure 6 are not separately reported in the water accounting statements because they are interactions between the water stores that make up the region's water assets:

- managed aquifer recharge to groundwater
- urban extractions from groundwater
- urban discharge to rivers (surface water)
- urban diversions from surface water
- urban water delivered for irrigation (when the irrigation scheme is identified as part of the region).

The sub-system analysis provides the following additional information about the urban water supply system, the wastewater collection system and the recycled water system:

- the split of the urban water flows according to the sub-systems they affect by water type, source and quality;
- the flows between sub-systems. These flows are not reported in the note on the system's interactions with the region, as they occur within the urban water system itself; and
- the division of the total urban water use into several components, such as business and households.

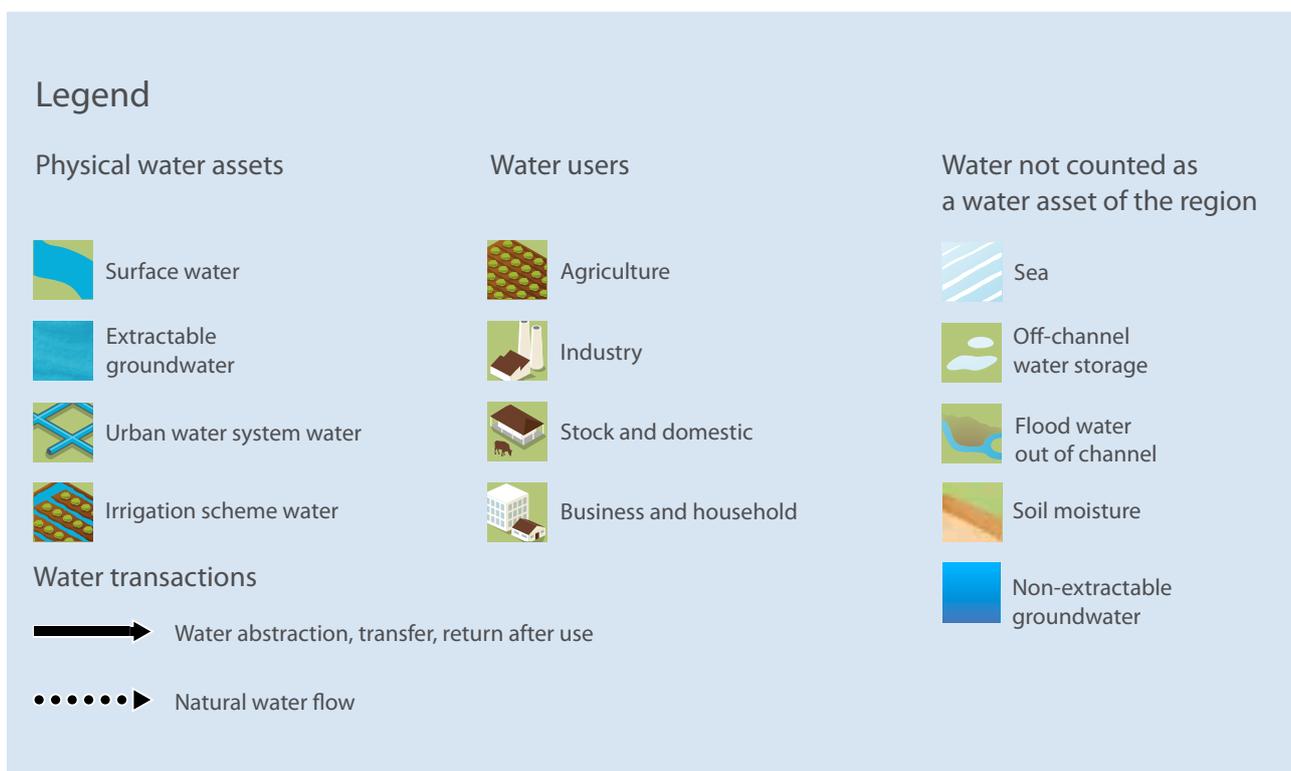
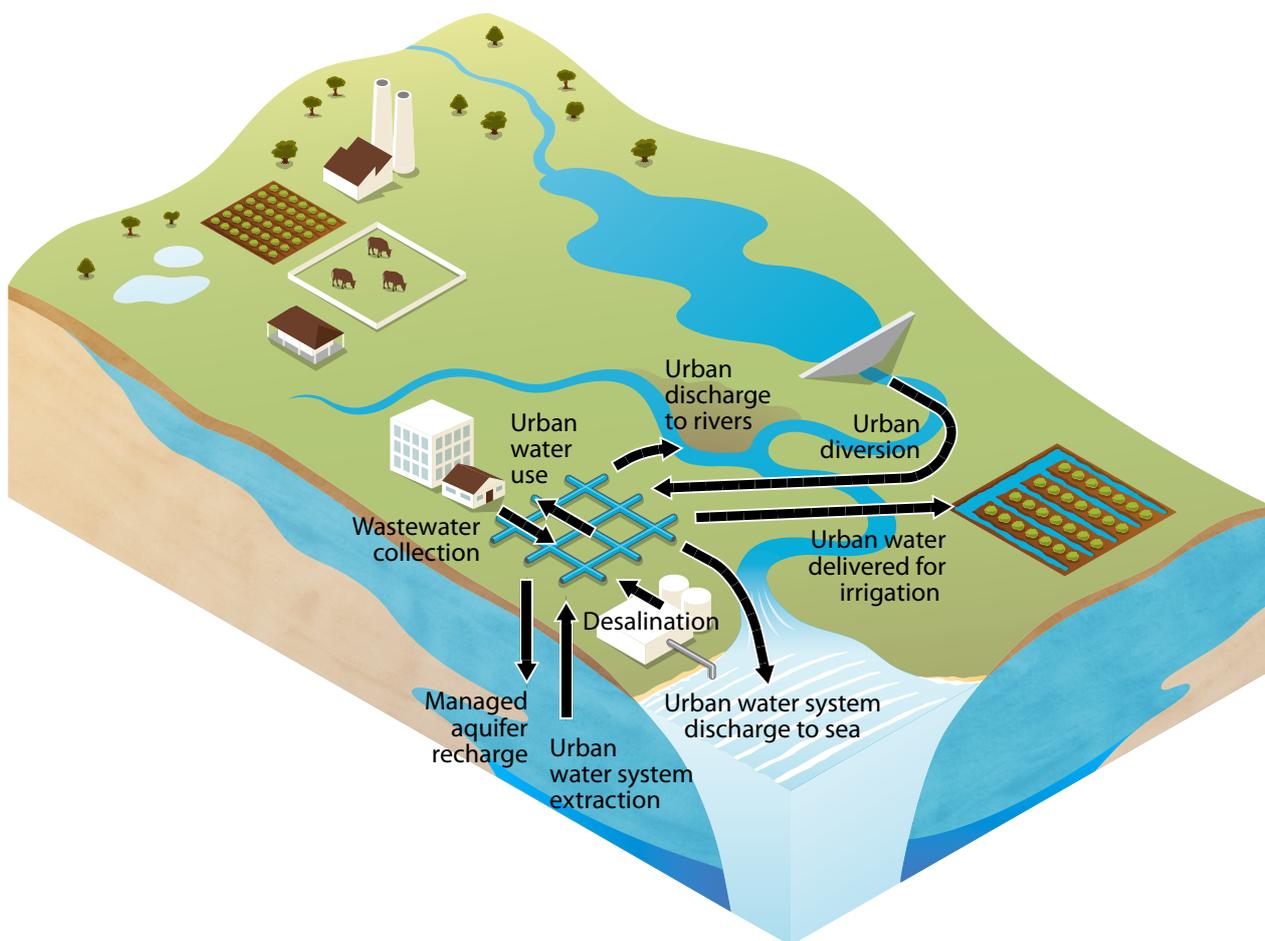


Figure 6 Urban water system inflows and outflows that may be reported in the urban water system note.

3. Navigating the National Water Account

Line item notes

The line item volumes of water reported in the water accounting statements have associated line item notes. The following information on line item volumes is reported:

- what the line item for the reporting year actually represents in the given region. For example, it may provide information about the capacities and end-of-year volumes of the various surface water storages in a region;
- how the volumes for the reporting year were quantified, including:
 - the system from which the data used to determine the volume was sourced;
 - who provided the data;

- the method used to derive, evaluate or model the volume from the data;
- the assumptions, limitations, caveats and approximations made when determining the volume; and
- information about the uncertainty of the volume, if it is available.

Where the comparative year data has been restated in the current year's account, information about the reasons for and the nature of the changes are provided.

Information is also provided when the presentation has changed, for example, if the number or name of the line item has been modified.

Accountability statement

An accountability statement is included in each water accounting report within the National Water Account.

The Australian Water Accounting Standard 1 states that the function of an accountability statement is to provide the user with information about whether the report was prepared and presented in accordance with this standard.⁹

For the National Water Account, an accountability statement attests that a water accounting report accords with the Australian Water Accounting Standard 1 while noting any exceptions. It also includes statements about the:

- quality of the data used in the preparation of the report; and
- responsibility of the Bureau for interpretations of the standard.

⁹ Bureau of Meteorology 2012, *Australian Water Accounting Standard 1: Preparation and Presentation of General Purpose Water Accounting Reports* and associated illustrative water accounting reports.

Overview

The National Water Account is a water resources report. The content and structure is informed by the relevant Australian water accounting standards and the concepts of the water cycle and water balance.

In this chapter the following topics are covered:

- how the physical environment is conceptualised for the National Water Account;
- how the water accounting region is defined;
- a description of water assets and water liabilities from the perspective of the National Water Account;
- how water rights are conceptualised and water use reported upon; and
- the concept of accrual water accounting.



See Chapter 5 for more information about the Australian water accounting standards.

How the environment is conceptualised for the National Water Account

The National Water Account focuses on the volume of water in the environment, its availability, the rights to abstract it and its actual abstraction over time.

The National Water Account reports on the total water resource of a region: the inputs to, outputs from and movements of water within a hydrological region. It includes atmospheric inputs and outputs, such as rainfall and evaporation, as well as flows of water through rivers, pipes, channels and aquifers within the region.

The water available for abstraction is a subset of this total water resource, as some of the water is not physically or legally accessible. Legal rights and claims to water regulate the volume of water that is available for abstraction by individuals and businesses. The volume actually abstracted is also a function of their needs at the time.

The water cycle

In the National Water Account accounting for water flows and changes in water storage is based on a conceptualisation of the terrestrial part of the water cycle as shown in Figure 7.

The terrestrial part of the water cycle includes all water that has precipitated on the land and has not yet evaporated or flowed into the sea. For the purposes of the National Water Account it excludes water in tidal estuaries, which is considered to be sea water.

Water flows

Water flows are fluxes of water that occur between a region's water stores or between water stores inside and outside of the region. Data on the volumes of water flows are aggregated as separate line items. Examples of water flows shown in Figure 7 are:

- precipitation (snow and rain on surface water stores)
- evaporation from surface water stores
- runoff (the net of precipitation on and evapotranspiration from the landscape)
- recharge of the groundwater from the landscape
- water abstractions from the various water stores
- water transfers between the region's water stores and from other regions
- returns after use of urban water and irrigation water.

Information about these water flows is collected as line items. Line items are numbered in a way that is consistent across all regions. This means that direct comparisons can be drawn about the water flows (or line items) across all the regions reported in the National Water Account.

Detailed information about what the line items represent and how the volumes were determined are included in the line item notes.



Water balance: Change in water storage

$$\Delta S = S_c - S_o$$

Where: ΔS : Change in water storage (ML)
 S_c : Volume of water in store at the close of the reporting period (ML)
 S_o : Volume of water in store at the opening of the reporting period (ML)

Water balance: Difference between inflows and outflows

$$\Delta S = I - O + B$$

Where: ΔS : Change in water storage (ML)
I: Water inflows to the water store during the reporting period (ML)
O: Water outflows from the store during the reporting period (ML)
B: Balancing item (ML)

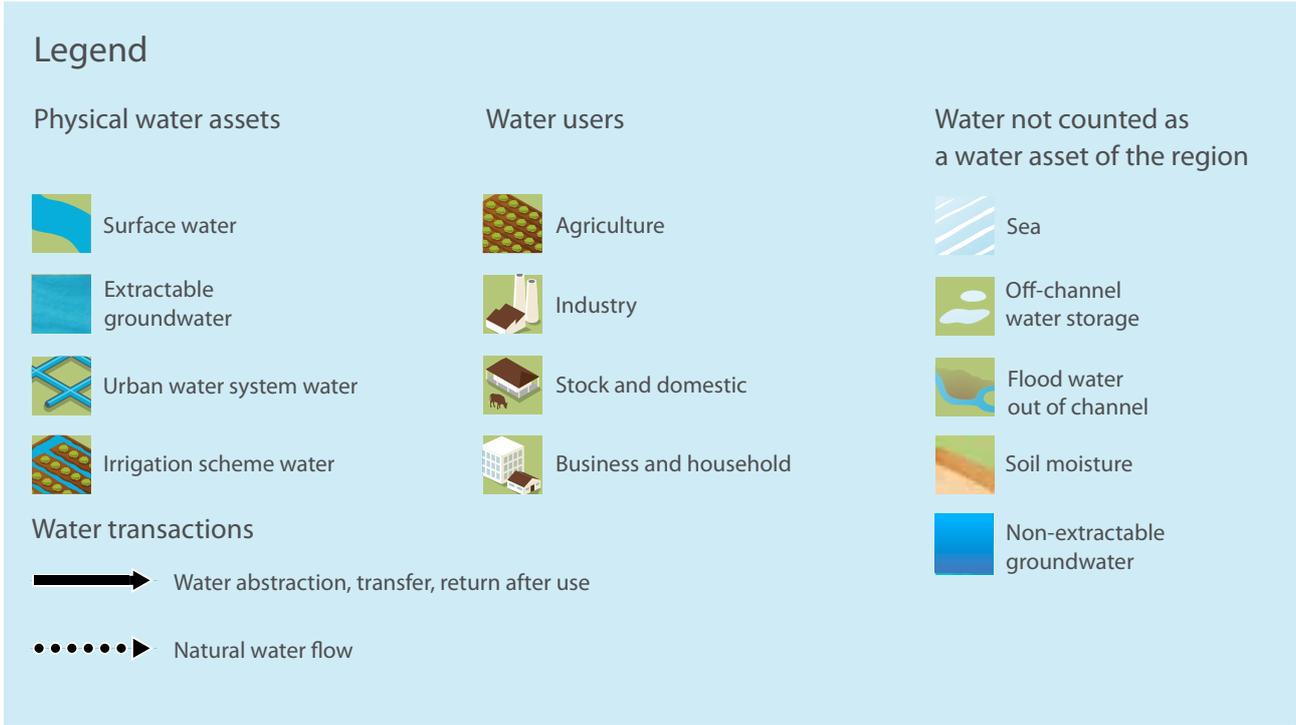
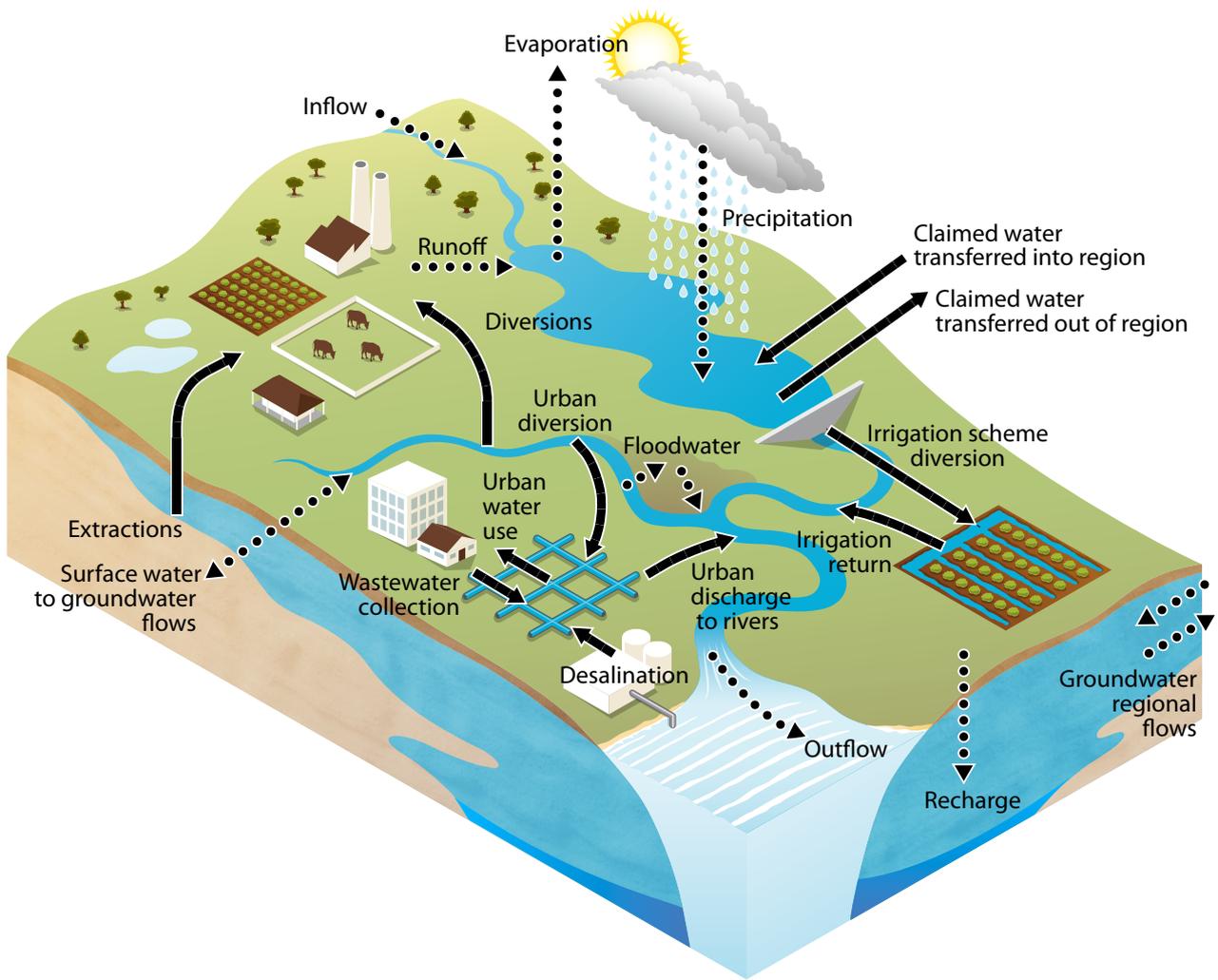


Figure 7 The terrestrial water cycle.

4. Concepts in the National Water Account

Water stores

The intersection of the objective of the National Water Account and the structure of water management in Australia has shaped the identification of the separate water stores in the National Water Account. The water stores separately identified and used are (see Figure 8):

- surface water
- groundwater
- urban water system
- irrigation scheme
- off-channel water
- landscape water.

These water stores differ from those of classical hydrology in that:

1. water available for sharing is separated from the rest of the water resource of the region; and
2. water stores are aligned to the water access rights that are granted by State governments.

Water available for sharing constitutes the physical water assets of the water accounting region. It may include water in the following water stores:

- surface water
- groundwater
- urban water system
- irrigation scheme.

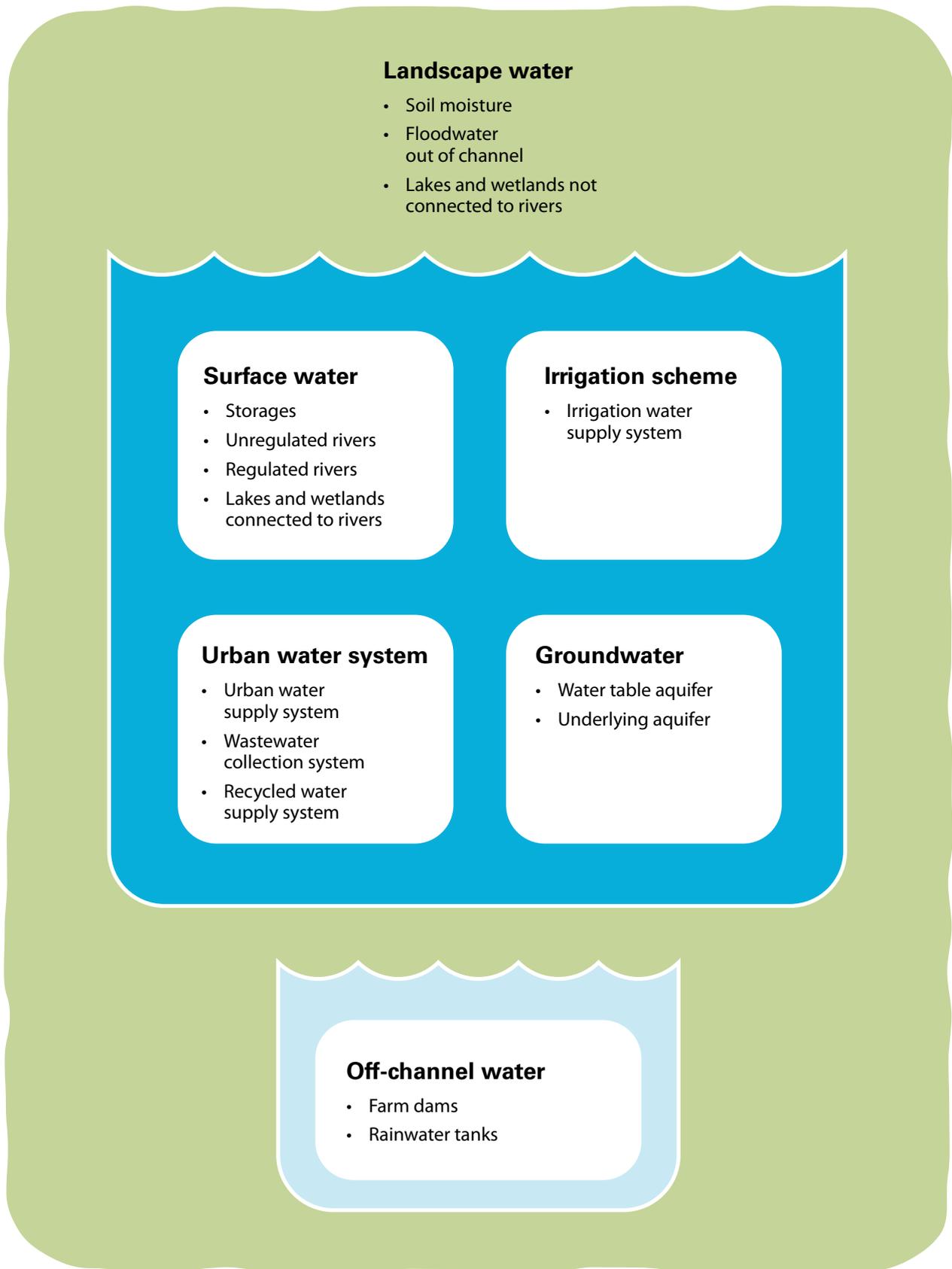
Water located within the boundary of a region but not available for sharing includes:

- off-channel water
- landscape water.

Water balance

Water balance calculations are performed on the components of the water cycle to verify the water mass balance over the whole region and over the separate water stores of the region. The water balance approach means that all of the inflows, outflows and changes in stores add-up. The balancing item reflects changes in stores that are not explained by the estimated water inflows and outflows.

The value of the balancing item is a result of calculation errors and data gaps. In the water accounting sense the balancing item represents the unaccounted-for difference (see page 12).



 The physical water assets of the region that are available for sharing

 Water not counted as a water asset and not associated with a water access right

 Water not counted as a water asset but associated with a water access right and reported in the notes

Figure 8 Types of water stores in the National Water Account.

Definition of the water accounting region

In the National Water Account a region is a hydrological region. All water resources that are available for sharing within a region form the water accounting region.

Whether a water resource is included in the specification of a water accounting region directly influences the way it is reported in the National Water Account, as follows:

- Water that is counted as a water asset of the water accounting region may be reported in the water accounting statements.
- Water that is not counted as a water asset of the water accounting region may be reported only in the notes.

The water accounting regions covered by the National Water Account differ in terms of their water assets.

For example:

- In mainly rural regions of the National Water Account, such as the Murray–Darling Basin or the Ord, most of the water assets are made up of surface water and groundwater. In the

Murray–Darling Basin, for instance, there is relatively little water that is transferred in by users (individuals or utilities).

- In mainly urban areas of the National Water Account, a significant proportion of the water assets may include claims on water from outside the region, desalinated sea water, and/or recycled water produced within the urban water system.
- In rural or urban areas of the National Water Account, irrigation schemes are included in the water accounting region in cases where substantial volumes of water are transferred into them from outside the region. These flows might otherwise not be captured.

Landscape water and off-channel water are a direct resource for some users, for example, timber plantations, owners of farm dams harvesting runoff, and farmers using soil moisture. However, they are not counted as a water asset of a water accounting region because this water is not available for sharing.

Water Assets and Water Liabilities

Water assets

For the purpose of the National Water Account, **water assets** are water or a claim to water which the region holds and from which water users can derive future benefits.

There are two types of water assets, physical water assets and non-physical water assets.

- **Physical water assets**

This refers to water located within the region that meets the definition of water asset and may include some or all of the water in the following water stores, depending on its physical or legal accessibility:

- surface water
- groundwater
- urban water system
- irrigation scheme water.

For the purposes of the National Water Account, the groundwater asset is the managed groundwater volume, usually defined in a water plan.

- **Non-physical water assets**

Claims to water made on behalf of the region are referred to as **non-physical water assets** of the region. They may include:

- inter-government or intra-government agreements to transfer water into the region
- allocations on water rights outside the region on behalf of the region's urban water system, for example, allocation on River Murray licences held by SA Water on behalf of Adelaide.

urban water system).

- contractual arrangements to transfer desalinated sea water into the region
- overdraft of an allocation by a water user. This constitutes an advance granted to water users on future allocation that will offset the future water liabilities of the region
- claims resulting from water rights of another region being traded into the region.

When it is exercised, a claim to water results in a water inflow into one of the water stores of the region.

Water liabilities

The water liabilities of a region are made up of commitments to deliver water, such as:

- water allocations announced;
- water traded-out but not delivered; and
- other inter-basin agreements over the water assets of the region.

A water liability is settled when the water commitment or other obligation to deliver water held by the region is exercised through a water abstraction (for example, allocation abstraction or water transfer out of the region under an inter-basin agreement) or when the obligation is adjusted (for example, forfeits of unused allocations at the end of the accounting period of the water licence).

The conceptualisation of water rights

Water rights

Ownership and control of natural water resources in Australia is vested in the Crown and water access rights are conferred by State and Territory water legislation (see Figure 9).

Part of the water resource is incorporated in water management plan areas, where access is regulated through an entitlement system. Under an entitlement system, the State or Territory licensing authority grants water access entitlements to water users.

The remainder of the water may be accessed under other statutory water rights. This can include basic landholder rights, riparian rights, Indigenous rights and stock and domestic rights.

In water plan areas, water to meet these rights is set aside from the pool of water available for sharing under the entitlement system.

Water access entitlements are categorised by the State and Territory governments with reference to the system from which the water is accessed, the security or reliability of the entitlement and, in some cases, the purpose or intended use of the abstracted water.

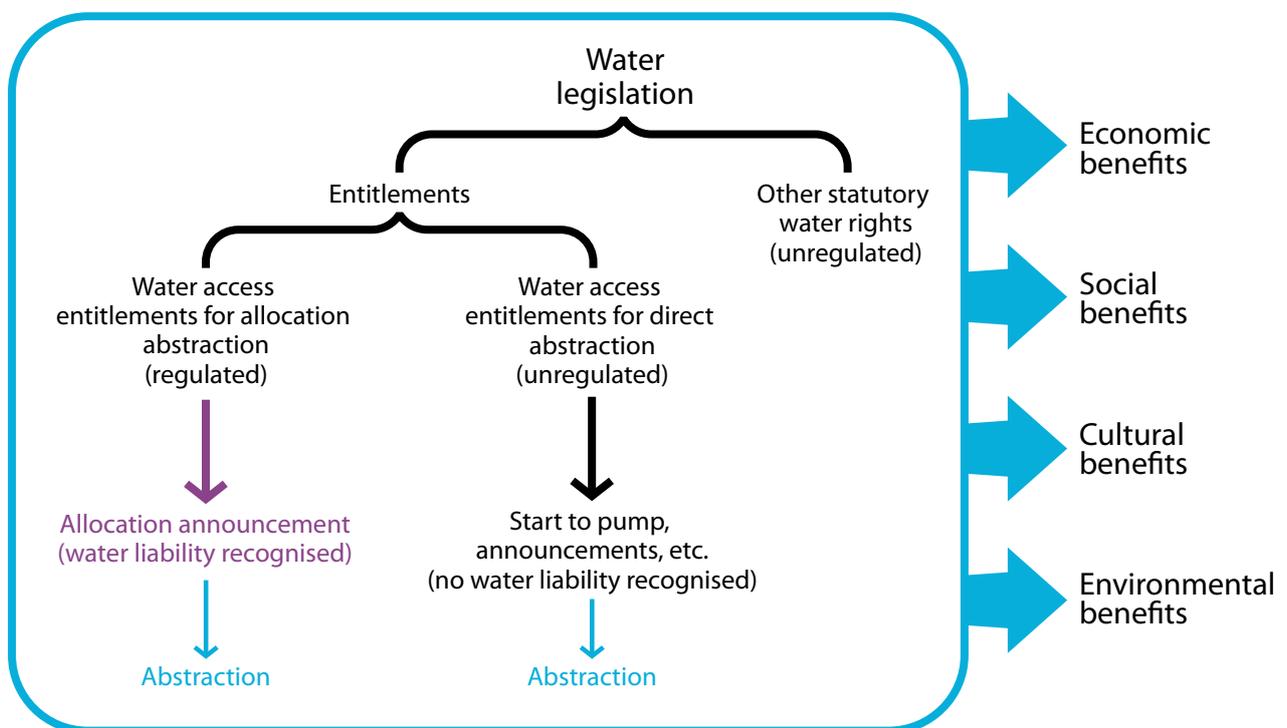


Figure 9 The control of water abstraction through the conferring of water rights.
Note: the benefits derive from the whole water resource not just the entitled portion.

Access to alternative water sources

Alternative water sources are being developed to supplement natural water flows. They include desalinated sea water and recycled water.

These water sources are not controlled by the State and Territory governments in the same way as the natural water resources. They are owned by the organisations that produce them, and access is controlled through contracts or commercial agreements, for example:

- a commercial contract between a major urban water utility and a desalination plant operator for the delivery of desalinated water to the urban water system; or
- a commercial contract between an urban utility and a water user for the delivery of recycled water to the water user.

Accounting for water rights

The diversity of entitlement systems across Australia makes comparisons extremely difficult. For this reason, the National Water Account primarily categorises an entitlement on the basis of whether a water liability, or commitment to deliver water, is recognised prior to abstraction. For example:

- A water entitlement for which a water liability is recognised prior to abstraction is categorised as a water access entitlement for allocation abstraction.
- A water entitlement for which no water liability is recognised prior to abstraction is categorised as a water access entitlement for direct abstraction.

Not all water access entitlements can give rise to a water liability.

Water liabilities exist when it is expected that water will be delivered, as it becomes available, to fulfil entitlements or claims. In cases where there is no capacity for a water delivery, no water liability is recognised.

Contracts and other arrangements to access alternative water sources may or may not create a claim to water (non-physical water asset) or a commitment to deliver water to users (water liability), for the region.



Water access entitlement

A perpetual or ongoing entitlement that allows exclusive access to a share of water from a specified consumptive pool as defined in the relevant water plan.



Water allocation

The specific volume of water allocated to a water access entitlement in a given water year or allocated according to the rules established in the relevant water plan.



Naming conventions for water abstraction

Specific words may be used instead of abstract for the taking of water from the various water sources:

- harvest— for landscape water
- divert— for surface water
- extract— for groundwater.

4. Concepts in the National Water Account

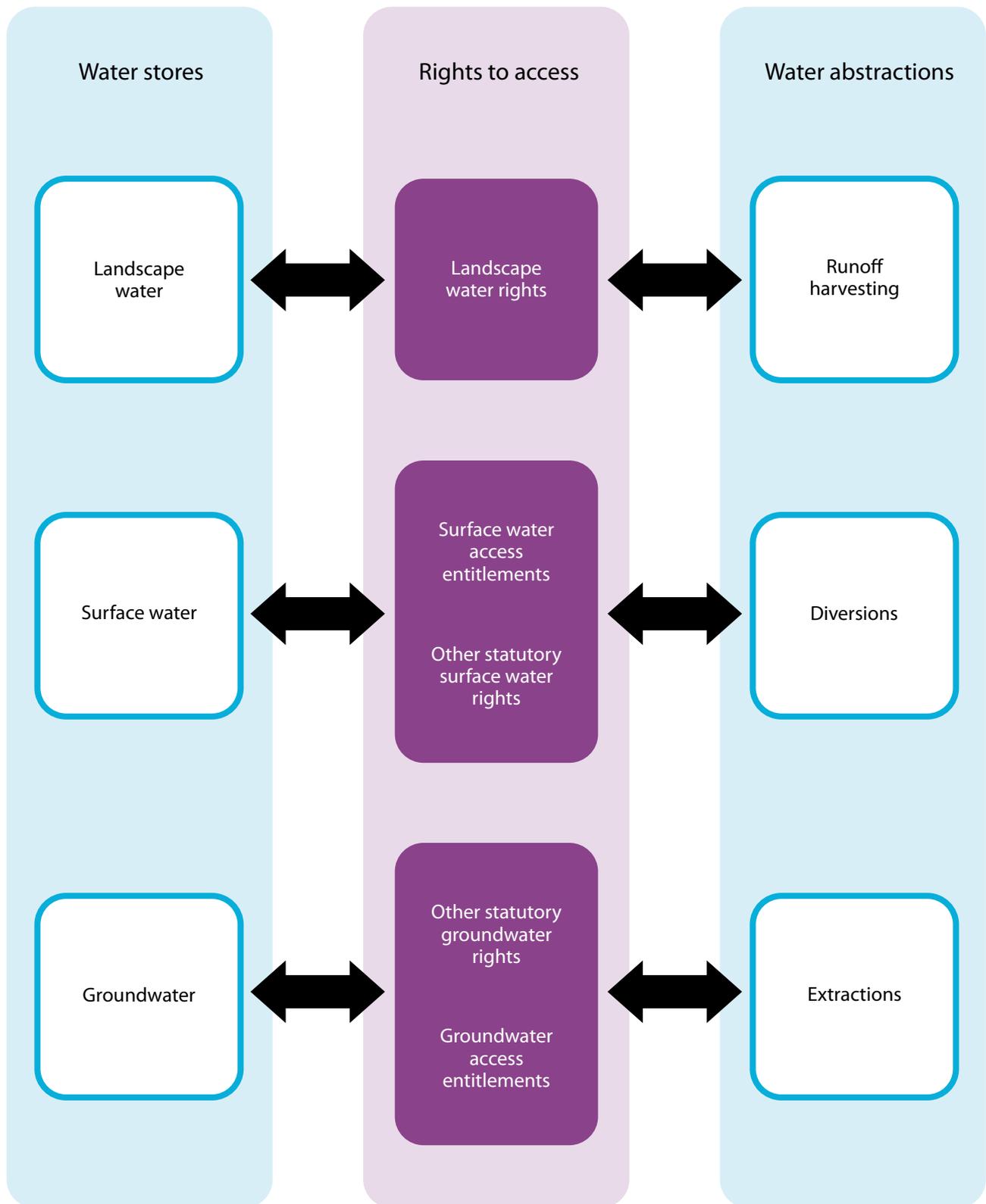


Figure 10 Alignment of water stores, rights to access water and water abstractions.

Alignment of water rights and water stores

In Australia, landscape water, surface water and groundwater resources are usually managed separately. Rights giving access to these resources are also separate and not interchangeable. The National Water Account closely aligns reporting on the water resources and abstraction with the corresponding water access rights (see Figure 10).

The National Water Account distinguishes between three broad types of water access rights conferred by States and Territory legislation:

- landscape water rights, which allow access to landscape runoff that is 'harvested' by farm dams;
- surface water rights, which allow access to surface water that is 'diverted' for storage or use; and
- groundwater rights, which allow access to groundwater that is 'extracted' for storage or use.

These water access rights exist in all States and Territories of Australia, although the specific names and categorisation of rights vary.

Regulated water rights

Regulated water rights in the context of the National Water Account refer to those in which the water access entitlement will result in an allocation.

Under regulated entitlements water is made available for abstraction through the announcement of a water allocation. A water allocation results from an assessment of the total water resource and a determination of how much water can be made available under each type of entitlement according to the rules of the water plan. In the case of water access entitlements for allocation abstraction, the volumes of water allocated or claimed and the volumes abstracted are reported in the water accounting statements.

In the case of water access entitlements to a groundwater resource, a formal annual water allocation announcement is rare. Often the full volume of the entitlement is considered to be available for extraction by the entitlement holder. In those cases, the National Water Account considers that the full entitled volume constitutes an allocation announcement. Under these circumstances the entitlement is defined as regulated. The full entitlement is recognised as a water liability of the region prior to the groundwater extraction.



Regulated water rights

An entitlement or claim to water is considered to be regulated when:

- the holder of a water entitlement or a claim to water can order the delivery of water or extract water as per the entitlement or claim; and
- the volume of water as specified on the entitlement or claim is 'at call' and subject to relatively few access conditions under normal circumstances; and
- the entitlement or claim to water is volumetrically well specified.

In the case of the surface water resource, a regulated entitlement may only exist in a physically regulated system, where water is held in an upstream storage.

4. Concepts in the National Water Account

Unregulated water rights

In the National Water Account, unregulated water rights include:

1. water access entitlements for direct abstractions; and
2. other statutory water rights.

Water under an unregulated access entitlement is made available through announcements to start or cease to pump (diverting). These are triggered by the availability of sufficient water in the system according to rules specified in the relevant water plan (for example, when water in a river is above a certain level at a control point).

Other statutory water rights such as landholder, riparian, Indigenous, and stock and domestic rights may be exercised whenever water is physically available.

The National Water Account does not recognise any water liability prior to the exercise of an unregulated water right.

For all unregulated water rights, the volumes of water abstracted (not the claim itself) resulting from the exercise of the claim are reported in the water accounting statements, where known.



Unregulated water rights

An entitlement or claim to water is considered to be unregulated when the holder of a water entitlement or a claim to water cannot order the release or delivery of water. The holder must abstract or otherwise exercise their entitlement or claim subject to that water being available.

In the case of the surface water resource, an unregulated entitlement may exist in both a physically unregulated or regulated system. In the case of a physically regulated system, it gives access to water spilling from or generated below an upstream storage, and not to water in the storage.

An unregulated entitlement is generally capped by a maximum annual diversion limit and specifies conditions for diversions, such as maximum pumping rate.

Water trade

Some water access entitlements can be traded. Others, such as basic landholder rights (stock and domestic, riparian rights) cannot be traded separately from the land.

The National Water Account distinguishes and reports on the following types of trade (see Figure 11):

- water access entitlement (permanent trade)
- lease of water access entitlements
- allocation trade.

The National Water Account also differentiates between intra-regional trade and inter-regional trade.

Trade in water access entitlements between various security or reliability classes within a region is not reported in the National Water Account.

All approved water trade transactions are reported in the water market activity note if the information is available.

In the case of inter-regional trade, a delivery right is acquired by the region receiving the trade against the region from which it originates. This delivery right represents a water liability for the latter and a water asset for the former. The liability is settled when water is actually transferred between both regions. This delivery right and water transfer are reported in the water accounting statements.

Intra-regional trade (trade within a region) may also impact upon the water assets and water liabilities of the water accounting region. For example, where an exchange rate is applied to account for losses in the transfer of water from the location of the seller to the location of the buyer. Where this occurs, water allocations may not directly reconcile with each other.

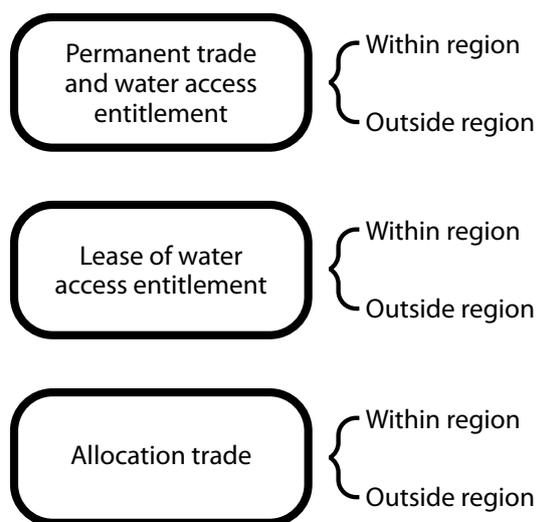


Figure 11 Typology of water trade



Water access entitlement—permanent trade

A transaction to transfer a water access entitlement permanently from one legal entity to another, with or without change in location of the abstraction point.

Lease of water access entitlement

A transaction to transfer a surface water access entitlement for a specified term from one legal entity to another, with or without change in location of the abstraction point.

Allocation trade

A transaction to transfer an allocation from one legal entity to another, with or without change in location of the abstraction point.

Reporting of water use

Water abstractions

Legal water abstraction depends on the existence of a right to access, abstract or use the water.

Actual water abstraction can occur illegally. The volumes of water abstracted illegally are difficult to quantify except in data-rich regions. The National Water Account does not report explicitly on illegal abstractions but they are captured in the unaccounted-for difference in the water accounting statements.

In accordance with the practice of aligning water abstraction with the water access rights in the National Water Account, each abstraction from a water store is named for the access right under which the abstraction is made. Examples include 'surface water diversions —other statutory rights' and 'entitled diversion of allocated surface water to users'.

Water abstraction appears as a decrease in the surface water, groundwater or landscape water store. It can also appear as an increase in the recipient store, that is, off-channel water store, urban water system or irrigation scheme.

Water use and benefits

All the water in a system may produce benefits whether it is abstracted or left in the water system. The National Water Account reports on the economic, environmental, social and cultural benefits provided by the total water resource of a region.

Some types of benefits are more readily specified and documented than others.

Economic benefit from water is usually provided by abstracting water from its sources under a water access entitlement. These are well documented and include irrigation, mining, industrial and commercial uses. Economic benefits are also derived from water

left in-stream, for example, through the generation of hydro-power.

The environmental benefit of water is increasingly understood and documented. Environmental water objectives are being incorporated into water management frameworks. They can include, for example, environmental water regime requirements needed to maintain ecological values of water dependent ecosystems at low levels of risk.

Objectives can be contained in environmental water provisions that specify water level or flow criteria for given periods at key representative sites.

Environmental objectives are provided through:

- planned or rules-based environmental water
- held environmental water.

Planned environmental water is water that is committed or preserved by plans or other legislative instruments.

Held environmental water is water available under a water access entitlement, a water delivery right or an irrigation right.

The share of water that provides other public benefits, such as social and cultural benefits, is less well documented. There is much less specificity about water management for social and cultural benefits, although it is a requirement that water management regimes provide for them. Some information is provided in the notes to the National Water Account. This is an area that will be further developed in the National Water Account over time.

Water can produce several benefits at the same time. For example, water released from a storage for irrigation purposes can also meet environmental flow criteria. In such cases, the National Water Account will register the benefit only once, relating it to the original purpose of the release or abstraction. This means that some benefits may be under-represented in the National Water Account.

Accrual accounting

The National Water Account applies an accrual accounting approach.

This means that changes to water assets and water liabilities are recorded when the decision that creates the claim or obligation on water occurs.

In many cases, the changes to water assets and water liabilities are recorded at the same time as the actual water flow, for example, runoff to surface water or diversion from a river under a riparian water right.

Where this is not the case, the change to water assets and water liabilities are recorded before the actual flow is recorded.

One typical water event for which an obligation or claim is recorded before the actual water flow is an allocation announcement.

Figure 12 shows the accrual transactions and water flows that may be recorded by the National Water Account. In the figure, the terms shown in purple constitute the accrual (or non-physical) transactions, while the terms shown in blue represent the (physical) water flows. Together they form what is referred to as the 'allocation reconciliation equation'.

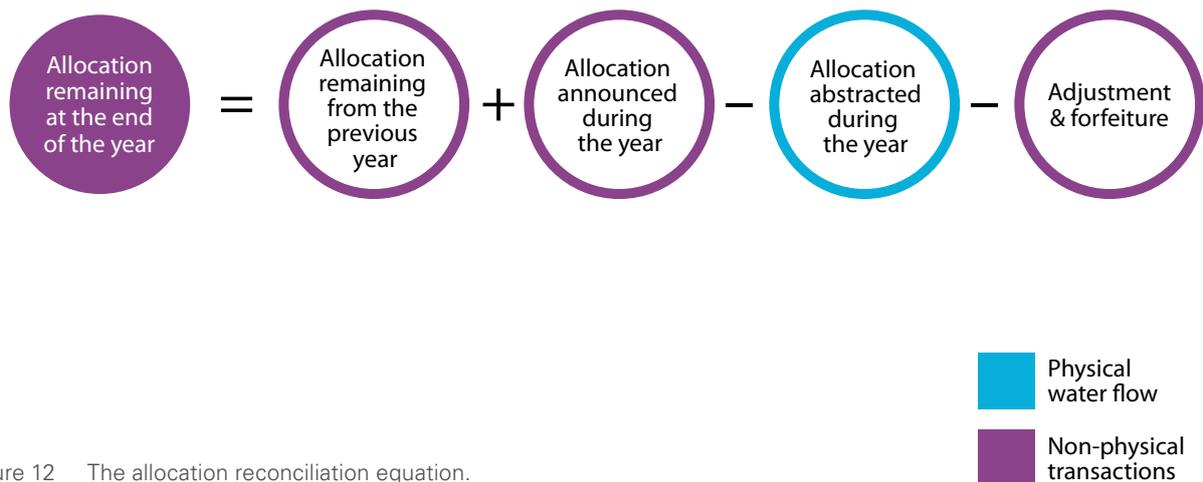


Figure 12 The allocation reconciliation equation.

4. Concepts in the National Water Account

The allocation reconciliation equation (Figure 12) means that all terms should reconcile in the following instances:

- During the reporting year, announced allocations are recognised as increases of water liabilities and add to the allocation remaining (water liability balance) from the previous year.
- The water liability, or commitment to deliver water, is met when allocated water is abstracted during the year (physical water flow).
- At the end of the reporting year, the allocated volume that has not been abstracted is either totally forfeited or partially forfeited (adjusted) or carried over to the next reporting year as an allocation remaining at the end of the year.
- In the event that the water year of the entitlement corresponds to the National Water Account reporting year:
 - the volume of the allocation remaining equals the carry-over volume announced by the licensing authority; and
 - the volume of the adjustment and forfeiture equals the allocated volume that has not been abstracted less the carry-over volume announced by the licensing authority.
- In the event that the water year of the entitlement does not correspond to the National Water Account reporting year, (that is, if the reporting year ends before the allocation carry-over

is announced) the volume of the allocation remaining at the end of the year equals the totality of the allocated volume that has not been abstracted.

In the water accounting report, the terms of the allocation reconciliation equation are reported in the following water accounting statements:

- *Statement of Water Assets and Water Liabilities:*
 - allocation remaining from the previous year (as a water liability)
 - allocation remaining at the end of the year (as a water liability).
- *Statement of Changes in Water Assets and Water Liabilities:*
 - allocation announced during the year (as a water liability increase)
 - adjustment and forfeiture (as a water liability decrease).
- *Statement of Physical Water Flows:*
 - allocation abstracted during the year (as an outflow).

Water events for which no commitment is recognised, such as runoff to surface water or diversion from a river under a riparian water right, are reported both in the *Statement of Changes in Water Assets and Water Liabilities* and in the *Statement of Physical Water Flows*, as in those cases the physical water flow itself increases or decreases the water asset of the water accounting region.

Overview

This chapter will help you to understand the:

- role of national water reform in driving the development of water accounting
- development of water accounting and water accounting standards
- development of the National Water Account
- the approach to the compilation of the National Water Account.

Water accounting and water reform

The Council of Australian Governments' National Water Initiative directed¹¹ the development of water resource accounting to ensure that adequate measurement, monitoring and reporting systems are in place in all jurisdictions, to support public and investor confidence in the amount of water being traded, extracted for consumptive use, and recovered and managed for environmental and other public benefit outcomes.¹¹

Water information is a critical underpinning of the water reform process, both on which to base decisions and against which to measure progress.

An increasing focus on the sustainable management of catchments and aquifers has led to closer attention to understanding the water balance, levels of abstraction

and environmental and other non-consumptive requirements.

An additional information imperative derives from water trade, which depends on adequate information to fully inform the operation of the marketplace.

Water accounting is an emerging practice guided by the development of standards and through applications such as the National Water Account. These activities support the achievement of the water accounting objective of the National Water Initiative, which is to improve the measurement, monitoring and reporting of water.

¹¹: Council of Australian Governments 2004 Intergovernmental Agreement on a National Water Initiative, paragraph 80.

Development of water accounting

Water accounting merges the science of hydrology and the rigour of accounting.

From hydrology, it borrows the concept of the water cycle and the water balance.

From accounting, it borrows the foundation concepts of identification, quantification, recognition, presentation and disclosure.

The National Water Initiative is Australia's blueprint for water reform. This inter-governmental agreement committed governments across the country to a number of actions to achieve a more cohesive national approach to the way water is managed, measured, planned for, priced and traded.

The National Water Initiative provided the impetus for developments in the area of water accounting. This included the *Stocktake and Analysis of Australia's Water Accounting Practice*¹⁰ that described existing water accounting capabilities and requirements for future development. This report recommended establishing water accounting as a discipline, similar to financial accounting, to serve external users' needs as well as the management requirements of water businesses.

Following the Stocktake report's recommendations, the Natural Resource Management Ministerial Council established the Water Accounting Development Committee. This Committee was mandated to develop water accounting standards and practice through the National Water Accounting Development Project.

The National Water Accounting Development Project ran from 2007 until June 2010. It was partly funded by the National Water Commission's Raising National Water Standards Program. Outputs from the development project include:

- a user information requirements study
- the development of the *Water Accounting Conceptual Framework for the Preparation and Presentation of General Purpose Water Accounting Reports*¹¹

- the identification of a process for developing the Australian water accounting standards
- preparation of the Exposure Draft of the Australian Water Accounting Standard 1
- development of a proposal for future institutional arrangements to support water accounting.

The Commonwealth *Water Act 2007* gave the Bureau specific water information powers and obligations. The statutory water information functions of the Bureau include collecting, interpreting and disseminating water information, publishing an annual National Water Account and issuing national water information standards.

In October 2008, the Council of Australian Governments Working Group on Climate Change and Water endorsed the reconstitution of the Water Accounting Development Committee as the Water Accounting Standards Board. The Board came into existence on 20 April 2009, as an independent advisory board to the Bureau, overseeing and coordinating the development of water accounting standards.

Water accounting standards

The *Water Accounting Conceptual Framework for the Preparation and Presentation of General Purpose Water Accounting Reports* underpins the development of water accounting standards. In May 2009, the *Preliminary Australian Water Accounting Standard* was also released for adoption and public comment. The preliminary standard was tested by the Bureau in a pilot of the National Water Account and other pilot projects. This information contributed to the development of the *Exposure Draft of Australian Water Accounting Standard 1*.

The *Exposure Draft of Australian Water Accounting Standard 1* was made available for voluntary adoption and review and feedback in October 2010. Stakeholder consultation and feedback assisted with the development of the final Australian Water

¹¹ This report was commissioned in 2006 by the Australian Government Department of Agriculture, Fisheries and Forestry.

Accounting Standard 1 which was released in October 2012.

The standard provides guidance on the preparation of general-purpose water accounting reports. The water accounting reports are designed to inform users about how water resources have been sourced, managed, shared and used during the reporting period. They aim to enhance public and investor confidence in the amount of water available, allocated, traded, extracted

for consumptive use and recovered and managed for environmental and other public benefit outcomes.

The Bureau continues to develop and maintain the Australian water accounting standards and support their voluntary adoption. This includes the development, along with the Auditing and Assurance Standards Board, of a standard for assurance engagements for general-purpose water accounting reports.

Development of the National Water Account

Under the Commonwealth *Water Act 2007* the Director of Meteorology through the Bureau is required to publish an annual National Water Account.

In late 2008, the Council of Australian Governments resolved that a National Water Account Committee would be established to assist the Bureau in the development of the National Water Account. The National Water Account Committee has had an important role supporting the Bureau in producing a pilot followed by the first National Water Account.

In 2009, the Bureau tested a range of methods and processes necessary to produce the National Water Account. The Pilot National Water Account was published in December 2009. It demonstrated the breadth of information being considered for inclusion in the National Water Account and contained demonstration water accounting reports for the Murray–Darling Basin, and the Onkaparinga, Murrumbidgee and Namoi–Peel catchments.

Pilot testing was also conducted on the Gngangara groundwater system, South East Queensland and Melbourne regions.

Feedback and knowledge gained through the pilot process guided the shape, content and structure of the National Water Account. The first National Water Account was published in 2011 for the 2009–10 year. A continuous improvement strategy has been adopted for the development of the National Water Account. This involves cycles of evaluation and review leading to developments in methods, coverage and presentation. The National Water Account is prepared to conform to the relevant Australian water accounting standard. Any deviation from the standard and the reasons for that deviation are explained in an accountability statement.

A significant achievement for the Bureau and contributing water agencies

The annual publication of the National Water Account is a significant achievement for the Bureau and its reporting partners. The Bureau has led this development and worked closely with water agencies across the country to define the scope of information and resolve the many methodological challenges that have arisen throughout its development.

The National Water Account is compiled by the Bureau from information sourced both internally and from its reporting partners.

For the National Water Account, the Bureau provides climatic data that includes temperature, precipitation and the information about natural inflows and outflows, such as runoff and groundwater recharge. The exception is where the reporting partners own models are used because they yield more accurate values.

Some information is sourced by the Bureau from data originally provided by reporting partners and other organisations named under the Commonwealth Water Regulations 2008.

The reporting partners provide all the values reported in the National Water Account about the rights, entitlements and abstraction of water. Contextual information, such as the description of the physical systems and the administrative arrangements, is largely provided by the lead State and Territory water agencies.

The information provided by the reporting partners is reviewed by the Bureau to ascertain that it meets National Water Account requirements and is fit for the reporting purpose.

The technical reporting capacity of the Bureau has been enhanced through its Water Information Research and Development Alliance with the CSIRO. Reporting capacity within reporting partners has been enhanced through the Australian Government's Modernisation and Extension of Hydrologic Monitoring Systems Program.

The involvement of a large number of organisations in the preparation of the National Water Account has enhanced the breadth and depth of information gathered. The information sharing has, in turn, strengthened the technical capacity of all involved.

In addition, knowledge has been built within the Bureau and its partners about the requirements and benefits of water accounting.

Consultation and collaboration has been essential to the successful compilation of the National Water Account.

A full list of National Water Account reporting partners can be found at www.bom.gov.au/water/nwa



Australian Government
Bureau of Meteorology

