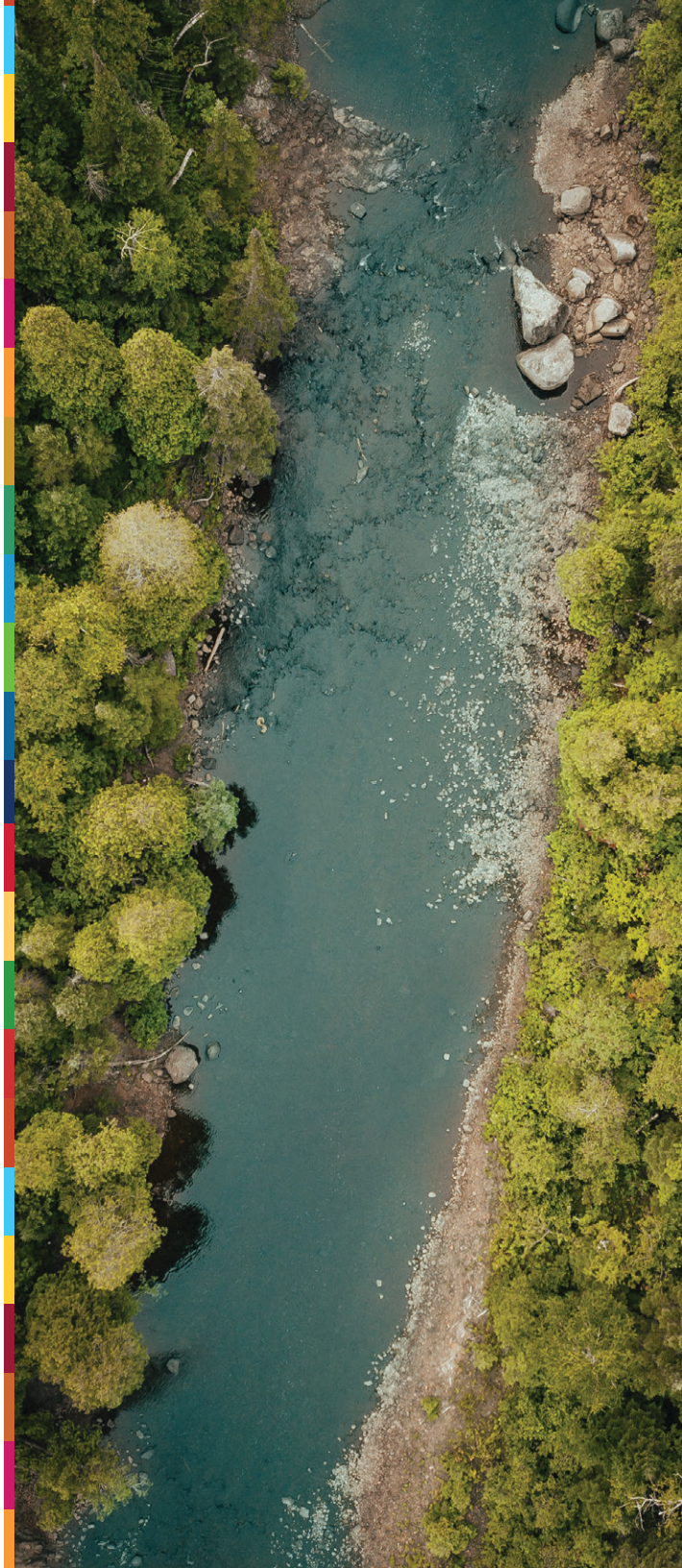
Volumetric Water Benefit Accounting (VWBA): **A Practical Guide to Implementing Water Replenishment Targets**

Bluerisk

valuing nature

UN GLOBAL COMPACT CEO WATER MANDATE



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Disclaimer
This guide was originally developed by the project team for Nestlé Waters. The views expressed in this publication are those of the project team and do not necessarily reflect those of the project sponsors. This publication contains preliminary research, analysis, findings, and recommendations. It is being circulated to stimulate timely discussion and critical feedback and to influence ongoing debate on emerging issues. This guide may eventually be published in another form and its content may be revised.

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About this Guide

The objective of the guide is to assist practitioners with the application of the Volumetric Water Benefit Accounting (VWBA) method during the implementation of activities to meet corporate and/or site water replenishment targets.

This guide is not intended as a stand-alone document, but rather, as a practical resource to facilitate the application of VWBA methods. Practitioners should use the information provided here only after having read and understood the content outlined in "Volumetric Water Benefit Accounting (VWBA): A Method for Implementing and Valuing Water Stewardship Activities" (Reig et al. 2019).

For the purpose of this guidebook, **water replenishment** means returning a volume of water to the local catchment from which it came in ways that

- Address the local water challenges that are shared with local communities and stakeholders;
- Align with leading practice for corporate water stewardship;
- Are informed by the best available information and catchment context; and
- Have a measurable and positive impact on the catchment's water availability, quality, and accessibility.

Water replenishment targets are also referred to as water balance or restoration targets. They are often intended to return to the local catchment a volume of water equivalent to what a site in that same catchment withdraws or consumes on an annual basis.

Because the Alliance for Water Stewardship (AWS) International Water Stewardship Standard 2.0 already provides a common, credible, globally applicable framework for sites to manage water sustainably within the wider catchment context, this guide builds on many of the steps, criteria, and indicators outlined in the AWS Standard's framework (AWS 2019). However, following this guide does not entitle users to make any claims of conformity to or alignment with the AWS Standard. The guide has been developed in close consultation with practitioners by two of the authors of the founding paper on VWBA (Reig et al. 2019).

The guide is intended for three principal audiences:

- Practitioners at a corporate level who are responsible for seeing that corporate water stewardship goals are met and for supporting regions, markets, and business units with respect to target implementation, measurement, and reporting;
- Practitioners at a regional, market, or business-unit level who are working with sites to meet their water replenishment targets and support their water resources management efforts more broadly; and
- Practitioners at a site level, such as site managers or technical water specialists, who are charged with identifying and implementing activities that can contribute to meeting a water replenishment target.

The rest of this guide outlines the proposed approach for how sites can meet a water replenishment target. It provides guidance and methods for how to apply the approach, including detailed information on where and how to select water stewardship activities, develop an implementation road map, and measure progress toward meeting the target.

APPROACH

Building on information required to apply the AWS Standard framework, this guide helps practitioners apply the steps outlined in the VWBA method to identify and implement activities, measure progress, and make claims toward meeting a water replenishment target in ways that address current and future shared water challenges in local catchments. This guide draws on VWBA to recommend the volumetric water benefit (VWB) as a common metric to measure the outputs of water stewardship activities and track progress in a consistent way across activities, markets, geographies, and businesses.

This guide follows the three steps of the VWBA method, provides guidance for how to implement each step, and makes recommendations for who should review, validate, and communicate replenishment achievements and progress toward a target.

For each step, the guide provides:

- Indication if the information is relevant to a site or to a specific water stewardship activity;
- Prerequisites to completing the step;
- Decision trees to help identify action items and know when to move to the next step; and
- Required output from each step.

Glossary

Internal water stewardship champions: practitioners within an organization, at a corporate, regional, business, or site level, responsible for delivering corporate water stewardship commitments and programs and supporting others within the organization with water stewardship target implementation, measurement, and reporting.

Shared water challenge: A water-related issue, concern, or threat shared by the site and one or more stakeholders within the catchment(s). Examples include physical water scarcity, deteriorating water quality, and regulatory restrictions on water allocation (AWS 2019).

Site's physical scope: The land area relevant to the site's water stewardship actions and engagement. It should incorporate the relevant catchment(s) but may extend to relevant political or administrative boundaries. It is typically centered on the site but may include separate areas where the origin of water supply is more distant (AWS 2019).

Site: the site is the physical area over which the implementing organization owns or manages land and carries out its principal activities. In most cases, a site will be a contiguous area of land, but may also include areas that are physically separated but nearby (especially if in the same catchment). For a factory, the "site" is typically represented by the fenced area encompassing all its buildings, parking, and storage areas. If the organization operates its own water sources or wastewater plant (or both), these should be considered part of the site. For example, for a bottled water factory that operates a physically separate water source (e.g., a spring or borehole), the source should be considered part of the site (AWS 2019).

Volumetric Water Benefit Accounting: provides corporate water stewardship practitioners with a standardized approach and set of indicators to quantify and communicate the volumetric water benefits, complementary indicators to measure nonvolumetric outputs, and elements of effective water stewardship activities that increase the likelihood of generating social, economic, and environmental benefits and solving shared water challenges (Reig et al. 2019).

Volumetric water benefits: the volume of water resulting from water stewardship activities, relative to a unit of time, that modifies the hydrology in a beneficial way or helps to reduce shared water challenges, improve water stewardship outcomes, or meet the targets of Sustainable Development Goal 6 (SDG 6) (Reig et al. 2019).

Water replenishment: the act of returning a volume of water to a site's local catchment areas in ways that address the local water challenges shared by local communities and stakeholders; align with leading practice for corporate water stewardship; are informed by the best available information and catchment context; and have a measurable and positive impact on the catchment's water availability, quality, and accessibility.

Abbreviations

AWS	Alliance for Water Stewardship
CAPEX	capital expenditures
ML	million liters
OPEX	operating expenditures
SDG	Sustainable Development Goal
USD	United States dollar
VWBA	Volumetric Water Benefit Accounting
VWB	Volumetric Water Benefit
WASH	Water access, sanitation, and hygiene

STEP 1: Identify shared water challenges and understand the local context

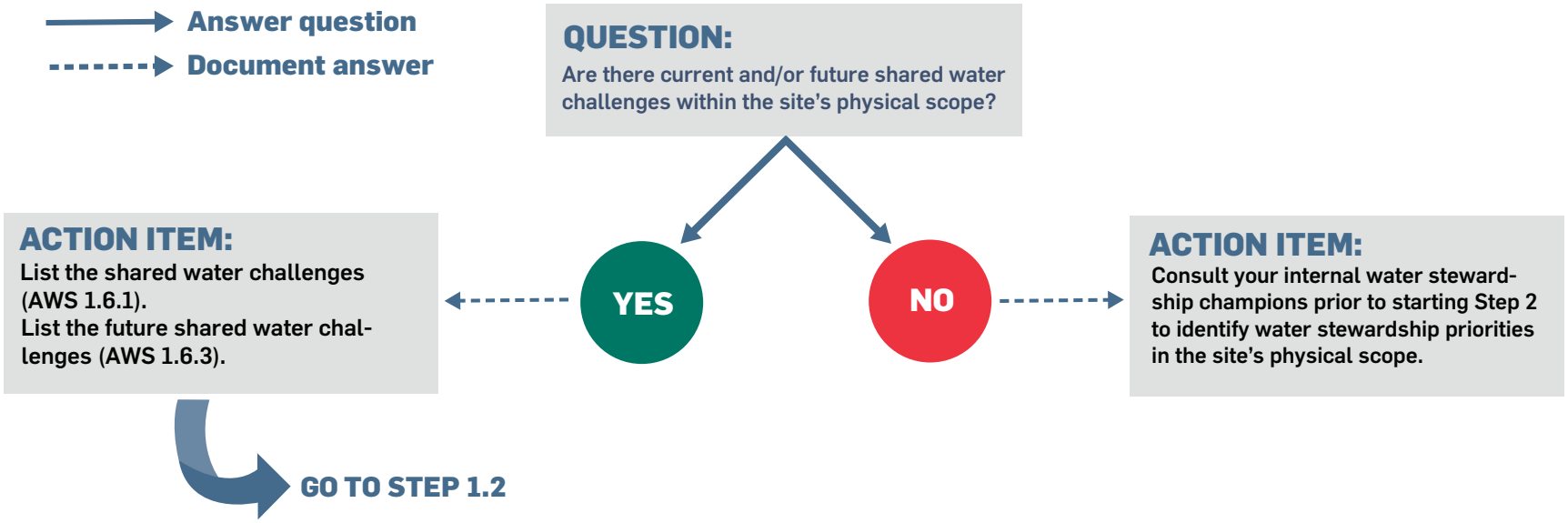
For each site:

STEP 1.1: IDENTIFY SHARED WATER CHALLENGES AND THEIR ROOT CAUSES

Prerequisites for Step 1.1 include collecting the information gathered as part of AWS Step 1, specifically:

- Criterion 1.1. Gather information to define the site's physical scope for water stewardship purposes, including its operational boundaries, the water sources from which the site draws, the locations to which the site returns its discharges, and the catchment(s) that the site affect(s) and upon which it is reliant.
- Criterion 1.5. Gather water-related data for the catchment, including water governance, water balance, water quality, important water-related areas, infrastructure, and water access, sanitation, and hygiene (WASH); and
- Criterion 1.6. Understand current and future shared water challenges in the catchment, by linking the water challenges identified by stakeholders with the site's water challenges.

Decision tree to help complete Step 1.1:



STEP 1.2: UNDERSTAND CATCHMENT STAKEHOLDERS AND ONGOING WATER STEWARDSHIP ACTIVITIES

Prerequisites for Step 1.2 include collecting the information gathered as part of AWS Step 1, specifically:

- Criterion 1.2: Understand relevant stakeholders, their water-related challenges, and the site's ability to influence action beyond its boundaries.
- Indicator 1.6.2: Identify initiatives to address shared water challenges.
- Indicator 1.7.2: Identify water-related opportunities, including how the site may participate in them; conduct assessment and prioritization of potential savings and business opportunities.

Required output of Step 2:

- List of current and future shared water challenges in the catchment, informed by the water challenges identified by stakeholders and the site's water challenges.
- List of ongoing water stewardship initiatives to address shared water challenges.
- List of water-related opportunities, including how the site may participate in them, and an assessment and prioritization of potential savings and business opportunities.

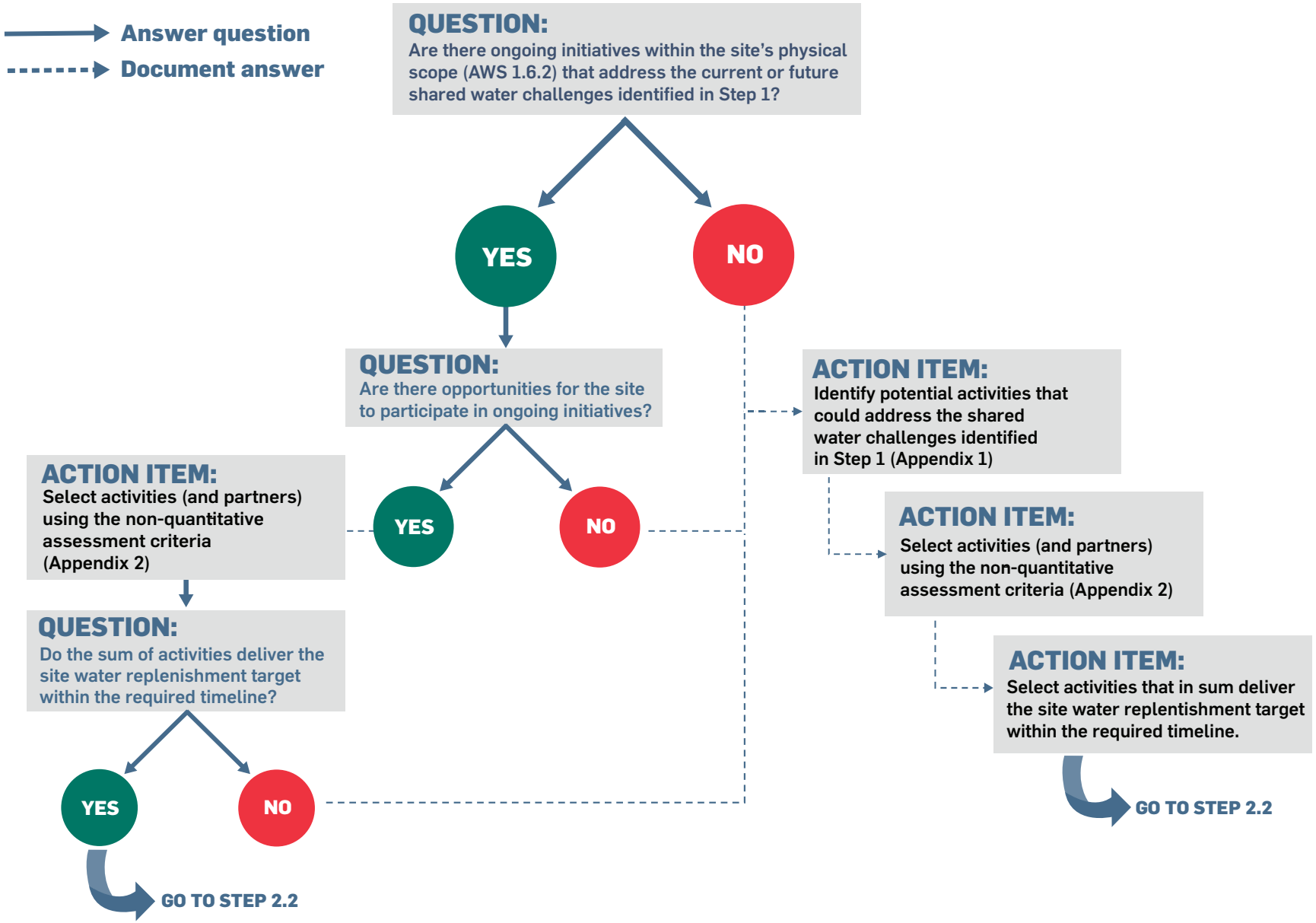
STEP 2: Define Water Stewardship Project Activities and Partners

For each site:

STEP 2.1 SELECT PROJECT ACTIVITIES AND PARTNERS BASED ON VWBA ACTIVITY GUIDELINES

Prerequisites for Step 2.1 include an understanding of the elements of effective water stewardship activities (i.e., VWBA activity guidelines) (Reig et al. 2019) and a definition of the volume of water required to meet the site's water replenishment target during the current reporting period.

Decision tree to help complete Step 2.1:

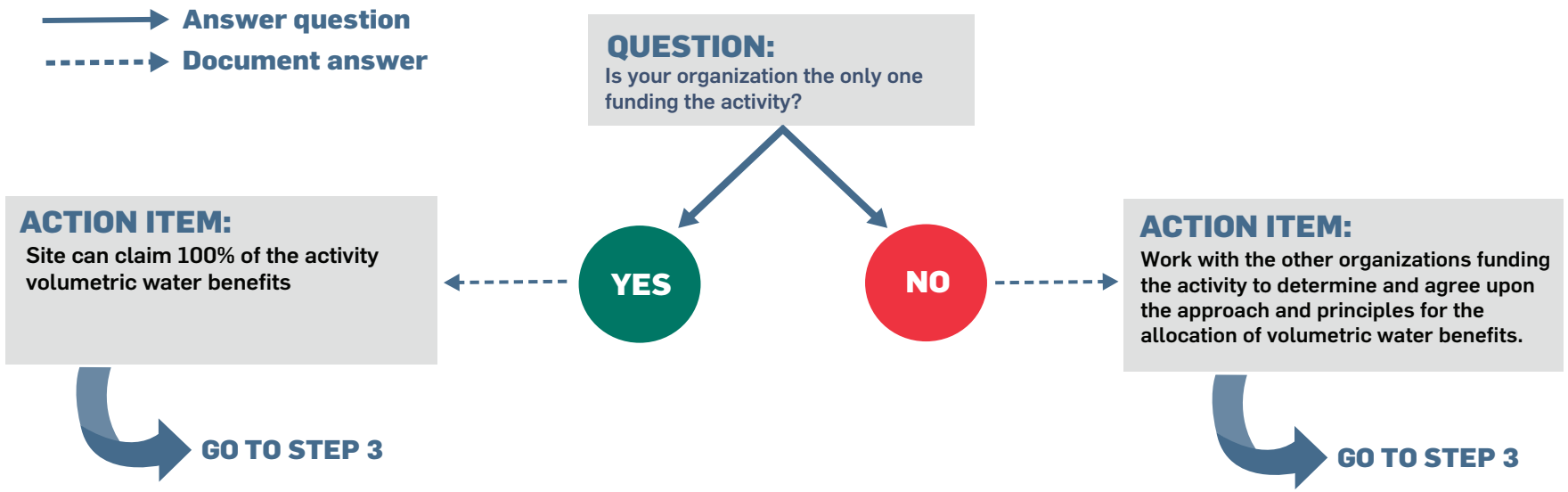


For each water stewardship activity:

STEP 2.2 DETERMINE ALLOCATION OF VOLUMETRIC WATER BENEFITS

Prerequisites for Step 2.2 include submit the list of proposed water stewardship activities (and partners) to the relevant internal water stewardship champions and other parties as appropriate for review and approval.

Decision tree to help complete Step 2.2:



The approach to, and principles for, allocation should be determined and agreed upon with all activity partners before implementing the activity. For example, if the total benefits are allocated to three different companies on the basis of cost contribution, there should be agreement on what is included in the total cost used for the cost-sharing calculation (e.g., planning, design, maintenance, monitoring, reporting). For some very large projects (e.g., water funds, projects that are expanding over time, or projects with many funders), it may be difficult to determine total costs. In these cases, it may be possible to work with the activity partners to define a portion of the project that can be 100 percent funded, eliminating the need to determine a total project cost for the entire large project.

Required outputs of Step 2 include:

- List of approved water stewardship activities (and partners) that can be implemented to meet the site's water replenishment target within the required timeline.
- Agreed-upon approach and principles for the allocation of VWBs for each water stewardship activity.

STEP 3: Gather Data and Calculate Volumetric Water Benefits

For each site:

Prerequisites for Step 3 include:

- Cost/benefit analysis
- Implementation road map
- Review and approval

Cost/benefit analysis. Develop estimated costs to achieve the site's water replenishment target (Appendix 3) and secure funding, considering the site's ongoing water stewardship activities already underway. The total cost of an activity can be determined based on the activity's capital expenditures (CAPEX) plus the activity's operating expenditures (OPEX) for at least the first 10 years of the activity lifetime. The activity's CAPEX refers to the capital expenditures required to implement the water stewardship activity in the first place; the activity OPEX refers to the day-to-day costs that are necessary to maintain the activity over time.

$$\text{Total Cost} = \text{CAPEX} + \text{OPEX (years 1 to 10)}$$

Time and materials provided to a water stewardship activity can be quantified monetarily and included as part of the CAPEX or OPEX when relevant; and sites that are interested in developing the cost-benefit analysis for water governance or other catalytic activities are encouraged to do so in collaboration with the relevant internal water stewardship champions.

Implementation road map. Develop an implementation road map for achieving the site's water replenishment target (Appendix 4), considering the site's ongoing water stewardship activities already underway.

Review and approval. Submit the cost/benefit analysis and implementation road map to the relevant internal water stewardship champions and other parties for review and approval.

For each water stewardship activity, apply the available guidance on VWBA (Steps 3.1 to 3.4):

Step 3.1 Document baseline

Baseline conditions can be estimated using existing empirical information available in the public domain (from government agencies, regulators, or other thirdparty estimates), as well as local knowledge.

Step 3.2 Select VWBs indicator and complementary indicators

Note that each shared water challenge may be caused by a variety of underlying drivers. Special attention is required to select the right type of activity and indicator to address the driver of the shared water challenge. To that end, Appendix 1 includes a table to help identify the right type of activity and indicator for the underlying driver of each shared water challenge.

Step 3.3 Gather required data and calculate VWBs and complementary indicators

Step 3.4 Allocate VWBs and complementary indicators

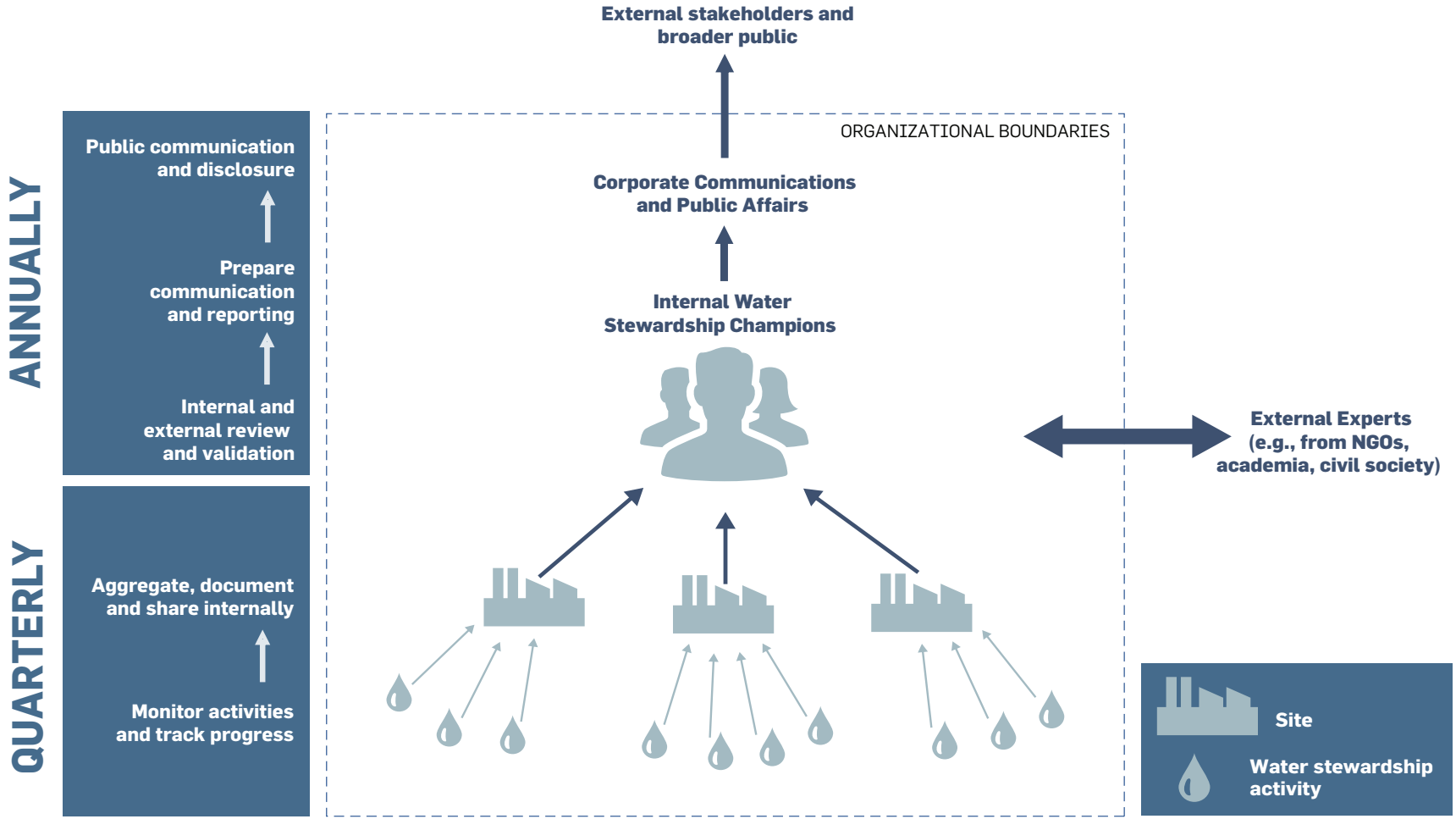
When required, allocate volumetric water benefits, based on the total volumetric water benefit achieved for a given time and the approach to allocation agreed upon with all activity partners in advance of implementing the project, as outlined in Step 2.2.

Review, Approve, and Communicate Volumetric Water Benefits

The following graphic provides a sample internal governance structure and recommended frequency for:

- **Sites** to monitor and track progress, aggregate and share activity results internally;
- **Internal water stewardship champions** to review and approve activity selection and results; and
- **Corporate communications and public affairs** to prepare claims for public communication and disclosure.

This figure is for illustrative purposes only. Modifications will be needed to meet an organization's specific needs and requirements.



Roles and responsibilities

The following table includes generic roles and responsibilities for illustrative purposes only and should not be adopted without prior modifications to meet an organization's specific needs and requirements.

Roles	Responsibility	Frequency
Sites	Submit list of water stewardship activities, cost/benefit analysis, and implementation road map to the internal water stewardship champions for review and approval before implementing activities.	Ongoing basis
	Implement and monitor progress of activities toward meeting the water replenishment target.	Ongoing basis
	Aggregate results of activities and share with internal water stewardship champions.	Quarterly
Internal water stewardship champions	Provide technical support and guidance to sites.	Ongoing basis
	Review, validate, and confirm list of water stewardship activities, cost/benefit analysis, and implementation road map prior to starting activities.	Ongoing basis
	Review, validate, and confirm water replenishment claims prior to public communication and disclosure.	Annual
External experts	Provide technical input and feedback to the internal water stewardship champions.	Ongoing basis
	Review, validate, and confirm list of water stewardship activities before implementing activities.	Ongoing basis
	Review and validate water replenishment claims before public communication and disclosure.	Annual
Corporate communications and public affairs	Work with the internal water stewardship champions to prepare and launch the public communication and disclosure of water replenishment claims and progress toward the water replenishment target.	Annual

APPENDIX 1: Shared Water Challenges, Drivers, Activities, and VWB Indicators

Some shared water challenges may be driven by more than one underlying driver. Special attention is required to select the right type of activity and indicator to address the specific driver causing the shared water challenge or challenges in the site's physical scope. The following table can help sites identify activities and indicators that address shared water challenges and underlying drivers.

SDG	SDG 6.1	SDG 6.3			SDG 6.4			SDG 6.5	SDG 6.6	SDG 11.5 and 13.1
Shared Water Challenge	**Water Access**	**Water Quality**			**Water Quantity**			**Water Governance**	**Important Water-related Ecosystems**	**Extreme Weather Events**
Drivers	**Access to drinking water**	**Turbidity**	**Nutrient pollution**	**Industrial pollution**	**Surface water availability**	**Groundwater availability**	**Increased demand**	**Multiple**	**Multiple**	**Multiple**
Example Activities	Access to drinking water.	Agricultural BMP's; Constructed wetland treatment systems; Land conservation; Land cover restoration; Regenerative agriculture*; Storm water management.	Agricultural BMPs; Constructed wetland treatment systems; Land conservation; Land cover restoration; Regenerative agriculture*; Storm water management; Wastewater treatment plants.	Constructed wetland treatment systems; Wastewater treatment plants.	Desalination*; Leak repair; Legal transactions to keep water in-stream; Water demand reduction; Water efficiency; Water reuse; Wastewater treated and provided for beneficial use.	Desalination*; Leak repair; Groundwater efficiency; Groundwater recharge*; Groundwater reuse; Groundwater demand reduction; Legal transactions to keep water in aquifer; Rainwater harvesting; Wetland protection; Wetland restoration and creation; Wastewater treated and provided for beneficial use.	Desalination*; Leak repair; New water supply; Water demand reduction; Water efficiency; Water reuse; Wastewater treated and provided for beneficial use.	Sites interested in supporting water governance or other catalytic activities are encouraged to do so by first engaging the internal water stewardship champions to discuss if VWB quantification is required, and if so, what is the most adequate approach for quantification, tracking, and reporting of VWBs.	Example activities and recommended VWB indicators related to important water-related ecosystems are considered under water quantity and quality shared water challenges because they ultimately contribute to improving water quantity and/or quality.	Sites interested in reducing the threats form extreme weather events can do so by selecting activities under water quantity and quality shared water challenges that also contribute to reducing the impacts of extreme weather events.
Recommended VWB Indicators	Volume Provided.	Reduced runoff; Avoided runoff; Volume captured; Volume treated.	Reduced runoff; Avoided runoff; Volume captured; Volume treated.	Volume treated.	Reduced withdrawal; Reduced consumption; Volume provided (from treatment or desalination).	Increased recharge; Maintained recharge; Reduced withdrawal; Reduced consumption; Volume provided (from treatment or desalination).	Reduced withdrawal; Reduced consumption; Volume provided (from treatment or desalination).			

* Activities not referenced in VWBA

APPENDIX 2. Nonquantatative Assessment Criteria to Help Select Activities

For each potential water stewardship activity, assess the opportunity using the following nonquantitative opportunity assessment criteria:

		POOR (does not meet expectations) (Score = 1)	GOOD (meets expectations) (Score = 2)	EXCELLENT (reflects leadership) (Score = 3)
Collaborative	**Activity is achievable with partners**	Limited or uncertain partner readiness and capacity	Partners exist with proven track records and capacity to deliver	Known partners confirmed with proven track records and capacity to deliver
Credible	**Activity is aligned with site and stakeholder priorities**	Delivers little more than compliance and has negative political and stakeholder views	Addresses site water priorities and reflects stakeholder priorities	Addresses site water priorities and has strong political and stakeholder support
Feasible—financially	**Activity costs and VWBs are understood, and financing is available**	Uncertain cost, VWBs, and funding sources	Cost and VWBs are understood and financing options are available	Cost and VWBs are well documented and financing is secured
Feasible—technically	**Activity is technically achievable by target year**	Activity road map delivers uncertain VWB's by target year	Activity road map can deliver VWB's by target year	High confidence that the activity road map delivers VWBs by target year
Meaningful	**Activity goes beyond compliance and addresses shared water challenges**	Required for compliance /or does not respond to priority shared water challenges	Goes beyond compliance, responds to priority shared water challenges	Goes beyond compliance, responds to priority shared water challenge, and delivers environmental and social co-benefits
Measurable	**Activity supports monitoring and reporting**	Unable to measure progress	Monitoring and reporting are possible with secondary data	Monitoring and reporting are possible with primary data
Sustainable	**Activity contributes self-sustaining long-term benefits**	Delivers short-term VWB's that rely on Nestlé Water's involvement	Delivers long-term VWB's that will need to be maintained	Delivers self-sustaining long-term VWBs
VWBA alignment	**Activity is aligned with VWBA's Elements of Effective Water Stewardship Activities**	Activity does not meet VWBA's Elements of Effective Water Stewardship Activities	Activity meets all VWBA's Elements of Effective Water Stewardship Activities	Activity exceeds VWBA's Elements of Effective Water Stewardship Activities

Here is a sample table to help rank potential water stewardship activity with the nonquantitative opportunity assessment criteria. It is recommended that sites pursue only opportunities with a rank of 2 or higher across all nonquantitative opportunity assessment criteria.

Rank each opportunity from 1 to 3 using the criteria on the previous page

1 = Poor 2 = Good 3 = Excellent

	Opportunity A	Opportunity B	Opportunity C	Opportunity D	Opportunity E
Collaborative	2	1	2	1	1
Credible	3	2	3	2	1
Feasible—financially	2	2	2	2	1
Feasible—technically	3	2	3	1	1
Meaningful	3	3	2	1	1
Measurable	3	1	3	1	1
Sustainable	2	3	2	3	3
VWBA alignment	3	2	2	2	3

APPENDIX 3. Cost Per Volumetric Water Benefit Analysis

Here is a sample table to help estimate the cost to achieve a site's water replenishment target.

Site Name	
Site Water Replenishment Target (ML/year)	
Shared water challenge/s in the site's physical scope:	
Underlying driver of the shared water challenge/s:	

Proposed Activity	VWB Indicator	Total VWB (ML/year)	Attribution (% of total)	Attributed VWB (ML/year)	CAPEX (USD)	Annual OPEX (USD/year)	10-Year OPEX (i.e. Annual OPEX x 10) (USD)	Total Cost (i.e. CAPEX + 10-Year OPEX) (USD)	Cost/VWB (total cost/attributed VWB) (USD/ML)
Total for site									

APPENDIX 4. Implementation Road Map

Below is an illustration showing how progress may be made on a site to meet a water replenishment target. Costs are excluded but can easily be added, per years and total accumulated investment, using the guidance provided in Appendix 3. A total of four activities is shown for illustrative purposes, but either more or fewer activities should be needed so that in sum they provide a sufficient volume of water to meet the water replenishment target.

Site Water Replenishment Target (ML/year) = 600 ML/year

	Estimated Attributed VWB (ML/year)				
	2021	2022	2023	2024	2025
Activity A	100	150	150	150	150
Activity B		50	50	50	50
Activity C		100	150	200	250
Activity D				150	150
Total VWB (ML/year)	**100**	**300**	**350**	**550**	**600**

FREQUENTLY ASKED QUESTIONS

Q: Does this guide include methods for quantifying the volumetric water benefits of activities that improve water quality?

A: Yes, this guide includes methods for quantifying the volumetric water benefits of activities that address shared water challenges related to water quality, specifically, water quality challenges related to turbidity, excess nutrients, and/or industrial pollution.

Q: Can treated wastewater be claimed as a volumetric water benefit?

A: Yes, treated wastewater can be claimed as a volumetric water benefit when the volume treated is provided for beneficial use in the catchment and addresses specific water quantity challenges (e.g., surface or groundwater availability or increased demand); or when the volume treated addresses a specific water quality challenges in the catchment, for example, when there is no regulatory requirement, or the regulatory requirement in place doesn't address the local water quality challenges.

Q: Does this guidance include methods to calculate the volumetric water benefits of nature-based solutions?

A: Yes, examples of nature-based solution activities and recommended volumetric water benefit indicators are included under the water quantity and quality shared water challenges in the table in Appendix 1, because they ultimately contribute to improving water quantity, quality, or both. Example nature-based solution activities include wetland protection, wetland restoration and creation, constructed wetland treatment systems, land conservation, and land cover restoration. However, for now, only shared water quality challenge-related activities can be claimed with the curve number methodology.

Q: Can volumetric water benefits be claimed from water governance or catalytic activities?

A: Yes, volumetric water benefits resulting from water governance or catalytic activities can be estimated using the same volumetric water benefit indicators required to measure the volumetric water benefits of the water stewardship activities that the water governance and catalytic activities ultimately deliver.

Q: Can water access projects provide volumetric water benefits?

A: Yes, water access projects can provide volumetric water benefits when the water source is sustainable, the increasing demand is not causing negative impacts on the local hydrology, the beneficiaries have access to sanitation service and are trained in hygiene, and the volume of water claimed is being used as the main drinking water source of the beneficiaries.

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Reig, P., W. Larson, S. Vionnet, and J.B. Bayart. 2019. “Volumetric Water Benefit Accounting (VWBA): A Method for Implementing and Valuing Water Stewardship Activities.” Working Paper. Washington, DC: World Resources Institute. Available online athttps://www.wri.org/publication/volumetric-water-benefit-accounting

AWS (Alliance for Water Stewardship). 2019. “International Water Stewardship Standard. Version 2.0.” Available online at https://a4ws.org/the-aws-standard-2-0/

The CEO Water Mandate's six core elements:

Direct Operations

Mandate endorsers measure and reduce their water use and wastewater discharge and develop strategies for eliminating their impacts on communities and ecosystems.

Supply Chain and Watershed Management

Mandate endorsers seek avenues through which to encourage improved water management among their suppliers and public water managers alike.

Collective Action

Mandate endorsers look to participate in collective efforts with civil society, intergovernmental organizations, affected communities, and other businesses to advance water sustainability.

Public Policy

Mandate endorsers seek ways to facilitate the development and implementation of sustainable, equitable, and coherent water policy and regulatory frameworks.

Community Engagement

Mandate endorsers seek ways to improve community water efficiency, protect watersheds, and increase access to water services as a way of promoting sustainable water management and reducing risks.

Transparency

Mandate endorsers are committed to transparency and disclosure in order to hold themselves accountable and meet the expectations of their stakeholders.

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