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D4: Consideration of water as a produced asset

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Executive Summary

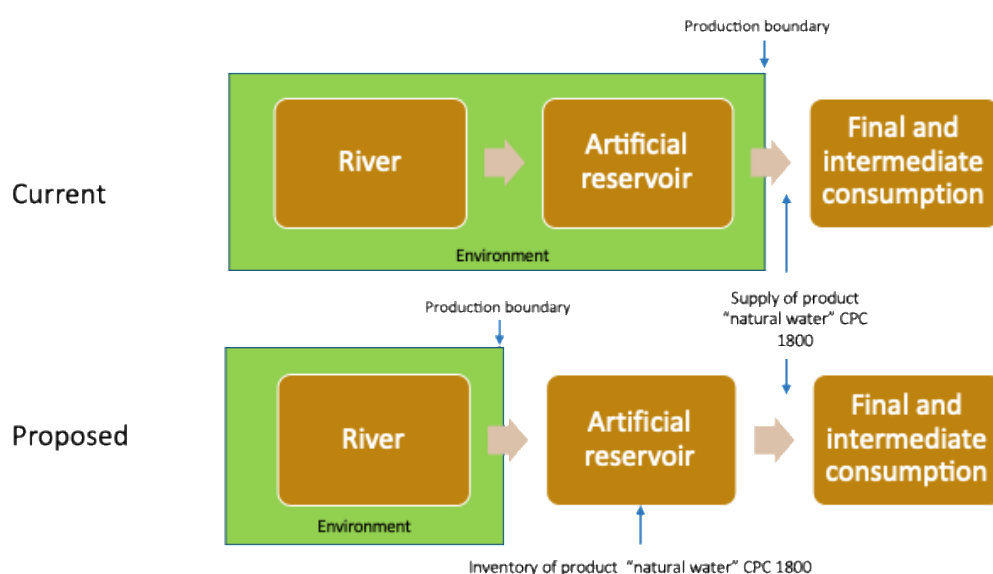
This Guidance Note is for Issue D4 “*Consideration of water as a produced asset (e.g. water in artificial reservoirs)*” in the SEEA Central Framework (SEEA-CF) update list.

Water availability varies worldwide, and in many places it is scarce, with availability varying within and between years. With changing water availability due to factors such as climate change, and water demand increasing with a growing population and economy, water policy and management are becoming increasingly important. Information from water accounts is used for water policy and management, and the update of the SEEA-CF provides an opportunity to make them more useful to decision-makers.

Artificial reservoirs are a key tool for water management. They have three functions to control, regulate and store water. Control and regulation are, for example, to manage water from natural bodies of surface water (e.g., rivers and lakes), for flood protection, navigation and hydroelectric power. Water is stored to ensure it is available when there is demand in the economy (e.g. for drinking water, irrigation, and hydroelectricity). The construction and operation of artificial reservoirs have profound impacts on the economy and environment. These impacts are not fully captured in the current SEEA-CF water accounts.

Currently, the SEEA-CF classify all water, including that in artificial reservoirs, as a natural resource, with production recorded when water is abstracted from a water body. This treatment, however, overlooks the significant human effort and capital required to create and manage reservoirs for the purpose of supplying water in a different time period. It also means that the treatment of water differs from that of other natural resources that enter the economy through the deployment of capital, labour and intermediate consumption.

Figure 1. Current and proposed production boundary for water.



The paper proposes recording the production of water in artificial reservoirs used primarily for water supply at the time it enters the reservoir (Fig. 1), and treating the water held in the reservoir as an inventory, as defined by the 2025 SNA, of the product “Natural water” (CPC 1800). The current SEEA-CF treatment is that water production occurs at the time of abstraction from artificial reservoirs.

The primary arguments for moving the production boundary are:

1. Substantial human intervention is required to create and manage reservoir water, including the use of labour, capital, and goods and services. The reservoirs displace water in time and space, enabling it to be made available to users in a different time period.
2. The creation and operation of artificial reservoirs mean that water that would naturally flow through the landscape is not available to downstream users, imposing an opportunity cost on these potential users.
3. The creation and operation of artificial reservoirs increases the amount of evaporation above that which would have occurred in the absence of the reservoir, reducing the overall volume of water available, and another opportunity cost to downstream users as well as the operator of the reservoir.
4. This approach aligns with the treatment of other natural, such as cultivated forests, which are considered produced assets and with other natural resources that are displaced in time and space by human activity and are not, *per se*, “created”. For example, iron in the ground, which becomes the product “Iron ore” (CPC 1410) when it is removed from the ground.
5. Moving the production boundary more accurately reflects the economic activities associated with water supply and management, making accounts more relevant to decision-makers.

The proposal to move the production boundary does not affect the existing water asset account, but has several implications. Significantly, this changes the timing of production, from when the water leaves the reservoir to when it enters the reservoir. Water entering artificial reservoirs would be recorded as the use of a natural resource by the reservoir's operator (e.g., the water supply industry, ISIC 36) and the water held in the reservoir for the purpose of supply would be an inventory of the product “Natural water” CPC 1800. Production would be the amount of water entering the reservoir less any return flows. Losses from the inventory, such as those from evaporation and seepage, would be recorded as a use by the water supply industry.

The Physical Supply and Use Tables (PSUT) can be adapted to accommodate this change by:

- Adding a column "Change in inventory"
- Splitting the water supply industry (ISIC 36) into water storage and water distribution

Example PSUTs and matching figures are provided in the body of this Guidance Note to compare the existing and proposed treatments. PSUTs for the proposed treatment using example data for "wet" and "dry" years are used to illustrate these changes in the PSUT, the changes to production of “Natural water” CPC 1800,

and to show how they more comprehensively capture the flow of water and the role of reservoirs. Suggested text for the SEEA-CF update is also provided.

The changes to PSUT are mostly a rearrangement of the data included in the existing SEEA-CF water PSUT and asset account. These accounts have been widely compiled, and the technical challenge of producing the proposed PSUT is no greater than that for the existing accounts.

The adoption of the proposal will require clear guidance on the definition of artificial reservoirs, the treatment of water in artificial canals, rainwater tanks, managed aquifer recharge (where water is injected into a natural aquifer) and return flows (from the economy to the environment).

The treatment of water in artificial reservoirs is relevant to other issues in the SEEA-CF update, including water valuation (Issue D7), the treatment of losses (Issue B2), links to policy (A6), the linkages between the SEEA-EA and SEEA-CF (Issue A1), and SNA consistency (A9).

The arguments against the change are:

1. Water cannot be produced as it is not physically transformed
2. The change is unnecessary as the information is already available in the existing accounts
3. Water availability is based on rainfall, not human intervention
4. The change would mean there is a disconnect between the way the production boundary is interpreted in the SNA, meaning there is a disconnect between SNA and SEEA-EA
5. Practical challenges, including the delineation of artificial reservoirs, distinguishing the primary purpose of reservoirs, and the measurement of stocks and flows
6. The possible impacts on related issues in the 2028 SEEA-CF update, and in particular, water valuation (Issue D7) and the treatment of losses (Issue B2)

In response, one is a fundamental issue, and if water cannot be produced, this in itself would be a change requiring a rethink of the SUT. Second, the information in the current asset account does contain this information, but the SUT does not reflect the economic intervention and can be adapted with information from the asset account to reflect this. Third, surface water availability is dependent on rainfall and at present there is an anomaly as water can be produced from artificial reservoirs in periods when there is no rain. Fourth, those implementing the SNA could also consider moving the boundary for water using the SEEA-CF update. Practically, the change of the time of production is unlikely to have a significant impact on total GDP although in places of high rainfall variability it would alter the IVA of the water supply industry (ISIC 36). Fifth, measurement challenges exist with the current water asset account and SUTs, and additional guidance on the scope, delineation, and primary purpose of artificial reservoirs can be provided to aid. A range of material and practical experience is available to support implementation. Sixth, the impacts on related issues must be considered and a process is needed to ensure alignment between these issues.

Questions

1. Can water be produced?
 - a. If it is produced, then when does production occur?
 - b. If it is produced, is water stored in artificial reservoirs for future supply and inventory as defined in the SNA?
2. To what degree, if any, should the conceptual model be dictated by:
 - a. Practical measurement considerations?
 - b. The implications for the SNA?
 - c. Likelihood of uptake by national accountants?
3. What guidance is needed on the:
 - a. Definition and delineation of artificial reservoirs
 - b. Distinguishing the primary purpose of artificial reservoirs
 - c. Measurement of water stocks and flows
4. How to effectively coordinate issue D4 with other issues in the SEEA-CF update?
 - a. Water valuation (D7), links to SEEA EA (A1), treatment of losses (B2), linking stock and flow accounts (A8), SNA consistency (A9), and links to policy (A6)

1. Description of the issue

1. Issue D4 is “Consideration of water as a produced asset (e.g. water in artificial reservoirs)” in the SEEA Central Framework issue update list. Issue D4 is described as:

“This was also an issue during the SEEA CF 2012 revision, which may need to be revisited. Currently the SEEA CF does not consider water (such as in artificial reservoirs) as a produced asset, but instead only records production at the point the water is abstracted from a water body (natural or artificial). Further discussion is needed on the appropriate recording, considering also the link to the SNA production boundary.”

2. Artificial reservoirs are one of four surface water asset classes defined in the SEEA-CF (Annex 1). The others are (1) rivers and streams, (2) lakes, and, (3) snow, ice and glaciers. The SEEA-EA includes the same entities as ecosystem asset classes, but “snow, ice and glaciers” is renamed “Polar-alpine (cryogenic)”. Artificial reservoirs are defined in the SEEA-CF as purpose-built reservoirs used for the storage, regulation, and control of water resources (para 5.477). Other human-built infrastructure, such as pipes, canals and drains, are often connected to artificial reservoirs and water treatment facilities.
3. Artificial reservoirs are also defined elsewhere. For example, the International Commission on Large Dams (ICOLD)¹ defines them as an “artificial barrier that has the ability to impound water for the purpose of storage or control of water”.
4. The current SEEA Central Framework (SEEA-CF) treats water as a natural resource regardless of the source from which it is extracted. That is, water extracted from a lake, river, artificial reservoir, or the ground is all considered a natural resource. Production is recorded at the point where water is abstracted from any water body (natural or artificial). This treatment, as noted in the description in the update list, was debated in previous SEEA revisions^{2,3} and aligns with the 2008 SNA, but overlooks the significant human intervention required to create and manage artificial reservoirs.
5. The paper re-examines this issue for the SEEA-CF update, motivated by the need to ensure the water accounts have as much policy relevance as possible, the conceptual and practical advances in water accounting, the SNA 2025 update, and the adoption of the 2021 SEEA-Ecosystem Accounting (SEEA-EA). The SEEA-Water⁴, which pre-dates the SEEA-CF and SEEA-EA, also needs consideration.

¹ <https://www.icold-cigb.org/> Note; ICOLD also maintains a register of large dams.

² Nagy, M., Alfieri, A., and Vardon, M. 2009. Water in artificial reservoirs a produced asset? 14th Meeting of the London Group on Environmental Accounting. Canberra, 27-30 April 2009.

https://www.researchgate.net/publication/242784852_Water_in_artificial_reservoirs_-_A_produced_asset

³ Obst, C. 2010. Issue #16: The treatment of water in artificial reservoirs.

⁴ <https://seea.un.org/content/seea-water>

- 32 6. There are close links between the data recorded in water asset accounts and ecosystem
33 accounts, and treating water as a produced asset is a cross-cutting issue for linking the
34 SEEA-EA and SEEA-CF, Issue A1 in the SEEA-CF update. For example, in the measurement
35 of ecosystem assets, which includes all water bodies, ecosystem condition and the
36 measurement and recording of final and intermediate water-related ecosystem services.
37 Notably, the IUCN Global Ecosystem Typology (GET) highlights the high-level distinction
38 between natural rivers and streams, lakes, and artificial freshwater bodies (a subset of
39 which includes artificial reservoirs), suggesting that these are fundamentally different
40 ecosystem assets. Additionally, a new ecosystem service, water storage, may be relevant.
41 These issues are not the focus of the paper, but are explored to some extent in Annex 2.
- 42 7. The treatment of water in artificial reservoirs as a produced asset is also related to other
43 issues in the SEEA-CF update. Firstly, the valuation of water, Issue D7. Valuation studies
44 have primarily treated water in artificial reservoirs as a natural resource. Secondly, the
45 treatment of losses, Issue B2, because water in artificial reservoirs is lost through
46 evaporation and subsurface seepage.
- 47 8. Discussion of water accounts and the links between the SNA, SEEA-CF and SEEA-EA can
48 be confused by the terminology used. To minimise confusion, definitions of water stocks
49 and flows from the 2025 SNA, SEEA-CF, SEEA-EA and the Central Product Classification
50 (CPC) are provided as Annex 1 to this paper. This includes the definition of the product
51 “Natural water” (CPC 1800). Discussions with water industry experts and other
52 stakeholders can also be hindered by their use of different terms or the same terms with
53 varying meanings.
- 54 9. One reason for the confusion is that in addition to the SEEA, there are other water
55 accounting frameworks in use around the world⁵. These include the Water Account+
56 (WA+)⁶ and those developed by individual countries – both national and subnational, for
57 example, in Australia and California – and by water suppliers, other business, and in
58 academia. In general, these frameworks can be mapped into SEEA⁷.

⁵ Vardon, M. J., Thi Ha Lien Le, Martinez-Lagunes, R., Pule, O. P., Schenau, S., May, S., & Grafton, R.Q. (2025) Accounting for water: A global review and indicators of best practice for improved water governance. *Ecological Economics*. <https://doi.org/10.1016/j.ecolecon.2024.108396>

⁶ Karimi, P., Bastiaanssen, W. G. M., & Molden, D. (2013). Water Accounting Plus (WA+) – a water accounting procedure for complex river basins based on satellite measurements. *Hydrology and Earth System Sciences*, 17(7), 2459–2472

⁷ Vardon, M., Martinez-Lagunes, R., Gan, H., and Nagy, M. (2012). The System of Environmental-Economic Accounting for Water: Development, Implementation and Use. In Godfrey, J. and Chalmers, K. (Eds) *International Water Accounting: Effective Management of a Scarce Resource*. Edward Elgar. <https://doi.org/10.4337/9781849807500>

10. This Guidance note is the result of several years of development through the London Group, with papers related to the topic presented in 2022⁸ and a position paper presented in 2024⁹. The Report of the 2024 London Group Meeting¹⁰ noted:

“There was support for treating water in reservoirs as a produced asset and for updating the tables to reflect this new treatment—particularly by clarifying the table explanations, the description of the new water storage service, and the subdivision of the water supply industry (ISIC 36) into water storage and water distribution.”

2. Review of existing measurement and research

11. A substantial body of work exists on the measurement of water resources, water-related ecosystem services, and water accounting¹¹. Water asset accounts are one of the most commonly produced environmental-economic accounts, with around 50 countries producing them. Measurement of surface water, including the amount in artificial reservoirs and the flows into and out of artificial reservoirs, is not a technical challenge, as is demonstrated by the production of water asset accounts in many countries¹².

12. The treatment of water in artificial reservoirs as a produced asset has not been explicitly developed in statistical frameworks. However, water as a natural resource is included in the water asset accounts (SEEA-CF paragraph 5.11), and artificial reservoirs and their opening and closing stocks, inflows and outflows, are separately identified. In addition, abstractions from artificial reservoirs are also recorded in the PSUT shown in rows which disaggregate the sources of water (artificial reservoirs, rivers and lakes, and groundwater). Although the issue has not been explicitly addressed, current practice indicates that measurement for accounts is possible. If water in artificial reservoirs is treated as a produced asset, then what is occurring is a rearrangement of the existing PSUT, and the water asset account remains unchanged.

13. A case study in Australia investigated how the treatment of water in artificial reservoirs affects the recording of flows in the SEEA-CF and SEEA-EA¹³. The recording of flows has

⁸ <https://seea.un.org/sites/seea.un.org/files/vardon.pdf>

⁹ https://seea.un.org/sites/seea.un.org/files/session_8_position_paper_water_accounting.pdf

¹⁰ https://seea.un.org/sites/seea.un.org/files/2024_london_group_report_.pdf

¹¹ Vardon, M. J., Thi Ha Lien Le, Martinez-Lagunes, R., Pule, O. P., Schenau, S., May, S., & Grafton, R.Q. (2025) Accounting for water: A global review and indicators of best practice for improved water governance. Ecological Economics. <https://doi.org/10.1016/j.ecolecon.2024.108396>

¹² *Ibid.*

¹³ Chen, Y. & Vardon, M. (2024). Accounting for water-related ecosystem services to provide information for water policy and management: an Australian case study. Ecosystem Services. <https://doi.org/10.1016/j.ecoser.2024.101658>

significant effects on the valuation of water flows (water-related ecosystem services, natural resources, and products)¹⁴.

14. International experience, particularly through the SEEA CF and SEEA EA, has developed consistent approaches for compiling physical water asset accounts and SUT. Work by the United Nations Statistics Division (UNSD), Eurostat, and the OECD has resulted in manuals and compilation guides that underpin national implementation. This includes the International Recommendations for Water Statistics¹⁵.

3. Alternative conceptual options and treatments

3.1 Definitions and frameworks

15. The 2025 SNA¹⁶ Glossary defines: “An asset is a store of value representing a benefit or series of benefits accruing to the economic owner by holding or using the entity over a period of time. It is a means of carrying forward value from one accounting period to another. All assets in the SNA are economic assets.”
16. The 2025 SNA identifies financial and non-financial assets. Two categories of non-financial assets are recognised: produced assets and non-produced assets. “Produced assets are non-financial assets that have come into existence as outputs from production processes that fall within the production boundary of the SNA” and “Non-produced assets are non-financial assets that have come into existence in ways other than through processes of production”.
17. The 2025 SNA Glossary defines: “Production is an activity, carried out under the responsibility, control and management of an institutional unit, that uses inputs of labour, capital, and goods and services to produce outputs of goods and services.”
18. The 2025 SNA Glossary also defines inventories as “produced assets that consist of goods and services, which came into existence in the current period or in an earlier period, and that are held for sale, use in production or other use at a later date.” In the 2025 SNA paragraphs 7.115–7.120 and 11.135–11.136 explain that inventories record the difference between production and use within a period. Goods enter inventories when not immediately sold or used, and withdrawals occur when demand exceeds production.
19. Under the 2025 SNA and SEEA-CF, water is a natural resource under non-financial assets, regardless of where it is and how it came to occur. For water in artificial

¹⁴ Chen, Y., Wywoll, P., Burnett, P., Grafton, R.Q., & Vardon, M. (2025). Valuing and accounting for water-related ecosystem services for water pricing and management: An Australian case study. *Ecosystem Services*,

¹⁵ https://seea.un.org/sites/seea.un.org/files/irws_en.pdf

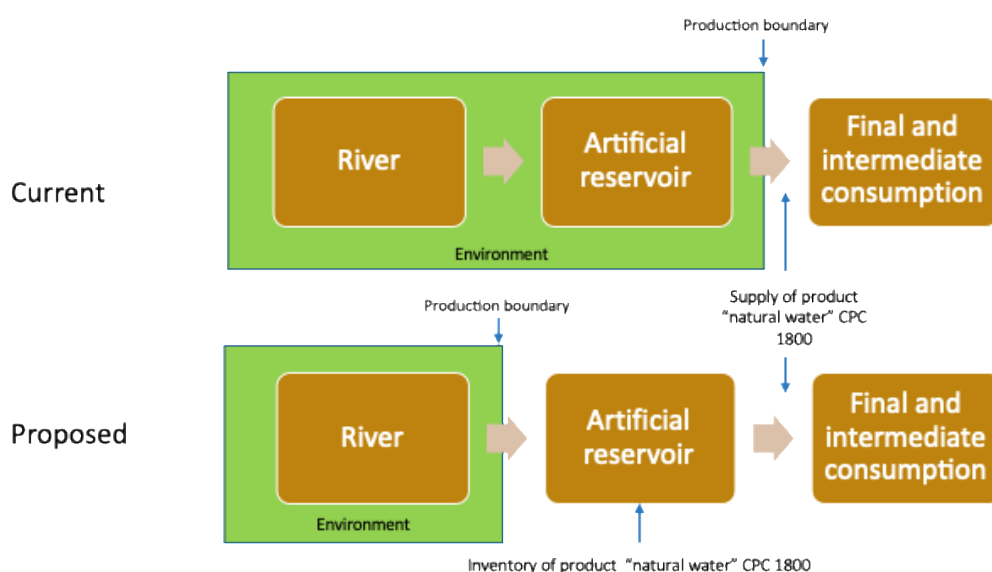
¹⁶ https://unstats.un.org/unsd/nationalaccount/docs/2025_SNA_Pre-edit.pdf

reservoirs, the infrastructure (e.g., the dam) is a produced asset, and its operation requires labour and other goods and services. However, the water itself is still considered a natural resource that simply exists within the reservoir. This treatment is essentially the same as for rivers or lakes, where the water is naturally occurring. But there is clearly a difference between water in lakes and water in reservoirs.

3.2 Current and proposed treatments of water in artificial reservoirs

20. Currently, the SEEA-CF classifies all water, including that in artificial reservoirs, as a natural resource, with production recorded when water is abstracted from a water body. This treatment, however, overlooks the significant human effort and capital required to create and manage reservoirs for the purpose of supplying water in a different time period. It also means that the treatment of water differs from that of other natural resources that enter the economy through the deployment of capital, labour and intermediate consumption.

Figure 1. Current and proposed production boundary for water.



21. The proposal is to record the production of water in artificial reservoirs used primarily for water supply at the time it enters the reservoir (Fig. 1), and treating the water in the reservoir as an inventory, as defined by the 2025 SNA, of the product "Natural water" (CPC 1800). The current SEEA-CF treatment is that water production occurs at the time of abstraction from artificial reservoirs.

3.3 Arguments for the reclassification of water in artificial reservoirs as a produced asset

22. The traditional classification of reservoir water as a non-produced asset does not fully capture the realities of water management in artificial reservoirs. For the water to occur in reservoirs, substantial human intervention is required to create, manage, and maintain the water in the reservoirs. This intervention displaces the water in time and space, which is essential in areas where water availability is variable and in hot or arid climates. This intervention requires the use of produced capital, intermediate consumption, and labour, including the construction of dam walls and ongoing operational activities for water regulation (e.g. for hydro-electricity), quality control, and flow distribution (e.g., via pipes).
23. While the water and its value is displaced in time and space, it is not intentionally transformed for an economic purpose. However, this is like subsurface assets. For example, iron ore is in the ground and, using capital, intermediate consumption, and labour, comes to the surface and becomes a product, “Iron ore” (CPC 1410).
24. Artificial reservoirs create inventories as defined in the 2025 SNA. The reservoir water is produced (stored) in one period to be used in another period. The purpose of artificial reservoirs is to store water when it is abundant and use it when it is scarce.
25. The SEEA-CF defines *artificial reservoirs*, which are purpose-built reservoirs used for storage, regulation and control of water resources. These are distinct from *lakes* which are, in general, large more natural bodies of standing water occupying a depression in the earth’s surface (para. 5.477). The water in reservoirs that is intended for possible future supply (e.g., for drinking, irrigation, or hydroelectricity) is what is in scope of being considered produced. Structures built for water regulation, for example, flood mitigation and diversions for run-of-the-river hydroelectricity or hydroelectricity from lakes, are out of scope. For hydroelectricity from rivers or lakes, the treatment remains unchanged – the water is produced at the point of abstraction.
26. Building and maintaining artificial reservoirs and abstracting water from natural sources (e.g. rivers) involves the inputs of capital, labour and other goods and services, to produce another product, “Natural water” (CPC 1800), which aligns with the definitions of production, produced assets and inventories in the 2025 SNA (see above).
27. Treating water in reservoirs as a produced asset (inventory) more accurately reflects the economic activities associated with its management; without the reservoir and its management, there would be no water to distribute later and the value would be in a different place and often under different ownership. Impounding the water also means that the water, the natural resource or final

ecosystem service of water supply (as well as other water-dependent downstream ecosystem services, such as recreation) and its value, is not available to potential water users downstream of reservoirs.

28. The treatment of reservoir water as a produced asset and inventory aligns with the different treatment of plantation forests and natural forests used for timber production. Trees in plantation forests are treated as produced, with timber production recorded annually. In contrast, trees in natural forests that are ultimately harvested are treated as non-produced, and timber production is recorded at the time of felling. In this analogy, water in lakes and rivers would be non-produced assets (akin to natural forests), reservoir water, and produced assets (akin to plantation forests). A similar analogue is aquaculture production, where fish and shellfish take more than one year to be ready for sale.

3.4 Implications of moving the production boundary

29. There would be no change to the water asset account, but the change has implications for the *physical supply and use tables*. It alters the existing PSUT by adding a column called “Change in Inventory” to the economy and splitting the water supply industry (ISIC 36) into water storage and water distribution. The flows from artificial reservoirs are currently included as a row under the surface water category and would need to be separated.

30. In the proposed change, the water flowing into the artificial reservoirs (e.g., from rivers) would be shown as use by the owner or operator of the reservoir (e.g., the water storage component of the water supply industry, ISIC 36). The water storage industry would then supply the water distribution industry. When more water (the natural resource) from the environment is used by the water supply ISIC 36 than is supplied as product (“Natural Water” CPC 1800), then there would be a positive change to the inventory. This would occur in a “wet” year. The reverse would be true in a dry year – there would be a negative change in the inventory.

31. Recognising the water in artificial reservoirs as an inventory (produced asset) requires the recording of losses from this inventory, such as those due to evaporation, which can be significant, and seepage. These losses are in addition to losses in distribution (e.g., through burst and leaky pipes). The text on water losses in paragraph 3.212 of the SEEA-CF provides ambiguous guidance on accounting for these losses, but they are conventionally recorded as use by the water supply industry.

32. The water *asset* accounts already separately distinguish the additions and reductions to artificial reservoirs. Adding water to artificial reservoirs would enable the inventory to be included on the national balance sheet.

33. The collection and storage of water from other sources would also result in additions to the inventory. This includes rainwater collection and the pumping and

storage of groundwater by industry and households. For households, this would be own-account house production of “Natural water” (CPC 1800).

34. Water banking and managed aquifer recharge, the process of injecting surface water into sub-surface water or groundwater, which requires capital, labour and intermediate consumption, could mean the water injected would be treated as produced water. In this case, the water injected is from within the economy. The question is whether this is a return to the environment or is it the storage of the product “Natural water” (CPC 1800). The aquifer is natural, but the water was produced. If the water is stored for future use, then it could be an inventory, even though the aquifer is natural.

4. Recommendations on conceptual treatments

35. This section presents supply and use tables integrating the Central Framework and Ecosystem Accounting frameworks. For completeness, and due to their use in some countries, the tables in the SEEA-Water¹⁷ are also referenced.

36. Two alternative accounting tables are presented: (1) reservoir water is treated as an inventory (produced asset), and (2) reservoir water is treated as a natural resource (non-produced asset). In these tables water as a natural resource in the Central Framework is equated to the ecosystem service of water supply in the SEEA-EA (see Section 2, terminology), while Annex 2 presents integrated SEEA-CF and SEEA-EA tables

4.1 Current tables in SEEA-CF, SEEA-Water and SEEA-EA

37. There are differences in the presentation of tables in the SEEA-CF and SEEA-Water. The SEEA-Water PSUT and the asset account are found in Supplementary Tables. A feature of the SEEA-Water PSUT is that the use table precedes the supply table. This presentation was used to enable water consumption (i.e., water abstracted from water resources but not returned to water resources, SEEA Water A3.9) to be calculated from the supply and use tables. The table also presents two views of water abstraction. Rows 1.a and 1.b split abstraction by water for own use and water for distribution, while rows 1.i to 1.ii show abstraction by water source. This presentation was used so that direct abstraction by industries, the own-account production of “Natural water” (CPC 1800), which in the SNA should theoretically be reallocated to the water supply industry, can be seen in the tables.
38. The SEEA-CF PSUT greatly expands the SEEA-Water table, spanning 4 pages, and presents, as is customary, the supply side of the table before the use side. The split presentation of abstraction by water source (surface water, groundwater, soil, etc)

¹⁷ <https://seea.un.org/content/seea-water>

and abstraction for own use or distribution shown in the SEEA-Water PSUT is maintained on the use side and added to the supply side in the SEEA-CF. The recording of wastewater¹⁸ is also expanded. A water consumption identity is not shown in the SEEA-CF. The recording of wastewater is also expanded in the SEEA-CF, but a water consumption identity is not shown. The amount of water abstracted that is transpired, evaporated or incorporated into products is separately shown, allowing the calculation of indicators from the accounts (e.g., water footprint). The differences between the PSUT in the SEEA-CF and SEEA-Water are not explained in the SEEA-CF, and the SEEA-CF makes only a few cross-references to SEEA-Water (pp. viii, 4, 70, and footnote 78, p. 217). The differences in table format have caused confusion.

39. The water accounts in the SEEA-CF and SEEA-Water are, in practice, often modified. Many countries simplify the accounts, reducing the number of industries and flows recorded in the accounts¹⁹. This is due mainly to lack of data, but also because not all flows are relevant in all circumstances. Countries also present the data in different ways. For example, Australia presents the industries and households in rows and water flows in columns, subdividing agricultural water use by industry subdivision.

40. SEEA-EA shows the supply and use of the water-related ecosystem services. The SEEA-EA essentially expands the “environment” column in the SEEA-CF and SEEA-Water to encompass ecosystems. Annex 2 presents an example. In the SEEA-CF and SEEA-Water, the final ecosystem service of water supply is provided by a water body of some type (e.g., surface water or groundwater), which is shown in the rows rather than the columns, as it is affected by abstraction by industry or households. The difference between the SEEA-CF and SEEA-Water PSUT and the SEEA-EA PSUT is that in the SEEA CF and SEEA-Water water abstraction by industries is shown in the rows by water sources, while in the SEEA-EA abstraction from ecosystems (e.g. surface or groundwater) is shown in the columns and aggregated to one line in the row as the ecosystem service of water supply.

4.2 Proposed tables

41. Table 1 is the PSUT showing the current treatment of water in artificial reservoirs as a non-produced asset. This is accompanied by a diagram of the flows (Fig. 1). Table 2 and Figure 2 are the proposed treatment. This builds on the data used in Table 1 and Figure 1 adding in the inflows and return flows to the environment. This is for a wet year

¹⁸ Wastewater is a term that has different meanings in different contexts. Here we are using the term as defined in the SEEA-CF

¹⁹ Vardon, M. J., Thi Ha Lien Le, Martinez-Lagunes, R., Pule, O. P., Schenau, S., May, S., & Grafton, R.Q. (2025) Accounting for water: A global review and indicators of best practice for improved water governance. Ecological Economics. <https://doi.org/10.1016/j.ecolecon.2024.108396>

where the water in artificial reservoirs increases; an addition to the inventory of CPC 1800. Also provided are Tables 3 and 4 and Figures 3 and 4, which are for a dry year and a decrease in inventory. The environment column could be split into water sources, rather than shown as rows, which is how it is presented in 2012 SEEA-CF PSSUT (Table 3.6, pp. 72-75).

Table 1. Current treatment, water as a natural resource (non-produced asset), wet year, million m³

Million m ³	Economy							Environment	Total
	Agriculture, forestry and fishing	Mining	Manufacturing	Water supply	Other industry	Households	Import (supply) / Export (use)		
Supply									
Natural resource									
Artificial reservoirs								74	74
Lakes								0	0
Rivers								14	14
Groundwater								0	0
Total natural resource								88	88
Product									
Natural water (CPC 1800)				74					74
Use									
Natural resource									0
Artificial reservoirs				74					74
Lakes									
Rivers	11	1			1	1	0		88
Groundwater									
Total natural resource	11	1	-	74	1	1	-		88
Product									
Natural water (CPC 1800)	26		2	4	8	34	0		74

Figure 1. Current treatment, water as a natural resource (non-produced asset), wet year, million m³

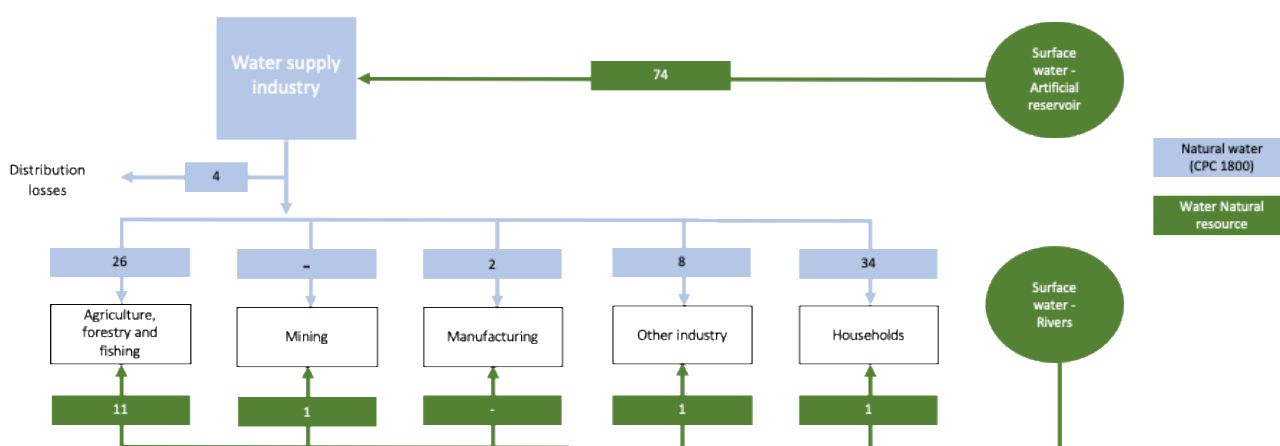


Table 2. Proposed treatment, water in artificial reservoirs as an inventory (produced asset), wet year, million m³

		Economy									Environment	Total
	Million m3	Agriculture, forestry and fishing	Mining	Manufacturi ng	Water supply -storage	Water supply -distribution	Other industry	Households	Change in inventory	Import (supply) / Export (use)		
Supply												
Natural resource												
Lakes											0	0
Rivers											277	277
Groundwater											-	-
Total natural resource												277
Product Natural water (CPC 1800)												
Storage					117							117
Distribution						74						74
Total product		-	-	-	117	74	-	-	-	-		191
Return flow					72							72
Use												
Natural resource												
Lakes												
Rivers		11	1		263		1	1				277
Groundwater												
Total natural resource		11	1	-	263	-	1	1	-	-		277
Product Natural water (CPC 1800)												
Storage					14				103			117
Distribution		26		2		4	8	34				74
Total product		26	-	2	14	4	8	34	103	-		191
Return flow												72

Figure 2. Proposed treatment, water in artificial reservoirs as an inventory (produced asset), wet year, million m³

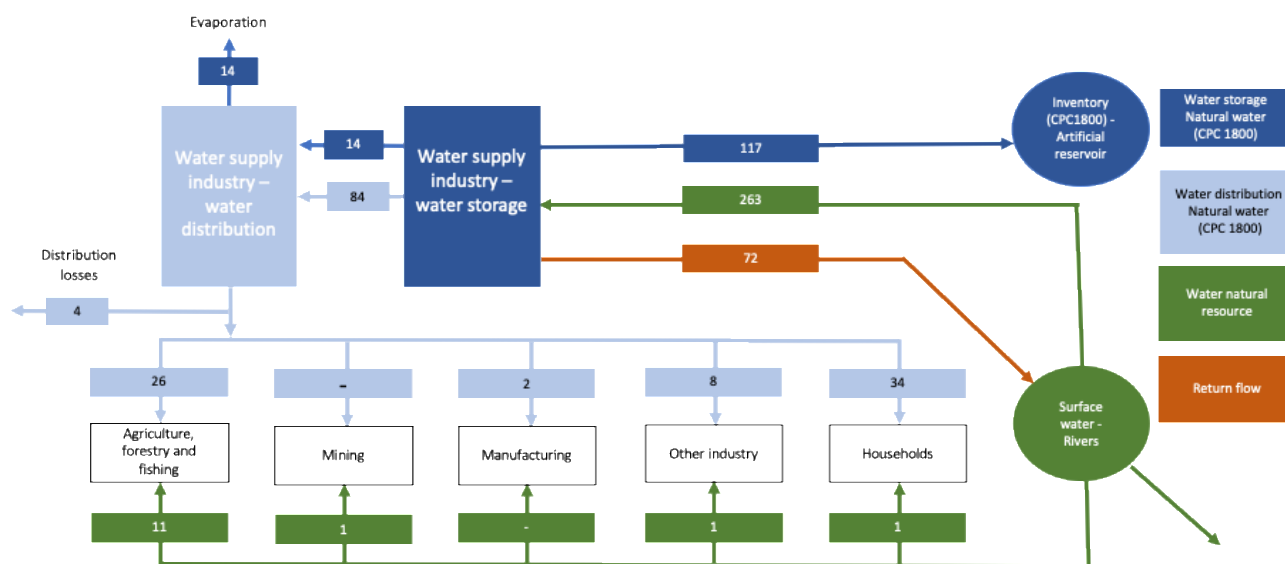


Table 3. Current treatment, water in artificial reservoirs as a natural resource (non-produced asset), dry year, million m³

Million m3	Economy							Environment	Total
	Agriculture, forestry and fishing	Mining	Manufacturing	Water supply	Other industry	Households	Import (supply) / Export (use)		
Supply									
Natural resource									
Artificial reservoirs								109	109
Lakes								0	0
Rivers								4	4
Groundwater								0	0
<i>Total natural resource</i>								112	112
Product									
Natural water (CPC 1800)				109					109
Use									
Natural resource									
Artificial reservoirs				109					109
Lakes									0
Rivers	3	1							4
Groundwater									0
<i>Total natural resource</i>	3	1	0	109	0	0	0		112
Product									
Natural water (CPC 1800)	47		3	8	9	42			109

Figure 3. Current treatment, water in artificial reservoirs as a natural resource (non-produced asset), dry year, million m³

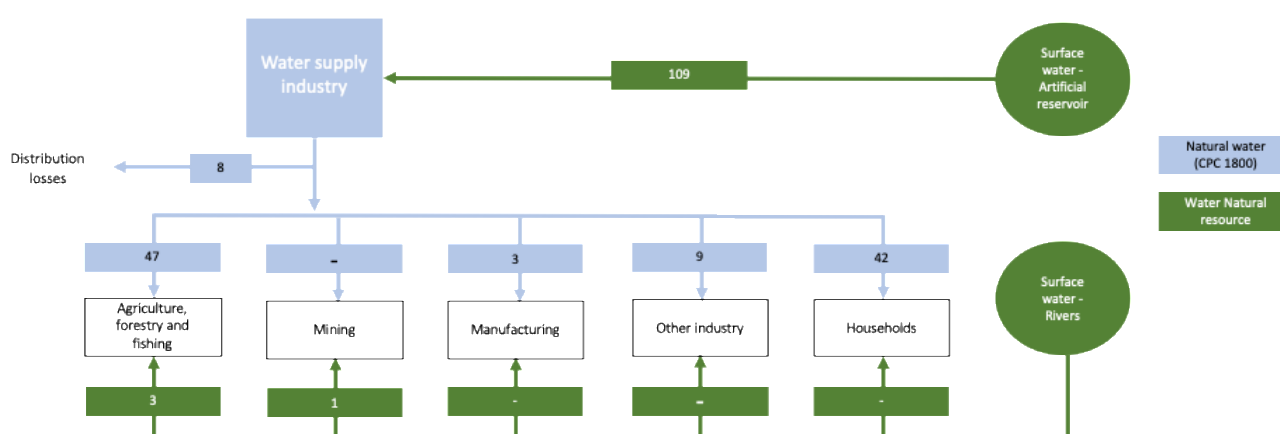
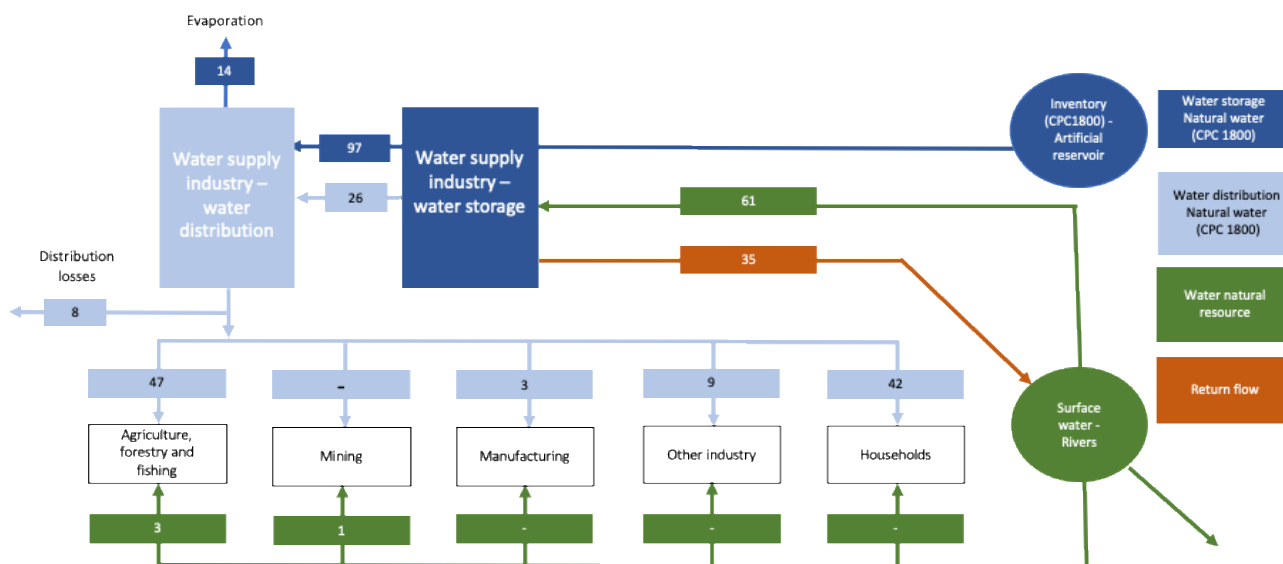


Table 4. Proposed treatment, water in artificial reservoirs as an inventory (produced asset), dry year, million m³

Million m ³	Economy									Environment	Total
	Agriculture, forestry and fishing	Mining	Manufacturing	Water supply - storage	Water supply - distribution	Other industry	Households	Change in inventory	Import (supply) / Export (use)		
Supply											
Natural resource											
Lakes										0	0
Rivers										65	65
Groundwater										-	-
<i>Total natural resource</i>											65
Product Natural water (CPC 1800)											
Storage								97			97
Distribution					26						26
<i>Total product</i>	-	-	-	-	26	-	-	97	-		123
Return flow				35							35
Use											
Natural resource											
Lakes											
Rivers	3	1		61		-	-				65
Groundwater											
<i>Total natural resource</i>	3	1	-	61	-	-	-	-	-		65
Product Natural water (CPC 1800)											
Storage				14							14
Distribution	47	-	3		8	9	42				109
<i>Total product</i>	47	-	3	14	8	9	42	-	-		123
Return flow										35	35

Figure 4. Proposed treatment, water in artificial reservoirs as an inventory (produced asset), dry year, million m³



- 333 42. Table 1 is simpler than Table 2. In Table 1, water extractions are shown for from all
 334 water sources, in this example, artificial reservoirs, lakes, rivers and groundwater
 335 (but there are no extractions from lakes or groundwater but are include for
 336 completeness). The water supply industry extracts 74 Mm³ of water as a natural
 337 resource from artificial reservoirs, and this is all converted into the product, CPC
 338 1800, at the point of extraction. This water is then distributed to industries and
 339 households. Distribution losses (4 Mm³) are recorded as a use by the water supply
 340 industry, and the remainder of the distributed water is used by industry (36 Mm³) and
 341 households (34 Mm³).
- 342 43. If water in artificial reservoirs is treated as an inventory (produced asset), then a
 343 column “Change in Inventory” within the economy is added to the PSUT, and
 344 extraction from the environment occurs when the water enters the reservoir. In Table
 345 2 and Figure 2, this is 277 Mm³ of water as a natural resource. As in Table 1, use of
 346 distributed water by industries other than the water supply industry and households
 347 remains at 36 Mm³ and 34 Mm³, respectively. Use by the water supply increases, with
 348 an additional 14 Mm³ used through evaporation from reservoirs and 103 Mm³ is
 349 added to the inventory in artificial reservoirs. A return flow of 72 Mm³ is shown. This
 350 is the water that leaves the reservoirs and returns to the environment, in this
 351 example, a river. The addition and return would match the entries in the water asset
 352 account for artificial reservoirs. Production for the reservoir in this year 191 Mm³
 353 which is the amount of water entering the reservoir (263 Mm³) minus the amount
 354 returned to the environment (72 Mm³).
- 355 44. In dry years, less water flows into reservoirs, leading to withdrawals from the
 356 inventory. Table 4 and Figure 4 show that rivers supply 61 Mm³ to the water supply
 357 industry (an additional 4 Mm³ is supplied to other industries). Total use of the product
 358 “Natural water” CPC 1800 is 123 Mm³, which is supplied from the production by the
 359 water supply industry 26 Mm³ and the balance from inventories (97 Mm³). Again, the
 360 water industry production is the inflows (61 Mm³) less returns (35 Mm³).
- 361 45. The changes in production between the two treatments are significant. This is shown
 362 in Table 5. The differences are significant. As the proposed treatment is based on
 363 inflows to reservoirs, this aligns with the availability of water driven by rainfall.

364 **Table 5. Comparison of the production of “Natural water” CPC 1800 in the current**
 365 **and proposed shift in the production boundary**

	Current treatment	Proposed treatment
	Mm ³	Mm ³
Wet year	74	194
Dry year	109	26

366 4.3 Proposed text

367 46. The text from the 2012 SEEA-CF for the water PSUT is found in Annex 3. The proposed
368 updated text is found in Annex 4. It is not included in the main body of this document
369 to avoid confusion with the paragraph numbering. Line numbers are provided in
370 Annex 4 to aid discussion.

371 5. Other considerations in advancing the issue

372 47. The existing guidance for water statistics and water accounting can be used and
373 augmented. For these, the guidance needed is limited to accounting treatment in
374 PSUT, as stocks and flows are already included in the asset accounts. The water
375 PSUT guidance would be updated to include inventories, the split of the water
376 supply industry (ISIC 36) in water storage and water distribution, the treatment of
377 losses due to evaporation and water leakage from artificial reservoirs as a use by
378 the water supply industry of “Natural water” (CPC 1800).

379 48. During discussions of this issue over the past few years, it was recognised that the
380 PSUT in the SEEA-CF, while a beautifully intricate account, could be placed in an
381 annex, with a si presented in the main text. This was a key point raised when a paper
382 on the topic was given to the London Group in 2024.

383 49. The treatment of water as a produced asset has been applied in Australian research.
384 The treatment is yet to be tested by a national statistical office, and this would be the
385 logical next step. Countries with well-established water accounting programs, such
386 as Australia and the Netherlands, are well-positioned to do this.

Annex 1 Water accounting classifications and definitions.

Table A1. Asset definitions and classifications in SEEA-CF, SEEA-Water and SEEA-EA

2025 SNA	SEEA Central Framework and SEEA-Water	SEEA Ecosystem Accounting – Global Ecosystem typology	Notes for determining the scope and definitions of water assets for valuation
<i>Definition</i>			
Water resources (AN34) consist of surface and groundwater resources used for extraction to the extent that their scarcity leads to the enforcement of ownership and/or use rights, market valuation and some measure of economic control. If it is not possible to separate the value of surface water from the associated land, the whole should be allocated to the category representing the greater part of the total value	Water resources consist of fresh and brackish water in inland water bodies, including groundwater and soil water. (SEEA CF, para 5.474)		SNA recognizes the need to separate the value of water from land. Valuation is not considered in SEEA-CF
<i>Classification</i>			
	Surface water • Rivers and streams • Lakes • Artificial reservoirs • Snow, ice and glaciers	Freshwater • F1 Rivers and streams • F2 Lakes • F3 Artificial reservoirs • T6 Polar-alpine (cryogenic)	Direct correspondence between SEEA-Water, SEEA Central Framework and SEEA Ecosystem Accounting
	Groundwater	• SF1 Subterranean freshwater • SF1 Anthropocentric subterranean freshwater • FM1 Semi-confined transitional waters	SEEA Ecosystem Accounting sub-divides groundwater into three classes. In the SEEA-Water and SEEA Central Framework, groundwater includes all these sources and could be similarly divided.
	Soil water	• Water use in rainfed agricultural and cultivated forest ecosystems	The SEEA-Water and Central Framework only identifies soil water, which is found in all ecosystem types with soil. However, in practice the use of soil water is only estimated for rain-fed agricultural ecosystems. The use of soil water can be shown by the ecosystem types used in the SEEA Ecosystem Accounting.

Note: SEEA -EA/GET also includes Transitional TF1 Palustrine wetlands, MFT1 Brackish tidal systems, M1 Marine shelf, M2 Pelagic ocean waters, M3 Deep sea floors. The SEEA-Water and Central Framework does not explicitly recognize these assets although water assets consist “*of fresh and brackish water in inland water bodies, including groundwater and soil water*” (SEEA Central Framework para 5.474) and these would likely be recorded as abstractions from surface water (i.e. lakes). The SEEA-Water included seas and oceans as a source of water for desalinization and cooling water as well as receiving return flows from the economy and river outflows. The ocean accounts

described in SEEA Ecosystem Accounting do not consider marine ecosystems as a possible source of water.

Table A2. Definitions of water flows recorded in the SNA, SEEA-CF, SEEA-Water, and SEEA-EA

Abiotic flows as defined in SEEA-EA

Abiotic flow are contributions to benefits from the environment that are not underpinned by, or reliant on, ecological characteristics and processes. (SEEA-EA, para. 6.35)

Water supply-related ecosystem services defined in SEEA-EA

Water supply service (water provisioning) reflect the combined ecosystem contributions of water flow regulation, water purification, and other ecosystem services to the supply of water of appropriate quality to users for various uses including household consumption. (SEEA-EA, p. 131)

Water flows defined in SEEA Central Framework and SEEA-Water

Water (natural resource) Natural resources include all natural biological resources (including timber and aquatic resources), mineral and energy resources, soil resources and water resources. (SEEA Central Framework, paras 2.101, 5.18)

Water abstraction is defined as the amount of water that is removed from any source, either permanently or temporarily, in a given period of time. (SEEA Central Framework, para 3.195)

Wastewater *SEEA-Water* Water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply of water to a user elsewhere. It includes discharges of cooling water. (EDG)

Wastewater *SEEA-CF* Wastewater is discarded water that is no longer required by the owner or user. (SEEA Central Framework, para 3.86)

Recycled water *SEEA-Water* The reuse of water within the same industry or establishment (on site).

Reused water *SEEA-Water* Wastewater delivered to a user for further use with or without prior treatment. Recycling within industrial sites is excluded. (EDG)

Reuse water *SEEA-CF* Reused water is wastewater supplied to a user for further use with or without prior treatment, excluding the reuse (or recycling) of water within economic units. (3.207)

Water in the Central Product Classification (CPC)

Natural water (CPC 1800) This subclass includes: potable and non-potable water, suitable for further use, including:

- treated water (e.g., from desalination plants, water treatment plants)
- untreated water (e.g., obtained directly from natural sources)

This subclass also includes:

- used water suitable for further use

This subclass does not include:

- sea water, cf. 16200
 - steam and hot water, cf. 17300
 - mineral waters containing added carbon dioxide, cf. 24410
 - waters individually bottled as beverages, cf. 24410
 - distilled water, cf. 34250
 - sewage and other wastewater, i.e. water not suitable for further use, cf. 39990
- (CPC, p. 197)

Bottled waters, not sweetened or flavoured (CPC 24410) This subclass includes waters individually bottled as beverages, including:

- aerated (carbonated) waters
- mineral waters (natural or artificial)

This subclass does not include: - ice and snow, cf. 17400 - natural water (i.e. non-bottled), cf. 18000 - sweetened or flavoured water, cf. 24490

Annex 2 Integrated SEEA-CF and SEEA-EA PSUT

1. To aid the integration of the SEEA-CF and SEEA-EA we propose an integrated SUT. These are provided for: (1) reservoir water as a produced asset, and (2) reservoir water as a non-produced asset. The integrated tables record final and intermediate ecosystem services, as well as products. The supply and use of wastewater (including return flows and reuse water) are not shown but could be added.
2. The SEEA-CF PSUT would simply delete the rows for the supply and use of final and intermediate water-related ecosystem services

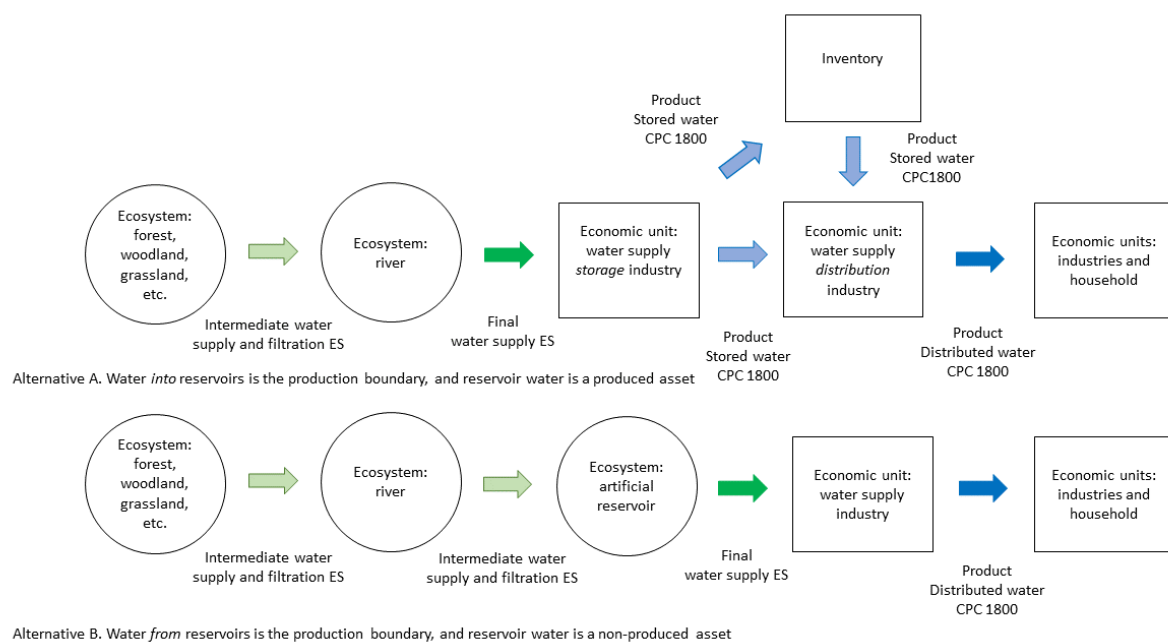


Figure A1. Alternative accounting treatments for (A) water as a produced and (B) water as a non-produced asset. The change in asset classification also changes the recording of the final water supply ecosystem service (ES) and the flow of water products stored and distributed water (CPC 1800) (After: Chen et al., 2025)²⁰.

3. Figure A1 compares the alternative accounting treatments for water as a produced asset (Alternative A) and water as a non-produced asset (Alternative B). The alternative treatments shown in Figures 1A and 1B have significant impacts on the valuation of the water supply ES, with the volume of the ES changing depending on treatment, which has implications for how observed prices or replacement cost methods are used for water valuation²¹. The key difference between the alternative

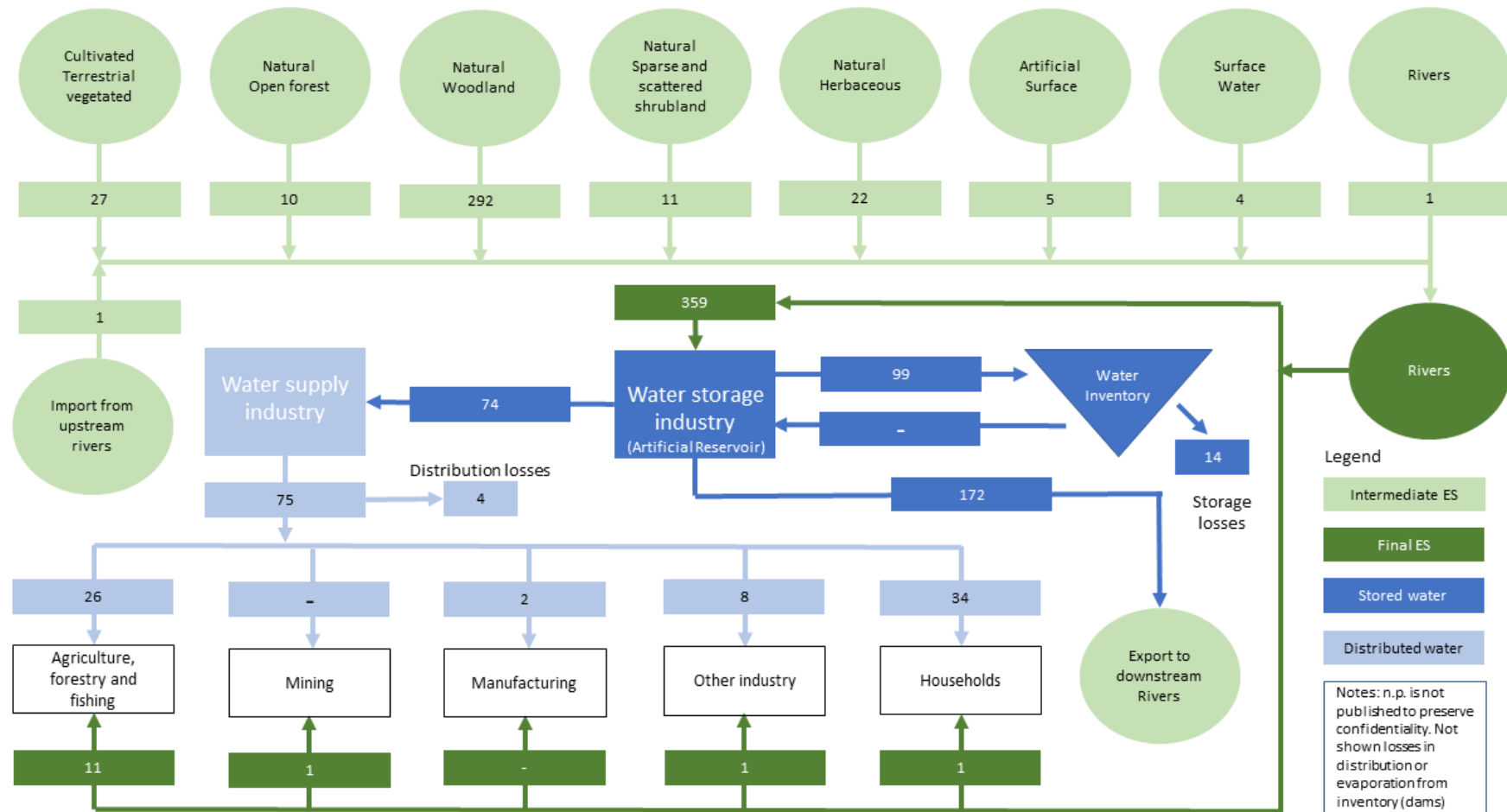
²⁰ Chen, Y., Wywroll, P., Burnett, P., Grafton, R.Q., & Vardon, M. (2025). Valuing and accounting for water-related ecosystem services for water pricing and management: An Australian case study. *Ecosystem Services*,

²¹ Ibid.

treatments is when the final ES is recorded, which is when water converts from a natural resource (ecosystem service) to a product, which is the production boundary, and the question of when (or if) water becomes a produced asset.

4. Alternative A (Fig. A1a) is when reservoir water is treated as a produced asset; hence the final water supply ES is recorded when the water flows into an artificial reservoir, while in Alternative B (Fig. A1b) the final water supply ES is recorded when water flows out of an artificial reservoir, and reservoir water remains a non-produced asset. Alternative B results in a simpler supply and use table, but this treatment masks the impact on water availability caused by reservoirs (e.g., evaporation) and does not show the connection between reservoirs and the ecosystems (e.g., the flows from terrestrial ecosystems to rivers to reservoirs). Alternative B also results in the final water supply ES used by the water supply industry equalling the volume of distributed water. We use an example to illustrate the difference in the recording of flows using the two treatments.
5. Examples of Treatments A and B are provided. Water as a produced asset, is shown in Figure A2 and Table A1, while Treatment B, water as a non-produced asset, is shown in Fig A3 and Table A2. Recording reservoir water as a produced asset results in an expanded supply and use table. An example is shown in Figure A2 and Table A1. In this, the water supply industry is split into the water storage and water distribution in the columns, and with the two associated water products, stored water, and distributed water (both CPC 1800) are split into rows. In this recording, the volume entering the reservoir equals the final water supply ES. In this example, 359 million m³. The chain of flows extends back: the river runs into the reservoir, other rivers run into rivers (1 million m³ from within the accounting area and 1 million m³ from upstream of the accounting area), and water runs off terrestrial ecosystem systems into rivers (but total run-off is not equal to the ecosystem service). In this example, 292 million m³ from Natural Woodland. The data in the systems described in Figures 2 and 3 and in Tables 1 and 2 are the same.

Reservoir water as a produced asset (million m³)



1

2 **Figure A2.** Water as a produced asset example

3 **Table A1. Water as a produced asset example (proposed treatment)**

			Economy									Environment									
ES or product	Units	Agriculture , forestry and fishing	Mining	Manufactu ring	Water storage industry	Water distributio n industry	Other industry	Household s	Inventory	Import (supply) / Export (use)	Cultivated terrestrial Vegetated	Natural Open forest	Natural Woodland	Natural Sparse and scattered shrubland	Natural Herbaceous	Bare Surface	Surface Water	Rivers	Import (supply) / Export (use)	Total	
Supply																					
Intermediate ES																					
Water supply	million m3										27	10	292	11	22	5	4	1	1	373	
Final ES																			373		373
Water supply	million m3																		373		373
Products																				359	
Stored water	million m3				359															359	
Distributed water	million m3					74														74	
Use																					
Intermediate ES																					
Water supply	million m3																		373		373
Final ES																					
Water supply	million m3	11	1		359		1	1												373	
Products																					
Stored water	million m3				14	74			99	172										359	
Distributed water	million m3	26		2		4	8	34												74	

4
5 (Data matches that in Fig. A2)
6

Reservoir water as a non-produced asset (million m³)

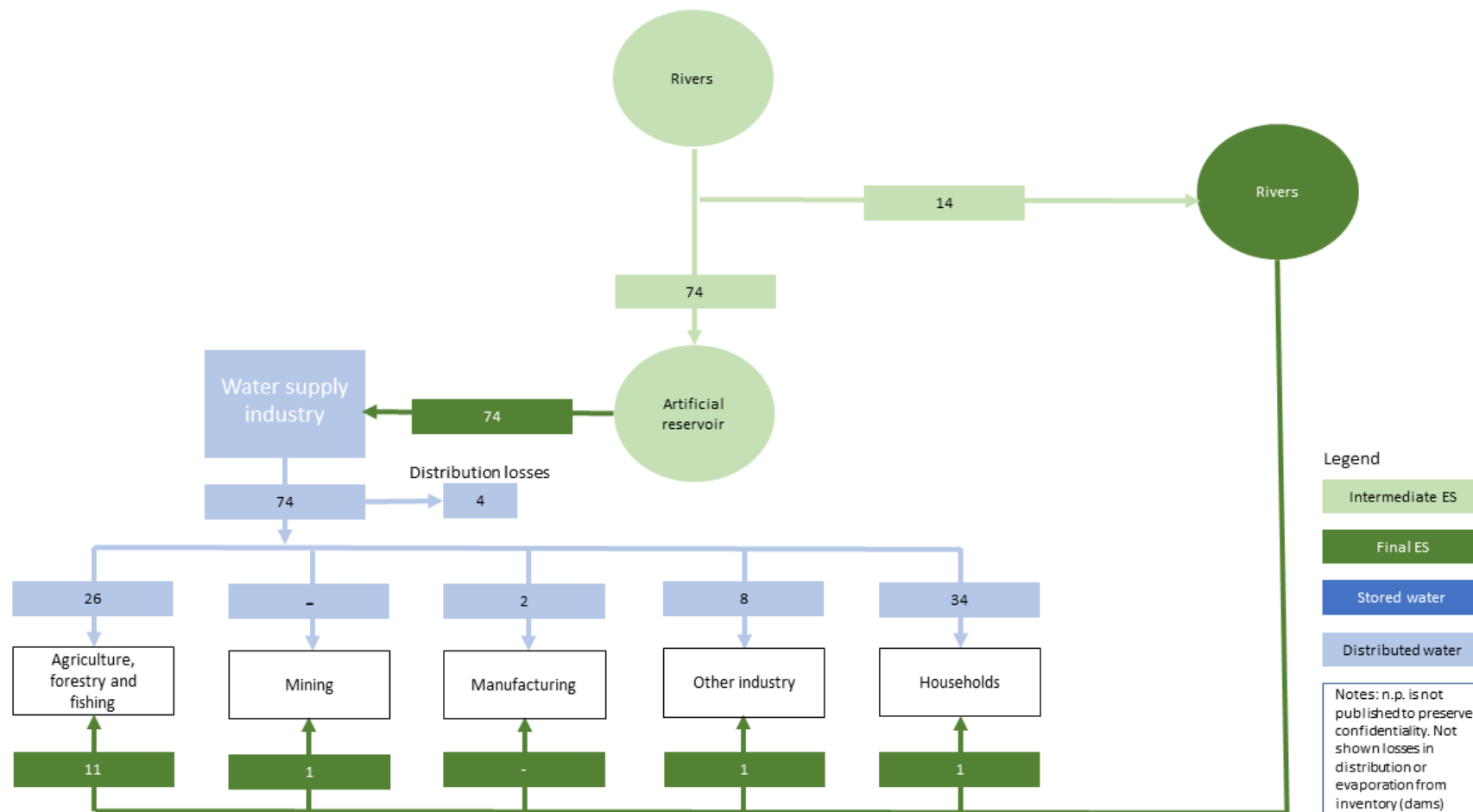


Figure A3. Water as non-produced asset example

10 **Table A2. Water as a non-produced asset (Current Treatment)**

11

			Economy								Environment										Total								
ES or product	Units	Agriculture , forestry and fishing	Mining	Manufactu ring	Water storage industry	Water distributio n industry	Other industry	Household s	Inventory	Import (supply) / Export (use)	Cultivated terrestrial Vegetated	Natural Open forest	Natural Woodland	Natural Sparse and scattered shrubland	Natural Herbaceous	Bare Surface	Surface Water	Artificial reservoirs	Rivers	Import (supply) / Export (use)									
Supply																													
Intermediate ES																													
	Water supply	million m3																								88		88	
Final ES																													
	Water supply	million m3																								74	14		88
Products																													
	Stored water	million m3																											
	Distributed water	million m3																			74								
Use																													
Intermediate ES																													
	Water supply	million m3																								74	14		88
Final ES																													
	Water supply	million m3	11	1																	88								
Products																													
	Stored water	million m3																											
	Distributed water	million m3	26		2																74								
	Nil by defintion																												
	Removed industry and product																												
	Added environmental asset																												

12

13 (Data matches that in Fig. A2)

14

15

16

6. Figure 2A and Table 2B show a subset of the flows in Figure 1A and Table 1A. With water treated as a non-produced asset, the recording of flows is more straightforward. This is the recording in the SEEA-CF and SEEA-Water. The Intermediate water supply ecosystem service from the vegetation is not shown, just the flow from rivers into reservoirs, reservoirs are explicitly recorded to the ecosystem types (they are already in the surface water classification of SEEA-EA, see Table 2), and the water storage industry and stored water are deleted from the tables. The losses from evaporation in reservoirs are not shown, nor the flows out of the reservoir exported downstream. The latter could be shown as return flows from the water supply industry.
7. Monetary tables consistent with the PSUT would be included. Valuation is a related discussion and is the subject of a separate issue paper (D7).

Annex 3 Current SEEA CF text on water PSUT

Section 3.5.3 Physical supply and use table for water

- 3.189 Physical supply and use tables can be compiled at various levels of detail, depending on the required policy and analytical focus and data availability. A basic PSUT for water contains information on the supply and use of water and provides an overview of water flows. The PSUT is divided into five sections which organize information on (a) abstraction of water from the environment; (b) distribution and use of abstracted water across enterprises and households; (c) flows of wastewater and reused water (between households and enterprises); (d) return flows of water to the environment; and (e) evaporation, transpiration and water incorporated into products.
- 3.190 Table 3.6 presents the SEEA physical supply and use table for water. The columns of the PSUT are structured in the same way as the general PSUT represented by table 3.1.
- 3.191 The breakdown of the economic activities, classified according to the ISIC, distinguishes the following groups:
- ISIC divisions 01-03: Agriculture, forestry and fishing^[1]
 - ISIC divisions 05-33 and 41: Mining and quarrying; manufacturing; and construction, respectively
 - ISIC division 35: Electricity, gas, steam and air conditioning supply
 - ISIC division 36: Water collection, treatment and supply; sewerage, waste management and remediation activities
 - ISIC division 37: Sewerage
 - ISIC divisions: 38, 39 and 45-99: Other industries
- 3.192 Industry divisions ISIC 35, 36 and 37 are specifically identified because of their importance in the supply and use of water and provision of water-related services. ISIC division 35 covers users of water for hydroelectric power generation and cooling purposes. ISIC divisions 36 and 37 cover activities of the main industries for the distribution and treatment of water and wastewater.
- 3.193 Described directly below are the key components of the physical supply and use table for water.

Abstraction of water

- 3.194 The abstraction of water is recorded in part I of the supply table, entitled “Sources of abstracted water”, as being supplied by the environment. The same volume of water is recorded in part I of the use table, “Sources of abstracted water”, by the industry that undertakes the abstraction. Water may be abstracted from artificial reservoirs, rivers, lakes, groundwater and soil water. The capture of precipitation through, for example, the capture of water from the roofs of houses in water tanks, is recorded as abstraction through precipitation. Precipitation direct to the inland water system is recorded not in the PSUT but in the asset account for water resources.
- 3.195 ***Abstraction is defined as the amount of water that is removed from any source, either permanently or temporarily, in a given period of time.*** Water used for hydroelectric power generation, is considered abstraction and is recorded as a use of water by the abstractor. Water abstracted but not used in production, such as water flows in mine dewatering, are recorded as natural resource residuals. Water abstraction is disaggregated by source and by industry.

- 3.196 Following the general treatment of household own-account activity, the abstraction of water by households for own consumption should be recorded as part of the activity of the water collection, treatment and supply industry (ISIC 36). In addition, there may be a range of different methods of water supply; for example, water supply to agricultural enterprises may be undertaken quite differently from water supply to urban areas. Additional columns may be included in the supply table in order to highlight different types of water abstraction covered under ISIC division 36.
- 3.197 Consistent with the treatment in the asset accounts for water resources, the water in artificial reservoirs is not considered to have been produced, i.e., it is not considered to have come into existence via a process of production. Consequently, abstraction from artificial reservoirs is recorded as abstraction from the environment and flows of precipitation into artificial reservoirs and flows of evaporation not recorded in the PSUT for water. These flows are recorded as part of the asset accounts for water resources as part of the overall accounting for the change in the stock of water resource is over an accounting period.
- 3.198 Abstraction of soil water refers to the uptake of water by plants and is equal to the amount of water transpired by plants plus the amount of water that is embodied in the harvested product. Most abstraction of soil water is used in agricultural production and in cultivated timber resources but in theory the boundary extends to all soil water abstracted for use in production to include, for example, soil water abstracted in the operation of golf courses^[2]. Abstraction of soil water is calculated based on the area under cultivation using coefficients of water use. Different coefficients should be used for different plants and should take into consideration location effects (e.g., soil types, geography and climate).
- 3.199 In principle, an amount of abstracted water is retained at the end of each accounting period for use in the next accounting period, for example, in storage tanks. However, this volume of water is relatively small in comparison with the overall flows of water during an accounting period and is also small relative to the stock of water held in the total inland water system. Therefore, in practice and by convention, the net change in the accumulation of abstracted water over an accounting period is assumed to be zero.

Distribution and Use of Abstracted Water

- 3.200 Water that has been abstracted must be either used by the same economic unit that abstracts it (and in this case is referred to as abstracted water for own use) or distributed, possibly after some treatment, to other economic units (referred to as abstracted water for distribution). Most of the water for distribution is recorded under ISIC division 36, Water collection, treatment and supply. However, there may be other industries that abstract and distribute water as a secondary activity.
- 3.201 Part II of the supply table, entitled “Abstracted water”, shows the supply of abstracted water by the industries undertaking the abstraction, differentiating between water abstracted for distribution and water abstracted for own use. This part of the supply table also records imports of water from the rest of the world. The total of water abstracted for own use, water abstracted for distribution, and imported water represents the total water available for use in the economy.
- 3.202 The use of this water is shown in part II of the use table, entitled “Abstracted water”, where the water available for use is recorded under the intermediate consumption of

industries, the final consumption of households and exports to economic units in the rest of the world.

- 3.203 The abstracted water received from other economic units is the amount of water that is delivered to an industry, households or the rest of the world by another economic unit. This water is usually delivered through systems of pipes (mains), but other means of transportation are also possible (such as artificial open channels and trucks).
- 3.204 Within the economy, water is often exchanged between water distributors before being delivered to users. These water exchanges are referred to as intra-industry sales. There are cases, for example, where the distribution network of one distributor does not reach the water user and hence water must be sold to another distributor in order for it to be delivered. In principle, all intra-industry sales should be recorded following standard accounting principles. However, these exchanges are not recorded in the PSUT, as this would increase the total flows recorded even though there may be no additional physical flows of water; that is to say, the intra-industry sales are transactions of water in situ and the same physical flow of water occurs whether intra-industry sales take place or not. Nonetheless, depending on the volumes of water involved, it may be useful to present these intra-industry flows in a supplementary table

Flows of Wastewater and Reused Water

- 3.205 After accounting for the distribution and use of water, it is necessary to consider flows of wastewater between economic units. Wastewater is discarded water which is no longer required by the owner or user. Wastewater can be discharged directly into the environment (in which case it is recorded as a return flow), supplied to a sewerage facility (ISIC division 37) (in which case it is recorded as wastewater to sewerage) or supplied to another economic unit for further use (in which case it is recorded as reused water). Flows of wastewater include exchanges of wastewater between sewerage facilities in different economies. These flows are recorded as imports and exports of wastewater
- 3.206 In situations where wastewater flows to a treatment facility or is supplied to another economic unit, flows of water are recorded in part III of the supply table, entitled "Wastewater and reused water", and part III of the use table, entitled "Wastewater and reused water". Flows of wastewater are generally residual flows between economic units, since it is usually the case that the flow of wastewater to a sewerage facility is also accompanied by a payment of a service fee to the sewerage facility, that is to say, the sewerage facility does not purchase the wastewater from the discarding unit.
- 3.207 ***Reused water is wastewater supplied to a user for further use with or without prior treatment, excluding the reuse (or recycling) of water within economic units.*** It is also commonly referred to as reclaimed wastewater. Reused water is considered a product when payment is made by the receiving unit.
- 3.208 Reused water excludes the recycling of water within the same establishment (on site). Information on these flows, although potentially useful for analysis of water-use efficiency, is not generally available. However, a reduction in the total volume of water used, while the same level of output is maintained, can provide an indication of an increase in water-use efficiency which, in turn, may be due to the reuse of recycled water within an industry.

- 3.209 Once wastewater is discharged into the environment (e.g., into a river), its re-abstraction downstream is considered not a reuse of water in the accounting tables, but rather a new abstraction from the environment.

Return Flows of Water to the Environment

- 3.210 All water that is returned to the environment is recorded as being supplied to the environment in part IV of the supply table, entitled “Return flows of water”. In some cases, these flows will comprise flows of wastewater direct to the environment from industries and households, i.e., flows of wastewater not sent to treatment facilities. In other cases, these flows will comprise flows of water from treatment facilities following treatment. In the supply table, such flows are shown as being supplied by the various industries and households either to the inland water system or to other sources, including the sea. Corresponding volumes of water are recorded in part IV of the use table, entitled “Return flows of water”, with the flows shown as being received by the environment.
- 3.211 Some return flows of water to the environment are losses of water. Consistent with the general definition of losses outlined in section 3.2, losses of water encompass flows of water that do not reach their intended destination or have disappeared from storage. The primary type of losses of water are losses during distribution
- 3.212 Losses during distribution occur between a point of abstraction and a point of use or between points of use and reuse of water. These losses may be caused by a number of factors including evaporation (e.g., when water is distributed through open channels) and leakages (e.g., when water leaks from pipes or distribution channels, including rivers in some cases, into the ground). In practice, when losses during distribution are computed as a difference between the amount of water supplied and the amount received, they may also include problems associated with water meters and theft.
- 3.213 Urban run-off, a significant flow of water, is that portion of precipitation on urban areas that does not naturally evaporate or percolate into the ground, but flows via overland flow, underflow or channels, or is piped into a defined surface-water channel or a constructed infiltration facility. Urban run-off that is collected by a sewerage or similar facility is recorded as the abstraction of water from the environment (and, by convention, attributed to the sewerage industry (ISIC division 37)) in the supply table. It may then be treated before returning to the environment or it may be treated and distributed as reused water. Urban run-off that is not collected by a sewerage or similar facility but flows directly to the inland water system is not recorded in the PSUT.
- 3.214 Although separate estimates for urban run-off may be available in some countries, these flows generally cannot be measured directly. Estimates may be obtained by measuring the difference between the volumes of wastewater discharged by economic units (industries and households) into sewers and the volumes of wastewater collected by the sewerage system.

Evaporation of Abstracted Water, Transpiration and Water Incorporated into Products

- 3.215 To fully account for the balance of flows of water entering the economy through abstraction and returning to the environment as return flows of water, it is necessary to record three additional physical flows: evaporation of abstracted water, transpiration and water incorporated into products.

- 3.216 Flows of evaporation are recorded when water is distributed between economic units after abstraction, for instance, during distribution via open channels or while in water storage tanks and similar structures. The transpiration of water occurs when soil water is absorbed by cultivated plants as they grow and is subsequently released to the atmosphere.
- 3.217 Amounts of water incorporated into products (e.g., water used in the manufacture of beverages) are shown as supplied by the relevant industry, commonly a manufacturing industry.
- 3.218 The supply and use of evaporation of abstracted water, transpiration and water incorporated into products is recorded in part V of the supply and use tables, entitled “Evaporation of abstracted water, transpiration and water incorporated into products”. Ideally, these flows would be recorded separately, with the flows of evaporation of abstracted water and transpiration shown as going to the environment from the relevant water user, and the flows of water incorporated into products shown as retained in the economy, in the accumulation column. In practice, direct measurement of these flows, particularly as it relates to the distinction between transpiration and the water incorporated into cultivated plants, is usually not possible and hence a combined flow may be recorded.

Footnotes

²⁴ For certain analytical purposes, it may be relevant to distinguish among the uses of water by these different industries.

²⁵ Soil water abstracted by non-cultivated plants is not in scope of the PSUT but there may be interest in recording these flows, for example, in respect of natural timber resources.

Annex 4 Suggested text for water in artificial reservoirs as a produced asset.

The relevant text from the 2012 CF is mainly in Section 3.5.3. This text is found in Annex 3. Updates to this text are suggested in blue and ~~striketrough~~ below.

3.189 Physical supply and use tables can be compiled at various levels of detail, depending on the required policy and analytical focus and data availability. A basic PSUT for water contains information on the supply and use of water and provides an overview of water flows. [suggest new paragraph]The PSUT is divided into five sections which organize information on (a) abstraction of water from the environment and **inventories**; (b) distribution and use of abstracted water across enterprises, households; (c) flows of wastewater and reused water (between households and enterprises); (d) return flows of water to the environment; and (e) evaporation, transpiration and water incorporated into products.

3.190 Table 3.6 presents the SEEA physical supply and use table for water. The columns of the PSUT are structured in the same way as the general PSUT represented by table 3.1. (unchanged)

3.191 The breakdown of the economic activities, classified according to the ISIC, distinguishes the following groups:

- ISIC divisions 01-03: *Agriculture, forestry and fishing*
- ISIC divisions 05-33 and 41: *Mining and quarrying; manufacturing; and construction,*
 - respectively
- ISIC division 35: *Electricity, gas, steam and air conditioning supply*
- ISIC division 36: *Water collection, treatment and supply; sewerage, waste management and remediation activities*
- ISIC division 37: *Sewerage*
- ISIC divisions: 38, 39 and 45-99: *Other industries*
- **Inventory**

3.192 Industry divisions ISIC 35, 36 and 37 are specifically identified because of their importance in the supply and use of water and provision of water-related services. ISIC division 35 covers users of water for hydroelectric power generation and cooling purposes. ISIC divisions 36 and 37 cover activities of the main industries for the distribution and treatment of water and wastewater. It is useful to separate ISIC 36 into (a) water storage and (b) distribution), to assist with integration with SEEA-EA [insert reference to the appropriate part of SEEA-CF or external references. E.g., and updated SEEA-Water].

New paragraph:

3.xx An inventory of the product “Natural water” CPC 1800 may be held in artificial reservoirs. Large reservoirs are usually operated by ISIC 36. Smaller reservoirs (e.g. farm dams) may be operated by Agriculture (ISIC 01), and the rainwater tanks of households or other industries could also be included in the inventory. These smaller reservoirs vary in importance, and where they are significant can be accommodated. It is suggested that these be separately identified in the SUT.

3.193 Described directly below are the key components of the physical supply and use table for water. (unchanged)

Abstraction of water

3.194 The abstraction of water is recorded in part I of the supply table, entitled “Sources of abstracted water”, as being supplied by the environment. The same volume of water is recorded in part I of the use table, “Sources of abstracted water”, by the industry that undertakes the abstraction. Water may be abstracted from artificial reservoirs, rivers, lakes, groundwater and soil water. The capture of precipitation through, for example, the capture of water from the roofs of houses in water tanks, is recorded as abstraction through precipitation. Precipitation direct to the inland water system is recorded not in the PSUT but in the asset account for water resources. Water abstracted from artificial reservoirs is not an abstraction from the environment and is discussed later.

3.195 **Abstraction is defined as the amount of water that is removed from any source—rivers, lakes, groundwater and soil water, either permanently or temporarily, in a given period of time.** Water used for hydroelectric power generation, is considered abstraction and is recorded as a use of water by the abstractor. Water abstracted but not used in production, such as water flows in mine dewatering, are recorded as natural resource residuals. Water abstraction is disaggregated by source and by industry.

3.196 Following the general treatment of household own-account activity, the abstraction of water by households for own consumption should be recorded as part of the activity of the water collection, treatment and supply industry (ISIC 36). In addition, there may be a range of different methods of water supply; for example, water supply to agricultural enterprises may be undertaken quite differently from water supply to urban areas. Additional columns may be included in the supply table in order to highlight different types of water abstraction covered under ISIC division 36. (unchanged)

~~3.197 Consistent with the treatment in the asset accounts for water resources, the water in artificial reservoirs is not considered to have been produced, i.e., it is not considered to have come into existence via a process of production. Consequently, abstraction from artificial reservoirs is recorded as abstraction from the environment and flows of precipitation~~

into artificial reservoirs and flows of evaporation from the reservoirs are not recorded in the PSUT for water. These flows are recorded in the asset accounts for water resources as part of the overall accounting for the change in the stock of water resources over an accounting period.”

Replacement paragraphs:

3.xx In line with the SNA definition of produced assets and inventories, the water in artificial reservoirs is produced. When water enters an artificial reservoir, the amount that is held in the reservoir becomes the product “Natural water” CPC 1800. Production is the amount of water entering the reservoirs less any that is returned to the environment (i.e., as a return flow). The water produced in one year may be supplied in another year from the water inventory. Flows of water into artificial reservoirs (e.g. from rivers or direct rainfall) are a use of the natural resource water by the owner or operator of the reservoir. For large reservoirs, this will usually be the water supply industry (ISIC 36). Small reservoirs may be owned or operated by other industries and households.

3.xxx When inflows to artificial reservoirs exceed the amount supplied by, for example, the water supply industry (ISIC 36) in an accounting period, then ISIC 36 will supply product “Natural water” CPC 1800 to the Inventory. When inflows are less than the volume supplied then the balance is supplied by the Inventory. The same treatment would apply to other industries and households. For households, this production should be re-assigned to ISIC 36 following the general treatment of own-account household production.

3.xxy Evaporation from artificial reservoirs becomes a use of “Natural water” CPC 1800 by the water supply industry (ISIC 36) or the other operators of reservoirs (e.g. Agriculture, ISIC 01).

3.xyy Managed aquifer recharge, the injection of water into natural occurring groundwater, is analogously recorded as an addition to the Inventory.

3.198 Abstraction of soil water refers to the uptake of water by plants and is equal to the amount of water transpired by plants plus the amount of water that is embodied in the harvested product. Most abstraction of soil water is used in agricultural production and in cultivated timber resources but in theory the boundary extends to all soil water abstracted for use in production to include, for example, soil water abstracted in the operation of golf courses²⁵. Abstraction of soil water is calculated based on the area under cultivation using coefficients of water use. Different coefficients should be used for different plants and should take into consideration location effects (e.g., soil types, geography and climate). (unchanged)

~~3.199 In principle, an amount of abstracted water is retained at the end of each accounting period for use in the next accounting period, for example, in storage tanks. However, this volume of water is relatively small in comparison with the~~

²⁵ Soil water abstracted by non-cultivated plants is not in scope of the PSUT but there may be interest in recording these flows, for example, in respect of natural timber resources.

overall flows of water during an accounting period and is also small relative to the stock of water held in the total inland water system. Therefore, in practice and by convention, the net change in the accumulation of abstracted water over an accounting period is assumed to be zero.

Distribution and Use of Abstracted Water

3.200 Water that has been abstracted must be either used by the same economic unit that abstracts it (and in this case is referred to as abstracted water for own use) or distributed, possibly after some treatment, to other economic units (referred to as abstracted water for distribution) or supplied to the Inventory. Most of the water for distribution is recorded under ISIC division 36, Water collection, treatment and supply. However, there may be other industries that abstract and distribute, or store water as a secondary activity.

3.201 Part II of the supply table, entitled “Abstracted water”, shows the supply of abstracted water by the industries undertaking the abstraction, differentiating between water abstracted for distribution and water abstracted for own use. This part of the supply table also records imports of water from the rest of the world and Inventory. The total of water abstracted for own use, water abstracted for distribution, stored in the inventory, and imported water represents the total water available for use in the economy.

3.202 The use of this water is shown in part II of the use table, entitled “Abstracted water”, where the water available for use is recorded under the intermediate consumption of industries, the Inventory, the final consumption of households, and exports to economic units in the rest of the world.

3.203 The abstracted water received from other economic units is the amount of water that is delivered to an industry, households or the rest of the world by another economic unit. This water is usually delivered through systems of pipes (mains), but other means of transportation are also possible (such as artificial open channels and trucks). Water supplied that was produced in previous accounting periods is shown as a supply by the inventory.

3.204 Within the economy, water is often exchanged between water distributors before being delivered to users. These water exchanges are referred to as intra-industry sales. There are cases, for example, where the distribution network of one distributor does not reach the water user and hence water must be sold to another distributor in order for it to be delivered. In principle, all intra-industry sales should be recorded following standard accounting principles. However, these exchanges are not recorded in the PSUT, as this would increase the total flows recorded even though there may be no additional physical flows of water; that is to say, the intra-industry sales are transactions of water in situ and the same physical flow of water occurs whether intra-industry sales take place or not. Nonetheless, depending on the volumes of water involved, it may be useful to present these intra-industry flows in a supplementary table (unchanged)

174

175 **Flows of Wastewater and Reused Water**

176

177 3.205 After accounting for the distribution and use of water, [including the](#)
178 [Inventory](#), it is necessary to consider flows of wastewater between
179 economic units. Wastewater is discarded water which is no longer
180 required by the owner or user. Wastewater can be discharged directly into
181 the environment (in which case it is recorded as a return flow), supplied to
182 a sewerage facility (ISIC division 37) (in which case it is recorded as
183 wastewater to sewerage) or supplied to another economic unit for further
184 use (in which case it is recorded as reused water). Flows of wastewater
185 include exchanges of wastewater between sewerage facilities in different
186 economies. These flows are recorded as imports and exports of
187 wastewater. [\(unchanged\)](#)

188 3.206 In situations where wastewater flows to a treatment facility or is supplied
189 to another economic unit, flows of water are recorded in part III of the
190 supply table, entitled “Wastewater and reused water”, and part III of the
191 use table, entitled “Wastewater and reused water”. Flows of wastewater
192 are generally residual flows between economic units, since it is usually the
193 case that the flow of wastewater to a sewerage facility is also
194 accompanied by a payment of a service fee to the sewerage facility, that is
195 to say, the sewerage facility does not purchase the wastewater from the
196 discarding unit. [\(unchanged\)](#)

197 3.207 **Reused water is wastewater supplied to a user for further use with or**
198 **without prior treatment, excluding the reuse (or recycling) of water**
199 **within economic units.** It is also commonly referred to as reclaimed
200 wastewater. Reused water is considered a product when payment is made
201 by the receiving unit. [\(unchanged\)](#)

202 3.208 Reused water excludes the recycling of water within the same
203 establishment (on site). Information on these flows, although potentially
204 useful for analysis of water-use efficiency, is not generally available.
205 However, a reduction in the total volume of water used, while the same
206 level of output is maintained, can provide an indication of an increase in
207 water-use efficiency which, in turn, may be due to the reuse of recycled
208 water within an industry. [\(unchanged\)](#)

209 3.209 Once wastewater is discharged into the environment (e.g., into a river), its
210 re-abstraction downstream is considered not a reuse of water in the
211 accounting tables, but rather a new abstraction from the environment.
212 [\(unchanged\)](#)

213

214 **Return Flows of Water to the Environment**

215 3.210 All water that is returned to the environment is recorded as being supplied
216 to the environment in part IV of the supply table, entitled “Return flows of
217 water”. In some cases, these flows will comprise flows of wastewater

direct to the environment from industries and households, i.e., flows of wastewater not sent to treatment facilities. In other cases, these flows will comprise flows of water from treatment facilities following treatment. In the supply table, such flows are shown as being supplied by the various industries and households either to the inland water system or to other sources, including the sea. Corresponding volumes of water are recorded in part IV of the use table, entitled “Return flows of water”, with the flows shown as being received by the environment.

New paragraph:

3.x.yz Water from artificial reservoirs is often returned to the environment. This can be either spillovers or intended releases for use downstream. Spillovers can be planned or unplanned. Planned spillovers are when water is released in expectation of inflows, which may cause unplanned spillovers. Unplanned spillovers are when water flows over or around dam walls because the reservoir is full. Most large reservoirs are engineered to accommodate spillovers. Releases of water can be for use by industries or households. In some cases, water is released for environmental purposes.

3.211 Some return flows of water to the environment are losses of water. Consistent with the general definition of losses outlined in section 3.2, losses of water encompass flows of water that do not reach their intended destination or have disappeared from storage. The primary type of losses of water are losses during distribution

3.212 Losses during distribution occur between a point of abstraction and a point of use or between points of use and reuse of water. These losses may be caused by a number of factors including evaporation (e.g., when water is distributed through open channels) and leakages (e.g., when water leaks from pipes or distribution channels, including rivers in some cases, into the ground). In practice, when losses during distribution are computed as a difference between the amount of water supplied and the amount received, they may also include problems associated with water meters and theft. **(unchanged)**

3.213 Urban run-off, a significant flow of water, is that portion of precipitation on urban areas that does not naturally evaporate or percolate into the ground, but flows via overland flow, underflow or channels, or is piped into a defined surface-water channel or a constructed infiltration facility. Urban run-off that is collected by a sewerage or similar facility is recorded as the abstraction of water from the environment (and, by convention, attributed to the sewerage industry (ISIC division 37) in the supply table. It may then be treated before returning to the environment or it may be treated and distributed as reused water. Urban run-off that is not collected by a sewerage or similar facility but flows directly to the inland water system is not recorded in the PSUT. **(unchanged)**

3.214 Although separate estimates for urban run-off may be available in some countries, these flows generally cannot be measured directly. Estimates may be obtained by measuring the difference between the volumes of

wastewater discharged by economic units (industries and households) into sewers and the volumes of wastewater collected by the sewerage system. (unchanged)

Evaporation of Abstracted Water, Transpiration and Water Incorporated into Products

3.215 To fully account for the balance of flows of water entering the economy through abstraction and returning to the environment as return flows of water, it is necessary to record three additional physical flows: evaporation of abstracted water, transpiration and water incorporated into products. [Water evaporated from artificial reservoirs is recorded as use by the owner or operator of the reservoir.](#)

3.216 Flows of evaporation are recorded when water is distributed between economic units after abstraction, for instance, during distribution via open channels or ~~while in water storage tanks and~~ similar structures. The transpiration of water occurs when soil water is absorbed by cultivated plants as they grow and is subsequently released to the atmosphere.

3.217 Amounts of water incorporated into products (e.g., water used in the manufacture of beverages) are shown as supplied by the relevant industry, commonly a manufacturing industry.

3.218 The supply and use of evaporation of abstracted water, transpiration and water incorporated into products is recorded in part V of the supply and use tables, entitled “Evaporation of abstracted water, transpiration and water incorporated into products”. Ideally, these flows would be recorded separately, with the flows of evaporation of abstracted water and transpiration shown as going to the environment from the relevant water user, and the flows of water incorporated into products shown as retained in the economy, in the accumulation column. [Evaporation from artificial reservoirs is recorded as use by the owner or operator of the reservoir.](#) In practice, direct measurement of these flows, particularly as it relates to the distinction between transpiration and the water incorporated into cultivated plants, is usually not possible and hence a combined flow may be recorded.

Annex 5 Comments of Guidance Note

Comment	Response
There is no need to change, as all the information is already covered in the existing water stock and flow accounts.	Agree that all the information is already included. However, the current accounting does not fully reflect the economic or environmental consequences of the water held in artificial reservoirs. The displacement of water in time and space, and the evaporation from reservoirs, has implications for the water supply industry and for economic units downstream of reservoirs. The information can be easily rearranged to better reflect the economic and environmental interactions. Note: Many agree that the change is warranted as it better reflects reality, the information is useful for water management and policy, and the issues to be solved are mostly practical, and the proposal improves consistency in the treatment of other managed SEEA CF resources (e.g., timber, aquaculture).
Water cannot be produced because it does not come into existence via a production process.	Something does not have to come into existence for it to be produced. It just needs to be displaced in space or time by human activity. E.g. Iron Ore is in the ground as a natural resource and becomes a produced asset when it is extracted from the ground.
Need a clear definition of artificial reservoirs.	Maintain the current definition of artificial reservoirs and provide further guidance. Restrict scope to artificial reservoirs operated by the water supply industry (ISIC 36) with the primary purpose of storing water for supply to the economy (e.g., households, irrigation, hydroelectricity). Provide a size threshold and refer to World Register of Dams maintained by ICOLD.
Inclusion of small farm dams and rainwater tanks	Exclude these from the scope. Provide guidance on the treatment of own-account production by the agricultural and energy industries, as well as household and other rainwater tanks, for completeness and in circumstances where such information is important.
Establishing where artificial reservoirs begin and end (e.g., where does	Establish the start at the point where the water supply industry measures inflows to reservoirs. The reservoir ends at the dam wall.

the river end and the reservoir begin)	
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Comment	Response
There is no need to change, as all the information is already covered in the existing water stock and flow accounts.	Agree that all the information is already included. However, the current accounting does not fully reflect the economic or environmental consequences of the water held in artificial reservoirs. The displacement of water in time and space, and the evaporation from reservoirs, has implications for the water supply industry and for economic units downstream of reservoirs. The information can be easily rearranged to better reflect the economic and environmental interactions. Note: Many agree that the change is warranted as it better reflects reality, the information is useful for water management and policy, and the issues to be solved are mostly practical.
Water cannot be produced because it does not come into existence via a production process.	Something does not have to come into existence for it to be produced. It just needs to be displaced in space or time by human activity. E.g. Iron Ore is in the ground as a natural resource and becomes a produced asset when it is extracted from the ground.
Need a clear definition of artificial reservoirs.	Maintain the current definition of artificial reservoirs and provide further guidance. Restrict scope to artificial reservoirs operated by the water supply industry (ISIC 36) with the primary purpose of storing water for supply to the economy (e.g., households, irrigation, hydroelectricity). Provide a size threshold and refer to World Register of Dams maintained by ICOLD.
Inclusion of small farm dams and rainwater tanks	Exclude these from the scope. Provide guidance on the treatment of own-account production by the agricultural and energy industries, as well as household and other rainwater tanks, for completeness and in circumstances where such information is important.

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Establishing where artificial reservoirs begin and end (e.g., where does the river end and the reservoir begin)	Establish the start at the point where the water supply industry measures inflows to reservoirs. The reservoir ends at the dam wall.
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Comment	Response
The change means the time of production changes, which affects GDP.	Make this clear in the text. As the water supply industry (ISIC 36) is a tiny fraction of GDP, national accountants will likely ignore. Does not change the timing of production of electricity production from hydropower.
Effect of calculation of depletion in the 2025 SNA	How water is accounted for in the calculation of depletion is a matter of SNA alignment. This issue extends beyond water in artificial reservoirs to all water resources. The change in the production boundary from water leaving the reservoir to water entering the reservoir would at least change the time of recording of depletion. Evaporation from artificial reservoirs would likely be recorded as depletion irrespective of the proposed change
More reference could be made to the change in the treatment of cultivated assets in the 2025 SNA	Noted. This is a general issue. The water guidance note and proposed text for SEEA CF will include appropriate references
What would a change in treatment mean for the definition of natural capital in the 2025 SNA?	Noted: The definition of natural capital is a general issue. For water, the treatment would likely be the same for cultivated and non-cultivated timber (i.e. include both as natural capital). The water guidance note, and proposed text for SEEA CF will include appropriate references.

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